

Chehalis Generation Facility 1813 Bishop Road Chehalis, Washington 98532

July 6, 2016

Mr. John Rapp Voluntary Cleanup Program Site Manager Washington Department of Ecology Southwest Regional Office P.O. Box 47775 Olympia, WA, 98504-7775

RE: PacifiCorp Rocky Mountain Power Chehalis Power Plant Voluntary Cleanup Program VCP # SW 1246 Cleanup Action Report

PacifiCorp Rocky Mountain Power Chehalis Power Plant (Chehalis Power) submits the following documents for the Washington Department of Ecology (Ecology) Voluntary Cleanup Program (VCP). Included with this document is a VCP Request for Opinion Form and a Cleanup Action Report.

A VCP Application and Cleanup Action Report were submitted previously in August 2012 for an oil spill incident on January 20, 2011. A Generation Step Up Transformer #1 (GSU#1) containing non-PCB mineral oil experienced an explosive failure and subsequent fire which resulted in a release of mineral oil around the transformer and also impacting the stormwater system. Chehalis Power cleaned up the release and remediated the affected area immediately after the incident.

This Cleanup Action Report covers investigation and cleanup activities for the period 2013 to the present. Follow up investigation was initiated in Fall 2013. Then, in November 2013, GSU#3 failed similar to the 2011 incident, resulting in a mineral oil release. Chehalis Power cleaned up the release and remediated the affected area in January 2014.

As we have discussed with you, Chehalis Power has conducted a comprehensive investigation of soil and groundwater contamination. This Cleanup Action Report covers the 2013 oil spill and the subsequent investigation and groundwater monitoring for four quarters over one year, April 2015 to March 2016.

As described in the Cleanup Action Report, Chehalis Power has concluded site remediation is complete and a No Further Action opinion is appropriate. Chehalis Power requests that Ecology proceed to review Cleanup Action Report and provide an opinion to Chehalis Power under the VCP.

The VCP Application and the Cleanup Action Report are provided in both hard copy and Adobe PDF electronic file formats. In addition, the laboratory analysis data (along with other required information) in electronic format is in process in Ecology's Electronic Information Management (EIM) system.

If you have questions or need additional information, please contact Jeremy Smith or myself at 360-748-1300; or you may contact Lenora Westbrook, KTA Associates, Inc. at 360-250-7694.

Sincerely,

Mark A. Miller Plant Manager

Attachments

cc w/electronic copy of attachments:

Bill Teitzel Code Compliance Supervisor Lewis County Public Health and Social Services 2025 NE Kresky Avenue Chehalis, WA 98532-2626

Jim LaSpina Siting Specialist Energy Facility Site Evaluation Council 1300 S. Evergreen Park Dr. SW P.O. Box 43172 Olympia, WA 98504-1372

Lenora Westbrook – KTA Associates, Inc.

### Attachment 1

VCP Request for Opinion Form



### **Voluntary Cleanup Program**

### Washington State Department of Ecology Toxics Cleanup Program

### **REQUEST FOR OPINION FORM**

Use this form to request a written opinion on your planned or completed independent remedial action under the Voluntary Cleanup Program (VCP). Attach to this form the plans or reports documenting the remedial action. Please submit only one form for each request.

### Step 1: IDENTIFY HAZARDOUS WASTE SITE

Please identify below the hazardous waste site for which you are requesting a written opinion under the VCP. This information may be found on the VCP Agreement.

Facility/Site Name: Chehalis Power Plant

Facility/Site Address: 1813 Bishop Road, Chehalis, WA 98532

Facility/Site No: 11776

VCP Project No.: SW1246

### Step 2: REQUEST WRITTEN OPINION ON PLAN OR REPORT

•	
What type of independent remedial action plan or report are you submitting to Ecology under the VCP? Please check all that apply.	for review
Remedial investigation plan	
Remedial investigation report	
Feasibility study report	
Property cleanup* plan (* cleanup of one or more parcels located within the	Site)
Property cleanup* report	
Site cleanup plan	
Site cleanup report	
Other – please specify:	
Do you want Ecology to provide you with a written opinion on the planned or of independent remedial action?	completed
🖂 Yes 📋 No	
Please note that Ecology's opinion will be limited to:	
• Whether the planned or completed remedial action at the site meets the service requirements of the Model Toxics Control Act (MTCA), and/or	ubstantive
Whether further remedial action is necessary at the site under MTCA.	

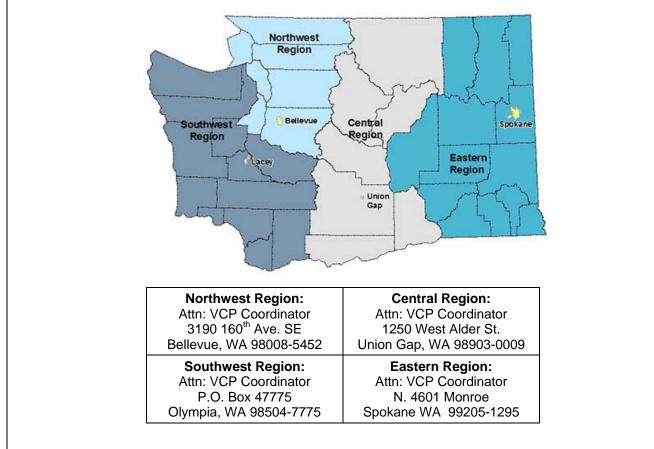
### Step 3: REPRESENTATIONS AND SIGNATURE

The undersigned representative of the Customer hereby certifies that he or she is fully authorized to request services from Ecology under the Agreement for this VCP Project.

Name: Mark A. Miller			Title: Plant Manager		
Signature:			Date:		Date:
Organization: PacifiCorp Rocky Mountain Power Chehalis Power Plant					
Mailing address: 1813 Bish	nop Road				
City: Chehalis	State: WA		Zi	Zip code: 98532	
Phone: 360-748-1300 Fax: 360-740-1891			E-mail: m	nark_a.	miller@pacificorp.com

### Step 4: SUBMITTAL

Please mail your completed form and the independent remedial action plan or report that you are requesting Ecology review to the site manager Ecology assigned to your Site. If a site manager has not yet been assigned, please mail your completed form to the Ecology regional office for the County in which your Site is located.



If you need this publication in an alternate format, please call the Toxics Cleanup Program at 360-407-7170. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

### Attachment 2

**Cleanup Action Report** 

# CLEANUP ACTION REPORT FOR:

## CHEHALIS POWER PLANT

### TRANSFORMERS GSU#1 AND GSU#3 OIL SPILLS



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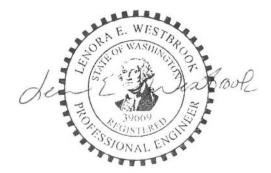
CLEANUP ACTION REPORT FOR:

### **CHEHALIS POWER PLANT**

### TRANSFORMERS GSU#1 AND GSU#3 OIL SPILLS

Prepared for: PacifiCorp Rocky Mountain Power

June 2016



Prepared by: KTA Associates, Inc. 800 Fifth Avenue, Suite 4100 Seattle, WA



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#### **COMMON ACRONYMS**

- ASTM American Society for Testing and Materials below ground surface bgs CERCLA Comprehensive Environmental Response, Compensation and Liability Act CAR **Cleanup Action Report** CCS Cowlitz Clean Sweep DRO **Diesel Range Organics** ESA **Environmental Site Assessment** GSU Generator step up transformer KTA KTA Associates, Inc. MTCA Model Toxics Control Act NWTPH-Dx Northwest Total Petroleum Hydrocarbons-diesel extended range NWTPH-Gx Northwest Total Petroleum Hydrocarbons-gasoline extended range NFA No Further Action NPL National Priority List РСВ **Polychlorinated Biphenyls** RCRA Resource Conservation and Recovery Act RRO **Residual Range Organics** SI Site Investigation USEPA United States Environmental Protection Agency
- VCP Voluntary Cleanup Program

### 1.0 INTRODUCTION

KTA Associates, Inc. (KTA) has prepared this Cleanup Action Report (CAR) for the Chehalis Power Plant transformer oil spills which occurred on January 20, 2011 and November 22, 2013. The Chehalis Power Plant (Power Plant) is owned and operated by PacifiCorp Rocky Mountain Power (PacifiCorp) at 1813 Bishop Road in Chehalis. As established in Section 200 of Chapter 340 of Title 173 of the Washington Administrative Code (WAC 173-340-200), the "Site" is defined by the full lateral and vertical extent of contamination that resulted from the transformer oil spills.

The January 2011 incident from the Generator Step Up (GSU) #1 transformer released non-PCB mineral oil to the ground and to fire suppression water that overflowed the containment structure. The Site was limited to near-surface petroleum-contaminated soil and gravel near the transformer and in the stormwater collection system. The Site was remediated within weeks of the oil spill. PacifiCorp submitted a CAR for the GSU#1 transformer oil spill in August 2012 and entered the Voluntary Cleanup Program (VCP). Washington Department of Ecology VCP program issued a **Further Action Opinion Letter** on November 20, 2012. This letter is included in **Appendix A**.

In the fall of 2013, PacifiCorp and KTA met with VCP staff and planned for further investigation around GSU#1. Installation of monitoring wells, groundwater and soil sampling was conducted at the end of October 2013. In November 2013, a different transformer, GSU#3, failed and released mineral oil and fire suppression water from the containment to the ground and stormwater system. This site was cleaned up and remediated within weeks with removal and replacement of contaminated soil.

The areas impacted by the 2011 and 2013 transformer spills are herein, collectively referred to as the "Site".

In early 2015, a comprehensive plan was developed to confirm that mineral oil contamination from the 2011 and 2013 transformer spills was cleaned up. In April 2015, additional groundwater wells were installed, with soil sampling, and a program of four quarterly groundwater sample events was initiated. At the completion of four quarters of groundwater monitoring, the analysis results showed that the five wells had non-detectable levels of mineral oil during the year of sampling.

This CAR supplements the report submitted in August 2012 and includes the subsequent investigation of soil and groundwater investigation from the GSU#1 spill following the Ecology VCP Further Action letter, and the cleanup and investigation for the GSU#3 transformer oil spill in 2013.

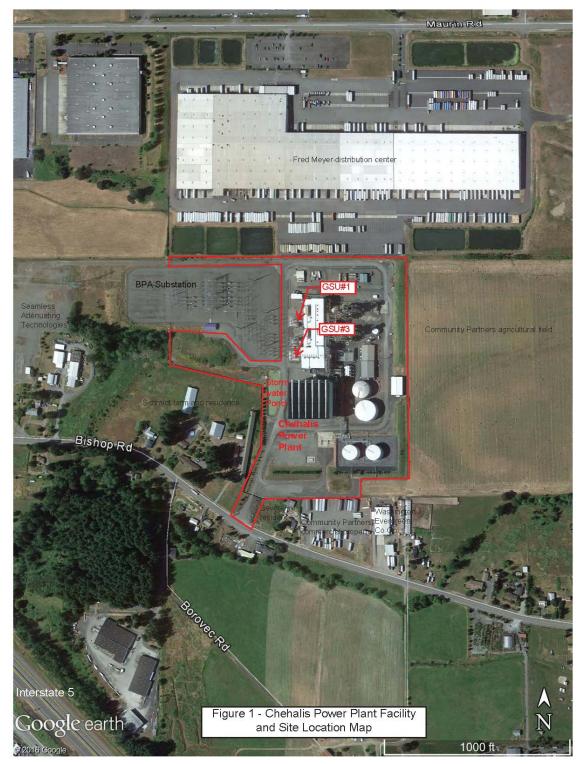
This CAR documents (1) the oil spill incidents, (2) the remediation of the Site, (3) site investigation, and (4) evaluation of the remedial actions.

### 1.1 PURPOSE

The purpose of this CAR is to satisfy the specific requirements of the Washington State Model Toxics Control Act (MTCA), in accordance with WAC 173-340-400 and 173-340-410, to obtain a determination of No Further Action (NFA) from the Washington State Department of Ecology (Ecology) through Ecology's Voluntary Cleanup Program.

### 1.2 SITE LOCATION AND DESCRIPTION

PacifiCorp Rocky Mountain Power owns and operates a natural gas-fired combined cycle power plant, which produces 520-megawatts of electricity (the "power plant"). The Site is located entirely within the property boundaries of the power plant as shown in Figure 1.



### 1.2.1 Site

The power plant is located at 1813 Bishop Road, Chehalis, Lewis County, in the Chehalis River Valley. The power plant completed construction and began operation in 2003. The facility is located on 20 acres of level graded property. The power plant is a large industrial facility including two combustion turbines, electrical transformers, heat recovery steam generators, air emissions control equipment, exhaust gas stacks, air-cooled steam condenser, water treatment equipment, operations and maintenance building. The power plant also includes several tanks primarily used for water. Two 1.7 million gallon fuel oil storage tanks in lined earthen containment are empty and have not been used since the initial startup of the power plant. The tanks were cleaned and closed in 2012.

The generator step up transformers convert the generated electrical power to high voltage for transmission at the BPA substation. The electrical transformers at the power plant use mineral oil as a dielectric fluid. The transformers are certified as Non-PCB, as is standard for transformers manufactured after the 1970s. The mineral oil in GSU#1 was tested after the failure in 2011 to confirm no PCBs were present.

The power plant is staffed 24 hours per day, 7 days per week and operates as needed for electrical generation demand. The facility is fenced and secured with automatic systems.

Stormwater collected from the power plant is directed by stormwater ditches and underground pipes to a retention pond. Stormwater is discharged from the pond to a waterway to nearby drainage under an Ecology Industrial Stormwater General NPDES Permit.

The Site subject to this CAR, includes surface water, soil, and groundwater affected by the two transformer oil spills. The information gathered after the spill indicates that the release did not affect any property outside the power plant. The areas affected by the spill are:

- Soil and gravel surrounding the failed transformers
- Surface water, soil and gravel in stormwater collection ditches
- Groundwater near the failed transformers and
- Stormwater pond surface water and soil/gravel on the pond banks.

### 1.2.2 Adjoining Properties

The property adjoining the Site is the power plant owned by PacifiCorp. The areas affected by the oil spill were confined to the power plant. The properties outside the power plant boundaries are typical of the area.

The Chehalis River Valley is considered a rural area, with approximately 7,000 residents living in and around the town. The power plant is located 3 miles south of town and consists mostly of farms, small pockets of light industrial areas, rural homes and a few housing subdivisions. The power plant and commercial businesses in the area are located in the Chehalis Industrial Park developed by the Port of Chehalis. There are several roadways near the power plant, the closest being Bishop Road. Interstate 5 is 0.25 miles southwest of the power plant and Jackson Highway is 0.5 miles northeast of the plant.

The electrical substation property adjoining the power plant on the west side is owned by Bonneville Power Administration (BPA) and was constructed for Chehalis Power to transport power generated by the power plant to the BPA high voltage electrical transmission line less than one mile west. The fenced substation is surrounded by Chehalis Power property on three sides.

As shown in Figure 1, the other properties adjoining Chehalis Power include:

- East of the power plant is an open agricultural field planted with grass owned by Community Partners.
- Southeast of the power plant on Bishop Road is Washington Evergreen Co Op Inc., a commercial business.
- South of the power plant on Bishop Road is an open commercial property owned by Community Partners.
- South of the power plant, adjacent to the power plant driveway on Bishop Road, is a residence and shop owned by David and Sherry Devore.
- South and east of the power plant is a farm, incorporating a residence, garage, shop, barns and several acres of open pasture, owned by Shirley Schmidt.
- West of the power plant is property owned by Seamless Attenuating Technologies, Inc. with a light industrial power plant and a natural waterway and wetland adjoining the power plant stormwater waterway.
- Directly north of the power plant is a Fred Meyer retail distribution transportation warehouse and paved parking lot.

### 1.3 Site Property Land Use History

Chehalis Power was originally developed by independent power companies who purchased the property in the mid-1990s and began permitting for a power plant. Construction was delayed several years for siting and environmental permitting; construction began in May 2001 and was completed in October 2003. The power plant began operation in July 2003. Tractebel had developed and operated the power plant; later the company became part of SUEZ. PacifiCorp purchased the power plant in 2008. PacifiCorp Rocky Mountain Power operates power plants in several states in the western U.S.

Prior to construction, the power plant property was an agricultural field. The power plant is located on a relatively level open field. It is probable that the Site has been used for agriculture since the land was settled in the second half of the 19<sup>th</sup> century.

### 1.4 SITE FUTURE PROPERTY LAND USE

The power plant is a permanent installation designed for several decades of operation. It is expected that the plant will remain on the property and in operation for the foreseeable future. PacifiCorp plans to continue operating the power plant and does not plan to use the property for other purposes.

### 1.5 GEOLOGIC AND HYDROGEOLOGIC SETTING

### 1.5.1 Regional Hydrogeology

The power plant is located in the Chehalis River Valley, in the northwest-southeast Newaukum River drainage that flows northwest to the Chehalis River. The elevation of the power plant is 245 feet above sea level and rises to 300 feet 0.5-mile northeast at the Jackson Highway. Northeast of the highway, the

elevation rises to foothills. The lowest elevation of the valley in the area is the Newaukum River at 200 feet above sea level, one mile southwest of the power plant. The area around the power plant is a relatively flat bench of level soils used for agriculture. In general, the surface, and likely groundwater flow, is southwest from the foothills in the northeast to the river at the bottom of the drainage valley to the southwest.

A geotechnical subsurface investigation was conducted by URS Corporation (URS) in 2000 for the construction of the power plant. The Geotechnical Data Report was included as Appendix B in the August 2012 CAR.

### 1.5.2 Site Geology

The URS Geotechnical Data Report explains that the surficial geology beneath the power plant consists of late glacial sand and gravel deposits from the Hayden Creek Drift. Silt and clay deposits underlie the surface soils to a depth of 100 - 200 feet in the area.

The overall soil-type distribution at the Site consists of a low permeability silt and clay layer underlain by 45 to 50 feet of water-bearing sand and gravel, underlain by a silt and clay aquitard. These soil types are consistent with regional geologic mapping (Weigle and Foxworthy 1962) and a regional study for the Chehalis Generation Facility (Dames and Moore 1994).

These regional studies classify the upper 50 feet of soil in the area of the site as recent alluvium and glaciofluvial sediments. The aquitard found at approximately 50 feet bgs is widespread and is often described as blue-gray, clayey silt, It is reported to be more than 100 feet thick (Dames and Moore 1994).

### 1.5.3 Site Hydrology

The power plant yard areas are graded level with a layer of gravel in the transformer area. Surface water at the power plant flows to stormwater ditches along the roadway encircling the power plant which collects and directs stormwater to a retention pond. The pond outfall flows west in a gravel waterway (under an Industrial Stormwater permit) to Berwick Creek. Berwick Creek flows from east to west, under Bishop Road and Interstate 5, to Dillenbaugh Creek, which then flows into the Newaukum River.

The groundwater flow direction beneath the power plant travels southwest towards Bishop Road and Berwick Creek. Regional investigations conducted by others (Dames and Moore 1994) have categorized the shallow aquifer in the area as unconfined or semi-confined. However, the shallow aquifer appears to exhibit the characteristics of a confined or semi-confined aquifer, primarily due to the low permeably silt cap immediately above the aquifer.

The field exploration for the URS Geotechnical Data Report was conducted in August 2000. At that time, the groundwater elevation was found to be 15 - 20 feet bgs. During the groundwater investigation in May 2011, the groundwater elevation was found to be 5 - 14 feet bgs. An evaluation of groundwater level and probable flow direction was conducted during April 2015 to March 2016, as explained in Section 3.3.2, the groundwater level varied between 3.5 and 7.4 feet bgs. These levels are likely higher than normal due to the high precipitation during the 2015-6 rainy season and associated seasonal changes.

#### 2.0 TRANSFORMER OIL RELEASE INCIDENTS

### 2.1 2011 TRANSFORMER FAILURE AND OIL RELEASE

Electrical Transformer GSU#1 at the power plant failed at 04:15 am on January 20, 2011, with an explosion and fire. Non-PCB mineral oil in the transformer sprayed onto the transformer containment structure and to the soil outside the containment. The transformer fire suppression system initiated automatically and sprayed water over the transformer. The Fire Department responded and extinguished the fire using water with aqueous fire-fighting foam. The water and foam pooled around the transformer, overflowed the containment, and flowed into adjacent stormwater ditches. The water was contaminated with small amounts



Figure 2 – Transformer Oil Spill Cleanup

of mineral oil. Some oily water reached the stormwater pond. However, PacifiCorp personnel had shutoff the discharge flow from the pond so that no oil contaminated water was discharged from the stormwater pond or from the power plant property.

Cowlitz Clean Sweep (CCS) of Longview, WA was retained for emergency spill response. The contractor arrived the morning of January 20, 2011 as the Fire Department wrapped up their operations. CCS initiated oil spill containment and remained on-site for several weeks for spill cleanup. CCS conducted extensive remediation, followed by sampling of the soil and water from the stormwater ditches, stormwater pond and the area around GSU#1. The contaminated soil and gravel in the ditches and pond were removed by CCS and replaced with clean material. It was necessary to excavate the west side of the transformer containment, in order to pour concrete for a larger foundation and containment structure for the replacement transformer. At this time, the stormwater ditch west of the transformer was replaced with a culvert, and covered by the new concrete containment structure.

A few weeks after the oil spill, the area around GSU#1 (approximately 70 by 80 feet) which was affected by the mineral oil sprayed during the transformer explosion release was remediated by excavating contaminated soil and gravel. Then clean fill was deposited in the excavated area and compacted.

CCS sampled the stormwater ditches, pond banks and around transformer GSU#1 for laboratory analysis to confirm that contaminated soil had been removed. In three locations, the mineral oil level exceeded 4,000 mg/kg. Two of the locations, a ditch and pond bank, further excavation and additional confirmation sampling were necessary and completed. The third location was under the new transformer foundation containment extension and was inaccessible for excavation and re-sampling. This Sample #D8 had a NWTPH-Dx result of 28,100 mg/kg, 20" bgs, sampled in early February 2011. This location had been in the stormwater ditch west of GSU#1.

In early February 2011, PacifiCorp retained KTA Associates Inc. (KTA) of Seattle, Washington, to prepare and coordinate oil spill remediation plans. CCS prepared a Mineral Oil Release Report describing the

response and cleanup activities with detailed information on sampling, lab analysis and waste disposal. The CCS report was included in the PacifiCorp Energy Chehalis Power Plant Transformer GSU#1 Oil Spill Status Report sent to agencies in May 2011. The status report was included in the 2012 CAR as Attachment C.

### 2.2 2013 TRANSFORMER FAILURE AND OIL RELEASE

On November 22, 2013, at 05:20 am, Generation Step Up Transformer #3 (GSU#3) at the power plant experienced an explosive failure and subsequent fire which resulted in a release of non-PCB mineral oil around the transformer and also impacted the stormwater system. The oil spill and cleanup efforts are described in detail in the PacifiCorp Energy Chehalis Power Plant Transformer GSU#3 Oil Spill Cleanup Status Report, February 2014, included in Appendix B of this CAR.

### 2.2.1 Spill Incident

Transformer GSU# 3 failed in a similar manner to GSU#1, resulting in an explosion and fire. The automatic fire suppression



Figure 3 – Stormwater Pond Cleanup after GSU#3 Spill

system controlled the fire, and water filled the concrete transformer containment and overflowed to the surrounding soil and gravel. The stormwater pond discharge valve was closed by Plant Operators immediately after the transformer failure. During this incident, the fire was out before the Fire Department arrived and no fire suppression foam or additional water was required. Water and transformer mineral oil flowed out from the containment across the gravel road to nearby stormwater ditches. Oil reached the stormwater pond, but was not released through the outfall, as the pond level was low due to the dry weather, and stormwater was not being discharged.

### 2.2.2 Spill Response and Cleanup

Cowlitz Clean Sweep (CCS) of Longview, Washington was called for spill response and cleanup and arrived approximately three hours after the incident. Oil absorbent socks and pads had been placed in stormwater ditches and the pond by Plant personnel to contain the spill. CCS initiated response and initial cleanup of the pond and then the transformer containment filled with water and oil.

Oil and water from the transformer containment flowed south and north to the stormwater ditch, east of the turbine building, and west across the road to stormwater ditches. The ditches to the south and west flow into the pond through underground culverts. Due to cold dry weather, the extent of the contamination was simple to observe and contain.

CCS conducted the spill cleanup for four weeks after the incident. Mineral oil and contaminated water were removed from the pond, ditches and transformer containment and stored in tanks on-site. An additional 40,000 gallons of water was treated and disposed to the Plant sanitary sewer under a permit

from the City of Chehalis. Discharge of stormwater from the pond was resumed on December 3, 2013, with Ecology's approval.

After the transformer was replaced, CCS excavated oilcontaminated gravel and soil around the transformer containment, stormwater ditches and pond banks. The soils were removed to a depth below the contamination level or to the compacted clay soil layer approximately 4-5 feet below ground surface. The materials were replaced and the excavated gravel and soils were stored on-site. All the waste oil/water and gravel/soil were removed and CCS completed on-site work on January 9, 2014.

### The CCS Spill Cleanup Report is included in Appendix B, Attachment 3.

### 2.2.3 Soil Cleanup Sampling and Status

After removing the contaminated soil and gravel shortly following the release, CCS conducted confirmation soil sampling of the remaining soil before replacement of the gravel and soil. Forty-five samples were taken throughout the extent of contamination, and the samples were analyzed by Dragon Analytical



Figure 4 – Installation of New GSU#3 with Groundwater Monitoring Culvert

Laboratory in Olympia. The sample locations are shown on the maps in the CCS report in Attachment 3 in Appendix B. Of the 45 samples, only two indicated detectable levels of mineral oil per NWTPH-Dx. The two locations were in stormwater ditches near the pond. The mineral oil concentrations were 128 mg/kg and 76.9 mg/kg. Both values are well under the MTCA A cleanup level for soil of 4,000 kg/mg. The sample analysis results are included in the **CCS Report in Appendix B**, **Attachment 3**.

At the conclusion of the soil excavation during cleanup activities by CCS in January 2014, an oil sheen was observed floating on the perched groundwater layer approximately five feet below ground surface. CCS installed a vertical open slotted culvert on the south side of the transformer containment, near the location where most of the oil/water flowed over the containment wall as shown in Figure 4. The culvert was installed by CCS to a depth just below the bottom of the perched groundwater layer, and some droplets of oil were present on the groundwater surface. Power plant staff inspected the groundwater level declined in the spring until the groundwater until it was no longer detected at five feet depth at the bottom of the culvert. When the groundwater level rose in the fall of 2014, initially a few droplets of oil were observed; but the groundwater surface has been clear of oil since that time.

### 3.0 SITE INVESTIGATION

### 3.1 PREVIOUS SITE INVESTIGATION

Shortly after the GSU#1 oil spill release in January 2011, most contaminated soil and surface water were removed. The extent of groundwater contamination was unknown. Therefore, KTA along with subcontractor, TEC (a respected national environmental consulting firm), conducted a Site investigation to ensure that the extent of contamination remaining on the Site was well understood. A summary of the Site investigation follows.

### 3.1.1 Establishment of Cleanup Standards for the Site

The Site, incorporating areas impacted by the transformer spills, is within the power plant property boundaries. Chehalis Power plans to continue use of the Site and surrounding property for the power plant operations in the foreseeable future. There are no plans to change usage or sell the power plant containing the Site.

Although site-specific cleanup standards can be developed for industrial properties, Chehalis Power and CCS decided to cleanup all contaminated soil and water to Model Toxics Cleanup Act (MTCA) Method A screening levels.

KTA reviewed the appropriate cleanup levels when planning the site investigation and determined that Model Toxics Cleanup Act (MTCA) Method A cleanup levels are appropriate for the Site. Soil and water samples from remediated areas were tested for NWTPH-Dx, as described in Section 2.0. The only hazardous substance detected was mineral oil. Therefore, cleanup levels for mineral oil from MTCA in WAC 173-340-900 are appropriate.

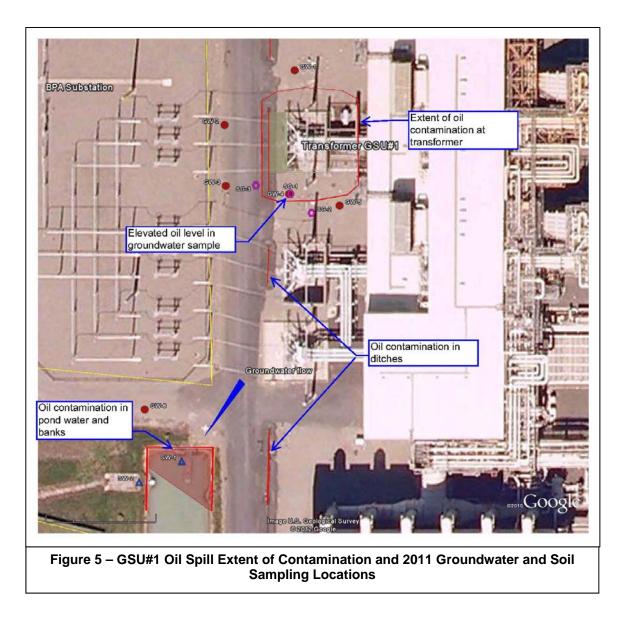
- MTCA A Soil cleanup levels of 4,000 mg/kg for mineral oil in WAC 173-340-900 Table 740-1
- MTCA A Groundwater cleanup levels of 500 µg/l for mineral oil in WAC 173-340-900 Table 740-2.

The point of compliance for the remedial action is at the point of release, the transformer, for soil and groundwater. Therefore, by complying with the cleanup standards at the transformer, there would be no future restrictions for Site use, even though Chehalis Power does not have other uses planned.

### 3.1.2 2011 Investigation Process

The Site Investigation report prepared by TEC was included in Attachment D to the 2012 CAR. Temporary monitoring wells were installed in the shallow water bearing zone within the six boreholes with a track mounted direct-push GeoProbe rig. Four temporary monitoring wells were placed downgradient of the transformer, one up gradient of the transformer, and one directly west from the transformer.

During the boring of the temporary monitoring wells, soil and gravel in the GeoProbe cores were inspected for evidence of oil. A limited oil sheen was detected in only one borehole, GW-4. Subsurface soil samples were collected from the gravel/clay soil interface at three locations (SG-1, SG-2 and SG-3) at or near GW-4 as described in the 2011 investigation report.



The extent of oil contamination from the GSU#1 spill and May 2011 sample locations are shown in Fig. 5.

### 3.1.3 2011 Site Investigation Results

Table 3-1 shows the results and screening levels for the 2011 groundwater samples. Locations near sampling conducted in the subsequent 2013 and 2015 investigations are also identified in Table 3-1. NWTPH-Dx was detected in only one temporary groundwater well, GW-4, at a concentration of 1100 ug/L. This is the temporary well within the transformer explosion spray area and nearest to transformer GSU#1. This concentration exceeds the Model Toxics Control Act (MTCA) Method A cleanup level for mineral oil in groundwater, 500 µg/l. The Concentrations of NWTPH-Dx exceeded the Model Toxics Control Act (MTCA) Method A cleanup level for mineral oil in groundwater, 500 µg/l.

Location Type (proximity to sample locations in later investigations)	Sample ID / Date	Depth To water (feet bgs)	NWTPH-Dx Results (µg/L)	TPH-Dx MTCA A Screening Level (µg/L)
GW Sample	GW-1 05/24/2011	13.56	ND	NA
GW Sample	GW-2 05/24/2011	10.58	ND	NA
GW Sample (near 2013 well MW-3)	GW-3 05/24/2011	13.37	ND	NA
GW Sample (next to 2013 well MW-2)	GW-4 05/24/2011	13.60	1100	500
GW Sample	GW-5 05/24/2011	5.38	ND	NA
GW Sample (near 2015 well MW-5)	GW-6 05/24/2011	13.80	ND	NA

### Table 3-1 Groundwater Sample Results and Screening Levels – May 2011

ND = not detected, NA = not applicable,  $\mu g/l$  = micrograms per liter, Bold = detected value above MTCA screening level

Table 3-2 shows the results and screening levels for the 2011 soil samples. Soil contamination was detected in only one soil sample, SG-1, at a concentration of 160 mg/kg. This is the soil sample nearest to transformer GSU#1 and to GW-4. This concentration does not exceed the Model Toxics Control Act (MTCA) Method A cleanup level for mineral oil in soil, 4,000 mg/kg.

Table 3-2 Soil Sample	Results and Screening	Levels – May 2011
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Location Type (proximity to sample locations in later investigations)	Sample ID / Date	Depth (inches bgs)	NWTPH-Dx Results (mg/kg)	TPH-Dx MTCA A Screening Level (mg/kg)
Soil (near 2013 SG-2)	SG-1 05/25/2011	~18	160	4,000
Soil (near 2013 SG-2)	SG-2 05/25/2011	~26	ND	NA
Soil (near 2013 SG-1)	SG-3 05/25/2011	~20	ND	NA

ND = not detected, NA = not applicable, mg/kg = milligrams per kilogram

#### 3.1.4 2011 Site Investigation Conclusions

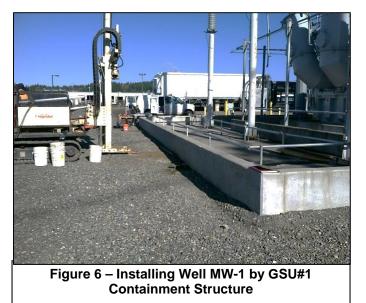
The Site investigation in May 2011 showed no soil, surface water or groundwater samples over MTCA A cleanup level, except one groundwater sample (1100 µg/l). Based on this information, groundwater

contamination impacts appeared to be localized within 50 feet of GSU#1 (and thus within the area sprayed with mineral oil when the transformer failed in January 2011).

One sample, D8, exceeded the MTCA A level of 4,000 mg/kg, at 28,100 mg/kg, as described in Section 2.2.3. This sample was collected by CCS from the ditch west of GSU#1, in February 2011, before the concrete foundation and containment was installed for the new larger replacement transformer. The TEC Site investigation was not able to access the D8 location to obtain a follow-up soil sample under the concrete.

### 3.2 2013 INVESTIGATION

After review of the 2012 CAR and VCP application, Ecology VCP prepared an opinion letter, dated November 20, 2012 on Further Action needed at the Site. The



Ecology VCP **Further Action letter** is included in **Appendix A**. Ecology concluded that most of the soil and groundwater contamination had been cleaned up, but there were two hotspots that would require additional investigation and potential cleanup.

In the fall of 2013, PacifiCorp and KTA followed up with Ecology and proposed further investigation of soil and groundwater near GSU#1 to determine if contamination exceeding MTCA A levels was still present. PacifiCorp, KTA and Ecology VCP staff agreed to investigate soil and groundwater in the two areas and characterize the local groundwater flow to determine if the mineral oil released from GSU#1 had any longer-term impacts to the deeper subsurface soils, vadose zone and/or the local shallow groundwater from areas with previously identified concentrations of mineral oil above regulatory limits.

### 3.2.1 2013 Investigation Process

KTA along with Cardno (formerly TEC) proceeded to construct, develop and sample three new groundwater monitoring wells at the Site. The well construction and associated well development took place on October 28 and 29, 2013. The groundwater sampling took place on November 1, 2013. The wells, sampling and analytical results are described in Cardno's report, **PacifiCorp Groundwater Investigation**, included in **Appendix C**.

Groundwater monitoring wells were installed in the shallow water bearing zone at two of the three locations. Monitoring well (MW-1) was positioned adjacent to the 2011 soil sample D8 which was collected under the transformer containment structure, as shown in Figure 6. Monitoring well (MW-2) was positioned near a previous groundwater sample location (GW-4). Monitoring well (MW-3) was positioned downgradient from the transformer in a location outside the spill containment area to triangulate groundwater level and flow direction.

Wells were installed at two locations (MW-1 and MW-3) using a track mounted direct-push GeoProbe rig. Monitoring wells were installed in accordance with Washington Administrative Code (WAC 173-160 and -

162), and developed using U.S. Environmental Protection Agency guidelines (US EPA, 1992). Details on the well installation, including boring log details are provided in the Cardno **PacifiCorp Groundwater Investigation** report in **Appendix C.** Only two of the groundwater monitoring wells were installed. This was due to encountering utilities during the construction of MW-2. After reaching the targeted depth of 30-feet below grade surface at soil boring #2 (SB-2), and collecting a soil sample, the GeoProbe sampling rods and core unit were removed from the boring. A small piece of HDPE plastic material, similar to material used for fire water supply pipe coating was found—excavation determined the well location was adjacent to a fire water supply line. However, prior to excavation, water was present in the borehole, and a groundwater grab sample was collected directly from the casing rods via the same methodology as the other site wells.

Samples of subsurface soil were collected during GeoProbe drilling activities at MW-1, SB-2 and MW-3. Material was collected continuously in five foot intervals. Each core sample was inspected visually for evidence of oil sheen, including wetting dry soil/gravel with clean water. Stainless steel spoons were used to collect material from the core samples at desired depths. Soil sample material was placed into stainless steel bowls and thoroughly homogenized prior to being placed directly into pre-labeled analytical jars. Soil and groundwater samples were analyzed by ARI Laboratories in Tukwila.

The 2013 investigation well construction information, groundwater sampling results and soil sampling are presented in Table 3-3 and Table 3-4.

### 3.2.2 2013 Site Investigation Conclusions

NWTPH-Dx was detected at location MW-2 at a concentration of 380  $\mu$ g/L, which is below the MTCA Method A cleanup level of 500  $\mu$ g/L for groundwater. As previously described, the NWTPH-Dx concentration in GW-4 in 2011 in the same location was 1100  $\mu$ g/L. This reduction suggests that natural processes are present resulting in a significant reduction of contamination over the 2.5-year period between sampling events.

None of the soil samples collected as part of the 2013 well installations had detectable levels of NWTPH-Dx. Monitoring well MW-1 was located as close as practical to 2011 soil sample D8 which had higher mineral oil levels. Sample SB-1 was collected from the borings of well MW-1, which is located four feet west of the 2011 soil sample D8, collected by CCS from the stormwater ditch before installation of the new transformer foundation and concrete containment extension. Therefore, no mineral oil was detected in the soil four feet from the location of sample D8.

### 3.3 2015 INVESTIGATION

The November 22, 2013 GSU#3 transformer failure and oil spill occurred shortly after the initial phase of the Cardno investigation was completed in 2013. Further sampling plans for the two wells MW-1 and MW-3 were suspended so a comprehensive investigation program could be developed for the 2011 GSU#1 and 2013 GSU#3 transformer oil spills. As described previously in Section 2.2, CCS conducted extensive sampling of the contaminated area in January 2014 to confirm that all soil contamination was cleaned up.

In February 2015, PacifiCorp and KTA met with Ecology VCP staff to review plans for installing new groundwater wells to supplement the existing wells around GSU#1. It was proposed to install three new

wells, near GSU#3 and downgradient for groundwater for both spill locations. The primary objective of the investigation was to determine if any residual impacts from mineral oil exposure exists in the subsurface soil and shallow groundwater in concentrations above Ecology's Model Toxics Control Act (MTCA) regulatory limits. In addition, the wells were located to provide characterization of the groundwater levels and flow direction.

The extent of mineral oil contamination and locations of the wells for the 2013 and 2015 investigations are shown in Figure 7.

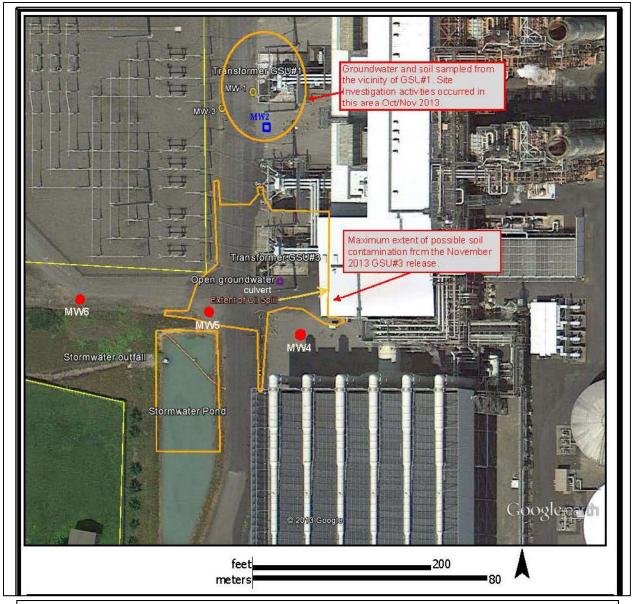


Figure 7 – GSU#3 Oil Spill Extent of Contamination and 2013-2015 Groundwater and Soil Sampling Locations

### 3.3.1 2015 Investigation Process

KTA along with their subcontractors Cardno and Clear Water Services conducted a groundwater investigation that included an assessment of potential impacts to subsurface soil and shallow groundwater within certain Site areas previously exposed to mineral oil releases in 2011 and 2013 at the power plant.

This project was divided into two main phases. The first phase includes monitoring well installation, in conjunction with various support tasks, as shown in Figure 8. The outcome of soil boring, subsurface soil sampling, monitoring well installation activities and associated environmental sampling



Figure 8 – Installing Well MW-5 by Pond

results are included within the **Monitoring Well Installation and Support Tasks Report** included in **Appendix D**. All field efforts for this first project phase were conducted between March 2015 and April, 2015.

The second phase of the project involves groundwater monitoring, which was conducted on a predetermined, scheduled basis (e.g. quarterly; April, June-Sept, December 2015 and March 2016). The groundwater monitoring process and results are described in the Cardno and Clear Water Services **Groundwater Monitoring Reports** in **Appendices E, F G, and H.** 

### 3.3.2 2015 Groundwater Elevation Measurements

A (relative) elevation survey of the monitoring well casings was conducted on April 15, 2016 to aid in the determination of groundwater flow direction.

Prior to sample collection, each monitoring well was opened allowed to equilibrate to the current ambient air pressure. An electronic interface probe was used to check for the presence/thickness of any accumulated free-phase hydrocarbon product and to measure the distance from the top edge of the PVC well casing to the surface of the water table (static water level) within each monitoring well. No hydrocarbon product was detected (to a minimum thickness of 0.01') at any of the wells.

The southwest corner of the GSU#1 transformer concrete containment wall was assigned an elevation of 100.00 feet above mean-sea level (amsl). A level survey was conducted to accurately determine the elevation of each monitoring well casing, using the assigned elevation of the GSU#1 containment wall corner as a benchmark. Water level measurements were subtracted from their well casing elevations to calculate (relative) elevation of the groundwater table beneath each well location. Site groundwater elevations were highest at MW-1 and lowest at MW-6. The initial well level results are included in the **Monitoring Well Installation and Support Tasks Report** included in **Appendix D**. The summary of the groundwater levels and flow direction assessment for all of the quarterly sampling events, results are described in Section 3.4.3

### 3.3.3 2015 Electrical Vault In-Flow Water Sampling

It was noted during a site visit in March, 2015 that the electrical utility vaults in the areas adjacent to GSU#1 and GSU#3, and areas in between, were at least partially filled with inflowing stormwater infiltration and groundwater that filled the utility trenches leading to these vaults. Water was seen freely flowing into several of these vaults as they were opened during the utility locating event.

The system of electrical vaults are equipped with submersible pumps to remove the in-flow water. Several of the vaults are connected to other vaults. In turn, pumps at certain vaults are connected to piping that discharges to the main stormwater drainage ditches running along the western boundary of the GSUs. Plant operators check the ditches and stormwater pond daily, and have not observed oil discharged into the ditches with the vault water. However, pumping out the in-flow water from the vaults is a potential mechanism for removal of any residual groundwater oil contamination since the oil spill cleanup.

The water inflow to the electrical vaults may have been impacted by the mineral oil releases from GSU#3 and GSU#1. Discussion about this water inflow was conducted between the representatives of PacifiCorp, KTA and Cardno, resulting in a decision to collect and analyze water samples from select vaults. Four electrical vault in-flow water samples were submitted to the laboratory for Mineral Oil analysis via NWTPH-Dx. Results were reported as Diesel Range Organics (DRO), Mineral Oil and Motor Oil (residual range organics or RRO). Low levels of diesel range and mineral oil were measured in the accumulated in-flow water of two vaults. The sampling conducted on April 8, 2015, and analysis results are described in Sections 3.4 and 4.3 of the Monitoring Well Installation and Support Tasks Report included in Appendix D.

### 3.4 2013 AND 2015 INVESTIGATION RESULTS

### 3.4.1 Subsurface Soil Sample Results

For assessment of subsurface soil samples, project analytical data are compared to values listed for MTCA Method A Cleanup Levels for Unrestricted Land Uses (WAC 173-340-740). Under this method mineral oil concentrations of 4,000 mg/Kg or less are acceptable (see parameter table listed under WAC 173-340-900).

Three subsurface and one duplicate (duplicate of SB-4) soil samples were submitted to ARI Laboratory in Tukwila, WA, for Mineral Oil analysis via NWTPH-Dx. Results are reported as Diesel Range Organics (DRO), Mineral Oil and Motor Oil (residual range organics or RRO). DRO quantitation was noted on chromatograph peaks in the range from Cl2 to C24. Mineral Oil quantitation was noted on chromatograph peaks in the range from Cl6 to C28. RRO quantitation was noted on chromatograph peaks in the DRO/RRO results indicate the total diesel range extended identified in a particular sample. Mineral Oil, therefore, is a subset of the total DRO/RRO concentration.

Mineral Oil was detected in one sample, SB-5. It was detected at a concentration of 6.7 mg/Kg. The sample from SB-5 was collected at a depth of five feet bgs on the north side of the pond, which is within the extent of contamination shown in Figure 7.

The soil sampling results, for both the 2013 and 2015 investigations are presented in Table 3-3.

Sample ID Date	Depth Feet bgs	Parameter	Detection Limit mg/Kg	Reporting Limit mg/Kg	Result Value mg/Kg	TPH-Dx MTCA A Screening Level (mg/kg)
SB-1 10/28/13	5	DRO		32	ND	NA
SB-1 10/28/13	5	RRO		130	ND	NA
SB-2 10/28/13	6	DRO		30	ND	NA
SB-2 10/28/13	6	RRO		120	ND	NA
SB-3 10/29/13	5	DRO		32	ND	NA
SB-3 10/29/13	5	RRO		130	ND	NA
SB-4 04/07/15	5	DRO	1.8	6.8	ND	NA
SB-4 04/07/15	5	Mineral Oil	0	14	ND	NA
SB-4 04/07/15	5	RRO	0	14	ND	NA
SB-5 04/08/15	5	DRO	1.7	6.2	6.7	4,000
SB-5 04/08/15	5	Mineral Oil	0	12	ND	NA
SB-5 04/08/15	5	RRO	0	12	ND	NA
SB-6 04/08/15	5	DRO	1.7	6.3	ND	NA
SB-6 04/08/15	5	Mineral Oil	0	13	ND	NA
SB-6 04/08/15	5	RRO	0	13	13	NA

### Table 3-3 – Soil Sampling Results 2013-2016

ND = Non-detect NA = Not Applicable

#### 3.4.2 Groundwater Sample Results

The 2013 investigation included one set of groundwater samples from three wells, MW-1, MW-2, and MW3. As explained previously, it was not possible to install a well at MW-2, but a groundwater sample was taken from the borehole. The 2013 groundwater sampling results are shown in Table 3-4. NWTPH-

Dx was detected at location MW-2 at a concentration of 380  $\mu$ g/L, which is below the MTCA Method A cleanup level of 500  $\mu$ g/L for groundwater.

For the four quarterly sampling events during the period April 2015 to March, 2016, five groundwater samples, along with one duplicate were submitted to ARI Laboratory for Mineral Oil analysis via NWTPH-Dx. Results are reported as Diesel Range Organics (DRO), Mineral Oil and Residual Range Organics (RRO) / heavy fuel oil / motor oil. DRO quantitation would be noted on chromatograph peaks in the range from C12 to C24. Mineral Oil quantitation would be noted on chromatograph peaks in the range from C16 to C34. RRO quantitation was noted on chromatograph peaks in the range from C24 to C38. Combined, the DRO/RRO results would indicate the total diesel range extended (Dx) identified in a particular sample. Mineral Oil, therefore, is a subset of the total DRO/RRO concentration.

There were no reportable detections of DRO, RRO or Mineral Oil at any of the tested well locations, during the 2015 four quarterly groundwater sampling events.

The groundwater monitoring well sampling results for 2013 and 2015-2016 are presented in Table 3-4.

Sample ID	Parameter	Detection Limit µg/L	Reporting Limit µg/L	11/1/13 Result Value µg/L*	4/15/15 Result Value µg/L	7/9/15 Result Value µg/L	12/16/15 Result Value μg/L	3/22/16 Result Value µg/L
MW-1	DRO	30	100	<270U	<100	<100	<100	<100
MW-1	Mineral Oil	100	200		<200	<200	<200	<200
MW-1	RRO	60	200	< 540U	<200	<200	<200	<200
MW-2**	DRO		270	380 Y				
MW-2**	RRO		540	< 540U				
MW-3	DRO	30	100	<250U	<100	<100	<100	<100
MW-3	Mineral Oil	100	200		<200	<200	<200	<200
MW-3	RRO	60	200	<500U	<200	<200	<200	<200
MW-4	DRO	30	100		<100	<100	<100	<100
MW-4	Mineral Oil	100	200		<200	<200	<200	<200
MW-4	RRO	60	200		<200	<200	<200	<200

Table 3-4 – Groundwater Sampling Results 2013-2016

Sample ID	Parameter	Detection Limit µg/L	Reporting Limit µg/L	11/1/13 Result Value µg/L*	4/15/15 Result Value µg/L	7/9/15 Result Value µg/L	12/16/15 Result Value μg/L	3/22/16 Result Value µg/L
MW-5	DRO	30	100		<100	<100	<100	<100
MW-5	Mineral Oil	100	200		<200	<200	<200	<200
MW-5	RRO	60	200		<200	<200	<200	<200
MW-6	DRO	30	100		<100	<100	<100	<100
MW-6	Mineral Oil	100	200		<200	<200	<200	<200
MW-6	RRO	60	200		<200	<200	<200	<200

\* 2013 analyses conducted at different detection limit and reporting limit than 2015-16 analyses

\*\* Sampled groundwater from boring on 10/29/13, no well installed

Data Qualifiers: U = non-detect; Y = the chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.

#### 3.4.3 Groundwater Levels and Flow Direction Assessment

As described in Section 3.3.2, the groundwater level evaluation was conducted for each of the quarterly sampling events, April 2015 to March 2016.

Table 3-5 lists the well casing elevations, depth to product, static water level measurements and groundwater elevations calculated for each quarterly event.

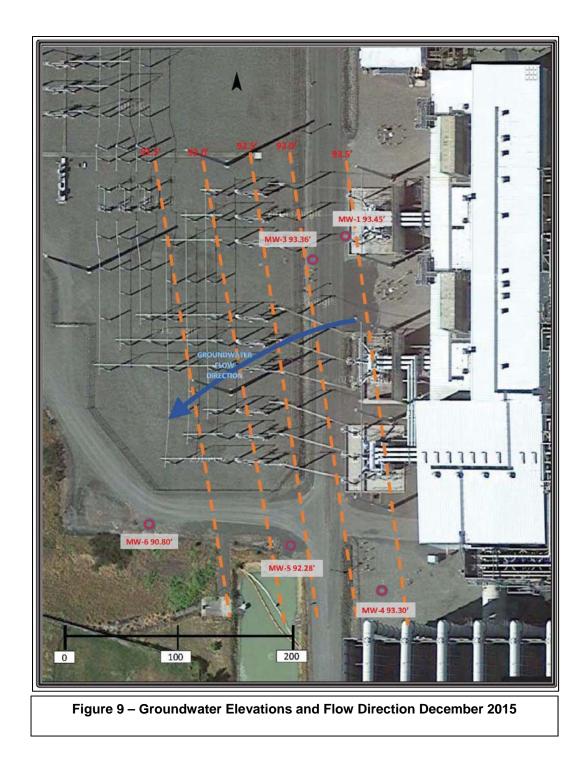
Groundwater elevation contours were constructed and the flow direction was assessed. In each sampling rounds, groundwater was noted to flow from east to southwest. A steepening gradient was noted toward the northern end and more even contour spacing was noted toward the southern end of the site. As seen in each sampling round the groundwater table is deflected southwesterly, flowing towards a small stream basin offsite in the same direction. Figure 9 shows the generalized groundwater flow direction along with the elevation contours for the 3<sup>rd</sup> sample event in December 2015, which reflects the time of year when the GSU#1 and GSU#3 spill occurred.

There are variations between each groundwater flow direction for each quarterly evaluation; flow direction diagrams are included in the Cardno and Clear Water Services **Groundwater Monitoring Reports** in **Appendices E, F G, and H.** 

Event Date		4/15/2015		7/8/2015		12/16/2015		3/22/2016	
Well ID	<sup>1</sup> Relative Survey Elevation (ft amsl)	1st Quarter WL Elev. (ft)	Ground water Elev (ft amsl)	2nd Quarter WL Elev. (ft)	Ground water Elev (ft amsl)	3rd Quarter WL Elev. (ft)	Ground water Elev (ft amsl)	4th Quarter WL Elev. (ft)	Ground water Elev (ft amsl)
SW Corner GSU #1 Contain. Wall	100.00	NA	NA	NA	NA	NA	NA	NA	NA
MW-1	97.76	4.27	93.49	5.22	92.54	4.31	93.45	3.53	94.23
MW-3	97.57	5.03	92.54	5.27	92.30	4.21	93.36	3.98	93.59
MW-4	97.64	4.9	92.74	6.70	90.94	4.34	93.30	3.77	93.87
MW-5	97.08	4.98	92.10	6.70	90.38	4.8	92.28	4.02	93.06
MW-6	96.18	5.07	91.11	7.39	88.79	5.38	90.80	4.3	91.88
Ave		Ave. Chng	92.40	Ave. Chng	90.99	Ave Chng	92.64	Ave Chng	93.33
Median		NA	92.54	-1.406	90.94	1.648	93.30	0.688	93.59
Relative W	L Change bet	ween quart	erlv around	water evalu	ations (ft)				l
MW-1			Base		-0.95		0.91		0.78
MW-3			Base		-0.24		1.06		0.23
MW-4			Base		-1.80		2.36		0.57
MW-5			Base		-1.72		1.90		0.78
MW-6			Base		-2.32		2.01		1.08

Table 3-5 - Water Level Measurements and Groundwater Elevations

<sup>1</sup>Relative survey elevations were measured from the top of the PVC casing at each monitoring well. The survey control point (SW corner of GSU#1 containment wall) was assigned an elevation of 100.00 ft above mean sea level (amsl).



# 4.0 REMEDIAL ACTION EVALUATION

# 4.1 SITE CLEANUP ALTERNATIVES

After the two transformer oil spills occurred and initial response and containment were completed, PacifiCorp directed CCS to remove contaminated soil, surface water and groundwater. The other alternative at the time would have been to wait for a Site investigation to define the extent of contamination before planning the remedial action; however, prompt replacement of the transformer was necessary for power plant operation. After the replacement of each transformer, in February 2011 and January 2014, were completed and the power plant operation restored, PacifiCorp, with CCS and KTA, decided to remediate the remaining mineral oil contaminated soil by excavation vertically and laterally at the Site.

Following the completion of these efforts, based on the sampling results after the bulk of the soil and surface water removal occurred, PacifiCorp decided to conduct more detailed sampling and analysis to determine whether further action was necessary.

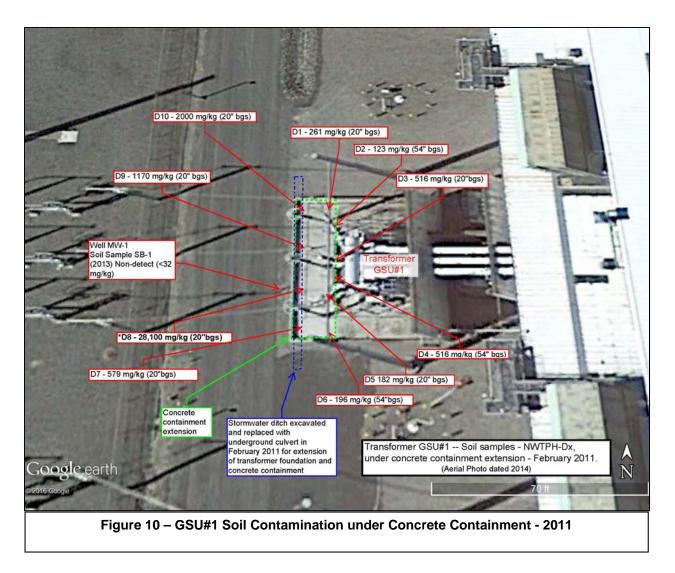
# 4.2 EVALUATION OF COMPLETED REMEDIAL ACTION

For both transformer oil spills, the oil-contaminated surface water in the stormwater ditches and stormwater pond had been removed for disposal. The ditch and pond banks were remediated by removing contaminated soil/gravel and replacing the soil and gravel.

Around Transformer GSU#1 and Transformer GSU#3, oil contamination of the Site was more extensive from the oil sprayed during the transformer explosion. The contaminated soil/gravel was removed and replaced to a point 4-6 inches below evidence of oil contamination. In 2011, oil was removed from the surface of the groundwater and a large volume of groundwater was removed during repair and expansion of the transformer foundation and containment. In 2013-4, the groundwater level was lower than 2011, due to dry cold weather and it appeared that there was minimal groundwater contamination because the groundwater level was below the level of contaminated soil. A vertical slotted culvert was installed to visually monitor groundwater at the location where oil contaminated fire suppression water had flowed over the concrete containment wall. Oil sheen and droplets on the groundwater were observed initially, but dissipated over a few months.

The approach to confirmation sampling for the transformer area, stormwater ditches and pond banks was to sample the soil systematically in contaminated areas. CCS conducted extensive sampling in locations shown in the PacifiCorp Energy Chehalis Power Plant Transformer GSU#1 Oil Spill Status Report, May 2011 in the 2012 CAR, Attachment C, and in the **PacifiCorp Energy Chehalis Power Plant Transformer GSU#3 Oil Spill Cleanup Status Report, February 2014,** included in **Appendix B** of this CAR.

In one location for the 2011 confirmation sampling for the GSU#1 spill, the mineral oil level exceeded 4,000 mg/kg. The hot spot identified in the confirmation sampling in early February 2011 is located beneath the transformer foundation/containment extension installed after sampling. It is therefore inaccessible for further sampling or remediation. Sample D8 showed 28,100 mg/kg mineral oil. The sample location was 20 inches bgs and is now covered by concrete. The hot spot is small and localized; the samples at locations four to five feet away showed NWTPH-Dx levels less than half the MTCA A level of 4,000 mg/kg. The location of the soil samples are shown in Figure 10.



Site investigation in May 2011, conducted both up gradient and down gradient from Transformer GSU#1, showed no soil, surface water, or groundwater samples over MTCA A cleanup levels, except one (GW-4, 1100  $\mu$ g/l) near transformer GSU#1, within the Site area directly affected by the spray of oil during the explosion. Therefore, the groundwater impacts were localized, within 50 feet of the transformer, and the mineral oil level in the groundwater was moderately low.

The follow up investigation in October 2013 included groundwater sampling at the same location of GW-4. The NWTPH-Dx level of the groundwater (MW-2) was determined to be 380  $\mu$ g/l levels, which is below the MTCA A level of 500  $\mu$ g/l. As described previously, a permanent groundwater monitoring well could not be installed at MW-2.

After the GSU#3 oil spill and cleanup, a comprehensive investigation was planned with five groundwater monitoring wells for residual contamination from the GSU#1 and GSU#3 spills. The groundwater monitoring wells were sampled from April 2015 to March 2016--none of the five wells had detectable levels of mineral oil, or DRO and RRO. Groundwater elevations and flow direction data collected over the

one-year period show a general flow direction to the southwest. In conclusion, groundwater at the Site including the two transformer spills is significantly below the MTCA A level of 500  $\mu$ g/l.

There are no direct results from the location of Sample D8 under the concrete on the west side of Transformer GSU#1 after the installation of that concrete pad. The soil boring SB-1 in October 2013, located approximately four feet from D8, showed no evidence of oil contamination, and the soil sample SB-1 was non-detect for NWTPH-Dx. The soil contamination has not impacted groundwater, as the adjacent monitoring well MW-1 showed no oil contamination in groundwater sampling in November 2013 and April 2015 to March 2016.

# 4.3 NEED FOR ADDITIONAL REMEDIAL ACTION

The confirmation sampling by CCS in February 2011 for GSU#1 spill and in January 2014 for the GSU#3 spill have demonstrated that the cleanup and remedial actions for the transformer mineral oil spills were successful. Further site investigation in May 2011, October 2013 and April 2015 to March 2016 have confirmed that the soil and groundwater cleanup has been successful. Groundwater monitoring for four quarters over one year, April 2015 to March 2016, showed all sampling results for five wells had non-detectable readings for oil, significantly below the MTCA A level of 500  $\mu$ g/l for mineral oil. The groundwater flow direction evaluation showed that groundwater flows to the southwest in the area of the Site. Therefore, it is highly unlikely that a plume of mineral oil contamination from the transformer oil spills would not have been detected by monitoring the five wells.

There may be a small quantity of oil contaminated soil directly beneath the transformer GSU#1 concrete containment structure 2011 extension. One soil sample of ten, now beneath the new transformer concrete containment structure, exceeded the MTCA Method A level for soil (D8 – 28,100 mg/kg) in 2011 as shown in Figure 10. The sample was obtained prior to the placement of the containment structure and the sample results were received following the placement of the containment structure. This timing resulted due to an urgent need to replace the transformer so that the plant could resume operation. As stated above, soil directly adjacent to the containment structure was later removed resulting in no exceedances of MTCA Method A levels for soil around the transformer. Based on this finding, and the 2013 soil sample SB-1 and monitoring at well MW-1 adjacent to the D8 location showing no detectable oil in the groundwater, no further remedial action is recommended for any remaining mineral oil contamination beneath containment structure.

Extensive confirmation soil sampling after the transformer oil spills demonstrated that the mineral oil cleanup to MTCA Method A levels was successful. During the period 2011 to 2016, three site investigations of soil and groundwater impacts, including four consecutive quarterly samples, has shown that groundwater near the spill locations and downgradient have non-detectable levels of mineral oil, significantly below exceed MTCA Method A levels. A determination opinion of No Further Action is supported and recommended.

# 4.4 TERRESTRIAL ECOLOGICAL EVALUATION

Under MTCA, a terrestrial ecological evaluation is necessary for releases of hazardous substances. However, the Site may be excluded from further evaluation if the Site meets the criteria in WAC 173-340-7491. The Site qualifies for the exclusion because the soil contamination has been cleaned up. In addition, the power plant is covered with a graded gravel surface over the industrial areas. The applicable exclusion is Barriers to Exposure; WAC 173-340-7491(1)(b), "All contaminated soil, is or will be covered by physical barriers (such as buildings or paved roads) that prevent exposure to plants and wildlife, and institutional controls are used to manage remaining contamination." The Terrestrial Ecological Evaluation Form was completed for the August 2012 CAR and continues to be applicable to this CAR.

# 5.0 CONCLUSIONS

As demonstrated in this Cleanup Action Report, PacifiCorp acted quickly to clean up two transformer oil spills in January 2011 and November 2013, which contaminated an extended area due to fire suppression water used for the transformer explosion and fire overflowing the containment. Soil and surface water were remediated after both spill incidents by CCS with confirmation sampling. Investigations of residual soil and groundwater contamination impacts were conducted in 2011, 2013 and 2015. In March 2016, the fourth quarterly set of samples of five wells showed no detections of mineral oil in the groundwater.

The confirmation sampling and site investigation indicated that no further action was necessary beyond the initial responses taken by CCS. Therefore, PacifiCorp recommends that a No Further Action opinion be granted to the Site through the Voluntary Cleanup Program.

#### 6.0 REFERENCES

Cowlitz Clean Sweep (CCS) 2011. Mineral Oil Split Cleanup Report, Chehalis, Washington.

Cowlitz Clean Sweep (CCS) 2014. Mineral Oil Split Cleanup Report, Chehalis, Washington.

Cardno, 2015. Monitoring Well Installation and Support Tasks Final Report, PacifiCorp Chehalis Plant

- Cardno, 2015. Groundwater Quarterly Monitoring Report; 1<sup>st</sup> Quarterly Event April 2015, PacifiCorp Chehalis, WA Plant.
- Cardno, 2015. Groundwater Quarterly Monitoring Report; 2<sup>nd</sup> Quarterly Event July 2015, PacifiCorp Chehalis, WA Plant.
- TEC, Inc., 2011. Site Investigation Report, PacifiCorp Chehalis Plant, Chehalis, Washington.
- Cardno, 2014. PacifiCorp Groundwater Investigation (Report), PacifiCorp Chehalis Plant
- Clear Water Services, 2016. Groundwater Quarterly Monitoring Report; 3<sup>rd</sup> Quarterly Event December 2015, PacifiCorp Chehalis, WA Plant.
- Clear Water Services, 2016. Groundwater Quarterly Monitoring Report; 4<sup>th</sup> Quarterly Event March 2015, Rocky Mountain Power Chehalis, WA Plant.
- Dames and Moore, Inc. 1994. *Groundwater Resources Investigation for Ecology Groundwater Right Application No. G2-29004.* Prepared for Chehalis Power, Inc. Chehalis, Washington.

PacifiCorp, August 2012, Cleanup Action Report – Chehalis Power Plant – Transformer GSU#1 Oil Spill

URS Corporation, September 2000, *Geotechnical Data Report Subsurface Investigation*, Proposed Chehalis Generation Facility, Lewis County Washington.

Washington State Department of Ecology, 2007. Guidelines for Property Cleanups under the Voluntary Cleanup Program.

Washington State Department of Ecology, 2007. *Model Toxics Control Act—Cleanup.* Chapter 173-340 WAC.

Weigle, J.M. and B.L. Foxworthy 1962. *Geology and Groundwater Resources of Western Central Lewis County, Washington.* Water Supply Bulletin No. 17. State of Washington Department of Conservation, District of Water Resources.

# CLEANUP ACTION REPORT -- JUNE 2016

# APPENDICES

# APPENDIX A

# WASHINGTON DEPARTMENT OF ECOLOGY

# FURTHER ACTION LETTER

NOVEMBER 2012



# STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

November 20, 2012

# RECEIVED

Mr. T. Patrick Sanchez Chehalis Power Plant 1813 Bishop Road Chehalis, WA 98532

NOV 2 9 2012

# CHEHALIS POWER PLANT

#### Re: Further Action at the following Site:

- Site Name: Chehalis Power LP Generation Facility •
- Site Address: 1813 Bishop Road
- Facility/Site No.: 3336951
- Cleanup Site ID No.: 11776
- VCP Project No.: SW1246

Dear Mr. Sanchez:

S S The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup of the Chehalis Power LP Generation Facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

# **Issue Presented and Opinion**

Is further remedial action necessary to clean up contamination at the Site?

# YES. Ecology has determined that further remedial action is necessary to clean up contamination at the Site.

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA"). The analysis is provided below.

# **Description of the Site**

This opinion applies only to the Site described below. The Site is defined by the nature and extent of contamination associated with the following release:

Petroleum hydrocarbons and related constituents into the Soil, Groundwater, and Surface Water.

**Enclosure A** includes a detailed description and diagram of the Site, as currently known to Ecology.

Please note the parcels of real property can be affected by multiple sites. At this time, we have no information that the parcel(s) associated with this Site are affected by other sites.

# **Basis for the Opinion**

This opinion is based on the information contained in the following documents:

- 1. URS Corporation, Geotechnical Data Report-Subsurface Investigation Proposed Chehalis Generation Facility, Lewis County, Washington. September 13, 2000.
- 2. Cowlitz Clean Sweep, Inc., Chehalis Power Pacific Corp. Energy Mineral Oil Release (Initial Spill Cleanup Report), January 20, 2011.
- 3. PacificCorp Energy, Pacific Energy Chehalis Power Plant Transformer GSU#1 Oil Spill Status Report, April 29, 2011.
- 4. TEC Inc., Site Investigation-PacifiCorp Chehalis Plant, July 2011.
- 5. KTA Associates, Inc., Water Disposal Report for Chehalis Power Plant Generator Stepup Transformer No. 1 (GSU #1) Oil Spill, August 2012.
- 6. KTA Associates, Inc., Cleanup Action Report for Chehalis Power Plant Generator Stepup Transformer No.1 (GSU #1) Oil Spill, August 2012.
- 7. PacifiCorp Energy, PacifiCorp Energy Chehalis Power Plant Voluntary Cleanup Program Application, August 10, 2012.
- 8. Email communications with Mr. Patrick Sanchez, the Environmental Analyst of Chehalis Power Plant, with regard to clarifications on cleanup activities. October 23-31, 2012.
- 9. Ecology Industrial Stormwater Discharge Permit (WAR0087807) monitoring data for Chehalis Power Generation Facility, April 2011 to April 2012.

Those documents are kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. You can make an appointment by calling the SWRO resource contact at (360) 407-6365.

This opinion is void if any of the information contained in those documents is materially false or misleading.

# Analysis of the Cleanup

Ecology has concluded that **further remedial action** is necessary to clean up contamination at the Site. That conclusion is based on the following analysis:

### 1. Characterization of the Site.

Ecology has determined your characterization of the Site is sufficient to establish cleanup standards and select a cleanup action. The Site is described above and in **Enclosure A**.

The Chehalis Power LP Generation Facility Site is located at 1813 Bishop Road, Chehalis, Lewis County, in the Chehalis River Valley. The Site is a 20-acre, level grade property occupied by a power generation facility. The facility also includes two 1.7 million gallon fuel oil aboveground storage tanks (ASTs) in a lined earthen containment. A stormwater collection ditch surrounds the facility to collect stormwater from the facility's graveled lot, and conveys the water to a stormwater pond located at the west side of the facility. The ditch is lined with gravel, and some segments are covered, galvanized pipes. The stormwater pond has a permitted outfall under Ecology's Industrial General Stormwater Permit (WAR008707) under the National Pollutant Discharge Elimination System (NPDES).

At 4:15am on January 20, 2011, a Generation Step Up transformer (GSU #1) containing non-Polychlorinated Biphenyls (PCB) mineral oil experienced an explosive failure and subsequent fire. An estimated 2000 gallons of the 11,000 gallons of mineral oil in the transformer sprayed onto the transformer containment structure and onto the soil outside the containment. The transformer suppression system initiated automatically and sprayed water over the transformer. The Fire Department responded and extinguished the fire using water and aqueous fire-fighting foam, which added significant amount of water to the Site.

During the fire fighting operations, the containment around GSU #1 was filled beyond capacity causing the spilled mineral oil to flow over the top. The mixture of oil, oil-contaminated water, and foam saturated the fill gravel and soil surrounding the containment and pooled around the transformer, and further flowed into the adjacent stormwater ditches. The oil-contaminated water reached the stormwater pond yet no water was discharged from the pond because the on duty staff was able to shut off the discharge outfall.

Cleanup effort was started subsequently by a spill response company, Cowlitz Clean Sweep (CCS), right after the fire was extinguished about two hours following the incident (see Section 4 of this letter for details).

Due to the emergency nature of the spill and contamination, cleanup was conducted without pre-cleanup characterization for any contaminated media (soil, groundwater, and

> surface water), rather, samples were collected after various cleanup efforts for confirmation purposes. Several months after the cleanup activities, a Site investigation was conducted to evaluate the status of groundwater contamination.

Based on a review of Site investigations and other available file information as well as the confirmation soil sampling during interim cleanup activities, Ecology has determined the investigations were sufficient to characterize the Site for soil, groundwater, and surface water for their extent and degree of contamination, and summarized as follows.

- 1. Stormwater Pond and Ditches: The stormwater pond and ditches were cleaned up through oil skimming, pumping, and soil excavation. Contaminated water was pumped into an AST for temporary storage (see Section 4 of this letter for details). A total of 23 soil samples were collected from the stormwater ditches on January 27, 2011, and 12 soil samples were collected from the stormwater pond on February 4, 2011 after the cleanup effort. Soil analysis results indicated that one location in the stormwater ditch and one location in the stormwater pond detected concentrations above the MTCA cleanup level for mineral oil. Additional excavation was conducted at these locations and two more confirmation samples, one each from stormwater ditch and pond, were collected on March 2, 2011, and the results met the MTCA Method A cleanup level for soil. One water sample from the stormwater pond also indicated that the stormwater in the pond met MTCA Method A cleanup level (Note: no surface water criteria exists for mineral oil, so the data were compared against MTCA Method A cleanup levels for groundwater). Since the stormwater system is permitted through Ecology's Industrial Stormwater NPDES Permit (WAR008707), the subsequent required quarterly monitoring indicated that the stormwater met the permit limitations and met the MTCA Method A cleanup level. The characterization of the stormwater system (water, bank liners and soil) was sufficient.
- 2. Soil Around GSU #1: Three separate confirmation soil sampling efforts were conducted to evaluate the cleanup of soil contamination surrounding the GSU#1 (see Fig. 3 of Enclosure A), and the results demonstrated that soil contamination still exists in a limited area under the extension portion of the newly enlarged GSU#1 containment structure.

After the spill incident, soil in the stormwater ditch segment immediately to the west of the GSU#1 containment structure was excavated in an effort to remediate the soil. Soil from the closest locations possible to the footing on the west side of the containment was also excavated in a limited extent. Six soil samples collected (January 28, 2011) detected no mineral oil above the MTCA Method A cleanup level. Second set of confirmation soil samples were collected on February 5, 2011, including one each from the three footing pits at 4.5 feet below ground surface (bgs) prior to the concrete footings being poured, and seven from the rest of the area, which was excavated to 20 inches bgs and to be covered by the extension of the containment. Out of the ten samples collected, only one soil sample (#D8) collected at 20 inches bgs detected mineral oil at 28,100 milligram per kilogram (mg/kg), exceeding the MTCA Method A cleanup level. The results came back after the concrete containment was completed because replacing the transformer was urgently needed so that the plant could resume operation. As such, no further excavation was conducted to the soil directly beneath the new containment structure, and contaminated soil remains and is now covered by the concrete containment. The containment extension is 14 feet wide in east-west direction and 51 feet long in south-north direction.

One month after the spill incident and after the completion of the new containment structure, soil surrounding the enlarged GSU#1 containment structure, in an area approximately 70 by 80 feet in dimension, was excavated to approximately 6 inches below the static groundwater table. Free product was present and absorbents were deployed in the excavated area to remove it. Confirmation soil samples were collected on February 21–22, 2011 from the saturated zone at the excavation bottom. The results indicated that the soil was either non-detect for mineral oil, or detected mineral oil at levels that were below the MTCA Method A cleanup level.

The soil cleanup and confirmation sampling demonstrated that no soil contamination went beyond the extent of the 70 foot by 80 foot area surrounding the GSU#1 containment. However, soil contamination remains in the area now covered under the extended portion of the enlarged GSU#1 containment structure. The sample from 20 inches bgs detected mineral oil at 28,100 mg/kg, which exceeded the MTCA Method A cleanup level.

3. Groundwater: Free product was observed and absorbents were used to remove free product in the area surrounding the enlarged GSU#1 containment, which confirmed the contamination of groundwater. Unknown amount of contaminated groundwater was pumped into the AST on Site for temporary storage but no groundwater samples were collected from excavation pits.

A Site investigation focused on groundwater was conducted in July 2012, several months after the soil excavation. Temporary wells were installed using a track mounted direct-push GeoProbe® rig. Five of the six wells were located down gradient of the transformer and one was located upgradient. The wells were screened from 5 to 15 feet bgs. Groundwater samples were collected from all six wells. One well (GW-4) detected diesel-range total petroleum hydrocarbon (TPH-Dx) at 1,100 microgram per liter (ug/L), which exceeded the MTCA Method A cleanup level of 500 ug/L. Other wells detected TPH-Dx at lower than the MTCA Method A cleanup level, or non-detect for TPH-Dx. With only one out of six wells detected mineral oil, at a location close to GSU#1, the groundwater contamination plume was sufficiently defined.

Ecology has the following additional comment:

In accordance with WAC 173-340-840(5) and Ecology Toxics Cleanup Program Policy 840 (Data Submittal Requirements), data generated for Independent Remedial Actions shall be submitted simultaneously in both a written and electronic format. For additional information regarding electronic format requirements, see the website http://www.ecy.wa.gov/eim. Be advised that according to the policy, any reports containing sampling data that are submitted for Ecology review are considered incomplete until the electronic data has been entered. Please ensure that data generated during on-site activities is submitted pursuant to this policy. **Data must be submitted to Ecology in this format for Ecology to issue a No Further Action determination.** Please be sure to submit all data in this format. Data collected prior to August 2005 (effective date of this policy) is not required to be submitted; however, you are encouraged to do so if it is available. Be advised that Ecology requires up to two weeks to process the data once it is received.

# 2. Establishment of cleanup standards.

Ecology has determined the cleanup levels and points of compliance you established for the Site meet the substantive requirements of MTCA.

MTCA Method A cleanup levels for soil and groundwater were used for the Site. Since no surface water criteria exists for mineral oil, the Method A cleanup level for groundwater was used to determine compliance in surface water. Standard points of compliance were used for the Site. The point of compliance for protection of groundwater was established in the soils throughout the Site. For soil cleanup levels based on human exposure via direct contact or other exposure pathways where contact with the soil is required to complete the pathway, the point of compliance was established in the soils throughout the Site from the ground surface to 15 bgs. In addition, the point of compliance for the groundwater was established throughout the Site from the uppermost level of the saturated zone extending vertically to the lower most depth that could potentially be affected by the Site.

# 3. Selection of cleanup action.

Ecology has determined the cleanup actions you selected for the Site have not met the substantive requirements of MTCA.

Cleanup actions selected included source removal (removal of spilled mineral oil on Site and migrated free product in stormwater pond, ditches and surface of groundwater table); contaminated soil excavation; and pumping and discharge of contaminated surface and groundwater. The discharge of the contaminated water and surface water was through a tank storage and was run through an oil/water separator. These cleanup actions did not

complete the contaminated soil and groundwater cleanup (please refer to Section 4 of this letter for details).

# 4. Cleanup.

Ecology has determined the cleanup you performed has not met the cleanup standards at the Site. The cleanup activities conducted so far at the Site included:

- 1. Stormwater pond and ditches cleanup:
  - Free product removal: containment boom was deployed to limit the migration of mineral oil in the stormwater pond. Absorbents were also deployed. Oil skimmer was used along with a vacuum truck to remove the oil from the pond surface. The same oil skimming process was employed to collect free product from the open channel segments of the stormwater ditches and the skimmed oil was also loaded into the vacuum truck.
  - Contaminated water cleanup and temporary storage: After the oil on the surface of the stormwater pond was cleaned, uncontaminated excess stormwater was pumped into the lined earthen containment for the two 1.7-million-gallon fuel oil ASTs for temporary storage to avoid stormwater pond overflow. The AST's containment area is a large bermed area, lined with heavy gauge vinyl material with a total capacity of 2 times 1.7 million gallons plus 10% of the AST's capacity. The pump was stopped when water was about 12 inches deep in the containment.

The potentially contaminated water from the stormwater pond, however, was pumped into one of the two empty 1.7-million-gallon ASTs for temporary storage (see Bullet #4 within this section for its disposal).

- Soil excavation and cleanup: Soil and line gravel along the bank of the stormwater pond and along the stormwater ditches were visually inspected and those impacted by the oil were excavated to approximate depth of 6 to 8 inches on average. One area of the pond was excavated to a lower extent due to a little tree at the location and a confirmation soil sample indicating higher than MTCA cleanup level concentration of mineral oil. Additional excavation was also conducted at an area of the stormwater ditch where higher than MTCA cleanup level contamination was identified after the first round of soil samples were analyzed. All the excavated fill rock and soil was loaded into dump trucks for subsequent disposal.
- 2. Soil cleanup around GSU#1:
  - Soil cleanup at area covered by the newly enlarged GSU#1 containment: After the spill incident, soil in a stormwater ditch segment immediately to the west of the GSU#1 containment structure was excavated in an effort to remediate the soil.

Soil from the closest locations possible to the footing on the west side of the containment was also excavated in a limited extent to construct an enlarged containment for the GSU#1. Soil was removed to 4.5 feet in three footing pits, and to 20 inches beneath the rest of the extended portion of the enlarged containment. Even though one of seven soil samples collected at 20 inches bgs detected mineral oil at level of 28,100 mg/kg, exceeding the MTCA cleanup level, no further cleanup action was conducted at this location because the results came back after the concrete containment was completed due to an urgent need to replace the transformer so that the plant could resume operation. As such, the soil directly beneath the new containment structure still contains contaminated soil and may be not feasible for further excavation. The area covered by the containment extension was 14 feet wide in east-west direction and 51 feet long in south-north direction.

- Soil cleanup in area surrounding the newly enlarged GSU#1 containment: One month after the spill incident, after the completion of the new containment structure, soil affected by the transformer oil release, approximately 70 by 80 feet in dimension surrounding the new GSU#1 containment structure, was excavated to approximately 6 inches below the static groundwater table. Confirmation soil samples collected (February 21–22, 2011) from the saturated zone at the excavation bottom indicated that the soil was either non-detect for mineral oil, or detected mineral oil at levels that were below MTCA cleanup level.
- 3. Groundwater cleanup around GSU#1:
  - Groundwater cleanup in area surrounding the GSU#1 containment: Free product
    was removed from the surface of groundwater table in the excavation pits during
    the soil excavation effort from under and surround GSU#1 containment.
    Contaminated groundwater was also pumped to the east AST from the excavation
    pits. However, no information was recorded with regard to how much
    groundwater was pumped. No confirmation groundwater samples were collected
    upon the completion of the excavation.
  - A Site investigation conducted in July 2011 demonstrated that groundwater contamination still exists in the area surrounding the enlarged GSU#1 containment structure (see Section 1 of this letter for details), yet no further cleanup action was taken.
- 4. Disposal of collected free product and contaminated soil/gravel:
  - Free product collected from the stormwater pond surface, from the stormwater ditches, and from groundwater surface using oil skimmers and vacuum trucks became emulsified oil and water. A total of 8,869 gallons of such fluid was transported off Site for disposal as non-hazardous waste to Oil Re-Refine Co. (ORRCO) in Portland, OR for recycle.

- A total of 845.51 tons of contaminated soil and gravel excavated from stormwater ditches, stormwater pond, and under and around the GSU#1 transformer was transported to the Weyerhaeuser transfer station, and subsequently disposed of at Weyerhaeuser Headquarter Landfill in Cowlitz County, WA.
- 5. Disposal of contaminated water collected during cleanup operations and stored temporarily in the containment and in the on Site AST:
  - The water stored in the containment of the two 1.7-million-gallon ASTs was authorized for discharge through Ecology's Industrial Stormwater NPDES Permit (WAR008707) after the water was tested and met the permit limitations before discharge.
  - The potentially contaminated water pumped from the stormwater pond, stormwater ditches, and from groundwater into one of the two 1.7-million-gallon empty ASTs on Site for temporary storage during the original spill cleanup effort was discharged or disposed of through several steps. The total amount of water filled the tank up to about 25% of its capacity and was estimated at 339,562 gallons. A 0.5 inch oil layer was present at the top of the water within the AST.

After sampling, the water beneath the oil layer was confirmed to meet the stormwater discharge limitations and was approved for discharge through Ecology's Industrial Stormwater NPDES Permit (WAR008707). The AST has a discharge pipe suction located in a sump below the floor of the AST and allows the discharge of water at lower portion of the AST being discharged without disturbing the oil layer at the top of the water surface. A total of 270,301 of the 339,562 gallons of water in the AST was discharged to the stormwater system. The water drained out of the AST was run through a three-compartment, opentop, 9,000-gallon oil/water separator. Best management practice was used, including the use of oil absorbent mats in the three compartments so any oil could be readily detected.

- The remaining 60,000 gallons of water, about 1.5-2 feet in depth, was drained through the plant's waste water system with the permanent oil/water separator as part of the in-line process, and essentially discharged to the City of Chehalis Wastewater Treatment Plant.
- The remaining oil in the AST was removed with a vacuum truck and transported to ORRCO in Portland, OR for recycle.

Based on review of the cleanup activities reported in the several documents in "Basis for the Opinion" section of this letter, residual contamination is still present in soil and groundwater. Ecology has following additional comments:

- Soil contamination was found in a limited pocket in the area under the newly extended portion of the GSU#1 containment. The concentration of mineral oil at 20 inches depth was 28,100 mg/kg, exceeding the MTCA cleanup level. The contaminated soil is now covered under the enlarged concrete containment structure. Additional remediation is needed. Alternatively, an environmental covenant may be put on the Site if additional remediation is deemed infeasible, in which case, please provide a brief feasibility study and disproportionate cost analysis that evaluates alternatives for cleanup in this area.
- 2. Free product was found on the surface of the groundwater right after the spill incident in the area immediately adjacent to the GSU#1 containment. One month after the incident, the free product was present on the surface of groundwater table in the area surrounding the enlarged GSU#1 containment. Even though free product was removed and contaminated groundwater was pumped out from the excavation pit, further investigation in July 2011, six months after the incident, indicated that mineral oil in groundwater still exceeded MTCA cleanup level within a limited area near the GSU#1 containment at a concentration of 1,100 ug/L. Additional groundwater remediation is warranted. Please note that Ecology requires four consecutive quarters of monitoring results below the MTCA cleanup levels to demonstrate compliance. This is to account for seasonal variation in groundwater levels.

# Limitations of the Opinion

### 1. Opinion does not settle liability with the state.

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion **does not**:

- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70.105D.040(4).

# 2. Opinion does not constitute a determination of substantial equivalence.

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you performed is substantially equivalent. Courts make that determination. *See* RCW 70.105D.080 and WAC 173-340-545.

# 3. State is immune from liability.

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. See RCW 70.105D.030(1)(i).

# **Contact Information**

Thank you for choosing to clean up the Site under the Voluntary Cleanup Program (VCP). After you have addressed our concerns, you may request another review of your cleanup. Please do not hesitate to request additional services as your cleanup progresses. We look forward to working with you.

For more information about the VCP and the cleanup process, please visit our web site: <u>www.</u> <u>ecy.wa.gov/programs/tcp/vcp/vcpmain.htm</u>. If you have any questions about this opinion, please contact me by phone at (360) 407-6265 or by e-mail at <u>hqiu461@ecy.wa.gov</u>.

Sincerely,

<del>~\_\_\_\_\_</del>e

Hans Qiu, L.HG. Site Manager SWRO Toxics Cleanup Program

HQ/ksc:Site FA Draft Chehalis Power

Enclosures: A – Description and Diagrams of the Site

By certified mail: (7010 2780 0000 2503 5895)

cc: Bill Tietzel – Lewis County Health Department Kevin Hancock – Ecology Dolores Mitchell – Ecology Scott Rose – Ecology

# **Enclosure** A

# **Description and Diagrams of the Site**

# **Site Description**

The Chehalis Power LP Generation Facility Site is located at 1813 Bishop Road, Chehalis, Lewis County, in the Chehalis River Valley. The Site is a 20-acre, level grade property occupied by a large industrial facility, including two combustion turbines, electrical transformers, heat recovery steam generators, air emissions control equipment, exhaust gas stacks, air-cooled steam condenser, water treatment equipment, and operations and maintenance buildings. The facility also includes two 1.7-million-gallon fuel oil aboveground storage tanks (ASTs) in a lined earthen containment. The tanks were never used for oil storage since the initial startup of the facility. A stormwater collection ditch surrounds the facility to collect stormwater from the facility. The ditch is lined with gravel, and some segments are covered, galvanized pipes. The stormwater pond has a permitted outfall under Ecology's Industrial General Stormwater National Pollutant Discharge Elimination System (NPDES) Permit (WAR008707). The pond outfall flows west in a gravel waterway to Berwick Creek. Berwick Creek flows from east to west to Dillenbaugh Creek, which then flows into the Newaukum River.

The geology beneath the Site consists of pre-Fraser Glaciation sand and gravel recessional outwash deposits. Bore holes revealed a silty clay layer within 5 feet of the land surface, a silty sand about 5 feet may exist in some areas beneath the silty clay layer. Below the silty sand lies the shallow aquifer, a sandy gravel layer about 30 to 40 feet thick. A silt layer at about 50 feet below ground surface perhaps serves as a confined layer. Groundwater table was at 15 to 20 during drilling and was observed between 4 to 14 feet during the cleanup activity period in 2011. Groundwater flow direction at the Site was assumed from northeast to south/southwest.

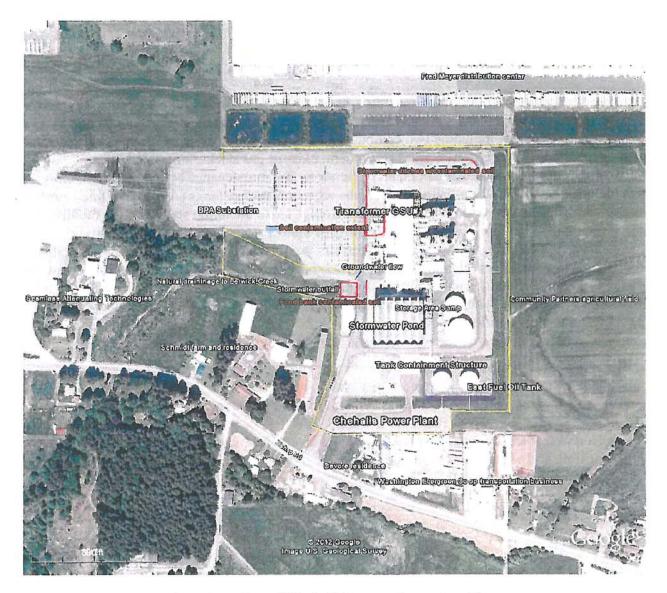


Fig 1. Location of Chehalis Power Generation Plant

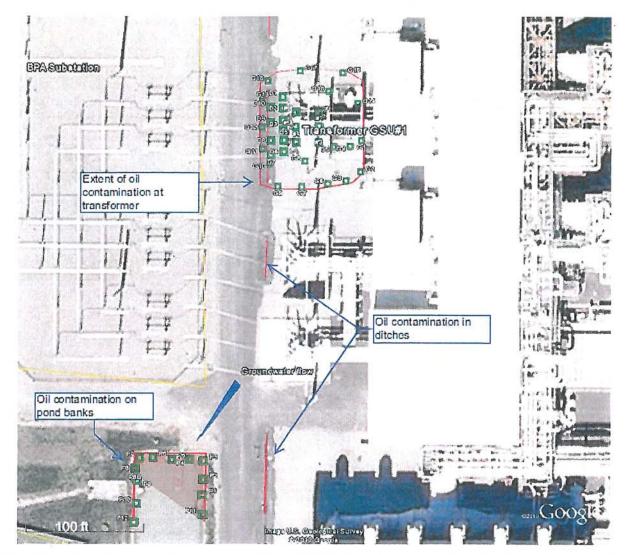


Fig. 2 Sampling locations for soil around the GSU#1 containment, and for the Stormwater pond



Fig.3 Soil Confirmation sample locations and groundwater Site Investigation Surrounding GSU#1 Soil Sample: 1) #1- 6, Jan. 28,

2011 from under old containment; 2) D1-D10, Feb. 5, 2011 from construction pits under the extension of the containment; 3) G1-G18, Feb. 21-22, 2011, from surrounding the newly constructed containment; 4) GW1–GW5, groundwater wells, SG1-SG3, surface soil, both on July 2011.

# APPENDIX B

# PACIFICORP ENERGY CHEHALIS POWER PLANT TRANSFORMER GSU#3

OIL SPILL CLEANUP STATUS REPORT

FEBRUARY 2014



Chehalis Power Plant 1813 Bishop Road Chehalis,Washington 98532

February 18, 2014

Cris Matthews Toxics Cleanup Program Washington Department of Ecology Southwest Regional Office P.O. Box 47775 Olympia, WA, 98504-7775

Bill Teitzel Code Compliance Supervisor Lewis County Public Health and Social Services 2025 NE Kresky Avenue Chehalis, WA 98532-2626

# RE: PacifiCorp Energy Chehalis Power Plant Transformer GSU#3 Oil Spill Cleanup Status Report

On November 22, 2013, at 05:20 am, Generation Step Up Transformer #3 (GSU#3) at the Chehalis Power Plant experienced a failure and subsequent fire which resulted in a release of non-PCB mineral oil around the transformer and also impacted the stormwater system. PacifiCorp Energy completed the verbal spill notifications to the required Federal and State agencies after the incident. Doug Stoltz, of Department of Ecology's Spill Response Program, visited the facility about 11:45 that day and provided coordination assistance in the days after the incident.

PacifiCorp Energy is providing this status report, per the requirements of WAC 173-340-310, Policy 310A, on the results of the cleanup efforts, initial investigation and plans for further investigation and remediation of the oil spill.

# Spill Incident

Transformer GSU# 3 failed resulting in an explosion and fire. The automatic fire suppression system controlled the fire, however, water filled the concrete transformer containment and overflowed to the surrounding soil and gravel. Water and transformer mineral oil flowed out from the containment to nearby stormwater ditches. Oil reached the stormwater pond, but was not released through the outfall, as the pond level was low due to the dry weather and stormwater was not being discharged. The discharge valve was closed by Plant Operators immediately after the transformer failure.

The spill incident and spill response were documented in a letter dated November 26, 2013, following up on verbal spill notifications. The letter included in Attachment A provides additional details on the incident.

# Spill Response

Cowlitz Clean Sweep (CCS) of Longview, Washington was called for spill response and cleanup and arrived approximately three hours after the incident. Oil absorbent socks and pads had been placed in stormwater

ditches and the pond by Plant personnel to contain the spill. CCS initiated response and initial cleanup of the pond and then the transformer containment filled with water and oil.

The extent of the oil contamination from the GSU#3 transformer failure and oil spill is shown on the figure in Attachment 2. Oil and water from the transformer containment flowed south and north to the stormwater ditch, east to the turbine building, and west across the road to stormwater ditches. The ditches to the south and west flow into the pond through underground culverts. Due to dry weather, the extent of the contamination was simple to observe and contain.

# Spill Cleanup

CCS conducted the spill cleanup for four weeks after the incident. Mineral oil and contaminated water were removed from the pond, ditches and transformer containment and stored in tanks on-site. An additional 40,000 gallons of water was treated and disposed to the Plant sanitary sewer under a permit from the City of Chehalis. Discharge of stormwater from the pond was resumed on December 3, 2013, with Ecology's approval.

After the transformer was replaced, CCS excavated oil-contaminated gravel and soil around the transformer containment, stormwater ditches and pond banks. The soils were removed to a depth below the contamination level or to the compacted clay soil layer approximately 4-5 feet below ground surface. The materials were replaced and the excavated gravel and soils were stored on-site. All the waste oil/water and gravel/soil were removed and CCS completed on-site work on January 9, 2014.

A Spill Cleanup Report prepared by CCS is included in Attachment 3.

# Quantity of Oil Released and Recovered

The GSU#3 transformer contained 11,100 gallons of non-PCB mineral oil. The quantity of oil released from the transformer during the incident was 4,337 gallons. Most of that oil was recovered from the transformer containment, ditches and stormwater pond. CCS transported oil/water off-site for energy recovery. Additional oil was recovered in the absorbents and waste water treatment system. CCS determined that 840 gallons of mineral oil had been released and not recovered prior to soil/gravel excavation. Of the 840 gallons, a substantial quantity was removed with 1270 tons of excavated soil and gravel. It is probable that the quantity of mineral oil not recovered, remaining in the soil and groundwater is a small fraction of the 840 gallons.

# Soil Cleanup Sampling

After removing the contaminated soil and gravel, CCS conducted confirmation soil sampling of the remaining soil before replacement of the gravel and soil. Forty-five samples were taken throughout the extent of contamination, and the samples were analyzed by Dragon Analytical Laboratory in Olympia. The sample locations are shown on the maps in the CCS report in Attachment 3. Of the 45 samples, only two indicated detectable levels of mineral oil per NWTPH-Dx. The two locations were in stormwater ditches near the pond. The mineral oil concentrations were 128 mg/kg and 76.9 mg/kg. Both values are well under the MTCA A cleanup level for soil of 4,000 kg/mg. The sample analysis results are included in the CCS Report in Attachment 3.

# Plans for Further Investigation and Remediation

At the conclusion of the cleanup activities by CCS, one portion of oil contamination from the spill remains to be cleaned up. There is remaining groundwater contamination from mineral oil. An oil sheen has been observed

floating on the perched groundwater layer approximately five feet below ground surface. Based on previous studies, the groundwater level is normally 4 -5 feet deep, and then rises during periods with precipitation and wet weather. PacifiCorp Energy is planning to pump contaminated groundwater for disposal from an open slotted culvert installed on the south side of the transformer containment, near the location where most of the oil/water flowed over the containment wall. The culvert was installed by CCS to a depth just above the bottom of the perched groundwater layer.

PacifiCorp Energy is planning further investigation of the area around the GSU#3 transformer. Installation of several permanent groundwater monitoring wells is planned to determine the extent of remaining oil contamination and future remedial actions.

Last fall, under Ecology's Voluntary Cleanup Program, two of three planned groundwater monitoring wells were installed for the GSU#1 2011 transformer oil spill. GSU#3 is 150 feet south (groundwater downgradient) from GSU#1. PacifiCorp Energy would like to discuss further plans for groundwater monitoring for the GSU#3 spill in conjunction with the on-going monitoring for the 2011 GSU#1 spill with Ecology.

At your convenience, we would like to set up a meeting with you and Hans Qui to discuss the follow-on plans identified above under the Voluntary Cleanup Program. In the meantime, if you have any questions or need additional information, please do not hesitate to contact me at 360-748-1300.

Sincerely,

1,00e\_

Mark A. Miller Manager, Gas Plant Attachments

cc:

Jim LaSpina Siting Specialist Energy Facility Site Evaluation Council 1300 S. Evergreen Park Dr. SW P.O. Box 43172 Olympia, WA 98504-1372

Hans Qui Site Manager, Voluntary Cleanup Program Washington Department of Ecology Southwest Regional Office P.O. Box 47775 Olympia, WA, 98504-7775

# Attachment 1

Chehalis Plant GSU#3 Spill Follow-up Letter



Chehalis Power Plant 1813 Bishop Road Chehalis,Washington 98532

November 26, 2013

Doug Stoltz Spill Response Program Washington Department of Ecology Southwest Regional Office P.O. Box 47775 Olympia, WA, 98504-7775

Washington State Emergency Response Commission Department of Ecology PO Box 47659 Olympia, WA, 98504-7659

Lewis County Local Emergency Planning Committee Emergency Management Services 345 West Main MS:,SHE01 Chehalis, WA 98532

RE: PacifiCorp Energy Chehalis Power Plant Transformer GSU#3 Oil Spill - Incident #13-4385

PacifiCorp Energy Chehalis Power Plant (Plant) is providing follow-up information for an oil spill reported to you verbally on November 22, 2013.

#### Spill Incident Description

On Friday, November 22, 2013, at 05:20, Transformer GSU# 3 failed resulting in a release of transformer oil into and around the transformer secondary containment area. Transformer GSU#3 is a large voltage step up transformer delivering power from the Plant's steam turbine to the adjacent BPA substation and transmission lines. GSU# 3 is filled with 11,100 gallons of non-PCB mineral oil.

The transformer is located in a concrete containment structure; however, the containment filled with fire suppression water and overflowed to the surrounding gravel and soil. Oil and water flowed out from the containment approximately 50-90 feet and flowed into stormwater ditches to the south, west and north of the transformer. The south and west stormwater ditches are connected to the stormwater pond through a culvert under a roadway. Plant personnel immediately closed the plant's storm water pond discharge valve preventing a release of mineral oil from the plant site.

#### Spill Response

Plant management called Cowlitz Clean Sweep (CCS) of Longview, Washington for spill response – CCS arrived at 08:30.

Plant management notified the following agencies at 09:00:

- National Response Center (Case #1066576)
- Washington Emergency Management Division Spill Line (Incident # 13-4385)
- Washington Department of Ecology Southwest Regional Office
- Lewis County LEPC

Doug Stoltz of Ecology's Spill Response Program visited the spill site November 22, 2013, at approximately 11:45.

#### Spill Description

The quantity of mineral oil released was determined after the remaining oil was removed from the failed transformer. Quantity of oil released from the transformer = 4,337 gallons (a portion of the oil was retained in the containment structure).

Mineral oil and water were released to the soil and gravel around the transformer containment, to gravel-lined stormwater ditches, and to the stormwater pond as described above.

#### Cleanup Plans

The failed transformer has been removed, and the transformer supports and containment structure cleaned in preparation for siting the an on-site spare transformer.

CCS has removed most of the free oil from the ditches and pond, and the next step is to remediate the contaminated soil from the pond and ditches for environmental sampling. Water from the ditches and stormwater pond will be treated and disposed to the Plant's wastewater system during cleanup; treatment and disposal plans are being coordinated through the City of Chehalis and The Washing Department of Ecology. Storm water discharge from the pond will not resume until after approval by Ecology's Stormwater Program.

CCS is coordinating disposal of the oil contaminated water, soil, debris and absorbent materials. Waste material is being accumulated on site in suitable containers for future transport and disposal.

If you have questions or need additional information, please contact me at 360-748-1300.

Sincerely,

LUD, PASKST

Mark A. Miller Manager, Gas Plant

cc:

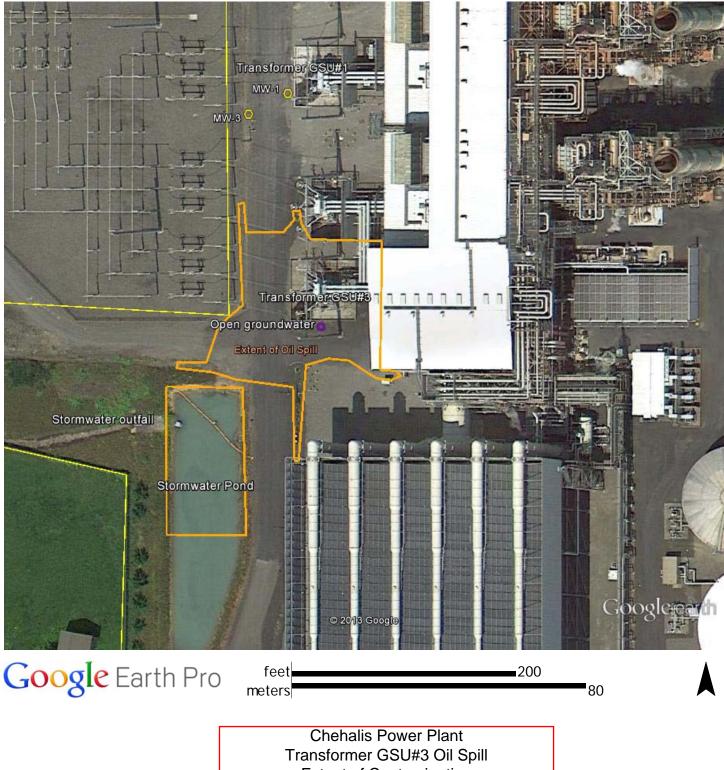
Bill Teitzel Code Compliance Supervisor Lewis County Public Health and Social Services 2025 NE Kresky Avenue Chehalis, WA 98532-2626

Mr. Kevin Hancock Washington Department of Ecology Southwest Regional Office P.O. Box 47775 Olympia, WA, 98504-7775

Jim LaSpina Siting Specialist Energy Facility Site Evaluation Council 1300 S. Evergreen Park Dr. SW P.O. Box 43172 Olympia, WA 98504-1372

# Attachment 2

GSU#3 Oil Spill Extent of Contamination



Extent of Contamination

Attachment 3

Cowlitz Clean Sweep (CCS) Mineral Oil Release Spill Cleanup Report



Solutions

#### **Pacific Corp**

Mineral Oil Release

1813 Bishop Rd. Chehalis, Washington

November 22, 2013

Prepared by:

Randy Legler, Operations Manager CCS – A Division of PNE Corp. 55 International Way Longview, WA 98632

#### LONGVIEW OPERATIONS

55 International Way Longview, WA 98632 Phone (360) 423-6316 Fax (360) 423-3409 www.pnecorp.com

#### PORT ANGELES OPERATIONS

202 North Cedar, Suite 4 Port Angeles, WA 98363 Phone (360) 452-5344 Fax (360) 452-3411

#### ABERDEEN OPERATIONS

181 N. Willow Aberdeen, WA 98520 Phone: (360) 532-4309 Fax: (360) 538-0296

#### SWEEPING OPERATIONS

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#### PORTLAND OPERATIONS

9420 NW St. Helens Road Portland, OR 97231 Phone (503) 247-9466 Fax (503) 247-1002

#### EUGENE OPERATIONS

90498 Hwy 99 N #1 Eugene, OR 97402 Phone (541) 607-9177 Fax (541) 607-9179 CCB#78140 COWLICS 971L0



Mr. Jeremey Smith Pacific Corp. 1813 Bishop Rd. Chehalis, WA

#### Spill Cleanup Report Mineral Oil Release Chehalis, Washington CCS Project # 9313352

Mr. Smith,

Pacific Corp. contracted CCS, a division of PNE Corp., to respond to and mitigate a release of mineral oil at the address 1813 Bishop Rd. Chehalis, WA. CCS performed these services Nov. 22, 2013 – Jan. 9<sup>th,</sup> 2014

#### Background

GSU# 3 had a failure, causing it to catch fire. The fire suppression system around the GSU was activated. The influx of water into the GSU and containment caused the oil in the GSU and containment to be displaced into the surrounding soil. The large volume of oil travel to the facilities storm water ditches located near the GSU. Oil then migrated to the storm water retention pond on site.

#### Initial Response

The on duty operator immediately shut the valve on the retention pond to prevent any of the oil from migrating off the site. Once the avenue for the oil to leave site was secured Pacific Corp. initiated a response from CCS.

Upon arrival the Response Manager from CCS preformed a scene size up. The fire at the GSU had been extinguished, all the oil released was contained to the storm water pond and surrounding soils. CCS immediately deployed a secondary containment in the pond to insure that oil would not leave the site.

#### Spill Cleanup and Site Restoration

CCS immediately addressed the gross contamination on the storm water ponds and surrounding ditches. Portable storage tanks were mobilized to the site to contain all recovered waste. Crews used liquid vacuum trucks along with absorbents to capture the gross contamination in the water. The containment

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Aberdeen Operations

OPERATIONS 181 N. Willow Aberdeen, WA 98520 Phone: (360) 532-4309 Fax: (360) 538-0296 SWEEPING OPERATIONS 55 International Way Longview, WA 98632 Phone (360) 423-6316 Fax (360) 423-3409 PORTLAND OPERATIONS 9420 NW St. Helens Road Portland, OR 97231 Phone (503) 247-9466 Fax (503) 247-1002

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around the GSU was evacuated of all contamination and cleaned using degreaser and pressure washers. All wash waters were collected and transferred to the onsite storage. The remaining oil in GSU# 3 was removed and transferred to onsite storage. Pacific Corp. along with CCS contacted the local waste water treatment plant, and advised them that CCS and Pacific Corp, would like to treat the captured waste waters thru a carbon filter system then discharge the treated water to the waste water treatment plant under Pacific Corps. Storm water permit. Pacific Corp. was granted permission by the POTW.

With the approval a mobile carbon treatment system was then mobilized to the site. Upon arrival treatment was immediately implemented. The storm water pond was monitored and waters were removed during significant weather events to storage to prevent any possible contamination from leaving the site. All waters removed were treated and discharged to POTW.

Once the contaminated waters were addressed, CCS then focused on removing the impacted soils on site. Excavation was started around GSU# 3. Excavation depth was approx... 4' (to the water perch) some areas were excavated to a slightly shallower depth because of possible impacted to structural integrity of building and other surrounding structures. All contaminated soils removed were transferred to an onsite secured, stock pile area pending transportation for disposal. CCS controlled the extent of the excavation using visual, olfactory, and Photo Ionization Detector (PID) readings. Upon completion of removal of all impacted soils on site, the soil was transported the Weyerhaeuser landfill located in Castle Rock, WA. Liquids that were not able to be treated, (high oil to water ratio) were transported to ORRCO in Portland, Oregon

CCS removed 1,270.54 tons of soil from the affected area.

#### Sampling and Laboratory Analyses

CCS collected 45 soil samples to verify the cleanup of affected soils. Dragon Analytical Laboratory in Olympia analyzed soil samples for NWTPH-Dx. CCS collected samples from the areas most likely to contain residual contamination.

Sample locations are shown on the site map.

All results are below the MTCA cleanup standard of 4,000 mg/Kg advised by the Washington Department of Ecology.

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#### Disposal

CCS transported 1,270.54 tons of soil under Manifest # 9313952 to the Weyerhaeuser MRF in Castle Rock, Washington for disposal as a non-hazardous waste.

CCS also transported 17, 225 gallons to ORRCO in Portland, Oregon for energy recovery.

A total of 40,000 gallons of contaminated waters were treated onsite and discharged to the local POTW.

If you have any questions or concerns please feel free to contact me here at the office (888) 423-6316 or on my cell phone (360) 957-2639. Thank you for the opportunity to provide services to you. Should you need additional assistance, please do not hesitate to contact me.

Sincerely, CCS – A Division of PNE Corp.

nz

Randy Legler Operation Manager, Emergency Response CCS

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GSU #3 Confirmation Sample Map. \*See Key for GPS Loc.\*

#1

#15

#3

#4

1990Imagery Date: 7/5/2012 | at 46.621877° | on -122.915813° elev 244 ft eye alt 425 ft.

#5

#7

Googlegent

Sample #	GPS Coordinate	Sample Results
#1	46.37327 -122.54.967	N/D
#2	46.3714 -122.56.6	N/D
#3	46.621868 -122.915935	N/D
#4	46.621771 -122.915843	N/D
#5	46.621747 -122.916096	N/D
#6	46.621747 -122.915918	N/D
#7	46.621696 -122.915917	N/D
#8	46.621846 -122.915857	N/D
#9	46.621823 -122.915732	N/D
#10	46.621809 -122.915836	N/D
#11	46.621932 -122.915691	N/D
#12	46.622006 -122.915752	N/D
#13	46.621825 -122.915775	N/D
#14	46.621825 -122.915825	N/D
#15	46.621886 -122.915881	N/D



Sampled By: Randy Legler

DAL Project No.: 131224-05

Preparation Method: US EPA 3550C Analytical Method: NWTPH-Dx Date Prepared: 12/31/2013 Date Analyzed: 1/7/2014 Analyst: GD Data Reviewed By: DRAGON ANALYTICAL LABORATORY

530 A1 Ronlee Ln, Olympia, WA 98502 (360) 866-0543

Hazardous Waste, Microbiology, NPDES, Potable and Non-potable Water Mobile Environmental Laboratory



Project Name: Mineral Oil Project No.: 9313352 P.O. No.: n/a Date Collected: 12/17/2013; 11:20-12:20 Date Received: 12/24/2013; 14:05 Temperature Received (°C): n/a Report Date: 1/7/2014

> Units: mg/kg Matrix: Soil Reporting Limits: Standard Injection Volume: 3 uL Instrument ID: Shimadzu GC-14A Lab Data File: n/a

Sample Identification	CAS No.	MRL	Method Blank	46.37327N- 122.54967W	46°37'14"N- 122.56'6"W	46.621868- 122.915939	46.621771- 122.915843	46.621747- 122.916096	46.621747- 122.915918	46.621696- 122.915917	46.621846- 122.915857
Kerosine	84742-81-0	25	nd	nd	nd	nd	nd	nd	nd	nd	nd
Diesel Range Organics	68334-30-5	25	nd	nd	nd	nd	nd	nd	nd	248	nd
Fuel Oil #6 (Bunker C)	68553-00-4	100	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mineral Oil	64742-47-8	100	nd	nd	nd	nd	nd	nd	nd	nd	nd
Motor Oil	64742-47-8	100	nd	nd	nd	nd	nd	nd	nd	nd	nd
Percent Solids (%)			n/a	78.1	77.6	78.1	79.6	97.1	95.3	96.0	96.1
Dilution Factor			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Data Flags											



Sampled By: Randy Legler

DAL Project No.: 131224-05

Preparation Method: US EPA 3550C Analytical Method: NWTPH-Dx Date Prepared: 12/31/2013 Date Analyzed: 1/7/2014 Analyst: GD Data Reviewed By: DRAGON ANALYTICAL LABORATORY

530 A1 Ronlee Ln, Olympia, WA 98502 (360) 866-0543

Hazardous Waste, Microbiology, NPDES, Potable and Non-potable Water Mobile Environmental Laboratory



Project Name: Mineral Oil Project No.: 9313352 P.O. No.: n/a Date Collected: 12/17/2013; 11:20-12:20 Date Received: 12/24/2013; 14:05 Temperature Received (°C): n/a Report Date: 1/7/2014

> Units: mg/kg Matrix: Soil Reporting Limits: Standard Injection Volume: 3 uL Instrument ID: Shimadzu GC-14A Lab Data File: n/a

Sample Identification	CAS No.	MRL	Method Blank	46.621823- 122.915732	46.621809- 122.915836	46.621932- 122.915691	46.622006- 122.915752	46.621825- 122.915775	46.621825- 122.915825	46.621886- 122.915881
Kerosine	84742-81-0	25	nd	nd	nd	nd	nd	nd	nd	nd
Diesel Range Organics	68334-30-5	25	nd	nd	124	nd	120	103	622	684
Fuel Oil #6 (Bunker C)	68553-00-4	100	nd	nd	nd	nd	nd	nd	nd	nd
Mineral Oil	64742-47-8	100	nd	nd	nd	nd	nd	nd	nd	nd
Motor Oil	64742-47-8	100	nd	nd	nd	nd	nd	nd	nd	nd
Percent Solids (%)			n/a	96.3	92.5	97.1	94.0	95.8	95.9	96.8
Dilution Factor			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Data Flags										



DAL Project No.: 131224-05

CCS

DRAGON ANALYTICAL LABORATORY

530 A1 Ronlee Ln, Olympia, WA 98502 (360) 866-0543

Hazardous Waste, Microbiology, NPDES, Potable and Non-potable Water Mobile Environmental Laboratory



Project Name: Mineral Oil Project No.: 9313352

DIESEL & OIL QUALITY CONTROL RESULTS

SURROGATE RECOVERY

Surrogate	Limits (%)	Method Blank	46.37327N- 122.54967W	46°37'14"N- 122.56'6"W	46.621868- 122.915939	46.621771- 122.915843	46.621747- 122.916096	46.621747- 122.915918	46.621696- 122.915917	46.621846 122.91585
-FBP	50-150	97.8	146	114	112	103	72.9	95.8	117	108
			46.621823-	46.621809-	46.621932-	46.622006-	46.621825-	46.621825-	46.621886-	
Surrogate	Limits (%)		122.915732	122.915836	122.915691	122.915752	122.915775	122.915825	122.915881	

LABORATORY CONTROL SAMPLE AND MATRIX SPIKE

#### QC Batch ID: 140107-Fuels

	MS/MSD	MS/MSD	Sample	MS				MS/MSD		LCS	LCS	LCS	LCS
	Limits	Level	Conc.	Recovery	MS Percent	MSD Recovery	MSD Percent	RPD		Limits	Level	Recovery	Percent
Analyte	(%)	(mg/kg)	(mg/kg)	(mg/kg)	Recovery	(mg/kg)	Recovery	Limits	RPD	(%)	(mg/kg)	(mg/kg)	Recovery
Diesel Fuel #2	65-135	1000	nd	1092	109%	1104	110%	≤ 15%	0.540	65-135	1000	1016	102%

WA-DOE-Laboratory Certification No.: C890

"nd" indicates the analyte was not detected at or above the listed Method Reporting Limit.

"n/a" indicates not applicable

Sample results based on dry weight.

Comments and Explanations: None.

## **Pond Locations**

Sample #	<b>GPS Coordinate</b>	Sample Results
#1	46.621231 -122.916347	N/D
#2	46.621252 -122.916329	N/D
#3	46.621308 -122.916317	N/D
#4	46.621510 -122.916142	N/D
#5	46.621530 -122.916411	N/D
#6	46.621623 -122.916377	N/D
#7	46.621533 -122.916224	N/D
#8	46.621343 -122.916109	N/D
#9	46.621237 -122.916086	N/D
#10	46.621191 -122.916224	N/D
#11	46.621122 -122.916296	N/D
#12	46.621059 -122.916188	N/D

## **Ditch Line Locations**

Sample #	GPS Coordinate	Sample Results
#1	46.621764 -122.915944	N/D
#2	46.621512 -122.916117	N/D
#3	46.621494 -122.916165	N/D
#4	46.621572 -122.916366	N/D
#5	46.621687 -122.915887	N/D
#6	46.621351 -122.915729	76.9

## **Roadway Locations**

Sample #	GPS Coordinate	Sample Results
#1	46.621762 -122.915918	N/D
#2	46.621625 -122.916159	N/D
#3	46.621748 -122.916081	N/D
#4	46.621541 -122.915932	N/D
#5	46.621506 -122.915576	N/D
#6	46.621669 -122.916039	N/D

## **North Pond Ditch Locations**

Sample #	GPS Coordinate	Sample Results
#1	46.621926 -122.916229	N/D
#2	46.621681 -122.916334	N/D
#3	46.621618 -122.916128	N/D
#4	46.621716 -122.916256	128
#5	46.621717 -122.916379	N/D

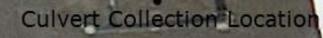
# Pond Sample Locations Google

#1

#6

#7

0



Ditch Line Locations

#3'1

#4

#5

#6

© 2013 Google

Google

## **Roadway Sample Locations**

.#5 .#6

.#2 . #1

.#3 •#4

© 2013 Google

2 1990

Google

## North Pond Ditch Locations

#2 #1 #4

© 2013 Google

H

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Google



Sampled By: Stephen Shore

DAL Project No.: 131224-04

Preparation Method: US EPA 3550C Analytical Method: NWTPH-Dx Date Prepared: 12/31/2014 Date Analyzed: 1/12/2014 Analyst: GD Data Reviewed By: DRAGON ANALYTICAL LABORATORY

530 A1 Ronlee Ln, Olympia, WA 98502 (360) 866-0543

Hazardous Waste, Microbiology, NPDES, Potable and Non-potable Water Mobile Environmental Laboratory



Project Name: Pond Project No.: 9313352 P.O. No.: n/a Date Collected: 12/23/2013; 09:30-11:20 Date Received: 12/24/2013; 14:04 Temperature Received (°C): n/a Report Date: 1/13/2014

> Units: mg/kg Matrix: Soil Reporting Limits: Standard Injection Volume: 3 uL Instrument ID: Shimadzu GC-14A Lab Data File: n/a

Sample Identification	CAS	MRL	Method						N46.621623 E-
Campio laonanoadon	No.		Blank	122.916347	122.916329	122.916317	122.916142	122.916411	122.916377
Mineral Oil	64742-47-8	100	nd	0.00	0.00	nd	nd	nd	nd
Percent Solids (%)			n/a	77.3	73.9	77.1	72.3	74.1	64.4
Dilution Factor			1.0	1.0	1.0	1.0	1.0	1.0	1.0
Data Flags									



Sampled By: Stephen Shore

DAL Project No.: 131224-04

Preparation Method: US EPA 3550C Analytical Method: NWTPH-Dx Date Prepared: 12/31/2014 Date Analyzed: 1/12/2014 Analyst: GD Data Reviewed By: DRAGON ANALYTICAL LABORATORY

530 A1 Ronlee Ln, Olympia, WA 98502 (360) 866-0543

Hazardous Waste, Microbiology, NPDES, Potable and Non-potable Water Mobile Environmental Laboratory



Project Name: Pond Project No.: 9313352 P.O. No.: n/a Date Collected: 12/23/2013; 09:30-11:20 Date Received: 12/24/2013; 14:04 Temperature Received (°C): n/a Report Date: 1/13/2014

> Units: mg/kg Matrix: Soil Reporting Limits: Standard Injection Volume: 3 uL Instrument ID: Shimadzu GC-14A Lab Data File: n/a

Sample Identification	CAS No.	MRL	Method Blank	N46.621533 E- 122.916224	N46.621343 E- 122.916109	N46.621237 E- 122.916086	N46.621191 E- 122.916224	N46.621122 E- 122.916296	N46.621059 E- 122.916188
Mineral Oil	64742-47-8	100	nd	nd	nd	nd	nd	nd	nd
Percent Solids (%)			n/a	73.6	69.7	75.0	78.6	72.4	72.8
Dilution Factor			1.0	1.0	1.0	1.0	1.0	1.0	1.0
Data Flags									



DAL Project No.: 131224-04

CCS

DRAGON ANALYTICAL LABORATORY

530 A1 Ronlee Ln, Olympia, WA 98502 (360) 866-0543

Hazardous Waste, Microbiology, NPDES, Potable and Non-potable Water Mobile Environmental Laboratory



Project Name: Pond Project No.: 9313352

DIESEL & OIL QUALITY CONTROL RESULTS

SURROGATE RECOVERY

		Method	N46.621231 E-	N46.621252 E-	N46.621308 E-	N46.621510 E-	N46.621530 E-	N46.621623 E-
Surrogate	Limits (%)	Blank	122.916347	122.916329	122.916317	122.916142	122.916411	122.916377
2-FBP	50-150	94.7	108	95.6	81.8	65.0	89.9	73.2
			N46.621533 E-	N46.621343 E-	N46.621237 E-	N46.621191 E-	N46.621122 E-	N46.621059 E-
Surrogate	Limits (%)		122.916224	122.916109	122.916086	122.916224	122.916296	122.916188
2-FBP	50-150		77.5	57.4	100	66.6	60.4	61.0

LABORATORY CONTROL SAMPLE AND MATRIX SPIKE

#### QC Batch ID: 140112-Fuels

	MS/MSD	MS/MSD	Sample	MS				MS/MSD		LCS	LCS	LCS	LCS
	Limits	Level	Conc.	Recovery	MS Percent	MSD Recovery	MSD Percent	RPD		Limits	Level	Recovery	Percent
Analyte	(%)	(mg/kg)	(mg/kg)	(mg/kg)	Recovery	(mg/kg)	Recovery	Limits	RPD	(%)	(mg/kg)	(mg/kg)	Recovery
Diesel Fuel #2	65-135	500	nd	424	84.9%	459	91.8%	≤ 15%	3.95	65-135	500	386	77.3%

WA-DOE-Laboratory Certification No.: C890

"nd" indicates the analyte was not detected at or above the listed Method Reporting Limit.

"n/a" indicates not applicable

Sample results based on dry weight.

Comments and Explanations: None.



Sampled By: Stephen Shore

DAL Project No.: 131224-02

Preparation Method: US EPA 3550C Analytical Method: NWTPH-Dx Date Prepared: 1/10/2014 Date Analyzed: 1/10/2014 Analyst: GD Data Reviewed By: DRAGON ANALYTICAL LABORATORY

530 A1 Ronlee Ln, Olympia, WA 98502 (360) 866-0543

Hazardous Waste, Microbiology, NPDES, Potable and Non-potable Water Mobile Environmental Laboratory



Project Name: Ditch Line Project No.: 9313352 P.O. No.: n/a Date Collected: Unknown; 13:30-14:20 Date Received: 12/24/2013; 14:06 Temperature Received (°C): n/a Report Date: 1/9/2014

> Units: mg/kg Matrix: Soil Reporting Limits: Standard Injection Volume: 3 uL Instrument ID: Shimadzu GC-14A Lab Data File: n/a

Sample Identification	CAS No.	MRL	Method Blank	N46.621764 E- 122.915944	N46.621512 E- 122.916117	N46.621494 E- 122.916165	N46.621572 E- 122.916366	N46.621687 E- 122.915887	N46.621351 E- 122.915729
Mineral Oil	64742-47-8	100	nd	nd	nd	nd	nd	nd	76.9
Percent Solids (%)			n/a	81.4	77.7	76.6	76.2	80.7	81.8
Dilution Factor			1.0	1.0	1.0	1.0	1.0	1.0	1.0
Data Flags									



DAL Project No.: 131224-02

CCS

DRAGON ANALYTICAL LABORATORY

530 A1 Ronlee Ln, Olympia, WA 98502 (360) 866-0543

Hazardous Waste, Microbiology, NPDES, Potable and Non-potable Water Mobile Environmental Laboratory



Project Name: Ditch Line Project No.: 9313352

DIESEL & OIL QUALITY CONTROL RESULTS

SURROGATE RECOVERY

		Method	N46.621764 E-	N46.621512 E-	N46.621494 E-	N46.621572 E	N46.621687 E-	N46.621351 E-
Surrogate	Limits (%)	Blank	122.915944	122.916117	122.916165	122.916366	122.915887	122.915729
2-FBP	50-150	101	107	96.6	96.7	79.1	114	68.2

#### LABORATORY CONTROL SAMPLE AND MATRIX SPIKE

#### QC Batch ID: 140110-Fuels

	MS/MSD	MS/MSD	Sample	MS				MS/MSD		LCS	LCS	LCS	LCS
	Limits	Level	Conc.	Recovery	MS Percent	MSD Recovery	MSD Percent	RPD		Limits	Level	Recovery	Percent
Analyte	(%)	(mg/kg)	(mg/kg)	(mg/kg)	Recovery	(mg/kg)	Recovery	Limits	RPD	(%)	(mg/kg)	(mg/kg)	Recovery
Diesel Fuel #2	65-135	1000	109	1174	106%	1188	108%	≤ 15%	0.668	65-135	1000	1059	106%

WA-DOE-Laboratory Certification No.: C890

"nd" indicates the analyte was not detected at or above the listed Method Reporting Limit.

"n/a" indicates not applicable

Sample results based on dry weight.

Comments and Explanations: None.



Sampled By: Stephen Shore

DAL Project No.: 131224-01

Preparation Method: US EPA 3550C Analytical Method: NWTPH-Dx Date Prepared: 12/31/2013 Date Analyzed: 1/10/2014 Analyst: GD Data Reviewed By: DRAGON ANALYTICAL LABORATORY

530 A1 Ronlee Ln, Olympia, WA 98502 (360) 866-0543

Hazardous Waste, Microbiology, NPDES, Potable and Non-potable Water Mobile Environmental Laboratory



Project Name: Roadway Project No.: 9313352 P.O. No.: n/a Date Collected: 12/23/2013; 14:30-15:20 Date Received: 12/24/2013; 14:06 Temperature Received (°C): n/a Report Date: 1/13/2014

> Units: mg/kg Matrix: Soil Reporting Limits: Standard Injection Volume: 3 uL Instrument ID: Shimadzu GC-14A Lab Data File: n/a

Sample Identification	CAS No.	MRL	Method Blank	N46.621762 E- 122.915918	N46.621625 E- 122.916159	N46.621748 E- 122.916081	N46.621541 E- 122.915932	N46.621506 E- 122.915576	N46.621664 E- 122.916039
Mineral Oil	64742-47-8	100	nd	nd	nd	nd	nd	nd	nd
Percent Solids (%)			n/a	95.5	95.1	93.9	94.8	95.3	93.2
Dilution Factor			1.0	1.0	1.0	1.0	1.0	1.0	1.0
Data Flags									



DAL Project No.: 131224-01

CCS

DRAGON ANALYTICAL LABORATORY

530 A1 Ronlee Ln, Olympia, WA 98502 (360) 866-0543

Hazardous Waste, Microbiology, NPDES, Potable and Non-potable Water Mobile Environmental Laboratory



Project Name: Roadway Project No.: 9313352

DIESEL & OIL QUALITY CONTROL RESULTS

SURROGATE RECOVERY

		Method	N46.621762 E-	N46.621625 E-	N46.621748 E-	N46.621541 E-	N46.621506 E-	N46.621664 E-
Surrogate	Limits (%)	Blank	122.915918	122.916159	122.916081	122.915932	122.915576	122.916039
2-FBP	50-150	94.7	97.2	63.1	91.4	69.0	89.2	58.4

#### LABORATORY CONTROL SAMPLE AND MATRIX SPIKE

#### QC Batch ID: 140110-Fuels

	MS/MSD	MS/MSD	Sample	MS				MS/MSD		LCS	LCS	LCS	LCS
	Limits	Level	Conc.	Recovery	MS Percent	MSD Recovery	MSD Percent	RPD		Limits	Level	Recovery	Percent
Analyte	(%)	(mg/kg)	(mg/kg)	(mg/kg)	Recovery	(mg/kg)	Recovery	Limits	RPD	(%)	(mg/kg)	(mg/kg)	Recovery
Mineral Oil	65-135	500	nd	424	84.9%	459	91.8%	≤ 15%	3.95	65-135	500	386	77.3%

WA-DOE-Laboratory Certification No.: C890

"nd" indicates the analyte was not detected at or above the listed Method Reporting Limit.

"n/a" indicates not applicable

Sample results based on dry weight.

Comments and Explanations: None.



Sampled By: Stephen Shore

DAL Project No.: 131224-03

Preparation Method: US EPA 3550C Analytical Method: NWTPH-Dx Date Prepared: 1/10/2014 Date Analyzed: 1/10/2014 Analyst: GD Data Reviewed By: DRAGON ANALYTICAL LABORATORY

530 A1 Ronlee Ln, Olympia, WA 98502 (360) 866-0543

Hazardous Waste, Microbiology, NPDES, Potable and Non-potable Water Mobile Environmental Laboratory



Project Name: N. Pond Ditch 1-5/Culvert Collection 6 Project No.: 9313352 P.O. No.: n/a Date Collected: 12/23/2013; 12:30-13:10 Date Received: 12/24/2013; 14:07 Temperature Received (°C): n/a Report Date: 1/13/2014

> Units: mg/kg Matrix: Soil Reporting Limits: Standard Injection Volume: 3 uL Instrument ID: Shimadzu GC-14A Lab Data File: n/a

Sample Identification	CAS	MRL	Method	N46.621926 E-	N46.621681 E-	N46.621618 E-	N46.621716 E-	N46.621717 E-
Sample Identification	No.		Blank	122.916229	122.916334	122.916128	122.916256	122.916379
Mineral Oil	64742-47-8	100	nd	nd	nd	nd	128	nd
Percent Solids (%)			n/a	75.3	77.2	75.5	74.7	76.3
Dilution Factor			1.0	1.0	1.0	1.0	1.0	1.0
Data Flags								



DAL Project No.: 131224-03

CCS

DRAGON ANALYTICAL LABORATORY

530 A1 Ronlee Ln, Olympia, WA 98502 (360) 866-0543

Hazardous Waste, Microbiology, NPDES, Potable and Non-potable Water Mobile Environmental Laboratory



Project Name: N. Pond Ditch 1-5/Culvert Collection 6 Project No.: 9313352

DIESEL & OIL QUALITY CONTROL RESULTS

SURROGATE RECOVERY

		Method	N46.621926 E-	N46.621681 E-	N46.621618 E-	N46.621716 E-	N46.621717 E-
Surrogate	Limits (%)	Blank	122.916229	122.916334	122.916128	122.916256	122.916379
2-FBP	50-150	101	107	97.6	73.6	105	66.6

#### LABORATORY CONTROL SAMPLE AND MATRIX SPIKE

#### QC Batch ID: 140110-Fuels

	MS/MSD	MS/MSD	Sample	MS				MS/MSD		LCS	LCS	LCS	LCS
	Limits	Level	Conc.	Recovery	MS Percent	MSD Recovery	MSD Percent	RPD		Limits	Level	Recovery	Percent
Analyte	(%)	(mg/kg)	(mg/kg)	(mg/kg)	Recovery	(mg/kg)	Recovery	Limits	RPD	(%)	(mg/kg)	(mg/kg)	Recovery
Mineral Oil	65-135	500	nd	424	84.9%	459	91.8%	≤ 15%	3.95	65-135	500	386	77.3%

WA-DOE-Laboratory Certification No.: C890

"nd" indicates the analyte was not detected at or above the listed Method Reporting Limit.

"n/a" indicates not applicable

Sample results based on dry weight.

Comments and Explanations: None.

#### APPENDIX C

#### PACIFICORP GROUNDWATER INVESTIGATION

#### JANUARY 2014



#### A Professional Environmental Service Corporation

KTA Associates, Inc. 800 5<sup>th</sup> Avenue Suite 4100 Seattle, WA 98104 206-447-1450 www.ktainc.net

January 8, 2014

Jeremy Smith Mark Miller Chehalis Power Plant PacifiCorp Energy 1813 Bishop Road Chehalis, WA 98532

#### Re: Chehalis Power Plant GSU#1 Transformer Oil Spill Groundwater Investigation

Dear Jeremy and Mark,

KTA Associates, Inc. is pleased to provide the Groundwater Investigation Report prepared by CardnoTEC for the GSU#1 Transformer Oil Spill for the Chehalis Power Plant. The groundwater well installation was conducted October 28 – 29, 2013, with well sampling on November 1, 2013. Well MW-2 was not installed, however, a groundwater sample was obtained, therefore we have one complete set of groundwater and soil sample results. All of the samples were were non-detect for mineral oil, with the exception of MW-2, which was 380  $\mu$ g/L, below the groundwater MTCA A cleanup level of 500  $\mu$ g/L.

This report is provided in two versions, with and without the laboratory report from ALS Environmental, as the lab report is over 300 pages long. KTA and CardnoTEC appreciate the opportunity to support both you and PacifiCorp. We look forward to working with you on the continued remediation plans.

Sincerely, **KTA Associates, Inc**.

Lenon Destoroh

Lenora E Westbrook, PE Senior Environmental Engineer

Attachment

Attachment 1

PacifiCorp Groundwater Investigation Report

by CardnoTEC

## PacifiCorp Groundwater Investigation

PacifiCorp Chehalis Plant

90154

Prepared for PacifiCorp

January 2014





## **Document Information**

Prepared for	KTA Associates, Inc.
Project Name	PacifiCorp Groundwater Investigation
File Reference	Document 2 (Final Report)
Job Reference	P90154
Date	07January 2014

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Project Manager, Brian Rupert

## **Document Control**

Version	Date	Author	Author Initials	Reviewer	Reviewer Initials
002	01/07/2014	B Rupert	BR	1. DC Metallo	DCM

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## Abbreviations and Acronyms

AST	above ground storage tank
ASTM	American Society for Testing Material
Bgs	below ground surface
Cardno TEC	Cardno TEC, Inc.
CCS	Cowlitz Clean Sweep
CoC	chain of custody
DO	dissolved oxygen
DOT	Department of Transportation
DPT	direct push technology
IDW	investigation-derived waste
IFP	interface probe
KTA	KTA Associates, Inc.
mg/kg	milligrams per kilograms
MTCA	Model Toxics Control Act
PVC	polyvinyl chloride
SI	Site Investigation
TPH-Dx	total petroleum hydrocarbons – diesel extended range
TPH-Gx	total petroleum hydrocarbons – gasoline extended range
WAC	Washington Administration Code
Ug/L	micrograms per liter
USCS	Unified Soil Classification System

## 1 Introduction

#### 1.1 Purpose

Cardno TEC Inc. (Cardno TEC) was contracted by KTA Associates, Inc. (KTA) to install, develop and sample three newly installed groundwater monitoring wells at the PacifiCorp Chehalis Plant located in Chehalis, Washington. The monitoring well installation and well development field work was conducted between October 28<sup>th</sup> and 29<sup>th</sup>, 2013. The groundwater sampling was completed on November 1, 2013. Figure 3-1 shows the newly installed monitoring well locations.

The primary objectives of the groundwater sampling activities were to:

• Determine if shallow groundwater has been impacted from areas with previously identified concentrations of mineral oil above regulatory limits.

#### 1.2 Original Scope

To meet the above stated objectives, the scope of work for this groundwater investigation consisted of the following field activities:

#### Groundwater Investigation

Installation of shallow (≤ 30' below grade surface) groundwater monitoring wells at three locations using a Geoprobe® direct push drill (DPT). Sample results will be used to determine if shallow groundwater has been impacted from a previous mineral oil spill.

#### Subsurface Soil Sampling Activities

Collect a minimum of one subsurface soil sample from each boring during monitoring well installation. Collect up to two additional soil samples from each boring if mineral oil impacted soil is encountered.

#### 1.3 Scope Modification

Of the three monitoring well installations originally scoped, only two were actually completed. This was due to encountering utilities beneath the cleared PacifiCorp approved location selected for MW-2. After reaching the targeted depth of 30-feet below grade surface at soil boring #2 (SB-2) (logging lithology and collecting the requisite soil sample) the DPT sampling rods and core unit were removed from the boring. A small piece of HDPE plastic material, similar to material used for fire water supply pipe coating was found in one of the five-foot sampler core units that were previously removed from the boring. The fire water supply line was known to be within this area, and was spray marked on the ground several feet away. The drill crew had re-tooled and driven down approximately 18-feet of larger diameter well casing rods (hitting refusal at this depth). Because PacifiCorp had concerns that the small piece of HDPE may have been generated due to a glancing blow to the fire water supply line, they requested that no further drilling / well installation activities occur at this location. Therefore no permanent well was completed at this location. However, prior to removing the well casing rods, as there was water in the borehole, a groundwater grab sample was collected directly from the casing rods via the same methodology as the other site wells (further explained below). Cardno TEC worked closely with on-site KTA and PacifiCorp personnel to determine a mutually-agreed upon course of action. This was the only modification of the original scope that occurred during the course of the planned field efforts.

#### 1.4 Report Organization

This SI Report has been organized into the following sections:

- > Section 1.0 Introduction
- > Section 2.0 Site Background
- > Section 3.0 Sampling Events
- > Section 4.0 Analytical Results
- > Section 5.0 References

Discussions of the procedures and methods of the groundwater investigation and data collected are presented in the main text of this report. The boring logs, water quality and well development forms are presented in Appendices A and B.

### 2 Site Background

#### 2.1 Site Description

PacifiCorp owns and maintains a natural gas-fired combined cycle power plant, which produces 520-megawatts of electricity. The plant is located at 1813 Bishop Road, Chehalis, Washington, in the Chehalis River Valley.

The Chehalis River Valley is considered a rural area, with approximately 7,000 residents living in and around the city. The plant is located 3 miles south of town, which consists mostly of small parks, farms, small pockets of light industrial areas, and a few housing subdivisions.

#### 2.1.1 <u>Geology</u>

The overall soil-type distribution at the site consists of low permeability silt and clay layer underlain by 45 to 50 feet of water-bearing sand and gravel, underlain by a silt and clay aquitard. These soil-types are consistent with regional geologic mapping by Weigle and Foxworthy (1962) and a regional study for the Chehalis Generation facility (Dames and Moore 1994). These regional studies classify the upper 50 feet of soil in the area of the site as recent alluvium and glaciofluvial sediments. The aquitard found at approximately 50 feet bgs is widespread, is often described as blue-gray, clayey silt, and is reported to be more than 100 feet thick (Dames and Moore 1994).

#### 2.1.2 <u>Hydrogeology</u>

The groundwater flow direction beneath the site is assumed to travel south/southwest towards Bishop Road and Berwick Creek. Regional investigations conducted by others (Dames and Moore 1994) have categorized the shallow aquifer in the area as unconfined or semi-confined. However, the shallow aquifer appears to exhibit the characteristics of a confined or semi-confined aquifer, primarily due to the low permeably silt cap immediately above the aquifer.

#### 2.2 Previous Investigation/Cleanup Efforts

Cowlitz Clean Sweep (CCS) completed a site cleanup (CCS 2011) at the PacifiCorp Chehalis Plant during the months of January through March, 2011. CCS removed floating product from the stormwater pond and ditch lines using oil booms, absorbent material, an oil skimmer and vacuum truck. The stormwater ditch lines were cleaned by removing contaminated material down to the clay layer.

CCS sampled affected areas and ditches for analysis to determine the extent of oil contamination; additional soil and water sampling was conducted after cleanup.

The main excavation occurred at or near the transformer that caught fire and subsequently leaked mineral oil to the surrounding areas. Contaminated soil was removed to a depth of six inches below the static groundwater line using olfactory methods (i.e., visual). During the excavation, free product was noted floating on top of the water and absorbent materials were deployed in the excavation area to remove the product. All excavated materials were loaded onto waiting dump trucks and taken to the Weyerhaeuser transfer station located in Longview, WA for disposal.

Once the excavations had been completed, the area around the transformer was backfilled with clean material and compacted to the required 95% compaction. All ditch lines were relined with clean gravel to prevent sediment loss and water quality issues.

Water collected during excavation activities completed near and around the transformer area was pumped to the on-site 1.7 million gallon diesel above ground storage tank (AST) and the AST containment area.

CCS removed 845 tons of rock and soil and 8,869 gallons of water from affected areas during excavation activities. CCS backfilled the excavations with 92 tons of 2 to 4 inch quarry spalls and 462 tons of 1 ¼" rock to help achieve the required 95% compaction standard.

### 2.3 **Previous Site Investigation**

Cardno TEC completed a Site Investigation (SI) (Cardno TEC 2011) at the PacifiCorp Chehalis Plant on May 23<sup>rd</sup> through May 25<sup>th</sup>, 2011 (Figure 2-1). Cardno TEC conducted the SI to determine the following:

- If groundwater has been impacted from the mineral oil spill;
- If the large AST used to contain the water collected during excavation activities exceeded any regulatory levels, and;
- If surface water in the stormwater pond has been impacted from the mineral oil spill.

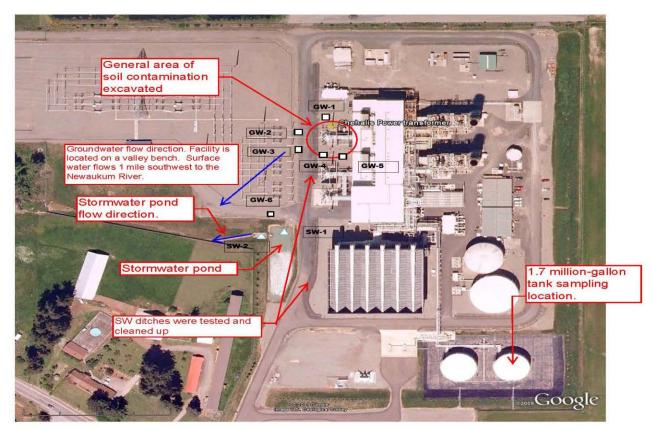
Cardno TEC completed the following activities during the SI:

- Installed and sampled six temporary monitoring wells placed within the shallow water bearing zone;
- Collected two water samples from the AST at varying depths;
- Collected two surface water samples from the stormwater pond, and;
- Collected three surface soil samples downgradient of the mineral oil spill.

The results are as follows:

- One groundwater location (GW-4) had a detection of 1100 ug/L, which exceeded the Model Toxics Control Act (MTCA) method cleanup level for groundwater;
- One AST sample (TS2) had a detection of 440 ug/L, which did not exceed the MTCA cleanup level;
- One surface water sample (SW1) had a detection of 360 ug/L, which did not exceed the MTCA cleanup level, and;
- One soil sample (SG1) had a detection of 160 mg/kg, which did not exceed the MTCA cleanup level.





# 3 Sampling Event

### 3.1 Groundwater Investigation

Installation and sampling of newly installed monitoring wells was conducted as a component of the groundwater investigation activities. Samples were analyzed for mineral oil using total petroleum hydrocarbons – diesel extended range (TPH-Dx).

The objective most pertinent to the groundwater investigation was to:

• Determine if shallow groundwater has been impacted from the previous 2011 mineral oil spill;

Sample locations are shown on Figure 3-1. A description of groundwater related investigation activities at the PacifiCorp Chehalis Plant is provided below.





### 3.1.1 Groundwater Sample Locations

Groundwater monitoring wells were installed in the shallow water bearing zone at two of the three locations as listed in Table 3-1 and shown in Figure 3-1. These wells were screened from 4.5 feet to 17 feet below ground surface (bgs) at MW-1 and from 4 feet to 19 feet bgs at MW-3 (Table 3-2). Monitoring well (MW-1) was positioned adjacent to a previous soil sample (D-8) which was collected under the transformer containment area. Monitoring well (MW-2) was positioned bear a previous groundwater sample location (GW-4). Monitoring well (MW-3) was positioned downgradient from the transformer in a location outside the spill containment area to triangulate groundwater level and flow direction.

### 3.1.2 Monitoring Well Installation Activities

Flush mount monitoring wells were installed at two locations (MW-1 and MW-3) using a track mounted directpush GeoProbe® rig by Cascade DRILLING L.P. The monitoring wells installed consisted of two-inch inside diameter polyvinyl chloride (PVC) pipe with GeoProbe® prepack well screens (10 slot) containing 20/40 grade environmental sand (Table 3-1). Monitoring wells were installed in accordance with Washington Administrative Code (WAC 173-160 and -162). Monitoring wells were properly developed using U.S. Environmental Protection Agency guidelines (US EPA, 1992). Boring log details are provided in Appendix A.

Location	Completion Type	Final Depth to water (bgs) <sup>1</sup>	Total Depth (bgs) <sup>1</sup>	Screen Length (bgs) <sup>1</sup>	Sand Pack (bgs) <sup>1</sup>	Bentonite Seal (bgs) <sup>1</sup>	Surface Seal (bgs) <sup>1</sup>
GW-1	Flush Mount	5	17	4.5-17	3-17	2-3	0-2
GW-2	NA	NA <sup>3</sup>	NA <sup>3</sup>	NA <sup>3</sup>	NA <sup>3</sup>	NA <sup>3</sup>	NA <sup>3</sup>
GW-3	Flush Mount	~18 to $20^{2}$	19	4-19	3-19	2-3	0-2

Table 3-1	Monitoring Well Construction detail
-----------	-------------------------------------

Notes:

<sup>1</sup> bgs - below grade surface <sup>2</sup> Water level collected from boring log, well was dry after completion

<sup>3</sup> Monitoring well could not be installed, sampled collected directly from boring.

### 3.1.3 Monitoring Well Survey Information

A relative survey of the monitoring well casings and the grade surface adjacent to each well was conducted. An auto-level and hand held survey grade stadia rod were used to collect the elevation measurements. An elevation of 100.00' was assigned to a point on the southwest corner of the containment wall surrounding GSU-1. A reference mark was placed on the top of the wall as close to the corner as possible. A back site was also established using the top of the southeast bolt of the A-Phase pole associated with GSU-1. Table 3-2 present the data collected during the site survey.

Location	Grade Surface elevation (ft)	Top PVC Casing (ft)	Backshot at start of survey event	Backshot at end of survey event
SW corner GSU-1 cont. wall	100.00	NA	98.26	98.26
GW-1	98.06	97.76	NA	NA
SB-2	98.14	NA	NA	NA
GW-3	97.93	97.58	NA	NA

\*All elevations are referenced to the top of the SW corner of the GSU-1 containment wall. The location was assigned an elevation of 100.00' above mean sea level.

### 3.1.4 Monitoring Well Sampling Activities

The newly installed monitoring wells (MW-1 and MW-3) were allowed to settle and equilibrate for two days prior to sampling activities. The presence of light non-aqueous phase liquid at each location was checked using an oil/water interface probe prior to sampling (Table 3-3).

A peristaltic pump with dedicated (i.e., disposable) tubing was used to obtain groundwater samples after purging each well location using low-flow sampling techniques. Monitoring wells were purged until water quality readings stabilized.

Parameter measurements recorded during purging were: conductivity, temperature, pH, dissolved oxygen (DO) and turbidity). Water quality parameters are presented in Table 3-3.

Water quality parameter information collected from each well includes purge rate, water level, and cumulative volume of groundwater purged from well at each interval (Appendix B).

Sample ID	Depth to water feet btoc) <sup>1</sup>	Depth to product (feet btoc) <sup>1</sup>	Screened interval (feet btoc) <sup>1</sup>	Time	Temp (°C)	рН	Sp. Cond. <sup>3</sup>	Turbidity <sup>4</sup>	DO⁵
GW1-110113	5.10	ND <sup>2</sup>	4.5-17	1040	16.08	6.72	0.196	83	0.86
GW2-102913	13.00	ND <sup>2</sup>	NA <sup>6</sup>	NA <sup>6</sup>	NA <sup>6</sup>	NA <sup>6</sup>	NA <sup>6</sup>	NA <sup>6</sup>	NA <sup>6</sup>
GW3-110113	13.50	ND <sup>2</sup>	4-19	1310	14.2	6.39	25.5	545	10.20

### Table 3-3 Monitoring Well Water Quality Readings

Notes:

<sup>1</sup> feet (btoc) – below top of casing

<sup>2</sup> ND – not detected
 <sup>4</sup> NTU – nephelometric turbidity units

<sup>3</sup> mS/cm – milli seimens/centimeter <sup>5</sup> mg/L – milligrams per liter

<sup>6</sup> Monitoring well could not be installed, sampled collected directly from boring.

### 3.1.5 Well Abandonment Procedures

Boring location (SB-2) was properly abandoned in accordance with WAC 173-160. A monitoring well could not be completed at SB-2 due to the presence of utilities in close proximity to this location, as noted above. Additional well installation efforts at SB-2 were discontinued per the client's direction.

### 3.2 Subsurface Soil Sampling Activities

Samples of subsurface soil were collected during DPT drilling activities at MW-1, SB-2 and MW-3. Material was collected continuously in five foot intervals using stainless steel Macro-Core® soil core units, which were each fitted with new, pre-cleaned disposable PVC liners. Stainless steel spoons were used to collect material from within the Macro-Core® liners at desired depths. Soil sample material was placed into stainless steel bowls and thoroughly homogenized prior to being placed directly into pre-labeled analytical jars. These jars were stored in clean insulated coolers containing ice. Table 3-4 shows the sampling depths and time for each subsurface soil sample collected.

Table 3-4	SubSurface Soil Sampling Depths
-----------	---------------------------------

Sample ID	Time	Sample depth (feet bgs <sup>1</sup> )	Material
SB1-5-102813	1115	4 to 5	Dark grey (2.5Y 4/1) and Olive Brown (2.5Y 4/4) slightly moist, mottled, w/ browns, reds, greys, Silt and silty lean Clay. (SM-CL)
SB2-6-102813	1450	5 to 6.5	Very dark greyish brown (2.5Y 3/2), very moist to wet, fine to coarse grain, well graded Sand, with trace silt and small pebbles. (SW)
SB3-5-102913	1100	3.5 to 5.5	Light olive brown (2.5Y 5/4) slightly moist, Clay, mottled color, very stiff to tight. (CH)

Notes:

<sup>1</sup> feet (bgs) – below ground surface

### 3.3 Field Methods

The following sections describe the use of additional field equipment as well as sample handling and documentation procedures during the sampling event.

### 3.3.1 <u>Utility Location</u>

All underground utilities were located and marked by PacifiCorp personnel prior to Geoprobe<sup>®</sup> DPT drilling activities.

### 3.3.2 Handling Procedures

After samples were placed in appropriately labeled containers they were immediately transferred to ice filled coolers to keep them out of the direct sunlight and to maintain a temperature of four degrees centigrade. Disposable nitrile gloves were used by personnel collecting and handling the samples and were changed frequently and in between each sample collection to avoid cross contamination.

Chain of Custody (CoC) forms were completed to accompany each cooler from the field to the laboratory. The date, time, sample location, number of containers, and analysis to be performed was recorded on each CoC. Samples were hand delivered by field staff to ALS Environmental of Kelso, WA at conclusion of the sampling event.

### 3.3.3 Record Keeping

A field activity log book was used to document the sampling procedures performed by field personnel. More specifically, the field log provided a record of specific sample location and collection information, noted other contractors involved during the field sampling and their role(s), described the major equipment used at each location and provided noteworthy observations, problems, or incidents. Field data sheets were completed for all groundwater sampling components of the study and were stored with the field activity log book. Copies of the field data sheets are included in Appendices A and B.

### 3.3.4 Lithology Documentation

The lithology from the boring locations were continuously logged during drilling (Appendix B). Information collected on the lithology logs included borehole location; drilling information; information such as logging intervals, recovery; and sample description information.

Lithologic descriptions of unconsolidated materials encountered in the boreholes were described in accordance with American Society for Testing and Materials (ASTM) D-2488-00 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) (ASTM, 1990). Descriptive information recorded included:

- identification of the predominate particles size and range of particle sizes;
- percent of gravel, sand, fines, or all three;
- description of grading and sorting of coarse particles;
- particle angularity and shape; and
- maximum particle size or dimension. Separate identification of the Unified Soil Classification System (USCS) group symbol was also used.

Additional information recorded on the logs included the depth of the water table, caving or sloughing of the borehole, changes in drilling rate, presence of organic materials, and other noteworthy observation or conditions.

### 3.3.5 Sample Identification and Labeling

Samples collected in the field as part of this project were identified by their media type (i.e., GW and SB), location (i.e., 1, 2 or 3) and the corresponding date a sample was collected. Soil samples collected from each boring were also designated with the depth at which each sample was collected. Sample identification numbers, including sample media type, location number, media and depths were recorded on field sheets completed for each location or sample.

### 3.3.6 Instrument Calibration

All field instruments that require a zeroing and/or a user calibration were appropriately calibrated at the start of each day's deployment per the instrument manufacturer's instructions. Calibration checks against standards were performed at the beginning and periodically throughout each field day to verify equipment operation.

Calibration data were recorded in the field logbook. All calibration media (i.e., gas, liquid or otherwise) were properly stored and managed per manufacturer's recommendations.

### 3.3.7 Decontamination Procedures

All non-disposable equipment that was exposed to site soils and then re-used for multiple sample collection was decontaminated after completing a temp well at each location. The decontamination wash consisted of:

- > non-phosphate detergent (Alconox) and water wash;
- > tap water rinse; and
- > de-ionized water rinse.

#### 3.3.8 Summary of Investigation-Derived Waste Characterization

Investigation-derived waste (IDW) generated by this project generally consisted of soil cuttings, excess groundwater generated during development and sampling activities and decontamination/rinse water. All IDW was containerized in two Department of Transportation (DOT) approved 55-gallon drums, which were segregated by media, and stored in a PacifiCorp approved storage area. All drums were properly labeled with their contents, date, where the waste came from and generation dates. After properly containing the project derived wastes and labeling of the containers, all further IDW management and disposal was handled directly by PacifiCorp.

## 4 Analytical Results

This section summarizes the results of the groundwater and subsurface soil sampling activities completed at the PacifiCorp Chehalis Plant.

### 4.1 TPH-Dx

TPH-Dx was detected at location MW-2 at a concentration of 380 Y ug/L, which is below the MTCA method A cleanup level of 500 ug/L for groundwater. None of the soil samples collected as part of the well installations exceeded the MTCA A soil cleanup standards. Results and screening levels for groundwater and soil samples are summarized in Tables 4-1 and 4-2. Complete groundwater and soil analytical sample results are provided in Appendices C and D, respectively.

Location Type	Sample ID	TPH-Dx Results (ug/L)	TPH-Dx MTCA A Screening Level (ug/L)
MW-1	GW1-110113	ND	500
MW-2	GW2-102913	380 Y	500
MW-3	GW3-110113	ND	500

#### Table 4-1 Groundwater Sample Results and Screening Levels

Notes:

ND – not detected ug/L – micrograms per liter

Y = the chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.

Location Type	Sample ID	Sample depth (bgs)	TPH-Dx Results (mg/kg)	TPH-Dx MTCA A Screening Level (mg/kg)
MW-1	SB1-5-102813	5	ND	4,000
MW-2	SB2-6-102813	6	ND	4,000
MW-3	SB3-5-102913	5	ND	4,000

Notes:

ND - not detected

NA – not applicable

mg/kg - milligrams per kilogram bgs - below ground surface

## 5 References

Cardno TEC Inc. (Cardno TEC) 2011. Site Investigation Report, PacifiCorp Chehalis Plant, Chehalis, Washington.

Cowlitz Clean Sweep (CCS) 2011. Mineral Oil Split Cleanup Report, Chehalis, Washington.

- Dames and Moore, Inc. 1994. *Groundwater Resources Investigation for Ecology Groundwater Right Application No. G2-29004.* Prepared for Chehalis Power, Inc. Chehalis, Washington. July 7.
- Washington State Department of Ecology (DOE) 2007. *Model Toxics Control Act.* Cleanup screening levels for TPH is soil and groundwater.

2008. Minimum Standards for Construction and Maintenance of Wells. Washington Administration Code 173-160.

- U.S. Environmental Protection Agency (US EPA) 1992. *Monitoring Well Development Guidelines for Superfund Project Managers.*
- Weigle, J.M. and B.L. Foxworthy 1962. *Geology and Groundwater Resources of Western Central Lewis County, Washington.* Water Supply Bulletin No. 17. State of Washington Department of Conservation, District of Water Resources.



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### ATTACHMENT A

### LITHOLOGY BORING LOGS & WELL CONSTRUCTION INFORMATION

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Site Name: Sample Lo	Site Name: <u>PacifiCorp</u> Sample Location X-Ref ID: <u>(field well ID)</u> Usion of D: MM/2-340443	f ID: (field		MW-3 (1040)		Purge S Mid Scr	Purge Style: Reristaltic/ Bladde Mid Screen Depth (ft btoc): 15 Dimo Intolo (4 btoc) 16 25 to	%/ Bladder / S (toc): <u>15</u>	Purge Style: <u>Reristaltic</u> / Bladder / Submersible /Other Mid Screen Depth (ft btoc): <u>15</u> Dumo Intolo (4 btoc) <u>16 25 to 10</u>
Sampler(s)	Sampler(s) <u>B. Rupert</u>	2				QC San	CUTIP IIIIAKE (IL DLOC) <u>10.33 (0 10</u> QC Sample: Y / N Type: <u>ES Sample</u>	r <u>o. 23 (0 10</u> /pe: <u>ES San</u>	ple
Parameters	Parameters: <u>NWTPH-Dx</u>	XC			•	A.	19.20'		
Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp.	Ha	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO DO	Comments
	Stabiliz	Stabilization Requirements	uirements	( ± 10% )	(±0.2)	( ± 10% )	(±10%)	( ± 10% )	
0908			13,50						Initial water level, pre-pumping
	2 loome	~1002	15,50	14.34	6.98	1,25	12	Sisa	B.C
1015	-loome	1-20022	15.90	14.20	7.21	921	21	5:36	
020	rloom	Nan/~	16.30	(1)H	7.23	1.44	6	5.23	
	2100m	2 1500 M	しょうし	14,08	7.35	1149	n	Silt	
2501 01-BC	rloom	~ 20001	17.15	14.08	7.40	1,56	5	s s	
~ 1040 ~	2100 ~1	~25004		14.05	7.37	1:59	൭	Й.93	1 toold sumple
									Thur to can when
									level & cittle to NO
								-	Recharge Conginal
									Samples Collected
			<sup>1</sup> Water L	evel Measul	rements in t	hese boxes	'Water Level Measurements in these boxes must match !		at start were not
1040		~2Saun	13,50	14.05	7.37	1:59	ຄ	4,93	
(ana)									

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

PAGE \_\_\_ OF \_\_\_\_

	Date. Of MOREIPOI FOID	013					PIU Borenole Keading: N/A	N/A	
Project I	Project Name: PacifiCorp Groundwater Investigatio	orp Ground	water Invest	tigation		LNAPL:	LNAPL: Y N X_ DNAPL: Y		N X Product Depth
Site Nar	Site Name: PacifiCorp					Purge St	tyle: Peristaltic	Bladder / S	Purge Style: Peristaltic Bladder / Submersible /Other
Sample	Sample Location X-Ref ID: (field well ID)	f ID: (field		MW-1 6/150		Mid Scre	Mid Screen Depth (ft btoc): 10.75	toc): 10.75	
Unique	Unique ID: <u>MW1-110113</u>	13				Pump Int	Pump Intake (ft btoc) 10.50	10.50	
Samplei	Sampler(s) <u>B. Rupert</u>					QC Sam	QC Sample: Y / N Type: ES Sample	rpe: ES San	Iple
Paramet	Parameters: <u>NWTPH-Dx</u>	DX				P	TD= 16.74		
Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. ©	Hď	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
	Stabili	zation Req	Stabilization Requirements	( ± 10% )	(±0.2)	( ∓ 10% )	( ± 10 %)	( ± 10% )	
1055			1 S, 10						Initial water level, pre-pumping
100	2-loom	~ 106.01	Sidl	15:31	7,08	0,298	<u>4</u> 5	29.2	
1105	~ 100 mr	-Socal	S.92	15.44	6.98	0,259	93	ルチチ	
9111	-100 mL	~10001	6.58	1 Siley	6.91	0. 24S	B6	1.46	
SIII	100m	-150 M	- 6.86	15.75	6.89	0.237	Q 3	1.31	
1120	~ 100 mL	~2010 ~	7.22	15,98	(ଚ.୫(	0.215	Q 2	l ios	
1125	~ 100 ml	2500 M	7.35	16:02	6.78	0.208	63	0.96	
1130	~ 100 ~	~ 3000 ~ 1	7.49	10.91	6.75	0.203	G3	0.91	
1135	210000	2300~	7.70	16.03	لو، کا	0.200	<del>8</del> 3	0.87	
0411	210022	nyocom	18.F	90%	6.73	0.199	83	0.86	
SHII	-100 -1	rycom	7.97	16,08	6.72	0,196	83	0.86	
			<sup>1</sup> Water Level		ements in t	hese boxes	Measurements in these boxes must match !		
1150		riferent	Silo	16.09	6.32	0.196	83	96.0	
		A1 (.0-							

PAGE \_\_\_ OF \_\_\_

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Additional Comments:



Page \_ / \_\_\_\_of\_\_\_\_

	Monitoring Well Development Form											
Project N	p.: 090	0154	Site an	d Location ID :	Pacifilorp	MW-3 Date: 10.29.13						
Date Insta	Project No.: $090154$ Site and Location ID : $P_{acifi(orp MW-3)}$ Date : $10.29.13$ Date Installed : $10.29.13$ Personnel Conducting Development : $CDI(Floyd \sim P_{ilmot})$ , $M_{ilmot}(cTEC)$											
Devlopment Method(s) Used :												
<sup>1</sup> Total We	ell Depth (F	<b>-Τ) (TOC)</b> : _Ο΄	²Initial Dry	Water Level (FT)	):	<sup>3</sup> Length of Static Water Column (FT) :						
	neter (IN) : 2″	<sup>4</sup> Conv	ersion Factor	(see below): C "= .65 6"=1.5 8		Casing Volume CV (GAL) =						
			$-2 = 3; 3 \times 4$									
DATE	TIME	WL (FT)	TOTAL VOL REMOVED (GAL)	TURBIDITY (NTU) / SED. MEASURE (ImHoff Cone)	(recha	<b>COMMENTS</b> arge rate, water color, suspended sediments, other)						
10-29	1415	Dry	0	0	Well insta gang	vell installed w/in 2 hrs prior to gauging						
10.29	~1600	Dry	0	0		,						

FINAL WELL MEASUREMENTS

TOTAL DEPTH (FT): 19.20	WATER LEVEL (FT): MA	DATE / TIME: 10.24.13 1600
Well Developer Signature:	pl-phet. Do	



Page \_\_\_\_\_of \_\_\_\_

	Monitoring Well Development Form												
Project No	o.: 090	154	Site ar	Site and Location ID: Pacifi Corp MW1 Date: 10.29.13									
Date Insta	alled :	8.13 Perso	nnel Conduct	ting Developmer	nt: CDI	(Floyd/Pilmor) Matallo CTEC							
Devlopme	Devlopment Method(s) Used: 2" surge tool, submersible 12-v pump												
<sup>1</sup> Total We	ell Depth (F	T) (TOC):	<sup>2</sup> Initial	Water Level (FT) 4.87 <sup>-</sup>	):	<sup>3</sup> Length of Static Water Column (FT) : <i>[1.88</i>							
Well Dian	neter (IN) : 2″			· (see below): C "= .65 6"=1.5 8		Casing Volume CV (GAL) = 1.9 gal.							
Casing Vo			$-2 = 3; 3 \times 4$										
DATE	TIME	WL (FT)	TOTAL VOL REMOVED (GAL)	TURBIDITY (NTU) / SED. MEASURE (ImHoff Cone)	<b>COMMENTS</b> (recharge rate, water color, suspended sediments, other)								
1	3-1415		0	0	TDW	ell casing = 19.20 DM							
10.29	1425	Rumping	~2.5	אדע 2000 אדע	V. Muda 2.5	dy, thick, well ran dry ofter gal.s							
10-29	1535	Rumping	~8	~700 NTU	charin	ly, thick, well randry after gal.s ~g, ~ 4 CVs removed							

FINAL WELL MEASUREMENTS

TOTAL DEPTH (FT): 16.75	WATER LEVEL (FT):	DATE / TIME:	1535	10.29
Well Developer Signature:	ll- 27 stalles			<u>.</u>

### ATTACHMENT B

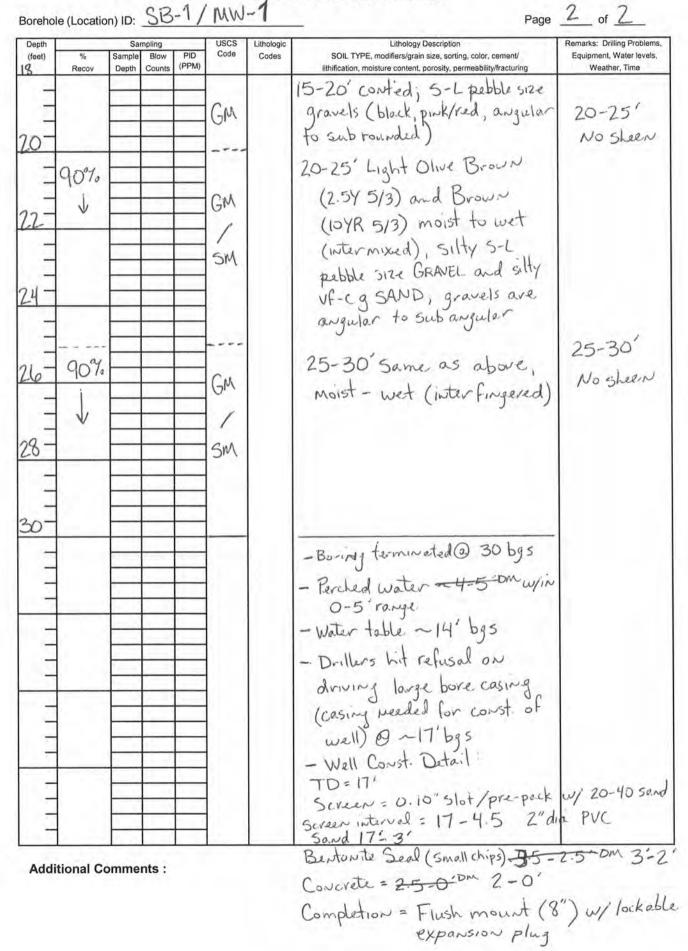
### WATER QUALITY AND WELL DEVELOPMENT FIELD SHEETS

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V manufacture and the second se	GE	OLOGIC BOREHOLE LO	G	
Borehole / Well ID: SB-1 / MW-	1	Site ID: GSU#1 Pacifil	Corp	Page of
Location Description: ~ 5 W off No	rthface	2 of cont. Wall	WL (FT) 1st:	5.89' Date/Time: 10.28.13 (1540)
Drill Rig Type / Drill Method: Geoprobe			WL (FT) 2nd:	+.87' Date/Time: 10-29-13 (1305)
Establishing Company: Cardno TEC	Geologi	st: DC Metallo	iny: Cascade	
Drilling Foreman: Eli Floyd		Surface Elevation: TBD	Datum: Gro	de surface
Sampling Device: geoprobe 5' MO.cra	- core	Borehole diameter (in) $Z''$	Total Depth (F	eet): 30'
Date/Time Drilling Started: 10.28.13 (1	(00)	Date/Time Total Depth Reached:	0.28.13 (	~1215)
Depth         Sampling           (feet)         %         Sample         Blow         US0           O         Recov         Depth         Counts         PID	Lithologic S Codes	Lithology Descrip SOIL TYPE, modifiers/grain size, s lithification, moisture content, porosity	sorting, color, cement/	Remarks: Drilling Problems, Equipment, Water levels, ng Weather, Time
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	(Final)	0-1.7' Surface Fill M Dory Grey 2.54 4/1 Wet 1.5-1.7'bgs. 5 Well graded GRAVEL 1.7-5' Dark Grey (2.5 1.7-5' Dive Brown SI. moist, Mothled W greys, SILT and es (SM/CL) W/VF- Cg Sa-d, tr. V.SMO 5-8' (2.54 4/3) Olive SI. moist - moist (1 SILY VF-F3 SAND e VF-F3 SAND W/S- gravel (esp top 1.5 Content 8-10' No Recover 10-15' Dark Kellowis V. Moist - wet, Silty (SM), Few layers o and layers of (SP) S-L gravel esp. top b	interial interi	to Sheen fest Neg. (SAND SAND SAND SAND SAND SAND SAND SAND SAND SAND SAND SAND SAND SAND Sheen test Negative Sheen test Sheen test Negative Sheen test Sheen test
- 75% GN	N	and Brown (10YR 51. moist 16 5-20 (GM) w/ silty V	, silty G	RAVEL 15-20'





C Cardno

			-			GE	OLOGIC BOREHOLE LO	G	_			
Borehole	e / Well ID:	SE	3-2	IM	W-2		Site ID: PacifiCorp		Pag	ge of		
		n: ~	22:5	Past	of GSI	1-1 co	st. Wall	WL (FT) 1st:	~5' 0	Date/Time: ~1445		
· · · · · · · · · · · · · · · · · · ·	Type / Drill		~		1	130 D	frack mount (CDI. W-180	(T		ate/Time:		
	hing Compa		Cardr	1.		Geologis	· · · · · · · · · · · · · · · · · ·	Drilling Compa	ny: Cosco	ade		
Drilling Foreman: Eli Floyd							Surface Elevation: TBD	de				
Sampling Device: 5' Macro - Core						-	Borehole diameter (in) 2"	Total Depth (F	eet): 30'			
Date/Tin	ne Drilling S				1	1438)	Date/Time Total Depth Reached:	10.28.13 (	1545)			
Depth		Sampling					Lithology Descrip	ption	1.000	Remarks: Drilling Problems,		
(feet)	%	Sample	1.2.2		USCS	Codes	SOIL TYPE, modifiers/grain size,			Equipment, Water levels, Weather, Time		
0	Recov	Depth	Counts	PID			lithification, moisture content, porosit			Trouting, Third		
	50%				FILL	FILL	0-1.2' Dark Gray (2.5 , Sandy GRAVEL (S-L	Y 4/1), avy	SITY			
_	1		-				, Sendy GRAVEL (S-L	pebble, angu	19.8) FIL	2.3-2.5		
2'-	V		-		ML	Maten	17-73' Dark Gray (	2.544/1) c	1. moist	No Sheen		
64			1				1.2-2.3' Dark Gray ( SILT W/ 1. He VFF	9 sand m	notfled	100 0		
					SM/SW							
-		-		-			V. moist-wet silty	SANDYU	ell grade	df-vcg		
4'-	10.23				NR		2.3-2.5 Dark Olive v. moist-wet silty 2.5-5 No Recovery (likely Fill mote	-gravels	SAND (S	W) Sample		
	1		$\sim - $		1		(Intely Fill mote	urial)		*SB2-6-		
1		_	1		(	V	(n. 7.			102813 (1450)		
		X		-			F'I'N D DC	LD.	INEV3	(2) Collected		
6-	75%	$\leq$			SW		5-6 Very Dork Grey	ish Drown	(2.54)	(L) 515'		
1000	J.	$\geq$		1			V. moist - wet F-C	g well gri	aded	5-6.5		
-	V	-	2		Cas		SAND, w/ tr. sitt	+tr. S.P.	ebbles	No sheen		
-	11.1	-		-	GM			-				
8-	1.000	1	12.2	1			6-8 Dork Yellowis	in Brown	11	6.5-8		
-		1	-	1			(10 YR 4/4), mot	fled w/ ye	llows,			
-		-			NR		browns, greys, reds	i, Moist,		No Sheen		
-		-		1	1017		silly sandy GRAN	JEI (GM)	5-			
10-							Siriy Survey Cit		1.1			
-	75%	-	-	1			L pebble size gro	nel, sub 1	rounded			
	1		1				to sub angular					
121-		-			SN		8-10'No Recover;	1 - gravel	S	i al		
14		-			SM		0 10 100 10000	1.5		10-15		
-		-	-	-	1		10-15 Dark Yellow	ish Brown	0	No sheen		
1					C		(104R 4/6) V	moist to	>			
111-					GM		mostly wet, si and s-L pebble	HUNF-MA	SAND	(SM)		
17		-		-			and s-1 nable	SHU GR	AVEL IC	m		
-							man - a proble	July Olin	1.20 (0	2		
		-						1. 24				
11-	90%	-	-	10			15-20 Dark Yells	owish Broi	~~	15-20		
10	1010	-		-	SM		(10 YR 4/4) V.M	ioist to u	vet	No Sheen		
-		-	1		1		Silty VF-Mg SA	ND (SM)	and 5	dy		
			1000				S-L pebble SIZE G	RAVEL (G	m)	/		
18-	V		-	-	GM	1.0	5-L pebble Size C	ins black	) ''			
10			1				mottled w/ reds, bro	WPS, DIACK	/			



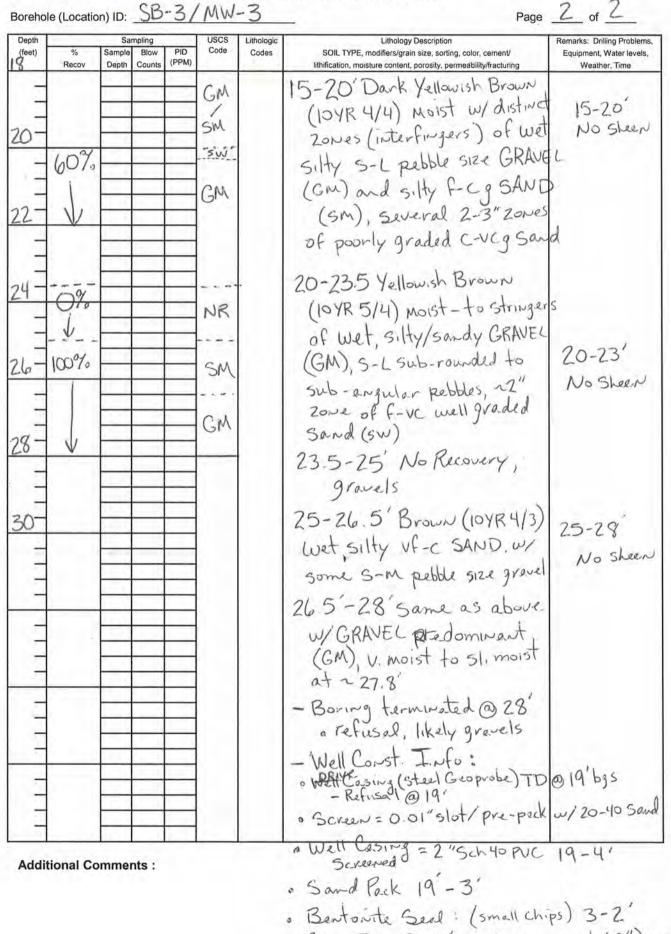
Borehole (Location) ID: SB-2/MW-2 Page 2 of 2 USCS Sampling Lithologic Remarks: Drilling Problems Lithology Description Code Sample Blow PID Codes Equipment, Water levels, % SOIL TYPE, modifiers/grain size, sorting, color, cement Steet) (PPM) Recov Depth Counts lithification, moisture content, porosity, permeability/fracturing Weather Time SM GM 20-25 Dark Yellowish Brown 60% (10YR 4/4), V. Moist - wet 20-25 silty s-L pebble size No sheen GM GRAVEL (GM), w/tr-1.Hle f-cg sand, pebbles sub-rounded to angular 25-30 Dark Killowish Brown 75% 26 (10YR 4/4) V. moist w/ 25-30' "stringers" of wet b/w No Sheen gravel, silty S-L rounded GM 28 to sub angular puble size GRAVEL (GM), motiled w/ Yellowi, greens, block, greys, red - Boring terminated 30' , wet at ~2.3' bgs to ~6 · 15'-25' V. Moist to wet . 25-30 V. moist to interfingers of wet \* Boring was abandoned -No Monitoring well installed

Additional Comments: \* A piece of HDPE plastic (black, ~ 1"wide X 4" long) was found in the top of the 5-10' interval macro-core liner. Pacifi Corp asked us to halt construction on MW-2 until they determine whether a utility was encountered.



Deschal												
Borenoi	e / Well ID:	SB	-31	M	N-3		Site ID: Pacifi Corp		Pag	ge of		
						on SI	31 + S ~ 15', Next to hydre ?	WL (FT) 1st: D	ry D	ate/Time: 10.29 (1400)		
							) track mount - CDI W-180			oate/Time:		
	hing Compa		Cardr				st: DC Metallo	Drilling Compan	y: Caso	icade		
Drilling Foreman: Eli Floyd Grou							Surface Elevation: TBD	Datum: Grad	e			
Samplin	Sampling Device: 5' Macro-core						Borehole diameter (in) $2''$	Total Depth (Fe	et): 28'			
Date/Time Drilling Started: 10-29 - 13 (1055								10.29.13 (	~1200			
Depth		Sam				Lithologic	Lithology Descrip	tion		Remarks: Drilling Problems,		
(feet)					USCS	Codes	SOIL TYPE, modifiers/grain size, s		-	Equipment, Water levels, Weather, Time		
0	Recov	Depth	Counts	PID	-	-	lithification, moisture content, porosity	1		Weather, This		
-	90%	1	) — _ i		F		0-2 Greyish Brown			100 100 100		
	90.	l		-	FILL		dry, Sand /grave	el Mix, 5-	-L	No Sheen		
2 -					100		cut availar lavagla	Vavavel		@ Z'		
6	v			-			Sub angular / anugla. FILL material	Juneli				
		1			1				1.20			
		~	-		CH		2-5" Light Olive B	YOWN (2.54	5/4)	-Sompled ~3.5'		
4 -		$\Diamond$	-		1		SI. moist, SHIT			to 5.5'		
-		$\overline{\mathbf{x}}$		-	Att					* 5B3-5-10291		
1	1	$\leq$	1	1			(MH-CH) Most	rly clay, m	offled	(1100)		
_		$\approx$	-	- 5			_ color, very stiff	1 fight		No sheen @		
6-	90%	A		-	CH		5-6.5 Same as a	above		No Shar O		
Y	i		-				- June is a	LDOVE		2		
							15 10'11. 10	a 1	mehi			
	V	-	-				6.5-10 Yellowish [					
8 -				-	0.14		51. moist - mois	t, silty -	clayey			
0				1	GM		S-L pebble size			1 No Sheen		
1.3	1				/					1		
1.2		_		1	GC		coloring (reds, gr	1 brown	~, ), -,	1		
10-			-	-			little c-veg Sar	d				
10	0.01	-					10 11/ 0 1					
	90%		100	1.1			10-14' Brown (10	YR 4/3),				
-	1	1	1	12			V. moist to mo	stly wet		and a set		
12-	4 1	-	-	-	SM		Silty Empso	ND (cm)		No Sheen		
16-		-	-	1			Silty F-Mg SA			11-12'		
	V		L. mili		1		little C-VCg san	d and lit	Hle.	11-16		
1							S-M pebble size	grovel				
14 -	-	-					And the second second			No Sheen		
							unterl on a			14-15		
					GM		14-15 Brown (10	YR 5/3),		14.10		
			-				Moist - U Moist	(although	dry			
110-	90%	-		-			bottom ~2") SI					
14	1				GM		CDNUEL ( ) SI	117 - Janal	7			
					GM		GRAVEL (GM),	mottled				
	V				1							
		1	1		SM	1				1		





· Concrete: 2-0' . Flush mount (8") completion

## ATTACHMENT C ANALYTICAL RESULTS GROUNDWATER

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1317 South 13<sup>th</sup> Avenue Kelso, WA 98626 T: +1 360 577 7222 F: +1 360 636 1068 **www.alsglobal.com** 

November 15, 2013

Analytical Report for Service Request No: K1311913

Lenora Westbrook KTA Associates 3530 32nd Way NW Olympia, WA 98502

### RE: PacifiCorp-Chehalis Power Groundwater

Dear Lenora:

Enclosed are the results of the samples submitted to our laboratory on November 01, 2013. For your reference, these analyses have been assigned our service request number K1311913.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3364. You may also contact me via Email at Howard.Holmes@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Howard Holmes

Project Manager

HH/ln

Page 1 of 145

### Acronyms

	-
ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
М	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a
	substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater
	than or equal to the MDL.

#### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- O See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

#### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
   DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

### ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingW aterLabs/tabid/1833/Default.aspx	-
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPer mitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaborator yAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

# **Case Narrative**

#### ALS ENVIRONMENTAL

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Water

Service Request No.: Date Received:

K1311913 11/01/13

#### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt

Three water samples were received for analysis at ALS Environmental on 11/01/13. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### **Diesel Range Organics by Method NWTPH-Dx**

#### Surrogate Exceptions:

The upper control criterion was exceeded for n-Triacontane in sample MW2-102913. No target analytes were detected in the sample. The error associated with an elevated recovery equated to a high bias. The quality of the sample data was not significantly affected. No further corrective action was appropriate.

#### Sample Notes and Discussion:

The chromatographic fingerprint for sample MW2-102913 did not match that of the light and heavy weight mineral oil standards analyzed with the field samples.

6

No other anomalies associated with the analysis of these samples were observed.

Approved by\_\_\_\_\_\_Aewand Hohn\_\_\_\_\_

# **Chain of Custody**

Ime	Date/Time	RELINQUISHED BY:	Peques	Data Validation Report	(no raw data)	III. CLP Like Summary	II. Report Dup., MS, MSD as TURNAROUND		Blank, Surrogate, as	I. Routine Report: Method Bill To:	REPORT REQUIREMENTS P.O. #						MUS-110113 11/13 1046	MW-10/13 W/1/13 1150	MAN - 2 MWZ-102440-29.13 1345	Environmental 1317 South 13th Ave., 1 MEPACIFI Corp - Chehalis MER ME Lewara West brook ME KTA Associates, In ME Lewest brooke CILTA	
Printed Name	Spinature	RECE	Requested Report Date	Provide FAX Results	5 day Standard (15 working days)	48 hr.	ND REQUIREMENTS				INFORMATION				/		EN		W 2		
Firm	- 11/11/2 1320	RECEIVED BY:	Sample Shipment contains			*ASK KTALL	STRUC	<b>*INDICATE STATE HYDI</b>	Dissolved Metals: Al As Sb	Total Metals: Al As Sb	Circle which metals are to be analyzed			1 A A	12.0					Semivolatile Organics by GC/MS	
Printed Name	Signature	RELINOUISHED	USDA regula			Lesona) Ker fly	3	HYDROCARBON PROCEDURE:	Ba Be B Ca Cd Co	Ba Be B Ca Cd Co	nalyzed:		<i>f</i>							1664 HEM     0il □       PCBs     1664 SGT       Aroclors     Congeners       Pesticides/Herbicides       Chlorophenolics       80810       81410	
Firm	Date/Time	ISHED RY:	ted soil samples (check bo			Reporting Kea		AK CA WI	Cr Cu Fe Pb Mg Mn	Cr Cu Fe Pb Mg Mn	[									Cyanide [] Hex-Chrom [] (circle) pH, Cond., Cl. SO4, PO4, F, NO2, (circle) NH3-N, COD, TKN, TOC	
Printed Name	Signature	RECE	(check box if applicable)			Keo winemends		NORTHWEST OTHER:	Mo Ni K Ag Na Se	Mo Ni K Ag Na Se							×	×		$\begin{array}{c c} Dioxins/Furans \\ \hline Dioxins/Furans \\ \hline 1613 \\ \Box \\ \hline 8290 \\ \hline \\ RSK 175 \\ \Box \\ Methane \\ \Box \\ Ethan \\ \hline \\ Fthan \\ \hline \\ Fthan \\ \hline \\ \hline \\ \\ \hline \\ \\ \hline \\ \hline \\ \\ \hline \\ \hline \\ \\ \\ \hline \\ \hline \\ \hline \\ \\ \hline \\ \\ \hline \\ \hline \\ \\ \hline \\ \hline \\ \\ \hline \\ \\ \hline \\ \\ \hline \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ \hline$	
	Date/Time	RECEIVED BY						(CIRCLE ONE)	Sr TI Sn V Zn Hg	Sr TI Sn V Zn Hg									Very turbid	REMARKS	

Copyright 2012 by ALS Group

	P	c H	H
Cooler Receipt and Preservation Form		Manager Constraints	
ient / Project: KTA, INC. Service Request K13 /1913			devenue and the
	By:	50	
Samples were received via? Mail Fed Ex UPS DHL PDX Courier Hand Delivered Samples were received in: (circle) Cooler Box Envelope Other		NA	•
Were custody seals on coolers? NA Y (N) If yes, how many and where?			
If present, were custody seals intact? Y S If present, were they signed and dated?		Y	
Baw Corrected Baw Corrected Corr. Thermometer Cooler/COCID Tracking	Number	- Ga	A\#Filed
coler Temp <u>Cooler Temp Blank</u> <u>Temp Blank</u> <u>Factor</u> <u>ID</u> (NA)	and a second	- Andrew Provider	
			-
Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves		<u></u>	
Were custody papers properly filled out (ink, signed, etc.)?	NA	Ð	N
Did all bottles arrive in good condition (unbroken)? Indicate in the table below.	NA	()	N
Were all sample labels complete (i.e analysis, preservation, etc.)?	NA	$\bigotimes$	N
Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2.	NA	(e)	N
Were appropriate bottles/containers and volumes received for the tests indicated?	NA	C)	N
0. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below	(AA)	Y	N
1. Were VOA vials received without headspace? Indicate in the table below.	(AA)	Y	N
2. Was C12/Res negative?		Y	N
Sample ID on Bottle Sample ID on COC	ν.		
Sample ID on Bottle Sample ID on COC Identified B	<ul> <li>M. 1990 (0110) 486,22345</li> </ul>		
5.			
Bottle Count Out of Head-	Lot		
Sample ID Bottle Type Temp space Broke pH Reagent added Number		itials 🛛 🗍	iime 👘
		¥,	

Notes, Discrepancies, & Resolutions:\_\_\_\_\_

Page\_\_\_\_of\_\_\_

### **Diesel and Residual Range Organics**

## Organic Analysis: <u>Diesel and Residual Range Organics - Silica Gel</u> <u>Treated</u> Summary Package

Sample and QC Results

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power Groundwater

#### Cover Page - Organic Analysis Data Package Diesel and Residual Range Organics - Silica Gel Treated

Lab Code	Date Collected	Date Received
K1311913-001	10/29/2013	11/01/2013
K1311913-002	11/01/2013	11/01/2013
K1311913-003	11/01/2013	11/01/2013
KWG1312533-1	11/01/2013	11/01/2013
	K1311913-001 K1311913-002 K1311913-003	Lab CodeCollectedK1311913-00110/29/2013K1311913-00211/01/2013K1311913-00311/01/2013

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature:	Tome E Potroso	Name: Lon Potwash
Date:	11/14/12	Title:

Cover Page - Organic

Analytical Results

Client:		KTA Associates	Service Request:	K1311913
Project:	•	PacifiCorp-Chehalis Power Groundwater	Date Collected:	10/29/2013
Sample Matrix:		Water	Date Received:	11/01/2013

#### **Diesel and Residual Range Organics - Silica Gel Treated**

Sample Name:	MW2-102913	Units:	-
Lab Code:	K1311913-001	Basis:	
Extraction Method: Analysis Method:	EPA 3510C NWTPH-Dx	Level:	Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	380 Y	270	1	11/04/13	11/13/13	KWG1312533	
Residual Range Organics (RRO)	ND U	540	1	11/04/13	11/13/13	KWG1312533	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	140	50-150	11/13/13	Acceptable
n-Triacontane	155	50-150	11/13/13	Outside Control Limits

**Comments:** 

Analytical Results

Client:	KTA Associates	Service Request:	K1311913
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected:	11/01/2013
Sample Matrix:	Water	Date Received:	11/01/2013

#### Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	MW1-110113	Units:	÷
Lab Code:	K1311913-002	Basis:	
Extraction Method: Analysis Method:	EPA 3510C NWTPH-Dx	Level:	Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND U	270	1	11/04/13	11/13/13	KWG1312533	
Residual Range Organics (RRO)	ND U	540	1	11/04/13	11/13/13	KWG1312533	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	137	50-150	11/13/13	Acceptable
n-Triacontane	149	50-150	11/13/13	Acceptable

**Comments:** 

Merged

Analytical Results

Client:	KTA Associates	Service Request: K1311913
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected: NA
Sample Matrix:	Water	Date Received: NA

#### Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	Method Blank	Units:	•
Lab Code:	KWG1312533-3	Basis:	
Extraction Method: Analysis Method:	EPA 3510C NWTPH-Dx	Level:	Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND U	250	1	11/04/13	11/13/13	KWG1312533	
Residual Range Organics (RRO)	ND U	500	1	11/04/13	11/13/13	KWG1312533	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	98	50-150	11/13/13	Acceptable
n-Triacontane	109	50-150	11/13/13	Acceptable

**Comments:** 

QA/QC Report

Service Request: K1311913

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Water

#### Surrogate Recovery Summary Diesel and Residual Range Organics - Silica Gel Treated

**Extraction Method:** EPA 3510C Analysis Method: NWTPH-Dx Units: Percent Level: Low

Sample Name	Lab Code	<u>Sur1</u>	<u>Sur2</u>
MW2-102913	K1311913-001	140	155 *
MW1-110113	K1311913-002	137	149
MW3-110113	K1311913-003	110	116
MW3-110113DUP	KWG1312533-1	108	115
Method Blank	KWG1312533-3	98	109
Lab Control Sample	KWG1312533-2	119	127

Surrogate Recovery Control Limits (%)

Sur1 = o-Terphenyl Sur2 = n-Triacontane 50-150 50-150

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater
Sample Matrix:	Water

Service Request: K1311913 Date Extracted: 11/04/2013 Date Analyzed: 11/13/2013

#### Duplicate Sample Summary Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	MW3-110113	Units:	-
Lab Code:	K1311913-003	Basis:	
Extraction Method:	EPA 3510C	Level:	
Analysis Method:	NWTPH-Dx	Extraction Lot:	
		MW3-110113DUP KWG1312533-1 Relative	

		Sample	Duplicate	e Sample	Percent	<b>RPD</b> Limit
Analyte Name	MRL	Result	Result	Average	Difference	
Diesel Range Organics (DRO)	270	ND	ND	ND	-	30
Residual Range Organics (RRO)	540	ND	ND	ND	-	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater
Sample Matrix:	Water

 Service Request:
 K1311913

 Date Extracted:
 11/04/2013

 Date Analyzed:
 11/13/2013

#### Lab Control Spike Summary Diesel and Residual Range Organics - Silica Gel Treated

Extraction Method: Analysis Method:	EPA 3510C NWTPH-Dx	Lab C KW	Control Samp /G1312533-/ Control Spik	2		Units: Basis: Level: Extraction Lot:	NA Low
Analyte Name	_	Result	Spike Amount	%Rec	%Rec Limits		
Diesel Range Organics (		3490	3200	109	46-140		
Residual Range Organic	s (RRO)	2040	1600	127	45-159		

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Water

 Service Request:
 K1311913

 Date Extracted:
 11/04/2013

 Date Analyzed:
 11/13/2013

 Time Analyzed:
 14:47

#### Method Blank Summary Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	Method Blank	Instrument ID:	GC21
Lab Code:	KWG1312533-3	File ID:	J:\GC21\DATA\111313F\1113F034.D
Extraction Method: Analysis Method:		Level: Extraction Lot:	

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	KWG1312533-2	J:\GC21\DATA\111313F\1113F032.D	11/13/13	14:24
MW2-102913	K1311913-001	J:\GC21\DATA\111313F\1113F036.D	11/13/13	15:09
MW1-110113	K1311913-002	J:\GC21\DATA\111313F\1113F038.D	11/13/13	15:31
MW3-110113	K1311913-003	J:\GC21\DATA\111313F\1113F040.D	11/13/13	15:54
MW3-110113DUP	KWG1312533-1	J:\GC21\DATA\111313F\1113F042.D	11/13/13	16:16

QA/QC Report

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Water

 Service Request:
 K1311913

 Date Extracted:
 11/04/2013

 Date Analyzed:
 11/13/2013

 Time Analyzed:
 14:24

#### Lab Control Sample Summary Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	Lab Control Sample	Instrument ID:	GC21
Lab Code:	KWG1312533-2	File ID:	J:\GC21\DATA\111313F\1113F032.D
Extraction Method:	EPA 3510C	Level:	
Analysis Method:	NWTPH-Dx	Extraction Lot:	

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1312533-3	J:\GC21\DATA\111313F\1113F034.D	11/13/13	14:47
MW2-102913	K1311913-001	J:\GC21\DATA\111313F\1113F036.D	11/13/13	15:09
MW1-110113	K1311913-002	J:\GC21\DATA\111313F\1113F038.D	11/13/13	15:31
MW3-110113	K1311913-003	J:\GC21\DATA\111313F\1113F040.D	11/13/13	15:54
MW3-110113DUP	KWG1312533-1	J:\GC21\DATA\111313F\1113F042.D	11/13/13	16:16

QA/QC Results

Client: Project: KTA Associates PacifiCorp-Chehalis Power Groundwater Service Request: K1311913 Calibration Date: 09/10/2013

#### Initial Calibration Summary Diesel and Residual Range Organics - Silica Gel Treated

Calibrati Instrume		CAL12766 GC21		Column: ZB-1
Level ID	File ID		Level ID	File ID
А	J:\GC21\DA	ATA\091013F\0910F072.D	Ι	J:\GC21\DATA\091013F\0910F096.D
В	J:\GC21\DA	ATA\091013F\0910F074.D	J	J:\GC21\DATA\091013F\0910F098.D
С	J:\GC21\DA	ATA\091013F\0910F076.D	K	J:\GC21\DATA\091013F\0910F100.D
D	J:\GC21\DA	ATA\091013F\0910F078.D	L	J:\GC21\DATA\091013F\0910F102.D
Е	J:\GC21\DA	ATA\091013F\0910F080.D	М	J:\GC21\DATA\091013F\0910F104.D
F	J:\GC21\DA	ATA\091013F\0910F082.D	Ν	J:\GC21\DATA\091013F\0910F106.D
G	J:\GC21\DA	ATA\091013F\0910F092.D		
Н	J:\GC21\DA	ATA\091013F\0910F094.D		

Analyte Name	Level ID	Amt	RF	Level ID	Amt	RF	Leve ID	Amt	RF	Level ID	Amt	RF	Level ID	Amt	RF
Diesel Range Organics (DRO)	K	2000	989	G L	20 5000	1010 1030	H M	50 20000	924 916	I N	200 50000	965 920	J	500	972
Residual Range Organics (RRO)	A F	20 5000	968 588	В	50	756	С	200	699	D	500	627	Е	2000	615
o-Terphenyl	К	100	1280	G L	1.0 250	1300 1330	Н	2.5	1190	I	10	1260	J	25	1280
n-Triacontane	К	100	1070	G L	1.0 250	938 1160	Н	2.5	919	Ι	10	1050	J	25	1080

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Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Results

Client: Project: KTA Associates PacifiCorp-Chehalis Power Groundwater Service Request: K1311913 Calibration Date: 09/10/2013

ZB-1

#### Initial Calibration Summary Diesel and Residual Range Organics - Silica Gel Treated

Calibration ID: Instrument ID:	CAL12766 GC21				Column:
			Calibration Evaluation	Ì	
		Compound	Eval.	Control	

Analyte Name	Compound Type	Fit Type	Eval.	Eval. Result	Q	Control Criteria
Diesel Range Organics (DRO)	MS	AverageRF	% RSD	4.4		≤20
Residual Range Organics (RRO)	MS	Linear	R2	0.999		≥0.99
o-Terphenyl	SURR	AverageRF	% RSD	3.8		≤20
n-Triacontane	SURR	AverageRF	% RSD	8.8		≤20

Results flagged with an asterisk (\*) indicate values outside control criteria.

	QA/QC Results		
Client:	KTA Associates	Service Request:	K1311913
Project:	PacifiCorp-Chehalis Power Groundwater	<b>Calibration Date:</b>	
Ū		Date Analyzed:	09/11/2013
	Second Source Calibration Verification Diesel and Residual Range Organics - Silica Gel Treated		
Calibration Type: Analysis Method:	External Standard NWTPH-Dx	Calibration ID: Units:	

J:\GC21\J	DATA\091013F							
Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
Diesel Range Organics (DRO) Residual Range Organics (RRO)	1000 1000	1000 990	965 709	964 599	0 NA	NA -1	± 15 % ± 15 %	AverageRF Linear

J:\GC21\DATA\091013F\0910F088.D

Results flagged with an asterisk (\*) indicate values outside control criteria.

File ID:

Column ID: ZB-1

QA/QC Results

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater

 Service Request:
 K1311913

 Date Analyzed:
 11/13/2013

#### Continuing Calibration Verification Summary Diesel and Residual Range Organics - Silica Gel Treated

Calibration Type: Analysis Method:	External Standard NWTPH-Dx			Calibration Date: Calibration ID:	CAL12766
				•	KWG1312715
				Units:	
File ID:	J:\GC21\DATA\111313F\1113F012.D J:\GC21\DATA\111313F\1113F014.D			Column ID:	ZB-1
		Average	CCV		

Expected	Result	RF	RF	%D	%Drift	Criteria	Curve Fit
1000	1100	965	1030	6	NA	± 15 %	AverageRF
1000	980	709	595	NA	-2	± 15 %	Linear
50	55	1270	1400	10	NA	± 15 %	AverageRF
50	54	1040	1120	8	NA	± 15 %	AverageRF
	1000 1000 50	1000 1100 1000 980 50 55	ExpectedResultRF10001100965100098070950551270	Expected ResultRFRF1000110096510301000980709595505512701400	Expected ResultRFRF%D10001100965103061000980709595NA50551270140010	Expected ResultRFRF%D%Drift1000110096510306NA1000980709595NA-250551270140010NA	Expected ResultRFRF%D%DriftCriteria1000110096510306NA± 15 %1000980709595NA-2± 15 %50551270140010NA± 15 %

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Results

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater

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#### Service Request: K1311913 Date Analyzed: 11/13/2013

#### Continuing Calibration Verification Summary Diesel and Residual Range Organics - Silica Gel Treated

Calibration Type: Analysis Method:	External Standard NWTPH-Dx	Calibration Date: 09/10/2013 Calibration ID: CAL12766
		Analysis Lot: KWG1312715
		Units: ppm
File ID:	J:\GC21\DATA\111313F\1113F044.D J:\GC21\DATA\111313F\1113F046.D	Column ID: ZB-1

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Diesel Range Organics (DRO)	1000	990	965	954	-1	NA	± 15 %	AverageRF
Residual Range Organics (RRO)	1000	1100	709	640	NA	6	± 15 %	Linear
o-Terphenyl	50	51	1270	1290	1	NA	± 15 %	AverageRF
n-Triacontane	50	51	1040	1060	2	NA	± 15 %	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Results

Service Request: K1311913

Client: Project: KTA Associates PacifiCorp-Chehalis Power Groundwater

#### Analysis Run Log Diesel and Residual Range Organics - Silica Gel Treated

Analysis Method: NWTPH-Dx

Analysis Lot: KWG1312715 Instrument ID: GC21 Column: ZB-1

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
1113F012.D	Continuing Calibration Verification	KWG1312715-1	11/13/2013	10:41		11/13/2013	10:57
1113F014.D	Continuing Calibration Verification	KWG1312715-1	11/13/2013	11:03		11/13/2013	11:19
1113F016.D	Instrument Blank	KWG1312715-4	11/13/2013	11:25		11/13/2013	11:41
1113F020.D	ZZZZZZ	ZZZZZZ	11/13/2013	12:10		11/13/2013	12:26
1113F022.D	ZZZZZZ	ZZZZZZ	11/13/2013	12:33		11/13/2013	12:49
1113F024.D	ZZZZZZ	ZZZZZZ	11/13/2013	12:55		11/13/2013	13:11
1113F026.D	ZZZZZZ	ZZZZZZ	11/13/2013	13:17		11/13/2013	13:33
1113F028.D	ZZZZZZ	ZZZZZZ	11/13/2013	13:39		11/13/2013	13:55
1113F030.D	ZZZZZZ	ZZZZZZ	11/13/2013	14:02		11/13/2013	14:18
1113F032.D	Lab Control Sample	KWG1312533-2	11/13/2013	14:24		11/13/2013	14:40
1113F034.D	Method Blank	KWG1312533-3	11/13/2013	14:47		11/13/2013	15:03
1113F036.D	MW2-102913	K1311913-001	11/13/2013	15:09		11/13/2013	15:25
1113F038.D	MW1-110113	K1311913-002	11/13/2013	15:31		11/13/2013	15:47
1113F040.D	MW3-110113	K1311913-003	11/13/2013	15:54		11/13/2013	16:10
1113F042.D	MW3-110113DUP	KWG1312533-1	11/13/2013	16:16		11/13/2013	16:32
1113F044.D	Continuing Calibration Verification	KWG1312715-2	11/13/2013	16:38		11/13/2013	16:54
1113F046.D	Continuing Calibration Verification	KWG1312715-2	11/13/2013	17:00		11/13/2013	17:16
1113F048.D	Instrument Blank	KWG1312715-5	11/13/2013	17:23		11/13/2013	17:39
1113F056.D	ZZZZZZ	ZZZZZZ	11/13/2013	18:52		11/13/2013	19:08
1113F058.D	ZZZZZZ	ZZZZZZ	11/13/2013	19:14		11/13/2013	19:30
1113F060.D	ZZZZZZ	ZZZZZZ	11/13/2013	19:36		11/13/2013	19:52
1113F062.D	ZZZZZZ	ZZZZZZ	11/13/2013	19:59		11/13/2013	20:15
1113F064.D	ZZZZZZ	ZZZZZZ	11/13/2013	20:22		11/13/2013	20:38
1113F066.D	ZZZZZZ	ZZZZZZ	11/13/2013	20:44		11/13/2013	21:00
1113F068.D	ZZZZZZ	ZZZZZZ	11/13/2013	21:06		11/13/2013	21:22
1113F070.D	ZZZZZZ	ZZZZZZ	11/13/2013	21:28		11/13/2013	21:44
1113F072.D	Continuing Calibration Verification	KWG1312715-3	11/13/2013	21:51		11/13/2013	22:07
1113F074.D	Continuing Calibration Verification	KWG1312715-3	11/13/2013	22:13		11/13/2013	22:29
1113F076.D	Instrument Blank	KWG1312715-6	11/13/2013	22:35		11/13/2013	22:51

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

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QA/QC Results

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Water

**Service Request:** K1311913 **Date Extracted:** 11/04/2013

#### Extraction Prep Log Diesel and Residual Range Organics - Silica Gel Treated

**Extraction Method:** EPA 3510C Analysis Method: NWTPH-Dx Extraction Lot: KWG1312533 Level: Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
MW2-102913	K1311913-001	10/29/13	11/01/13	470mL	1mL	NA	
MW1-110113	K1311913-002	11/01/13	11/01/13	470mL	1mL	NA	
MW3-110113	K1311913-003	11/01/13	11/01/13	480mL	1mL	NA	
MW3-110113DUP	KWG1312533-1	11/01/13	11/01/13	470mL	1mL	NA	
Method Blank	KWG1312533-3	NA	NA	500mL	1mL	NA	
Lab Control Sample	KWG1312533-2	NA	NA	500mL	1mL	NA	

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

# Organic Analysis: <u>Diesel and Residual Range Organics - Silica Gel</u> <u>Treated</u> Validation Package

# Organic Analysis: <u>Diesel and Residual Range Organics - Silica Gel</u> <u>Treated</u> Validation Package

QC Reports

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QA/QC Report

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Water

#### Surrogate Recovery Summary Diesel and Residual Range Organics - Silica Gel Treated

**Extraction Method:** EPA 3510C Analysis Method: NWTPH-Dx Units: Percent Level: Low

Sample Name	Lab Code	<u>Sur1</u>	<u>Sur2</u>
MW2-102913	K1311913-001	140	155 *
MW1-110113	K1311913-002	137	149
MW3-110113	K1311913-003	110	116
MW3-110113DUP	KWG1312533-1	108	115
Method Blank	KWG1312533-3	98	109
Lab Control Sample	KWG1312533-2	119	127

Surrogate Recovery Control Limits (%)

Sur1 = o-Terphenyl Sur2 = n-Triacontane 50-150 50-150

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Service Request: K1311913

QA/QC Report

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater
Sample Matrix:	Water

Service Request: K1311913 Date Extracted: 11/04/2013 Date Analyzed: 11/13/2013

#### Duplicate Sample Summary Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	MW3-110113	Units:	-
Lab Code:	K1311913-003	Basis:	
Extraction Method:	EPA 3510C	Level:	
Analysis Method:	NWTPH-Dx	Extraction Lot:	

	MRL	Sample	MW3-110113DUP KWG1312533-1 Duplicate Sample		Relative Percent	<b>RPD</b> Limit
Analyte Name		Result	Result	Average	Difference	10 MINISTRATIO
Diesel Range Organics (DRO) Residual Range Organics (RRO)	270 540	ND ND	ND ND	ND ND	-	30 30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater
Sample Matrix:	Water

 Service Request:
 K1311913

 Date Extracted:
 11/04/2013

 Date Analyzed:
 11/13/2013

#### Lab Control Spike Summary Diesel and Residual Range Organics - Silica Gel Treated

Extraction Method: Analysis Method:	EPA 3510C NWTPH-Dx					Units: Basis: Level: Extraction Lot:	NA Low
		Lab Control Sample KWG1312533-2 Lab Control Spike					
Analyte Name	_	Result	Spike Amount	%Rec	%Rec Limits		
Diesel Range Organics (I Residual Range Organics		3490 2040	3200 1600	109 127	46-140 45-159		

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Water

 Service Request:
 K1311913

 Date Extracted:
 11/04/2013

 Date Analyzed:
 11/13/2013

 Time Analyzed:
 14:47

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#### Method Blank Summary Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	Method Blank	Instrument ID:	GC21
Lab Code:	KWG1312533-3	File ID:	J:\GC21\DATA\111313F\1113F034.D
Extraction Method:	EPA 3510C	Level:	
Analysis Method:	NWTPH-Dx	Extraction Lot:	

This Method Blank applies to the following analyses:

			Date	Time
Sample Name	Lab Code	File ID	Analyzed	Analyzed
Lab Control Sample	KWG1312533-2	J:\GC21\DATA\111313F\1113F032.D	11/13/13	14:24
MW2-102913	K1311913-001	J:\GC21\DATA\111313F\1113F036.D	11/13/13	15:09
MW1-110113	K1311913-002	J:\GC21\DATA\111313F\1113F038.D	11/13/13	15:31
MW3-110113	K1311913-003	J:\GC21\DATA\111313F\1113F040.D	11/13/13	15:54
MW3-110113DUP	KWG1312533-1	J:\GC21\DATA\111313F\1113F042.D	11/13/13	16:16
	10101512555 1			

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QA/QC Report

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Water

 Service Request:
 K1311913

 Date Extracted:
 11/04/2013

 Date Analyzed:
 11/13/2013

 Time Analyzed:
 14:24

#### Lab Control Sample Summary Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	Lab Control Sample	Instrument ID:	GC21
Lab Code:	KWG1312533-2	File ID:	J:\GC21\DATA\111313F\1113F032.D
Extraction Method:	EPA 3510C	Level:	
Analysis Method:	NWTPH-Dx	Extraction Lot:	

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1312533-3	J:\GC21\DATA\111313F\1113F034.D	11/13/13	14:47
MW2-102913	K1311913-001	J:\GC21\DATA\111313F\1113F036.D	11/13/13	15:09
MW1-110113	K1311913-002	J:\GC21\DATA\111313F\1113F038.D	11/13/13	15:31
MW3-110113	K1311913-003	J:\GC21\DATA\111313F\1113F040.D	11/13/13	15:54
MW3-110113DUP	KWG1312533-1	J:\GC21\DATA\111313F\1113F042.D	11/13/13	16:16

# Organic Analysis: <u>Diesel and Residual Range Organics - Silica Gel</u> <u>Treated</u> Validation Package

Raw Data

Analytical Results

Client:	KTA Associates	Service Request:	K1311913
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected:	
Sample Matrix:	Water	Date Received:	11/01/2013

#### Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	MW2-102913	Units:	0
Lab Code:	K1311913-001	Basis:	
Extraction Method: Analysis Method:	EPA 3510C NWTPH-Dx	Level:	Low

			Dilution	Date	Date	Extraction	
Analyte Name	Result Q	MRL	Factor	Extracted	Analyzed	Lot	Note
Diesel Range Organics (DRO)	380 Y	270	1	11/04/13	11/13/13	KWG1312533	
Residual Range Organics (RRO)	ND U	540	1	11/04/13	11/13/13	KWG1312533	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	140	50-150	11/13/13	Acceptable
n-Triacontane	155	50-150	11/13/13	Outside Control Limits

Comments:

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Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\111313F\1113F036.D Vial: 9 Acq On : 13 Nov 2013 3:09 pm Operator: DVaillenco Inst : GC21 : K1311913-001 Sample Multiplr: 1.00 Misc : IntFile : rteint.p Ouant Time: Nov 14 08:15:24 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds 

 1) S
 4-Bromofluorobenzene
 2.89
 30629
 54.019 ppm

 2) S
 o-Terphenyl
 Recovery
 =
 108.04%

 2) S
 o-Terphenyl
 5.57
 88863
 69.792 ppm

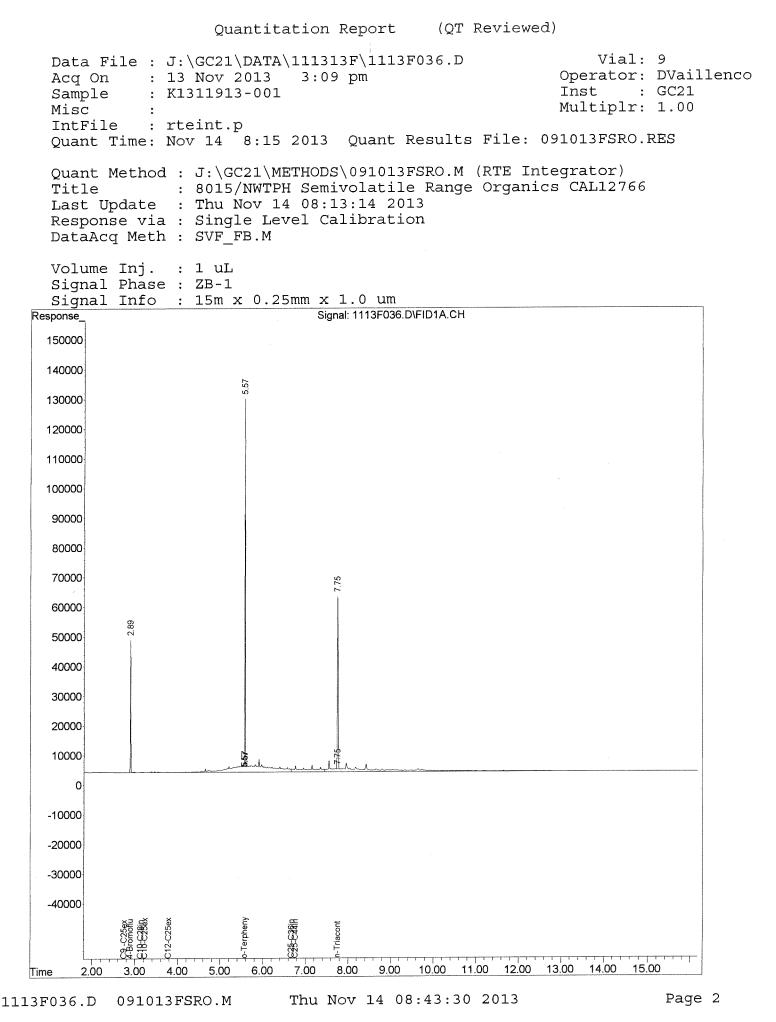
 2) S
 n-Triacontane
 7.75
 80077
 77.302 ppm

 3) S
 n-Triacontane
 7.75
 80077
 77.302 ppm

 Spiked Amount 50.000 2) S o-Terphenyl Spiked Amount 50.000 Recovery = 154.60% Spiked Amount 50.000 Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.75175859152.787 ppm5) HC10-C25ex DRO[AK102]3.23174588154.257 ppm6) HC10-C28in DRO[8015]3.13218133192.468 ppm7) HC12-C25ex DRO[NWTPH]3.78171676177.816 ppm8) HC25-C36in RRO[NWTPH]6.66137500216.177 ppm9) HC25-C44in RRO[TPH-Oil]6.76182680197.480 ppm

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Analytical Results

Client:	KTA Associates	Service Request:	K1311913
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected:	11/01/2013
Sample Matrix:	Water	Date Received:	11/01/2013

#### Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	MW1-110113	Units:	-
Lab Code:	K1311913-002	Basis:	
Extraction Method: Analysis Method:	EPA 3510C NWTPH-Dx	Level:	Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND U	270	1	11/04/13	11/13/13	KWG1312533	
Residual Range Organics (RRO)	ND U	540	1	11/04/13	11/13/13	KWG1312533	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note	
o-Terphenyl	137	50-150	11/13/13	Acceptable	
n-Triacontane	149	50-150	11/13/13	Acceptable	

**Comments:** 

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### **Exception Report**

# Data File: J:\GC21\DATA\111313F\1113F038.D Lab ID: K1311913-002 RunType: SMPL Matrix: WATER

Date Acquired: Date Quantitated: Batch ID: Analysis Method: ListJoinID: 11/13/2013 15:31 11/14/2013 08:15 KWG1312715 NWTPH-Dx LJ1365

### Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
Analytical Holding Time	NA	NA	NA	x	
Preparation Holding Time	NA	NA	NA	x	
Pre-Preparation Holding Time	NA	NA	NA	x	
ICAL Analyte Recovery	NA	NA	NA	x	
Second Source ICAL Verification	NA	NA	NA	x	
Calibration Verification Pass/Fail	NA	NA	NA	x	
Continuing Calibration Recovery	NA	NA	NA	x	
Continuing Calibration Recovery (Closing)	NA	NA	NA	х	
Method Blank	NA	NA	NA	x	
MB Surrogate Recovery	NA	NA	NA	x	
Lab Control Spike	NA	NA	NA	x	
Surrogates	NA	NA	NA	x	
Analyte Co-elution	NA	NA	NA	х	
Retention Time	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	x	
Std MRL Unsupported by ICAL	NA	NA	NA	x	
Above Highest ICAL Level	NA	NA	NA	x	
Enviroquant/Stealth Calibration Check	NA	NA	NA	x	
Overdiluted Analysis	NA	NA	NA	x	

Primary Review: Secondary Review:

### Quantitation Report

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\111 11/13/2013 15:31 SMPL K1311913-002	.313F\11		Quant Date:	11/14/2013 08:15	Vial: Dilut	ument: ion: Conc. Units:	GC21 10 1.0 ppm		
Bottle ID: Prod Code:	NWTPH-Dx NW T	PH		Tier: Collect Date:	IV 11/01/2013	Matr Rece	ix: ive Date:	WATE 11/01/2		
Analysis Lot: Analysis Method: Prep Ref:	KWG1312715 NWTPH-Dx 1302599			Prep Lot: Prep Method: Prep Date:	KWG1312533 EPA 3510C 11/04/2013	Repo	Report Group: K1311913			
Quant Method: Title:	J:\GC21\METHODS\091013FSRO.M Diesel and Residual Range Organics - Silica Gel Tre					Repo	ration ID: CAL12766 t List ID: LJ1365 od ID: MJ227			, _ ,
MB Ref:	J:\GC21\DATA\111	313F\11	13F034.D			Qua	nt based on	Report I	List	
Surrogate Comp	pounds									
Parameter Na	nme	RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl n-Triacontan	е,	5.58 7.75	0.01 0.00		87028 76930	68.35 74.26	137 149	50-150 50-150		
Target Compour	nds				Final C	Conc. Units:	ug/L			
Parameter Na		RT	RT Dev		Response	Solution Conc	Fina Cone		Q	Rpt?
	e Organics (DRO) age Organics (RRO)	3.78 6.66			8416 15558	8.72 11.45	19 24		] J	
Prep Amount: Prep Final Vol:	470 mL 1 mL		Dilution: Unit Factor	1.0 r: 1000						

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/14/2013 09:15:45 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution d: Compound integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis \*: Result fails acceptance criteria

K. Acceptance criteria not applicable
 Insufficient information to determine acceptance
 Result >= MRL, but MRL less than low point of ICAL

c: check for co-elution

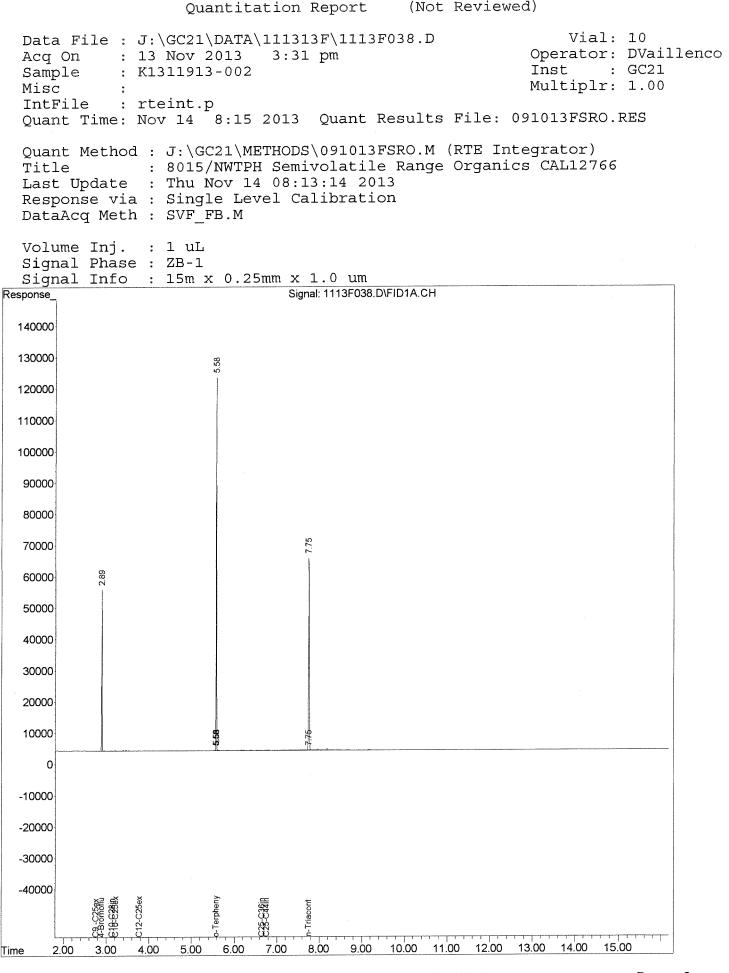
J:\GC21\DATA\111313F\1113F038.D

44

Quantitation Report (Not Reviewed) Vial: 10 Data File : J:\GC21\DATA\111313F\1113F038.D Acq On : 13 Nov 2013 3:31 pm Operator: DVaillenco : K1311913-002 Inst : GC21 Sample Multiplr: 1.00 Misc : IntFile : rteint.p Quant Time: Nov 14 08:15:24 2013 Quant Results File: 091013FSRO.RES Ouant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound 1) S4-Bromofluorobenzene2.893551462.634 ppmSpiked Amount 50.000Recovery=125.27%2) So-Terphenyl5.588702868.351 ppmSpiked Amount 50.000Recovery=136.70%3) Sn-Triacontane7.757693074.264 ppmSpiked Amount 50.000Recovery=148.53% System Monitoring Compounds Recovery = 148.53% Spiked Amount 50.000 Target Compounds 4) HC9 -C25ex DRO [TPH-Diesel]2.751180610.257 ppm5) HC10-C25ex DRO [AK102]3.23109279.655 ppm6) HC10-C28in DRO [8015]3.131559513.760 ppm7) HC12-C25ex DRO [NWTPH]3.7884168.717 ppm8) HC25-C36in RRO [NWTPH]6.661555811.453 ppm9) HC25-C44in RRO [TPH-Oil]6.762004116.419 ppm

45

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Analytical Results

Client:	KTA Associates	Service Request:	K1311913
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected:	11/01/2013
Sample Matrix:	Water	Date Received:	11/01/2013

#### **Diesel and Residual Range Organics - Silica Gel Treated**

Sample Name:	MW3-110113	Units:	0
Lab Code:	K1311913-003	Basis:	
Extraction Method: Analysis Method:	EPA 3510C NWTPH-Dx	Level:	Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND U	270	1	11/04/13	11/13/13	KWG1312533	
Residual Range Organics (RRO)	ND U	530	1	11/04/13	11/13/13	KWG1312533	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	110	50-150	11/13/13	Acceptable
n-Triacontane	116	50-150	11/13/13	Acceptable

Comments:

# Data File: J:\GC21\DATA\111313F\1113F040.D Lab ID: K1311913-003 RunType: SMPL Matrix: WATER

Date Acquired: Date Quantitated: Batch ID: Analysis Method: ListJoinID: 11/13/2013 15:54 11/14/2013 08:15 KWG1312715 NWTPH-Dx LJ1365

# Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
Analytical Holding Time	NA	NA	NA	x	
Preparation Holding Time	NA	NA	NA	x	
Pre-Preparation Holding Time	NA	NA	NA	x	
ICAL Analyte Recovery	NA	NA	NA	x	
Second Source ICAL Verification	NA	NA	NA	х	
Calibration Verification Pass/Fail	NA	NA	NA	х	
Continuing Calibration Recovery	NA	NA	NA	x	
Continuing Calibration Recovery (Closing)	NA	NA	NA	x	
Method Blank	NA	NA	NA	x	
MB Surrogate Recovery	NA	NA	NA	x	
Lab Control Spike	NA	NA	NA	x	
Surrogates	NA	NA	NA	x	
Analyte Co-elution	NA	NA	NA	x	
Retention Time	NA	NA	NA	х	
Below Lowest ICAL Level	NA	NA	NA	х	
Std MRL Unsupported by ICAL	NA	NA	NA	х	
Above Highest ICAL Level	NA	NA	NA	x	
Enviroquant/Stealth Calibration Check	NA	NA	NA	x	
Overdiluted Analysis	NA	NA	NA	x	

Primary Review: Secondary Review:

# Quantitation Report

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\111 11/13/2013 15:54 SMPL K1311913-003	313F\11		Quant Date:	11/14/2013 08:15	Vial: Dilut		GC21 11 1.0 ppm		e, yn ywraedd a thynol
Bottle ID: Prod Code:	NWTPH-Dx NW T	PH	<u>ayun - parta 2 - an Universitan An</u>	Tier: Collect Date:	IV 11/01/2013	Matr Rece	ix: ive Date:	WATE 11/01/		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Analysis Lot: Analysis Method: Prep Ref:	KWG1312715 NWTPH-Dx 1302600			Prep Lot: Prep Method: Prep Date:	KWG1312533 EPA 3510C 11/04/2013	Repo	ort Group:	K1311	913	
Quant Method: Title:	J:\GC21\METHOD Diesel and Residua			ica Gel Treated		Repo	Report List ID: LJ		CAL12766 LJ1365 MJ227	
MB Ref:	J:\GC21\DATA\111	313F\11	13F034.D			Qua	nt based on	Report I	List	
Surrogate Comp	oounds									
Parameter Na	ime	RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl n-Triacontane	e	5.58 7.75	0.01		70016 60222	54.99 58.14	110 116	50-150 50-150		
Target Compour	nds				Final C	Conc. Units:	ug/L			
Parameter Na	ANNO 1999	RT	RT Dev	<u> </u>	Response	Solution Conc	Fina Cone		Q	Rpt?
	Organics (DRO) ge Organics (RRO)	3.78 6.66			17318 22511	17.94 23.13	37 48		J J	
Prep Amount: Prep Final Vol:	480 mL 1 mL		Dilution: Unit Facto	1.0 r: 1000						

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/14/2013 09:15:49 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\111313F\1113F040.D

Quantitation Report (QT Reviewed) Vial: 11 Data File : J:\GC21\DATA\111313F\1113F040.D Acq On : 13 Nov 2013 3:54 pm Operator: DVaillenco Inst : GC21 : K1311913-003 Sample Multiplr: 1.00 Misc : IntFile : rteint.p Quant Time: Nov 14 08:15:25 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_ System Monitoring Compounds 

 System Monitoring Compounds

 1) S 4-Bromofluorobenzene
 2.89
 25790
 45.484 ppm

 Spiked Amount 50.000
 Recovery = 90.97%

 2) S o-Terphenyl
 5.58
 70016
 54.990 ppm

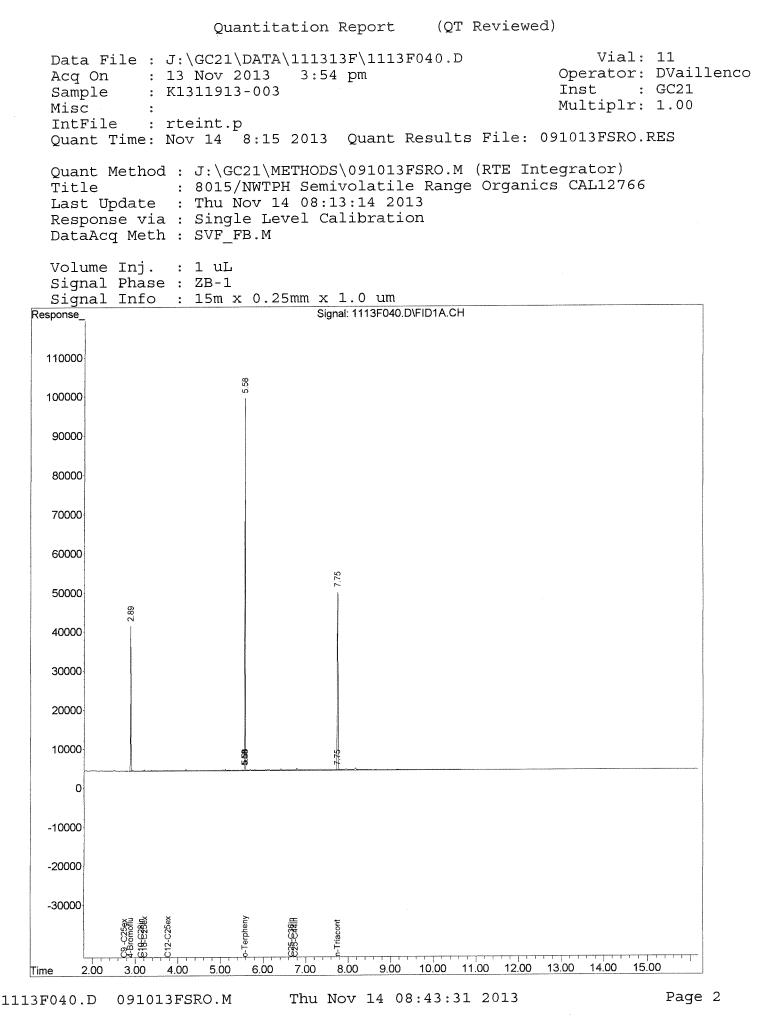
 Spiked Amount 50.000
 Recovery = 109.98%

 3) S n-Triacontane
 7.75
 60222
 58.135 ppm

 Spiked Amount 50.000
 Recovery = 116.27%

 Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.752125118.463 ppm5) HC10-C25ex DRO[AK102]3.232008717.748 ppm6) HC10-C28in DRO[8015]3.132822524.904 ppm7) HC12-C25ex DRO[NWTPH]3.781731817.937 ppm8) HC25-C36in RRO[NWTPH]6.662251123.126 ppm9) HC25-C44in RRO[TPH-Oil]6.762815525.452 ppm

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Analytical Results

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater
Sample Matrix:	Water

 Service Request:
 K1311913

 Date Collected:
 11/01/2013

 Date Received:
 11/01/2013

#### **Diesel and Residual Range Organics - Silica Gel Treated**

Sample Name:	MW3-110113DUP	Units:	0
Lab Code:	KWG1312533-1	Basis:	
Extraction Method: Analysis Method:	EPA 3510C NWTPH-Dx	Level:	Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND U	270	1	11/04/13	11/13/13	KWG1312533	
Residual Range Organics (RRO)	ND U	540	1	11/04/13	11/13/13	KWG1312533	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note	
o-Terphenyl	108	50-150	11/13/13	Acceptable	
n-Triacontane	115	50-150	11/13/13	Acceptable	

**Comments:** 

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# **Exception Report**

# Data File: J:\GC21\DATA\111313F\1113F042.D Lab ID: KWG1312533-1 RunType: DUP Matrix: WATER

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/13/2013 16:16 11/14/2013 08:15 KWG1312715 NWTPH-Dx MJ227

# Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
Analytical Holding Time	NA	NA	NA	x	
ICAL Analyte Recovery	NA	NA	NA	x	
Second Source ICAL Verification	NA	NA	NA	x	
Calibration Verification Pass/Fail	NA	NA	NA	x	
Continuing Calibration Recovery	NA	NA	NA	x	
Continuing Calibration Recovery (Closing)	NA	NA	NA	x	
Surrogates	NA	NA	NA	x	
Analyte Co-elution	NA	NA	NA	x	
Retention Time	NA	NA	NA	x	
Std MRL Unsupported by ICAL	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	x	
Above Highest ICAL Level	NA	NA	NA	x	
Enviroquant/Stealth Calibration Check	NA	NA	NA	x	
Overdiluted Analysis	NA	NA	NA	Х	

Primary Review Secondary Review:

### Quantitation Report

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\111313F\1113F042.D 11/13/2013 16:16 DUP KWG1312533-1		1/13/2013         16:16         Quant Date:           DUP		11/14/2013 08:15	Vial: Dilut	Instrument: Vial: Dilution: Soln Conc. Units:		GC21 12 1.0 ppm	
Bottle ID: Prod Code:	NWTPH-Dx NW T	PH		Tier: Collect Date:		Matr Rece	ix: ive Date:	WATE 11/11/		2010-00-00-00-00-00-00-00-00-00-00-00-00-
Analysis Lot: Analysis Method: Prep Ref:	KWG1312715 NWTPH-Dx 1302601			Prep Lot: Prep Method: Prep Date:	KWG1312533 EPA 3510C 11/04/2013	Repo	ort Group:			
Quant Method: Title:	J:\GC21\METHOD	S\091013	BFSRO.M	<u></u>	iene e constant de la marte de la della	Calib	oration ID:	CALI	2766	
MB Ref:	J:\GC21\DATA\111313F\1113F034.D				Meth Qua	MJ227 n Method	MJ227 <b>Method</b>			
Surrogate Comp	<u>11 - Dan German (1997), 1997</u> - 1997		RT		P	Solution	%Rec	%Rec Limits		Rpt?
Parameter Na	ime	RT	Dev	,	Response	Conc			01/	Кріз
o-Terphenyl n-Triacontane	~	5.58 7.75	0.01 0.00		68845 59460	54.07 57.40	108 115	50-150 50-150	OK OK	
n-Triacontane Target Compour		1.15	0.00			Conc. Units:	ug/L	50 150	ÖI	
Parameter Na	me	RT	RT Dev		Response	Solution Conc	Fir Co	nal onc	Q	Rpt?
C9 - C24 DR	0	2.75			14433	12.54	27	70	U	
	Organics (DRO)	3.78			10419	10.79	23	.0	J ·	
-	ge Organics (RRO)	6.66			16834	13.60	28	.9	J	
C25 - C44 RF	RO	6.76			22250	18.88	54	10	U	
Prep Amount: Prep Final Vol:	470 mL 1 mL		Dilution: Unit Facto	1.0 or: 1000						

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/14/2013 09:15:53  $u: \times tealth \times teal.rpt \times teal$ 

D: Result from dilution b. Result la integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\111313F\1113F042.D

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\111313F\1113F042.D Vial: 12 Acq On : 13 Nov 2013 4:16 pm Operator: DVaillenco Inst : GC21 Sample : K1311913-003DUP Misc : Multiplr: 1.00 IntFile : rteint.p Ouant Time: Nov 14 08:15:26 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title: 8015/NWTPH Semivolatile Range Organics CAL12766Last Update: Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_ System Monitoring Compounds 

 System Monitoring compounds

 1) S 4-Bromofluorobenzene
 2.89
 25287
 44.597 ppm

 Spiked Amount 50.000
 Recovery
 =
 89.19%

 2) S o-Terphenyl
 5.58
 68845
 54.070 ppm

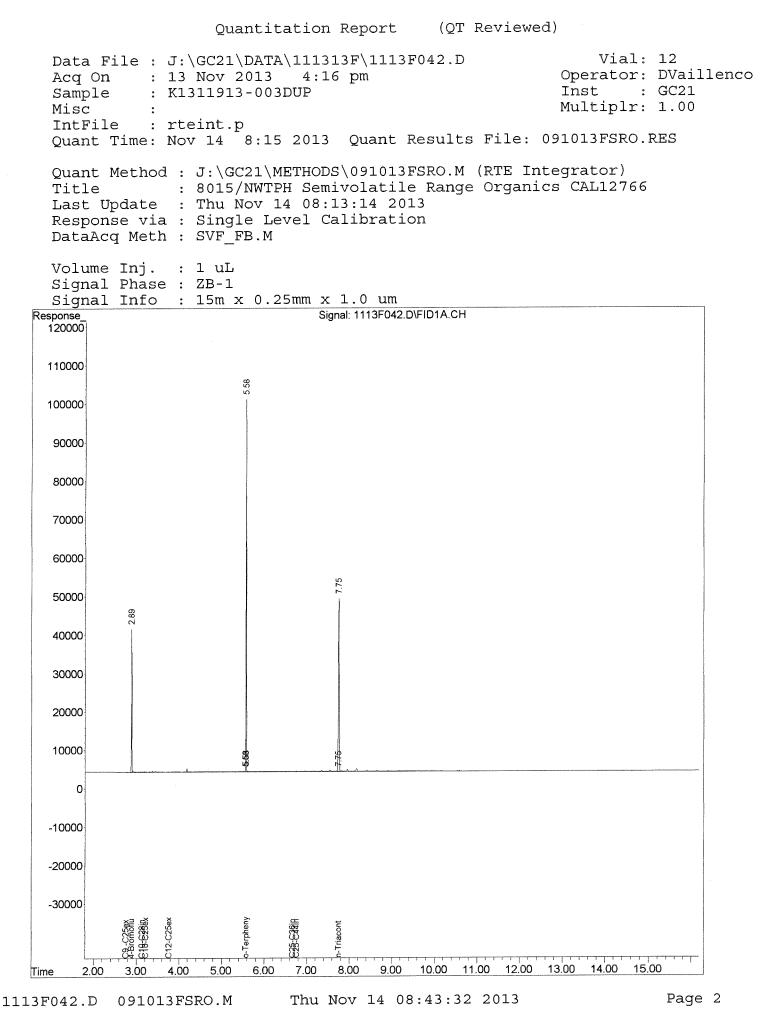
 Spiked Amount 50.000
 Recovery
 =
 108.14%

 3) S n-Triacontane
 7.75
 59460
 57.399 ppm

 Spiked Amount 50.000 2) S o-Terphenyl Spiked Amount 50.000 Recovery = 114.80% Spiked Amount 50.000 Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.751443312.539 ppm5) HC10-C25ex DRO[AK102]3.231317211.638 ppm6) HC10-C28in DRO[8015]3.131768015.600 ppm7) HC12-C25ex DRO[NWTPH]3.781041910.792 ppm8) HC25-C36in RRO[NWTPH]6.661683413.595 ppm9) HC25-C44in RRO[TPH-Oil]6.762225018.878 ppm

Page 1

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Analytical Results

Client:	KTA Associates	Service Request: K13	311913
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected: NA	
Sample Matrix:	Water	Date Received: NA	

#### Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	Method Blank	Units:	0
Lab Code:	KWG1312533-3	Basis:	
Extraction Method: Analysis Method:	EPA 3510C NWTPH-Dx	Level:	Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO) Residual Range Organics (RRO)	ND U ND U	250 500	1	11/04/13 11/04/13	11/13/13 11/13/13	KWG1312533 KWG1312533	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	98	50-150	11/13/13	Acceptable
n-Triacontane	109	50-150	11/13/13	Acceptable

**Comments:** 

Merged

# **Exception Report**

# Data File: J:\GC21\DATA\111313F\1113F034.D Lab ID: KWG1312533-3 RunType: MB Matrix: WATER

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/13/2013 14:47 11/14/2013 08:15 KWG1312715 NWTPH-Dx MJ227

# Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
Analytical Holding Time	NA	NA	NA	х	
ICAL Analyte Recovery	NA	NA	NA	x	
Second Source ICAL Verification	NA	NA	NA	x	
Calibration Verification Pass/Fail	NA	NA	NA	Х	
Continuing Calibration Recovery	NA	NA	NA	х	
Continuing Calibration Recovery (Closing)	NA	NA	NA	х	
Surrogates	NA	NA	NA	х	
Analyte Co-elution	NA	NA	NA	х	
Retention Time	NA	NA	NA	x	
Std MRL Unsupported by ICAL	NA	NA	NA	х	
Below Lowest ICAL Level	NA	NA	NA	х	
Above Highest ICAL Level	NA	NA	NA	x	
Enviroquant/Stealth Calibration Check	NA	NA	NA	x	
Overdiluted Analysis	NA	NA	NA	x	

Primary Review Secondary Review: Page 1 of 1

# Quantitation Report

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\111313F\1113F034.D 11/13/2013 14:47 MB KWG1312533-3		11/13/2013 14:47 Quant Date: 11/14 MB		11/14/2013 08:15	Vial: Dilu	Instrument: Vial: Dilution: Soln Conc. Units:			
Bottle ID: Prod Code:	NWTPH-Dx NW 1	РН		Tier: Collect Date:		Matu Rece	rix: ive Date:	WATI 11/11		
Analysis Lot: Analysis Method: Prep Ref:	KWG1312715 NWTPH-Dx 1302603			Prep Lot: Prep Method: Prep Date:	KWG1312533 EPA 3510C 11/04/2013	Repo	ort Group:	1970-1971 1970 1970 1970 1970 1970 1970 1970		
Quant Method: Title:	J:\GC21\METHOD	S\09101	3FSRO.M			Calil	pration ID:	CALI	2766	
MB Ref:		11.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1					od ID: nt based or	MJ227 Method	7	
Surrogate Compo			RT			Solution		%Rec		
Parameter Nan	ne	RT	Dev		Response	Conc	%Rec	Limits		Rpt?
o-Terphenyl		5.58	0.01		62617	49.18	98	50-150		
n-Triacontane		7.75	0.00		56490	54.53	109	50-150	OK	
Target Compound	ds				Final C	Conc. Units:	ug/L			
Parameter Nan	ne	RT	RT Dev	eense aan aan aan aan ah	Response	Solution Conc	Fin: Cor		Q	Rpt?
C9 - C24 DRO	)	2.75		······································	5667	4.92	250	0	U	
-	Organics (DRO)	3.78			2820	2.92	11		U	
Residual Rang	e Organics (RRO)	6.66			9055	0.5350	19	•	U	
C25 - C44 RR0	0	6.76			15220	11.05	500	)	U	
Prep Amount: Prep Final Vol:	500 mL 1 mL		Dilution: Unit Facto	1.0 pr: 1000						

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/14/2013 09:15:37 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

Result fails acceptance criteria
 Acceptance criteria not applicable
 Insufficient information to determine acceptance
 Result >= MRL, but MRL less than low point of ICAL

c: check for co-elution

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\111313F\1113F034.D Vial: 8 Acq On : 13 Nov 2013 2:47 pm Operator: DVaillenco Sample : KQ1313041-03MB Inst : GC21 Multiplr: 1.00 Misc Misc : IntFile : rteint.p Quant Time: Nov 14 08:15:23 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds 2.89 26231 46.262 ppm 1) S 4-Bromofluorobenzene 

 1) S
 4-Bromoliuorobenzene
 2.89
 26231
 46.262
 ppm

 Spiked Amount
 50.000
 Recovery
 =
 92.52%

 2) S
 o-Terphenyl
 5.58
 62617
 49.179
 ppm

 Spiked Amount
 50.000
 Recovery
 =
 98.36%

 3) S
 n-Triacontane
 7.75
 56490
 54.532
 ppm

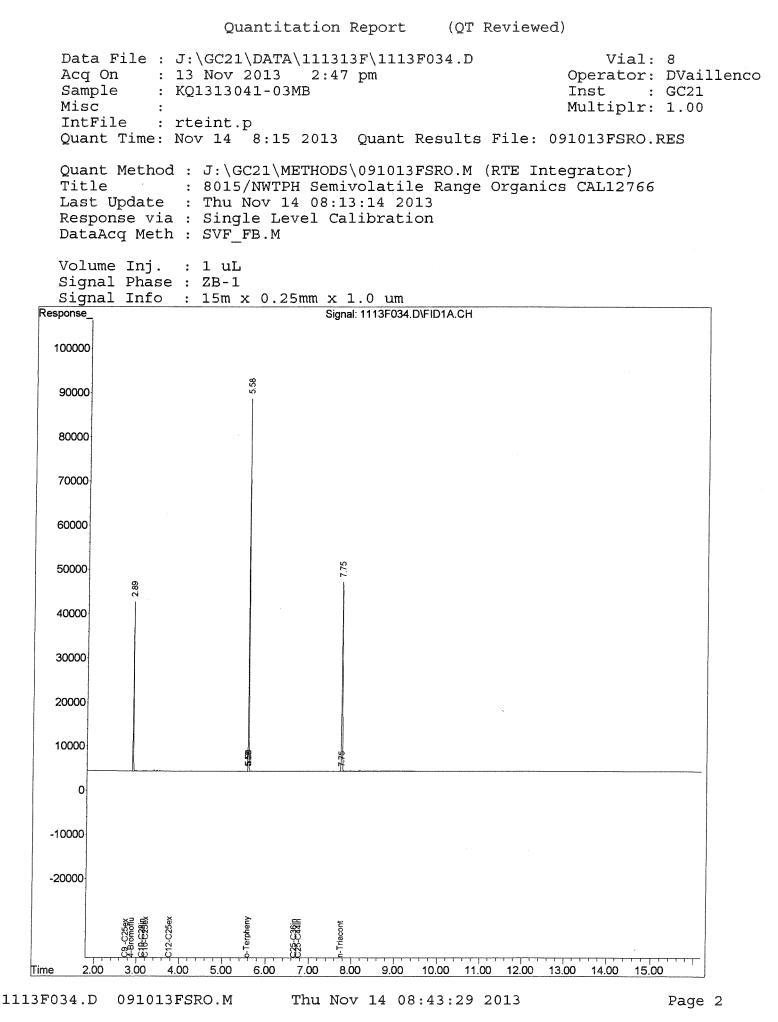
 Spiked Amount
 50.000
 Recovery
 =
 109.06%

 Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.7556674.924 ppm5) HC10-C25ex DRO[AK102]3.2348814.313 ppm6) HC10-C28in DRO[8015]3.1363505.603 ppm7) HC12-C25ex DRO[NWTPH]3.7828202.921 ppm8) HC25-C36in RRO[NWTPH]6.6690550.535 ppm9) HC25-C44in RRO[TPH-Oil]6.761522011.052 ppm

\_\_\_\_\_

60

n mar and non the set of the set



Analytical Results

Client:	KTA Associates	Service Request: K1311913
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected: NA
Sample Matrix:	Water	Date Received: NA

#### Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	Lab Control Sample	Units:	0
Lab Code:	KWG1312533-2	Basis:	
Extraction Method: Analysis Method:	EPA 3510C NWTPH-Dx	Level:	Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	3490	250	1	11/04/13	11/13/13	KWG1312533	
Residual Range Organics (RRO)	2040	500	1	11/04/13	11/13/13	KWG1312533	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	119	50-150	11/13/13	Acceptable
n-Triacontane	127	50-150	11/13/13	Acceptable

**Comments:** 

# Data File: J:\GC21\DATA\111313F\1113F032.D Lab ID: KWG1312533-2 RunType: LCS Matrix: WATER

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/13/2013 14:24 11/14/2013 08:15 KWG1312715 NWTPH-Dx MJ227

# Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
Analytical Holding Time	NA	NA	NA	x	
ICAL Analyte Recovery	NA	NA	NA	х	
Second Source ICAL Verification	NA	NA	NA	x	
Calibration Verification Pass/Fail	NA	NA	NA	x	
Continuing Calibration Recovery	NA	NA	NA	x	
Continuing Calibration Recovery (Closing)	NA	NA	NA	x	
Surrogates	NA	NA	NA	х	
Analyte Co-elution	NA	NA	NA	х	
Retention Time	NA	NA	NA	х	
Std MRL Unsupported by ICAL	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	x	
Above Highest ICAL Level	NA	NA	NA	x	
Enviroquant/Stealth Calibration Check	NA	NA	NA	x	
Overdiluted Analysis	NA	NA	NA	x	

Primary Review Secondary Review:

### Quantitation Report

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\111313F\1113F032.D 11/13/2013 14:24 LCS KWG1312533-2		11/13/201314:24Quant Date:11/14/201308:15LCS		11/13/2013 14:24 Qu LCS		11/14/2013 08:15	Instr Vial: Dilut Soln	GC21 7 1.0 : ppm		
Bottle ID: Prod Code:	NWTPH-Dx NW 1	ΡН		Tier: Collect Date:		Matr Rece	ix: ive Date:	WAT 11/11			
Analysis Lot: Analysis Method: Prep Ref:	KWG1312715 NWTPH-Dx 1302602			Prep Lot: Prep Method: Prep Date:	KWG1312533 EPA 3510C 11/04/2013	Repo	ort Group:				
Quant Method: Title:	J:\GC21\METHOD	S\09101	3FSRO.M			Calib	oration ID:	CAL1	2766		
MB Ref:	J:\GC21\DATA\111313F\1113F034.D						od ID: nt based on	MJ22' Method			
Surrogate Comp	ounds										
Parameter Na	me	RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits		Rpt?	
o-Terphenyl n-Triacontane		5.58 7.75	0.01 0.00		75517 65945	59.31 63.66	119 127	50-150 50-150			
Target Compoun	ds				Final C	Conc. Units:	ug/L				
Parameter Nar	ne	RT	RT Dev		Response	Solution Conc	Fin: Cor		Q	Rpt?	
	) Organics (DRO) ge Organics (RRO)	2.75 3.78 6.66			2026384 1684045 615581	1,761 1,744 1,019	352 349 204	0			
C25 - C44 RR	0	6.76			897223	992.96	199	0			
Prep Amount: Prep Final Vol:	500 mL 1 mL		Dilution: Unit Facto	1.0 r: 1000							

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/14/2013 09:15:29 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL

c: check for co-elution

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\111313F\1113F032.D Vial: 7 Operator: DVaillenco Acq On : 13 Nov 2013 2:24 pm Inst : GC21 : KQ1313041-02LCS Sample Multiplr: 1.00 Misc IntFile : rteint.p Quant Time: Nov 14 08:15:22 2013 Quant Results File: 091013FSRO.RES Ouant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_ System Monitoring Compounds 

 System Monitoring Compounds

 1) S 4-Bromofluorobenzene
 2.89
 33054
 58.295 ppm

 Spiked Amount 50.000
 Recovery
 =
 116.59%

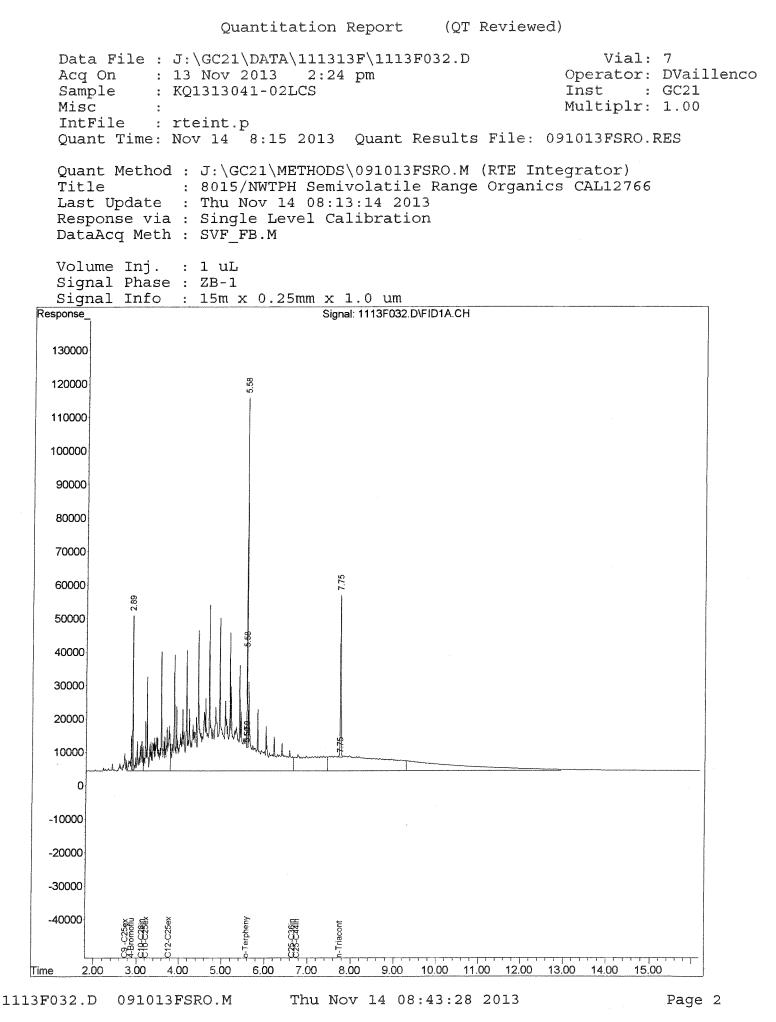
 2) S o-Terphenyl
 5.58
 75517
 59.310 ppm

 Spiked Amount 50.000
 Recovery
 =
 118.62%

 3) S n-Triacontane
 7.75
 65945
 63.660 ppm

 Spiked Amount 50.000
 Recovery
 =
 127.32%

 Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.7520263841760.536ppm5) HC10-C25ex DRO[AK102]3.2319570481729.144ppm6) HC10-C28in DRO[8015]3.1321539841900.552ppm7) HC12-C25ex DRO[NWTPH]3.7816840451744.276ppm8) HC25-C36in RRO[NWTPH]6.666155811018.812ppm9) HC25-C44in RRO[TPH-Oil]6.76897223992.959ppm



# Organic Analysis: <u>Diesel and Residual Range Organics - Silica Gel</u> <u>Treated</u> Validation Package

Standards Data

QA/QC Results

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power Groundwater

#### Service Request: K1311913 Calibration Date: 09/10/2013

#### Initial Calibration Summary Diesel and Residual Range Organics - Silica Gel Treated

Calibration Instrume		CAL12766 GC21		Column: ZB-1
Level ID	File ID		Level ID	File ID
A	J:\GC21\DA	ATA\091013F\0910F072.D	Ι	J:\GC21\DATA\091013F\0910F096.D
В	J:\GC21\DA	\TA\091013F\0910F074.D	Ј	J:\GC21\DATA\091013F\0910F098.D
С	J:\GC21\DA	\TA\091013F\0910F076.D	K	J:\GC21\DATA\091013F\0910F100.D
D	J:\GC21\DA	ATA\091013F\0910F078.D	L	J:\GC21\DATA\091013F\0910F102.D
Е	J:\GC21\DA	\TA\091013F\0910F0 <b>8</b> 0.D	М	J:\GC21\DATA\091013F\0910F104.D
F	J:\GC21\DA	\TA\091013F\0910F082.D	Ν	J:\GC21\DATA\091013F\0910F106.D
G	J:\GC21\DA	\TA\091013F\0910F092.D		
Н	J:\GC21\DA	\TA\091013F\0910F094.D		

Analyte Name	Level D	Amt	RF	Level ID	Amt	RF	Level ID	l Amt	RF	Leve ID	l Amt	RF	Level ID	Amt	RF
Diesel Range Organics (DRO)				G	20	1010	н	50	924	I	200	965	J	500	972
	К	2000	989	L	5000	1030	М	20000	916	Ν	50000	920			
Residual Range Organics (RRO)	A F	20 5000	968 588	В	50	756	С	200	699	D	500	627	E	2000	615
o-Terphenyl	K	100	1280	G L	1.0 250	1300 1330	Н	2.5	1190	I	10	1260	J	25	1280
n-Triacontane	K	100	1070	G L	1.0 250	938 1160	н	2.5	919	Ι	10	10 <b>50</b>	J	25	1080

Results flagged with an asterisk (\*) indicate values outside control criteria.

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QA/QC Results

Client: Project:

Diesel Range Organics (DRO)

o-Terphenyl

n-Triacontane

Residual Range Organics (RRO)

KTA Associates PacifiCorp-Chehalis Power Groundwater

MS

MS

SURR

SURR

Service Request: K1311913 Calibration Date: 09/10/2013

#### Initial Calibration Summary Diesel and Residual Range Organics - Silica Gel Treated

Calibration ID: Instrument ID:	CAL12766 GC21							Column:	ZB-1
			2008 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	Calibrati	on Evaluati	ion			
Analyte Name		Compound Type	Fit Type	Eval.	Eval. Result	Q	Control Criteria		

AverageRF

Linear

AverageRF

AverageRF

% RSD

R2

% RSD

% RSD

4.4

0.999

3.8

8.8

≤20

≤20

≤20

≥0.99

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Results									
Client: Project:	KTA Associates PacifiCorp-Chehalis Power Groundwater	Service Request: Calibration Date: Date Analyzed:	09/10/2013						
	Second Source Calibration Verification Diesel and Residual Range Organics - Silica Gel Treated								
Calibration Type: Analysis Method:	External Standard NWTPH-Dx	Calibration ID: Units:							
File ID:	J:\GC21\DATA\091013F\0910F088.D J:\GC21\DATA\091013F\0910F110.D	Column ID:	ZB-1						

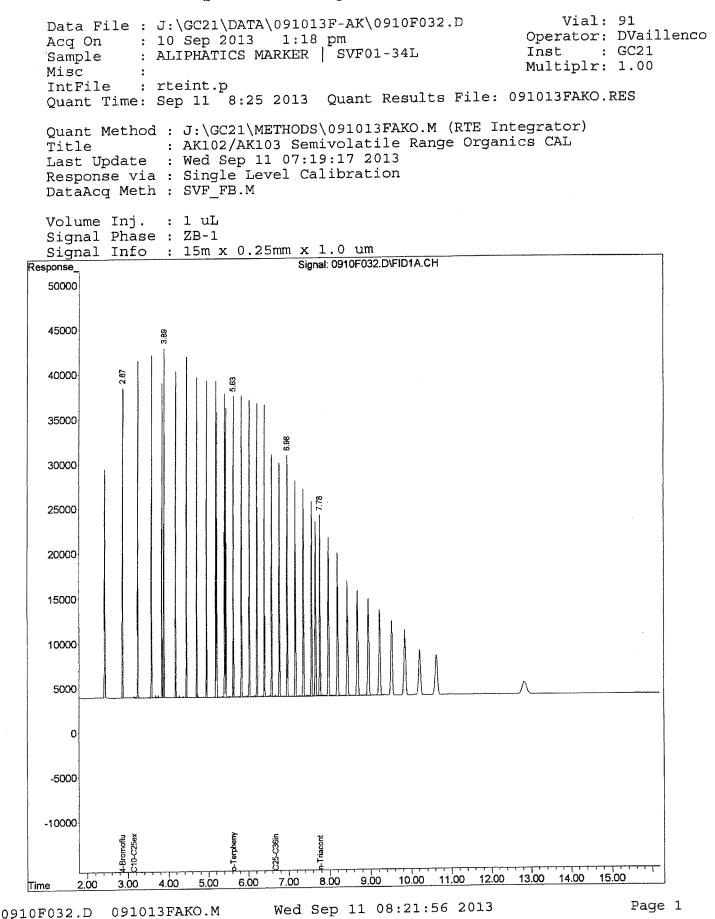
Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
Diesel Range Organics (DRO)	1000	1000	965	964	0	NA	± 15 %	AverageRF
Residual Range Organics (RRO)	1000	990	709	599	NA	-1	± 15 %	Linear

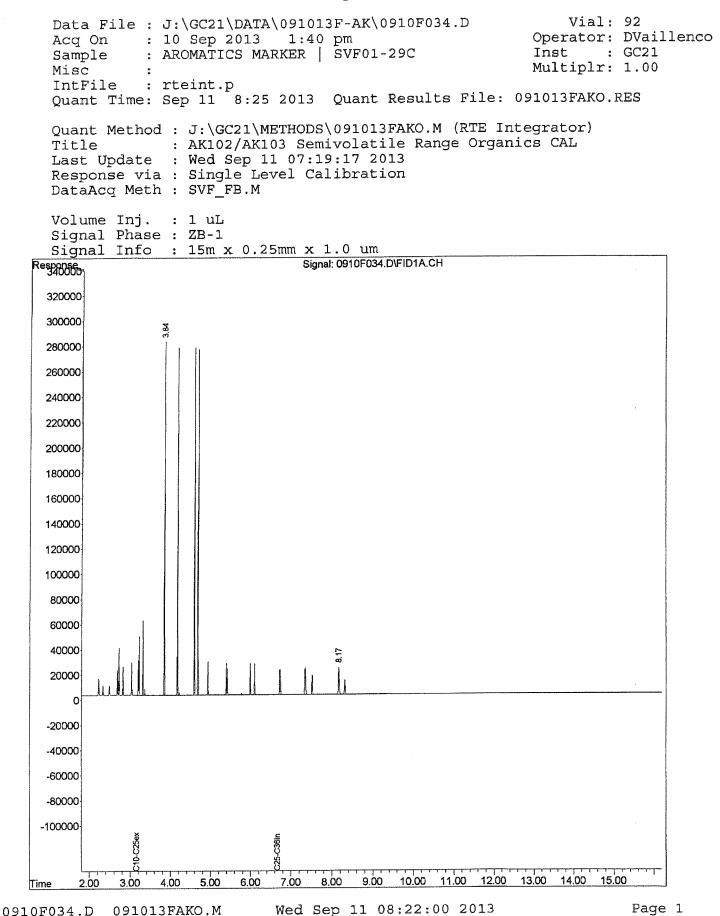
Results flagged with an asterisk (\*) indicate values outside control criteria.

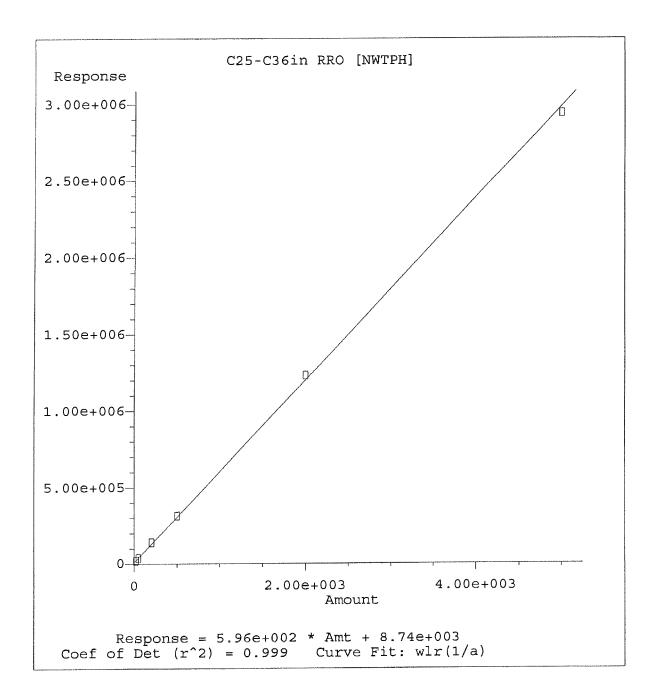
Directory:

j:\GC21\data\091013F

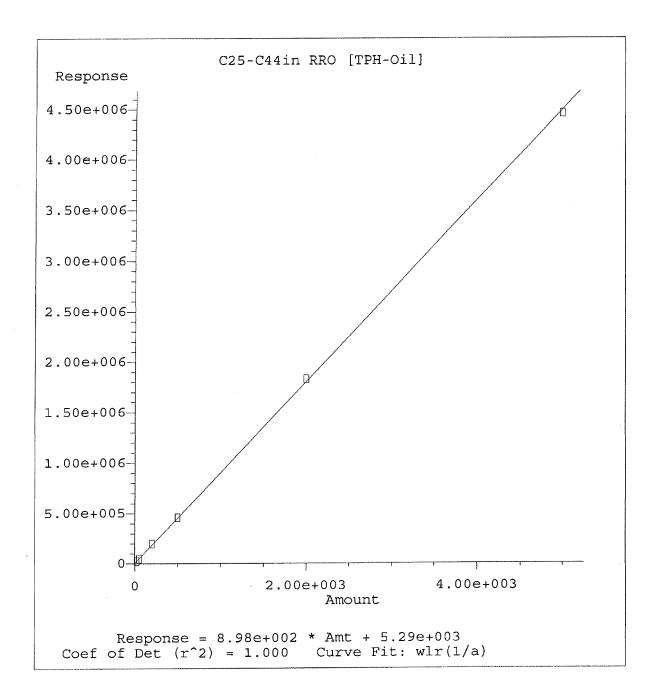
Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1 2 3 4 5 6 7 8 9	90 90 90 97 96 90 90	0910F002.D 0910F004.D 0910F006.D 0910F008.D 0910F010.D 0910F012.D 0910F014.D 0910F016.D 0910F018.D	1. 1. 1. 1. 1. 1. 1. 1.	DCM DCM DCM DCM RRO CCV CHK DRO CCV CHK DCM DCM DCM	NESPO	09/10/22013 7:04 09/10/22013 7:26 09/10/22013 7:48 09/10/22013 8:10 09/10/22013 8:32 09/10/22013 8:55 09/10/22013 9:17 09/10/22013 9:39 09/10/22013 10:0
10 11 12 13 14 15 16 17 18 19	90 90 90 90 90 90 91 92 90 97	0910F020.D 0910F022.D 0910F024.D 0910F026.D 0910F028.D 0910F030.D 0910F032.D 0910F034.D 0910F036.D 0910F038.D	1. 1. 1. 1. 1. 1. 1. 1.	DCM DCM DCM DCM DCM ALIPHATICS MARKER   SVF0 AROMATICS MARKER   SVF0 DCM RRO @ 1000ppm   SVF01-42I		09/10/22013 10:2- 09/10/22013 10:4- 09/10/22013 11:0- 09/10/22013 12:1- 09/10/22013 12:3- 09/10/22013 12:5- 09/10/22013 1:18 09/10/22013 1:40 09/10/22013 2:03 09/10/22013 2:25
20 21 22 23 24 25 26 27 28 29	96 86 90 90 90 90 1 2 3 4	0910F040.D 0910F042.D 0910F044.D 0910F046.D 0910F048.D 0910F050.D 0910F052.D 0910F052.D 0910F056.D 0910F056.D	1. 1. 1. 1. 1. 1. 1. 1. 1.	DRO @ 1000/50ppm   SVF01-3 IB DCM DCM DCM DCM/IB AK103 @ 20ppm   SVF01-38M AK103 @ 200ppm   SVF01-38L AK103 @ 200ppm   SVF01-38L AK103 @ 500ppm   SVF01-38J	mp clone mp clone that used for SPD (a)	09/10/22013 2:47 09/10/22013 3:09 09/10/22013 3:32 09/10/22013 3:54 09/10/22013 4:58 09/10/22013 5:20 09/10/22013 5:42 09/10/22013 6:04 09/10/22013 6:26 09/10/22013 6:48
30 31 32 33 34 35 36 37 38 39	90 90 7 90 8 9 10	0910F060.D 0910F062.D 0910F064.D 0910F066.D 0910F068.D 0910F070.D 0910F072.D 0910F074.D 0910F076.D 0910F078.D	1. 1. 1. 1. 1. 1. 1. 1.	AK103 @2000ppm   SVF01-38 AK103 @ 5000ppm   SVF01-38 DCM - CARRYOVER DCM - CARRYOVER AK ICV @ 1000ppm   SVF01-4 DCM RRO @ 20ppm   SVF01-40N RRO @ 50ppm   SVF01-40M RRO @ 200ppm   SVF01-40L RRO @ 500ppm   SVF01-40K		09/10/22013 7:11 09/10/22013 7:33 09/10/22013 7:55 09/10/22013 8:18 09/10/22013 8:40 09/10/22013 9:02 09/10/22013 9:24 09/10/22013 9:46 09/10/22013 10:01 09/10/22013 10:31
40 41 42 43 44 45 46 47 48 49	13 90 90 14 90 15 16 17	0910F080.D 0910F082.D 0910F084.D 0910F086.D 0910F088.D 0910F090.D 0910F092.D 0910F094.D 0910F096.D 0910F098.D	1. 1. 1. 1. 1. 1. 1. 1.	RRO @ 2000ppm   SVF01-40J RRO @ 5000ppm   SVF01-40J DCM - CARRYOVER DCM - CARRYOVER RRO @ 1000ppm   SVF01-42J DCM DRO @ 20/1.0ppm   SVF01-42 DRO @ 50/2.5ppm   SVF01-42 DRO @ 200/10ppm   SVF01-42 DRO @ 500/25ppm   SVF01-42	'H 'G 2F	09/10/22013 10:5: 09/10/22013 11:1: 09/10/22013 11:3: 09/11/22013 12:0: 09/11/22013 12:2: 09/11/22013 12:4: 09/11/22013 1:07 09/11/22013 1:51 09/11/22013 2:14
50 51 52 53 54 55	20 21 22 90	0910F100.D 0910F102.D 0910F104.D 0910F106.D 0910F108.D 0910F110.D	1. 1. 1. 1. 1. 1.	DRO @ 2000/100ppm   SVF01 DRO @ 5000/250ppm  SVF01- DRO @ 20000ppm   SVF01-42 DRO @ 50000ppm   SVF01-42 DCM - CARRYOVER DRO ICV @ 1000ppm   SVF01	42C B A	09/11/22013 2:36 09/11/22013 2:58 09/11/22013 3:20 09/11/22013 3:42 09/11/22013 4:05 09/11/22013 4:27







Method Name: J:\GC21\METHODS\091013FSRO.M Calibration Table Last Updated: Wed Sep 11 08:39:03 2013

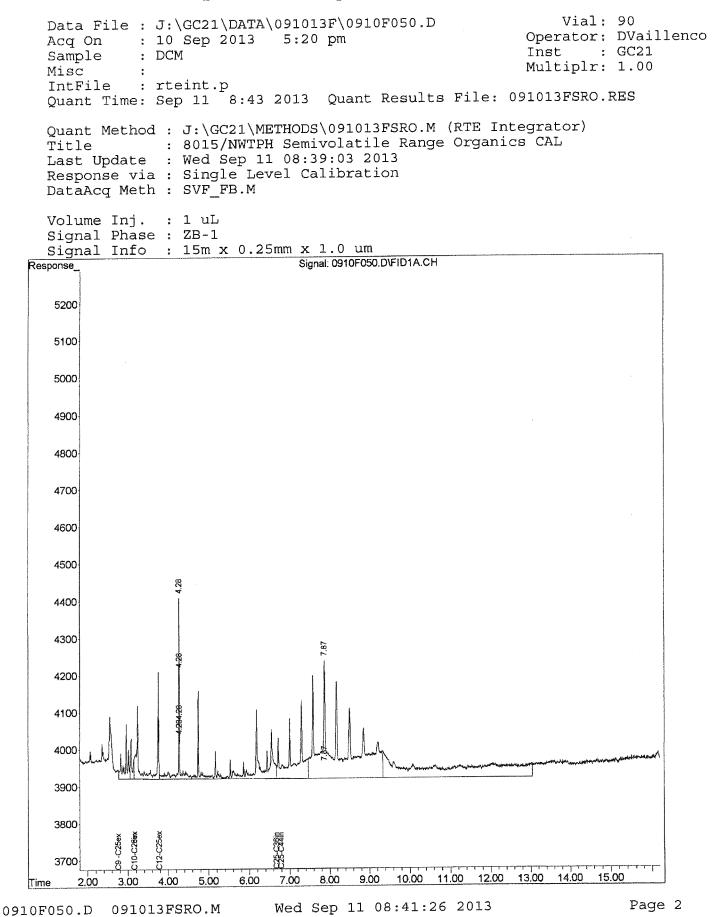


Method Name: J:\GC21\METHODS\091013FSRO.M Calibration Table Last Updated: Wed Sep 11 08:39:03 2013

Vial: 90 Data File : J:\GC21\DATA\091013F\0910F050.D Acq On : 10 Sep 2013 5:20 pm Operator: DVaillenco Sample : DCM (JB) Misc : Inst : GC21 Multiplr: 1.00 IntFile : rteint.p Quant Time: Sep 11 08:39:35 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title: 8015/NWTPH Semivolatile Range Organics CALLast Update: Wed Sep 11 08:39:03 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_ System Monitoring Compounds Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.7755374.811 ppm5) HC10-C25ex DRO[AK102]3.1549714.392 ppm6) HC10-C28in DRO[8015]3.1571696.326 ppm7) HC12-C25ex DRO[NWTPH]3.7935713.699 ppm8) HC25-C36in RRO[NWTPH]6.68106403.196 ppm9) HC25-C44in RRO[TPH-Oil]6.781700113.034 ppm

(m)=manual int.

(f) = RT Delta > 1/2 Window0910F050.D 091013FSRO.M Wed Sep 11 08:41:26 2013



Vial: 8 Data File : J:\GC21\DATA\091013F\0910F072.D Acq On : 10 Sep 2013 9:24 pm Sample : RRO @ 20ppm | SVF01-40N Operator: DVaillenco Inst : GC21 Multiplr: 1.00 Misc : IntFile : rteint.p Quant Time: Sep 11 08:27:18 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound R.T. Response Conc Units System Monitoring Compounds Target Compounds 8) H C25-C36in RRO [NWTPH] 6.68 19355 12.110 ppm

\_\_\_\_ (f)=RT Delta > 1/2 Window 0910F072.D 091013FSRO.M Wed Sep 11 08:41:26 2013

(m)=manual int. Page 1

```
Vial: 8
     Data File : J:\GC21\DATA\091013F\0910F072.D
                                                                 Operator: DVaillenco
     Acq On : 10 Sep 2013 9:24 pm
                                                                       : GC21
                                                                 Inst
                : RRO @ 20ppm | SVF01-40N
     Sample
                                                                 Multiplr: 1.00
     Misc
                •
     IntFile : rteint.p
     Quant Time: Sep 11 8:31 2013 Quant Results File: 091013FSRO.RES
     Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator)
                : 8015/NWTPH Semivolatile Range Organics CAL
     Title
     Last Update : Wed Sep 11 08:26:19 2013
     Response via : Single Level Calibration
     DataAcq Meth : SVF FB.M
     Volume Inj. : 1 uL
     Signal Phase : ZB-1
     Signal Info : 15m x 0.25mm x 1.0 um
                                     Signal: 0910F072.D\FID1A.CH
   Response_
      4850
      4800
      4750
      4700
      4650
      4600
      4550
      4500
      4450
      4400
      4350
      4300
      4250
      4200
      4150
      4100
                                       7.87
      4050
      4000
      3950
      3900
                                  C25-C36in
      3850
                                                           12.00 13.00 14.00
                                                                          15.00
                                  7.00
                                       8.00
                                            9.00
                                                 10.00 11.00
              3.00
                   4.00
                        5.00
                             6.00
         2.00
   Time
                                                                              Page 2
                                 Wed Sep 11 08:41:27 2013
0910F072.D 091013FSRO.M
```

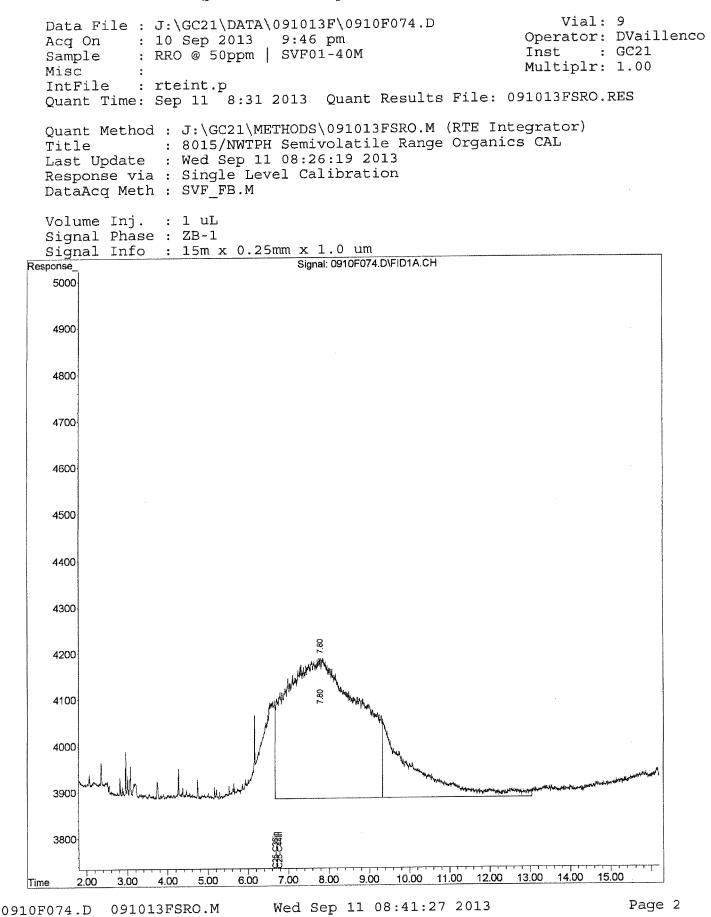
Vial: 9 Data File : J:\GC21\DATA\091013F\0910F074.D Acq On : 10 Sep 2013 9:46 pm Operator: DVaillenco Inst : GC21 : RRO @ 50ppm | SVF01-40M Sample Multiplr: 1.00 Misc : IntFile : rteint.p Quant Time: Sep 11 08:27:19 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF\_FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds Target Compounds 8) HC25-C36in RRO [NWTPH]6.683779644.867 ppm9) HC25-C44in RRO [TPH-Oil]6.784630516.227 ppm

2 11/113

(m)=manual int.

(f)=RT Delta > 1/2 Window 0910F074.D 091013FSRO.M Wed Sep 11 08:41:27 2013

80

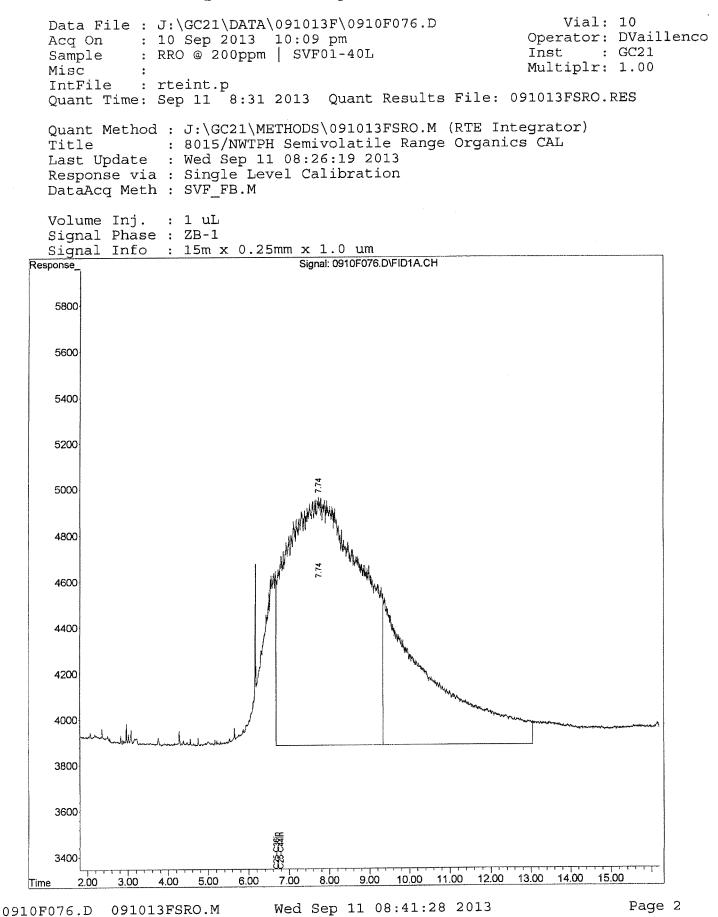


Vial: 10 Data File : J:\GC21\DATA\091013F\0910F076.D Acq On : 10 Sep 2013 10:09 pm Operator: DVaillenco Inst : GC21 Sample : RRO @ 200ppm | SVF01-40L Multiplr: 1.00 Misc : IntFile : rteint.p Misc Quant Time: Sep 11 08:27:19 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF\_FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_\_ System Monitoring Compounds Target Compounds 8) HC25-C36in RRO [NWTPH]6.68139742225.957 ppm9) HC25-C44in RRO [TPH-Oil]6.78194795194.322 ppm

) [INWIED]	0.00	102740	
	6 70	194795	194.322 ppm

(m)=manual int.

(f)=RT Delta > 1/2 Window 0910F076.D 091013FSRO.M Wed Sep 11 08:41:28 2013 Page 1



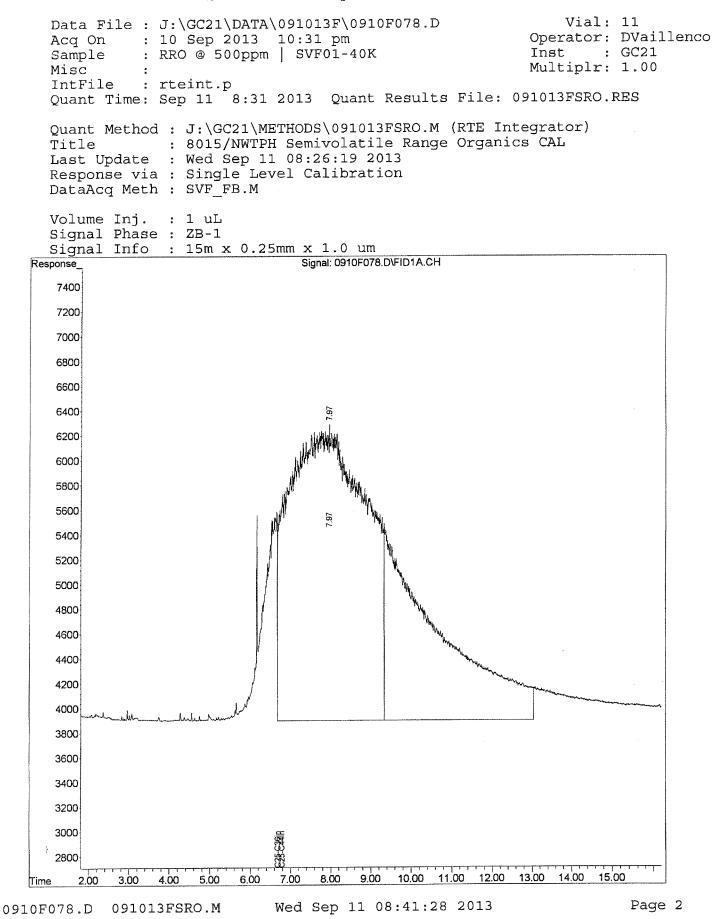
Vial: 11 Data File : J:\GC21\DATA\091013F\0910F078.D Acq On : 10 Sep 2013 10:31 pm Sample : RRO @ 500ppm | SVF01-40K Operator: DVaillenco Inst : GC21 Multiplr: 1.00 . Misc IntFile : rteint.p Quant Time: Sep 11 08:27:20 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound R.T. Response Conc Units System Monitoring Compounds Target Compounds

Targ	et compounds				
н	C25-C36in RRO	[NWTPH]	6.68	313687	534.940 ppm
	C25-C44in RRO		6.78	<b>4</b> 5805 <b>9</b>	510.072 ppm

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\_\_\_\_\_ (f) = RT Delta > 1/2 Window 0910F078.D 091013FSRO.M Wed Sep 11 08:41:28 2013

8) 9)



Vial: 12 Data File : J:\GC21\DATA\091013F\0910F080.D Operator: DVaillenco Acq On : 10 Sep 2013 10:53 pm Sample : RRO @ 2000ppm | SVF01-40J Inst : GC21 Multiplr: 1.00 Misc : IntFile : rteint.p Quant Time: Sep 11 08:27:21 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcg Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds Target Compounds 8) HC25-C36in RRO [NWTPH]6.6812296792162.043ppm9) HC25-C44in RRO [TPH-Oil]6.7818303142155.912ppm

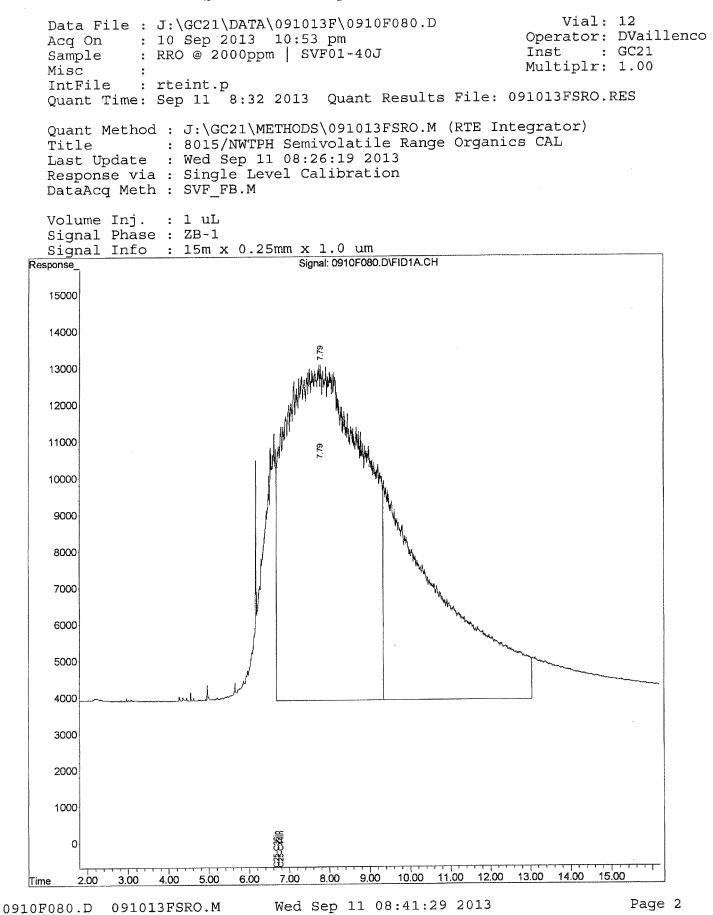
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(m) = manual int.

\_\_\_\_\_ (f)=RT Delta > 1/2 Window 0910F080.D 091013FSRO.M

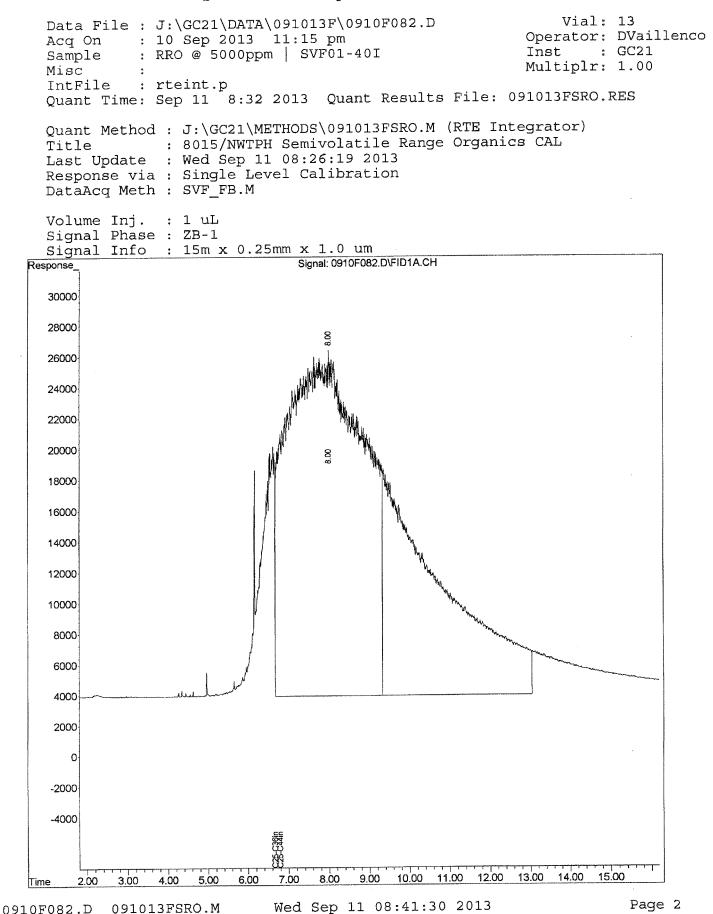
Wed Sep 11 08:41:29 2013

Page 1



Vial: 13 Data File : J:\GC21\DATA\091013F\0910F082.D Operator: DVaillenco Acq On : 10 Sep 2013 11:15 pm Sample : RRO @ 5000ppm | SVF01-40I Inst : GC21 Multiplr: 1.00 : Misc IntFile : rteint.p Quant Time: Sep 11 08:27:21 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcg Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound R.T. Response Conc Units System Monitoring Compounds Target Compounds 8) HC25-C36in RRO [NWTPH]6.6829402795200.631 ppm9) HC25-C44in RRO [TPH-Oil]6.7844581655307.674 ppm

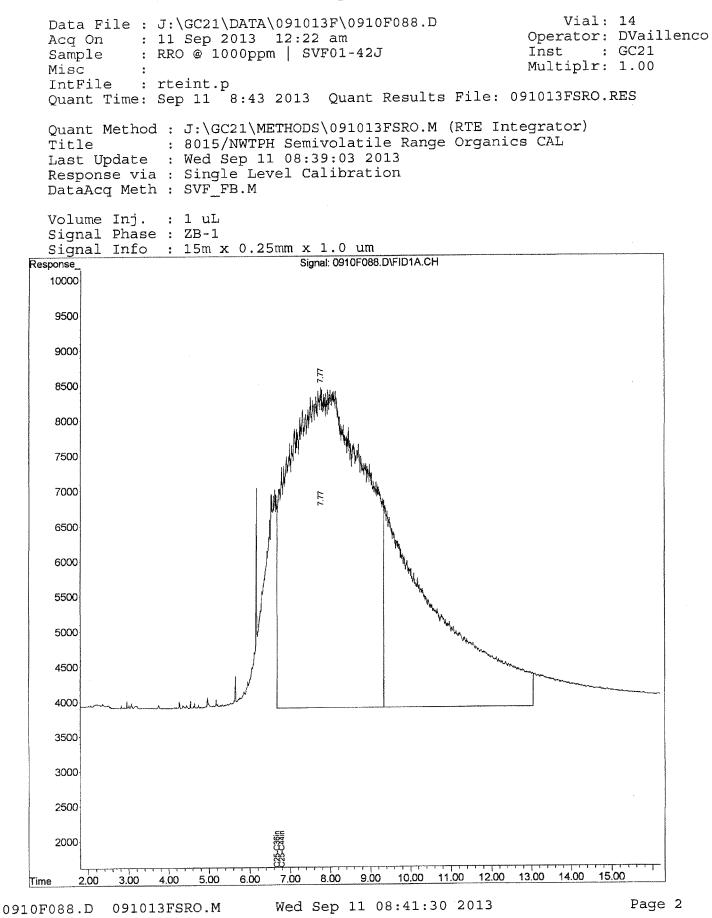
\_\_\_\_\_ (f)=RT Delta > 1/2 Window 0910F082.D 091013FSRO.M Wed Sep 11 08:41:29 2013 Page 1



Vial: 14 Data File : J:\GC21\DATA\091013F\0910F088.D Operator: DVaillenco Acq On : 11 Sep 2013 12:22 am Sample : RRO @ 1000ppm | SVF01-42J Acq On : 11 Sep 2013 12:22 am Inst : GC21 Multiplr: 1.00 Misc : IntFile : rteint.p Quant Time: Sep 11 08:39:36 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:39:03 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds Target Compounds 8) HC25-C36in RRO [NWTPH]6.68598693990.459 ppm9) HC25-C44in RRO [TPH-Oil]6.78871184963.971 ppm

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(f)=RT Delta > 1/2 Window 0910F088.D 091013FSRO.M Wed Sep 11 08:41:30 2013 Page 1



Vial: 15 Data File : J:\GC21\DATA\091013F\0910F092.D Operator: DVaillenco Acq On : 11 Sep 2013 1:07 am Inst : GC21 : DRO @ 20/1.0ppm | SVF01-42H Sample Multiplr: 1.00 Misc . . IntFile : rteint.p Quant Time: Sep 11 08:27:22 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds 2.91 604 0.982 ppm Recovery = 1.96% 5.60 1301 0.942 ppm Recovery = 1.88% 7.78 938 0.806 ppm Recovery = 1.61% 1) S 4-Bromofluorobenzene Spiked Amount 50.000 2) S o-Terphenyl Spiked Amount 50.000 3) S n-Triacontane Spiked Amount 50.000 Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.772457819.880 ppm5) HC10-C25ex DRO[AK102]3.152401519.821 ppm6) HC10-C28in DRO[8015]3.152463820.427 ppm7) HC12-C25ex DRO[NWTPH]3.792020919.538 ppm

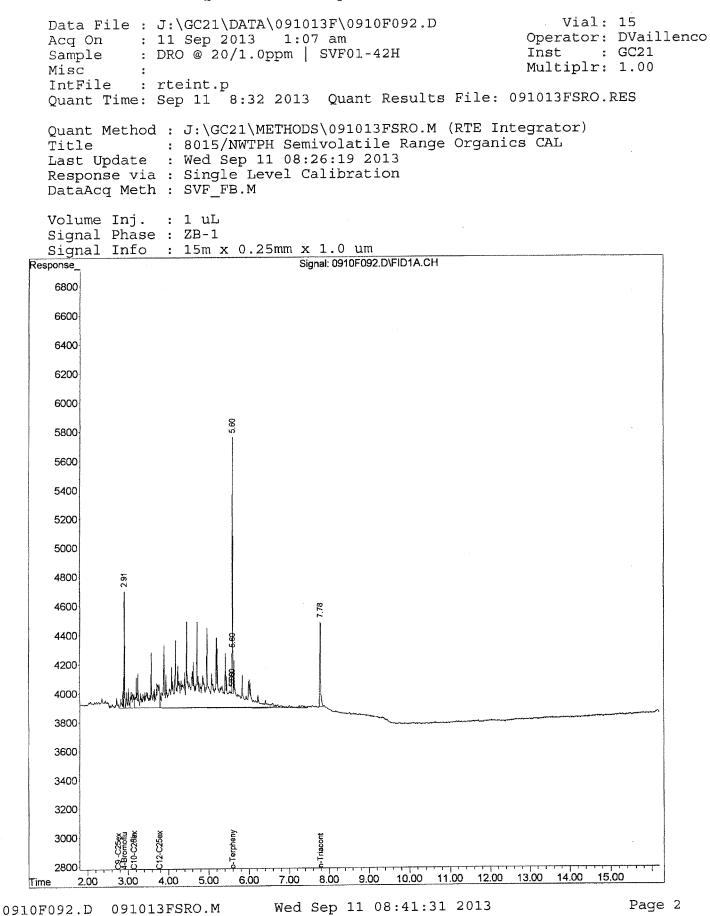
(m)=manual int.

(f) = RT Delta > 1/2 Window0910F092.D 091013FSRO.M Wed Sep 11 08:41:31 2013

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Page 1

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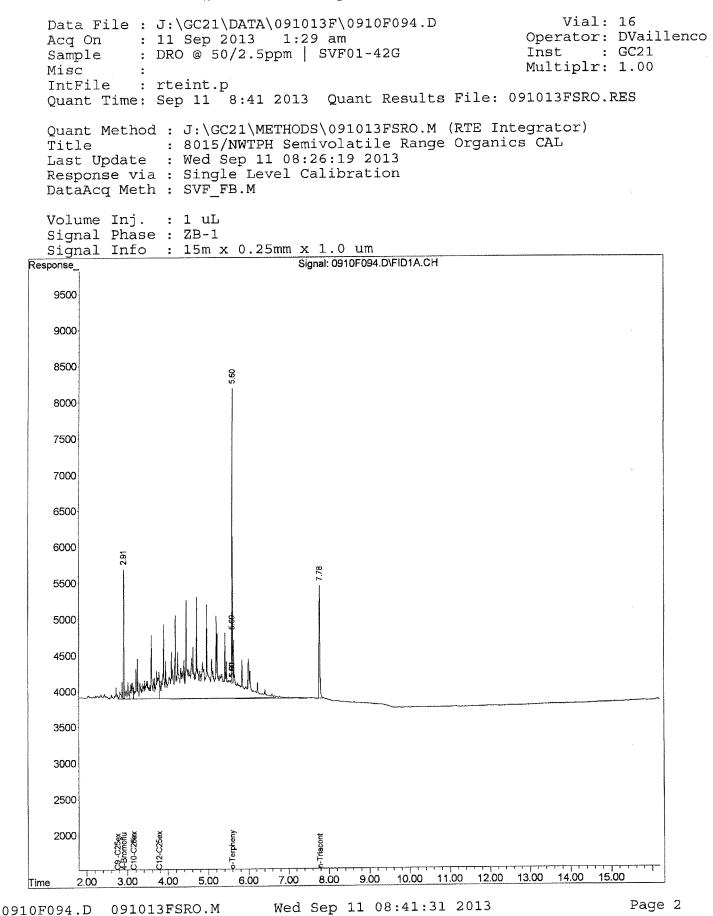
Vial: 16 Data File : J:\GC21\DATA\091013F\0910F094.D Operator: DVaillenco Acq On : 11 Sep 2013 1:29 am Inst : GC21 : DRO @ 50/2.5ppm | SVF01-42G Sample Multiplr: 1.00 Misc : IntFile : rteint.p Quant Time: Sep 11 08:27:22 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_ System Monitoring Compounds1) S4-Bromofluorobenzene2) S0-Terphenyl2) S0-Terphenyl5,6029722) S0-Terphenyl5,6029722) S13152) S0-Terphenyl5,6029722) S13152) S0-Terphenyl5,6029722,152ppmRecovery=4.30%3) Sn-Triacontane7.7822981.975ppmTeiled Amount50.000Recovery=3.95% Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.775526844.704 ppm5) HC10-C25ex DRO[AK102]3.155425344.778 ppm6) HC10-C28in DRO[8015]3.155501745.614 ppm7) HC12-C25ex DRO[NWTPH]3.794618344.650 ppm

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(m)=manual int.

(f)=RT Delta > 1/2 Window 0910F094.D 091013FSRO.M Wed Sep 11 08:41:31 2013 Page 1

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Data File : J:\GC21\DATA\091013F\0910F096.D Vial: 17 Operator: DVaillenco Acq On : 11 Sep 2013 1:51 am Inst : GC21 Sample : DRO @ 200/10ppm | SVF01-42F Multiplr: 1.00 Misc IntFile : rteint.p Quant Time: Sep 11 08:27:23 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcg Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound 

 System Monitoring Compounds
 2.91
 5719
 9.295 ppm

 1) S
 4-Bromofluorobenzene
 2.91
 5719
 9.295 ppm

 Spiked Amount
 50.000
 Recovery
 =
 18.59%

 2) S
 o-Terphenyl
 5.60
 12576
 9.106 ppm

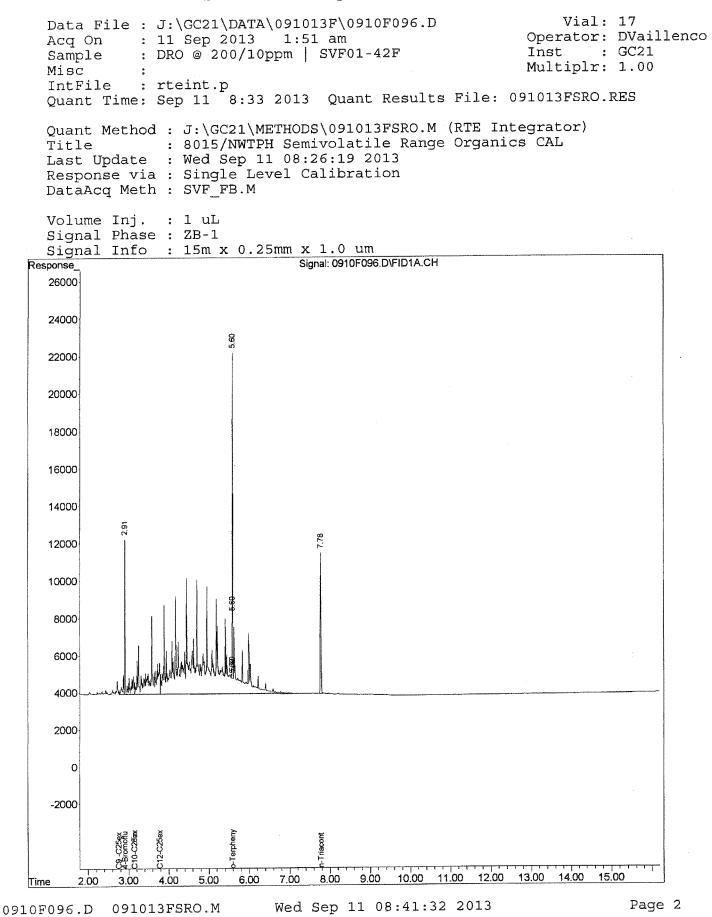
 Spiked Amount
 50.000
 Recovery
 =
 18.21%

 3) S
 n-Triacontane
 7.78
 10475
 9.001 ppm

 Spiked Amount
 50.000
 Recovery
 =
 18.00%

 Target Compounds 4) HC9 -C25ex DRO<[TPH-Diesel]</th>2.77229949185.996 ppm5) HC10-C25ex DRO<[AK102]</td>3.15226348186.817 ppm6) HC10-C28in DRO<[8015]</td>3.15227285188.438 ppm7) HC12-C25ex DRO<[NWTPH]</td>3.79193042186.632 ppm

\_\_\_\_\_ (f)=RT Delta > 1/2 Window 0910F096.D 091013FSR0.M Wed Sep 11 08:41:32 2013 Page 1



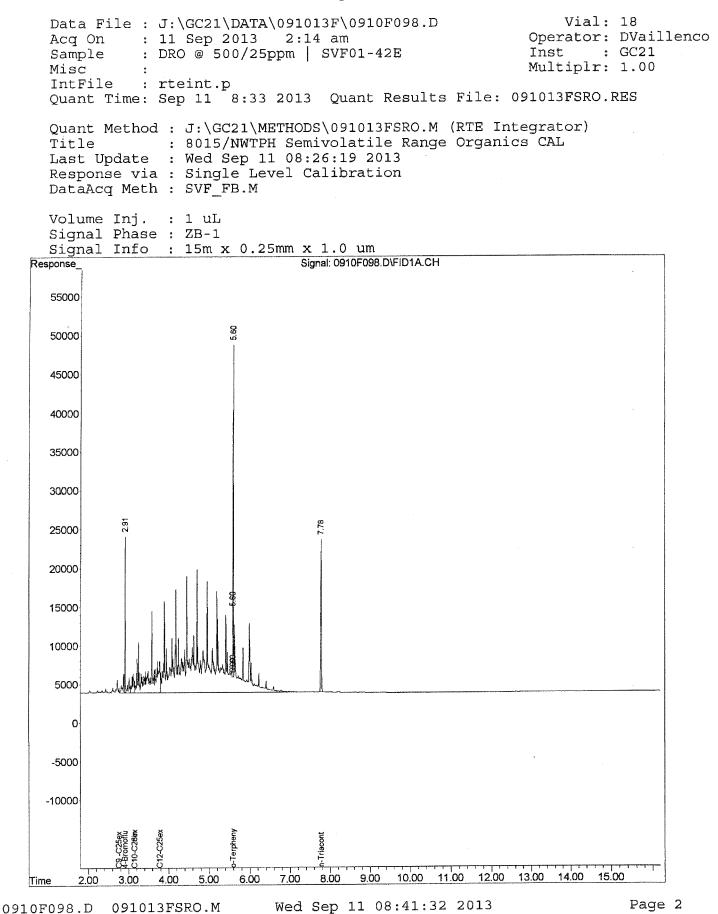
Data File : J:\GC21\DATA\091013F\0910F098.D Vial: 18 : DRO @ 500/25ppm | SVF01-42E : Operator: DVaillenco Acq On : 11 Sep 2013 2:14 am Inst : GC21 Sample Multiplr: 1.00 Misc IntFile : rteint.p Quant Time: Sep 11 08:27:24 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_ System Monitoring Compounds System Monitoring Compounds1) S4-Bromofluorobenzene2.911413322.970 ppmSpiked Amount50.000Recovery=45.94%2) So-Terphenyl5.603194723.131 ppmSpiked Amount50.000Recovery=46.26%3) Sn-Triacontane7.782699323.196 ppmSpiked Amount50.000Recovery=46.39% Target Compounds 4) HC9 -C25ex DRO [TPH-Diesel]2.77577353466.997 ppm5) HC10-C25ex DRO [AK102]3.15568516469.226 ppm6) HC10-C28in DRO [8015]3.15565932469.204 ppm7) HC12-C25ex DRO [NWTPH]3.79486113469.972 ppm

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(m)=manual int.

\_\_\_\_\_ (f) = RT Delta > 1/2 Window 0910F098.D 091013FSRO.M Wed Sep 11 08:41:32 2013 Page 1

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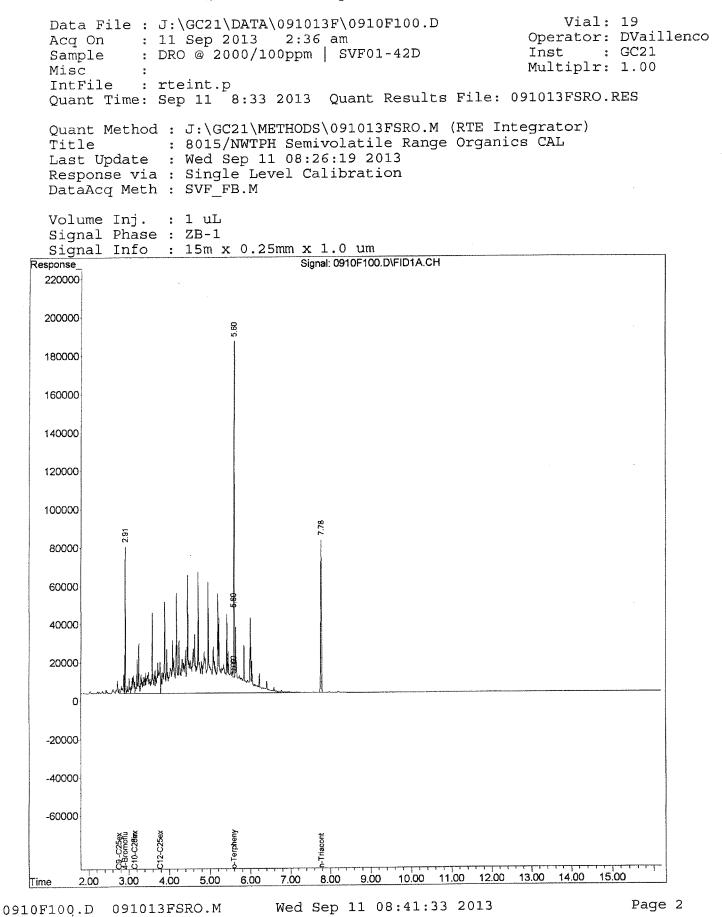


Data File : J:\GC21\DATA\091013F\0910F100.D Acg On : 11 Sep 2013 2:36 am Vial: 19 Operator: DVaillenco Acq On : 11 Sep 2013 2:36 am Inst : GC21 Sample : DRO @ 2000/100ppm | SVF01-42D Multiplr: 1.00 Misc : IntFile : rteint.p Quant Time: Sep 11 08:27:24 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound -1) S4-Bromofluorobenzene2.915511089.569 ppmSpiked Amount50.000Recovery=179.14%2) So-Terphenyl5.6012831292.904 ppmSpiked Amount50.000Recovery=185.81%3) Sn-Triacontane7.7810726492.174 ppmSpiked Amount50.000Recovery=184.35% System Monitoring Compounds Target Compounds 4) HC9-C25ex DRO[TPH-Diesel]2.7723386601891.644ppm5) HC10-C25ex DRO[AK102]3.1523041391901.726ppm6) HC10-C28in DRO[8015]3.1522868661896.000ppm7) HC12-C25ex DRO[NWTPH]3.7919778021912.131ppm

(m)=manual int.

(f) = RT Delta > 1/2 Window0910F100.D 091013FSRO.M Wed Sep 11 08:41:33 2013

Page 1



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Data File : J:\GC21\DATA\091013F\0910F102.D Acq On : 11 Sep 2013 2:58 am Sample : DRO @ 5000/250ppm |SVF01-42C Misc : Vial: 20 Vial: 20 Operator: DVaillenco Inst : GC21 Multiplr: 1.00 IntFile : rteint.p Quant Time: Sep 11 08:27:25 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound 

 System Monitoring Compounds
 1
 System Monitoring Compounds

 1) S
 4-Bromofluorobenzene
 2.91
 145932
 237.179
 ppm

 Spiked Amount 50.000
 Recovery
 =
 474.36%

 2) S
 o-Terphenyl
 5.60
 332783
 240.950
 ppm

 Spiked Amount 50.000
 Recovery
 =
 481.90%

 3) S
 n-Triacontane
 7.78
 289586
 248.848
 ppm

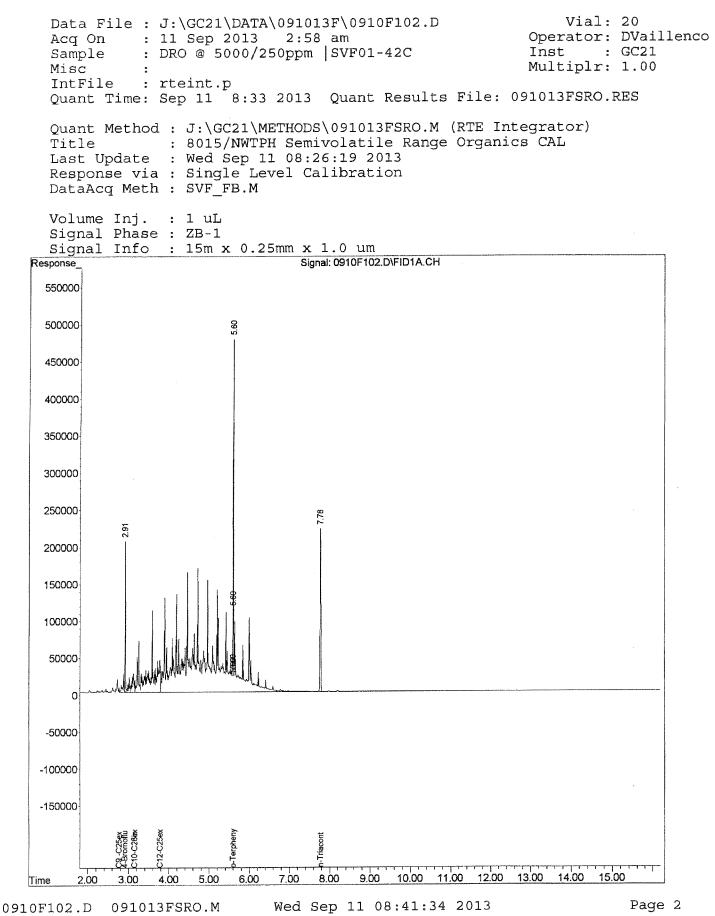
 Spiked Amount 50.000
 Recovery
 =
 497.70%

 Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.7760820164919.487 ppm5) HC10-C25ex DRO[AK102]3.1559918664945.399 ppm6) HC10-C28in DRO[8015]3.1559490444932.246 ppm7) HC12-C25ex DRO[NWTPH]3.7951370074966.437 ppm

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(f)=RT Delta > 1/2 Window 0910F102.D 091013FSRO.M Wed Sep 11 08:41:33 2013 Page 1

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Vial: 21 Data File : J:\GC21\DATA\091013F\0910F104.D Acq On : 11 Sep 2013 3:20 am Operator: DVaillenco Sample : DRO @ 20000ppm | SVF01-42B Misc : Inst : GC21 Multiplr: 1.00 IntFile : rteint.p Quant Time: Sep 11 08:27:26 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_\_ System Monitoring Compounds Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.772183719317663.187 ppm5) HC10-C25ex DRO[AK102]3.152149025017737.021 ppm6) HC10-C28in DRO[8015]3.152132215417677.818 ppm7) HC12-C25ex DRO[NWTPH]3.791831610017707.929 ppm

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(m)=manual int.

(f)=RT Delta > 1/2 Window 0910F104.D 091013FSRO.M Wed Sep 11 08:41:35 2013 Page 1

Vial: 21 Data File : J:\GC21\DATA\091013F\0910F104.D Operator: DVaillenco Acq On : 11 Sep 2013 3:20 am Inst : GC21 : DRO @ 20000ppm | SVF01-42B Sample Multiplr: 1.00 Misc . IntFile : rteint.p Quant Time: Sep 11 8:34 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Single Level Calibration DataAcg Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Response 700000 Signal: 0910F104.D\FID1A.CH 650000 1.72 600000 550000 500000 450000 400000 350000 300000 250000 200000 150000 100000 50000 0 -50000 -100000 -150000 -200000 10-C28ex -C25ex 2-C25ex 8 5.00 6.00 7.00 8.00 9.00 10.00 11.00 12.00 13.00 14.00 15.00 2.00 3.00 4.00 Time Page 2 Wed Sep 11 08:41:35 2013 0910F104.D 091013FSRO.M

Data File : J:\GC21\DATA\091013F\0910F106.D Vial: 22 Acq On : 11 Sep 2013 3:42 am Operator: DVaillenco Sample : DRO @ 50000ppm | SVF01-42A Misc : Inst : GC21 Multiplr: 1.00 IntFile : rteint.p Quant Time: Sep 11 08:27:27 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds Target Compounds n n

5) 6)	H H	C10-C25ex C10-C28in	DRO DRO	[8015]	2.77 3.15 3.15	53743718 53344566	44152.660 44357.485 44227.030	ppm ppm
- /		C12-C25ex			3.79	46005174	44477.609	ppm

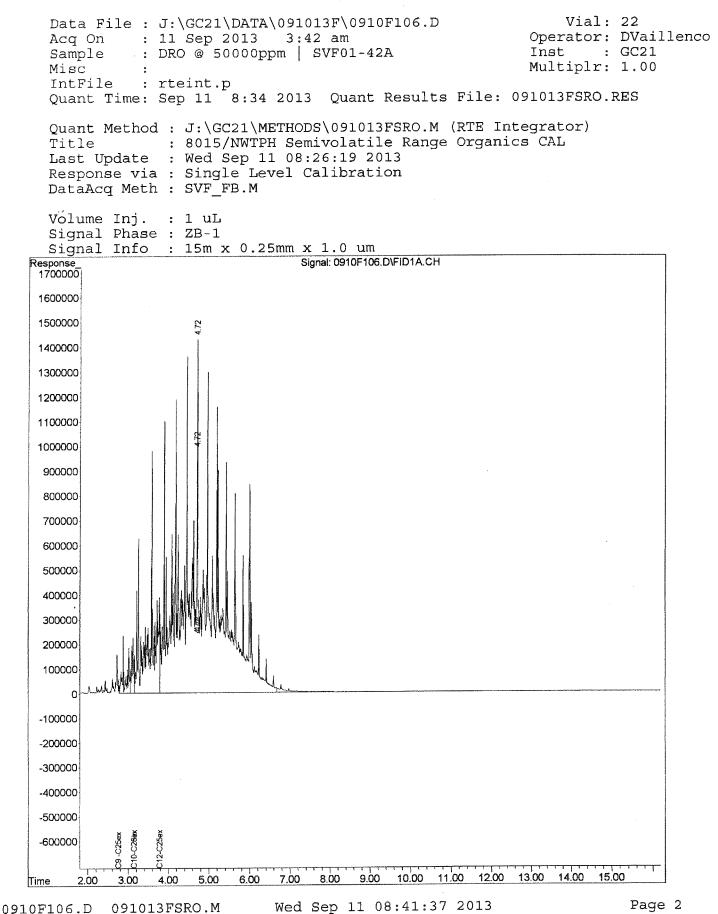
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(m) = manual int.

\_\_\_\_\_ (f) = RT Delta > 1/2 Window 0910F106.D 091013FSRO.M Wed Sep 11 08:41:37 2013

Page 1

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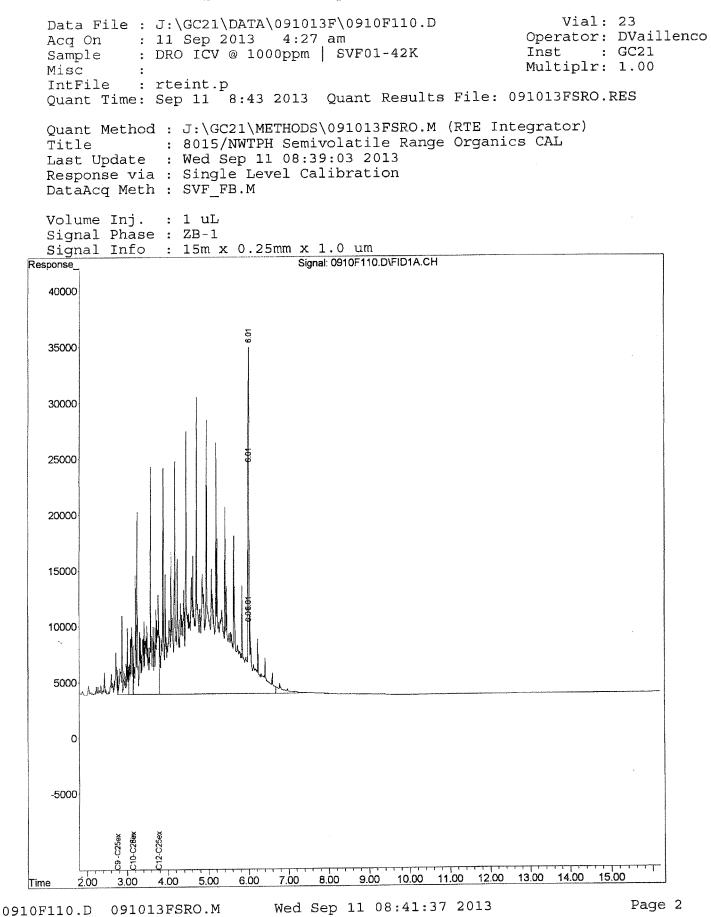
Vial: 23 Data File : J:\GC21\DATA\091013F\0910F110.D Acq On : 11 Sep 2013 4:27 am Operator: DVaillenco Sample : DRO ICV @ 1000ppm | SVF01-42K Misc : IntFile : rteint.p Inst : GC21 Multiplr: 1.00 Quant Time: Sep 11 08:39:36 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:39:03 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_\_ System Monitoring Compounds Target Compounds 1192251 1010 A15 . .

4) H	C9 -C25ex DRO	[TPH-Diesel]	2.77	1173351	1019.415 ppm	.1
	C10-C25ex DRO		3.15	1147865	1014.193 ppm	a
	C10-C28in DRO		3,15	1138726	1004.747 ppm	a
	C12-C25ex DRO		3.79	963886	998.360 ppm	a

(m)=manual int.

(f) = RT Delta > 1/2 Window0910F110.D 091013FSRO.M Wed Sep 11 08:41:37 2013 Page 1

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#### ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater

#### Service Request: K1311913 Date Analyzed: 11/13/2013

### Continuing Calibration Verification Summary Diesel and Residual Range Organics - Silica Gel Treated

Calibration Type: Analysis Method:	External Standard NWTPH-Dx			-	CAL12766 KWG1312715
				Units:	ppm
File ID:	J:\GC21\DATA\111313F\1113F012.D J:\GC21\DATA\111313F\1113F014.D			Column ID:	ZB-1
		Average	CCV		

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Diesel Range Organics (DRO)	1000	1100	965	1030	6	NA	± 15 %	AverageRF
Residual Range Organics (RRO)	1000	980	709	595	NA	-2	± 15 %	Linear
o-Terphenyl	50	55	1270	1400	10	NA	±15 %	AverageRF
n-Triacontane	50	54	1040	1120	8	NA	±15%	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

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# Data File:J:\GC21\DATA\111313F\1113F012.DLab ID:KWG1312715-1RunType:CCVMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/13/2013 10:41 11/14/2013 08:15 KWG1312715 NWTPH-Dx MJ227

## Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
ICAL Analyte Recovery	NA	NA	NA	x	
Second Source ICAL Verification	NA	NA	NA	x	
Analyte Co-elution	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	х	
Above Highest ICAL Level	NA	NA	NA	х	
Enviroquant/Stealth Calibration Check	NA	NA	NA	x	

Primary Review: Secondary Review:

## Quantitation Report

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\11 11/13/2013 10:41 CCV KWG1312715-1	1313F\111	3F012.D	Quant Date:	11/14/2013 08:15	Vial: Dilu		GC21 96 1.0 ppm		
Bottle ID: Prod Code:	NWTPH-DX NW 2	ГРН		Tier: Collect Date:		Matr Rece	rix: ive Date:	NOT / 11/14/		CABLE
Analysis Lot: Analysis Method: Prep Ref:	KWG1312715 NWTPH-Dx			Prep Lot: Prep Method: Prep Date:		Repo	ort Group:			
Quant Method: Title:	J:\GC21\METHOD	S\091013F	SRO.M			Calil	oration ID:	CALI	2766	
MB Ref:							nod ID: nt based on ]	MJ227 Method	,	
Surrogate Comp	ounds									
Parameter Nar	ne	RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl n-Triacontane		5.57 7.75			69767 56197	54.79 54.25		50-150 50-150		
arget Compoun	ds			4	Final	Conc. Units:	ug/L			
Parameter Nan	ne	RT	RT Dev		Response	Solution Conc	Final Conc		Q	Rpt?
C9 - C24 DRC Diesel Range (	) Organics (DRO)	2.75 3.78			1223378 1026098	1,063 1,063				
•	e Organics (RRO)	5.10			7734	1,000				NR
C25 - C44 RR	C	6.76		*******	14240	9.96				

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

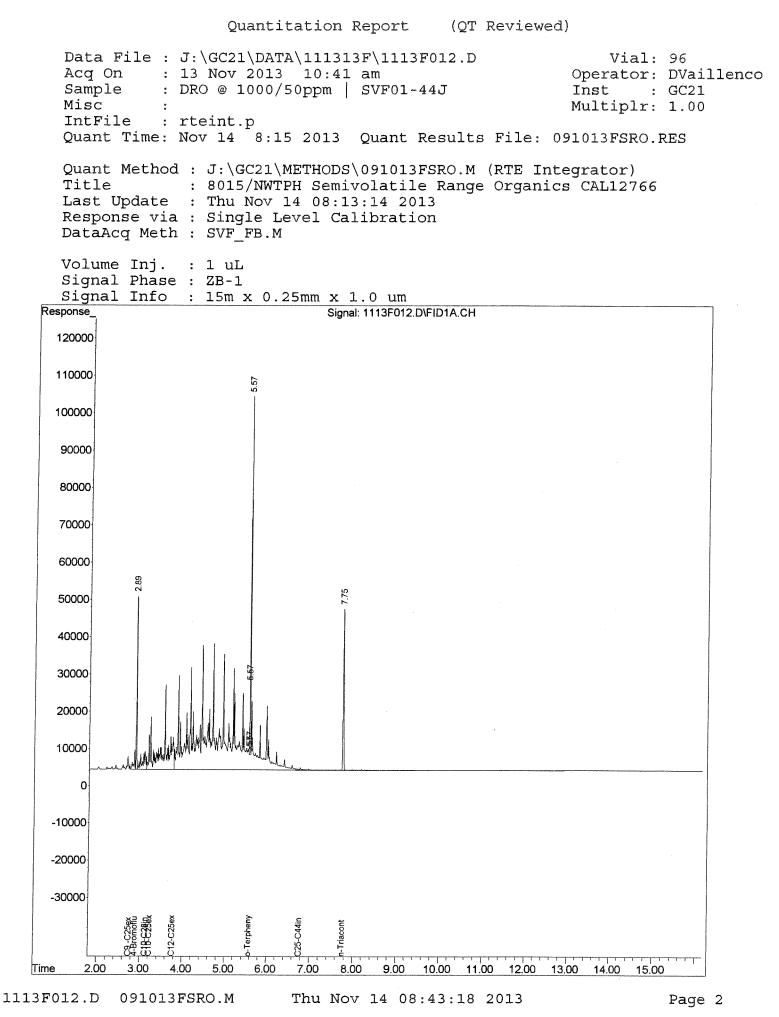
Printed: 11/14/2013 09:14:39 

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\111313F\1113F012.D 112

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\111313F\1113F012.D Vial: 96 Operator: DVaillenco Acq On : 13 Nov 2013 10:41 am Sample : Misc : : DRO @ 1000/50ppm | SVF01-44J Inst : GC21 Multiplr: 1.00 IntFile : rteint.p Quant Time: Nov 14 08:15:13 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units System Monitoring Compounds System Monitoring compounds1) S4-Bromofluorobenzene2.893343958.974 ppmSpiked Amount50.000Recovery= 117.95%2) So-Terphenyl5.576976754.794 ppmSpiked Amount50.000Recovery= 109.59% Spiked Amount 50.000 Recovery = 109.59% 7.75 56197 54.249 ppm Spiked Amount 50.000 3) S n-Triacontane Recovery = 108.50% Spiked Amount 50.000 Target Compounds 4) HC9 - C25ex DRO [TPH-Diesel]2.751223378 1062.879 ppm5) HC10-C25ex DRO [AK102]3.231188549 1050.139 ppm6) HC10-C28in DRO [8015]3.131193932 1053.457 ppm7) HC12-C25ex DRO [NWTPH]3.781026098 1062.797 ppm9) HC25-C44in RRO [TPH-Oil]6.76142409.961 ppm

(f)=RT Delta > 1/2 Window 1113F012.D 091013FSRO.M 

# Data File:J:\GC21\DATA\111313F\1113F014.DLab ID:KWG1312715-1RunType:CCVMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/13/2013 11:03 11/14/2013 08:23 KWG1312715 NWTPH-Dx MJ227

## Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
ICAL Analyte Recovery	NA	NA	NA	x	
Second Source ICAL Verification	NA	NA	NA	x	
Analyte Co-elution	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	x	
Above Highest ICAL Level	NA	NA	NA	x	***
Enviroquant/Stealth Calibration Check	NA	NA	NA	x	

Primary Review Secondary Review:

## Quantitation Report

Run Type: C	\GC21\DATA\11 1/13/2013 11:03 CV WG1312715-1	1313F\111	3F014.D	Quant Date:	11/14/2013 08:23	Vial Dilu	rument: : tion: Conc. Units:	GC21 97 1.0 ppm		1000011124114-10011104124
Bottle ID: Prod Code: N	WTPH-DX NW	ГРН		Tier: Collect Date:		Mat Rece	rix: zive Date:	NOT / 11/14/		CABLE
•	WG1312715 WTPH-Dx			Prep Lot: Prep Method: Prep Date:		Repo	ort Group:			
Quant Method: J:\ Title:	GC21\METHOD	S\091013I	FSRO.M			Calil	bration ID:	CALI	2766	
MB Ref:		non financia da la compañía da de parte y sera					nod ID: nt based on [	MJ227 <b>Method</b>	1	
Surrogate Compou	nds									
Surrogate Compour Parameter Name	nds	RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits		Rpt?
********	nds	RT			Response 0 0d		%Rec			Rpt? NR NR
Parameter Name	nds	RT			0 0 <b>d</b>		%Rec ug/L	Limits 50-150		NR
Parameter Name o-Terphenyl n-Triacontane	nds	RT			0 0 <b>d</b>	Conc		Limits 50-150 50-150		NR
Parameter Name o-Terphenyl n-Triacontane Target Compounds	nds		Dev		0 0d Final C	Conc Conc. Units: Solution	ug/L Final	Limits 50-150 50-150	NA	NR NR
Parameter Name o-Terphenyl n-Triacontane <i>Carget Compounds</i> Parameter Name		RT	Dev		0 0d Final C Response	Conc Conc. Units: Solution Conc	ug/L Final	Limits 50-150 50-150	NA	NR NR
Parameter Name o-Terphenyl n-Triacontane <i>Carget Compounds</i> Parameter Name C9 - C24 DRO	anics (DRO)	<b>RT</b> 2.75	Dev		0 0d <b>Final C</b> <u>Response</u> 89425	Conc. Units: Solution Conc. 77.69	ug/L Final	Limits 50-150 50-150	NA	NR NR Rpt?

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank

E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/14/2013 09:14:46

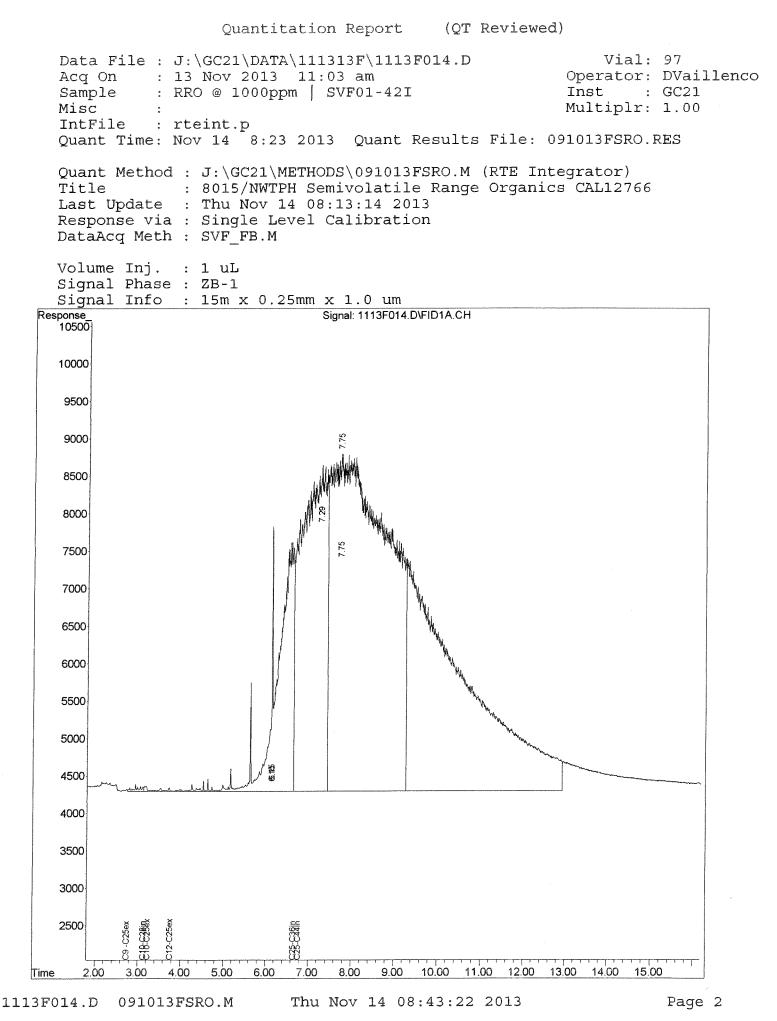
u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

Result fails acceptance criteria
 Acceptance criteria not applicable
 Insufficient information to determine acceptance
 Result >= MRL, but MRL less than low point of ICAL
 check for co-elution

J:\GC21\DATA\111313F\1113F014.D

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\111313F\1113F014.D Vial: 97 Operator: DVaillenco Acq On : 13 Nov 2013 11:03 am : RRO @ 1000ppm | SVF01-42I Inst : GC21 Sample Misc : Multiplr: 1.00 IntFile : rteint.p Quant Time: Nov 14 08:15:14 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.758942577.693 ppm5) HC10-C25ex DRO[AK102]3.238868478.357 ppm6) HC10-C28in DRO[8015]3.13267662236.170 ppm7) HC12-C25ex DRO[NWTPH]3.788788991.032 ppm8) HC25-C36in RRO[NWTPH]6.66595332984.816 ppm9) HC25-C44in RRO[TPH-Oil]6.76882431976.492 ppm



#### ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater

#### Service Request: K1311913 Date Analyzed: 11/13/2013

#### Continuing Calibration Verification Summary Diesel and Residual Range Organics - Silica Gel Treated

Calibration Type: Analysis Method:	External Standard NWTPH-Dx	Calibration Date: 0 Calibration ID: C	
v		Analysis Lot: K Units: p	
File ID:	J:\GC21\DATA\111313F\1113F044.D J:\GC21\DATA\111313F\1113F046.D	Column ID: Z	•

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Diesel Range Organics (DRO)	1000	990	965	954	-1	NA	± 15 %	AverageRF
Residual Range Organics (RRO)	1000	1100	709	640	NA	6	± 15 %	Linear
o-Terphenyl	50	51	1270	1290	1	NA	± 15 %	AverageRF
n-Triacontane	50	51	1040	1060	2	NA	±15%	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

## Data File:J:\GC21\DATA\111313F\1113F044.DLab ID:KWG1312715-2RunType:CCVMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/13/2013 16:38 11/14/2013 08:15 KWG1312715 NWTPH-Dx MJ227

## Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
ICAL Analyte Recovery	NA	NA	NA	x	
Second Source ICAL Verification	NA	NA	NA	x	
Analyte Co-elution	NA	NA	NA	x	***
Below Lowest ICAL Level	NA	NA	NA	x	*****
Above Highest ICAL Level	NA	NA	NA	x	
Enviroquant/Stealth Calibration Check	NA	NA	NA	х	

Primary Review Secondary Review:

## Quantitation Report

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\11 11/13/2013 16:38 CCV KWG1312715-2		3F044.D	Quant Date:	11/14/2013 08:15	Vial Dilu		GC21 96 1.0 ppm		
Bottle ID: Prod Code:	NWTPH-DX NW	TPH		Tier: Collect Date:		Mat Rece	rix: ive Date:	NOT 4 11/14/		CABLE
Analysis Lot: Analysis Method: Prep Ref:	KWG1312715 NWTPH-Dx			Prep Lot: Prep Method: Prep Date:		Repo	ort Group:			
Quant Method: Title:	J:\GC21\METHODS\091013FSRO.M					Calil	oration ID:	CALI	2766	
MB Ref:	3 Ref:						od ID: nt based on ]	MJ227 Method	,	
Surrogate Comp	ounds									
Parameter Na	me	RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl		5.58			64367	50.55		50-150	NA	
n-Triacontane	:	7.75			52753	50.93		50-150	NA	
arget Compour	ıds				Final	Conc. Units:	ug/L			
Parameter Na	me	RT	RT Dev		Response	Solution Conc	Final Conc		Q	Rpt?
	)	2.75			1134870	985.98				
C9 - C24 DR0					953801	987.91				
Diesel Range	Organics (DRO)	3.78			953801	207.21				
Diesel Range	Organics (DRO) ge Organics (RRO)	3.78			7376	207.21				NR

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/14/2013 09:16:33 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

7

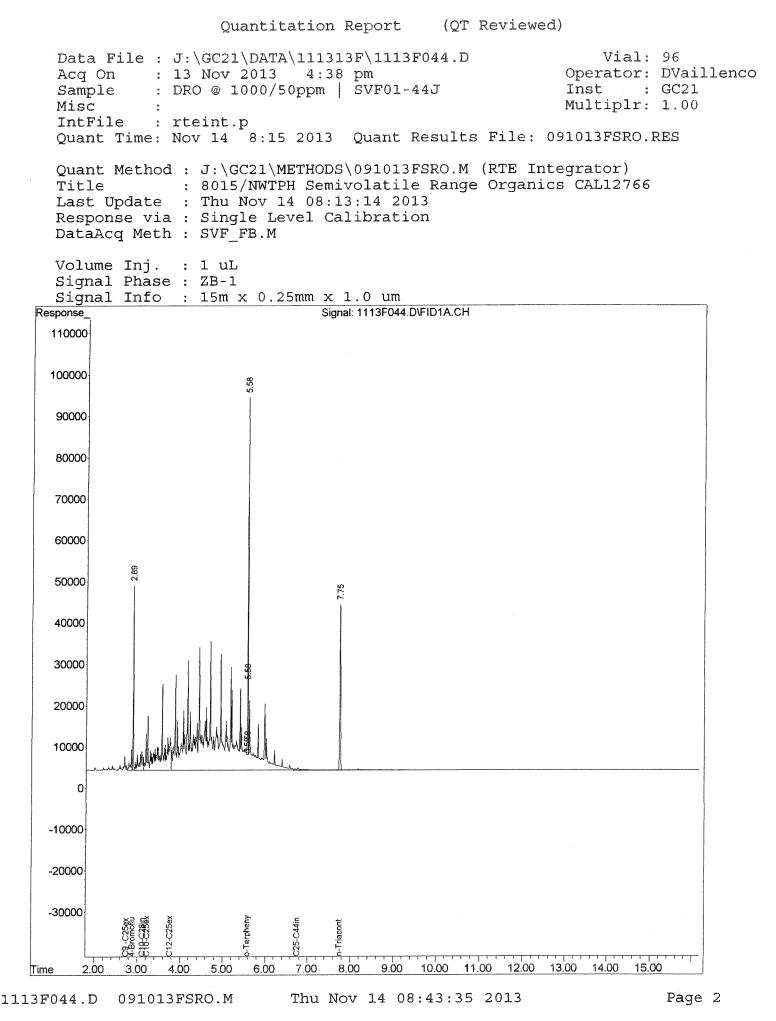
\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\111313F\1113F044.D

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\111313F\1113F044.D Vial: 96 Operator: DVaillenco Acq On : 13 Nov 2013 4:38 pm Inst : GC21 : DRO @ 1000/50ppm | SVF01-44J Sample Multiplr: 1.00 8 8 Misc IntFile : rteint.p Quant Time: Nov 14 08:15:27 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_ System Monitoring Compounds 2.89 30520 53.826 ppm Recovery = 107.65% 5.58 64367 50.553 ppm Recovery = 101.11% 7.75 52753 50.925 ppm 1) S 4-Bromofluorobenzene Spiked Amount 50.000 2) S o-Terphenyl Spiked Amount 50.000 3) S n-Triacontane Recovery = 101.85% Spiked Amount 50.000 Target Compounds 4) HC9 -C25ex DRO [TPH-Diesel]2.751134870985.983 ppm5) HC10-C25ex DRO [AK102]3.231102522974.130 ppm6) HC10-C28in DRO [8015]3.131107650977.327 ppm7) HC12-C25ex DRO [NWTPH]3.78953801987.914 ppm9) HC25-C44in RRO [TPH-Oil]6.761608512.015 ppm

(m)=manual int.

n 1929 and 2010 and 2010 and 2010 and 2017 and 2010 and 2



## Exception Report

# Data File:J:\GC21\DATA\111313F\1113F046.DLab ID:KWG1312715-2RunType:CCVMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/13/2013 17:00 11/14/2013 08:34 KWG1312715 NWTPH-Dx MJ227

## Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
ICAL Analyte Recovery	NA	NA	NA	х	
Second Source ICAL Verification	NA	NA	NA	х	
Analyte Co-elution	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	x	
Above Highest ICAL Level	NA	NA	NA	x	
Enviroquant/Stealth Calibration Check	NA	NA	NA	x	

Primary Review: Secondary Review:

## Quantitation Report

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\11 11/13/2013 17:00 CCV KWG1312715-2	1313F\111	3F046.D	Quant Date:	11/14/2013 08:34	Vial: Dilut		GC21 97 1.0 ppm	-	Personal and a second and a
Bottle ID: Prod Code:	NWTPH-DX NW	IPH		Tier: Collect Date:		Matr Rece	ix: ive Date:	NOT . 11/14/		CABLI
Analysis Lot: Analysis Method: Prep Ref:	KWG1312715 NWTPH-Dx			Prep Lot: Prep Method: Prep Date:		Repo	rt Group:			
Quant Method: Title:	J:\GC21\METHODS\091013FSRO.M					Calib	ration ID:	CALI	2766	
MB Ref:	1B Ref:						od ID: nt based on [	MJ227 Method	7	
Surrogate Comp	ounds		RT			Solution		%Rec		
Parameter Na	me	RT	Dev		Response	Conc	%Rec	Vinits		Rpt?
o-Terphenyl n-Triacontane					0 Odi			50-150 50-150		NR NR
Target Compoun	ds				Final C	Conc. Units:	ug/L			
Parameter Nar	ne	RT	RT Dev	annan da na san ann ann ann ann ann ann ann ann	Response	Solution Conc	Final Conc		Q	Rpt?
C9 - C24 DRC	)	2.75			101159	87.89	***************************************			
-	Organics (DRO)	3.78			99686	103.25				NR
	e Organics (RRO)	6.66			639707	1,059				
C25 - C44 RR	<u>^</u>	6.76			946539	1,048				

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

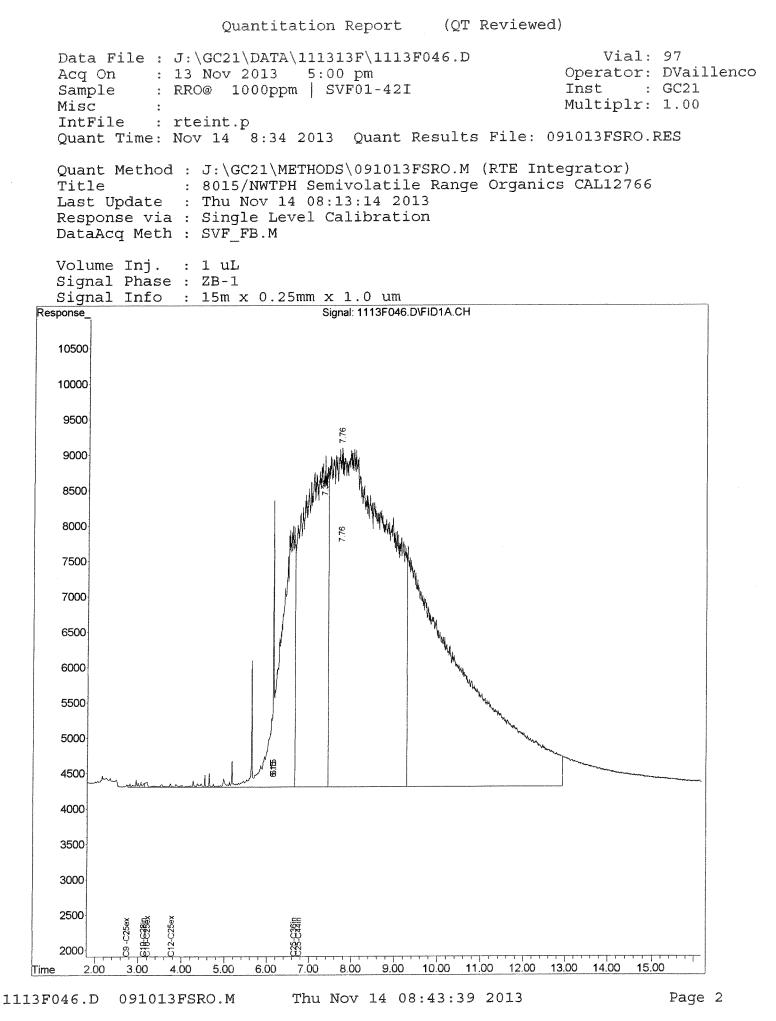
Printed: 11/14/2013 09:16:40 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

Result fails acceptance criteria
Acceptance criteria not applicable
Insufficient information to determine acceptance
Result >= MRL, but MRL less than low point of ICAL
check for co-elution

J:\GC21\DATA\111313F\1113F046.D

Quantitation Report (QT Reviewed) Vial: 97 Data File : J:\GC21\DATA\111313F\1113F046.D Operator: DVaillenco Acq On : 13 Nov 2013 5:00 pm Sample : RRO@ 1000ppm | SVF01-42I Inst : GC21 Multiplr: 1.00 Misc : IntFile : rteint.p Ouant Time: Nov 14 08:15:28 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units System Monitoring Compounds Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.7510115987.888 ppm5) HC10-C25ex DRO[AK102]3.2310045788.759 ppm6) HC10-C28in DRO[8015]3.13293562259.022 ppm7) HC12-C25ex DRO[NWTPH]3.7899686103.251 ppm8) HC25-C36in RRO[NWTPH]6.666397071059.316 ppm9) HC25-C44in RRO[TPH-Oil]6.769465391047.861 ppm



## Organic Analysis: <u>Diesel and Residual Range Organics - Silica Gel</u> <u>Treated</u> Validation Package

Sample Prep and Screen Data

L

rreparation Information												
Group ID: Department:	KWG1312533 Semivoa GC	Prep Method:	Method- EPA 3571D	2	Prep Date:	11/04/13 08:45	akan papakan katala					
Lab Code	Client ID	Product	Matrix	Amt. Ext.	Final Vol.		Solid					
K1311913-001	MW2-102913	NWTPH-Dx NW TPH	I WATER	470mL	ImL							
K1311913-002	MW1-110113	SGT NWTPH-Dx NW TPF SGT	I WATER	470mL	lmL							
<1311913-003	MW3-110113	NWTPH-Dx NW TPH SGT	I WATER	480mL	lmL							
KWG1312533-1	Duplicate	NWTPH-Dx NW TPH SGT	I WATER	470mL	lmL							
KWG1312533-2	Lab Control Sample	NWTPH-Dx NW TPH SGT	WATER	500mL	1mL							
KWG1312533-3	Method Blank	NWTPH-Dx NW TPH SGT	WATER	500mL	1mL							
Lab Code	Parent Lab Code	Comments										
KWG1312533-1	K1311913-001 5	KQ1313041-01	Anno 1997 - Ann									
KWG1312533-2		KQ1313041-02										
KWG1312533-3		KQ1313041-03										
			mount Added	Spike	Amount A	Added						
Lab Code	Prep Event ID	Solution ID		Solution ID		Witness						
K1311913-001	1302598					KClark						
K1311913-002	1302599					KClark						
K1311913-003	1302600					KClark						
KWG1312533-1	1302601											

KClark

KClark

KClark

KWG1312533-1

KWG1312533-2

KWG1312533-3

1302601

1302602

1302603

Comments:	* Changed	Parent Info to refle	et Raw B.	S. AN Alipitas
Started By: Completed By:	HSteele JJohnson	Assisted By:		Yes No
Reviewed By:	EB	Date: 11-11-13	Storage:	Yes No
Chain of Custor	dy			
Relinquished Received By:			Date: 118 3	Extracts Examined
	#354##4666666999000000000000000000000000000		Date:	Yes No
Printed: 11/00 a:\Stealth\Crystal.r	8/2013 16:31:39 pt\prep1.rpt	Preparation Information 129		Page 1 of 1

## Prenaration Information

#### **Preparation Information Benchsheet**

Prep Run:	195978	Prep Workflow:	TPHextAq	Status:	Draft	Dros Data	11/04/2013
Team:	Semivoa	i cp workiiow.	(14)	Current Step:	Extraction	Prep Date:	11/04/2013 07:01
ream.	GC	Prep Method:	Method				11/07/2013
Analyst:	HSTEELE	Rush/NPDES:	N/A			Hold Date:	11/12/2013

	Lab Code	Client ID	Bottle #	<	Initial Amgunt	pH Initial	pH Adj 1	Inter. Volume	Final Volume M	Surr Amt	Spike Amt	TestNo List
-4		MW2-102913	.02	~	470	<2	M	NA	* Office and the second	10D		NW TPH SGT
	K1311913-002	MW1-110113	.02	V	470	42						NW TPH SGT
	K1311913-003	MW3-110113	.02	V	490	12			1			NW TPH SGT
A	K1311913- <del>001</del> : KQ1313041-01	Duplicate	.92	V	410	12	4		(		-	NW TPH SGT
e	KQ1313041-02	Lab Control Sample	-	~	500	NA	12		1		100	NW TPH SGT
	KQ1313041-03	Method Blank			500	NA	12	1			, and the second second	NW TPH SGT

6 Total Samples consisting of 3 Client Samples, 1 Client QC Sample, 2 Batch QC Samples associated with the current Prep Run.

Spiking Solution	ns	Witness:	cliavie 11	413
SURR: SVFC	1-446 500ppm ex: =	3/25/14 100 m	l lee	p)
SPIKE: SVFI	21- 37H 10000 8000 ppm	4x: 15/20/13	loved	(epp)
Preparation Ste				
Step	Started Finished By	Assisted By	Training?	<u>Comments</u>
Extraction	0-10-11-4-13 11-4-13 TB			

#### Comments

Q DE 11-4-13 18, C. Pro.	uced emusion-	beng marky	-fine sedment
Q DE 11-4-13 ts, E Pro. A used sample 003	instead of 001	for dup.	

Additional Prep Information For Fuels by 3510
Service Request $\# \overline{K31913}$ Work Group $\neq 195978$
Batch Start (Time/Date/Initial): 0945 /11-4-13 /115 Batch Stop (Time/Date/Initial): 09130 /11-4-13/145
DCM Lot # DJ 358 HCl Lot # 59080 Sulfate Lot # 139318 Glass Wool Lot # 20911999
S-Evap Thermometer ID: X-SVM-076 Date/Time/Initial: // 10 / 11-4-13/13 Temp as measured: 73 °C Correction factor: °C Adjusted temp: °C
N-Evap Thermometer ID: <u>DWB-12</u> Date Time/Initial: <u>1350 / 11-413 / 115</u> Temp as measured: <u>32</u> °C Correction factor: <u>°</u> C Adjusted temp: <u>°</u> C
Acid Cieanup (Date/Time/Initial): 1345 118 13 KC Lot #: 53002
Silica Gel Cleanup (Date/Time/Initial): 1416 U/8/13 JSTKC Lot #: VH218
Vial: (leav Storage: DWL Archive:
Comments/Observations:

## QC Requirements

AK 102/103	MS/DMS - LCS/DLCS every 20 samples	
NWTPH-DXHCID	Duplicate every 10 samples - LCS/MB every 20 samples	
8015-DRO	MS/DMS + LCS/MB every 20 samples	

	Bench Sheet Review Check List	
	Hord Times Met (if no, Reacon:	;
	Prep date, dept, method, product code correct in stealth	
$\Box$	Spike Information correct	
$\Box$	Weights/Volumes and units correct on raw and final bench sheets	
	Names present for: Started by, Completed by, relinquished by, and witnessed by.	
	Training has been dircled	
	Extract Storage recorded	
	Additional Pren Sheet completely filled out ( NA or line out Blanks)	
	All clean-ups have been noted on additional prep sheet	
	Signed service request with Form V, if applicable, has been attached	

 $\label{eq:Rilexing} $$ Rilexing to the Benchsheets SVG Fuels 3510.doc Reviewed by: Elissa Bruno 12/27/12 $$$ 

EXT-3510 Rev. 9

Lin	e Vial FileName	Multiplier	SampleName	Misc Info	Injected
1 2 3 4 5 6 7 8 9	<ul> <li>90 1113F002.</li> <li>90 1113F004.</li> <li>90 1113F006.</li> <li>91 1113F008.</li> <li>92 1113F010.</li> <li>96 1113F012.</li> <li>97 1113F014.</li> <li>87 1113F016.</li> <li>90 1113F018.</li> </ul>	D 1. D 1. D 1. D 1. D 1. D 1. D 1. D 1.	DCM DCM DCM ALIPHATICS MARKER   S AROMATICS MARKER   S DRO @ 1000/50ppm   SV RRO @ 1000ppm   SVF01 B° DCM	SVF01-29C	11/13/22013 8:5( 11/13/22013 9:12 11/13/22013 9:34 11/13/22013 9:56 11/13/22013 10:1 11/13/22013 10:4 11/13/22013 11:0 11/13/22013 11:2 11/13/22013 11:4
10 11 12 13 14 15 16 17 18 19	1         1113F020.0           2         1113F022.1           3         1113F024.1           4         1413F026.1           5         1113F028.0           6         1113F030.0           7         1113F032.1           8         1113F032.1           9         1113F036.1           9         1113F038.0           10         1413F038.0	Image: 1.         Image: 1.	KQ1313041-02LCS KQ1313041-03MB K1311913-001 K1311913-002	1940 JM 11/14/13 EE	11/13/22013 12:1( 11/13/22013 12:3: 11/13/22013 12:5: 11/13/22013 1:17 11/13/22013 1:39 11/13/22013 2:02 11/13/22013 2:24 11/13/22013 2:47 11/13/22013 3:09 11/13/22013 3:31
20 21 22 23 24 25 26 27 28 29	11         1113F040.0           12         1113F042.0           96         1113F044.0           97         1113F044.0           97         1113F046.0           86         1113F048.0           14         1113F050.0           15         1113F052.0           86         1113F054.0           16         1113F056.0           17         1113F058.0	y 1. 0 1. 0 1. ▶ 1.	K1311913-003 K1311913-003DUP DRO @ 1000/50ppm   SVF RRO@ 1000ppm   SVF01 IB LT MINERAL OIL   HCV2-8 HVY MINERAL OIL   HCV2 IB KQ1313404-01LCS KQ1313404-02DLCS		11/13/22013 3:54 11/13/22013 4:16 11/13/22013 4:38 11/13/22013 5:00 11/13/22013 5:23 11/13/22013 5:45 11/13/22013 6:30 11/13/22013 6:30 11/13/22013 6:52 11/13/22013 7:14
30 31 32 33 34 35 36 37 38 39	18         1113F060.D           19         1113F062.D           20         1113F064.D           21         1113F066.D           22         1113F068.D           23         1113F070.D           96         1113F072.D           97         1113F074.D           86         1113F076.D           90         1113F078.D	<ul> <li>1.</li> <li>3.</li> </ul>	KQ1313404-03MB K1312117-001 @ 5X K1312117-002 @ 5X K1312117-004 @ 5X K1312117-005 @ 5X K1312117-003 @ 5X DRO @ 1000/50ppm   SVF RRO @ 1000ppm   SVF01- IB DCM		11/13/22013 7:36 11/13/22013 7:59 11/13/22013 8:22 11/13/22013 8:44 11/13/22013 9:06 11/13/22013 9:28 11/13/22013 9:51 11/13/22013 10:11 11/13/22013 10:31 11/13/22013 10:51
40 41 42 43 44 45 46 47 48 49	901113F080.D901113F082.D901113F084.D901113F086.D901113F088.D901113F090.D901113F092.D901113F094.D901113F096.D901113F098.D	1. 1.	DCM DCM DCM DCM DCM DCM DCM DCM DCM		11/13/22013 11:20 11/13/22013 11:40 11/14/22013 12:00 11/14/22013 12:20 11/14/22013 12:20 11/14/22013 12:40 11/14/22013 1:12 11/14/22013 1:57 11/14/22013 2:18 11/14/22013 2:41
50 51 52 53 54 55	<ul> <li>90 1113F100.D</li> <li>90 1113F102.D</li> <li>90 1113F104.D</li> <li>90 1113F106.D</li> <li>90 1113F108.D</li> <li>90 1113F110.D</li> </ul>	1. 1. 1. 1.	DCM DCM DCM DCM DCM DCM		11/14/22013 3:04 11/14/22013 3:26 11/14/22013 3:49 11/14/22013 4:11 11/14/22013 4:34 11/14/22013 4:56

L	.ine	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
5	6	90	1113F112.D	1	DCM		11/14/22013 5:18
-	7	90	1113F114.D	1.	DCM		11/14/22013 5:4
5	8	90	1113F116.D	1.	DCM		11/14/22013 6:0:
5	9	90	1113F118.D	1.	DCM		11/14/22013 6:2€
6	0	90	1113F120.D	1.	DCM		11/14/22013 6:48
6	1	90	1113F122.D	1.	DCM		11/14/22013 7:11
6	2	90	1113F124.D	1.	DCM		11/14/22013 7:33

Quantitation Report (Not Reviewed) Vial: 91 Data File : J:\GC21\DATA\111313F\1113F008.D Operator: DVaillenco Acq On : 13 Nov 2013 9:56 am Inst : GC21 Sample : Misc : : ALIPHATICS MARKER | SVF01-34L Multiplr: 1.00 IntFile : rteint.p Quant Time: Nov 14 08:15:11 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_ 

 System Monitoring Compounds

 1) S
 4-Bromofluorobenzene
 2.85f
 25664
 45.262 ppm

 Spiked Amount 50.000
 Recovery
 90.52%

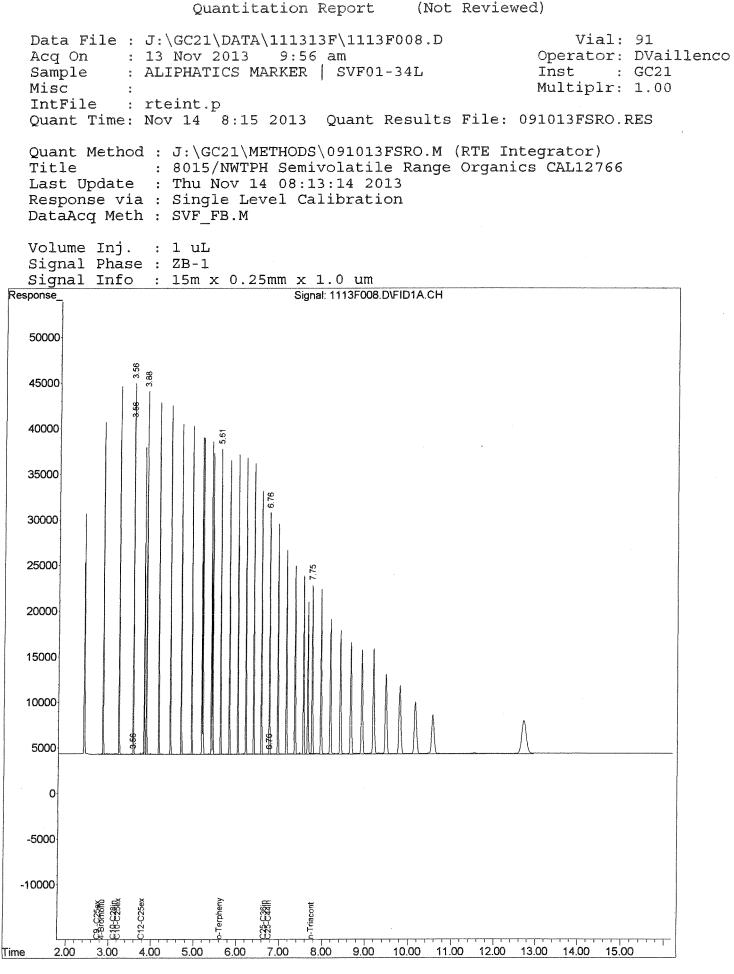
 2) S
 o-Terphenyl
 5.61f
 25560
 20.075 ppm

 Spiked Amount 50.000
 Recovery
 40.15%

 3) S
 n-Triacontane
 7.75
 24839
 23.978 ppm

 Spiked Amount 50.000 Spiked Amount 50.000 Recovery = 47.96% Spiked Amount 50.000 Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.75441033383.172 ppm5) HC10-C25ex DRO[AK102]3.23439733388.525 ppm6) HC10-C28in DRO[8015]3.13543520479.571 ppm7) HC12-C25ex DRO[NWTPH]3.78386705400.536 ppm8) HC25-C36in RRO[NWTPH]6.66303043494.102 ppm9) HC25-C44in RRO[TPH-Oil]6.76424639466.846 ppm

Page 1



Thu Nov 14 08:45:25 2013

Quantitation Report (Not Reviewed) Vial: 92 Data File : J:\GC21\DATA\111313F\1113F010.D Operator: DVaillenco Acq On : 13 Nov 2013 10:18 am Sample : AROMATICS MARKER | SVF01-29C Misc : Inst : GC21 Multiplr: 1.00 IntFile : rteint.p Quant Time: Nov 14 08:15:12 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.75254308220.944 ppm5) HC10-C25ex DRO[AK102]3.23245219216.663 ppm6) HC10-C28in DRO[8015]3.13267645236.155 ppm7) HC12-C25ex DRO[NWTPH]3.78222697230.662 ppm8) HC25-C36in RRO[NWTPH]6.664391959.067 ppm9) HC25-C44in RRO[TPH-Oil]6.765399154.214 ppm

(m)=manual int.

Vial: 92 Data File : J:\GC21\DATA\111313F\1113F010.D Operator: DVaillenco : 13 Nov 2013 10:18 am Acq On : AROMATICS MARKER | SVF01-29C Inst : GC21 Sample Multiplr: 1.00 Misc IntFile : rteint.p Quant Time: Nov 14 8:15 2013 Quant Results File: 091013FSRO.RES Ouant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) : 8015/NWTPH Semivolatile Range Organics CAL12766 Title Last Update : Thu Nov 14 08:13:14 2013 Response via : Single Level Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Signal: 1113F010.D\FID1A.CH Response 100000 90000 5 80000 70000 60000 50000 40000 30000 20000 7.32 10000 0 -10000 -20000 -C25ex 35-E39IR 18-E29ig 2-C25e) 8 (0 11.00 12.00 13.00 14.00 15.00 6.00 7.00 10.00 2.00 3.00 4.00 5.00 8.00 9.00 Time Thu Nov 14 08:45:32 2013 Page 2 1113F010.D 091013FSRO.M

## **Exception Report**

## Data File:J:\GC21\DATA\111313F\1113F016.DLab ID:KWG1312715-4RunType:IBMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/13/2013 11:25 11/14/2013 08:15 KWG1312715 NWTPH-Dx MJ227

## Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
ICAL Analyte Recovery	NA	NA	NA	x	
Second Source ICAL Verification	NA	NA	NA	x	*******
Analyte Co-elution	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	x	
Above Highest ICAL Level	NA	NA	NA	x	
Enviroquant/Stealth Calibration Check	NA	NA	NA	x	

Primary Review Secondary Review:

## Quantitation Report

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\1 11/13/2013 11:25 IB KWG1312715-4		3F016.D	Quant Date:	11/14/2013 08:15	Vial: Dilut		GC21 87 1.0 ppm		
Bottle ID: Prod Code:	NWTPH-DX NW	TPH		Tier: Collect Date:		Matr Rece	ix: ive Date:	NOT / 11/14/		CABLE
Analysis Lot: Analysis Method: Prep Ref:	KWG1312715 NWTPH-Dx			Prep Lot: Prep Method: Prep Date:		Repo	rt Group:			
Quant Method: Title:	J:\GC21\METHOI	DS\091013I	FSRO.M			Meth	ration ID: od ID:	CAL12 MJ227		
MB Ref: Surrogate Comp	ounds					Qua	nt based on ]	Method	*****	
Parameter Na	me	RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits	****	Rpt?
o-Terphenyl n-Triacontane					0 0			50-150 50-150		
Target Compoun	ıds				Final	Conc. Units:	ug/L			
Parameter Na	ne	RT	RT Dev		Response	Solution Conc	Final Conc	*******	Q	Rpt?
_	) Organics (DRO) ge Organics (RRO)	2.75 3.78			3002 1721 7070	2.61 1.78				
C25 - C44 RR	0	6.76			16441	12.41				

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/14/2013 09:14:53  $u: \stealth \crystal.rpt \quant l.rpt$ 

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

- \*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\111313F\1113F016.D 139

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\111313F\1113F016.D Vial: 87 Acq On : 13 Nov 2013 11:25 am Operator: DVaillenco Sample : IB Inst : GC21 Misc : Multiplr: 1.00 IntFile : rteint.p Quant Time: Nov 14 08:15:15 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units System Monitoring Compounds Target Compounds 30022.608 ppm24962.205 מתמ 

 4) H
 C9 - C25ex DRO [TPH-Diesel]
 2.75

 5) H
 C10-C25ex DRO [AK102]
 3.23

 6) H
 C10-C28in DRO [8015]
 3.13

 7) H
 C12-C25ex DRO [NWTPH]
 3.78

 9) H
 C25-C44in RRO [TPH-Oil]
 6.76

 24962.205 ppm37313.292 ppm17211.783 ppm1644112.411 ppm

(f) = RT Delta > 1/2 Window 1113F016.D 091013FSRO.M

(m)=manual int.

Thu Nov<sub>140</sub> 08:43:23 2013

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\111313F\1113F016.D Vial: 87 : 13 Nov 2013 11:25 am Acq On Operator: DVaillenco Sample : IB Inst : GC21 Misc Multiplr: 1.00 : IntFile : rteint.p Quant Time: Nov 14 8:15 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Single Level Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Response Signal: 1113F016.D\FID1A.CH 5200 5150 5100 5050 5000 4950 4900 4850 4800 4750 4700 4650 4600 4550 4500 4450 4400 9.20 4350 normal weeks have been been a stand of the 4300 4250 Time 2.00 3.00 4.00 5.00 6.00 7.00 8.00 9.00 10.00 11.00 12.00 13.00 14.00 15.00

## **Exception Report**

Data File:J:\GC21\DATA\111313F\1113F048.DLab ID:KWG1312715-5RunType:IBMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/13/2013 17:23 11/14/2013 08:15 KWG1312715 NWTPH-Dx MJ227

## Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
ICAL Analyte Recovery	NA	NA	NA	х	
Second Source ICAL Verification	NA	NA	NA	x	
Analyte Co-elution	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	х	
Above Highest ICAL Level	NA	NA	NA	х	
Enviroquant/Stealth Calibration Check	NA	NA	NA	x	

Primary Review Secondary Review:

Printed: 11/14/2013 09:18:48 u:\Stealth\Crystal.rpt\except2.rpt Page 1 of 1

## Quantitation Report

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\11 11/13/2013 17:23 IB KWG1312715-5	1313F\111	3F048.D	Quant Date:	11/14/2013 08:15	Vial: Dilut	ument: ion: Conc. Units:	GC21 86 1.0 ppm	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
Bottle ID: Prod Code:	NWTPH-DX NW	TPH		Tier: Collect Date:		Matr Rece	ix: ive Date:	NOT A 11/14/		CABLE
Analysis Lot: Analysis Method: Prep Ref:	KWG1312715 NWTPH-Dx			Prep Lot: Prep Method: Prep Date:		Repo	rt Group:			
Quant Method: Title:	J:\GC21\METHOL	)S\091013I	SRO.M				pration ID:	CAL12		
MB Ref:							od ID: nt based on	MJ227 Method		da d
Surrogate Comp	oounds		RT			Solution		%Rec	<del></del>	
Parameter Na	me	RT	Dev		Response	Conc	%Rec	Limits		Rpt?
o-Terphenyl n-Triacontane	2				0 0			50-150 50-150		
arget Compour	ıds				Final	Conc. Units:	ug/L	,		
Parameter Na		RT	RT Dev		Response	Solution Conc	Final Conc	-	Q	Rpt?
	) Organics (DRO) ge Organics (RRO)	2.75 3.78			2774 1427 4990	2.41 1.48				

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/14/2013 09:16:47 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

Data File : J:\GC21\DATA\111313F\1113F048.D Vial: 86 Acq On : 13 Nov 2013 5:23 pm Operator: DVaillenco Inst : GC21 : IB Sample Multiplr: 1.00 Misc . IntFile : rteint.p Quant Time: Nov 14 08:15:29 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Thu Nov 14 08:13:14 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds Target Compounds 

 4) H
 C9 - C25ex DRO [TPH-Diesel]
 2.75

 5) H
 C10-C25ex DRO [AK102]
 3.23

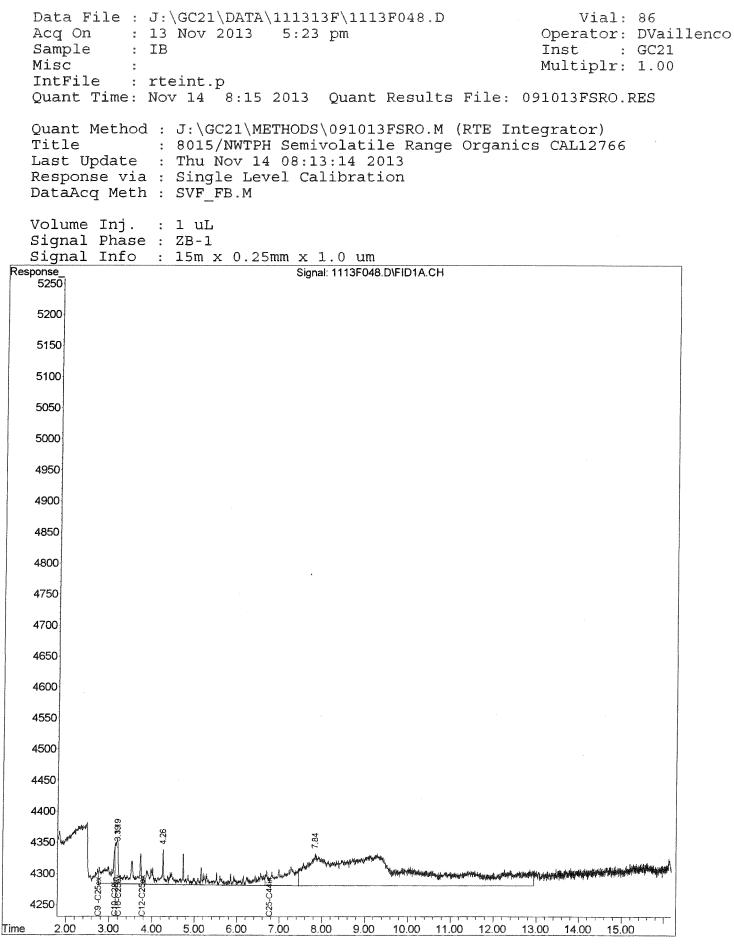
 6) H
 C10-C28in DRO [8015]
 3.13

 7) H
 C12-C25ex DRO [NWTPH]
 3.78

 9) H
 C25-C44in RRO [TPH-Oil]
 6.76

 27742.410 ppm22381.977 ppm30112.657 ppm14271.478 ppm

9248 4.403 ppm



1113F048.D 091013FSRO.M

ATTACHMENT D ANALYTICAL RESULTS SUBSURFACE SOIL [This page intentionally left blank.]



1317 South 13<sup>th</sup> Avenue Kelso, WA 98626 T: +1 360 577 7222 F: +1 360 636 1068 **www.alsglobal.com** 

November 14, 2013

Analytical Report for Service Request No: K1311914

Lenora Westbrook KTA Associates 3530 32nd Way NW Olympia, WA 98502

#### RE: PacifiCorp-Chehalis Power Soil

Dear Lenora:

Enclosed are the results of the samples submitted to our laboratory on November 01, 2013. For your reference, these analyses have been assigned our service request number K1311914.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3364. You may also contact me via Email at Howard.Holmes@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Howard Holmes Project Manager

HH/ln

Page 1 of 186

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
М	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a
	substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater
	than or equal to the MDL.

#### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i  $\hfill The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.$
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

#### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
   DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

#### ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingW aterLabs/tabid/1833/Default.aspx	_
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPer mitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaborator yAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

## **Case Narrative**

#### ALS ENVIRONMENTAL

Client: **KTA** Associates Project: PacifiCorp-Chehalis Power Groundwater Sample Matrix: Soil

Service Request No.: Date Received:

K1311914 11/01/13

#### **Case Narrative**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt

Three soil samples were received for analysis at ALS Environmental on 11/01/13. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### **Diesel Range Organics by Method NWTPH-Dx**

No anomalies associated with the analysis of these samples were observed.

Approved by

## Chain of Custody

ime	Signature Vetalo Date/Time	RELINQUISMED BY:	Requ	IV. Data Validation Report	III. CLP Like Summary 5 day	II. Report Dup., MS, MSD as TURNAROUND		Blank, Surrogate, as					SB3-5-102913 100213 1100	582-6-102313 10-23.13 1450	581-5-102813 10.28.13 1115	Dave Metallo Vore Notallo SAMPLEID. DATE TIME I	PHONE & JUDY-250-7697 FXX#	CITV/STATE/ZIP	COMPANY NAME KTA, INC.	PROJECT NUMBER PACIFICORP - Chahalis	1317 South 13th Ave.,	
Printed Name	Signature	, RECE	Requested Report Date	Standard (15 working days) Provide FAX Results	48 hr.	UND REQUIREMENTS			CE INFORMATION				5	S ->	5	LAB I.D. MATRIX	, Net			S Power Ground wate	Kelso, WA 98626   360	P P
Firm	Date/Timey S	RECEIVED BY:	Sample Shipment contains		ASIL KTA (L		*INNICATE STATE LYDE		io be							Semin 625 Volatil 24 Hydi Gas r	Sodrh_	ganics 1 8270 s 802	by GC/M	-0	360.577.7222   800.695.7222	CHAIN OF CU
Printed Name	Signature	RELINQU	USDA regula		Levora) Rei K	FIONS/COMMENTS:										PCBs Arocic Pestic 608 []	rides/Hert 8081/J Dohenolics	conger Noides	1664 SG		360.636.1068 (fax)	CUSTODY
Firm	Date/Time	QUISHED BY:	ted soil samples (check box if applicable)		Reporting Requirements	AN CA WI	CU TE PU MU									Cyanic (circle) NO <sub>3</sub> , E (circle) DOC	st below) de [] F PH, Cond, 30D, TSS, NH3-N	Dissol lex-Ch , CI, SC TDS, TL	Ved Prom [] 04, P04, F,		PAGE	
Printed Name	Signature	REC	ox if applicable)		wirements.		MO N A	NO NI N AG NA					X	X		Alkalin Dioxin 1613 [ Disso	hity [] C Is/Furans ] 8290 [ Ived c	$0_3 \square$	650[] 50 HCO3	060		SR# //
Firm	Date/Time	RECEIVED BY:				(VINCLE ONE)	Sr II Sn V Zn				0		 ×	×	×	REMARKS	Met Z	et al	D2 Ethane [] E IW TPH Solid	thener SGT S		HIPHC

Copyright 2012 by ALS Group



Cooler Receipt and Preservation Form         Client / Project: KTA, 1WC.       Service Request K13_119144         Received: NOU. 1, ZUI 3       Opened: 1111       By: $4$ Unloaded: 1111       By: $4$	_
	_
	_
1. Samples were received via? Mail Fed Ex UPS DHL PDX Courier Hand Delivered	
2. Samples were received in: (circle) Cooler Box Envelope Other NA	_
3. Were custody seals on coolers? NA Y (N) If yes, how many and where?	ALCONGER .
If present, were custody seals intact? Y N If present, were they signed and dated? Y	N
Raw Corrected, Raw Corrected Corr. Thermometer Cooler/COC ID Tracking Number	Filed
Cooler Temp Cooler Temp Blank Temp Blank Factor ID (NA)	4.400.4
4. Packing material: Inserts Baggies Bubble Wrap Gel Packs (Wet Ice Dry Ice Sleeves	
5. Were custody papers properly filled out (ink, signed, etc.)?	N
6. Did all bottles arrive in good condition (unbroken)? Indicate in the table below. NA	N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA	Ν
8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA	N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA	Ν
10. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below (NA) Y	Ν
11. Were VOA vials received without headspace? Indicate in the table below. Y	Ν
12. Was C12/Res negative? Y	N
Sample ID on Bottle Sample ID on COC Identified by:	

Sample ID	Bottle Count Bottle Type	Out of Temp	Head- space	Broke	рH	Reagent	Volume added	Reagent Lot Number	Initials	Time
· · · · · · · · · · · · · · · · · · ·										
						~				
								-		

Notes, Discrepancies, & Resolutions:\_\_\_\_\_

## **Total Solids**

#### Analytical Results

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater
Sample Matrix:	Soil

#### **Total Solids**

Prep Method:	NONE
Analysis Method:	160.3M
Test Notes:	

Units: PERCENT Basis: Wet

Service Request: K1311914

Sample Name	Lab Code	Date Collected	Date Received	Date Analyzed	Result	<b>Result Notes</b>
SB1-5-102813	K1311914-001	10/28/2013	11/01/2013	11/12/2013	78.9	
SB2-6-102813	K1311914-002	10/28/2013	11/01/2013	11/12/2013	82.5	
SB3-5-102913	K1311914-003	10/29/2013	11/01/2013	11/12/2013	77.6	

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# EPA Method 160.3 - Total Solids

Gro	Group ID:	KWG1312630			د د ۱	7			
Analyst:	lyst:	PFaimanzy			151899	~		<b>Reviewed By:</b>	BDC
Date	Date Acquired:	11/12/2013 16:24	Oven TempStart:	Start:	105 DEG C			Date Reviewed:	61/13/13
Date	Date Completed:	11/13/2013 08:10	Oven TempEnd:	End:	105 DEG C				
#	Lab Code	Client ID	Matrix	Tare	Tare+Wet	Tare+Dry	% Solids	QC Ref Sample	Comments
Z	K1311369-002	485-131016-02	SEDIMENT	1.38g	15.42g	8.20g	48.6		K-BALANCE-16 K-OVEN-07
2	K1311369-004	485-131016-04	SEDIMENT	1.38g	11.63g	4.79g	33.3		K-BALANCE-16 K-OVEN-07
3	K1311369-006	485-131016-06	SEDIMENT	1.38g	21.04g	11.59g	51.9		K-BALANCE-16 K-OVEN-07
4	K1311369-008	485-131016-08	SEDIMENT	1.38g	19.10g	15.97g	82.3		K-BALANCE-16 K-OVEN-07
æ,	K1311580-001	ROCK 001	SOIL	1.35g	19.62g	19.60g	99.9		K-BALANCE-16 K-OVEN-07
6 .	K1311580-002	ROCK 002	SOIL	1.38g	14.57g	13.85g	94.5		K-BALANCE-16 K-OVEN-07
7	K1311580-003	ROCK 004	SOIL	1.38g	12.29g	11.90g	96.4		K-BALANCE-16 K-OVEN-07
8	K1311580-004	OUTCROP 001	SOIL	1.37g	12.59g	12.56g	99.7		K-BALANCE-16 K-OVEN-07
9	K1311879-001	CLBS2146S002SP	SOIL	1.36g	11.73g	11.21g	95.0		K-BALANCE-16 K-OVEN-07
10	K1311880-001	CLBS2030S002SP	SOIL	1.37g	15.64g	15.37g	98.1		K-BALANCE-16 K-OVEN-07
1	K1311914-001	SB1-5-102813	SOIL	1.38g	12.97g	10.52g	78.9		K-BALANCE-16 K-OVEN-07
12	K1311914-002	SB2-6-102813	SOIL	1.38g	24.24g	20.24g	82.5		K-BALANCE-16 K-OVEN-07
13	K1311914-003	SB3-5-102913	SOIL	1.35g	20.68g	16.35g	77.6		K-BALANCE-16 K-OVEN-07
14	K1311979-001	FP 8/18	SOIL	1.40g	16.54g	16.40g	99.1	-	K-BALANCE-16 K-OVEN-07
15	K1311979-002	NASI 8/19	SOIL	1.41g	20.92g	20.12g	95.9		K-BALANCE-16 K-OVEN-07
16	K1311995-001	CLBS2071S002SP	SOIL	1.39g	13.94g	13.42g	95.9		K-BALANCE-16 K-OVEN-07
17	K1311995-002	CLBS2114S002SP	SOIL	1.38g	14.13g	13.63g	96.1		K-BALANCE-16 K-OVEN-07
18	K1312071-001	MWV SBS w/Poly	PAPERBOA	1.93g	6.55g	6.37g	96.1		K-BALANCE-16 K-OVEN-07 🗙 🏠
19	KWG1312630-1	Duplicate Client Sample	SEDIMENT	1.39g	14.88g	8.04g	49.3	K1311369-002	K-BALANCE-16 K-OVEN-07 49 🚯
20	KWG1312630-2	Duplicate Client Sample	SOIL	1.36g	14.36g	14.35g	99.9	K1311580-001	K-BALANCE-16 K-OVEN-07 $qq_{1}q_{2}$
21	KWG1312630-3	Continuing Calibration Verific ation	PAPERBOA	1.00g	1.00g	ŝ			K-BALANCE-16
22	KWG1312630-4	Continuing Calibration Verific ation	PAPERBOA	100.00g	100.00g	g			K-BALANCE-16
23	KWG1312630-5	Continuing Calibration Verific ation	PAPERBOA	1.0g	1.00g	00			K-BALANCE-16

u/\Stealth\Crystal.rpt\prep3.rpt Printed: 11/13/2013 08:47:53

EPA Method 160.3 - Total Solids

Page l of 2

			- Total Solids	EPA Method 160.3 - Total Solids	EP		08:47:53	Printed: 11/13/2013 ( u/Stealth/Crystal.rpt/prep3.rpt
K-BALANCE-16			φ	100.00g	100.00g	PAPERBOA	Continuing Calibration Verific ation	24 KWG1312630-6
Comments	QC Ref Sample	% Solids	Tare+Dry	Tare+Wet	Tare	Matrix	Client ID	
	Date Reviewed:			105 DEG C 105 DEG C	npStart: npEnd:	Oven TempStart: Oven TempEnd:	11/12/2013 16:24 11/13/2013 08:10	Date Acquired: Date Completed:
B	<b>Reviewed By:</b>						PFaiman	Analyst:
							KWG1312630	Group ID:

**Analytical Results Summary** 

Analysis Lot:

368137 Method/Testcode: TS-MET/Total Solids

Instrument Name: K-Balance-16

Analyst: PFAIMAN

KQ1313533-02	KQ1312071-001 KQ1313533-01	K1311995-002	K1311979-002 K1311995-001	K1311979-001	K1311914-003	K1311914-002	K1311914-001	K1311880-001	K1311879-001	K1311580-004	K1311580-003	K1311580-002	K1311580-001	K1311369-008	K1311369-006	K1311369-004	<u>Lab Code</u> K1311369-002	
Solids, Total	Solids, Total Solids, Total	Solids, Total	Solids, Total Solids. Total	Solids, Total	Solids, Total	Solids, Total	Solids, Total	Solids, Total	Solids, Total	Solids, Total	Solids, Total	Solids, Total	Solids, Total	Solids, Total	Solids, Total	Solids, Total	<u>Target Analytes</u> Solids, Total	
DUP	N/A DUP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
K1311580-001	K1311369-002																Parent Sample	
Soil	Paperboard Sediment	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Sediment	Sediment	Sediment	Matrix Sediment	
99.90 Percent	96.10 Percent 49.30 Percent	96.10 Percent	95.90 Percent 95.90 Percent	99.10 Percent	77.60 Percent	82.50 Percent	78,90 Percent	98.10 Percent	95.00 Percent	99.70 Percent	96.40 Percent	94,50 Percent	99.90 Percent	82.30 Percent	51.90 Percent	33.30 Percent	48,60 Percent	
μο	ao ao	ao a	φη	00	ga	ſα	ŝ	g	0q	(JQ	50	αq	19	g	(10)	01Q	Sample Amt.	
99.9 Percent 🖌	49.3 Percent	96.1 Percent	95.9 Percent	99.1 Percent 🔏	77.6 Percent &	82.5 Percent 🖌	78.9 Percent 🖌	98.1 Percent X	95.0 Percent 🖌	99.7 Percent	96.4 Percent	94.5 Percent	99.9 Percent 🖌	82.3 Percent	51.9 Percent K	33.3 Percent d	Final Result Dil 48.6 Percent X	
	.4	·															MDL	
																	POL <u>% Rec</u> <u>% RSD</u>	
, <u>^</u>	-																% RSD	
11/12/13 16:24:00 N	11/12/13 16:24:00 11/12/13 16:24:00	11/12/13 16:24:00	11/12/13 16:24:00 11/12/13 16:24:00	11/12/13 16:24:00	11/12/13 16:24:00	11/12/13 16:24:00	11/12/13 16:24:00	11/12/13 16:24:00	11/12/13 16:24:00	11/12/13 16:24:00	11/12/13 16:24:00	11/12/13 16:24:00	11/12/13 16:24:00	11/12/13 16:24:00	11/12/13 16:24:00	11/12/13 16:24:00	Date Analyzed QC 11/12/13 16:24:00 N	
E A.L	200 Z Z	õð	$\supset \bigcirc$	0	01	$\sim$	$\sim$	$\circ$	$\circ$	$^{\circ}$	0 . N	$\circ$	$\sim$	$\sim$	$\circ$	õ	0 <u>0C</u> ?	

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# indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Results Summary

Page 1 of

### **Diesel and Residual Range Organics**

# Organic Analysis: <u>Diesel and Residual Range Organics - Silica Gel</u> <u>Treated</u> Summary Package

Sample and QC Results

Service Request: K1311914

Client: Project:

#### KTA Associates PacifiCorp-Chehalis Power Groundwater

#### Cover Page - Organic Analysis Data Package Diesel and Residual Range Organics - Silica Gel Treated

Sample Name	Lab Code	Date Collected	Date Received
SB1-5-102813	K1311914-001	10/28/2013	11/01/2013
SB2-6-102813	K1311914-002	10/28/2013	11/01/2013
SB3-5-102913	K1311914-003	10/29/2013	11/01/2013
SB3-5-102913	KWG1312475-3	10/29/2013	11/01/2013

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature:	Lon 2 Petrood	Name: hom Portugo
Date:	11110	Title:

Cover Page - Organic

Analytical Results

Client:	KTA Associates	Service Request: K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected: 10/28/2013
Sample Matrix:	Soil	<b>Date Received:</b> 11/01/2013

#### Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	SB1-5-102813	<b>Units:</b> mg/Kg
Lab Code:	K1311914-001	<b>Basis:</b> Dry
Extraction Method: Analysis Method:	EPA 3550B NWTPH-Dx	Level: Low

			Dilution	Date	Date	Extraction	
Analyte Name	Result Q	MRL	Factor	Extracted	Analyzed	Lot	Note
Diesel Range Organics (DRO)	ND U	32	1	11/06/13	11/08/13	KWG1312475	
Residual Range Organics (RRO)	ND U	130	1	11/06/13	11/08/13	KWG1312475	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	87	50-150	11/08/13	Acceptable
n-Triacontane	93	50-150	11/08/13	Acceptable

**Comments:** 

Merged

Analytical Results

Client:	KTA Associates	Service Request:	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected:	10/28/2013
Sample Matrix:	Soil	Date Received:	11/01/2013

#### Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	SB2-6-102813	Units:	mg/Kg
Lab Code:	K1311914-002	Basis:	Dry
Extraction Method: Analysis Method:	EPA 3550B NWTPH-Dx	Level:	Low

			Dilution	Date	Date	Extraction	
Analyte Name	Result Q	MRL	Factor	Extracted	Analyzed	Lot	Note
Diesel Range Organics (DRO)	ND U	30	1	11/06/13	11/08/13	KWG1312475	
Residual Range Organics (RRO)	ND U	120	1	11/06/13	11/08/13	KWG1312475	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note	
o-Terphenyl	103	50-150	11/08/13	Acceptable	
n-Triacontane	113	50-150	11/08/13	Acceptable	

**Comments:** 

Analytical Results

Client:	KTA Associates	Service Request:	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected:	10/29/2013
Sample Matrix:	Soil	Date Received:	11/01/2013

#### Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	SB3-5-102913	Units:	mg/Kg
Lab Code:	K1311914-003	Basis:	Dry
Extraction Method: Analysis Method:	EPA 3550B NWTPH-Dx	Level:	Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND U	32	1	11/06/13	11/08/13	KWG1312475	
Residual Range Organics (RRO)	ND U	130	1	11/06/13	11/08/13	KWG1312475	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note	
o-Terphenyl	101	50-150	11/08/13	Acceptable	
n-Triacontane	111	50-150	11/08/13	Acceptable	

**Comments:** 

Analytical Results

Client:	KTA Associates	Service Request: K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected: NA
Sample Matrix:	Soil	Date Received: NA

#### Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	Method Blank	Units:	mg/Kg
Lab Code:	KWG1312475-2	Basis:	Dry
Extraction Method: Analysis Method:	EPA 3550B NWTPH-Dx	Level:	Low

			Dilution	Date	Date	Extraction	
Analyte Name	Result Q	MRL	Factor	Extracted	Analyzed	Lot	Note
Diesel Range Organics (DRO)	ND U	25	1	11/06/13	11/08/13	KWG1312475	
Residual Range Organics (RRO)	ND U	99	1	11/06/13	11/08/13	KWG1312475	

o-Terphenyl 102 50-150 11/08/13 Acceptable	Surrogate Name	%Rec	Control Limits	Date Analyzed	Note	
n-Triacontane 104 50-150 11/08/13 Acceptable			-		1	

**Comments:** 

Merged

QA/QC Report

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Soil

#### Surrogate Recovery Summary Diesel and Residual Range Organics - Silica Gel Treated

**Extraction Method:** EPA 3550B **Analysis Method:** NWTPH-Dx Units: Percent Level: Low

Sample Name	Lab Code	<u>Sur1</u>	<u>Sur2</u>
SB1-5-102813	K1311914-001	87	93
SB2-6-102813	K1311914-002	103	113
SB3-5-102913	K1311914-003	101	111
SB3-5-102913DUP	KWG1312475-3	98	99
Method Blank	KWG1312475-2	102	104
Lab Control Sample	KWG1312475-1	92	93

Surrogate Recovery Control Limits (%)

Sur1 = o-Terphenyl50-150Sur2 = n-Triacontane50-150

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Service Request: K1311914

QA/QC Report

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater
Sample Matrix:	Soil

Service Request: K1311914 Date Extracted: 11/06/2013 Date Analyzed: 11/08/2013

#### Duplicate Sample Summary Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	SB3-5-102913	Units:	mg/Kg
Lab Code:	K1311914-003	Basis:	Dry
Extraction Method:	EPA 3550B	Level:	
Analysis Method:	NWTPH-Dx	Extraction Lot:	

		Sample	SB3-5-10 KWG13 Duplicate	12475-3	Relative Percent	RPD Limit
Analyte Name	MRL	Result	Result	Average	Difference	
Diesel Range Organics (DRO) Residual Range Organics (RRO)	33 130	ND ND	ND ND	ND ND		40 40

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

#### QA/QC Report

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Soil

 Service Request:
 K1311914

 Date Extracted:
 11/06/2013

 Date Analyzed:
 11/08/2013

#### Lab Control Spike Summary Diesel and Residual Range Organics - Silica Gel Treated

<b>Extraction Method:</b> EPA 35: <b>Analysis Method:</b> NWTPH	l-Dx Lab C KW	Control Samı G1312475- Control Spik	1		Units: mg/Kg Basis: Dry Level: Low Extraction Lot: KWG1312475
Analyte Name	Result	Spike Amount	%Rec	%Rec Limits	
Diesel Range Organics (DRO) Residual Range Organics (RRO)	219 128	267 133	82 96	42-134 48-141	

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Soil

 Service Request:
 K1311914

 Date Extracted:
 11/06/2013

 Date Analyzed:
 11/08/2013

 Time Analyzed:
 14:19

#### Method Blank Summary Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	Method Blank	Instrument ID:	GC21
Lab Code:	KWG1312475-2	File ID:	J:\GC21\DATA\110813F\1108F040.D
Extraction Method:	EPA 3550B	Level:	
Analysis Method:	NWTPH-Dx	Extraction Lot:	

This Method Blank applies to the following analyses:

			Date	Time
Sample Name	Lab Code	File ID	Analyzed	Analyzed
Lab Control Sample	KWG1312475-1	J:\GC21\DATA\110813F\1108F038.D	11/08/13	13:57
SB1-5-102813	K1311914-001	J:\GC21\DATA\110813F\1108F050.D	11/08/13	16:10
SB3-5-102913	K1311914-003	J:\GC21\DATA\110813F\1108F052.D	11/08/13	16:32
SB3-5-102913DUP	KWG1312475-3	J:\GC21\DATA\110813F\1108F054.D	11/08/13	16:54
SB2-6-102813	K1311914-002	J:\GC21\DATA\110813F\1108F066.D	11/08/13	19:07

QA/QC Report

**Client: KTA** Associates **Project:** PacifiCorp-Chehalis Power Groundwater Soil Sample Matrix:

Service Request: K1311914 Date Extracted: 11/06/2013 **Date Analyzed:** 11/08/2013 Time Analyzed: 13:57

#### Lab Control Sample Summary **Diesel and Residual Range Organics - Silica Gel Treated**

Sample Name:	Lab Control Sample	Instrument ID:	GC21
Lab Code:	KWG1312475-1	File ID:	J:\GC21\DATA\110813F\1108F038.D
Extraction Method:	EPA 3550B	Level:	
Analysis Method:	NWTPH-Dx	Extraction Lot:	

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1312475-2	J:\GC21\DATA\110813F\1108F040.D	11/08/13	14:19
SB1-5-102813	K1311914-001	J:\GC21\DATA\110813F\1108F050.D	11/08/13	16:10
SB3-5-102913	K1311914-003	J:\GC21\DATA\110813F\1108F052.D	11/08/13	16:32
SB3-5-102913DUP	KWG1312475-3	J:\GC21\DATA\110813F\1108F054.D	11/08/13	16:54
SB2-6-102813	K1311914-002	J:\GC21\DATA\110813F\1108F066.D	11/08/13	19:07

QA/QC Results

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power Groundwater

#### Service Request: K1311914 Calibration Date: 09/10/2013

#### Initial Calibration Summary Diesel and Residual Range Organics - Silica Gel Treated

Calibrati Instrume		CAL12766 GC21		Column:	ZB-1
Level ID	File ID		Level ID	File ID	
А	J:\GC21\Da	ATA\091013F\0910F072.D	I	J:\GC21\DATA\091013F\0910F096.D	
В	J:\GC21\DA	ATA\091013F\0910F074.D	J	J:\GC21\DATA\091013F\0910F098.D	
С	J:\GC21\DA	ATA\091013F\0910F076.D	K	J:\GC21\DATA\091013F\0910F100.D	
D	J:\GC21\DA	ATA\091013F\0910F078.D	L	J:\GC21\DATA\091013F\0910F102.D	
Е	J:\GC21\DA	ATA\091013F\0910F080.D	М	J:\GC21\DATA\091013F\0910F104.D	
F	J:\GC21\DA	ATA\091013F\0910F082.D	Ν	J:\GC21\DATA\091013F\0910F106.D	
G	J:\GC21\DA	ATA\091013F\0910F092.D			
Н	J:\GC21\DA	ATA\091013F\0910F094.D			

Analyte Name	Level ID	Amt	RF	Level ID	Amt	RF	Level ID	Amt	RF	Level ID	Amt	RF	Level ID	Amt	RF
Diesel Range Organics (DRO)				G	20	1010	Н	50	924	I	200	965	J	500	972
	К	2000	989	Ĺ	5000	1030	M	20000	916	Ν	50000	920			
Residual Range Organics (RRO)	A F	20 5000	968 588	В	50	756	С	200	699	D	500	627	E	2000	615
o-Terphenyl	K	100	1280	G L	1.0 250	1300 1330	Н	2.5	1190	I	10	1260	J	25	1280
n-Triacontane	К	100	1070	G L	1.0 250	9 <b>38</b> 1160	Н	2.5	919	I	10	1050	J	25	1080

QA/QC Results

Client: Project:

o-Terphenyl

n-Triacontane

KTA Associates PacifiCorp-Chehalis Power Groundwater

SURR

SURR

Service Request: K1311914 Calibration Date: 09/10/2013

#### Initial Calibration Summary Diesel and Residual Range Organics - Silica Gel Treated

% RSD

% RSD

3.8

8.8

≤20

 $\leq 20$ 

Curror union 12 (	AL12766 C21						Column:	ZB-1
			Calibrati	on Evaluat	ion			
	Compor			Eval.	_	Control		
Analyte Name	Туре	Fit Type	Eval.	Result	<u>Q</u>	Criteria		
Diesel Range Organics (DI	RO) MS	AverageRF	% RSD	4.4		≤20		
Residual Range Organics (	(RRO) MS	Linear	R2	0.999		≥0.99	ĺ	

AverageRF

AverageRF

		QA/QC Results				
Client:	KTA Associates				Service Request:	K1311914
Project:	PacifiCorp-Chehalis Power Groundwa	ter			<b>Calibration Date:</b>	
•					Date Analyzed:	09/11/2013
	Second Sour Diesel and Residual R	ce Calibration Lange Organics		Freated		
Calibration Type: Analysis Method:	External Standard NWTPH-Dx				Calibration ID: Units:	-
File ID:	J:\GC21\DATA\091013F\0910F088.D				Column ID:	<b>ZB-</b> 1
	J:\GC21\DATA\091013F\0910F110.D					
		Average	SSV			

RF

965 709

Expected

1000

1000

Result

1000

**99**0

RF

964

599

%Drift

NA

-1

%D

0

NA

Criteria

± 15 %

± 15 %

Curve Fit

AverageRF

Linear

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

**Analyte Name** 

Diesel Range Organics (DRO)

Residual Range Organics (RRO)

‡ CCC Compound

2.5

QA/QC Results

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater

Service Request: K1311914 Date Analyzed: 11/08/2013

#### Continuing Calibration Verification Summary Diesel and Residual Range Organics - Silica Gel Treated

Calibration Type: Analysis Method:	External Standard NWTPH-Dx	Calibration Date: Calibration ID:	
•		Analysis Lot:	KWG1312552
		Units:	ppm
File ID:	J:\GC21\DATA\110813F\1108F020.D J:\GC21\DATA\110813F\1108F022.D	Column ID:	ZB-1

			Average	CCV				
Analyte Name	Expected	Result	RF	RF	%D	%Drift	Criteria	Curve Fit
Diesel Range Organics (DRO)	1000	1000	965	995	3	NA	± 15 %	AverageRF
Residual Range Organics (RRO)	1000	1000	709	623	NA	3	±15 %	Linear
o-Terphenyl	50	54	1270	1380	8	NA	$\pm 15$ %	AverageRF
n-Triacontane	50	50	1040	1030	0	NA	±15 %	AverageRF

QA/QC Results

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater

 Service Request:
 K1311914

 Date Analyzed:
 11/08/2013

#### Continuing Calibration Verification Summary Diesel and Residual Range Organics - Silica Gel Treated

Calibration Type: Analysis Method:	External Standard NWTPH-Dx	Calibration Date: Calibration ID:	
<i>U</i>		Analysis Lot:	KWG1312552
		Units:	ppm
File ID:	J:\GC21\DATA\110813F\1108F056.D J:\GC21\DATA\110813F\1108F058.D	Column ID:	ZB-1

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Diesel Range Organics (DRO)	1000	1000	965	981	2	NA	±15 %	AverageRF
Residual Range Organics (RRO)	1000	1100	709	672	NA	11	± 15 %	Linear
o-Terphenyl	50	53	1270	1340	6	NA	± 15 %	AverageRF
n-Triacontane	50	55	1040	1140	10	NA	± 15 %	AverageRF

QA/QC Results

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater

#### Service Request: K1311914 Date Analyzed: 11/08/2013

#### Continuing Calibration Verification Summary Diesel and Residual Range Organics - Silica Gel Treated

Calibration Type:	External Standard			Calibration Date:	09/10/2013
Analysis Method:	NWTPH-Dx			Calibration ID:	CAL12766
				Analysis Lot:	KWG1312552
				Units:	ppm
File ID:	J:\GC21\DATA\110813F\1108F086.D			Column ID:	ZB-1
	J:\GC21\DATA\110813F\1108F088.D				
		•	CCN		

Analyte Name	Expected	Result	Average RF	RF	%D	%Drift	Criteria	Curve Fit
Diesel Range Organics (DRO)	1000	1100	965	1020	5	NA	$\pm 15$ %	AverageRF
Residual Range Organics (RRO)	1000	1100	709	665	NA	10	±15 %	Linear
o-Terphenyl	50	54	1270	1380	8	NA	± 15 %	AverageRF
n-Triacontane	50	56	1040	1160	12	NA	± 15 %	AverageRF

QA/QC Results

Service Request: K1311914

Client: Project: KTA Associates PacifiCorp-Chehalis Power Groundwater

#### Analysis Run Log Diesel and Residual Range Organics - Silica Gel Treated

Analysis Method: NWTPH-Dx

Analysis Lot:KWG1312552Instrument ID:GC21Column:ZB-1

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
1108F020.D	Continuing Calibration Verification	KWG1312552-1	11/8/2013	10:31		11/8/2013	10:47
1108F022.D	Continuing Calibration Verification	KWG1312552-1	11/8/2013	10:58		11/8/2013	11:14
1108F024.D	Instrument Blank	KWG1312552-4	11/8/2013	11:21		11/8/2013	11:37
1108F026.D	ZZZZZZ	ZZZZZZ	11/8/2013	11:43		11/8/2013	11:59
1108F028.D	ZZZZZZ	ZZZZZZ	11/8/2013	12:05		11/8/2013	12:21
1108F030.D	ZZZZZZ	ZZZZZZ	11/8/2013	12:27		11/8/2013	12:43
1108F032.D	ZZZZZZ	ZZZZZZ	11/8/2013	12:50		11/8/2013	13:06
1108F034.D	ZZZZZZ	ZZZZZZ	11/8/2013	13:12		11/8/2013	13:28
1108F036.D	ZZZZZZ	ZZZZZZ	11/8/2013	13:34		11/8/2013	13:50
1108F038.D	Lab Control Sample	KWG1312475-1	11/8/2013	13:57		11/8/2013	14:13
1108F040.D	Method Blank	KWG1312475-2	11/8/2013	14:19		11/8/2013	14:35
1108F042.D	ZZZZZZ	ZZZZZZ	11/8/2013	14:41		11/8/2013	14:57
1108F044.D	ZZZZZZ	ZZZZZZ	11/8/2013	15:03		11/8/2013	15:19
1108F046.D	ZZZZZZ	ZZZZZZ	11/8/2013	15:26		11/8/2013	15:42
1108F048.D	ZZZZZZ	ZZZZZZ	11/8/2013	15:48		11/8/2013	16:04
1108F050.D	SB1-5-102813	K1311914-001	11/8/2013	16:10		11/8/2013	16:26
1108F052.D	SB3-5-102913	K1311914-003	11/8/2013	16:32		11/8/2013	16:48
1108F054.D	SB3-5-102913DUP	KWG1312475-3	11/8/2013	16:54		11/8/2013	17:10
1108F056.D	Continuing Calibration Verification	KWG1312552-2	11/8/2013	17:17		11/8/2013	17:33
1108F058.D	Continuing Calibration Verification	KWG1312552-2	11/8/2013	17:39		11/8/2013	17:55
1108F064.D	Instrument Blank	KWG1312552-5	11/8/2013	18:46		11/8/2013	19:02
1108F066.D	SB2-6-102813	K1311914-002	11/8/2013	19:07		11/8/2013	19:23
1108F068.D	ZZZZZZ	ZZZZZZ	11/8/2013	19:30		11/8/2013	19:46
1108F070.D	ZZZZZZ	ZZZZZZ	11/8/2013	19:52		11/8/2013	20:08
1108F072.D	ZZZZZZ	ZZZZZZ	11/8/2013	20:14		11/8/2013	20:30
1108F074.D	ZZZZZZ	ZZZZZZ	11/8/2013	20:36		11/8/2013	20:52
1108F076.D	ZZZZZZ	ZZZZZZ	11/8/2013	20:59		11/8/2013	21:15
1108F078.D	ZZZZZZ	ZZZZZZ	11/8/2013	21:20		11/8/2013	21:36
1108F080.D	ZZZZZZ	ZZZZZZ	11/8/2013	21:43		11/8/2013	21:59
1108F082.D	ZZZZZZ	ZZZZZZ	11/8/2013	22:05		11/8/2013	22:21
1108F084.D	ZZZZZZ	ZZZZZZ	11/8/2013	22:27		11/8/2013	22:43
1108F086.D	Continuing Calibration Verification	KWG1312552-3	11/8/2013	22:49		11/8/2013	23:05
1108F088.D	Continuing Calibration Verification	KWG1312552-3	11/8/2013	23:11		11/8/2013	23:27
1108F090.D	Instrument Blank	KWG1312552-6	11/8/2013	23:34		11/8/2013	23:50

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

QA/QC Results

**KTA** Associates **Client:** PacifiCorp-Chehalis Power Groundwater **Project:** Soil Sample Matrix:

Service Request: K1311914 Date Extracted: 11/06/2013

#### **Extraction Prep Log Diesel and Residual Range Organics - Silica Gel Treated**

EPA 3550B Extraction Method: **Analysis Method:** NWTPH-Dx Extraction Lot: KWG1312475 Level: Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
SB1-5-102813	K1311914-001	10/28/13	11/01/13	30.272g	10mL	78.9	
SB2-6-102813	K1311914-002	10/28/13	11/01/13	30.320g	10mL	82.5	
SB3-5-102913	K1311914-003	10/29/13	11/01/13	30.405g	10mL	77.6	
SB3-5-102913DUP	KWG1312475-3	10/29/13	11/01/13	30.020g	10mL	77.6	
Method Blank	KWG1312475-2	NA	NA	30.408g	10mL	NA	
Lab Control Sample	KWG1312475-1	NA	NA	30.000g	10mL	NA	

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

# Organic Analysis: <u>Diesel and Residual Range Organics - Silica Gel</u> <u>Treated</u> Validation Package

# Organic Analysis: <u>Diesel and Residual Range Organics - Silica Gel</u> <u>Treated</u> Validation Package

QC Reports

QA/QC Report

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Soil

#### Surrogate Recovery Summary Diesel and Residual Range Organics - Silica Gel Treated

**Extraction Method:** EPA 3550B Analysis Method: NWTPH-Dx Units: Percent Level: Low

Sample Name	Lab Code	<u>Sur1</u>	<u>Sur2</u>
SB1-5-102813	K1311914-001	87	93
SB2-6-102813	K1311914-002	103	113
SB3-5-102913	K1311914-003	101	111
SB3-5-102913DUP	KWG1312475-3	98	99
Method Blank	KWG1312475-2	102	104
Lab Control Sample	KWG1312475-1	92	93

Surrogate Recovery Control Limits (%)

Sur1 = o-Terphenyl Sur2 = n-Triacontane 50-150 50-150

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

Client:	KTA Associates
Project:	PacifiCorp-Chehalis Power Groundwater
Sample Matrix:	Soil

Service Request: K1311914 Date Extracted: 11/06/2013 Date Analyzed: 11/08/2013

#### Duplicate Sample Summary Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	SB3-5-102913	Units:	mg/Kg
Lab Code:	K1311914-003	Basis:	Dry
Extraction Method:	EPA 3550B	Level:	
Analysis Method:	NWTPH-Dx	Extraction Lot:	

		Sample	SB3-5-102 KWG13 Duplicate	12475-3	Relative Percent	RPD Limit
Analyte Name	MRL	Result	Result	Average	Difference	
Diesel Range Organics (DRO)	33	ND	ND	ND	-	40
Residual Range Organics (RRO)	130	ND	ND	ND	-	40

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Soil

Service Request: K1311914 Date Extracted: 11/06/2013 Date Analyzed: 11/08/2013

#### Lab Control Spike Summary Diesel and Residual Range Organics - Silica Gel Treated

Extraction Method: Analysis Method:	EPA 3550B NWTPH-Dx		Sentral Com			Units: Basis: Level: Extraction Lot:	Low
		Lab Control Sample KWG1312475-1 Lab Control Spike					
Analyte Name		Result	Spike Amount	%Rec	%Rec Limits		
Diesel Range Organics (l	-	219	267	82	42-134		2004-000-00-00-00-00-00-00-00-00-00-00-00
Residual Range Organics	s (RRO)	128	133	96	48-141		

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Soil

 Service Request:
 K1311914

 Date Extracted:
 11/06/2013

 Date Analyzed:
 11/08/2013

 Time Analyzed:
 14:19

#### Method Blank Summary Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	Method Blank	Instrument ID:	GC21	
Lab Code:	KWG1312475-2	File ID:	J:\GC21\DATA\110813F\1108F040.D	
Extraction Method: Analysis Method:	EPA 3550B NWTPH-Dx	Level: Extraction Lot:		

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File D	Date Analyzed	Time Analyzed
Lab Control Sample	KWG1312475-1	J:\GC21\DATA\110813F\1108F038.D	11/08/13	13:57
SB1-5-102813	K1311914-001	J:\GC21\DATA\110813F\1108F050.D	11/08/13	16:10
SB3-5-102913	K1311914-003	J:\GC21\DATA\110813F\1108F052.D	11/08/13	16:32
SB3-5-102913DUP	KWG1312475-3	J:\GC21\DATA\110813F\1108F054.D	11/08/13	16:54
SB2-6-102813	K1311914-002	J:\GC21\DATA\110813F\1108F066.D	11/08/13	19:07

QA/QC Report

Client:KTA AssociatesProject:PacifiCorp-Chehalis Power GroundwaterSample Matrix:Soil

 Service Request:
 K1311914

 Date Extracted:
 11/06/2013

 Date Analyzed:
 11/08/2013

 Time Analyzed:
 13:57

#### Lab Control Sample Summary Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	Lab Control Sample	Instrument ID:	GC21
Lab Code:	KWG1312475-1	File ID:	J:\GC21\DATA\110813F\1108F038.D
Extraction Method:	EPA 3550B	Level:	
Analysis Method:	NWTPH-Dx	Extraction Lot:	

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1312475-2	J:\GC21\DATA\110813F\1108F040.D	11/08/13	14:19
SB1-5-102813	K1311914-001	J:\GC21\DATA\110813F\1108F050.D	11/08/13	16:10
SB3-5-102913	K1311914-003	J:\GC21\DATA\110813F\1108F052.D	11/08/13	16:32
SB3-5-102913DUP	KWG1312475-3	J:\GC21\DATA\110813F\1108F054.D	11/08/13	16:54
SB2-6-102813	K1311914-002	J:\GC21\DATA\110813F\1108F066.D	11/08/13	19:07

# Organic Analysis: <u>Diesel and Residual Range Organics - Silica Gel</u> <u>Treated</u> Validation Package

Raw Data

Analytical Results

Client:	KTA Associates	Service Request:	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected:	10/28/2013
Sample Matrix:	Soil	Date Received:	11/01/2013

# Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	SB1-5-102813	Units:	mg/Kg
Lab Code:	K1311914-001	Basis:	Dry
Extraction Method: Analysis Method:	EPA 3550B NWTPH-Dx	Level:	Low

			Dilution	Date	Date	Extraction	
Analyte Name	Result Q	MRL	Factor	Extracted	Analyzed	Lot	Note
Diesel Range Organics (DRO)	ND U	32	1	11/06/13	11/08/13	KWG1312475	
Residual Range Organics (RRO)	ND U	130	1	11/06/13	11/08/13	KWG1312475	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note	
o-Terphenyl	87	50-150	11/08/13	Acceptable	
n-Triacontane	93	50-150	11/08/13	Acceptable	

**Comments:** 

 Data File:
 J:\GC21\DATA\110813F\1108F050.D

 Lab ID:
 K1311914-001

 RunType:
 SMPL

 Matrix:
 SOIL

Date Acquired: Date Quantitated: Batch ID: Analysis Method: ListJoinID: 11/08/2013 16:10 11/09/2013 11:35 KWG1312552 NWTPH-Dx LJ10933

# Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
Analytical Holding Time	NA	NA	NA	х	
Preparation Holding Time	NA	NA	NA	. X	
Pre-Preparation Holding Time	NA	NA	NA	x	
ICAL Analyte Recovery	NA	NA	NA	x	
Second Source ICAL Verification	NA	NA	NA	x	
Calibration Verification Pass/Fail	NA	NA	NA	х	
Continuing Calibration Recovery	NA	NA	NA	x	
Continuing Calibration Recovery (Closing)	NA	NA	NA	x	
Method Blank	NA	NA	NA	х	
MB Surrogate Recovery	NA	NA	NA	x	
Lab Control Spike	NA	NA	NA	x	
Surrogates	NA	NA	NA	x	
Analyte Co-elution	NA	NA	NA	х	
Retention Time	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	х	
Std MRL Unsupported by ICAL	NA	NA	NA	х	
Above Highest ICAL Level	NA	NA	NA	х	
Enviroquant/Stealth Calibration Check	NA	NA	NA	х	
Overdiluted Analysis	NA	NA	NA	х	

Primary Review Secondary Review:

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\110 11/08/2013 16:10 SMPL K1311914-001	)813F\11(		Quant Date:	11/09/2013 11:35	Vial: Dilut	ument: ion: Conc. Units:	GC21 13 1.0 ppm		
Bottle ID: Prod Code:	NWTPH-Dx NW T	PH		Tier: Collect Date:	IV 10/28/2013	Matr Recei	ix: ve Date:	SOIL 11/01/2	2013	
Analysis Lot: Analysis Method: Prep Ref:	KWG1312552 NWTPH-Dx 1302249			Prep Lot: Prep Method: Prep Date:	KWG1312475 EPA 3550B 11/06/2013	Repo	rt Group:	K13119	914	
Quant Method: Title:	d: J:\GC21\METHODS\091013FSRO.M Calibration ID: Diesel and Residual Range Organics - Silica Gel Treated Report List ID: Method ID:						rt List ID:	CAL12 LJ1093 MJ108	3	
MB Ref:	J:\GC21\DATA\110	)813F\11(	08F040.D	and an	name, " – u viasu dugu jego – na secono	Quar	nt based on	Report L	ist	
Surrogate Comp Parameter Na		RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl		5.58	0.00		27755	21.80	87	50-150	OK	
n-Triacontan	e	7.75	0.00		24159	23.32	93	50-150	OK	
Target Compou	nds				Final	Conc. Units:	mg/Kg	Dry We	ight	
Parameter Na	ame	RT	RT Dev	<u></u>	Response	Solution Conc	Fina Cone	-	Q	Rpt?
-	e Organics (DRO) nge Organics (RRO)	3.78 6.66			6635 36864	6.87 47.22	2.9 20		J J	
Prep Amount: Prep Final Vol:	30.272 g 10 mL 78.9 %		Dilution: Unit Facto	1.0 r: 1						

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / (Prep Amount x Solids)) x Unit Factor

U: Undetected at or above MDL

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/14/2013 09:51:54  $u:\blue th\Crystal.rpt\quantl.rpt$ 

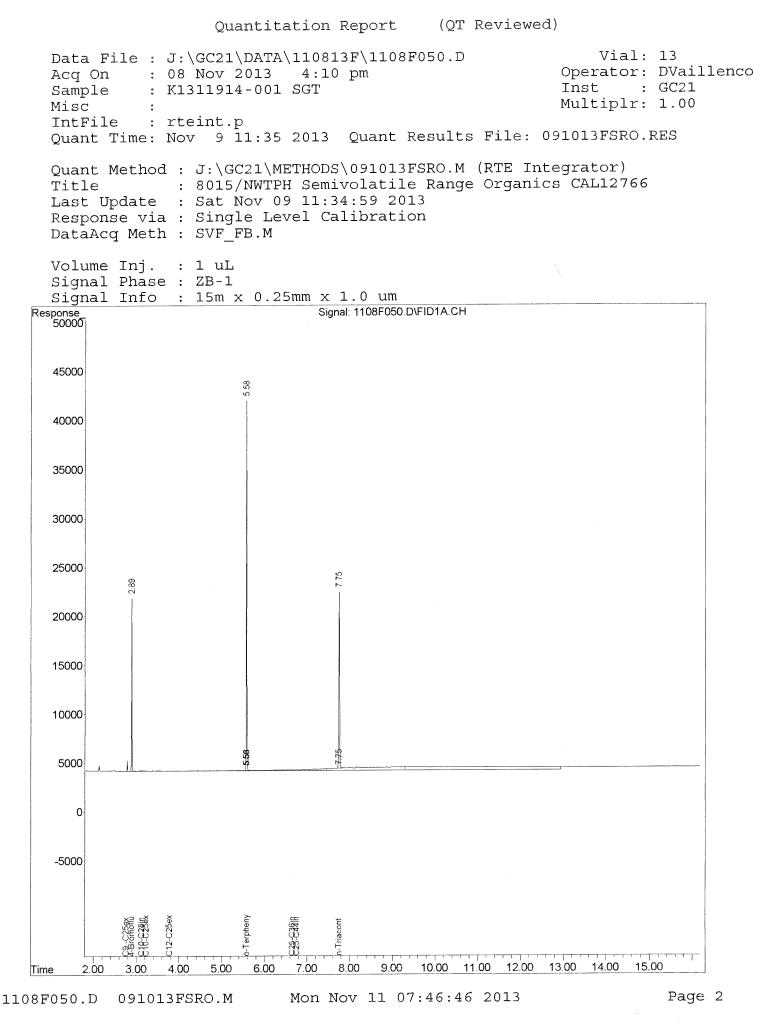
D: Result from dilution d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F050.D

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\110813F\1108F050.D Vial: 13 Acq On : 08 Nov 2013 4:10 pm Operator: DVaillenco Inst : GC21 : K1311914-001 SGT Sample Multiplr: 1.00 Misc : IntFile : rteint.p Quant Time: Nov 09 11:35:30 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds 2.89 11850 20.899 ppm Recovery = 41.80% 5.58 27755 21.798 ppm Recovery = 43.60% 7.75 24159 23.322 ppm Recovery = 46.64% 1) S 4-Bromofluorobenzene Spiked Amount 50.000 2) S o-Terphenyl Spiked Amount 50.000 3) S n-Triacontane Spiked Amount 50.000 Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.7592238.013 ppm5) HC10-C25ex DRO[AK102]3.2378506.936 ppm6) HC10-C28in DRO[8015]3.131372012.106 ppm7) HC12-C25ex DRO[NWTPH]3.7866356.872 ppm8) HC25-C36in RRO[NWTPH]6.663686447.223 ppm9) HC25-C44in RRO[TPH-Oil]6.76103853109.724 ppm

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Analytical Results

Client:	KTA Associates	Service Request:	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected:	10/28/2013
Sample Matrix:	Soil	Date Received:	11/01/2013

# Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	SB2-6-102813	Units: mg/Kg
Lab Code:	K1311914-002	Basis: Dry
Extraction Method: Analysis Method:	EPA 3550B NWTPH-Dx	Level: Low

			Dilution	Date	Date	Extraction	
Analyte Name	Result Q	MRL	Factor	Extracted	Analyzed	Lot	Note
Diesel Range Organics (DRO)	ND U	30	1	11/06/13	11/08/13	KWG1312475	
Residual Range Organics (RRO)	ND U	120	1	11/06/13	11/08/13	KWG1312475	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note	
o-Terphenyl n-Triacontane	103 113	50-150 50-150	11/08/13 11/08/13	Acceptable Acceptable	

**Comments:** 

Merged

Data File:	J:\GC21\DATA\110813F\1108F066.D
Lab ID:	K1311914-002
RunType:	SMPL
Matrix:	SOIL
• •	

Date Acquired: Date Quantitated: Batch ID: Analysis Method: ListJoinID: 11/08/2013 19:07 11/09/2013 11:35 KWG1312552 NWTPH-Dx LJ10933

# Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
Analytical Holding Time	NA	NA	NA	x	
Preparation Holding Time	NA	NA	NA	x	
Pre-Preparation Holding Time	NA	NA	NA	x	
ICAL Analyte Recovery	NA	NA	NA	х	
Second Source ICAL Verification	NA	NA	NA	x	
Calibration Verification Pass/Fail	NA	NA	NA	x	
Continuing Calibration Recovery	NA	NA	NA	х	
Continuing Calibration Recovery (Closing)	NA	NA	NA	х	
Method Blank	NA	NA	NA	х	
MB Surrogate Recovery	NA	NA	NA	х	
Lab Control Spike	NA	NA	NA	х	
Surrogates	NA	NA	NA	х	
Analyte Co-elution	NA	NA	NA	х	
Retention Time	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	х	
Std MRL Unsupported by ICAL	NA	NA	NA	x	
Above Highest ICAL Level	NA	NA	NA	х	
Enviroquant/Stealth Calibration Check	NA	NA	NA	х	
Overdiluted Analysis	NA	NA	NA	x	

Primary Review Secondary Review:

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Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\110 11/08/2013 19:07 SMPL K1311914-002	)813F\11		Quant Date:	11/09/2013 11:35	Vial: Dilut		GC21 16 1.0 ppm		
Bottle ID: Prod Code:	NWTPH-Dx NW T	ΡH		Tier: Collect Date:	IV 10/28/2013	Matr Recei	ix: ive Date:	SOIL 11/01/2	2013	
Analysis Lot: Analysis Method: Prep Ref:	KWG1312552 NWTPH-Dx 1302250			Prep Lot: Prep Method: Prep Date:	KWG1312475 EPA 3550B 11/06/2013	Repo	ort Group:	K13119	914	
Quant Method: Title:	: J:\GC21\METHODS\091013FSRO.M Diesel and Residual Range Organics - S			lica Gel Treated		Repo	oration ID: ort List ID: ood ID:	CAL12 LJ1093 MJ108	3	
MB Ref:	J:\GC21\DATA\110	)813F\11	08F040.D			Qua	nt based on	Report L	ist	
Surrogate Com		RT	RT		Response	Solution Conc	%Rec	%Rec Limits		Rpt?
Parameter N			Dev		_				01/	
o-Terphenyl n-Triacontar		5.58 7.75	0.00 0.00		32795 29195	25.76 28.18	103 113	50-150 50-150	OK OK	
Target Compou	inds				Final	Conc. Units:	mg/Kg	, Dry We	ight	
Parameter N		RT	RT Dev	<u></u>	Response	Solution Conc	Fina Cone	-	Q	Rpt?
	e Organics (DRO) nge Organics (RRO)	3.78 6.66			5308 9818	5.50 1.82	2.2 4.7		U U	
Prep Amount: Prep Final Vol: Solids:	30.320 g 10 mL 82.5 %		Dilution: Unit Factor	1.0 r: 1						

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / (Prep Amount x Solids)) x Unit Factor

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL

N: Presumptive evidence of compound

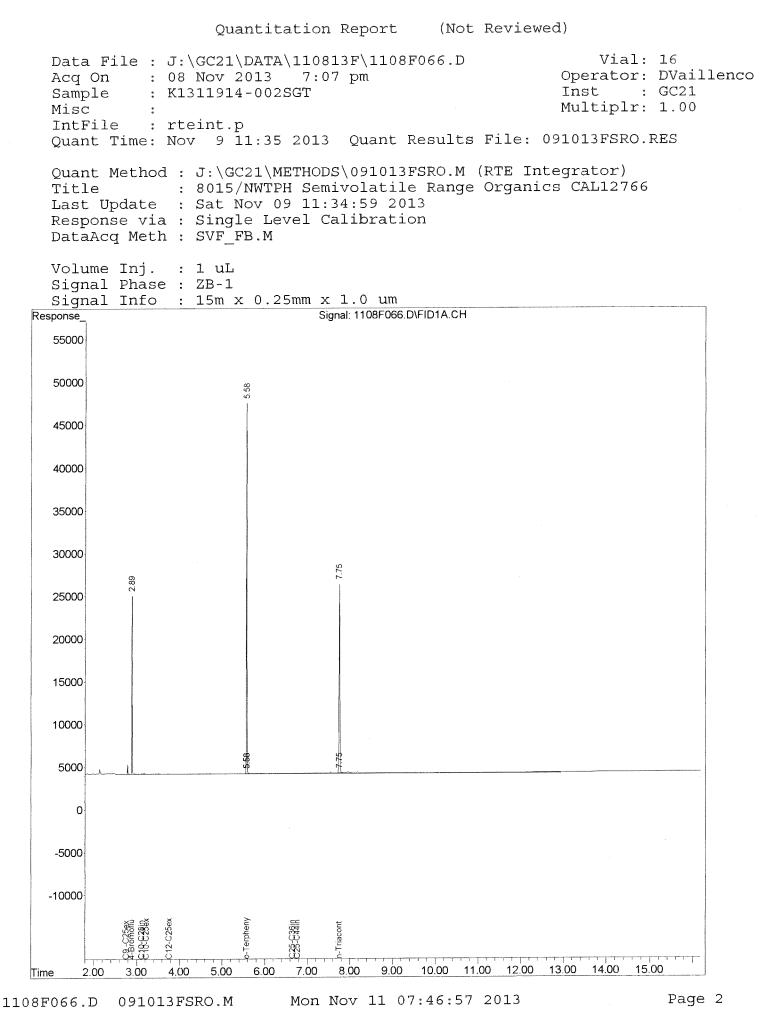
Printed: 11/14/2013 09:52:09 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution d: Compound integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

Quantitation Report (Not Reviewed) Data File : J:\GC21\DATA\110813F\1108F066.D Vial: 16 Acq On : 08 Nov 2013 7:07 pm Operator: DVaillenco Inst : GC21 : K1311914-002SGT Sample Multiplr: 1.00 Misc . IntFile : rteint.p Quant Time: Nov 09 11:35:37 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_ \_\_\_\_\_ System Monitoring Compounds 2.89 14361 25.328 ppm Recovery = 50.66% 5.58 32795 25.757 ppm Recovery = 51.51% 7.75 29195 28.183 ppm Recovery = 56.37% 1) S 4-Bromofluorobenzene Spiked Amount 50.000 2) S o-Terphenyl Spiked Amount 50.000 3) S n-Triacontane Spiked Amount 50.000 Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.7581767.103 ppm5) HC10-C25ex DRO[AK102]3.2366835.905 ppm6) HC10-C28in DRO[8015]3.1391288.054 ppm7) HC12-C25ex DRO[NWTPH]3.7853085.498 ppm8) HC25-C36in RRO[NWTPH]6.6698181.816 ppm9) HC25-C44in RRO[TPH-Oil]6.762135017.876 ppm

51



Analytical Results

Client:	KTA Associates	Service Request:	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected:	10/29/2013
Sample Matrix:	Soil	Date Received:	11/01/2013

#### Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	SB3-5-102913	Units:	mg/Kg
Lab Code:	K1311914-003	Basis:	Dry
Extraction Method: Analysis Method:	EPA 3550B NWTPH-Dx	Level:	Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND U	32	1	11/06/13	11/08/13	KWG1312475	
Residual Range Organics (RRO)	ND U	130	1	11/06/13	11/08/13	KWG1312475	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	$\begin{array}{c} 101 \\ 111 \end{array}$	50-150	11/08/13	Acceptable
n-Triacontane		50-150	11/08/13	Acceptable

**Comments:** 

Merged

 Data File:
 J:\GC21\DATA\110813F\1108F052.D

 Lab ID:
 K1311914-003

 RunType:
 SMPL

 Matrix:
 SOIL

Date Acquired: Date Quantitated: Batch ID: Analysis Method: ListJoinID: 11/08/2013 16:32 11/09/2013 11:35 KWG1312552 NWTPH-Dx LJ10933

# Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
Analytical Holding Time	NA	NA	NA	x	
Preparation Holding Time	NA	NA	NA	x	
Pre-Preparation Holding Time	NA	NA	NA	x	
ICAL Analyte Recovery	NA	NA	NA	x	
Second Source ICAL Verification	NA	NA	NA	x	
Calibration Verification Pass/Fail	NA	NA	NA	x	
Continuing Calibration Recovery	NA	NA	NA	x	
Continuing Calibration Recovery (Closing)	NA	NA	NA	x	
Method Blank	NA	NA	NA	x	
MB Surrogate Recovery	NA	NA	NA	x	
Lab Control Spike	NA	NA	NA	x	
Surrogates	NA	NA	NA	x	
Analyte Co-elution	NA	NA	NA	x	
Retention Time	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	x	
Std MRL Unsupported by ICAL	NA	NA	NA	х	
Above Highest ICAL Level	NA	NA	NA	x	
Enviroquant/Stealth Calibration Check	NA	NA	NA	x	
Overdiluted Analysis	NA	NA	NA	x	

Primary Review: Secondary Review:

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\110 11/08/2013 16:32 SMPL K1311914-003	)813F\11		Quant Date:	11/09/2013 11:35	Vial: Dilut	ument: ion: Conc. Units:	GC21 14 1.0 ppm		at any start of the
Bottle ID: Prod Code:	NWTPH-Dx NW T	PH		Tier: Collect Date:	IV 10/29/2013	Matr Rece	ix: ive Date:	SOIL 11/01/2	2013	
Analysis Lot: Analysis Method: Prep Ref:	KWG1312552 NWTPH-Dx 1302251			Prep Lot: Prep Method: Prep Date:	KWG1312475 EPA 3550B 11/06/2013	Repo	ort Group:	K13119	914	
Quant Method: Title:	J:\GC21\METHOD Diesel and Residua			ica Gel Treated		Repo	oration ID: ort List ID: ood ID:	CAL12 LJ1093 MJ1081	3	
MB Ref:	J:\GC21\DATA\110	)813F\11(	08F040.D			Qua	nt based on	Report L	ist	
Surrogate Com		RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl		5.58	0.00		31998	25.13	101	50-150	OK	
n-Triacontar		7.75	0.00		28676	27.68	111	50-150	OK	
Target Compou	ands				Final	Conc. Units:	mg/Kg	g Dry Wei	ight	
Parameter N		RT	RT Dev		Response	Solution Conc	Fin2 Con		Q	Rpt?
-	e Organics (DRO) nge Organics (RRO)	3.78 6.66			4932 15537	5.11 11.42	2.3 5.0		U U	
Prep Amount: Prep Final Vol: Solids:	30.405 g 10 mL 77.6 %		Dilution: Unit Factor	1.0 r: 1						

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / (Prep Amount x Solids)) x Unit Factor

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

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D: Result from dilution d: Compound integration performed d: Compound manually deleted NR: Analyte not reported from this analysis \*: Result fails acceptance criteria

#: Acceptance criteria not applicable ?: Insufficient information to determine acceptance

e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F052.D

Quantitation Report (QT Reviewed) Vial: 14 Data File : J:\GC21\DATA\110813F\1108F052.D Acq On : 08 Nov 2013 4:32 pm Operator: DVaillenco Inst : GC21 : K1311914-003 SGT Sample Multiplr: 1.00 Misc : IntFile : rteint.p Quant Time: Nov 09 11:35:31 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound -System Monitoring Compounds 2.89 13964 24.628 ppm Recovery = 49.26% 5.58 31998 25.131 ppm Recovery = 50.26% 7.75 28676 27.682 ppm Recovery = 55.26% 1) S 4-Bromofluorobenzene Spiked Amount 50.000 2) S o-Terphenyl Spiked Amount 50.000 3) S n-Triacontane Recovery = 55.36% Spiked Amount 50.000 Target Compounds 73356.373 ppm60665.360 ppm92158.131 ppm49325.108 ppm1553711.417 ppm4157140.387 ppm 4) H C9 -C25ex DRO [TPH-Diesel] 2.75 

 4)
 H
 C)
 C23EX
 DRO<[ITH DICBCI]</td>
 2.75

 5)
 H
 C10-C25ex
 DRO<[AK102]</td>
 3.23

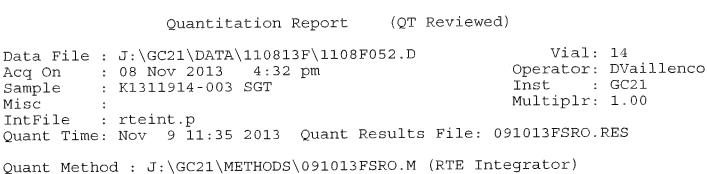
 6)
 H
 C10-C28in
 DRO<[8015]</td>
 3.13

 7)
 H
 C12-C25ex
 DRO<[NWTPH]</td>
 3.78

 8)
 H
 C25-C36in
 RRO<[NWTPH]</td>
 6.66

 9)
 H
 C25-C44in
 RRO<[TPH-Oil]</td>
 6.76

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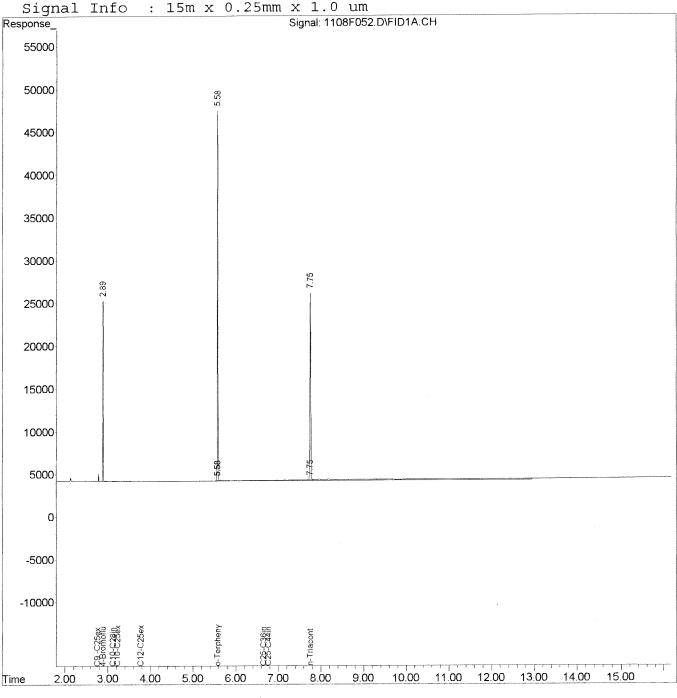
: 8015/NWTPH Semivolatile Range Organics CAL12766 Title Last Update : Sat Nov 09 11:34:59 2013 Response via : Single Level Calibration

DataAcq Meth : SVF FB.M

Volume Inj. : 1 uL Signal Phase : ZB-1

Acq On

Misc



1108F052.D 091013FSRO.M

### Mon Nov 11 07:46:47 2013

Analytical Results

Client:	KTA Associates	Service Request:	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected:	10/29/2013
Sample Matrix:	Soil	Date Received:	11/01/2013

#### Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	SB3-5-102913DUP	Units:	00
Lab Code:	KWG1312475-3	Basis:	
Extraction Method: Analysis Method:	EPA 3550B NWTPH-Dx	Level:	Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND U	33	1	11/06/13	11/08/13	KWG1312475	
Residual Range Organics (RRO)	ND U	130	1	11/06/13	11/08/13	KWG1312475	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note	4000.000
o-Terphenyl	98	50-150	11/08/13	Acceptable	
n-Triacontane	99	50-150	11/08/13	Acceptable	

**Comments:** 

Merged

1 of 1

Data File:	J:\GC21\DATA\110813F\1108F054.D
Lab ID:	KWG1312475-3
RunType:	DUP
Matrix:	SOIL

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/08/2013 16:54 11/09/2013 11:35 KWG1312552 NWTPH-Dx MJ1081

# Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
Analytical Holding Time	NA	NA	NA	x	
ICAL Analyte Recovery	NA	NA	NA	x	
Second Source ICAL Verification	NA	NA	NA	x	
Calibration Verification Pass/Fail	NA	NA	NA	х	
Continuing Calibration Recovery	NA	NA	NA	х	
Continuing Calibration Recovery (Closing)	NA	NA	NA	х	
Surrogates	NA	NA	NA	х	
Analyte Co-elution	NA	NA	NA	х	
Retention Time	NA	NA	NA	х	
Std MRL Unsupported by ICAL	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	x	
Above Highest ICAL Level	NA	NA	NA	x	
Enviroquant/Stealth Calibration Check	NA	NA	NA	x	
Overdiluted Analysis	NA	NA	NA	х	

Primary Review: Secondary Review:

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\110 11/08/2013 16:54 DUP KWG1312475-3	)813F\11(		Quant Date:	11/09/2013 11:35	Vial: Diluti	iment: ion: Conc. Units:	GC21 15 1.0 ppm		
Bottle ID: Prod Code:	NWTPH-Dx NW T	PH		Tier: Collect Date:		Matr Recei	ix: ve Date:	SOIL 11/07/2	2013	
Analysis Lot: Analysis Method: Prep Ref:	KWG1312552 NWTPH-Dx 1302254			Prep Lot: Prep Method: Prep Date:	KWG1312475 EPA 3550B 11/06/2013	Repo	rt Group:	99974444		
Quant Method: Title:	J:\GC21\METHODS\091013FSRO.M						ration ID:	CAL12		
MB Ref:	J:\GC21\DATA\110	0813F\110	08F040.D				od ID: nt based on	MJ108 Method		
Surrogate Com Parameter N		RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits		Rpt?
		5.58	0.00		31145	24.46	98	50-150	OK	
o-Terphenyl n-Triaconta		5.58 7.75	0.00		25525	24.40	99	50-150		
Target Compoi					Final	Conc. Units:	mg/Kg	Wet We	eight	
Parameter N		RT	RT Dev	<u>an</u>	Response	Solution Conc	Fina Cone	-	Q	Rpt?
	e Organics (DRO) nge Organics (RRO)	3.78 6.66			7195 13724	7.45 8.37	2.48 3.9	1	J U	
Prep Amount: Prep Final Vol: Solids:	30.020 g 10 mL %		Dilution: Unit Facto	1.0 or: 1						

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / (Prep Amount x Solids)) x Unit Factor

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank

E: Analyte concentration above high point of ICAL

N: Presumptive evidence of compound

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D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL

c: check for co-elution

o-Terphenyl n-Triacontar Target Compou Parameter N		RT	RT Dev		Final ( Response	Conc. Units: Solution Conc	mg/Kg Fina Con	I	ight Q	Rpt
n-Triacontar	nds				Final	Conc. Units:	mg/Kg	; Dry We	ight	
	arget Compounds						mg/Kg Dry Weigh			
		5.58 7.75	0.00 0.00		31145 25525	24.46 24.64	98 99	50-150 50-150	OK OK	
Parameter N		RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits		Rpt
MB Ref:	J:\GC21\DATA\110 	)813F\11(	)8F040.D				od ID: nt based on	MJ108 Method	1	
Quant Method: Title:	J:\GC21\METHODS\091013FSRO.M						ration ID:	CAL12		
Prep Ref:	1302254			Prep Date:	11/06/2013					
Analysis Lot: Analysis Method:	KWG1312552 NWTPH-Dx			Prep Lot: Prep Method:	KWG1312475 EPA 3550B	Repo	rt Group:			*******
Bottle ID: Prod Code:	NWTPH-Dx NW T	PH		Tier: Collect Date:		Matri Recei	x: ve Date:	SOIL 11/07/2	2013	
Run Type: Lab ID:	DUP KWG1312475-3		ang a chaolain a chuir a sua an bh			Diluti Soln (	on: Conc. Units:	1.0 ppm		
	J:\GC21\DATA\110 11/08/2013 16:54	)813F\11(		Quant Date:	11/09/2013 11:35	Instru Vial:	iment:	GC21 15		

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / (Prep Amount x Solids)) x Unit Factor

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/14/2013 09:52:01 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution different integration performed
 d: Compound manually deleted
 NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance

e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F054.D

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\110 11/08/2013 16:54 DUP KWG1312475-3	)813F\11	08F054.D	Quant Date:	11/09/2013 11:35	Vial: Dilut		GC21 15 1.0 ** ppm	operative and the second s	1100
Bottle ID: Prod Code:	NWTPH-Dx NW T	PH		Tier: Collect Date:		Matr Rece	ix: ive Date:	SOIL 11/07/	2013	
Analysis Lot: Analysis Method: Prep Ref:	KWG1312552 8015C 1302254			Prep Lot: Prep Method: Prep Date:	KWG1312475 EPA 3550B 11/06/2013	Repo	ort Group:			
Quant Method: Title:	J:\GC21\METHOD	S\091013	FSRO.M	£		Calit	oration ID:	CALI	2766	TEROSTAN ANNALY STATE
MB Ref:	J:\GC21\DATA\110	)813F\11(	08F040.D				od ID: nt based of	MJ108 n Method	32	
Surrogate Comp	oounds									
Parameter Na	ime	RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluor	obenzene	2.89	0.00		13761	24.27	97	70-129	OK	
o-Terphenyl		5.58	0.00		31145	24.46	98	51-126		
n-Triacontane	2	7.75	0.00		25525	24.64	99	50-150	OK	
arget Compour	nds				Final C	Conc. Units:	mg/K	g Dry We	eight	
Parameter Na	me	RT	RT Dev		Response	Solution Conc	Fir Co		Q	Rpt?
C10 - C25 DI	RO	3.23			8579	7.58	3.2	25	J	
C10 - C28 DI	RO	3.13			11984	10.57	4.:		J	
Diesel Range	Organics (DRO)	3.78			7195	7.45	3.2	20	J	
Residual Ran	ge Organics (RRO)	6.66			13724	8.37	5.	1	U	
Prep Amount: Prep Final Vol: Solids:	30.020 g 10 mL 77.6 %		Dilution: Unit Facto	1.0 <b>sr:</b> 1						

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / (Prep Amount x Solids)) x Unit Factor

U: Undetected at or above MDL

Analyte detected above MDL, but below MRL
 B: Hit above MRL also found in Method Blank
 E: Analyte concentration above high point of ICAL
 W. Desperative arithmetic efforts and the second sec

N: Presumptive evidence of compound

Printed: 11/14/2013 09:52:05  $u:\timestal.rpt\quantl.rpt$ 

D: Result from dilution d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\110813F\1108F054.D Vial: 15 Acq On : 08 Nov 2013 4:54 pm Operator: DVaillenco Inst : GC21 : K1311914-003DUP SGT Sample Multiplr: 1.00 Misc : IntFile : rteint.p Quant Time: Nov 09 11:35:32 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds 

 1) S
 4-Bromofluorobenzene
 2.89
 13761
 24.269 ppm

 2) S
 o-Terphenyl
 Recovery
 =
 48.54%

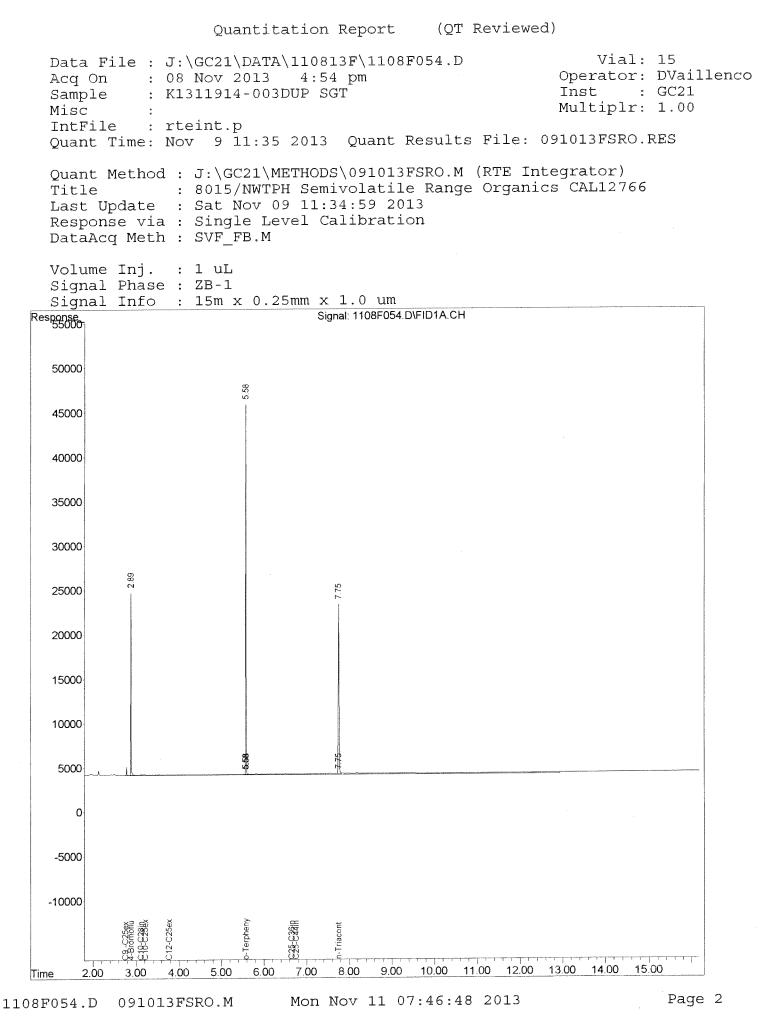
 2) S
 o-Terphenyl
 5.58
 31145
 24.461 ppm

 Spiked Amount
 50.000
 Recovery
 =
 48.92%

 3) S
 n-Triacontane
 7.75
 25525
 24.640 ppm

 Spiked Amount
 50.000
 Recovery
 =
 49.28%

 Spiked Amount 50.000 Spiked Amount 50.000 Spiked Amount 50.000 Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.7597448.466 ppm5) HC10-C25ex DRO[AK102]3.2385797.580 ppm6) HC10-C28in DRO[8015]3.131198410.574 ppm7) HC12-C25ex DRO[NWTPH]3.7871957.452 ppm8) HC25-C36in RRO[NWTPH]6.66137248.374 ppm9) HC25-C44in RRO[TPH-Oil]6.763284730.675 ppm



Analytical Results

Client:	KTA Associates	Service Request: K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected: NA
Sample Matrix:	Soil	Date Received: NA

# Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	Method Blank	Units:	mg/Kg
Lab Code:	KWG1312475-2	Basis:	D <del>r</del> y
Extraction Method: Analysis Method:	EPA 3550B NWTPH-Dx	Level:	Low

			Dilution	Date	Date	Extraction	
Analyte Name	Result Q	MRL	Factor	Extracted	Analyzed	Lot	Note
Diesel Range Organics (DRO)	ND U	25	1	11/06/13	11/08/13	KWG1312475	
Residual Range Organics (RRO)	ND U	99	1	11/06/13	11/08/13	KWG1312475	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note	
o-Terphenyl	102	50-150	11/08/13	Acceptable	
n-Triacontane	104	50-150	11/08/13	Acceptable	

**Comments:** 

Merged

# **Exception Report**

Data File:	J:\GC21\DATA\110813F\1108F040	).D
Lab ID:	KWG1312475-2	
RunType:	MB	
Matrix:	SOIL	



Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/08/2013 14:19 11/09/2013 11:35 KWG1312552 NWTPH-Dx MJ1081

# Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
Analytical Holding Time	NA	NA	NA	х	
ICAL Analyte Recovery	NA	NA	NA	x	
Second Source ICAL Verification	NA	NA	NA	x	
Calibration Verification Pass/Fail	NA	NA	NA	x	
Continuing Calibration Recovery	NA	NA	NA	x	
Continuing Calibration Recovery (Closing)	NA	NA	NA	x	
Surrogates	NA	NA	NA	x	
Analyte Co-elution	NA	NA	NA	x	
Retention Time	NA	NA	NA	x	
Std MRL Unsupported by ICAL	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	x	
Above Highest ICAL Level	NA	NA	NA	x	
Enviroquant/Stealth Calibration Check	NA	NA	NA	х	
Overdiluted Analysis	NA	NA	NA	Х	

Primary Review Secondary Review:

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\1 11/08/2013 14:19 MB KWG1312475-2			Quant Date:	11/09/2013 11:35	Vial: Dilu		GC21 8 1.0 ppm		
Bottle ID: Prod Code:	NWTPH-Dx NW	TPH		Tier: Collect Date:		Matr Rece	ix: ive Date:	SOIL 11/07/2	2013	
Analysis Lot: Analysis Method: Prep Ref:	KWG1312552 NWTPH-Dx 1302253			Prep Lot: Prep Method: Prep Date:	KWG1312475 EPA 3550B 11/06/2013	Repo	ort Group:			
Quant Method: Title:	J:\GC21\METHO	DS\09101	3FSRO.M	negraansen van de de kerken van de	<u>ME-100 III 200 III 200</u>	Calil	pration ID:	CAL12	2766	
MB Ref:							od ID: nt based on	MJ108 Method	1	
Surrogate Com Parameter N		RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl		5.58	0.00		32601	25.60	102	50-150	OK	
n-Triacontar		7.75	0.00		26906	25.97	104	50-150	OK	
Target Compou	nds				Final	Conc. Units:	mg/Kg	Wet We	eight	
Parameter N		RT	RT Dev	******	Response	Solution Conc	Final Conc		Q	Rpt?
-	e Organics (DRO) nge Organics (RRO)	3.78			4767 8634	4.94	1.8 3.9	er ( men ann an dia an dia ann ann an dia	U U	
Prep Amount: Prep Final Vol: Solids:	30.408 g 10 mL %		Dilution: Unit Factor	1.0 r: 1						

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / (Prep Amount x Solids)) x Unit Factor

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:30:39 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #. Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F040.D

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA 11/08/2013 14 MB KWG1312475-	:19	.08F040.D	Quant Date:	11/09/2013 11:35	Vial: Dilu		GC21 8 1.0 s: ppm		
Bottle ID: Prod Code:	NWTPH-Dx N	W TPH		Tier: Collect Date:		Mati Rece	rix: ive Date:	SOIL 11/07/	/2013	******
Analysis Lot: Analysis Method: Prep Ref:	KWG1312552 8015C 1302253			Prep Lot: Prep Method: Prep Date:	KWG1312475 EPA 3550B 11/06/2013	Repo	ort Group:			
Quant Method: Title:	J:\GC21\METH	ODS\091013	BFSRO.M			Calil	oration ID:	CAL1	2766	99999999999999999999999999999999
MB Ref:		NEW TROUGHT CONTRACTOR		namente a companya a companya da stagony da stagonda e co	11-11-11-11-11-11-11-11-11-11-11-11-11-		nod ID: nt based o	MJ108 <b>n Method</b>	32	
Surrogate Comp	ounds			Bennersten and an and a second se			- Male of a March of March and Strange			
Parameter Na	me	RT	RT Dev		Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluor	obenzene	2.89	0.00		14214	25.07	100	70-129	OK	
o-Terphenyl		5.58	0.00		32601	25.60	102	51-126	OK	
n-Triacontane	:	7.75	0.00		26906	25.97	104	50-150	OK	
arget Compoun	ıds				Final	Conc. Units:	mg/K	g Wet We	eight	
Parameter Na	те	RT	RT Dev		Response	Solution Conc	Fir Co		Q	Rpt?
C10 - C25 DR	RO	3.23			6178	5.46	2.	0	U	
C10 - C28 DR	10	3.13			8085	7.13	2.	6	U	
Diesel Range	Organics (DRO)	3.78			4767	4.94	1.	8	U	
Residual Rang	ge Organics (RRC	))		en e	8634		3.	9	U	
Prep Amount: Prep Final Vol: Solids:	30.408 g 10 mL %		Dilution: Unit Facto	1.0 pr: 1						

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / (Prep Amount x Solids)) x Unit Factor

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:30:43 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

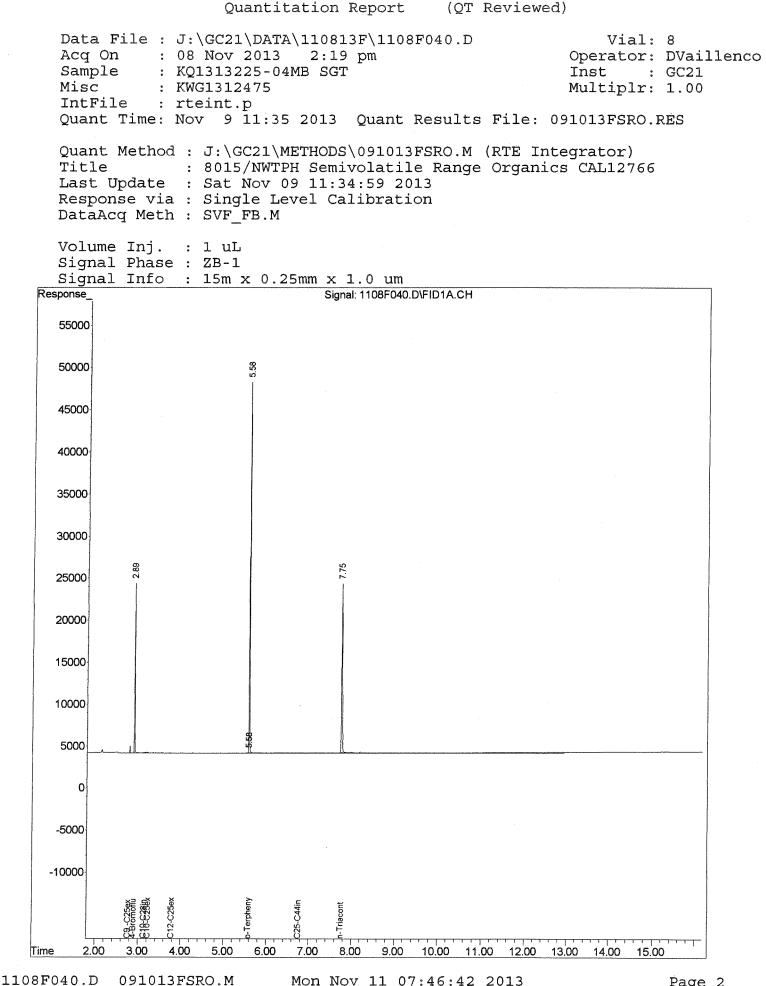
J:\GC21\DATA\110813F\1108F040.D

Quantitation	Report (QT	Reviewed)	)	
Data File : J:\GC21\DATA\11081 Acq On : 08 Nov 2013 2:19 Sample : KQ1313225-04MB SGT Misc : KWG1312475 IntFile : rteint.p Quant Time: Nov 09 11:35:26 203			Multiplr	: GC21 : 1.00
Quant Method : J:\GC21\METHODS Title : 8015/NWTPH Semi Last Update : Sat Nov 09 11:34 Response via : Initial Calibrat DataAcq Meth : SVF_FB.M	volatile Range 4:59 2013	(RTE Inte Organics	egrator) 5 CAL1276	6
Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1	1.0 um			
Compound	R.T. R	esponse	Conc U	nits
System Monitoring Compounds 1) S 4-Bromofluorobenzene Spiked Amount 50.000 2) S o-Terphenyl Spiked Amount 50.000 3) S n-Triacontane Spiked Amount 50.000	2.89 Recovery 5.58 Recovery 7.75 Recovery	14214 = 32601 = 26906 =	25.068 ] 50.14% 25.604 ] 51.21% 25.974 ] 51.95%	opm opm
Target Compounds 4) H C9 -C25ex DRO [TPH-Diesel] 5) H C10-C25ex DRO [AK102] 6) H C10-C28in DRO [8015] 7) H C12-C25ex DRO [NWTPH] 9) H C25-C44in RRO [TPH-Oil]	275	7391	6 4 2 1 1	marc

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Page 2

Analytical Results

Client:	KTA Associates	Service Request: K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	Date Collected: NA
Sample Matrix:	Soil	Date Received: NA

#### Diesel and Residual Range Organics - Silica Gel Treated

Sample Name:	Lab Control Sample	Units:	mg/Kg
Lab Code:	KWG1312475-1	Basis:	Dry
Extraction Method: Analysis Method:	EPA 3550B NWTPH-Dx	Level:	Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	219	25	1	11/06/13	11/08/13	KWG1312475	
Residual Range Organics (RRO)	128	100	1	11/06/13	11/08/13	KWG1312475	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note	
o-Terphenyl	92	50-150	11/08/13	Acceptable	
n-Triacontane	93	50-150	11/08/13	Acceptable	

**Comments:** 

Merged

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# **Exception Report**

# Data File: J:\GC21\DATA\110813F\1108F038.D Lab ID: KWG1312475-1 RunType: LCS Matrix: SOIL

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/08/2013 13:57 11/09/2013 11:35 KWG1312552 NWTPH-Dx MJ1081

# Sample Exceptions

Exception Categories	Result	Low Limit	High Limit	Pass	Fail
Analytical Holding Time	NA	NA	NA	x	
ICAL Analyte Recovery	NA	NA	NA	x	
Second Source ICAL Verification	NA	NA	NA	x	
Calibration Verification Pass/Fail	NA	NA	NA	х	ann an Sanna Colon an Stada an Sanna an Sanna
Continuing Calibration Recovery	NA	NA	NA	x	2008/2014/2004/0004/2014/2014/2014/2014
Continuing Calibration Recovery (Closing)	NA	NA	NA	х	
Surrogates	NA	NA	NA	x	
Analyte Co-elution	NA	NA	NA	х	
Retention Time	NA	NA	NA	x	***********
Std MRL Unsupported by ICAL	NA	NA	NA	x	
Below Lowest ICAL Level	NA	NA	NA	x	
Above Highest ICAL Level	NA	NA	NA	x	
Enviroquant/Stealth Calibration Check	NA	NA	NA	x	
Overdiluted Analysis	NA	NA	NA	x	

Primary Review Secondary Review:

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\110813F\1108F038.D 11/08/2013 13:57 LCS KWG1312475-1			Quant Date:	11/09/2013 11:35	Vial: Dilu		GC21 7 1.0 ppm		
Bottle ID: Prod Code:	NWTPH-Dx NW T	TPH		Tier: Collect Date:		Matı Rece	ix: ive Date:	SOIL 11/07/20	)13	
Analysis Lot: Analysis Method: Prep Ref:	KWG1312552 NWTPH-Dx 1302252			Prep Lot: Prep Method: Prep Date:	KWG1312475 EPA 3550B 11/06/2013	Rеро	ort Group:	UT TOYON UL- CAN AND AND AND AND		
Quant Method: Title:	J:\GC21\METHOD	S\091013	3FSRO.M	YEARTA E FINAL EDA CERCINI CANADALENTI IVAN		Calil	pration ID:	CAL127	66	<u>ey)</u>
MB Ref:	J:\GC21\DATA\11(	0813F\11	08F040.D	n de ser ann an an de ser anna an airdeach de ser			od ID: nt based on	MJ1081 <b>Method</b>		
Surrogate Com			RT			Solution		%Rec		
Parameter N	ame	RT	Dev		Response	Conc	%Rec	Limits		Rpt?
o-Terphenyl		5.58	0.00		29347	23.05	92		ЭK	
n-Triacontar Farget Compou		7.75	0.00		24157 Final (	23.32 Conc. Units:	93 mg/Kg	50-150 (Wet Weig		
Parameter Name		RT	RT Dev		Response	Solution Conc	Final Conc		and a faith of the faith of the second	Rpt?
Diesel Range Organics (DRO) Residual Range Organics (RRO)		3.78 6.66			634570 236817	657.27 382.92	219 128			
Prep Amount: Prep Final Vol: Solids:	30.000 g 10 mL %		Dilution: Unit Factor	1.0 r: 1						

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / (Prep Amount x Solids)) x Unit Factor

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:30:23 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution b: Result from dataon m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL

c: check for co-elution

Data File: Acqu Date: Run Type: Lab ID:	J:\GC21\DATA\110813F\1108F038.D 11/08/2013 13:57 LCS KWG1312475-1			Quant Date:	11/09/2013 11:35	Vial: Dilu		GC21 7 1.0 :: ppm		
Bottle ID: Prod Code:	NWTPH-Dx NW TPH		Tier: Collect Date:		Matr Rece	rix: ive Date:	SOIL 11/07/2	013	******	
Analysis Lot: Analysis Method: Prep Ref:	KWG1312552 8015C 1302252		Prep Lot: Prep Method: Prep Date:	KWG1312475 EPA 3550B 11/06/2013	Report Group:			-		
Quant Method: Title:	J:\GC21\METHOD	)S\09101:	3FSRO.M			Calil	pration ID:	CAL12	766	
MB Ref:	ef: J:\GC21\DATA\110813F\1108F040.D						od ID: nt based of	MJ1082 n Method		
Surrogate Comp			RT			Solution		%Rec		
Parameter Na	me	RT	Dev		Response	Conc	%Rec	Limits		Rpt?
4-Bromofluor	obenzene	2.89	0.00		13106	23.11	92		OK	
o-Terphenyl		5.58	0.00		29347	23.05	92	51-126		
n-Triacontane	;	7.75	0.00		24157	23.32	93	50-150	OK	
arget Compoun	nds				Final	Conc. Units:	mg/K	g Wet Wei	ght	
Parameter Na		RT	RT Dev	арады разраманын (, , , , , , , , , , , , , , , , , , ,	Response	Solution Conc	Fin Co		Q	Rpt?
C10 - C25 DR	20	3.23			740258	654.05	21	8		
C10 - C28 DR	0	3.13			817138	721.00	24	0		
Diesel Range	Organics (DRO)	3.78			634570	657.27	21	9		
Residual Rang	ge Organics (RRO)	6.66			236817	382.92	12	8		
Prep Amount: Prep Final Vol: Solids:	30.000 g 10 mL %		Dilution: Unit Factor	1.0 :: 1						

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / (Prep Amount x Solids)) x Unit Factor

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:30:27 u:\Stealth\Crystal.rpt\quant1.rpt

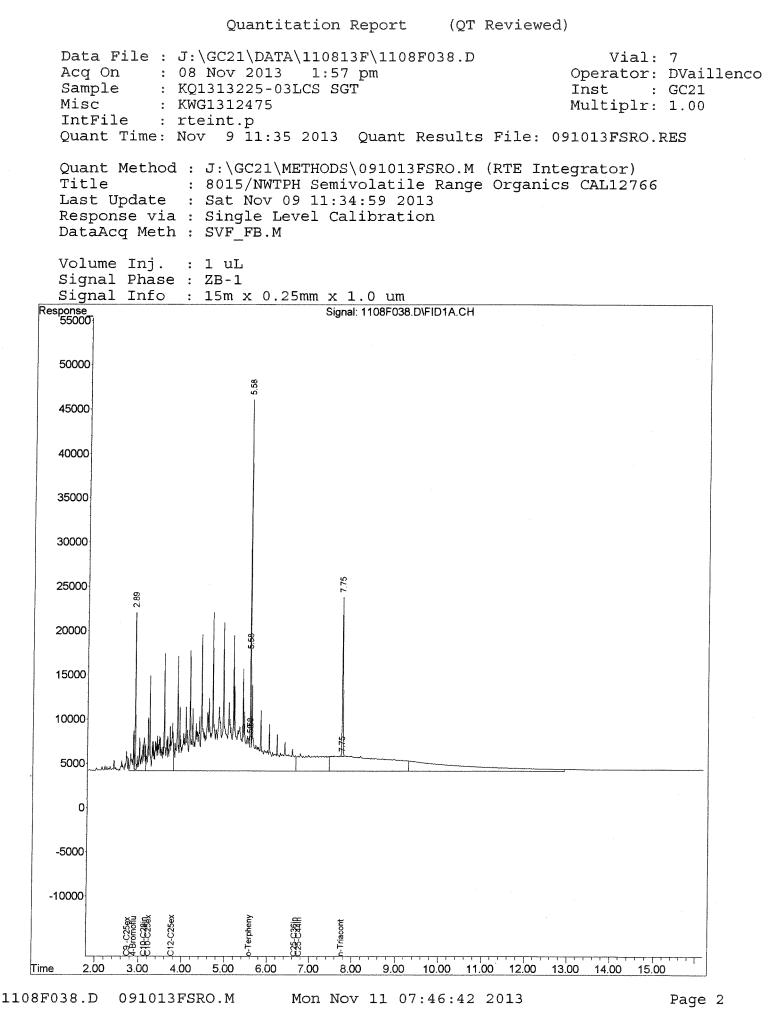
D: Result from dilution h: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL

c: check for co-elution

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\110813F\1108F038.D Vial: 7 Acq On : 08 Nov 2013 1:57 pm Sample : KQ1313225-03LCS SGT Operator: DVaillenco : KQ1313225-03LCS SGT Inst : GC21 Misc : KWG1312475 Multiplr: 1.00 IntFile : rteint.p Quant Time: Nov 09 11:35:25 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound ------System Monitoring Compounds 1) S 4-Bromofluorobenzene 2.89 13106 23.114 ppm 1) S4-Bromotruorobenzene2.891310023.114 ppmSpiked Amount50.000Recovery=46.23%2) So-Terphenyl5.582934723.049 ppmSpiked Amount50.000Recovery=46.10%3) Sn-Triacontane7.752415723.320 ppm Recovery = 46.64% Spiked Amount 50.000 Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.75769057668.162 ppm5) HC10-C25ex DRO[AK102]3.23740258654.053 ppm6) HC10-C28in DRO[8015]3.13817138720.996 ppm7) HC12-C25ex DRO[NWTPH]3.78634570657.266 ppm8) HC25-C36in RRO[NWTPH]6.66236817382.917 ppm9) HC25-C44in RRO[TPH-Oil]6.76345587378.839 ppm

75



# Organic Analysis: <u>Diesel and Residual Range Organics - Silica Gel</u> <u>Treated</u> Validation Package

Standards Data

QA/QC Results

**Client: Project:**  **KTA** Associates PacifiCorp-Chehalis Power Groundwater

#### Service Request: K1311914 Calibration Date: 09/10/2013

#### **Initial Calibration Summary Diesel and Residual Range Organics - Silica Gel Treated**

Calibrati Instrume		CAL12766 GC21		Column:	ZB-1
Level ID	File ID		Level ID	File ID	
А	J:\GC21\DA	ATA\091013F\0910F072.D	Ι	J:\GC21\DATA\091013F\0910F096.D	
В	J:\GC21\DA	\TA\091013F\0910F074.D	J	J:\GC21\DATA\091013F\0910F098.D	
С	J:\GC21\DA	\TA\091013F\0910F076.D	K	J:\GC21\DATA\091013F\0910F100.D	
D	J:\GC21\DA	\TA\091013F\0910F078.D	L	J:\GC21\DATA\091013F\0910F102.D	
Е	J:\GC21\DA	ATA\091013F\0910F080.D	М	J:\GC21\DATA\091013F\0910F104.D	
F	J:\GC21\DA	ATA\091013F\0910F082.D	Ν	J:\GC21\DATA\091013F\0910F106.D	
G	J:\GC21\DA	ATA\091013F\0910F092.D			
Н	J:\GC21\DA	ATA\09101 <b>3F\0910F094.D</b>			

Analyta Noma	Level ID	Amt	RF	Level ID	Amt	RF	Leve ID	l Amt	RF	Leve ID	l Amt	RF	Level ID	Amt	RF
Analyte Name		Aint							<b>N</b> I	-	71110	IVI,			
Diesel Range Organics (DRO)				G	20	1010	н	50	924	T	200	965	J	500	972
	К	2000	989	L	5000	1010	M	20000	916	N	50000	9 <b>2</b> 0	Ū	200	
Residual Range Organics (RRO)	A	20	968	В	50	756	C	200	699	D	500	627	E	2000	615
	F	5000	588	4 4 7 8											
o-Terphenyl												10.00	f • •		1000
				G	1.0	1300	Н	2.5	1190	1	10	1260	J	25	1280
	K	100	1280	L	250	1330							•		
n-Triacontane										_			-		
				G	1.0	938	Η	2.5	919	Ι	10	1050	J	25	1080
	K	100	1070	L	250	1160							1		

Results flagged with an asterisk (\*) indicate values outside control criteria.

# ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

### Client: Project:

**Calibration ID:** 

**Instrument ID:** 

KTA Associates PacifiCorp-Chehalis Power Groundwater

CAL12766

GC21

#### Service Request: K1311914 Calibration Date: 09/10/2013

## Initial Calibration Summary Diesel and Residual Range Organics - Silica Gel Treated

Column: ZB-1

			Calibration Evaluation			
Analyte Name	Compound Type	Fit Type	Eval.	Eval. Result	Q	Control Criteria
Diesel Range Organics (DRO)	MS	AverageRF	% RSD	4.4		≤ 20
Residual Range Organics (RRO)	MS	Linear	R2	0.999		≥0.99
o-Terphenyl	SURR	AverageRF	% RSD	3.8		≤ 20
n-Triacontane	SURR	AverageRF	% RSD	8.8		≤ 20

Results flagged with an asterisk (\*) indicate values outside control criteria.

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Results							
Client:	KTA Associates	Service Request:	K1311914				
Project:	PacifiCorp-Chehalis Power Groundwater	<b>Calibration Date:</b>	09/10/2013				
-		Date Analyzed:	09/11/2013				
Second Source Calibration Verification Diesel and Residual Range Organics - Silica Gel Treated							
<b>Calibration Type:</b>	External Standard	<b>Calibration ID:</b>	CAL12766				
Analysis Method:	NWTPH-Dx	Units:	ppm				
File ID:	J:\GC21\DATA\091013F\0910F088.D	Column ID:	ZB-1				

Average

RF

965

709

SSV

RF

964

599

%D

0

NA

%Drift

NA

-1

Criteria

± 15 %

± 15 %

**Curve** Fit

AverageRF

Linear

J:\GC21\DATA\091013F\0910F110.D

Expected

1000

1000

Result

1000

990

Results flagged with an asterisk (\*) indicate values outside control criteria.

Analyte Name

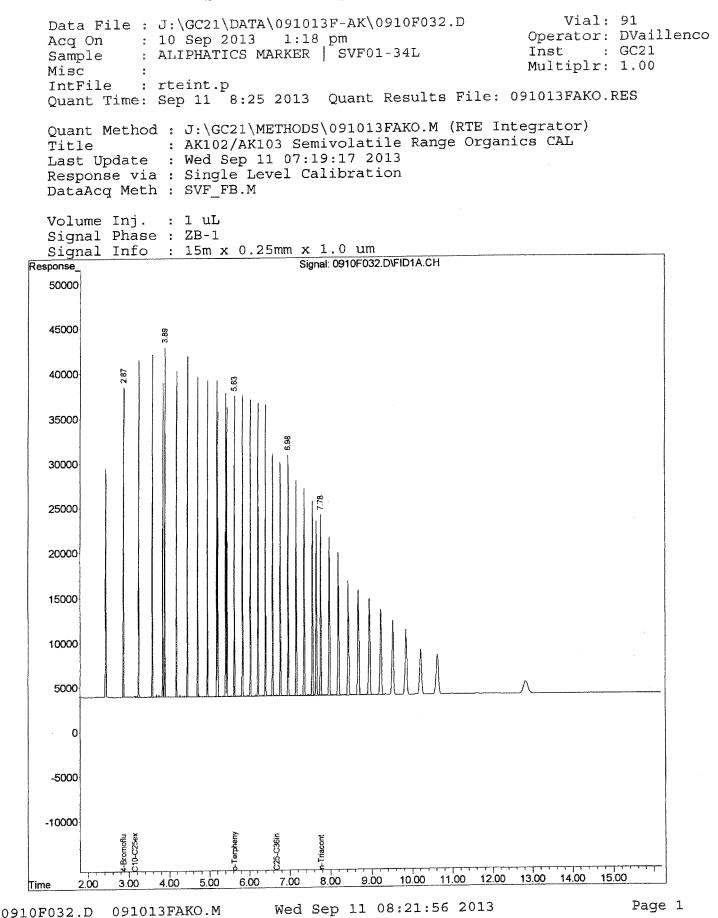
Diesel Range Organics (DRO)

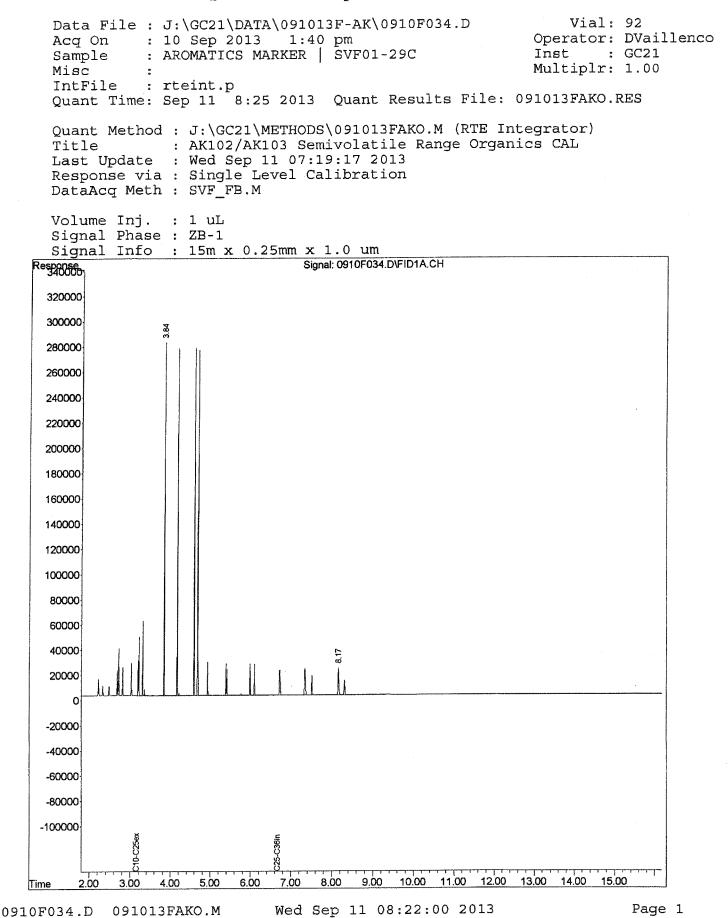
Residual Range Organics (RRO)

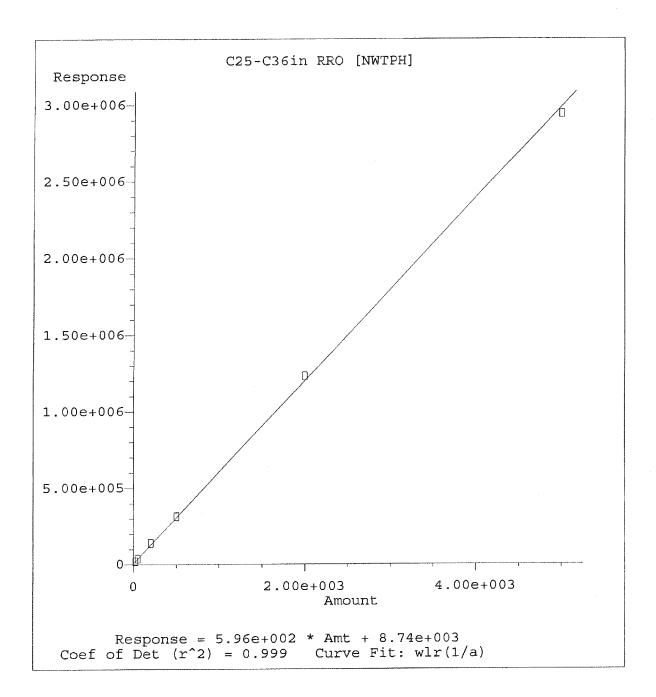
‡ CCC Compound

Directory: j:\GC21\data\091013F

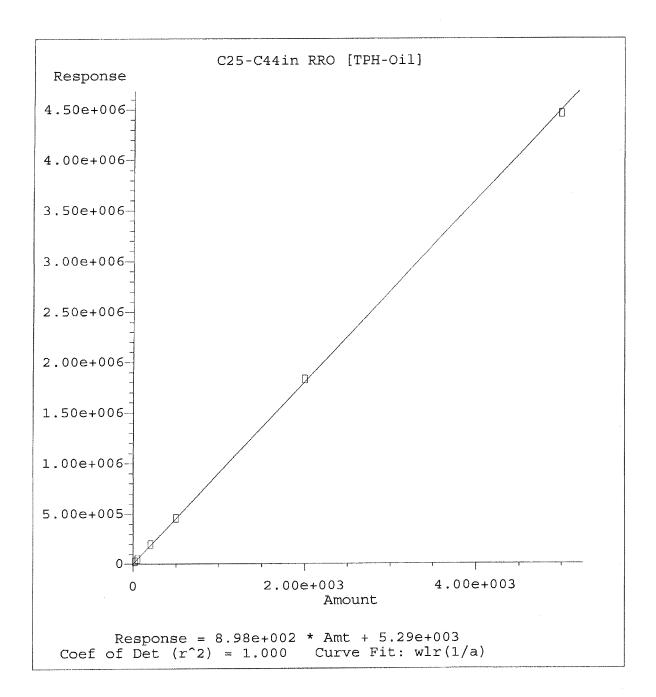
Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
			-			-
1	90	0910F002.D	1.	DCM		09/10/22013 7:04 09/10/22013 7:26
2	90	0910F004.D	1.	DCM		09/10/22013 7:48
3	90	0910F006.D	1.	DCM		09/10/22013 8:10
4	90	0910F008.D	1.	DCM RRO CCV CHK		09/10/22013 8:32
5	97 96	0910F010.D 0910F012.D	1. 1.	DRO CCV CHK		09/10/22013 8:55
6 7	90	0910F012.D	1.	DCM		09/10/22013 9:17
8	90 90	0910F016.D	1.	DCM		09/10/22013 9:39
9	90	0910F018.D	1.	DCM	OGIOBESDO CALIZZ66	09/10/22013 10:0
					ARIN 154	
10	90	0910F020.D	1.	DCM	(7)1010	09/10/22013 10:2
11	90	0910F022.D	1.	DCM		09/10/22013 10:4 09/10/22013 11:0
12	90	0910F024.D	1.		1177/06	09/10/22013 12:1:
13	90	0910F026.D	1.	DCM DCM	CALIAI	09/10/22013 12:3
14	90 90	0910F028.D 0910F030.D	1. 1.	DCM		09/10/22013 12:5
15 16	90 91	0910F032.D	1.	ALIPHATICS MARKER   SVF01-34L		09/10/22013 1:18
17	92	0910F034.D	1.	AROMATICS MARKER   SVF01-29C		09/10/22013 1:40
18	90	0910F036.D	1.	DCM		09/10/22013 2:03
19	97	0910F038.D	1	RRO @ 1000nnm   S\/E01-42		09/10/22013 2:25
				DRO @ 1000/50ppm   SVF01-37K B DCM DCM DCM DCM/TB AK103 @ 20ppm   SVF01-38M $n$ $V$ $V$ AK103 @ 50ppm   SVF01-38L AK103 @ 200ppm   SVF01-38L	$\sim$	
20	96	0910F040.D	1.	DRO @ 1000/50ppm   SVF01-3/K		09/10/22013 2:47 09/10/22013 3:09
21	86	0910F042.D	1.	IB DOM	NR	09/10/22013 3:32
22	90	0910F044.D	1.		1000	09/10/22013 3:54
23 24	90 90	0910F046.D	1. 1.	DCM _ COMPANY COMPANY	~ ``	09/10/22013 4:58
24 25	90 90	0910F048.D 0910F050.D	1.	DCM/TR	1 - CODCAD	09/10/22013 5:20
25 26	90 1	0910F050.D	1.	AK103 @ 2000m   SVE01-38M-00+VE	a fuzze and	09/10/22013 5:42
27	2	0910F054.D	1.	AK103 @50ppm   SVF01-38L		09/10/22013 6:04
28	3	0910F056.D	1.	AK103 @200ppm   SVF01-38K		09/10/22013 6:26
29	4	0910F058.D	1.	AK103 @500ppm   SVF01-38J	• •	09/10/22013 6:48
				-	Dep. 183 Malalos	09/10/22013 7:11
30	5	0910F060.D	1. 1.	AK103 @2000ppm   SVF01-38I AK103 @ 5000ppm   SVF01-38H	KI Yahalla	09/10/22013 7:33
31 32	6 90	0910F062.D 0910F064.D	1. 1.	DCM - CARRYOVER	h h h	09/10/22013 7:55
32		0910F066.D	1. 1.	DCM - CARRYOVER	ι.	09/10/22013 8:18
34	7	0910F068.D	1.	AK ICV @ 1000ppm   SVF01-41K		09/10/22013 8:40
35		0910F070.D	1.	DCM		09/10/22013 9:02
36		0910F072.D	1.	RRO @ 20ppm   SVF01-40N	11 10 107	09/10/22013 9:24
37	9	0910F074.D	1.	RRO @ 50ppm   SVF01-40M	a ( - V (	09/10/22013 9:46
38	10	0910F076.D	1.	RRO @ 200ppm   SVF01-40L		09/10/22013 10:0
39	11	0910F078.D	1.	RRO @ 500ppm   SVF01-40K		09/10/22013 10:3
40	12	0910F080.D	1.	RRO @ 2000ppm   SVF01-40J		09/10/22013 10:5
41		0910F082.D	1.	RRO @ 5000ppm   SVF01-40l		09/10/22013 11:1:
42		0910F084.D	1.	DCM - CARRYOVER		09/10/22013 11:3
43	90	0910F086.D	1.	DCM - CARRYOVER		09/11/22013 12:0
44	14	0910F088.D	1.	RRO @ 1000ppm   SVF01-42J		09/11/22013 12:22
45		0910F090.D	1.	DCM		09/11/22013 12:4:
46		0910F092.D	1.	DRO @ 20/1.0ppm   SVF01-42H		09/11/22013 1:07
47		0910F094.D	1.	DRO @ 50/2.5ppm   SVF01-42G		09/11/22013 1:29
48		0910F096.D	1.	DRO @ 200/10ppm   SVF01-42F		09/11/22013 1:51 09/11/22013 2:14
49	18	0910F098.D	1.	DRO @ 500/25ppm   SVF01-42E		
50	19	0910F100.D	1.	DRO @ 2000/100ppm   SVF01-42D		09/11/22013 2:36
51		0910F102.D	1.	DRO @ 5000/250ppm  SVF01-42C		09/11/22013 2:58
52	21	0910F104.D	1.	DRO @ 20000ppm   SVF01-42B		09/11/22013 3:20
53		0910F106.D	1.	DRO @ 50000ppm   SVF01-42A		09/11/22013 3:42
54		0910F108.D	1.	DCM - CARRYOVER		09/11/22013 4:05
55	23	0910F110.D	1.	DRO ICV @ 1000ppm   SVF01-42K		09/11/22013 4:27







Method Name: J:\GC21\METHODS\091013FSRO.M Calibration Table Last Updated: Wed Sep 11 08:39:03 2013



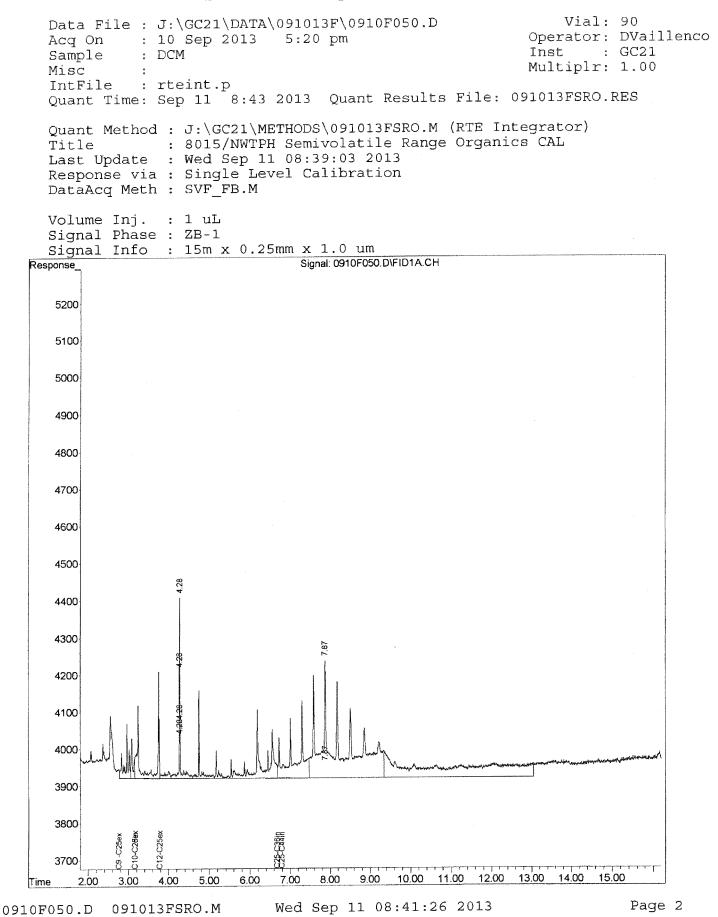
Method Name: J:\GC21\METHODS\091013FSRO.M Calibration Table Last Updated: Wed Sep 11 08:39:03 2013

Vial: 90 Data File : J:\GC21\DATA\091013F\0910F050.D Acq On : 10 Sep 2013 5:20 pm Operator: DVaillenco Inst : GC21 Sample : DCM (JB) Misc : Multiplr: 1.00 IntFile : rteint.p Quant Time: Sep 11 08:39:35 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:39:03 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_\_ System Monitoring Compounds Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.775) HC10-C25ex DRO[AK102]3.156) HC10-C28in DRO[8015]3.157) HC12-C25ex DRO[NWTPH]3.798) HC25-C36in RRO[NWTPH]6.689) HC25-C44in RRO[TPH-Oil]6.78 55374.811 ppm49714.392 ppm71696.326 ppm35713.699 ppm106403.196 ppm1700113.034 ppm

(m)=manual int.

(f)=RT Delta > 1/2 Window 0910F050.D 091013FSRO.M Wed Sep 11 08:41:26 2013

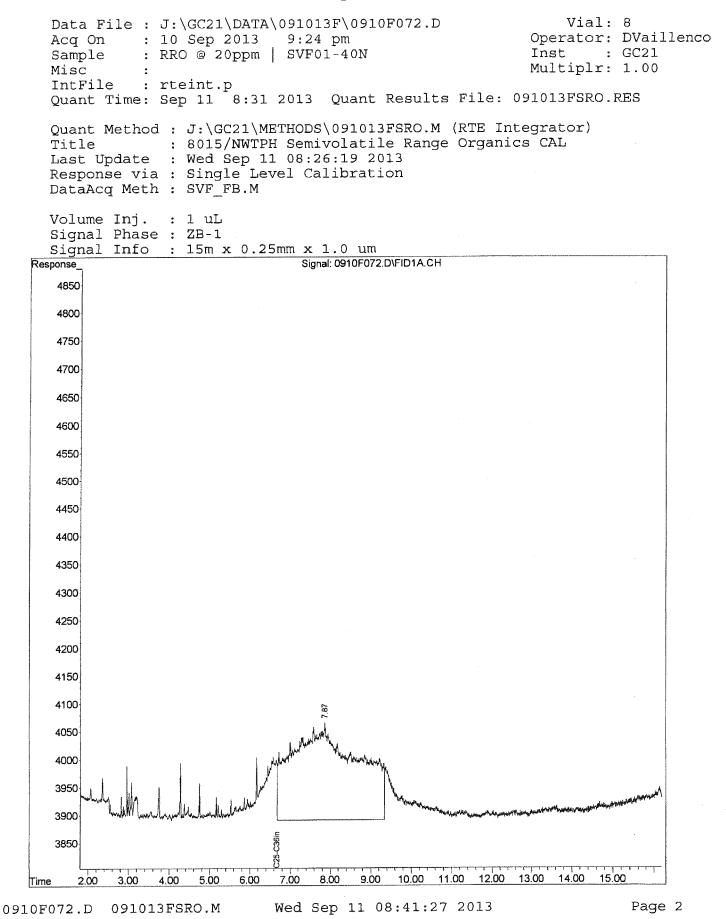
Page 1



Vial: 8 Data File : J:\GC21\DATA\091013F\0910F072.D Acq On : 10 Sep 2013 9:24 pm Operator: DVaillenco Sample : RRO @ 20ppm | SVF01-40N Inst : GC21 Multiplr: 1.00 : Misc IntFile : rteint.p Quant Time: Sep 11 08:27:18 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds Target Compounds 8) H C25-C36in RRO [NWTPH] 6.68 19355 12.110 ppm

(f)=RT Delta > 1/2 Window 0910F072.D 091013FSRO.M Wed Sep 11 08:41:26 2013

(m)=manual int. Page 1

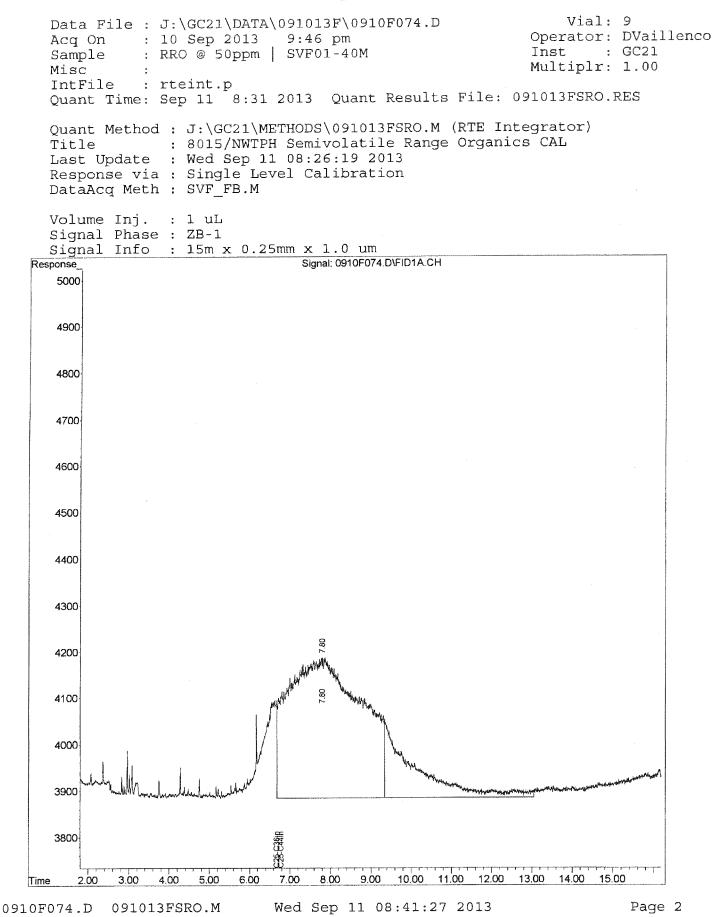


Data File : J:\GC21\DATA\091013F\0910F074.D Vial: 9 Operator: DVaillenco Acq On : 10 Sep 2013 9:46 pm Sample : RRO @ 50ppm | SVF01-40M Inst : GC21 Multiplr: 1.00 Misc Misc : IntFile : rteint.p Quant Time: Sep 11 08:27:19 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units System Monitoring Compounds Target Compounds 8) HC25-C36in RRO [NWTPH]6.683779644.867 ppm9) HC25-C44in RRO [TPH-Oil]6.784630516.227 ppm

(f) = RT Delta > 1/2 Window0910F074.D 091013FSRO.M Wed Sep 11 08:41:27 2013

Page 1

(m)=manual int.

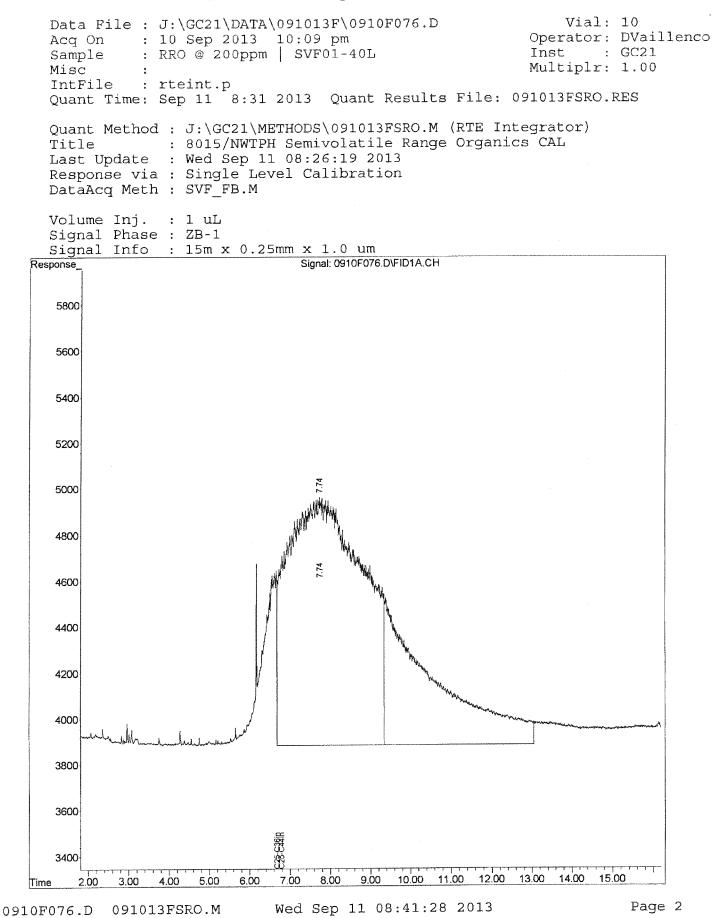


Quantitation Report (QT Reviewed)

Vial: 10 Data File : J:\GC21\DATA\091013F\0910F076.D Acq On : 10 Sep 2013 10:09 pm Operator: DVaillenco Inst : GC21 : RRO @ 200ppm | SVF01-40L Sample Multiplr: 1.00 Misc : IntFile : rteint.p Quant Time: Sep 11 08:27:19 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds Target Compounds 8) HC25-C36in RRO [NWTPH]6.68139742225.957 ppm9) HC25-C44in RRO [TPH-Oil]6.78194795194.322 ppm

(m)=manual int.

~~~~~ (f) = RT Delta > 1/2 Window0910F076.D 091013FSRO.M Wed Sep 11 08:41:28 2013

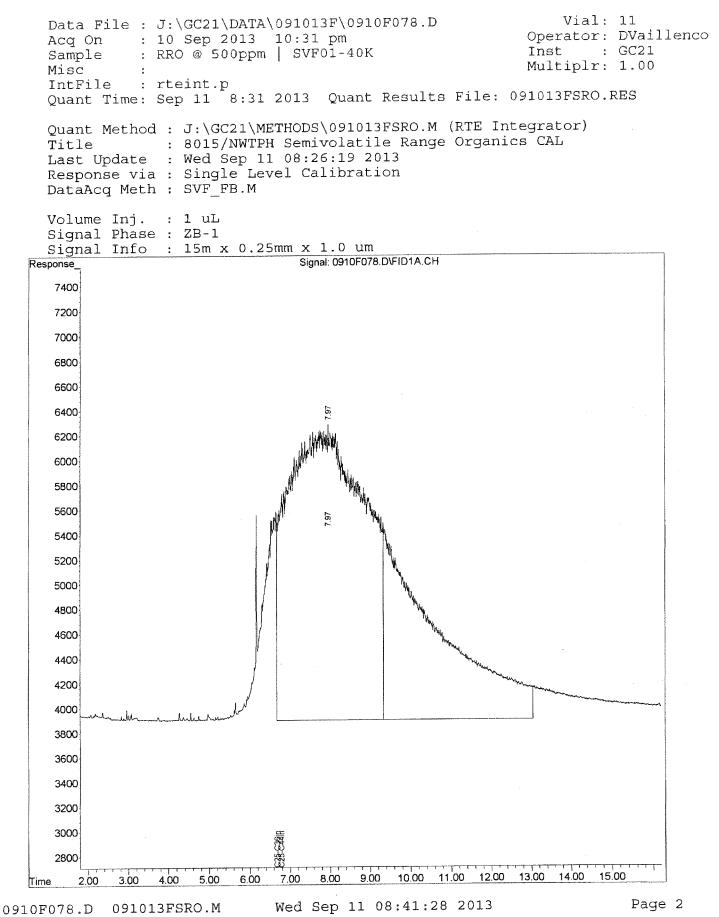


Data File : J:\GC21\DATA\091013F\0910F078.D Vial: 11 Acq On : 10 Sep 2013 10:31 pm Sample : RRO @ 500ppm | SVF01-40K Operator: DVaillenco Inst : GC21 Multiplr: 1.00 Misc : IntFile : rteint.p Quant Time: Sep 11 08:27:20 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units \_\_\_\_\_ System Monitoring Compounds Target Compounds 8) HC25-C36in RRO [NWTPH]6.68313687534.940 ppm9) HC25-C44in RRO [TPH-Oil]6.78458059510.072 ppm

(f)=RT Delta > 1/2 Window 0910F078.D 091013FSRO.M Wed Sep 11 08:41:28 2013

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(m)=manual int. Page 1



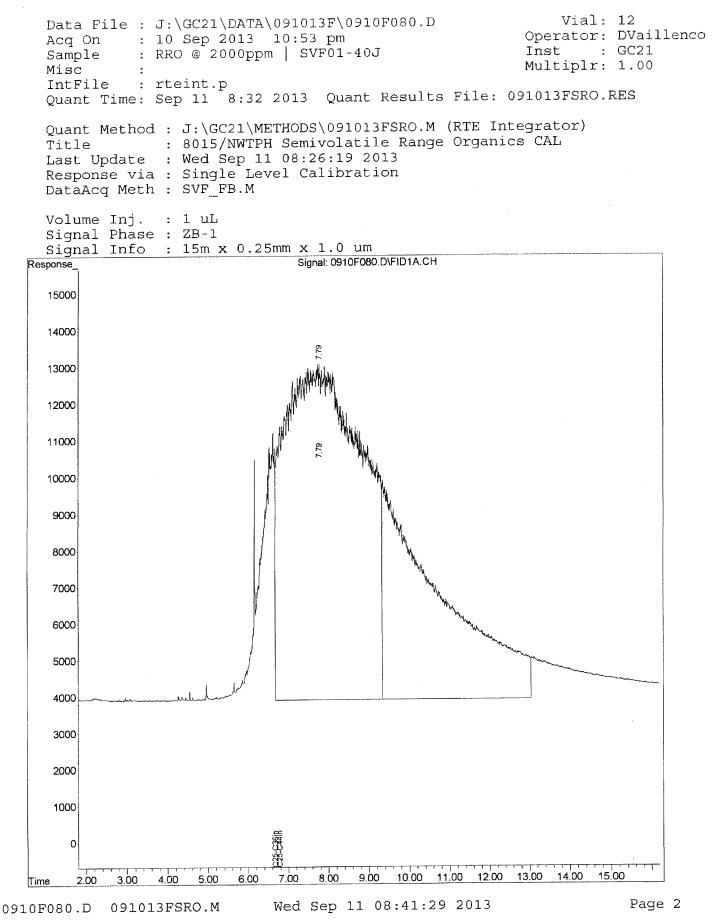
Data File : J:\GC21\DATA\091013F\0910F080.D Vial: 12 Acq On : 10 Sep 2013 10:53 pm Sample : RRO @ 2000ppm | SVF01-40J Operator: DVaillenco Inst : GC21 Misc : IntFile : rteint.p Multiplr: 1.00 Quant Time: Sep 11 08:27:21 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units System Monitoring Compounds Target Compounds 8) HC25-C36in RRO [NWTPH]6.6812296792162.043 ppm9) HC25-C44in RRO [TPH-Oil]6.7818303142155.912 ppm

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(f)=RT Delta > 1/2 Window 0910F080.D 091013FSRO.M Wed Sep 11 08:41:29 2013

97

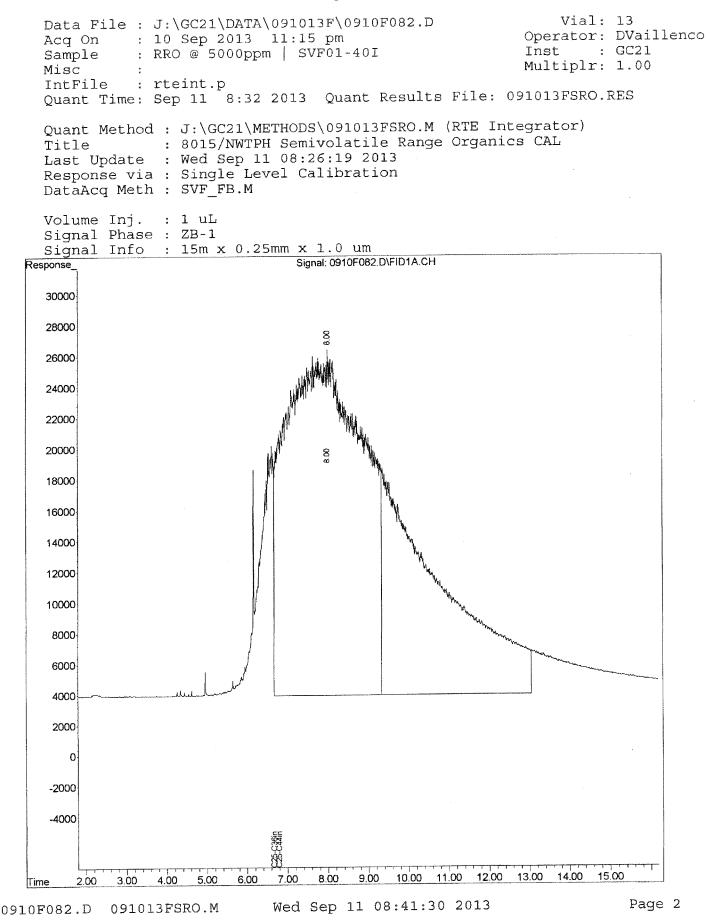
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Data File : J:\GC21\DATA\091013F\0910F082.D Vial: 13 Operator: DVaillenco Acq On : 10 Sep 2013 11:15 pm Sample : RRO @ 5000ppm | SVF01-40I Inst : GC21 Multiplr: 1.00 Misc : IntFile : rteint.p Misc Quant Time: Sep 11 08:27:21 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds Target Compounds 1 arget Compounds8) HC25-C36in RRO [NWTPH]6.682940279 5200.631 ppm9) HC25-C44in RRO [TPH-Oil]6.784458165 5307.674 ppm

(f) = RT Delta > 1/2 Window 0910F082.D 091013FSRO.M Wed Sep 11 08:41:29 2013 Page 1

(m)=manual int.



Data File : J:\GC21\DATA\091013F\0910F088.D Vial: 14 Acq On : 11 Sep 2013 12:22 am Sample : RRO @ 1000ppm | SVF01-42J Operator: DVaillenco Inst : GC21 Misc : IntFile : rteint.p Multiplr: 1.00 Misc Quant Time: Sep 11 08:39:36 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:39:03 2013 Response via : Initial Calibration DataAcq Meth : SVF\_FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units System Monitoring Compounds Target Compounds 8) HC25-C36in RRO [NWTPH]6.68598693990.459 ppm9) HC25-C44in RRO [TPH-Oil]6.78871184963.971 ppm

many

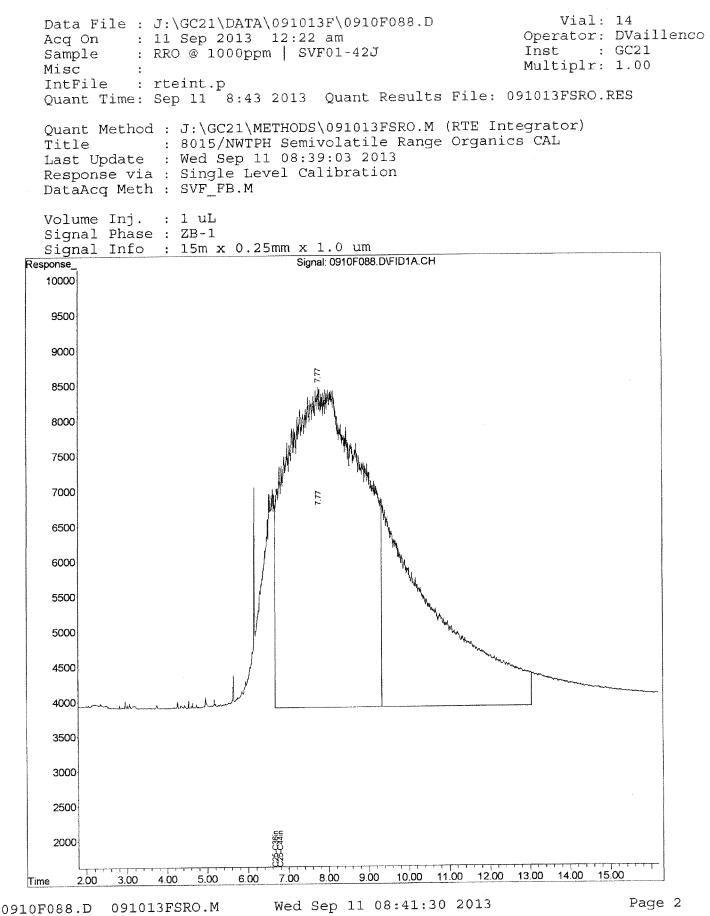
(f)=RT Delta > 1/2 Window 0910F088.D 091013FSRO.M Wed Sep 11 08:41:30 2013

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Page 1

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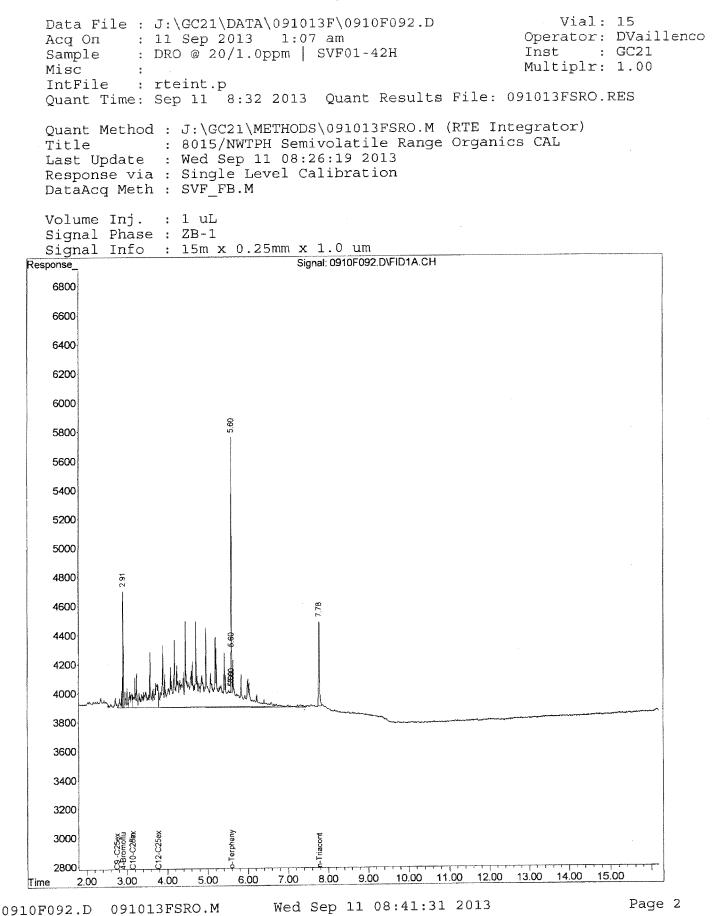
(m)=manual int.



Data File : J:\GC21\DATA\091013F\0910F092.D Vial: 15 Operator: DVaillenco Acq On : 11 Sep 2013 1:07 am Sample : DRO @ 20/1.0ppm | SVF01-42H Inst : GC21 Multiplr: 1.00 Misc : IntFile : rteint.p Misc Quant Time: Sep 11 08:27:22 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_ System Monitoring Compounds1) S4-Bromofluorobenzene2.916040.982 ppmSpiked Amount50.000Recovery=1.96%2) So-Terphenyl5.6013010.942 ppmSpiked Amount50.000Recovery=1.88%3) Sn-Triacontane7.789380.806 ppmSpiked Amount50.000Recovery=1.61% Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.772457819.880 ppm5) HC10-C25ex DRO[AK102]3.152401519.821 ppm6) HC10-C28in DRO[8015]3.152463820.427 ppm7) HC12-C25ex DRO[NWTPH]3.792020919.538 ppm

(m)=manual int.

(f) = RT Delta > 1/2 Window0910F092.D 091013FSRO.M Wed Sep 11 08:41:31 2013 Page 1

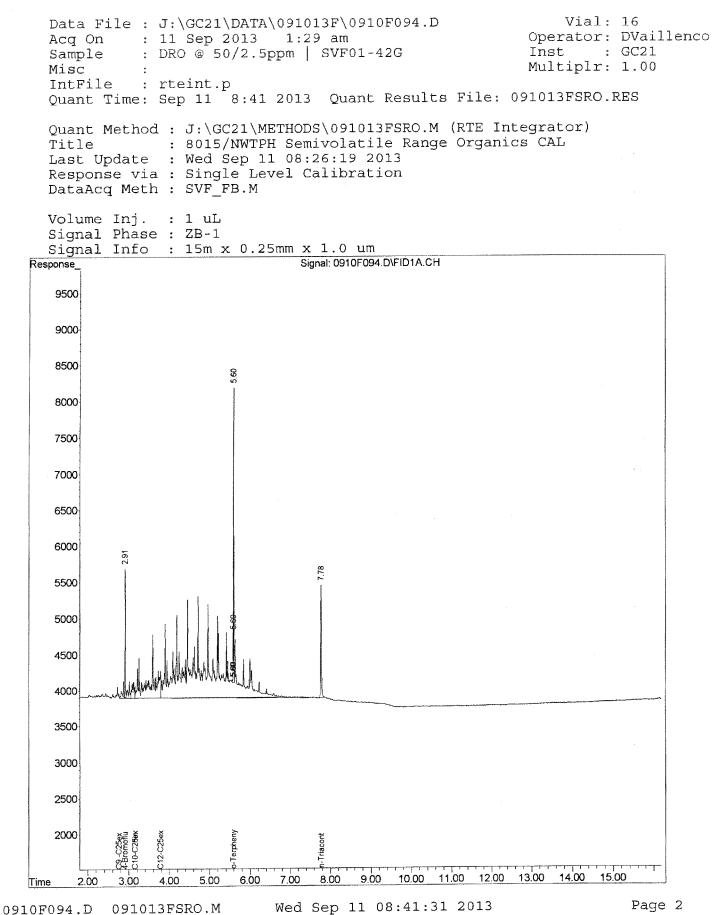


| Sample : DRO @ 50/2.5ppm   3<br>Misc :<br>IntFile : rteint.p                                                                                                                                                                  | Data File : J:\GC21\DATA\091013F\0910F094.D<br>Acq On : 11 Sep 2013 1:29 am<br>Sample : DRO @ 50/2.5ppm   SVF01-42G<br>Misc :<br>IntFile : rteint.p<br>Quant Time: Sep 11 08:27:22 2013 Quant Results File |                                  |                                      |            |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------|------------|--|--|--|
| Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator)<br>Title : 8015/NWTPH Semivolatile Range Organics CAL<br>Last Update : Wed Sep 11 08:26:19 2013<br>Response via : Initial Calibration<br>DataAcq Meth : SVF_FB.M |                                                                                                                                                                                                            |                                  |                                      |            |  |  |  |
| Volume Inj. : 1 uL<br>Signal Phase : ZB-1<br>Signal Info : 15m x 0.25mm x 1.0 um                                                                                                                                              |                                                                                                                                                                                                            |                                  |                                      |            |  |  |  |
| Compound                                                                                                                                                                                                                      | R.T. Re                                                                                                                                                                                                    | sponse                           | Conc L                               | Jnits      |  |  |  |
| System Monitoring Compounds<br>1) S 4-Bromofluorobenzene<br>Spiked Amount 50.000<br>2) S o-Terphenyl<br>Spiked Amount 50.000<br>3) S n-Triacontane<br>Spiked Amount 50.000                                                    | 2 91                                                                                                                                                                                                       | 1315                             | 2.137                                | maa        |  |  |  |
| Target Compounds<br>4) H C9 -C25ex DRO [TPH-Diesel]<br>5) H C10-C25ex DRO [AK102]<br>6) H C10-C28in DRO [8015]<br>7) H C12-C25ex DRO [NWTPH]                                                                                  | 2.77<br>3.15<br>3.15<br>3.15<br>3.79                                                                                                                                                                       | 55268<br>54253<br>55017<br>46183 | 44.704<br>44.778<br>45.614<br>44.650 | ppm<br>ppm |  |  |  |

Al 9/11/3

(f) = RT Delta > 1/2 Window0910F094.D 091013FSRO.M Wed Sep 11 08:41:31 2013

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Data File : J:\GC21\DATA\091013F\0910F096.D Vial: 17 Acq On : 11 Sep 2013 1:51 am Sample : DRO @ 200/10ppm | SVF01-42F Operator: DVaillenco Inst : GC21 Multiplr: 1.00 Misc Misc : IntFile : rteint.p Quant Time: Sep 11 08:27:23 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units 

 System Monitoring Compounds
 2.91
 5719
 9.295 ppm

 1) S
 4-Bromofluorobenzene
 2.91
 5719
 9.295 ppm

 Spiked Amount
 50.000
 Recovery
 =
 18.59%

 2) S
 o-Terphenyl
 5.60
 12576
 9.106 ppm

 Spiked Amount
 50.000
 Recovery
 =
 18.21%

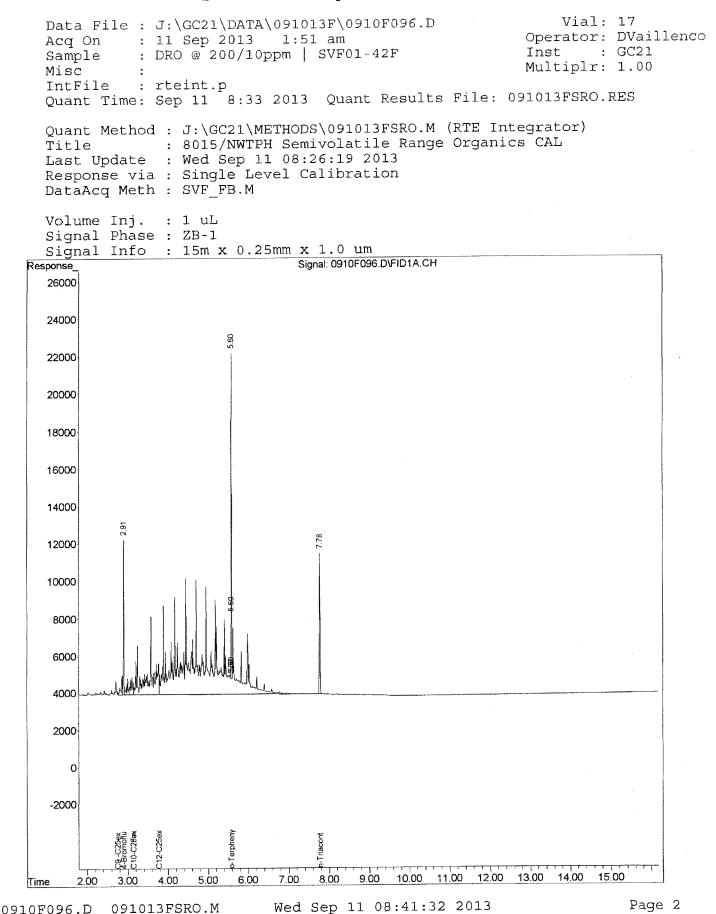
 3) S
 n-Triacontane
 7.78
 10475
 9.001 ppm

 Recovery
 =
 18.00%
 18.00%
 18.00%

 Recovery = 18.00% Spiked Amount 50.000 Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.77229949185.996 ppm5) HC10-C25ex DRO[AK102]3.15226348186.817 ppm6) HC10-C28in DRO[8015]3.15227285188.438 ppm7) HC12-C25ex DRO[NWTPH]3.79193042186.632 ppm

(f)=RT Delta > 1/2 Window 0910F096.D 091013FSRO.M Wed Sep 11 08:41:32 2013 Page 1

(m)=manual int.



Data File : J:\GC21\DATA\091013F\0910F098.D Vial: 18 Operator: DVaillenco Acq On : 11 Sep 2013 2:14 am Sample : DRO @ 500/25ppm | SVF01-42E Inst : GC21 Multiplr: 1.00 Misc IntFile : rteint.p Quant Time: Sep 11 08:27:24 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units \_\_\_\_\_\_ 

 System Monitoring Compounds
 1) S 4-Bromofluorobenzene
 2.91
 14133
 22.970 ppm

 Spiked Amount 50.000
 Recovery
 =
 45.94%

 2) S o-Terphenyl
 5.60
 31947
 23.131 ppm

 Spiked Amount 50.000
 Recovery
 =
 46.26%

 3) S n-Triacontane
 7.78
 26993
 23.196 ppm

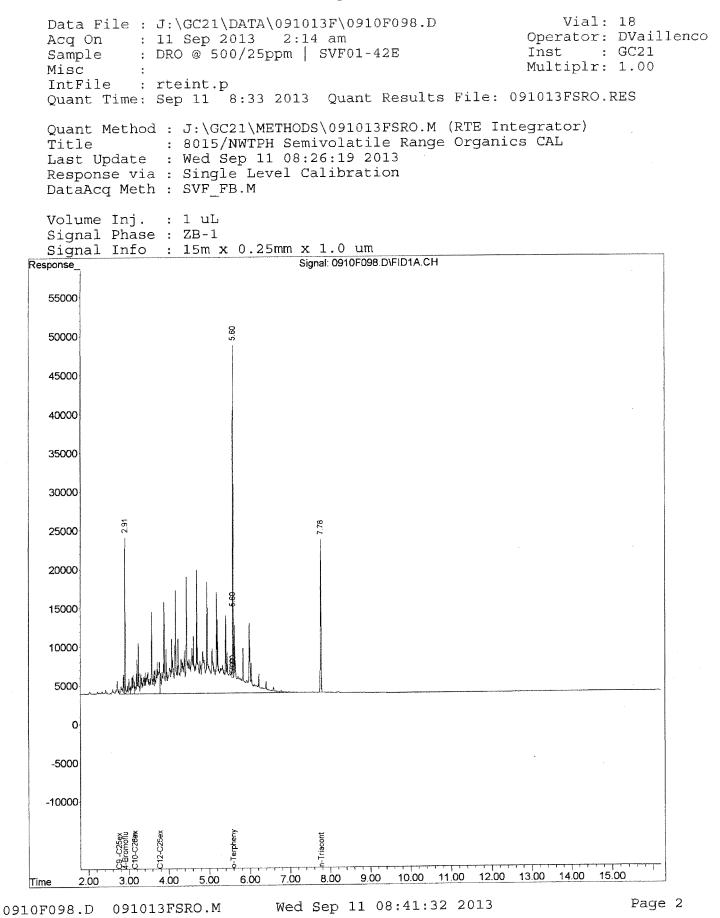
 System Monitoring Compounds Recovery = 46.39% Spiked Amount 50.000 Target Compounds 4) HC9 -C25ex DRO<[TPH-Diesel]</td>2.77577353466.997 ppm5) HC10-C25ex DRO<[AK102]</td>3.15568516469.226 ppm6) HC10-C28in DRO<[8015]</td>3.15565932469.204 ppm7) HC12-C25ex DRO<[NWTPH]</td>3.79486113469.972 ppm

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(f) = RT Delta > 1/2 Window 0910F098.D 091013FSRO.M Wed Sep 11 08:41:32 2013 Page 1

(m)=manual int.



Acq On : 11 Sep 2013 2:36 am Sample : DRO @ 2000/100ppm | SVF01-42D Inst : GC21 Sample Multiplr: 1.00 Misc : IntFile : rteint.p Misc Quant Time: Sep 11 08:27:24 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound 

 System Monitoring Compounds
 2.91
 55110
 89.569 ppm

 Spiked Amount 50.000
 Recovery = 179.14%

 2) S o-Terphenyl
 5.60
 128312
 92.904 ppm

 Spiked Amount 50.000
 Recovery = 185.81%

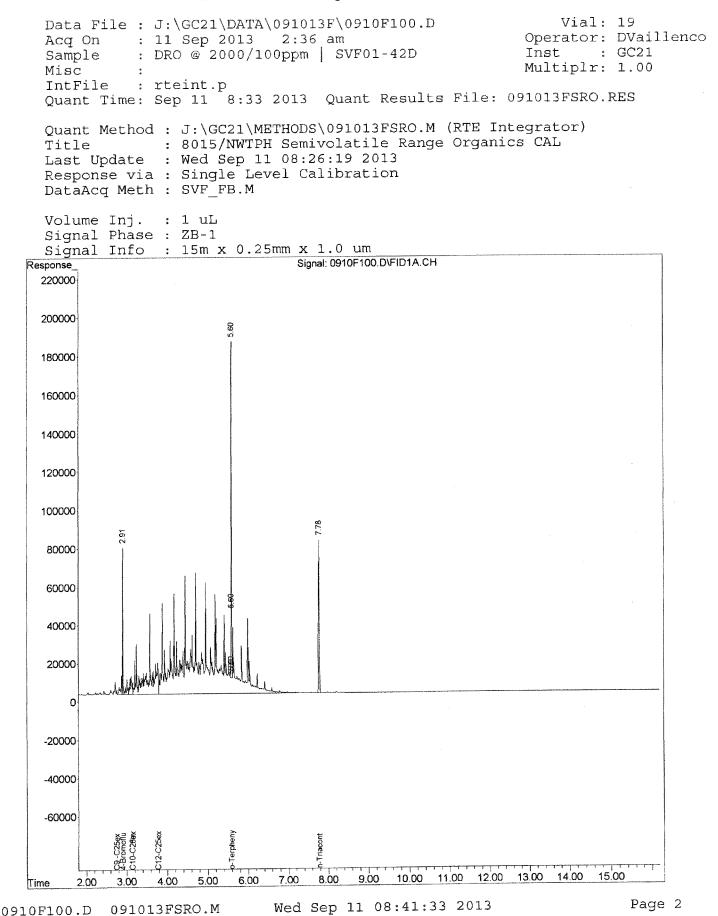
 3) S n-Triacontane
 7.78
 107264
 92.174 ppm

 Recovery = 184.35%
 184.35%

 Spiked Amount 50.000 Spiked Amount 50.000 3) S n-Triacontane Spiked Amount 50.000 Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.7723386601891.644ppm5) HC10-C25ex DRO[AK102]3.1523041391901.726ppm6) HC10-C28in DRO[8015]3.1522868661896.000ppm7) HC12-C25ex DRO[NWTPH]3.7919778021912.131ppm

(m)=manual int.

(f) = RT Delta > 1/2 Window 0910F100.D 091013FSRO.M Wed Sep 11 08:41:33 2013 Page 1



Data File : J:\GC21\DATA\091013F\0910F102.D Vial: 20 Vial: 20 Operator: DVaillenco Acq On : 11 Sep 2013 2:58 am Sample : DRO @ 5000/250ppm |SVF01-42C Inst : GC21 Misc : IntFile : rteint.p Multiplr: 1.00 Misc Quant Time: Sep 11 08:27:25 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units 

 System Monitoring Compounds
 2.91
 145932
 237.179
 ppm

 Spiked Amount 50.000
 Recovery
 =
 474.36%

 2) S o-Terphenyl
 5.60
 332783
 240.950
 ppm

 Spiked Amount 50.000
 Recovery
 =
 481.90%

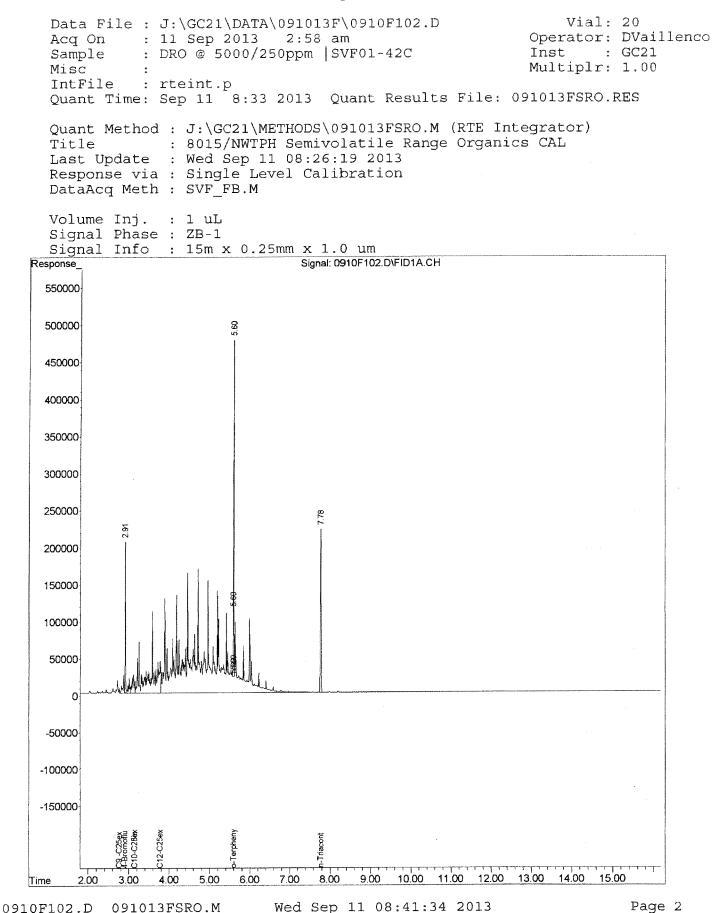
 3) S n-Triacontane
 7.78
 289586
 248.848
 ppm

 Spiked Amount 50.000
 Recovery
 =
 497.70%

 Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.776082016 4919.487 ppm5) HC10-C25ex DRO[AK102]3.155991866 4945.399 ppm6) HC10-C28in DRO[8015]3.155949044 4932.246 ppm7) HC12-C25ex DRO[NWTPH]3.795137007 4966.437 ppm

W 9/11/12

(f)=RT Delta > 1/2 Window (m)=manual int. 0910F102.D 091013FSRO.M Wed Sep 11 08:41:33 2013 Page 1

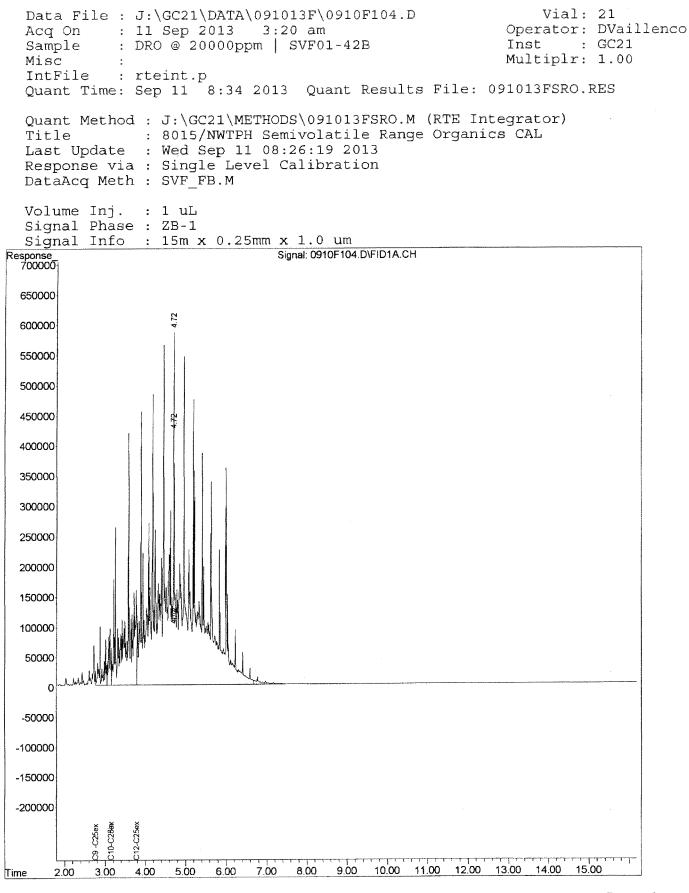


Vial: 21 Data File : J:\GC21\DATA\091013F\0910F104.D Operator: DVaillenco Acq On : 11 Sep 2013 3:20 am Sample : DRO @ 20000ppm | SVF01-42B Misc : Inst : GC21 Multiplr: 1.00 IntFile : rteint.p Quant Time: Sep 11 08:27:26 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcg Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_\_ System Monitoring Compounds Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.772183719317663.187ppm5) HC10-C25ex DRO[AK102]3.152149025017737.021ppm6) HC10-C28in DRO[8015]3.152132215417677.818ppm7) HC12-C25ex DRO<[NWTPH]</td>3.791831610017707.929ppm

(f) = RT Delta > 1/2 Window 0910F104.D 091013FSRO.M Wed Sep 11 08:41:35 2013 Page 1

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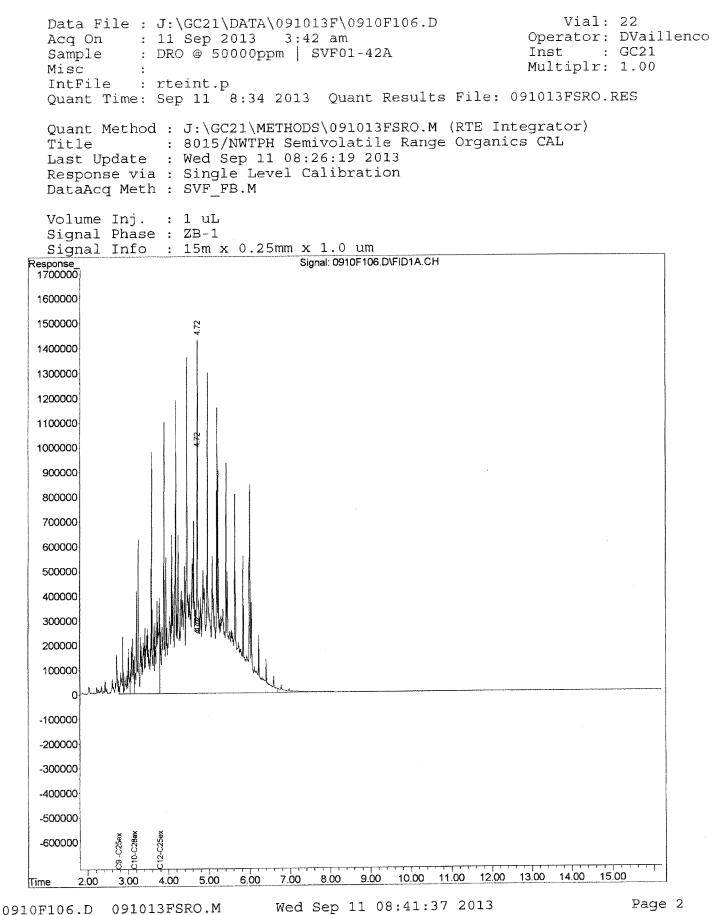
0910F104.D 091013FSRO.M Wed Sep 11 08:41:35 2013

Page 2

Data File : J:\GC21\DATA\091013F\0910F106.D Vial: 22 Acq On : 11 Sep 2013 3:42 am Operator: DVaillenco Sample : DRO @ 50000ppm | SVF01-42A Misc : Inst : GC21 Multiplr: 1.00 IntFile : rteint.p Quant Time: Sep 11 08:27:27 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:26:19 2013 Response via : Initial Calibration DataAcg Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_\_ System Monitoring Compounds Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.775458642044152.660ppm5) HC10-C25ex DRO[AK102]3.155374371844357.485ppm6) HC10-C28in DRO[8015]3.155334456644227.030ppm7) HC12-C25ex DRO<[NWTPH]</td>3.794600517444477.609ppm

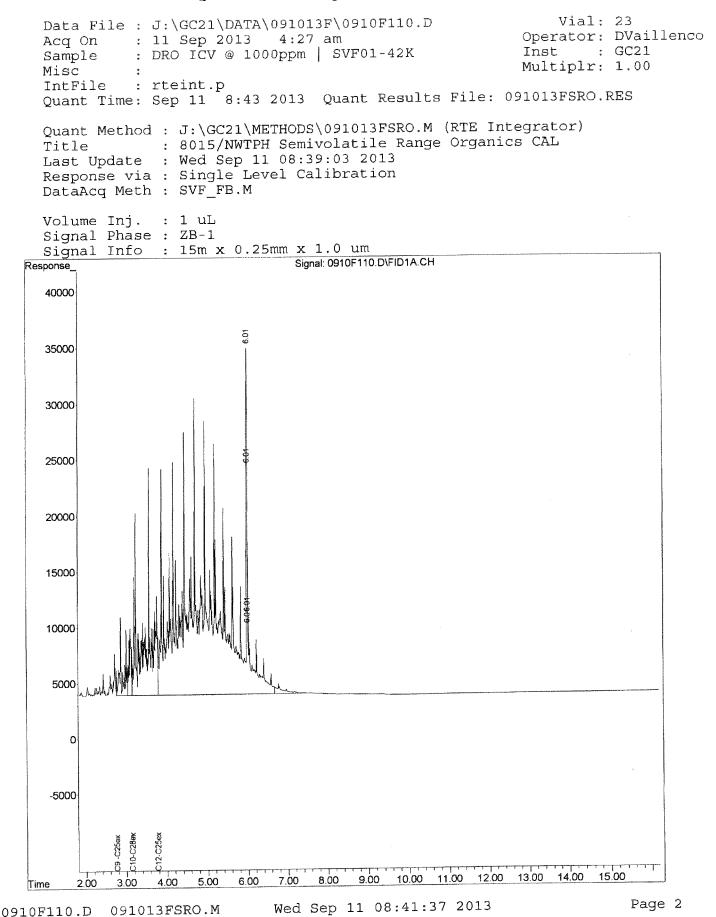
(m)=manual int.

(f)=RT Delta > 1/2 Window 0910F106.D 091013FSRO.M Wed Sep 11 08:41:37 2013



Data File : J:\GC21\DATA\091013F\0910F110.D Vial: 23 Operator: DVaillenco Acq On : 11 Sep 2013 4:27 am Sample : DRO ICV @ 1000ppm | SVF01-42K Inst : GC21 Misc : IntFile : rteint.p Multiplr: 1.00 Quant Time: Sep 11 08:39:36 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL Last Update : Wed Sep 11 08:39:03 2013 Response via : Initial Calibration DataAcg Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units System Monitoring Compounds Target Compounds 4) HC9 -C25ex DRO[TPH-Diesel]2.7711733511019.415ppm5) HC10-C25ex DRO[AK102]3.1511478651014.193ppm6) HC10-C28in DRO[8015]3.1511387261004.747ppm7) HC12-C25ex DRO[NWTPH]3.79963886998.360ppm

(f)=RT Delta > 1/2 Window 0910F110.D 091013FSRO.M Wed Sep 11 08:41:37 2013



#### ALS Group USA, Corp. dba ALS Environmental

| QA/QC | Results |
|-------|---------|
|-------|---------|

| Client:  | KTA Associates                        |
|----------|---------------------------------------|
| Project: | PacifiCorp-Chehalis Power Groundwater |

 Service Request:
 K1311914

 Date Analyzed:
 11/08/2013

#### Continuing Calibration Verification Summary Diesel and Residual Range Organics - Silica Gel Treated

| Calibration Type:<br>Analysis Method: | External Standard<br>NWTPH-Dx   | Calibration Date:<br>Calibration ID: |            |
|---------------------------------------|---------------------------------|--------------------------------------|------------|
|                                       |                                 | Analysis Lot:<br>Units:              | KWG1312552 |
| File ID:                              | J;\GC21\DATA\110813F\1108F020.D | Column ID:                           |            |
| File ID.                              | J:\GC21\DATA\110813F\1108F022.D |                                      |            |

| Analyte Name                  | Expected | Result | Average<br>RF | CCV<br>RF | %D | %Drift | Criteria | Curve Fit |
|-------------------------------|----------|--------|---------------|-----------|----|--------|----------|-----------|
| Diesel Range Organics (DRO)   | 1000     | 1000   | 965           | 995       | 3  | NA     | ± 15 %   | AverageRF |
| Residual Range Organics (RRO) | 1000     | 1000   | 709           | 623       | NA | 3      | ± 15 %   | Linear    |
| o-Terphenyl                   | 50       | 54     | 1270          | 1380      | 8  | NA     | ± 15 %   | AverageRF |
| n-Triacontane                 | 50       | 50     | 1040          | 1030      | 0  | NA     | ± 15 %   | AverageRF |

Results flagged with an asterisk (\*) indicate values outside control criteria.

#### **Exception Report**

# Data File:J:\GC21\DATA\110813F\1108F020.DLab ID:KWG1312552-1RunType:CCVMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/08/2013 10:31 11/09/2013 11:35 KWG1312552 NWTPH-Dx MJ1081

### Sample Exceptions

| Exception Categories                  | Result | Low Limit | High Limit | Pass | Fail |
|---------------------------------------|--------|-----------|------------|------|------|
| ICAL Analyte Recovery                 | NA     | NA        | NA         | x    |      |
| Second Source ICAL Verification       | NA     | NA        | NA         | x    |      |
| Analyte Co-elution                    | NA     | NA        | NA         | x    |      |
| Below Lowest ICAL Level               | NA     | NA        | NA         | x    |      |
| Above Highest ICAL Level              | NA     | NA        | NA         | x    |      |
| Enviroquant/Stealth Calibration Check | NA     | NA        | NA         | x    |      |

Primary Review Secondary Review:

|                          | J:\GC21\DATA\11<br>11/08/2013 10:31<br>CCV<br>KWG1312552-1 | 0813F\110 | 8F020.D   | Quant Date:                             | 11/09/2013                                                                                                      | 11:35   | Vial:<br>Dilu    |                                                    | GC21<br>96<br>1.0<br>ppm |      |         |
|--------------------------|------------------------------------------------------------|-----------|-----------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------|------------------|----------------------------------------------------|--------------------------|------|---------|
| Bottle ID:<br>Prod Code: | NWTPH-DX NW 1                                              | ГРН       |           | Tier:<br>Collect Date:                  |                                                                                                                 |         | Matu<br>Rece     | rix:<br>ive Date:                                  | NOT /                    |      | CABLE   |
| -                        | KWG1312552<br>NWTPH-Dx                                     |           |           | Prep Lot:<br>Prep Method:<br>Prep Date: |                                                                                                                 |         | Repo             | ort Group:                                         |                          |      |         |
| Quant Method:<br>Title:  | J:\GC21\METHOD                                             | S\091013I | FSRO.M    | M                                       | Ar an Anna an A |         | Calil            | pration ID:                                        | CAL12                    | 2766 |         |
| MB Ref:                  |                                                            |           |           |                                         |                                                                                                                 |         |                  | od ID:<br>nt based on                              | MJ108<br><b>Method</b>   | 1    |         |
| Surrogate Compo          | ounds                                                      |           |           |                                         |                                                                                                                 |         |                  |                                                    |                          |      |         |
| Parameter Nam            | e                                                          | RT        | RT<br>Dev |                                         | Resp                                                                                                            | onse    | Solution<br>Conc | %Rec                                               | %Rec<br>Limits           |      | Rpt?    |
| o-Terphenyl              |                                                            | 5.58      |           |                                         | 68                                                                                                              | 877     | 54.10            |                                                    | 50-150                   | NA   |         |
| n-Triacontane            |                                                            | 7.75      |           |                                         | 51                                                                                                              | 602     | 49.81            |                                                    | 50-150                   | NA   |         |
| Target Compound          | ls                                                         |           |           |                                         |                                                                                                                 | Final ( | Conc. Units:     |                                                    |                          |      |         |
| Parameter Nam            | e                                                          | RT        | RT<br>Dev |                                         | Resp                                                                                                            | onse    | Solution<br>Conc | Final<br>Conc                                      |                          | Q    | Rpt?    |
| Diesel Range C           | Drganics (DRO)                                             | 3.78      | 4-9-1-00  |                                         | 995                                                                                                             | 462     | 1,031            | <del>19 de date de marca cana</del> issemente asua |                          |      | <u></u> |
| 0                        | Organics (RRO)                                             | 6.66      |           |                                         | 10                                                                                                              | 512     | 2.98             |                                                    |                          |      | NR      |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:28:54  $u:\stealth\Crystal.rpt\quantl.rpt$ 

D: Result from dilution d: Compound manually deleted NR: Analyte not reported from this analysis \*: Result fails acceptance criteria

Result tais acceptance criteria
 #: Acceptance criteria not applicable
 Insufficient information to determine acceptance
 e: Result >= MRL, but MRL less than low point of ICAL
 c: check for co-elution

J:\GC21\DATA\110813F\1108F020.D

| Acqu Date: 11/08<br>Run Type: CCV              | 21\DATA\110813F\1108<br>/2013 10:31<br>1312552-1 | F020.D                                                                                                                                                                                                                             | Quant Date:                                                                                                    | 11/09/2013 11:35                                                                                                | Vial:<br>Dilu    |                         | GC21<br>96<br>1.0<br>ppm |      |       |
|------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------|-------------------------|--------------------------|------|-------|
| Bottle ID:<br>Prod Code: NWT                   | PH-DX NW TPH                                     |                                                                                                                                                                                                                                    | Tier:<br>Collect Date:                                                                                         |                                                                                                                 | Mata<br>Rece     | rix:<br>ive Date:       | NOT /<br>11/11/          |      | CABLE |
| Analysis Lot:KWGAnalysis Method:80150Prep Ref: | 1312552                                          | 19 000 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 1<br>19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 00 19 0 | Prep Lot:<br>Prep Method:<br>Prep Date:                                                                        |                                                                                                                 | Repo             | ort Group:              |                          |      |       |
| Quant Method: J:\GC2<br>Title:                 | 1\METHODS\091013F                                | SRO.M                                                                                                                                                                                                                              | алаан ал | 99999 BL 2019 B | Calit            | oration ID:             | CALI                     | 2766 |       |
| MB Ref:                                        |                                                  | CHERNOLOGIC COME AND                                                                                                                                                                                                               |                                                                                                                |                                                                                                                 |                  | od ID:<br>nt based on 1 | MJ108<br><b>Method</b>   | 32   |       |
| Surrogate Compounds                            | **********                                       | RT                                                                                                                                                                                                                                 |                                                                                                                |                                                                                                                 | Solution         |                         | %Rec                     |      |       |
| Parameter Name                                 | RT                                               | Dev                                                                                                                                                                                                                                |                                                                                                                | Response                                                                                                        | Conc             | %Rec                    | Limits                   |      | Rpt?  |
| 4-Bromofluorobenzen                            |                                                  |                                                                                                                                                                                                                                    |                                                                                                                | 31677                                                                                                           | 55.87            |                         | 70-129                   | NA   |       |
| o-Terphenyl                                    | 5.58                                             |                                                                                                                                                                                                                                    |                                                                                                                | 68877                                                                                                           | 54.10            |                         | 51-126                   |      |       |
| n-Triacontane                                  | 7.75                                             |                                                                                                                                                                                                                                    |                                                                                                                | 51602                                                                                                           | 49.81            |                         | 50-150                   | NA   |       |
| arget Compounds                                |                                                  |                                                                                                                                                                                                                                    |                                                                                                                | Final C                                                                                                         | Conc. Units:     |                         |                          |      |       |
| Parameter Name                                 | RT                                               | RT<br>Dev                                                                                                                                                                                                                          | ANNAN DA UNDA NA POSTA POSTA DA                                            | Response                                                                                                        | Solution<br>Conc | Final<br>Conc           |                          | Q    | Rpt?  |
| C10 - C25 DRO                                  | 3.23                                             |                                                                                                                                                                                                                                    |                                                                                                                | 1150291                                                                                                         | 1,016            |                         |                          |      |       |
| C10 - C28 DRO                                  | 3.13                                             |                                                                                                                                                                                                                                    |                                                                                                                | 1157033                                                                                                         | 1,021            |                         |                          |      |       |
| Diesel Range Organic                           | s (DRO) 3.78                                     |                                                                                                                                                                                                                                    |                                                                                                                | 995462                                                                                                          | 1,031            |                         |                          |      |       |
| Residual Range Organ                           | nics (RRO) 6.66                                  |                                                                                                                                                                                                                                    |                                                                                                                | 10512                                                                                                           | 2.98             |                         |                          | ,1   | NR    |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:29:02 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F020.D 124

| Acqu Date: 11/08<br>Run Type: CCV                                                                                                                                                   | C21\DATA\1108<br>8/2013 10:31<br>G1312552-1 | 313F\110                                                  | )8F020.D            | Quant Date:                                    | 11/09/2013                                                | 11:35                                                             | Vial:<br>Dilut                                                                                           |                       | GC21<br>96<br>1.0<br>ppm                     |          |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------------------|---------------------|------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------------|----------|-------|
| Bottle ID:<br>Prod Code: NWT                                                                                                                                                        | TPH-DX NW TP                                | 'n                                                        |                     | Tier:<br>Collect Date:                         |                                                           |                                                                   | Matr<br>Rece                                                                                             | ix:<br>ive Date:      | NOT /<br>11/11/                              |          | CABLI |
| Analysis Lot: KWG<br>Analysis Method: 80156<br>Prep Ref:                                                                                                                            | G1312552<br>C                               |                                                           |                     | Prep Lot:<br>Prep Method:<br>Prep Date:        |                                                           |                                                                   | Repo                                                                                                     | ort Group:            |                                              |          |       |
| Quant Method: J:\GC                                                                                                                                                                 | 21\METHODS                                  | 0910131                                                   | FSRO.M              |                                                |                                                           | Anna - 20 - 20 - 20 - 20 - 20 - 20 - 20 - 2                       | Calib                                                                                                    | oration ID:           | CALI                                         | 2766     |       |
| TRAC.                                                                                                                                                                               |                                             |                                                           |                     |                                                |                                                           |                                                                   | Meth                                                                                                     | od ID:                | MJ745                                        | i        |       |
| MB Ref:                                                                                                                                                                             | Naka-ta-1.0000 managang newerapana          |                                                           |                     | 0440185411024111111111111111111111111111111111 |                                                           |                                                                   | Quar                                                                                                     | nt based on i         | Method                                       |          |       |
| MB Ref:<br>Surrogate Compounds                                                                                                                                                      | 5                                           |                                                           | RT                  |                                                |                                                           |                                                                   | Quar                                                                                                     | nt based on i         | Method                                       | ******   |       |
|                                                                                                                                                                                     | \$                                          | RT                                                        | RT<br>Dev           |                                                | Respo                                                     | Dnse                                                              |                                                                                                          | nt based on .<br>%Rec |                                              |          | Rpt?  |
| Surrogate Compounds                                                                                                                                                                 |                                             | RT<br>2.89                                                |                     |                                                |                                                           | <b>onse</b><br>677                                                | Solution                                                                                                 |                       | %Rec                                         | NA       | Rpt?  |
| Surrogate Compounds<br>Parameter Name                                                                                                                                               | ne                                          |                                                           | Dev                 |                                                | 31                                                        |                                                                   | Solution<br>Conc                                                                                         |                       | %Rec<br>Limits                               |          | Rpt?  |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenze                                                                                                                         | ne                                          | 2.89                                                      | Dev<br>?            |                                                | 31 68                                                     | 677                                                               | Solution<br>Conc<br>55.87                                                                                |                       | %Rec<br>Limits<br>50-150                     | NA       | Rpt?  |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl                                                                                                          | ne                                          | 2.89<br>5.58                                              | <b>Dev</b> ? ?      |                                                | 31 68                                                     | 677<br>877<br>602                                                 | Solution<br>Conc<br>55.87<br>54.10                                                                       |                       | %Rec<br>Limits<br>50-150<br>55-133           | NA       | Rpt?  |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl<br>n-Triacontane                                                                                         | ne                                          | 2.89<br>5.58                                              | <b>Dev</b> ? ?      |                                                | 31 68                                                     | 677<br>877<br>602<br>Final Co                                     | Solution<br>Conc<br>55.87<br>54.10<br>49.81                                                              | %Rec                  | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA       | Rpt?  |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl<br>n-Triacontane<br>Target Compounds                                                                     | ne                                          | 2.89<br>5.58<br>7.75                                      | Dev<br>?<br>?<br>RT | · · · · · · · · · · · · · · · · · · ·          | 31<br>68<br>51                                            | 677<br>877<br>602<br>Final Co<br>onse                             | Solution<br>Conc<br>55.87<br>54.10<br>49.81<br>nc. Units:<br>Solution                                    | %Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA | -     |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl<br>n-Triacontane<br>Farget Compounds<br>Parameter Name                                                   | ne                                          | 2.89<br>5.58<br>7.75<br><b>RT</b>                         | Dev<br>?<br>?<br>RT | · · · · · · · · · · · · · · · · · · ·          | 31<br>68<br>51<br>Respo                                   | 677<br>877<br>602<br>Final Co<br>onse<br>666                      | Solution<br>Conc<br>55.87<br>54.10<br>49.81<br>nc. Units:<br>Solution<br>Conc                            | %Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA | -     |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl<br>n-Triacontane<br>Farget Compounds<br>Parameter Name<br>C9 - C24 DRO                                   | ne                                          | 2.89<br>5.58<br>7.75<br><b>RT</b><br>2.75                 | Dev<br>?<br>?<br>RT |                                                | 31<br>68<br>51<br><b>Respo</b><br>1183                    | 677<br>877<br>602<br>Final Co<br>onse<br>666<br>291               | Solution<br>Conc<br>55.87<br>54.10<br>49.81<br>nc. Units:<br>Solution<br>Conc<br>1,028                   | %Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA | -     |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl<br>n-Triacontane<br>Sarget Compounds<br>Parameter Name<br>C9 - C24 DRO<br>C10 - C25 DRO                  | ne                                          | 2.89<br>5.58<br>7.75<br><b>RT</b><br>2.75<br>3.23         | Dev<br>?<br>?<br>RT | · · · · · · · · · · · · · · · · · · ·          | 31<br>68<br>51<br><b>Respo</b><br>11830<br>11502          | 677<br>877<br>602<br>Final Co<br>onse<br>666<br>291<br>033        | Solution<br>Conc<br>55.87<br>54.10<br>49.81<br>nc. Units:<br>Solution<br>Conc<br>1,028<br>1,016          | %Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA | -     |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl<br>n-Triacontane<br>Farget Compounds<br>Parameter Name<br>C9 - C24 DRO<br>C10 - C25 DRO<br>C10 - C28 DRO | ne<br>cs (DRO)                              | 2.89<br>5.58<br>7.75<br><b>RT</b><br>2.75<br>3.23<br>3.13 | Dev<br>?<br>?<br>RT | · · · · · · · · · · · · · · · · · · ·          | 31<br>68<br>51<br><b>Respo</b><br>11830<br>11502<br>11570 | 677<br>877<br>602<br>Final Co<br>onse<br>666<br>291<br>033<br>462 | Solution<br>Conc<br>55.87<br>54.10<br>49.81<br>nc. Units:<br>Solution<br>Conc<br>1,028<br>1,016<br>1,021 | %Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA | -     |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

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D: Result from dilution b: Kestar hom and an m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

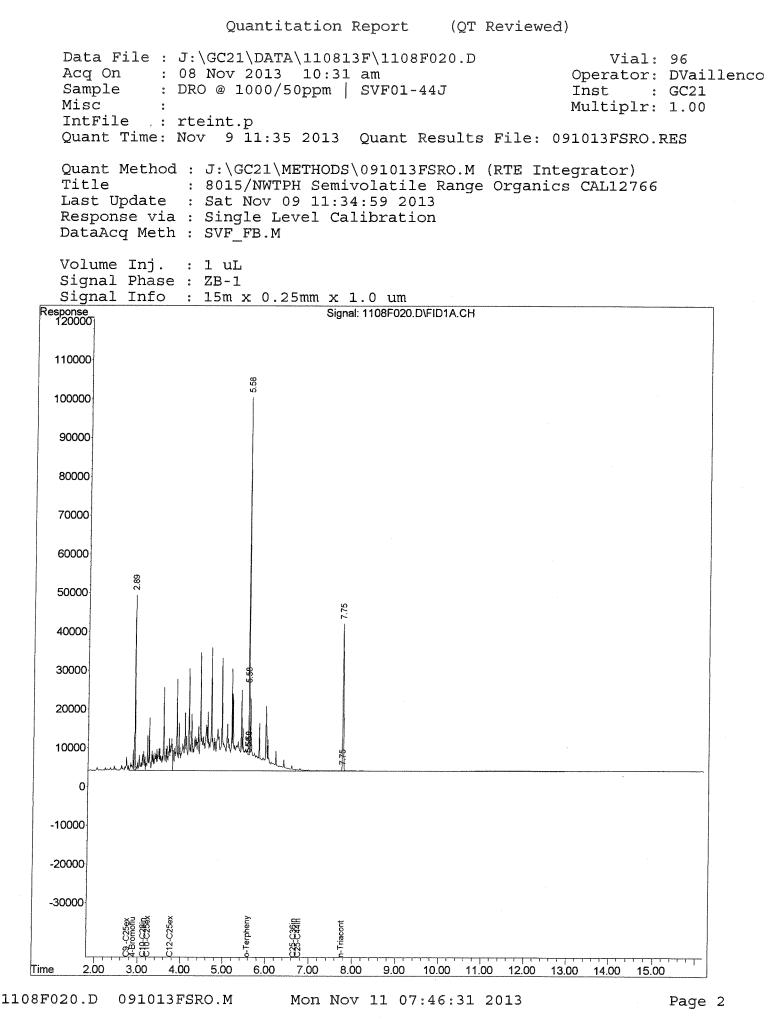
\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F020.D

125

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\110813F\1108F020.D Vial: 96 Operator: DVaillenco Inst : GC21 Acq On : 08 Nov 2013 10:31 am : DRO @ 1000/50ppm | SVF01-44J Sample Misc : Multiplr: 1.00 IntFile : rteint.p Quant Time: Nov 09 11:35:17 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds 2.89 31677 55.867 ppm Recovery = 111.73% 5.58 68877 54.095 ppm Recovery = 108.19% 7.75 51602 49.814 ppm 1) S 4-Bromofluorobenzene Spiked Amount 50.000 2) S o-Terphenyl Spiked Amount 50.000 3) S n-Triacontane Spiked Amount 50.000 Recovery = 99.63% Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.7511836661028.377ppm5) HC10-C25ex DRO[AK102]3.2311502911016.336ppm6) HC10-C28in DRO[8015]3.1311570331020.900ppm7) HC12-C25ex DRO[NWTPH]3.789954621031.065ppm8) HC25-C36in RRO[NWTPH]6.66105122.981ppm9) HC25-C44in RRO[TPH-Oil]6.761888415.131ppm

Page 1



# Data File:J:\GC21\DATA\110813F\1108F022.DLab ID:KWG1312552-1RunType:CCVMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/08/2013 10:58 11/09/2013 11:35 KWG1312552 NWTPH-Dx MJ1081

## Sample Exceptions

| Exception Categories                  | Result | Low Limit | High Limit | Pass | Fail                                     |
|---------------------------------------|--------|-----------|------------|------|------------------------------------------|
| ICAL Analyte Recovery                 | NA     | NA        | NA         | X    |                                          |
| Second Source ICAL Verification       | NA     | NA        | NA         | x    |                                          |
| Analyte Co-elution                    | NA     | NA        | NA         | x    | an a |
| Below Lowest ICAL Level               | NA     | NA        | NA         | x    |                                          |
| Above Highest ICAL Level              | NA     | NA        | NA         | x    |                                          |
| Enviroquant/Stealth Calibration Check | NA     | NA        | NA         | x    | HINTINIA (ALCONOMICAL)                   |

Primary Review: Secondary Review:

| 2-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1 |                                                                                                                |                                                                                                                 | 02545521454285428542854214541656244454                |                    |                                                                                            |                                          |                                      | 22 (22 (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) (20 ) |                                              |                               |                                                                                                                 |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|--------------------|--------------------------------------------------------------------------------------------|------------------------------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Data File:                              | J:\GC21\DATA\1                                                                                                 | 1081 <b>3</b> F\110                                                                                             | )8F022.D                                              |                    |                                                                                            | ]                                        | Instrument                           | :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | GC21                                         |                               |                                                                                                                 |
| Acqu Date:                              | 11/08/2013 10:58                                                                                               |                                                                                                                 |                                                       | <b>Ouant Date:</b> | 11/09/2013 11:35                                                                           |                                          | Vial:                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 97                                           |                               |                                                                                                                 |
| Run Type:                               | CCV                                                                                                            |                                                                                                                 |                                                       |                    |                                                                                            | 1                                        | Dilution:                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.0                                          |                               |                                                                                                                 |
| Lab ID:                                 | KWG1312552-1                                                                                                   |                                                                                                                 |                                                       |                    |                                                                                            |                                          | Soln Conc.                           | Units:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ppm                                          |                               |                                                                                                                 |
|                                         |                                                                                                                |                                                                                                                 |                                                       |                    |                                                                                            |                                          |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PPm                                          |                               | u Madiana di Malandari ya da ya d |
| Bottle ID:                              | n ann ann an |                                                                                                                 | 97.201.200.000 AND ALL OF THE OWNER AND A DESCRIPTION | Tier:              |                                                                                            | 1                                        | Matrix:                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | NOT A                                        | APPLIC                        | CABLI                                                                                                           |
| Prod Code:                              | NWTPH-DX NW                                                                                                    | TPH                                                                                                             | *****                                                 | Collect Date:      |                                                                                            | , ]                                      | Receive Dat                          | e:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 11/11/                                       |                               |                                                                                                                 |
| Analysis Lot:                           | KWG1312552                                                                                                     | which and a second s |                                                       | Prep Lot:          |                                                                                            | I                                        | Report Gro                           | սթ։                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                              |                               |                                                                                                                 |
| Analysis Method:                        | NWTPH-Dx                                                                                                       |                                                                                                                 |                                                       | Prep Method:       |                                                                                            |                                          |                                      | _                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                              |                               |                                                                                                                 |
| Prep Ref:                               |                                                                                                                |                                                                                                                 |                                                       | Prep Date:         |                                                                                            |                                          |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                              |                               |                                                                                                                 |
| 1 rep Kei.                              |                                                                                                                |                                                                                                                 |                                                       |                    |                                                                                            |                                          | anannaa aguna goorad goorad ar an an |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10/10 CARD & MARKED                          |                               | marinen valanz                                                                                                  |
| Quant Method:                           | J:\GC21\METHOI                                                                                                 | DS\0910131                                                                                                      | FSRO.M                                                | *******            |                                                                                            | <u> </u>                                 | Calibration                          | ID:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CAL12                                        | 2766                          | *********                                                                                                       |
| Title:                                  |                                                                                                                |                                                                                                                 |                                                       |                    |                                                                                            |                                          |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                              |                               |                                                                                                                 |
|                                         |                                                                                                                |                                                                                                                 |                                                       |                    |                                                                                            | N                                        | fethod ID:                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | MJ108                                        | 1                             |                                                                                                                 |
| MB Ref:                                 |                                                                                                                |                                                                                                                 |                                                       |                    |                                                                                            | (                                        | Quant base                           | ed on N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | lethod/                                      |                               |                                                                                                                 |
| Surrogate Comp                          | ounds                                                                                                          | an a                                                                        | 4/R(mild4ngargunungang maganaguna                     |                    | nerven er fon typende net skope den er konst de proppeder yn er sy pany fer anwer i kan de | an a |                                      | 48e4arla-2000.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | onnon an | N <del>man manan</del> sensis |                                                                                                                 |
|                                         |                                                                                                                | n son fan in de sen sen se                                                  | RT                                                    |                    | анаалаан малаан на туу туу туу туу туу таан таан таа                                       | Soluti                                   | on                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | %Rec                                         | -                             |                                                                                                                 |
| Parameter Na                            | me                                                                                                             | RT                                                                                                              | Dev                                                   |                    | Response                                                                                   | Co                                       | nc %Re                               | c                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Limits                                       |                               | Rpt?                                                                                                            |
| o-Terphenyl                             |                                                                                                                | ini yini kanalaran yang kanang                                                                                  |                                                       |                    | 0                                                                                          |                                          | *******                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 50-150                                       | NA                            | NR                                                                                                              |
| n-Triacontane                           | e                                                                                                              |                                                                                                                 |                                                       |                    | 0                                                                                          |                                          |                                      | :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 50-150                                       | NA                            | NR                                                                                                              |
| Target Compour                          | nds                                                                                                            |                                                                                                                 |                                                       |                    | Final C                                                                                    | Conc. Unit                               | s:                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                              |                               |                                                                                                                 |
|                                         |                                                                                                                |                                                                                                                 | RT                                                    |                    | nen en una en                                          | Solutio                                  |                                      | Final                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |                               |                                                                                                                 |
| Parameter Na                            | me                                                                                                             | RT                                                                                                              | Dev                                                   |                    | Response                                                                                   | Col                                      | nc                                   | Conc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                              | Q                             | Rpt?                                                                                                            |
| Diesel Range                            | Organics (DRO)                                                                                                 | 3.78                                                                                                            |                                                       |                    | 92082                                                                                      | 95.3                                     | 38                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                              |                               | NR                                                                                                              |
|                                         |                                                                                                                |                                                                                                                 |                                                       |                    |                                                                                            |                                          |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                              |                               |                                                                                                                 |

623370

Residual Range Organics (RRO) 6.66

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

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D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

1,032

\*: Result fails acceptance criteria
 #: Acceptance criteria not applicable
 ?: Insufficient information to determine acceptance
 e: Result >= MRL, but MRL less than low point of ICAL
 c: check for co-elution

J:\GC21\DATA\110813F\1108F022.D 129

| Run Type:                                                                                                                                                     | J:\GC21\DATA\11<br>11/08/2013 10:58<br>CCV<br>KWG1312552-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    | )8F022.D                                                                                                        | Quant Date:                             | 11/09/2013 11:35                                                    | Vial:<br>Dilu                                                           |                     | GC21<br>97<br>1.0<br>ppm                     | hummanynsikkevees |                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------|----------------------------------------------|-------------------|---------------------------------------------------|
| Bottle ID:<br>Prod Code:                                                                                                                                      | NWTPH-DX NW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TPH                | 940-000-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-                                                                        | Tier:<br>Collect Date:                  |                                                                     | Mati<br>Rece                                                            | rix:<br>ive Date:   | NOT /                                        |                   | CABLE                                             |
| -                                                                                                                                                             | XWG1312552<br>8015C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                                                                                                                 | Prep Lot:<br>Prep Method:<br>Prep Date: |                                                                     | Rеро                                                                    | ort Group:          | 998.84978.00099.99979.00099.00099            |                   | STOCE COMPACT AND THE                             |
| Quant Method: J<br>Title:                                                                                                                                     | :\GC21\METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | S\091013I          | FSRO.M                                                                                                          | <u></u>                                 |                                                                     | Calit                                                                   | pration ID:         | CALI                                         | 2766              |                                                   |
|                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                                                                                                                 |                                         |                                                                     | Meth                                                                    | od ID:              | MJ108                                        | 32                |                                                   |
| MB Ref:                                                                                                                                                       | Sector Contraction of |                    | and and the state of |                                         | una tancastantas no en resegis e sergin e se i tranç                | Qua                                                                     | nt based on         | Method                                       |                   | 11809-1180-10-10-10-10-10-10-10-10-10-10-10-10-10 |
|                                                                                                                                                               | unds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                                                                                                                 |                                         |                                                                     | 1997-999-999-999-999-999-999-999-999-999                                | nt based on         | 80 #************************************     |                   |                                                   |
|                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | RT                 | RT<br>Dev                                                                                                       |                                         | Response                                                            | Qua<br>Solution<br>Conc                                                 | nt based on<br>%Rec | Method<br>%Rec<br>Limits                     |                   | Rpt?                                              |
| Surrogate Compose<br>Parameter Name<br>4-Bromofluorob                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | RT                 |                                                                                                                 |                                         | 0                                                                   | Solution                                                                |                     | %Rec<br>Limits<br>70-129                     |                   | Rpt?                                              |
| <i>urrogate Compol</i><br>Parameter Name                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | RT                 |                                                                                                                 |                                         |                                                                     | Solution                                                                |                     | %Rec<br>Limits                               | NA                | Rpt?<br>NR<br>NR                                  |
| Parameter Name<br>4-Bromofluorob<br>o-Terphenyl<br>n-Triacontane                                                                                              | enzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | RT                 |                                                                                                                 |                                         | 0<br>0<br>0                                                         | Solution                                                                |                     | %Rec<br>Limits<br>70-129<br>51-126           | NA                | NR                                                |
| Parameter Name<br>4-Bromofluorob<br>o-Terphenyl<br>n-Triacontane                                                                                              | e<br>enzene<br>§                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | RT                 |                                                                                                                 |                                         | 0<br>0<br>0                                                         | Solution<br>Conc                                                        |                     | %Rec<br>Limits<br>70-129<br>51-126<br>50-150 | NA                | NR                                                |
| Surrogate Compose<br>Parameter Name<br>4-Bromofluorob<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds<br>Parameter Name<br>C10 - C25 DRO                  | enzene<br>S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    | Dev<br>RT                                                                                                       |                                         | 0<br>0<br>0<br><b>Final (</b>                                       | Solution<br>Conc<br>Conc. Units:<br>Solution                            | %Rec<br>Final       | %Rec<br>Limits<br>70-129<br>51-126<br>50-150 | NA<br>NA          | NR<br>NR                                          |
| Surrogate Compose<br>Parameter Name<br>4-Bromofluorob<br>o-Terphenyl<br>n-Triacontane<br>Sarget Compounds<br>Parameter Name<br>C10 - C25 DRO<br>C10 - C28 DRO | e<br>enzene<br>S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | RT<br>3.23<br>3.13 | Dev<br>RT                                                                                                       |                                         | 0<br>0<br>0<br><b>Final (</b><br><b>Response</b><br>93267<br>280944 | Solution<br>Conc<br>Conc. Units:<br>Solution<br>Conc<br>82.41<br>247.89 | %Rec<br>Final       | %Rec<br>Limits<br>70-129<br>51-126<br>50-150 | NA<br>NA          | NR<br>NR                                          |
| Furrogate Compose<br>Parameter Name<br>4-Bromofluorob<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds<br>Parameter Name<br>C10 - C25 DRO                  | e<br>enzene<br>S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | RT<br>3.23         | Dev<br>RT                                                                                                       |                                         | 0<br>0<br>0<br><b>Final (</b><br><u>Response</u><br>93267           | Solution<br>Conc<br>Conc. Units:<br>Solution<br>Conc<br>82.41           | %Rec<br>Final       | %Rec<br>Limits<br>70-129<br>51-126<br>50-150 | NA<br>NA          | NR<br>NR                                          |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:29:27 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution d: Compound manually deleted NR: Analyte not reported from this analysis

Result fails acceptance criteria
 Acceptance criteria not applicable
 Insufficient information to determine acceptance
 Result >= MRL, but MRL less than low point of ICAL
 check for co-elution

J:\GC21\DATA\110813F\1108F022.D

| Data File:         J:\GC21\DA'           Acqu Date:         11/08/2013           Run Type:         CCV           Lab ID:         KWG131255                                                                                         |                                       | 98F022.D  | Quant Date:                                                                                                     | 11/09/2013               | 11:35                                                        | Vial:<br>Dilut                                                                  | ument:<br>ion:<br>Conc. Units: | GC21<br>97<br>1.0<br>ppm                     | Balteli Hanadaremakin | igran der konstanterson       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------|----------------------------------------------|-----------------------|-------------------------------|
| Bottle ID:<br>Prod Code: NWTPH-DX                                                                                                                                                                                                  | NW TPH                                | <u></u>   | Tier:<br>Collect Date:                                                                                          |                          |                                                              | Matr<br>Rece                                                                    | ix:<br>ive Date:               | NOT /<br>11/11/                              |                       | CABLE                         |
| Analysis Lot: KWG131255<br>Analysis Method: 8015C<br>Prep Ref:                                                                                                                                                                     | 52                                    |           | Prep Lot:<br>Prep Method:<br>Prep Date:                                                                         |                          |                                                              | Repo                                                                            | rt Group:                      |                                              |                       |                               |
| Quant Method: J:\GC21\ME'                                                                                                                                                                                                          | THODS\091013I                         | FSRO.M    | 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - |                          | 11.2.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.                      | Calib                                                                           | ration ID:                     | CALIZ                                        | 2766                  | den sen gen gen en en en en e |
| MB Ref:                                                                                                                                                                                                                            |                                       |           |                                                                                                                 |                          |                                                              |                                                                                 | od ID:<br>nt based on l        | MJ745<br>Mothod                              | i.                    |                               |
| MB Rei:                                                                                                                                                                                                                            |                                       |           |                                                                                                                 |                          |                                                              | Qua                                                                             | ni baseu on .                  | TALELUOU                                     |                       |                               |
| urrogate Compounds                                                                                                                                                                                                                 | DT                                    | RT        |                                                                                                                 | Desne                    | 0.19.5.6                                                     | Solution                                                                        |                                | %Rec                                         |                       | Dat                           |
| urrogate Compounds<br>Parameter Name                                                                                                                                                                                               | RT                                    | RT<br>Dev |                                                                                                                 | Respo                    |                                                              |                                                                                 | %Rec                           | %Rec<br>Limits                               | NIA                   | Rpt                           |
| <i>urrogate Compounds</i> Parameter Name 4-Bromofluorobenzene                                                                                                                                                                      | RT                                    |           |                                                                                                                 | Respo                    | 0                                                            | Solution                                                                        |                                | %Rec<br>Limits<br>50-150                     |                       |                               |
| <i><sup>t</sup>urrogate Compounds</i><br>Parameter Name                                                                                                                                                                            | RT                                    |           |                                                                                                                 | Respo                    |                                                              | Solution                                                                        |                                | %Rec<br>Limits                               | NA                    | Rpt?<br>NR<br>NR              |
| Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane                                                                                                                                                             | RT                                    |           |                                                                                                                 | Respo                    | 0<br>0<br>0                                                  | Solution                                                                        |                                | %Rec<br>Limits<br>50-150<br>55-133           | NA                    | NR                            |
| urrogate Compounds<br>Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane                                                                                                                                       | RT                                    |           |                                                                                                                 | Respo                    | 0<br>0<br>0<br>Final C                                       | Solution<br>Conc                                                                | %Rec                           | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA                    | NR<br>NR                      |
| Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds                                                                                                                                         |                                       | Dev       |                                                                                                                 | Respo                    | 0<br>0<br>0<br>Final C                                       | Solution<br>Conc<br>onc. Units:<br>Solution                                     | %Rec<br>ug/L<br>Final          | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA              | NR<br>NR                      |
| <i>Turrogate Compounds</i> Parameter Name 4-Bromofluorobenzene o-Terphenyl n-Triacontane <i>Target Compounds</i> Parameter Name                                                                                                    | RT                                    | Dev       |                                                                                                                 | Respo<br>94              | 0<br>0<br>Final Co                                           | Solution<br>Conc<br>onc. Units:<br>Solution<br>Conc                             | %Rec<br>ug/L<br>Final          | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA              | NR<br>NR                      |
| Furrogate Compounds Parameter Name 4-Bromofluorobenzene o-Terphenyl n-Triacontane Carget Compounds Parameter Name C9 - C24 DRO                                                                                                     | RT<br>2.75                            | Dev       |                                                                                                                 | Respo<br>94              | 0<br>0<br><b>Final C</b><br>onse<br>841<br>267               | Solution<br>Conc<br>onc. Units:<br>Solution<br>Conc<br>82.40                    | %Rec<br>ug/L<br>Final          | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA              | NR<br>NR                      |
| Furrogate Compounds         Parameter Name         4-Bromofluorobenzene         o-Terphenyl         n-Triacontane         Varget Compounds         Parameter Name         C9 - C24 DRO         C10 - C25 DRO         C10 - C28 DRO | RT<br>2.75<br>3.23<br>3.13            | Dev       |                                                                                                                 | Respo<br>94<br>93<br>280 | 0<br>0<br><b>Final C</b><br>onse<br>841<br>267               | Solution<br>Conc<br>onc. Units:<br>Solution<br>Conc<br>82.40<br>82.41           | %Rec<br>ug/L<br>Final          | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA              | NR<br>NR                      |
| Furrogate Compounds         Parameter Name         4-Bromofluorobenzene         o-Terphenyl         n-Triacontane         Carget Compounds         Parameter Name         C9 - C24 DRO         C10 - C25 DRO                       | RT<br>2.75<br>3.23<br>3.13<br>O) 3.78 | Dev       |                                                                                                                 | Respo<br>94<br>93<br>280 | 0<br>0<br><b>Final C</b><br>onse<br>841<br>267<br>944<br>082 | Solution<br>Conc<br>onc. Units:<br>Solution<br>Conc<br>82.40<br>82.41<br>247.89 | %Rec<br>ug/L<br>Final          | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA              | NR<br>Rpt?                    |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

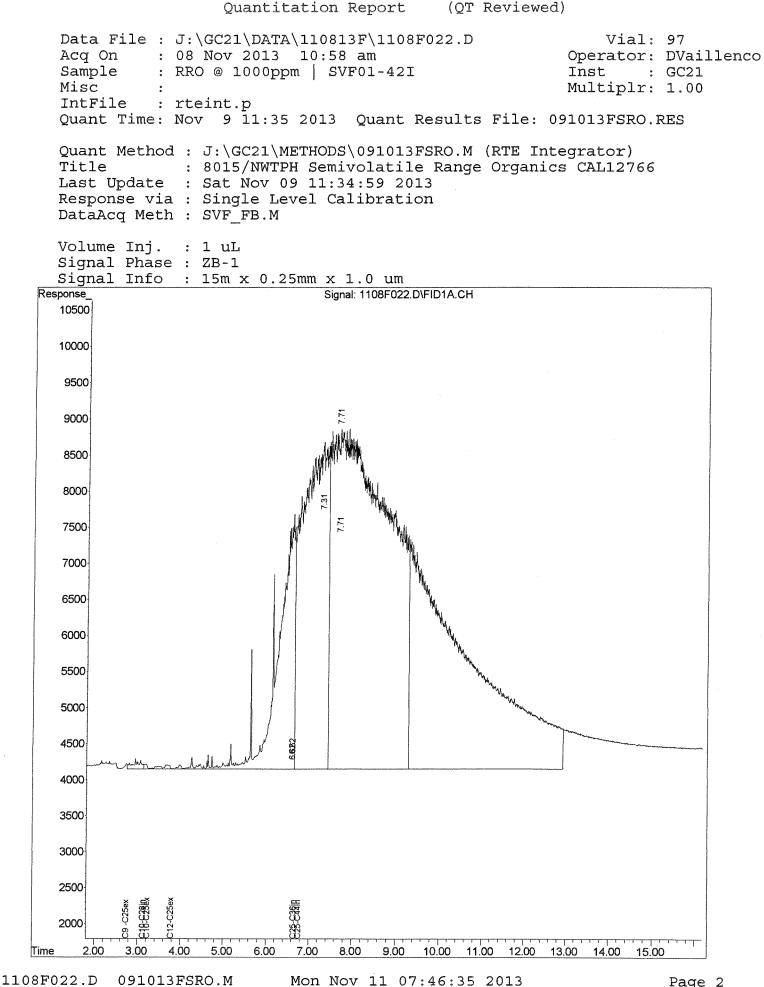
Printed: 11/11/2013 08:29:35 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

Result fails acceptance criteria
 Acceptance criteria not applicable
 Insufficient information to determine acceptance
 Result >= MRL, but MRL less than low point of ICAL
 check for co-elution

J:\GC21\DATA\110813F\1108F022.D

Quantitation Report (QT Reviewed) Vial: 97 Data File : J:\GC21\DATA\110813F\1108F022.D Acq On : 08 Nov 2013 10:58 am Operator: DVaillenco Sample : Misc : : RRO @ 1000ppm | SVF01-421 Inst : GC21 Multiplr: 1.00 IntFile : rteint.p Quant Time: Nov 09 11:35:18 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units System Monitoring Compounds Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.759484182.398 ppm5) HC10-C25ex DRO[AK102]3.239326782.406 ppm6) HC10-C28in DRO[8015]3.13280944247.889 ppm7) HC12-C25ex DRO[NWTPH]3.789208295.375 ppm8) HC25-C36in RRO[NWTPH]6.666233701031.888 ppm9) HC25-C44in RRO[TPH-Oil]6.769319131031.579 ppm



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#### ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

| Client:  | KTA Associates                        |
|----------|---------------------------------------|
| Project: | PacifiCorp-Chehalis Power Groundwater |

| Service Request: | K1311914   |
|------------------|------------|
| Date Analyzed:   | 11/08/2013 |

#### Continuing Calibration Verification Summary Diesel and Residual Range Organics - Silica Gel Treated

| Calibration Type:<br>Analysis Method: | External Standard<br>NWTPH-Dx                                      | Calibration Date:<br>Calibration ID: |      |
|---------------------------------------|--------------------------------------------------------------------|--------------------------------------|------|
| -                                     |                                                                    | Analysis Lot:<br>Units:              |      |
| File ID:                              | J:\GC21\DATA\110813F\1108F056.D<br>J:\GC21\DATA\110813F\1108F058.D | Column ID:                           | ZB-1 |

| Analyte Name                  | Expected | Result | Average<br>RF | CCV<br>RF | %D | %Drift | Criteria | Curve Fit |
|-------------------------------|----------|--------|---------------|-----------|----|--------|----------|-----------|
| Diesel Range Organics (DRO)   | 1000     | 1000   | 965           | 981       | 2  | NA     | ±15%     | AverageRF |
| Residual Range Organics (RRO) | 1000     | 1100   | 709           | 672       | NA | 11     | ± 15 %   | Linear    |
| o-Terphenyl                   | 50       | 53     | 1270          | 1340      | 6  | NA     | ±15 %    | AverageRF |
| n-Triacontane                 | 50       | 55     | 1040          | 1140      | 10 | NA     | ±15%     | AverageRF |

Results flagged with an asterisk (\*) indicate values outside control criteria.

# Data File: J:\GC21\DATA\110813F\1108F056.D Lab ID: KWG1312552-2 RunType: CCV Matrix: NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/08/2013 17:17 11/09/2013 11:35 KWG1312552 NWTPH-Dx MJ1081

## Sample Exceptions

| Exception Categories                  | Result | Low Limit | High Limit | Pass | Fail |
|---------------------------------------|--------|-----------|------------|------|------|
| ICAL Analyte Recovery                 | NA     | NA        | NA         | x    |      |
| Second Source ICAL Verification       | NA     | NA        | NA         | x    |      |
| Analyte Co-elution                    | NA     | NA        | NA         | x    |      |
| Below Lowest ICAL Level               | NA     | NA        | NA         | x    |      |
| Above Highest ICAL Level              | NA     | NA        | NA         | x    |      |
| Enviroquant/Stealth Calibration Check | NA     | NA        | NA         | x    |      |

Primary Review Secondary Review:

| Data File:<br>Acqu Date:<br>Run Type:<br>Lab ID: | J:\GC21\DATA\11<br>11/08/2013 17:17<br>CCV<br>KWG1312552-2 |                                                                                                                 | 08F056.D  | Quant Date:                                                                                                     | 11/09/2013 11:35 | Via<br>Dih       | rument:<br>l:<br>ntion:<br>n Conc. Units: | GC21<br>96<br>1.0<br>ppm            |      |                 |
|--------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------|------------------|------------------|-------------------------------------------|-------------------------------------|------|-----------------|
| Bottle ID:<br>Prod Code:                         | NWTPH-DX NW                                                | TPH                                                                                                             |           | Tier:<br>Collect Date:                                                                                          |                  | Mat<br>Rec       | rix:<br>eive Date:                        | NOT /                               |      | CABLE           |
| Analysis Lot:<br>Analysis Method:<br>Prep Ref:   | KWG1312552<br>NWTPH-Dx                                     |                                                                                                                 |           | Prep Lot:<br>Prep Method:<br>Prep Date:                                                                         |                  | Rep              | ort Group:                                |                                     |      | NAL-GALTER, AND |
| Quant Method:<br>Title:                          | J:\GC21\METHOD                                             | S\091013I                                                                                                       | FSRO.M    | and the feature of the second seco |                  | Cali             | bration ID:                               | CAL1                                | 2766 |                 |
| MB Ref:                                          |                                                            | 550-55 (1995) - 1995 (1995) - 1995 (1995) - 1995 (1995) - 1995 (1995) - 1995 (1995) - 1995 (1995) - 1995 (1995) |           |                                                                                                                 |                  |                  | hod ID:<br>int based on ]                 | MJ108<br><b>Method</b>              | 81   |                 |
| Surrogate Comp                                   | ounds                                                      |                                                                                                                 |           |                                                                                                                 |                  |                  |                                           |                                     |      |                 |
| Parameter Na                                     | me                                                         | RT                                                                                                              | RT<br>Dev |                                                                                                                 | Response         | Solution<br>Conc | %Rec                                      | %Rec<br>Limits                      | **** | Rpt?            |
| o-Terphenyl<br>n-Triacontane                     |                                                            | 5.58<br>7.75                                                                                                    |           |                                                                                                                 | 67242<br>56899   | 52.81<br>54.93   | · · · · · · · · · · · · · · · · · · ·     | 50-150<br>50-150                    |      |                 |
| arget Compoun                                    | ds                                                         |                                                                                                                 |           |                                                                                                                 | Final            | Conc. Units:     |                                           |                                     |      |                 |
| Parameter Na                                     | ne                                                         | RT                                                                                                              | RT<br>Dev |                                                                                                                 | Response         | Solution<br>Conc | Final<br>Conc                             | Cinda II, mipergrafia (Constantino) | Q    | Rpt?            |
|                                                  | Organics (DRO)<br>ge Organics (RRO)                        | 3.78<br>6.66                                                                                                    |           |                                                                                                                 | 981468<br>9903   | 1,017<br>1.96    |                                           |                                     |      | NR              |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:33:31 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F056.D 136

| Data File:         J:\GC21\D/           Acqu Date:         11/08/2013           Run Type:         CCV           Lab ID:         KWG1312 |                                                                                                                 | 8F056.D                | Quant Date:                                                                                                    | 11/09/2013 11:35 | Vial:<br>Dilu    |                         | GC21<br>96<br>1.0<br>ppm |      |       |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------|------------------|------------------|-------------------------|--------------------------|------|-------|
| Bottle ID:<br>Prod Code: NWTPH-D                                                                                                        | X NW TPH                                                                                                        |                        | Tier:<br>Collect Date:                                                                                         |                  | Mati<br>Rece     | rix:<br>ive Date:       | NOT /<br>11/11/          |      | CABLE |
| Analysis Lot:KWG13125Analysis Method:8015CPrep Ref:                                                                                     | 552                                                                                                             |                        | Prep Lot:<br>Prep Method:<br>Prep Date:                                                                        |                  | Repo             | ort Group:              |                          |      |       |
| Quant Method: J:\GC21\MI<br>Title:                                                                                                      | ETHODS\091013F                                                                                                  | SRO.M                  | 99 99 M 49 F 199 F 1 |                  | Calib            | oration ID:             | CALI2                    | 2766 |       |
| MB Ref:                                                                                                                                 |                                                                                                                 | sustaina se an abberag |                                                                                                                |                  |                  | od ID:<br>nt based on ] | MJ108<br>Method          | 32   |       |
| Surrogate Compounds                                                                                                                     | 1999 - 1999 - 1994 - 1994 - 1994 - 1994 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - | RT                     |                                                                                                                |                  | Solution         |                         | %Rec                     |      |       |
| Parameter Name                                                                                                                          | RT                                                                                                              | Dev                    |                                                                                                                | Response         | Conc             | %Rec                    | Limits                   |      | Rpt?  |
| 4-Bromofluorobenzene                                                                                                                    | 2.89                                                                                                            |                        |                                                                                                                | 31635            | 55.79            |                         | 70-129                   | NA   |       |
| o-Terphenyl                                                                                                                             | 5.58                                                                                                            |                        |                                                                                                                | 67242            | 52.81            |                         | 51-126                   | NA   |       |
| n-Triacontane                                                                                                                           | 7.75                                                                                                            |                        |                                                                                                                | 56899            | 54.93            |                         | 50-150                   | NA   |       |
| Target Compounds                                                                                                                        |                                                                                                                 |                        |                                                                                                                | Final (          | Conc. Units:     |                         |                          |      |       |
| Parameter Name                                                                                                                          | RT                                                                                                              | RT<br>Dev              |                                                                                                                | Response         | Solution<br>Conc | Final<br>Conc           |                          | Q    | Rpt?  |
| C10 - C25 DRO                                                                                                                           | 3.23                                                                                                            | *****                  |                                                                                                                | 1135647          | 1,003            |                         |                          |      |       |
| C10 - C28 DRO                                                                                                                           | 3.13                                                                                                            |                        |                                                                                                                | 1142117          | 1,008            |                         |                          |      |       |
| Diesel Range Organics (DF                                                                                                               | RO) 3.78                                                                                                        |                        |                                                                                                                | 981468           | 1,017            |                         |                          |      |       |
|                                                                                                                                         |                                                                                                                 |                        |                                                                                                                |                  |                  |                         |                          |      |       |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

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D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance oriteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL

c: check for co-elution

J:\GC21\DATA\110813F\1108F056.D 137

| Acqu Date: 11/08/<br>Run Type: CCV                                                                                                                         | 21\DATA\110813F\110<br>/2013 17:17                                           | 08F056.D                 | Quant Date:                             | 11/09/2013 1                                                               | 1:35                                                                                          | Instrum<br>Vial:<br>Dilution                                            | 1:                    | GC21<br>96<br>1.0                                                                                               |                    |                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------|-----------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------|--------------------|--------------------------|
| LAD ID: KWG                                                                                                                                                | 1312552-2                                                                    |                          |                                         |                                                                            |                                                                                               | Soln Co                                                                 | nc. Units:            | ppm                                                                                                             |                    |                          |
| Bottle ID:<br>Prod Code: NWTF                                                                                                                              | PH-DX NW TPH                                                                 |                          | Tier:<br>Collect Date:                  |                                                                            |                                                                                               | Matrix:<br>Receive                                                      |                       | NOT /                                                                                                           |                    | CABLE                    |
| Analysis Lot:KWG1Analysis Method:8015CPrep Ref:                                                                                                            | 1312552                                                                      |                          | Prep Lot:<br>Prep Method:<br>Prep Date: |                                                                            |                                                                                               | Report                                                                  | Group:                | na ka Guptakan kanga dan pangan kanga dan p |                    |                          |
| Quant Method: J:\GC2<br>Title:                                                                                                                             | 1\METHODS\0910131                                                            | FSRO.M                   |                                         |                                                                            |                                                                                               | Calibrat                                                                | tion ID:              | CALI                                                                                                            | 2766               |                          |
| MB Ref:                                                                                                                                                    |                                                                              |                          |                                         |                                                                            |                                                                                               | Method                                                                  |                       | MJ745                                                                                                           | ;                  |                          |
| MD KI.                                                                                                                                                     | an a                                     |                          |                                         |                                                                            |                                                                                               | Quant                                                                   | based on I            | vietnoa                                                                                                         |                    |                          |
|                                                                                                                                                            |                                                                              |                          |                                         |                                                                            | 20002220000000000000000000000000000000                                                        | Quant                                                                   | based on f            | vietnoa                                                                                                         |                    | 1940001,00-001,00-000,00 |
| <del>มของสาวสุขางสาววัตรออสสาวสาวสาว (1976) (1976) (1</del> 976)                                                                                           | RT                                                                           | RT<br>Dev                |                                         | Respons                                                                    | Solu<br>se C                                                                                  | tion                                                                    | 6Rec                  | %Rec<br>Limits                                                                                                  | Angen and a second | Rpt?                     |
| Surrogate Compounds                                                                                                                                        |                                                                              |                          |                                         | Respons<br>3163                                                            | se C                                                                                          | tion                                                                    |                       | %Rec                                                                                                            | NA                 | Rpt?                     |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl                                                                               |                                                                              | Dev                      |                                         | -                                                                          | se C                                                                                          | tion<br>Conc %                                                          |                       | %Rec<br>Limits                                                                                                  |                    | Rpt?                     |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenzene                                                                                              | e 2.89                                                                       | <b>Dev</b>               |                                         | 3163                                                                       | se C<br>5 55<br>2 52                                                                          | tion<br>Conc 9                                                          |                       | %Rec<br>Limits<br>50-150                                                                                        | NA                 | Rpt?                     |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane                                                              | e 2.89<br>5.58                                                               | Dev<br>?<br>?            |                                         | 3163<br>6724<br>5689                                                       | se C<br>5 55<br>2 52                                                                          | tion<br>Conc 9<br>5.79<br>2.81<br>1.93                                  |                       | %Rec<br>Limits<br>50-150<br>55-133                                                                              | NA                 | Rpt?                     |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane                                                              | e 2.89<br>5.58                                                               | Dev<br>?<br>?            |                                         | 3163<br>6724<br>5689                                                       | se C<br>5 55<br>2 52<br>9 54<br>Final Conc. Un<br>Solu                                        | tion %<br>Conc %<br>5.79<br>2.81<br>1.93<br>its:                        | 6Rec                  | %Rec<br>Limits<br>50-150<br>55-133                                                                              | NA                 | Rpt?                     |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds                                          | e 2.89<br>5.58<br>7.75                                                       | Dev<br>?<br>?<br>?<br>RT |                                         | 3163<br>6724<br>5689<br>1                                                  | e C                                                                                           | tion %<br>Sonc %<br>5.79<br>2.81<br>1.93<br>its:<br>tion                | 6Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133                                                                              | NA<br>NA           |                          |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane<br>Farget Compounds<br>Parameter Name                        | e 2.89<br>5.58<br>7.75<br><b>RT</b>                                          | Dev<br>?<br>?<br>?<br>RT |                                         | 3163<br>6724<br>5689<br>1<br>Respons                                       | se C<br>5 55<br>2 52<br>9 54<br>Final Conc. Un<br>e C<br>4 1,0                                | tion<br>Conc 9<br>5.79<br>2.81<br>4.93<br>its:<br>tion<br>onc           | 6Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133                                                                              | NA<br>NA           |                          |
| Surrogate Compounds<br>Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds<br>Parameter Name<br>C9 - C24 DRO        | e 2.89<br>5.58<br>7.75<br><b>RT</b><br>2.75                                  | Dev<br>?<br>?<br>?<br>RT |                                         | 3163<br>6724<br>5689<br>1<br>Respons<br>1169024                            | se C<br>5 55<br>2 52<br>9 54<br>Final Conc. Un<br>Solu<br>e C<br>4 1,<br>7 1,                 | tion %<br>Conc %<br>5.79<br>2.81<br>4.93<br>its:<br>tion<br>conc<br>016 | 6Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133                                                                              | NA<br>NA           |                          |
| Surrogate Compounds Parameter Name 4-Bromofluorobenzene o-Terphenyl n-Triacontane Farget Compounds Parameter Name C9 - C24 DRO C10 - C25 DRO               | e 2.89<br>5.58<br>7.75<br><b>RT</b><br>2.75<br>3.23<br>3.13                  | Dev<br>?<br>?<br>?<br>RT | · · · · · · · · · · · · · · · · · · ·   | 3163<br>6724<br>5689<br>1<br><b>Respons</b><br>1169024<br>113564           | se C<br>5 55<br>2 52<br>9 54<br>Final Conc. Un<br>e C<br>4 1,<br>7 1,<br>7 1,                 | tion 9<br>5.79<br>2.81<br>4.93<br>its:<br>tion<br>016<br>003<br>008     | 6Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133                                                                              | NA<br>NA           |                          |
| Surrogate Compounds Parameter Name 4-Bromofluorobenzene o-Terphenyl n-Triacontane Target Compounds Parameter Name C9 - C24 DRO C10 - C25 DRO C10 - C28 DRO | e 2.89<br>5.58<br>7.75<br><b>RT</b><br>2.75<br>3.23<br>3.13<br>\$ (DRO) 3.78 | Dev<br>?<br>?<br>?<br>RT |                                         | 3163<br>6724<br>5689<br>1<br><b>Respons</b><br>1169024<br>113564<br>114211 | se C<br>5 55<br>2 52<br>9 54<br>Final Conc. Un<br>Solu<br>e C<br>4 1,<br>7 1,<br>7 1,<br>8 1, | tion %<br>5.79<br>2.81<br>4.93<br>its:<br>tion %<br>onc 016<br>003      | 6Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133                                                                              | NA<br>NA           |                          |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

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D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

J:\GC21\DATA\110813F\1108F056.D

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\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL

c: check for co-elution

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\110813F\1108F056.D Vial: 96 Acq On : 08 Nov 2013 5:17 pm Operator: DVaillenco Sample : DRO @ 1000/50ppm | SVF01-44J Inst : GC21 Misc : Multiplr: 1.00 IntFile : rteint.p Quant Time: Nov 09 11:35:33 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF\_FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound System Monitoring Compounds 

 System Monitoring Compounds

 1) S 4-Bromofluorobenzene
 2.89
 31635
 55.793 ppm

 spiked Amount 50.000
 Recovery
 = 111.59%

 2) S o-Terphenyl
 5.58
 67242
 52.811 ppm

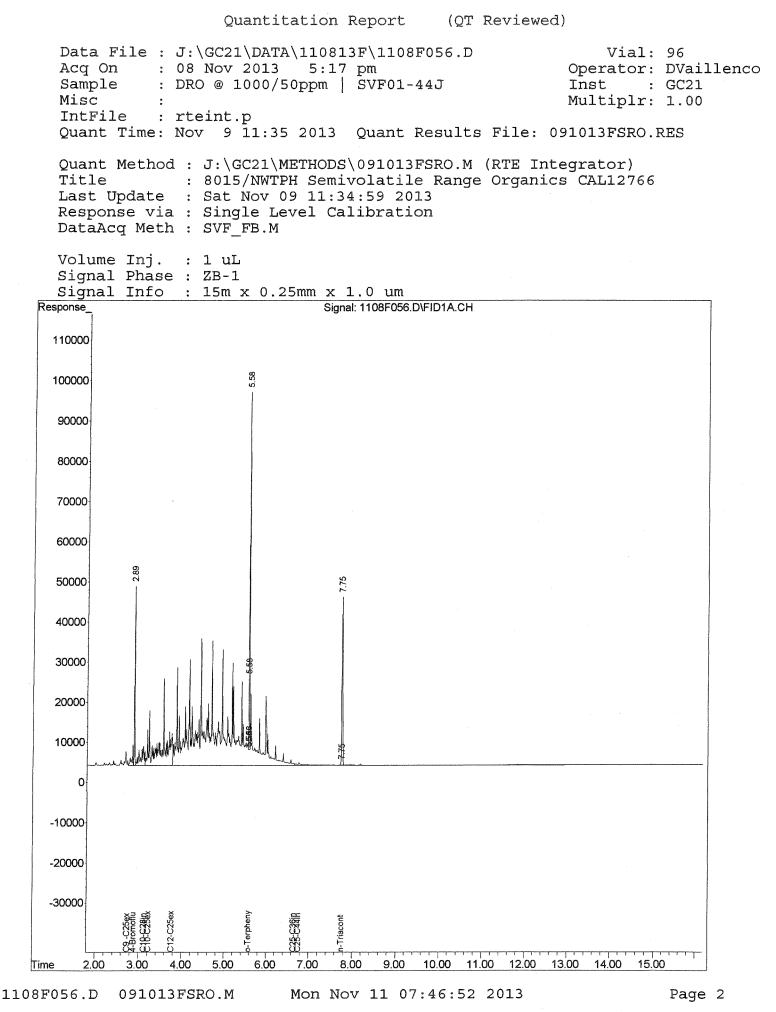
 spiked Amount 50.000
 Recovery
 = 105.62%

 3) S n-Triacontane
 7.75
 56899
 54.927 ppm

 Spiked Amount 50.000 Spiked Amount 50.000 Recovery = 109.85% Spiked Amount 50.000 Target Compounds 4) HC9 -C25ex DRO [TPH-Diesel]2.751169024 1015.656 ppm5) HC10-C25ex DRO [AK102]3.231135647 1003.398 ppm6) HC10-C28in DRO [8015]3.131142117 1007.739 ppm7) HC12-C25ex DRO [NWTPH]3.78981468 1016.571 ppm8) HC25-C36in RRO [NWTPH]6.669903 1.959 ppm9) HC25-C44in RRO [TPH-Oil]6.7617212 13.269 ppm

(f)=RT Delta > 1/2 Window 1108F056.D 091013FSRO.M

Mon Nov 11 07:46:51 2013



# Data File:J:\GC21\DATA\110813F\1108F058.DLab ID:KWG1312552-2RunType:CCVMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/08/2013 17:39 11/11/2013 07:41 KWG1312552 NWTPH-Dx MJ1081

## Sample Exceptions

| Exception Categories                  | Result | Low Limit | High Limit | Pass | Fail                                                                                                            |
|---------------------------------------|--------|-----------|------------|------|-----------------------------------------------------------------------------------------------------------------|
| ICAL Analyte Recovery                 | NA     | NA        | NA         | x    |                                                                                                                 |
| Second Source ICAL Verification       | NA     | NA        | NA         | x    | <b></b>                                                                                                         |
| Analyte Co-elution                    | NA     | NA        | NA         | X    | and the state of the |
| Below Lowest ICAL Level               | NA     | NA        | NA         | X    |                                                                                                                 |
| Above Highest ICAL Level              | NA     | NA        | NA         | x    | 8276-849-7-64-2-000-800-800-800-800-800-800-800-800-8                                                           |
| Enviroquant/Stealth Calibration Check | NA     | NA        | NA         | x    | and the formation of the second                                                                                 |

Primary Review Secondary Review:

| Data File:<br>Acqu Date:<br>Run Type:<br>Lab ID: | J:\GC21\DATA\11<br>11/08/2013 17:39<br>CCV<br>KWG1312552-2 | 0813F\11( | 08F058.D                                | Quant Date:                             | 11/11/2013 07:41 | Via<br>Dil       | trument:<br>1:<br>ution:<br>n Conc. Units: | GC21<br>97<br>1.0<br>ppm |                                        |          |
|--------------------------------------------------|------------------------------------------------------------|-----------|-----------------------------------------|-----------------------------------------|------------------|------------------|--------------------------------------------|--------------------------|----------------------------------------|----------|
| Bottle ID:<br>Prod Code:                         | NWTPH-DX NW                                                | ТРН       | 999995209929920992992292222222222222222 | Tier:<br>Collect Date:                  |                  |                  | trix:<br>ceive Date:                       | NOT .<br>11/11/          |                                        | CABLE    |
| Analysis Lot:<br>Analysis Method:<br>Prep Ref:   | KWG1312552<br>NWTPH-Dx                                     |           |                                         | Prep Lot:<br>Prep Method:<br>Prep Date: |                  | Reg              | oort Group:                                |                          | 50000000000000000000000000000000000000 | ······   |
| Quant Method:<br>Title:                          | J:\GC21\METHOD                                             | S\091013I | FSRO.M                                  |                                         |                  | Cal              | ibration ID:                               | CAL12                    | 2766                                   |          |
| MB Ref:                                          |                                                            |           |                                         |                                         |                  |                  | thod ID:<br>ant based on I                 | MJ108<br>Method          | 31                                     |          |
| Surrogate Comp                                   | ounds                                                      |           |                                         |                                         |                  |                  |                                            |                          |                                        |          |
| Parameter Na                                     | ne                                                         | RT        | RT<br>Dev                               |                                         | Response         | Solution<br>Conc | %Rec                                       | %Rec<br>Limits           |                                        | Rpt?     |
| o-Terphenyl<br>n-Triacontane                     |                                                            |           |                                         |                                         | 0<br>0 <b>d</b>  | nii (111         |                                            | 50-150<br>50-150         |                                        | NR<br>NR |
| arget Compoun                                    | ds                                                         |           |                                         |                                         | Final            | Conc. Units:     |                                            |                          |                                        |          |
| Parameter Nan                                    | ne                                                         | RT        | RT<br>Dev                               | м-облато-бала Спалаласа (на на куска)   | Response         | Solution<br>Conc | Final<br>Conc                              |                          | Q                                      | Rpt?     |
| -                                                | Organics (DRO)                                             | 3.78      |                                         |                                         | 100092           | 103.67           |                                            |                          |                                        | NR       |

671644

Residual Range Organics (RRO) 6.66

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank

E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

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D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

1,113

•: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

| Data File:<br>Acqu Date:<br>Run Type:<br>Lab ID: | J:\GC21\DATA\11<br>11/08/2013 17:39<br>CCV<br>KWG1312552-2 |                          | )8F058.D                       | Quant Date:                             | 11/11/2013 07:41     | Vial:<br>Dilu    |                   | GC21<br>97<br>1.0<br>ppm |                |          |
|--------------------------------------------------|------------------------------------------------------------|--------------------------|--------------------------------|-----------------------------------------|----------------------|------------------|-------------------|--------------------------|----------------|----------|
| Bottle ID:<br>Prod Code:                         | NWTPH-DX NW                                                | ТРН                      |                                | Tier:<br>Collect Date:                  |                      | Matı<br>Rece     | rix:<br>ive Date: | NOT A<br>11/11/2         |                | CABLI    |
| Analysis Lot:<br>Analysis Method:<br>Prep Ref:   | KWG1312552<br>8015C                                        |                          |                                | Prep Lot:<br>Prep Method:<br>Prep Date: |                      | Repo             | ort Group:        |                          |                |          |
| Quant Method:<br>Title:<br>MB Ref:               | J:\GC21\METHOE                                             | DS\091013                | FSRO.M                         |                                         |                      | Meth             | oration ID:       | CAL12<br>MJ108           |                |          |
| Surrogate Comp                                   | ounds                                                      |                          |                                |                                         |                      |                  | nt based on 3     | WIEthod                  |                |          |
| Parameter Na                                     | me                                                         | RT                       | RT<br>Dev                      |                                         | Response             | Solution<br>Conc | %Rec              | %Rec<br>Limits           | *****          | Rpt?     |
| 4-Bromofluor<br>o-Terphenyl<br>n-Triacontane     |                                                            |                          |                                |                                         | 0<br>0<br>0 <b>d</b> |                  | <u> </u>          |                          | NA<br>NA<br>NA | NR<br>NR |
| Target Compoun                                   | ıds                                                        | Methons and accurate sec | 9/84/DA 1// 240/00/00/00/00/00 | -                                       | Final C              | onc. Units:      |                   |                          |                |          |
| Parameter Na                                     | me                                                         | RT                       | RT<br>Dev                      |                                         | Response             | Solution<br>Conc | Final<br>Conc     |                          | Q              | Rpt?     |
| C10 - C25 DR<br>C10 - C28 DR                     | kO                                                         | 3.23<br>3.13             |                                |                                         | 101181<br>299930     | 89.40<br>264.64  |                   |                          |                |          |
|                                                  | Organics (DRO)<br>ge Organics (RRO)                        | 3.78<br>6.66             |                                |                                         | 671644               | 103.67           |                   |                          |                | NR       |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

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D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

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J:\GC21\DATA\110813F\1108F058.D

| Data File:         J:\GC21\DATA\1           Acqu Date:         11/08/2013         17:33           Run Type:         CCV           Lab ID:         KWG1312552-2 |           | 08F058.D                                                                                                        | Quant Date:                                                                                                     | 11/11/2013 07:41                 | Vial<br>Dilu     | rument:<br>:<br>tion:<br>Conc. Units | GC21<br>97<br>1.0<br>: ppm |      |                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------|------------------|--------------------------------------|----------------------------|------|---------------------------------------------------------------|
| Bottle ID:<br>Prod Code: NWTPH-DX NW                                                                                                                           | TPH -     |                                                                                                                 | Tier:<br>Collect Date:                                                                                          |                                  | Mat:<br>Rece     | rix:<br>eive Date:                   | NOT .<br>11/11.            |      | CABLE                                                         |
| Analysis Lot:KWG1312552Analysis Method:8015CPrep Ref:                                                                                                          |           |                                                                                                                 | Prep Lot:<br>Prep Method:<br>Prep Date:                                                                         |                                  | Repo             | ort Group:                           |                            |      |                                                               |
| Quant Method: J:\GC21\METHO                                                                                                                                    | DS\091013 | FSRO.M                                                                                                          | nen versen en e                                                                |                                  | Calil            | oration ID:                          | CALI                       | 2766 | 54010-7- <sup>6</sup> 0-00-00-00-00-00-00-00-00-00-00-00-00-0 |
| MB Ref:                                                                                                                                                        |           | 10 Mar |                                                                                                                 | 9. Hilion internet concernations |                  | od ID:<br>nt based on                | MJ745<br>Method            | 5    |                                                               |
| Surrogate Compounds                                                                                                                                            |           |                                                                                                                 | an the first the state of the state of the first state of the state of the state of the state of the state of t |                                  |                  |                                      |                            |      |                                                               |
| Parameter Name                                                                                                                                                 | RT        | RT<br>Dev                                                                                                       |                                                                                                                 | Response                         | Solution<br>Conc | %Rec                                 | %Rec<br>Limits             |      | Rpt?                                                          |
| 4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane                                                                                                           |           |                                                                                                                 |                                                                                                                 | 0<br>0<br>0 <b>d</b>             |                  |                                      | 50-150<br>55-133<br>54-136 | NA   | NR<br>NR                                                      |
| Target Compounds                                                                                                                                               |           |                                                                                                                 |                                                                                                                 | <b>Final</b> (                   | Conc. Units:     | ug/L                                 |                            |      |                                                               |
| Parameter Name                                                                                                                                                 | RT        | RT<br>Dev                                                                                                       |                                                                                                                 | Response                         | Solution<br>Conc | Fina<br>Cone                         | -                          | Q    | Rpt?                                                          |
| C9 - C24 DRO                                                                                                                                                   | 2.75      |                                                                                                                 |                                                                                                                 | 101990                           | 88.61            |                                      |                            |      |                                                               |
| C10 - C25 DRO                                                                                                                                                  | 3.23      |                                                                                                                 |                                                                                                                 | 101181                           | 89.40            |                                      |                            |      |                                                               |
| C10 - C28 DRO                                                                                                                                                  | 3.13      |                                                                                                                 |                                                                                                                 | 299930                           | 264.64           |                                      |                            |      |                                                               |
| Diesel Range Organics (DRO)                                                                                                                                    | 3.78      |                                                                                                                 |                                                                                                                 | 100092                           | 103.67           |                                      |                            |      | NR                                                            |
| Residual Range Organics (RRO)<br>C25 - C44 RRO                                                                                                                 | 6.66      |                                                                                                                 |                                                                                                                 | 671644                           | 1,113            |                                      |                            |      |                                                               |
|                                                                                                                                                                | 6.76      |                                                                                                                 |                                                                                                                 | 1015462                          | 1,125            |                                      |                            |      |                                                               |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL E: Hit above MRL also found in Method Blank

E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

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D: Result from dilution d: Compound manually deleted NR: Analyte not reported from this analysis

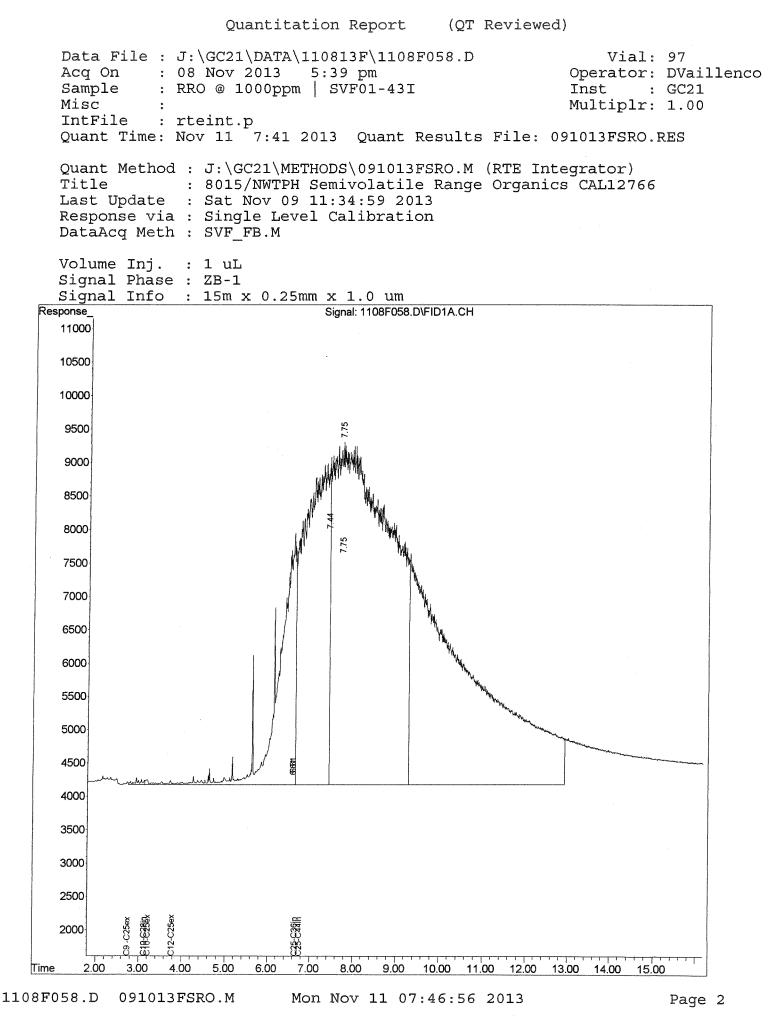
\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F058.D

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\110813F\1108F058.D Vial: 97 Acq On : 08 Nov 2013 5:39 pm Operator: DVaillenco : 08 Nov 2013 5:39 pm : RRO @ 1000ppm | SVF01-43I Sample Inst : GC21 Misc : Multiplr: 1.00 IntFile : rteint.p Quant Time: Nov 09 11:35:34 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_ System Monitoring Compounds Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.7510199088.610 ppm5) HC10-C25ex DRO[AK102]3.2310118189.398 ppm6) HC10-C28in DRO[8015]3.13299930264.641 ppm7) HC12-C25ex DRO[NWTPH]3.78100092103.672 ppm8) HC25-C36in RRO[NWTPH]6.666716441112.934 ppm9) HC25-C44in RRO[TPH-Oil]6.7610154621124.591 ppm

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Page 1



#### ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

| Client:  | KTA Associates                        |
|----------|---------------------------------------|
| Project: | PacifiCorp-Chehalis Power Groundwater |

#### Service Request: K1311914 Date Analyzed: 11/08/2013

#### Continuing Calibration Verification Summary Diesel and Residual Range Organics - Silica Gel Treated

| Calibration Type:<br>Analysis Method: | External Standard<br>NWTPH-Dx                                      | Calibration Date:<br>Calibration ID: |            |
|---------------------------------------|--------------------------------------------------------------------|--------------------------------------|------------|
| <i>v</i>                              |                                                                    | Analysis Lot:                        | KWG1312552 |
|                                       |                                                                    | Units:                               | ppm        |
| File ID:                              | J:\GC21\DATA\110813F\1108F086.D<br>J:\GC21\DATA\110813F\1108F088.D | Column ID:                           | ZB-1       |

| Analyte Name                  | Expected | Result | Average<br>RF | CCV<br>RF | %D | %Drift | Criteria | Curve Fit |
|-------------------------------|----------|--------|---------------|-----------|----|--------|----------|-----------|
| Diesel Range Organics (DRO)   | 1000     | 1100   | 965           | 1020      | 5  | NA     | ±15 %    | AverageRF |
| Residual Range Organics (RRO) | 1000     | 1100   | 709           | 665       | NA | 10     | ± 15 %   | Linear    |
| o-Terphenyl                   | 50       | 54     | 1270          | 1380      | 8  | NA     | ± 15 %   | AverageRF |
| n-Triacontane                 | 50       | 56     | 1040          | 1160      | 12 | NA     | ± 15 %   | AverageRF |

Results flagged with an asterisk (\*) indicate values outside control criteria.

## **Exception Report**

# Data File:J:\GC21\DATA\110813F\1108F086.DLab ID:KWG1312552-3RunType:CCVMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/08/2013 22:49 11/09/2013 11:35 KWG1312552 NWTPH-Dx MJ1081

## Sample Exceptions

| Exception Categories                  | Result | Low Limit | High Limit | Pass | Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------|--------|-----------|------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ICAL Analyte Recovery                 | NA     | NA        | NA         | x    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Second Source ICAL Verification       | NA     | NA        | NA         | x    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Analyte Co-elution                    | NA     | NA        | NA         | x    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Below Lowest ICAL Level               | NA     | NA        | NA         | x    | Contractor of the Address of the Add |
| Above Highest ICAL Level              | NA     | NA        | NA         | x    | ********                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Enviroquant/Stealth Calibration Check | NA     | NA        | NA         | x    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Primary Review Secondary Review:

| Data File:<br>Acqu Date:<br>Run Type:<br>Lab ID: | J:\GC21\DATA\110<br>11/08/2013 22:49<br>CCV<br>KWG1312552-3                  | 0813F\110 | 98F086.D  | Quant Date:                                                                                   | 11/09/2013 11:35         | Vial<br>Dilu                               | rument:<br>:<br>tion:<br>1 Conc. Units: | GC21<br>96<br>1.0<br>ppm |    |              |
|--------------------------------------------------|------------------------------------------------------------------------------|-----------|-----------|-----------------------------------------------------------------------------------------------|--------------------------|--------------------------------------------|-----------------------------------------|--------------------------|----|--------------|
| Bottle ID:<br>Prod Code:                         | NWTPH-DX NW 1                                                                | ТРН       |           | Tier:<br>Collect Date:                                                                        |                          | Mat<br>Reco                                | rix:<br>eive Date:                      | NOT /<br>11/11/          |    | CABLE        |
| Analysis Lot:<br>Analysis Method:<br>Prep Ref:   | KWG1312552<br>NWTPH-Dx                                                       |           |           | Prep Lot:<br>Prep Method:<br>Prep Date:                                                       |                          | Rep                                        | ort Group:                              |                          |    |              |
| Quant Method:<br>Title:                          | J:\GC21\METHOD                                                               | S\091013I | FSRO.M    | antinalmakati ang kata kata kata kata kata kata kata kat                                      |                          |                                            | bration ID:                             | CALI                     |    |              |
| MB Ref:                                          | nen itze aktor aktoleko haranta va erako data teriarrakan erako razona aktor |           |           |                                                                                               |                          | Method ID: MJ1081<br>Quant based on Method |                                         |                          |    | 949844545454 |
| Surrogate Comp                                   | ounds                                                                        |           |           |                                                                                               |                          |                                            |                                         |                          |    |              |
| Parameter Na                                     | me                                                                           | RT        | RT<br>Dev |                                                                                               | Response                 | Solution<br>Conc                           | %Rec                                    | %Rec<br>Limits           |    | Rpt?         |
| o-Terphenyl                                      | Mr64 E                                                                       | 5.58      |           |                                                                                               | 68972                    | 54.17                                      |                                         | 50-150                   | NA |              |
| n-Triacontane                                    | ;                                                                            | 7.75      |           |                                                                                               | 57783                    | 55.78                                      |                                         | 50-150                   | NA |              |
| Target Compour                                   | ıds                                                                          |           |           |                                                                                               | Final                    | Conc. Units:                               |                                         |                          |    |              |
| Parameter Na                                     | me                                                                           | RT        | RT<br>Dev | en en el comensan en un de se se par la companya en analysis de la companya en analysis en an | Response                 | Solution<br>Conc                           | Fina<br>Con                             | -                        | Q  | Rpt?         |
| -                                                | Organics (DRO)<br>ge Organics (RRO)                                          | 3.78      |           |                                                                                               | 1016 <b>7</b> 85<br>8194 | 1,053                                      |                                         |                          |    |              |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F086.D

| Acqu Date: 11<br>Run Type: C | \GC21\DATA\1<br>1/08/2013 22:4<br>CV<br>WG1312552-3 |            | )8F086.D                                         | Quant Date:                             | 11/09/2013 11:35                                                                                               | Vial<br>Dilu     | rument:<br>;<br>tion:<br>Conc. Units: | GC21<br>96<br>1.0<br>ppm |      |       |
|------------------------------|-----------------------------------------------------|------------|--------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------|---------------------------------------|--------------------------|------|-------|
| Bottle ID:<br>Prod Code: N   | WTPH-DX NW                                          | TPH        | 2010-0-12/00/00/00/00/00/00/00/00/00/00/00/00/00 | Tier:<br>Collect Date:                  |                                                                                                                | Mat<br>Reco      | rix:<br>tive Date:                    | NOT .<br>11/11           |      | CABLE |
|                              | WG1312552<br>115C                                   |            |                                                  | Prep Lot:<br>Prep Method:<br>Prep Date: |                                                                                                                | Repo             | ort Group:                            |                          |      |       |
| Quant Method: J:\<br>Title:  | GC21\METHO                                          | DS\091013I | FSRO.M                                           |                                         | der seine machanismen in der sich diese minister eine der sonder von der sonder sonder der sondere sondere son | Calil            | oration ID:                           | CALI                     | 2766 |       |
| MB Ref:                      |                                                     |            |                                                  |                                         |                                                                                                                |                  | od ID:<br>nt based on                 | MJ108<br>Method          | 32   |       |
| Surrogate Compour            | nds                                                 | Dira       | RT                                               |                                         |                                                                                                                | Solution         |                                       | %Rec                     |      |       |
|                              |                                                     | RT         | Dev                                              |                                         | Response                                                                                                       | Conc             | %Rec                                  | Limits                   |      | Rpt?  |
| 4-Bromofluorober             | nzene                                               | 2.89       |                                                  |                                         | 32959                                                                                                          | 58.13            |                                       | 70-129                   | NA   |       |
| o-Terphenyl                  |                                                     | 5.58       |                                                  |                                         | 68972                                                                                                          | 54.17            |                                       | 51-126                   | NA   |       |
| n-Triacontane                |                                                     | 7.75       |                                                  |                                         | 57783                                                                                                          | 55.78            |                                       | 50-150                   | NA   |       |
| arget Compounds              |                                                     |            |                                                  |                                         | Final C                                                                                                        | Conc. Units:     |                                       |                          |      |       |
| Parameter Name               |                                                     | RT         | RT<br>Dev                                        |                                         | Response                                                                                                       | Solution<br>Conc | Final<br>Conc                         |                          | Q    | Rpt?  |
| C10 - C25 DRO                |                                                     | 3.23       |                                                  |                                         | 1177212                                                                                                        | 1,040            | ******                                |                          |      |       |
| C10 - C28 DRO                |                                                     | 3.13       |                                                  |                                         | 1183036                                                                                                        | 1,044            |                                       |                          |      |       |
| Diesel Range Orga            | anics (DRO)                                         | 3.78       |                                                  |                                         | 1016785                                                                                                        | 1,053            |                                       |                          |      |       |
| Residual Range O             | rganics (RRO)                                       |            | *****                                            |                                         | 8194                                                                                                           |                  |                                       | ******                   |      |       |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:35:12 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

| Acqu Date:11/0Run Type:CCV                                                                                                                                                         | C21\DATA\1108<br>08/2013 22:49<br>V<br>G1312552-3 | 13F\11                                                    | 08F086.D       | Quant Date:                             | 11/09/2013                                                      | 11:35                                                     | Vial<br>Dilu                                                                                              | rument:<br>:<br>tion:<br>Conc. Units: | GC21<br>96<br>1.0<br>ppm                     |          |                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------|----------------|-----------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------|----------|-----------------------------------------------|
| Bottle ID:<br>Prod Code: NW                                                                                                                                                        | TPH-DX NW TP                                      | H                                                         |                | Tier:<br>Collect Date:                  |                                                                 | ****                                                      | Mati<br>Rece                                                                                              | rix:<br>tive Date:                    | NOT /                                        |          | CABLE                                         |
| Analysis Lot: KWG<br>Analysis Method: 8015<br>Prep Ref:                                                                                                                            | G1312552<br>5C                                    |                                                           |                | Prep Lot:<br>Prep Method:<br>Prep Date: |                                                                 |                                                           | Repo                                                                                                      | ort Group:                            |                                              |          | <u>, , , , , , , , , , , , , , , , , , , </u> |
| Quant Method: J:\GC<br>Title:                                                                                                                                                      | C21\METHODS\(                                     | 091013                                                    | FSRO.M         |                                         |                                                                 | CB/ACCINALINALINA (Spiniska)                              | Calil                                                                                                     | pration ID:                           | CAL12                                        | 2766     |                                               |
| MD D-6                                                                                                                                                                             |                                                   |                                                           |                |                                         |                                                                 |                                                           |                                                                                                           | nod ID:                               | MJ745                                        | ;        |                                               |
| MB Ref:                                                                                                                                                                            |                                                   |                                                           |                |                                         |                                                                 |                                                           | Qua                                                                                                       | nt based on i                         | Method                                       |          |                                               |
| and a second                                                                     | ls                                                |                                                           |                |                                         |                                                                 |                                                           | Qua                                                                                                       | nt based on .                         | Method                                       |          | -                                             |
| and a second                                                                     | ls                                                | RT                                                        | RT<br>Dev      |                                         | Resp                                                            | onse                                                      | Qua<br>Solution<br>Conc                                                                                   | nt based on .<br>%Rec                 | Method<br>%Rec<br>Limits                     |          | Rpt?                                          |
| urrogate Compound                                                                                                                                                                  |                                                   | <b>RT</b><br>2.89                                         |                |                                         |                                                                 | onse<br>959                                               | Solution                                                                                                  |                                       | %Rec                                         | NA       | Rpt?                                          |
| <i>urrogate Compound</i><br>Parameter Name                                                                                                                                         | ene 2                                             |                                                           | Dev            |                                         | 32                                                              |                                                           | Solution<br>Conc                                                                                          |                                       | %Rec<br>Limits                               |          | Rpt?                                          |
| <i>Furrogate Compound</i><br>Parameter Name<br>4-Bromofluorobenze                                                                                                                  | ene 2                                             | 2.89                                                      | <b>Dev</b>     |                                         | 32                                                              | 959                                                       | Solution<br>Conc<br>58.13                                                                                 |                                       | %Rec<br>Limits<br>50-150                     | NA       | Rpt?                                          |
| Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl<br>n-Triacontane                                                                                                               | ene 2                                             | 2.89<br>5.58                                              | <b>Dev</b> ? ? |                                         | 32                                                              | 959<br>972<br>783                                         | Solution<br>Conc<br>58.13<br>54.17                                                                        |                                       | %Rec<br>Limits<br>50-150<br>55-133           | NA       | Rpt?                                          |
| Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl<br>n-Triacontane                                                                                                               | ene 2                                             | 2.89<br>5.58                                              | <b>Dev</b> ? ? | · · · · · · · · · · · · · · · · · · ·   | 32                                                              | 959<br>972<br>783<br>Final C                              | Solution<br>Conc<br>58.13<br>54.17<br>55.78                                                               | %Rec                                  | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA       | Rpt?<br>Rpt?                                  |
| Furrogate Compound<br>Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds                                                                     | ene                                               | 2.89<br>5.58<br>7.75                                      | Dev ? ? ? ?    |                                         | 32<br>68<br>57                                                  | 959<br>972<br>783<br>Final C                              | Solution<br>Conc<br>58.13<br>54.17<br>55.78<br>onc. Units:<br>Solution                                    | %Rec<br>ug/L<br>Final                 | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA |                                               |
| Furrogate Compound<br>Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds<br>Parameter Name                                                   | ene 2                                             | 2.89<br>5.58<br>7.75<br><b>RT</b>                         | Dev ? ? ? ?    |                                         | 32<br>68<br>57<br>Respo                                         | 959<br>972<br>783<br>Final C<br>onse<br>864               | Solution<br>Conc<br>58.13<br>54.17<br>55.78<br>onc. Units:<br>Solution<br>Conc                            | %Rec<br>ug/L<br>Final                 | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA |                                               |
| Surrogate Compound<br>Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds<br>Parameter Name<br>C9 - C24 DRO                                   | ene 2<br>2<br>2<br>3                              | 2.89<br>5.58<br>7.75<br><b>RT</b>                         | Dev ? ? ? ?    |                                         | 32<br>68<br>57<br><b>Respo</b><br>1211                          | 959<br>972<br>783<br>Final C<br>onse<br>864<br>212        | Solution<br>Conc<br>58.13<br>54.17<br>55.78<br>onc. Units:<br>Solution<br>Conc<br>1,053                   | %Rec<br>ug/L<br>Final                 | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA |                                               |
| Surrogate Compound<br>Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds<br>Parameter Name<br>C9 - C24 DRO<br>C10 - C25 DRO<br>C10 - C28 DRO | ene 2<br>2<br>3<br>3                              | 2.89<br>5.58<br>7.75<br><b>RT</b><br>2.75<br>5.23         | Dev ? ? ? ?    |                                         | 32<br>68<br>57<br><b>Respo</b><br>1211<br>1177<br>11830         | 959<br>972<br>783<br>Final C<br>onse<br>864<br>212<br>036 | Solution<br>Conc<br>58.13<br>54.17<br>55.78<br>onc. Units:<br>Solution<br>Conc<br>1,053<br>1,040<br>1,044 | %Rec<br>ug/L<br>Final                 | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA |                                               |
| Surrogate Compound<br>Parameter Name<br>4-Bromofluorobenze<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds<br>Parameter Name<br>C9 - C24 DRO<br>C10 - C25 DRO                  | ene                                               | 2.89<br>5.58<br>7.75<br><b>RT</b><br>2.75<br>5.23<br>5.13 | Dev ? ? ? ?    |                                         | 32<br>68<br>57<br><b>Respo</b><br>1211<br>1177<br>11830<br>1016 | 959<br>972<br>783<br>Final C<br>onse<br>864<br>212<br>036 | Solution<br>Conc<br>58.13<br>54.17<br>55.78<br>onc. Units:<br>Solution<br>Conc<br>1,053<br>1,040          | %Rec<br>ug/L<br>Final                 | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA |                                               |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:35:19 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F086.D

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\110813F\1108F086.D Vial: 96 Operator: DVaillenco Inst : GC21 Acq On : 08 Nov 2013 10:49 pm Sample : DRO @ 1000/50ppm | SVF01-44J Misc Multiplr: 1.00 : IntFile : rteint.p Quant Time: Nov 09 11:35:46 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units 

 System Monitoring Compounds

 1) S 4-Bromofluorobenzene
 2.89
 32959
 58.128 ppm

 Spiked Amount 50.000
 Recovery
 = 116.26%

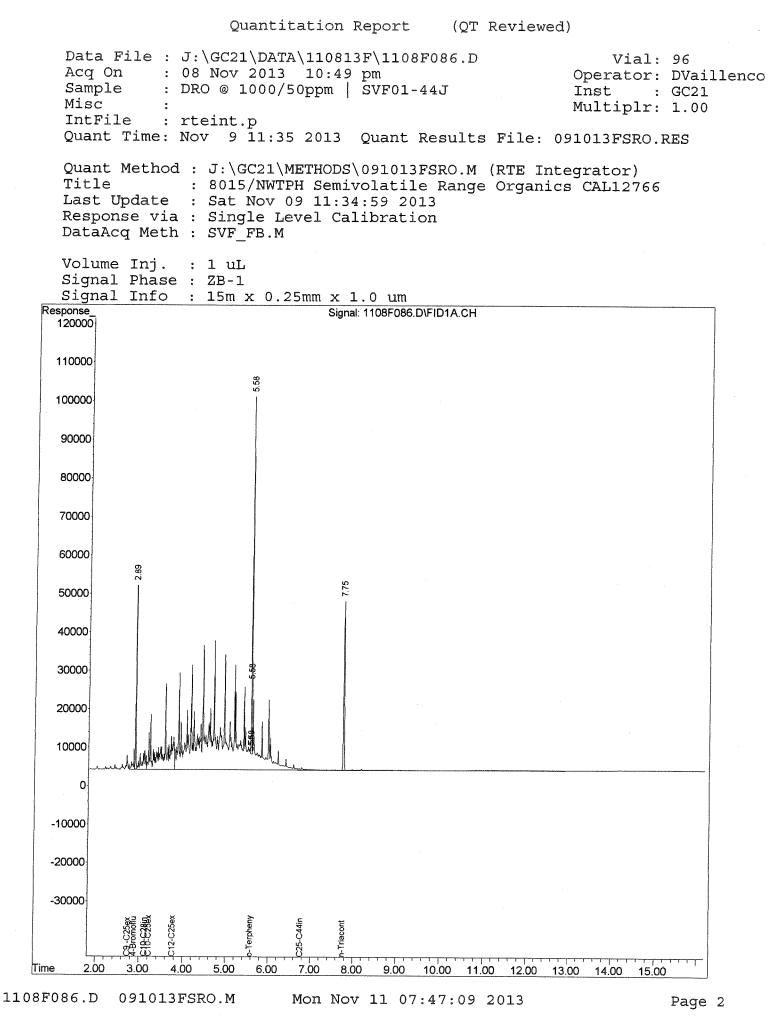
 2) S o-Terphenyl
 5.58
 68972
 54.170 ppm

 Spiked Amount 50.000
 Recovery
 = 108.34%

 3) S n-Triacontane
 7.75
 57783
 55.780 ppm

 Spiked Amount 50.000
 Recovery
 = 111.56%

 System Monitoring Compounds Target Compounds 4) HC9 -C25ex DRO [TPH-Diesel]2.7512118641052.876ppm5) HC10-C25ex DRO [AK102]3.2311772121040.122ppm6) HC10-C28in DRO [8015]3.1311830361043.843ppm7) HC12-C25ex DRO [NWTPH]3.7810167851053.151ppm9) HC25-C44in RRO [TPH-Oil]6.761951715.835ppm



# Data File:J:\GC21\DATA\110813F\1108F088.DLab ID:KWG1312552-3RunType:CCVMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/08/2013 23:11 11/11/2013 07:37 KWG1312552 NWTPH-Dx MJ1081

#### Sample Exceptions

| Exception Categories                  | Result | Low Limit | High Limit | Pass | Fail                        |
|---------------------------------------|--------|-----------|------------|------|-----------------------------|
| ICAL Analyte Recovery                 | NA     | NA        | NA         | x    |                             |
| Second Source ICAL Verification       | NA     | NA        | NA         | x    |                             |
| Analyte Co-elution                    | NA     | NA        | NA         | x    |                             |
| Below Lowest ICAL Level               | NA     | NA        | NA         | x    | 1003641954220-2004020000000 |
| Above Highest ICAL Level              | NA     | NA        | NA         | X    |                             |
| Enviroquant/Stealth Calibration Check | NA     | NA        | NA         | x    |                             |

Primary Review: Secondary Review:

| Data File;<br>Acqu Date:<br>Run Type:<br>Lab ID: | J:\GC21\DATA\11<br>11/08/2013 23:11<br>CCV<br>KWG1312552-3 | 0813F\110    | 8F088.D   | Quant Date:                             | 11/11/2013 07:37                   | Vial:<br>Dilut   |                                        | GC21<br>97<br>1.0<br>ppm        |   |       |
|--------------------------------------------------|------------------------------------------------------------|--------------|-----------|-----------------------------------------|------------------------------------|------------------|----------------------------------------|---------------------------------|---|-------|
| Bottle ID:<br>Prod Code:                         | NWTPH-DX NW                                                | ГРН          |           | Tier:<br>Collect Date:                  |                                    | Mat<br>Rece      | ix:<br>ive Date:                       | NOT /<br>11/11/                 |   | CABLE |
| Analysis Lot:<br>Analysis Method:<br>Prep Ref:   | KWG1312552<br>NWTPH-Dx                                     |              |           | Prep Lot:<br>Prep Method:<br>Prep Date: |                                    | Repo             | rt Group:                              |                                 |   |       |
| Quant Method:<br>Title:<br>MB Ref:               | J:\GC21\METHOD                                             | S\091013F    | SRO.M     |                                         |                                    | Meth             | oration ID:<br>od ID:<br>nt based on   | CAL12<br>MJ108<br><b>Method</b> |   |       |
| Surrogate Comp                                   | ounds                                                      |              |           |                                         |                                    |                  |                                        |                                 |   |       |
| Parameter Na                                     | me                                                         | RT           | RT<br>Dev |                                         | Response                           | Solution<br>Conc | %Rec                                   | %Rec<br>Limits                  |   | Rpt?  |
| o-Terphenyl<br>n-Triacontane                     |                                                            |              |           |                                         | 0<br>0 <b>d</b>                    |                  |                                        | 50-150<br>50-150                |   | NR    |
| Target Compoun                                   | ıds                                                        |              |           |                                         | Final C                            | Conc. Units:     |                                        |                                 |   |       |
| Parameter Na                                     | ne                                                         | RT           | RT<br>Dev |                                         | Response                           | Solution<br>Conc | Final<br>Conc                          |                                 | Q | Rpt?  |
| -                                                | Organics (DRO)<br>ge Organics (RRO)                        | 3.78<br>6.66 |           |                                         | 10 <b>22</b> 06<br>664 <b>8</b> 01 | 105.86<br>1,101  | ************************************** |                                 |   |       |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:35:27 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F088.D

| Acqu Date:<br>Run Type:<br>Lab ID:                                                                                                                      | J:\GC21\DATA\11<br>11/08/2013 23:11<br>CCV<br>KWG1312552-3 | 0813F\110  | 8F088.D                                                                                                                                                                                                                            | Quant Date:                             | 11/11/2013 07:37                                      | Vial:<br>Dilu                                                 |                   | GC21<br>97<br>1.0<br>ppm                     |          |         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------------------------------|---------------------------------------------------------------|-------------------|----------------------------------------------|----------|---------|
| Bottle ID:<br>Prod Code:                                                                                                                                | NWTPH-DX NW                                                | ГРН        |                                                                                                                                                                                                                                    | Tier:<br>Collect Date:                  |                                                       | Matr                                                          | rix:<br>ive Date: | NOT /                                        |          | CABLF   |
| Analysis Lot:<br>Analysis Method:<br>Prep Ref:                                                                                                          | KWG1312552<br>8015C                                        |            | 90 2011 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 201<br>- 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 - 2012 | Prep Lot:<br>Prep Method:<br>Prep Date: |                                                       | Repo                                                          | ort Group:        |                                              |          |         |
| Quant Method:<br>Title:                                                                                                                                 | J:\GC21\METHOD                                             | S\091013F  | SRO.M                                                                                                                                                                                                                              |                                         | an ann an               | Calif                                                         | oration ID:       | CAL12                                        | 2766     |         |
|                                                                                                                                                         |                                                            |            |                                                                                                                                                                                                                                    |                                         |                                                       |                                                               | od ID:            | MJ108                                        | 32       |         |
| MB Ref:                                                                                                                                                 |                                                            |            |                                                                                                                                                                                                                                    |                                         |                                                       | Qua                                                           | nt based on ]     |                                              |          | ******  |
| MB Ref:<br>Surrogate Compo<br>Parameter Nan                                                                                                             | ***************************************                    | RT         | RT<br>Dev                                                                                                                                                                                                                          |                                         | Response                                              | Qua<br>Solution<br>Conc                                       | %Rec              | %Rec<br>Limits                               |          | Rpt?    |
| Surrogate Compo                                                                                                                                         | ne                                                         | RT         |                                                                                                                                                                                                                                    |                                         | Response                                              | Solution                                                      |                   | %Rec<br>Limits                               | NA       | Rpt?    |
| Surrogate Compo<br>Parameter Nan                                                                                                                        | ne                                                         | RT         |                                                                                                                                                                                                                                    |                                         | -                                                     | Solution                                                      |                   | %Rec                                         |          | Rpt?    |
| Furrogate Compo<br>Parameter Nan<br>4-Bromofluoro                                                                                                       | ne                                                         | RT         |                                                                                                                                                                                                                                    |                                         | 0                                                     | Solution                                                      |                   | %Rec<br>Limits<br>70-129                     | NA       |         |
| <b>Surrogate Compe</b><br>Parameter Nan<br>4-Bromofluoro<br>o-Terphenyl                                                                                 | ne<br>benzene                                              | RT         |                                                                                                                                                                                                                                    |                                         | 0<br>0<br>0 <b>d</b>                                  | Solution                                                      |                   | %Rec<br>Limits<br>70-129<br>51-126           | NA       |         |
| <b>Furrogate Compe</b><br>Parameter Nan<br>4-Bromofluoro<br>o-Terphenyl<br>n-Triacontane                                                                | ne<br>benzene<br>ds                                        | RT         |                                                                                                                                                                                                                                    |                                         | 0<br>0<br>0 <b>d</b>                                  | Solution<br>Conc                                              |                   | %Rec<br>Limits<br>70-129<br>51-126<br>50-150 | NA       |         |
| Furrogate Compo<br>Parameter Nan<br>4-Bromofluoro<br>o-Terphenyl<br>n-Triacontane<br>Carget Compound                                                    | ne<br>benzene<br>ds<br>ne                                  |            | Dev                                                                                                                                                                                                                                |                                         | 0<br>0<br>0 <b>d</b><br>Final C                       | Solution<br>Conc<br>Conc. Units:<br>Solution                  | %Rec<br>Final     | %Rec<br>Limits<br>70-129<br>51-126<br>50-150 | NA<br>NA | NR      |
| Furrogate Compe<br>Parameter Nan<br>4-Bromofluoro<br>o-Terphenyl<br>n-Triacontane<br>Carget Compound<br>Parameter Nan                                   | ne<br>benzene<br>ds<br>ne<br>D                             | RT         | Dev                                                                                                                                                                                                                                |                                         | 0<br>0<br>0d<br>Final C<br>Response                   | Solution<br>Conc<br>Conc. Units:<br>Solution<br>Conc          | %Rec<br>Final     | %Rec<br>Limits<br>70-129<br>51-126<br>50-150 | NA<br>NA | NR      |
| Furrogate Compo<br>Parameter Nan<br>4-Bromofluoro<br>o-Terphenyl<br>n-Triacontane<br>Carget Compound<br>Parameter Nan<br>C10 - C25 DRG<br>C10 - C28 DRG | ne<br>benzene<br>ds<br>ne<br>D                             | RT<br>3.23 | Dev                                                                                                                                                                                                                                |                                         | 0<br>0<br>0 <b>d</b><br>Final C<br>Response<br>103354 | Solution<br>Conc<br>Conc. Units:<br>Solution<br>Conc<br>91.32 | %Rec<br>Final     | %Rec<br>Limits<br>70-129<br>51-126<br>50-150 | NA<br>NA | NR Rpt? |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

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D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F088.D

| Acqu Date:11/0Run Type:CCV                                | C21\DATA\110<br>8/2013 23:11<br>7<br>G1312552-3 | 813F\110             | 8F088.D                                  | Quant Date:                                   | 11/11/2013        | 07:37                                                                                                           | Vial:<br>Dilut           |                                        | GC21<br>97<br>1.0<br>ppm   | 201925/1019722410-002                   | 10112-117-120-120-120-140-1-00 |
|-----------------------------------------------------------|-------------------------------------------------|----------------------|------------------------------------------|-----------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------------|----------------------------|-----------------------------------------|--------------------------------|
| Bottle ID:<br>Prod Code: NW                               | IPH-DX NW T                                     | PH                   |                                          | Tier:<br>Collect Date:                        |                   |                                                                                                                 | Matr<br>Rece             | ix:<br>ive Date:                       | NOT /                      |                                         | CABLE                          |
| Analysis Lot:KW0Analysis Method:8015Prep Ref:             | 31312552<br>C                                   |                      |                                          | Prep Lot:<br>Prep Method:<br>Prep Date:       |                   |                                                                                                                 | Repo                     | rt Group:                              |                            |                                         |                                |
| Quant Method: J:\GC<br>Title:                             | 21\METHODS                                      | \091013F             | SRO.M                                    |                                               |                   | an fan de fan | Calib                    | ration ID:                             | CALI                       | 2766                                    | utontenskinderner konsterne    |
| MB Ref:                                                   |                                                 |                      | al an earr go bre a 's constituid do 160 |                                               |                   | a para ang ang ang ang ang ang ang ang ang an                                                                   |                          | od ID:<br>nt based on ]                | MJ745<br>Method            | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |                                |
| Surrogate Compound                                        | 5                                               | RT                   | RT<br>Dev                                | ng kapang ang ang ang ang ang ang ang ang ang | Resp              | onse                                                                                                            | Solution<br>Conc         | %Rec                                   | %Rec<br>Limits             |                                         | Rpt?                           |
| 4-Bromofluorobenzo<br>o-Terphenyl<br>n-Triacontane        | ene                                             |                      |                                          |                                               |                   | 0<br>0<br>0 <b>d</b>                                                                                            |                          |                                        | 50-150<br>55-133<br>54-136 | NA                                      | NR                             |
| Target Compounds                                          |                                                 |                      |                                          |                                               |                   | Final C                                                                                                         | Conc. Units:             | ug/L                                   |                            |                                         |                                |
| Parameter Name                                            |                                                 | RT                   | RT<br>Dev                                |                                               | Resp              | onse                                                                                                            | Solution<br>Conc         | Final<br>Conc                          |                            | Q                                       | Rpt?                           |
| C9 - C24 DRO<br>C10 - C25 DRO<br>C10 - C28 DRO            | 924 M 4 M 5 M 5 M 5 M 5 M 6 M 6 M 6 M 6 M 6 M 6 | 2.75<br>3.23<br>3.13 |                                          |                                               | 104<br>103<br>304 | 354                                                                                                             | 90.49<br>91.32<br>268.70 | ······································ |                            |                                         | NR                             |
| Diesel Range Organ<br>Residual Range Org<br>C25 - C44 RRO |                                                 | 3.78<br>6.66<br>6.76 |                                          |                                               | 102<br>664<br>998 | 801                                                                                                             | 105.86<br>1,101<br>1,106 |                                        |                            |                                         |                                |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

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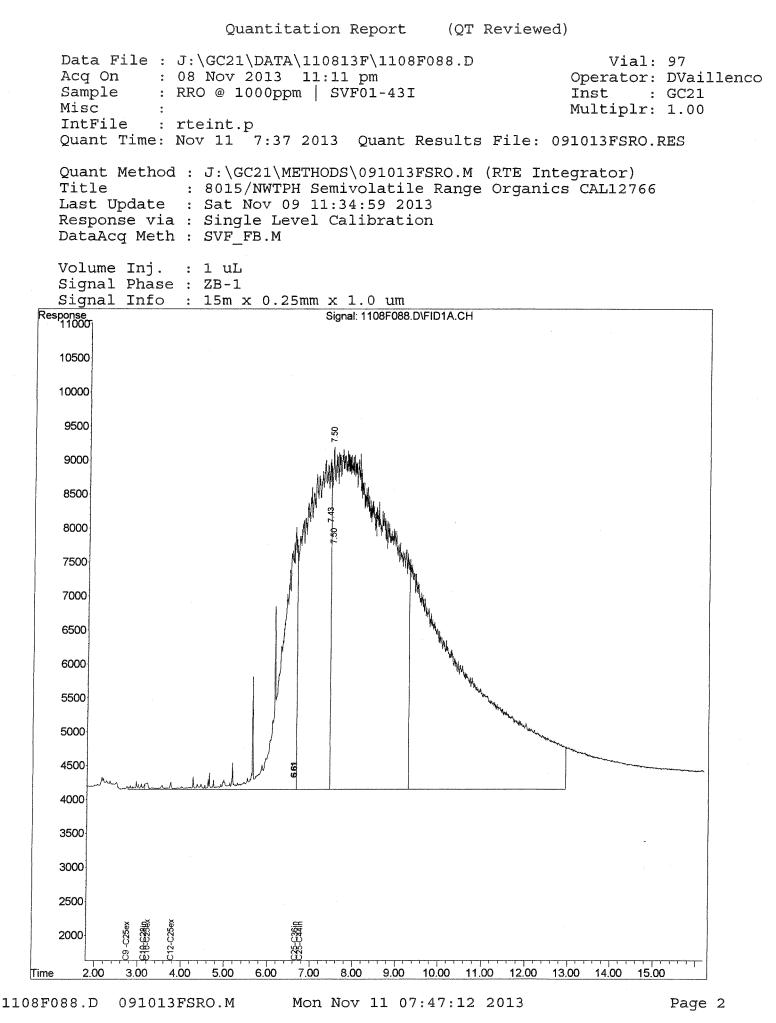
D: Result from dilution n: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

- \*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F088.D

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\110813F\1108F088.D Vial: 97 Operator: DVaillenco Inst : GC21 Acq On : 08 Nov 2013 11:11 pm Sample : RRO @ 1000ppm | SVF01-43I Inst : GC21 Misc Multiplr: 1.00 : IntFile : rteint.p Quant Time: Nov 09 11:35:47 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um R.T. Response Conc Units Compound \_\_\_\_\_ System Monitoring Compounds Target Compounds 4) HC9 - C25ex DRO [TPH-Diesel]2.7510415990.494 ppm5) HC10-C25ex DRO [AK102]3.2310335491.318 ppm6) HC10-C28in DRO [8015]3.13304533268.703 ppm7) HC12-C25ex DRO [NWTPH]3.78102206105.861 ppm8) HC25-C36in RRO [NWTPH]6.666648011101.446 ppm9) HC25-C44in RRO [TPH-Oil]6.769986461105.871 ppm

158



# Organic Analysis: <u>Diesel and Residual Range Organics - Silica Gel</u> <u>Treated</u> Validation Package

Sample Prep and Screen Data

| Group ID:<br>Department: | KWG1312475<br>Semivoa GC | Prep Method:                                                                                                   | EPA 3550B    |                      | Prep Date: 1 | 1/06/13 19:30 |              |
|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------|--------------|----------------------|--------------|---------------|--------------|
| Lab Code                 | Client ID                | Product                                                                                                        | Matrix       | Amt. Ext.            | Final Vol.   | *********     | Solid        |
| K1311604-001             | SS-1-1S                  | 8015C DRO                                                                                                      | SEDIMENT     | 30.172g              | 10mL         |               |              |
| <1311604-002             | SS-2-1S                  | 8015C DRO                                                                                                      | SEDIMENT     |                      | 10mL         |               | 97.8         |
| <1311914-001             | SB1-5-102813             | NWTPH-Dx NW TPF<br>SGT                                                                                         |              | 30.272g              | 10mL         |               | 92.3         |
| <1311914-002             | SB2-6-102813             | NWTPH-Dx NW TPH<br>SGT                                                                                         | + SOIL       | 30.320g              | 10mL         |               |              |
| <1311914-003             | SB3-5-102913             | NWTPH-Dx NW TPH<br>SGT                                                                                         | I SOIL       | 30.405g              | 10mL         |               |              |
| WG1312475-1              | Lab Control Sample       | NWTPH-Dx NW TP <del>I</del><br>SGT                                                                             | I SOIL       | 30.000g              | 10mL         |               |              |
| WG1312475-2              | Method Blank             | NWTPH-Dx NW TPH<br>SGT                                                                                         | I SOIL       | 30.408g              | 10mL         |               |              |
| WG1312475-3              | Duplicate                | NWTPH-Dx NW TPH<br>SGT                                                                                         | I SOIL       | 30.020g              | 10mL         |               |              |
| WG1312475-4              | Matrix Spike             | 8015C DRO                                                                                                      | SEDIMENT     | 30.345g              | 10mL         |               | 92.3         |
| WG1312475-5              | Duplicate Matrix Spike   | 8015C DRO                                                                                                      | SEDIMENT     | 30.324g              | 10mL         |               | 92.3<br>92.3 |
| Lab Code                 | Parent Lab Code          | Comments                                                                                                       |              | NM 2334              |              |               |              |
| KWG1312475-1             | ******                   | KQ1313225-03                                                                                                   |              |                      |              |               |              |
| KWG1312475-2             |                          | KQ1313225-04                                                                                                   |              |                      |              |               |              |
| KWG1312475-3             | K1311914-003             | KQ1313225-05                                                                                                   |              |                      |              |               |              |
| KWG1312475-4             | K1311604-002             | KQ1313225-06                                                                                                   |              |                      |              |               |              |
| KWG1312475-5             | K1311604-002             | KQ1313225-07                                                                                                   |              |                      |              |               |              |
| Lab Code                 | Prep Event ID            | Surrogate A<br>Solution ID                                                                                     | amount Added | Spike<br>Solution ID | Amount Addec |               |              |
| K1311604-001             | 1302247                  | деманиканан калараттар калараттар жалараттар калараттар калараттар калараттар калараттар калараттар калараттар |              |                      |              | Witness       |              |
| K1311604-002             | 1302248                  |                                                                                                                |              |                      |              | NCisney       |              |
| K1311914-001             | 1302249                  |                                                                                                                |              |                      |              | NCisney       |              |
|                          |                          |                                                                                                                |              |                      |              | NCisney       |              |

## **Preparation Information**

Comments:

K1311914-002

K1311914-003

KWG1312475-1

KWG1312475-2

KWG1312475-3

KWG1312475-4

KWG1312475-5

1302250

1302251

1302252

1302253

1302254

1302255

1302256

| · · · · · · · · · · · · · · · · · · ·                         |                         |                                    |
|---------------------------------------------------------------|-------------------------|------------------------------------|
| Started By: JJohnson                                          | Assisted By:            | Training                           |
| Completed By: JJohnson                                        | Assisted By: CV.each Ho | Yes No                             |
| teviewed By:                                                  | Date: 11 11 12 Storage: | (Yes No                            |
| Relinquished By: ))ohnson                                     | Date: 11/7/13           |                                    |
| Received By:                                                  | Date:                   | <u>Extracts Examined</u><br>Yes No |
| rinted: 11/07/2013 21:50:49<br>\Stealth\Crystal.rpt\prep1.rpt | Preparation Information | Page 1 of                          |

NCisney

NCisney

NCisney

NCisney

NCisney

NCisney

NCisney

NCisney

#### **Preparation Information Benchsheet**

| Prep Run: | 196297     | Prep Workflow: | OrgExtS | Status:       | Draft      | Prep Date: | 11/06/2013 |
|-----------|------------|----------------|---------|---------------|------------|------------|------------|
|           | Semivoa    |                | (14)    | Current Step: | Extraction |            | 13:00      |
| Team:     | GC         | Prep Method:   | EPA     | ana.          |            | Due Date:  | 11/01/2013 |
| Analyst   | Hobecon    |                | 3550B   |               | 86         | Hold Date: | 11/06/2013 |
| Analyst.  | 1001112011 | Rush/NPDES:    | N/A     |               |            |            | ,,,        |

|       | Lab Code                      | Client ID              | Bottle<br># |   | Target<br>Amt | Initial<br>Amount | Inter.<br>Volume | Final<br>Volume<br>ML | Surr<br>Amt  | Spike<br>Amt         | TestNo<br>List |
|-------|-------------------------------|------------------------|-------------|---|---------------|-------------------|------------------|-----------------------|--------------|----------------------|----------------|
| C     | K1311914-001                  | SB1-5-102813           | .01         | 1 | 30 g          | 30.272            | N/A              | 10                    | 500          |                      | NW TPH<br>SGT  |
| ¥ 5/c | K1311914-002                  | SB2-6-102813           | .01         | / | 30 g          | 30.320            |                  | 10                    |              |                      | NW TPH<br>SGT  |
| C     | K1311914-003                  | SB3-5-102913           | .01         | / | 30 g          | 30.405            |                  | 10                    |              |                      | NW TPH<br>SGT  |
| RO    | K1311604-001                  | SS-1-1S                | .01         | / | 30 g          | 30172             |                  | 10                    |              |                      | DRO            |
| Ro    | K1311604-002                  | SS-2-1S                | .01         |   | 30 g          | 30.408            |                  | 10                    |              | Qualitation of State | DRO            |
| C     | K1311914-003:<br>KQ1313225-05 | Duplicate              | .01         | 7 | 30 g          | 30.020            |                  | 10                    |              |                      | NW TPH<br>SGT  |
| RO    | K1311604-002:<br>KQ1313225-06 | Matrix Spike           | .01         | V | 30 g          | 70.345            |                  | 10                    |              | 500                  | DRO            |
|       | K1311604-002:<br>KQ1313225-07 | Duplicate Matrix Spike | .01         | 1 | 30 g          | 30.724            |                  | 10                    |              | 500                  | DRO            |
|       | KQ1313225-03                  | Lab Control Sample     |             |   | 30 g          | 30.00             |                  | 10                    |              | 500                  | NW TPH<br>SGT  |
|       | KQ1313225-04                  | Method Blank           |             |   | 30 g          | 30.408            | V                | 10                    | $\checkmark$ |                      | NW TPH<br>SGT  |

10 Total Samples consisting of 5 Client Samples, 3 Client QC Samples, 2 Batch QC Samples associated with the current Prep Run.

#### **Spiking Solutions**

| Witness: | Nlisner | <br>·lo· | B |  |
|----------|---------|----------|---|--|
|          |         | •        |   |  |

# SURVESVEDI-44G EXP. 3/25/14 500 ppm 500 ML (epp)

| -THE DIVIS /H EXPLUDIS | 16000/3000 aph | ~ 600 UL (eon) |
|------------------------|----------------|----------------|
|                        | 11             | 11             |

| Preparation Steps |         |          |           |             |           |          |
|-------------------|---------|----------|-----------|-------------|-----------|----------|
| Step              | Started | Finished | <u>Βγ</u> | Assisted By | Training? | Comments |
| Extraction        |         |          |           | une         |           |          |
| Final Volume      |         |          |           |             |           |          |
|                   |         |          |           |             |           |          |
|                   |         |          |           |             |           |          |

#### Comments

C= Clay tike Sample, S=Sand in Sample, R=Rocks in sample, O= organic matter in sample, at = Sample boiled low on S-Evap

## QUALITY TRACKING FORM

| WORK ORDER #: LY                                                                                                                  | <u>3 11604</u>       | EXTRACT LOCATION:                                                            | Arrested<br>Development |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------------------------------------------------------|-------------------------|--|--|--|--|--|--|
| TEST:                                                                                                                             | 8015C DRO w/ SGT     | DATE REQUESTED:                                                              | <u>11/6/13</u>          |  |  |  |  |  |  |
| SAMPLE #:                                                                                                                         | <u>1 &amp; 2</u>     | DATE DESIRED:                                                                | ASAP                    |  |  |  |  |  |  |
| MATRIX:                                                                                                                           | soil                 | REQUESTED BY:                                                                | Dave V.                 |  |  |  |  |  |  |
| <i>QUALITY DEFICIENCY</i> : (DOES PC NEED TO BE NOTIFIED? YES □ NO □)<br>Notified on/ by:<br>High surrogates, even after re-clean |                      |                                                                              |                         |  |  |  |  |  |  |
| <u>CORRECTIVE AC</u>                                                                                                              | <i>TION NEEDED</i> : |                                                                              |                         |  |  |  |  |  |  |
| Please re-extract sa                                                                                                              | mples 1 and 2 with   | appropriate QC                                                               |                         |  |  |  |  |  |  |
| Please re-extract samples 1 and 2 with appropriate QC         ANALYST:         DATE COMPLETED:                                    |                      |                                                                              |                         |  |  |  |  |  |  |
| <ul> <li>Reext/Prep. Techn</li> <li>Reext/Matrix (B)</li> </ul>                                                                   | ique (A)             | <ul> <li>HT Missed (Primary) (F)</li> <li>HT Missed Upon Reext. (</li> </ul> | <b>G</b> )              |  |  |  |  |  |  |

- $\Box$  Reext/GPC Loss (C)
- □ Reext/ASE (D)
- $\Box$  Clean-up Needed (E)

- Other (H)\_\_\_\_\_
- $\Box$  NCAR Filed (I)
- HT Missed (Received Past HT) (J)
- HT Missed (Analytical) (K)

# Additional Prep Information For Fuel Hydrocarbons In Soil By 3550

| Service Request # <b>613/1914</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Work Group # KQ 1313225                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Extraction (3550):                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                       |
| Date/Time/Initials Weighed:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                       |
| Sulfate Lot # Matrix Sa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | nd Lot #                                                              |
| DCM Lot # DJ 358                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
| Sonic Horns Tuned (Initial/Date) 11/6/13 J<br>Extraction Start (Date/Time/Initials) 11/6/13 1830 DExtr<br>S-Evap Thermometer ID: BDWB-10 S-Evap<br>Temp as measured: 75 °C Correction factor: 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | action Stop(Date/Time/Initials):11/6/13 2030 33                       |
| N-Evap Thermometer ID: N-Evap<br>Temp as measured:°C Correction factor:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | (Date/Time/Initial):°C Adjusted temp:°C                               |
| <u>Cleanups:</u> (Check paperwork to see if cleanups are new                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | cessary)                                                              |
| Sulfuric Acid Clean-up (3665) (Date/Time/Initials): 11/7/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 13 20:00 » (Acid Lot # 53002                                          |
| Silica Gel Clean-up (3630) (Date/Time/Initials): 11/7/13 a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | RO:45 ) 21/ Silica Gel Lot # VHUB                                     |
| Archive:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 417 N                                                                 |
| Vial: Clear Vial Storage: B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | JWL                                                                   |
| Archived Extract Storage: Steller                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                       |
| Comments/Observations:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                       |
| Bench Sheet Review Check List         Hold Times Met (if no, Reason:         Prep date, dept, method, product code correct in stealth         Spike Information correct         Weights/Volumes and units correct on raw and final bend         Sample IDs have been checked—Bottle numbers append         Names present for: Started by, Completed by, relinquish         Training has been circled         Extract Storage recorded         Additional Prep Sheet completely filled out ( NA or line o         All clean-ups have been noted on additional prep sheet         Signed service request with Form V, if applicable, has be         R:/Extractions/Active Benchsheets/SVG/Fuels 3550.doc         Reviewed By: Elissa Bruno 12/27/12 | ch sheets<br>ed if required<br>ed by, and witnessed by.<br>ut Blanks) |

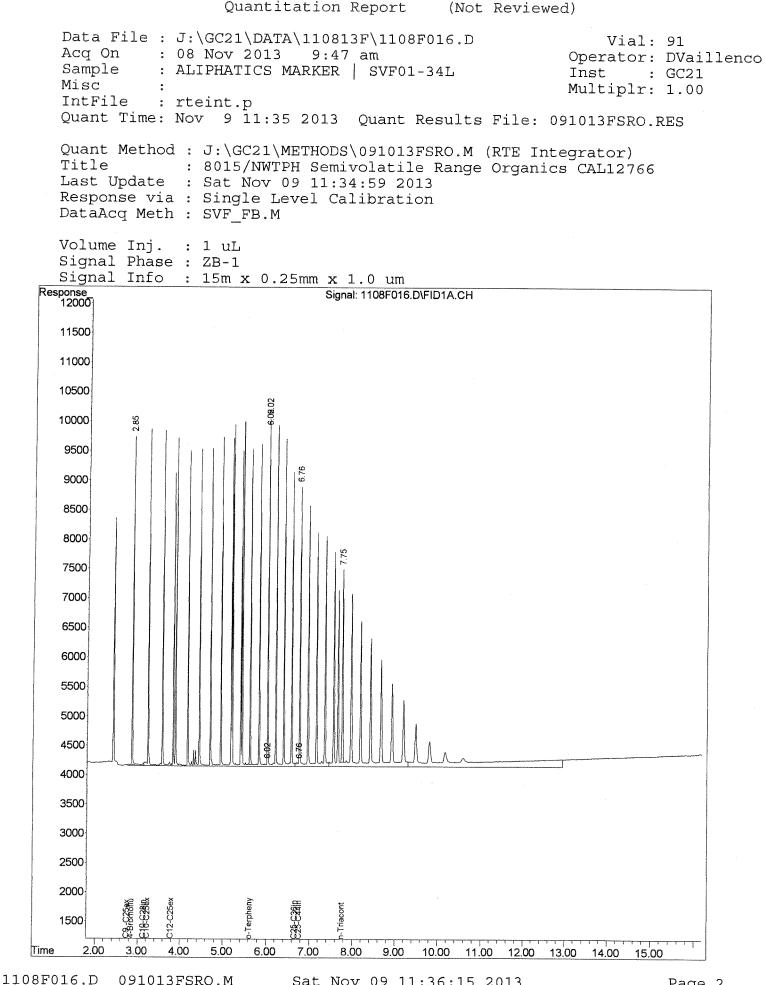
| Group ID:<br>Department: | KWG1312475<br>Semivoa GC | Prep Method:           | EPA 3550B |           | Prep Date: | 11/06/13 19:30 |              |
|--------------------------|--------------------------|------------------------|-----------|-----------|------------|----------------|--------------|
| ab Code                  | Client ID                | Product                | Matrix    | Amt. Ext. | Final Vol. |                | Solids       |
| (1311604-001             | SS-1-1S                  | 8015C DRO              | SEDIMENT  | 30.172g   | l0mL       |                | 97.8         |
| (1311604-002             | SS-2-1S                  | 8015C DRO              | SEDIMENT  | 30.408g   | 10mL       |                | 92.3         |
| 1311914-001              | SB1-5-102813             | NWTPH-Dx NW TPH<br>SGT | SOIL      | 30.272g   | 10mL       |                | 12.5         |
| 1311914-002              | SB2-6-102813             | NWTPH-Dx NW TPH<br>SGT | SOIL      | 30.320g   | 10mL       |                |              |
| (1311914-003             | SB3-5-102913             | NWTPH-Dx NW TPH<br>SGT | SQIL      | 30.405g   | 10mL       |                |              |
| WG1312475-1              | Lab Control Sample       | NWTPH-Dx NW TPH        | SOIL      | 30.000g   | 10mL       |                |              |
| WG1312475-2              | Method Blank             | NWTPH-Dx NW TPH<br>SGT | SOIL      | 30.408g   | 10mL       |                |              |
| WG1312475-3              | Duplicate                | NWTPH-Dx NW TPH<br>SGT | SOIL      | 30.020g   | 10mL       |                |              |
| WG1312475-4              | Matrix Spike             | 8015C DRO              | SEDIMENT  | 30.345g   | 10mL       |                | 02.2         |
| WG1312475-5              | Duplicate Matrix Spike   | 8015C DRO              | SEDIMENT  | 30.324g   | 10mL       |                | 92.3<br>92.3 |
| Lab Code                 | Parent Lab Code          | Comments               |           |           |            |                |              |
| KWG1312475-1             |                          | KQ1313225-03           |           |           |            |                |              |
| KWG1312475-2             |                          | KQ1313225-04           |           |           |            |                |              |
| KWG1312475-3             | K1311914-003             | KQ1313225-05           |           |           |            |                |              |
| KWG1312475-4             | K1311604-002             | KQ1313225-06           |           |           |            |                |              |
| KWG1312475-5             | K1311604-002             | KQ1313225-07           |           |           |            |                |              |

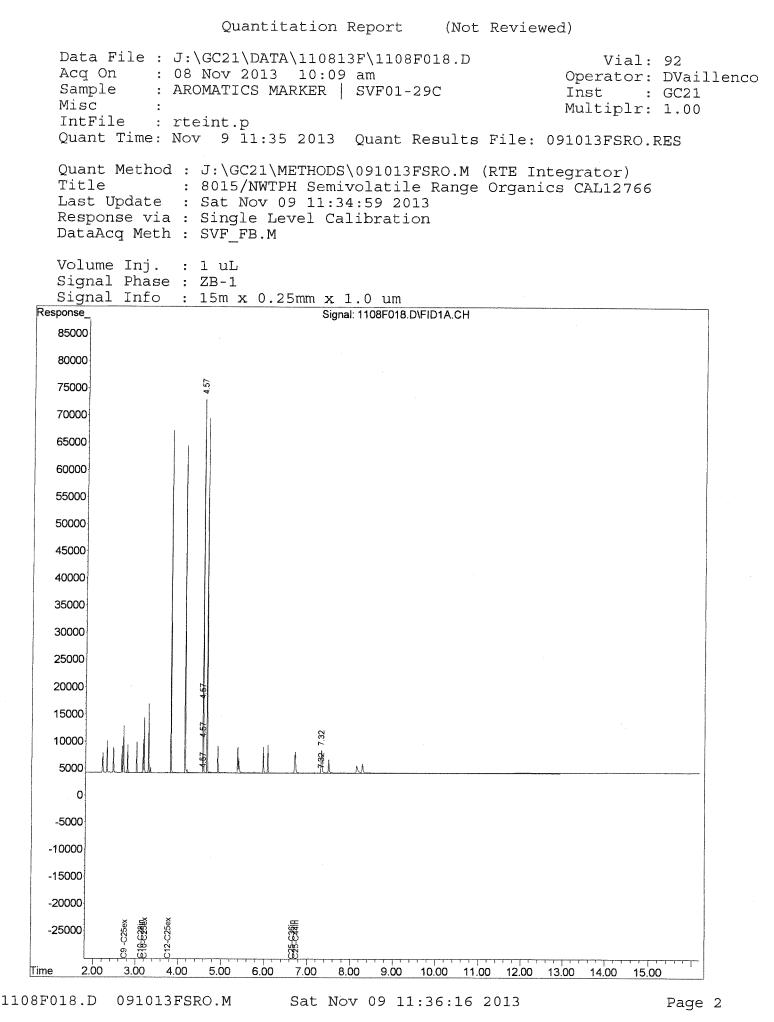
### Preparation Information

|              | <b>N</b>      | Surrogate   | Amount Added | Spike       | Amount Added |
|--------------|---------------|-------------|--------------|-------------|--------------|
| Lab Code     | Prep Event ID | Solution ID |              | Solution ID | Witness      |
| K1311604-001 | 1302247       |             |              | ******      | NCisney      |
| K1311604-002 | 1302248       |             |              |             | 2            |
| K1311914-001 | 1302249       |             |              |             | NCisney      |
| K1311914-002 | 1302250       |             |              |             | NCisney      |
| K1311914-002 | 1302251       |             |              |             | NCisney      |
|              |               |             |              |             | NCisney      |
| KWG1312475-1 | 1302252       |             |              |             | NCisney      |
| KWG1312475-2 | 1302253       |             |              |             | NCisney      |
| KWG1312475-3 | 1302254       |             |              |             | NCisney      |
| KWG1312475-4 | 1302255       |             |              |             | •            |
| KWG1312475-5 | 1302256       |             |              |             | NCisney      |
|              | 1302230       |             |              |             | NCisney      |

| Comments: 664                                                    | · S27 11/1 914-11   | 1/14                                                                                                             |                                                                                                                 |
|------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Started By: JJohnson                                             |                     |                                                                                                                  | Training                                                                                                        |
|                                                                  | Assisted By:        |                                                                                                                  | Yes No                                                                                                          |
| Completed By: JJohnson                                           | Assisted By:        |                                                                                                                  | Yes No                                                                                                          |
| Reviewed By:                                                     | Date:               | Storage:                                                                                                         |                                                                                                                 |
| Chain of Custody                                                 |                     | and the second | nan mana ana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana am |
| Relinquished By: ))ohngon                                        |                     | Date: 11/7/12                                                                                                    | 6                                                                                                               |
| Received By:                                                     | A                   | Date: MRP                                                                                                        | Extracts Examined<br>Yes No                                                                                     |
| Printed: 11/07/2013 21:50:49<br>n:\Stealth\Crystal.rpt\prep1.rpt | Preparation Informa | ation                                                                                                            | Page 1 of                                                                                                       |

| Line                                                                       | Vial                                                                                                          | FileName                                                                                                                                                                           | Multiplier                                               | SampleName                                                                                                                                                                                                                     | Misc Info                                       |                                                               | Injected                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9                                  | 90<br>90<br>90<br>90<br>90<br>90<br>90<br>91<br>92                                                            | 1108F002.D<br>1108F004.D<br>1108F006.D<br>1108F008.D<br>1108F010.D<br>1108F012.D<br>1108F014.D<br>1108F016.D<br>1108F018.D                                                         | 1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.                   | DCM<br>DCM<br>DCM<br>DCM<br>DCM<br>DCM<br>ALIPHATICS MARKER   SVF<br>AROMATICS MARKER   SVF                                                                                                                                    | 01-34L<br>⊡1-29C                                | \$ 767524                                                     | 11/08/220137:1211/08/220137:3411/08/220137:5611/08/220138:1611/08/220138:4011/08/220139:0311/08/220139:2511/08/220139:4711/08/2201310:0!                                                                                                                                                                                                                                                                   |
| 10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19                   | 97<br>86<br>1<br>2<br>3<br>4<br>5<br>6                                                                        | 1108F020.D<br>1108F022.D<br>1108F024.D<br>1108F026.D<br>1108F028.D<br>1108F030.D<br>1108F032.D<br>1108F032.D<br>1108F034.D<br>1108F036.D<br>1108F038.D                             | 1.<br>1.<br>1.<br>1.<br>1.                               | DRO @ 1000/50ppm   SVF0<br>RRO @ 1000ppm   SVF01-4<br>IB<br>KQ1313193-01LCS<br>KQ1313193-02DLCS<br>KQ1313193-03MB<br>K1312000-001<br>K1312000-002<br>K1312000-003<br>KQ1313225-03LCS SGT                                       | 440<br>KWG1312<br>KWG1312<br>KWG1312<br>KWG1312 | 2460<br>2460<br>2460                                          | 11/08/22013       10:3         11/08/22013       10:5         11/08/22013       11:2         11/08/22013       11:4         11/08/22013       12:0         11/08/22013       12:2         11/08/22013       12:5         11/08/22013       12:5         11/08/22013       12:5         11/08/22013       12:5         11/08/22013       1:12         11/08/22013       1:34         11/08/22013       1:57 |
| 26<br>27<br>28                                                             | 9<br>10<br>11<br>12<br>13<br>14<br>15<br>96                                                                   | 1108F040.D<br>1108F042.D<br>1108F044.D<br>1108F046.D<br>1108F048.D<br>1108F050.D<br>1108F052.D<br>1108F052.D<br>1108F054.D<br>1108F056.D<br>1108F058.D                             | 1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.             | KQ1313225-04MB SGT<br>K1311604-002 SGT<br>K1311604-002MS SGT<br>K1311604-002DMS SGT<br>K1311604-001 SGT<br>K1311914-001 SGT<br>K1311914-003 SGT<br>K1311914-003DUP SGT<br>DRO @ 1000/50ppm   SVF01<br>RRO @ 1000ppm   SVF01-43 |                                                 | 1<br>1<br>1<br>1<br>1                                         | 11/08/22013       2:19         11/08/22013       2:41         11/08/22013       3:03         11/08/22013       3:26         11/08/22013       3:48         11/08/22013       3:48         11/08/22013       4:10         11/08/22013       4:54         11/08/22013       5:17         11/08/22013       5:39                                                                                              |
|                                                                            |                                                                                                               | 1108F060.D<br>1108F062.D                                                                                                                                                           | 1.<br>1.                                                 | LT MINERAL OIL @ 2000ppr<br>HVY MIN OIL @ 2000ppm   H                                                                                                                                                                          |                                                 | QUANT<br>1                                                    | 1/08/22013 6:01                                                                                                                                                                                                                                                                                                                                                                                            |
| 32<br>33<br>34<br>35<br>36<br>37<br>38                                     | 86<br>16<br>17<br>18<br>19<br>20<br>21                                                                        | 1108F064.D<br>1108F066.D<br>1108F068.D<br>1108F070.D<br>1108F072.D<br>1108F074.D<br>1108F076.D<br>1108F078.D                                                                       | 1.<br>1.<br>1.<br>1.<br>1.                               | IB<br>K1311914-002SGT<br>KWG1312450-01LCS<br>KWG1312450-02DLCS<br>KWG1312450-03MB<br>K1311252-005<br>K1311252-002<br>K1311252-003                                                                                              | OL-OTE NOTFOR                                   | 1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1                     | 1/08/22013       6:23         1/08/22013       6:46         1/08/22013       7:07         1/08/22013       7:30         1/08/22013       7:52         1/08/22013       8:14         1/08/22013       8:36         1/08/22013       8:59         1/08/22013       9:20                                                                                                                                      |
| 41<br>42<br>43<br>44<br>45<br>46<br>47<br>48<br>49<br>50<br>51<br>52<br>52 | 24<br>25<br>96<br>397<br>86<br>1<br>90<br>1<br>90<br>1<br>90<br>1<br>90<br>1<br>90<br>1<br>90<br>1<br>90<br>1 | 108F080.D<br>108F082.D<br>108F082.D<br>108F086.D<br>108F088.D<br>108F090.D<br>108F092.D<br>108F094.D<br>108F096.D<br>108F100.D<br>108F102.D<br>108F102.D<br>108F104.D<br>108F106.D | 1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1. | K1311252-004<br>K1311252-006<br>K1311252-001<br>DRO @ 1000/50ppm   SVF01<br>RRO @ 1000ppm   SVF01-43<br>IB<br>SURR CHK @ 10X SVF01-46<br>DCM<br>DCM<br>DCM<br>DCM<br>DCM<br>DCM<br>DCM<br>DCM                                  | I                                               | 1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | 1/08/22013 9:43<br>1/08/22013 10:0:<br>1/08/22013 10:2<br>1/08/22013 10:2<br>1/08/22013 10:4!<br>1/08/22013 11:1<br>1/08/22013 11:3<br>1/08/22013 11:5<br>1/09/22013 12:1<br>1/09/22013 12:4<br>1/09/22013 1:02<br>1/09/22013 1:47<br>1/09/22013 2:09<br>1/09/22013 2:31                                                                                                                                   |





# Data File:J:\GC21\DATA\110813F\1108F024.DLab ID:KWG1312552-4RunType:IBMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/08/2013 11:21 11/09/2013 11:35 KWG1312552 NWTPH-Dx MJ1081

#### Sample Exceptions

| Exception Categories                  | Result | Low Limit | High Limit | Pass | Fail |
|---------------------------------------|--------|-----------|------------|------|------|
| ICAL Analyte Recovery                 | NA     | NA        | NA         | x    |      |
| Second Source ICAL Verification       | NA     | NA        | NA         | x    |      |
| Analyte Co-elution                    | NA     | NA        | NA         | x    |      |
| Below Lowest ICAL Level               | NA     | NA        | NA         | x    |      |
| Above Highest ICAL Level              | NA     | NA        | NA         | x    |      |
| Enviroquant/Stealth Calibration Check | NA     | NA        | NA         | x    |      |

Primary Review Secondary Review:

| Data File:<br>Acqu Date:<br>Run Type:<br>Lab ID: | J:\GC21\DATA\110813F\1108<br>11/08/2013 11:21<br>IB<br>KWG1312552-4 | 8F024.D   | Quant Date:                             | 11/09/2013 11:35 | Vial<br>Dilu     | rument:<br>:<br>ation:<br>1 Conc. Units: | GC21<br>86<br>1.0<br>ppm          |                            |      |  |
|--------------------------------------------------|---------------------------------------------------------------------|-----------|-----------------------------------------|------------------|------------------|------------------------------------------|-----------------------------------|----------------------------|------|--|
| Bottle ID:<br>Prod Code:                         |                                                                     |           |                                         |                  | Mat<br>Reco      | rix:<br>eive Date:                       |                                   | NOT APPLICAB<br>11/11/2013 |      |  |
| Analysis Lot:<br>Analysis Method:<br>Prep Ref:   | KWG1312552<br>NWTPH-Dx                                              |           | Prep Lot:<br>Prep Method:<br>Prep Date: |                  | Rep              | ort Group:                               |                                   |                            |      |  |
| Quant Method:<br>Title:<br>MB Ref:               | J:\GC21\METHODS\091013F                                             | SRO.M     |                                         |                  | Metl             | bration ID:<br>hod ID:<br>ant based on   | CAL127<br>MJ1081<br><b>Method</b> | 66                         |      |  |
| Surrogate Comp                                   | ounds                                                               |           |                                         |                  |                  |                                          |                                   |                            |      |  |
| Parameter Na                                     | me RT                                                               | RT<br>Dev |                                         | Response         | Solution<br>Conc | %Rec                                     | %Rec<br>Limits                    |                            | Rpt? |  |
| o-Terphenyl<br>n-Triacontane                     |                                                                     |           |                                         | 0<br>0           |                  |                                          | 50-150 1<br>50-150 1              |                            |      |  |
| Target Compour                                   | nds                                                                 | RT        |                                         | Final C          | Conc. Units:     | Fina                                     |                                   |                            |      |  |

Response

3093

9821

Diesel Range Organics (DRO) 3.78 Residual Range Organics (RRO)

**Parameter Name** 

6.66

RT

Dev

U: Undetected at or above MDL

J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank

E: Analyte concentration above high point of ICAL

N: Presumptive evidence of compound

Printed: 11/11/2013 08:29:43 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution Neural integration performed
 Compound manually deleted
 NR: Analyte not reported from this analysis

Conc

3.20

1.82

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance

e: Result >= MRL, but MRL less than low point of ICAL

c: check for co-elution

Page 1 of 1

Q

Conc

Rpt?

| Acqu Date: ]<br>Run Type: ] | E:\GC21\DATA\11<br>1/08/2013 11:21<br>B<br>KWG1312552-4 | 0813F\110 | )8F024.D  | Quant Date:                                       | 11/09/2013 11:35 | Vial:<br>Dilu    |                         | GC21<br>86<br>1.0<br>ppm |    |                 |
|-----------------------------|---------------------------------------------------------|-----------|-----------|---------------------------------------------------|------------------|------------------|-------------------------|--------------------------|----|-----------------|
| Bottle ID:<br>Prod Code: N  | WTPH-DX NW                                              | ГРН       |           | Tier:<br>Collect Date:                            |                  | Math             | ix:<br>ive Date:        | NOT /<br>11/11/          |    | CABLE           |
|                             | CWG1312552<br>015C                                      |           |           | Prep Lot:<br>Prep Method:<br>Prep Date:           |                  | Керс             | ort Group:              |                          |    |                 |
| Quant Method: J;<br>Title:  |                                                         |           |           |                                                   |                  |                  | oration ID:             | CALIZ                    |    | *************** |
| MB Ref:                     | รของเป็นระบบคุณ เป็นประวัติสาย อาการประวัติสาย          |           |           | uno a spano se su o |                  |                  | od ID:<br>nt based on [ | MJ108<br>Method          |    |                 |
| Surrogate Compou            | ınds                                                    |           | RT        |                                                   |                  | Solution         | #1. <del>1.1</del>      | %Rec                     |    |                 |
| Parameter Name              |                                                         | RT        | Dev       |                                                   | Response         | Conc             | %Rec                    | Limits                   |    | Rpt?            |
| 4-Bromofluorob              | enzene                                                  |           |           |                                                   | 0                |                  |                         | 70-129                   |    |                 |
| o-Terphenyl                 |                                                         |           |           |                                                   | 0                |                  |                         | 51-126                   |    |                 |
| n-Triacontane               |                                                         |           |           |                                                   | 0                |                  |                         | 50-150                   | NA |                 |
| Target Compounds            | 5                                                       |           |           |                                                   | Final C          | Conc. Units:     |                         |                          |    |                 |
| Parameter Name              | ulada da               | RT        | RT<br>Dev |                                                   | Response         | Solution<br>Conc | Final<br>Conc           |                          | Q  | Rpt?            |
| C10 - C25 DRO               |                                                         | 3.23      |           |                                                   | 3855             | 3.41             | ****                    |                          |    |                 |
| C10 - C28 DRO               |                                                         | 3.13      |           |                                                   | 5756             | 5.08             |                         |                          |    |                 |
| Diesel Range Or             | ganics (DRO)                                            | 3.78      |           |                                                   | 3093             | 3.20             |                         |                          |    |                 |
| Residual Range              | Organics (RRO)                                          | 6.66      |           |                                                   | 9821             | 1.82             |                         |                          |    |                 |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:29:47  $u:\label{eq:linear} u:\label{eq:linear} u:\l$ 

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F024.D 171

|                                                                                                                                                            | Type: IB                          |                                         |                                           | 11/09/2013 11:35                                                  | Vial<br>Dilu                                                                 | rument:<br>:<br>tion:<br>Conc. Units: | GC21<br>86<br>1.0<br>ppm                                                                                       |                                          |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------|-------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------|
| Bottle ID:<br>Prod Code: NWTPH-DX NW                                                                                                                       | / TPH                             | 10/10/2010/2010/2010/2010/2010/2010/201 | Tier:<br>Collect Date:                    |                                                                   | Mat                                                                          | rix:<br>tive Date:                    | NOT .<br>11/11                                                                                                 |                                          | CABLI        |
| Analysis Lot: KWG1312552<br>Analysis Method: 8015C<br>Prep Ref:                                                                                            |                                   |                                         | Prep Lot:<br>Prep Method:<br>Prep Date:   |                                                                   | Repo                                                                         | ort Group:                            | ning and a second s |                                          |              |
| Quant Method: J:\GC21\METHO<br>Title:                                                                                                                      | DS\091013I                        | FSRO.M                                  |                                           |                                                                   | Calif                                                                        | pration ID:                           | CALI                                                                                                           | 2766                                     |              |
|                                                                                                                                                            |                                   |                                         |                                           | nod ID:                                                           | MJ745                                                                        | 5                                     |                                                                                                                |                                          |              |
| MB Ref:                                                                                                                                                    |                                   |                                         | nya na wa ana ana ana ana ana ana ana ana |                                                                   | Qua                                                                          | nt based on ]                         | Method                                                                                                         |                                          | <del>,</del> |
|                                                                                                                                                            | RT                                | RT<br>Dev                               |                                           | Response                                                          | Qua<br>Solution<br>Conc                                                      | nt based on ]                         | Method<br>%Rec<br>Limits                                                                                       | 2000-00-00-00-00-00-00-00-00-00-00-00-00 | Rpt?         |
| <i>urrogate Compounds</i><br>Parameter Name                                                                                                                | RT                                |                                         |                                           | Response                                                          | Solution                                                                     |                                       | %Rec<br>Limits                                                                                                 | NA                                       | Rpt?         |
| <i>urrogate Compounds</i> Parameter Name 4-Bromofluorobenzene                                                                                              | RT                                |                                         |                                           | Response<br>0<br>0                                                | Solution                                                                     |                                       | %Rec<br>Limits<br>50-150                                                                                       |                                          | Rpt?         |
| <i>urrogate Compounds</i><br>Parameter Name                                                                                                                | RT                                |                                         |                                           | . 0                                                               | Solution                                                                     |                                       | %Rec<br>Limits                                                                                                 | NA                                       | Rpt?         |
| Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane                                                                                     | RT                                |                                         |                                           | 0<br>0<br>0                                                       | Solution                                                                     |                                       | %Rec<br>Limits<br>50-150<br>55-133                                                                             | NA                                       | Rpt?         |
| Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane                                                                                     | RT                                |                                         | · · · · · · · · · · · · · · · · · · ·     | 0<br>0<br>0                                                       | Solution<br>Conc                                                             | %Rec                                  | %Rec<br>Limits<br>50-150<br>55-133<br>54-136                                                                   | NA                                       |              |
| Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds                                                                 |                                   | Dev                                     | · · · · · · · · · · · · · · · · · · ·     | 0<br>0<br>0<br>Final 0                                            | Solution<br>Conc<br>Conc. Units:<br>Solution                                 | %Rec<br>ug/L<br>Final                 | %Rec<br>Limits<br>50-150<br>55-133<br>54-136                                                                   | NA<br>NA                                 |              |
| Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds<br>Parameter Name                                               | RT                                | Dev                                     |                                           | 0<br>0<br>0<br>Final 0<br>Response                                | Solution<br>Conc<br>Conc. Units:<br>Solution<br>Conc                         | %Rec<br>ug/L<br>Final                 | %Rec<br>Limits<br>50-150<br>55-133<br>54-136                                                                   | NA<br>NA                                 | Rpt?<br>Rpt? |
| Parameter Name         4-Bromofluorobenzene         o-Terphenyl         n-Triacontane         Carget Compounds         Parameter Name         C9 - C24 DRO | <b>RT</b><br>2.75                 | Dev                                     | · · · · · · · · · · · · · · · · · · ·     | 0<br>0<br>0<br>Final 0<br>Response<br>4273                        | Solution<br>Conc<br>Conc. Units:<br>Solution<br>Conc<br>3.71                 | %Rec<br>ug/L<br>Final                 | %Rec<br>Limits<br>50-150<br>55-133<br>54-136                                                                   | NA<br>NA                                 |              |
| Surrogate Compounds Parameter Name 4-Bromofluorobenzene o-Terphenyl n-Triacontane Sarget Compounds Parameter Name C9 - C24 DRO C10 - C25 DRO               | <b>RT</b><br>2.75<br>3.23         | Dev                                     |                                           | 0<br>0<br>0<br>Final 0<br>Response<br>4273<br>3855                | Solution<br>Conc<br>Conc. Units:<br>Solution<br>Conc<br>3.71<br>3.41         | %Rec<br>ug/L<br>Final                 | %Rec<br>Limits<br>50-150<br>55-133<br>54-136                                                                   | NA<br>NA                                 |              |
| Surrogate Compounds Parameter Name 4-Bromofluorobenzene o-Terphenyl n-Triacontane Carget Compounds Parameter Name C9 - C24 DRO C10 - C25 DRO C10 - C28 DRO | <b>RT</b><br>2.75<br>3.23<br>3.13 | Dev                                     |                                           | 0<br>0<br><b>Final</b><br><b>Response</b><br>4273<br>3855<br>5756 | Solution<br>Conc<br>Conc. Units:<br>Solution<br>Conc<br>3.71<br>3.41<br>5.08 | %Rec<br>ug/L<br>Final                 | %Rec<br>Limits<br>50-150<br>55-133<br>54-136                                                                   | NA<br>NA                                 |              |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:29:50 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

J:\GC21\DATA\110813F\1108F024.D

172

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\110813F\1108F024.D Vial: 86 Acq On : 08 Nov 2013 11:21 am Operator: DVaillencc : IB Sample Inst : GC21 Misc . Multiplr: 1.00 IntFile : rteint.p Quant Time: Nov 09 11:35:19 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units \_\_\_\_\_ System Monitoring Compounds Target Compounds 4) HC9 - C25ex DRO [TPH-Diesel]2.7542733.712 ppm5) HC10-C25ex DRO [AK102]3.2338553.406 ppm6) HC10-C28in DRO [8015]3.1357565.079 ppm7) HC12-C25ex DRO [NWTPH]3.7830933.204 ppm8) HC25-C36in RRO [NWTPH]6.6698211.821 ppm9) HC25-C44in RRO [TPH-Oil]6.763092328.533 ppm

Data File : J:\GC21\DATA\110813F\1108F024.D Vial: 86 : 08 Nov 2013 11:21 am Acq On Operator: DVaillenco : IB Sample Inst : GC21 Misc Multiplr: 1.00 2 IntFile : rteint.p Quant Time: Nov 9 11:35 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Single Level Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Response\_ Signal: 1108F024.D\FID1A.CH 5200 5150 5100 5050 5000 4950 4900 4850 4800 4750 4700 4650 4600 4550 4500 4450 4400 4350 12.85 4300 4250 4200 9.28 4150 4100 18-E28ux 12-C25ex -C25ex 35-639ir 4050 ຮື 2.00 3.00 4.00 5.00 Time 6.00 7.00 8.00 9.00 10.00 11.00 12.00 13.00 14.00 15.00 1108F024.D 091013FSRO.M Mon Nov 11 07:46:36 2013 Page 2

# Data File:J:\GC21\DATA\110813F\1108F064.DLab ID:KWG1312552-5RunType:IBMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/08/2013 18:46 11/09/2013 11:35 KWG1312552 NWTPH-Dx MJ1081

### Sample Exceptions

| Exception Categories                  | Result | Low Limit | High Limit | Pass | Fail |
|---------------------------------------|--------|-----------|------------|------|------|
| ICAL Analyte Recovery                 | NA     | NA        | NA         | x    |      |
| Second Source ICAL Verification       | NA     | NA        | NA         | x    |      |
| Analyte Co-elution                    | NA     | NA        | NA         | x    |      |
| Below Lowest ICAL Level               | NA     | NA        | NA         | x    |      |
| Above Highest ICAL Level              | NA     | NA        | NA         | x    |      |
| Enviroquant/Stealth Calibration Check | NA     | NA        | NA         | X    |      |

Primary Review Secondary Review:

| Data File:<br>Acqu Date:<br>Run Type:<br>Lab ID: | J:\GC21\DATA\11<br>11/08/2013 18:46<br>IB<br>KWG1312552-5 |           | 08F064.D  | Quant Date:                                                                                                     | 11/09/2013 11:35 | Vial:<br>Dilu                               |                         | GC21<br>86<br>1.0<br>ppm |                                          | in the formation of the |
|--------------------------------------------------|-----------------------------------------------------------|-----------|-----------|-----------------------------------------------------------------------------------------------------------------|------------------|---------------------------------------------|-------------------------|--------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bottle ID:<br>Prod Code:                         | NWTPH-DX NW                                               | TPH       |           | Tier:<br>Collect Date:                                                                                          |                  | Mati<br>Rece                                | ix:<br>ive Date:        | NOT /<br>11/11/          |                                          | CABLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Analysis Lot:<br>Analysis Method:<br>Prep Ref:   | KWG1312552<br>NWTPH-Dx                                    |           |           | Prep Lot:<br>Prep Method:<br>Prep Date:                                                                         |                  | Repo                                        | ort Group:              |                          |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Quant Method:<br>Title:                          | J:\GC21\METHOD                                            | S\091013] | FSRO.M    | 999-999-999-999-999-999-999-999-999-99                                                                          |                  | Calil                                       | oration ID:             | CAL12                    | 2766                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MB Ref:                                          |                                                           |           |           |                                                                                                                 |                  |                                             | od ID:<br>nt based on ] | MJ108<br><b>Method</b>   | 1                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Surrogate Comp                                   | ounds                                                     |           |           |                                                                                                                 |                  | watowants - row to card a conserve when you |                         |                          | an a |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Parameter Na                                     | me                                                        | RT        | RT<br>Dev |                                                                                                                 | Response         | Solution<br>Conc                            | %Rec                    | %Rec<br>Limits           |                                          | Rpt?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| o-Terphenyl<br>n-Triacontane                     | •                                                         | ********* |           |                                                                                                                 | 0                |                                             |                         | 50-150<br>50-150         |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Target Compour                                   |                                                           |           |           |                                                                                                                 |                  | Conc. Units:                                |                         | 50-150                   | 7177                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Parameter Na                                     | me                                                        | RT        | RT<br>Dev | na na na mana m | Response         | Solution<br>Conc                            | Final<br>Conc           |                          | Q                                        | Rpt?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Diesel Range                                     | Organics (DRO)                                            | 3.78      |           |                                                                                                                 | 2806             | 2.91                                        |                         |                          |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Residual Rang                                    | ge Organics (RRO)                                         | 6.66      |           |                                                                                                                 | 12167            | 5.76                                        |                         |                          |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

- \*: Result fails acceptance criteria
   #: Acceptance criteria not applicable
   ?: Insufficient information to determine acceptance
   e: Result >= MRL, but MRL less than low point of ICAL
   c: oheck for co-elution

| Acqu Date:                         | J:\GC21\DATA\11<br>11/08/2013 18:46<br>B<br>KWG1312552-5                                                       | 0813F\11(                         | )8F064.D                               | Quant Date:                                  | 11/09/2013 11:35                                                                                                                                                                                                                    | Vial<br>Dilu                     |                         | GC21<br>86<br>1.0<br>ppm   |                         |       |
|------------------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------|----------------------------|-------------------------|-------|
| Bottle ID:<br>Prod Code: 1         | NWTPH-DX NW                                                                                                    | ГРН                               | 99999499999999999999999999999999999999 | Tier:<br>Collect Date:                       | verse et an appenen sammen de la construction de la construction de la construction de la construction de la co<br>Marcine de la construction de la con | Mat<br>Rece                      | rix:<br>ive Date:       | NOT /<br>11/11/            |                         | CABLE |
|                                    | KWG1312552<br>8015C                                                                                            |                                   |                                        | Prep Lot:<br>Prep Method:<br>Prep Date:      |                                                                                                                                                                                                                                     | Repo                             | ort Group:              | *****                      |                         |       |
| Quant Method: J                    | :\GC21\METHOD                                                                                                  | S\091013]                         | FSRO.M                                 | NTALIN I NI |                                                                                                                                                                                                                                     | Calil                            | oration ID:             | CAL12                      | 2766                    |       |
| MB Ref:                            |                                                                                                                |                                   |                                        |                                              |                                                                                                                                                                                                                                     |                                  | od ID:<br>nt based on 1 | MJ108<br>Method            | 2                       |       |
| Surrogate Compou<br>Parameter Name |                                                                                                                | RT                                | RT<br>Dev                              |                                              | Response                                                                                                                                                                                                                            | Solution<br>Conc                 | %Rec                    | %Rec<br>Limits             |                         | Rpt?  |
| 4-Bromofluorob<br>o-Terphenyl      | enzene                                                                                                         |                                   |                                        |                                              | 0<br>0<br>0                                                                                                                                                                                                                         |                                  |                         | 70-129<br>51-126<br>50-150 | NA                      |       |
| n-Triacontane                      |                                                                                                                |                                   |                                        |                                              | 0                                                                                                                                                                                                                                   |                                  |                         |                            |                         |       |
|                                    | 7                                                                                                              |                                   |                                        |                                              | -                                                                                                                                                                                                                                   | Conc. Units:                     |                         |                            |                         |       |
| n-Triacontane                      | ti (Minimi Minimi Internet i Constanti Constanti Constanti Constanti Constanti Constanti Constanti Constanti C | RT                                | RT<br>Dev                              |                                              | -                                                                                                                                                                                                                                   | Conc. Units:<br>Solution<br>Conc | Final<br>Conc           | NCY 2015 I LITTLE STORE    | Q                       | Rpt?  |
| n-Triacontane                      |                                                                                                                | <b>RT</b><br>3.23<br>3.13<br>3.78 |                                        |                                              | Final (                                                                                                                                                                                                                             | Solution                         | Final                   |                            | N1.1000.07.07.10.100.00 | Rpt?  |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

J:\GC21\DATA\110813F\1108F064.D

- \*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

| Acqu Date:         11/08/2013         18:4           Run Type:         IB         Lab ID:         KWG1312552-5                                                                   | 110813F\110                               | 08F064.D  | Quant Date:                             | 11/09/2013 11:35                                                 | Vial<br>Dilu                                                       | rument:<br>:<br>tion:<br>1 Conc. Units: | GC21<br>86<br>1.0<br>ppm             | 10110/101100100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------|-----------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Bottle ID:<br>Prod Code: NWTPH-DX NW                                                                                                                                             | V TPH                                     |           | Tier:<br>Collect Date:                  |                                                                  | Mat<br>Rec                                                         | rix:<br>eive Date:                      | NOT .<br>11/11                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CABLE                                                                                                           |
| Analysis Lot:KWG1312552Analysis Method:8015CPrep Ref:                                                                                                                            |                                           |           | Prep Lot:<br>Prep Method:<br>Prep Date: |                                                                  | Rep                                                                | ort Group:                              |                                      | on on a good and a good                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | n na zako zako na posoba na pos |
| Quant Method: J:\GC21\METHO<br>Title:                                                                                                                                            | DS\091013]                                | FSRO.M    |                                         |                                                                  | Cali                                                               | bration ID:                             | CAL1                                 | 2766                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                 |
| MB Ref:                                                                                                                                                                          |                                           |           |                                         |                                                                  |                                                                    | nod ID:<br>nt based on I                | MJ745<br><b>Method</b>               | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                 |
|                                                                                                                                                                                  |                                           |           |                                         |                                                                  | 1915-1931-1947-1947-1949-1949-1949-1949-1949-194                   |                                         |                                      | in a statistic statistics of the statistics of t |                                                                                                                 |
| Surrogate Compounds                                                                                                                                                              |                                           | ĐT        |                                         |                                                                  | <u> </u>                                                           |                                         |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                 |
| Surrogate Compounds<br>Parameter Name                                                                                                                                            | RT                                        | RT<br>Dev |                                         | Response                                                         | Solution<br>Conc                                                   | %Rec                                    | %Rec<br>Limits                       | nin sin sin sin sin sin sin sin sin sin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Rpt?                                                                                                            |
|                                                                                                                                                                                  | RT                                        |           |                                         | <b>Response</b><br>0                                             |                                                                    | %Rec                                    | Limits                               | NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Rpt?                                                                                                            |
| Parameter Name                                                                                                                                                                   | RT                                        |           |                                         |                                                                  |                                                                    | %Rec                                    |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Rpt?                                                                                                            |
| Parameter Name 4-Bromofluorobenzene                                                                                                                                              | RT                                        |           |                                         | 0                                                                |                                                                    | %Rec                                    | Limits 50-150                        | NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Rpt?                                                                                                            |
| Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane                                                                                                           | RT                                        |           |                                         | 0<br>0<br>0                                                      |                                                                    |                                         | Limits<br>50-150<br>55-133           | NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Rpt?                                                                                                            |
| Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane                                                                                                           | RT                                        |           |                                         | 0<br>0<br>0                                                      | Conc                                                               | %Rec<br>ug/L<br>Final<br>Conc           | Limits<br>50-150<br>55-133<br>54-136 | NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Rpt?                                                                                                            |
| Parameter Name<br>4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane<br>Target Compounds                                                                                       |                                           | Dev       |                                         | 0<br>0<br>0<br><b>Fina</b>                                       | Conc<br>l Conc. Units:<br>Solution                                 | ug/L<br>Final                           | Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                 |
| Parameter Name         4-Bromofluorobenzene         o-Terphenyl         n-Triacontane         Target Compounds         Parameter Name         C9 - C24 DRO         C10 - C25 DRO | RT                                        | Dev       |                                         | 0<br>0<br>0<br>Fina<br>Response                                  | Conc<br>l Conc. Units:<br>Solution<br>Conc                         | ug/L<br>Final                           | Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                 |
| Parameter Name         4-Bromofluorobenzene         o-Terphenyl         n-Triacontane         Target Compounds         Parameter Name         C9 - C24 DRO                       | <b>RT</b><br>2.75                         | Dev       |                                         | 0<br>0<br>0<br>Fina<br>Response<br>3841                          | Conc<br>I Conc. Units:<br>Solution<br>Conc<br>3.34                 | ug/L<br>Final                           | Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                 |
| Parameter Name         4-Bromofluorobenzene         o-Terphenyl         n-Triacontane         Target Compounds         Parameter Name         C9 - C24 DRO         C10 - C25 DRO | RT<br>2.75<br>3.23                        | Dev       | ······                                  | 0<br>0<br>0<br>Fina<br>Response<br>3841<br>3453                  | Conc<br>l Conc. Units:<br>Solution<br>Conc<br>3.34<br>3.05         | ug/L<br>Final                           | Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                 |
| 4-Bromofluorobenzene<br>o-Terphenyl<br>n-Triacontane<br>Target Compounds<br>Parameter Name<br>C9 - C24 DRO<br>C10 - C25 DRO<br>C10 - C28 DRO                                     | <b>RT</b><br>2.75<br>3.23<br>3.13<br>3.78 | Dev       |                                         | 0<br>0<br><b>Fina</b><br><b>Response</b><br>3841<br>3453<br>5538 | Conc<br>l Conc. Units:<br>Solution<br>Conc<br>3.34<br>3.05<br>4.89 | ug/L<br>Final                           | Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                 |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:34:21 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

J:\GC21\DATA\110813F\1108F064.D

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\110813F\1108F064.D Vial: 86 Acq On : 08 Nov 2013 6:46 pm Operator: DVaillenco Sample : IB Inst : GC21 Misc Multiplr: 1.00 : IntFile : rteint.p Quant Time: Nov 09 11:35:37 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units System Monitoring Compounds Target Compounds 4) HC9 - C25ex DRO[TPH-Diesel]2.7538413.337 ppm5) HC10-C25ex DRO[AK102]3.2334533.051 ppm6) HC10-C28in DRO[8015]3.1355384.886 ppm7) HC12-C25ex DRO[NWTPH]3.7828062.906 ppm8) HC25-C36in RRO[NWTPH]6.66121675.760 ppm9) HC25-C44in RRO[TPH-Oil]6.763470332.741 ppm

(f)=RT Delta > 1/2 Window 1108F064.D 091013FSRO.M

Page 1

Data File : J:\GC21\DATA\110813F\1108F064.D Vial: 86 : 08 Nov 2013 6:46 pm Acq On Operator: DVaillenco Sample : IB Inst : GC21 Misc Multiplr: 1.00 . IntFile : rteint.p Quant Time: Nov 9 11:35 2013 Ouant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Single Level Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Response\_ Signal: 1108F064.D\FID1A.CH 5250 5200 5150 5100 5050 5000 4950 4900 4850 4800 4750 4700 4650 4600 4550 4500 4450 4400 4350 9.28 4300 4250 4200 4150 12-C25ex C25ex 18-E28µ 4100 8 2.00 8.00 10.00 11.00 12.00 Time 3.00 4.00 5.00 6.00 7.00 9.00 13.00 14.00 15.00 1108F064.D 091013FSRO.M Mon Nov 11 07:46:56 2013 Page 2

#### **Exception Report**

# Data File:J:\GC21\DATA\110813F\1108F090.DLab ID:KWG1312552-6RunType:IBMatrix:NOT APPLICABLE

Date Acquired: Date Quantitated: Batch ID: Analysis Method: MethodJoinID: 11/08/2013 23:34 11/09/2013 11:35 KWG1312552 NWTPH-Dx MJ1081

#### Sample Exceptions

| Exception Categories                  | Result | Low Limit | High Limit | Pass | Fail |
|---------------------------------------|--------|-----------|------------|------|------|
| ICAL Analyte Recovery                 | NA     | NA        | NA         | x    |      |
| Second Source ICAL Verification       | NA     | NA        | NA         | x    |      |
| Analyte Co-elution                    | NA     | NA        | NA         | x    |      |
| Below Lowest ICAL Level               | NA     | NA        | NA         | x    |      |
| Above Highest ICAL Level              | NA     | NA        | NA         | x    |      |
| Enviroquant/Stealth Calibration Check | NA     | NA        | NA         | x    |      |

Primary Review Secondary Review:

| Data File:<br>Acqu Date:<br>Run Type:<br>Lab ID: | J:\GC21\DATA\11<br>11/08/2013 23:34<br>IB<br>KWG1312552-6 | 0813F\110 | 08F090.D                                            | Quant Date:                                                                                                    | 11/09/2013 11:35 | Via<br>Dih       | rument:<br> :<br> tion:<br>1 Conc. Units: | GC21<br>86<br>1.0<br>ppm |      |       |
|--------------------------------------------------|-----------------------------------------------------------|-----------|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------|------------------|-------------------------------------------|--------------------------|------|-------|
| Bottle ID:<br>Prod Code:                         | NWTPH-DX NW                                               | ГРН       |                                                     | Tier:<br>Collect Date:                                                                                         |                  | Mai<br>Rec       | rix:<br>eive Date:                        | NOT /<br>11/11/          |      | CABLE |
| Analysis Lot:<br>Analysis Method:<br>Prep Ref:   | KWG1312552<br>NWTPH-Dx                                    |           |                                                     | Prep Lot:<br>Prep Method:<br>Prep Date:                                                                        |                  | Rep              | ort Group:                                |                          |      |       |
| Quant Method:<br>Title:                          | J:\GC21\METHOD                                            | S\091013I | SRO.M                                               | 9999998275267555555555555592949455494949494949499499499499499                                                  |                  | Cali             | bration ID:                               | CALI                     | 2766 |       |
| MB Ref:                                          |                                                           |           | Ale Statistics and a statistics of party statistics |                                                                                                                |                  |                  | hod ID:<br>int based on                   | MJ108<br><b>Method</b>   | 1    |       |
| Surrogate Comp                                   | ounds                                                     |           |                                                     |                                                                                                                |                  |                  |                                           |                          |      |       |
| Parameter Na                                     | me                                                        | RT        | RT<br>Dev                                           |                                                                                                                | Response         | Solution<br>Conc | %Rec                                      | %Rec<br>Limits           |      | Rpt?  |
| o-Terphenyl<br>n-Triacontane                     |                                                           |           |                                                     |                                                                                                                | 0<br>0           |                  |                                           | 50-150<br>50-150         |      |       |
| arget Compoun                                    | ds                                                        |           |                                                     |                                                                                                                | <b>Final</b> (   | Conc. Units:     |                                           |                          |      |       |
| Parameter Nar                                    | ne                                                        | RT        | RT<br>Dev                                           |                                                                                                                | Response         | Solution<br>Conc | Final<br>Conc                             |                          | Q    | Rpt?  |
| -                                                | Organics (DRO)<br>ge Organics (RRO)                       | 3.78      |                                                     | 99 - 199 - 199 - 199 - 199 - 199 - 199 - 199 - 199 - 199 - 199 - 199 - 199 - 199 - 199 - 199 - 199 - 199 - 199 | 3451<br>7576     | 3.57             |                                           |                          |      |       |

Printed: 11/11/2013 08:35:48 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

| Acqu Date: 11<br>Run Type: IB                       | GC21\DATA\11<br>/08/2013 23:34<br>VG1312552-6 | 0813F\11(            | 08F090.D                                   | Quant Date:                                                                                                     | 11/09/2013 11:35                                                                                                | Vial<br>Dilu         | rument:<br>;<br>tion:<br>Conc. Units: | GC21<br>86<br>1.0<br>ppm   |      |       |
|-----------------------------------------------------|-----------------------------------------------|----------------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------|----------------------------|------|-------|
| Bottle ID:<br>Prod Code: NV                         | VTPH-DX NW                                    | ГРН                  |                                            | Tier:<br>Collect Date:                                                                                          |                                                                                                                 | Mat<br>Rece          | rix:<br>ive Date:                     | NOT .<br>11/11/            |      | CABLF |
| -                                                   | VG1312552<br>15C                              |                      |                                            | Prep Lot:<br>Prep Method:<br>Prep Date:                                                                         |                                                                                                                 | Repo                 | ort Group:                            |                            |      |       |
| Quant Method: J:\(<br>Title:                        | C21\METHOD                                    | S\091013             | FSRO.M                                     | NER AS CONTRACTOR OF A CANADA CONTRACTOR OF A CANADA CONTRACTOR OF A CANADA CONTRACTOR OF A CANADA CONTRACTOR O | 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - | Calil                | pration ID:                           | CAL12                      | 2766 |       |
| MB Ref:                                             |                                               |                      | 453.8510.8510.9510.9510.9510.9510.9510.951 |                                                                                                                 |                                                                                                                 |                      | od ID:<br>nt based on                 | MJ108<br>Method            | 32   |       |
| Parameter Name                                      | ds                                            | RT                   | RT<br>Dev                                  |                                                                                                                 | Response                                                                                                        | Solution<br>Conc     | %Rec                                  | %Rec<br>Limits             |      | Rpt?  |
| 4-Bromofluoroben<br>o-Terphenyl<br>n-Triacontane    | zene                                          | ***                  |                                            |                                                                                                                 | 0<br>0<br>0                                                                                                     |                      | <br>-                                 | 70-129<br>51-126<br>50-150 | NA   |       |
| arget Compounds                                     |                                               |                      |                                            |                                                                                                                 | Final C                                                                                                         | Conc. Units:         |                                       |                            |      |       |
| Parameter Name                                      |                                               | RT                   | RT<br>Dev                                  |                                                                                                                 | Response                                                                                                        | Solution<br>Conc     | Final                                 |                            | Q    | Rpt?  |
| C10 - C25 DRO<br>C10 - C28 DRO<br>Diesel Range Orga | nics (DRO)                                    | 3.23<br>3.13<br>3.78 |                                            |                                                                                                                 | 4269<br>6129<br>3451                                                                                            | 3.77<br>5.41<br>3.57 |                                       |                            |      |       |
| Residual Range Or                                   | ganics (RRO)                                  |                      |                                            |                                                                                                                 | 7576                                                                                                            |                      |                                       |                            |      |       |

U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:35:51 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c; check for co-elution

| Acqu Date: 11<br>Run Type: IB                                                                                                                                                    | GC21\DATA\11(<br>/08/2013 23:34<br>WG1312552-6                  | )813F\11                          | 08F090.D                          | Quant Date:                              | 11/09/2013                                        | 11:35                                           | Vial:<br>Dilu                                                               |                       | GC21<br>86<br>1.0<br>ppm                     |                                          |              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------|-----------------------------------|------------------------------------------|---------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------------------------|-----------------------|----------------------------------------------|------------------------------------------|--------------|
| Bottle ID:<br>Prod Code: NV                                                                                                                                                      | VTPH-DX NW I                                                    | PH                                | Nyel i eleven kanan oskan a kozar | Tier:<br>Collect Date:                   | ann an Anna Anna Anna Anna Anna Anna An           |                                                 | Mata<br>Rece                                                                | ix:<br>ive Date:      | NOT .<br>11/11                               |                                          | CABLI        |
| Analysis Lot: KV<br>Analysis Method: 803<br>Prep Ref:                                                                                                                            | VG1312552<br>15C                                                |                                   |                                   | Prep Lot:<br>Prep Method:<br>Prep Date:  |                                                   |                                                 | Repo                                                                        | ort Group:            |                                              | an a |              |
| Quant Method: J:\C<br>Title:                                                                                                                                                     | C21\METHODS                                                     | 5\091013                          | FSRO.M                            |                                          | yan samap nga | NINE                                            | Calib                                                                       | pration ID:           | CALI                                         | 2766                                     |              |
|                                                                                                                                                                                  |                                                                 |                                   |                                   |                                          |                                                   |                                                 | Meth                                                                        | od ID:                | MJ744                                        | 5                                        |              |
| MB Ref:                                                                                                                                                                          | anna a shara a sheran casa a sa s |                                   |                                   | an a |                                                   |                                                 | Qua                                                                         | nt based on           | Method                                       |                                          |              |
| MMMoyamman and a sound of the sound only only only and a sound of the                                                                                                            | ds                                                              |                                   |                                   |                                          |                                                   | <u>x</u>                                        | Qua                                                                         | nt based on 2         | Method                                       | <del></del>                              |              |
| ЧММкузаунун каланалагын ултан олар сайуулар нуулар жала сайтаг.                                                                                                                  | ds                                                              | RT                                | RT<br>Dev                         |                                          | Respo                                             | Dnse                                            | Quar<br>Solution<br>Conc                                                    | nt based on 7         | Method<br>%Rec<br>Limits                     |                                          | Rpt?         |
| Surrogate Compoun                                                                                                                                                                |                                                                 | RT                                |                                   |                                          | Respo                                             |                                                 | Solution                                                                    |                       | %Rec<br>Limits                               | NA                                       | Rpt?         |
| <i>urrogate Compoun</i><br>Parameter Name                                                                                                                                        |                                                                 | RT                                |                                   |                                          | Respo                                             | onse<br>0<br>0                                  | Solution                                                                    |                       | %Rec                                         |                                          | Rpt?         |
| Surrogate Compoun<br>Parameter Name<br>4-Bromofluoroben:                                                                                                                         |                                                                 | RT                                |                                   |                                          | Respo                                             | 0                                               | Solution                                                                    |                       | %Rec<br>Limits<br>50-150                     | NA                                       | Rpt?         |
| Parameter Name<br>4-Bromofluoroben:<br>o-Terphenyl<br>n-Triacontane                                                                                                              |                                                                 | RT                                |                                   |                                          | Respo                                             | 0<br>0<br>0                                     | Solution                                                                    |                       | %Rec<br>Limits<br>50-150<br>55-133           | NA                                       | Rpt?         |
| Parameter Name<br>4-Bromofluoroben:<br>o-Terphenyl<br>n-Triacontane                                                                                                              |                                                                 | RT                                |                                   |                                          | Respo                                             | 0<br>0<br>0<br>Final Co                         | Solution<br>Conc                                                            | %Rec                  | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA                                       | -            |
| Parameter Name<br>4-Bromofluorobenz<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds                                                                                          |                                                                 |                                   | Dev                               | · · · · · · · · · · · · · · · · · · ·    | Respo                                             | 0<br>0<br>0<br>Final Co                         | Solution<br>Conc<br>onc. Units:<br>Solution                                 | %Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA                                 | Rpt?<br>Rpt? |
| Parameter Name<br>4-Bromofluorobenz<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds<br>Parameter Name                                                                        |                                                                 | RT                                | Dev                               |                                          | Respo<br>4'                                       | 0<br>0<br>Final Co                              | Solution<br>Conc<br>onc. Units:<br>Solution<br>Conc                         | %Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA                                 | -            |
| Parameter Name<br>4-Bromofluoroben<br>o-Terphenyl<br>n-Triacontane<br>Carget Compounds<br>Parameter Name<br>C9 - C24 DRO                                                         |                                                                 | <b>RT</b><br>2.75                 | Dev                               |                                          | Respo<br>4'<br>42                                 | 0<br>0<br>Final Co<br>mse<br>734                | Solution<br>Conc<br>onc. Units:<br>Solution<br>Conc<br>4.11                 | %Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA                                 | -            |
| Surrogate Compoun<br>Parameter Name<br>4-Bromofluoroben:<br>o-Terphenyl<br>n-Triacontane<br>Sarget Compounds<br>Parameter Name<br>C9 - C24 DRO<br>C10 - C25 DRO<br>C10 - C28 DRO | zene                                                            | <b>RT</b><br>2.75<br>3.23<br>3.13 | Dev                               |                                          | <b>Respo</b><br>47<br>42<br>61                    | 0<br>0<br>Final Co<br>onse<br>734<br>269<br>129 | Solution<br>Conc<br>onc. Units:<br>Solution<br>Conc<br>4.11<br>3.77<br>5.41 | %Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA                                 | -            |
| Surrogate Compoun<br>Parameter Name<br>4-Bromofluorobenz<br>o-Terphenyl<br>n-Triacontane<br>Sarget Compounds<br>Parameter Name<br>C9 - C24 DRO<br>C10 - C25 DRO                  | zene<br>nics (DRO)                                              | RT<br>2.75<br>3.23                | Dev                               |                                          | Respo<br>47<br>42<br>61<br>34                     | 0<br>0<br>Final Co<br>mse<br>734<br>269         | Solution<br>Conc<br>onc. Units:<br>Solution<br>Conc<br>4.11<br>3.77         | %Rec<br>ug/L<br>Final | %Rec<br>Limits<br>50-150<br>55-133<br>54-136 | NA<br>NA                                 | -            |

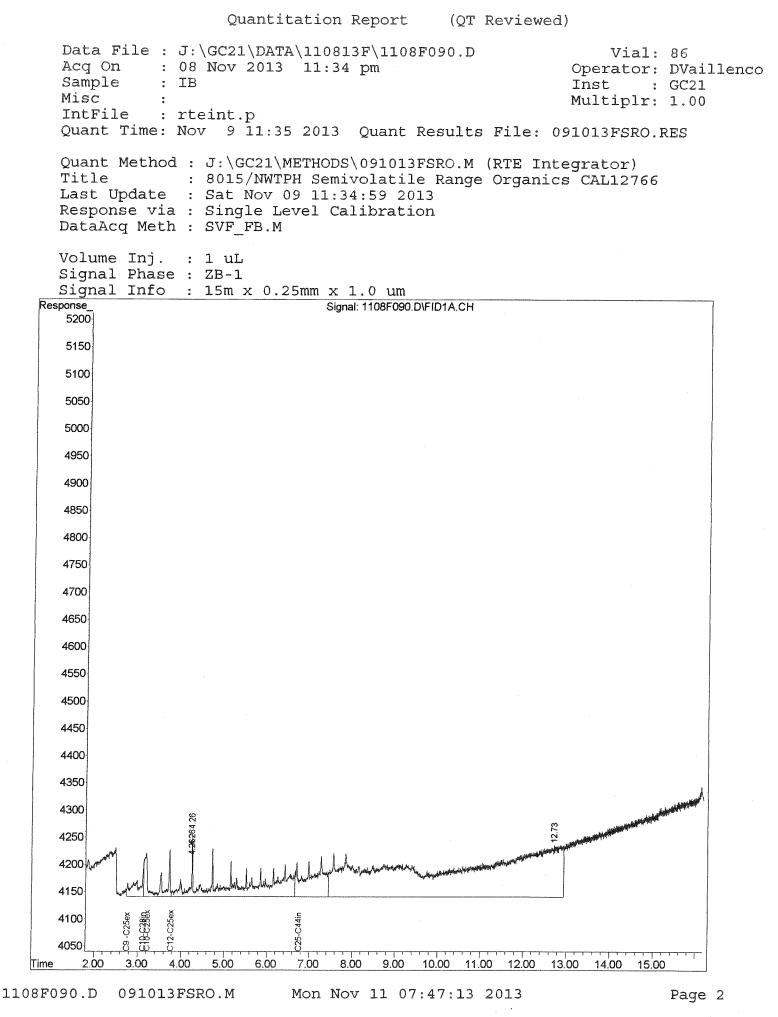
U: Undetected at or above MDL J: Analyte detected above MDL, but below MRL B: Hit above MRL also found in Method Blank E: Analyte concentration above high point of ICAL N: Presumptive evidence of compound

Printed: 11/11/2013 08:35:54 u:\Stealth\Crystal.rpt\quant1.rpt

D: Result from dilution m: Manual integration performed d: Compound manually deleted NR: Analyte not reported from this analysis

\*: Result fails acceptance criteria #: Acceptance criteria not applicable ?: Insufficient information to determine acceptance e: Result >= MRL, but MRL less than low point of ICAL c: check for co-elution

Quantitation Report (QT Reviewed) Data File : J:\GC21\DATA\110813F\1108F090.D **Vial:** 86 Acq On : 08 Nov 2013 11:34 pm Operator: DVaillenco Sample : IB Inst : GC21 Misc Multiplr: 1.00 : IntFile : rteint.p Quant Time: Nov 09 11:35:48 2013 Quant Results File: 091013FSRO.RES Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator) Title : 8015/NWTPH Semivolatile Range Organics CAL12766 Last Update : Sat Nov 09 11:34:59 2013 Response via : Initial Calibration DataAcq Meth : SVF FB.M Volume Inj. : 1 uL Signal Phase : ZB-1 Signal Info : 15m x 0.25mm x 1.0 um Compound R.T. Response Conc Units System Monitoring Compounds Target Compounds 4) HC9 -C25ex DRO [TPH-Diesel]2.7547344.113 ppm5) HC10-C25ex DRO [AK102]3.2342693.772 ppm6) HC10-C28in DRO [8015]3.1361295.408 ppm7) HC12-C25ex DRO [NWTPH]3.7834513.574 ppm9) HC25-C44in RRO [TPH-Oil]6.762055316.989 ppm



#### APPENDIX D

#### MONITORING WELL INSTALLATION & SUPPORT TASKS FINAL REPORT

APRIL 2015



Monitoring Well Installation & Support Tasks Final Report PacifiCorp Chehalis, WA Plant

Cardno Project 90369



Prepared for KTA Associates, Inc.



KTA Associates, Inc A Professional Environmental Service Corporation

And for PacifiCorp



## May 2015

Monitoring Well Installation And Support Tasks

# **FINAL REPORT**

# PacifiCorp Chehalis, WA Plant

Cardno Project 90369

# **MAY 2015**

**Prepared for:** 

KTA, Associates, Inc.

And

PacifiCorp

### **Document Information**

| Prepared for   | KTA Associates, Inc.                                  |
|----------------|-------------------------------------------------------|
| Project Name   | Monitoring Well Installation and Support Tasks Report |
| File Reference | Document 2- Final1                                    |
| Job Reference  | P90369.008                                            |
| Date           | 22 May 2015                                           |

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### Document Control

| Version | Date      | Author       | Author Initials           | Reviewer | Reviewer<br>Initials |
|---------|-----------|--------------|---------------------------|----------|----------------------|
| 001     | 5/22/2015 | Dave Metallo | DCM L. Westbrook<br>(KTA) |          |                      |

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# Abbreviations and Acronyms

| AST     | above ground storage tank                              |
|---------|--------------------------------------------------------|
| ASTM    | American Society for Testing Material                  |
| bgs     | below ground surface                                   |
| Cardno  | Cardno                                                 |
| CCS     | Cowlitz Clean Sweep                                    |
| CDI     | Cascade Drilling, Inc. (of Portland, OR)               |
| CoC     | chain of custody                                       |
| DO      | dissolved oxygen                                       |
| DOE     | (WA) Department of Ecology                             |
| DOT     | Department of Transportation                           |
| GSU     | Generator Set-Up Unit                                  |
| IDW     | investigation-derived waste                            |
| IFP     | interface probe                                        |
| KTA     | KTA Associates, Inc.                                   |
| mg/kg   | milligrams per kilograms (parts per million)           |
| MTCA    | Model Toxics Control Act                               |
| MW      | Monitoring Well                                        |
| MWIR    | Monitoring Well Installation and Support Tasks Report  |
| PC      | PacifiCorp                                             |
| PVC     | polyvinyl chloride                                     |
| SB      | Soil Boring                                            |
| SI      | Site Investigation                                     |
| SIC     | Standard Industrial Classification                     |
| SPT     | Standard Penetration Test                              |
| TPH-Dx  | Total Petroleum Hydrocarbons – Diesel Extended Range   |
| TPH-Gx  | Total Petroleum Hydrocarbons – Gasoline Extended Range |
| USCS    | Unified Soil Classification System                     |
| VCP     | Voluntary Clean-up Program (WADOE)                     |
| WAC     | Washington Administration Code                         |
| WLI     | Water Level Indicator                                  |
| µg/L    | micrograms per liter (parts per billion)               |
| 11 0015 |                                                        |

### 1 Introduction

#### 1.1 **Purpose and Objective**

Cardno was contracted by KTA Associates, Inc. (KTA) to conduct a groundwater investigation that included an assessment of potential impacts to subsurface soil and shallow groundwater within certain site areas previously exposed to mineral oil releases at the PacifiCorp (PC) power plant in Chehalis, WA. Mineral oil releases at the site (2011 and 2013) were due to malfunctions with the plant's Generator Step-up Unit (GSU)s. Mineral oil is used as insulting fluid in the GSUs.

The primary objective of this project is to determine if any residual impacts from mineral oil exposure exists in the subsurface soil and shallow groundwater in concentrations above the Washington Department of Ecology's (WADOE) Model Toxics Control Act (MTCA) regulatory limits. Site investigation activities are being conducted under the WA DoE's Voluntary Cleanup Program (VCP).

This project is divided into two main phases. The first phase includes monitoring well installation, in conjunction with various support tasks. The outcome of soil boring / monitoring well installation activities and associated environmental sampling results are included within this *Monitoring Well Installation and Support Tasks Report (MWIR)*. All field efforts for this first project phase were conducted between 13 March and 15 April, 2015.

The second phase of this project involves groundwater monitoring, which will be conducted on a pre-determined, scheduled basis (e.g. quarterly; April, June-Sept, December 2015 and March 2016). Future *Groundwater Monitoring Reports*, detailing field methods, water level measurements, groundwater table / flow direction assessment and sampling results will be drafted as appropriate and submitted to KTA under separate covers.

#### 1.2 Scope of Work

To meet the above stated objectives, the scope of work for the monitoring well installation and associated support tasks consisted of the following field activities:

- Pre- (field) mobilization and utility clearance tasks.
- Characterization of subsurface lithology and soil sampling at three newly positioned soil boring (SB)s.
- Monitoring well installation and development tasks, including well construction and surface completion, well development, and equipment decontamination.
- Re-development of pre-existing monitoring wells (MW1 and MW3) to prepare them for sampling.
- Sampling of water inflow at several nearby electrical vaults adjacent to the GSUs.

- Elevation survey of the top edge of the monitoring well casings, including re-surveying the monitoring wells installed in 2013.
- Handling and management of project collected environmental samples and field documentation. and,
- Supervision of investigation derived waste (IDW) collection and containment tasks.

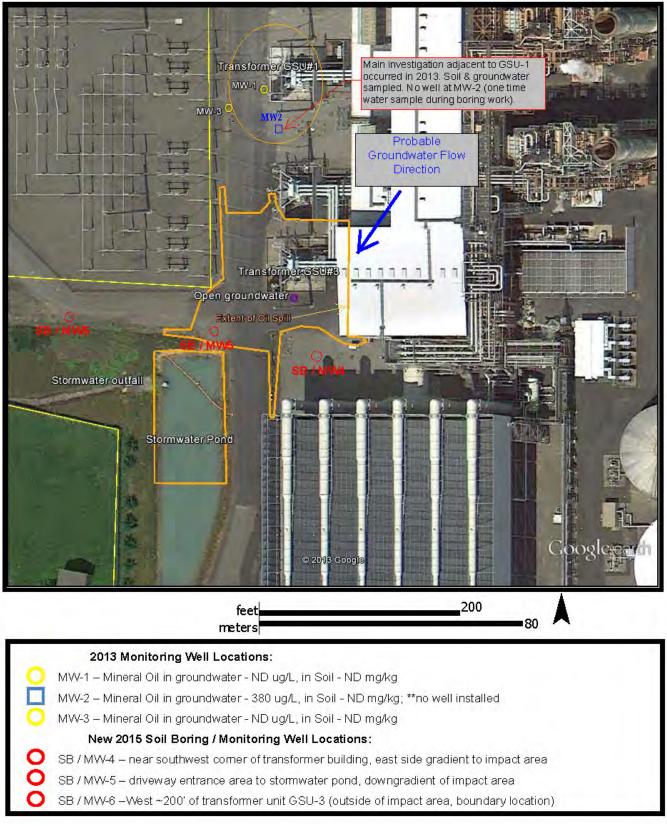
Prominent site features and soil boring / well locations are shown on Figure 1.

#### 1.3 Report Organization

This MWIR is organized into the following sections:

- > Section 1.0 Introduction
- > Section 2.0 Site Background
- > Section 3.0 Field Efforts
- > Section 4.0 Analytical Results
- > Section 5.0 References

Discussions regarding the procedures and methods for the groundwater investigation and results of the data collected are presented in the main text of this report. Utility Clearance Documentation, Health & Safety Tailgate Forms / CDI Daily Work Reports, Geologic Borehole Logs / Well Construction Logs, Monitoring Well Development Forms, Field Notebook entries, and Laboratory Chain-of-Custody Forms / Analytical Report are presented in Appendices A through F, respectively.



#### Figure 1. Site Map with Monitoring Well and Prominent Features

## 2 Site Background

#### 2.1 Site Description

PacifiCorp owns and maintains a natural gas-fired combined cycle power plant, which produces 520-megawatts of electricity. The plant is located at 1813 Bishop Road, Chehalis, Washington, in the Chehalis River Valley.

The Chehalis River Valley is considered a rural area, with approximately 7,000 residents living in and around the city. The plant is located 3 miles south of town, which consists mostly of small parks, farms, small pockets of light industrial areas, and a few housing subdivisions.

#### 2.1.1 <u>Geology</u>

The overall soil-type distribution at the site consists of low permeability silt and clay layer underlain by 45 to 50 feet of water-bearing sand and gravel, underlain by a silt and clay aquitard. These soil-types are consistent with regional geologic mapping by Weigle and Foxworthy (1962) and a regional study for the Chehalis Generation facility (Dames and Moore 1994). These regional studies classify the upper 50 feet of soil in the area of the site as recent alluvium and glaciofluvial sediments. The aquitard found at approximately 50 feet bgs is widespread, is often described as blue-gray, clayey silt, and is reported to be more than 100 feet thick (Dames and Moore 1994).

#### 2.1.2 <u>Hydrogeology</u>

The groundwater flow direction beneath the site is assumed to travel south/southwest towards Bishop Road and Berwick Creek. Regional investigations conducted by others (Dames and Moore 1994) have categorized the shallow aquifer in the area as unconfined or semi-confined. However, the shallow aquifer appears to exhibit the characteristics of a confined or semiconfined aquifer, primarily due to the low permeably silt cap immediately above the aquifer.

#### 2.2 Previous Investigation/Cleanup Efforts

Cowlitz Clean Sweep (CCS) completed a site cleanup (CCS 2011) at the PC Chehalis Plant during the months of January through March, 2011. CCS removed floating product from the stormwater pond and ditch lines using oil booms, absorbent material, an oil skimmer and vacuum truck. The stormwater ditch lines were cleaned by removing impacted material down to the clay layer.

CCS sampled affected areas and ditches for analysis to determine the extent of oil contamination; additional soil and water sampling was conducted after cleanup.

The main excavation occurred at or near GSU-1, the first plant transformer that caught fire and subsequently released mineral oil to the surrounding areas. Impacted soil was removed to a depth of six inches below the static groundwater line using olfactory methods (i.e., visual).

During the excavation, free product was noted floating on top of the water and absorbent materials were deployed in the excavation area to remove the product. All excavated materials were loaded onto waiting dump trucks and taken to the Weyerhaeuser transfer station located in Longview, WA for disposal.

Once the excavations had been completed, the area around the GSU-1 transformer was backfilled with clean material and compacted to the required 95% compaction. All ditch lines were relined with clean gravel to prevent sediment loss and water quality issues.

Water collected during excavation activities completed near and around the transformer area was pumped to the on-site 1.7 million gallon diesel above ground storage tank (AST) and the AST containment area.

CCS removed 845 tons of rock and soil and 8,869 gallons of water from affected areas during excavation activities. CCS backfilled the excavations with 92 tons of 2 to 4 inch quarry spalls and 462 tons of 1 ¼" rock to help achieve the required 95% compaction standard.

Most recently, GSU-3 experienced a similar malfunction in late 2013 as the one that occurred at GSU-1 in early 2011. Consequently, this malfunction caused the release of mineral oil around the base of the transformer unit and impacted the surface areas adjacent to it, the roadway and ditches and the area around the southwest corner of the plant building. The release of mineral oil at GSU-3 was approached and conducted in a similar fashion to the previous cleanup at GSU-1.

#### 2.3 **Previous Site Investigation**

Cardno completed a Site Investigation (SI) at the PC-Chehalis Plant on May 23<sup>rd</sup> through May 25<sup>th</sup>, 2011. Cardno conducted the SI to determine the following:

- If groundwater has been impacted from the mineral oil spill;
- If the large AST used to contain the water collected during excavation activities exceeded any regulatory levels, and;
- If surface water in the stormwater pond has been impacted from the mineral oil spill.

Cardno completed the following activities during the 2011 SI:

- Installed and sampled six temporary monitoring wells placed within the shallow water bearing zone;
- Collected two water samples from the AST at varying depths;
- Collected two surface water samples from the stormwater pond, and;
- Collected three surface soil samples downgradient of the mineral oil spill.

The results of the 2011 SI are summarized as follows:

- One groundwater location (GW-4) had a detection of 1100 μg/L, which exceeded the MTCA Method A Cleanup Level of 500 μg/L for groundwater;
- One AST water sample (TS2) had a detection of 440 µg/L, which did not exceed the MTCA Method A Groundwater Cleanup Level ;
- One surface water sample (SW1) had a detection of 360 µg/L, which did not exceed the MTCA Method A Groundwater Cleanup Level, and;
- One soil sample (SG1) had a detection of 160 mg/kg, which did not exceed the MTCA Method A Soil Cleanup Level of 4000 mg/Kg.

Subsequent to the 2011 SI, a follow-up field investigation was undertaken by Cardno in October and November of 2013. These follow-up tasks were conducted after a review of all field efforts and sampling results to date by WADOE VCP staff. VCP identified two hot spots and near GSU#1. PacifiCorp, KTA and WADOE VCP agreed to investigate soil and groundwater in these two areas and characterize the local groundwater flow to determine if the mineral oil released from GSU-1 had any longer-term impacts to the deeper subsurface soils, vadose zone and/or the local shallow groundwater from areas with previously identified concentrations of mineral oil above regulatory limits. The *Groundwater Investigation Report* (Cardno, 2014) presented data from this effort. Efforts and sampling results contained in this report are summarized below;

Cardno completed the following activities during the 2013 SI:

- Drill, characterize and sample subsurface soil from 3 locations to ~30-feet below grade surface. Soil samples from the borings at SB-1 thru SB-3 were analyzed for mineral oil.
- Install permanent wells at two of the drilling locations, MW-1 and MW-3. Due to utility interferences, a well was not set at the location for MW-2. These activities took place on October 28 and 29, 2013.
- A (relative) survey of the monitoring well casing elevations was conducted to aid in the determination of groundwater flow direction.
- Sample groundwater from MW-1 and MW-3, via well casing. A one-time groundwater sample was collected at MW-2 during the extraction of the drill rods. These activities took place on November 1, 2013 – except for the MW-2 sample, collected earlier (10/29/2013).

The results of the 2013 SI are summarized as follows:

- One groundwater sample had a detection of Mineral Oil at 380  $\mu$ g/L, which is below the MTCA Method A Cleanup Level for TPH-Dx of 500  $\mu$ g/L.
- There were no detections of Mineral Oil in any of the subsurface soil samples.

# 3 Field Efforts

This section details the field efforts that were employed during the 2015 monitoring well installation and support tasks. These tasks included pre-field mobilization planning / utility clearances, subsurface soil characterization and sampling, monitoring well installation and development, re-development of two existing site monitoring wells, electrical vault water inflow sampling, well casing elevation survey, handling and management of project collected environmental samples and field documentation, and supervision of IDW collection and containment tasks. Any discrepancies between the Work Plan (Cardno, 2015) and field methodologies are also described in this section.

#### 3.1 Pre-Field Mobilization Planning and Utility Clearances

A project Kick-Off (KO) Meeting was held on 13 March, 2015 at PC-Chehalis, WA Plant, satisfying the two-week lead-time requirement for the start of field work. The KO Meeting was attended by the PC Plant Environmental Analyst representative, the KTA Project Manager, the Cardno Project Manager and the Cardno Task Lead. Items discussed in detail at the meeting included; the overall project field schedule, health and safety concerns, site access, utility clearances, final placement of the new monitoring wells, site communications, and other project particulars (e.g. IDW, electrical vault access, etc.).

#### 3.1.1 Safety Orientation Course

A requirement of PC is that all plant personnel, consultants, subcontractors, and vendors attend a company and plant-specific video safety orientation course. This requirement also includes taking and passing an exam of the material covered in the video. This training provides all personnel an opportunity to receive current plant safety information, up-to-date emergency procedures and for site workers to become familiar with the site and associated operational particulars. All project personnel (KTA, Cardno, and associated subcontractors) completed this course and passed the exam prior to initialization of field work activities.

#### 3.1.2 <u>Utility Clearance Event</u>

All drilling locations were cleared for utility contact concerns by PC Chehalis plant staff, a thirdparty, qualified and licensed Utility Locator Contractor (All County Locating Services, Inc.), and the general public locating service, appropriate for Lewis County, WA (e.g. *Call Before U Dig* 800-424-5555 or 811). All County Locating was able to provide the necessary services to locate, map and mark all utilities in the work area of the project site, which include at least: electrical, gas, potable water, fire suppression water, communications, and sewer. The trace of each utility was marked on the ground surface with colored paint or marking whiskers according to the American Public Works Association (APWA) (see Cardno 2015 Work Plan). During this event representatives from PC, KTA and Cardno were present at the site to coordinate activities with the Utility Locator Contractor. All available and reasonable measures were untaken to ensure that plant and public utilities were clearly and accurately marked to protect against encountering these service lines during the planned intrusive subsurface work. Utility clearance tasks also provided a final opportunity for onsite pre-drilling coordination and discussions regarding boring positioning between PC/ KTA and Cardno. Utility clearance documentation is provided in Appendix A.

#### 3.1.3 <u>Health and Safety</u>

A Site Specific Health and Safety Plan (Cardno, 2015) was drafted for the work detailed in the Cardno 2015 Work Plan (Cardno, 2015) and in the contracted Scope of Services. At a minimum this Health and Safety Plan provided emergency contact information, routes to the nearest medical and/or aid facilities and site specific work task and environmental /physical hazard information. Prior to the initiation of any field tasks, a mandatory tailgate safety meeting was conducted each field day. The purpose of these Tailgate Meetings was to review any expected site specific hazards, general task hazards, current / changed site conditions, to receive a brief from PC, to discuss emergency procedures, and to review our daily work / task schedule. Health and Safety Tailgate Forms along with the drilling subcontractor's Daily Work Reports are included in Appendix B.

#### 3.2 Subsurface Soil Characterization and Sampling

Subsurface soils were investigated at three new boring locations during this current investigation. Boring locations are identified as SB-4, SB-5 and SB-6. Positioning of these borings is shown on Figure 1, descriptions are noted below.

- SB-4 is located south-southeast of the extent of soil contamination from the 2013 GSU#3 mineral oil release.
- SB-5 is located on the west side of the perimeter access road, at the northeast corner of the stormwater pond. This location is within the outer extent of the soil contamination from the 2013 GSU#3 mineral oil release. This location is southwest of GSU#3, which is assumed to be in the most likely direct pathway of groundwater flow.
- SB-6 is located west of the maximum extent of the soil contamination from the 2013 GSU#3 mineral oil release, near the PacifiCorp property boundary.

Characterization (logging) of subsurface soil was undertaken during drilling activities at SB's 4, 5 and 6 using a CME-85 hollow stem auger rig mounted on a twin-axle flatbed truck (Rig ID # 1211), provided and operated by Cascade Drilling,L.P. (CDI), of Portland, OR. Borings were drilled using 8.25-inch OD x 4.25-inch ID x 5-foot long hollow stem augers. Soils were collected and logged using Standard Penetration Test methods, driving an 18-inch long x two-inch outside diameter harden steel split barrel sampler down into undisturbed substrate.

In a progressive fashion, subsurface soil was continuously sampled from grade level down to a depth of six feet below grade surface (bgs). At SB-4, subsurface soil was continuously sampled down to 7.5 feet bgs. Then starting at the 10 feet bgs interval, subsurface soil was

logged at five-foot intervals, down to each borings termination depth. Total boring depths ranged from 26.5 feet bgs at SB-5 and SB-6 to 31.5 feet bgs at SB-4.

#### 3.2.1 <u>Lithological Description</u>

Split barrel sampler units from each logging interval were brought to the surface, carefully opened to retain as much lithologic material as possible, thus exposing the core of the recovered soil sample. Stainless steel spoons and/or spatulas were used to laterally dissect the soil cores to permit thorough examination of their contents. Lithological descriptions of unconsolidated subsurface materials contained in each sampler unit were described in accordance with American Society for Testing and Materials (ASTM) D-2488-00 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) (ASTM, 1990). Descriptive information recorded included (but was not limited to):

- Color (based on Munsell Color System)
- Moisture content
- Identification of the predominate particles size based on the Unified Soil Classification System (ASTM D-2487-98) (Gravel, Sand, Silt, Clay, and organic range of particle sizes);
- Percent of gravel, sand, fines, or all three;
- Description of grading and sorting of coarse particles;
- Particle angularity and shape; and
- Maximum particle size or dimension.
- Separate identification of the Unified Soil Classification System (USCS) group symbols or combinations thereof were assigned to each logged interval.

Additional information recorded on the logs (at least partially) included soil sample information, sample depth indications, percent material recovery (from within sampler units), depth of the water table, SPT "blow counts", caving or sloughing of the borehole, changes in drilling rate, presence of organic materials, well construction information and other noteworthy observation or conditions. Geologic Borehole Logs are included in Appendix C.

#### 3.2.2 Soil Sample Collection

At desired and/or targeted depths from within each soil boring, subsurface material recovered from the split barrel samplers was placed into stainless steel bowls and thoroughly homogenized. Once this material was mixed it was placed directly into pre-labeled, laboratory supplied analytical jars. These jars were then stored in clean insulated coolers containing ice. Soil samples were hand-delivered to the laboratory, Analytical Resources, Incorporated (ARI) in Tukwila, WA. Table 1 provides sample collection information, including parameters, testing methods and number of samples and duplicates.

| Sample<br>Type         | Analytical<br>Parameter | Sample<br>Matrix | Analytical<br>Method | <sup>1</sup> No. of<br>Samples | No. of<br>Duplicates |  |
|------------------------|-------------------------|------------------|----------------------|--------------------------------|----------------------|--|
| Soil Boring<br>Samples | Mineral Oil             | Soil             | NWTPH-Dx             | 3                              | 1                    |  |
|                        | Total Solids            | Soil             | EPA 150.1            | 3                              | 1                    |  |

 Table 1. Soil Sample Collection Information

One subsurface soil sample was collected from each of the three new soil borings. These soil samples were obtained within the zone of continuous sampling (0-6 feet bgs), optimally targeting material from 4-6 feet bgs. This particular depth range was targeted in an attempt to sample soil that had the highest potential of being impacted by the 2013 GSU#3 mineral oil release event. If evidence of mineral oil impacts had been observed deeper in the boring column (below the 4-6 feet bgs range), up to two additional soil samples would have been collected to determine the basal extent of the contamination. To assess the presence of mineral oil contamination within the recovered soil boring material, several field screening methods were employed, including; visual observations, vapor screenings and water sheen tests. No such field evidence of contamination was found in any of the new borings at any depth. Table 2 lists the soil sample IDs, boring ID, sampling depths, and a description of the material and lithologic description for each subsurface soil sample that was collected for analysis.

| Sample ID           | Boring<br>ID | Sample<br>Depth<br>(feet bgs) | Material / Lithologic Description                                                                                                                                                                                                             |  |  |
|---------------------|--------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| SB4-5-040715        | SB-4         | 4.5 - 6                       | Yellowish Brown (10YR 5/4), moist, SILT and silty CLAY, with very fine to fine grain sand and little small-medium pebble size gravel, mottled appearance, no sheen, ML-CL                                                                     |  |  |
| SBDUP-01-<br>040715 | SB-4         | 4.5 - 6                       | Duplicate sample of SB4-5-040715, same material and lithologic description                                                                                                                                                                    |  |  |
| SB5-5-040815        | SB-5         | 4.5 - 6                       | Yellowish Brown (10YR 5/4), moist, silty CLAY, with little medium to very coarse grain sand and small pebble size gravel, mottled appearance, stiff to very stiff, no sheen, CL                                                               |  |  |
| SB6-4-040815        | SB-6         | 3.5 - 5                       | Yellowish Brown (10YR 5/6), very moist to moist, sandy / silty CLAY, with little small-large pebble size gravel and some fine to coarse grain sand, mottled, blackish granular material (~2-3 mm thick) near bottom of interval, no sheen, CL |  |  |

#### 3.3 Monitoring Well Installation and Development

All monitoring well tasks described herein adhered to the Minimum Standards for Construction and Maintenance of Wells set forth on Washington Administration Code (WAC) 173-160 and -162. The drilling Contractor was responsible for securing the required Monitoring Well Start Cards and submitting this information to the WA-DOE.

Three new groundwater monitoring wells, MW-4, MW-5 and MW-6, corresponding to the soil borings listed in Table 2, were installed within the shallow water bearing zone at locations shown on Figure 1. This section describes installation and development of the new project monitoring wells. Re-development of two existing monitoring wells, MW-1 and MW-3, is also discussed.

#### 3.3.1 Monitoring Well Installation and Completion Activities

Final well depths were determined during installation to capture the range of seasonal groundwater levels, to ensure adequate production of water for sampling, and to focus on the groundwater layers that may have been contaminated by the GSU#3 mineral oil release. The 2015 project monitoring wells were all set at a maximum depth of 25.5 feet bgs. At this depth each well was assured to maximize its encounter with the local seasonal groundwater table fluctuations. This depth range will also enabled future sampling of the upper portion of the groundwater aquifer most likely, if at all, impacted by the GSU#3 mineral oil release.

Monitoring well construction details are as follows;

- Each monitoring well was constructed with a six-inch long threaded end cap and 20 feet of two-inch diameter, 0.010-inch (#10 slot) slotted schedule 40 polyvinyl chloride (PVC) threaded screen. Well screens extended from 25 to 5 feet bgs at each 2015 well location.
- 10/20 graded clean (environmental) sand was utilized for filter pack applications at all project wells. Filter pack material was set by manually pouring the sand material through the augers and into the annular space between the outside of the PVC well casing and the soil formation. The filter pack was set according to the screen placement and extended to one foot above the top of the screened interval of the well. For this project, each well's sand filter was set from the boring's terminal depth to within four feet bgs.
- Bentonite was used as both a borehole sealant (as in MW-4, bentonite was used to seal off the bottom of the boring from 31.5 to 26.5 feet bgs) and as a filter pack sealant. A minimum one-foot thick, hydrated bentonite seal was placed atop the upper terminus of the filter pack at each monitoring well. Both pelletized and chipped bentonite was used for sealing applications.
- Redi-Mix concrete was used to seal each well construction. The concrete seal was approximately three feet thick at each well location, was set directly on top of the bentonite filter pack seal and extended to grade surface.

- Traffic rated flush-mounted wellhead access monuments were installed at the surface of each monitoring well. These monuments are 8-inches in diameter with 12-inch long steel skirts which extend down into the concrete borehole seal. Each monument has a removable lid secured into place with bolts. The monuments are surrounded on the surface by small concrete pads, generally not exceeding 24-inches in diameter and at least four-inches thick.
- The top of the PVC casing at each well was neatly trimmed to approximately half the distance between the underside of the monument lid and the top of the concrete seal within the vault. A lockable, water-tight expansion plug was properly fitted onto the top of each well casing. A metal tag, with the official WA-DOE unique Well ID number, was fastened to the upper portion of the well casing, fitting inside the monument vault when the lid is attached. The project well ID number (e.g. MW-4) was clearly stamped on the outside of the monument for future ease of identification. Well Construction Diagrams are presented in Appendix C.

Table 3 provides a summary of monitoring well construction details.

| Well ID | Surface<br>Completion | Total<br>Boring<br>Depth<br>(ft bgs) | Bottom<br>End Cap<br>Depth<br>(ft bgs) <sup>2</sup> | Screen<br>Length<br>(ft bgs) | 10/20<br>Sand Filter<br>Pack<br>(ft bgs) | Bentonite<br>Seal<br>(ft bgs) | Concrete<br>Surface<br>Seal<br>(ft bgs) |
|---------|-----------------------|--------------------------------------|-----------------------------------------------------|------------------------------|------------------------------------------|-------------------------------|-----------------------------------------|
| MW-4    | flush mount           | 31.5 <sup>1</sup>                    | 25.5                                                | 25 - 5                       | 26.5 – 4                                 | 4 -3                          | 3 - 0                                   |
| MW-5    | flush mount           | 26.5                                 | 25.5                                                | 25 - 5                       | 26.5 – 4                                 | 4 - 2                         | 2 - 0                                   |
| MW-6    | flush mount           | 26.5                                 | 25.5                                                | 25 - 5                       | 26.5 - 4                                 | 4 - 3                         | 3 - 0                                   |

 Table 3
 Monitoring Well Construction Detail

<sup>1</sup> MW-4 was backfilled from 31.5 to 26.5 feet bgs with bentonite. 10/20 Sand was placed from 26.5 to 25.5 feet bgs. <sup>2</sup> Bottom end caps are six inches long and extend from 25.5 to 25 feet bgs.

#### 3.3.2 <u>Monitoring Well Development</u>

A necessary step in preparing for the collection of representative formation water, for accurate water level measurement, for protection of the native formation surrounding the well, and proper continued future operation, is the development of the monitoring well's filter pack. In this process, lithic fines, suspended sediments, and native and non-formation fluids are removed from the filter pack and well casing as completely as possible, while causing the least disturbance or impact to the native formation and in a non-destructive manner to the well screen and filter pack itself.

Newly installed monitoring wells were appropriately developed, removing accumulated sediment and drilling fluids (potable water only, introduced to aid installation and development tasks) from inside of each well casing. Additional volumes of native formation water were also developed through the filter pack and removed. Well development was accomplished using a

combination of surge block tool, submersible pump and bailers. Monitoring wells were developed following U.S. Environmental Protection Agency guidelines (US EPA, 1992).

Development tasks were undertaken after allowing the well seal components (bentonite and concrete sections) ample time to cure, optimally greater than 12 hours. At least three well casing volumes of formation water (sans drilling fluid amount) were extracted during these procedures. Detailed notes of the development event at each well, noting total casing volume, water level, total volumes removed, turbidity assessments and other information are recorded Monitoring Well Development Forms, presented in Appendix D.

#### 3.3.3 <u>Re-Development of Existing Monitoring Wells</u>

Re-development of the two existing site monitoring wells (MW-1 and MW-3), which were installed in October of 2013, was conducted during the same event as the new wells. Accumulated sediment from within the well casing, lithic fines in the filter pack and stagnant groundwater was removed from each well. Development methods similar to those used for the new wells were applied to these pre-existing well locations. Table 4 presents the summary of well development particulars for all 5 site monitoring wells.

| Well<br>ID | Installation<br>Date | Development<br>Method                         | Total<br>Well<br>Casing<br>Depth<br>(ft TOC) | Initial<br>Water<br>Level<br>(ft TOC) | Static<br>Water<br>Column<br>Height<br>(ft) | Well<br>Casing<br>Volume<br>(gal) | Total<br>Volume<br>Removed<br>(gal) | Resultant<br>Turbidity               |
|------------|----------------------|-----------------------------------------------|----------------------------------------------|---------------------------------------|---------------------------------------------|-----------------------------------|-------------------------------------|--------------------------------------|
| MW-1       | 10/2013              | Sub-pump & surge action                       | 16.90                                        | 4.80                                  | 12.10                                       | 1.94                              | 10                                  | Brownish<br>tint,<br>mostly<br>clear |
| MW-3       | 10/2013              | Sub-pump & surge action                       | 19.4                                         | 5.20                                  | 14.2                                        | 2.27                              | 5                                   | clear                                |
| MW-4       | 4/7/2015             | Surge tool and sub-pump                       | 25.40                                        | 5.80                                  | 19.6                                        | 3.14                              | 30                                  | clear                                |
| MW-5       | 4/8/2015             | Surge tool and<br>sub-pump w/<br>surge action | 25.50                                        | 4.60                                  | 20.9                                        | 3.34                              | 45                                  | clear                                |
| MW-6       | 4/8/2015             | Sub-pump & surge action                       | 25                                           | 5.5                                   | 19.5                                        | 3.12                              | 45                                  | Brownish<br>tint, nearly<br>clear    |

\*\*All wells are 2-inch diameter Sch40 PVC

#### 3.4 Electrical Vault Water In-Flow Sampling

It was noted during a site visit in March, 2015 that the electrical utility vaults in the areas adjacent to GSU-1 and GSU-3, and areas in between, were at least partially filled with inflowing stormwater infiltration and groundwater that filled the utility trenches leading to these vaults. Water was seen freely flowing into several of these vaults as they were opened during the utility locating event. Various electrical vaults in the vicinity of the GSUs are shown on Figure 2.

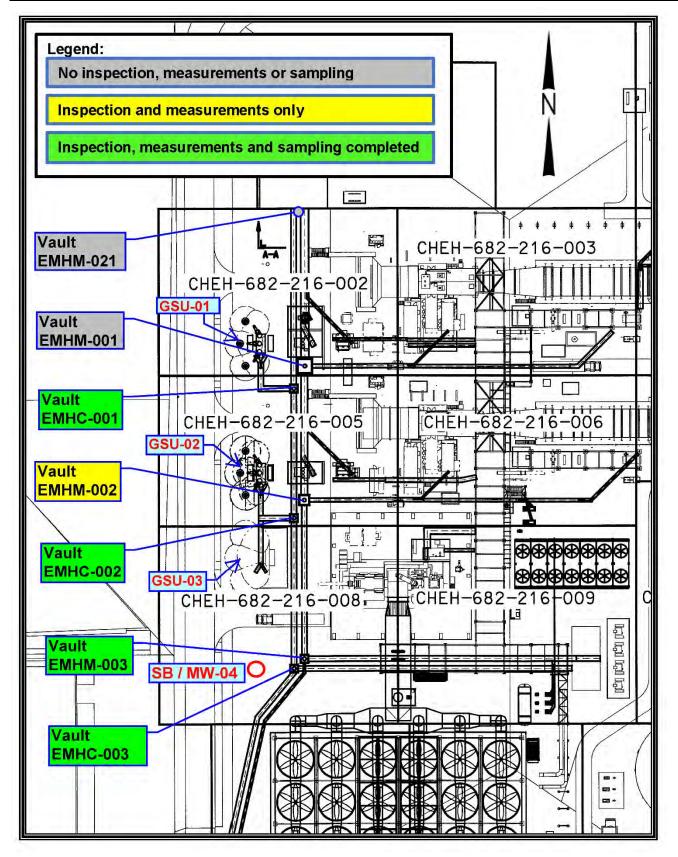


Figure 2. Electrical Vault Locations

The electrical vaults are equipped with submersible pumps to keep the in-flow water levels to a pre-set maximum before discharging their contents further downstream. Several of the vaults are connected to other vaults. In turn, pumps at certain vaults are then connected to piping that discharges to the main stormwater drainage ditches running along the western boundary of the GSUs.

Water inflow to the electrical vaults may have been impacted by the mineral oil releases from GSU#3 and GSU#1. Discussion about this water inflow was conducted between the representatives of PC, KTA and Cardno, resulting in a decision to collect and analyze water samples from select vaults. Water level measurements, visual inspections and samples were collected from four vaults (EMHC-001, EMHC-002, EMHM-003 and EMHC-003) via bailer grab methods. Water level measurements and visual inspections (only) were collected at vault EMHM-002. Two other vaults were considered, but ultimately not inspected or sampled. EMHM-021 was too far beyond and too far upgradient from the footprint of the mineral oil impact area. EMHM-001 is connected and drains to the adjacent vault, therefore its contents were represented by the sample from EMHC-001.

The following methods were used to characterize the contents of the vault in-flow water;

- Visual inspections of the vault water was completed to assess the presence of an oil sheen

   which may be indicative of impacts from mineral oil releases.
- Direct measurements of hydrocarbon presence, hydrocarbon thickness, water level and vault depth were collect with an Interface Probe.
- Water collection via grab methods were conducted using certified clean, single use, disposable polyethylene bailers. Vault in-flow water samples were submitted to ARI for analytical testing via NWTPH-Dx to assess the concentration of mineral oil.

Notes on visual inspections of the vaults, in particular the presence of any sheens or oil globules, were made in the field notebook. Field Logbook Entries are included in Appendix E. Table 5 lists the vault measurement details and sample collection information.

| Vault ID | Depth to<br>Product<br>(ft) | Depth to<br>Water (ft) | Total Vault<br>Depth (ft) | Water<br>Column<br>Height (ft) | Visual<br>Sheen<br>Noted<br>(Y/N) | Sample<br>Collected<br>for<br>Analysis | Duplicate<br>Sample<br>Collected |
|----------|-----------------------------|------------------------|---------------------------|--------------------------------|-----------------------------------|----------------------------------------|----------------------------------|
| EMHC-001 | 12.69                       | 12.71                  | 14.05                     | 1.34                           | Possible<br>sheen                 | Yes                                    | No                               |
| EMHM-002 | ND                          | 9.12                   | 12.16                     | 3.04                           | No                                | No                                     | No                               |
| EMHC-002 | ND                          | 9.43                   | 12.41                     | 2.98                           | No                                | Yes                                    | Yes                              |
| EMHM-003 | 13.61                       | 13.62                  | 14.15                     | 0.89                           | Possible<br>sheen                 | Yes                                    | No                               |

 Table 5. Electrical Vault Measurements and Sample Collection Information

| Vault ID | Depth to<br>Product<br>(ft) | Depth to<br>Water (ft) | Total Vault<br>Depth (ft) | Water<br>Column<br>Height (ft) | Visual<br>Sheen<br>Noted<br>(Y/N) | Sample<br>Collected<br>for<br>Analysis | Duplicate<br>Sample<br>Collected |
|----------|-----------------------------|------------------------|---------------------------|--------------------------------|-----------------------------------|----------------------------------------|----------------------------------|
| EMHC-003 | 18.37                       | 18.38                  | 19.73                     | 1.35                           | Possible<br>sheen                 | Yes                                    | No                               |

 Table 5. Electrical Vault Measurements and Sample Collection Information

#### 3.5 Well Casing Elevation Survey

An elevation survey that collected measurements of the top of the PVC casings at each monitoring well was conducted. An auto-level and hand held survey grade stadia rod were used to collect these elevation measurements. An elevation of 100.00' was assigned to a reference point on the southwest corner of the containment wall surrounding GSU-1. A mark was placed on the top of the wall as close to the corner as possible. This is the same reference location used during the 2013 survey event. Table 6 presents the data collected during the site survey.

| Location                         | Top PVC Casing<br>(ft amsl) | Backshot at start of<br>survey event (ft) | Backshot at end of<br>survey event (ft) |  |  |  |
|----------------------------------|-----------------------------|-------------------------------------------|-----------------------------------------|--|--|--|
| SW corner GSU-1 containment wall | 100.00 <sup>1</sup>         | 3.13                                      | 3.13                                    |  |  |  |
| MW-1                             | 97.76                       | 5.37                                      | 5.37                                    |  |  |  |
| MW-3                             | 97.57                       | 5.56                                      | 5.57                                    |  |  |  |
| MW-4                             | 97.64                       | 5.49                                      | 5.49                                    |  |  |  |
| MW-5                             | 97.08                       | 6.05                                      | 6.05                                    |  |  |  |
| MW-6                             | 96.18                       | 6.96                                      | 6.95                                    |  |  |  |

#### Table 6. Monitoring Well Survey Data

<sup>1</sup>All elevations are referenced to the top of the SW corner of the GSU-1 containment wall. The location was assigned an elevation of 100.00' above mean sea level.

#### 3.6 Sample Management, Field Documentation and Quality Assurance

This section discussed procedures used to handle and manage the environmental samples collected for laboratory analysis. Field documentation and project quality assurance methods are also detailed.

#### 3.6.1 Sample Handling Procedures

After samples were collected into laboratory supplied containers, they were appropriately labeled and iced in coolers. This was done to keep the samples out of the direct sunlight and to maintain a temperature of four degrees centigrade. Disposable nitrile gloves were used by

personnel collecting and handling all samples. Gloves were changed frequently and in between each sample collection to avoid cross contamination.

Chain of Custody (CoC) forms will be completed to accompany each cooler shipment from the field to the laboratory. Date, time, sample identification, number of containers, and analysis to be performed will be recorded on each CoC. Samples were hand delivered by Cardno staff to ARI of Tukwila, WA at the conclusion of the sampling event. CoC records are included in Appendix F.

#### 3.6.1.1 Sample Identification and Labeling

Samples were identified by their media type, location and the corresponding date a sample was collected. Any quality control samples (e.g. duplicates) were also be denoted. Soil samples were further designated with their collection depth. Sample identification numbers, including sample media type, location number, media and depths were recorded on field sheets completed for each location or sample.

#### 3.6.2 Field Documentation

A logbook was used to document sampling and other support procedures performed during field activities. More specifically, the Field Activities Logbook entries provide a record of specific sample locations and collection information, subcontractor activities, noting their role(s), describing the major equipment used at each sampling location and providing noteworthy observations, description of problems, or incidents and their resolutions. Completed field forms, planning and safety documents and the Field Activities Logbook were all stored in a weather-proof file box, maintained on site, during all project work activities. Field Activity Logbook entries and field forms used for recording and detailing utility locates, health and safety tailgate information, soil boring and logging, well construction and well development activities are included in various appendices, as noted in previous sections of this MWIR.

#### 3.6.3 **Quality Assurance Methods**

#### 3.6.3.1 Instrument Calibration

All field instruments that require a zeroing and/or a user calibration will be appropriately calibrated at the start of each day's deployment per the instrument manufacturer's instructions. Calibration checks against standards will be performed at the beginning and periodically throughout each field day to verify equipment operation. Any calibration data was recorded in the field logbook. All calibration media (e.g. gas, liquid or otherwise) was properly stored and managed per manufacturer's recommendations and according to applicable PC Plant requirements.

#### 3.6.3.2 Decontamination Procedures

Any non-disposable equipment (except rigs, vehicles and large drilling equipment such as auger flights) that had not been previously decontaminated and ready for project use, or was exposed to site soils, groundwater or other non-sample media contact and slated for re-use at

multiple sample locations was decontaminated prior to its initial use and after completing a particular sampling or logging task. Decontamination wash consisted of the following:

- > non-phosphate detergent (Alconox) and water wash;
- > tap water rinse; and
- > De-ionized water rinse.
- > Drilling rigs, support vehicles, drill works, connection rods, augers and other large pieces of equipment were decontaminated by power washing with a high-pressure steam cleaner only as described in Section 4 of the 2015 Project Work Plan (Cardno, 2015).

#### 3.7 Investigation Derived Waste

Investigation-derived waste (IDW) generated by this project consisted of soil cuttings, excess groundwater generated during development and decontamination/rinse (steam cleaner washer) water. All IDW was containerized in Department of Transportation (DOT)-17H approved open head 55-gallon drums. All drums were properly labeled with their media contents, date of generation, location of origin, and contents' owner.

Waste streams were segregated by media, drummed, sealed and placed on pallets. Pallets of soil cuttings and development water drums were generally placed adjacent to their boring / well locations of origin. Decontamination water drums were placed on a common pallet within the project work site. Approximately 19 drums of IDW were generated during this project; these included 12 soil cuttings and seven decontamination / development water containers.

All drum/pallet placements were approved by the PC Environmental Analyst and stored wholly within PacifiCorp property. After properly containing, palletizing, and labeling the drums, all additional IDW tasks, including testing, further staging, manifesting and disposal is being managed directly by PacifiCorp. No IDW was transported off of the site by Cardno or the drilling Contractor.

#### 3.8 **Project Work Plan Discrepancies**

There were no significant or substantive changes, modifications, or revisions between the Project Work Plan (PWP) (Cardno, 2015) and the actual field tasks as performed. Methodologies as described in the PWP were followed to completion.

# 4 Analytical Results

This section summarizes the results of the subsurface soil and electrical vault water inflow sampling activities completed at the PacifiCorp Chehalis Plant. Samples were analyzed for mineral oil using Northwest methods for total petroleum hydrocarbons – diesel extended range (NWTPH-Dx). These results are compared to the appropriate WA DoE MTCA Cleanup Levels (WAC 173-340) and related stormwater benchmark values. The complete analytical report, including the CoC forms and electronic data deliverable table, are included in Appendix F.

#### 4.1 Comparison of Project Results to Regulatory Guidance

For assessment of subsurface soil samples, project analytical data are compared to values listed for WA DoE MTCA Method A Cleanup Levels for Unrestricted Soil Land Uses (WAC 173-340-740). Under this method Mineral Oil concentrations in soil of **4,000 mg/Kg** or less are acceptable (2,000 mg/Kg for other Dx components) (see parameter table listed under WAC 173-340-900). The definition of mineral oil under this section of MTCA means non-PCB mineral oil, typically used as an insulator and coolant in electrical devices such as transformers and capacitors, measured using NWTPH-Dx. The cleanup level is based on preventing the accumulation of free product on the groundwater, as described in WAC 173-340-747 (10). Additional PCB testing requirements of this section do not apply because PacifiCorp can demonstrate that: (1) The release originated from an electrical device that was manufactured after July 1, 1979; and (2) oil containing PCBs was never used in the equipment suspected as the source of the release.

Electrical vault inflow water analytical data are compared to permissible values from two sets of regulatory guidance. Mineral oil concentrations in vault water samples data are compared to values listed for MTCA Method A Cleanup Levels for Groundwater (WAC 173-340-720) and to benchmark values listed for the USEPA Industrial Stormwater General Permit (ISGP) with certain Standard Industrial Classification (SIC) codes related to Total Petroleum Hydrocarbon concentrations.

Similar to the MTCA soil requirements, mineral oil for groundwater assessment is defined as non-PCB mineral oil, typically used as an insulator and coolant in electrical devices such as transformers and capacitors measured using NWTPH-Dx. The MTCA Method A Groundwater Cleanup Level of **500 µg/L** is based on protection from noncarcinogenic effects during drinking water use. Additional PCB testing requirements listed under the MTCA groundwater section (173-340-720) do not apply to project sampling for the same reasons as listed above in the soil discussion.

PC's Chehalis, WA plant has an ISGP and is identified with SIC code of 4911. This SIC classification requires only standard monitoring (pH, metals, turbidity) and quarterly checks for visible oil sheen per Section 5 "*BENCHMARKS, EFFLUENT LIMITATIONS, AND SPECIFIC SAMPLING REQUIREMENTS, A. Benchmarks and Sampling Requirements,* Table 2. Benchmarks and Sampling Requirements Applicable to All Facilities. However, facilities with

SIC codes that make Section 5B, "Additional Sampling Requirements for Specific Industrial Groups", relevant and applicable are subject to additional sampling requirements. Facilities listed under the SIC codes for Primary Metals, Metal Mining, Automobile Salvage, Scrap Recyclers, Metal Fabricating, Hazardous Waste TSD facilities and Dangerous Waste Recyclers, Air Transportation and Transportation need to analyze stormwater samples for NWTPH-Dx. The benchmark for NWTPH-Dx per Table 3, Additional Benchmarks and Sampling Requirements Applicable to Specific Industries, is **10,000 µg/L**. Although PacifiCorp's ISGP SIC code is not included among those facility types listed above, the 10,000 µg/L benchmark for TPH could be referenced as a conservative concentration, which is relevant as an acceptable level of TPH in stormwater discharges from the electrical vaults at the PC Chehalis Plant.

#### 4.2 Subsurface Soil Sampling Results

Three subsurface and one duplicate (duplicate of SB-4) soil samples were submitted to the laboratory for Mineral Oil analysis via NWTPH-Dx. Results are reported as Diesel Range Organics (DRO), Mineral Oil and Motor Oil (heavy oil, residual range organics or RRO). DRO quantitation was noted on chromatograph peaks in the range from C12 to C24. Mineral Oil quantitation was noted on chromatograph peaks in the range from C16 to C28. RRO quantitation was noted on chromatograph peaks in the range from C24 to C38. Combined, the DRO/RRO results indicate the total diesel range extended (Dx) identified in a particular sample. Mineral Oil, therefore, is a subset of the total DRO/RRO concentration.

SB-5 showed the only reportable detection of TPH, at 6.7 mg/Kg for DRO. There were no reportable detections of Mineral Oil in any of the soil samples. The SB-5 soil sample was collected at a depth of five feet bgs. The DRO detection was well below the MTCA Method A Soil Cleanup Level of 2,000 mg/Kg. Soil sampling results are presented in Table 7.

| Sample ID       | Parameter   | Detection Limit<br>mg/Kg | Reporting<br>Limit mg/Kg | Result Value<br>mg/Kg | Data<br>Qualifier |
|-----------------|-------------|--------------------------|--------------------------|-----------------------|-------------------|
| SB4-5-040715    | DRO         | 1.8                      | 6.8                      | 6.8                   | U                 |
| SB4-5-040715    | Mineral Oil | 0                        | 14                       | 14                    | U                 |
| SB4-5-040715    | RRO         | 0                        | 14                       | 14                    | U                 |
| SBDUP-01-040715 | DRO         | 1.7                      | 6.3                      | 6.3                   | U                 |
| SBDUP-01-040715 | Mineral Oil | 0                        | 12                       | 12                    | U                 |
| SBDUP-01-040715 | RRO         | 0                        | 12                       | 12                    | U                 |
| SB6-4-040815    | DRO         | 1.7                      | 6.3                      | 6.3                   | U                 |

| Sample ID    | Parameter   | Detection Limit<br>mg/Kg | Reporting<br>Limit mg/Kg | Result Value<br>mg/Kg | Data<br>Qualifier |
|--------------|-------------|--------------------------|--------------------------|-----------------------|-------------------|
| SB6-4-040815 | Mineral Oil | 0                        | 13                       | 13                    | U                 |
| SB6-4-040815 | RRO         | 0                        | 13                       | 13                    | U                 |
| SB5-5-040815 | DRO         | 1.7                      | 6.2                      | 6.7                   |                   |
| SB5-5-040815 | Mineral Oil | 0                        | 12                       | 12                    | U                 |
| SB5-5-040815 | RRO         | 0                        | 12                       | 12                    | U                 |

Table 7. Subsurface Soil Sampling Results

U = non-detect Duplicate collected at SB-4

#### 4.3 Electrical Vault In-Flow Water Sampling Results

Four electrical vault in-flow water samples, along with one duplicate (duplicate from EMHC-002) were submitted to the laboratory for Mineral Oil analysis via NWTPH-Dx. Results are reported as Diesel Range Organics (DRO), Mineral Oil and Motor Oil (heavy oil, residual range organics or RRO). DRO quantitation was noted on chromatograph peaks in the range from C12 to C24. Mineral Oil quantitation was noted on chromatograph peaks in the range from C18 to C28. RRO quantitation was noted on chromatograph peaks in the range from C18 to C28. RRO quantitation was noted on chromatograph peaks in the range from C24 to C38. Combined, the DRO/RRO results indicate the total diesel range extended (Dx) identified in a particular sample. Mineral Oil, therefore, is a subset of the total DRO/RRO concentration.

DRO was noted in the accumulated in-flow water at EMHC-003 (120  $\mu$ g/L), EMHC-002 (110  $\mu$ g/L), and in the EMHC-002 Duplicate (110  $\mu$ g/L). DRO detections at these vaults were below the MTCA Method A Groundwater Cleanup Level of **500**  $\mu$ g/L. There were no reportable detections of Mineral Oil identified at any of these locations.

Detections of DRO, Mineral and RRO were noted at EMHC-001 at 1900  $\mu$ g/L, 1300  $\mu$ g/L and 320  $\mu$ g/L, respectively. The RRO concentration was below the MTCA Method A Groundwater Cleanup Level of **500**  $\mu$ g/L. Although the DRO and Mineral Oil concentrations exceed the MTCA groundwater cleanup level threshold, they are well below the **10,000**  $\mu$ g/L ISGP Stormwater Benchmark for TPH. Electrical vault in-flow water sampling results are presented in Table 8.

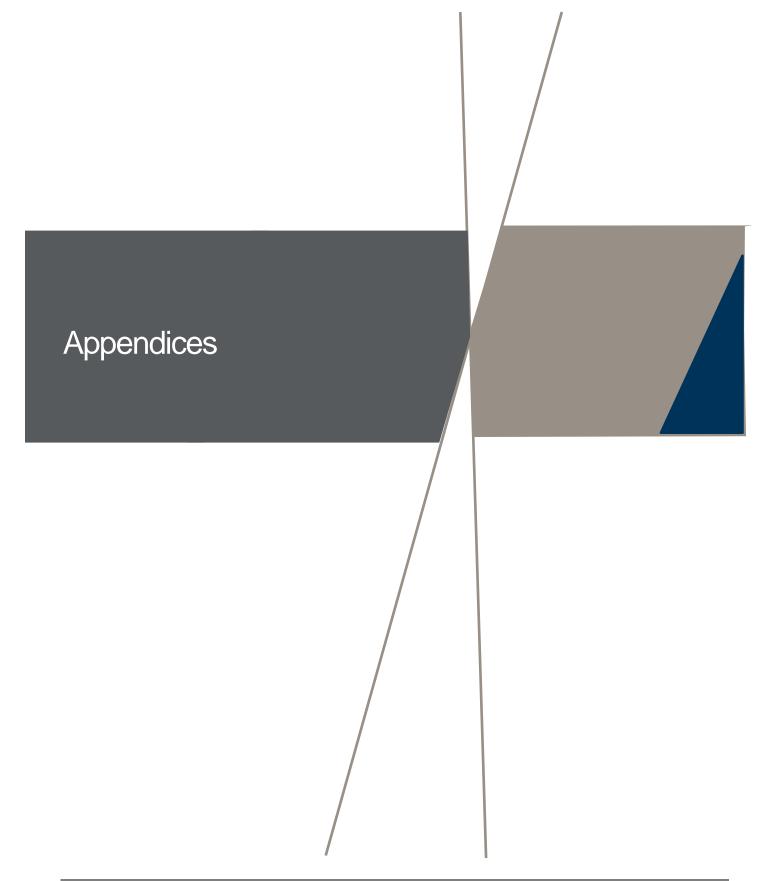
| Sample ID     | Parameter   | Detection Limit<br>µg/L | Reporting<br>Limit µg/L | Result Value<br>µg/L | Data<br>Qualifier |
|---------------|-------------|-------------------------|-------------------------|----------------------|-------------------|
| EMHC003-Vault | DRO         | 20                      | 100                     | 100                  | U                 |
| EMHC003-Vault | Mineral Oil | 0                       | 200                     | 200                  | U                 |
| EMHC003-Vault | RRO         | 0                       | 200                     | 200                  | U                 |
| EMHM003-Vault | DRO         | 20                      | 100                     | 120                  |                   |
| EMHM003-Vault | Mineral Oil | 0                       | 200                     | 200                  | U                 |
| EMHM003-Vault | RRO         | 0                       | 200                     | 0.2                  | U                 |
| EMHC002-Vault | DRO         | 20                      | 100                     | 110                  |                   |
| EMHC002-Vault | Mineral Oil | 40                      | 200                     | 200                  | U                 |
| EMHC002-Vault | RRO         | 0                       | 200                     | 200                  | U                 |
| DUP-Vault     | DRO         | 20                      | 100                     | 110                  |                   |
| DUP-Vault     | Mineral Oil | 0                       | 200                     | 200                  | U                 |
| DUP-Vault     | RRO         | 0                       | 200                     | 200                  | U                 |
| EMHC001-Vault | DRO         | 20                      | 100                     | 1900                 |                   |
| EMHC001-Vault | Mineral Oil | 0                       | 200                     | 1300                 |                   |
| EMHC001-Vault | RRO         | 0                       | 200                     | 320                  |                   |

#### Table 8. Electrical Vault In-Flow Water Sampling Results

U = non-detect Duplicate collected at EMHC-002

### 5 References

- Cardno 2015. Groundwater Investigation and Quarterly Monitoring Work Plan 2015/2016, PacifiCorp Chehalis, WA Plant.
- Cardno TEC Inc. (Cardno TEC) 2011. Site Investigation Report, PacifiCorp Chehalis Plant, Chehalis, Washington.
- Cardno TEC 2014. PacifiCorp Groundwater Investigation (Report), PacifiCorp Chehalis Plant
- Cowlitz Clean Sweep (CCS) 2011. Mineral Oil Split Cleanup Report, Chehalis, Washington.
- Dames and Moore, Inc. 1994. *Groundwater Resources Investigation for Ecology Groundwater Right Application No. G2-29004.* Prepared for Chehalis Power, Inc. Chehalis, Washington. July 7.
- Washington State Department of Ecology (DOE) 2007. *Model Toxics Control Act.* Cleanup screening levels for TPH is soil and groundwater.
  - 2008. Minimum Standards for Construction and Maintenance of Wells. Washington Administration Code 173-160 & 173-162.
- U.S. Environmental Protection Agency (US EPA) 1992. *Monitoring Well Development Guidelines for Superfund Project Managers.*
- Weigle, J.M. and B.L. Foxworthy 1962. *Geology and Groundwater Resources of Western Central Lewis County, Washington.* Water Supply Bulletin No. 17. State of Washington Department of Conservation, District of Water Resources.



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### APPENDIX A UTILITY CLEARANCE DOCUMENTATION

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INV.# 7753



For those who needed it done - yesterday!

## **PRIVATE WORK REQUEST**

| Customer: <u>A A ASSOCIUS, Inc.</u>                                                                                                                                                                                                                                                                                                                                                                                                        | Date: 3-18-15                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| 2825 Eastlake Ave East Ste.                                                                                                                                                                                                                                                                                                                                                                                                                | €<br>300P.O.#:                                                                               |
| Seattle, U.A. 98102                                                                                                                                                                                                                                                                                                                                                                                                                        | _ Job #: parine Corp. power plant                                                            |
| Billing Address: POB BAR - 704 - ZZEA AVE                                                                                                                                                                                                                                                                                                                                                                                                  | NE SAM MAMASh W74,98079                                                                      |
| Date Requested: <u>3-18-15</u> Reques                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                              |
| Locate/Site Address: 1813 Bishop Rd                                                                                                                                                                                                                                                                                                                                                                                                        | Thehealis, aug. 98532                                                                        |
| Description of Locating Private Utilities: <u>Locate 3</u> -                                                                                                                                                                                                                                                                                                                                                                               | Areas for drelling                                                                           |
| 0ff. Tel.: <u>206-267-1400</u> Cell #: <u>206-794-</u><br>Date Completed: <u>3-18-15</u> Site Contact: <u>Dowl Ma</u>                                                                                                                                                                                                                                                                                                                      |                                                                                              |
| Activity Summary: Located Power & Com. c                                                                                                                                                                                                                                                                                                                                                                                                   | outof 2. Outotts                                                                             |
| At Generaton Buildy Neur Cooli                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                              |
| #5 in Doct Anew #6/7/8 BROW<br>Plastic Water/Fire Lines in Area                                                                                                                                                                                                                                                                                                                                                                            | s- oki                                                                                       |
| Please Note: This locate is being performed on private property at the customer's request.<br>All County Locating Services, LLC has no knowledge of, and customer has not furnished<br>as-installed plans, drawings or information of other utilities and the area of the requested lo-<br>cate. All County Locating Services, LLC, shall not be liable for damage to any type of utility, or<br>any loss or injury caused by such damage. | THIS IS YOUR INVOICE, TOTAL AMOUNT<br>DUE ON COMPLETION OF SERVICES                          |
| *Charges outstanding over 30 days from the date of service are subject to a 1½%<br>FINANCE CHARGE PER MONTH or annual percentage rate of 18%.<br>Customer agrees to pay accrued expenses in the event of collection.                                                                                                                                                                                                                       | Travel <u>3</u> hrs. @ \$65.00 = <u>195</u><br>Man Hrs. <u>2</u> hrs. @ \$65.00 = <u>130</u> |
| Method of-Payment: DC/C DVisa DMaster Card D Other                                                                                                                                                                                                                                                                                                                                                                                         | Total = 3 25,00                                                                              |
| ⊒Torbe Billed □Cash □Check - #<br>⊇Comm. □Res. □PAID IN FULL - Initials                                                                                                                                                                                                                                                                                                                                                                    | Note: Minimum I-hour labor charges apply. Travel is computed                                 |
| □Comm. □Res. □PAID IN FULL - Initials<br>□Traffic - Lt. □Traffic - Heavy □Wet □ Dry<br>Customer Signature: ↓                                                                                                                                                                                                                                                                                                                               | from our home office or from the last job site - whichever is less.                          |
| Locator's Signature: Bell & Been                                                                                                                                                                                                                                                                                                                                                                                                           | Thank You For Your Business!                                                                 |

Print Form

Committed to Safety, Quality Productivity and Service



#### **Regulatory Information Form**

Please complete <u>all fields</u> in this form. It must be returned no later than <u>3-Business days</u> before project start date or <u>the project will be rescheduled</u>. Thank you for your time and attention in this project. We look forward to working with you.

| JOB DESCRIPTION   |                                |  |  |  |
|-------------------|--------------------------------|--|--|--|
|                   | 101-15-0075 Bid 9195           |  |  |  |
| WORK START DATE:  | 04/07/2015                     |  |  |  |
| START TIME:       | 0900                           |  |  |  |
| CLIENT JOB#:      |                                |  |  |  |
| NAME OF JOB SITE: | Chehalis Plant                 |  |  |  |
| SITE ADDRESS:     | 1813 Bishop Road               |  |  |  |
| CITY, STATE, ZIP: | Chehalis, WA 98532             |  |  |  |
| CROSS STREET:     | Rush Road                      |  |  |  |
| FIELD CONTACT:    | Lenora Westbrook/ Dave Metallo |  |  |  |
| FIELD CELL:       | 360-250-7694 / 206-794-0095    |  |  |  |

| COMPANY INFORMATION |                              |  |  |
|---------------------|------------------------------|--|--|
|                     | KTA Associates Inc.          |  |  |
|                     | 800 Fifth Avenue, Suite 4100 |  |  |
|                     | Seattle, WA 98104            |  |  |
| OFFICE CONTACT:     | Lenora Westbrook             |  |  |
| PHONE:              | 877-736-1499                 |  |  |
|                     | lwestbrook@ktainc.net        |  |  |
| BILL TO NAME:       | Ken Taylor                   |  |  |
| ADDRESS:            | 704 228th Avenue NE, PMB 872 |  |  |
| CITY, STATE, ZIP:   | Sammamish, WA 98074          |  |  |

| SCOPE OF WORK CONFIRMATION        |  |
|-----------------------------------|--|
| Cascade Drilling Bid No. 9210 R-2 |  |
|                                   |  |

| LEGAL DESCRIPTION |                       |         |  |
|-------------------|-----------------------|---------|--|
| TOWNSHIP:         | 13N                   |         |  |
| RANGE:            |                       |         |  |
| SECTION:          | 10                    |         |  |
| QTR/QTR:          |                       |         |  |
| QTR:              | SW                    |         |  |
| TAX LOT/PARCEL#:  | 017774                | 4006005 |  |
| COUNTY:           | Lewis                 |         |  |
|                   | PacifiCorp Energy     |         |  |
|                   | 1813 Bishop Rd        |         |  |
| CITY, STATE, ZIP: | P: Chehalis, WA 98532 |         |  |

| SITE CONDITIONS          |                                              |  |  |
|--------------------------|----------------------------------------------|--|--|
| TRAFFIC CONTROL:         | Restricted in plant area                     |  |  |
| WORK HOUR RESTRICTION:   | none                                         |  |  |
| PREVAILING WAGE: (Y/N)   | Ν                                            |  |  |
| CUTTINGS CONTAINMENT:    | place into drums                             |  |  |
| SURFACE:                 | gravel, packed roads                         |  |  |
| SPECIAL SITE CONDITIONS: | working in vicinity of high voltage lines, 5 |  |  |

| PRIVATE and PUBLIC utility locates are REQUIRED before digging can start |                                   |  |  |
|--------------------------------------------------------------------------|-----------------------------------|--|--|
| Company and Ticket Identification REQUIRED                               |                                   |  |  |
| **PRIVATE UTILITY LOCATE                                                 | All County Locating Services, LLC |  |  |
| ****LOCATE TICKET:                                                       | Private Work Request Inv #7753    |  |  |
| ****DATE OF LOCATE:                                                      | 03-18-2015                        |  |  |

#### WORK AUTHORIZATION DOCUMENT REQUIRED PLEASE ATTACH

| NOTES AND SPECIAL INSTRUCTIONS                                                                          |  |  |  |
|---------------------------------------------------------------------------------------------------------|--|--|--|
| Cascade Drilling PO PacifiCorp Groundwater Wells                                                        |  |  |  |
| work site wholly on PacifiCorp property, SW portion of plant to northeast of SW pond, adjacent to GSU#3 |  |  |  |
| All County Locating Services invoice attached                                                           |  |  |  |
| Drilling 3 new well locations, SB/MW-4, SB/MW-5 & SB/MW-6, Site map attached                            |  |  |  |

## **APPENDIX B**

## HEALTH AND SAFETY TAILGATE FORMS / CDI DAILY WORK REPORTS

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### Attachment 1 Daily Health and Safety Tailgate Meeting Form

# DAILY HEALTH AND SAFETY TAILGATE MEETING FORM

**Project Health and Safety Manager Conducting Meeting :** 

Date: 4.7.15 Weather: Rain (lite), 50°s, Sl. breeze Personnel In Attendance: Dave Metallo (Cardno), Brad Rwasnowski (Cardno) Lenora Westbrook (KTA), Joe Staloch (CDI), Don Dodson (CDI), Derek Aamodt Meeting Minutes (Brief description of topics, special concerns and sites discussed): - Site Safety concerns; Slips, trip-falls, good house keeping - Electrical safety, high voltage concerns - Weather conditions - Utility clearances, thrid party locates - Drillers took the PC Safety course (required) - The group sot down w/ Jeremy Smith (Plant Enviro/Safety) for a Safety discussion - KO Safety Neeting Signature of Attendees' : en (1) is Horona

"THE BEST JOB IS ONE DONE SAFELY ! "

### Attachment 1 Daily Health and Safety Tailgate Meeting Form

DAILY HEALTH AND SAFETY TAILGATE MEETING FORM **Project Health and Safety Manager Conducting Meeting :** Date: 4.8.2015 Date: 4.8.2015 Weather: Partly Cldy, charing, 45-60, lite breezy Personnel In Attendance: Joe, Don, Darek (CDI Portland) D Metallo, B. Kwasnowski Meeting Minutes (Brief description of topics, special concerns and sites - Site access - Energized lines (hydraulic, water) - Rigging/Coble L.O.F. - Site / Personnel Comm - Rivete Pinch points - listen up for directions - Proper lifting techniques via plant radio - Proper House keeping - HSP in file box - Fire protection / F.A. Kits - Proper use of required PPE - S/T/Fs Signature of Attendees' : Ho Zno "THE BEST JOB IS ONE DONE SAFELY ! "

## Attachment 5 Drill Rig Inspection Check List

| Inspector's Name: DC Metallo |
|------------------------------|
| Date: 4 7 2015               |
| Drill Rig ID Number_1211     |

.

| Drilling Contractor      | . Cascad | e Dri | lling | L.P. |
|--------------------------|----------|-------|-------|------|
| Drill Rig Type <u>C1</u> |          |       |       |      |

| Inspection Items                                                                               | Yes          | No           | N/A |
|------------------------------------------------------------------------------------------------|--------------|--------------|-----|
| 1. Drill rig cleaned                                                                           | $\checkmark$ |              |     |
| 2. Auger flights                                                                               | V            |              |     |
| 3. Extra Auger heads (extra bits)                                                              |              |              |     |
| 4. Drill rods                                                                                  | 1            |              |     |
| 5. Subs                                                                                        | V            |              |     |
| 6. Timbers (leveling boards)                                                                   | 1            |              |     |
| 7. Auger bolts                                                                                 |              |              |     |
| 8. Air filters                                                                                 | V            |              |     |
| 9. Fire extinguisher (charged) Cabs, deck                                                      | 1            |              |     |
| 10. Mud pan                                                                                    |              |              |     |
| 11. Oil levels checked                                                                         |              |              |     |
| 12. Hoses checked (hydraulic and air compressor)                                               |              |              |     |
| 13. Hoses checked (water)                                                                      | /            |              |     |
| 14. Tire                                                                                       | /            |              |     |
| 15. Jacks (outriggers)                                                                         |              |              |     |
| 16. Leaks (inspect hydraulic lines and ground plastic)                                         |              |              |     |
| 17. Cables and ropes                                                                           |              |              |     |
| Are cables free of any of the following conditions:                                            | · · · · ·    | -<br>-       |     |
| Randomly distributed broken wire (excess of six) in one strand in one lay                      |              | /            |     |
| Wear of one-third the original diameter of outside individual wires                            |              | /            |     |
| Kinking, crushing, bird caging, or other damage resulting in distortion of the cable structure |              | $\checkmark$ |     |

| Inspection Items                                                                      | Yes          | No | N/A |
|---------------------------------------------------------------------------------------|--------------|----|-----|
| Are end fittings free of three broken wires in one strand, rust, or corrosion         |              |    |     |
| Do end fittings use three clamps, properly placed, securing the eye                   |              |    |     |
| Are drums and pulleys free of cracked hubs, spokes, flanges, or other damages         |              |    |     |
| Are cables the correct size for drums and pulleys, as recommended by the manufacturer |              |    |     |
| Do cable hooks have safety latches                                                    |              |    |     |
| Are fiber ropes free of excess wear, fraying, or cuts                                 | $\checkmark$ |    |     |
| 18. Emergency operator stop switch (back, side                                        |              |    |     |
| 19. Inspect fuel tanks for leaks and spills                                           |              |    |     |

Comments: Rig & Support vehicles are in good, proper working Condition ) and decon - Also on-site, CDI support trucks 2 inspied and found to be trailer - all IN good, porking order w/ all visible Safety inctional, L IN place eatures #508 Truck UDDORT (# 425 Truck 2 port #206 Trailer econ

Inspector's Signature: \_Date\_4.7./5

Contractor Representative Signature: Date <u>4-7-15</u>

503-775-4099

**CASCADE DRILLING DAILY WORK REPORT** 



Boise, ID (208) 345-0878 Fife, WA (253) 883-5200 Peoria, AZ (623) 935-0124 Upland, CA (562) 929-8176 Las Vegas, NV (702) 643-0023 Portland, OR (503) 775-4118 Reno, NV (530) 682-3068 Richmond, CA (510) 478-0858 Sacramento, CA (916) 638-1169 San Diego, CA (619) 596-0644 Seattle, WA (425) 485-8908

| AM Sh<br>Travel | op Time   | Please explain                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                 | PM Sho    | 1211<br>508<br>425<br>206<br>206<br>EM 30 CHAF<br>E SIG<br>OC 1. F<br>SIG<br>SON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | PM Shop Time TOTA E HOURS: START EQUIPMENT I2.11 COMPRESSOR/JA # 508 SNOW FENCE REN # 42.5 CONTINUOUS SAM # 0F CORE CUTS # 0F BULLDOG CL # 0F BULLDOG CL # 0F SERVICE RUN # 0F SERVICE RUN # 0F SERVICE RUN # 0F SERVICE RUN # 0F SAW CUTS P P P P P P P P P P P P P P P P P P P | PM Shop Time  TOTAL CHAP E HOURS: START  EQUIPMENT  EQUIPMENT  I 2 // COMPRESSOR/JACKHAMMER  SOS SNOW FENCE RENTAL  4 50% SNOW FENCE RENTAL  4 725 CONTINUOUS SAMPLER  2 2 6 CONTINUOUS SAMPLER  2 6 CONTINUOUS SAMPLER  2 6 CONTINUOUS SAMPLER  2 6 CONTINUOUS SAMPLER  2 6 CONTINUOU | PM Shop Time       TOTAL CHARGEABL         E HOURS:       START       STOP         EQUIPMENT         1211       COMPRESSOR/JACKHAMMER         4       508       SNOW FENCE RENTAL         4       425       CONTINUOUS SAMPLER       4.9 6.7         206       CONTINUOUS SAMPLER FOOTAGE       4.0 F         407       SAW CUTS       9         908       CHARGEABLE EXTRA LABOR HRS       11.55         8       SIGNATURE       SHOP       0         8       SIGNATURE       SHOP       0         9       SIGNATURE       SHOP       11.55         8       SIGNATURE       SHOP       11.55         8       SIGNATURE       SHOP       11.55 <td>PM Shop Time         TOTAL CHARGEABLE RIG HOL         E HOURS:       START       STOP         EQUIPMENT       CAS         12 /1       COMPRESSOR/JACKHAMMER       TYPE_SLOT_         #       SDS       SNOW FENCE RENTAL       20' SOREEN         #       Y25       CONTINUOUS SAMPLER       #.9       6'       10' SOREEN         #       Y25       CONTINUOUS SAMPLER FOOTAGE       5' SOREEN       20' BLANK         #       Y25       CONTINUOUS SAMPLER FOOTAGE       5' SOREEN         #       Y25       CONTINUOUS SAMPLER FOOTAGE       5' SOREEN         #       Y25       CONTINUOUS SAMPLER FOOTAGE       5' SOREEN         #       Y0F CORE CUTS       20' BLANK         #       OF GERE CUTS       20' BLANK         #       OF SERVICE RUNS       5' BLANK         #       OF SERVICE RUNS       5' BLANK         #       OF SERVICE RUNS       5' PP SCREEN         P       PORTABLE RESTROOM       10' PP SCREEN         SIGNATURE       SHOP       DRILL       TOTAL HRS       LOCKING CAPS         E       SIGNATURE       SHOP       DRILL       TOTAL HRS       LOCKS         Soon</td> <td>PM Shop Time         TOTAL CHARGEABLE RIG HOURS         EQUIPMENT       CASING         Image: Part of the start of the start</td> <td>PM Shop Time         TOTAL CHARGEABLE RIG HOURS         EQUIPMENT         CASING         I2 /1       COMPRESSOR/JACKHAMMER       TYPE_SLOT_2       2       4         I2 /1       CONTINUOUS SAMPLER       FOOTABE       5' SCREEN       2         I2 /2 0 CONTINUOUS SAMPLER FOOTABE       5' SCREEN       2       10' BLANK       2         I2 0 F SAW CUTS       5' SP SCREEN       5' SP SCREEN       5       5' PP SCREEN       5         I2 0 F SAW CUTS       5' SP SCREEN       10' DP SCREEN       10' SUP CAP       10' SUP CAP</td> <td>PM Shop Time       TOTAL CHARGEABLE RIG HOURS       I.S         E HOURS:       START       STOP       CASING       ITEM         EQUIPMENT       CASING       ITEM         12.11       COMPRESSOR/JACKHAMMER       TYPE_SLOT_2       2       4       SAND         9       SD8       SNOW FENCE RENTAL       20' SCREEN       READYMX       READYMX         9       SD8       SNOW FENCE RENTAL       20' SCREEN       QUICKSET         20 CONTINUOUS SAMPLER FOOTAGE       5' SCREEN       PORTLAND         # 0F CORE CUTS       20' BLANK       ASPHALT         # 0F CORE CUTS       20' BLANK       ASPHALT         # 0F SERVICE RUNS       5' BLANK       BENTONITE GROUT         # 0F SAW CLITS       10' BLANK       BENTONITE POWDER         P       PORTLAND       5' SCREEN       BENTONITE POWDER         P       PORTLAND       SUP SCREEN       BENTONITE CHIPS         # 0F SAW CLITS       5' PROEEN       BENTONITE POWDER         P       PORTLAND       SUP SCREEN       BENTONITE CHIPS         # 0F SAW CLITS       10' PP SCREEN       BENTONITE CHIPS         SUP CAP       BENTONITE CHIPS       SUP SCREEN       BENTONITE CHIPS         SUP CAP</td> <td>PM Shop Time       TOTAL CHARGEABLE RIG HOURS       J.S         E HOURS:       START       STOP       MATERI.         EQUIPMENT       CASING       ITEM       OTY         1/2 //       COMPRESSOR/JACKHAMMER       TYPE_SLOT_2       2       4       SAND       1/5       V         4       50%       SOMO FENCE RENTAL       PO SCREEN       2       GUCKEET       #       #       4       25       CONTINUOUS SAMPLER       4.5       6'       10 SCREEN       2       GUCKEET       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #<td>PM Shop Time       TOTAL CHARGEABLE RIG HOURS       I.S         E HOURS:       START       STOP       TOTAL         E HOURS:       START       STOP         CONTINUUS: START       TOTAL         CASING       TEM       OTTAL         EQUIPMENT       CASING       TTEM       OTTAL         AS \$       SIGNET       CASING       TTEM       OTTAL         AS \$       SIGNET       CASING       TTEM       OTTAL         A \$       OURSET       ADDIAGE       SIGNET       PORTABLE RESTROOM       SIGNET       DENTONTE COLSPANE         PORTABLE RESTROOM</td><td>PM Shop Time       TOTAL CHARGEABLE RIG HOURS       I.S.         E HOURS:       START       STOP       TOTAL         E HOURS:       START       CASING       TEEM       OTY         E HOURS:       START       CASING       TEEM       OTY       TEM         E LOUIPMENT       CASING       TEEM       OTY       TEM       WELLCOVER 37         E LOUIPMENT       CASING       SNOW ENCERENTAL       20 SOBEEN       PEADYMX       WELLCOVER 37         E V 25       CONTINUOUS SAMPLER       4.9 &amp; L       01 SOBEEN       PORTLAND       BOLLADOS       BOLLADOS         E 0 F SERVICE RUAS       S 0 BLANK       A SPHALT       DRUES       BENTOME CHIPS       PASTC SHEETING         E 0 F SERVICE RUAS       S 0 BLANK       2       BENTOME CHIPS       PASTC SHEETING       DOHE BOVES         E 0 F SERVICE RUAS       S 0 BLANK       2       BENTOME CHIPS       PASTC SHEETING       DOHE BOVES         E 0 F SERVICE RUAS       S 0 BLANK</td></td> | PM Shop Time         TOTAL CHARGEABLE RIG HOL         E HOURS:       START       STOP         EQUIPMENT       CAS         12 /1       COMPRESSOR/JACKHAMMER       TYPE_SLOT_         #       SDS       SNOW FENCE RENTAL       20' SOREEN         #       Y25       CONTINUOUS SAMPLER       #.9       6'       10' SOREEN         #       Y25       CONTINUOUS SAMPLER FOOTAGE       5' SOREEN       20' BLANK         #       Y25       CONTINUOUS SAMPLER FOOTAGE       5' SOREEN         #       Y25       CONTINUOUS SAMPLER FOOTAGE       5' SOREEN         #       Y25       CONTINUOUS SAMPLER FOOTAGE       5' SOREEN         #       Y0F CORE CUTS       20' BLANK         #       OF GERE CUTS       20' BLANK         #       OF SERVICE RUNS       5' BLANK         #       OF SERVICE RUNS       5' BLANK         #       OF SERVICE RUNS       5' PP SCREEN         P       PORTABLE RESTROOM       10' PP SCREEN         SIGNATURE       SHOP       DRILL       TOTAL HRS       LOCKING CAPS         E       SIGNATURE       SHOP       DRILL       TOTAL HRS       LOCKS         Soon | PM Shop Time         TOTAL CHARGEABLE RIG HOURS         EQUIPMENT       CASING         Image: Part of the start | PM Shop Time         TOTAL CHARGEABLE RIG HOURS         EQUIPMENT         CASING         I2 /1       COMPRESSOR/JACKHAMMER       TYPE_SLOT_2       2       4         I2 /1       CONTINUOUS SAMPLER       FOOTABE       5' SCREEN       2         I2 /2 0 CONTINUOUS SAMPLER FOOTABE       5' SCREEN       2       10' BLANK       2         I2 0 F SAW CUTS       5' SP SCREEN       5' SP SCREEN       5       5' PP SCREEN       5         I2 0 F SAW CUTS       5' SP SCREEN       10' DP SCREEN       10' SUP CAP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | PM Shop Time       TOTAL CHARGEABLE RIG HOURS       I.S         E HOURS:       START       STOP       CASING       ITEM         EQUIPMENT       CASING       ITEM         12.11       COMPRESSOR/JACKHAMMER       TYPE_SLOT_2       2       4       SAND         9       SD8       SNOW FENCE RENTAL       20' SCREEN       READYMX       READYMX         9       SD8       SNOW FENCE RENTAL       20' SCREEN       QUICKSET         20 CONTINUOUS SAMPLER FOOTAGE       5' SCREEN       PORTLAND         # 0F CORE CUTS       20' BLANK       ASPHALT         # 0F CORE CUTS       20' BLANK       ASPHALT         # 0F SERVICE RUNS       5' BLANK       BENTONITE GROUT         # 0F SAW CLITS       10' BLANK       BENTONITE POWDER         P       PORTLAND       5' SCREEN       BENTONITE POWDER         P       PORTLAND       SUP SCREEN       BENTONITE CHIPS         # 0F SAW CLITS       5' PROEEN       BENTONITE POWDER         P       PORTLAND       SUP SCREEN       BENTONITE CHIPS         # 0F SAW CLITS       10' PP SCREEN       BENTONITE CHIPS         SUP CAP       BENTONITE CHIPS       SUP SCREEN       BENTONITE CHIPS         SUP CAP | PM Shop Time       TOTAL CHARGEABLE RIG HOURS       J.S         E HOURS:       START       STOP       MATERI.         EQUIPMENT       CASING       ITEM       OTY         1/2 //       COMPRESSOR/JACKHAMMER       TYPE_SLOT_2       2       4       SAND       1/5       V         4       50%       SOMO FENCE RENTAL       PO SCREEN       2       GUCKEET       #       #       4       25       CONTINUOUS SAMPLER       4.5       6'       10 SCREEN       2       GUCKEET       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       #       # <td>PM Shop Time       TOTAL CHARGEABLE RIG HOURS       I.S         E HOURS:       START       STOP       TOTAL         E HOURS:       START       STOP         CONTINUUS: START       TOTAL         CASING       TEM       OTTAL         EQUIPMENT       CASING       TTEM       OTTAL         AS \$       SIGNET       CASING       TTEM       OTTAL         AS \$       SIGNET       CASING       TTEM       OTTAL         A \$       OURSET       ADDIAGE       SIGNET       PORTABLE RESTROOM       SIGNET       DENTONTE COLSPANE         PORTABLE RESTROOM</td> <td>PM Shop Time       TOTAL CHARGEABLE RIG HOURS       I.S.         E HOURS:       START       STOP       TOTAL         E HOURS:       START       CASING       TEEM       OTY         E HOURS:       START       CASING       TEEM       OTY       TEM         E LOUIPMENT       CASING       TEEM       OTY       TEM       WELLCOVER 37         E LOUIPMENT       CASING       SNOW ENCERENTAL       20 SOBEEN       PEADYMX       WELLCOVER 37         E V 25       CONTINUOUS SAMPLER       4.9 &amp; L       01 SOBEEN       PORTLAND       BOLLADOS       BOLLADOS         E 0 F SERVICE RUAS       S 0 BLANK       A SPHALT       DRUES       BENTOME CHIPS       PASTC SHEETING         E 0 F SERVICE RUAS       S 0 BLANK       2       BENTOME CHIPS       PASTC SHEETING       DOHE BOVES         E 0 F SERVICE RUAS       S 0 BLANK       2       BENTOME CHIPS       PASTC SHEETING       DOHE BOVES         E 0 F SERVICE RUAS       S 0 BLANK</td> | PM Shop Time       TOTAL CHARGEABLE RIG HOURS       I.S         E HOURS:       START       STOP       TOTAL         E HOURS:       START       STOP         CONTINUUS: START       TOTAL         CASING       TEM       OTTAL         EQUIPMENT       CASING       TTEM       OTTAL         AS \$       SIGNET       CASING       TTEM       OTTAL         AS \$       SIGNET       CASING       TTEM       OTTAL         A \$       OURSET       ADDIAGE       SIGNET       PORTABLE RESTROOM       SIGNET       DENTONTE COLSPANE         PORTABLE RESTROOM | PM Shop Time       TOTAL CHARGEABLE RIG HOURS       I.S.         E HOURS:       START       STOP       TOTAL         E HOURS:       START       CASING       TEEM       OTY         E HOURS:       START       CASING       TEEM       OTY       TEM         E LOUIPMENT       CASING       TEEM       OTY       TEM       WELLCOVER 37         E LOUIPMENT       CASING       SNOW ENCERENTAL       20 SOBEEN       PEADYMX       WELLCOVER 37         E V 25       CONTINUOUS SAMPLER       4.9 & L       01 SOBEEN       PORTLAND       BOLLADOS       BOLLADOS         E 0 F SERVICE RUAS       S 0 BLANK       A SPHALT       DRUES       BENTOME CHIPS       PASTC SHEETING         E 0 F SERVICE RUAS       S 0 BLANK       2       BENTOME CHIPS       PASTC SHEETING       DOHE BOVES         E 0 F SERVICE RUAS       S 0 BLANK       2       BENTOME CHIPS       PASTC SHEETING       DOHE BOVES         E 0 F SERVICE RUAS       S 0 BLANK |

503-775-4099

## **CASCADE DRILLING DAILY WORK REPORT**

CASCADE DRILLING, L.P. LEADERS IN SAFETY

Boise, ID (208) 345-0878 Fife, WA (253) 883-5200 Peoria, AZ (623) 935-0124 Upland, CA (562) 929-8176 Las Vegas, NV (702) 643-0023 Portland, OR (503) 775-4118 Reno, NV (530) 682-3068 Richmond, CA (510) 478-0858 Sacramento, CA (916) 638-1169 San Diego, CA (619) 596-0644 Seattle, WA (425) 485-8908

| o Time<br>Site<br>Site<br>Site<br>Site<br>Site<br>Site<br>Mw<br>after<br>after<br>and | Corp (<br>Please explain<br>Mectin<br>inish ñ<br>(o to 2<br>(o, 25<br>Drill<br>, Set c                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | g<br>1wf<br>25'<br>1 TC<br>1unc<br>Mw- | ESC<br>ns for I | <b>RIPTIC</b><br>Down Time | DIG ALEF<br>DN OF W(<br>and Standby T<br>and Standby T<br>busing Standby T<br>busing Standby T | DRK<br>Time an | d Shop T        |                                     | CD-LP# /<br>HO<br>Start<br>700<br>730 | 0 / 15<br>URS<br>Stop<br>730        | Total<br>Hrs | Charg |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-----------------|----------------------------|------------------------------------------------------------------------------------------------|----------------|-----------------|-------------------------------------|---------------------------------------|-------------------------------------|--------------|-------|
| Time<br>Site<br>fety<br>ip / f<br>Mw<br>after<br>c and<br>after                       | Please explai<br>Mectin<br>Conish ñ<br>Conish ñ<br>Conish<br>Conish<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conist<br>Conis | g<br>1wf<br>25'<br>1 TC<br>1unc<br>Mw- | ESC<br>ns for I | <b>RIPTIC</b><br>Down Time | and Standby T                                                                                  | DRK<br>Time an |                 |                                     | HO<br>Start<br>700<br>730             | URS<br>Stop<br>730                  | Total<br>Hrs | Charg |
| Site<br>fety<br>ip 14<br>Mw<br>after<br>after                                         | Mectin<br>inish ñ<br>lo to 2<br>6, 25<br>Drill<br>, Set c                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | g<br>Iwf<br>25'<br>'TC<br>Iunc<br>Mw-  | (), s           | Down Time                  | e and Standby 1                                                                                | Time an        |                 |                                     | Start<br>700<br>730                   | Stop<br>730<br>730                  | Hrs          |       |
| Site<br>fety<br>ip 14<br>Mw<br>after<br>after                                         | Drill<br>, Set o                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Mw.                                    | :h<br>:5 +      | ntinul<br>sct an           | oussam<br>d built                                                                              | nole           |                 |                                     | 700                                   | 730                                 |              |       |
| Site<br>fety<br>ip 14<br>Mw<br>after<br>after                                         | Drill<br>, Set o                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Mw.                                    | :h<br>:5 +      | ntinu l<br>bet an          | oussan<br>d built                                                                              | nole           |                 |                                     | 700                                   | 730                                 |              |       |
| fety<br>ip / f<br>Mw<br>after<br>c and<br>after                                       | Drill<br>, Set o                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Mw.                                    | :h<br>:5 +      | itinul<br>isct an          | ous san<br>d built                                                                             | nole           |                 |                                     | 730                                   |                                     |              |       |
| e and<br>ifter                                                                        | Drill<br>, Set o                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Mw.                                    | :h<br>:5 +      | itinu i<br>set an          | ous sam<br>d built                                                                             | nole           |                 |                                     |                                       | 000                                 |              | 1     |
| e and<br>ifter                                                                        | Drill<br>, Set o                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Mw.                                    | :h<br>:5 +      | itinul                     | d built                                                                                        | nole           |                 |                                     | Prot                                  | 020                                 |              | -     |
| e and<br>ifter                                                                        | Drill<br>, Set o                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Mw.                                    | :h<br>:5 +      | isct an                    | d built                                                                                        | ADIP .         | 1.1             |                                     |                                       | 830                                 | 12           |       |
| e and<br>ifter                                                                        | Drill<br>, Set o                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Mw.                                    | :h<br>:5 +      | ict an                     | d built                                                                                        | Fic            | 104,            | every                               | 830                                   |                                     |              | -     |
| ifter                                                                                 | Drill,<br>Set a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MW                                     | 5+              |                            |                                                                                                | 2" 0           | Nell            |                                     | 1.000                                 | 1230                                | 4            |       |
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|                                                                                       | TOT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | AL CH                                  | HAR             | GEABL                      | E RIG HOL                                                                                      | IBS            | 0               | 1.5                                 | 1                                     |                                     |              |       |
| START                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                 | STOP                       |                                                                                                |                |                 | 1                                   |                                       | TOTAL                               | 10           |       |
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| EQUI                                                                                  | PMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                 |                            | CAS                                                                                            | SING           | 1.1             | ITEM                                | QTY                                   | ITEM                                |              | QTY   |
| 1211                                                                                  | COMPRESSOR/J                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | JACKHAMM                               | ER              |                            | TYPE TOSLOT IUI                                                                                | 2 4            | e 11 10 10      | SAND                                | 31 1                                  | VELL COVER 8                        |              |       |
| 508                                                                                   | SNOW FENCE RE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ENTAL                                  |                 |                            | 20' SCREEN                                                                                     | 4              |                 | READYMIX                            | 100                                   | VELL COVER 1                        |              | 1     |
| 425                                                                                   | CONTINUOUS SA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MPLER                                  |                 |                            | 10' SCREEN                                                                                     | 4              | -               | QUICKSET                            | N                                     | MONUMENT CA                         | SING         |       |
| 206                                                                                   | CONTINUOUS SA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MPLER FOO                              | DTAGE           | 12                         | 5' SCREEN                                                                                      |                |                 | PORTLAND                            | E                                     | OLLARDS                             |              |       |
|                                                                                       | # OF CORE CUTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3                                      | -               |                            | 20' BLANK                                                                                      |                | _               | ASPHALT                             | E                                     | RUMS                                |              | _     |
|                                                                                       | # OF BULLDOG C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | JUTS                                   | -               |                            | 10' BLANK                                                                                      | ~              | -               | BENTONITE GROUT                     |                                       | IOLE COVER PL                       | ATES         |       |
|                                                                                       | # OF SERVICE RU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                 |                            | 5' BLANK                                                                                       | 2              | -               | BENTONITE CHIPS                     | 2 p                                   | LASTIC SHEET                        | ING          |       |
|                                                                                       | # OF SAW CUTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                 |                            | 5' PP SCREEN                                                                                   |                | -               | BENTONITE POWDER                    | 1                                     | RAFFIC CONTR                        | ROL          | -     |
|                                                                                       | PORTABLE RESTR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        | 1               | 14                         | 10' PP SCREEN                                                                                  |                | -               | BENTONITE PELLETS                   |                                       | ORE BOXES                           |              |       |
|                                                                                       | ABOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | AMPIC                                  | 3               |                            | SLIP CAP<br>THREADED CAPS                                                                      | 3              |                 | BENTONITE GRANULAR<br>SAMPLER TUBES |                                       | LYWOOD                              |              |       |
| JAY                                                                                   | IGEABLE EXTRA LABO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                 |                            | LOCKING CAPS                                                                                   |                |                 | SHELBY TUBES                        | H                                     | VATER SAMPLI<br>YDROPUNCH<br>AMPLES | ES           | -     |
|                                                                                       | NATURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SHOP                                   | DRILL           | TOTAL HRS                  |                                                                                                |                |                 | PROBE POINTS                        |                                       | UGER PLUGS                          |              |       |
| - Ordi                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        | Critec          | 10                         | CENTRALIZERS                                                                                   |                |                 | GW PROBE POINTS                     |                                       | RILL OUT BITS                       |              |       |
| -                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                 | 10                         | LOCKS                                                                                          |                |                 | MACRO LINERS                        |                                       | THE OUT DITO                        | -            |       |
| E-                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                 | 10                         |                                                                                                |                |                 | SAMPLER SHOE                        |                                       |                                     |              |       |
| F                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0                                      |                 |                            | UTILITIES FO                                                                                   | DUND           | OR HIT          |                                     |                                       |                                     |              |       |
| F                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | .1-                                    |                 |                            |                                                                                                |                |                 |                                     |                                       |                                     |              |       |
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| F.                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                 |                            |                                                                                                |                |                 |                                     |                                       |                                     |              |       |
| F.                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                 |                            |                                                                                                |                |                 |                                     |                                       |                                     |              |       |
| W.                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                 |                            |                                                                                                |                |                 |                                     |                                       |                                     |              |       |
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CASCADE DRILLING, L.P.

# **CASCADE DRILLING DAILY WORK REPORT**

Boise, ID (208) 345-0878 Fife, WA (253) 883-5200 Peoria, AZ (623) 935-0124 Upland, CA (562) 929-8176 Las Vegas, NV (702) 643-0023 Portland, OR (503) 775-4118 Reno, NV (530) 682-3068 Richmond, CA (510) 478-0858

Sacramento, CA (916) 638-1169 San Diego, CA (619) 596-0644 Seattle, WA (425) 485-8908

| CLIENT C C<br>JOB LOCATION<br>Well # Depth                                                                                         | NPA                                             | . ^                                                                                                            |                                                                                                                                                                                                                  |                                                         | ECT NO   | 5                         |                                                                                                                                                                                                 | -         |        | DATE 9 April 1                                                                                                                                                                                                                      | SUAY     | 1                                                                                                                            | hup                                                                                                                                                                                                                                           | r                             |           |
|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|----------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------|
| Well # Depth                                                                                                                       | 1 44                                            | Cotic 1                                                                                                        | Corp                                                                                                                                                                                                             | che                                                     | 2ha      | 115                       | DIG ALEF                                                                                                                                                                                        | RT#       |        |                                                                                                                                                                                                                                     | CD-LP#   | 10                                                                                                                           | 1-15                                                                                                                                                                                                                                          | 20                            | 7         |
|                                                                                                                                    | 1                                               |                                                                                                                | 1                                                                                                                                                                                                                | D                                                       | ESC      | RIPTIC                    | N OF W                                                                                                                                                                                          | OR        | К      |                                                                                                                                                                                                                                     |          | HOUR                                                                                                                         |                                                                                                                                                                                                                                               | Later Street                  | 1000      |
| Bore # Drilled                                                                                                                     |                                                 |                                                                                                                | Please explai                                                                                                                                                                                                    | in reaso                                                | ns for l | Down Time                 | and Standby                                                                                                                                                                                     | Time      | and St | nop Time                                                                                                                                                                                                                            | Star     | -                                                                                                                            | Stop                                                                                                                                                                                                                                          | Total<br>Hrs                  | Cha<br>Hr |
| here a second                                                                                                                      | AM Sh                                           | op Time                                                                                                        |                                                                                                                                                                                                                  |                                                         |          |                           |                                                                                                                                                                                                 |           |        |                                                                                                                                                                                                                                     | **       |                                                                                                                              | oup                                                                                                                                                                                                                                           | 110                           |           |
|                                                                                                                                    | Travel                                          |                                                                                                                |                                                                                                                                                                                                                  |                                                         |          |                           |                                                                                                                                                                                                 |           |        |                                                                                                                                                                                                                                     | 7-1      | -                                                                                                                            | 770                                                                                                                                                                                                                                           |                               | 1         |
|                                                                                                                                    |                                                 | the second s | IA and                                                                                                                                                                                                           | 100                                                     |          |                           |                                                                                                                                                                                                 |           |        |                                                                                                                                                                                                                                     | 100      |                                                                                                                              | 730                                                                                                                                                                                                                                           | 1                             | -         |
|                                                                                                                                    | 14                                              | Fety                                                                                                           | Mw-                                                                                                                                                                                                              | -1                                                      |          |                           |                                                                                                                                                                                                 |           |        |                                                                                                                                                                                                                                     | 73       |                                                                                                                              | 800                                                                                                                                                                                                                                           |                               |           |
|                                                                                                                                    | Ch                                              | ip up                                                                                                          | MW                                                                                                                                                                                                               | )´                                                      |          |                           |                                                                                                                                                                                                 | _         | _      |                                                                                                                                                                                                                                     | 80       |                                                                                                                              | 830                                                                                                                                                                                                                                           |                               |           |
|                                                                                                                                    | por                                             | and,                                                                                                           | Derek                                                                                                                                                                                                            | Se.                                                     | t u      | sell                      | box's                                                                                                                                                                                           |           |        |                                                                                                                                                                                                                                     | 83       | 0 :                                                                                                                          | 200                                                                                                                                                                                                                                           |                               |           |
|                                                                                                                                    | 108                                             | Dev                                                                                                            | cloped                                                                                                                                                                                                           | M                                                       | w.4      | ,                         |                                                                                                                                                                                                 |           |        |                                                                                                                                                                                                                                     | 830      | 0                                                                                                                            | 1000                                                                                                                                                                                                                                          | )                             |           |
|                                                                                                                                    |                                                 | Deve                                                                                                           | boed                                                                                                                                                                                                             | Mu                                                      | 2-5      | TI                        |                                                                                                                                                                                                 |           |        |                                                                                                                                                                                                                                     | 1000     |                                                                                                                              | 1100                                                                                                                                                                                                                                          | 1                             |           |
|                                                                                                                                    | -                                               |                                                                                                                | Derek<br>cloped<br>loped                                                                                                                                                                                         | M                                                       | WI       | 2-                        |                                                                                                                                                                                                 |           |        |                                                                                                                                                                                                                                     | 110      | 2.5                                                                                                                          | 200                                                                                                                                                                                                                                           | 5                             |           |
|                                                                                                                                    |                                                 |                                                                                                                |                                                                                                                                                                                                                  | 11                                                      | us L     | 1                         |                                                                                                                                                                                                 |           |        |                                                                                                                                                                                                                                     | 110      | 10.                                                                                                                          |                                                                                                                                                                                                                                               | (                             | -         |
|                                                                                                                                    |                                                 |                                                                                                                |                                                                                                                                                                                                                  | 101                                                     | 0        | ļ                         |                                                                                                                                                                                                 |           | _      |                                                                                                                                                                                                                                     | 120      |                                                                                                                              | 100                                                                                                                                                                                                                                           | 1                             | -         |
|                                                                                                                                    | - 1                                             |                                                                                                                | . /                                                                                                                                                                                                              | 141                                                     | NS       |                           | ٨                                                                                                                                                                                               |           |        |                                                                                                                                                                                                                                     | 100      |                                                                                                                              | 200                                                                                                                                                                                                                                           | )                             |           |
|                                                                                                                                    | Clean-up / get trucks Road Ready<br>Mob to town |                                                                                                                |                                                                                                                                                                                                                  |                                                         |          |                           |                                                                                                                                                                                                 |           |        | 200                                                                                                                                                                                                                                 | > 2      | 230                                                                                                                          |                                                                                                                                                                                                                                               |                               |           |
|                                                                                                                                    | Mo                                              | 6 to                                                                                                           | town                                                                                                                                                                                                             |                                                         | 1.0      |                           |                                                                                                                                                                                                 |           |        |                                                                                                                                                                                                                                     | 23       | 0 3                                                                                                                          | 300                                                                                                                                                                                                                                           |                               | -         |
|                                                                                                                                    |                                                 |                                                                                                                |                                                                                                                                                                                                                  |                                                         | 14       | ich                       |                                                                                                                                                                                                 |           |        |                                                                                                                                                                                                                                     | 201      | 2 8                                                                                                                          | 330                                                                                                                                                                                                                                           | -                             |           |
| 1                                                                                                                                  | Mo                                              | b ch                                                                                                           | e halis                                                                                                                                                                                                          | 434                                                     | 4 -      | to cill                   | Lekama                                                                                                                                                                                          | c         | A      |                                                                                                                                                                                                                                     | 224      | 2                                                                                                                            | 330<br>530                                                                                                                                                                                                                                    | 1                             |           |
|                                                                                                                                    | 1-                                              | ~ ~ ~                                                                                                          | STU-10                                                                                                                                                                                                           |                                                         | 3_1      |                           |                                                                                                                                                                                                 | -         | a.C.   |                                                                                                                                                                                                                                     | 22-      |                                                                                                                              | -2-                                                                                                                                                                                                                                           |                               | -         |
|                                                                                                                                    | Travel t                                        | n Chan                                                                                                         |                                                                                                                                                                                                                  |                                                         |          | -                         |                                                                                                                                                                                                 |           |        |                                                                                                                                                                                                                                     |          |                                                                                                                              |                                                                                                                                                                                                                                               |                               | -         |
|                                                                                                                                    | Lo a sur ser                                    |                                                                                                                |                                                                                                                                                                                                                  |                                                         |          |                           |                                                                                                                                                                                                 |           |        |                                                                                                                                                                                                                                     |          |                                                                                                                              |                                                                                                                                                                                                                                               | -                             |           |
|                                                                                                                                    | PM Sho                                          | p lime                                                                                                         |                                                                                                                                                                                                                  |                                                         |          |                           |                                                                                                                                                                                                 |           |        | 10.0                                                                                                                                                                                                                                | 53       | 00                                                                                                                           | 000                                                                                                                                                                                                                                           |                               | -         |
|                                                                                                                                    |                                                 |                                                                                                                | 101                                                                                                                                                                                                              | AL CI                                                   | HAR      | <b>JEABLI</b>             | E RIG HOL                                                                                                                                                                                       | JRS       | 5      | 10                                                                                                                                                                                                                                  |          | -111-                                                                                                                        |                                                                                                                                                                                                                                               |                               | 1.2       |
| Total Ft.                                                                                                                          | Contract of the second                          | 1                                                                                                              | -                                                                                                                                                                                                                |                                                         | T        |                           | T                                                                                                                                                                                               |           |        |                                                                                                                                                                                                                                     |          |                                                                                                                              |                                                                                                                                                                                                                                               |                               |           |
| RIG ENGINE                                                                                                                         | HOURS                                           | : START                                                                                                        |                                                                                                                                                                                                                  |                                                         |          | STOP                      | 1                                                                                                                                                                                               |           |        |                                                                                                                                                                                                                                     |          |                                                                                                                              | TOTAL                                                                                                                                                                                                                                         | 5.14                          |           |
|                                                                                                                                    | HOURS                                           |                                                                                                                |                                                                                                                                                                                                                  | _                                                       |          | STOP                      |                                                                                                                                                                                                 |           |        |                                                                                                                                                                                                                                     | MATER    |                                                                                                                              | 6                                                                                                                                                                                                                                             |                               |           |
| RIG ENGINE                                                                                                                         | HOURS                                           | EQUIF                                                                                                          | PMENT                                                                                                                                                                                                            |                                                         |          | STOP                      |                                                                                                                                                                                                 | SING      |        | ITEM                                                                                                                                                                                                                                | MATER    |                                                                                                                              |                                                                                                                                                                                                                                               |                               |           |
| RIG ENGINE                                                                                                                         | HOURS                                           | EQUIF                                                                                                          | PMENT<br>COMPRESSOR/J                                                                                                                                                                                            | 1.11                                                    | ER       | STOP                      | TYPESLOT                                                                                                                                                                                        | SING<br>2 | 4      | SAND                                                                                                                                                                                                                                | QTY      | WELL                                                                                                                         | G<br>ITEM<br>COVER 8"                                                                                                                                                                                                                         |                               | an<br>3   |
| RIG ENGINE I<br>DRILL RIG #<br>SUPPORT TRUCK #                                                                                     | HOURS                                           | EQUIF<br>12.(1<br>508                                                                                          | COMPRESSOR/J<br>SNOW FENCE RE                                                                                                                                                                                    | INTAL                                                   | ER       | STOP                      | TYPESLOT<br>20' SCREEN                                                                                                                                                                          | T         |        | SAND<br>READYMIX                                                                                                                                                                                                                    | QTY<br>8 | WELL                                                                                                                         | G<br>ITEM<br>COVER 8"<br>COVER 12                                                                                                                                                                                                             | <u>]</u> "                    |           |
| RIG ENGINE                                                                                                                         | HOURS                                           | EQUIF<br>12(1<br>508<br>425                                                                                    | PMENT<br>COMPRESSOR/J<br>SNOW FENCE RE<br>CONTINUOUS SA                                                                                                                                                          | ental<br>Mpler                                          |          | STOP                      | TYPESLOT<br>20' SCREEN<br>10' SCREEN                                                                                                                                                            | T         |        | SAND<br>READYMIX<br>QUICKSET                                                                                                                                                                                                        | QTY      | WELL<br>WELL<br>MONL                                                                                                         | GUVER 8"<br>COVER 12<br>JMENT CAS                                                                                                                                                                                                             | <u>]</u> "                    |           |
| RIG ENGINE<br>DRILL RIG #<br>SUPPORT TRUCK #<br>SUPPORT TRUCK #<br>TRAILER #                                                       | HOURS                                           | EQUIF<br>12.(1<br>508                                                                                          | PMENT<br>COMPRESSOR/J<br>SNOW FENCE RE<br>CONTINUOUS SA                                                                                                                                                          | INTAL<br>MPLER<br>MPLER FOO                             |          | STOP                      | TYPESLOT<br>20' SCREEN<br>10' SCREEN<br>5' SCREEN                                                                                                                                               | T         |        | SAND<br>READYMIX<br>QUICKSET<br>PORTLAND                                                                                                                                                                                            | QTY<br>8 | WELL<br>WELL<br>MONL<br>BOLLA                                                                                                | G<br>ITEM<br>COVER 8"<br>COVER 12<br>JMENT CAS<br>ARDS                                                                                                                                                                                        | <u>]</u> "                    | 3         |
| RIG ENGINE                                                                                                                         | HOURS                                           | EQUIF<br>12(1<br>508<br>425                                                                                    | PMENT<br>COMPRESSOR/J<br>SNOW FENCE RE<br>CONTINUOUS SA<br>CONTINUOUS SA<br># OF CORE CUTS                                                                                                                       | INTAL<br>MPLER<br>MPLER FOC                             |          | STOP                      | TYPESLOT<br>20' SCREEN<br>10' SCREEN<br>5' SCREEN<br>20' BLANK                                                                                                                                  | T         |        | SAND<br>READYMIX<br>QUICKSET<br>PORTLAND<br>ASPHALT                                                                                                                                                                                 | QTY<br>8 | WELL<br>WELL<br>MONU<br>BOLLA                                                                                                | S<br>ITEM<br>COVER 8"<br>COVER 12<br>JMENT CAS<br>ARDS                                                                                                                                                                                        | sing                          |           |
| RIG ENGINE                                                                                                                         | HOURS                                           | EQUIF<br>12(1<br>508<br>425                                                                                    | PMENT<br>COMPRESSOR/J<br>SNOW FENCE RE<br>CONTINUOUS SA                                                                                                                                                          | INTAL<br>MPLER<br>MPLER FOC                             |          | STOP                      | TYPESLOT<br>20' SCREEN<br>10' SCREEN<br>5' SCREEN                                                                                                                                               | T         |        | SAND<br>READYMIX<br>QUICKSET<br>PORTLAND<br>ASPHALT<br>BENTONITE GROUT                                                                                                                                                              | QTY<br>8 | WELL<br>WELL<br>WELL<br>MONU<br>BOLLA<br>DRUM<br>HOLE                                                                        | COVER 8"<br>COVER 8"<br>COVER 12<br>JMENT CAS<br>ARDS<br>15<br>COVER PL/                                                                                                                                                                      | SING<br>ATES                  | 3         |
| RIG ENGINE                                                                                                                         | HOURS                                           | EQUIF<br>12(1<br>508<br>425                                                                                    | PMENT<br>COMPRESSOR/J<br>SNOW FENCE RE<br>CONTINUOUS SA<br>CONTINUOUS SA<br># OF CORE CUTS<br># OF CORE CUTS<br># OF BULLDOG C                                                                                   | ENTAL<br>MPLER<br>MPLER FOC<br>UTS<br>JNS               |          | STOP                      | TYPESLOT<br>20' SCREEN<br>10' SCREEN<br>5' SCREEN<br>20' BLANK<br>10' BLANK<br>5' BLANK                                                                                                         | T         |        | SAND<br>READYMIX<br>QUICKSET<br>PORTLAND<br>ASPHALT<br>BENTONITE GROUT<br>BENTONITE CHIPS                                                                                                                                           | QTY<br>8 | WELL<br>WELL<br>WELL<br>BOLLA<br>DRUM<br>HOLE<br>PLAST                                                                       | COVER 8"<br>COVER 8"<br>COVER 12<br>JMENT CAS<br>ARDS<br>AS<br>COVER PL/<br>TIC SHEETIN                                                                                                                                                       | SING<br>ATES<br>NG            | 3         |
|                                                                                                                                    | HOURS                                           | EQUIF<br>12(1<br>508<br>425                                                                                    | PMENT<br>COMPRESSOR/J<br>SNOW FENCE RE<br>CONTINUOUS SA<br>CONTINUOUS SA<br># OF CORE CUTS<br># OF CORE CUTS<br># OF BULLDOG C<br># OF SERVICE RL                                                                | INTAL<br>MPLER<br>MPLER FOC<br>UTS<br>JNS               |          | STOP                      | TYPESLOT<br>20' SCREEN<br>10' SCREEN<br>5' SCREEN<br>20' BLANK<br>10' BLANK                                                                                                                     | T         |        | SAND<br>READYMIX<br>QUICKSET<br>PORTLAND<br>ASPHALT<br>BENTONITE GROUT                                                                                                                                                              | QTY<br>8 | WELL<br>WELL<br>MONU<br>BOLLA<br>DRUM<br>HOLE<br>PLAST                                                                       | COVER 8"<br>COVER 12<br>JMENT CAS<br>ARDS<br>AS<br>COVER PL/<br>TIC SHEETIM                                                                                                                                                                   | SING<br>ATES<br>NG            | 3         |
| RIG ENGINE<br>DRILL RIG #<br>SUPPORT TRUCK #<br>SUPPORT TRUCK #<br>TRAILER #<br>BOBCAT<br>AUTO HAMMER<br>GROUT MIXER<br>GROUT PUMP | HOURS                                           | EQUIF<br>12(1<br>508<br>425<br>206                                                                             | COMPRESSOR/J<br>SNOW FENCE RE<br>CONTINUOUS SA<br>CONTINUOUS SA<br># OF CORE CUTS<br># OF CORE CUTS<br># OF SERVICE RL<br># OF SERVICE RL<br># OF SAW CUTS<br>PORTABLE RESTE                                     | INTAL<br>MPLER<br>MPLER FOC<br>UTS<br>JNS               |          | STOP                      | TYPESLOT<br>20' SCREEN<br>10' SCREEN<br>5' SCREEN<br>20' BLANK<br>10' BLANK<br>5' BLANK<br>5' PP SCREEN                                                                                         | T         |        | SAND<br>READYMIX<br>GUICKSET<br>PORTLAND<br>ASPHALT<br>BENTONITE GROUT<br>BENTONITE CHIPS<br>BENTONITE POWDER                                                                                                                       | QTY<br>8 | WELL<br>WELL<br>MONU<br>BOLLA<br>DRUM<br>HOLE<br>PLAST                                                                       | COVER 8"<br>COVER 12<br>COVER 12<br>JIMENT CAS<br>ARDS<br>AS<br>COVER PL/<br>TIC SHEETIN<br>FIC CONTRO<br>BOXES                                                                                                                               | SING<br>ATES<br>NG            | 3         |
| RIG ENGINE                                                                                                                         | HOURS                                           | EQUIF<br>12(1<br>508<br>425<br>206                                                                             | COMPRESSOR/J<br>SNOW FENCE RE<br>CONTINUOUS SA<br>CONTINUOUS SA<br># OF CORE CUTS<br># OF CORE CUTS<br># OF SERVICE RL<br># OF SERVICE RL<br># OF SAW CUTS                                                       | INTAL<br>MPLER<br>MPLER FOC<br>UTS<br>JNS               |          | STOP                      | TYPESLOT<br>20' SCREEN<br>10' SCREEN<br>5' SCREEN<br>20' BLANK<br>10' BLANK<br>5' BLANK<br>5' PP SCREEN<br>10' PP SCREEN                                                                        | T         |        | SAND<br>READYMIX<br>GUICKSET<br>PORTLAND<br>ASPHALT<br>BENTONITE GROUT<br>BENTONITE CHIPS<br>BENTONITE POWDER<br>BENTONITE PELLETS                                                                                                  | QTY<br>8 | WELL<br>WELL<br>WELL<br>MONU<br>BOLLA<br>DRUM<br>HOLE<br>PLAST<br>TRAFF<br>CORE<br>PLYWI<br>WATE                             | ITEM<br>COVER 8"<br>COVER 12<br>JMENT CAS<br>ARDS<br>AS<br>COVER PL/<br>TIC SHEETIN<br>FIC CONTRO<br>BOXES<br>TOOD                                                                                                                            | SING<br>ATES<br>NG<br>DL      |           |
| RIG ENGINE                                                                                                                         |                                                 | EQUIF<br>12.(1<br>50 8<br>42.5<br>2.06                                                                         | COMPRESSOR/J<br>SNOW FENCE RE<br>CONTINUOUS SA<br>CONTINUOUS SA<br># OF CORE CUTS<br># OF CORE CUTS<br># OF SERVICE RL<br># OF SERVICE RL<br># OF SAW CUTS<br>PORTABLE RESTE                                     | INTAL<br>MPLER<br>MPLER FOC<br>IUTS<br>JNS              |          | STOP                      | TYPESLOT<br>20' SCREEN<br>10' SCREEN<br>5' SCREEN<br>20' BLANK<br>10' BLANK<br>5' BLANK<br>5' PP SCREEN<br>10' PP SCREEN<br>SLIP CAP                                                            | T         |        | SAND<br>READYMIX<br>QUICKSET<br>PORTLAND<br>ASPHALT<br>BENTONITE GROUT<br>BENTONITE CHIPS<br>BENTONITE POWDER<br>BENTONITE PELLETS<br>BENTONITE GRANULAR                                                                            | QTY<br>8 | WELL<br>WELL<br>WELL<br>MONU<br>BOLLA<br>DRUM<br>HOLE<br>PLAST<br>TRAFF<br>CORE<br>PLYWI<br>WATE                             | COVER 9"<br>COVER 12<br>JMENT CAS<br>ARDS<br>AS<br>COVER PL/<br>TIC SHEETIN<br>TIC CONTRO<br>BOXES<br>ODD                                                                                                                                     | SING<br>ATES<br>NG<br>DL      | 3         |
| RIG ENGINE                                                                                                                         |                                                 | EQUIF<br>1.2.(1<br>.50 %<br>42.5<br>2.06<br>                                                                   | PMENT<br>COMPRESSOR/J<br>SNOW FENCE RE<br>CONTINUOUS SA<br>CONTINUOUS SA<br># OF CORE CUTS<br># OF CORE CUTS<br># OF CORE CUTS<br># OF SERVICE RL<br># OF SAW CUTS<br>PORTABLE RESTR<br>BOR                      | INTAL<br>MPLER<br>MPLER FOC<br>IUTS<br>JNS              |          | TOTAL HRS                 | TYPESLOT<br>20' SCREEN<br>10' SCREEN<br>20' BLANK<br>10' BLANK<br>5' BLANK<br>5' PP SCREEN<br>10' PP SCREEN<br>5LIP CAP<br>THREADED CAPS                                                        | T         |        | SAND<br>READYMIX<br>GUICKSET<br>PORTLAND<br>ASPHALT<br>BENTONITE GROUT<br>BENTONITE CH IPS<br>BENTONITE POWDER<br>BENTONITE POWDER<br>BENTONITE GRANULAR<br>SAMPLER TUBES                                                           | QTY<br>8 | WELL<br>WELL<br>MONL<br>BOLLA<br>DRUIM<br>HOLE<br>PLAST<br>TRAFF<br>CORE<br>PLYW<br>WATE<br>HYDR(<br>SAMP                    | ITEM<br>COVER 8"<br>COVER 12<br>JMENT CAS<br>ARDS<br>AS<br>COVER PL/<br>TIC SHEETIN<br>FIC CONTRO<br>BOXES<br>TOOD                                                                                                                            | SING<br>ATES<br>NG<br>DL      | 3         |
| RIG ENGINE                                                                                                                         | n p<br>Joen                                     | EQUIF<br>1.2.(1<br>.50 %<br>4.2.5<br>2.06                                                                      | PMENT<br>COMPRESSOR/J<br>SNOW FENCE RE<br>CONTINUOUS SA<br>CONTINUOUS SA<br># OF CORE CUTS<br># OF CORE CUTS<br># OF CORE CUTS<br># OF SERVICE RL<br># OF SAW CUTS<br>PORTABLE RESTR<br>BOR<br>BOR               | INTAL<br>MPLER<br>MPLER FOC<br>I<br>IUTS<br>INS<br>ROOM | DTAGE    | TOTAL HRS                 | TYPESLOT<br>20' SCREEN<br>10' SCREEN<br>20' BLANK<br>10' BLANK<br>5' BLANK<br>5' PP SCREEN<br>10' PP SCREEN<br>10' PP SCREEN<br>SLIP CAP<br>THREADED CAPS<br>LOCKING CAPS                       | 2         |        | SAND<br>READYMIX<br>GUICKSET<br>PORTLAND<br>ASPHALT<br>BENTONITE GROUT<br>BENTONITE CHIPS<br>BENTONITE CHIPS<br>BENTONITE POWDER<br>BENTONITE POWDER<br>BENTONITE GRANULAR<br>SAMPLER TUBES<br>SHELBY TUBES                         | QTY<br>8 | WELL<br>WELL<br>MONU<br>BOLLA<br>DRUM<br>HOLE<br>PLAST<br>TRAFF<br>CORE<br>PLYW<br>WATE<br>HYDR(C<br>SAMP)<br>AUGEF<br>DRILL | COVER B"<br>COVER 12<br>IMENT CAS<br>ARDS<br>AS<br>COVER PL/<br>IC SHEETIN<br>COVER PL/<br>COVER PL/<br>COVER PL/<br>COVER PL/<br>SHEETIN<br>COVER PL/<br>BOXES<br>COD<br>R SAMPLES<br>OPDINCH<br>R SAMPLES<br>OPDINCH<br>R PLUGS<br>OUT BITS | SING<br>ATES<br>NG<br>DL<br>S | 3         |
| RIG ENGINE                                                                                                                         | loch<br>gwod                                    | EQUIF<br>1.2.(1<br>.50 %<br>4.2.5<br>2.06                                                                      | PMENT<br>COMPRESSOR/J<br>SNOW FENCE RE<br>CONTINUOUS SA<br>CONTINUOUS SA<br># OF CORE CUTS<br># OF CORE CUTS<br># OF CORE CUTS<br># OF SERVICE RL<br># OF SAW CUTS<br>PORTABLE RESTR<br>BOR<br>BOR               | INTAL<br>MPLER<br>MPLER FOC<br>I<br>IUTS<br>INS<br>ROOM | DTAGE    | TOTAL HRS<br>1025<br>1045 | TYPESLOT<br>20' SCREEN<br>10' SCREEN<br>5' SCREEN<br>20' BLANK<br>10' BLANK<br>5' BLANK<br>5' BLANK<br>5' PP SCREEN<br>10' PP SCREEN<br>SLIP CAP<br>THREADED CAPS<br>LOCKING CAPS<br>DRIVE SHOE | T         |        | SAND READYMIX QUICKSET PORTLAND ASPHALT BENTONITE GROUT BENTONITE CH IPS BENTONITE POWDER BENTONITE PELLETS BENTONITE GRANULAR SAMPLER TUBES SHELBY TUBES PROBE POINTS                                                              | QTY<br>8 | WELL<br>WELL<br>MONU<br>BOLLA<br>DRUM<br>HOLE<br>PLAST<br>TRAFF<br>CORE<br>PLYW<br>WATE<br>HYDR(C<br>SAMP)<br>AUGEF<br>DRILL | COVER B"<br>COVER 12<br>JMENT CAS<br>ARDS<br>AS<br>COVER PL/<br>TIC SHEETIN<br>TIC SHEETIN<br>TIC CONTRO<br>BOXES<br>ODD<br>AS SAMPLES<br>OPUNCH<br>LES<br>R PLUGS                                                                            | SING<br>ATES<br>NG<br>DL<br>S | 3         |
| RIG ENGINE                                                                                                                         | loch<br>gwod                                    | EQUIF<br>1.2.(1<br>.50 %<br>4.2.5<br>2.06                                                                      | PMENT<br>COMPRESSOR/J<br>SNOW FENCE RE<br>CONTINUOUS SA<br>CONTINUOUS SA<br># OF CORE CUTS<br># OF CORE CUTS<br># OF CORE CUTS<br># OF SERVICE RL<br># OF SAW CUTS<br>PORTABLE RESTR<br>BOR<br>BEABLE EXTRA LABC | INTAL<br>MPLER<br>MPLER FOC<br>I<br>IUTS<br>INS<br>ROOM | DTAGE    | TOTAL HRS                 | TYPESLOT<br>20'SCREEN<br>10'SCREEN<br>20'BLANK<br>10'BLANK<br>5' BLANK<br>5' PP SCREEN<br>10' PP SCREEN<br>5LIP CAP<br>THREADED CAPS<br>LOCKING CAPS<br>DRIVE SHOE<br>CENTRALIZERS              | 2         |        | SAND READYMIX QUICKSET PORTLAND ASPHALT BENTONITE GROUT BENTONITE GROUT BENTONITE CH IPS BENTONITE POWDER BENTONITE PELLETS BENTONITE GRANULAR SAMPLER TUBES PROBE POINTS GW PROBE POINTS GW PROBE POINTS MACRO LINERS SAMPLER SHOE | QTY<br>8 | WELL<br>WELL<br>MONU<br>BOLLA<br>DRUM<br>HOLE<br>PLAST<br>TRAFF<br>CORE<br>PLYW<br>WATE<br>HYDR(C<br>SAMP)<br>AUGEF<br>DRILL | COVER B"<br>COVER 12<br>IMENT CAS<br>ARDS<br>AS<br>COVER PL/<br>IC SHEETIN<br>COVER PL/<br>COVER PL/<br>COVER PL/<br>COVER PL/<br>SHEETIN<br>COVER PL/<br>BOXES<br>COD<br>R SAMPLES<br>OPDINCH<br>R SAMPLES<br>OPDINCH<br>R PLUGS<br>OUT BITS | SING<br>ATES<br>NG<br>DL<br>S | 3         |

APPENDIX C GEOLOGIC BOREHOLE LOGS AND WELL CONSTRUCTION DIAGRAMS [This page intentionally left blank.]



## **GEOLOGIC BOREHOLE LOG**

| Borehole / Well ID: SB4 / MW-4 site ID: GSW #3 - Pacifi (orp Page 1 of 2<br>Location Description: S-SE of GSU3, M.e.e., NW (GTMLer of EVAP. tower WL (FT) 1st: 24.25 DaterTime: 1315<br>Drill Rig Type / Drill Method: HSA W/ CME-35 twin axle, truck WL (FT) and 4.9 DaterTime: 415 is (1145)<br>Establishing Company: Cardno Geologist: D.C. Metallo, LHG Drilling Company: Casede Drilling (Portland)<br>Drilling Foreman: Joe Staloch Ground Surface Elevation: Datum: Grade Surface.<br>Sampling Device: 1.5' Splt Speon Borehole diameter (n) 8.25" Total Depth (Feet: 30° (Scmple to 31.5')<br>DeterTime Drilling Started: 4-7-15 (1235)<br>DeterTime Drilling Started: 4-7-15 (1245)<br>DeterTime Blow USCS Codes Universe to produce prevention (Code Starter Code Code Starter Code Starter Code Code Code Code Co                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | GEOLOGIC BOREHOLE LOG |                             |                     |                                     |                                       |                             |  |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------|---------------------|-------------------------------------|---------------------------------------|-----------------------------|--|--|--|--|
| Drill Rig Type / Drill Method: HSA w/CME-85 twin axle truck WL (FT) 2nd: 4.9 Date/Time: 415:15 (1145)<br>Establishing Company: Cardno Geologist: D.C. Metallo, LHG Drilling Company: Cascade Drilling (Portland)<br>Drilling Foreman: Joe Staloch Ground Surface Elevation: Datum: Grade Surface.<br>Sampling Device: 1.5' Splt Spox Borehole diameter (n) 8.25" Total Depth (Feet): 30' (Scomple to 31.5')<br>Date/Time Drilling Started: 4-7-15 (1945)<br>Date/Time Drilling St                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |                             |                     |                                     |                                       |                             |  |  |  |  |
| Drill Rig Type / Drill Method: HSA w/CME-85 twin axle truck WL (FT) 2nd: 4.9 Date/Time: 415:15 (1145)<br>Establishing Company: Cardno Geologist: D.C. Metallo, LHG Drilling Company: Cascade Drilling (Portland)<br>Drilling Foreman: Joe Staloch Ground Surface Elevation: Datum: Grade Surface.<br>Sampling Device: 1.5' Splt Spox Borehole diameter (n) 8.25" Total Depth (Feet): 30' (Scomple to 31.5')<br>Date/Time Drilling Started: 4-7-15 (1945)<br>Date/Time Drilling St                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Location Descri       | iption: S-SE of GSU.        | 3, NEAR NU          | NCONNER of evap. tower              | WL (FT) 1st: 24.25 E                  | Date/Time: 1315             |  |  |  |  |
| Drilling Foreman: Joel Staloch Ground Surface Elevation:       Datum: Grade Surface,         Sampling Device: (1.5' Splth Spoon)       Borehole diameter (in) § 2.5"       Total Depth (Feet): 30' (Scomple to 31.5')         Date/Time Drilling Startact: 4-7-15 (1945)       Date/Time Total Depth Reached: 4-7-15 (1235)       Remarks: Drilling Problems.         Depth       Sampling       USCS       Codes       Solid TYPE, modifiers/grain size, soring, color, cement       Remarks: Drilling Problems.         Depth       Sampling       USCS       Codes       Solid TYPE, modifiers/grain size, soring, color, cement       Remarks: Drilling Problems.         0       Recov       Depth       Fill       O-1.5' D ork & Greyish B vouw       Remarks: Drilling Problems.         2       S       Fill       O-1.5' D ork & Greyish B vouw       Solid TYPE, and the silt silt solid view of the silt weight view of the silt solid view of the silt weight view of the silt solid view of the silt weight view of the silt weigh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |                             |                     |                                     | WL (FT) 2nd: 4,9 D                    | Date/Time: 4-15-15 (1145)   |  |  |  |  |
| Sampling Device: (1.5' Splt Spoon<br>Date/Time Drilling Started: 4-7-15 (1245)<br>Date/Time Total Depth Reached: 4-7-15 (1235)<br>Depth Sample Blow PD USCS Codes<br>Soll TYPE, modified primately generating size, soring, color, cement/<br>(reet) % Sample Blow PD USCS Codes<br>Soll TYPE, modified primately generating size, soring, color, cement/<br>(reet) % Sample Blow PD USCS Codes<br>Soll TYPE, modified primately generating size, soring, color, cement/<br>(reet) % Sample Blow PD USCS Codes<br>Soll TYPE, modified primately generating size, soring, color, cement/<br>(reet) % Sample Counts PD Or 1.5' Dark Grey ish Brown<br>2 2 3 Fill<br>5 0 12 C GM-SM<br>12 GM-SM<br>12 GM-SM<br>12 GM-SM<br>15-3' Same as above, greater<br>5 0 255 ML-<br>50 255 ML                                                                                                                                                                                                                                                                                                                                                                                                                                               | Establishing Co       | ompany: Cardno              | Geologis            | st: D.C. Metallo, LHG               | Drilling Company: Cascad              | e Drilling (Portland)       |  |  |  |  |
| Sampling Device: (1.5' Splt Spoon<br>Date/Time Drilling Started: 4-7-15 (1245)<br>Date/Time Total Depth Reached: 4-7-15 (1235)<br>Depth Sample Blow PID<br>Recov Depth Courts PID<br>Remarks: Drilling Problems.<br>Recov Depth Courts PID<br>Recov Depth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Drilling Foremar      | in: Joe Staloch             | Ground              | Surface Elevation:                  | Datum: Grade Surf                     | ace                         |  |  |  |  |
| Date/Time Drilling Started: 4-7-15 (1235)         Depth         Sampling         (reet)         %         Barphing         (reet)         %         Barphing         Uscs         Codes         Soilt TYPE, modifier/grain size, sorting, color, cement/         Weather, Time         %         Barphing         10         75         112         75         112         6         12         12         12         12         12         13         14         15         16         17         18         19         10         12         13         14         15         15         16         17         18         19         10         12         14         15         15         16         17         18      <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Sampling Devic        | ce: 1.5' Split Spoon        | 2                   | Borehole diameter (in) 8.25"        |                                       |                             |  |  |  |  |
| Depth<br>(reet)Sampling<br>SampleLithologic<br>CodesLithology Description<br>SOIL TYPE, modifiers/grain size, sorting, color, cement/<br>Bithification, moisture content, porceity, permeability/fracturingRemarks: Drilling Problems.<br>Equipment, Water levels,<br>Weather. Time0RecovDepth<br>CountsFill<br>(GM)0-1.5'Dowrk Greyish Brown<br>(2.5Y 4/2), diry, Sandy vf-fg<br>silty GRAVEL GM, Fill material<br>Sub-awgular metarialRemarks: Drilling Problems.<br>Equipment, Water levels,<br>Weather. Time23Fill<br>(GM)0-1.5'Dowrk Greyish Brown<br>(2.5Y 4/2), diry, Sandy vf-fg<br>silty GRAVEL GM, Fill material<br>Sub-awgular metarial0-1.5'Shaen<br>somple en<br>5'45012<br>ML-Silty GRAVEL GM, Fill material<br>Sub-awgular metarial0-1.5'Shaen<br>somple en<br>5'45012<br>ML-Silty GRAVEL GM, Fill material<br>Sub-awgular metarial0-1.5'Shaen<br>somple en<br>5'5025ML-<br>CLSome as above, greater<br>Some as above, greater<br>vfg sond with Hitter silt sitty (ML)<br>wf some (IoYR 5/2)1.5-3Sheen<br>somple collacter<br>somple collacter<br>some collacter6010CLMoist4.5-6'Yellowish Brown (IoYR 5/4)<br>wf vf-fg sond and Little S-M3-45Sheen<br>somple collacter<br>somple collacter810GCSM<br>GCSM<br>Silt (ML) and silty CLAY (CL)<br>w/ vf-fg sond and Little S-M4.5-6Moist910GCSM<br>Silt (ML) and silty CLAY (CL)<br>w/ vf-fg sond and Little S-M4.5-6Moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                             |                     |                                     |                                       |                             |  |  |  |  |
| NoteDepthCourtsPIDDefinitionDefinitionDefinitionDefinitionDefinitionDefinitionDefinition0RecovDepthCourtsPIDIthilicationmoisture content, porosity, permeability/fracturingWeather, Time-16FillGMFill0-1.5'Davk Greyish Brown0-6'bgs, star23Fill(GM)(2.5Y 4/2), dry, sandy vf-fgstar10' sample Courtinue23FillSilly GRAVEL GM, Fill material5'0-1.5' Sheen1212ML-Silly GRAVEL GM, Fill material5'0-1.5' Sheen44CLSand content, Fill (GM-5M)1.5-3 sheentest negative5025ML-Sold Content, Fill (GM-5M)1.5-3 sheentest negative6CLML-Sand content, Fill (GM-5M)1.5-3 sheentest negative625ML-CLVfg sand w/ Hitle sill silly (ML)3-45 sheen610CLGCMoist4.5-6' Yellowish Brown (107R5/4)3-45 sheen810GCMoist5'5'0407115810GCSilt (ML) and silty CLAY (cl)45-6 NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |                             |                     | Lithology Descript                  | tion                                  | Remarks: Drilling Problems, |  |  |  |  |
| - 75<br>16<br>75<br>16<br>2-75<br>16<br>2-75<br>16<br>2-75<br>16<br>2-75<br>16<br>2-75<br>16<br>2-75<br>16<br>2-75<br>16<br>2-75<br>16<br>2-75<br>16<br>2-75<br>16<br>2-75<br>10<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75<br>2-75 | (feet) %              | Biow                        | USCS Codes          | SOIL TYPE, modifiers/grain size, so | orting, color, cement/                | Equipment, Water levels,    |  |  |  |  |
| - 75<br>16<br>- 75<br>16<br>- 75<br>16<br>- 75<br>16<br>- 75<br>16<br>- 75<br>16<br>- 75<br>16<br>- 75<br>- 16<br>- 75<br>- 16<br>- 75<br>- 75<br>- 16<br>- 75<br>-      | C Reco                |                             |                     |                                     | and a shift to the second             |                             |  |  |  |  |
| <ul> <li>75</li> <li>2-</li> <li>8</li> <li>FILL</li> <li>50</li> <li>4-</li> <li>50</li> <li>4-</li> <li>50</li> <li>4-</li> <li>50</li> <li>50</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | _                     |                             |                     | 0-1.5 Dark Greyis                   | ih Brown                              |                             |  |  |  |  |
| 2-<br>8 FILL<br>50 12<br>4 CL<br>50 25<br>4 CL<br>50 25<br>50 25                                                                                                            |                       | 13                          | (GM)                | (2.544/2), dry,                     | sandy vf-fg                           |                             |  |  |  |  |
| 4 GM-SM<br>12 GM-SM<br>15-3 Same as above, greater<br>50 4 GL<br>50 255 ML-<br>6 80 10 CL<br>50 255 ML-<br>50 255 ML                                                                                                                                                                                                                                                                                                                                                                 |                       |                             |                     |                                     |                                       |                             |  |  |  |  |
| 4<br>50<br>4<br>50<br>4<br>50<br>50<br>50<br>50<br>50<br>50<br>50<br>50<br>50<br>50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 6                     |                             | FILL                | SITY GILL GM                        | , FIII Malerial                       |                             |  |  |  |  |
| 4<br>4<br>4<br>50<br>4<br>50<br>50<br>50<br>50<br>50<br>50<br>50<br>50<br>50<br>50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |                             | GM-SM               | Sub-angular meter                   | Roll                                  |                             |  |  |  |  |
| 4<br>50<br>25<br>ML-<br>6<br>50<br>25<br>ML-<br>6<br>50<br>25<br>ML-<br>CL<br>50<br>50<br>50<br>50<br>50<br>50<br>50<br>50<br>50<br>50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 5(                    |                             |                     | 1.5-3' same as a                    | boup appater                          | test negative               |  |  |  |  |
| - 50<br>- 80<br>- 80<br>- 10<br>- 50<br>- 80<br>- 10<br>- 50<br>- 8<br>- 50<br>- 8<br>- 50<br>- 8<br>- 8<br>- 8<br>- 8<br>- 9<br>- 9<br>- 9<br>- 9<br>- 9<br>- 9<br>- 9<br>- 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       | <u> </u>                    | ML-                 |                                     |                                       |                             |  |  |  |  |
| 4.5-6 Yellowish Brown (2.545/2) test negative<br>4.5-6 Yellowish Brown (2.545/2) test negative<br>3-45 sheen<br>4.5-6 Yellowish Brown (104R5/4)<br>4.5-6 No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |                             | CL                  | Jana CONTENT, F                     | ILL (GM-SM)                           | 1.5-3 Sheen                 |  |  |  |  |
| 4 - 80 CL Vfg Sond w/ Htter silt southy (ML)<br>4 Clay (CL) w/ trace Small<br>4 Clay (CL) w/ trace Small<br>50 8 SM-<br>6 - 6 Yellowish Brown (104R5/4)<br>8 - 6 Joint Moist<br>8 - 6 Joint (ML) and silty CLAY (CL)<br>6 - 6 No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | - 50                  |                             |                     | 30-45 Greyish B                     | NOWN (2.545/2)                        | test negative               |  |  |  |  |
| 4 - 80<br>- 50<br>- 6<br>- 6<br>- 6<br>- 7<br>- 6<br>- 7<br>- 6<br>- 7<br>- 6<br>- 7<br>- 6<br>- 7<br>- 7<br>- 7<br>- 7<br>- 7<br>- 7<br>- 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |                             | ML-                 |                                     |                                       |                             |  |  |  |  |
| 50 3 SM-<br>GC Moist 4.5-6 Yellowish Brown (104R514) # Semple collecte<br>3-<br>8-<br>8-<br>10-<br>10-<br>10-<br>10-<br>10-<br>10-<br>10-<br>10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | $1 \exists RC$        |                             | CL                  |                                     |                                       | 3-45 Sheen                  |  |  |  |  |
| 8 - Moist 4.5-6 Yellowish Brown (104R5/4) * Semple collecte<br>8 - Silt (ML) and silty CLAY (CL) 45-6 NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 6 00                  | - 2 -                       | That with some case | F(Tay (BL) W/ T                     | have success                          | first wegative              |  |  |  |  |
| 8 - Moist 4.5-6 Yellowish Brown (104R514) at (1130) 5B4 5<br>5ilt (ML) and silty CLAY (CL) 040715<br>w/vf-fg sand and little S-M 45-6 NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | - 50                  | $\cap   \frac{4}{4}   \leq$ | SM-                 |                                     | · · · · · · · · · · · · · · · · · · · | - x .                       |  |  |  |  |
| W/VF-Fg sand and little S-M 45-6 NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |                             | GC                  | 4.5-6 Yellowish Br                  | .own (104R514)                        | * Sample College            |  |  |  |  |
| W/VF-Fg sand and little S-M 45-6 NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       | -                           | Moist               |                                     |                                       | at (1130) 50 0              |  |  |  |  |
| DM pebble size gravel, mottled appearence sheen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Γď                    | \v                          |                     | SIII (III) ONLA SI                  |                                       |                             |  |  |  |  |
| pebble size gravel, mottled appearence sheer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       | 5.04                        |                     | W/VF-Fg Sond o                      | and little since                      |                             |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                             |                     | pebble size gravel                  | , mottled appear                      | ence shell                  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       | 5                           |                     |                                     |                                       |                             |  |  |  |  |
| 10- 5 (6-7.5 Yellowish Brown (10YR 5/4), 6-75'NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 107                   |                             |                     | 6-1.5 Tellowish Droc                | ~~ (10 YK 5/4),                       | 6-75'No                     |  |  |  |  |
| Moist Silty E-C 9 SAND and Slaw                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | - 10                  | 4                           | SIM-                | Moist Silty F-Cg                    | SAND and                              |                             |  |  |  |  |
| - GC Clayey S-M pebble SIZE GRAVEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       | <u> </u>                    | 0                   | Cloyey S-M pebbl                    | e size GRAVEL                         |                             |  |  |  |  |
| - GC - Cloyey S-M pebble Size GRAVEL<br>(SM-GC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                             | at n) at. algor     | (SM-GC)                             |                                       |                             |  |  |  |  |
| In the second Republic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 12-                   |                             |                     |                                     |                                       |                             |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                             |                     | 10-11-5 MOIST, 42                   | CAUD A                                | 10-11.5' NO                 |  |  |  |  |
| (10YR 5/6) Silty F-cg SAND and Sheen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |                             |                     | (10 YR 5/6) Silty +                 | -cg SAND and                          | SHERN                       |  |  |  |  |
| clayey GRAVEL (SM-GC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                             |                     | clayey GRAVEL (                     | SM-GC)                                |                             |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 14 -                  |                             |                     |                                     |                                       |                             |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                             |                     |                                     |                                       |                             |  |  |  |  |
| 15-16.5, v. moist - wet, Kellowish                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |                             |                     | 15-16.5, V. moist - i               | vet, Kellowish                        |                             |  |  |  |  |
| 40 Brown (10 YR 5/4) Silty & 15-16.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | -0,                   | 40                          | C HA -              |                                     |                                       |                             |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 11-10                 |                             | -                   |                                     |                                       | NO Sheen                    |  |  |  |  |
| 16 NA GC VF-mg sandy S-L pebble NO Shear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 140                   |                             | GU                  | Vr-my sandy                         | S-L pebble                            |                             |  |  |  |  |
| Size GRAVEL (GM=GC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |                             |                     | Size GRAVEL (G                      | GM=GC)                                |                             |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                             |                     |                                     | - 1                                   |                             |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 18-                   |                             |                     |                                     |                                       |                             |  |  |  |  |
| * Collected one add. co.t. Semple 6-7.5' (logging ONly)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       | <u></u>                     | 0 11 1 1            |                                     | 21.17511                              |                             |  |  |  |  |

\* Collected one add. cont. semple 6-7.5' (logging ONIY)



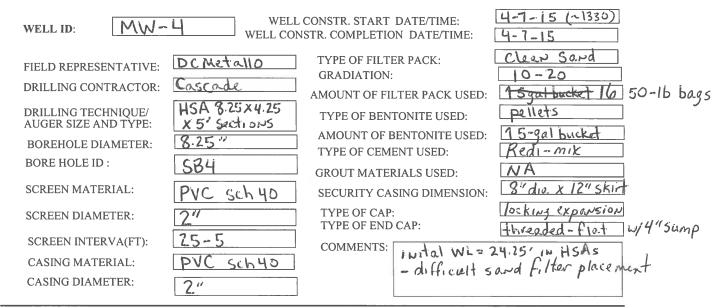
**GEOLOGIC BOREHOLE LOG** 

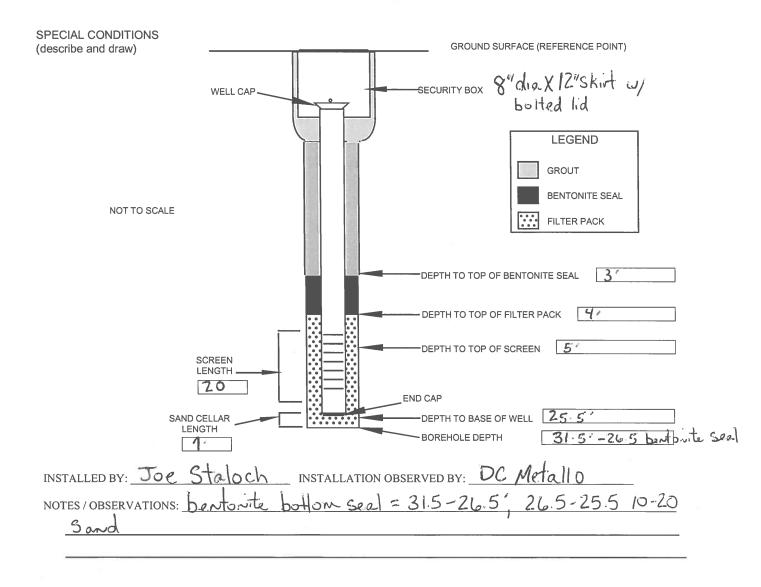
Borehole (Location) ID: SB4/MW-U

Page <u>2</u> of 2

Depth Sampling Lithologia Lithology Description Remarks: Drilling Problems Code Sample SOIL TYPE, modifiers/grain size, sorting, color, cement/ 1<sup>(faet)</sup> Blow Codes Equipment, Water levels (PPM) Recov Depth Counts lithification, moisture content, porosity, permeability/fracturing Weather, Time 20-21.5, wet, Yellowish 20-21.5' NO Sheen Brown (10 YR 5/4), Clayey 70 S-L sub rounded to sub angular 25 25 CM-GRAVEL and clayey GRAVEL 35 GC (GM-GC) 24  $\nabla$ 25-26.5' wet, Dark Greyish -26 -Brown (10YR 4/2) silty 25-265 18 SMwell graded F-WCg SAND No Sheen 40 GM 40 and silty S-M pebble size GRAVEL (SM-GM) 28-30-31.5; BNWN (10YR 4/3) 30 wet, silly fg SAND and 50/3 SM NA GM Silty poorly graded GRAVEL (SM-GM), much less Fines NA 32 than interval above - Boring terminated at 31.5 - Well Construction (meas= bas) -TD 31.5' -TD 31.5' back Fill 31.5-26.5 -Screens 2"0.01" slot 25-5' sch bottom Seal-bent. pellets 26.5 -Filter Pack 26.5-4 (10-20 Sond) SCh 40 - Upper Seal (Chips) 4-3 - Converte: 3-0 **Additional Comments :** A duplicate Soil Sample - Surface Completion: flush monument 8" dia was goileded /split w/ the Normal sample that was collected

#### **CONSTRUCTION DETAILS for WELLS COMPLETED BELOW GRADE**





| (SUBMIT ONE WELL REPORT PE                                                                   |                                                                             |                                                                                                                      | e of Intent No              |              |  |  |  |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------|--|--|--|
| Construction/Decommission                                                                    | 101-15-00                                                                   | 075(9210)                                                                                                            | Type of Well                |              |  |  |  |
| Construction                                                                                 |                                                                             |                                                                                                                      | Resource Protection         | on           |  |  |  |
| Decommission ORIGINAL INSTA                                                                  |                                                                             |                                                                                                                      | Geotechnical Soil           | Boring       |  |  |  |
| of Intent Number _                                                                           |                                                                             |                                                                                                                      |                             |              |  |  |  |
| Consulting Firm                                                                              | TA Associatos                                                               | Site Address<br>City Chehalis                                                                                        | 1813 Bishop                 |              |  |  |  |
|                                                                                              | TA ASSociates                                                               | _ City Chehalis                                                                                                      | County                      | Lewis        |  |  |  |
| Unique Ecology Well ID                                                                       |                                                                             | Location 1/4 NE                                                                                                      | 1/4 SW Sec 10 Twn           | 13N R 2W     |  |  |  |
| Тад No вн                                                                                    |                                                                             | -                                                                                                                    |                             |              |  |  |  |
| WELL CONSTRUCTION CERTIFICATION: 1 construction of this well, and its compliance with all We |                                                                             | Lat/Long (s,t,r Lat Deg still Required) Long Deg                                                                     |                             | Min/Sec      |  |  |  |
| Materials used and the information reported above are t                                      |                                                                             | sin required) Long Deg                                                                                               | L01                         | ig win sec   |  |  |  |
|                                                                                              |                                                                             | Tax Parcel No.                                                                                                       |                             |              |  |  |  |
| Driller Trainee Name (Print)                                                                 | Joe Staloch                                                                 | -2                                                                                                                   |                             |              |  |  |  |
| Driller/Trainee Signature                                                                    | 2749                                                                        | Cased Diameter                                                                                                       | 8.25'                       | Static Level |  |  |  |
| Driller/Trainee License No.                                                                  | 2143                                                                        | - Work/Decommission Start Date                                                                                       | 04/                         | 07/2015      |  |  |  |
| If trainee, licensed driller's                                                               |                                                                             |                                                                                                                      |                             |              |  |  |  |
| Signature and License No.                                                                    |                                                                             | Work/Decommission End Date                                                                                           | mission End Date 04/09/2015 |              |  |  |  |
| Construction/Design                                                                          | Well Nam                                                                    | e: MW-4                                                                                                              | Formation                   | Description  |  |  |  |
|                                                                                              | Material<br>Backfill<br>Type<br>Seal<br>Material<br>Gravel Pack<br>Material | <u>Sch 40 PVC</u><br>FT<br><u>3 - 4</u> FT<br><u>Bentonite Chips</u><br><u>4 - 25</u> FT<br><u>10X20 Silica sand</u> | Brown clay and g            | 25 FT        |  |  |  |
|                                                                                              | Screen (dia x dep)                                                          | <u>2 " 5 x 25</u> FT                                                                                                 |                             | FT           |  |  |  |
|                                                                                              | Slot Size                                                                   | .010                                                                                                                 |                             |              |  |  |  |
|                                                                                              | Material                                                                    | Sch 40 PVC                                                                                                           |                             | FT           |  |  |  |
|                                                                                              | Well Depth                                                                  | 25FT                                                                                                                 |                             | FT           |  |  |  |
|                                                                                              | Backfill<br>Material                                                        |                                                                                                                      |                             | FT           |  |  |  |
|                                                                                              |                                                                             |                                                                                                                      |                             |              |  |  |  |



**GEOLOGIC BOREHOLE LOG** 

| GEOLOGIC BOREHOLE LOG |                                                                  |                      |             |          |                     |                                                                                |                       |                    |                                           |  |
|-----------------------|------------------------------------------------------------------|----------------------|-------------|----------|---------------------|--------------------------------------------------------------------------------|-----------------------|--------------------|-------------------------------------------|--|
| Borehole              | e / Well ID:                                                     | SB                   | 57M         | W-5      |                     | Site ID: GSU#3 PacifiCo                                                        | ρrρ                   | Pag                | ge of                                     |  |
| Location              | Description                                                      | n: Neg               | or are      | vel po   | thwa                | Nentry to SW pond                                                              | WL (FT) 1st: 🔦        | 14-15'0            | ate/Time:                                 |  |
| Drill Rig             | Type / Drill                                                     |                      |             |          |                     | twin axle truck                                                                | WL (FT) 2nd: 4        | 1.98° D            | ate/Time: 4 15 15                         |  |
|                       | ning Compa                                                       |                      | Cardno      |          | Geologis            | t: D.C. Metallo, LHG                                                           | e Drilling (Portland) |                    |                                           |  |
|                       | oreman:                                                          |                      |             |          |                     | Surface Elevation: Datum: Grade Surface                                        |                       |                    |                                           |  |
|                       | g Device:                                                        |                      |             | 6        |                     | Borehole diameter (in) $8.25''$                                                | Total Depth (Fe       |                    |                                           |  |
| Date/Tim              | ne Drilling S                                                    | started: L           | 1.8.15      | (1320    | )                   | Date/Time Total Depth Reached:                                                 | 84815                 | (~1545             | 5)                                        |  |
| Depth<br>(feet)       | %                                                                | Sampling<br>Sample E | g<br>Blow   | USCS     | Lithologic<br>Codes | Lithology Descrip                                                              |                       |                    | Remarks: Drilling Problems,               |  |
|                       | Recov                                                            |                      | ounts PID   |          | Codes               | SOIL TYPE, modifiers/grain size, s<br>lithification, moisture content, porosit | -                     | g                  | Equipment, Water levels,<br>Weather, Time |  |
|                       | 40                                                               |                      | 5           | FILL     |                     | 0-1.5' Brown (10YR4                                                            |                       |                    | 0-1.5' No                                 |  |
| -                     | 40                                                               |                      | 9           | (cl)     |                     | & Silty Clay (CL)                                                              | wigravel (            | [iHle)             | Sheen                                     |  |
|                       |                                                                  |                      |             |          |                     | 5-m pebble size,                                                               | FILL moteri           | al                 |                                           |  |
| 2-                    | 0                                                                |                      | 4           | NR       |                     |                                                                                |                       |                    |                                           |  |
| -                     |                                                                  |                      | 4           | (FIII?)  |                     | 1.5-3' No recovery                                                             | - likely la           | rge                |                                           |  |
| $- $                  |                                                                  |                      | 4           |          |                     | growel                                                                         |                       | -                  |                                           |  |
|                       |                                                                  |                      | 5           |          |                     | 3-4.5' Dork Vellowish                                                          | Brown (10)            | 1R 414)            | 3-4.5 No Shew                             |  |
| 4                     | 20                                                               |                      | 10          | CL       |                     | moist, silty, gro CL                                                           |                       |                    |                                           |  |
| $- $                  |                                                                  |                      |             |          |                     |                                                                                |                       |                    |                                           |  |
|                       |                                                                  |                      | 3           | CL       |                     | 5-m pebble size gro                                                            | wel, sub-             | FOUND              |                                           |  |
| $ I_{-} $             | 75                                                               |                      | 6           |          |                     | to Sub-angular                                                                 |                       |                    | * SB5-5-04081                             |  |
| 6                     |                                                                  |                      | 20          |          |                     | 4.5-6 Yellowish Bro                                                            | UN (10 YR :           | 5/4),              | (1345)                                    |  |
|                       |                                                                  |                      |             | 1        |                     | Moist, SIHY CLAY                                                               | (cL) w/ /H            | the to             |                                           |  |
|                       |                                                                  |                      |             | .<br>    |                     |                                                                                |                       |                    | 4.5-6 No Sheen                            |  |
| 9-                    |                                                                  |                      |             | 1        |                     | Spebble Size grave                                                             | 1. mottled            | appear             | nce,                                      |  |
|                       |                                                                  |                      |             | 1        |                     | Stiff to V. Stiff                                                              | 1                     | •                  |                                           |  |
|                       |                                                                  |                      |             | ]        |                     |                                                                                |                       |                    |                                           |  |
| -                     |                                                                  | -                    |             | -        |                     |                                                                                |                       |                    |                                           |  |
| 10 -                  |                                                                  |                      |             |          |                     | 10-11.5 Brown (10YR                                                            | (4/3) V.              | moist              | 10-11.5                                   |  |
|                       | 50                                                               |                      | 5           | GM       |                     |                                                                                |                       |                    | NOSLEZN                                   |  |
|                       | 50                                                               |                      | 10          |          |                     | Clayry/Silly GR                                                                | ,                     |                    |                                           |  |
|                       |                                                                  |                      | 6           | GC       |                     | pebble sizes, mo                                                               | stly Sub              | roina              | 2a                                        |  |
| 12                    |                                                                  |                      |             | ]        |                     | to sub augular,<br>(GM-GC)                                                     | med. dens             | e,                 |                                           |  |
| _                     |                                                                  |                      |             | -        |                     | (GM-GC)                                                                        |                       |                    | GW encountered                            |  |
| -                     |                                                                  |                      |             | 527      |                     |                                                                                |                       |                    | Þ/w 11.5 415'                             |  |
|                       |                                                                  |                      |             |          |                     |                                                                                |                       |                    |                                           |  |
| μч                    |                                                                  |                      |             | -        |                     | 15-16.5 Yellowish B                                                            | rown (104)            | ₹5/4) <sub>,</sub> | No sheen 16.5'                            |  |
| -                     |                                                                  |                      |             | -        |                     | wet, silty F-vcg St                                                            | AND ad 5              | ilty               | IN SKOCK I WIN                            |  |
|                       |                                                                  |                      |             |          |                     | S- N Debble Size G                                                             | BRAVEL                |                    |                                           |  |
| 16-                   | 50                                                               |                      | 12          | SM-      | С                   | (SM-GM), 1005                                                                  | e to med.             | arnsh              |                                           |  |
|                       |                                                                  |                      | 15          | GM       |                     |                                                                                |                       |                    |                                           |  |
|                       |                                                                  |                      |             |          |                     |                                                                                |                       |                    |                                           |  |
|                       |                                                                  |                      |             |          |                     |                                                                                |                       |                    |                                           |  |
| 118 -                 |                                                                  |                      |             | -        |                     |                                                                                |                       |                    |                                           |  |
| L                     | <u> </u>                                                         |                      | <br>بيدياني | nastiz - | 1-01-1              | bac Hand 101/20                                                                | log query             | 151:               | theyal                                    |  |
|                       | Log Continuously to 6' bgs, then at 10'bgs log every 5' interval |                      |             |          |                     |                                                                                |                       |                    |                                           |  |



**GEOLOGIC BOREHOLE LOG** 

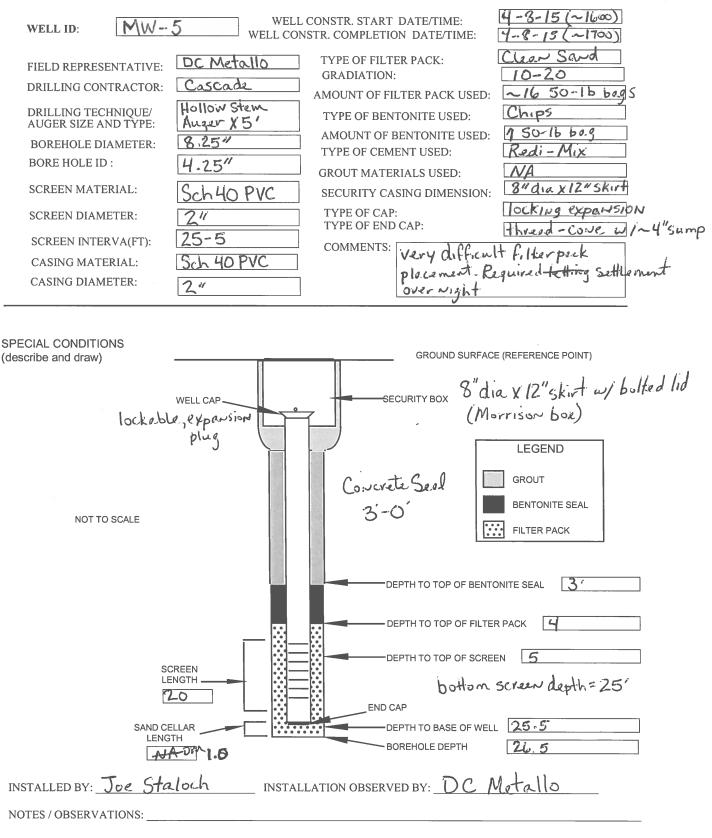
Borehole (Location) ID: <u>SB5/MW-5</u>

Page Z of Z

| Depth  |       | Sar    | npling           |       | USCS | Lithologic | Lithology Description                                                                                                                                                                                                                                                                                                                                                                       | Remarks: Drilling Problems, |
|--------|-------|--------|------------------|-------|------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| (feet) | %     | Sample | Blow             | PID   | Code | Codes      | SOIL TYPE, modifiers/grain size, sorting, color, cement/                                                                                                                                                                                                                                                                                                                                    | Equipment, Water levels,    |
| 18     | Recov | Depth  | Counts           | (PPM) |      |            | lithification, moisture content, porosity, permeability/fracturing                                                                                                                                                                                                                                                                                                                          | Weather, Time               |
| 20-    |       |        | 28<br>50/0<br>NA |       | GM   |            | 20-21.5' Vellowish Brown (10 YR<br>5/4), wet, Very Similar<br>composition to interval logge<br>above except V. 1005e/loose<br>and less silt/sand fraction                                                                                                                                                                                                                                   | 21.5° No<br>Sheen           |
| 24-    |       |        |                  |       | GM   |            | 25-26.5' Dark Greyish Brown<br>(2.544/2), wet; silty S-L<br>Pebble Size GRAVEL, with some<br>F-C g Sand, loose-med. dense<br>- Boring terminated at 26.5'<br>- Well Const. Detail:<br>TD = 26.5'<br>Screen = 2"0.01" Slot 25-5'<br>Fitter pack= 26.5 - 4'<br>10-20 clean Sand<br>Bent: Seal = Chips 4'-3'<br>Concrete Seal = Redi-Mix 3-0<br>Surface Completion = 8" flush,<br>w/ 12" Skirt | (1450)<br>SCK 40            |
|        |       |        |                  |       |      |            |                                                                                                                                                                                                                                                                                                                                                                                             |                             |

**Additional Comments :** 

### **CONSTRUCTION DETAILS for WELLS COMPLETED BELOW GRADE**



| Construction/Decommission                                | 101-15-007                                                                                                      | 75(9210)                       | Tyme of Wall                        |  |  |  |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------|--|--|--|
|                                                          | 101-13-007                                                                                                      | 5(3210)                        | Type of Well                        |  |  |  |
|                                                          |                                                                                                                 |                                | Resource Protection                 |  |  |  |
| Decommission ORIGINAL INST                               |                                                                                                                 | Geotechnical Soil Boring       |                                     |  |  |  |
| oj inteni tvumoer                                        |                                                                                                                 | Property Owner<br>Site Address | PacifiCorp Energy<br>1813 Bishop Rd |  |  |  |
| Consulting Firm                                          | KTA Associates                                                                                                  |                                | County Lewis                        |  |  |  |
|                                                          |                                                                                                                 |                                |                                     |  |  |  |
| Unique Ecology Well ID<br>Tag No. Вн                     | IV 149                                                                                                          | Location 1/4 NE                | 1/4 SW Sec 10 Twn 13N R 2W          |  |  |  |
| WELL CONSTRUCTION CERTIFICATION: 1 const                 | A CONTRACT OF A CONTRACT                                                                                        | Lat/Long (s,t,r Lat Deg        |                                     |  |  |  |
| construction of this well, and its compliance with all W | ashington well construction standards                                                                           | still Required) Long Deg       |                                     |  |  |  |
| Materials used and the information reported above are    | true to my best knowledge and belief                                                                            | Tay Dancel No.                 |                                     |  |  |  |
| Driller Trainee Name (Print)                             | Joe Staloch                                                                                                     | Tax Parcel No.                 |                                     |  |  |  |
| Driller/Trainee Signature                                |                                                                                                                 | Cased Diameter                 | 8.25" Static Level                  |  |  |  |
| Driller/Trainee License No.                              | 2749                                                                                                            |                                |                                     |  |  |  |
| If trainee, licensed driller's                           |                                                                                                                 | Work/Decommission Start Date   | 04/08/2015                          |  |  |  |
| Signature and License No.                                |                                                                                                                 | Work/Decommission End Date     | 04/09/2015                          |  |  |  |
|                                                          |                                                                                                                 |                                |                                     |  |  |  |
| Construction/Design                                      | Well Name:                                                                                                      | 10100-5                        | Formation Description               |  |  |  |
| St                                                       |                                                                                                                 |                                |                                     |  |  |  |
|                                                          | Concrete Surface Seal<br>Depth                                                                                  | 0 - 3 FT                       | 0 - 2 FT                            |  |  |  |
|                                                          |                                                                                                                 | Constant of the                | Gravel and cobbles                  |  |  |  |
|                                                          | the second se | <u>2 " 0 x 5</u> FT            | <u>2 - 10 FT</u>                    |  |  |  |
|                                                          | Material                                                                                                        | Sch 40 PVC                     | Clay and gravel                     |  |  |  |
|                                                          | Backfill                                                                                                        | FT                             | <u>10 - 25 FT</u>                   |  |  |  |
|                                                          | Туре                                                                                                            |                                | wet brown silty gravel              |  |  |  |
|                                                          | Seal                                                                                                            | <u>3 - 4</u> FT                | FT                                  |  |  |  |
|                                                          | Material                                                                                                        | Bentonite Chips                |                                     |  |  |  |
|                                                          |                                                                                                                 |                                | - FT                                |  |  |  |
|                                                          | Gravel Pack                                                                                                     | <u>4 - 25</u> FT               | - FI                                |  |  |  |
|                                                          | Material                                                                                                        | 10X20 Silica sand              |                                     |  |  |  |
|                                                          |                                                                                                                 |                                | - FT                                |  |  |  |
|                                                          |                                                                                                                 | 12 1 2 7 min 14                |                                     |  |  |  |
|                                                          | Screen (dia x dep)                                                                                              | <u>2 " 5 x 25</u> FT           | - FT_                               |  |  |  |
|                                                          | Slot Size                                                                                                       | 010                            |                                     |  |  |  |
|                                                          | Matarial                                                                                                        |                                | - FT                                |  |  |  |
|                                                          | Material                                                                                                        | Sch 40 PVC                     |                                     |  |  |  |
|                                                          |                                                                                                                 | FT                             | - FT                                |  |  |  |
|                                                          | Backfill                                                                                                        |                                |                                     |  |  |  |
|                                                          |                                                                                                                 |                                | FT                                  |  |  |  |
|                                                          | Material                                                                                                        |                                |                                     |  |  |  |
|                                                          | Total Hole Depth                                                                                                | 25 FT                          |                                     |  |  |  |



**GEOLOGIC BOREHOLE LOG** 

|             |                                            | 0.0 /             |         |              |            | DLOGIC BOREHOLE LOO                                         |                        |               |                             |
|-------------|--------------------------------------------|-------------------|---------|--------------|------------|-------------------------------------------------------------|------------------------|---------------|-----------------------------|
|             | e / Well ID:                               |                   |         | W-6          |            | Site ID: Pacifi Corp GSU                                    |                        | Pag           | ge of                       |
| Location    | Description                                | 1: Along          | Acces   |              |            | Building, ~210 from ditch                                   | WL (FT) 1st: ~1        | 10 0          | Date/Time:                  |
| Drill Rig   | Type / Drill                               | Method:           | SAV     | J CMI        | <u> </u>   | twin axle rig                                               | WL (FT) 2nd: 5         | .0 <b>7</b> c | Date/Time: 54.15.15 (1345)  |
| Establish   | ning Compa                                 | iny: Car          | rdno    |              | 1          | t: D.C. Metallo, LHG                                        | Drilling Company       | : Cascad      | e Drilling (Portland)       |
| Drilling F  | oreman: J                                  | Tue Sto           | 2/00/   | \<br>\       | Ground S   | Surface Elevation:                                          | Datum: Grade Surface   |               |                             |
| Samplin     | g Device: [.                               | 5' x 2"           | 55      |              |            | Borehole diameter (in) 8.2.5                                | Total Depth (Fee       | et): 21       | 0.5                         |
| Date/Tim    | ne Drilling S                              | started: 4.9      | 8.15    | (0825        | )          | Date/Time Total Depth Reached:                              |                        |               |                             |
| Depth       |                                            | Sampling          |         | [            | Lithologic | Lithology Descript                                          |                        |               | Remarks: Drilling Problems, |
| (feet)      | %                                          | Sample Blov       | 1       | USCS         | Codes      | SOIL TYPE, modifiers/grain size, so                         | orting, color, cement/ |               | Equipment, Water levels,    |
|             | Recov                                      | Depth Cour        | nts PID | 77.11        |            | lithification, moisture content, porosity,                  |                        |               | Weather, Time               |
|             | 50                                         | 3                 | +       | Fill<br>(CL) |            | 0-1.5' SI moist, Yel                                        | <b>A A A A</b>         |               | - NO Sheen                  |
| -           | 0                                          | 2                 |         |              |            | (10YR514), grovell                                          | Y CLAY (               | cL)           | at 1.5'                     |
|             |                                            |                   |         |              |            | Fill meterial, moth                                         | led color, n           | 1-L           |                             |
| 6           |                                            |                   |         | Fill         |            | pepple size grovel,                                         |                        |               |                             |
| -           | 40                                         | 7                 | _       | (CL)         |            | 15-2 same as ab                                             | ove mois               | tto           | - NO Sheen @                |
|             | - 40 14 (cl) 1.5-3 same as above, moist to |                   |         |              |            |                                                             |                        |               | 5                           |
|             |                                            |                   |         | ]            |            |                                                             | 1                      | 1.5           |                             |
|             | 1-0                                        | $\sqrt{1}$        |         | CL           |            | 3-4.5 Yellowish Bron                                        | vr(104R51)             | (°),          | - NO Sheen@<br>4.5'         |
| _           | 100                                        | $X = \frac{3}{7}$ |         |              |            | V. Moist to moist, S.                                       | andy silty             |               | 4.5                         |
|             |                                            |                   |         |              | •          | 11000                                                       |                        | Isuar         |                             |
| 11-         |                                            | 7                 |         | CL           |            | CLAY (CL) W/15-LP<br>and Some forcg Sand<br>granular meters | d an alled             | black         | ish - No sheen              |
| $\varphi$ – | 50                                         | 10                |         |              |            | and some ting sand                                          | i, money               | VILL.         |                             |
|             |                                            |                   |         | 4            |            |                                                             | (~ 2/3 MM              | () This       |                             |
|             |                                            |                   |         | -            |            | near bottom                                                 |                        |               | * Sample at                 |
| -           |                                            |                   |         | 4            |            | 4.5-6 Same as a                                             | bour,                  |               | 4'                          |
| 8-          |                                            |                   |         | 1            |            | 4.5 4 50000 005                                             |                        |               | 586-4-040815                |
|             |                                            |                   |         | ]            |            |                                                             |                        |               | (0900)                      |
| _           |                                            |                   |         | 4            |            |                                                             |                        |               | 1 1                         |
|             |                                            |                   |         | -            |            | 10-11.5 Yellowish Br                                        | La UD                  | $r_{11}$      | Semple compied              |
| 10-         |                                            |                   |         |              |            | IO II O PRIODISK DY                                         | OWN (10 YK             | 516),         | from 3.5 - 5"               |
| _           | 50                                         | 4                 |         | SM .         |            | Wet, Silty & Clayey,                                        | V. 10058 5-            | M             | - Wet@ 10'                  |
|             |                                            | 4                 |         | GM           |            | pebble Size GRAVEL ((                                       | GM) and 5              | 114           | SS dripping                 |
| -           | -                                          |                   | 1       | <b>.</b>     |            | VF-VCg SAND (SM                                             | .),                    |               |                             |
| 12-         | 1                                          |                   |         | -            |            |                                                             | 000 F                  |               | - NO Sheen                  |
|             |                                            |                   |         | 1            |            |                                                             |                        |               | @ 11.5'                     |
|             | ]                                          |                   |         | ]            |            |                                                             |                        |               |                             |
| _           | -                                          |                   |         | 4            |            |                                                             |                        |               |                             |
| 14-         | -                                          |                   |         | -            |            |                                                             |                        |               |                             |
| - 1         |                                            |                   |         | -            |            | 15-16.5' Same as                                            | above sl.              | ghtly         |                             |
| -           | 1                                          |                   |         | 1            |            | 125                                                         | /                      | , ,           | -No sheen@                  |
|             |                                            |                   |         |              | -          | less wet                                                    |                        |               | 16.51                       |
| 16-         | 70                                         |                   | 3       | SM-          |            |                                                             |                        |               |                             |
|             |                                            |                   | 5       | GM           |            | 3                                                           |                        |               |                             |
| -           | 1                                          |                   | 10      |              | ***        |                                                             |                        |               |                             |
|             | 1                                          |                   |         | 1            |            |                                                             |                        |               |                             |
| 19          | ]                                          |                   |         |              |            | <u>×</u>                                                    |                        |               |                             |
| 10          | L                                          |                   |         |              |            |                                                             |                        | 1             |                             |
|             |                                            | * Con             | tinu    | ous s        | ampl.      | ing O-6 bgs, then ev.                                       | ery 5'sta              | rting         | at 10° bgs                  |
|             |                                            |                   |         |              |            |                                                             |                        | -             | -                           |



GEOLOGIC BOREHOLE LOG

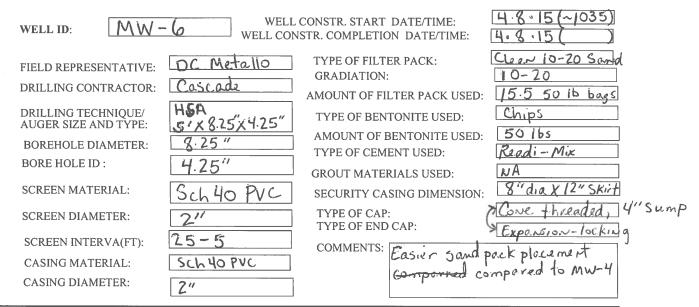
Borehole (Location) ID: SB6/MW-6

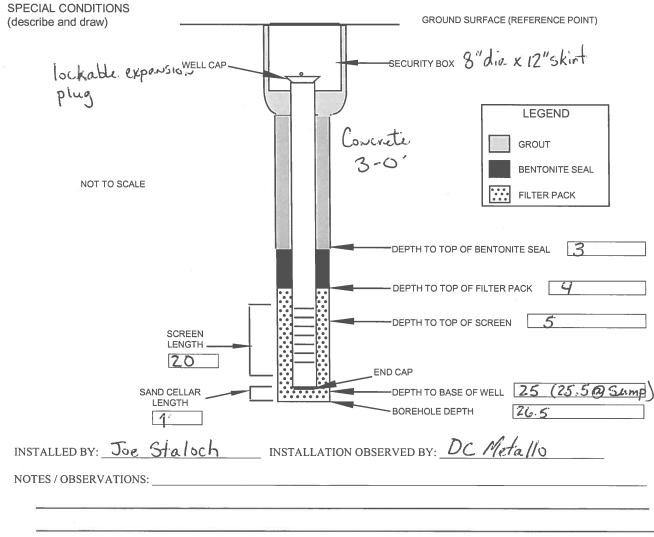
Page 2 of 2

| %       Sample       Blow       PID       Code       Codes       SOIL TYPE, modifiers/grain size, sorting, color, cement/<br>lithification, moisture content, porosity, permeability/fracturing       Equipment, Water levels,<br>Weather, Time                                                                                                                                                                                                                                                                                                                          | Depth |       | Sa    | mpling                    |         | USCS      | Lithologic | Lithology Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Remarks: Drilling Problems,    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|-------|---------------------------|---------|-----------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| 20<br>$70$ $\frac{15}{25}$ CM<br>$35$ $\frac{15}{57}$<br>22<br>22<br>22<br>22<br>22<br>22<br>24<br>24<br>24<br>24<br>24<br>24<br>26<br>$75$ $\frac{15}{57}$ CM<br>215<br>35<br>22<br>24<br>24<br>24<br>25 $26$ $5'$ Brown (loyR5/3),<br>Wet silty well graded GRAVEL<br>(GM) and (lesser %) silty<br>fg SAND (sm) $w$ some<br>$M_V cg$ Sand throughout,<br>bose<br>- Boring Terminetid 26.5'<br>@ (1020)<br>- Coust Info<br>TD = 26.5'<br>* Screen (2" 0 01" slotted)<br>25-5<br>* Filter Pack (10-20 clean)<br>= 26.5 - 4'<br>Best Seal: 4-3<br>$\cdot$ Coucret: $3-0'$ |       | %     |       |                           | PID     |           | -          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -                              |
| 20<br>70<br>25<br>35<br>22<br>22<br>22<br>24<br>24<br>24<br>24<br>24<br>24<br>24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 18    | Recov | Depth | Counts                    | (PPM)   |           |            | lithification, moisture content, porosity, permeability/fracturing                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 20-   |       | Depth | 15<br>25<br>35<br>7<br>15 | ((PPM)) | SP<br>GM- |            | 20 - 21.5 Dark Killavish Brown<br>(10YR 4/4) wet, layered Section<br>of VCg SAND W/ little silt/fines<br>(SP) and VF-Fgeg SAND and<br>silty M-L pebble Size GRAVEL<br>(GM)<br>25-26.5 Brown (10YR5/3),<br>wet silty well graded GRAVEL<br>(GM) and (lesser %) silty<br>Fg SAND (SM) W/ Some<br>M-VCg Sand throughout,<br>loose<br>- Boring Terminated 26.5<br>© (1020)<br>- Const. Info<br>. TD = 26.5'<br>. Screen (2" 0.01" slotted)<br>25-5'<br>Filter Pack (10-20 clean)<br>= 26.5 - 4'<br>Bent. Seal: 4-3<br>. Concreta: 3-0' | No sheen<br>(26.5'<br>No sheen |

**Additional Comments :** 

#### CONSTRUCTION DETAILS for WELLS COMPLETED BELOW GRADE





| <b>RESOURCE PROTEC</b><br>(SUBMIT ONE WELL REPORT PER 1                                                        |                                                                                                                                                     | METUKI          |                                    | RRENT<br>e of Intent No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RE11198       |
|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Construction/Decommission                                                                                      | 101-15-007                                                                                                                                          | 75(9210)        |                                    | Type of Well                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |
| Construction                                                                                                   |                                                                                                                                                     |                 |                                    | Resource Protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |
| Decommission ORIGINAL INSTAL                                                                                   | LATION Notice                                                                                                                                       |                 |                                    | Geotechnical Soil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |               |
| of Intent Number                                                                                               |                                                                                                                                                     | Property Owner  |                                    | PacifiCorp E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | nergy         |
| Consulting Firm KT                                                                                             | Accesictor                                                                                                                                          | Site Address    | 01-1-1                             | 1813 Bishop I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |
|                                                                                                                | AASSociates                                                                                                                                         | City            | Chehalis                           | County                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Lewis         |
| Unique Ecology Well ID<br>Tag NoBHV 1                                                                          | 50                                                                                                                                                  | Location        | 1/4 <u>NE</u>                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
| WELL CONSTRUCTION CERTIFICATION: 1 constructe                                                                  |                                                                                                                                                     |                 |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Min/Sec       |
| construction of this well, and its compliance with all Washir                                                  |                                                                                                                                                     | still Required) | Long Deg                           | Lon                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | g Min/Sec     |
| Materials used and the information reported above are true t                                                   |                                                                                                                                                     | Tax Parcel No.  |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
| Driller Trainee Name (Print)                                                                                   | Joe Staloch                                                                                                                                         | 2               |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Sec. 1        |
| Driller/Trainee Signature                                                                                      | 2749                                                                                                                                                | Cased Diameter  |                                    | 8.25"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Static Level  |
|                                                                                                                | Ento                                                                                                                                                | Work/Decommissi | on Start Date                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 08/2015       |
|                                                                                                                |                                                                                                                                                     | 201.0           |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
| Signature and License No.                                                                                      |                                                                                                                                                     | Work Decommissi | on End Date                        | 04/09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | /2015         |
| Construction/Design                                                                                            | Well Name:                                                                                                                                          | MW-6            | 5                                  | Formation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Description   |
|                                                                                                                | Depth<br>Blank Casing (dia x dep)<br>Material<br>Backfill<br>Type<br>Seal<br>Material<br>Gravel Pack<br>Material<br>Screen (dia x dep)<br>Slot Size | Sch 40 PVC      | 5 FT<br>FT<br>FT<br>FT<br>FT<br>nd | Gravel and cobble                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1 <u>0 FT</u> |
|                                                                                                                | Material                                                                                                                                            | Sch 40 PVC      |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|                                                                                                                | - Well Depth                                                                                                                                        | 25              | FT                                 | ) <u> </u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | FT            |
|                                                                                                                | Backfill                                                                                                                                            |                 |                                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | FT            |
| the second s |                                                                                                                                                     |                 |                                    | The second | 1 1           |

# APPENDIX D MONITORING WELL DEVELOPMENT FORMS

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|                                                                                                                                                                                                         | Monitoring Well Development Form Mac - 1                                    |           |                                   |                   |        |                                                          |  |  |  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------|-----------------------------------|-------------------|--------|----------------------------------------------------------|--|--|--|--|--|--|--|
| Project No                                                                                                                                                                                              | o.:903                                                                      | 369-0     | Site ar                           | nd Location ID: ( | SU#1   | /MW-7 Date: 4/9/15                                       |  |  |  |  |  |  |  |
| Date Insta                                                                                                                                                                                              | illed : Oct                                                                 | Perso     | nnel Conduct                      | ting Developmer   | t:CDI  | Bob Staloch                                              |  |  |  |  |  |  |  |
|                                                                                                                                                                                                         |                                                                             | d(s) Used |                                   | Pamp with         |        |                                                          |  |  |  |  |  |  |  |
| <sup>1</sup> Total We                                                                                                                                                                                   | ell Depth (F                                                                |           |                                   | Water Level (FT)  |        | <sup>3</sup> Length of Static<br>Water Column (FT): 12.1 |  |  |  |  |  |  |  |
| Well Dian                                                                                                                                                                                               | neter (IN) :                                                                |           |                                   | (see below) : C   | I      | Casing Volume CV (GAL) =                                 |  |  |  |  |  |  |  |
|                                                                                                                                                                                                         | 2                                                                           |           |                                   | "= .65 6"=1.5 8   |        | 1.94 gal                                                 |  |  |  |  |  |  |  |
| Casing Volume CV (GAL) = $(1 - 2 = 3; 3 \times 4 = 1 \text{ CV})$ : 12.1 X (2.16)                                                                                                                       |                                                                             |           |                                   |                   |        |                                                          |  |  |  |  |  |  |  |
| DATE     TIME     WL (FT)     TOTAL<br>VOL<br>REMOVED<br>(GAL)     TURBIDITY<br>(NTU) / SED.<br>MEASURE<br>(ImHoff<br>Cone)     COMMENTS<br>(recharge rate, water color, suspended<br>sediments, other) |                                                                             |           |                                   |                   |        |                                                          |  |  |  |  |  |  |  |
| Ha                                                                                                                                                                                                      |                                                                             | 118       |                                   |                   |        | Dry after 4921                                           |  |  |  |  |  |  |  |
| -119                                                                                                                                                                                                    | 1/9 1000 418 4 cleved up in less than a gar<br>ran Dry after 2011 and 2 gal |           |                                   |                   |        |                                                          |  |  |  |  |  |  |  |
|                                                                                                                                                                                                         | 1045                                                                        |           | 6 bn tint for a second then clear |                   |        |                                                          |  |  |  |  |  |  |  |
|                                                                                                                                                                                                         | 10 /-                                                                       |           | 2                                 |                   | 61 7.1 | T For a second Full Cleared                              |  |  |  |  |  |  |  |
|                                                                                                                                                                                                         |                                                                             |           |                                   | 1                 |        |                                                          |  |  |  |  |  |  |  |
|                                                                                                                                                                                                         |                                                                             |           | 1                                 |                   | ) .    |                                                          |  |  |  |  |  |  |  |
|                                                                                                                                                                                                         |                                                                             | j.        |                                   |                   |        |                                                          |  |  |  |  |  |  |  |
|                                                                                                                                                                                                         |                                                                             |           | 2                                 |                   |        |                                                          |  |  |  |  |  |  |  |
|                                                                                                                                                                                                         |                                                                             |           |                                   |                   |        | 1 ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (                  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                         |                                                                             |           |                                   |                   | 1      |                                                          |  |  |  |  |  |  |  |
|                                                                                                                                                                                                         |                                                                             |           |                                   |                   |        |                                                          |  |  |  |  |  |  |  |
| FINAL WELL MEASUREMENTS                                                                                                                                                                                 |                                                                             |           |                                   |                   |        |                                                          |  |  |  |  |  |  |  |
| TOTAL D                                                                                                                                                                                                 | EPTH (FT)                                                                   | 17        | WATE                              | R LEVEL (FT):     | Dry    | DATE / TIME: 4-9 @ 1047                                  |  |  |  |  |  |  |  |
| Well Developer Signature:                                                                                                                                                                               |                                                                             |           |                                   |                   |        |                                                          |  |  |  |  |  |  |  |



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| Monitoring Well Development Form $MW-3$                                  |              |                   |                                  |                                                          |                                                                                |                                                            |  |  |
|--------------------------------------------------------------------------|--------------|-------------------|----------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------|--|--|
| Project No. : 90369-002 Site and Location ID: GSU#1 MW-3 Date: 4-9-15    |              |                   |                                  |                                                          |                                                                                |                                                            |  |  |
| Date Installed : OCT Personnel Conducting Development : CDI, Bob Staloch |              |                   |                                  |                                                          |                                                                                |                                                            |  |  |
| Development Method(s) Used : WCI Pump                                    |              |                   |                                  |                                                          |                                                                                |                                                            |  |  |
| <sup>1</sup> Total We                                                    | II Depth (F  |                   | <sup>2</sup> Initial             | Water Level (FT)                                         | -                                                                              | <sup>3</sup> Length of Static<br>Water Column (FT) : / 4·2 |  |  |
| Well Diam                                                                | neter (IN) : | <sup>4</sup> Conv |                                  | (see below) : C<br>'= .65 6''=1.5 8                      | ircle One                                                                      | Casing Volume CV (GAL) =                                   |  |  |
| Casing Vo                                                                | olume CV (   |                   | $-2 = 3; 3 \times 4$             |                                                          |                                                                                |                                                            |  |  |
| DATE TIME WL (FT) REI                                                    |              |                   | TOTAL<br>VOL<br>REMOVED<br>(GAL) | TURBIDITY<br>(NTU) / SED.<br>MEASURE<br>(ImHoff<br>Cone) | <b>COMMENTS</b><br>(recharge rate, water color, suspended<br>sediments, other) |                                                            |  |  |
| 4-9                                                                      | 1103         |                   | 9                                |                                                          | pumped clean form the stor                                                     |                                                            |  |  |
|                                                                          | 1) (0        |                   | 4,5                              |                                                          | Dry AFter 4/2 Gallars                                                          |                                                            |  |  |
|                                                                          | 1140         |                   |                                  |                                                          | Restry                                                                         |                                                            |  |  |
|                                                                          | 1146         |                   | 5.0                              |                                                          | pumped                                                                         | ZGEL and hole went Dry                                     |  |  |
|                                                                          |              |                   |                                  |                                                          |                                                                                |                                                            |  |  |
|                                                                          |              |                   |                                  |                                                          | F.                                                                             |                                                            |  |  |
|                                                                          |              |                   |                                  |                                                          |                                                                                |                                                            |  |  |
|                                                                          |              |                   |                                  |                                                          |                                                                                |                                                            |  |  |
|                                                                          |              |                   |                                  |                                                          |                                                                                |                                                            |  |  |

FINAL WELL MEASUREMENTS

| TOTAL DEPTH (FT): 19,4    | WATER LEVEL (FT): DFY | DATE / TIME: 4-9-15@1141 |
|---------------------------|-----------------------|--------------------------|
| Well Developer Signature: | Reviewed by: Do the   | tillo.                   |



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|                                                                                                                                                        |              |         | Monitori                         | ng Well Develop                                          | ment Form                                                         | MW-4                     |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------|----------------------------------|----------------------------------------------------------|-------------------------------------------------------------------|--------------------------|--|--|--|
| Project No.: 90369-002 Site and Location ID: Pacifi Corp MW4 Date: 4-7-15                                                                              |              |         |                                  |                                                          |                                                                   |                          |  |  |  |
| Date Installed: 4.7.15 Personnel Conducting Development: Cascade; Bob Staloch, Devek Aamo                                                              |              |         |                                  |                                                          |                                                                   |                          |  |  |  |
| Development Method(s) Used : Surge block                                                                                                               |              |         |                                  |                                                          |                                                                   |                          |  |  |  |
| <sup>1</sup> Total Well Depth (FT) (TOC):<br>NA <sup>2</sup> Initial Water Level (FT):<br>NA <sup>3</sup> Length of Static<br>Water Column (FT) : $NA$ |              |         |                                  |                                                          |                                                                   |                          |  |  |  |
| Well Diam<br>2                                                                                                                                         | neter (IN) : |         |                                  | (see below): C<br>"= .65 6"=1.5 8                        |                                                                   | Casing Volume CV (GAL) = |  |  |  |
| Casing Vo                                                                                                                                              | olume CV (   |         | -2=3; 3 x 4                      |                                                          |                                                                   |                          |  |  |  |
| DATE                                                                                                                                                   | TIME         | WL (FT) | TOTAL<br>VOL<br>REMOVED<br>(GAL) | TURBIDITY<br>(NTU) / SED.<br>MEASURE<br>(ImHoff<br>Cone) | D. COMMENTS                                                       |                          |  |  |  |
| 4.7.15                                                                                                                                                 | ~1615        | ~5'     | NA                               | >                                                        | Surge ONLY, very Muddy water<br>entire screen length (25-5)~20 mi |                          |  |  |  |
|                                                                                                                                                        |              |         |                                  |                                                          | entive screen length (25-5)~20 mi<br>* Will continue development  |                          |  |  |  |
|                                                                                                                                                        |              |         |                                  |                                                          | 0~                                                                | 4/9-See Pg 2             |  |  |  |
|                                                                                                                                                        |              |         | - 5                              |                                                          |                                                                   |                          |  |  |  |
|                                                                                                                                                        |              |         |                                  |                                                          | a<br>a                                                            |                          |  |  |  |
|                                                                                                                                                        |              |         |                                  |                                                          |                                                                   |                          |  |  |  |
|                                                                                                                                                        |              |         |                                  |                                                          |                                                                   |                          |  |  |  |
|                                                                                                                                                        |              |         |                                  | E                                                        |                                                                   |                          |  |  |  |
|                                                                                                                                                        |              |         |                                  |                                                          |                                                                   |                          |  |  |  |

#### FINAL WELL MEASUREMENTS

| TOTAL DEPTH (FT):         | WATER LEVEL (FT): | DATE / TIME: |
|---------------------------|-------------------|--------------|
| Well Developer Signature: | pl tetallo        | <u>.</u>     |



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|                       |                                                    |            | Monitori                         | ng Well Develop                                          | ment Form                 | MW-4                                                                         |  |  |  |  |
|-----------------------|----------------------------------------------------|------------|----------------------------------|----------------------------------------------------------|---------------------------|------------------------------------------------------------------------------|--|--|--|--|
| Project No            | 0.:09031                                           | A-00       | 2 Site ar                        | Site and Location ID: Pacifi Cor P//2SU 3 Date: 4-9-15   |                           |                                                                              |  |  |  |  |
|                       |                                                    |            |                                  | ersonnel Conducting Development : CPI, Bob Staloch       |                           |                                                                              |  |  |  |  |
|                       | Development Method(s) Used: Pump with Surge Action |            |                                  |                                                          |                           |                                                                              |  |  |  |  |
| <sup>1</sup> Total We | Total Well Depth (FT) (TOC):                       |            |                                  | Water Level (FT)                                         |                           | <sup>3</sup> Length of Static<br>Water Column (FT) : 16.2                    |  |  |  |  |
| Well Dian             | Well Diameter (IN) :                               |            |                                  | (see below) : Circle One<br>'= .65 6''=1.5 8''=2.6]      |                           | Casing Volume CV (GAL) = $\frac{2.59^{\text{PM}}}{3.14}$                     |  |  |  |  |
| Casing Vo             | olume CV (C                                        | GAL) = ( 1 | -2=3; 3 x 4                      | =1 CV): <u>2</u> 5                                       | .4-5.8                    | = 19.6×0.16= 3.14                                                            |  |  |  |  |
| DATE                  | TIME WL (F                                         |            | TOTAL<br>VOL<br>REMOVED<br>(GAL) | TURBIDITY<br>(NTU) / SED.<br>MEASURE<br>(ImHoff<br>Cone) |                           |                                                                              |  |  |  |  |
| 4.9                   | 1204                                               |            |                                  |                                                          | Thick Mud. Fire bra stad  |                                                                              |  |  |  |  |
|                       | 1217                                               |            | 10                               |                                                          | Thick Mud. Fine bran Stad |                                                                              |  |  |  |  |
|                       | 1240                                               |            | 30                               |                                                          | clear                     |                                                                              |  |  |  |  |
| 4.7-4.8.15            | ~1600                                              | ~4-5       | NA                               | >9999                                                    | extrem                    | ely muddy, thick water                                                       |  |  |  |  |
|                       |                                                    |            |                                  |                                                          | used g                    | ely muddy, thick water<br>surge tool aver entire le<br>ren section - Via han |  |  |  |  |
|                       |                                                    |            | 2                                |                                                          | to PVI                    | -hand w/ surged for r.30n                                                    |  |  |  |  |
|                       | -                                                  |            |                                  |                                                          | ater                      | y easy, steady rate DCn                                                      |  |  |  |  |
|                       |                                                    |            |                                  |                                                          |                           |                                                                              |  |  |  |  |
|                       |                                                    |            | FI                               | NAL WELL MEA                                             | SUREMEN                   | TS                                                                           |  |  |  |  |
| TOTAL D               | EPTH (FT):                                         | 25,        | U WATE                           | R LEVEL (FT):                                            | 10                        | DATE / TIME: 4-9 - 1245                                                      |  |  |  |  |
| W                     | ell Develope                                       | er Signatu | ire: Revie                       | w By: K                                                  | Dej                       | Aulos .                                                                      |  |  |  |  |



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| Monitoring Well Development Form $\dot{M}\omega$ -S                      |                        |             |                                  |                                                          |                   |                                                                                                         |  |  |  |
|--------------------------------------------------------------------------|------------------------|-------------|----------------------------------|----------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------|--|--|--|
| Project No. : 90369 - 002 Site and Location ID: GSU#3 MW-5 Date: 4-9-15  |                        |             |                                  |                                                          |                   |                                                                                                         |  |  |  |
| Date Installed : 4-8 Personnel Conducting Development : CDI, Bob Staloch |                        |             |                                  |                                                          |                   |                                                                                                         |  |  |  |
| Development Method(s) Used:<br>Well Painf w!th Scroge Action             |                        |             |                                  |                                                          |                   |                                                                                                         |  |  |  |
| <sup>1</sup> Total We                                                    | ell Depth (F<br>2 3, S | -           |                                  | Water Level (FT)                                         |                   | <sup>3</sup> Length of Static<br>Water Column (FT) : /8.9⊖                                              |  |  |  |
| Well Diameter (IN) : <sup>4</sup> Conversion                             |                        |             |                                  | r (see below): C<br>"= .65 6"=1.5 8                      |                   | Casing Volume CV (GAL) =                                                                                |  |  |  |
| Casing V                                                                 | olume CV (             | (GAL) = ( 1 | -2=3; 3 x 4                      | 4 = 1 CV):                                               |                   |                                                                                                         |  |  |  |
| DATE                                                                     | TIME                   | WL (FT)     | TOTAL<br>VOL<br>REMOVED<br>(GAL) | TURBIDITY<br>(NTU) / SED.<br>MEASURE<br>(ImHoff<br>Cone) | (recha            | <b>COMMENTS</b><br>arge rate, water color, suspended<br>sediments, other)                               |  |  |  |
| 4.9                                                                      | 100                    |             |                                  |                                                          | Thick             | Mud Fine Brn Sand                                                                                       |  |  |  |
|                                                                          | 117                    |             | ~20                              |                                                          | Zas               | Divty                                                                                                   |  |  |  |
|                                                                          | 152                    |             | 45                               |                                                          | End               | Pumped elear                                                                                            |  |  |  |
|                                                                          |                        |             |                                  | а.<br>-                                                  |                   |                                                                                                         |  |  |  |
| .~~                                                                      |                        |             |                                  |                                                          |                   |                                                                                                         |  |  |  |
| 4-8-15                                                                   | ~1630                  | 3-4'        | ЛА                               | 79999                                                    | Water<br>tool to  | very thick + turbid, Used sur<br>flush formation water<br>t of fitter pack. Surged for<br>30 mins - DCM |  |  |  |
|                                                                          |                        |             |                                  |                                                          | in a our<br>about | t of fitter pack. Surged for<br>30 mins - DCM                                                           |  |  |  |
|                                                                          |                        |             |                                  |                                                          |                   |                                                                                                         |  |  |  |
|                                                                          |                        |             |                                  |                                                          |                   |                                                                                                         |  |  |  |
| L                                                                        | 2                      |             | F                                | INAL WELL MEA                                            | SUREMEN           | rs                                                                                                      |  |  |  |
| TOTAL D                                                                  | EPTH (FT)              | :25.5       | WATE                             | R LEVEL (FT):                                            | 7.6               | DATE / TIME: 4/9@ 154                                                                                   |  |  |  |



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| Monitoring Well Development Form                                                                    |                                                                                                                                                                                                  |     |                      |                                     |                                                                               |                                         |  |  |  |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----------------------|-------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------|--|--|--|
| Project No.: 90369-002 Site and Location ID: GSU#3/MW-6 Date: 9 April 15                            |                                                                                                                                                                                                  |     |                      |                                     |                                                                               |                                         |  |  |  |
| Date Installed : 48.15 Personnel Conducting Development : CDI, Bob Staloch                          |                                                                                                                                                                                                  |     |                      |                                     |                                                                               |                                         |  |  |  |
| Development Method(s) Used:<br>Well plimp with Songe Action                                         |                                                                                                                                                                                                  |     |                      |                                     |                                                                               |                                         |  |  |  |
| <sup>1</sup> Total Well Depth (FT) (TOC):<br>25 <sup>1</sup> Si |                                                                                                                                                                                                  |     |                      |                                     |                                                                               |                                         |  |  |  |
|                                                                                                     | neter (IN) :                                                                                                                                                                                     | L.  |                      | (see below) : C<br>'= .65 6''=1.5 8 |                                                                               | Casing Volume CV (GAL) =                |  |  |  |
| Casing Vo                                                                                           | olume CV                                                                                                                                                                                         |     | $-2 = 3; 3 \times 4$ |                                     |                                                                               |                                         |  |  |  |
| DATE                                                                                                | DATE     TIME     WL (FT)     TOTAL<br>VOL<br>REMOVED<br>(GAL)     TURBIDITY<br>(NTU) / SED.<br>MEASURE<br>(ImHoff<br>Cone)     COMMENTS<br>(recharge rate, water color, su<br>sediments, other) |     |                      |                                     | arge rate, water color, suspended                                             |                                         |  |  |  |
| 4/9                                                                                                 | 9:13                                                                                                                                                                                             |     | 5                    | *                                   | Fine sitty stud<br>Divity Drep Brn Chocolate Milk<br>Kas cleon as when stored |                                         |  |  |  |
|                                                                                                     | 936                                                                                                                                                                                              |     | 25                   |                                     | 1                                                                             | clean as when storked<br>z better       |  |  |  |
|                                                                                                     | 1000                                                                                                                                                                                             | E E | 45                   |                                     |                                                                               | Fint almost clear                       |  |  |  |
|                                                                                                     |                                                                                                                                                                                                  |     |                      | 54                                  | Drigan                                                                        | Ge) pepth tog 23                        |  |  |  |
|                                                                                                     |                                                                                                                                                                                                  |     |                      |                                     |                                                                               | tag 25                                  |  |  |  |
|                                                                                                     |                                                                                                                                                                                                  |     |                      |                                     |                                                                               |                                         |  |  |  |
|                                                                                                     |                                                                                                                                                                                                  |     |                      | ×<br>*                              |                                                                               |                                         |  |  |  |
|                                                                                                     |                                                                                                                                                                                                  |     |                      |                                     |                                                                               |                                         |  |  |  |
| [                                                                                                   |                                                                                                                                                                                                  |     | FI                   | NAL WELL MEA                        | SUREMEN                                                                       | TS //////////////////////////////////// |  |  |  |

TOTAL DEPTH (FT): 25

WATER LEVEL (FT): 14

R

Hallo

.

Well Developer Signature: Keview

## APPENDIX E

## FIELD LOGBOOK ENTRIES

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18 PacifiCorp - 2015 GW Invest 4.6.15 PacifiConp - 2015 GW Invest 19 - Load Cardno Van W/ gear, equipment and Necessary supplies to conduct ground 4.7.15 - Weather: Overcast 50-1060s, lite Rain water nonitoring well install/const. V. lite wind - forecast for rain throughout the day, clearing later and nice (hopefully) & devel. task, surveying and elec. vault sampling at the Paciti Corp Plant in for tomorrow Chehalis, WA. Also load Hars and personal gear. - Mob over to grocery Store, bought ice a water for to day's event - D. Metallo and B. Kwasnowski Leave Seattle - Eastlake shop at ~ 1345. Head down to Tukurle - ARI Labs Arrive at PC plant ~ 0800, load gear back into Van from Receiving Bay, spoke · Arrive at heb, pick up bottles, coolers, w/ Jeveny Smith - touched base on current Supplies · continue driving down to PC plant issues Drillers (Cascade Drilling, LP-Portland) - Arrive at PC plant ~ 1600 mob outo site and drop off majority of supplies / gear arrive onsite ~ 0845 - Don Staloch (driller) at Receiving Shop - store gear here for the Night - Mob off site ~ 1620 · Don Dodson ( Support). · Derek Aamodt (Support) - Head over to Home Depot to purchase remaining Conduct Hes trainings / discussions, Has supplies KO Has Mtg, drillers sat through PC - Mob over to Hotel (Olympic) in Centralia required training Interior I DCM DCM - ----Rite in the Rain

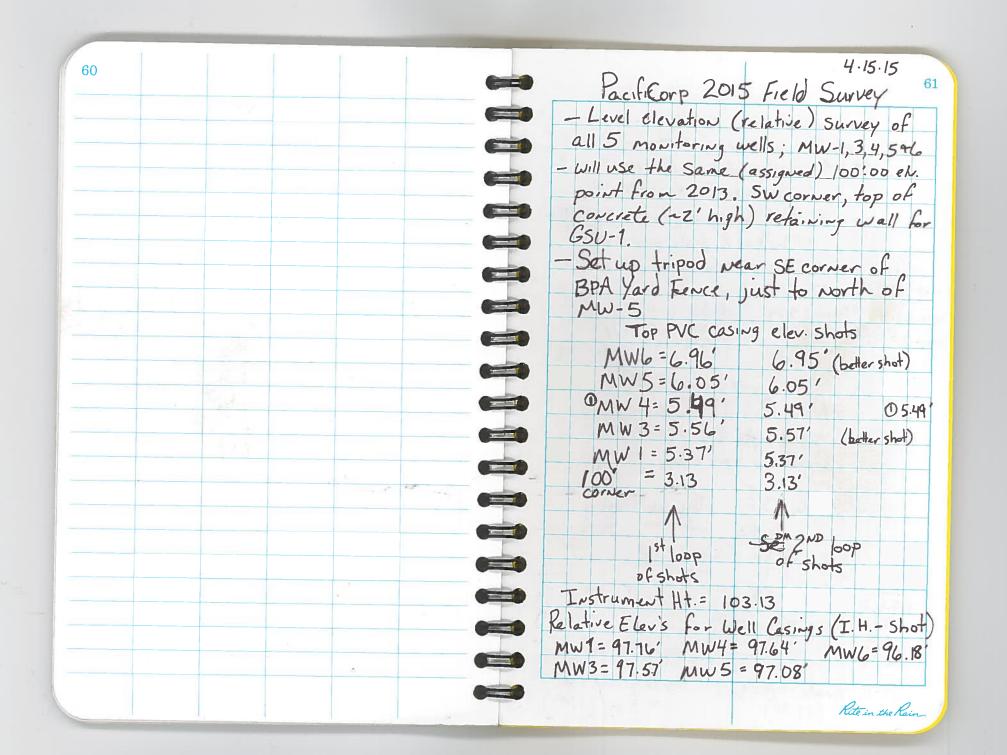
PacifiCorp 2015 4.7.15 21 20 PacifiCarp 2015 4.7.15 and the second - Collect WL through HSAs, 24.25' - Mob around to project area to South + to grade - cutter head may be sealing off West of GSU-3 water from freely entering borehole - Set up on MW-4 (1025) - Drillers back from Lunch (~1330) . 8.25" OD X 4.25" ID HSA'S 100-225 · Using 1.5' X 2" Split barrel Samplers - Begin Setting MW4: · Semple continuous D'- 6 bgs, then ( III. Bottom Seal : 31.5-26.5 bent. pellets starting at 10 bgs sample every 5' Fitter Pack (10-20 clear sand) 26.5-4' to 30'bgs (projected TD) Screen: 2" PVC 0.01" slot 25-5' - 0-1.5 FILL (GM) dry NO Sheen Bottom Cap: Flat, threaded w/ 25" sump 1.5-3 Fill (GM-SM) dry No sheen 3-4.5 ML-CL Moist NO Sheen \* Having Issues u/ setting fitter pack, borehole Seems to be taking an 4.5-6 - SM-GECL moist No sleen \* Sample SB4 - 5-040715 (1130) excessive amount of sand - Not certain 6-7.5 5M-GC moist No sheen why, ~15/16 50-16 bags 10-11.5 Sm-GC moist No sheen 15-16.5 V. moist-wet GM-GC No shew - While drillers are completing sand 20-21.5 GM-GC wet NO Sheen (ELE) pack placement Cardno conducts elec. 25-26.5 SM-GM Wet NO Sheen Vault groundwater IaI sampling of 30-31.5 SM-GM wet NO Sheen - Boring-terminated at 31.5' accumulated gon water . Lengra Westbrook directed the - Well Construction De DM efforts re: which vaults to be Sampled - Drillers break for lunch (~1245) Rite in the Rain DCM Dem

|             |                                 | MULLING AL      |          |                                                                                                                             |
|-------------|---------------------------------|-----------------|----------|-----------------------------------------------------------------------------------------------------------------------------|
| 22 Pacifil  | lorp 2015                       | 4.7.15          |          | Pacifi Corp 2015 4.7.15                                                                                                     |
|             |                                 |                 | of       |                                                                                                                             |
| 2015        | ampling: See<br>5 Work Plan     |                 |          | measured Cartante of the un the de                                                                                          |
| Vault ID    | Depth Prod.                     | Depth Gu        | J TD     | - Vault EMHM Was not opened or<br>measured. Contents of this vault dra<br>into EMHC-001.                                    |
|             | -                               |                 |          |                                                                                                                             |
| CMAC-005    | Sheen 0.01' the<br>omater 18.37 | 18.38           |          | - Vault EMHM-021 was too far North fr                                                                                       |
| EM HM - 003 | 13.61 (?)                       | 13.62           | /4.15    | <ul> <li>Vault EMHM-021 was too far North fr</li> <li>GSU#1, NO meas or Sample collected.</li> </ul>                        |
|             |                                 |                 |          |                                                                                                                             |
| EMHC-002    | NA                              | 9.43            | 12.41    | - Drill Crew performed pre-completion                                                                                       |
| DUPCI       | (E mail ( 202)                  |                 |          | - Drill Crew performed pre-completion<br>Well development fasks at MW-4 using                                               |
| DUP Sample  | (EMHC-002)                      |                 |          | entire length of screen section for ~ 30 m.                                                                                 |
| EMHM-002    | (NO Sample)                     | 9.12            | 12.16    | to aid filter pack Settlement. Water rem.                                                                                   |
|             |                                 |                 | 10.2     |                                                                                                                             |
| EMHC-001    | Sheen 0.02 thick<br>on 12.69    | 12.71           | 14.05    |                                                                                                                             |
| 1.2         | NO Measurem                     | ette er         | S. Ja    | - Demob site for the auning; close/sec<br>all IDW drums, pump out decon water h<br>decon trailer + containerize into a drum |
|             | NO PERSUICIN                    |                 | Sample   | all IDw drums, pump out decon water h                                                                                       |
| EMHM -021 - | Too far North, No               | meas. or        | smpl.    |                                                                                                                             |
|             |                                 |                 |          | -Tower dvill rig mast down, clean up                                                                                        |
| - Collected | Somples for,<br>Oil) analysis   | UWTPH-          | .Dx      | -Tower dvill rig mast down, clean up<br>around site                                                                         |
| EMU(-D      | 03 (1525), EM                   | AT :<br>Hm - 00 | 3 (1515) |                                                                                                                             |
|             | (1535) Duplic                   |                 |          | - Take majority of Cardro gear & offload -<br>recieving area - store there for the wight                                    |
| (1345), and | EMHC-001 (16                    | 40)             |          | Tana A                                                                                                                      |
|             |                                 |                 |          | DCM Rite in the Rain                                                                                                        |

| <ul> <li>Pacifi Corp 2015 4.8.15</li> <li>Arrive at PC Plant (0715), checked in, mob over to receiving area &amp; re-loaded</li> <li>gear into van.</li> <li>Weather: Partly cloudy, clearing w/</li> <li>expected sur for most of day, 45-60,</li> <li>It's breaze</li> <li>Drillers arrive ~ 0725</li> <li>Conduct failgete H-S Meeting;</li> <li>Conserving drilling safety, site concerns,</li> <li>improvements from yesterolays events,</li> <li>plant/elec. safety, carrying a plant radio</li> <li>Attendas: Joe, Don, Derek from CDI</li> <li>All personnel mob around to project site</li> <li>Joe, tt.</li> <li>Jeach or to review anext huo drill</li> <li>Jeach or to review anext huo drill</li> <li>Joe at new y bing cardee</li> <li>Drillers arrive anext huo drill</li> <li>Joe at new y bing cardee</li> <li>Drillers arrive to review anext huo drill</li> <li>Joe at new y bing cardee</li> <li>Drillers arrive to review anext huo drill</li> <li>Deremy Smith checked in w/ us no805</li> <li>Drillers arrive to review anext huo drill</li> <li>Drillers arrive t</li></ul>                                                    |                                               |                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------|
| <ul> <li>mob dier to receiving wreck of the providence of the prov</li></ul>                                                        | 24 Pacifi Corp 2015 4.8.15                    | Pacifi Corp 2015 4.8.15 25                  |
| <ul> <li>mob dier to receiving wreck of the providence of the prov</li></ul>                                                        | - Annue at PC Plant (0715) checked in,        | - Appears Appears that the Sawd peck at     |
| gear into Van.<br>- Weather: Partly cloudy, clearing w/<br>expected sum for prost of day, 45-60,<br>lite breeze<br>- Drillers arrive ~ 0725<br>- Conduct failgate H+S Meeting;<br>covering drilling safety, site concerns,<br>improvements from yesterdays events,<br>plant/elec. safety, carrying a plant radio<br>- All personnel mob around to project site<br>- Jeremy Smith checked in w/ws ~ 0805<br>- Jeremy Smith checked in w/ws ~ 0805<br>- walked over to review weet two drill<br>lecations w/ him & Cascade                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | miller to receiving area & re-loaded          |                                             |
| <ul> <li>Weather: Partly cloudy, clearing w/<br/>expected sum for most of day, 45-60,<br/>lite breeze</li> <li>Drillers arrive ~ 0725</li> <li>Conduct failgate Hrs Mating;<br/>covering drilling safety, site concerns,<br/>improvements from yesterdays events,<br/>plant/else. safety, carrying a plant radio<br/>of day, 45-60,</li> <li>Drillers arrive ~ 0725</li> <li>Sample containously 0-6 bgs, then<br/>starting at 10 bgs, Sample every 5' intervel<br/>down to total depth</li> <li>0-1.5' Fill moist NO mineral oil slew<br/>r Metalloa Kwasnowski, from Cardwo<br/>r Metalloa Kwasnowski, from Cardwo<br/>r Metalloa Kwasnowski, from Cardwo<br/>r Metalloa Kwasnowski, from Cardwo<br/>r Jeremy Smith checked in v/us ~ 0805</li> <li>Jeremy Smith checked in v/us ~ 0805</li> <li>Walked over to review event two drill<br/>lecations w/ him &amp; Cascade</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Agas with Van                                 |                                             |
| <ul> <li>Weather: Partly cloudy, clearing w/<br/>expected sum for most of day, 45-60,<br/>lite breaze</li> <li>Drillers arrive ~0725</li> <li>Conduct failgate H~S Meeting;</li> <li>Covering drilling safety, site concerns,<br/>improvements from yesterdays events,<br/>plant/elec. safety, carrying a plant radio</li> <li>Attendes: Joe, Don, Derek from CDI<br/>Attendes: Joe, Don, Derek from Cardino</li> <li>All personnel mob around to project site</li> <li>Jaremy Smith checked in w/ us ~0805</li> <li>Jaremy Smith checked in w/ us ~0805</li> <li>Weither and ad firm up. Move rig off to<br/>Next drilling location</li> <li>Joe at new for most of day, 45-60,<br/>weither drilling location</li> <li>Jeremy Smith checked in w/ us ~0805</li> <li>Walked over to review next two drill<br/>locations w/ him &amp; Cascade</li> <li>Joe at new wet wo sheen</li> <li>25-265 GM/SP wet wo sheen</li> <li>Desting and the project site</li> <li>Desting and the project of the day of the project in the drill of the sheet wet wo sheen</li> <li>Joe at new to review next two drill</li> <li>Desting site of review next two drill</li> <li>Desting site of review next two drill</li> <li>Desting site of the sheet wet wo sheen</li> <li>Desting the sheet wet wo sheet</li> <li>Desting the sheet wet wo sheet</li> <li>Desting the sheet wet wo sheet</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                               |                                             |
| expected sur for most of day, "45-60,<br>lite breeze<br>- Drillers arrive ~ 0725<br>- Ouduct failgete H+S Meeting;<br>covering drilling safety, site concerns,<br>improvements from yesterdays events,<br>plant/elec. safety, carrying a plant radio<br>Attendeas: 50e, Don, Derek from CDI<br>+ Metalloa Kwasnowski from Cardno<br>- All personnel mob around to project site<br>to got Setup, safety gear on, rigs warned<br>up, etc.<br>- Jaremy Smith checked in w/ws ~ 0805<br>- walked over to review next two drill<br>locations w/ him + Coscade                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | - Washer: Pully cloudy clearing w/            | 1.11 Let stand and firm up. Move rig off to |
| <ul> <li>Interbreeze</li> <li>Drillers arrive ~ 0725</li> <li>Couduct failgate H~S Meeting;</li> <li>Covering drilling safety, site concerns,</li> <li>improvements from vesterdays events,</li> <li>plant/else. safety, carrying a plant radie</li> <li>Attendeas: Joe, Dow, Darek from CDI</li> <li>Metalloa Kwasnowski from Cardno</li> <li>Attendeas: Joe, Dow, Darek from Cardno</li> <li>Attendeas: Joe, Dow, Darek from Cardno</li> <li>Attendeas: Joe, Dow, Narek from Cardno</li> <li>Attendeas: Joe, Joe, Joe, Joe, Joe, Joe, Joe, Joe,</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | - Weather laving cloudy, court of day, 45-60. | wext drilling location                      |
| <ul> <li>Drillers arrive ~ 0725</li> <li>Conduct failgete H=S Meeting;</li> <li>Covering drilling safety, site concerns,</li> <li>improvements from yesterdays events,</li> <li>plant/elec. safety, carrying a plant radie</li> <li>Attendeas: Joe, Don, Derek from CDI</li> <li>Motelloa Kwasnowski from Cardno</li> <li>Attendeas: Joe, Don, Derek from Cardno</li> <li>Attendeas: Joe, Don, Derek from Cardno</li> <li>Jogt Setup, safety gear on, rigs warned</li> <li>Jaremy Smith checked in w/us no805</li> <li>Walked over to review next two drill</li> <li>Jocations w/ him &amp; Cascade</li> <li>Jocations w/ him &amp; Cascade</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | lite branze                                   |                                             |
| <ul> <li>Drillers arrive ~ 0725</li> <li>Conduct failgate H~S Meeting;</li> <li>Covering drilling safety, site concerns,</li> <li>improvements from yesterdays events,</li> <li>plant/elec. selety, carrying a plant radio</li> <li>Attenders: Joe, Don, Derek from CDI</li> <li>Metallo &amp; Kwasnowski from Cardno</li> <li>Attenders: Joe, Don, Derek from Cardno</li> <li>Metallo &amp; Kwasnowski from Cardno</li> <li>S-3' Fill (cl) moist No sheen</li> <li>J-5-3' Fill(cl) moist No sheen</li> <li>J-5-4' CL V.moist No sheen</li> <li>Ho get Setup, safety gear on, rigs warmed</li> <li>warked over to review next two drill</li> <li>Jecations w/ him &amp; Cascade</li> <li>25-265' GM-SM wet No sheen</li> <li>25-265' GM-SM wet No sheen</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                               | - Setup ON SB6 (0830)                       |
| <ul> <li>Conduct failgate H+S Meeting;</li> <li>Covering drilling safety, site concerns,</li> <li>improvements from yesterdays events,</li> <li>plant/elec. selety, carrying a plat radie</li> <li>Attendeas: Joe, Don, Derek from CDI</li> <li>Metallo &amp; Kwasnowski from Cardno</li> <li>Attendeas: Joe, Don, Derek from CDI</li> <li>Metallo &amp; Kwasnowski from Cardno</li> <li>Jeremy Smith checked in v/us n 0805</li> <li>Jeremy Smith checked in v/us n 0805</li> <li>Walked over to review next two drill</li> <li>Jocations v/ him &amp; Cascade</li> <li>Jocations v/ him &amp; Cascade</li> <li>Jeremy Smith checked in v/us n 0805</li> <li>Marked over to review next two drill</li> <li>Jocations v/ him &amp; Cascade</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | - Delless arms ~ 0725                         |                                             |
| <ul> <li>Conduct failgete H+S Meeting;</li> <li>Covering drilling safety, site concerns,</li> <li>improvements from yesterdamps events,</li> <li>plant/elec. selety, carrying a plant radio</li> <li>Attendees: Joe, Don, Derek from CDI</li> <li>Attendees: Joe, Don, Derek from Cardwo</li> <li>Attendees: Joe, Don, Nerek from Cardwo</li> <li>Attendees: Joe, Don, Nerek from Cardwo</li> <li>Attendees: Joe, Don, Derek from Cardwo</li> <li>Attendees: Joe, Don, Nerek from Cardwo</li> <li>Attendees: Joe, Joe, Joe, Joe, Joe, Joe, Joe, Joe,</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                               |                                             |
| covering drilling safety, site concerns,<br>improvements from vesterdays events,<br>plant/elec. selety, carrying a plant radio<br>Attendeds: Joe, Don, Derek from CDI<br>a Metallo & Kwasnowski from Cardno<br>- All personnel mob around to project site<br>to get setup, safety gear on, rigs warmed<br>up, etc.<br>- Jeremy Smith checked in v/us 20805<br>- walked over to review next two drill<br>lecations v/ him & Cascade<br>- Source of the setup                                            |                                               | · Sand, continuously O-6 bas then           |
| improvements from yesterdays events,<br>plant/elec. selety, carrying a plant radio<br>Attendeds: Joe, Don, Derek from CDI<br>a Metalloa Kwasnowski from Cardno<br>Attendeds: Joe, Don, Derek from CDI<br>a Metalloa Kwasnowski from Cardno<br>- All personnel mob around to project site<br>to get Setup, safety gear on, rigs warned<br>wp, etc.<br>- Jaremy Smith checked in u/us n0805<br>- walked over to review next two drill<br>locations u/ him & Cascade<br>- 20-21.5' GM/SP wet no sheen<br>- 25-265' GM-SM wet No sheen<br>- 25-265' GM-SM wet No sheen<br>- 25-265' GM-SM wet No sheen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | anning delling solate site concerns.          |                                             |
| <ul> <li>plant/elec. salety, carrying a plant radio</li> <li>Attendeas: Joe, Don, Derek from CDI</li> <li>Motalloa Kwasnowski from Cardno</li> <li>- All personnel mob around to project site</li> <li>- All personnel mob around to project site</li> <li>- All personnel mob around to project site</li> <li>- Get Setup, salety gear on, rigs warned</li> <li>- Jeremy Smith checked in u/us n 0805</li> <li>- Walked over to review next two drill</li> <li>- Jeatiens u/ him &amp; Cascade</li> <li>- 20-21.5' GM/SP wet No Sheen</li> <li>- 25-265' GM-SM wet No Sheen</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Covering withing savery side currents.        |                                             |
| <ul> <li>Attendees: Joe, Don, Derek from Clill</li> <li>Metalloa Kwasnowski from Cardno</li> <li>I.5-3' FIII (CL) moist No sheen</li> <li>I.5-3' FIII(CL) moist No sheen</li> <li>3-4.5' CL V.moist No sheen</li> <li>4.5-6 CL V.moist No sheen</li> <li>4.5-7 Sm-GM Wet No sheen</li> <li>4.5-16.5' Sm-GM Wet No sheen</li> <li>4.5-26.5' GM-SM Wet No sheen</li> <li>4.5-26.5' GM-SM Wet No sheen</li> </ul>                                                                                                                                                                                                                                                                                                                          | instalate caloty carrying a plast radio       |                                             |
| <ul> <li>All personnel mob around to project site</li> <li>All personnel mob around to project site</li> <li>4.5-6 CL v.moist No sheen</li> <li>5.5-7 SB6 - 4 - 040815 (0900)</li> <li>10-11.5' SM-GM Wet No sheen</li> <li>15-16.5' SM-GM wet/v.moist No sheen</li> <li>15-16.5' SM-GM wet/v.moist No sheen</li> <li>20-21.5' GM/SP wet No sheen</li> <li>25-26.5' GM-SM wet No sheen</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                               | · 0-1.5' Fill moist NO mineraloil sheen     |
| <ul> <li>All personnel mob around to project site</li> <li>to get Setup, safety gear on, rigs warmed</li> <li>up, etc.</li> <li>Jeremy Smith checked in u/us n0805</li> <li>Walked over to review next two drill</li> <li>locations u/ him &amp; Cascade</li> <li>3-9.5 CL U. Moist No Sheen</li> <li>4.5-6 CL U. moist No Sheen</li> <li>4.5-6 CL U. moist No Sheen</li> <li>10-11.5' SM-GM Wet No Sheen</li> <li>15-16.5' SM-GM Wet No Sheen</li> <li>20-21.5' GM/SP wet No Sheen</li> <li>25-26.5' GM-SM Wet No Sheen</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | a Motallog Kwasnowski From Cardno             |                                             |
| <ul> <li>All personnel mob around to project site.</li> <li>to get Setup, sately gear on, rigs warmed</li> <li>up, etc.</li> <li>Jeremy Smith checked in u/us n0805</li> <li>Walked over to review next two drill</li> <li>Jocations u/ him &amp; Cascade</li> <li>4.5-6 CL v.moist No sheen</li> <li>4.5-6 CL v.moist No sheen</li> <li>SBb - 4 - 040815 (0900)</li> <li>10-11.5' SM-GM Wet No sheen</li> <li>15-16.5' SM-GM Wet No sheen</li> <li>20-21.5' GM/SP wet No sheen</li> <li>25-26.5' GM-SM wet No sheen</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                               |                                             |
| - Jeremy Smith checked in v/us ~0805<br>- walked over to review next two drill<br>locations v/ him & Cascade                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | - All paravuel mob around to project site     |                                             |
| - Jeremy Smith checked in v/us ~0805<br>- walked over to review next two drill<br>locations v/ him & Cascade                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | to at Sotup Satety gear on, rigs warmed       | * Sande com 2 25+5'                         |
| - Jeremy Smith checked in v/us ~0805<br>- walked over to review next two drill<br>locations v/ him & Cascade                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | in the                                        | SB6 - 4 - 040815 (0900)                     |
| - Jeremy Smith checked in v/us ~0805<br>- walked over to review next two drill<br>locations v/ him & Cascade . 15-16.5' SM-GM wet/v.moist No sheen<br>20-21.5' GM/SP wet No sheen<br>25-26.5' GM-SM wet No sheen<br>26-21.5' |                                               |                                             |
| - walked over to review next two drill<br>locations w/ him & Cascade<br>.25-26.5' GM-SM wet No sheep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | - Jeremy Smith checked in w/ us ~ 0805        |                                             |
| locations u/ him & Cascada . 25-26.5 GM-SM wet No sheep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | i alked a contra Kauland have to so drill     | · 20-21.5' GM/SP wet NO Sheen               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | locations w/ him & Cascade                    | · 25-26.5' GM-SM wet No sheen               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                               | DCM Rite in the Rain.                       |
| Deve                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Dem                                           | - Coil nuembertain                          |

| 26 PacifiCorp 2015 4.8.15                                                                  | Pacifi Corp 2015 4.8.15 27                                |
|--------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| - Boring 386 Terminated 26.5 @ (1020)                                                      | 0-1.5' FILL(CL) 51. moist No sheen<br>1.5-3' No Rec./FILL |
| - MW-6 Well Construction Info:                                                             | 3-4.5 CL moist No sheen                                   |
| • TD borchole = 26.5'                                                                      | 4.5-6 CL moist no sheen                                   |
| · Screen: Z sch 40 0.01 Slotted 25-3                                                       | + Jample Collected 5-6 585-5-040815                       |
| • Fitter Pack: 10-20 clean sand 26.5-4                                                     | (1345)<br>10-11.5 GM-GC V. moist No sheen                 |
| <ul> <li>Well Sump: ~ 25.5 - 25'</li> <li>Bentonite Seal : 4-3' chips, hydrated</li> </ul> | 15-16.5' SM-GM wet No sheen                               |
| · Surface Completion : Concrete 3-0'                                                       | + IGW encountered b/w 11.5 +15 bas                        |
| w/ 8" flush monument w/ 12" skirt                                                          | 20-21.5' GM wet No sheen                                  |
| * well monument work will be completed                                                     | 20-21.5' GM wet No Sheen<br>25-26.5' GM wet No Sheen      |
| later today or tomorrow                                                                    | to Sa porine las for more detail                          |
| = Demob drill rig from MW-6 and set upon                                                   |                                                           |
| MW-5                                                                                       |                                                           |
|                                                                                            | - MW5 Well Construction Details<br>TD=26.5'               |
| - Set up on MW-5<br>. Using 8.25" OD x 4.25" ID HSAS                                       |                                                           |
| · Using 8.25" OD X 4.25" ID HOAS<br>· 1.5' X 2" Split barrel Samplers, using SPT           |                                                           |
| · 1.5 x 2" Split barrel Somplers, using SPT<br>Methods - blow counts recied on bore logs   | Bentonite Seal = 4-3' chips                               |
| · Sample soil continuously 0-6 bgs, then                                                   | Corcrete Seal = 3-0' Redi-mix                             |
| Starting at 10' sample every 5' (including                                                 | Surface Completion = 8" Morrison Hush                     |
| the 10' interval) thereafter until total/end                                               | Vault w/ 12" skirt                                        |
| depth is reached                                                                           | - lock able expansion plug                                |
| Dem                                                                                        | Dem Rite in the Rain.                                     |

Pacifilorp 2015 4.8.15 PacifiCorp 2015 4.8.15 28 29 \* Fitter pack placement at MW-5 is providing customary Co.C. procedures. Cardno of Will deliver the project samples to ARI difficulties similar to MW-4, using hand Surge methods to aid Settlement of the fitter tomorrow pack - water still v. turbid - Sign CDIdaily logs, give driller E LEE - will let this the completion of this well final instructions for tomorrows tasks be suspended until formorrow to allow the - Mob over to Plant office, turn it in fitter pack material to Stabilize & Settle assigned plant radio, leave GW sampl. -- Close up lids / bands on all drums, all supplies in Jevery Brith's office, source drums patte placed on pallets, near each geor in Cardno van and get ready for transport back to Seattle well - Clean up around site, pick up all debris (if any), took, gear, etc. - Leave Site ~ 1700 Real Property lies DCM -- Check in w/ Lewora Westbrook, brief her an current status · CDI will come back tomorrow, 4.9 to complete well construction and develop. ment/re-development tasks - All enviro-samples have been maintained or ice, in a single cooler, managed under Dcm Rite in the Rain



## APPENDIX F

## LABORTORY CHAIN OF CUSTODY FORMS

## AND

## ANALYTICAL REPORT

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## **Chain of Custody Record & Laboratory Analysis Request**

| ARI Assigned Number:           | Turn-around                    | Requested:      | Stando | erd                        | Page: 1                                  | of | 1              |                             | Analytica                                      | al Resources, Incorporated<br>al Chemists and Consultan<br>uth 134th Place, Suite 100 |  |
|--------------------------------|--------------------------------|-----------------|--------|----------------------------|------------------------------------------|----|----------------|-----------------------------|------------------------------------------------|---------------------------------------------------------------------------------------|--|
| ARI Client Company: KTA, IA    | IC.                            | Phone:<br>360 - |        |                            | 4.8.15 lee Present? Yes                  |    |                |                             | Tukwila, WA 98168<br>206-695-6200 206-695-6201 |                                                                                       |  |
| Levora L                       | west br                        | ook             |        |                            | No. of 1 Cooler<br>Coolers: 1 Temps: 4.4 |    |                |                             |                                                | labs.com                                                                              |  |
| Client Project Name: Pacifi Co | rp-Ch                          | ehalis          | ÷      |                            | ×                                        | 1  | Analysis Reque | sted                        |                                                | Notes/Comments                                                                        |  |
| Client Project #:              | Campalara                      | tallo, B        | .Kwas. | Jowski                     | CI OII                                   |    |                |                             |                                                |                                                                                       |  |
| Sample ID                      | Date                           | Time            | Matrix | No. Containers             | Mwerel<br>NW-TPH                         |    |                |                             |                                                | _                                                                                     |  |
| SB4-5-040715                   | 4.7.15                         | 1130            | S      | 1                          | X                                        |    |                |                             |                                                |                                                                                       |  |
| SBDUP-01-040715                | 4.7.15                         | 1200            | S      | 1                          | X                                        |    |                |                             |                                                |                                                                                       |  |
| 586-4-040815                   | 4.8.15                         | 0900            | S      | 1                          | X                                        |    |                | 1. Al 1.                    |                                                |                                                                                       |  |
| 585-5-040815                   | 4.8.15                         | 1345            | S      | 1 1                        | X                                        |    |                |                             |                                                |                                                                                       |  |
| EMHC003-VAULT                  | 4.7.15                         | 1525            | W      | 2                          | X                                        |    |                |                             |                                                |                                                                                       |  |
| EMHM 003-VAULT                 | 4.7.15                         | 1515            | W      | 2                          | X                                        |    |                |                             |                                                |                                                                                       |  |
| EMHCOO2-VAULT                  | 4.7.15                         | 1535            | W      | 2                          | X                                        |    |                |                             |                                                |                                                                                       |  |
| EMHCOD - VAULT                 | 4.7.15                         | 1640            | W      | 2                          | X                                        |    |                |                             |                                                |                                                                                       |  |
| DUP-VAULT                      | 4.7.15                         | 1345            | W      | 2                          | Х                                        |    |                |                             |                                                |                                                                                       |  |
| Comments/Special Instructions  | Relinquished by<br>(Signature) | 10-7            | tallo  | Received by<br>(Signature) | Relinquished by<br>(Signature)           |    |                | Received by:<br>(Signature) |                                                |                                                                                       |  |
|                                | Printed Name<br>Dave           | Meta            | 10     | Printed Name               | algardse                                 | 0  | Printed Name   |                             | Printed Name                                   |                                                                                       |  |
|                                | Company,                       | ardNo           |        | Company.                   |                                          |    | Company:       |                             | Company                                        |                                                                                       |  |
|                                | Date & Town                    | 5 (12.5         | 1)     | Date & Time:<br>4/9/15     |                                          | 7  | Date & Time.   |                             | Date & Time:                                   |                                                                                       |  |

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



15 April 2015

Lenora Westbrook KTA Associates, Inc. 3530 32<sup>nd</sup> Way NW Olympia, WA 98502-3230

### RE: Client Project: PacifiCorp-Chehalis

Dear Lenora:

Please find enclosed the original chain of custody record and the final results for the samples from the project referenced above. Four soil samples and five water samples were received on April 9, 2015. The samples were analyzed foe NWTPH-Dx as requested.

There were no problems associated with these analyses.

A copy of these reports will remain on file at ARI. Should you have any questions or need additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

70. C. Daus

Mark D. Harris Project Manager 206/695-6210 markh@arilabs.com

Enclosures

cc: Dave Metallo, Cardno-GS File AE90

MDH/mdh

Page 1 of \_\_\_\_\_7.5

| Request        |  |
|----------------|--|
| Analysis       |  |
| k Laboratory A |  |
| 00             |  |
| Record         |  |
| ⋧              |  |
| Custo          |  |
| đ              |  |
| Chain (        |  |

| ARI Assigned Number:                                                                                         | Turn-around                    | Turn-around Requested: Standard | Standa.      | ثط                          | Page:                        | of 7                           |         | Analytical Resources, Incorporated<br>Analytical Chemists and Consultants |
|--------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|--------------|-----------------------------|------------------------------|--------------------------------|---------|---------------------------------------------------------------------------|
| ARI Client Company: KTA T.NC.                                                                                | ,<br>C                         | Phone:<br>3(a0 -                | -250-7694    | - 94                        | 4.8.15                       | Present? Xes                   |         | Tukwila, WA 98168<br>206-695-6200 206-695-6201 (fax)                      |
| Client Contact: Lewora Westbrook                                                                             | Jestbr                         |                                 |              |                             | No. of<br>Coolers:           | Cooler<br>Temps: 4,4           |         | www.arilabs.com                                                           |
| Client Project Name: D P Client Project Name: D P Client Project Name: D P P P P P P P P P P P P P P P P P P |                                | 21220                           |              |                             |                              | Analysis Requested             | quested | Notes/Comments                                                            |
| Client Project #:                                                                                            | Samplers:<br>DC Metallo,       | tallo, B                        | B.Kwasnouski | مالالم                      | H-D×<br>101                  |                                |         |                                                                           |
| Sample ID                                                                                                    | Date                           |                                 | Matrix       | No. Containers              | мічеле<br>9Т-WN              |                                |         |                                                                           |
| SB4-5-040715                                                                                                 | 4.1.15                         | i130                            | S            |                             | ×                            |                                |         |                                                                           |
| 5800P-01-040715 4.7.15                                                                                       | 4.7.15                         | 1200                            | S            |                             | ×                            |                                |         |                                                                           |
| 5B6-4-040815                                                                                                 | 4.8.15                         | 0060                            | S            |                             | X                            |                                |         |                                                                           |
| 5B5-5-040815                                                                                                 | 4.8.15                         | 1345                            | S            |                             | X                            |                                |         |                                                                           |
| EMHC 003-VAULT                                                                                               | 4.7.15                         | 1525                            | Ŵ            | 2                           | X                            |                                |         |                                                                           |
| EMHM 003-VAULT                                                                                               | 4.7.15                         | 1515                            | M            | 2                           | ×                            |                                |         |                                                                           |
| EMHCDO2-VAULT                                                                                                | 4.7.15                         | 1535                            | Μ            | 2                           | X                            |                                |         |                                                                           |
| EMHCODI-VAULT                                                                                                | 4.7.15                         | 1640                            | Μ            | 2                           | X                            |                                |         |                                                                           |
| DUP-VAULT                                                                                                    | 4.7.15                         | 1345                            | Ň            | 2                           | ×                            |                                |         |                                                                           |
|                                                                                                              |                                |                                 |              |                             |                              |                                |         |                                                                           |
| Comments/Special Instructions                                                                                | Relinquished by<br>(Signature) | 1 Ju                            | Retallo      | Received by:<br>(Signature) | $\left\langle \right\rangle$ | Relinquished by<br>(Signature) |         | Received by:<br>(Signature)                                               |
|                                                                                                              | Printed Name                   | Dave Metallo                    | 011.         |                             | N CU VU CI V                 | Printed Name                   |         | Printed Name                                                              |
|                                                                                                              | Company.                       | ardno                           |              | Company.                    |                              | Company:                       |         | Company                                                                   |
| Q<br>4.9.15 (1257) 4/0                                                                                       | Date & Time:                   | 5 (125                          |              | Date & Time                 | tsel -                       | Date & Time.                   |         | Date & Time:                                                              |

signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



# **Cooler Receipt Form**

| ARI Client: KTA, INC. Project Name: PCICITICOYP-Chefe                                                  | $\Delta I I S$ |
|--------------------------------------------------------------------------------------------------------|----------------|
| COC No(s): (NA ; Delivered by: Fed-Ex UPS Courier (Hand Delivered Other                                |                |
| Assigned ARI Job No: NE 9.0 Tracking No:                                                               | (NA)           |
| Preliminary Examination Phase:                                                                         |                |
| Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES         | (NO :          |
| Were custody papers included with the cooler?                                                          | NO             |
| Were custody papers properly filled out (ink, signed, etc.)                                            | NO             |
| Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)         Time:       1.4           |                |
| If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 4005                     | 77952          |
| Cooler Accepted by:                                                                                    |                |
| Complete custody forms and attach all shipping documents                                               |                |
| Log-In Phase:                                                                                          |                |
| Was a temperature blank included in the cooler?                                                        |                |
| Was a temperature blank included in the cooler?                                                        | (NO)           |
|                                                                                                        |                |
|                                                                                                        | NO<br>Ra       |
|                                                                                                        | ØØ.            |
| Did all bottles arrive in good condition (unbroken)?                                                   | NO             |
| Were all bottle labels complete and legible?                                                           | NO             |
| Did the number of containers listed on COC match with the number of containers received?               | NO             |
| Did all bottle labels and tags agree with custody papers?                                              | NO             |
| Were all bottles used correct for the requested analyses?                                              | NO             |
| Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) YES | NO             |
| Were all VOC vials free of air bubbles? YES                                                            | NO             |
| Was sufficient amount of sample sent in each bottle?                                                   | NO             |
| Date VOC Trip Blank was made at ARI                                                                    |                |
| Was Sample Split by ARI : NA YES Date/Time: Equipment: Split by                                        |                |
| Samples Logged by: Date: Date: Time:730                                                                |                |

\*\* Notify Project Manager of discrepancies or concerns \*\*

| Sample ID on B       | ottle          | Sample ID on COC | Sample ID on Bottle                           | Sample ID on COC |
|----------------------|----------------|------------------|-----------------------------------------------|------------------|
|                      |                | **               |                                               |                  |
|                      |                |                  |                                               |                  |
|                      |                |                  |                                               |                  |
|                      |                |                  |                                               |                  |
| Additional Notes, Di | screpancies, & | Resolutions:     |                                               |                  |
|                      |                |                  |                                               |                  |
|                      |                |                  |                                               |                  |
|                      |                |                  |                                               |                  |
| By:                  | Date:          |                  | · · · · · · · · · · · · · · · · · · ·         |                  |
| Small Air Bubbles    | Peabubbles'    | LARGE Ar Bubbles | Small → "sm" (<2 mm)                          |                  |
| ~ 2mm                | 2-4 mm         | >4 mm            | Peabubbles $\rightarrow$ "pb" ( 2 to < 4 mm ) |                  |
| • • •                | • • • •        | 6 6 6            | Large → "lg" ( 4 to < 6 mm )                  |                  |
| ۲JL                  |                |                  | Headspace → "hs" (>6 mm)                      |                  |



### ARI Job No: AE90 Client: KTA Project Event: N/A Project Name: Pacifi Corp-Chehalis

|    | Sample ID       | ARI<br>Lab ID | ARI<br>LIMS ID   | Matrix | Sample Date/Time | VTSR           |
|----|-----------------|---------------|------------------|--------|------------------|----------------|
| 1. | SB4-5-040715    | AE90A         | 15-6967          | Soil   | 04/07/15 11:30   | 04/09/15 12:57 |
| 2. | SBDUP-01-040715 | AE90B         | 15-6968          | Soil   | 04/07/15 12:00   | 04/09/15 12:57 |
| з. | SB6-4-040815    | AE90C         | 15-6969          | Soil   | 04/08/15 09:00   | 04/09/15 12:57 |
| 4. | SB5-5-040815    | AE90D         | 15 <b>-</b> 6970 | Soil   | 04/08/15 13:45   | 04/09/15 12:57 |
| 5. | EMHC003-Vault   | AE90E         | 15-6971          | Water  | 04/07/15 15:25   | 04/09/15 12:57 |
| 6. | EMHM003-Vault   | AE90F         | 15-6972          | Water  | 04/07/15 15:15   | 04/09/15 12:57 |
| 7. | EMHC002-Vault   | AE90G         | 15-6973          | Water  | 04/07/15 15:35   | 04/09/15 12:57 |
| 8. | EMHC001-Vault   | AE90H         | 15-6974          | Water  | 04/07/15 16:40   | 04/09/15 12:57 |
| 9. | DUP-VAULT       | AE901         | 15-6975          | Water  | 04/07/15 13:45   | 04/09/15 12:57 |

Printed 04/09/15 Page 1 of 1



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## Data Reporting Qualifiers

Effective 12/31/13

### Inorganic Data

- U Indicates that the target analyte was not detected at the reported concentration
- \* Duplicate RPD is not within established control limits
- B Reported value is less than the CRDL but  $\geq$  the Reporting Limit
- N Matrix Spike recovery not within established control limits
- NA Not Applicable, analyte not spiked
- H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

## **Organic Data**

- U Indicates that the target analyte was not detected at the reported concentration
- \* Flagged value is not within established control limits
- B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J Estimated concentration when the value is less than ARI's established reporting limits
- D The spiked compound was not detected due to sample extract dilution
- E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.



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- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
- S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
- NA The flagged analyte was not analyzed for
- NR Spiked compound recovery is not reported due to chromatographic interference
- NS The flagged analyte was not spiked into the sample
- M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
- Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
- EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" (Dioxin/Furan analysis only)
- C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
- P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
- X Analyte signal includes interference from polychlorinated diphenyl ethers. (Dioxin/Furan analysis only)
- Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. (Dioxin/Furan analysis only)



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## **Geotechnical Data**

- A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
- F Samples were frozen prior to particle size determination
- SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
- SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
- W Weight of sample in some pipette aliquots was below the level required for accurate weighting



#### ORGANICS ANALYSIS DATA SHEET TOTAL DIESEL RANGE HYDROCARBONS

NWTPHD by GC/FID Extraction Method: SW3546 Page 1 of 1 QC Report No: AE90-KTA Project: Pacifi Corp-Chehalis

Date Received: 04/09/15

Matrix: Soil

Data Release Authorized: /

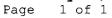
| ARI ID               | Sample ID                         | Extraction<br>Date | Analysis<br>Date  | EFV<br>DL   | Range/Surrogate                                                      | roð                    | Result                                  |
|----------------------|-----------------------------------|--------------------|-------------------|-------------|----------------------------------------------------------------------|------------------------|-----------------------------------------|
| MB-041015<br>15-6967 | Method Blank<br>HC ID:            | 04/10/15           | 04/11/15<br>FID4A | 1.00<br>1.0 | Diesel Range<br>Mineral Oil<br>Motor Oil<br>o-Terphenyl              | 5.0<br>10<br>10        | < 5.0 U<br>< 10 U<br>< 10 U<br>88.9%    |
| AE90A<br>15-6967     | SB4-5-040715<br>HC ID:            | 04/10/15           | 04/11/15<br>FID4A | 1.00<br>1.0 | Diesel Range<br>Mineral Oil<br>Motor Oil Range<br>o-Terphenyl        | 6.8<br>14<br>14        | < 6.8 U<br>< 14 U<br>< 14 U<br>77.1%    |
| AE90B<br>15-6968     | SBDUP-01-040715<br>HC ID:         | 04/10/15           | 04/11/15<br>FID4A | 1.00<br>1.0 | Diesel Range<br>Mineral Oil<br>Motor Oil Range<br>o-Terphenyl        | 6.3<br>12<br>12        | < 6.3 U<br>< 12 U<br>< 12 U<br>69.7%    |
| AE90C<br>15-6969     | SB6-4-040815<br>HC ID:            | 04/10/15           | 04/11/15<br>FID4A | 1.00<br>1.0 | Diesel Range<br>Mineral Oil<br>Motor Oil Range<br>o-Terphenyl        | 6.3<br>13<br>13        | < 6.3 U<br>< 13 U<br>< 13 U<br>70.0%    |
| AE90D<br>15-6970     | SB5-5-040815<br>HC ID: <b>DRO</b> | 04/10/15           | 04/11/15<br>FID4A | 1.00<br>1.0 | <b>Diesel Range</b><br>Mineral Oil<br>Motor Oil Range<br>o-Terphenyl | <b>6.2</b><br>12<br>12 | <b>6.7</b><br>< 12 U<br>< 12 U<br>75.4% |

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL. DL-Dilution of extract prior to analysis. LOQ-Limit of Quantitation

Diesel range quantitation on total peaks in the range from C12 to C24. Mineral Oil range quantitation on total peaks in the range from C16 to C28. Motor Oil range quantitation on total peaks in the range from C24 to C38. HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

## ORGANICS ANALYSIS DATA SHEET NWTPHD by GC/FID



Lab Sample ID: LCS-041015 LIMS ID: 15-6967 Matrix: Soil Data Release Authorized: Reported: 04/14/15

Date Extracted: 04/10/15 Date Analyzed: 04/11/15 01:48 Instrument/Analyst: FID4A/ML



Sample ID: LCS-041015 LAB CONTROL

QC Report No: AE90-KTA Project: Pacifi Corp-Chehalis

Date Sampled: NA Date Received: NA

Sample Amount: 10.0 g-dry-wt Final Extract Volume: 1.0 mL Dilution Factor: 1.00

| Range  | Lab<br>Control | Spike<br>Added | Recovery |
|--------|----------------|----------------|----------|
| Diesel | 132            | 150            | 88.0%    |

#### TPHD Surrogate Recovery

o-Terphenyl

87.4%

Results reported in mg/kg



#### TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job:AE90Matrix: SoilProject:Pacifi Corp-ChehalisDate Received:04/09/1504/09/15

---

| ARI ID             | Client ID       | Client<br>Amt | Final<br>Vol | Basis | Prep<br>Date |
|--------------------|-----------------|---------------|--------------|-------|--------------|
| 15-6967-041015MB1  | Method Blank    | 10.0 g        | 1.00 mL      |       | 04/10/15     |
| 15-6967-041015LCS1 | Lab Control     | 10.0 g        | 1.00 mL      |       | 04/10/15     |
| 15-6967-AE90A      | SB4-5-040715    | 7.31 g        | 1.00 mL      |       | 04/10/15     |
| 15-6968-AE90B      | SBDUP-01-040715 | 7.98 g        | 1.00 mL      |       | 04/10/15     |
| 15-6969-AE90C      | SB6-4-040815    | 7.95 g        | 1.00 mL      |       | 04/10/15     |
| 15-6970-AE90D      | SB5-5-040815    | 8.06 g        | 1.00 mL      |       | 04/10/15     |



#### TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: AE90-KTA Project: Pacifi Corp-Chehalis

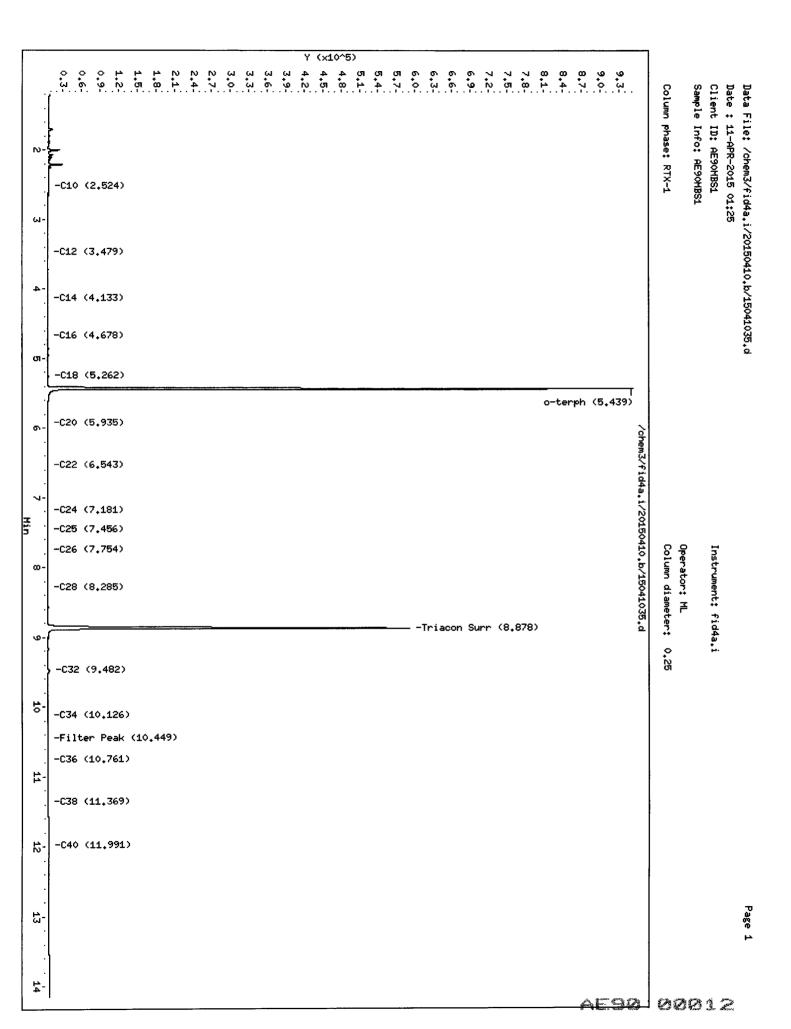
| 041015MB 88.9% (                      | OUT                   |
|---------------------------------------|-----------------------|
| 041015LCS 87.4%<br>SB4-5-040715 77.1% | )<br>)<br>)<br>)<br>) |

#### LCS/MB LIMITS QC LIMITS

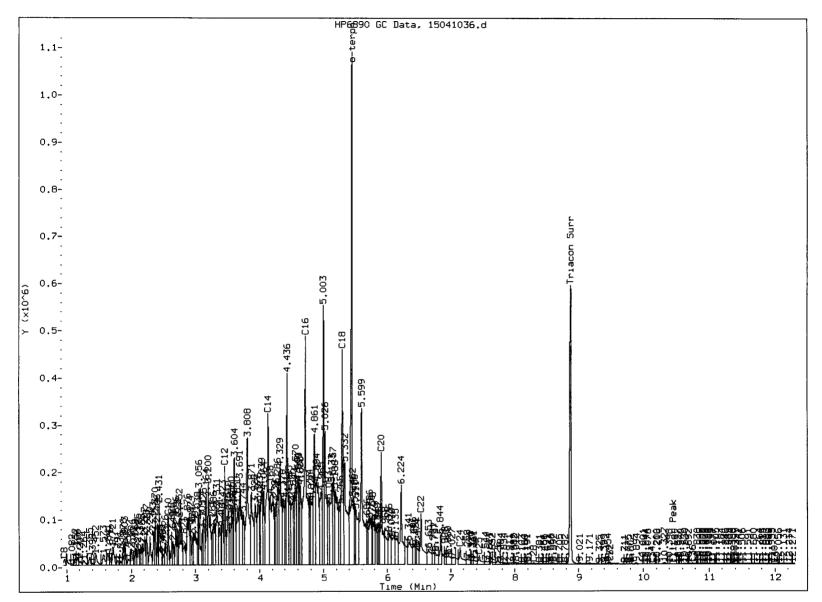
(50-150) (50-150)

Prep Method: SW3546 Log Number Range: 15-6967 to 15-6970

(OTER) = o-Terphenyl



#### FID:4A-2C/RTX-1 AE90LCSS1

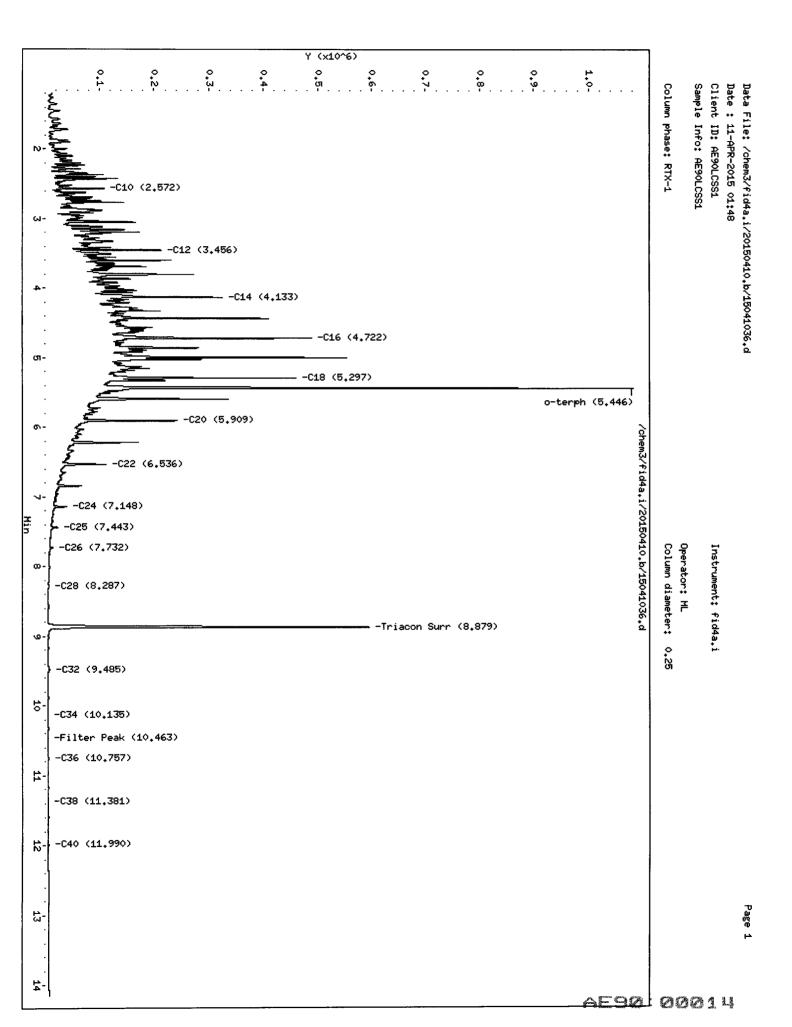


MANUAL INTEGRATION

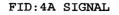
- 1. Baseline correction
- 3. Peak not found
- (5). Skimmed surrogate

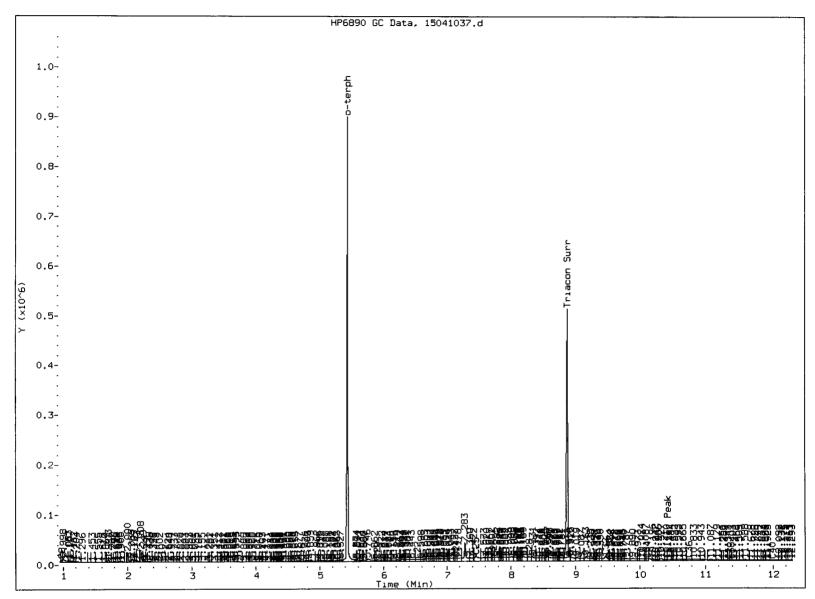
Analyst: <u>MU</u> Date

Date: 4/14/15



#### FID:4A-2C/RTX-1 AE90A



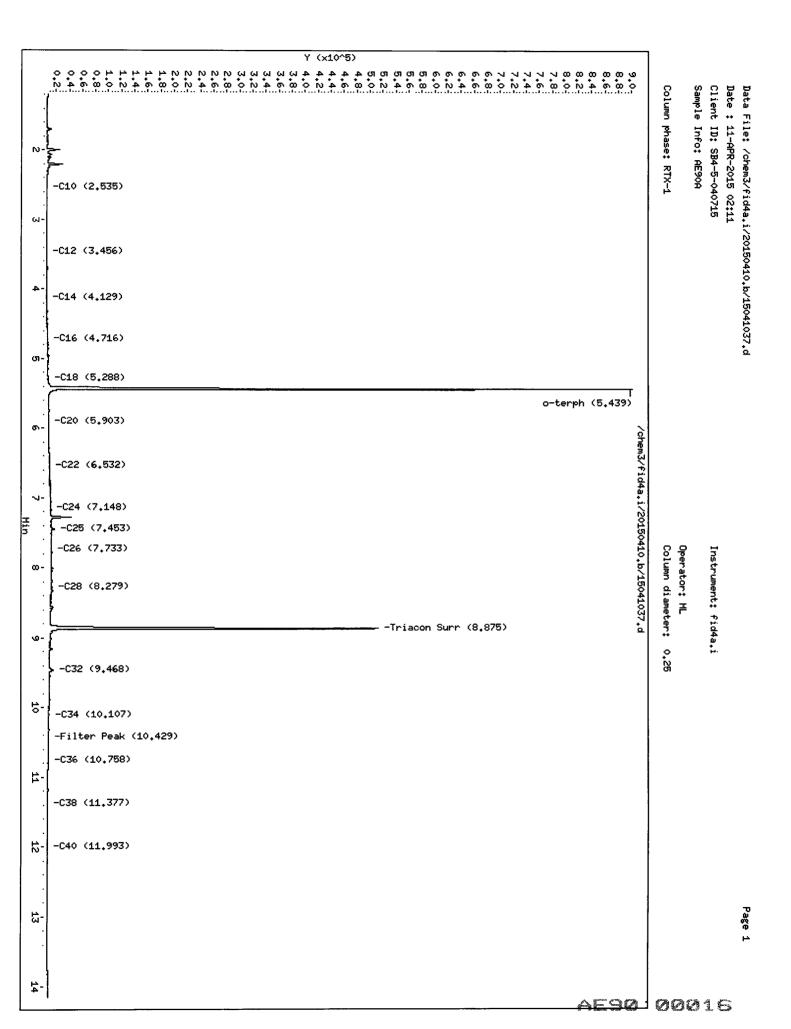


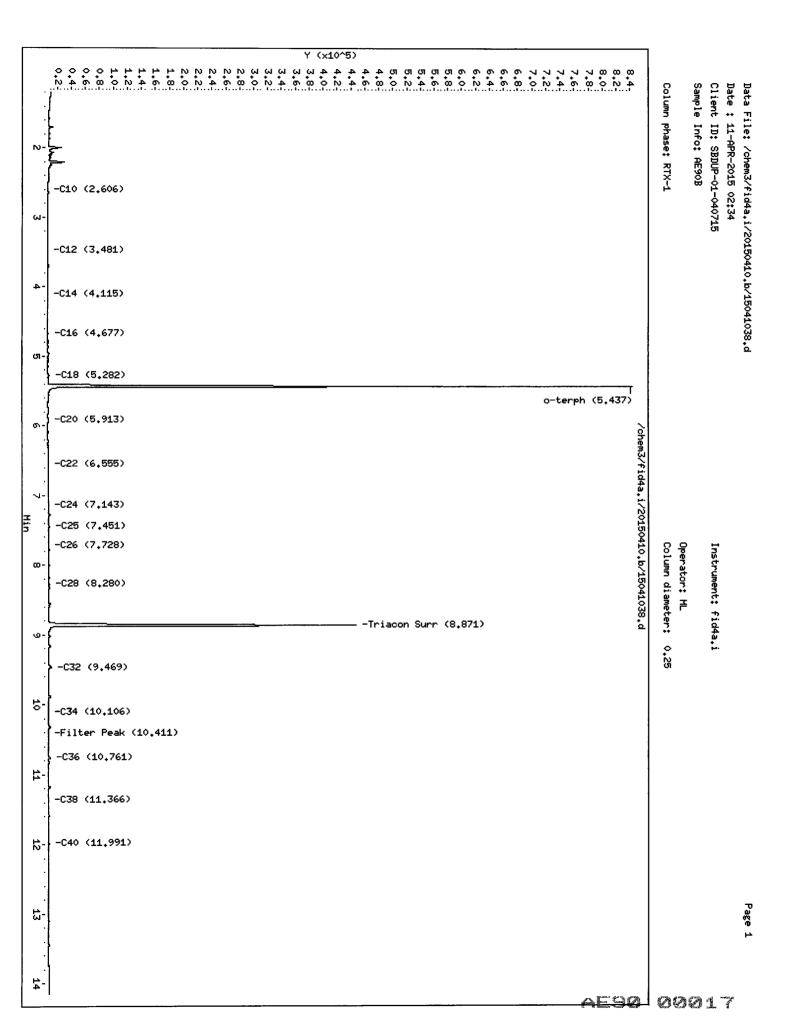
MANUAL INTEGRATION

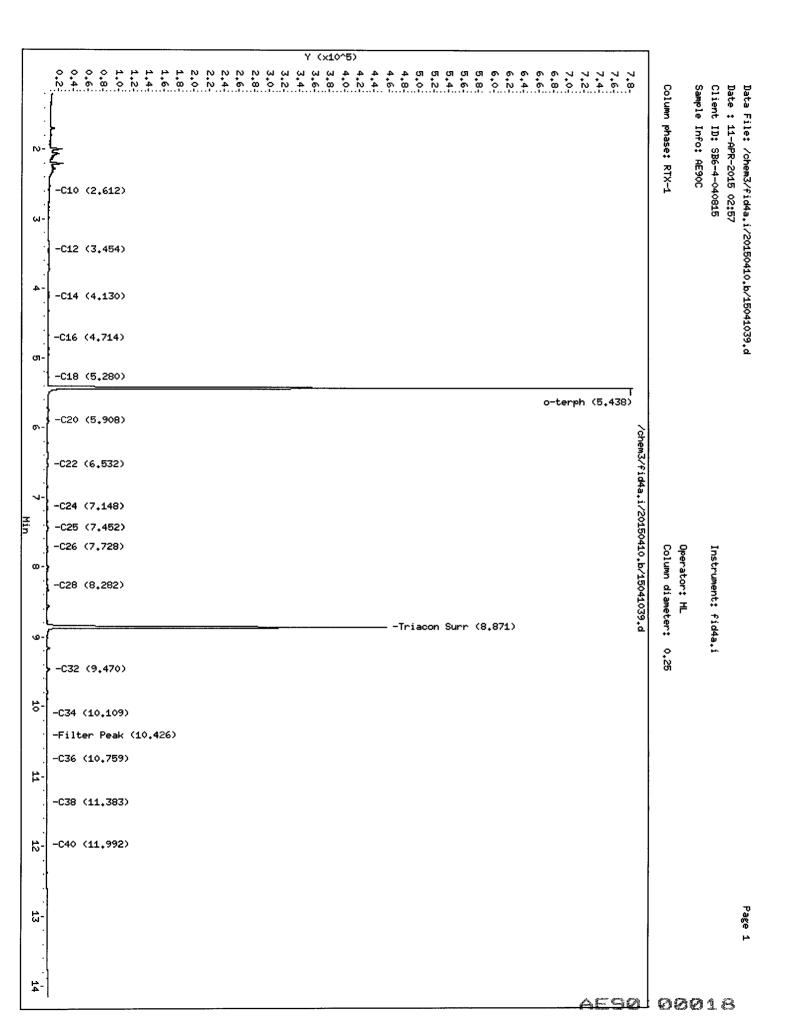
- 1. Baseline correction
- 3. Peak not found
- (5) Skimmed surrogate

Analyst: ML

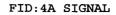
Date: 4/14/15

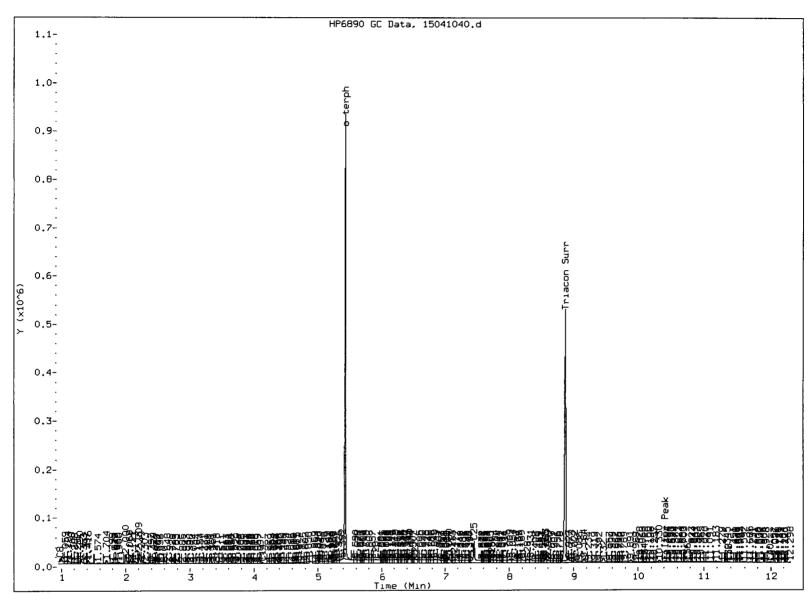






#### FID:4A-2C/RTX-1 AE90D



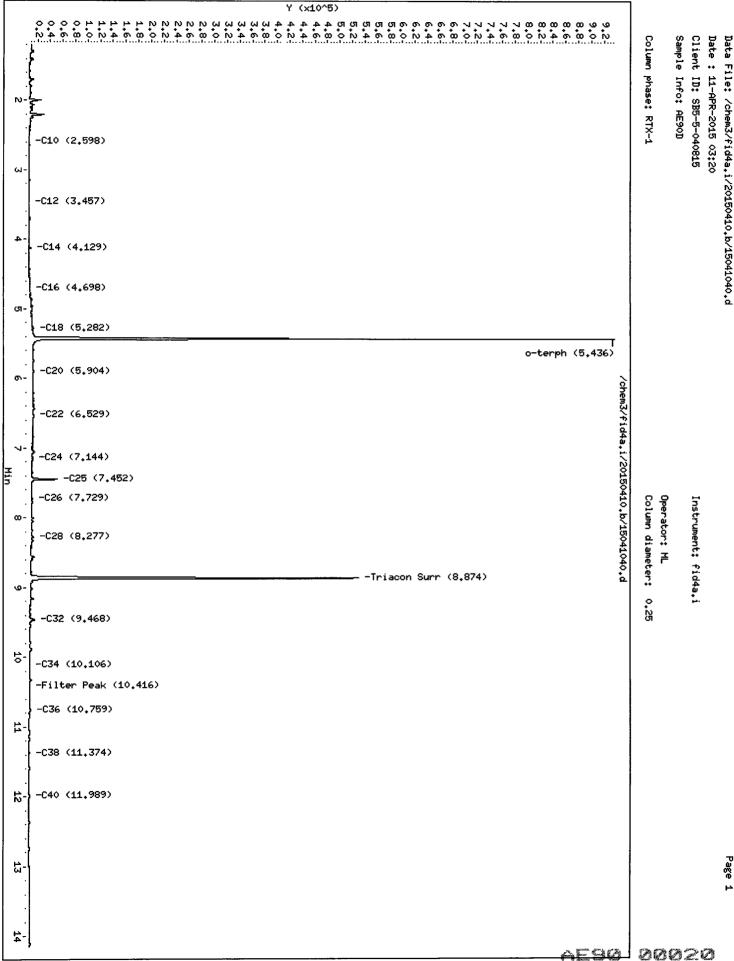


#### MANUAL INTEGRATION

- 1. Baseline correction
- 3. Peak not found
- 5 Skimmed surrogate

Analyst: M

Date: 4/14/15





#### ORGANICS ANALYSIS DATA SHEET TOTAL DIESEL RANGE HYDROCARBONS

NWTPHD by GC/FID Extraction Method: SW3510C Page 1 of 1

Matrix: Water

Data Release Authorized: Reported: 04/14/15 QC Report No: AE90-KTA Project: Pacifi Corp-Chehalis

Date Received: 04/09/15

| ARI ID               | Sample ID                           | Extraction<br>Date | Analysis<br>Date | EFV<br>DF   | Range/Surrogate                                                      | RL                          | Result                                       |
|----------------------|-------------------------------------|--------------------|------------------|-------------|----------------------------------------------------------------------|-----------------------------|----------------------------------------------|
| MB-041115<br>15-6971 | Method Blank<br>HC ID:              | 04/11/15           | 04/13/15<br>FID9 | 1.00<br>1.0 | Diesel Range<br>Mineral Oil<br>Motor Oil Range<br>o-Terphenyl        | 0.10<br>0.20<br>0.20        | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>82.9%    |
| AE90E<br>15-6971     | EMHC003-Vault<br>HC ID:             | 04/11/15           | 04/13/15<br>FID9 | 1.00<br>1.0 | Diesel Range<br>Mineral Oil<br>Motor Oil Range<br>o-Terphenyl        | 0.10<br>0.20<br>0.20        | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>83.0%    |
| AE90F<br>15-6972     | EMHM003-Vault<br>HC ID <b>: DRO</b> | 04/11/15           | 04/13/15<br>FID9 | 1.00<br>1.0 | <b>Diesel Range</b><br>Mineral Oi1<br>Motor Oil Range<br>o-Terphenyl | <b>0.10</b><br>0.20<br>0.20 | <b>0.12</b><br>< 0.20 U<br>< 0.20 U<br>72.6% |
| AE90G<br>15-6973     | EMHC002-Vault<br>HC ID: <b>DRO</b>  | 04/11/15           | 04/13/15<br>FID9 | 1.00<br>1.0 | <b>Diesel Range</b><br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | <b>0.10</b><br>0.20<br>0.20 | <b>0.11</b><br>< 0.20 U<br>< 0.20 U<br>76.6% |
| AE90H<br>15-6974     | EMHC001-Vault<br>HC ID: DRO/RRO     | 04/11/15           | 04/13/15<br>FID9 | 1.00<br>1.0 | Diesel Range<br>Mineral Oil<br>Motor Oil Range<br>o-Terphenyl        | 0.10<br>0.20<br>0.20        | 1.9<br>1.3<br>0.32<br>74.0%                  |
| AE90I<br>15-6975     | DUP-VAULT<br>HC ID: <b>DRO</b>      | 04/11/15           | 04/13/15<br>FID9 | 1.00<br>1.0 | <b>Diesel Range</b><br>Mineral Oil<br>Motor Oil Range<br>o-Terphenyl | <b>0.10</b><br>0.20<br>0.20 | <b>0.11</b><br>< 0.20 U<br>< 0.20 U<br>87.2% |

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL. DL-Dilution of extract prior to analysis. RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24. Mineral Oil range quantitation on total peaks in the range from C18 to C28. Motor Oil range quantitation on total peaks in the range from C24 to C38. HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

## ORGANICS ANALYSIS DATA SHEET NWTPHD by GC/FID



Page 1 of 1

Lab Sample ID: LCS-041115 LIMS ID: 15-6971 Matrix: Water Data Release Authorized: Reported: 04/14/15

Date Extracted: 04/11/15 Date Analyzed: 04/13/15 17:10 Instrument/Analyst: FID9/ML

#### Sample ID: LCS-041115 LAB CONTROL

QC Report No: AE90-KTA Project: Pacifi Corp-Chehalis

Date Sampled: NA Date Received: NA

Sample Amount: 500 mL Final Extract Volume: 1.0 mL Dilution Factor: 1.00

| Range  | Lab<br>Control | Spike<br>Added | Recovery |
|--------|----------------|----------------|----------|
| Diesel | 2.56           | 3.00           | 85.3%    |

#### TPHD Surrogate Recovery

o-Terphenyl

73.5%

Results reported in mg/L



#### TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: AE90 Project: Pacifi Corp-Chehalis

Matrix: Water Date Received: 04/09/15

| ARI ID             | Client ID     | Samp<br>Amt | Final<br>Vol | Prep<br>Date |
|--------------------|---------------|-------------|--------------|--------------|
| 15-6971-041115MB1  | Method Blank  | 500 mL      | 1.00 mL      | 04/11/15     |
| 15-6971-041115LCS1 | Lab Control   | 500 mL      | 1.00 mL      | 04/11/15     |
| 15-6971-AE90E      | EMHC003-Vault | 500 mL      | 1.00 mL      | 04/11/15     |
| 15-6972-AE90F      | EMHM003-Vault | 500 mL      | 1.00 mL      | 04/11/15     |
| 15-6973-AE90G      | EMHC002-Vault | 500 mL      | 1.00 mL      | 04/11/15     |
| 15-6974-AE90H      | EMHC001-Vault | 500 mL      | 1.00 mL      | 04/11/15     |
| 15-6975-AE90I      | DUP-VAULT     | 500 mL      | 1.00 mL      | 04/11/15     |



#### TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

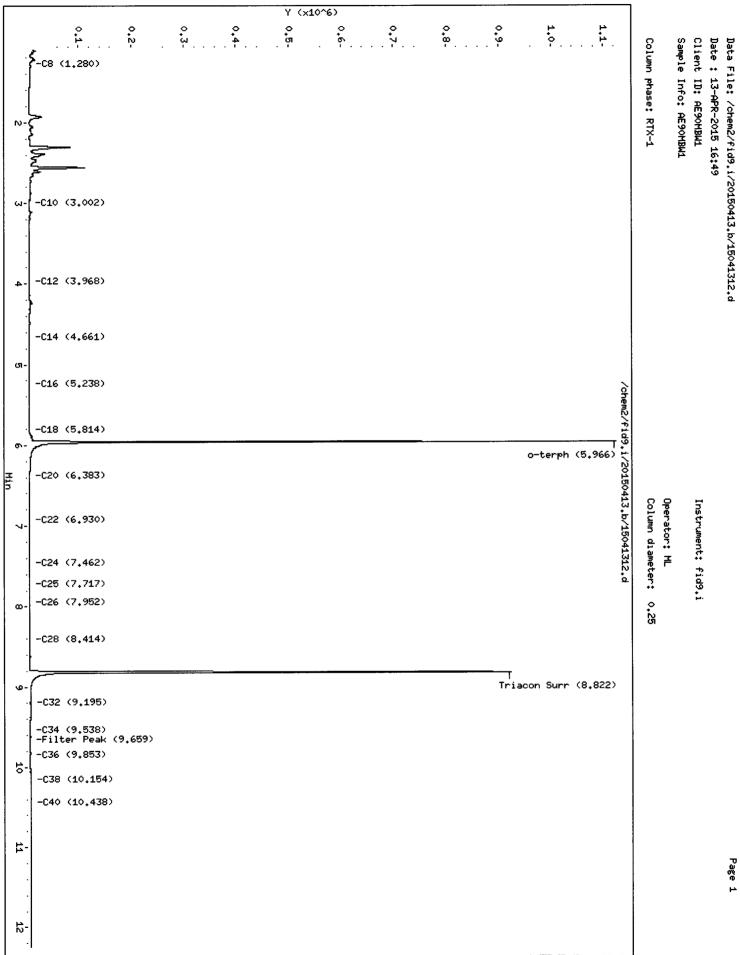
QC Report No: AE90-KTA Project: Pacifi Corp-Chehalis

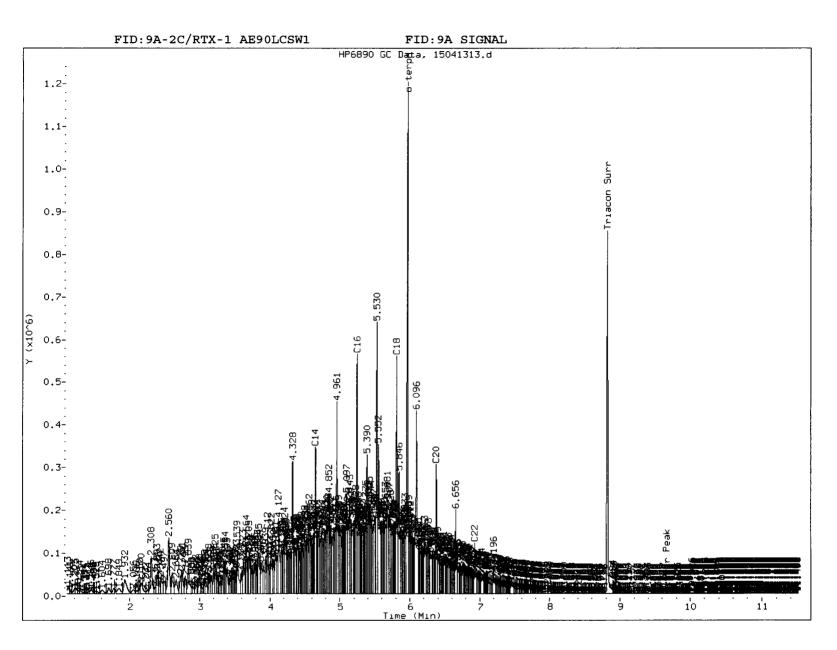
| Client ID     | OTER  | TOT OUT |
|---------------|-------|---------|
|               |       |         |
| MB-041115     | 82.9% | 0       |
| LCS-041115    | 73.5% | 0       |
| EMHC003-Vault | 83.0% | 0       |
| EMHM003-Vault | 72.6% | 0       |
| EMHC002-Vault | 76.6% | 0       |
| EMHC001-Vault | 74.0% | 0       |
| DUP-VAULT     | 87.2% | 0       |

#### LCS/MB LIMITS QC LIMITS

(OTER) = o-Terphenyl (50-150) (50-150)

Prep Method: SW3510C Log Number Range: 15-6971 to 15-6975



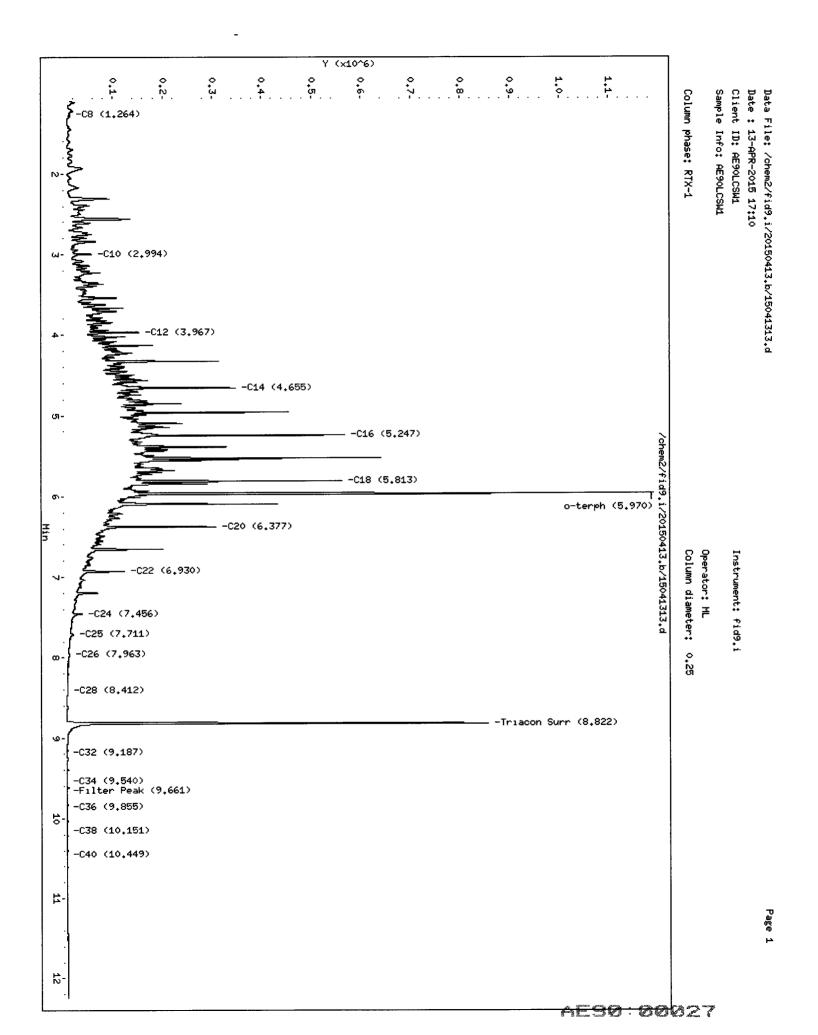


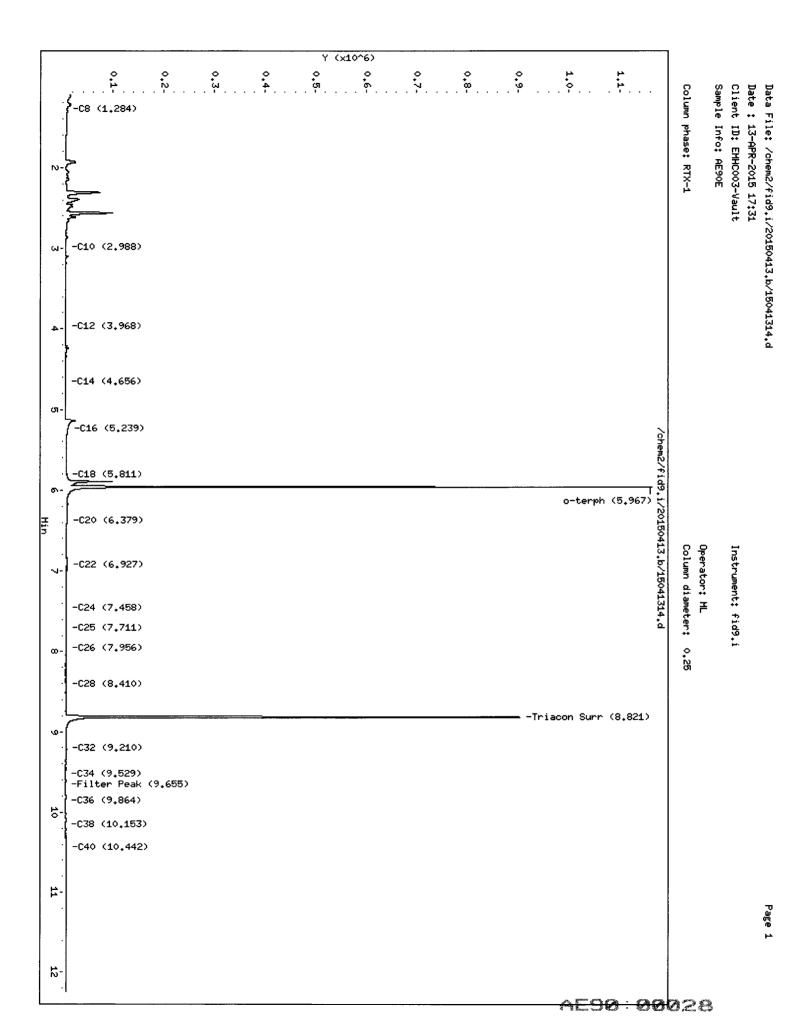
MANUAL INTEGRATION

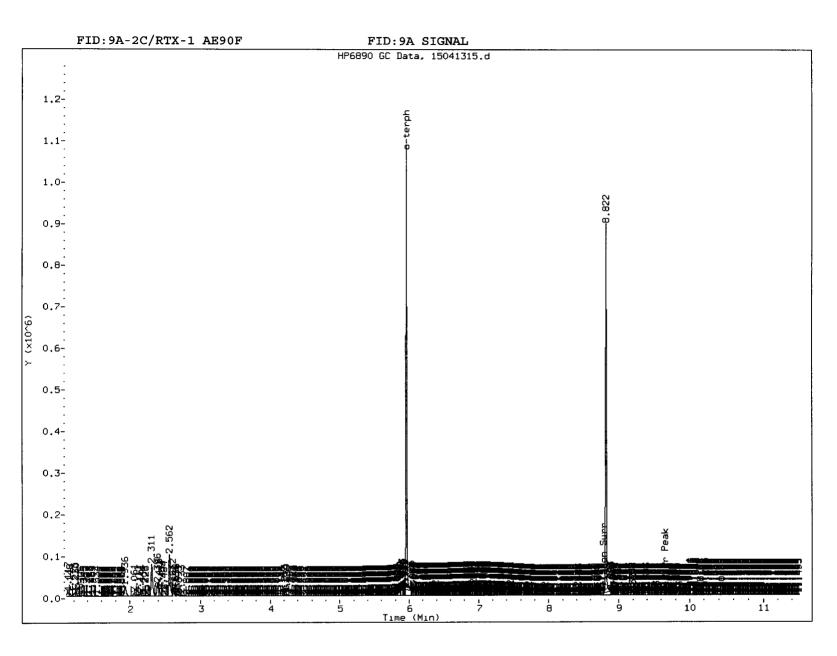
- 1. Baseline correction
- 2. Poor chromatography
- 3. Peak not found
- 4. Totals calculation
- $\overline{b}$  Surrogate Skimmed

Analyst: <u>M</u>

Date: <u>4/14/15</u>



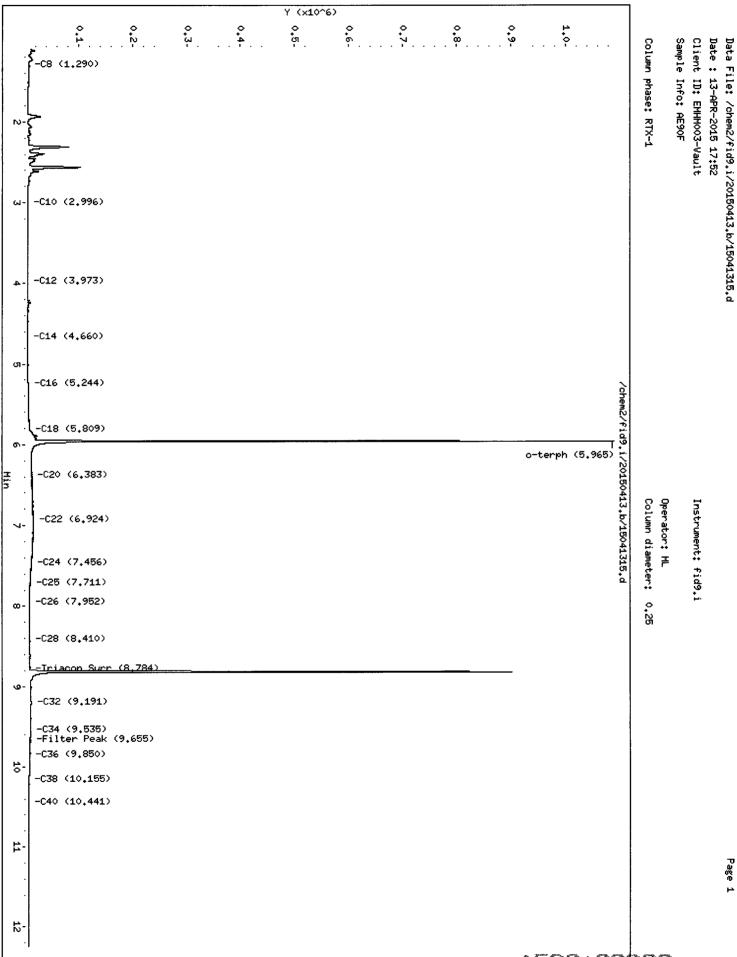




MANUAL INTEGRATION

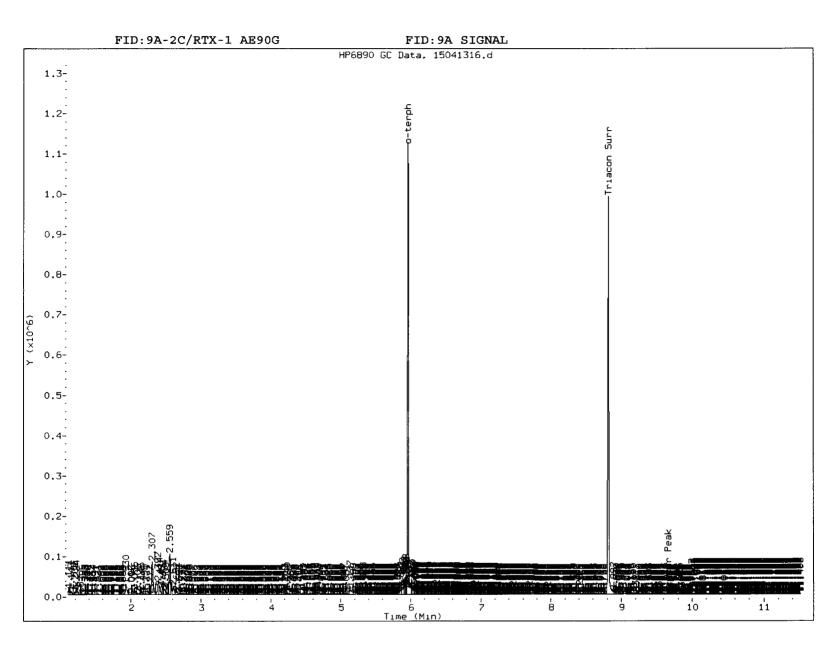
- 1. Baseline correction
- 2. Poor chromatography
- 3. Peak not found
- 4. Totals calculation
- 5 Surrogate Skimmed

Date: 4/14/15 Analyst: ML



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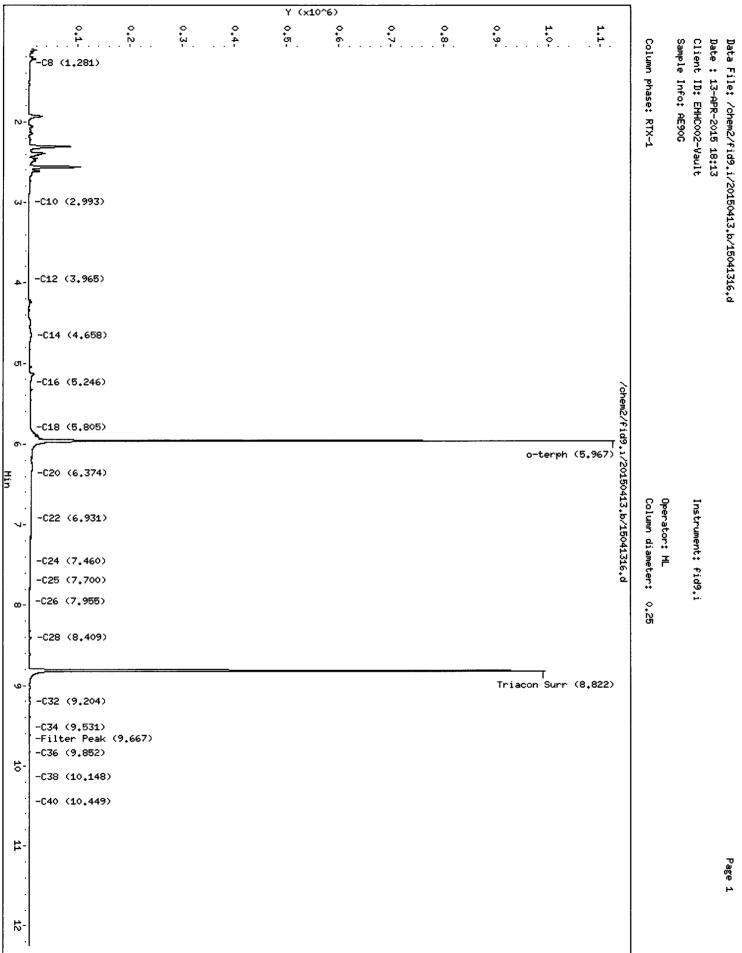
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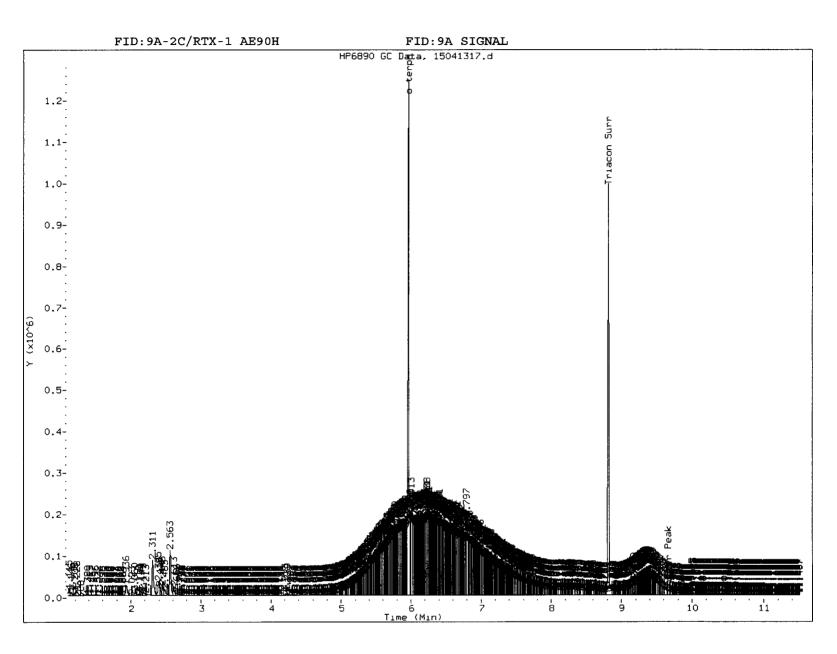


MANUAL INTEGRATION

- 1. Baseline correction
- 2. Poor chromatography
- 3. Peak not found
- 4. Totals calculation
- 5. Surrogate Skimmed

Analyst: \_\_\_\_\_ Date: \_\_\_\_\_

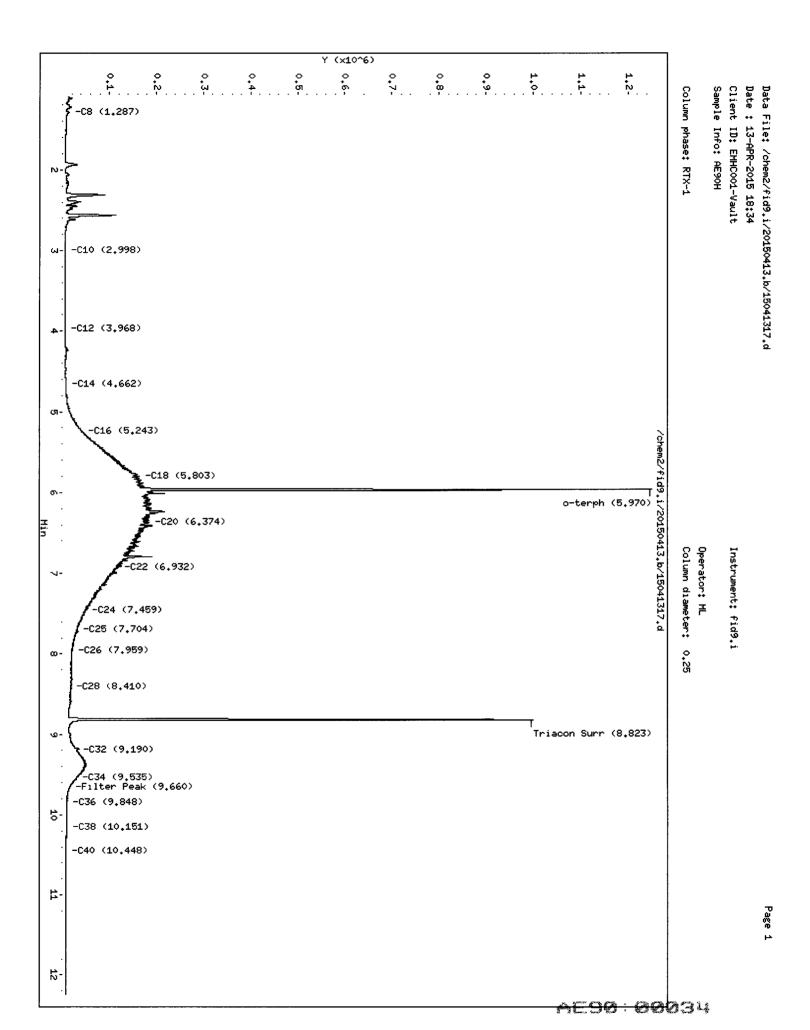


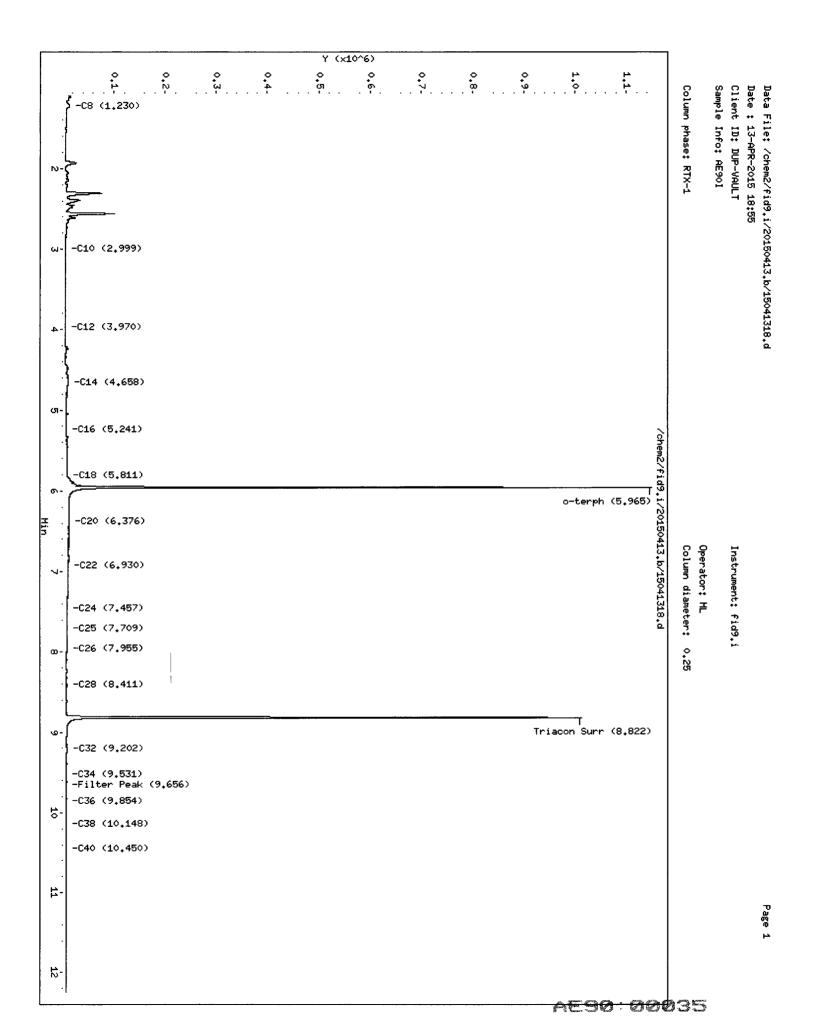


MANUAL INTEGRATION

- 1. Baseline correction
- 2. Poor chromatography
- 3. Peak not found
- 4. Totals calculation
- 5. Surrogate Skimmed

Analyst: \_\_\_\_\_ Date: \_\_\_\_





| Field_Collection_Type | Field_Collector | Field Collection Start Date | Field Collection Start Time | Sample ID       | Sample Matrix  | Sample_Source | Sample_Preparation_Method | Result Parameter Name | Lab_Analysis_Date | Lab_Analysis_Date_Accuracy | Lab_Analysis_Time | Result Value | Result Value Units | Result Reporting Limit |
|-----------------------|-----------------|-----------------------------|-----------------------------|-----------------|----------------|---------------|---------------------------|-----------------------|-------------------|----------------------------|-------------------|--------------|--------------------|------------------------|
| Sample                | Consultant      | 4/7/2015                    | 11:30:00                    | SB4-5-040715    | Solid/Sediment | Soil          | SW3546                    | Diesel Range Organics | 4/11/2015         | D                          | 2:11:00           | 6.8          | mg/kg              | 6.8                    |
| Sample                | Consultant      | 4/7/2015                    | 11:30:00                    | SB4-5-040715    | Solid/Sediment | Soil          | SW3546                    | Heavy Fuel Oil        | 4/11/2015         | D                          | 2:11:00           | 14           | mg/kg              | 14                     |
| Sample                | Consultant      | 4/7/2015                    | 11:30:00                    | SB4-5-040715    | Solid/Sediment | Soil          | SW3546                    | Lube Oil              | 4/11/2015         | D                          | 2:11:00           | 14           | mg/kg              | 14                     |
| Sample                | Consultant      | 4/7/2015                    | 12:00:00                    | SBDUP-01-040715 | Solid/Sediment | Soil          | SW3546                    | Diesel Range Organics | 4/11/2015         | D                          | 2:34:00           | 6.3          | mg/kg              | 6.3                    |
| Sample                | Consultant      | 4/7/2015                    | 12:00:00                    | SBDUP-01-040715 | Solid/Sediment | Soil          | SW3546                    | Heavy Fuel Oil        | 4/11/2015         | D                          | 2:34:00           | 12           | mg/kg              | 12                     |
| Sample                | Consultant      | 4/7/2015                    | 12:00:00                    | SBDUP-01-040715 | Solid/Sediment | Soil          | SW3546                    | Lube Oil              | 4/11/2015         | D                          | 2:34:00           | 12           | mg/kg              | 12                     |
| Sample                | Consultant      | 4/8/2015                    | 9:00:00                     | SB6-4-040815    | Solid/Sediment | Soil          | SW3546                    | Diesel Range Organics | 4/11/2015         | D                          | 2:57:00           | 6.3          | mg/kg              | 6.3                    |
| Sample                | Consultant      | 4/8/2015                    | 9:00:00                     | SB6-4-040815    | Solid/Sediment | Soil          | SW3546                    | Heavy Fuel Oil        | 4/11/2015         | D                          | 2:57:00           | 13           | mg/kg              | 13                     |
| Sample                | Consultant      | 4/8/2015                    | 9:00:00                     | SB6-4-040815    | Solid/Sediment | Soil          | SW3546                    | Lube Oil              | 4/11/2015         | D                          | 2:57:00           | 13           | mg/kg              | 13                     |
| Sample                | Consultant      | 4/8/2015                    | 13:45:00                    | SB5-5-040815    | Solid/Sediment | Soil          | SW3546                    | Diesel Range Organics | 4/11/2015         | D                          | 3:20:00           | 6.7          | mg/kg              | 6.2                    |
| Sample                | Consultant      | 4/8/2015                    | 13:45:00                    | SB5-5-040815    | Solid/Sediment | Soil          | SW3546                    | Heavy Fuel Oil        | 4/11/2015         | D                          | 3:20:00           | 12           | mg/kg              | 12                     |
| Sample                | Consultant      | 4/8/2015                    | 13:45:00                    | SB5-5-040815    | Solid/Sediment | Soil          | SW3546                    | Lube Oil              | 4/11/2015         | D                          | 3:20:00           | 12           | mg/kg              | 12                     |
|                       |                 |                             |                             |                 |                |               |                           |                       |                   |                            |                   |              |                    |                        |
| Sample                | Consultant      | 4/7/2015                    | 15:25:00                    | EMHC003-Vault   | Water          | Water         | SW3510C                   | Diesel Range Organics | 4/13/2015         | D                          | 17:31:00          | 0.1          | mg/l               | 0.1                    |
| Sample                | Consultant      | 4/7/2015                    | 15:25:00                    | EMHC003-Vault   | Water          | Water         | SW3510C                   | Heavy Fuel Oil        | 4/13/2015         | D                          | 17:31:00          | 0.2          | mg/l               | 0.2                    |
| Sample                | Consultant      | 4/7/2015                    | 15:25:00                    | EMHC003-Vault   | Water          | Water         | SW3510C                   | Lube Oil              | 4/13/2015         | D                          | 17:31:00          | 0.2          | mg/l               | 0.2                    |
| Sample                | Consultant      | 4/7/2015                    | 15:15:00                    | EMHM003-Vault   | Water          | Water         | SW3510C                   | Diesel Range Organics | 4/13/2015         | D                          | 17:52:00          | 0.12         | mg/l               | 0.1                    |
| Sample                | Consultant      | 4/7/2015                    | 15:15:00                    | EMHM003-Vault   | Water          | Water         | SW3510C                   | Heavy Fuel Oil        | 4/13/2015         | D                          | 17:52:00          | 0.2          | mg/l               | 0.2                    |
| Sample                | Consultant      | 4/7/2015                    | 15:15:00                    | EMHM003-Vault   | Water          | Water         | SW3510C                   | Lube Oil              | 4/13/2015         | D                          | 17:52:00          | 0.2          | mg/l               | 0.2                    |
| Sample                | Consultant      | 4/7/2015                    | 15:35:00                    | EMHC002-Vault   | Water          | Water         | SW3510C                   | Diesel Range Organics | 4/13/2015         | D                          | 18:13:00          | 0.11         | mg/l               | 0.1                    |
| Sample                | Consultant      | 4/7/2015                    | 15:35:00                    | EMHC002-Vault   | Water          | Water         | SW3510C                   | Lube Oil              | 4/13/2015         | D                          | 18:13:00          | 0.2          | mg/l               | 0.2                    |
| Sample                | Consultant      | 4/7/2015                    | 15:35:00                    | EMHC002-Vault   | Water          | Water         | SW3510C                   | Heavy Fuel Oil        | 4/13/2015         | D                          | 18:13:00          | 0.2          | mg/l               | 0.2                    |
| Sample                | Consultant      | 4/7/2015                    | 16:40:00                    | EMHC001-Vault   | Water          | Water         | SW3510C                   | Diesel Range Organics | 4/13/2015         | D                          | 18:34:00          | 1.9          | mg/l               | 0.1                    |
| Sample                | Consultant      | 4/7/2015                    | 16:40:00                    | EMHC001-Vault   | Water          | Water         | SW3510C                   | Heavy Fuel Oil        | 4/13/2015         | D                          | 18:34:00          | 1.3          | mg/l               | 0.2                    |
| Sample                | Consultant      | 4/7/2015                    | 16:40:00                    | EMHC001-Vault   | Water          | Water         | SW3510C                   | Lube Oil              | 4/13/2015         | D                          | 18:34:00          | 0.32         | mg/l               | 0.2                    |
| Sample                | Consultant      | 4/7/2015                    | 13:45:00                    | DUP-VAULT       | Water          | Water         | SW3510C                   | Diesel Range Organics | 4/13/2015         | D                          | 18:55:00          | 0.11         | mg/l               | 0.1                    |
| Sample                | Consultant      | 4/7/2015                    | 13:45:00                    | DUP-VAULT       | Water          | Water         | SW3510C                   | Heavy Fuel Oil        | 4/13/2015         | D                          | 18:55:00          | 0.2          | mg/l               | 0.2                    |
| Sample                | Consultant      | 4/7/2015                    | 13:45:00                    | DUP-VAULT       | Water          | Water         | SW3510C                   | Lube Oil              | 4/13/2015         | D                          | 18:55:00          | 0.2          | mg/l               | 0.2                    |

| Result_Reporting_Limit_Type | Result Detection Limit | Result Detection Limit Type | Result Data Qualifier | Result_Basis | Result Method | Result_Comment | Result_Lab_Name                            |
|-----------------------------|------------------------|-----------------------------|-----------------------|--------------|---------------|----------------|--------------------------------------------|
| LOQ                         | 1.8                    | MDL                         | U                     | Dry          | NWTPH-Dx      | 15-6967-AE90A  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     | Dry          | NWTPH-Dx      | 15-6967-AE90A  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     | Dry          | NWTPH-Dx      | 15-6967-AE90A  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 1.7                    | MDL                         | U                     | Dry          | NWTPH-Dx      | 15-6968-AE90B  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     | Dry          | NWTPH-Dx      | 15-6968-AE90B  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     | Dry          | NWTPH-Dx      | 15-6968-AE90B  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 1.7                    | MDL                         | U                     | Dry          | NWTPH-Dx      | 15-6969-AE90C  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     | Dry          | NWTPH-Dx      | 15-6969-AE90C  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     | Dry          | NWTPH-Dx      | 15-6969-AE90C  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 1.7                    | MDL                         |                       | Dry          | NWTPH-Dx      | 15-6970-AE90D  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     | Dry          | NWTPH-Dx      | 15-6970-AE90D  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     | Dry          | NWTPH-Dx      | 15-6970-AE90D  | Analytical Resources Inc (ARI), Seattle WA |
|                             |                        |                             |                       |              |               |                |                                            |
| LOQ                         | 0.02                   | MDL                         | U                     |              | NWTPH-Dx      | 15-6971-AE90E  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     |              | NWTPH-Dx      | 15-6971-AE90E  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     |              | NWTPH-Dx      | 15-6971-AE90E  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0.02                   | MDL                         |                       |              | NWTPH-Dx      | 15-6972-AE90F  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     |              | NWTPH-Dx      | 15-6972-AE90F  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     |              | NWTPH-Dx      | 15-6972-AE90F  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0.02                   | MDL                         |                       |              | NWTPH-Dx      | 15-6973-AE90G  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0.04                   | MDL                         | U                     |              | NWTPH-Dx      | 15-6973-AE90G  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     |              | NWTPH-Dx      | 15-6973-AE90G  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0.02                   | MDL                         |                       |              | NWTPH-Dx      | 15-6974-AE90H  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         |                       |              | NWTPH-Dx      | 15-6974-AE90H  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         |                       |              | NWTPH-Dx      | 15-6974-AE90H  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0.02                   | MDL                         |                       |              | NWTPH-Dx      | 15-6975-AE90I  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     |              | NWTPH-Dx      | 15-6975-AE90I  | Analytical Resources Inc (ARI), Seattle WA |
| LOQ                         | 0                      | MDL                         | U                     |              | NWTPH-Dx      | 15-6975-AE90I  | Analytical Resources Inc (ARI), Seattle WA |

#### APPENDIX E

#### GROUNDWATER MONITORING REPORT 1<sup>ST</sup> QUARTERLY EVENT

APRIL 2015



# Groundwater Monitoring Report 1<sup>st</sup> Quarterly Event – April 2015 PacifiCorp Chehalis, WA Plant

Cardno Project 90369

Prepared for KTA Associates, Inc.



KTA Associates, Inc A Professional Environmental Service Corporation

And for PacifiCorp



June 2015



# Groundwater Monitoring Report 1<sup>st</sup> Quarterly Event – April 2015

# **FINAL REPORT**

# PacifiCorp Chehalis, WA Plant

Cardno Project 90369

# June 2015

**Prepared for:** 

KTA, Associates, Inc.

And

PacifiCorp

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# Abbreviations and Acronyms

| AST    | above ground storage tank                             |
|--------|-------------------------------------------------------|
| bgs    | below ground surface                                  |
| Cardno | Cardno                                                |
| CCS    | Cowlitz Clean Sweep                                   |
| CoC    | chain of custody                                      |
| DO     | dissolved oxygen                                      |
| DOE    | (WA) Department of Ecology                            |
| DOT    | Department of Transportation                          |
| DRO    | Diesel Range Organics                                 |
| GSU    | Generator Set-Up Unit                                 |
| IDW    | investigation-derived waste                           |
| IFP    | interface probe                                       |
| ISGP   | Industrial Stormwater General Permit                  |
| KTA    | KTA Associates, Inc.                                  |
| mg/kg  | milligrams per kilograms (parts per million)          |
| MTCA   | Model Toxics Control Act                              |
| MW     | Monitoring Well                                       |
| MWIR   | Monitoring Well Installation and Support Tasks Report |
| PC     | PacifiCorp                                            |
| PVC    | polyvinyl chloride                                    |
| RRO    | Residual Range Organics                               |
| SB     | Soil Boring                                           |
| SI     | Site Investigation                                    |
| TPH-Dx | Total Petroleum Hydrocarbons – Diesel Extended Range  |
| VCP    | Voluntary Clean-up Program (WADOE)                    |
| WAC    | Washington Administration Code                        |
| WLI    | Water Level Indicator                                 |
| µg/L   | micrograms per liter (parts per billion)              |

### 1 Introduction

#### 1.1 **Purpose and Objective**

Cardno was contracted by KTA Associates, Inc. (KTA) to conduct a site investigation that included an assessment of potential impacts to subsurface soil and shallow groundwater within certain areas at PacifiCorp (PC)'s Chehalis, WA power plant that were previously exposed to Mineral Oil releases in 2011 and 2013. These releases were due to malfunctions with the plant's Generator Step-up Unit (GSU)s #1 and #3. Mineral Oil is used as insulting fluid in these GSUs.

The primary objective of this project is to determine if any residual impacts from Mineral Oil exposure exists in the subsurface soil and shallow groundwater at concentrations above the Washington Department of Ecology's (WADOE) Model Toxics Control Act (MTCA) regulatory limits. Site investigation activities are being conducted under the WA DoE's Voluntary Cleanup Program (VCP).

This project is divided into two main phases. The first phase included monitoring well installation, in conjunction with various support tasks. The outcome of soil boring / monitoring well installation activities and associated environmental sampling results are included within the *Monitoring Well Installation and Support Tasks Report (MWIR)* (Cardno, May 2015).

The second phase of this project involves groundwater monitoring, conducted on a quarterly basis, including events scheduled for April, June-Sept, December 2015 and March 2016. Groundwater Monitoring Report (GWMR)s, detailing field methods, water level measurements, groundwater table elevations, flow direction assessment and sampling results will be drafted as appropriate and submitted to KTA under separate covers. All field efforts for this first quarterly groundwater monitoring effort were conducted on 15 April, 2015.

#### 1.2 Scope of Work

To meet the above stated objectives, the scope of work for quarter groundwater monitoring consisted of the following field activities:

- Coordination of pre- (field) mobilization tasks.
- Collection of static groundwater level measurements.
- Sampling of five groundwater monitoring wells.
- Handling of project collected environmental samples.
- Documentation of field activities. and,
- Containment of investigation derived waste (IDW).

Prominent site features and well locations are shown on Figure 1.

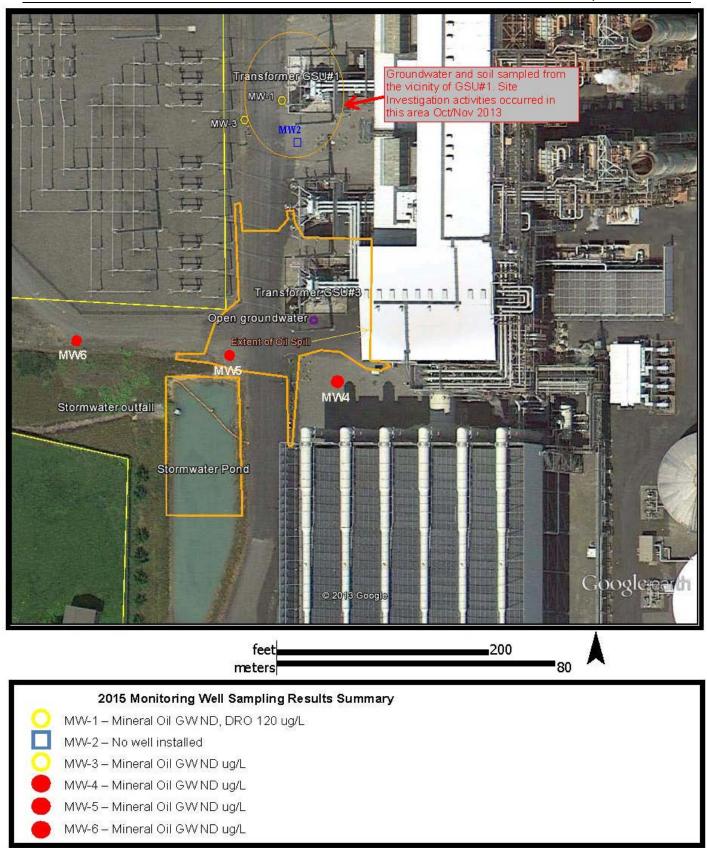
#### 1.3 Report Organization

This GWMR is organized into the following sections:

- > Section 1.0 Introduction
- > Section 2.0 Site Background
- > Section 3.0 Field Efforts
- > Section 4.0 Analytical Results
- > Section 5.0 References

Discussions regarding the procedures and methods utilized for the groundwater monitoring tasks and subsequent results of the data collected are presented in the main text of this GWMR report. Health & Safety Tailgate Forms, Monitoring Well Sampling and Water Quality Measurement Forms, Field Notebook entries, and Laboratory Chain-of-Custody Forms / Analytical Report are presented as Appendices A through D, respectively.

Groundwater Monitoring Report 1<sup>st</sup> Quarterly Event – April 2015 PacifiCorp Chehalis Plant



#### Figure 1. Site Map with Monitoring Well and Prominent Features

### 2 Site Background

#### 2.1 Site Description

PacifiCorp owns and maintains a natural gas-fired combined cycle power plant, which produces 520-megawatts of electricity. The plant is located at 1813 Bishop Road, Chehalis, Washington, in the Chehalis River Valley.

The Chehalis River Valley is considered a rural area, with approximately 7,000 residents living in and around the city. The plant is located 3 miles south of town, which consists mostly of small parks, farms, small pockets of light industrial areas, and a few housing subdivisions.

#### 2.1.1 <u>Geology</u>

The overall soil-type distribution at the site consists of low permeability silt and clay layer underlain by 45 to 50 feet of water-bearing sand and gravel, underlain by a silt and clay aquitard. These soil-types are consistent with regional geologic mapping by Weigle and Foxworthy (1962) and a regional study for the Chehalis Generation facility (Dames and Moore 1994). These regional studies classify the upper 50 feet of soil in the area of the site as recent alluvium and glaciofluvial sediments. The aquitard found at approximately 50 feet bgs is widespread, is often described as blue-gray, clayey silt, and is reported to be more than 100 feet thick (Dames and Moore 1994).

#### 2.1.2 <u>Hydrogeology</u>

The groundwater flow direction beneath the site is assumed to travel south/southwest towards Bishop Road and Berwick Creek. Regional investigations conducted by others (Dames and Moore 1994) have categorized the shallow aquifer in the area as unconfined or semi-confined. However, the shallow aquifer appears to exhibit the characteristics of a confined or semiconfined aquifer, primarily due to the low permeably silt cap immediately above the aquifer.

#### 2.2 Previous Mineral Oil Releases and Site Cleanup Efforts

Cowlitz Clean Sweep (CCS) completed a site cleanup (CCS 2011) at the PC Chehalis Plant during the months of January through March, 2011. CCS removed floating product from the stormwater pond and ditch lines using oil booms, absorbent material, an oil skimmer and vacuum truck. The stormwater ditch lines were cleaned by removing impacted material down to the clay layer.

CCS sampled affected areas and ditches for analysis to determine the extent of oil contamination; additional soil and water sampling was conducted after cleanup.

The main excavation occurred at or near GSU-1, the first plant transformer that caught fire and subsequently released mineral oil to the surrounding areas. Impacted soil was removed to a depth of six inches below the static groundwater line using olfactory methods (i.e., visual).

During the excavation, free product was noted floating on top of the water and absorbent materials were deployed in the excavation area to remove the product. All excavated materials were loaded onto waiting dump trucks and taken to the Weyerhaeuser transfer station located in Longview, WA for disposal.

Once the excavations had been completed, the area around the GSU-1 transformer was backfilled with clean material and compacted to the required 95% compaction. All ditch lines were relined with clean gravel to prevent sediment loss and water quality issues.

Water collected during excavation activities completed near and around the transformer area was pumped to the on-site 1.7 million gallon diesel above ground storage tank (AST) and the AST containment area.

CCS removed 845 tons of rock and soil and 8,869 gallons of water from affected areas during excavation activities. CCS backfilled the excavations with 92 tons of 2 to 4 inch quarry spalls and 462 tons of 1 ¼" rock to help achieve the required 95% compaction standard.

Most recently, GSU-3 experienced a similar malfunction in late 2013 to the one that occurred at GSU-1 in early 2011. Consequently, this malfunction caused the release of mineral oil around the base of the transformer unit and impacted the surface areas adjacent to it, the roadway and ditches and the area around the southwest corner of the plant building. The management of the release of mineral oil at GSU-3 was approached by PC and conducted by CCS in a similar fashion to the previous cleanup at GSU-1.

#### 2.3 **Previous Site Investigations**

Cardno completed a Site Investigation (SI) at the PC-Chehalis Plant on May 23<sup>rd</sup> through May 25<sup>th</sup>, 2011. Cardno conducted the SI to determine the following:

- If groundwater has been impacted from the mineral oil spill;
- If the large AST used to contain the water collected during excavation activities exceeded any regulatory levels, and;
- If surface water in the stormwater pond has been impacted from the mineral oil spill.

Cardno completed the following activities during the 2011 SI:

- Installed and sampled six temporary monitoring wells placed within the shallow water bearing zone;
- Collected two water samples from the AST at varying depths;
- Collected two surface water samples from the stormwater pond, and;
- Collected three surface soil samples downgradient of the mineral oil spill.

The results of the 2011 SI are summarized as follows:

- One groundwater location (GW-4) had a detection of 1100 μg/L, which exceeded the MTCA Method A Cleanup Level of 500 μg/L for groundwater;
- One AST water sample (TS2) had a detection of 440 µg/L, which did not exceed the MTCA Method A Cleanup Level;
- One surface water sample (SW1) had a detection of 360 µg/L, which did not exceed the MTCA Method A Cleanup Level, and;
- One soil sample (SG1) had a detection of 160 mg/kg, which did not exceed the MTCA Method A Cleanup Level of 4000 mg/Kg.

Subsequent to the 2011 SI, a follow-up field investigation was undertaken by Cardno in October and November of 2013. These follow-up tasks were conducted after a review of all field efforts and sampling results to date by WADOE VCP staff. VCP identified two hot spots and near GSU#1. PacifiCorp, KTA and WADOE VCP agreed to investigate soil and groundwater in these two areas and characterize the local groundwater flow to determine if the mineral oil released from GSU-1 had any longer-term impacts to the deeper subsurface soils, vadose zone and/or the local shallow groundwater from areas with previously identified concentrations of mineral oil above regulatory limits. The *Groundwater Investigation Report* (Cardno, 2014) presented data from this effort. Efforts and sampling results contained in this report are summarized below;

Cardno completed the following activities during the 2013 SI:

- Drill, characterize and sample subsurface soil from 3 locations to ~30-feet below grade surface. Soil samples from the borings at SB-1 thru SB-3 were analyzed for mineral oil.
- Install permanent wells at two of the drilling locations, MW-1 and MW-3. Due to utility interferences, a well was not set at the location for MW-2. These activities took place on October 28 and 29, 2013.
- A (relative) survey of the monitoring well casing elevations was conducted to aid in the determination of groundwater flow direction.
- Sample groundwater from MW-1 and MW-3, via well casing. A one-time groundwater sample was collected at MW-2 during the extraction of the drill rods. These activities took place on November 1, 2013 – except for the MW-2 sample, collected earlier (10/29/2013).

The results of the 2013 SI are summarized as follows:

- One groundwater sample (MW-2) had a detection of Mineral Oil at 380 μg/L, which is below the MTCA Method A Cleanup Level for TPH-Dx of 500 μg/L in groundwater.
- There were no detections of Mineral Oil in any of the subsurface soil samples.

Following the release of Mineral Oil from GSU#3 in November 2013 and associated site cleanup efforts, PacifiCorp continued its environmental protection efforts in conjunction with their ongoing VCP actions. Through cooperative agreements between PC and WA DoE, a site investigation similar to those previously designed by KTA and Cardno was implemented in the areas adjacent to and downgradient from GSU#3. Results of subsurface soil and electrical vault in-flow water testing are presented in the *MWIR* (Cardno, May 2015). These SI efforts were undertaken on April 7-15, 2015.

Cardno completed the following activities during the 2015 SI:

- Characterize and sample subsurface soil from 3 locations to ~30-feet below grade surface. Soil samples from the borings at SB-4 thru SB-6 were analyzed for NWTPH-Dx / Mineral Oil.
- Install permanent wells at all three 2015 boring locations. These wells are MW-4, MW-5 and MW-6. The three new wells, along with the two previous wells (MW-1 and MW-3) were developed / re-developed. These activities took place on April 7 9, 2015.
- A (relative) elevation survey of the monitoring well casings was conducted to aid in the determination of groundwater flow direction. This was completed on April 15, 2015.
- A one-time sampling event was completed to test in-flow water within four deep electrical vaults adjacent to GSU's #1 and #3. Water samples from these vaults was submitted for NWTPH-Dx / Mineral Oil. These activities took place on April 7, 2015.

The Results presented in the MWIR are summarized as follows:

- Soil from a depth of 5' bgs collected at SB5 had a detection of DO at 6.7 mg/Kg, which is below the MTCA Method A Soil Cleanup Level of 4,000 mg/Kg.
- EMHM003 had a detection of DRO at 120  $\mu$ g/L, which is below the MTCA Method A Groundwater Cleanup Level of 500  $\mu$ g/L.
- EMHC002 and its Duplicate (DUP-vault) had detections of DRO at 110 μg/L μg/L, which is below the MTCA Method A Groundwater Cleanup Level of 500 μg/L.
- EMHC001 had detections of DRO, Mineral Oil and RRO at 1900 μg/L, 1300 μg/L and 320 μg/L, respectively. DRO and Mineral Oil detections exceed MTCA Method A Groundwater Cleanup Level, but are, comparatively, below the 10,000 μg/L ISGP Stormwater Benchmark for TPH.

### 3 Field Efforts

Section 3 details the field efforts that were employed during the April 2015 quarter groundwater sampling event and support tasks. These tasks included pre-field mobilization planning, collection of static groundwater level measurements, sampling of five monitoring wells, handling of project collected environmental samples, documentation of field activities and containment of IDW. Any discrepancies between the *Groundwater Investigation and Quarterly Monitoring Work Plan 2015/2016* (Cardno, April 2015) and the actual field methodologies are also described in this section.

#### 3.1 Pre-Field Mobilization Planning

The April 2015 quarterly groundwater monitoring was scheduled for and conducted on April 15, 2015. Cardno coordinated the scheduling of this event with PC and KTA staff to minimize any logistical impacts to the yearly plant maintenance outage. This scheduled had been discussed and approved during the planning phase and at the Kick-Off Meeting held on 13 March, 2015. Pre field mobilization items considered also included health and safety concerns, coordination with the analytical testing facility and reservation / ordering / procurement / rental of all necessary field sampling equipment, monitoring instruments, personal protective equipment, and field consumables.

Within several days prior to initiation of groundwater sampling, Cardno was in direct contact with the PC Environmental / Safety Analyst, Project Manager to finalize event coordination, site access and to receive the latest health & safety and site condition reports. The laboratory was consulted during this period and an order was placed for the sampling containers, as wells as other necessary laboratory supplies. Cardno retrieve the containers and supplies directly from the laboratory during the mobilization to the site.

#### 3.1.1 <u>Health and Safety</u>

A Site Specific Health and Safety Plan was drafted for the groundwater sampling events and is included in the Cardno 2015 Work Plan (Cardno, April 2015). At a minimum this Health and Safety Plan provides emergency contact information, routes to the nearest medical and/or aid facilities and site specific work task and environmental /physical hazard information. Prior to the initiation of any field tasks, a mandatory tailgate safety meeting is conducted each field day. The purpose of these Tailgate Meetings is to review any expected site specific hazards, general task hazards, current / changed site conditions, to receive a briefing from PC, to discuss emergency procedures, and to review our daily work / task schedule. Health and Safety Tailgate Forms are included in Appendix A.

#### 3.2 Groundwater Level Measurements and Flow Direction Assessment

Prior to sample collection, each monitoring well was opened and its expansion plug was removed. Ample time was allotted for each well to equilibrate to the current ambient air pressure. An electronic interface probe was used to measure both the presence/thickness of any accumulated free-phase hydrocarbon product and the distance from the edge of the well casing to the surface of the water table (static water level) within each monitoring well.

The SW corner of the GSU-1 containment wall was assigned an elevation of 100.00 feet above mean-sea level. Water level measurements were subtracted from their relative well casing elevations to calculate the (relative) elevation of the groundwater table beneath each well location. MW-1 is the high point at 93.49 feet and MW-6 is the low point at 91.11 feet above mean-sea level. Once the groundwater table elevations where calculated at each well, groundwater contours were constructed and groundwater flow direction was assessed. Based on assessment of the groundwater table elevations and the derived water table contours, the groundwater at the site appears to flow east to west and bends sharply to the south-southwest.

Table 1 lists the well casing elevations, depth to product, static water level measurements and groundwater elevations calculated for this quarterly event. Figure 2 shows the generalized groundwater flow direction.

| Location                         | Top PVC Well<br>Casing<br>(ft amsl) | Depth to Product<br>(ft) | Static Water Level<br>Measurements (ft) | Groundwater<br>Elevation (ft amsl) |
|----------------------------------|-------------------------------------|--------------------------|-----------------------------------------|------------------------------------|
| SW corner GSU-1 containment wall | 100.00 <sup>1</sup>                 | Not Detected             | NA                                      | NA                                 |
| MW-1                             | 97.76                               | Not Detected             | 4.27                                    | 93.49                              |
| MW-3                             | 97.57                               | Not Detected             | 5.03                                    | 92.54                              |
| MW-4                             | 97.64                               | Not Detected             | 4.90                                    | 92.74                              |
| MW-5                             | 97.08                               | Not Detected             | 4.98                                    | 92.10                              |
| MW-6                             | 96.18                               | Not Detected             | 5.07                                    | 91.11                              |

 Table 1. Water Level Measurements and Groundwater Elevations

<sup>1</sup>All elevations are referenced to the top of the SW corner of the GSU-1 containment wall. The location was assigned an elevation of 100.00' above mean sea level (amsl).

#### 3.3 Groundwater Sampling

Groundwater sampling events are scheduled for completion on a quarterly basis. This first event was completed on April 15, 2015. Subsequent events are tentatively planned for 3<sup>rd</sup> quarter 2015 (July – September), 4<sup>th</sup> quarter 2015 (December) and mid-late 1<sup>st</sup> quarter 2016

(February-March). Groundwater sampling activities were conducted using U.S. Environmental Protection Agency Low-Flow Sampling Techniques and WA Department of Ecology accepted methodology. Monitoring wells at the PC-Chehalis Plant were sampled and analyzed for mineral oil using the total petroleum hydrocarbons – diesel extended range (TPH-Dx) method. Monitoring well locations are presented on Figure 1.

Prior to sampling, all five site monitoring wells were properly and effectively developed / redeveloped on April 9, during the 2015 SI field event. All monitoring wells were allowed to settle and equilibrate for at least three days prior to sampling activities. Well construction and development details are included in the MWIR (Cardno, May 2015).

A peristaltic pump with dedicated platinum-cured Tygon® tubing, connected to dedicated, Teflon®-lined polyethylene tubing, was used to purge and to obtain groundwater samples at each well location using low-flow sampling techniques (where pumping rates are matched to achieve minimal drawdown of the water column during pumping). Monitoring wells were purged until water quality readings had stabilized or a maximum of three casing volumes had been removed. Water quality parameter measurements were recorded during sample purging (stabilization assessment) and included: specific conductivity, temperature, pH, dissolved oxygen (DO) and turbidity. A summary of the collected water quality measurements are presented in Table 2.

Samples were collected from the mid-screen depth or from the middle of the existing water column, whichever of these two scenarios is the deepest level. Table 3 lists water sample information, including parameters, testing methods and number of samples and duplicates. Sampling and water quality information collected at each well includes purge rate, water level, parameter measurements and cumulative volume of groundwater purged from well at each well volume interval. Monitoring Well Sampling and Water Quality Measurement Forms are include in Appendix B.

| Well ID | Date /<br>Sample<br>Time | Average<br>Purge<br>Rate<br>(ml/min) | Total<br>Purge<br>Volume<br>(gal) | Temp.<br>(C°) | рН   | Sp. Cond<br>(µS/cm) | Turbidity<br>(NTU) | Dissolved<br>Oxygen<br>(mg/L) |
|---------|--------------------------|--------------------------------------|-----------------------------------|---------------|------|---------------------|--------------------|-------------------------------|
| MW-1    | 4/15/15<br>(1015)        | ~134                                 | 3.5                               | 12.8          | 6.32 | 164                 | 23.8               | 1.31                          |
| MW-3    | 4/15/15<br>(1115)        | 100                                  | 1.5                               | 12.8          | 6.39 | 219.1               | 16.5               | 5.67                          |
| MW-4    | 4/15/15<br>(1220)        | 100                                  | 2                                 | 11.9          | 6.33 | 170.8               | 11.7               | 2.4                           |
| MW-5    | 4/15/15<br>(1330)        | 100                                  | 2                                 | 13.8          | 6.49 | 132.3               | 18.0               | 0.61                          |
| MW-6    | 4/15/15<br>(1415)        | 100                                  | 1.5                               | 13.8          | 6.24 | 150.9               | 24.8               | 3.47                          |

#### Table 2 Summary of Water Quality Measurements

\*\*All wells are 2-inch diameter Sch40 PVC

Groundwater Monitoring Report 1<sup>st</sup> Quarterly Event – April 2015 PacifiCorp Chehalis Plant

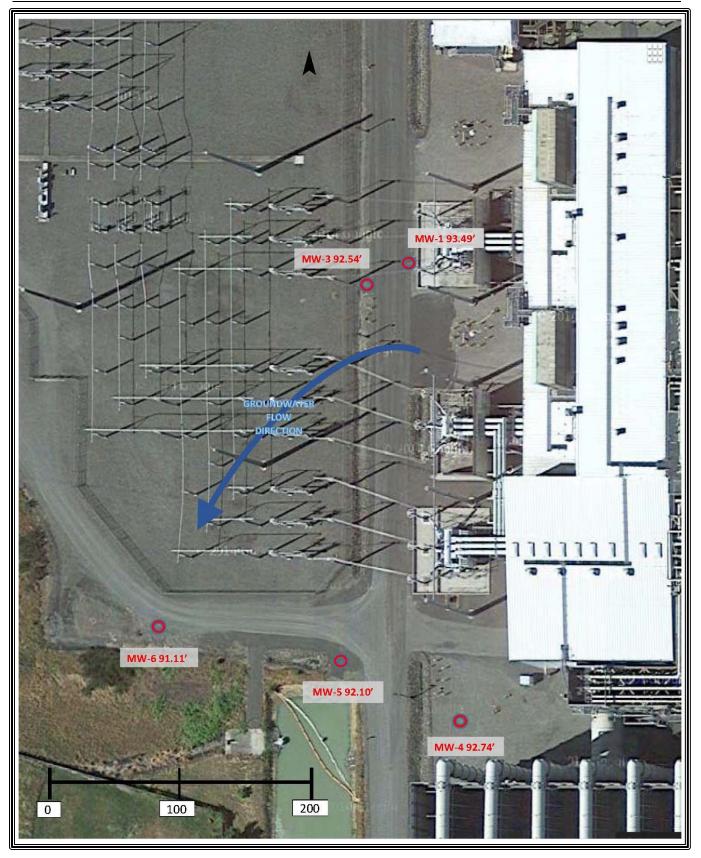


Figure 2. Groundwater Elevations and Flow Direction

|                                             | Analytical  | Sample | Analytical | No. of  | No. of     |
|---------------------------------------------|-------------|--------|------------|---------|------------|
| Sample Type                                 | Parameter   | Matrix | Method     | Samples | Duplicates |
| Quarterly<br>Groundwater<br>Sampling Events | Mineral Oil | Water  | NWTPH-Dx   | 5       | 1          |

#### Table 3. Groundwater Sample Collection Information

#### 3.4 Sample Handling, Field Documentation and Quality Assurance

This section discussed field documentation and procedures used to handle and manage the environmental samples collected for laboratory analysis. Project quality assurance methods are also detailed.

#### 3.4.1 Field Documentation

A logbook was used to document sampling and other support procedures performed during field activities. More specifically, the Field Activities Logbook entries provide a record of specific sample locations and collection information, any subcontractor activities, noting their role(s), describing the major equipment used at each sampling location and providing noteworthy observations, description of problems, or incidents and their resolutions. Completed field forms, planning and safety documents and the Field Activities Logbook were all stored in a weather-proof file box, maintained on site, during all project work activities. Field Activity Logbook entries are included in Appendix C.

#### 3.4.2 Sample Handling Procedures

After samples were collected into laboratory supplied containers, they were appropriately labeled and placed on ice within insulated coolers. This was done to keep the samples out of the direct sunlight and to maintain a temperature of four degrees centigrade. All project samples were hand-delivered to the contracted laboratory, Analytical Resources, Incorporated (ARI) laboratory in Tukwila, WA.

Disposable nitrile gloves were used by personnel collecting and handling all samples. Gloves were changed frequently and in between each sample collection to avoid cross contamination.

#### 3.4.2.1 Sample Identification, Labeling and Chain of Custody

Samples were identified by their location and corresponding date of collection. Any quality control samples (e.g. duplicates) were also properly denoted. Sample identification numbers, including sample media type, location number, and other pertinent descriptions were recorded on field sheets completed for each location and sample.

Chain of Custody (CoC) forms, detailing sample container, collection and possession information, were completed and accompanied each cooler shipment from the field to the laboratory. Date, time, sample identification, number of containers, analysis to be performed, and sampler/s in possession were recorded on each CoC. CoC records are included in Appendix D.

#### 3.4.3 Quality Assurance Methods

#### 3.4.3.1 Instrument Calibration

All field instruments that required a zeroing and/or a user calibration were appropriately calibrated at the start of each day's deployment per the instrument manufacturer's instructions. Calibration checks against standards were performed at the beginning and periodically throughout each field day (if necessary / required) to verify equipment operation. Any calibration data was recorded in the field logbook. All calibration media (e.g. gas, liquid or otherwise) was properly stored and managed per manufacturer's recommendations and according to applicable PC Plant requirements.

#### 3.4.3.2 Decontamination Procedures

Any non-disposable equipment (except rigs, vehicles and large drilling equipment such as auger flights) that had not been previously decontaminated and ready for project use, or was exposed to site soils, groundwater or other non-sample media contact and slated for re-use at multiple sample locations was decontaminated prior to its initial use and after completing a particular sampling or logging task. Decontamination wash consisted of the following:

- > non-phosphate detergent (Alconox) and water wash;
- > tap water rinse; and
- > De-ionized water rinse.
- > Drilling rigs, support vehicles, drill works, connection rods, augers and other large pieces of equipment would be decontaminated by power washing with a high-pressure steam cleaner only as described in Section 4 of the 2015 Project Work Plan (Cardno, April 2015).

#### 3.5 Investigation Derived Waste

Investigation-derived waste (IDW) generated during this quarterly groundwater sampling event consisted of excess groundwater purge and decontamination/rinse water. All IDW was containerized in Department of Transportation (DOT)-17H approved open head 55-gallon drums. Drums were properly labeled with their media contents, date of generation, location of origin, and contents' owner. All drums were sealed with fitted, gasketed lids and bolted bands, then placed on pallets. Approximately 10.5 gallons of purge and decontamination water were generated during this quarterly sampling event.

All drum/pallet placements were approved by the PC Environmental / Safety Analyst – Project Manager and stored wholly within PacifiCorp property. Additional IDW tasks, including testing, further staging, manifesting and disposal are being managed directly by PacifiCorp. No IDW was transported off of the site, nor manifested by Cardno.

#### 3.6 Project Work Plan Discrepancies

There were no significant or substantive changes, modifications, or revisions between the Project Work Plan (PWP) (Cardno, April 2015) and the actual field tasks as performed. Methodologies as described in the PWP were followed and conducted and completed accordingly.

### 4 Analytical Results

This section summarizes the results of the groundwater sampling activities completed at the PacifiCorp Chehalis Plant on April 15, 2015. Samples were analyzed for mineral oil using Northwest methods for total petroleum hydrocarbons – diesel extended range (NWTPH-Dx). These results are compared to the appropriate WA DoE MTCA Method A Cleanup Levels (WAC 173-340). The complete analytical report, including the CoC forms and electronic data deliverable table, are included in Appendix D.

#### 4.1 Comparison of Project Results to Regulatory Guidance

Assessment of mineral oil in groundwater sample data results are compared to permissible values listed for WA DoE MTCA Method A Cleanup Levels for Groundwater (WAC 173-340-720). MTCA's definition of Mineral Oil means non-PCB mineral oil, typically used as an insulator and coolant in electrical devices such as transformers and capacitors measured using NWTPH-Dx. The MTCA Method A Groundwater Cleanup Level for Mineral Oil of **500 µg/L** is based on protection from noncarcinogenic effects during drinking water use. Additional PCB testing requirements listed under the MTCA groundwater section (173-340-720) do not apply to project sampling because PacifiCorp can demonstrate that: (1) The release originated from an electrical device that was manufactured after July 1, 1979; or (2) oil containing PCBs was never used in the equipment suspected as the source of the release; or (3) it can be documented that the oil released was recently tested and did not contain PCBs.

#### 4.2 Groundwater Sampling Results

Five groundwater samples, along with one duplicate (duplicate from MW-4) were submitted to ARI Labs for Mineral Oil analysis via NWTPH-Dx. Results are reported as Diesel Range Organics (DRO), Mineral Oil and Residual Range Organics (RRO) / heavy fuel oil. DRO quantitation was noted on chromatograph peaks in the range from C12 to C24. Mineral Oil quantitation was noted on chromatograph peaks in the range from C18 to C28. RRO quantitation was noted on chromatograph peaks in the range from C24 to C38. Combined, the DRO/RRO results indicate the total diesel range extended (Dx) identified in a particular sample. Mineral Oil, therefore, is a subset of the total DRO/RRO concentration.

DRO was noted at reportable quantities from one location, MW-1, near GSU#1, having a concentration of 120  $\mu$ g/L. DRO detection at this well was below the MTCA Method A Groundwater Cleanup Level for Mineral Oil of **500**  $\mu$ g/L. There were no other reportable detections of DRO/RRO or Mineral Oil at any of the project tested well locations. Groundwater sampling results are presented in Table 4.

| Sample ID | Parameter   | Detection Limit<br>µg/L | Reporting<br>Limit µg/L | Result Value<br>µg/L | Data<br>Qualifier |
|-----------|-------------|-------------------------|-------------------------|----------------------|-------------------|
| MW-1      | DRO         | 20                      | 100                     | 120                  |                   |
| MW-1      | Mineral Oil | 40                      | 200                     | 200                  | U                 |
| MW-1      | RRO         | 0                       | 200                     | 200                  | U                 |
| MW-3      | DRO         | 20                      | 100                     | 100                  | U                 |
| MW-3      | Mineral Oil | 40                      | 200                     | 200                  | U                 |
| MW-3      | RRO         | 0                       | 200                     | 200                  | U                 |
| MW-4      | DRO         | 20                      | 100                     | 100                  | U                 |
| MW-4      | Mineral Oil | 40                      | 200                     | 200                  | U                 |
| MW-4      | RRO         | 0                       | 200                     | 200                  | U                 |
| DUP-GW    | DRO         | 20                      | 100                     | 100                  | U                 |
| DUP-GW    | Mineral Oil | 40                      | 200                     | 200                  | U                 |
| DUP-GW    | RRO         | 0                       | 200                     | 200                  | U                 |
| MW-5      | DRO         | 20                      | 100                     | 100                  | U                 |
| MW-5      | Mineral Oil | 40                      | 200                     | 200                  | U                 |
| MW-5      | RRO         | 0                       | 200                     | 200                  | U                 |
| MW-6      | DRO         | 20                      | 100                     | 100                  | U                 |
| MW-6      | Mineral Oil | 40                      | 200                     | 200                  | U                 |
| MW-6      | RRO         | 0                       | 200                     | 200                  | U                 |

Table 4. Groundwater Sampling Results

U = non-detect

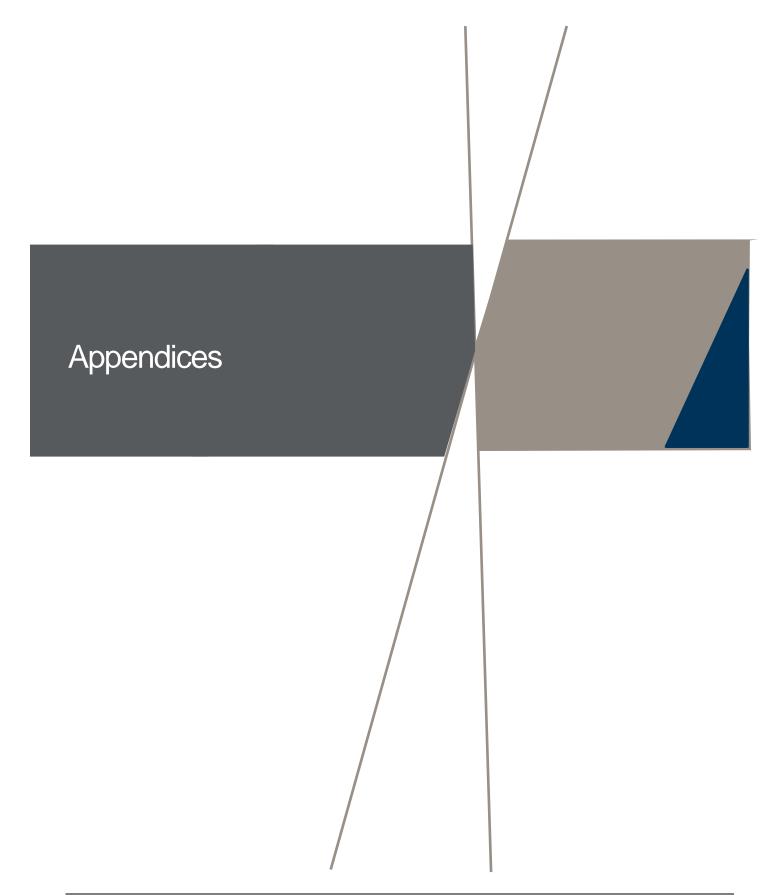
Duplicate collected at MW-4

### 5 References

- Cardno 2015. Groundwater Investigation and Quarterly Monitoring Work Plan 2015/2016, PacifiCorp Chehalis, WA Plant. April 2015
- Cardno 2015. Monitoring Well Installation and Support Tasks Final Report, PacifiCorp Chehalis, WA Plant. May 2015
- Cardno TEC Inc. (Cardno TEC) 2011. Site Investigation Report, PacifiCorp Chehalis Plant, Chehalis, Washington.
- Cardno TEC 2014. PacifiCorp Groundwater Investigation (Report), PacifiCorp Chehalis Plant
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- Dames and Moore, Inc. 1994. *Groundwater Resources Investigation for Ecology Groundwater Right Application No. G2-29004.* Prepared for Chehalis Power, Inc. Chehalis, Washington. July 7.
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2008. Minimum Standards for Construction and Maintenance of Wells. Washington Administration Code 173-160 & 173-162.

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- Weigle, J.M. and B.L. Foxworthy 1962. *Geology and Groundwater Resources of Western Central Lewis County, Washington.* Water Supply Bulletin No. 17. State of Washington Department of Conservation, District of Water Resources.



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## APPENDIX A HEALTH AND SAFETY TAILGATE FORMS

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#### Attachment 1 Daily Health and Safety Tailgate Meeting Form

DAILY HEALTH AND SAFETY TAILGATE MEETING FORM Project Health and Safety Manager Conducting Meeting : Date: 4-15-15 Weather: SUNNY, breezy 40-50°s Personnel In Attendance : Dave Metallo, Brad Kwasnowski Meeting Minutes (Brief description of topics, special concerns and sites discussed): - Discussed today's planned GW sampling fasks - Plant/site specific safety concerns - Overhead high voltage lines - Plant (radio) communications, check in w/ Control room a w/our PC Project Manager contact (Jeromy Smith) - Slip - Trips - Falls - Housekeeping / Clean site - Lifting of Leony coolers - Wearing Proper PPE & known (potential) hazards of related to exposure to ground water Signature of Attendees' : - Mallo "THE BEST JOB IS ONE DONE SAFELY ! "

### APPENDIX B

### MONITORING WELL SAMPLING AND WATER QUALITY MEASUREMENT FORMS

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PAGE 1\_ OF 2\_



| Date: 13 ABRIK- 2015                                | PID Borehole Reading:                                 |
|-----------------------------------------------------|-------------------------------------------------------|
| Project Name: Pacificurp Greating ATER INVESTIGHTAN | LNAPL: Y N X_ DNAPL: Y N X Product Depth_NA           |
| Site Name: Pocificulp                               | Purge Style Peristaltic) Bladder / Submersible /Other |
| Sample Location ID:                                 | Mid Screen Depth (ft btoc): 10.50                     |
| Unique ID: MW-Z                                     | Pump Intake (ft btoc) /0.50                           |
| Sampler(s) B. K. Washinshi / D. METALL              | QC Sample: Y 🔊 Type:                                  |
| Parameters: NNYPH-0x                                | 70=10-55 1625                                         |

| Time                                                              | Purge Rate<br>(ml/min)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Total<br>Purge<br>(gai) | Depth to<br>Water (ft<br>btoc) | Temp.<br>© | рН     | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L)   | Comments                         |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------|------------|--------|----------------------|---------------------|----------------|----------------------------------|
|                                                                   | Stabiliz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ation Req               | uirements                      | (±10%)     | (±0.2) | (±10%)               | (± 10 %)            | (±10%)         |                                  |
| 8:55                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         | 14.27                          |            |        |                      |                     |                | Initial water level, pre-pumping |
| 9:20                                                              | ~ 200 / Anins                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10/06                   | 5.61                           | 120        | 5.63   | 200.1                | 60.2                | 4.33           |                                  |
| 9:25                                                              | - 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | - Sound                 | 5.94                           | 12.2       | 6.02   | 171.2                | 58.3                | 3.45           | *<br>                            |
| 9:27                                                              | ~250                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | - SOCAL                 | 6.52                           | 12.4       | 67.22  | 172.3                | 68.3                | 3.35           |                                  |
| 9:30                                                              | -200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ~ 500                   | 6.98                           | 12.4       | 6.33   | 172.7                | 66.67               | 2.80           |                                  |
| 9:33                                                              | - 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | - 500                   | 7.31                           | 12.5       | 6.37   | 174.8                | 81.2                | 3.03           | SLOWED DUMP<br>RATE TO CEVEL L   |
| 938                                                               | Ro JOW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | .500                    | 7.35                           | 12.6       | 6.38   | 172.7                | 65.0                | 2.66           |                                  |
| 9:42                                                              | - 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | - 520                   | 7.10                           | 12.7       | 6.37   | 171.2                | 48.5                | 2.31           |                                  |
| 9:47                                                              | -100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ~ 500                   | 7.39                           | 1.7        | 6.35   | 168.8                | 36.2                | 196            | SPEED ON PUMP                    |
| 9:52                                                              | ~100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | - 500                   | 7.37                           | 12.8       | 6.35   | 166.9                | 32.4                | 1.67           |                                  |
| 9:57                                                              | - 400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ~ 570                   | 7.37                           | 12.8       | 6.32   | 163.5                | 26                  | 1.18           |                                  |
| <sup>1</sup> Water Level Measurements in these boxes must match ! |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         |                                |            |        |                      |                     |                |                                  |
|                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         | 1                              |            |        |                      |                     |                |                                  |
| (DUP)                                                             | and the second sec |                         |                                |            |        |                      |                     | and the second |                                  |



#### Cordno<sup>®</sup> Shaping the Future

| Date: 15 ppril 2015                   |
|---------------------------------------|
| Project Name: Pacine Comp             |
| Site Name:                            |
| Sample Location ID: Mni-2 (CONTINUED) |
| Unique ID:                            |
| Sampler(s)                            |

Parameters:\_\_\_\_\_\_

| PID Borehole Reading:                                   |   |
|---------------------------------------------------------|---|
| LNAPL: Y N DNAPL: Y N Product Depth                     | _ |
| Purge Style: Peristaltic / Bladder / Submersible /Other |   |
| Mid Screen Depth (ft btoc):                             |   |
| Pump Intake (ft btoc)                                   |   |
| QC Sample: Y / N Type:                                  |   |

| Time  | Purge Rate<br>(ml/min) | Total<br>Purge<br>(gal) | Depth to<br>Water (ft<br>btoc) | Temp.<br>© | рН     | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L) | Comments                         |
|-------|------------------------|-------------------------|--------------------------------|------------|--------|----------------------|---------------------|--------------|----------------------------------|
|       | Stabiliz               |                         | uirements                      | (±10%)     | (±0.2) | (±10%)               | (± 10 %)            | (±10%)       | -                                |
|       |                        |                         | 1                              |            |        |                      |                     |              | Initial water level, pre-pumping |
| 9:57  | 2 100                  | ~ 500                   | 7.37                           | 12.8       | 6.32   | 103.5                | 22.6                | 1.18         |                                  |
| 10:02 | 2100                   | - 500                   | 7.37                           | 12.8       | 6.33   | 164.4                | 24.2                | 1.33         |                                  |
| 10:05 | - 100                  | ~ 300                   | 7.37                           | 12.2       | 6.32   | 164.0                | 23.8                | 1.31         |                                  |
|       |                        |                         |                                |            |        |                      |                     |              |                                  |
|       |                        |                         |                                |            |        |                      |                     |              |                                  |
|       |                        |                         |                                |            |        |                      |                     |              |                                  |
|       |                        |                         |                                |            |        |                      |                     |              | 7                                |
|       |                        | ·                       |                                |            |        |                      |                     |              |                                  |
|       |                        |                         |                                |            |        |                      |                     |              |                                  |
|       |                        |                         |                                |            |        |                      |                     |              |                                  |
|       |                        |                         |                                |            |        |                      | must match !        |              |                                  |
| 10:15 |                        | ~ 3.5.<br>Car           | 14,27                          | 12.8       | 6.32   | 164.0                | 23.8                | 1.31         |                                  |
| (DUP) |                        |                         |                                |            |        |                      |                     |              |                                  |

| $( \square$ | Cardno             |
|-------------|--------------------|
|             | Shaping the Future |

| Date:         | 4-15-2015                   |
|---------------|-----------------------------|
| Project Name: | Pacificorp GW Investigation |
| Site Name:    | GSU-3                       |
| Sample Locati | on ID: <u>MW-3</u>          |
| Unique ID:    |                             |
| Sampler(s)    | B. Kwasnowski / D. Metallo  |
| Parameters:   | TPH-DX (Mineral Oil)        |

| PID Borehole Reading:A                                  |  |
|---------------------------------------------------------|--|
| LNAPL: Y NX_ DNAPL: Y NX Product Depth <u>NA</u>        |  |
| Purge Style: Peristaltic / Bladder / Submersible /Other |  |
| Mid Screen Depth (ft btoc): //.5                        |  |
| Pump Intake (ft btoc)//.5                               |  |
| QC Sample: Y /(N) Type:                                 |  |
| TD=19.21                                                |  |

| Time  | Purge Rate<br>(ml/min)                                            | Total<br>Purge<br>(gal) | Depth to<br>Water (ft<br>btoc) | Temp.<br>© | рН     | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L) | Comments                         |
|-------|-------------------------------------------------------------------|-------------------------|--------------------------------|------------|--------|----------------------|---------------------|--------------|----------------------------------|
|       | Stabilization Requirements                                        |                         |                                | (±10%)     | (±0.2) | (±10%)               | (± 10 %)            | (±10%)       |                                  |
| 1025  | 1075 15.03                                                        |                         | 15.03                          |            |        |                      |                     |              | Initial water level, pre-pumping |
| 10:35 | ~100                                                              | ~500 ML                 | 6.15                           | 12.3       | 6.45   | 243.5                | 9.3                 | 6.34         | pump speedel                     |
| 10:40 | -100                                                              | 500 AL                  | 6.83                           | 12.4       | 6.45   | 2431                 | 9.0                 | 5.89         |                                  |
| 10:45 | -100                                                              | - Soval                 | 7.51                           | 12.4       | 646    | 242.3                | 8.5                 | 5.91         |                                  |
| 10:50 | ~100                                                              | · 526 2                 | 8.23                           | 12.4       | 6.45   | 2390                 | 11.8                | 5.98         | 2042 5282<br>20-5                |
| 5     | 2100                                                              | - 500                   | 898                            | 12.6       | 6.38   | 210.6                | 21.3                | 5.87         |                                  |
| 11:05 | -100                                                              | - 500                   | 9.67                           | 12.6       | 6.37   | 213.8                | 16.5                | 575          |                                  |
| 11:05 | ~100                                                              | ~ 500                   | 10.35                          | 12.8       | 6.40   | 215.3                | 16.6                | 5.69         |                                  |
| 1. e  | 100                                                               | - 500                   | 10,97                          | 12.8       | 6.39   | 219.1                | 16.5                | 5.67         |                                  |
|       |                                                                   |                         |                                |            |        |                      |                     |              |                                  |
|       |                                                                   |                         |                                |            |        |                      |                     |              |                                  |
|       | <sup>1</sup> Water Level Measurements in these boxes must match ! |                         |                                |            |        |                      |                     |              |                                  |
| 1115  |                                                                   | ~1.5                    | 1 5.03                         | 12.8       | 6.39   | 219.1                | 16.5                | 5.67         |                                  |
|       |                                                                   |                         |                                |            |        |                      |                     |              |                                  |

| Date:           | 15 APRIL               | 2015                    |                                |              |              | PID Borehole Reading:A<br>LNAPL: Y N 🍌 DNAPL: Y N 🙀 Product Depth |                                        |                |                                 |  |  |
|-----------------|------------------------|-------------------------|--------------------------------|--------------|--------------|-------------------------------------------------------------------|----------------------------------------|----------------|---------------------------------|--|--|
|                 | ame: Pa                |                         | 67                             |              |              |                                                                   |                                        |                |                                 |  |  |
| Site Nam        | e:                     |                         |                                |              |              | Purge Sty                                                         | le: Peristaltic                        | / Bladder / Su | ubmersible /Other               |  |  |
| Sample L        | ocation ID:            | MW-4                    | 0                              | 5            |              | en Depth (ft bt                                                   |                                        | 2              |                                 |  |  |
| Unique ID: MN-4 |                        |                         |                                |              |              |                                                                   | ake (ft btoc)                          |                |                                 |  |  |
| Sampler(        | s) <u>3 Knia</u>       | sagensiv                | 1 / 0.19 27                    | ALLO         |              |                                                                   | ole: 🕖 N Ty                            | pe: Dupe       | 1847 2                          |  |  |
| Paramete        | ers: <u>Natra</u>      | 011-Dx                  |                                |              |              | TO                                                                | = 24.82<br>FRUM T-P                    | OF PUGE        | 45144)                          |  |  |
| Time            | Purge Rate<br>(ml/min) | Total<br>Purge<br>(gal) | Depth to<br>Water (ft<br>btoc) | Temp.<br>©   | рН           | Sp. Cond.<br>(µS/cm)                                              | Turbidity<br>(NTUs)                    | DO<br>(mg/L)   | Comments                        |  |  |
|                 | Stabiliz               | ation Req               | uirements                      | (±10%)       | (±0.2)       | (±10%)                                                            | ) (± 10 %)                             | (±10%)         |                                 |  |  |
| 11:45           |                        |                         | 1 4.90                         |              |              |                                                                   |                                        |                | Initial water level, pre-pumpin |  |  |
| 1:50            | ~/00                   | 500<br>146              | 5.09                           | 11.9         | 6.38         | 170.00                                                            | 14.0                                   | 5.4            |                                 |  |  |
| 1:55            | ~100                   | SELAL                   | 5,00                           | 11.9         | 6.36         | 170.7                                                             | 130                                    | 3.5            |                                 |  |  |
| 2:00            | -100                   | Socal                   | 5.08                           | 11.9         | 6.34         | 170.7                                                             | 11.0                                   | 2.7            |                                 |  |  |
| 2:05            | ~1.88                  | 200<br>inL              | 5.06                           | 11.7         | 6.34         | 170.8                                                             | 11.2                                   | 2.6            |                                 |  |  |
| 2:10            | 1.1.1.2                | SOUNC                   | 5,06                           | 11.9         | 6.33         | 170.8                                                             | 11.7                                   | 2,4            |                                 |  |  |
|                 |                        |                         |                                |              |              |                                                                   | ······································ |                |                                 |  |  |
|                 |                        |                         |                                |              |              |                                                                   |                                        |                |                                 |  |  |
|                 |                        |                         |                                |              |              |                                                                   |                                        |                |                                 |  |  |
|                 |                        |                         |                                |              |              |                                                                   |                                        |                |                                 |  |  |
|                 |                        |                         |                                |              |              |                                                                   |                                        |                |                                 |  |  |
|                 |                        | · ·                     | <sup>1</sup> Water Le          | evel Measure | ements in tl | nese boxes r                                                      | must match !                           |                |                                 |  |  |
| 2:15            | San Barrie             | 2-644                   | 1 4.90                         | 11.9         | 6.33         | 170.8                                                             | 11.7                                   | 2.4            |                                 |  |  |
| JP)<br>12:20    |                        | ii ii                   |                                | anderin      |              | State Statements                                                  |                                        | The second     | Dup 10: DUD-GW                  |  |  |

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|-------------|--------------------|
|             | Shaping the Future |

| Date: 15 April      | 2 2015     |   |           |  |
|---------------------|------------|---|-----------|--|
| Project Name:       | PACIEICERP |   |           |  |
| Site Name:          |            |   |           |  |
| Sample Location ID: | MW-5       |   |           |  |
| Unique ID:          | 19W-5      |   |           |  |
| Sampler(s) 8. 161   | VASNONSEI  | Ø | 19E7411 8 |  |

Parameters: NW7+2H-D×

| PID Borehole Reading:                                   |
|---------------------------------------------------------|
| LNAPL: Y N 💥 DNAPL: Y N 🔀 Product Depth                 |
| Purge Style: Peristaltic / Bladder / Submersible /Other |
| Mid Screen Depth (ft btoc): 15.3                        |
| Pump Intake (ft btoc) / 5.3                             |
| QC Sample: Y DType:                                     |

70=25.3

| Time  | Purge Rate<br>(ml/min) | Total<br>Purge<br>(gal) | Depth to<br>Water (ft<br>btoc) | Temp.<br>©   | рН           | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L) | Comments                         |
|-------|------------------------|-------------------------|--------------------------------|--------------|--------------|----------------------|---------------------|--------------|----------------------------------|
|       | Stabiliz               | ation Req               | uirements                      | (±10%)       | (±0.2)       | (±10%)               | (± 10 %)            | (±10%)       |                                  |
| 13:00 |                        |                         | 14.98                          |              |              |                      |                     |              | Initial water level, pre-pumping |
| 13:05 | 400                    | 258022                  | 5.13                           | 13.6         | 6.57         | 133.0                | 30.0                | 1.09         |                                  |
| 13.10 | -100                   | ~ STC                   | 5,13                           | 13.0         | 6.49         | 132.4                | 26.0                | 0.78         |                                  |
| 13:15 | -100                   | 520                     | 5.13                           | 13.7         | 6.49         | 132.5                | 19.7                | 0.71         |                                  |
| 13:20 | ~100                   | - 500<br>ML             | 5.13                           | 13.7         | 6.49         | 131.5                | 18.6                | 0.69         |                                  |
| 13:25 | ~100                   | - 52.0                  | 5.14                           | 13.8         | 6.49         | 132.3                | 18.0                | 0.01         |                                  |
|       |                        |                         |                                |              |              |                      |                     |              |                                  |
|       |                        |                         |                                |              |              |                      |                     |              |                                  |
|       |                        |                         |                                |              |              |                      |                     |              |                                  |
|       |                        |                         |                                |              |              |                      |                     |              | +;<br>                           |
|       |                        |                         | <sup>1</sup> Water Le          | evel Measure | ements in th | nese boxes i         | must match !        | l,           |                                  |
| 13:30 |                        | 2-442                   | 1 4.98                         | 13.6         | 6.49         | 132.3                | 18.0                | 0.61         |                                  |
| (DUP) |                        |                         |                                |              |              |                      |                     |              |                                  |

PAGE / OF /

|   | Cardno®            |
|---|--------------------|
| / | Shaping the Future |

| Date: 15 4prin 2015                    | _ PID Borehole Rea  |
|----------------------------------------|---------------------|
| Project Name: Pacific Comp             | LNAPL: Y N 🤰        |
| Site Name:                             | _ Purge Style: Peri |
| Sample Location ID:                    | Mid Screen Depth    |
| Unique ID: MW-C                        | _ Pump Intake (ft b |
| Sampler(s) B. Evilas Nowski D. Maralla | QC Sample: Y/       |

Parameters: NWTPH-O-

| PID Borehole Reading:                                   |   |
|---------------------------------------------------------|---|
| LNAPL: Y N X DNAPL: Y N Product Depth                   | D |
| Purge Style: Peristallic / Bladder / Submersible /Other |   |
| Mid Screen Depth (ft btoc): 15.30                       |   |
| Pump Intake (ft btoc)                                   |   |
| QC Sample: Y / Dype:                                    |   |

70=25.30

| Time  | Purge Rate<br>(ml/min) | Total<br>Purge<br>(gal) | Depth to<br>Water (ft<br>btoc) | Temp.<br>©   | рН           | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L) | Comments                         |
|-------|------------------------|-------------------------|--------------------------------|--------------|--------------|----------------------|---------------------|--------------|----------------------------------|
|       | Stabiliz               | ation Req               | uirements                      | (±10%)       | (±0.2)       | (±10%)               | (± 10 %)            | (±10%)       |                                  |
| 13:45 |                        |                         | 15.07                          |              |              |                      |                     |              | Initial water level, pre-pumping |
| 13:30 | 12100                  | - 5250<br>146           | 5.23                           | 13.6         | 6.24         | 150.3                | 25.1                | 23.93        | -                                |
| 13:55 | ~100                   | - gec<br>ML             | 527                            | 13.1         | 6.22         | 150 3                | 30.2                | 3.61         |                                  |
| 14:00 | 2100                   | -500<br>ML              | 5.27                           | 13.8         | 6.22         | 150.3                | 25.9                | 3.56         |                                  |
| 14:05 | ~/00                   | - Fezzal                | 5.29                           | 13.9         | 6.23         | 127                  | 24                  | 4.3.55       |                                  |
| 14:10 | ~/30                   | - 520<br>2 Ma           | 5,29                           | 13.8         | 624          | 150,9                | 24.8                | 3.47         |                                  |
|       |                        |                         |                                |              |              |                      |                     |              |                                  |
|       |                        |                         |                                |              |              |                      |                     |              | -                                |
|       |                        |                         |                                |              |              |                      |                     |              |                                  |
|       |                        |                         |                                |              |              |                      |                     |              |                                  |
|       |                        |                         |                                |              |              |                      |                     |              |                                  |
|       |                        |                         | <sup>1</sup> Water Le          | evel Measure | ements in th | nese boxes           | must match !        |              |                                  |
| 14:15 |                        | 1.5<br>G46              | 15.07                          | 13,8         | 6.24         | 17.9                 | 24.8                | 3.47         |                                  |
| (DUP) |                        | ·                       |                                |              | A States     |                      |                     |              |                                  |

# APPENDIX C FIELD LOGBOOK ENTRIES

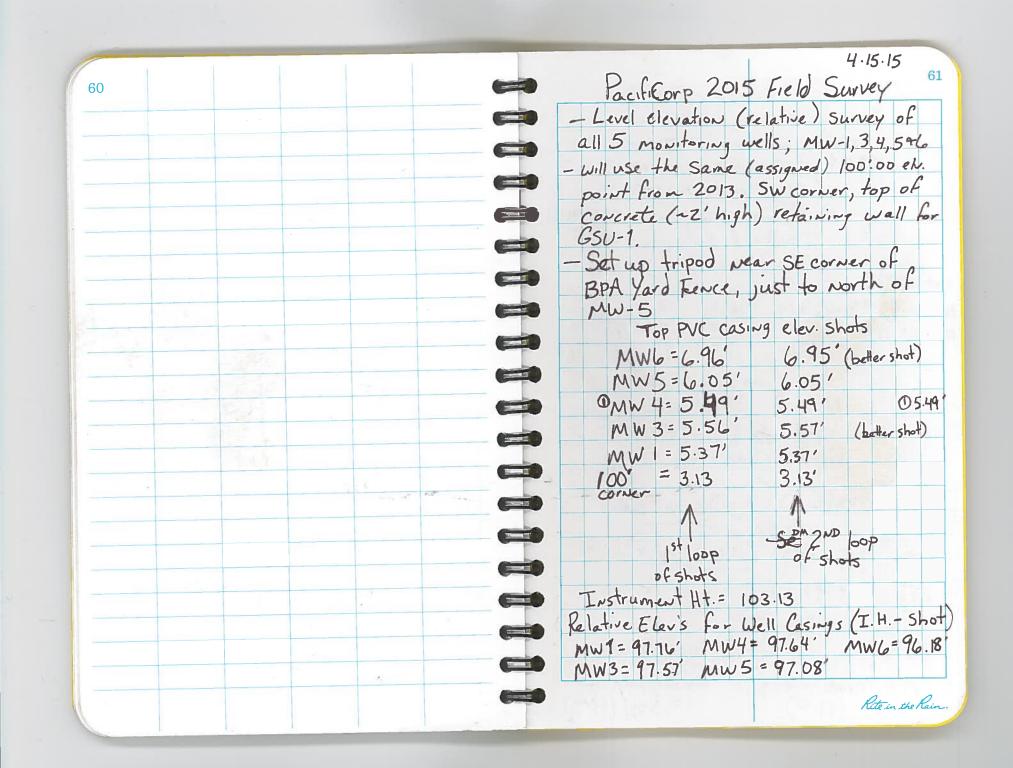
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PacifiCorp 2015 4-15-15 PacifiCorp 2015 4-15-15 - Arrive at Cardino Shop ~0600, lood and Sending (hard delivering) Samples to geor, instruments, supplies, Survey equip. ARI Labs in Tukuila, WA. All Samples ( pallet + tools will be analyzed for Mineral Oil via NWTPH-Dx. We - Mob to PacifiCorp Chehalis Plant, arrive will also conduct an elevation / level-only ~(0750), check in at front desk, contact. Jeverny Smith, pick up bottles, etc. that were left in his office since last survey of the 5 wells - Det up on MW-1 (~0850) week . WL = 4.27' TD = 16.75 - check in w/ plant operator, let him · Sampl. Intake = 10.50 - Peristaltic pump . NWTPH-Dx/mineral Know who we are a where/what we're doing today. We are assigned rodio · No product via IFP ganging - Final WQ Readings = #14 for plant comm. Temp = 12.8°C > pH = 6.32 - Conduct brief Health & Sakety Tailate Sp Cond = 164.0 us/cm Turb= 23.8 NTLL Meeting while parked at Admin Build. \* See Hors Tailgate form for meeting details -----DO = 1.31 mg/L Purse Vol = ~ 3.5 gal Ave Parge Rate = ~ 100 mi/min - Sample = MW-1 (1015) - Mob around to west side of plant \*NOTE : Cascade Drilling left (2) to get set-up for Ground water Sampling task. Joday 18 T we will be collecting groundwater samples from empty 55-gal drums for us to place purge (GW) water into. Placed These drums onto a pallet that Cardno each of the Five existing site wells prought to the site - Setting along south Dom DCM Rite in the Rain.

PacifiCorp 2015 4-15-15 Pacifilorp 2015 4-15-15 37 36 = - MW-4, conted side of GSU#3, near open culvert pipe. - Sample = MW-4 (1215) Labeled drum w/ content-type, date, owner name a content location origin. \* Collected a duplicate sample at this location = DUP-GW (1220) - Set up on MW-3 (~1020) · Depth to product = NA WL = 5.03' · TD = 19.21' #Sampl. Intake Depth = 11.5' · Peristaltic pump · NWTPH-Dx mineral oil - Set up on MW-5 (~1255) · Depth to prod. = NA WL. = 4.98' TD=25.3 Samp/ Intake Depth = 15.3 . Ave Purge Rate = 100 ml/min · Peristattic pump . NWTPH-Dx/mineral oil · Total Purge Vol= ~ 1.5 gals · Final WQ Readings: · Ave Purge Rate = 100 m1/min Temp. pH Sp. Gud. Turb D.O. 12.8 6.39 219.1 16.5 5.67 · Total Purge Vol. = ~2 gels . Final WQ Readings Interior Temp pH Sp. Cond. Turb D.O. 13.8 6.49 132.30 18.0 0.61 \* Units as per MW-1 - Sample = MW-3 (1115) 0.61 \* Units as per MW-1 - Set up on MW-4 (~1140) · Depth to product = NA WI = 4.90 · Sample = MW-5 (1330) . TD = 24.82 Sampl Intake Depth = 14.82 - Set up on MW-6 (~1340) · Peristaltic pump · NWTPH-Dx/minered oil · Depth to prod. = NA . WL = 5.07' · Ave Purge Rate = 100 ml/min TD = 25.30 Sampl Inteke Depth = 15.30 · Total Purge Vol. = ~2 gal.s Allowing the - Final WQ Readings · Peristaltic pump · NWTPH-Dx / M. werd Oil Temp pH Sp. Cond. Turb D.O. 11.90 6.33 170.80 11.70 2.40 · Ave Rurge Rate = 100 m1/min - Total Purge Vol = 1.5 pals \* Units as per MW-1 \_ DCM - DCM Rite in the Rain.

PacifiCorp 2015 4-15-15 39 38 PacifiGrp 2015 4-15-15 \* See Pg 62 of this field log book for survey details MW-6, conted Terral · Final WQ Readings (units as per MW-1) ( Balance ) Temp pH Sp. Cond Turb DO 13.80 6.24 150.90 24.80 - Completed (2) loops of elev. Shot readings closing each to within = 0.01' 3.47 . Sample = MW-6 1415 STREET. - Clean up around site, check samples against CoC for accuracy of fimes \* Transkerred all purge water (from all wells) to a single 55-gal drum and labeling, etc., Samples iced and -(ref. ed on pg 35). ~ 10.5 gals was had been placed into an insulated Thereas a generated from this 1st Quarterly GW cooler. Sampling Event. Drum 1. d was replaced equip., sampler cooler, etc. into var. + Seded w/ accompanying bolted ring band. Drum is on pallet. There THE OWNER OF The second second 15 also (1) empty drum on this pallet. - Made sure all well-heads were capped, locked and monument lids bolted. - Set up and conducted an elevon = elevation survey (level only) of the top of PVC well casings at all 5 - All drums lids secured, all drums labeled and on pallets. Site wells Used stadia rod and survey grade auto-level : Sokkia Unit ALC: NOT model C32 Ser.# 128658 - Checkback in w/ PC Abmin Build., w/22x mag. to collect elev. shot data. return PC radio, let. Jeremy Smith know we are finished sampling and (Internet DCM / Rite in the Rain

Pacifi Corp 2015 4-15-15 40 41 ready to drive back to Seattle. - Mob off site ~ (1530, drive to ARI Labs · arrive ARI Labs ~ (~1700) · drop off samples · all samples are in good condition @~4°C. - 1st Quarterly GW Sampling Round TCM (=) (=) E and the second division of the second divisio Rite in the Rain



# APPENDIX D LABORTORY CHAIN OF CUSTODY FORMS

### AND

### ANALYTICAL REPORT

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#### **Chain of Custody Record & Laboratory Analysis Request**

| ARI Assigned Number:               | Turn-around Requested:          |                |                                      | Page: of                    |                    |      |               |                          |           | Analyti<br>Analyti                | Analytical Resources, Incorporated<br>Analytical Chemists and Consultant |                                                      |                |
|------------------------------------|---------------------------------|----------------|--------------------------------------|-----------------------------|--------------------|------|---------------|--------------------------|-----------|-----------------------------------|--------------------------------------------------------------------------|------------------------------------------------------|----------------|
|                                    |                                 | Stan<br>Phone: | 19980                                |                             | Date: Ice          |      |               |                          |           | 4611 South 134th Place, Suite 100 |                                                                          |                                                      |                |
| ARI Client Company:                | €.                              | 360-2          | 250-36                               | 94                          |                    |      | Ice<br>Prese  | sent?                    |           |                                   |                                                                          | Tukwila, WA 98168<br>206-695-6200 206-695-6201 (fax) |                |
| Client Contact:                    |                                 |                |                                      |                             | No. of<br>Coolers: |      | Coole<br>Temp | er<br>Is:                |           |                                   |                                                                          |                                                      | rilabs.com     |
| Client Project Name:<br>Parci FICa | np - C                          |                | 2                                    |                             |                    |      |               | Analysis                 | Requested |                                   |                                                                          |                                                      | Notes/Comments |
| Client Project #:                  | Samplers:                       | 1410, B.       | hewaso                               | 48m/521                     | OX-                |      |               |                          |           |                                   |                                                                          |                                                      |                |
| Sample ID                          | Date                            | Time           | Matrix                               | No. Containers              | NWT                |      |               |                          |           | -                                 |                                                                          |                                                      |                |
| MW-I                               | 4/15/15                         | 10:15          | W                                    | 2                           | X                  |      |               |                          |           |                                   |                                                                          |                                                      |                |
| MW-3                               | 4/15/15                         | 11:15          | W                                    | Z                           | ×                  |      |               |                          |           |                                   |                                                                          |                                                      |                |
| MW-4                               | 4/15/15                         | 12:15          | W                                    | 2                           | ×                  |      |               |                          |           |                                   |                                                                          |                                                      |                |
| MW-5                               | 4/15/15                         | 13:30          | W                                    | 2                           | ×                  |      |               |                          |           |                                   |                                                                          |                                                      |                |
| MW-6                               | 4/19/15                         | 14:15          | W                                    | 2                           | ×                  |      |               |                          |           |                                   |                                                                          |                                                      |                |
| Dup-Girl                           | 41515                           | 12:20          | W                                    | 2                           | ×                  |      |               |                          |           |                                   |                                                                          |                                                      |                |
|                                    |                                 |                |                                      |                             |                    |      |               |                          |           |                                   |                                                                          |                                                      |                |
|                                    |                                 |                |                                      |                             |                    |      |               |                          |           |                                   |                                                                          |                                                      |                |
| -                                  |                                 |                |                                      | •*                          |                    |      |               |                          |           |                                   |                                                                          |                                                      |                |
|                                    |                                 |                |                                      | A                           |                    |      |               |                          |           |                                   |                                                                          |                                                      |                |
| Comments/Special Instructions      | Relinquished by:<br>(Signature) | -              | ne a visani- d al lindación a nor en | Received by:<br>(Signature) | ~                  |      |               | Relinquished (Signature) | by:       |                                   |                                                                          | Received by:<br>(Signature)                          |                |
|                                    | Printed Name:                   | -WASN          | anshi                                | Printed Name:               | Wis                | Atus | U             | Printed Name             | 9:        |                                   |                                                                          | Printed Name                                         | e:             |
|                                    | Company:                        |                |                                      | Company:                    | -                  |      |               | Company:                 |           |                                   |                                                                          | Company:                                             |                |
|                                    |                                 | @ 17           | 1.00                                 | Date & Time:                | 15                 | 170  | G             | Date & Time:             |           |                                   |                                                                          | Date & Time:                                         |                |

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



20 April 2015

Lenora Westbrook KTA Associates, Inc. 3530 32<sup>nd</sup> Way NW Olympia, WA 98502-3230

#### RE: Client Project: PacifiCorp-Chehalis

Dear Lenora.

Please find enclosed the original chain of custody record and the final results for the samples from the project referenced above. Six water samples were received on April 15, 2015. The samples were analyzed for NWTPH-Dx as requested.

There were no problems associated with these analyses.

A copy of these reports will remain on file at ARI. Should you have any questions or need additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D Harris

Project Manager 206/695-6210 markh@arilabs.com

Enclosures

cc Dave Metallo, Cardno-GS File AEJ6

MDH/mdh

Page 1 of \_ 2/

| Chain of Custody Record & Laboratory Analysis Req                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ra & Ladorat(                                                                | ory Analysis r                                                                | request                                              |                                                                         |                                                                                        | [                                                                               | Analytical Decon                                                                | Andutical Decources Incornerad                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| ARI Assigned Number AEJ6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Turn-around Requested                                                        | the sted                                                                      |                                                      | Page                                                                    | of                                                                                     |                                                                                 | Analytical Chemi                                                                | Analytical Resources, incorporated<br>Analytical Chemists and Consultants<br>A611 South 134th Place South 100 |
| ARI Client Company.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                              | Phone:<br>ЗСС - 25С - 76.94                                                   | 54                                                   | Date                                                                    | Present?                                                                               |                                                                                 | Tukwila, WA 98168<br>206-695-6200-206-                                          |                                                                                                               |
| Client Contact.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 53 14                                                                        | MESTERADK                                                                     |                                                      | No of<br>Coolers                                                        | Cooler C , 7                                                                           |                                                                                 | www.arılabs.com                                                                 |                                                                                                               |
| Client Project Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | - 18                                                                         |                                                                               |                                                      |                                                                         | Analysis Requested                                                                     | sted                                                                            | No                                                                              | Notes/Comments                                                                                                |
| Client Project #                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Samplers.                                                                    | ANSTRACT                                                                      | 12.52                                                | ()<br>×()<br>×()                                                        |                                                                                        |                                                                                 |                                                                                 |                                                                                                               |
| Sample ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | tte                                                                          | Time Matrix                                                                   | No Containers                                        | אוייי בבדי<br>איי אין גע                                                |                                                                                        |                                                                                 |                                                                                 |                                                                                                               |
| MW-I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4/15/15 13                                                                   | N 515                                                                         | Ņ                                                    | X                                                                       |                                                                                        |                                                                                 |                                                                                 |                                                                                                               |
| MW-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4/15/15 11                                                                   | 11:05 W                                                                       | 2                                                    | ×                                                                       |                                                                                        |                                                                                 |                                                                                 | · · ·                                                                                                         |
| Mw-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 415/15- 12                                                                   | 12:15 N                                                                       | N                                                    | ×                                                                       |                                                                                        |                                                                                 |                                                                                 |                                                                                                               |
| 2 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2/12/15 13                                                                   | 13.30 W                                                                       | 2                                                    | ×                                                                       |                                                                                        |                                                                                 |                                                                                 |                                                                                                               |
| S-NW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | alight 14                                                                    | 14:15 W                                                                       | 2                                                    | x                                                                       |                                                                                        |                                                                                 |                                                                                 |                                                                                                               |
| Dep-Giv                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | A15/5 12                                                                     | 1220 W                                                                        | 2                                                    | X                                                                       |                                                                                        |                                                                                 |                                                                                 |                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                              |                                                                               |                                                      |                                                                         |                                                                                        |                                                                                 |                                                                                 |                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                              |                                                                               |                                                      |                                                                         |                                                                                        |                                                                                 |                                                                                 |                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                              |                                                                               |                                                      |                                                                         |                                                                                        |                                                                                 |                                                                                 |                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                              |                                                                               | V                                                    |                                                                         |                                                                                        |                                                                                 |                                                                                 |                                                                                                               |
| Comments/Special Instructions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Reinquished by<br>(Signature)                                                |                                                                               | Received by (Signature)                              |                                                                         | Relinquished by<br>(Signature)                                                         |                                                                                 | Received by<br>(Signature)                                                      |                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Printed Name                                                                 | - Hassessisk 1                                                                | Printed Name                                         | INS ALADI                                                               | Printed Name                                                                           |                                                                                 | Printed Name                                                                    |                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Ô                                                                            | ່<br>ບ                                                                        | COMPANY                                              |                                                                         |                                                                                        |                                                                                 | Company                                                                         |                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Date & Time<br>ジバン/ご ピ                                                       | 17.00                                                                         | Date & Time                                          | 15 1700                                                                 | Date & Time                                                                            |                                                                                 | Date & Time                                                                     |                                                                                                               |
| <b>Limits of Liability:</b> ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program for meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services. Is all not exceed the Involved amount for said services. The accordance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract. Durchase order or contract. | all requested service<br>e total liability of ARI.<br>client of a proposal t | s in accordance with a<br>its officers, agents, er<br>for services by ARI rel | appropriate met<br>mployees, or su<br>lease ARI from | hodology following Al<br>ccessors, ansing out<br>any lability in excess | 31 Standard Operating Pro<br>of or in connection with th<br>thereof. not withstanding. | cedures and the ARI Que requested services, share out any provision to the cont | uality Assurance Progr<br>hall not exceed the Invo<br>trary in any contract. Du | am. This program<br>biced amount for<br>urchase order or co-                                                  |
| said services. The acceptance by une                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Client of a proposal I                                                       | Ior services by Annuel                                                        | Ease Ani Inui i                                      | any haumy in excess                                                     | mereur, riu winstantan                                                                 | אווא אנטעואטונו נט וווב יטיוו                                                   | lidiy hi diy connan, pr                                                         | ווכוומסם הוחבי                                                                                                |

signed agreement between ARI and the Client

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract

| ARI Client       Gr.d       Project Name       Projec | YES<br>¥EŞ<br>≪E5<br>D# <i>22×57</i> -2  | (A)<br>NO<br>NO<br>7-75 Z |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------|
| Assigned ARI Job No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | YES<br>¥EŞ<br>≪E5<br>D# <i>22×57</i> -2  | (A)<br>NO<br>NO<br>7-75 Z |
| Assigned ARI Job No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | YES<br>¥EŞ<br>≪E5<br>D# <i>22×57</i> -2  | (A)<br>NO<br>NO<br>7-75 Z |
| Preliminary Examination Phase:         Were intact, properly signed and dated custody seals attached to the outside of to cooler?         Were custody papers included with the cooler?         Were custody papers properly filled out (ink, signed, etc.)         Temperature of Cooler(s) (°C) (recommended 2 0-6 0 °C for chemistry)         Time.       1700         If cooler temperature is out of compliance fill out form 00070F       Temp Gun I         Cooler Accepted by       CA       Date:       4-15-15         Time       1700         Complete custody forms and attach all shipping documents         Log-In Phase:         Was a temperature blank included in the cooler?       Was used?       Burble Wrap Wet ide Gel Packs Baggies Foam Block Paper         Was sufficient ice used (if appropriate)?       NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | YES<br>VÆS<br>≪ES<br>D# <u>22×5/7-</u>   | NO<br>NO<br>775 Z         |
| Were custody papers included with the cooler?         Were custody papers properly filled out (ink, signed, etc.)         Temperature of Cooler(s) (°C) (recommended 2 0-6 0 °C for chemistry)         Time.       1700         If cooler temperature is out of compliance fill out form 00070F       Temp Gun         Cooler Accepted by       CA       Date:       7-75-75         Time       1700         Cooler Accepted by       CA       Date:       7-75-75         Uter Cooler Accepted by       CA       Date:       1700         Complete custody forms and attach all shipping documents       1700         Uter Cooler Accepted by       CA       Date:       1700         Was a temperature blank included in the cooler?       Uter Cooler Accepted by       NA         What kind of packing material was used?       But ble Wrap Wer ice Gel Packs Baggies Foam Block Paper         Was sufficient ice used (if appropriate)?       NA                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ₩ <b>E</b> \$<br>≪E\$<br>D# <u>22557</u> | NO<br>NO<br>775 Z         |
| Were custody papers included with the cooler?         Were custody papers properly filled out (ink, signed, etc.)         Temperature of Cooler(s) (°C) (recommended 2 0-6 0 °C for chemistry)         Time.       1700         If cooler temperature is out of compliance fill out form 00070F       Temp Gun         Cooler Accepted by       CA       Date:       17-15-15         Cooler Accepted by       CA       Date:       17-07         Complete custody forms and attach all shipping documents       Log-In Phase:       Verifies Gel Packs Baggies Foam Block Paper         Was a temperature blank included in the cooler?       But ble Wrap Werifies Gel Packs Baggies Foam Block Paper       Was sufficient ice used (if appropriate)?       NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ₩ <b>E</b> \$<br>≪E\$<br>D# <u>22557</u> | NO<br>775 Z               |
| Were custody papers properly filled out (ink, signed, etc.)         Temperature of Cooler(s) (°C) (recommended 2 0-6 0 °C for chemistry)         Time.       1700         If cooler temperature is out of compliance fill out form 00070F       Temp Gun I         Cooler Accepted by       CA       Date       17-75-75         Date       17-75-75       Time       1700         Complete custody forms and attach all shipping documents       Log-In Phase:       Was a temperature blank included in the cooler?         What kind of packing material was used?       Butple Wrap       Wei ice Gel Packs Baggies Foam Block Paper         Was sufficient ice used (if appropriate)?       NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | D# <u>1287</u>                           | NO<br>775 Z               |
| Temperature of Cooler(s) (°C) (recommended 2 0-6 0 °C for chemistry)       If cooler (s) (°C) (recommended 2 0-6 0 °C for chemistry)         Time.       If 2 °C         If cooler temperature is out of compliance fill out form 00070F       Temp Gun I         Cooler Accepted by       Image: 1 - 15 - 15 min 1000         Complete custody forms and attach all shipping documents       Image: 1 - 15 - 15 min 1000         Log-In Phase:       Image: 1 - 15 - 15 min 1000         Was a temperature blank included in the cooler?       Image: 1 - 15 - 15 min 1000         What kind of packing material was used?       Image: 1 - 15 - 15 min 1000         Was sufficient ice used (if appropriate)?       Image: 1 - 15 - 15 min 1000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | D# <u>1287</u>                           | 7752                      |
| If cooler temperature is out of compliance fill out form 00070F       Temp Gun I         Cooler Accepted by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ~                                        |                           |
| Complete custody forms and attach all shipping documents         Log-In Phase:       Was a temperature blank included in the cooler?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Ð                                        |                           |
| Complete custody forms and attach all shipping documents         Log-In Phase:       Was a temperature blank included in the cooler?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |                           |
| Log-In Phase:<br>Was a temperature blank included in the cooler?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                           |
| Was a temperature blank included in the cooler?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                          |                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | YES<br>Other                             | (NO-                      |
| Were all bottles sealed in individual plastic bags?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | (TES)                                    | NO                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | YES                                      | <u>ANO</u>                |
| Did all bottles arrive in good condition (unbroken)?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | (TE)                                     | NO                        |
| Were all bottle labels complete and legible?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ¥ES_                                     | NO                        |
| Did the number of containers listed on COC match with the number of containers received?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | YE8                                      | NO                        |
| Did all bottle labels and tags agree with custody papers?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | YS                                       | NO                        |
| Were all bottles used correct for the requested analyses?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>CES</b>                               | NO                        |
| Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | YES                                      | NO                        |
| Were all VOC vials free of air bubbles?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | YES                                      | NO                        |
| Was sufficient amount of sample sent in each bottle?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | (ES                                      | NO                        |
| Date VOC Trip Blank was made at ARI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                          |                           |
| Was Sample Split by ARI NA YES Date/Time Equipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Split by                                 |                           |
| Samples Logged by C.A Date Time Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |                           |
| ** Notify Project Manager of discrepancies or concerns **                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                           |

| Sample ID on Bottle            | Sample ID on COC       | Sample ID on Bottle             | Sample ID on COC                       |  |  |  |  |
|--------------------------------|------------------------|---------------------------------|----------------------------------------|--|--|--|--|
|                                |                        |                                 |                                        |  |  |  |  |
|                                |                        |                                 |                                        |  |  |  |  |
| · · · · ·                      |                        |                                 |                                        |  |  |  |  |
|                                |                        |                                 |                                        |  |  |  |  |
| Additional Mater Discourse     | R Deselutiones         |                                 | ······································ |  |  |  |  |
| Additional Notes, Discrepancie | es, a resolutions.     |                                 |                                        |  |  |  |  |
|                                |                        |                                 |                                        |  |  |  |  |
|                                |                        |                                 |                                        |  |  |  |  |
|                                |                        |                                 |                                        |  |  |  |  |
|                                |                        |                                 |                                        |  |  |  |  |
| By Da                          | ite                    |                                 |                                        |  |  |  |  |
| Small Air Bubbles Peabubb      | les' LARGE Air Bubbles | Small → "sm" (<2 mm)            |                                        |  |  |  |  |
| ~ 2mm 2-4 mm                   |                        | Peabubbles → "pb" (2 to < 4 mm) |                                        |  |  |  |  |
| ••••                           |                        | Large → "lg" (4 to < 6 mm)      |                                        |  |  |  |  |
|                                |                        | Headspace → "hs" (>6 mm)        |                                        |  |  |  |  |
|                                |                        | 1                               |                                        |  |  |  |  |



ARI Job No: AEJ6 Client: Cardno-TEC Project Event: N/A Project Name: Pacific Corp Chehalis

|                            | Sample ID                                      | ARI<br>Lab ID                                      | ARI<br>LIMS ID                                                 | Matrix                                             | Sample Date/Time                                                                                         | VTSR                                                                                                                       |
|----------------------------|------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 1.<br>2.<br>3.<br>4.<br>5. | MW-1<br>MW-3<br>MW-4<br>MW-5<br>MW-6<br>Dup-GW | AEJ6A<br>AEJ6B<br>AEJ6C<br>AEJ6D<br>AEJ6E<br>AEJ6F | 15-7423<br>15-7424<br>15-7425<br>15-7426<br>15-7427<br>15-7428 | Water<br>Water<br>Water<br>Water<br>Water<br>Water | 04/15/15 10:15<br>04/15/15 11:15<br>04/15/15 12:15<br>04/15/15 13:30<br>04/15/15 14:15<br>04/15/15 12:20 | 04/15/15 17:00<br>04/15/15 17:00<br>04/15/15 17:00<br>04/15/15 17:00<br>04/15/15 17:00<br>04/15/15 17:00<br>04/15/15 17:00 |

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Analytical Resources, Incorporated Analytical Chemists and Consultants

# Data Reporting Qualifiers

Effective 12/31/13

#### Inorganic Data

- U Indicates that the target analyte was not detected at the reported concentration
- \* Duplicate RPD is not within established control limits
- B Reported value is less than the CRDL but  $\geq$  the Reporting Limit
- N Matrix Spike recovery not within established control limits
- NA Not Applicable, analyte not spiked
- H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

#### Organic Data

- U Indicates that the target analyte was not detected at the reported concentration
- \* Flagged value is not within established control limits
- B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J Estimated concentration when the value is less than ARI's established reporting limits
- D The spiked compound was not detected due to sample extract dilution
- E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

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Version 14-003 12/31/13



Analytical Resources, Incorporated Analytical Chemists and Consultants

- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
- S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
- NA The flagged analyte was not analyzed for
- NR Spiked compound recovery is not reported due to chromatographic interference
- NS The flagged analyte was not spiked into the sample
- M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
- Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
- EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" (Dioxin/Furan analysis only)
- C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
- P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
- X Analyte signal includes interference from polychlorinated diphenyl ethers. (Dioxin/Furan analysis only)
- Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. (Dioxin/Furan analysis only)

Laboratory Quality Assurance Plan



Analytical Resources, Incorporated Analytical Chemists and Consultants

### **Geotechnical Data**

- A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
- F Samples were frozen prior to particle size determination
- SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
- SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
- W Weight of sample in some pipette aliquots was below the level required for accurate weighting



#### ORGANICS ANALYSIS DATA SHEET TOTAL DIESEL RANGE HYDROCARBONS

NWTPHD by GC/FID Extraction Method: SW3510C Page 1 of 1

Matrix: Water

QC Report No: AEJ6-Cardno-TEC Project: Pacific Corp Chehalis

Date Received: 04/15/15

Data Release Authorized: WWW Reported: 04/20/15

| ARI ID               | Sample ID                 | Extraction<br>Date | Analysis<br>Date | EFV<br>DF   | Range/Surrogate                                                      | RL                          | Result                                    |
|----------------------|---------------------------|--------------------|------------------|-------------|----------------------------------------------------------------------|-----------------------------|-------------------------------------------|
| MB-041715<br>15-7423 | Method Blank<br>HC ID:    | 04/17/15           | 04/17/15<br>FID9 | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl        | 0.10<br>0.20<br>0.20        | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>93.7; |
| AEJ6A<br>15-7423     | MW-1<br>HC ID: <b>DRO</b> | 04/17/15           | 04/17/15<br>FID9 | 1.00<br>1.0 | <b>Diesel Range</b><br>Motor Oıl Range<br>Mineral Oıl<br>o-Terphenyl | <b>0.10</b><br>0.20<br>0.20 | 0.12<br>< 0.20 U<br>< 0.20 U<br>92.03     |
| AEJ6B<br>15-7424     | MW-3<br>HC ID:            | 04/17/15           | 04/17/15<br>FID9 | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl        | 0.10<br>0.20<br>0.20        | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>98.5: |
| AEJ6C<br>15-7425     | MW-4<br>HC IL:            | 04/17/15           | 04/17/15<br>FID9 | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl        | 0.10<br>0.20<br>0.20        | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>99.4- |
| AEJ6D<br>15-7426     | MW-5<br>HC ID:            | 04/17/15           | 04/17/15<br>FID9 | 1.00<br>1.0 | Diesel Range<br>Motor Oıl Range<br>Mineral Oil<br>o-Terphenyl        | 0.10<br>0.20<br>0.20        | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>1023  |
| AEJ6E<br>15-7427     | MW-6<br>HC ID:            | 04/17/15           | 04/17/15<br>FID9 | 1.00<br>1.0 | Diesel Range<br>Motor Gil Range<br>Mineral Gil<br>o-Terphenyl        | 0.10<br>0.20<br>0.20        | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>1025  |
| AEJ6F<br>15-7428     | Dup-GW<br>НС ID:          | 04/17/15           | 04/17/15<br>FID9 | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl        | 0.10<br>0.20<br>0.20        | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>104   |

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL. DL-Dilution of extract prior to analysis. RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24. Motor Oil range quantitation on total peaks in the range from C24 to C38. Mineral Oil range quantitation on total peaks in the range from C18 to C28. HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.



#### TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: AEJ6-Cardno-TEC Project: Pacific Corp Chehalis

| Client ID  | OTER  | TOT OUT |
|------------|-------|---------|
|            |       |         |
| MB-041715  | 93.7% | 0       |
| LCS-041715 | 82.9% | 0       |
| MW-l       | 92.0% | 0       |
| MW-3       | 98.5% | 0       |
| MW-4       | 99.4% | 0       |
| MW-5       | 102%  | 0       |
| MW-6       | 102%  | 0       |
| Dup-GW     | 104%  | 0       |

| LCS/MB | LIMITS | QC LIMITS |
|--------|--------|-----------|
|--------|--------|-----------|

(OTER) = o-Terphenyl

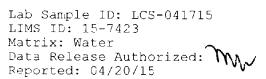
(50-150) (50-150)

Prep Method: SW3510C Log Number Range: 15-7423 to 15-7428

AEIE: GROAS

#### ORGANICS ANALYSIS DATA SHEET NWTPHD by GC/FID

Page lof1



Date Extracted: 04/17/15 Date Analyzed: 04/17/15 17:32 Instrument/Analyst: FID9/ML



#### Sample ID: LCS-041715 LAB CONTROL

QC Report No: AEJ6-Cardno-TEC Project: Pacific Corp Chehalis

> Date Sampled: NA Date Received: NA

Sample Amount: 500 mL Final Extract Volume: 1.0 mL Dilution Factor: 1.00

| Range  | Lab<br>Control | Spike<br>Added | Recovery |
|--------|----------------|----------------|----------|
| Diesel | 2.91           | 3.00           | 97.03    |

#### TPHD Surrogate Recovery

o-Terphenyl

82.9?

Results reported in mg/L

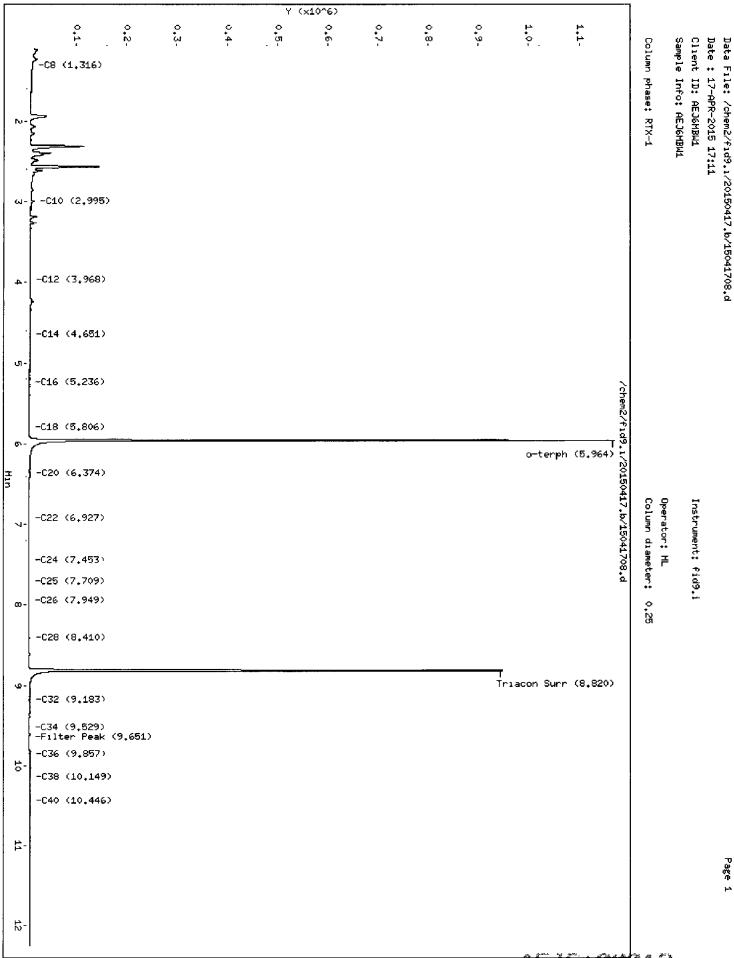


#### TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

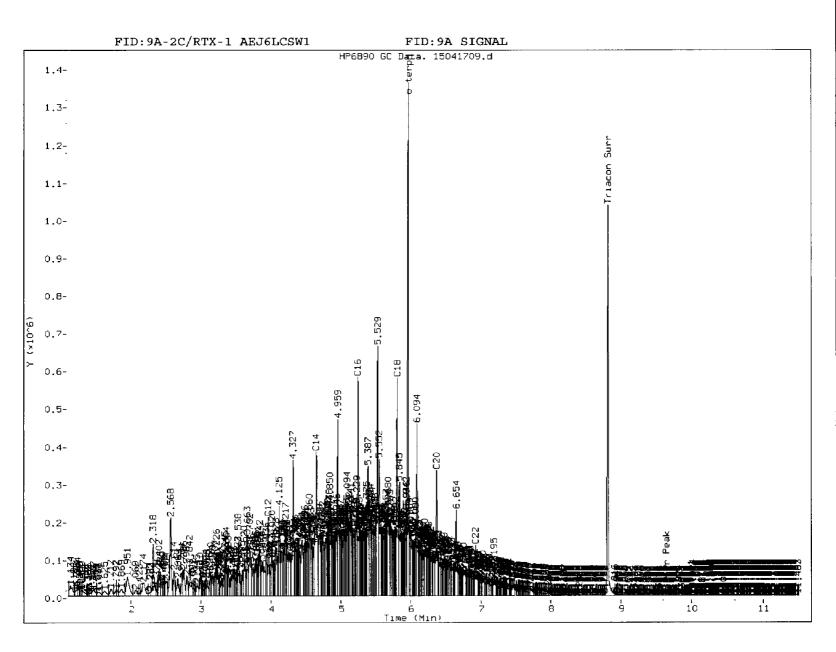
ARI Job: AEJ6 Project: Pacific Corp Chehalıs

Matrix: Water Date Received: 04/15/15

| ARI ID                                                                                                                       | Client ID                                                           | Samp<br>Amt                                                        | Final<br>Vol                                                              | Prep<br>Date                                                                     |
|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 15-7423-041715MB1<br>15-7423-041715LCS1<br>15-7423-AEJ6A<br>15-7424-AEJ6B<br>15-7425-AEJ6C<br>15-7426-AEJ6D<br>15-7427-AEJ6E | Method Blank<br>Lab Control<br>MW-1<br>MW-3<br>MW-4<br>MW-5<br>MW-6 | 500 mL<br>500 mL<br>500 mL<br>500 mL<br>500 mL<br>500 mL<br>500 mL | 1.00 mL<br>1.00 mL<br>1.00 mL<br>1.00 mL<br>1.00 mL<br>1.00 mL<br>1.00 mL | 04/17/15<br>04/17/15<br>04/17/15<br>04/17/15<br>04/17/15<br>04/17/15<br>04/17/15 |
| 15-7428-AEJ6F                                                                                                                | Dup-G <b>W</b>                                                      | 500 mL                                                             | 1.00 mL                                                                   | 04/17/15                                                                         |



AFIR: AMUA2

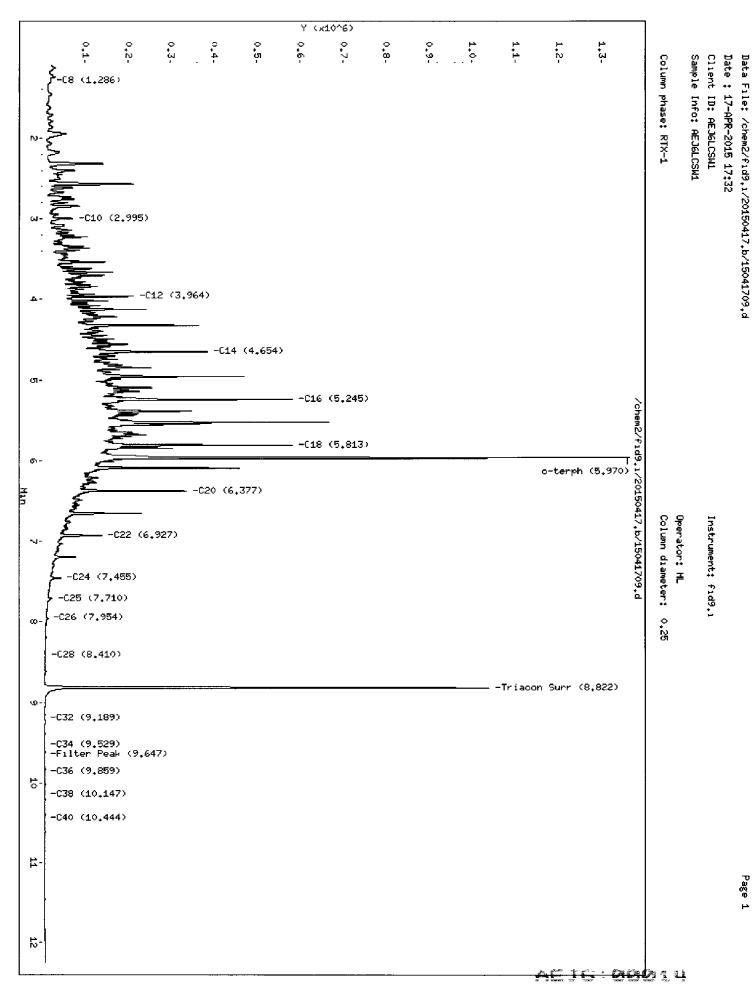


MANUAL INTEGRATION

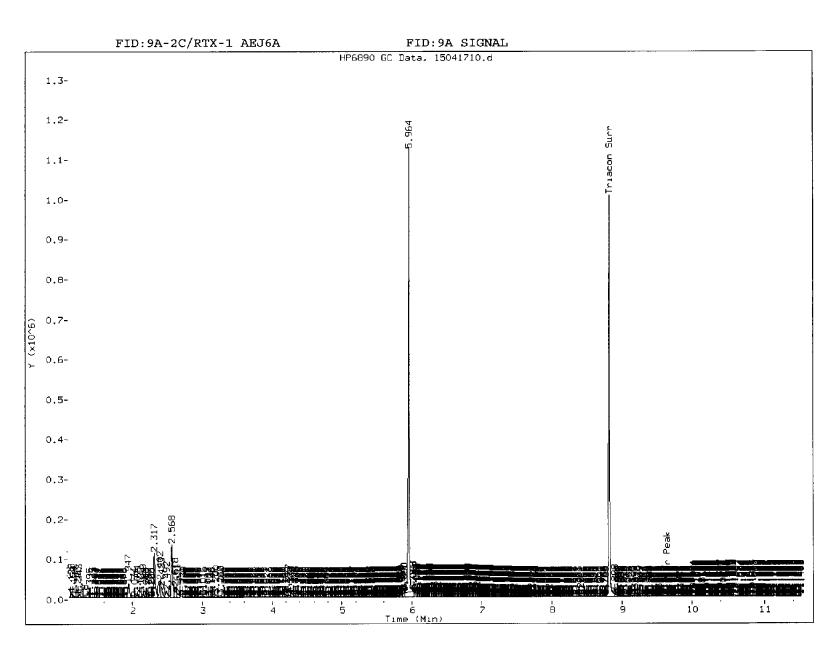
- 1. Baseline correction
- 2. Poor chromatography
- 3. Peak not found
- 4. Totals calculation
- 5, Surrogate Skimmed

Analyst: ML\_\_\_\_

Date: 4/20/15



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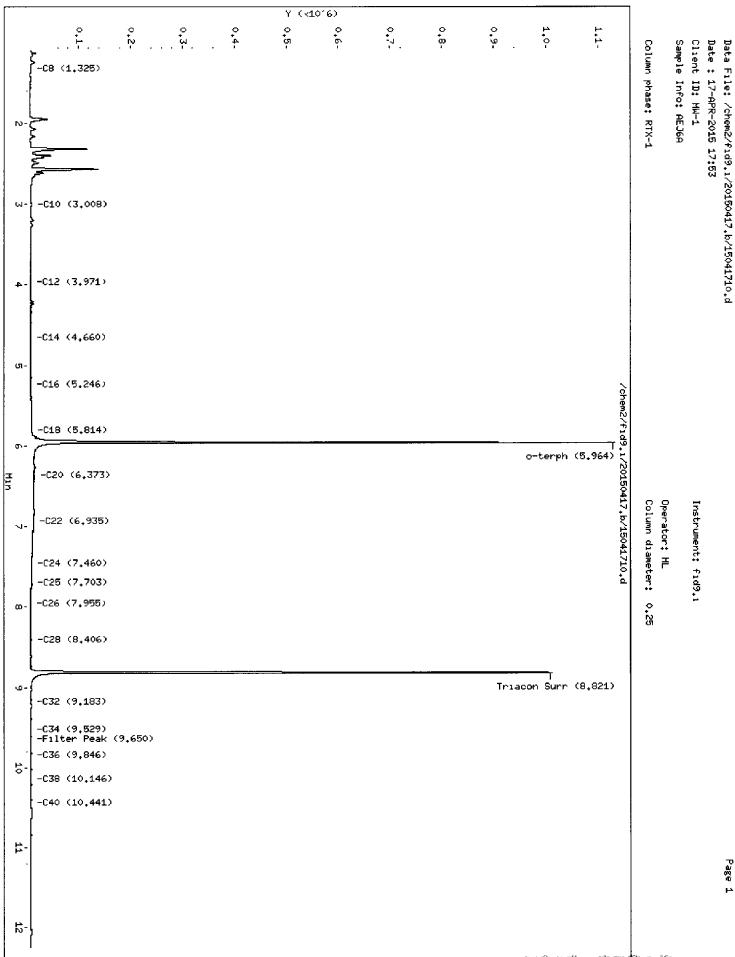


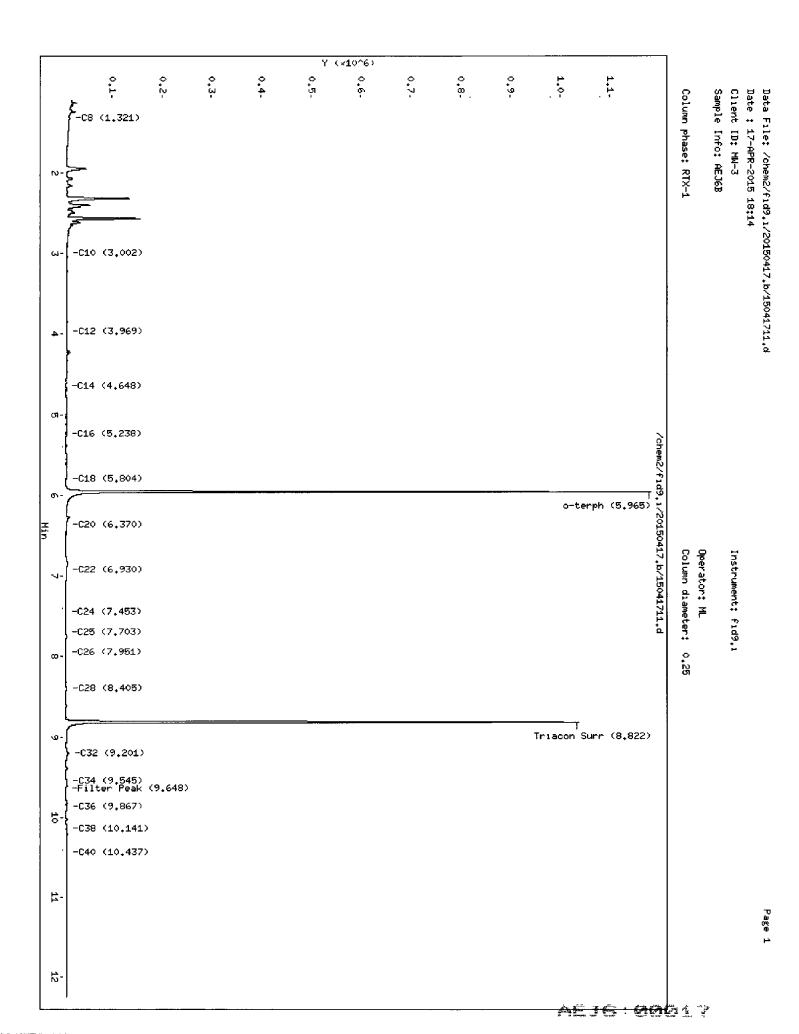
MANUAL INTEGRATION

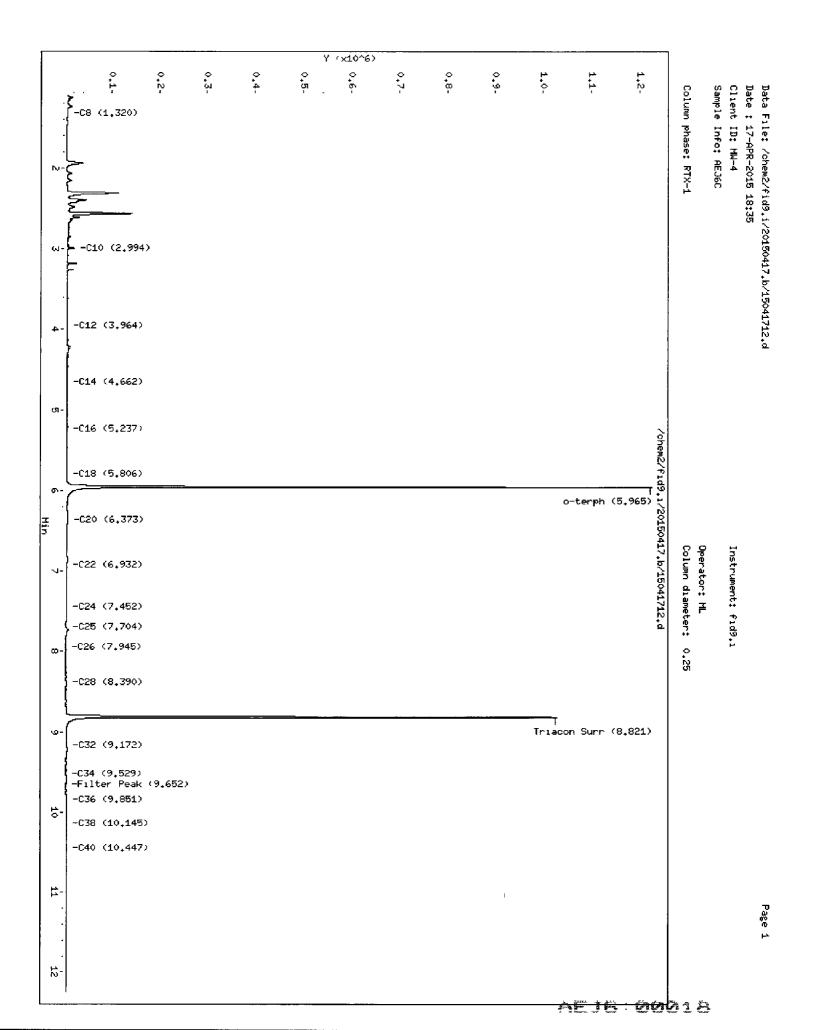
- 1. Baseline correction
- 2. Poor chromatography
- 3. Peak not found
- 4. Totals calculation
- (5.) Surrogate Skimmed

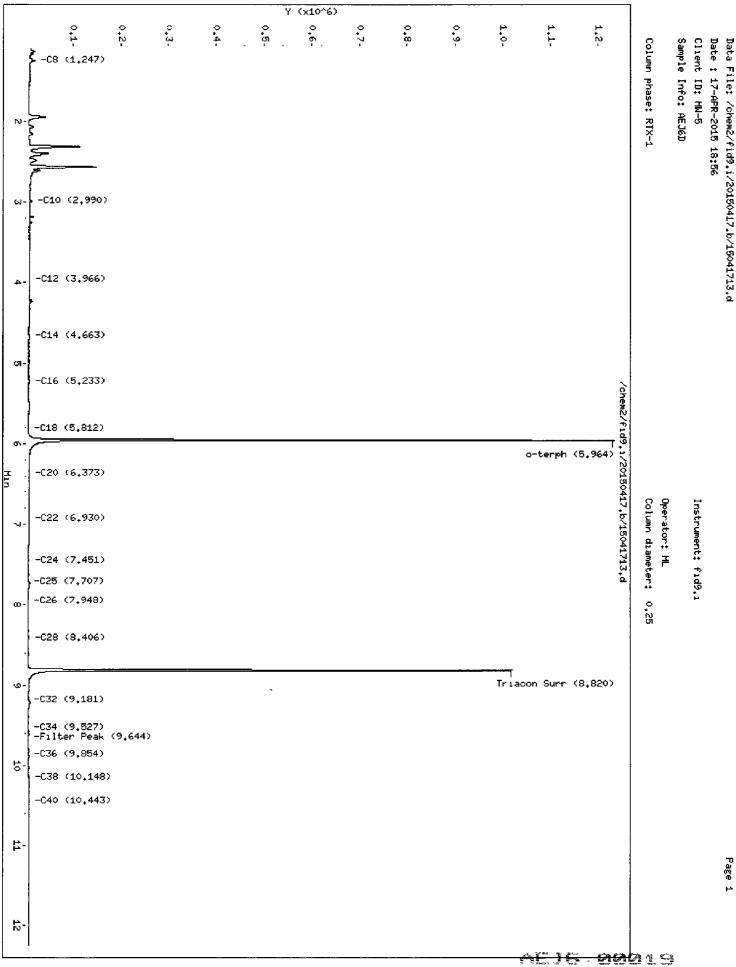
Analyst: Mc

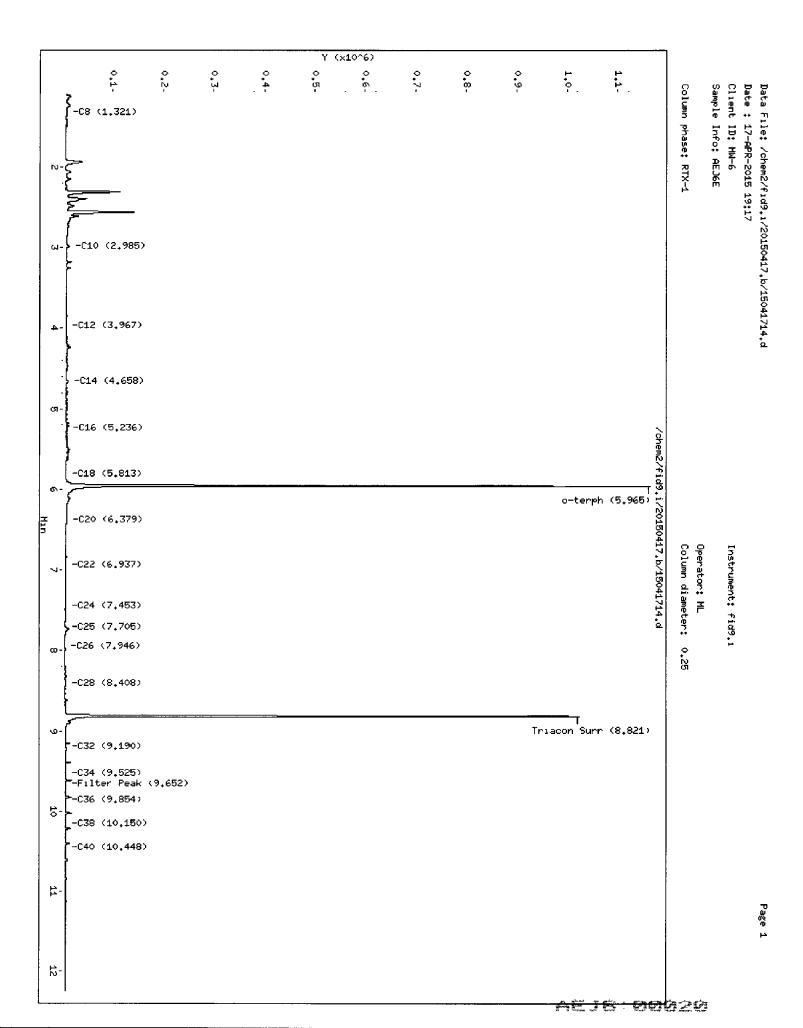
Date: 4/20/15

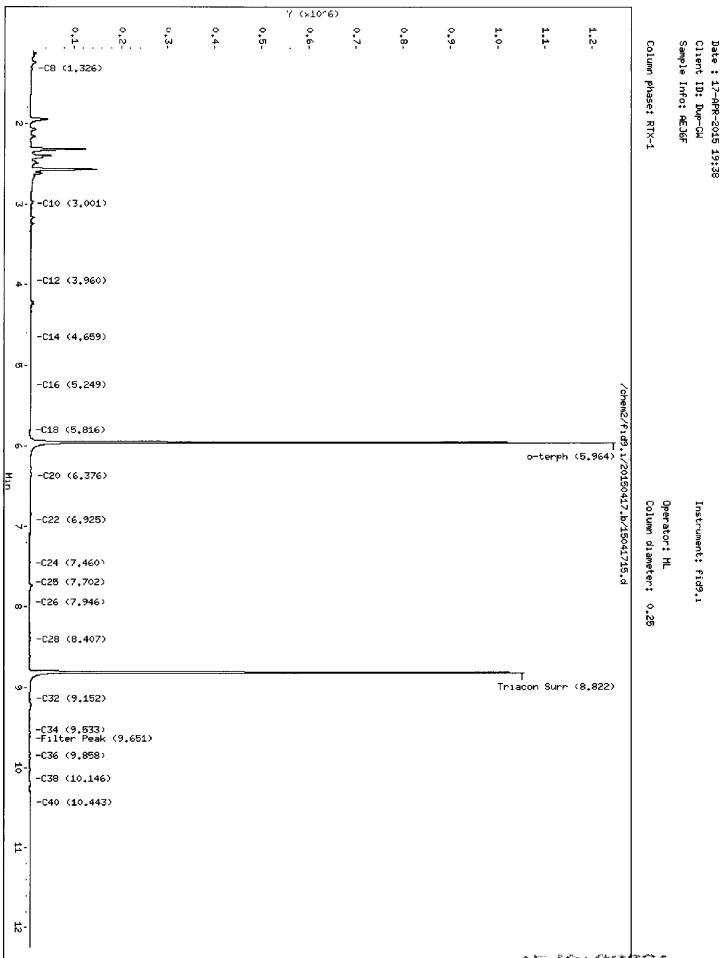












Data File: /chem2/fid9.i/20150417.b/15041715.d

AE 16:00021

| Tielu_ | _conection_start_bate in | leid_collection_start_nine | Sample_ID | Sample_Matrix | Sample_rreparation_inethod | Nesur_rarameter_Name  | Lab_Analysis_Date | Lab_Analysis_Date_Accuracy | Lab_Analysis_Time | Nesult_value | Result_value_onits | Result_Reporting_time | Result_Detection_Limit | Result_Detection_timit_ |
|--------|--------------------------|----------------------------|-----------|---------------|----------------------------|-----------------------|-------------------|----------------------------|-------------------|--------------|--------------------|-----------------------|------------------------|-------------------------|
|        | 4/15/2015                | 10:15:00                   | MW-1      | Water         | SW3510C                    | Diesel Range Organics | 4/17/2015         | D                          | 17:53:00          | 0.12         | mg/l               | 0.1                   | 0.02                   | MDL                     |
|        | 4/15/2015                | 10:15:00                   | MW-1      | Water         | SW3510C                    | Lube Oil              | 4/17/2015         | D                          | 17:53:00          | 0.2          | mg/l               | 0.2                   | 0.04                   | MDL                     |
|        | 4/15/2015                | 10:15:00                   | MW-1      | Water         | SW3510C                    | Heavy Fuel Oil        | 4/17/2015         | D                          | 17:53:00          | 0.2          | mg/l               | 0.2                   | 0                      | MDL                     |
|        | 4/15/2015                | 11:15:00                   | MW-3      | Water         | SW3510C                    | Diesel Range Organics | 4/17/2015         | D                          | 18:14:00          | 0.1          | mg/l               | 0.1                   | 0.02                   | MDL                     |
|        | 4/15/2015                | 11:15:00                   | MW-3      | Water         | SW3510C                    | Lube Oil              | 4/17/2015         | D                          | 18:14:00          | 0.2          | mg/l               | 0.2                   | 0.04                   | MDL                     |
|        | 4/15/2015                | 11:15:00                   | MW-3      | Water         | SW3510C                    | Heavy Fuel Oil        | 4/17/2015         | D                          | 18:14:00          | 0.2          | mg/l               | 0.2                   | 0                      | MDL                     |
|        | 4/15/2015                | 12:15:00                   | MW-4      | Water         | SW3510C                    | Diesel Range Organics | 4/17/2015         | D                          | 18:35:00          | 0.1          | mg/l               | 0.1                   | 0.02                   | MDL                     |
|        | 4/15/2015                | 12:15:00                   | MW-4      | Water         | SW3510C                    | Lube Oil              | 4/17/2015         | D                          | 18:35:00          | 0.2          | mg/l               | 0.2                   | 0.04                   | MDL                     |
|        | 4/15/2015                | 12:15:00                   | MW-4      | Water         | SW3510C                    | Heavy Fuel Oil        | 4/17/2015         | D                          | 18:35:00          | 0.2          | mg/l               | 0.2                   | 0                      | MDL                     |
|        | 4/15/2015                | 13:30:00                   | MW-5      | Water         | SW3510C                    | Diesel Range Organics | 4/17/2015         | D                          | 18:56:00          | 0.1          | mg/l               | 0.1                   | 0.02                   | MDL                     |
|        | 4/15/2015                | 13:30:00                   | MW-5      | Water         | SW3510C                    | Lube Oil              | 4/17/2015         | D                          | 18:56:00          | 0.2          | mg/l               | 0.2                   | 0.04                   | MDL                     |
|        | 4/15/2015                | 13:30:00                   | MW-5      | Water         | SW3510C                    | Heavy Fuel Oil        | 4/17/2015         | D                          | 18:56:00          | 0.2          | mg/l               | 0.2                   | 0                      | MDL                     |
|        | 4/15/2015                | 14:15:00                   | MW-6      | Water         | SW3510C                    | Diesel Range Organics | 4/17/2015         | D                          | 19:17:00          | 0.1          | mg/l               | 0.1                   | 0.02                   | MDL                     |
|        | 4/15/2015                | 14:15:00                   | MW-6      | Water         | SW3510C                    | Lube Oil              | 4/17/2015         | D                          | 19:17:00          | 0.2          | mg/l               | 0.2                   | 0.04                   | MDL                     |
|        | 4/15/2015                | 14:15:00                   | MW-6      | Water         | SW3510C                    | Heavy Fuel Oil        | 4/17/2015         | D                          | 19:17:00          | 0.2          | mg/l               | 0.2                   | 0                      | MDL                     |
|        | 4/15/2015                | 12:20:00                   | Dup-GW    | Water         | SW3510C                    | Diesel Range Organics | 4/17/2015         | D                          | 19:38:00          | 0.1          | mg/l               | 0.1                   | 0.02                   | MDL                     |
|        | 4/15/2015                | 12:20:00                   | Dup-GW    | Water         | SW3510C                    | Lube Oil              | 4/17/2015         | D                          | 19:38:00          | 0.2          | mg/l               | 0.2                   | 0.04                   | MDL                     |
|        | 4/15/2015                | 12:20:00                   | Dup-GW    | Water         | SW3510C                    | Heavy Fuel Oil        | 4/17/2015         | D                          | 19:38:00          | 0.2          | mg/l               | 0.2                   | 0                      | MDL                     |
|        |                          |                            |           |               |                            |                       |                   |                            |                   |              |                    |                       |                        |                         |

| Field_Collection_Start_Date | Field_Collection_Start_Time | Sample_ID | Sample_Matrix Sa | mple_Preparation_Method | Result_Parameter_Name | Lab_Analysis_Date | Lab_Analysis_Date_Accuracy | Lab_Analysis_Time | Result_Value | Result_Value_Units | Result_Reporting_Limit | Result_Detection_Limit | Result_Detection_Limit_Type | Result_Data_Qualifier | Result_Method | Result_Comment | Result_Lab_Name                            |
|-----------------------------|-----------------------------|-----------|------------------|-------------------------|-----------------------|-------------------|----------------------------|-------------------|--------------|--------------------|------------------------|------------------------|-----------------------------|-----------------------|---------------|----------------|--------------------------------------------|
| 4/15/2015                   | 10:15:00                    | MW-1      | Water            | SW3510C                 | Diesel Range Organics | 4/17/2015         | D                          | 17:53:00          | 0.12         | mg/l               | 0.1                    | 0.02                   | MDL                         |                       | NWTPH-Dx      | 15-7423-AEJ6A  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 10:15:00                    | MW-1      | Water            | SW3510C                 | Lube Oil              | 4/17/2015         | D                          | 17:53:00          | 0.2          | mg/l               | 0.2                    | 0.04                   | MDL                         | U                     | NWTPH-Dx      | 15-7423-AEJ6A  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 10:15:00                    | MW-1      | Water            | SW3510C                 | Heavy Fuel Oil        | 4/17/2015         | D                          | 17:53:00          | 0.2          | mg/l               | 0.2                    | 0                      | MDL                         | U                     | NWTPH-Dx      | 15-7423-AEJ6A  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 11:15:00                    | MW-3      | Water            | SW3510C                 | Diesel Range Organics | 4/17/2015         | D                          | 18:14:00          | 0.1          | mg/l               | 0.1                    | 0.02                   | MDL                         | U                     | NWTPH-Dx      | 15-7424-AEJ6B  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 11:15:00                    | MW-3      | Water            | SW3510C                 | Lube Oil              | 4/17/2015         | D                          | 18:14:00          | 0.2          | mg/l               | 0.2                    | 0.04                   | MDL                         | U                     | NWTPH-Dx      | 15-7424-AEJ6B  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 11:15:00                    | MW-3      | Water            | SW3510C                 | Heavy Fuel Oil        | 4/17/2015         | D                          | 18:14:00          | 0.2          | mg/l               | 0.2                    | 0                      | MDL                         | U                     | NWTPH-Dx      | 15-7424-AEJ6B  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 12:15:00                    | MW-4      | Water            | SW3510C                 | Diesel Range Organics | 4/17/2015         | D                          | 18:35:00          | 0.1          | mg/l               | 0.1                    | 0.02                   | MDL                         | U                     | NWTPH-Dx      | 15-7425-AEJ6C  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 12:15:00                    | MW-4      | Water            | SW3510C                 | Lube Oil              | 4/17/2015         | D                          | 18:35:00          | 0.2          | mg/l               | 0.2                    | 0.04                   | MDL                         | U                     | NWTPH-Dx      | 15-7425-AEJ6C  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 12:15:00                    | MW-4      | Water            | SW3510C                 | Heavy Fuel Oil        | 4/17/2015         | D                          | 18:35:00          | 0.2          | mg/l               | 0.2                    | 0                      | MDL                         | U                     | NWTPH-Dx      | 15-7425-AEJ6C  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 13:30:00                    | MW-5      | Water            | SW3510C                 | Diesel Range Organics | 4/17/2015         | D                          | 18:56:00          | 0.1          | mg/l               | 0.1                    | 0.02                   | MDL                         | U                     | NWTPH-Dx      | 15-7426-AEJ6D  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 13:30:00                    | MW-5      | Water            | SW3510C                 | Lube Oil              | 4/17/2015         | D                          | 18:56:00          | 0.2          | mg/l               | 0.2                    | 0.04                   | MDL                         | U                     | NWTPH-Dx      | 15-7426-AEJ6D  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 13:30:00                    | MW-5      | Water            | SW3510C                 | Heavy Fuel Oil        | 4/17/2015         | D                          | 18:56:00          | 0.2          | mg/l               | 0.2                    | 0                      | MDL                         | U                     | NWTPH-Dx      | 15-7426-AEJ6D  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 14:15:00                    | MW-6      | Water            | SW3510C                 | Diesel Range Organics | 4/17/2015         | D                          | 19:17:00          | 0.1          | mg/l               | 0.1                    | 0.02                   | MDL                         | U                     | NWTPH-Dx      | 15-7427-AEJ6E  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 14:15:00                    | MW-6      | Water            | SW3510C                 | Lube Oil              | 4/17/2015         | D                          | 19:17:00          | 0.2          | mg/l               | 0.2                    | 0.04                   | MDL                         | U                     | NWTPH-Dx      | 15-7427-AEJ6E  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 14:15:00                    | MW-6      | Water            | SW3510C                 | Heavy Fuel Oil        | 4/17/2015         | D                          | 19:17:00          | 0.2          | mg/l               | 0.2                    | 0                      | MDL                         | U                     | NWTPH-Dx      | 15-7427-AEJ6E  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 12:20:00                    | Dup-GW    | Water            | SW3510C                 | Diesel Range Organics | 4/17/2015         | D                          | 19:38:00          | 0.1          | mg/l               | 0.1                    | 0.02                   | MDL                         | U                     | NWTPH-Dx      | 15-7428-AEJ6F  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 12:20:00                    | Dup-GW    | Water            | SW3510C                 | Lube Oil              | 4/17/2015         | D                          | 19:38:00          | 0.2          | mg/l               | 0.2                    | 0.04                   | MDL                         | U                     | NWTPH-Dx      | 15-7428-AEJ6F  | Analytical Resources Inc (ARI), Seattle WA |
| 4/15/2015                   | 12:20:00                    | Dup-GW    | Water            | SW3510C                 | Heavy Fuel Oil        | 4/17/2015         | D                          | 19:38:00          | 0.2          | mg/l               | 0.2                    | 0                      | MDL                         | U                     | NWTPH-Dx      | 15-7428-AEJ6F  | Analytical Resources Inc (ARI), Seattle WA |

#### APPENDIX F

#### GROUNDWATER MONITORING REPORT 2<sup>ND</sup> QUARTERLY EVENT

JULY 2015



# Groundwater Monitoring Report 2<sup>nd</sup> Quarterly Event – July 2015 PacifiCorp Chehalis, WA Plant

Cardno Project 90369

Prepared for KTA Associates, Inc.



KTA Associates, Inc A Professional Environmental Service Corporation

And for PacifiCorp



July 2015



# Groundwater Monitoring Report 2<sup>nd</sup> Quarterly Event – July 2015

# **FINAL REPORT**

# PacifiCorp Chehalis, WA Plant

Cardno Project 90369

# July 2015

**Prepared for:** 

KTA, Associates, Inc.

And

PacifiCorp

### **Document Information**

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# Abbreviations and Acronyms

| amsl   | (feet) above mean sea level                           |
|--------|-------------------------------------------------------|
| AST    | above ground storage tank                             |
| bgs    | below ground surface                                  |
| Cardno | Cardno                                                |
| CCS    | Cowlitz Clean Sweep                                   |
| CoC    | chain of custody                                      |
| DO     | dissolved oxygen                                      |
| DOE    | (WA) Department of Ecology                            |
| DOT    | Department of Transportation                          |
| DRO    | Diesel Range Organics                                 |
| GSU    | Generator Set-Up Unit                                 |
| IDW    | investigation-derived waste                           |
| IFP    | interface probe                                       |
| ISGP   | Industrial Stormwater General Permit                  |
| KTA    | KTA Associates, Inc.                                  |
| mg/kg  | milligrams per kilograms (parts per million)          |
| MTCA   | Model Toxics Control Act                              |
| MW     | Monitoring Well                                       |
| MWIR   | Monitoring Well Installation and Support Tasks Report |
| PC     | PacifiCorp                                            |
| PVC    | polyvinyl chloride                                    |
| RRO    | Residual Range Organics                               |
| SB     | Soil Boring                                           |
| SI     | Site Investigation                                    |
| TPH-Dx | Total Petroleum Hydrocarbons – Diesel Extended Range  |
| VCP    | Voluntary Clean-up Program (WADOE)                    |
| WAC    | Washington Administration Code                        |
| WLI    | Water Level Indicator                                 |
| µg/L   | micrograms per liter (parts per billion)              |
|        |                                                       |

### 1 Introduction

#### 1.1 **Purpose and Objective**

Cardno was contracted by KTA Associates, Inc. (KTA) to conduct a site investigation that included an assessment of potential impacts to subsurface soil and shallow groundwater within certain areas at PacifiCorp (PC)'s Chehalis, WA power plant that were previously exposed to Mineral Oil releases in 2011 and 2013. These releases were due to malfunctions with the plant's Generator Step-up Unit (GSU)s #1 and #3. Mineral Oil is used as insulating fluid in these GSUs.

The primary objective of this project is to determine if any residual impacts from Mineral Oil exposure exists in the subsurface soil and shallow groundwater at concentrations above the Washington Department of Ecology's (WADOE) Model Toxics Control Act (MTCA) regulatory limits. Site investigation activities are being conducted under the WA DoE's Voluntary Cleanup Program (VCP).

This project is divided into two main phases. The first phase included monitoring well installation, in conjunction with various support tasks. The outcome of soil boring / monitoring well installation activities and associated environmental sampling results are included within the *Monitoring Well Installation and Support Tasks Report (MWIR)* (Cardno, May 2015).

The second phase of this project involves groundwater monitoring, conducted on a quarterly basis, including events scheduled for April, June-Sept, December 2015 and March 2016. This Groundwater Monitoring Report (GWMR) details field methods, water level measurements, groundwater table elevations, flow direction assessment and sampling results for the second quarterly field event. All field efforts, in support of this second quarterly groundwater monitoring event, were conducted on 08 July, 2015.

#### 1.2 Scope of Work

To meet the above stated objectives, the scope of work for quarter groundwater monitoring consisted of the following field activities:

- Coordination of pre- (field) mobilization tasks.
- Collection of static groundwater level measurements.
- Sampling of five groundwater monitoring wells.
- Handling of project collected environmental samples.
- Documentation of field activities. and,
- Containment of investigation derived waste (IDW).

Prominent site features and well locations are shown on Figure 1.

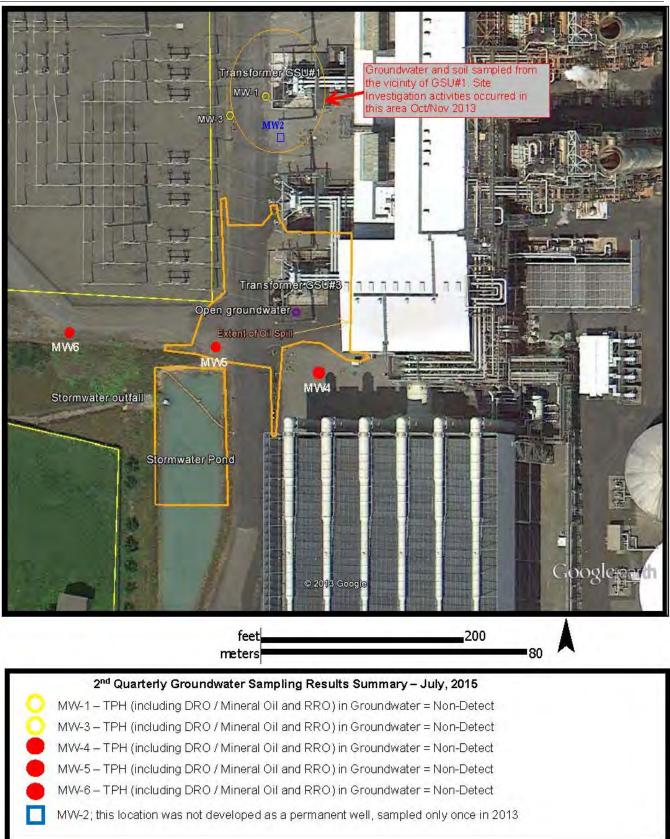
#### 1.3 Report Organization

This GWMR is organized into the following sections:

- > Section 1.0 Introduction
- > Section 2.0 Site Background
- > Section 3.0 Field Efforts
- > Section 4.0 Analytical Results
- > Section 5.0 References

Discussions regarding the procedures and methods utilized for the groundwater monitoring tasks and subsequent results of the data collected are presented in the main text of this GWMR report. Health & Safety Tailgate Forms, Monitoring Well Sampling and Water Quality Measurement Forms, Field Notebook entries, and Laboratory Chain-of-Custody Forms / Analytical Report are presented as Appendices A through D, respectively.

Groundwater Monitoring Report 2<sup>nd</sup> Quarterly Event – July 2015 PacifiCorp Chehalis Plant



#### Figure 1. Site Map with Monitoring Well and Prominent Features

## 2 Site Background

#### 2.1 Site Description

PacifiCorp owns and maintains a natural gas-fired combined cycle power plant, which produces 520-megawatts of electricity. The plant is located at 1813 Bishop Road, Chehalis, Washington, in the Chehalis River Valley.

The Chehalis River Valley is considered a rural area, with approximately 7,000 residents living in and around the city. The plant is located 3 miles south of town, which consists mostly of small parks, farms, small pockets of light industrial areas, and a few housing subdivisions.

#### 2.1.1 <u>Geology</u>

The overall soil-type distribution at the site consists of low permeability silt and clay layer underlain by 45 to 50 feet of water-bearing sand and gravel, underlain by a silt and clay aquitard. These soil-types are consistent with regional geologic mapping by Weigle and Foxworthy (1962) and a regional study for the Chehalis Generation facility (Dames and Moore 1994). These regional studies classify the upper 50 feet of soil in the area of the site as recent alluvium and glaciofluvial sediments. The aquitard found at approximately 50 feet bgs is widespread, is often described as blue-gray, clayey silt, and is reported to be more than 100 feet thick (Dames and Moore 1994).

#### 2.1.2 <u>Hydrogeology</u>

The groundwater flow direction beneath the site is assumed to travel south/southwest towards Bishop Road and Berwick Creek. Regional investigations conducted by others (Dames and Moore 1994) have categorized the shallow aquifer in the area as unconfined or semi-confined. However, the shallow aquifer appears to exhibit the characteristics of a confined or semiconfined system, primarily due to the low permeably silt cap immediately above the aquifer.

#### 2.2 Previous Mineral Oil Releases and Site Cleanup Efforts

Cowlitz Clean Sweep (CCS) completed a site cleanup (CCS 2011) at the PC Chehalis Plant during the months of January through March, 2011. CCS removed floating product from the stormwater pond and ditch lines using oil booms, absorbent material, an oil skimmer and vacuum truck. The stormwater ditch lines were cleaned by removing impacted material down to the clay layer.

CCS sampled affected areas and ditches for analysis to determine the extent of oil contamination; additional soil and water sampling was conducted after cleanup.

The main excavation occurred at or near GSU-1, the first plant transformer that caught fire and subsequently released mineral oil to the surrounding areas. Impacted soil was removed to a depth of six inches below the static groundwater line using olfactory methods (i.e., visual).

During the excavation, free product was noted floating on top of the water and absorbent materials were deployed in the excavation area to remove the product. All excavated materials were loaded onto waiting dump trucks and taken to the Weyerhaeuser transfer station located in Longview, WA for disposal.

Once the excavations had been completed, the area around the GSU-1 transformer was backfilled with clean material and compacted to the required 95% compaction. All ditch lines were relined with clean gravel to prevent sediment loss and water quality issues.

Water collected during excavation activities completed near and around the transformer area was pumped to an on-site 1.7 million gallon diesel above ground storage tank (AST) and the AST containment area.

CCS removed 845 tons of rock and soil and 8,869 gallons of water from affected areas during excavation activities. CCS backfilled the excavations with 92 tons of 2 to 4 inch quarry spalls and 462 tons of 1 ¼" rock to help achieve the required 95% compaction standard.

Most recently, GSU-3 experienced a similar malfunction in late 2013 to the one that occurred at GSU-1 in early 2011. Consequently, this malfunction caused the release of mineral oil around the base of the transformer unit and impacted the surface areas adjacent to it, the roadway and ditches and the area around the southwest corner of the plant building. The management of the release of mineral oil at GSU-3 was approached by PC and conducted by CCS in a similar fashion to the previous cleanup at GSU-1.

#### 2.3 **Previous Site Investigations**

Cardno completed a Site Investigation (SI) at the PC-Chehalis Plant on May 23<sup>rd</sup> through May 25<sup>th</sup>, 2011. Cardno conducted the SI to determine the following:

- If groundwater had been impacted from the mineral oil spill;
- If the water contained in the large AST, which was collected during excavation activities, exceeded any regulatory levels, and;
- If surface water in the stormwater pond had been impacted from the mineral oil spill.

Cardno completed the following activities during the 2011 SI:

- Installed and sampled six temporary monitoring wells placed within the shallow water bearing zone;
- Collected two water samples from the AST at varying depths;
- Collected two surface water samples from the stormwater pond, and;
- Collected three surface soil samples downgradient of the mineral oil spill.

The results of the 2011 SI are summarized as follows:

- One groundwater sample (GW-4) had a detection of Mineral Oil at 1100 μg/L, which exceeded the MTCA Method A Groundwater Cleanup Level of 500 μg/L;
- One AST water sample (TS2) had a detection of Mineral Oil at 440 µg/L, which did not exceed the MTCA Method A Groundwater Cleanup Level;
- One surface water sample (SW1) had a detection of Mineral Oil at 360 µg/L, which did not exceed the MTCA Method A Groundwater Cleanup Level, and;
- One soil sample (SG1) had a detection of Mineral Oil at 160 mg/kg, which did not exceed the MTCA Method A Soil Cleanup Level of **4000 mg/Kg**.

Subsequent to the 2011 SI, a follow-up field investigation was undertaken by Cardno in October and November of 2013. These follow-up tasks were conducted after a review of all field efforts and sampling results to date by WADOE VCP staff. The VCP identified two hot spots near GSU#1. PacifiCorp, KTA and WADOE VCP agreed to investigate soil and groundwater at these two areas and characterize the local groundwater flow to determine if the mineral oil released from GSU-1 had any longer-term impacts to the deeper subsurface soils, vadose zone and/or the local shallow groundwater from areas with previously identified concentrations of mineral oil above regulatory limits. The *Groundwater Investigation Report* (Cardno, 2014) presented data from this effort. Main investigative tasks and sampling results contained in this report are summarized below;

Cardno completed the following activities during the 2013 SI:

- Drill, characterize and sample subsurface soil from 3 locations to ~30-feet below grade surface. Soil samples from the borings at SB-1 thru SB-3 were analyzed for mineral oil.
- Install permanent wells at two of the drilling locations, MW-1 and MW-3. Due to utility interferences, a well was not set at the location for MW-2. These activities took place on October 28 and 29, 2013.
- A (relative) survey of the monitoring well casing elevations was conducted to aid in the determination of groundwater flow direction.
- Groundwater was sampled from site wells MW-1 and MW-3. A one-time groundwater sample was collected at MW-2 during the extraction of the drill rods. These activities took place on November 1, 2013 except for the MW-2 sample, which was collected earlier (10/29/2013).

The results of the 2013 SI are summarized as follows:

- One groundwater sample (MW-2) had a detection of Mineral Oil at 380 µg/L, which is below the MTCA Method A Groundwater Cleanup Level for Diesel Range Organics (DRO) – Mineral Oil of **500 µg/L**.
- There were no detections of Mineral Oil in any of the subsurface soil samples.

Following the release of Mineral Oil from GSU#3 in November 2013 and associated site cleanup efforts, PacifiCorp continued its environmental protection efforts in conjunction with their ongoing VCP actions. Through cooperative agreements between PC and WA DoE, a site investigation similar to those previously designed by KTA and Cardno was implemented in the areas adjacent to and downgradient from GSU#3. Results of subsurface soil and electrical vault in-flow water sampling are presented in the *MWIR* (Cardno, May 2015). These SI efforts were undertaken on April 7-15, 2015.

Cardno completed the following activities during the 2015 SI:

- Characterize and sampled subsurface soil from 3 locations to ~30-feet below grade surface. Soil samples from the borings at SB-4 thru SB-6 were analyzed for Northwest Total Petroleum Hydrocarbon – Diesel range extended (NWTPH-Dx) / Mineral Oil.
- Installed permanent wells at all three 2015 boring locations. These wells are MW-4, MW-5 and MW-6. The three new wells, along with the two previous wells (MW-1 and MW-3) were developed / re-developed. These activities took place on April 7 9, 2015.
- A (relative) elevation survey of the monitoring well casings was conducted to aid in the determination of groundwater flow direction. This was completed on April 15, 2015.
- A one-time sampling event was completed to test in-flow water within four deep electrical vaults adjacent to GSU's #1 and #3. Water samples from these vaults was submitted for NWTPH-Dx / Mineral Oil. These activities took place on April 7, 2015. Figure 2 shows the location of these electrical vaults at the site relative to the GSUs and other site features.

The Results presented in the MWIR are summarized as follows:

- Soil from a depth of 5' bgs collected at SB5 had a detection of DRO at 6.7 mg/Kg, which is below the MTCA Method A Soil Cleanup Level of **4,000 mg/Kg**.
- Electrical vault in-flow water from EMHM003 had a detection of DRO at 120 µg/L, which is below the MTCA Method A Groundwater Cleanup Level of **500 µg/L**.
- Electrical vault in-flow water from EMHC002 and its Duplicate (DUP-vault) had detections of DRO, both at 110  $\mu$ g/L, which are below the MTCA Method A Groundwater Cleanup Level of **500 \mug/L**.
- Electrical vault in-flow water from EMHC001 had detections of DRO, Mineral Oil and Residual Range Organics (RRO) at 1900 µg/L, 1300 µg/L and 320 µg/L, respectively. DRO and Mineral Oil detections exceed the MTCA Method A Groundwater Cleanup Level, but are, comparatively, below the 10,000 µg/L Industrial Stormwater General Permit (ISGP) Stormwater Benchmark for TPH.

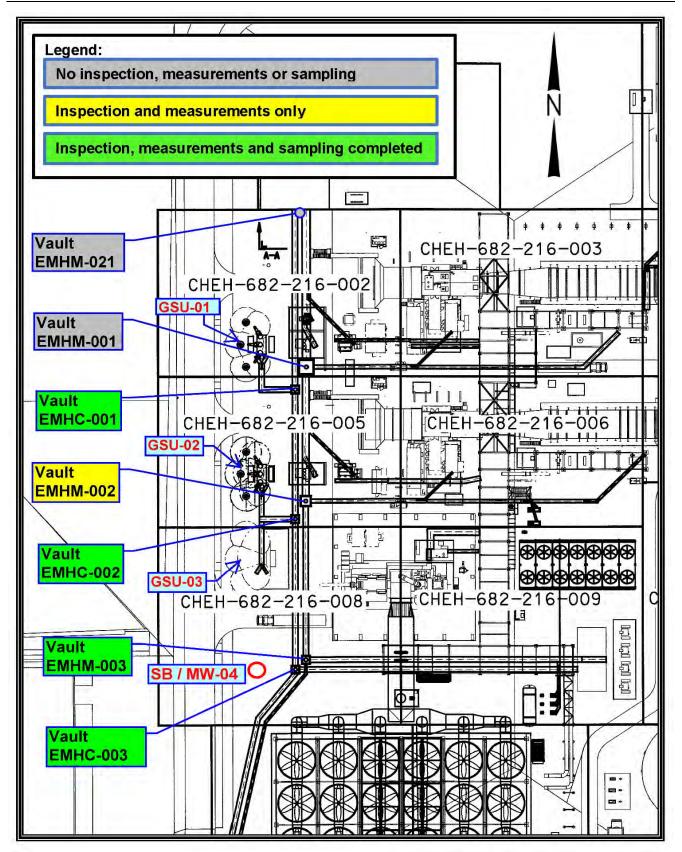


Figure 2. Electrical Vault / In-Flow Water Sampling Locations

## 3 Field Efforts

Section 3 details the field efforts that were employed during the July 2015 quarterly groundwater sampling event and support tasks. These tasks included pre-field mobilization planning, collection of static groundwater level measurements, sampling of five monitoring wells, handling of project collected environmental samples, documentation of field activities and containment of investigation-derived waste (IDW). Any discrepancies between the *Groundwater Investigation and Quarterly Monitoring Work Plan 2015/2016* (Cardno, April 2015) and the actual field methodologies utilized are also described in this section.

#### 3.1 Pre-Field Mobilization Planning

The second quarterly groundwater monitoring event was scheduled for and conducted on July 8, 2015. Cardno coordinated the scheduling of this event with PC and KTA staff to minimize any logistical impacts to plant operations. The overall schedule had been discussed and approved during the planning phase and at the Kick-Off Meeting held on 13 March, 2015. Pre field mobilization items considered also included health and safety concerns, coordination with the analytical testing facility and reservation / ordering / procurement / rental of all necessary field sampling equipment, monitoring instruments, personal protective equipment, and field consumables.

Several days prior to initiation of groundwater sampling, Cardno was in direct contact with the PC Environmental / Safety Analyst and the KTA Project Manager to finalize event coordination, site access and to receive the latest health & safety and site condition reports. The laboratory was consulted during this period and an order was placed for the sampling containers, as well as other necessary laboratory supplies. Cardno retrieve the containers and supplies directly from the laboratory during the mobilization to the site.

#### 3.1.1 <u>Health and Safety</u>

A Site Specific Health and Safety Plan was drafted for the groundwater sampling events and is included as an Appendix to the *Groundwater Investigation and Quarterly Monitoring Work Plan*, *2015/2016* (Cardno, April 2015). At a minimum this Health and Safety Plan provides emergency contact information, routes to the nearest medical and/or aid facilities and site specific work task and environmental /physical hazard information. Prior to the initiation of any field tasks, a mandatory tailgate safety meeting is conducted each field day. The purpose of these Tailgate Meetings is to review any expected site specific hazards, general task hazards, current / changed site conditions, to receive a briefing from PC, to discuss emergency procedures, and to review our daily work / task schedule. Such a Tailgate meeting was conducted on July 8, 2015, preceding the start of groundwater sampling tasks. Health and Safety Tailgate Forms are included in Appendix A.

#### 3.2 Groundwater Level Measurements and Flow Direction Assessment

Prior to sample collection, each monitoring well was opened and its expansion plug was removed. Ample time was allotted for each well to equilibrate to the current ambient air pressure. An electronic interface probe was used to gauge the presence/thickness of any accumulated free-phase hydrocarbon product and the distance from the top edge of the well casing to the surface of the water table (static water level) within each monitoring well. A trace amount ( $\leq 0.01$  feet) of hydrocarbon product was gauged at MW-3, but was not otherwise observed in the purge water or the collected sample.

The southwest corner of the GSU-1 containment wall was assigned an elevation of 100.00 feet above mean-sea level. A level survey was conducted to accurately assign each monitoring well casing an elevation, which was based on the assigned elevation of the GSU-1 containment wall corner. Water level measurements were subtracted from their well casing elevations to calculate (relative) elevation of the groundwater table beneath each well location. MW-1 is the high point at 92.54 and MW-6 is the low point at 88.79 feet above mean-sea level (amsl), respectively. On average the water table was 1.41 feet lower than during the first round of sampling, with the least difference of 0.24 feet at MW-3 and the greatest difference of 2.32 feet at MW-6. Table 1 lists the well casing elevations, depth to product, static water level measurements and groundwater elevations calculated for this quarterly event.

Groundwater elevation contours were constructed and groundwater flow direction was assessed. As was noted in the previous sampling round, groundwater flows east to west and bends sharply to the south-southwest. It was noted during this round that the contours were locally deflected (humped) to the northeast along an axis extending between MW-1 and MW-6. Figure 3 shows the generalized groundwater flow direction along with the elevation contours.

| Location   | LocationTop PVC Well<br>Casing<br>(ft amsl)SW corner GSU-1<br>containment wall100.001MW-197.76 |              | Static Water Level<br>Measurements (ft) | Groundwater<br>Elevation (ft amsl) |  |
|------------|------------------------------------------------------------------------------------------------|--------------|-----------------------------------------|------------------------------------|--|
|            |                                                                                                |              | NA                                      | NA                                 |  |
| MW-1       |                                                                                                |              | 5.22                                    | 92.54                              |  |
| MW-3       | 97.57                                                                                          | 5.26         | 5.27                                    | 92.30                              |  |
| MW-4       | 97.64                                                                                          | Not Detected | 6.70                                    | 90.94                              |  |
| MW-5       | 97.08                                                                                          | Not Detected | 6.70                                    | 90.38                              |  |
| MW-6 96.18 |                                                                                                | Not Detected | 7.39                                    | 88.79                              |  |

 Table 1. Water Level Measurements and Groundwater Elevations

<sup>1</sup>All elevations are relative, as they are referenced to the top of the SW corner of the GSU-1 containment wall. The location was assigned an elevation of 100.00' amsl.

#### 3.3 Groundwater Sampling

Groundwater sampling events are scheduled for completion on a quarterly basis. This second event was completed on July 8, 2015. Subsequent events are tentatively planned for the 4<sup>th</sup> quarter 2015 (December) and mid-late 1<sup>st</sup> quarter 2016 (February-March). Groundwater sampling activities were conducted using U.S. Environmental Protection Agency Low-Flow Sampling Techniques (USEPA, 1996, Rev 2010) (where pumping rates are matched to achieve minimal drawdown of the water column during pumping) and WA Department of Ecology (WADOE, 2011) accepted methodology. Groundwater samples at the PC-Chehalis Plant were collected and analyzed for mineral oil using the Northwest total petroleum hydrocarbons – diesel extended range (NWTPH-Dx) method. Monitoring well locations are presented on Figure 1.

Prior to sampling, all five site monitoring wells were properly and effectively developed / redeveloped on April 9, during the 2015 SI field event. All monitoring wells were allowed to settle and equilibrate for at least three days prior to initial sampling activities. Well construction and development details are included in the MWIR (Cardno, May 2015). Monitoring wells were not re-developed between quarterly sampling rounds.

A peristaltic pump setup with dedicated platinum-cured Tygon® tubing, connected to dedicated, Teflon®-lined polyethylene tubing, was used to purge aquifer formation water from the well casings and to obtain groundwater samples at each well location. Monitoring wells were purged until water quality readings had stabilized or a maximum of three casing volumes had been removed. Water quality parameter measurements were recorded during sample purging (stabilization assessment) and included: specific conductivity, temperature, pH, dissolved oxygen (DO) and turbidity. A summary of the final water quality measurements collected prior to sampling are presented in Table 2.

| Well ID           | Date /<br>Sample<br>Time | Average<br>Purge<br>Rate<br>(ml/min) | Total<br>Purge<br>Volume<br>(gal) | Temp.<br>(C°) | рН   | Sp. Cond<br>(µS/cm) | Turbidity<br>(NTU) | Dissolved<br>Oxygen<br>(mg/L) |
|-------------------|--------------------------|--------------------------------------|-----------------------------------|---------------|------|---------------------|--------------------|-------------------------------|
| <sup>a</sup> MW-1 | 7/8/15<br>(1040)         | 100                                  | 1.25                              | 17.0          | 6.66 | 183.60              | 4.60               | 0.77                          |
| MW-3              | 7/8/15<br>(0950)         | 177                                  | 2.5                               | 16.8          | 6.12 | 171.00              | 12.20              | 0.36                          |
| MW-4              | 7/8/15<br>(1200)         | 100                                  | 2                                 | 16.20         | 6.28 | 170.80              | 3.94               | 0.24                          |
| MW-5              | 7/8/15<br>(1235)         | 100                                  | 1                                 | 18.70         | 6.39 | 128.10              | 11.40              | 1.00                          |
| MW-6              | 7/8/15<br>(1310)         | 100                                  | 1                                 | 20.10         | 6.00 | 135.80              | 11.30              | 1.70                          |

\*\*All wells are 2-inch diameter Sch40 PVC

<sup>a</sup>Duplicate sample was collected at MW-1

Samples were collected from the mid-screen depth or from the middle of the existing water column, whichever of these two scenarios was the deepest level. Table 3 lists water sample information, including parameters, testing methods and number of samples and duplicates. Sampling and water quality information collected at each well included purge rate, water level, parameter measurements and cumulative volume of groundwater purged from well at each well volume interval. Detailed well measurement, purging and sampling information is contained on the Monitoring Well Sampling and Water Quality Measurement Forms, which are include in Appendix B.

| Sample Type                                 | Analytical  | Sample | Analytical | No. of  | No. of     |
|---------------------------------------------|-------------|--------|------------|---------|------------|
|                                             | Parameter   | Matrix | Method     | Samples | Duplicates |
| Quarterly<br>Groundwater<br>Sampling Events | Mineral Oil | Water  | NWTPH-Dx   | 5       | 1          |

#### 3.4 Sample Handling, Field Documentation and Quality Assurance

This section discussed field documentation and procedures used to handle and manage the environmental samples collected for laboratory analysis. Project quality assurance methods are also detailed.

#### 3.4.1 Field Documentation

A logbook was used to document sampling and other support procedures performed during field activities. More specifically, the Field Activities Logbook entries provide a record of specific sample locations and collection information, any subcontractor activities, noting their role(s), describing the major equipment used at each sampling location and providing noteworthy observations, description of problems, or incidents and their resolutions. Completed field forms, planning and safety documents and the Field Activities Logbook were all stored in a weather-proof file box, maintained on site, during all project work activities. Field Activity Logbook entries are included in Appendix C.

Groundwater Monitoring Report 2<sup>nd</sup> Quarterly Event – July 2015 PacifiCorp Chehalis Plant

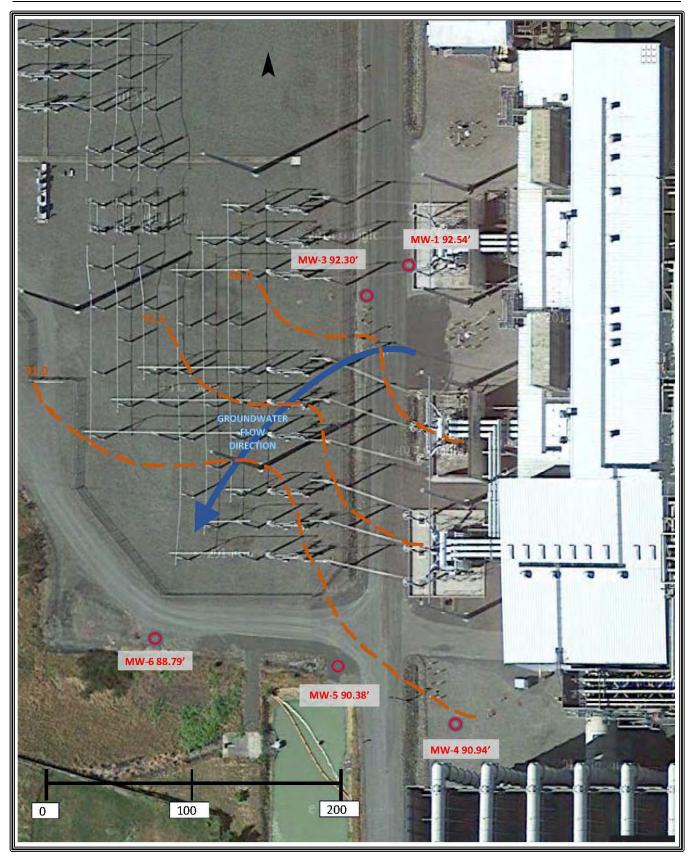


Figure 3. Groundwater Elevations and Flow Direction

#### 3.4.2 Sample Handling Procedures

Disposable nitrile gloves were used by personnel collecting and handling all samples. Gloves were changed frequently and in between each sample collection to avoid cross contamination. Samples were collected into certified clean, laboratory supplied containers, with pre-measured amounts of preservatives, as appropriate.

After the samples were collected they were appropriately labeled and placed in insulated coolers containing ice. This was done to keep the samples out of the direct sunlight and to maintain a temperature of as close to four degrees centigrade as possible. All project samples were hand-delivered to the contracted laboratory, Analytical Resources, Incorporated (ARI) laboratory in Tukwila, WA.

#### 3.4.2.1 Sample Identification, Labeling and Chain of Custody

Samples were identified by their location and corresponding date of collection. Any quality control samples (e.g. duplicates) were also properly denoted. Sample identification numbers, including sample media type, location number, and other pertinent descriptions were recorded on field sheets completed for each location and sample.

Chain of Custody (CoC) forms, detailing sample container, collection and possession information, were completed and accompanied each cooler shipment from the field to the laboratory. Date, time, sample identification, number of containers, analysis to be performed, and sampler/s in possession were recorded on each CoC. CoC records are included in Appendix D.

#### 3.4.3 **Quality Assurance Methods**

#### 3.4.3.1 Instrument Calibration

All field instruments that required a zeroing and/or a user calibration were appropriately calibrated at the start of each day's deployment per the instrument manufacturer's instructions. Calibration checks against standards were performed at the beginning and periodically throughout each field day (if necessary / required) to verify equipment operation. Any calibration data was recorded in the field logbook. All calibration media (e.g. gas, liquid or otherwise) was properly stored and managed per manufacturer's recommendations and according to applicable PC Plant requirements.

#### 3.4.3.2 Decontamination Procedures

Any non-disposable equipment was decontaminated prior to its initial use and after completing a particular sampling or logging task. Decontamination wash consisted of the following:

- > non-phosphate detergent (Alconox) and water wash;
- > tap water rinse; and
- > De-ionized water rinse.

> Drilling rigs, support vehicles, drill works, connection rods, augers and other large pieces of equipment would be decontaminated by power washing with a high-pressure steam cleaner only as described in Section 4 of the 2015 Project Work Plan (Cardno, April 2015).

No such decontamination of any equipment was necessary in the field during this quarterly groundwater sampling round.

#### 3.5 Investigation Derived Waste

Investigation-derived waste (IDW) generated during this quarterly groundwater sampling event consisted of excess purge water produced during well pumping and general soils waste debris (spent gloves, paper, etc.). All purge water containerized into a Department of Transportation (DOT)-17H approved open head 55-gallon drum. This drum was properly labeled with its media contents, date of generation, location of origin, and contents' owner. The drum was sealed with a fitted, gasketed lid and bolted band and placed on a pallet. A "common" drum, used for this same purpose, was initiated during the first quarterly sampling event. Approximately 8 gallons of purge water generated during this quarterly sampling event was placed into the "common" groundwater sampling drum. To date there is approximately 18 gallons of water in this drum.

The drum/pallet placement was approved by the PC Environmental / Safety Analyst – Project Manager. The storage location is secure and wholly within the PacifiCorp Chehalis property boundary. Additional IDW tasks, including testing, further staging, manifesting and disposal are being managed directly by PacifiCorp. No IDW was transported off of the site, nor manifested by Cardno.

#### 3.6 **Project Work Plan Discrepancies**

There were no significant or substantive changes, modifications, or revisions to the Project Work Plan (PWP) (Cardno, April 2015), nor discrepancies between the actual field tasks as performed and the PWP. Methodologies as described in the PWP were followed and conducted and completed accordingly.

## 4 Analytical Results

This section summarizes the results of the groundwater sampling activities completed at the PacifiCorp Chehalis Plant on July 8, 2015. Samples were analyzed for mineral oil using Northwest methods for total petroleum hydrocarbons – diesel extended range (NWTPH-Dx). These results are compared to the appropriate WA DoE MTCA Method A Cleanup Levels (WAC 173-340). The complete analytical report, including the CoC forms and electronic data deliverable table, are included in Appendix D.

#### 4.1 Comparison of Project Results to Regulatory Guidance

Assessment of mineral oil in groundwater sample data results are compared to permissible values listed for WA DoE MTCA Method A Cleanup Levels for Groundwater (WAC 173-340-720). MTCA's definition of Mineral Oil means non-PCB mineral oil, typically used as an insulator and coolant in electrical devices such as transformers and capacitors measured using NWTPH-Dx. The MTCA Method A Groundwater Cleanup Level for Mineral Oil of **500 µg/L** is based on protection from noncarcinogenic effects during drinking water use. Additional PCB testing requirements listed under the MTCA groundwater section (173-340-720) do not apply to project sampling because PacifiCorp can demonstrate that: (1) The release originated from an electrical device that was manufactured after July 1, 1979; or (2) oil containing PCBs was never used in the equipment suspected as the source of the release; or (3) it can be documented that the oil released was recently tested and did not contain PCBs.

#### 4.2 Groundwater Sampling Results

Five groundwater samples, along with one duplicate (duplicate from MW-1) were submitted to ARI Labs for Mineral Oil analysis via NWTPH-Dx. Results are reported as Diesel Range Organics (DRO), Mineral Oil and Residual Range Organics (RRO) / heavy fuel oil. DRO quantitation was noted on chromatograph peaks in the range from C12 to C24. Mineral Oil quantitation was noted on chromatograph peaks in the range from C18 to C28. RRO quantitation was noted on chromatograph peaks in the range from C24 to C38. Combined, the DRO/RRO results indicate the total diesel range extended (Dx) identified in a particular sample. Mineral Oil, therefore, is a subset of the total DRO/RRO concentration.

There were no reportable detections of DRO/RRO or Mineral Oil at any of the project tested well locations during this quarterly groundwater sampling event. Groundwater sampling results are presented in Table 4.

| Sample ID | Parameter   | Detection Limit<br>µg/L | Reporting<br>Limit μg/L | Result Value<br>µg/L | Data<br>Qualifier |
|-----------|-------------|-------------------------|-------------------------|----------------------|-------------------|
| MW-1      | DRO         | 20                      | 100                     | 100                  | U                 |
| MW-1      | Mineral Oil | 40                      | 200                     | 200                  | U                 |
| MW-1      | RRO         | 0                       | 200                     | 200                  | U                 |
| DUP-GW    | DRO         | 20                      | 100                     | 100                  | U                 |
| DUP-GW    | Mineral Oil | 40                      | 200                     | 200                  | U                 |
| DUP-GW    | RRO         | 0                       | 200                     | 200                  | U                 |
| MW-3      | DRO         | 20                      | 100                     | 100                  | U                 |
| MW-3      | Mineral Oil | 40                      | 200                     | 200                  | U                 |
| MW-3      | RRO         | 0                       | 200                     | 200                  | U                 |
| MW-4      | DRO         | 20                      | 100                     | 100                  | U                 |
| MW-4      | Mineral Oil | 40                      | 200                     | 200                  | U                 |
| MW-4      | RRO         | 0                       | 200                     | 200                  | U                 |
| MW-5      | DRO         | 20                      | 100                     | 100                  | U                 |
| MW-5      | Mineral Oil | 40                      | 200                     | 200                  | U                 |
| MW-5      | RRO         | 0                       | 200                     | 200                  | U                 |
| MW-6      | DRO         | 20                      | 100                     | 100                  | U                 |
| MW-6      | Mineral Oil | 40                      | 200                     | 200                  | U                 |
| MW-6      | RRO         | 0                       | 200                     | 200                  | U                 |

Table 4. Groundwater Sampling Results

U = non-detect Dup

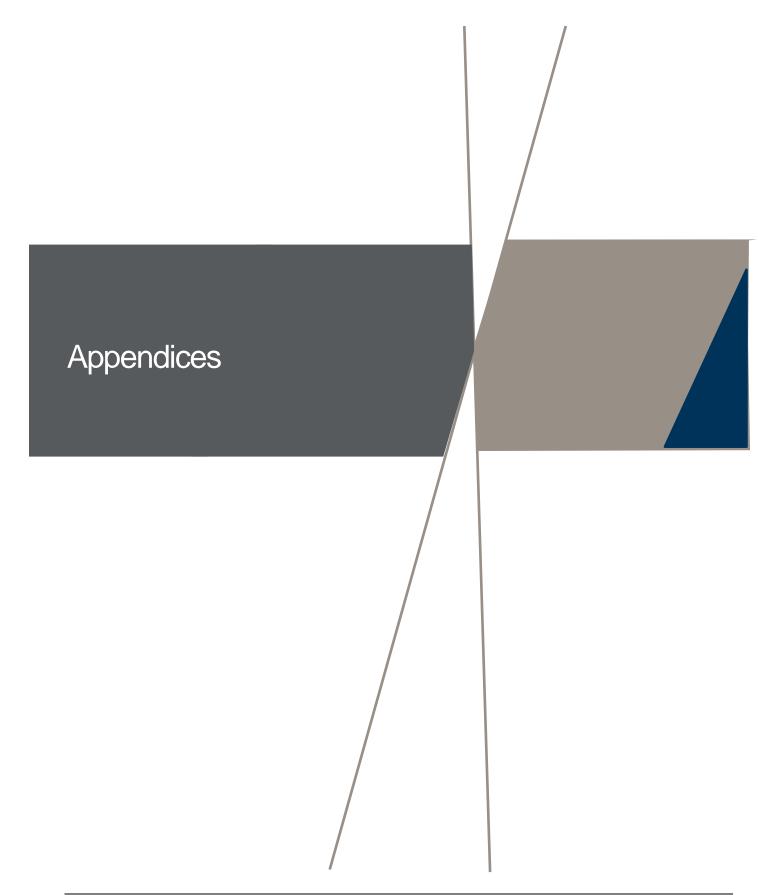
Duplicate collected at MW-1

# 5 References

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# APPENDIX A HEALTH AND SAFETY TAILGATE FORM

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### Attachment 1 Daily Health and Safety Tailgate Meeting Form

DAILY HEALTH AND SAFETY TAILGATE MEETING FORM **Project Health and Safety Manager Conducting Meeting :** Date : 7/8/2015 Weather: CLEAR - ABOVE AVERAGE TEMPS. Personnel In Attendance : Brao Kwaswowski DAVE METALLO Meeting Minutes (Brief description of topics, special concerns and sites discussed): - WEATHER is HOT + DRY; STAY HYDRATED AND USE SHADE WHENEVER POSSIBLE - PACIFICORP GROUNDS ARE INDUSTRIAL, REQUIRING HARD HAT, SAFETY GLASSES, DEFLECTIVE VESTS STEEL TOE BODTS, AND GLOVES. - BE AWARE OF HEAVY MACHINERY AND VEHICLES OPENATING AROUND FACILITY - MainTain Good - House LEEping AVOID SITUATIONS LEADING TO SLIPS, TRIPS, FOLLS. - ENERGIZED DOWER -LINIES OVERHEAD - BE MIRIDEUL OF CLEARANCE tallo Signature of Attendees' : "THE BEST JOB IS ONE DONE SAFELY ! "

## **APPENDIX B**

## MONITORING WELL SAMPLING AND WATER QUALITY MEASUREMENT FORMS

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| LOW FLOW WELL PURGING                     | G AND FIELD WATER QUALITY MEASUREMENT FORM PAGE / OF                          |
|-------------------------------------------|-------------------------------------------------------------------------------|
| Project Name: BcifiCorp GW Investigation  | Date: $7 - 8 - 2015$                                                          |
| Site Name: Chehalis Plant - GSUS          | LNAPL: Y N $$ DNAPL: Y N $$ Depth to Product (ft btoc): $NA$                  |
| Sample Location ID: <u>MW -1</u>          | Product Thickness (ft): <u>0.00</u>                                           |
| Sampler(s) <u>M_fallo Kwasnowski</u>      | Well Screen Interval: <u>17– 4.5</u> Mid Screen Depth (ft btoc): <u>10.75</u> |
| Parameters: <u>NWTPH-Ox (mineral oil)</u> | Pump Intake (ft btoc): $10.5$ TD = $16.75'$                                   |
| QC Sample: () N Type: <u>Displicate</u>   | Purge Style: Peristaltic) Bladder / Submersible /Other:                       |

| Time                 | Purge Rate<br>(ml/min) | Total<br>Purge<br>(gal) | Depth to<br>Water<br>(ft btoc) | Temp.<br>°C  | рН           | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L) | Comments                         |
|----------------------|------------------------|-------------------------|--------------------------------|--------------|--------------|----------------------|---------------------|--------------|----------------------------------|
| л.<br>Э              | Stabiliz               | zation Rec              | juirements                     | (±10%)       | (±0.2)       | (±10%)               | (± 10 %)            | (±10%)       |                                  |
| 1010                 | -14                    |                         | 15.22                          |              |              | 1                    | -                   |              | Initial water level, pre-pumping |
| 1015                 | ~ 100                  | 500                     | 5.96                           | 18.0         | 6.67         | 181.0                | 4.10                | 1.18         | Pump Speed = 0.5                 |
| 1020                 | ~10D                   | 500                     | 6.33                           | 17.6         | 6.67         | 180.2                | 4.10                | 0.86         |                                  |
| 1025                 | ~ 100                  | 500                     | 6.57                           | 17.5         | ماما. ما     | 180 181.0            | 4.20                | 0.81         |                                  |
| 1030                 | ~100                   | 500                     | 6.86                           | 17.4 -       | ماما. ما     | 182.10               | 4.70                | 0,78         |                                  |
| 1035                 | ~100                   | 500                     | 7.04                           | 17.0         | 6.66         | 183.60               | 4.60                | 0.77         |                                  |
|                      |                        | 1.1                     |                                |              |              |                      | 1                   |              |                                  |
|                      |                        |                         |                                |              |              |                      |                     |              |                                  |
|                      |                        |                         |                                |              |              |                      |                     |              |                                  |
|                      | -                      | -                       |                                |              | €            | 10 - 10              |                     | r            |                                  |
|                      |                        | ~1.25                   |                                |              |              |                      |                     |              |                                  |
|                      |                        |                         | <sup>1</sup> Water Le          | evel Measure | ements in th | ese boxes n          | nust match !        |              |                                  |
| 1040                 |                        | 1.25 gal                | 15.22                          | 17.0         | ماما. ما     | 183.60               | 4.60                | 17.0         | MW-1                             |
| <sup>(DUP)</sup> 300 |                        |                         |                                |              |              |                      |                     | Con Juffer   | MW-1<br>DUP-GW                   |

Additional Comments:

Water Quality inst. = YSI Pro DDS (Geo Tech Rental) #5005 14L103129 (soude)



LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

PAGE /\_ OF /\_

| Project Name: Pacificono Grownomare Inessi | Somer Date: 8 July 2015                                                      |
|--------------------------------------------|------------------------------------------------------------------------------|
| Site Name: CHEHAUS                         | LNAPL: Y / N DNAPL: Y N/ Depth to Product (ft btoc): 5.26'                   |
| Sample Location ID: <u>Mw-3</u>            | Product Thickness (ft): 0.01 (Sheen)                                         |
| Sampler(s) B. KWasNowski / D. METALLO      | Well Screen Interval: <u>I9-5'4'</u> Mid Screen Depth (ft btoc): <u>II.5</u> |
| Parameters: NWTPH-Dx                       | Pump Intake (ft btoc): $11.5^{\circ}$ TD = 19.21                             |
| QC Sample: Y // Type:                      | Purge Style Peristaltic Bladder / Submersible /Other:                        |

| Time     | Purge Rate<br>(ml/min) | Total<br>Purge<br>(gal) | Depth to<br>Water<br>(ft btoc) | Temp.<br>°C  | рН           | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L) | Comments                         |
|----------|------------------------|-------------------------|--------------------------------|--------------|--------------|----------------------|---------------------|--------------|----------------------------------|
|          | Stabiliz               | zation Req              | uirements                      | (±10%)       | (±0.2)       | (±10%)               | (± 10 %)            | (±10%)       |                                  |
| 0855     | 1 1 2                  |                         | 15,27                          |              |              |                      |                     |              | Initial water level, pre-pumping |
| 0906     | ~150                   | 500 ml                  | 5.27                           | 16.3         | 6.05         | 151.8                | 4.3                 | 4.40%        |                                  |
| 0912     | ~150                   | ~500ml                  | 7.01                           | 16.8         | 5.99         | 150.0                | 2.3                 | 3.20 0       |                                  |
| 0917     | ~150                   | ~1250                   | 8.04                           | 17.1         | 5.94         | 148.3                | 2.6                 | 0.25         | Pump @ Speed                     |
| 0922     | ~150                   | ~1000                   | 9.08                           | 17.6         | 5.92         | 147.4                | 7.1                 | 0.22         | Rate is closer to                |
| 0927     | ~200                   | ~1000                   | 9.98                           | 17.6         | 5.98         | 147.8                | 11.8                | 0.23         | ~200 m1/min                      |
| 0932     | ~200                   | ~ 1000                  | 10.98                          | 17.5         | 6.07         | 158.0                | 22.2                | 0.28         |                                  |
| 0937     | ~ 200                  | ~1000                   | 11.70                          | 17.3         | 6.10         | 162.50               | 118                 | 0.32         | lowered intate 215"              |
| 0942     | ~200                   | ~1000                   | 12.05                          | 17.1         | 6.04         | 158.00               | 11.4                | 0.29         |                                  |
| 0947     | ~200                   | ~1000                   | 12.79                          | 16.8         | 6.12         | 171.00               | ¥.12.2              | 0.36         |                                  |
|          |                        | ~2.5                    | gals                           |              |              |                      |                     |              |                                  |
|          |                        | C                       |                                | evel Measure | ements in th | iese boxes n         | nust match !        |              |                                  |
| 0950     |                        | ~1000                   | 15.27                          | 168          | 6.12         | 171.00               | 12.2                | 0.36         | MW-3                             |
| (DUP) NA |                        |                         |                                |              | and the set  |                      |                     |              |                                  |

Additional Comments: Sample Time = (0950)

|                     | PacifiCorp             |                         |                                | ion          | Date: <u>7.8</u> | .2015                |                     |               |                                         |
|---------------------|------------------------|-------------------------|--------------------------------|--------------|------------------|----------------------|---------------------|---------------|-----------------------------------------|
| Site Name: <u>C</u> | Thebalis Pla           | not-Ga                  | SUS                            |              | LNAPL: Y _       |                      | NPL: Y N <u>.</u>   | / Depth to P  | roduct (ft btoc): <u>NA</u>             |
|                     | ion ID: <u>MW</u>      | 1                       | 1.                             |              |                  | ckness (ft): _       |                     |               | 111 0                                   |
|                     | Metallo, A             |                         |                                |              |                  | Interval: 2          |                     |               | pth (ft btoc): <u>14.80</u>             |
|                     | NWTPH-                 |                         | liveral (                      |              |                  | e (ft btoc):         |                     |               | - TD=24.80                              |
| QC Sample:          | Y / N Type:            |                         |                                | *            | Purge Style:     | Peristalticy         | Bladder / Sub       | mersible /Oth | er:                                     |
| Time                | Purge Rate<br>(ml/min) | Total<br>Purge<br>(gal) | Depth to<br>Water<br>(ft btoc) | Temp.<br>°C  | рН               | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L)  | Comments                                |
| C 1 58 y            | Stabiliz               | ation Req               | uirements                      | (±10%)       | (±0.2)           | (±10%)               | (± 10 %)            | (±10%)        |                                         |
| 1121                |                        |                         | 1670                           |              |                  |                      |                     |               | Initial water level, pre-pumping        |
| 1125                | ~100                   | 500                     | 6.80                           | 16.60        | 6.33             | 174.0                | 4.70                | 0.78          | minor damage to<br>concrete well monume |
| 1130                | ~100                   | 500                     | 6.80                           | 16.70        | 628              | 174.9                | 4.80                | 0.45          | Rump Speed=0.5                          |
| 1135                | ~100                   | 500                     | 6.83                           | 16.60        | 6.26             | 175.4                | 4.50                | 0.42          |                                         |
| 1140                | ~100                   | 500                     | 6.83                           | 16.10        | 6.26             | 174.4                | 4.50                | 0.39          |                                         |
| 1145                | ~100                   | 500                     | 6.83                           | 16.10        | 6.27             | 171.8                | 3.90                | 0.27          |                                         |
| 1150                | ~100                   | 500                     | 6.83                           | 16.20        | 6.27             | 170.8                | 3.93                | 0.25          |                                         |
| 1155                | ~100                   | 500                     | 683                            | 16.20        | 6.28             | 170.8                | 3.94                | 0.24          |                                         |
|                     | -                      |                         |                                | 1            |                  |                      |                     |               |                                         |
|                     |                        |                         |                                | 村            |                  |                      |                     |               |                                         |
|                     |                        | 2Zgal                   | S                              |              |                  |                      |                     |               |                                         |
|                     |                        | 0                       | <sup>1</sup> Water Le          | evel Measure | ements in th     | nese boxes r         | nust match !        |               |                                         |
| 1200                |                        | 2 gals                  | 16.70                          | 16.20        | 628              | 170.8                | 3.94                | 0.24          | MW - 4                                  |
| (DUP) NA            |                        | V                       |                                |              |                  |                      |                     |               |                                         |

Additional Comments:

| <sup>o</sup> roject Name | : PacifiCorp<br>Chehalis - | GW -                    | Investigo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ution       | Date: $7 \cdot 8$ |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |               | roduct (ft btoc): NA             |
|--------------------------|----------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------|----------------------------------|
|                          | ion ID: MW                 | 1                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |               |                                  |
|                          | Metallo, K                 |                         | ski                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                   | ckness (ft): _                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     | d Screen De   | oth (ft btoc): <u>/5,</u> 3'     |
|                          | NWTPH-1                    |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | )           | Pump Intake       | e (ft btoc):                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <u>, 15</u> .3'     |               | - TD=25.3                        |
|                          | Y (N) Type:                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 50          | Purge Style:      | Peristaltic/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Bladder / Subr      | nersible /Oth | - 10-25.3<br>er:                 |
| Time                     | Purge Rate<br>(ml/min)     | Total<br>Purge<br>(gal) | Depth to<br>Water<br>(ft btoc)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Temp.<br>°C | рН                | Sp. Cond.<br>(µS/cm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Turbidity<br>(NTUs) | DO<br>(mg/L)  | Comments                         |
|                          | Stabiliz                   | ation Rec               | quirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | (±10%)      | (±0.2)            | (±10%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | (± 10 %)            | (±10%)        |                                  |
| 1210                     |                            |                         | 16.70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |               | Initial water level, pre-pumping |
| 1215                     | ~100                       | 500                     | 6.81                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 19.20       | 6.32              | 123.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 6.60                | 1.24          | Pump Speed 0.5                   |
| 1220                     | ~100                       | 500                     | 6.83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 18,90       | 6,36              | 124.80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 11.20               | 1.01          |                                  |
| 1225                     | ~100                       | 500                     | 6.83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 18.10       | 6.38              | 127.70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 11.50               | 1.00          |                                  |
| 1230                     | ~100                       | 500                     | 6.83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 18.70       | 6.39              | 128.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 11.40               | 1.00          |                                  |
| 1.2                      |                            |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |               |                                  |
|                          |                            |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |               |                                  |
|                          | -                          |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4.7         | 5                 | in a sale                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                                  |
|                          | -                          | rlgal                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             | -                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |               | 1                                |
|                          |                            | 0                       | <sup>1</sup> Water Le                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | vel Measure | ements in th      | ese boxes r                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | nust match !        |               |                                  |
| 1235                     |                            | Igal                    | 16.70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 18.70       | 639               | 128.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 11.40               | 1.00          | MW-5                             |
| (DUP) NA                 | -                          | 0                       | a and a state of the state of t |             |                   | A state of the sta |                     |               |                                  |

Additional Comments:

|                             | arcino <sup>®</sup><br>ing the Future | LOW FLC                 | W WELL P                       | URGING AN   | ID FIELD W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ATER QUAL            | ITY MEASUR            | EMENT FOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |
|-----------------------------|---------------------------------------|-------------------------|--------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Project Name:<br>Site Name: | PacifiCorp<br>Chehalis<br>on ID: MW-  | GWI<br>-GSU             | Nuestiga                       | tion        | Date: <u>7.9</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      | <br>\PL: Y N <u>V</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | roduct (ft btoc): <u>NA</u>      |
|                             | Metallo                               |                         | owski                          |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                       | d Screen Der                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | oth (ft btoc): 15.10             |
|                             | NW TPH-                               |                         |                                |             | Pump Intake                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | e (ft btoc):         | 15.30                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | - TD = 25.10                     |
|                             | Y (N) Type:                           | •                       |                                |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      | Bladder / Subr        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |
| Time                        | Purge Rate<br>(ml/min)                | Total<br>Purge<br>(gal) | Depth to<br>Water<br>(ft btoc) | Temp.<br>°C | pH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs)   | DO<br>(mg/L)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Comments                         |
|                             | Stabiliz                              | ation Req               | uirements                      | (±10%)      | (±0.2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | (±10%)               | (± 10 %)              | (±10%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                  |
| 1246                        |                                       |                         | 17.39                          |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Initial water level, pre-pumping |
| 1250                        | ~100                                  | 500                     | 7.51                           | 20.4        | 5.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 133.10               | 9.80                  | 1.68                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Rump Speed 0.5                   |
| 1255                        | ~100                                  | 500                     | 7.53                           | 21.0        | 5.98                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 135.4                | 11.40                 | 1.67                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | • • •                            |
| 1300                        | ~100                                  | 500                     | 7.53                           | 21.0        | 5.98                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 136.4                | 11.10                 | ماما. [                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                  |
| 1305                        | ~100                                  | 500                     | 7.54                           | 20.1        | 6.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 135.8                | 11.30                 | 1.70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |
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|                             |                                       |                         | 4                              |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |
|                             |                                       |                         |                                |             | 10 <sub>41</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | a (1997)<br>                     |
|                             |                                       |                         |                                |             | Ç.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |
|                             |                                       | rigal                   | i.                             |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |
|                             |                                       | 0                       | <sup>1</sup> Water Le          | evel Measur | ements in th                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ese boxes r          | nust match !          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |
| 1310<br>(DUP) A/A           |                                       | Igal                    | 17.39                          | 20.1        | 6.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 135.8                | 11.30                 | 1.70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | MW-6                             |
| (DUP) NA                    | the state of the state of the         |                         |                                |             | and the second s |                      |                       | and the second s |                                  |

Additional Comments:

# APPENDIX C FIELD LOGBOOK ENTRIES

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Pacifi Corp 2015 7-8-15 41 2ND Qterly GW Event \* 2ND QTerly GW Sampling Event D. Metallo, B. Kwasnowski - Weather : Clear, Sunny, 70-80's breezy, forecast to be hot today - Leave Seattle Shop 20600, mob down to Tukwile to pick up bottles at ARI Labs - Leave lab 20635 mob down to Pacifi Conp Power Plant in Chehelis WA - Arrive at PC-Chahalis ~0815. check in at front office - Jeremy Smith is out today - checked in 1/ Plant Mingr (Mark Miller · Stopped by control room and obtained a plant radio for the day - Conducted failgate H+S prieting, discussed plant particulars, etc. Rite in the Rais DCM

2ND Qterly GWEUNT PacifiCorp 2015 2ND Oterly GW EVNT 7.8.15 Pacifi Corp 2015 7.8.15 MW-1, contied Final Readings; - Set up on MW-3 (~0835) - readied all sampling gear, PPE, Supplies, Temp pH Sp. Cond. Turb DO Intel bottles, forms, etc. 183.60 4.60 0.71 17.0 6.66 \* Using a YSI Pro DDS muth-meter Units as per mw3 (GeoTech Rental) #5005 (soude Ser. # Sample = MW-1 (1040) 2 mark \* DUP = DUP-GW (1300) 14L103129) to measure water quality readings at all wells today. Same model . - Set up on Took purge water instrument used last round of sampling. collected thus far over to drum staping - Depth to Prod. = 5.26, thickness = 0.01" area at SE corner of property. All 2015 · Depth to Water = 5.27' . TD= 19.21 SI drums staged here. Placed ~ 4 gals @ Sample Intake = 11.5 . Peristattic pump . NWTPH-Dx . Are Bump rate = ~ 175m1/min of purge water into "Common" 55-gel drum that was initiated for this purpose · Total purge vol = 2.5 gals last sampling round. Will continue to · Final WQ Readings: Temp °C pH Diss.Ox mg/L Sp. Cond Jus/cm Turb deposit purpe water into this drum until it's full. Drum is setting on a pallet. 0.36 6.12 171.00 12.2 16.8 0950 Sample = MW-3 (0950) - Setup on MW-4 (1110) Dowered to ~13' during purging · Depth to product / thickness = NA - Set up on MW-1 (1005) -· WL = 6.70' TD = 24.80' . Depth to Product / Thickness = NA · Sample Intake = 14.80 · Peristallic pump · Depth to Water = 5.22' TD= 16.75' · NWTPH-Dx · Ave Purge Rate = 100 milmin · Sample Intake= 10.5 Peristattic pump · Total Purge Vol = ~ Zgals · NWTPH-Dx · Ave purge rate = 100 ml/min · Total purpe Vol. = 1.25 gals Rite in the Rain. DCM

PacifiCorp 2015 200 Qtor 14 GW Eurt PacifiCorp 2015 2ND Oterily GW EUNT 7.8.15 44 MWE confied. MWH contied · Final W@ Readings : WQ Readings: Temp pH Sp. Cord. Turb Temp pH Sp. Cond Turb DO DO 16.20 6.28 170.80 3.94 0.24 6.00 135.80 11.30 1.70 20.1 \* Units as por Mw-3 \* Units as per MW-3 · Sample = MW-6 (1310) Sample = MW-4 (1200) Contrast, - Mob back over to drum storage -Set up on MW-5 (1205) · Depth to Product / Thickness = NA area and deliver remaining - 4 gals Carlanter . of purge water to "common" Storage · WL = 6.70 · TD= 25.30 drum. Total of ~ 8 gals from today's · Sample Intake = 15.30 Peristattic pump event contained in drum - Total · NWTPH-Dx . Ave Purge Rate = 100 ml/min Drum Vol. ~ 18 gal.s. Re-sealed drum · Total Purge Vol. = ~ Igal lid and secured band. · Final WQ Readings: Temp pH Sp. Cord Turb DO - Mob back over to GSU area to collect 18.70 6.39 128.10 11.40 1.00 measurements of lateral distances b/w \* Units as per MW-3 Tinetill the various well heads ( weeded to enhance Sample = MW-5 (1235) Tomas I.C. assessment of water table (GW flow) - Set up on MW-6 (1240) - Use a measuring wheel a triangulation calc's to figure distances . Depth to Product / Thickwess = NA Lines MW1 to MW4 = 288' · WL = 7.39 TD= 25.10 -· Sample Inteke = 15.30 · Peristaltic lump MW1 to MW5=235' MW1 to MW6 = 305' · NWTPH-Dx · Ave Purpe Rate = 100 m1/min · Total Purpe Vol. = 1 gal. Rite in the Rain DCM

PacifiCorp 2015 200 Qter 14 GW EVANT 46 47 7.8.15 Well head distance Measurements, Contied; MW1 to MW3 = 38' **G** MW6 to MW5 = 151' MWS to MW4 = 96' MW5 to MW3 = 218' MW3 to MW6 = 265' and the state MW3 to MWH = 270' MW4 to MW6= 246 - Load gear into van, head back to Admin Office, return plant radio, sign out, call Lievora to Let her know we're finished. Mob offsite ~ 1400 - Mob to a gas station in Chehalis purchase additional Ice for samples. All samples are cushroned, in Zip-bocks and on the w/ water bath. COC has (Land been filled out Esalat - Mob back to Seattle disp samples aff at ARI Labs ~1530 • all somples are in good condition @~ 5.8°C 2 minute \* 2ND Qter GW Sampling Completed Rite in the Rain

# APPENDIX D LABORTORY CHAIN OF CUSTODY FORMS

## AND

# ANALYTICAL REPORT

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## **Chain of Custody Record & Laboratory Analysis Request**

| ARI Assigned Number:             | Turn-around                     | Requested: | standar | ł                           | Page:                | 1    | of             | 1                           |           |   | Analytic                    | cal Resources, Incorporated<br>cal Chemists and Consultants<br>buth 134th Place, Suite 100 |
|----------------------------------|---------------------------------|------------|---------|-----------------------------|----------------------|------|----------------|-----------------------------|-----------|---|-----------------------------|--------------------------------------------------------------------------------------------|
| ARI Client Company: KTA, Im      | С.                              | Phone: 36  | 0-250   | -7694                       | Date: 7.8.           | 2015 | lce<br>Prese   | nt? Ye                      | ŝ         |   | Tukwila                     | , WA 98168<br>5-6200 206-695-6201 (fax)                                                    |
| Lenora L                         | lestbrook                       | k          |         |                             | No. of<br>Coolers:   | 1    | Coole<br>Temps | r: 5'                       | 8         |   |                             | ilabs.com                                                                                  |
| Client Project Name: Pacifi Corp |                                 | westige    | ation   |                             | earse<br>earse       |      |                | Analysis I                  | Requested |   |                             | Notes/Comments                                                                             |
| Client Project #:                | Samplers:<br>D. M. et a.        | 110, B.K   | wasnow: | iki                         | H-<br>H-             |      |                |                             |           |   |                             |                                                                                            |
| Sample ID                        | Date -                          | Time       | Matrix  | No. Containers              | ATWN<br>XCO<br>Multi |      |                |                             |           |   |                             |                                                                                            |
| MW-3                             | 7.8.15                          | 0950       | W       | 2                           | Х                    |      |                |                             |           |   |                             |                                                                                            |
| MW-1                             | 7.8.15                          | 1040       | W       | 2                           | X                    |      |                |                             |           |   |                             |                                                                                            |
| MW-4                             | 7.8.15                          | 1200       | W       | 2                           | X                    |      |                |                             |           |   |                             |                                                                                            |
| MW-5                             | 7.8.15                          | 1235       | W       | 2                           | X                    |      |                |                             |           |   |                             |                                                                                            |
| MW-6                             | 7.8.15                          | 1310       | W       | 2                           | X                    |      |                |                             |           |   |                             |                                                                                            |
| DUP-GW                           | 7.8.15                          | 1300       | W       | 2                           | X                    |      |                |                             |           |   |                             |                                                                                            |
|                                  |                                 |            | *       |                             |                      |      |                |                             |           |   |                             |                                                                                            |
|                                  |                                 |            |         |                             |                      |      |                |                             |           | _ |                             |                                                                                            |
| CM                               |                                 |            |         |                             |                      |      |                |                             |           |   |                             |                                                                                            |
|                                  |                                 | 1          | le al   |                             |                      |      |                |                             |           |   |                             |                                                                                            |
| Comments/Special Instructions    | Relinquished by:<br>(Signature) | Mart       | tollo   | Received by:<br>(Signature) | Fo                   | my & | structe        | Relinquished<br>(Signature) | by:       |   | Received by:<br>(Signature) |                                                                                            |
|                                  | Printed Name:                   | Metal      | 10      | Printed Name:               | The F                | my & | /              | Printed Nam                 | e:        |   | Printed Name                | 9:                                                                                         |
|                                  | Company:                        | rdno       |         | Company:                    | ART                  |      |                | Company:                    |           |   | Company:                    |                                                                                            |
|                                  | Date & Time:<br>7.8.14          | 5 (153     | (0      | Date & Time:<br>7-8         | 7,15                 | 15   | 70             | Date & Time:                |           |   | Date & Time:                |                                                                                            |

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or cosigned agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



15 July 2015

Lenora Westbrook KTA Associates, Inc. 3530 32<sup>nd</sup> Way NW Olympia, WA 98502-3230

### RE: Client Project: PacifiCorp GW Investigation

Dear Lenora:

Please find enclosed the original chain of custody record and the final results for the samples from the project referenced above. Six water samples were received on July 8, 2015. The samples were analyzed for NWTPH-Dx as requested.

All samples were initially analyzed on 7/10/15. The percent difference was not within control limits for the CCAL that bracketed the analyses of these samples. All samples were re-analyzed on 7/13/15. The re-analyses proceeded without incident of note. The results for the re-analyses only have been submitted.

There were no further problems associated with these analyses.

A copy of these reports will remain on file at ARI. Should you have any questions or need additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mol? Mul Mark D Harris

Project Manager 206/695-6210 markh@arilabs.com

Enclosures

cc: Dave Metallo, Cardno-GS File AIW9

MDH/mdh

| Page 1 of | 22 |
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| ARI Assigned Number.            | Turn-around                  | Turn-around Requested: Standard | standar      |                            | Page: /                                                                                 | of              |                                | <b>Analytic</b><br>Analytica       | Analytical Resources, Incorporated<br>Analytical Chemists and Consultants                 |
|---------------------------------|------------------------------|---------------------------------|--------------|----------------------------|-----------------------------------------------------------------------------------------|-----------------|--------------------------------|------------------------------------|-------------------------------------------------------------------------------------------|
| ARI Client Company: KTA, T.M.   | ن ا                          | Phone 36                        | 360-250-7694 | -7694                      | 7.8 2015                                                                                | lce<br>Present? | 10 705                         | - 4611 500<br>Tukwila,<br>206-695- | 4611 South 134th Place, Suite 100<br>Tukwila, WA 98168<br>206-695-6200_206-695-6201 (fax) |
| Client Contact Lewora Westbrook | lest broo                    | _~                              |              |                            | No. of<br>Coolers.                                                                      | Cooler<br>Temps | 5.8                            | www.ari                            | www.arilabs.com                                                                           |
| Client Project Name: D / N      | 5 - 7                        | 1954.00                         | 1 time       |                            |                                                                                         |                 | Analysis Requested             |                                    | Notes/Comments                                                                            |
| Client Project # Samplers;      | Samplers;                    | - billanne                      |              |                            | 1:00                                                                                    |                 |                                |                                    |                                                                                           |
|                                 | D. Meta                      | D. Metallo, B. Kuasnowski       | Suons        |                            | роло<br>><br>- НД                                                                       |                 |                                |                                    |                                                                                           |
| Sample ID                       | Date                         | Time                            | Matrix       | No Containers              | NWT<br>Mo<br>Mu<br>Mu<br>Mu<br>Mu<br>Mu<br>Mu<br>Mu<br>Mu<br>Mu<br>Mu<br>Mu<br>Mu<br>Mu |                 |                                |                                    |                                                                                           |
| MW-3                            | 7.8.15                       | 7.8.15 0950                     | 3            | 2                          | X                                                                                       |                 |                                |                                    |                                                                                           |
| MW-1                            | 7.8.15                       | 1040                            | 3            | 4                          | ×                                                                                       |                 |                                |                                    |                                                                                           |
| MW-4                            | 7.8.15                       | 1200                            | Μ            | 2                          | X                                                                                       |                 |                                |                                    |                                                                                           |
| MW-5                            | 7.8.15                       | 1235                            | М            | 2                          | ×                                                                                       |                 |                                |                                    |                                                                                           |
| MW-6                            | 7.8.15                       | 1310                            | Ņ            | 7                          | ×                                                                                       |                 |                                |                                    |                                                                                           |
| DUP-GW                          | 7.8.15                       | 1300                            | Ŵ            | 2                          | ×                                                                                       |                 |                                |                                    |                                                                                           |
|                                 |                              |                                 |              |                            |                                                                                         |                 |                                |                                    |                                                                                           |
|                                 |                              |                                 |              |                            |                                                                                         |                 |                                |                                    |                                                                                           |
|                                 |                              |                                 |              |                            |                                                                                         |                 |                                |                                    |                                                                                           |
|                                 |                              | 0                               | 10           |                            |                                                                                         |                 |                                |                                    |                                                                                           |
| Comments/Special Instructions   | Reinquished by<br>(Signatury | 12. ()                          | 1/1/4        | Received by<br>(Signature) | Fry S                                                                                   | 1 grat          | Relinquished by<br>(Signature) | Received by<br>(Signature)         |                                                                                           |
| <b>1</b>                        | Printed Name                 | Metallo                         | 5            | Printed Name               | Tay tirete                                                                              |                 | Printed Name                   | Printed Name                       |                                                                                           |
| 2000<br>*                       | Company C                    | OUTUN                           |              | Company                    | ANT                                                                                     |                 | Company                        | Company                            | -                                                                                         |
|                                 | Date & Time.<br>7. 8 · 1 5 ( | 5 (1530                         |              | Date & Time                |                                                                                         | 153 <b>0</b>    | Date & Time                    | Date & Time                        |                                                                                           |

In the standard of the industry all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program the standard sor the industry and the industry. The total liability of ARI, its officers, agents, employees, or successors, ansing out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or constructes.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless afternate retention schedules have been established by work-order or contract

| Analytical Resources, Incorpora<br>Analytical Chemists and Consult                                              |                | Cooler R                      | eceipt Fo     | orm      |        |
|-----------------------------------------------------------------------------------------------------------------|----------------|-------------------------------|---------------|----------|--------|
| ARI Client KTA, InC                                                                                             |                | Project Name                  |               |          |        |
| Assigned ARI Job No トエい                                                                                         | _              | Tracking No                   |               | N/       | A      |
| Preliminary Examination Phase:                                                                                  |                |                               |               |          |        |
| Were intact, properly signed and dated custody sea                                                              | als attached t | o the outside of to cooler?   | Y             | ES NO    | )      |
| Were custody papers included with the cooler?                                                                   |                | · · · · · · · · ·             | Ŷ             | es No    | ,<br>, |
| Were custody papers properly filled out (ink, signed<br>Temperature of Cooler(s) (°C) (recommended 2.0-<br>Time |                |                               | й<br>С        |          | )      |
| If cooler temperature is out of compliance fill out fo                                                          | rm 00070F      |                               | Temp Gun ID#: | 90877472 | -      |
| Cooler Accepted by                                                                                              | 3              | Date7-δ·/5                    | _Time _ 153   |          | _      |
| Complete cu                                                                                                     | stody forms    | and attach all shipping docum | nents         |          |        |
| Log-in Phase:                                                                                                   |                |                               |               | ····     |        |

.

| Was a temperature blank included in the cooler?                                                     |               | YES        | NO,    |
|-----------------------------------------------------------------------------------------------------|---------------|------------|--------|
| What kind of packing material was used? Bubble Wrap Wet ice Gel Packs Baggies Foam Block            | Paper O       | ther:      | $\cup$ |
| Was sufficient ice used (if appropriate)?                                                           | NA            | YES/       | NO     |
| Were all bottles sealed in individual plastic bags?                                                 |               | YES        | NO     |
| Did all bottles arrive in good condition (unbroken)?                                                |               | YÆS,       | NO     |
| Were all bottle labels complete and legible?                                                        |               | YES        | NO     |
| Did the number of containers listed on COC match with the number of containers received?            |               | YES)       | NO     |
| Did all bottle labels and tags agree with custody papers?                                           |               | YES        | NO     |
| Were all bottles used correct for the requested analyses?                                           |               | YES,       | NO     |
| Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs). | (NA)          | YES        | NO     |
| Were all VOC vials free of air bubbles?                                                             | (NA)          | YES        | NO     |
| Was sufficient amount of sample sent in each bottle?                                                | $\bigcirc$    | YES        | NO     |
| Date VOC Trip Blank was made at ARI.                                                                | NA)           | $\bigcirc$ |        |
| Was Sample Split by ARI . NA) YES Date/Time Equipment:                                              | $\mathcal{O}$ | Split by:_ |        |
| Samples Logged by:                                                                                  | 7             |            |        |
| ** Notify Project Manager of discrepancies or concerns **                                           |               |            |        |

otify Project Manager of discrepancies or concerns

| Sample ID on Bottle           | Sample ID on COC         | Sample ID on Bottle                   | Sample ID on COC |
|-------------------------------|--------------------------|---------------------------------------|------------------|
|                               |                          |                                       |                  |
|                               |                          |                                       |                  |
|                               |                          |                                       |                  |
|                               |                          |                                       |                  |
| Additional Notes, Discrepanci | es, & Resolutions:       | · · · · · · · · · · · · · · · · · · · |                  |
|                               |                          |                                       |                  |
|                               |                          |                                       |                  |
|                               |                          |                                       |                  |
| By D                          | ate:                     |                                       |                  |
| Small Air Bubbles Peabub      | bles' LARGE Ar Bubbles S | imall → "sm" (<2 mm)                  |                  |
| - 2mm 2-4 m                   |                          | 'eabubbles → "pb" ( 2 to < 4 mm )     |                  |
| ••••                          |                          | $arge \rightarrow "lg" (4 to < 6 mm)$ |                  |
|                               |                          |                                       |                  |

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### ARI Job No: AIW9 Client: KTA Project Event: N/A Project Name: PacifiCorp GW Investigation

| Sample ID                        |                                                | ARI<br>Lab ID                                      | ARI<br>LIMS ID                                                       | Matrix                           | Sample Date/Time                                                                                         | VTSR                                                                                                                       |
|----------------------------------|------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 1.<br>2.<br>3.<br>4.<br>5.<br>6. | MW-3<br>MW-1<br>MW-4<br>MW-5<br>MW-6<br>DUP-GW | AIW9A<br>AIW9B<br>AIW9C<br>AIW9D<br>AIW9E<br>AIW9F | 15-12255<br>15-12256<br>15-12257<br>15-12258<br>15-12259<br>15-12260 | Water<br>Water<br>Water<br>Water | 07/08/15 09:50<br>07/08/15 10:40<br>07/08/15 12:00<br>07/08/15 12:35<br>07/08/15 13:10<br>07/08/15 13:00 | 07/08/15 15:30<br>07/08/15 15:30<br>07/08/15 15:30<br>07/08/15 15:30<br>07/08/15 15:30<br>07/08/15 15:30<br>07/08/15 15:30 |

Printed 07/08/15 Page 1 of 1



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# **Data Reporting Qualifiers**

Effective 12/31/13

## **Inorganic Data**

- U Indicates that the target analyte was not detected at the reported concentration
- \* Duplicate RPD is not within established control limits
- B Reported value is less than the CRDL but  $\geq$  the Reporting Limit
- N Matrix Spike recovery not within established control limits
- NA Not Applicable, analyte not spiked
- H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

## Organic Data

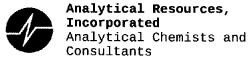
- U Indicates that the target analyte was not detected at the reported concentration
- \* Flagged value is not within established control limits
- B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J Estimated concentration when the value is less than ARI's established reporting limits
- D The spiked compound was not detected due to sample extract dilution
- E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.



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- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
- S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
- NA The flagged analyte was not analyzed for
- NR Spiked compound recovery is not reported due to chromatographic interference
- NS The flagged analyte was not spiked into the sample
- M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
- Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
- EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" (Dioxin/Furan analysis only)
- C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
- P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
- X Analyte signal includes interference from polychlorinated diphenyl ethers. (Dioxin/Furan analysis only)
- Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. (Dioxin/Furan analysis only)

Laboratory Quality Assurance Plan



## **Geotechnical Data**

- A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
- F Samples were frozen prior to particle size determination
- SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
- SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
- W Weight of sample in some pipette aliquots was below the level required for accurate weighting



#### ORGANICS ANALYSIS DATA SHEET TOTAL DIESEL RANGE HYDROCARBONS NWTPHD by GC/FID Extraction Method: SW3510C Page 1 of 1

Matrix: Water

Data Release Authorized:  $\sqrt{\int}$ Reported: 07/14/15 QC Report No: AIW9-KTA Project: PacifiCorp GW Investigation

Date Received: 07/08/15

| ARI ID                | Sample II           | Œ | Extraction<br>Date | Analysıs<br>Date  | EFV<br>DF   | Range/Surrogate                                               | RL                   | Result                                    |
|-----------------------|---------------------|---|--------------------|-------------------|-------------|---------------------------------------------------------------|----------------------|-------------------------------------------|
| MB-071015<br>15-12255 | Method B1<br>HC ID: |   | 07/10/15           | 07/13/15<br>FID4A | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>82.5% |
| AIW9A<br>15-12255     | MW-3<br>HC ID:      |   | 07/10/15           | 07/13/15<br>FID4A | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>88.3% |
| AIW9B<br>15-12256     | MW-1<br>HC ID:      |   | 07/10/15           | 07/13/15<br>FID4A | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>91.7% |
| AIW9C<br>15-12257     | MW-4<br>HC ID:      |   | 07/10/15           | 07/13/15<br>FID4A | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>85.4% |
| AIW9D<br>15-12258     | MW-5<br>HC ID:      |   | 07/10/15           | 07/13/15<br>FID4A | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>87.4% |
| AIW9E<br>15-12259     | MW-6<br>HC ID:      |   | 07/10/15           | 07/13/15<br>FID4A | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>87.3% |
| AIW9F<br>15-12260     | DUP-GW<br>HC ID:    |   | 07/10/15           | 07/13/15<br>FID4A | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oıl<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10 U<br>< 0.20 U<br>< 0.20 U<br>86.4% |

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL. DL-Dilution of extract prior to analysis. RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24. Motor Oil range quantitation on total peaks in the range from C24 to C38. Mineral Oil range quantitation on total peaks in the range from C16 to C28. HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.



### TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: AIW9-KTA Project: PacifiCorp GW Investigation

| Client ID   | OTER  | TOT OUT |
|-------------|-------|---------|
|             |       |         |
| MB-071015   | 82.5% | 0       |
| LCS-071015  | 87.3% | 0       |
| LCSD-071015 | 81.0% | 0       |
| MM-3        | 88.3% | 0       |
| MW-1        | 91.7% | 0       |
| MW-4        | 85.4% | 0       |
| MW-5        | 87.4% | 0       |
| MW-6        | 87.3% | 0       |
| DUP-GW      | 86.4% | 0       |

### LCS/MB LIMITS QC LIMITS

(50-150)

(OTER) = o-Terphenyl

Prep Method: SW3510C Log Number Range: 15-12255 to 15-12260

(50-150)



#### ORGANICS ANALYSIS DATA SHEET NWTPHD by GC/FID Page 1 of 1

Lab Sample ID: LCS-071015 LIMS ID: 15-12255 Matrix: Water Data Release Authorized: VIII Reported: 07/14/15

Date Extracted LCS/LCSD: 07/10/15

Date Analyzed LCS: 07/13/15 13:06 LCSD: 07/13/15 13:30 Instrument/Analyst LCS: FID4A/ML LCSD: FID4A/ML Sample ID: LCS-071015 LCS/LCSD

QC Report No: AIW9-KTA Project: PacifiCorp GW Investigation

Date Sampled: NA Date Received: NA

Sample Amount LCS: 500 mL LCSD: 500 mL Final Extract Volume LCS: 1.0 mL LCSD: 1.0 mL Dilution Factor LCS: 1.00 LCSD: 1.00

| Range  | LCS  | Spike<br>Added-LCS | LCS<br>Recovery | LCSD | Spike<br>Added-LCSD | LCSD<br>Recovery | RPD  |  |
|--------|------|--------------------|-----------------|------|---------------------|------------------|------|--|
| Diesel | 2.27 | 3.00               | 75.7%           | 2.28 | 3.00                | 76.0%            | 0.4% |  |

#### TPHD Surrogate Recovery

|             | LCS   | LCSD  |
|-------------|-------|-------|
| o-Terphenyl | 87.33 | 81.0% |

Results reported in mg/L

RPD calculated using sample concentrations per SW846.



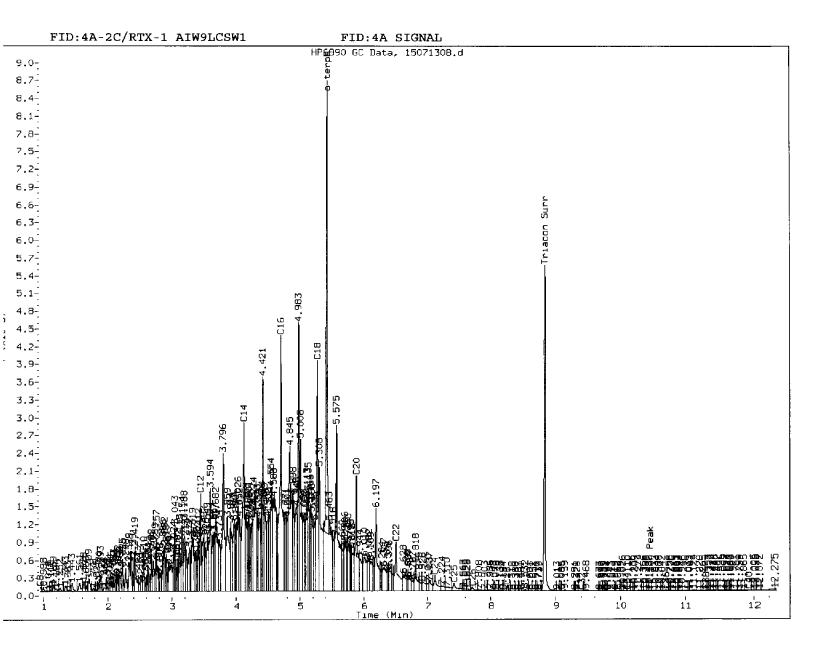
#### TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: AIW9 Project: PacifiCorp GW Investigation Date Received: 07/08/15

| ARI ID               | Client ID       | Samp<br>Amt | Final<br>Vol | Prep<br>Date |
|----------------------|-----------------|-------------|--------------|--------------|
| 15-12255-071015MB1   | Method Blank    | 500 mL      | 1.00 mL      | 07/10/15     |
| 15-12255-071015LCS1  | Lab Control     | 500 mL      | 1.00 mL      | 07/10/15     |
| 15-12255-071015LCSD1 | Lab Control Dup | 500 mL      | 1.00 mL      | 07/10/15     |
| 15-12255-AIW9A       | MW-3            | 500 mL      | 1.00 mL      | 07/10/15     |
| 15-12256-AIW9B       | MW-1            | 500 mL      | 1.00 mL      | 07/10/15     |
| 15-12257-AIW9C       | MW-4            | 500 mL      | 1.00 mL      | 07/10/15     |
| 15-12258-AIW9D       | MW-5            | 500 mL      | 1.00 mL      | 07/10/15     |
| 15-12259-AIW9E       | MW-6            | 500 mL      | 1.00 mL      | 07/10/15     |
| 15-12260-AIW9F       | DUP-GW          | 500 mL      | 1.00 mL      | 07/10/15     |

Matrix: Water

|           | Y (x10^5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                      |                                              |                        |          |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------------------|------------------------|----------|
| N-        | ער ער ער מי                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | •                                    | Sample Into: Hiwymbwi<br>Column phase: RTX-1 | Client ID: AIW9HBW1    | E TI     |
| ω-        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      | À IBMI                                       | 11 12:42               | f1d4a+1  |
|           | -C12 (3.449)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                      |                                              |                        | /2015071 |
| - 4-      | -C14 (4,106)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                      |                                              |                        | L3.6/150 |
|           | -C16 (4.674)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                      |                                              |                        | 171307.d |
| ហ-<br>-   | -C18 (5.243)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | -                                    |                                              |                        |          |
| ଚ-        | o-terph (5,421)<br>-C20 (5,920)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |                                              |                        |          |
| ~~~       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3/f1d4a.1/                           |                                              |                        |          |
| ŗ         | -025 (7.397)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | /201507                              |                                              |                        |          |
| ω-        | -C26 (7.713)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | /chem3/f1d4a,1/20150713,b/15071307,d | Operator: JW<br>Column diameter:             | Instrument: fid4a.i    |          |
| ا<br> -دە | -Triacon Surr (8,836)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 7,d                                  |                                              | fıd4a,ı                |          |
|           | -C32 (9.466)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                      | ¢,25                                         | -                      |          |
| 10        | -C34 (10,081)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                      |                                              |                        |          |
| .[        | -Filter Peak (10,465)<br>-C36 (10,703)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                      |                                              |                        |          |
| 11 .      | -C38 (11,327)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                      |                                              |                        |          |
| 12-       | -C40 (11.931)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                      |                                              |                        |          |
| 13        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |                                              |                        | Page 1   |
| 14        | م سوم از المراجع المراجع<br>المراجع المراجع المراجع<br>المراجع المراجع |                                      | *****<br>********************************    |                        |          |
|           | <u>بة مرية يا تحمد ا</u><br>من مريك المريك                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ة السني                              | an a     | r nà cri<br>nana arawa |          |

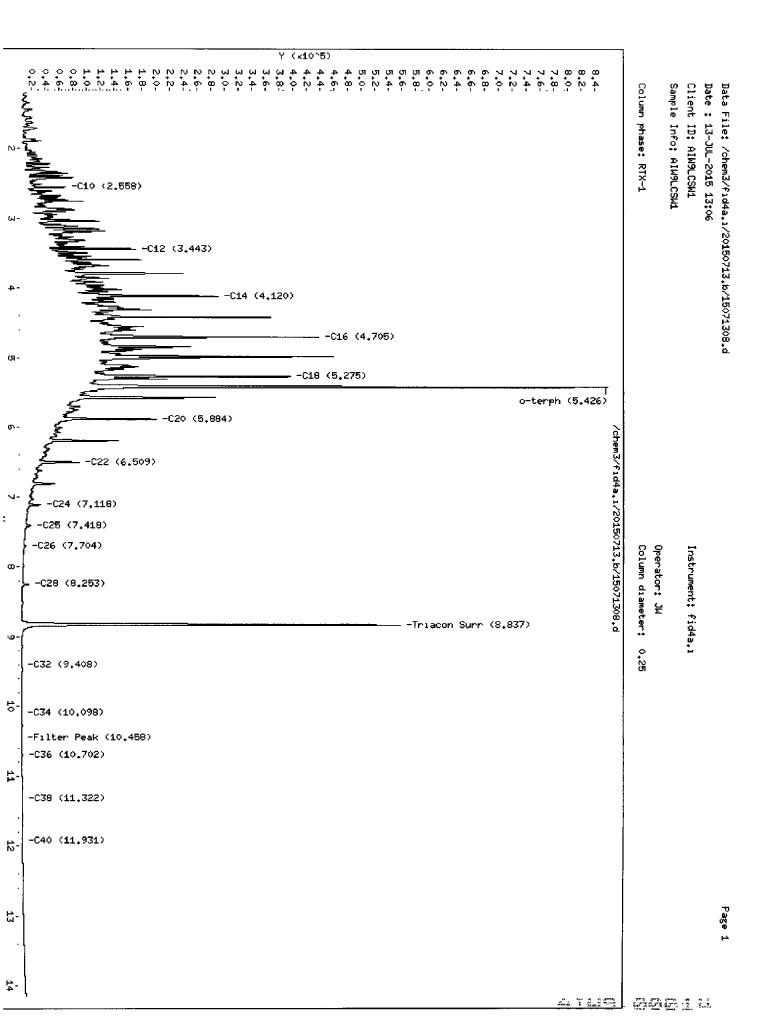


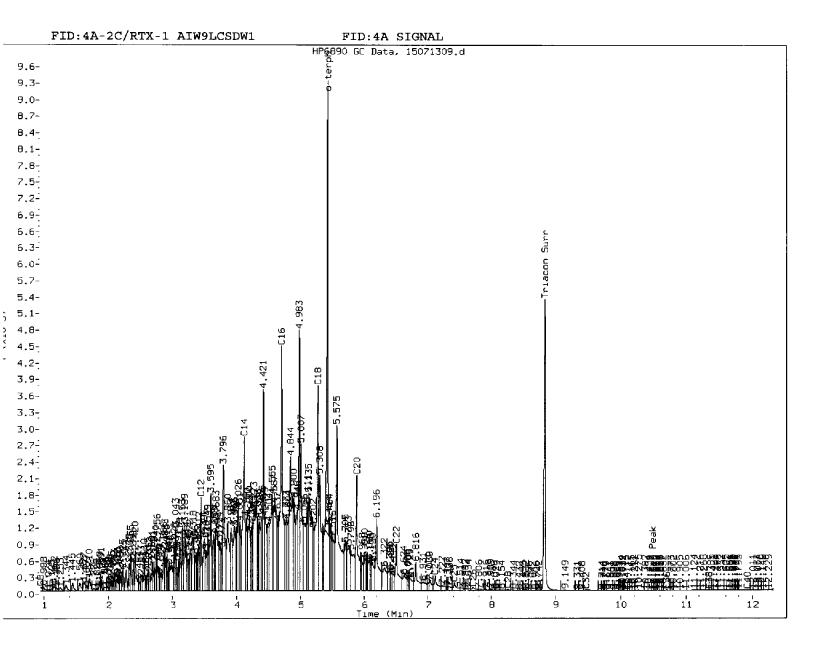
#### MANUAL INTEGRATION

- 1. Baseline correction
- 3. Peak not found
- (5, Skimmed surrogate

Analyst: \_M\_

Date: 7/13/15





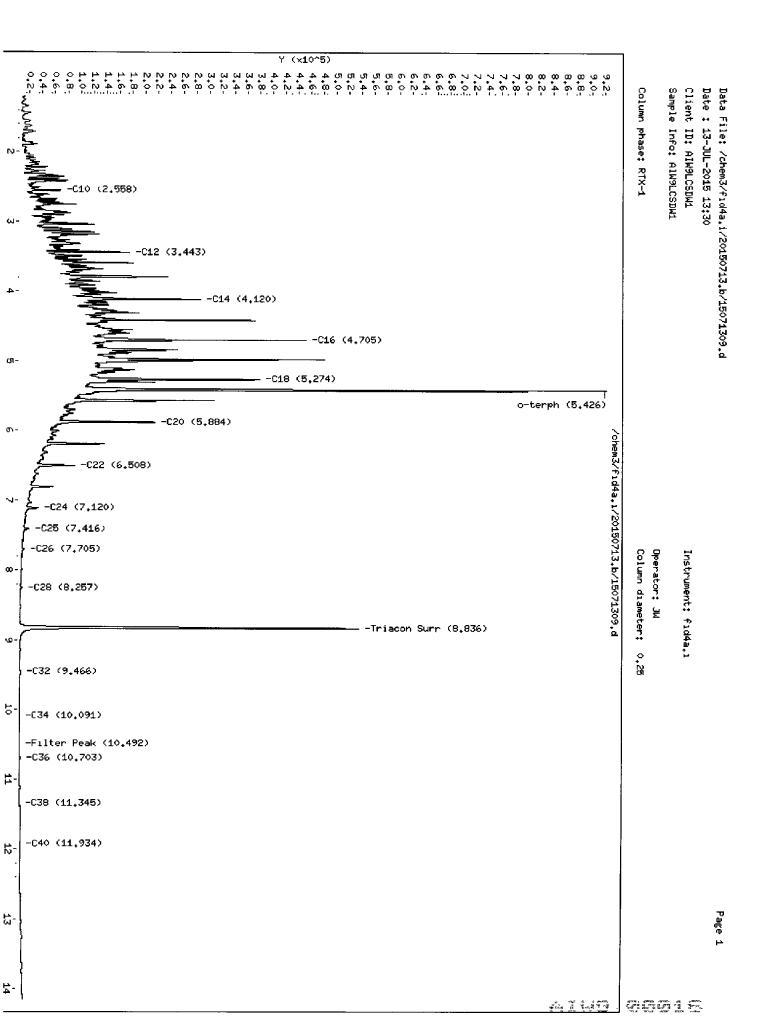
#### MANUAL INTEGRATION

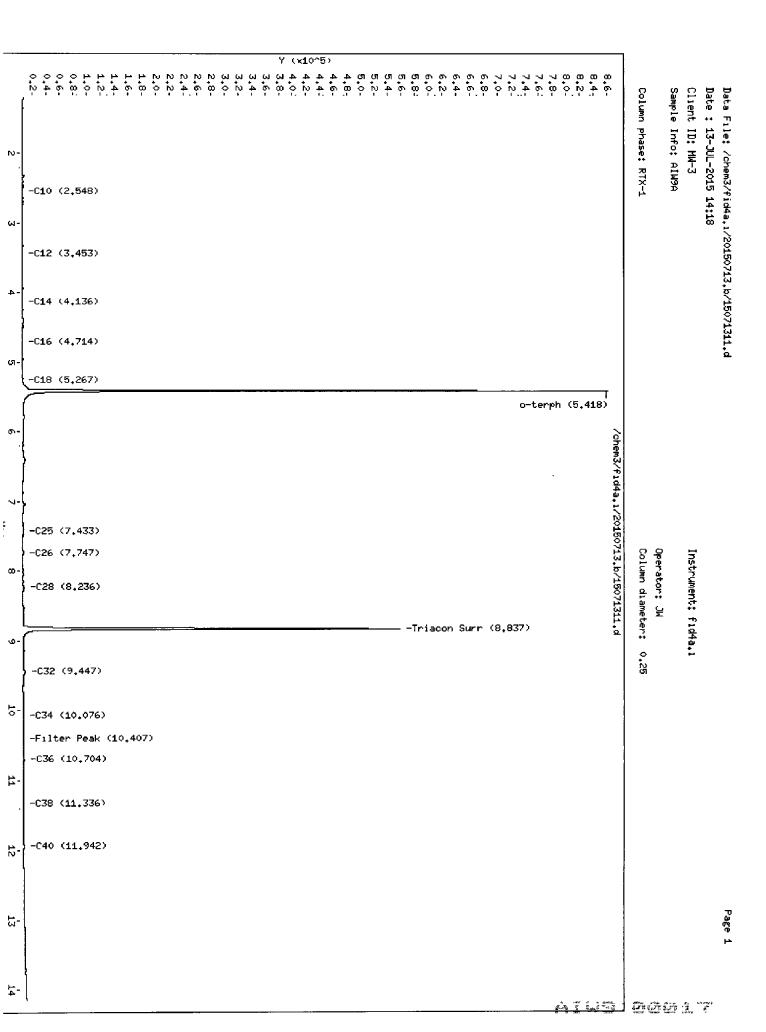
- 1. Baseline correction
- 3. Peak not found
- (5). Skimmed surrogate

Analyst: ML

Date:7/13/15

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|            | Y (x10^5)                                                                                            |                                                                                                      |                                      |                                 |             |                                       |                                            |
|------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------------|---------------------------------|-------------|---------------------------------------|--------------------------------------------|
| ſ          | ᢁᢁᢆᡁᢏᢏᢏᢏᡒᢛᢛᢛᢛᢛᢛᢛᢛᢛᢛᢛᢛᢛᢛᢛᢛᢛᢛᢋᢋᢋᢋᡅᡅᡅᡅᡁᡢᡢᡊᡊᢋᢋᢋᢋᢋᠧᠧᠧᠧ<br>ᠩᠳᠳᢋᡢᠥᢁᢛᢋᡊᡠᢩᢁᢛᢋᡊᡠᡂᡇᢋᡊᡠᢁᠣᢋᡊᠧᢁᢛᢋᡊᠧᢁᢛᢋᡊᠧᢁᢛᢋᡊᡠᠣᠣᡇᢋᡊ | ΥΥΥΩΩ<br>Α<br>Α<br>Ο<br>Ο<br>Ο<br>Ο<br>Ο<br>Ο<br>Ο<br>Ο<br>Ο<br>Ο<br>Ο<br>Ο<br>Ο<br>Ο<br>Ο<br>Ο<br>Ο |                                      | Column ph                       |             | Date : 13<br>Client ID                | Data File                                  |
| N-         |                                                                                                      |                                                                                                      |                                      | Column phase: RTX-1             | Info: AIW9B | 13-JUL~2015 14:42<br>ID: MW-1         | : /chem3/fi                                |
| ω-         | ]-                                                                                                   |                                                                                                      |                                      |                                 |             | .4:42                                 | File: /chem3/fid4a.1/20150713.b/15071312.d |
| -4         |                                                                                                      |                                                                                                      |                                      |                                 |             |                                       | )7 <b>13.</b> b/15071                      |
| ហ-         | -C16 (4,714)                                                                                         |                                                                                                      |                                      |                                 |             |                                       | 1312.d                                     |
|            | -C18 (5.267)                                                                                         |                                                                                                      | r                                    |                                 |             |                                       |                                            |
| თ-         | -C20 (5.871)                                                                                         | rph (5,420)                                                                                          |                                      |                                 |             |                                       |                                            |
|            | -C22 (6,490)                                                                                         |                                                                                                      | em3∕fid4                             |                                 |             |                                       |                                            |
| √-<br>     | 1-                                                                                                   |                                                                                                      | la. 1/20                             |                                 |             |                                       |                                            |
|            | -C25 (7,427)<br>-C26 (7,697)                                                                         |                                                                                                      | 01507:                               |                                 |             | _                                     |                                            |
| α-         |                                                                                                      |                                                                                                      | /chem3/fid4a.i/20150713.b/15071312.d | Operator: JW<br>Column diameter |             | Instrument: fid4a.1                   |                                            |
|            | Triacon Surr (8,837)                                                                                 |                                                                                                      | 312.d                                | JW<br>meter:                    | · · ·       | • • • • • • • • • • • • • • • • • • • |                                            |
| 9-         | -C32 (9,409)                                                                                         |                                                                                                      |                                      | 0,25                            | ;           | -                                     |                                            |
| 13-<br>13- | -C34 (10,069)                                                                                        |                                                                                                      |                                      |                                 |             |                                       |                                            |
| 11         | }<br> -Filter Peak (10.473)<br> -C36 (10.702)                                                        |                                                                                                      |                                      |                                 |             |                                       |                                            |
| -          | -C38 (11.310)                                                                                        |                                                                                                      |                                      |                                 |             |                                       |                                            |
| 12         | -C40 (11.927)                                                                                        |                                                                                                      |                                      |                                 |             |                                       |                                            |
| - 13<br>13 |                                                                                                      |                                                                                                      |                                      |                                 |             |                                       | Page                                       |
| 14         |                                                                                                      |                                                                                                      |                                      |                                 |             |                                       | 4                                          |
| 4          | ·                                                                                                    |                                                                                                      | <u> </u>                             |                                 | 1.<br>1. j  | 74                                    |                                            |

|            | Y (×10°5)                       |                                 |                                                                        |                                                                             |
|------------|---------------------------------|---------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------|
|            | <pre></pre>                     | Column phase: RTX-1             | Client ID;<br>Sample Inf                                               | Data File: /chem3/fid4a.1/20150713.b/15071313.d<br>Date : 13-JUL-2015 15:06 |
| N-         | -040 (3 549)                    | ase: RTX-                       | ID: HW−4<br>Info: AIW9C                                                | 11e: /chem3/fid4a.<br>13-JUL-2015 15:06                                     |
| ω-         | -C10 (2.549)                    | Ц<br>Ц                          | .,                                                                     | 'fid4a.ı/<br>5 15:06                                                        |
|            | -C12 (3,427)                    |                                 |                                                                        | 20150713                                                                    |
| -4         | -C14 (4,139)                    |                                 |                                                                        | 3,6/15071                                                                   |
| ഗ-         | -C16 (4.671)                    |                                 |                                                                        | L313₊d                                                                      |
| :          | -C18 (5,266)                    |                                 |                                                                        |                                                                             |
| ଚ-         | o-terph (5,418)<br>-C20 (5,883) |                                 |                                                                        |                                                                             |
|            | -C22 (6,522)                    |                                 |                                                                        |                                                                             |
| ا- ر~<br>! | 3.1/20                          |                                 |                                                                        |                                                                             |
|            | -C25 (7,405)<br>,-C26 (7,712)   | 00                              |                                                                        |                                                                             |
| œ-         | -C22 (6.522)                    | Operator: JW<br>Column diameter | Instrument: fid                                                        |                                                                             |
| Ì          |                                 | JW<br>ameter                    | t; fic                                                                 |                                                                             |
| -دى<br>    | -C32 (9,405)                    | ÷<br>•,25                       | (4a <b>.</b> 1                                                         |                                                                             |
| 10         | -C34 (10,110)                   |                                 |                                                                        |                                                                             |
| ĺ          | -Filter Peak (10,432)           |                                 |                                                                        |                                                                             |
| 12-        | -C36 (10,704)                   |                                 |                                                                        |                                                                             |
|            | -C38 (11,363)                   |                                 |                                                                        |                                                                             |
| 12-        | -C40 (11,930)                   |                                 |                                                                        |                                                                             |
|            |                                 |                                 |                                                                        |                                                                             |
| ±3-        |                                 |                                 |                                                                        | Page 1                                                                      |
| 1-<br>14   |                                 |                                 |                                                                        |                                                                             |
|            |                                 | 199 e.1<br>7933(d<br>1996) e.e  | адлайн ук ни<br>урагуу к к.<br>Сан ( 1 5.<br>Сан ( 1 5.<br>Сан ( 1 5.) |                                                                             |

|            | Y (x10^5)                                                                                                                                                                                                                          | 1                                |                                                                                                    |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------|
|            | офф / / / / / / / / / / / / / / / / / /                                                                                                                                                                                            | Colum                            | Data Fi<br>Date :<br>Client<br>Sample                                                              |
| ∾-         |                                                                                                                                                                                                                                    | Column phase: RTX-1              | File: /chem3/fid4a.i/20150713.k/15071314.d<br>: 13-JUL-2015 15:30<br>nt ID: MW-5<br>.e Info: AIW9D |
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| Field_Collection_Start_Date | Field_Collection_Start_Time | Sample_ID | Sample_Matrix | Result_Parameter_Name | Result_Value | Result_Value_Units | Result_Reporting_Limit | Result_Detection_Limit | Result_Data_Qualifier | Result_Method | Result_Lab_Name                            |
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| 7/8/2015                    | 9:50:00                     | MW-3      | Water         | Diesel Range Organics | 0.1          | mg/l               | 0.1                    | 0.02                   | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 9:50:00                     | MW-3      | Water         | Lube Oil              | 0.2          | mg/l               | 0.2                    | 0.04                   | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 9:50:00                     | MW-3      | Water         | Heavy Fuel Oil        | 0.2          | mg/l               | 0.2                    | 0                      | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 10:40:00                    | MW-1      | Water         | Diesel Range Organics | 0.1          | mg/l               | 0.1                    | 0.02                   | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 10:40:00                    | MW-1      | Water         | Lube Oil              | 0.2          | mg/l               | 0.2                    | 0.04                   | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 10:40:00                    | MW-1      | Water         | Heavy Fuel Oil        | 0.2          | mg/l               | 0.2                    | 0                      | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 12:00:00                    | MW-4      | Water         | Diesel Range Organics | 0.1          | mg/l               | 0.1                    | 0.02                   | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 12:00:00                    | MW-4      | Water         | Lube Oil              | 0.2          | mg/l               | 0.2                    | 0.04                   | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 12:00:00                    | MW-4      | Water         | Heavy Fuel Oil        | 0.2          | mg/l               | 0.2                    | 0                      | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 12:35:00                    | MW-5      | Water         | Diesel Range Organics | 0.1          | mg/l               | 0.1                    | 0.02                   | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 12:35:00                    | MW-5      | Water         | Lube Oil              | 0.2          | mg/l               | 0.2                    | 0.04                   | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 12:35:00                    | MW-5      | Water         | Heavy Fuel Oil        | 0.2          | mg/l               | 0.2                    | 0                      | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 13:10:00                    | MW-6      | Water         | Diesel Range Organics | 0.1          | mg/l               | 0.1                    | 0.02                   | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 13:10:00                    | MW-6      | Water         | Lube Oil              | 0.2          | mg/l               | 0.2                    | 0.04                   | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 13:10:00                    | MW-6      | Water         | Heavy Fuel Oil        | 0.2          | mg/l               | 0.2                    | 0                      | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 13:00:00                    | DUP-GW    | Water         | Diesel Range Organics | 0.1          | mg/l               | 0.1                    | 0.02                   | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 13:00:00                    | DUP-GW    | Water         | Lube Oil              | 0.2          | mg/l               | 0.2                    | 0.04                   | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |
| 7/8/2015                    | 13:00:00                    | DUP-GW    | Water         | Heavy Fuel Oil        | 0.2          | mg/l               | 0.2                    | 0                      | U                     | NWTPH-Dx      | Analytical Resources Inc (ARI), Seattle WA |

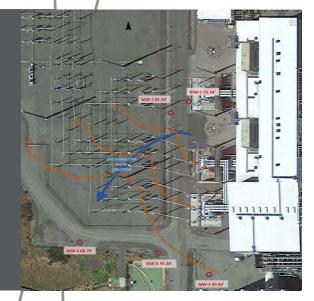
#### APPENDIX G

### GROUNDWATER MONITORING REPORT 3<sup>RD</sup> QUARTERLY EVENT

DECEMBER 2015



Groundwater Monitoring Report 3<sup>rd</sup> Quarterly Event – December 2015 PacifiCorp Chehalis, WA Plant Final Report



Clear Water Services Project 15KTA1

Prepared for KTA Associates, Inc.



KTA Associates, Inc. A Professional Environmental Service Corporation

And for PacifiCorp



# January 2016

# Groundwater Monitoring Report 3<sup>rd</sup> Quarterly Event – December 2015

# **FINAL REPORT**

# PacifiCorp Chehalis, WA Plant

**Clear Water Services Project 15KTA1** 

# January 2016

**Prepared for:** 

KTA, Associates, Inc.

And

PacifiCorp

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# Document Control

| Version | Date       | Author       | Author Initials | Reviewer              | Reviewer<br>Initials |
|---------|------------|--------------|-----------------|-----------------------|----------------------|
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# Abbreviations and Acronyms

| amsl   | (feet) above mean sea level                           |
|--------|-------------------------------------------------------|
| AST    | above ground storage tank                             |
| bgs    | below ground surface                                  |
| CCS    | Cowlitz Clean Sweep                                   |
| CoC    | chain of custody                                      |
| CWS    | Clear Water Services                                  |
| DO     | dissolved oxygen                                      |
| DOE    | (WA) Department of Ecology                            |
| DOT    | Department of Transportation                          |
| DRO    | Diesel Range Organics                                 |
| GSU    | Generator Set-Up Unit                                 |
| IDW    | investigation-derived waste                           |
| IFP    | interface probe                                       |
| ISGP   | Industrial Stormwater General Permit                  |
| KTA    | KTA Associates, Inc.                                  |
| mg/kg  | milligrams per kilograms (parts per million)          |
| MTCA   | Model Toxics Control Act                              |
| MW     | Monitoring Well                                       |
| MWIR   | Monitoring Well Installation and Support Tasks Report |
| PC     | PacifiCorp                                            |
| PVC    | polyvinyl chloride                                    |
| RRO    | Residual Range Organics                               |
| SB     | Soil Boring                                           |
| SI     | Site Investigation                                    |
| TPH-Dx | Total Petroleum Hydrocarbons – Diesel Extended Range  |
| VCP    | Voluntary Clean-up Program (WADOE)                    |
| WAC    | Washington Administration Code                        |
| WLI    | Water Level Indicator                                 |
| µg/L   | micrograms per liter (parts per billion)              |
|        |                                                       |

### 1 Introduction

### 1.1 **Purpose and Objective**

Clear Water Services (CWS) was contracted by KTA Associates, Inc. (KTA) to conduct a site investigation at PacifiCorp (PC)'s Chehalis, WA power plant. Site investigation activities focused on the assessment of potential impacts to subsurface soil and shallow groundwater within certain areas of the plant that were previously exposed to Mineral Oil releases in 2011 and 2013. These releases were due to malfunctions with the plant's Generator Step-up Unit (GSU)s #1 and #3. Mineral Oil is used as insulating fluid in these GSU transformers.

The primary objective of this project is to determine if any residual impacts from Mineral Oil exposure exists in the subsurface soil and shallow groundwater at concentrations above the Washington Department of Ecology's (WADOE) Model Toxics Control Act (MTCA) regulatory limits. Site investigation activities are being conducted under the WA DoE's Voluntary Cleanup Program (VCP).

This project is divided into two main phases. The first phase included monitoring well installation, in conjunction with various sampling and support tasks. The outcome of soil boring / monitoring well installation activities and associated environmental sampling results are included within the *Monitoring Well Installation and Support Tasks Report (MWIR)* (Cardno, May 2015).

The second phase of this project involves groundwater monitoring, conducted on a quarterly basis, including events completed in April, July and December 2015. There is one remaining event scheduled for March 2016. This Groundwater Monitoring Report (*GWMR*) details field methods, water level measurements, groundwater table elevations, flow direction assessment and sampling results for the third quarterly field event. All field efforts, in support of this third quarterly groundwater monitoring event, were conducted on 16 December, 2015.

### 1.2 Scope of Work

To meet the above stated objectives, the scope of work for quarterly groundwater monitoring consisted of the following field activities:

- Coordination of pre- (field) mobilization tasks.
- Collection of static groundwater level measurements.
- Sampling of five groundwater monitoring wells.
- Handling of project collected environmental samples.
- Documentation of field activities. and,
- Containment of investigation derived waste (IDW).

Prominent site features and well locations are shown on Figure 1.

### 1.3 Report Organization

This *GWMR* is organized into the following five sections:

- > Section 1.0 Introduction
- > Section 2.0 Site Background
- > Section 3.0 Field Efforts
- > Section 4.0 Analytical Results
- > Section 5.0 References

Discussions regarding the procedures and methods utilized for the groundwater monitoring tasks and subsequent results of the data collected are presented in the main text of this *GWMR*. Health & Safety Tailgate Forms, Monitoring Well Sampling and Water Quality Measurement Forms, Field Notebook entries, and Laboratory Chain-of-Custody Forms / Analytical Report are presented as Appendices A through D, respectively.

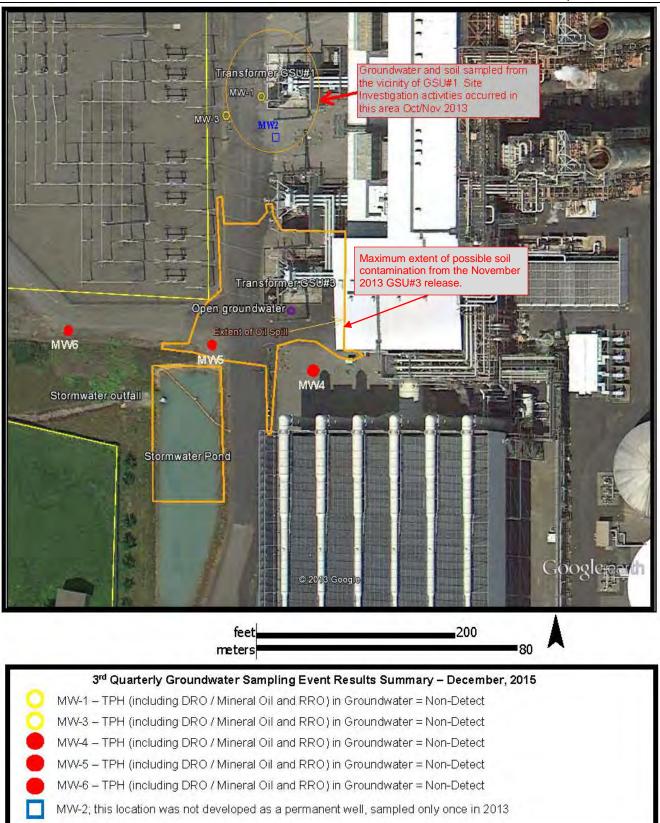


Figure 1. Site Map with Monitoring Well and Prominent Features

# 2 Site Background

### 2.1 Site Description

PacifiCorp owns and maintains a natural gas-fired combined cycle power plant, which produces 520-megawatts of electricity. The plant is located at 1813 Bishop Road, Chehalis, Washington, in the Chehalis River Valley.

The Chehalis River Valley is considered a rural area, with approximately 7,000 residents living in and around the city. The plant is located 3 miles south of town, which consists mostly of small parks, farms, small pockets of light industrial areas, and a few housing subdivisions.

### 2.1.1 <u>Geology</u>

The overall soil-type distribution at the site consists of low permeability silt and clay layer underlain by 45 to 50 feet of water-bearing sand and gravel, underlain by a silt and clay aquitard. These soil-types are consistent with regional geologic mapping by Weigle and Foxworthy (1962) and a regional study for the Chehalis Generation facility (Dames and Moore 1994). These regional studies classify the upper 50 feet of soil in the area of the site as recent alluvium and glaciofluvial sediments. The aquitard found at approximately 50 feet bgs is widespread, is often described as blue-gray, clayey silt, and is reported to be more than 100 feet thick (Dames and Moore 1994).

### 2.1.2 <u>Hydrogeology</u>

The groundwater flow direction beneath the site is assumed to travel south/southwest towards Bishop Road and Berwick Creek. Regional investigations conducted by others (Dames and Moore 1994) have categorized the shallow aquifer in the area as unconfined or semi-confined. However, the shallow aquifer appears to exhibit the characteristics of a confined or semiconfined system, primarily due to the low permeably silt cap immediately above the aquifer.

### 2.2 Previous Mineral Oil Releases and Site Cleanup Efforts

Cowlitz Clean Sweep (CCS) completed a site cleanup (CCS 2011) at the PC Chehalis Plant during the months of January through March, 2011. CCS removed floating product from the stormwater pond and ditch lines using oil booms, absorbent material, an oil skimmer and vacuum truck. The stormwater ditch lines were cleaned by removing impacted material down to the clay layer.

CCS sampled affected areas and ditches for analysis to determine the extent of oil contamination; additional soil and water sampling was conducted after cleanup.

The main excavation occurred at or near GSU-1, the first plant transformer that caught fire and subsequently released mineral oil to the surrounding areas. Impacted soil was removed to a depth of six inches below the static groundwater line using olfactory methods (i.e., visual).

During the excavation, free product was noted floating on top of the water and absorbent materials were deployed in the excavation area to remove the product. All excavated materials were loaded onto waiting dump trucks and taken to the Weyerhaeuser transfer station located in Longview, WA for disposal.

Once the excavations had been completed, the area around the GSU-1 transformer was backfilled with clean material and compacted to the required 95% compaction. All ditch lines were relined with clean gravel to prevent sediment loss and water quality issues.

Water collected during excavation activities completed near and around the transformer area was pumped to an on-site 1.7 million gallon diesel above ground storage tank (AST) and the AST containment area.

CCS removed 845 tons of rock and soil and 8,869 gallons of water from affected areas during excavation activities. CCS backfilled the excavations with 92 tons of 2 to 4 inch quarry spalls and 462 tons of 1 ¼" rock to help achieve the required 95% compaction standard.

Most recently, GSU-3 experienced a similar malfunction in late 2013 to the one that occurred at GSU-1 in early 2011. Consequently, this malfunction caused the release of mineral oil around the base of the transformer unit and impacted the surface areas adjacent to it, the roadway and ditches and the area around the southwest corner of the plant building. The management of the release of mineral oil at GSU-3 was approached by PC and conducted by CCS in a similar fashion to the previous cleanup at GSU-1.

### 2.3 **Previous Site Investigations**

A Site Investigation (SI) was completed at the PC-Chehalis Plant on May 23<sup>rd</sup> through May 25<sup>th</sup>, 2011. The SI was conducted to determine the following:

- If groundwater had been impacted from the mineral oil spill;
- If the water contained in the large AST, which was collected during excavation activities, exceeded any regulatory levels, and;
- If surface water in the stormwater pond had been impacted from the mineral oil spill.

The following activities were completed during the 2011 SI:

- Six temporary monitoring wells were installed and sampled within the shallow water bearing zone;
- Two water samples were collected from the AST at varying depths;
- Two surface water samples were collected from the stormwater pond, and;
- Three surface soil samples were collected downgradient of the mineral oil spill.

The results of the 2011 SI are summarized as follows:

- One groundwater sample (GW-4) had a detection of Mineral Oil at 1100 μg/L, which exceeded the MTCA Method A Groundwater Cleanup Level of 500 μg/L;
- One AST water sample (TS2) had a detection of Mineral Oil at 440 µg/L, which did not exceed the MTCA Method A Groundwater Cleanup Level;
- One surface water sample (SW1) had a detection of Mineral Oil at 360 µg/L, which did not exceed the MTCA Method A Groundwater Cleanup Level, and;
- One soil sample (SG1) had a detection of Mineral Oil at 160 mg/kg, which did not exceed the MTCA Method A Soil Cleanup Level of **4000 mg/Kg**.

Subsequent to the 2011 SI, a follow-up field investigation was undertaken in October and November of 2013. These follow-up tasks were conducted after a review of all field efforts and sampling results to date by WADOE VCP staff. The VCP stakeholders identified two hot spots near GSU#1. With concurrence from WADOE VCP staff, PacifiCorp and KTA agreed to investigate soil and groundwater at these two areas. This was undertaken to characterize the local groundwater flow to determine if the mineral oil released from GSU-1 had any longer-term impacts to the deeper subsurface soils, vadose zone and/or the local shallow groundwater from areas with previously identified concentrations of mineral oil above regulatory limits. The *Groundwater Investigation Report* (Cardno, 2014) presented data from this effort. Main investigative tasks and sampling results contained in this report are summarized below;

The following activities were completed during the 2013 SI:

- Drill, characterize and sample subsurface soil from 3 locations to ~30-feet below grade surface. Soil samples from the borings at SB-1 thru SB-3 were analyzed for mineral oil.
- Install permanent wells at two of the drilling locations, MW-1 and MW-3. Due to utility interferences, a well was not set at the location for MW-2. These activities took place on October 28 and 29, 2013.
- A (relative) survey of the monitoring well casing elevations was conducted to aid in the determination of groundwater flow direction.
- Groundwater was sampled from site wells MW-1 and MW-3. A one-time groundwater sample was collected at MW-2 during the extraction of the drill rods. These activities took place on November 1, 2013 – except for the MW-2 sample, which was collected earlier (10/29/2013).

The results of the 2013 SI are summarized as follows:

- One groundwater sample (MW-2) had a detection of Mineral Oil at 380 μg/L, which is below the MTCA Method A Groundwater Cleanup Level for Diesel Range Organics (DRO) – Mineral Oil of 500 μg/L.
- There were no detections of Mineral Oil in any of the subsurface soil samples.

Following the release of Mineral Oil from GSU#3 in November 2013 and associated site cleanup efforts, PacifiCorp continued its environmental protection efforts in conjunction with their ongoing VCP actions. Through cooperative agreements between PC and WA DoE, a site investigation, similar to those previously implemented at the GSU#1 area, was implemented in the areas adjacent to and downgradient from GSU#3. Results of subsurface soil and electrical vault in-flow water sampling are presented in the *MWIR* (Cardno, May 2015). These SI efforts were undertaken on April 7-15, 2015.

The following activities were completed during the 2015 SI:

- Subsurface soil from 3 locations to ~30-feet below grade surface was characterized and sampled. Soil samples from the borings at SB-4 thru SB-6 were analyzed for Northwest Total Petroleum Hydrocarbon – Diesel range extended (NWTPH-Dx) / Mineral Oil.
- Permanent wells were installed at all three 2015 boring locations. These wells are MW-4, MW-5 and MW-6. The three new wells, along with the two previous wells (MW-1 and MW-3) were developed / re-developed. These activities took place on April 7 9, 2015.
- A (relative) elevation survey of the monitoring well casings was conducted to aid in the determination of groundwater flow direction. This was completed on April 15, 2015.
- A one-time sampling event was completed to test in-flow water within four deep electrical vaults adjacent to GSU's #1 and #3. Water samples from these vaults was submitted for NWTPH-Dx / Mineral Oil. These activities took place on April 7, 2015. Figure 2 shows the location of these electrical vaults at the site relative to the GSUs and other site features.

The Results presented in the 2015 *MWIR* are summarized as follows:

- Soil from a depth of 5' bgs collected at SB5 had a detection of DRO at 6.7 mg/Kg, which is below the MTCA Method A Soil Cleanup Level of **4,000 mg/Kg**.
- Electrical vault in-flow water from EMHM003 had a detection of DRO at 120 µg/L, which is below the MTCA Method A Groundwater Cleanup Level of **500 µg/L**.
- Electrical vault in-flow water from EMHC002 and its Duplicate (DUP-vault) had detections of DRO, both at 110  $\mu$ g/L, which are below the MTCA Method A Groundwater Cleanup Level of **500 \mug/L**.
- Electrical vault in-flow water from EMHC001 had detections of DRO, Mineral Oil and Residual Range Organics (RRO) at 1900 µg/L, 1300 µg/L and 320 µg/L, respectively. DRO and Mineral Oil detections exceed the MTCA Method A Groundwater Cleanup Level, but are, comparatively, below the 10,000 µg/L Industrial Stormwater General Permit (ISGP) Stormwater Benchmark for TPH.

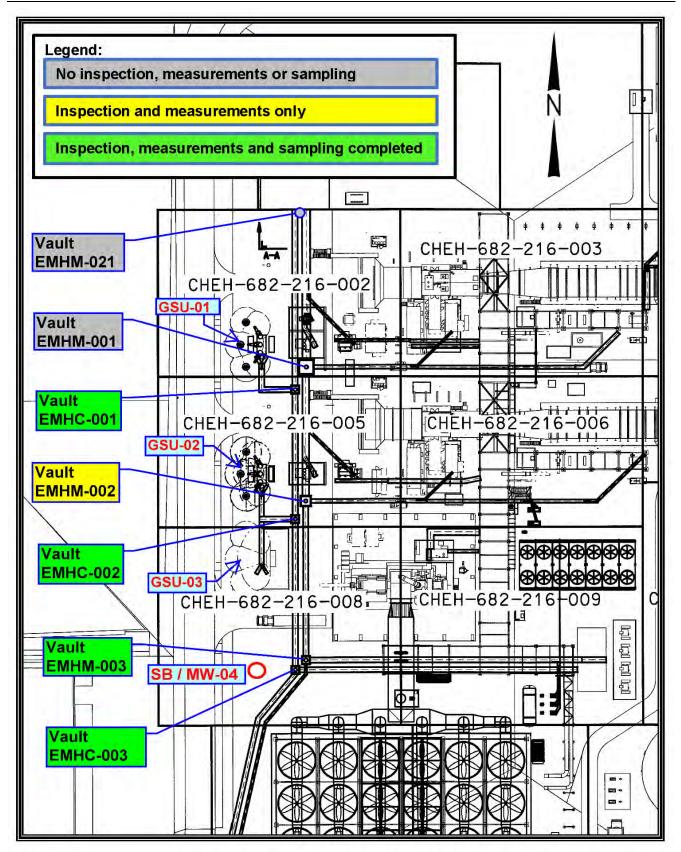


Figure 2. Electrical Vault / In-Flow Water Sampling Locations

# 3 Field Efforts

Section 3 details the field efforts that were employed during the December 2015 quarterly groundwater sampling event and support tasks. These tasks included pre-field mobilization planning, collection of static groundwater level measurements, sampling of five monitoring wells, handling of project collected environmental samples, documentation of field activities and containment of investigation-derived waste (IDW). Any discrepancies between the *Groundwater Investigation and Quarterly Monitoring Work Plan 2015/2016* (Cardno, April 2015) and the actual field methodologies utilized are also described in this section.

### 3.1 Pre-Field Mobilization Planning

The third quarterly groundwater monitoring event was scheduled for and conducted on December 16, 2015. CWS coordinated the scheduling of this event with PC and KTA staff to minimize any logistical impacts to plant operations and to the sampling event itself. The overall schedule had been discussed and approved during the planning phase and at the Kick-Off Meeting held on 13 March, 2015. Pre field mobilization items considered also included health and safety concerns, coordination with the analytical testing facility and reservation / ordering / procurement / rental of all necessary field sampling equipment, monitoring instruments, personal protective equipment, and field consumables.

Several days prior to initiation of groundwater sampling, CWS was in direct contact with the PC Environmental / Safety Analyst and the KTA Project Manager to finalize event coordination, site access and to receive the latest health & safety and site condition reports. The laboratory was consulted during this period and an order was placed for the sampling containers, as well as other necessary laboratory supplies. CWS retrieved the containers and supplies directly from the laboratory during mobilization to the PC site.

### 3.1.1 <u>Health and Safety</u>

A Site Specific Health and Safety Plan was drafted for the groundwater sampling events and is included as an Appendix to the *Groundwater Investigation and Quarterly Monitoring Work Plan*, *2015/2016* (Cardno, April 2015). CWS adopted the appropriate sections of this plan. At a minimum this Health and Safety Plan provides emergency contact information, routes to the nearest medical and/or aid facilities and site specific work task and environmental /physical hazard information. Prior to the initiation of any field tasks, it is a mandatory requirement to conduct a tailgate safety meeting. The purpose of the Tailgate Safety Meetings is to review any expected site specific hazards, general task hazards, current / changed site conditions, to receive a briefing from PC, to discuss emergency procedures, and to review the daily work / task schedule. Such a Tailgate meeting was conducted on December 16, 2015, preceding the start of groundwater sampling tasks. Health and Safety Tailgate Meeting Forms are included in Appendix A.

#### 3.2 Groundwater Level Measurements and Flow Direction Assessment

Prior to sample collection, each monitoring well was opened and its expansion plug was removed. Ample time was allotted for each well to equilibrate to the current ambient air pressure. An electronic interface probe was used to gauge the presence/thickness of any accumulated free-phase hydrocarbon product and the distance from the top edge of the well casing to the surface of the water table (static water level) within each monitoring well. No hydrocarbon product was detected (to a minimum thickness of 0.01') at any of the well, or otherwise observed in the purge water or the collected samples.

The southwest corner of the GSU-1 containment wall was assigned an elevation of 100.00 feet above mean-sea level. A level survey was conducted to accurately determine the elevation of each monitoring well casing, based on the assigned elevation of the GSU-1 containment wall corner. Water level measurements were subtracted from their well casing elevations to calculate (relative) elevation of the groundwater table beneath each well location. Site groundwater elevations were highest at MW-1 and lowest at MW-6, at 93.45 and 90.80 feet above mean-sea level (amsl), respectively. On average the water table was 1.65 feet higher than during the previous round of sampling. The least difference of 0.91 feet (higher) was noted at MW-1 and the greatest difference of 2.36 feet (higher) was noted at MW-4. Table 1 lists the well casing elevations, depth to product, static water level measurements and groundwater elevations calculated for this quarterly event.

Groundwater elevation contours were constructed and the flow direction was assessed. As in the previous sampling rounds, groundwater flow was noted to be generally east to west. Although not as pronounced as in the previous sampling round, there is a southwesterly pull on the groundwater table, flowing towards a small stream basin offsite in the same direction. Figure 3 shows the generalized groundwater flow direction along with the elevation contours.

| Location                            | Top PVC Well<br>Casing<br>(ft amsl) | Depth to Product<br>(ft) | Static Water Level<br>Measurements (ft) | Groundwater<br>Elevation (ft amsl) |
|-------------------------------------|-------------------------------------|--------------------------|-----------------------------------------|------------------------------------|
| SW corner GSU-1<br>containment wall | 100.00 <sup>1</sup>                 | NA                       | NA                                      | NA                                 |
| MW-1                                | 97.76                               | Not Detected             | 4.31                                    | 93.45                              |
| MW-3                                | 97.57                               | Not Detected             | 4.21                                    | 93.36                              |
| MW-4                                | 97.64                               | Not Detected             | 4.34                                    | 93.30                              |
| MW-5                                | 97.08                               | Not Detected             | 4.80                                    | 92.28                              |
| MW-6                                | 96.18                               | Not Detected             | 5.38                                    | 90.80                              |

 Table 1. Water Level Measurements and Groundwater Elevations

<sup>1</sup>All elevations are relative, as they are referenced to the top of the SW corner of the GSU-1 containment wall. This reference location has been assigned an elevation of 100.00' amsl.

### 3.3 Groundwater Sampling

Groundwater sampling events are scheduled for completion on a quarterly basis. This third event was completed on December 16, 2015. The groundwater sampling round was conducted on April 15<sup>th</sup> and the 2<sup>nd</sup> on July 8<sup>th</sup>, 2015. The remaining scheduled event is tentatively planned for late 1<sup>st</sup> quarter 2016 (March). Groundwater sampling activities were conducted using U.S. Environmental Protection Agency Low-Flow Sampling Techniques (USEPA, 1996, Rev 2010) (where pumping rates are matched to achieve minimal drawdown of the water column during pumping) and WA Department of Ecology (WADOE, 2011) accepted methodology. Groundwater samples at the PC-Chehalis Plant were collected and analyzed for mineral oil using the Northwest total petroleum hydrocarbons – diesel extended range (NWTPH-Dx) method. Monitoring well locations are presented on Figure 1.

Prior to sampling, all five site monitoring wells were properly and effectively developed / redeveloped on April 9, during the 2015 SI field event. All monitoring wells were allowed to settle and equilibrate for at least three days prior to initial sampling activities. Well construction and development details are included in the MWIR (Cardno, May 2015). Monitoring wells were not re-developed between or prior to quarterly sampling rounds.

A peristaltic pump, setup with dedicated platinum-cured Tygon® tubing, connected to dedicated, Teflon®-lined polyethylene tubing, was used to purge aquifer formation water and to obtain groundwater samples at each well location. Monitoring wells were purged until water quality readings had stabilized or a maximum of three casing volumes had been removed. Water quality parameter measurements were recorded during sample purging (stabilization assessment) and included: specific conductivity, temperature, pH, dissolved oxygen (DO) and turbidity. A summary of the final water quality measurements collected prior to sampling are presented in Table 2.

| Well ID             | Date /<br>Sample<br>Time | Average<br>Purge<br>Rate<br>(ml/min) | Total<br>Purge<br>Volume<br>(gal) | Temp.<br>(C°) | рН   | Sp. Cond<br>(µS/cm) | Turbidity<br>(NTU) | Dissolved<br>Oxygen<br>(mg/L) |
|---------------------|--------------------------|--------------------------------------|-----------------------------------|---------------|------|---------------------|--------------------|-------------------------------|
| **MW-1              | 12/16/15<br>(1245)       | 100                                  | 1.5                               | 13.49         | 5.83 | 119                 | 28                 | 3.61                          |
| MW-3                | 12/16/15<br>(1330)       | 100                                  | 1                                 | 12.10         | 5.79 | 109                 | 32                 | 3.85                          |
| MW-4                | 12/16/15<br>(1205)       | 100                                  | 1.5                               | 11.72         | 5.79 | 80                  | 89                 | 3.81                          |
| MW-5                | 12/16/15<br>(1105)       | 100                                  | 0.5                               | 12.39         | 5.77 | 98                  | 28                 | 4.41                          |
| <sup>a</sup> DUP-GW | 12/16/15<br>(1230)       | 100                                  | 0.5                               | 12.39         | 5.77 | 98                  | 28                 | 4.41                          |
| MW-6                | 12/16/15<br>(1025)       | 100                                  | 1                                 | 12.31         | 5.77 | 109                 | 44                 | 5.77                          |

#### Table 2 Summary of Water Quality Measurements

\*\*All wells are 2-inch diameter Sch40 PVC

<sup>a</sup>Duplicate sample was collected at MW-5

Samples were collected from the mid-screen depth or from the middle of the existing water column, whichever of these two scenarios was the deepest level. Table 3 lists water sample information, including parameters, testing methods and number of samples and duplicates. Sampling and water quality information collected at each well included purge rate, water level, parameter measurements and cumulative volume of groundwater purged from well at each well volume interval. Detailed well measurement, purging and sampling information is contained on the Monitoring Well Sampling and Water Quality Measurement Forms, which are include in Appendix B.

| Sample Type                                 | Analytical  | Sample | Analytical | No. of  | No. of     |
|---------------------------------------------|-------------|--------|------------|---------|------------|
|                                             | Parameter   | Matrix | Method     | Samples | Duplicates |
| Quarterly<br>Groundwater<br>Sampling Events | Mineral Oil | Water  | NWTPH-Dx   | 5       | 1          |

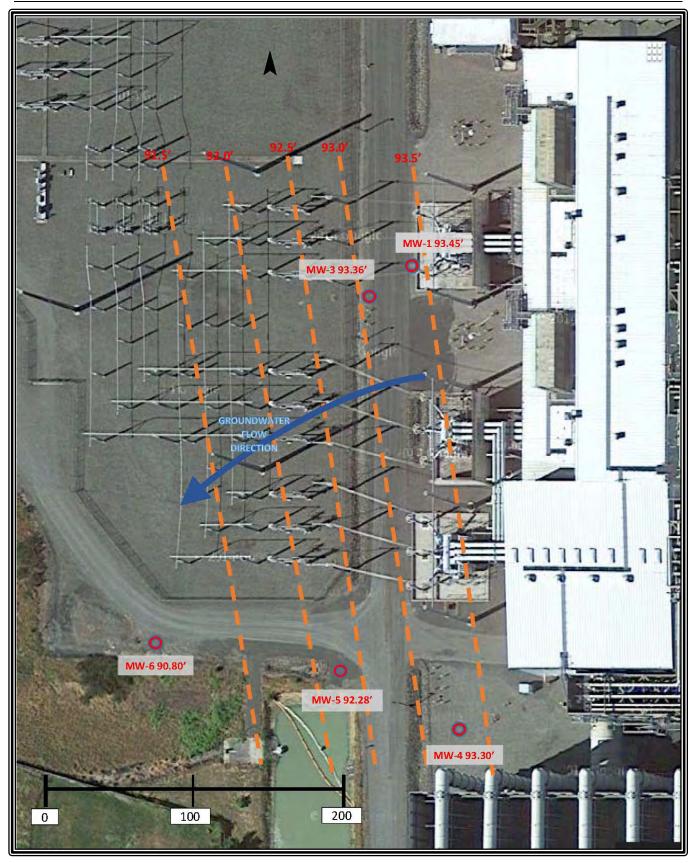
### Table 3. Groundwater Sample Collection Information

### 3.4 Sample Handling, Field Documentation and Quality Assurance

This section discussed field documentation and procedures used to handle and manage the environmental samples collected for laboratory analysis. Project quality assurance methods are also detailed.

### 3.4.1 Field Documentation

A logbook was used to document sampling and other support procedures performed during field activities. More specifically, the Field Activities Logbook entries provide a record of specific sample locations and collection information, any subcontractor activities, noting their role(s), describing the major equipment used at each sampling location and providing noteworthy observations, description of problems, or incidents and their resolutions. Completed field forms, planning and safety documents and the Field Activities Logbook were all stored in a weather-proof file box, maintained on site, during all project work activities. Field Activity Logbook entries are included in Appendix C.





### 3.4.2 Sample Handling Procedures

Disposable nitrile gloves were used by personnel collecting and handling all samples. Gloves were changed frequently and in between each sample collection to avoid cross contamination. Samples were collected into certified clean, laboratory supplied containers, with pre-measured amounts of preservatives, as appropriate.

After the samples were collected they were appropriately labeled and placed in insulated coolers containing ice. This was done to keep the samples out of the direct sunlight and to maintain a temperature of as close to four degrees centigrade as possible. All project samples were hand-delivered to the contracted laboratory, Analytical Resources, Incorporated (ARI) laboratory in Tukwila, WA.

### 3.4.2.1 Sample Identification, Labeling and Chain of Custody

Samples were identified by their location and corresponding date of collection. Any quality control samples (e.g. duplicates) were also properly denoted. Sample identification numbers, including sample media type, location number, and other pertinent descriptions were recorded on field sheets completed for each location and sample.

Chain of Custody (CoC) forms, detailing sample container, collection and possession information, were completed and accompanied each cooler shipment from the field to the laboratory. Date, time, sample identification, number of containers, analysis to be performed, and sampler/s in possession were recorded on each CoC. CoC records are included in Appendix D.

#### 3.4.3 **Quality Assurance Methods**

#### 3.4.3.1 Instrument Calibration

All field instruments that required a zeroing and/or a user calibration were appropriately calibrated prior to or at the start of each day's deployment per the instrument manufacturer's instructions. Calibration checks against standards were performed at the beginning and periodically throughout each field day (if necessary / required) to verify equipment operation. Any calibration data was recorded in the field logbook. All calibration media (e.g. gas, liquid or otherwise) was properly stored and managed per manufacturer's recommendations and according to applicable PC Plant requirements.

### 3.4.3.2 Decontamination Procedures

Any non-disposable equipment was decontaminated prior to its initial use and after completing a particular sampling or logging task. Decontamination wash consisted of the following:

- > non-phosphate detergent (Alconox) and water wash;
- > tap water rinse; and
- > De-ionized water rinse.

> Drilling rigs, support vehicles, drill works, connection rods, augers and other large pieces of equipment would be decontaminated by power washing with a high-pressure steam cleaner only as described in Section 4 of the 2015 Project Work Plan (Cardno, April 2015).

No such decontamination of any equipment was necessary in the field during this quarterly groundwater sampling round.

### 3.5 Investigation Derived Waste

Investigation-derived waste (IDW) generated during this quarterly groundwater sampling event consisted of excess purge water produced during well pumping and general sampling waste debris (spent gloves, paper, etc.). All purge water was containerized into a Department of Transportation (DOT)-17H approved open head 55-gallon drum. A "common" purge water collection drum was initiated during the first quarterly sampling event in April, 2015. This drum was properly labeled with its media contents, date of generation, location of origin, and contents' owner. The drum was sealed with a fitted, gasketed lid and bolted band and placed on a pallet. Purge water from each subsequent sampling round is added to the "common" drum.

Approximately 5.5 gallons of purge water was generated during this quarterly sampling event. All purge water was placed in the "common" groundwater event drum, which is stored onsite during and between sampling rounds. To date approximately 24 gallons of purge water has been contained in this drum.

The purge water drum/pallet placement was approved by the PC Environmental / Safety Analyst – Project Manager. The storage location is secure and wholly within the PacifiCorp Chehalis property boundary. Additional IDW tasks, including testing, further staging, manifesting and disposal are being managed directly by PacifiCorp. No IDW was transported off of the site, nor manifested by CWS.

### 3.6 **Project Work Plan Discrepancies**

There were no significant or substantive changes, modifications, or revisions to the Project Work Plan (PWP) (Cardno, April 2015), nor discrepancies between the actual field tasks as performed and their description in the PWP. Methodologies as described in the PWP were followed and conducted and completed accordingly.

# 4 Analytical Results

This section summarizes the results of the groundwater sampling activities completed at the PacifiCorp Chehalis Plant on December 16<sup>th</sup>, 2015. Samples were analyzed for mineral oil using Northwest methods for total petroleum hydrocarbons – diesel extended range (NWTPH-Dx). These results are compared to the appropriate WA DoE MTCA Method A Cleanup Levels (WAC 173-340). The complete analytical report, including the CoC forms and electronic data deliverable table, are included in Appendix D.

### 4.1 Comparison of Project Results to Regulatory Guidance

Assessment of mineral oil in groundwater sample data results are compared to permissible values listed for WA DoE MTCA Method A Cleanup Levels for Groundwater (WAC 173-340-720). MTCA's definition of Mineral Oil means non-PCB mineral oil, typically used as an insulator and coolant in electrical devices such as transformers and capacitors measured using NWTPH-Dx. The MTCA Method A Groundwater Cleanup Level for Mineral Oil of **500 µg/L** is based on protection from noncarcinogenic effects during drinking water use. Additional PCB testing requirements listed under the MTCA groundwater section (173-340-720) do not apply to project sampling because PacifiCorp can demonstrate that: (1) The release originated from an electrical device that was manufactured after July 1, 1979; or (2) oil containing PCBs was never used in the equipment suspected as the source of the release; or (3) it can be documented that the oil released was recently tested and did not contain PCBs.

### 4.2 Groundwater Sampling Results

Five groundwater samples, along with one duplicate (duplicate from MW-5) were submitted to ARI Labs for Mineral Oil analysis via NWTPH-Dx. Results are reported as Diesel Range Organics (DRO), Mineral Oil and Residual Range Organics (RRO) / heavy fuel oil. DRO quantitation would be noted on chromatograph peaks in the range from C12 to C24. Mineral Oil quantitation would be noted on chromatograph peaks in the range from C16 to C34. RRO quantitation was noted on chromatograph peaks in the range from C24 to C38. Combined, the DRO/RRO results would indicate the total diesel range extended (Dx) identified in a particular sample. Mineral Oil, therefore, is a subset of the total DRO/RRO concentration.

There were no reportable detections of DRO/RRO or Mineral Oil at any of the project tested well locations during this quarterly groundwater sampling event. Groundwater sampling results are presented in Table 4.

| Sample ID | Parameter   | Detection Limit<br>µg/L | Reporting<br>Limit μg/L | Result Value<br>µg/L | Data<br>Qualifier |
|-----------|-------------|-------------------------|-------------------------|----------------------|-------------------|
| MW-1      | DRO         | 30                      | 100                     | <100                 | U                 |
| MW-1      | Mineral Oil | 60                      | 200                     | <200                 | U                 |
| MW-1      | RRO         | 0                       | 200                     | <200                 | U                 |
| MW-3      | DRO         | 30                      | 100                     | <100                 | U                 |
| MW-3      | Mineral Oil | 60                      | 200                     | <200                 | U                 |
| MW-3      | RRO         | 0                       | 200                     | <200                 | U                 |
| MW-4      | DRO         | 30                      | 100                     | <100                 | U                 |
| MW-4      | Mineral Oil | 60                      | 200                     | <200                 | U                 |
| MW-4      | RRO         | 0                       | 200                     | <200                 | U                 |
| MW-5      | DRO         | 30                      | 100                     | <100                 | U                 |
| MW-5      | Mineral Oil | 60                      | 200                     | <200                 | U                 |
| MW-5      | RRO         | 0                       | 200                     | <200                 | U                 |
| DUP-GW    | DRO         | 30                      | 100                     | <100                 | U                 |
| DUP-GW    | Mineral Oil | 60                      | 200                     | <200                 | U                 |
| DUP-GW    | RRO         | 0                       | 200                     | <200                 | U                 |
| MW-6      | DRO         | 30                      | 100                     | <100                 | U                 |
| MW-6      | Mineral Oil | 60                      | 200                     | <200                 | U                 |
| MW-6      | RRO         | 0                       | 200                     | <200                 | U                 |

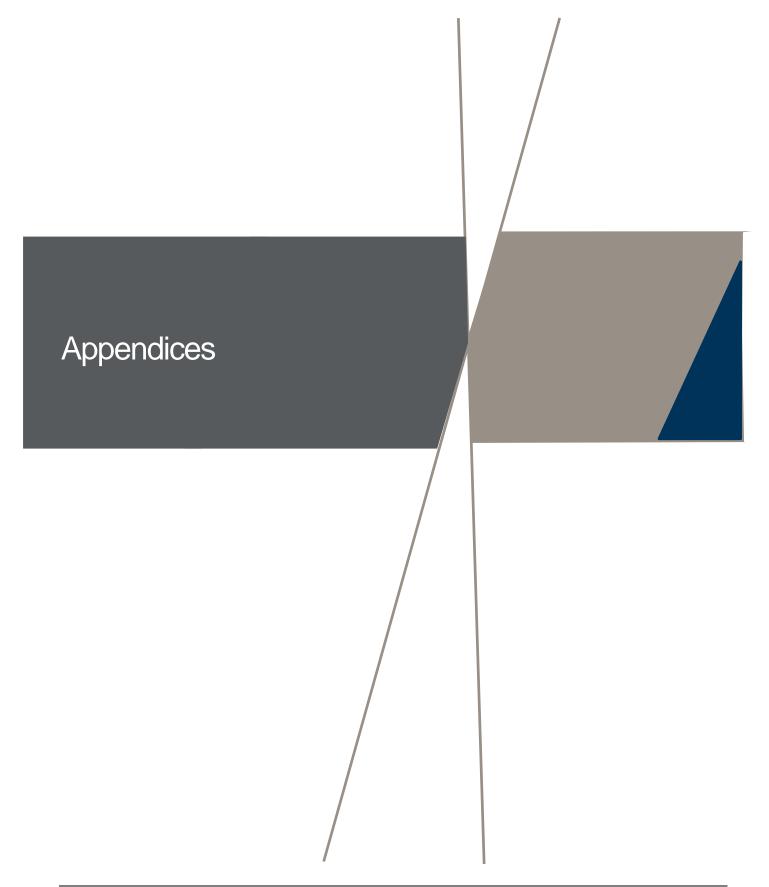
Table 4. Groundwater Sampling Results

U = non-detect

Duplicate collected at MW-5

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# APPENDIX A HEALTH AND SAFETY TAILGATE FORM

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Attachment 1 Daily Health and Safety Tailgate Meeting Form DAILY HEALTH AND SAFETY TAILGATE MEETING FORM Project Health and Safety Manager Conducting Meeting : Weather: Overcast / clearing, misty, Mid-hi 30's 12.6.15 Date : **Personnel In Attendance :** Dave Metallo - Clear Water Brad Kwasnowski - Cardno Meeting Minutes (Brief description of topics, special concerns and sites discussed): - Checked in at Front office, spoke w/ J. Smith re: site particulars, access, current issues - all good - Cold weather work conditions - Kroper PPE - \* Electrical hezerds/sete - Slips-trips-falls \_ DI - Retrieved Plant Emerg. Radio. Keep w/cveu throughout day - Lifting - Expected work tasks for the day - Potential Contaminants in GW Signature of Attendees' : 4 Hatallo "THE BEST JOB IS ONE DONE SAFELY ! "

## **APPENDIX B**

## MONITORING WELL SAMPLING AND WATER QUALITY MEASUREMENT FORMS

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| CLEAR WATER LOW FLOW WELL PURGING         | AND FIELD WATER QUALITY MEASUREMENT FORM PAGE / OF /            |
|-------------------------------------------|-----------------------------------------------------------------|
| Project Name: PacifiCorp GW Investigation | Date: 12.16.2015                                                |
| Site Name: Chehalis GSUS                  | LNAPL: Y N X DNAPL: Y N Depth to Product (ft btoc): NA          |
| Sample Location ID:                       | Product Thickness (ft): $0.00$ Depth to Water (ft btoc) $4.31'$ |
| Sampler(s) D. Metallo B. Kwasnowski       | Well Screen Interval: 17-4.5 Mid Screen Depth (ft btoc): 10.75' |
| Parameters: NWTPH-Dx Mineral Oil          | Pump Intake (ft btoc): 10.5' Total Depth (ft btoc): 16.75'      |
| QC Sample: Y/N Type:/A                    | Purge Style: Peristaltic Bladder / Submersible /Other:          |

| Time Purge Rate<br>(ml/min) |          | Total<br>Purge<br>(gal) <sub>ML</sub> | Purge Water PC pH Sp. Cond. Turbidity |             | (mg/L)       | Comments     |              |      |                                  |
|-----------------------------|----------|---------------------------------------|---------------------------------------|-------------|--------------|--------------|--------------|------|----------------------------------|
|                             | Stabiliz | uirements                             | (±10%)                                | (±0.2)      | (±10%)       | (± 10 %)     | (±10%)       |      |                                  |
| 1214                        |          |                                       | 14.31                                 |             |              |              | -            |      | Initial water level, pre-pumping |
| 1220                        | 2100     | 500                                   | 4.45                                  | 13.67       | 5.79         | 124          | 36           | 5.10 | Pump Speed=.5                    |
| 1225                        | N100     | 500                                   | 4-38                                  | 13°52       | 5.82         | 124          | 31           | 5.11 | 1 (                              |
| 1230                        | ~100     | 500                                   | 4.30                                  | 13.49       | 5.83         | 122          | 28           | 4.29 |                                  |
| 1235                        | ~100     | 500                                   | 4.15                                  | 13.58       | 5.83         | 121          | 28           | 3.69 |                                  |
| 1240                        | ~100     | 500                                   | 4.10                                  | 13:57       | 5.83         | 119          | 29           | 3.67 |                                  |
| /245                        | ~100     | 500                                   | 4'10                                  | 13.49       | 5.83         | 119          | 28           | 3.61 |                                  |
|                             |          |                                       |                                       |             |              |              |              |      |                                  |
| è.<br>11                    |          |                                       |                                       | vel Measure | ements in th | iese boxes r | nust match ! |      |                                  |
| 12-45<br>(DUP)              |          | ~1.5gel                               | 14.31                                 | 13.49       | 5.83         | 119          | 28           | 3.61 |                                  |

Additional Comments:

#### CLEAR WATER PAGE / OF / LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM Project Name: Particorp GW Investigation Date: 12.16.2015 GSUS LNAPL: Y N DNAPL: Y NX Depth to Product (ft btoc): NA Site Name: nalis MW-3 Product Thickness (ft): 0.00 Depth to Water (ft btoc) 4.21' Sample Location ID: Sampler(s) D. Motallo B. Kwasnowski Well Screen Interval: 19-4' Mid Screen Depth (ft btoc): 11.5 Total Depth (ft btoc): 19.20' Pump Intake (ft btoc): 11.5 Parameters: NW TPH-Dx Mineral Oil Purge Style: (Peristaltic) / Bladder / Submersible /Other: \_ QC Sample: Y/N Type: NA

| Time  | Purge Rate<br>(ml/min) | Total<br>Purge<br>(gal)- | Depth to<br>Water<br>(ft btoc) | Temp.<br>°C | pН          | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L) | Comments                         |  |  |
|-------|------------------------|--------------------------|--------------------------------|-------------|-------------|----------------------|---------------------|--------------|----------------------------------|--|--|
| £     | Stabiliz               | ation Red                | quirements                     | (±10%)      | (±0.2)      | (±10%)               | (± 10 %)            | (±10%)       |                                  |  |  |
| 1302  | 302 14.21              |                          |                                |             | 1           |                      | -                   | 1            | Initial water level, pre-pumping |  |  |
| 1310  | 100                    | 500                      | 5.48                           | 12.68       | 5.80        | 116                  | 29.6                | 3.67         | Pimp Spood = 5                   |  |  |
| 1315  | 100                    | 500                      | 6.05                           | 12.39       | 5.80        | 113                  | 30.7                | 4.16         |                                  |  |  |
| 1320  | 100                    | 500                      | 6.86                           | 12.18       | 5.79        | 110                  | 32.0                | 3.82         |                                  |  |  |
| 1325  | 100                    | 500                      | 7.48                           | 12.10       | 5.79        | 109                  | 32.1                | 3.95         |                                  |  |  |
|       |                        |                          |                                |             |             |                      |                     |              |                                  |  |  |
|       |                        |                          | 1Water Le                      | vel Messure | ments in th |                      | nust match !        | r,           |                                  |  |  |
| 1330  |                        | ~Igal                    | 14.21                          | 12.10       | 5.79        | 109                  | 32.1                | 3.85         | MW-3                             |  |  |
| (DUP) |                        | 1902                     | 1.24                           | 12:10       | 5-1         | 101                  |                     |              |                                  |  |  |

Additional Comments:

### CLEAR WATER SERVICES LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM PAG

PAGE / OF /

| Project Name: Pacifi Corp GW Investigation |
|--------------------------------------------|
| Site Name: Chehalis GSUS                   |
| Sample Location ID: <u>MW-4</u>            |
| Sampler(s) D. Matallo B. Kwasnowski        |
| Parameters: NWTPH-DX Mineral Oil           |
| QC Sample: Y / N Type: NA                  |
|                                            |

| Date: 12.16 - 2015                   |                                    |
|--------------------------------------|------------------------------------|
| LNAPL: Y N X DNAPL: Y                | N_X Depth to Product (ft btoc): NA |
| Product Thickness (ft): 0.00         | Depth to Water (ft btoc) 4.34 *    |
| Well Screen Interval: 25 - 5'        | Mid Screen Depth (ft btoc): 14,30  |
| Pump Intake (ft btoc): 15'           | Total Depth (ft btoc): 24.30       |
| Purge Style:(Peristaltic)/ Bladder / | Submersible /Other:                |

| Time Purge Rate<br>(ml/min) |          | Total Depth to<br>Purge Water<br>(gal) (ft btoc) |                       | Water °C    |              | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L) | Comments                         |
|-----------------------------|----------|--------------------------------------------------|-----------------------|-------------|--------------|----------------------|---------------------|--------------|----------------------------------|
|                             | Stabiliz | quirements                                       | (±10%)                | (±0.2)      | (±10%)       | (± 10 %)             | (±10%)              |              |                                  |
| 1126                        |          |                                                  | 14.34                 |             |              |                      |                     |              | Initial water level, pre-pumping |
| 1135                        | ~100     | 500                                              | 4.41                  | 12.06       | 5.77         | 89                   | 128                 | 3.96         |                                  |
| 1140                        | ~100     | 500                                              | 4.45                  | 11.70       | 5.31         | 30                   | 119                 | 4.15 .       |                                  |
| 1145                        | ~100     | 500                                              | 4.45                  | 11.13       | 5.81         | 80                   | 108                 | 4.06         |                                  |
| 1150                        | ~100     | 500                                              | 4.45                  | 11.79       | 5.80         | 80                   | 92.2                | 3.90         |                                  |
| 1155                        | ~100     | 500                                              | 4.45                  | 11.76       | 5.80         | 30                   | 83                  | 3.80         |                                  |
| 1200                        | ~100     | 500                                              | 4.45                  | 11.72       | 5.19         | ୡ୦                   | 89                  | 3.81         |                                  |
|                             |          |                                                  |                       |             |              |                      |                     |              |                                  |
|                             |          |                                                  |                       |             |              |                      |                     |              |                                  |
|                             |          |                                                  | <sup>1</sup> Water Le | vel Measure | ements in th | nese boxes n         | nust match !        |              |                                  |
| 1205                        | -        | 21.5g                                            | 14.34                 | 11.72       | 5:79         | 80                   | 39                  | 3.81         | MW-4                             |
| (DUP) NA                    |          |                                                  |                       |             |              |                      |                     |              | _                                |

Additional Comments: - Possibility of a very lite Sheen detected wi IFP, at limitation of meter

| ite Name:<br>ample Locat<br>ampler(s <u>) [</u><br>arameters: <u>/</u> | : Pairf, Corp<br>Chehalis<br>tion ID: <u>MW</u><br>D. Matallo, J<br>VWTPH - DX<br>ŶN Type: I | <u>GSUs</u><br>-5<br>B. Kwas<br>Minei | wowski                         | _            | Date: $12 \cdot 16 \cdot 2015$<br>LNAPL: Y (N) DNAPL: Y (N) Depth to Product (ft btoc): $12$<br>Product Thickness (ft): $0.00$ Depth to Water (ft btoc) $4.60$<br>Well Screen Interval: $25 - 5'$ Mid Screen Depth (ft btoc): $15 \cdot 3$<br>Pump Intake (ft btoc): $15'$ Total Depth (ft btoc): $25 \cdot 23'$<br>Purge Style: Peristaltic) Bladder / Submersible /Other: |                      |                     |              |                                 |  |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------|--------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------|--------------|---------------------------------|--|
| Time                                                                   | Purge Rate<br>(ml/min)                                                                       | Total<br>Purge<br>-(gal)              | Depth to<br>Water<br>(ft btoc) | Temp.<br>℃   | р́Н                                                                                                                                                                                                                                                                                                                                                                         | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L) | Comments                        |  |
|                                                                        | Stabiliz                                                                                     | ation Req                             | uirements                      | (±10%)       | (±0.2)                                                                                                                                                                                                                                                                                                                                                                      | (±10%)               | (± 10 %)            | (±10%)       |                                 |  |
| 1038                                                                   |                                                                                              |                                       | 14.80                          |              |                                                                                                                                                                                                                                                                                                                                                                             |                      |                     |              | Initial water level, pre-pumpin |  |
| 1045                                                                   | ~100                                                                                         | 500                                   | 4.80                           | 12.61        | 5.76                                                                                                                                                                                                                                                                                                                                                                        | 98                   | 29.70               | 5.16         | Pump Speed=0.5                  |  |
| 1050                                                                   | ~100                                                                                         | 500                                   | 4.80                           | 12.21        | 5-73                                                                                                                                                                                                                                                                                                                                                                        | 99                   | 28.10               | 4.86         | • •                             |  |
| 1055                                                                   | ~100                                                                                         | 500                                   | 4.80                           | 12.28        | 5.77                                                                                                                                                                                                                                                                                                                                                                        | 99                   | 27.50               | 4.56         |                                 |  |
| 1100                                                                   | ~100                                                                                         | 500                                   | 4.80                           | 12.39        | 5.11                                                                                                                                                                                                                                                                                                                                                                        | 93                   | 27.30               | 4.41         |                                 |  |
|                                                                        |                                                                                              |                                       |                                |              |                                                                                                                                                                                                                                                                                                                                                                             |                      |                     |              |                                 |  |
|                                                                        |                                                                                              | ~0.5 go.                              | ) <sup>1</sup> Water Le        | evel Measure | ements in th                                                                                                                                                                                                                                                                                                                                                                | nese boxes r         | nust match !        | P            |                                 |  |
| 1105                                                                   |                                                                                              | 11050m                                | 14.80                          | 12.39        | 5.77                                                                                                                                                                                                                                                                                                                                                                        | 98                   | 27.80               | 4.41         | MW-5<br>DUP-GW                  |  |
| 1230                                                                   |                                                                                              | 1230 DM                               |                                |              |                                                                                                                                                                                                                                                                                                                                                                             |                      |                     | -            | DUP-GW                          |  |

Additional Comments:

# CLEAR WATER LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

PAGE \_\_\_\_\_ OF \_\_\_\_

| Project Name: Pacifi Corp GW Investigation |
|--------------------------------------------|
| Site Name: Chehelis Plant-GSUS             |
| Sample Location ID: <u>MW-6</u>            |
| Sampler(s) Metallo, Kwasnowski             |
| Parameters: NW TPH-Dx (Mineral Dil)        |
| QC Sample: Y IN Type: NA                   |

| Date: 12-16-2015                    |                                    |
|-------------------------------------|------------------------------------|
| LNAPL: Y N DNAPL: Y                 | _ N Depth to Product (ft btoc):A   |
| Product Thickness (ft): 0,00        | Depth to Water (ft btoc) 5348      |
| Well Screen Interval: 25-5 '        | Mid Screen Depth (ft btoc): 15.10' |
| Pump Intake (ft btoc): 15           | Total Depth (ft btoc): 25, 16      |
| Purge Style: Peristaltic/ Bladder / | Submersible /Other:                |

| Time Purge Rate<br>(ml/min) |          |            |                       | Temp.<br>°C  | рН           | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L) | Comments                         |  |
|-----------------------------|----------|------------|-----------------------|--------------|--------------|----------------------|---------------------|--------------|----------------------------------|--|
|                             | Stabiliz | quirements | (±10%)                | (±0.2)       | (±10%)       | (± 10 %)             | (±10%)              |              |                                  |  |
|                             | 15.3/18  |            |                       |              | 1            |                      |                     |              | Initial water level, pre-pumping |  |
| 0955                        | ~100     | 500        | 5.39                  | 10:11.0      | 6,00         | x181                 | 44.3                | 5.92         | Pump Speed = 0.5                 |  |
| 1000                        | ~100     | 500        | 5.40                  | 11.64        | 5.89         | 141                  | 45.8                | 6.32         | . 4                              |  |
| 1005                        | ~100     | 500        | 5.40                  | 11.95        | 5.83         | 126                  | 43.0                | 6.15         |                                  |  |
| 1010                        | 2100     | 500        | 5.40                  | 12.26        | 5.79         | 113                  | 42.4                | 5.85         |                                  |  |
| 1015                        | ~100     | 500        | 5.40                  | 12.24        | 5.77         | 110                  | 43.4                | 5.78         |                                  |  |
| 1020                        | ~100     | 500        | 5.40                  | 12.31        | 5.77         | 109                  | 43.5                | 5.77         |                                  |  |
|                             | 1        |            |                       |              |              | _                    |                     |              |                                  |  |
|                             |          |            | 1                     |              |              |                      |                     |              |                                  |  |
|                             |          |            | <sup>1</sup> Water Le | evel Measure | ements in th | nese boxes r         | nust match !        |              |                                  |  |
| 1025                        |          | ~lgal      | 15.38                 | 12.31        | 5.77         | 109                  | 43.5                | 5.77         | MW-6                             |  |
| (DUP) NA                    |          |            |                       |              | 1            |                      |                     |              |                                  |  |

Additional Comments:

# APPENDIX C FIELD LOGBOOK ENTRIES

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PacifiCorp 2015 Sample Event 47 - Dave Motallo w/ Clear Water Srvs - Brad Kwasnowski - Cardno - Weather: Mostly Cloudy /overcast but sun is burning off deck cover ~ hi 30°s H. Greeze -Leave Cardno Shop ~0700 head down to ARI Labs to Pick up bottles head down to PacifiCorp in Chehalis, WA - Arrive at Power Plant (~0350) · Sign-in at front desk, speak w/ Severy Smith · Signed out a plant radio from Control Room (#9) · Jeremy moved purge water collect. 55-gal drum over to the sampl. avea for us - Conduct Health & Safety Tailgate Mosting ON-Site, See Taileste from for defails DCM Rite in the Rain.

12.16.1533 12.16.15 PacifiCorp 30 Qt Smpl Event 48 PacifiCorp 3rd Qt Smpl Event - Set up on MIN-6 (~0920) - readied all Sampling gear, PPE, supplies, bottles, forms, etc. MW-5 (1033) Thickness = 0.00' . Dpth to Prod= NA · Dpth to Wtr = 4.80' TD = 25.28" \* Using a Horiba U-52 w/ flo cell · Smpl Intake Depth = 15' · Peristattic pump ave rate = 100 ml/min rented from INW-GeoTech in Rickland, · Total Purge Vol. = ~ . 5 gals - Finel WQ Readings: WA. Serial No. (Soude) 60 RLGEAT Time Temp pH Spland Tirb DO 1105 12.39 5.77 98 27.80 4.41 (hand set) L7D1283J 12.39 5.77 27.30 4.41 GeoTech # 22.004 100-11 Sample ID = MW-5 Time (1105 MW-6 (~0940) Duplicate = DUP-GW (1230) fhickwess = 0.00 · Doth to Prod. = NA · Doth to Wtr.= 5.38' TD = 25.10' -- Clean up around well head, load · Smpl Intake Dath = 15' · Peristaltic Pump Ave Pump Rote = 100 min gear, move to next well. · Total Rurge Vol. = ~ Igal MW-4 (1126) " Final WQ Readings: Time Temp"C pH us/cm NTU Diss Ox . Doth to Prod = NA Thickness = 0.00 MgiL "Dipth to Wtr = 4.34' TD = 24.80' 1025 1231 5.77 109 43.5 -5.77 · Smpl Intake Depth= 15' Sampi ID = MW-6 Time = (1025) - Clean up around well, load gear, "Peristattic Pump que. rate = 100 m/min · Total purge Vol. = ~1.59als - Final WQ Readings : Time Temp pH Spland Turb DO 80 89 Reto in the has 1205 11.72 5.79

34 PacifiCorp 3rd Qt. Smpl Event 12.16.15 Pacifi Corp 30 Qtr Smpl Event - MW-4 Confied; · Smpl ID = MW-4 Time (1205) - MW-3, conted Sample ID = MW-3 Time (1330) MW-1 (1212) • Dpth To Prod. = NA Thickness= 0.00' • Dpth To Wtr = \$3.31' TD = 16.75' - Clean up around well head, power down and re-pack Horiba U-52 · Smpl Intake Doth = 10.5' -· Peristalic Ave Pump Rate = 100 M/min into its protective case - package Samples into cooler, ready · Total Purge Vol. = ~1.5gal them for transport to the lab · Final WQ Readings: Time Temp pH Sp. Cond Turb DO - OC MS/CM NTIL Mal -TEmpty remaining purge water into the "Common" purge water collection drum (Staged earlier today to the south - °C MS/Cm NTU Mg/L 1245 1349 583 119 28 3.61 Smpl. ID = MW-1 Time (1245 of GSU-3) ~ 5.5 gals of purge water MW-3 (1255 gals total. Drum de-sealed. · Doth To Prod = NA Thickness = 0.00' - Mob around to Admin office : Sign · Doth To WTR = 41.21 TD = 19.20 plant radio back into the control room, Speak · Smpl Intele Doth = 11.5' of Jevery Smith and Lerora Westbrook · Peristattic Ave Pump Rate = 100 m/min (Lenora was on site to observe us sampling " Total Purge Vol. = ~ Igal at MW-3), signed out in the vistor log · Final WQ Readings : -Time Temp pH Sp. Cond. Turb DO - Leave Pacificorp ~ 1415 °C unit instem NTU mgil 1330 12.10 5.79 109 3.85 32.1 DCM Rite in the Rain.

12-16:15 PacifiCorp 3rd Oterly Smpl Event 50 51 - Stop at convenience store to purchase additional ice; iced down samples. Cushioned & secure containers and seal coder for transport 100 m 10 m - Review Col on the way to lab-Good - Arrive at ARI Labs ~1550 - Sign over sample custody to - Samples received in good/undamaged Condition - Cooler temp. = 4.5°C - Mob back to Cardno Shop to off load gear, clean van . ET TR - Third Quarterly Sampling Event Completed. DCM \* Note: No droplets or visual sheen was observed in the observation well near 20 GSU-3 - Water V. Clear. Rite in the Rain

# APPENDIX D LABORATORY CHAIN OF CUSTODY FORMS

## AND

# ANALYTICAL REPORT

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### Chain of Custody Record & Laboratory Analysis Request

|                                                  | Jtandard                        |                  |        |                |                                                        |        |     |              |                             | (           |                 | Analytical Resources, Incorporated<br>Analytical Chemists and Consultants<br>4611 South 134th Place, Suite 100 |                                         |
|--------------------------------------------------|---------------------------------|------------------|--------|----------------|--------------------------------------------------------|--------|-----|--------------|-----------------------------|-------------|-----------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| ARI Client Company: KTA, Iw                      | c. 3                            | Phone:           | 50-76  | 94             | 12-10                                                  | - 2015 | _   | nt? Yes      |                             |             |                 | Tukwila,                                                                                                       | , WA 98168<br>5-6200 206-695-6201 (fax) |
| Client Contact: Lenora L                         | Jestbro                         | ok               |        |                | No. of Cooler Cooler Coolers: 1 Cooler Coolers: 4.5 °C |        |     |              |                             |             | www.arilabs.com |                                                                                                                |                                         |
| Client Project Name: PacifiCorp GW Investigation |                                 |                  |        |                |                                                        |        |     | Analysis F   | Requested                   |             |                 |                                                                                                                | Notes/Comments                          |
| Client Project #                                 | Samplers:<br>D.Metall           |                  |        |                | H-D<br>Val                                             |        |     |              |                             |             |                 |                                                                                                                |                                         |
| Sample ID                                        | Date                            | Time             | Matrix | No. Containers | ATWW<br>ALIM                                           |        |     |              |                             |             |                 |                                                                                                                |                                         |
| MW-6                                             | 12.16.15                        | 1025             | W      | 2              | X                                                      |        |     |              |                             |             |                 |                                                                                                                |                                         |
| MW-5                                             | 12.16.15                        | 1105             | W      | 2              | X                                                      |        |     |              |                             |             |                 |                                                                                                                |                                         |
| MW - 4                                           | 12.16.15                        | 1205             | W      | 2              | X                                                      |        |     |              |                             |             |                 |                                                                                                                |                                         |
| MW-1                                             | 12.16.15                        | 1245             | W      | 2              | X                                                      |        |     |              |                             |             |                 |                                                                                                                |                                         |
| MW-3                                             | 12.16.15                        | 1330             | W      | 2              | X                                                      |        |     |              |                             |             |                 |                                                                                                                |                                         |
| DUP-GW                                           | 12.16.15                        | 1230             | W      | 2              | X                                                      |        |     |              |                             |             |                 |                                                                                                                |                                         |
|                                                  |                                 |                  |        |                |                                                        |        |     |              |                             |             |                 |                                                                                                                |                                         |
| Dr                                               |                                 |                  |        |                |                                                        |        |     |              |                             |             |                 |                                                                                                                |                                         |
| LM.                                              |                                 |                  |        |                |                                                        |        |     |              |                             |             |                 |                                                                                                                |                                         |
|                                                  |                                 | -                |        |                |                                                        |        |     |              |                             |             |                 |                                                                                                                |                                         |
| Comments/Special Instructions                    | Relinquished by:<br>(Signature) | 20               | -26    | 2              | Relinquished<br>(Signature)                            | by:    |     |              | Received by:<br>(Signature) |             |                 |                                                                                                                |                                         |
|                                                  | Printed Name:                   | File             | Rai    | ikin           | Printed Nam                                            | e:     |     |              | Printed Name                | e:          |                 |                                                                                                                |                                         |
|                                                  | Company:                        | Metal<br>Water S | ) .    | Company:       | 12I                                                    | 1-21-  |     | Company:     |                             | Company:    |                 |                                                                                                                |                                         |
|                                                  | Date & Time:                    | 5 (155           | 4      | Date & Time:   | 1-16-                                                  | 15 1   | 550 | Date & Time: |                             | Date & Time |                 |                                                                                                                |                                         |

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

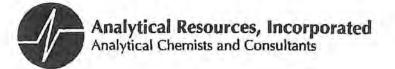
Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

# Ð

# Analytical Resources, Inc.

# Bottle Request

|                 |                                 |                          |                    |                  |                  | Needs E               | sy Date:          | 12/1                       | 5/2015            |  |  |
|-----------------|---------------------------------|--------------------------|--------------------|------------------|------------------|-----------------------|-------------------|----------------------------|-------------------|--|--|
|                 | t Name:                         |                          | KTA                |                  |                  | Time &                | Date of           | 25                         |                   |  |  |
|                 | oject<br>nber:                  |                          | Chehalis           |                  | X                | Client P              | lick Up:          | 27-                        |                   |  |  |
| Cli             | ent:                            |                          | Cardno-GS          |                  |                  | Time/Date             | Time/Date Courier |                            |                   |  |  |
| Con             | itact:                          |                          | Dave Metallo       |                  |                  | Delive                | er by:            |                            |                   |  |  |
| ARI             | PM:                             |                          | mdh i 12/          | 211              |                  | Time/Date             |                   |                            |                   |  |  |
|                 | te of<br>uest:                  |                          | 12/7/2015          |                  |                  | Comm<br>Shippe        |                   | PI                         |                   |  |  |
|                 | st Taken<br>ly:                 |                          |                    |                  |                  | Complete              | ed By:            | TID                        |                   |  |  |
| Sampl           | es Will<br>turn:                |                          |                    |                  | Date:            | 2/14/18               | _                 | # of Coole                 | rs Sent:          |  |  |
|                 |                                 | Sending                  | in Boxes is OK     | 4                | Include COCs (1  | per 10 Samples)       | ×                 | Put Labels                 | on Bottles        |  |  |
|                 |                                 | Coolers                  | are Needed         |                  | Blue Ice - [] wa | arm [] cold           | <                 | Loose Label                | s - [] vials only |  |  |
|                 | # of Coolers: According to need |                          |                    |                  | Extra Bubble V   | Vrap                  |                   | Individually               | Wrap Bottles      |  |  |
|                 |                                 | ip Blanks<br>2 per set): |                    |                  | ] Total Bo       | ttles for All A       | Analyses:         |                            |                   |  |  |
| # of<br>Samples | # for QC                        | # for<br>Breakage        | Analysis Requested | Sample<br>Matrix | Bottle Size      | Bottles Per<br>Sample | Total<br>Bottles  | Preservation<br>Lot Number | Bottle Lot Number |  |  |
| 6               | - 4                             |                          | NWTPH-Dx           | Water            | 500 mL AG        | 2                     | 12                |                            | 00061257          |  |  |
|                 |                                 | 1                        |                    |                  |                  |                       |                   |                            |                   |  |  |
|                 |                                 |                          |                    |                  |                  |                       |                   |                            |                   |  |  |
|                 |                                 |                          |                    |                  |                  |                       |                   | -                          |                   |  |  |
|                 |                                 |                          |                    | -                |                  |                       |                   |                            |                   |  |  |
|                 |                                 |                          |                    |                  |                  | 1                     | -                 |                            |                   |  |  |
|                 |                                 |                          |                    |                  |                  |                       |                   |                            |                   |  |  |
|                 |                                 |                          |                    |                  |                  |                       |                   |                            |                   |  |  |
| 0               |                                 |                          |                    |                  |                  |                       |                   |                            |                   |  |  |
|                 | bany /<br>tact:                 |                          |                    |                  | Comments         | 82                    | Fi                | ll to the top.             | /                 |  |  |
| Ship            | ping                            |                          |                    |                  |                  |                       |                   | 1                          |                   |  |  |
|                 | ess:                            |                          |                    |                  | Sec.             | <u>1</u>              |                   |                            |                   |  |  |
|                 | -                               |                          |                    |                  | _                | -                     |                   |                            |                   |  |  |
| Pho             | ne:                             |                          |                    |                  | -                | -                     |                   |                            |                   |  |  |
|                 | find 3                          |                          |                    | _                |                  |                       |                   |                            |                   |  |  |



21 December 2015

Lenora Westbrook KTA Associates, Inc. 3530 32<sup>nd</sup> Way NW Olympia, WA 98502-3230

#### RE: Client Project: PacifiCorp GW Investigation ARI Job No.: ASW9

Dear Lenora:

Please find enclosed the original chain of custody record and the final results for the samples from the project referenced above. Six water samples were received on December 16, 2015. The samples were analyzed for NWTPH-Dx as requested.

There were no problems associated with these analyses.

A copy of these reports will remain on file at ARI. Should you have any questions or need additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris Project Manager 206/695-6210 markh@arilabs.com

Enclosures

cc: Dave Metallo, Cardno-GS File ASW9

MDH/mdh

Page 1 of

|                                                | か<br>                    | Supersonbeur | Handard     | q                           | l age:               | 1                               |   | Analytical Chemists and Consultants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------|--------------------------|--------------|-------------|-----------------------------|----------------------|---------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ARI Client Company: KTA                        | KTA, Inc. 3              | 360-250-769  | 50-76       | 94                          | 12-16-2015           | Presente Yes                    | T | Tukwila, WA 98168                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Client Contact: Lewora Westbrook               | 2 Westbre                | sok          |             |                             | No. of Coolens:      | Cooler<br>Temps:                |   | www.arilabs.com                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Client Project Name: Puff 200 CW I west gation | Paro Cid                 | LUVES        | hatto       | 2                           |                      | Analysis Requested              |   | Notes/Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Client Project #:                              | D. Metallo               | 10 B.Ku      | B. Kwaswows | 1                           | 1~~~<br>H-DX         |                                 |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Sample ID                                      | Date                     | Time         | Matrix      | No. Containers              | 917WN<br>941M<br>[10 |                                 |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| MW-6                                           | 12.16.15                 | 1025         | M           | 2                           | ×                    |                                 |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| MW - 5                                         | 12.16-15                 | 1105         | M           | 2                           | X                    |                                 |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| MW - 4                                         | 12-16-15                 | 1205         | W           | 2                           | X                    |                                 |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1-WW                                           | 12.11.15                 | 1245         | M           | 2                           | ×                    |                                 |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| MW-3                                           | 12-16-15                 | 1330         | N           | 2                           | X                    |                                 |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| DUP-GW                                         | 12-16-15                 | 1230         | M           | 2                           | X                    |                                 |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                |                          |              |             |                             |                      |                                 |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Dr                                             |                          |              |             |                             |                      |                                 |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Wy                                             |                          | 1            |             |                             |                      |                                 |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                |                          | (            |             |                             |                      |                                 |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Comments/Special Instructions                  | Relinquished by          | 1 MA         | -On-        | Received by:<br>(Signeture) | 20-20                | Relinquished by:<br>(Signature) |   | Received by:<br>(Signature)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                | Printed Name:            | Motallo      | 0           | Printed Name:               | T. Les Prakin        | Primed Name:                    |   | Printed Name:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                | Company:                 | 1 ~          | some s      | company:                    | 12                   | Company:                        |   | Company:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                | Date & Time:<br>12.16-15 | 15 (1550     | (0)         | Date & Time:                | 2-16-15 15           | 1550 Date & Time:               |   | Date & Time: Date |

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

| ARI Client:       KTA_Inc.       Project Name:       Pacific Corp GW Investigat         COC No(s):       NA       Delivered by: Fed-Ex UPS Courier Hand Delivered Other:       Tracking No:         Assigned ARI Job No:       ASSWA       Tracking No:       Tracking No:         Preliminary Examination Phase:       NA       Tracking No:       Tracking No: | tice |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Were intact, properly signed and dated custody seels attached to the outside of to cooler? YES NO                                                                                                                                                                                                                                                                |      |
| Were custody papers properly filled out (ink, signed, etc.)                                                                                                                                                                                                                                                                                                      |      |
| If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: DO05276<br>Cooler Accepted by: TP Date: 12-16-15 Time: 1550                                                                                                                                                                                                                        |      |
| Complete custody forms and attach all shipping documents                                                                                                                                                                                                                                                                                                         |      |

# Log-In Phase:

| Was a temperature blank included in the cooler?                                                    |       | YES       | NO |
|----------------------------------------------------------------------------------------------------|-------|-----------|----|
| What kind of packing material was used? Bubble Wrap Wet Ice Gel Packs Baggies Foam Block           | Paper | Other:    |    |
| Was sufficient (ce used (if appropriate)?                                                          | NA    | 925D      | NO |
| Were all bottles sealed in individual plastic bags?                                                |       | YES       | Ro |
| Did all bottles arrive in good condition (unbroken)?                                               |       | (YES)     | NO |
| Were all bottle labels complete and legible?                                                       |       | TES       | NO |
| Did the number of containers listed on COC match with the number of containers received?           |       | TES       | NO |
| Did all bottle labels and tags agree with custody papers?                                          |       | CE        | NO |
| Were all bottles used correct for the requested analyses?                                          |       | YES       | NO |
| Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) | NA    | YES       | RO |
| Were all VOC vials free of air bubbles?                                                            | MAD   | YES       | NO |
| Was sufficient amount of sample sent in each bottle?                                               | -     | AES,      | NO |
| Date VOC Trip Blank was made at ARI                                                                | NA    | $\sim$    |    |
| Was Sample Split by ARI : NA YES Date/Time: Equipment:                                             |       | Split by: |    |
| Samples Logged by: TR Date: 12-16-15 Time: 16                                                      | 47    |           |    |

\*\* Notify Project Manager of discrepancies or concerns \*\*

| Sample ID on             | Bottle             | Sample ID on COC  | Sample ID on Bottle                                    | Sample ID on COC |
|--------------------------|--------------------|-------------------|--------------------------------------------------------|------------------|
|                          | 14                 |                   |                                                        |                  |
|                          |                    |                   |                                                        |                  |
|                          |                    |                   |                                                        |                  |
|                          | Discrepancies, & F |                   |                                                        |                  |
|                          |                    |                   |                                                        |                  |
| y:                       | Date:              |                   |                                                        |                  |
| y:<br>.Smell Air Bubbles | Date:              | LARGE Air Bubbles | Small → "sm" (<2 mm)                                   |                  |
|                          |                    | LARGE Air Bubbles | Small → "sm" (<2 mm)<br>Peabubbles → "pb" (2 to <4 mm) |                  |
| Small Air Bubbles        | Pestubbles'        |                   |                                                        |                  |

Revision 014

### Sample ID Cross Reference Report



### ARI Job No: ASW9 Client: KTA Project Event: N/A Project Name: PacifiCorp GW Investigation

|    | Sample ID | ARI<br>Lab ID | ARI<br>LIMS ID | Matrix | Sample Date/Time | VISR           |
|----|-----------|---------------|----------------|--------|------------------|----------------|
| 1. | MW-6      | ASW9A         | 15-24611       | Water  | 12/16/15 10:25   | 12/16/15 15:50 |
| 2. | MW-5      | ASW9B         | 15-24612       | Water  | 12/16/15 11:05   | 12/16/15 15:50 |
| 3. | MW-4      | ASW9C         | 15-24613       | Water  | 12/16/15 12:05   | 12/16/15 15:50 |
| 4. | MW-1      | ASW9D         | 15-24614       | Water  | 12/16/15 12:45   | 12/16/15 15:50 |
| 5. | MW-3      | ASW9E         | 15-24615       | Water  | 12/16/15 13:30   | 12/16/15 15:50 |
| 6, | DUP-GW    | ASW9F         | 15-24616       | Water  | 12/16/15 12:30   | 12/16/15 15:50 |

Printed 12/17/15 Page 1 of 1



Analytical Resources, Incorporated Analytical Chemists and Consultants

### Data Reporting Qualifiers Effective 12/31/13

### **Inorganic Data**

- U Indicates that the target analyte was not detected at the reported concentration
- \* Duplicate RPD is not within established control limits
- B Reported value is less than the CRDL but ≥ the Reporting Limit
- N Matrix Spike recovery not within established control limits
- NA Not Applicable, analyte not spiked
- H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

### Organic Data

- U Indicates that the target analyte was not detected at the reported concentration
- \* Flagged value is not within established control limits
- B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J Estimated concentration when the value is less than ARI's established reporting limits
- D The spiked compound was not detected due to sample extract dilution
- E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Laboratory Quality Assurance Plan

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Analytical Resources, Incorporated Analytical Chemists and Consultants

- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drlft or minimum RRF).</p>
- S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
- NA The flagged analyte was not analyzed for
- NR Spiked compound recovery is not reported due to chromatographic interference
- NS The flagged analyte was not spiked into the sample
- M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
- Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
- EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" (Dioxin/Furan analysis only)
- C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
- P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
- X Analyte signal includes interference from polychlorinated diphenyl ethers. (Dioxin/Furan analysis only)
- Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. (Dioxin/Furan analysis only)

Laboratory Quality Assurance Plan

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Analytical Resources, Incorporated Analytical Chemists and Consultants

### **Geotechnical Data**

- A The total of all fines fractions. This flag is used to report total fines when only sleve analysis is requested and balances total grain size with sample weight.
- F Samples were frozen prior to particle size determination
- SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
- SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
  - Weight of sample in some pipette aliquots was below the level required for accurate weighting

Laboratory Quality Assurance Plan

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ORGANICS ANALYSIS DATA SHEET TOTAL DIESEL RANGE HYDROCARBONS NWTPHD by GC/FID Extraction Method: SW3510C Page 1 of 1

QC Report No: ASW9-KTA Project: PacifiCorp GW Investigation

Date Received: 12/16/15

Matrix: Water

Data Release Authorized: // Reported: 12/21/15

| ARI ID                | Sample           | ID            | Extraction<br>Date | Analysis<br>Date  | efv<br>Df   | Range/Surrogate                                               | RL                   | Result                              |     |
|-----------------------|------------------|---------------|--------------------|-------------------|-------------|---------------------------------------------------------------|----------------------|-------------------------------------|-----|
| MB-121815<br>15-24611 | Method<br>HC ID: |               | 12/18/15           | 12/18/15<br>FID3B | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10<br>< 0.20<br>< 0.20<br>83.2% | 000 |
| ASW9A<br>15-24611     | MW-6<br>HC ID:   | <del>ai</del> | 12/18/15           | 12/18/15<br>FID3B | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10<br>< 0.20<br>< 0.20<br>84.6% | 000 |
| ASW9B<br>15-24612     | MW-5<br>HC ID:   |               | 12/18/15           | 12/18/15<br>FID3B | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10<br>< 0.20<br>< 0.20<br>81.8% | U   |
| ASW9C<br>15-24613     | MW-4<br>HC ID:   |               | 12/18/15           | 12/18/15<br>FID3B | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10<br>< 0.20<br>< 0.20<br>83.3% | U   |
| ASW9D<br>15-24614     | MW-1<br>HC ID:   |               | 12/18/15           | 12/18/15<br>FID3B | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10<br>< 0.20<br>< 0.20<br>86.0% | U   |
| ASW9E<br>15-24615     | MW-3<br>HC ID:   |               | 12/18/15           | 12/18/15<br>FID3B | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10<br>< 0.20<br>< 0.20<br>85.2% |     |
| ASW9F<br>15-24616     | DUP-GW<br>HC ID: |               | 12/18/15           | 12/18/15<br>FID3B | 1.00<br>1.0 | Diesel Range<br>Motor Oil Range<br>Mineral Oil<br>o-Terphenyl | 0.10<br>0.20<br>0.20 | < 0.10<br>< 0.20<br>< 0.20<br>88.8% | U   |

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL. DL-Dilution of extract prior to analysis. RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24. Motor Oil range quantitation on total peaks in the range from C24 to C38. Mineral Oil range quantitation on total peaks in the range from C24 to C38. HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.



ORGANICS ANALYSIS DATA SHEET NWTPHD by GC/FID Page 1 of 1

Lab Sample ID: LCS-121815 LIMS ID: 15-24611 Matrix: Water Data Release Authorized: Reported: 12/21/15

Date Extracted: 12/18/15 Date Analyzed: 12/18/15 16:19 Instrument/Analyst: FID3B/ML Sample ID: LCS-121815 LAB CONTROL

QC Report No: ASW9-KTA Project: PacifiCorp GW Investigation

Date Sampled: NA Date Received: NA

Sample Amount: 500 mL Final Extract Volume: 1.0 mL Dilution Factor: 1.00

| Range  | Lab<br>Control | Spike<br>Added | Recovery |
|--------|----------------|----------------|----------|
| Diesel | 2.37           | 3.00           | 79.0%    |

#### TPHD Surrogate Recovery

o-Terphenyl

86.5%

Results reported in mg/L



#### TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

|                |                | ARI Job: |            | 2.5 |               |
|----------------|----------------|----------|------------|-----|---------------|
| Matrix: Water  | and the second | Project: | PacifiCorp | GW  | Investigation |
| Date Received: | 12/16/15       |          |            |     |               |

| ARI ID              | Client ID    | Samp<br>Amt | Final<br>Vol | Prep<br>Date |
|---------------------|--------------|-------------|--------------|--------------|
| 15-24611-121815MB1  | Method Blank | 500 mL      | 1.00 mL      | 12/18/15     |
| 15-24611-121815LCS1 | Lab Control  | 500 mL      | 1.00 mL      | 12/18/15     |
| 15-24611-ASW9A      | MW-6         | 500 mL      | 1.00 mL      | 12/18/15     |
| 15-24612-ASW9B      | MW-5         | 500 mL      | 1.00 mL      | 12/18/15     |
| 15-24613-ASW9C      | MW-4         | 500 mL      | 1.00 mL      | 12/18/15     |
| 15-24614-ASW9D      | MW-1         | 500 mL      | 1.00 mL      | 12/18/15     |
| 15-24615-ASW9E      | MW-3         | 500 mL      | 1.00 mL      | 12/18/15     |
| 15-24616-ASW9F      | DUP-GW       | 500 mL      | 1.00 mL      | 12/18/15     |
|                     |              |             |              |              |

Diesel Extraction Report



#### TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

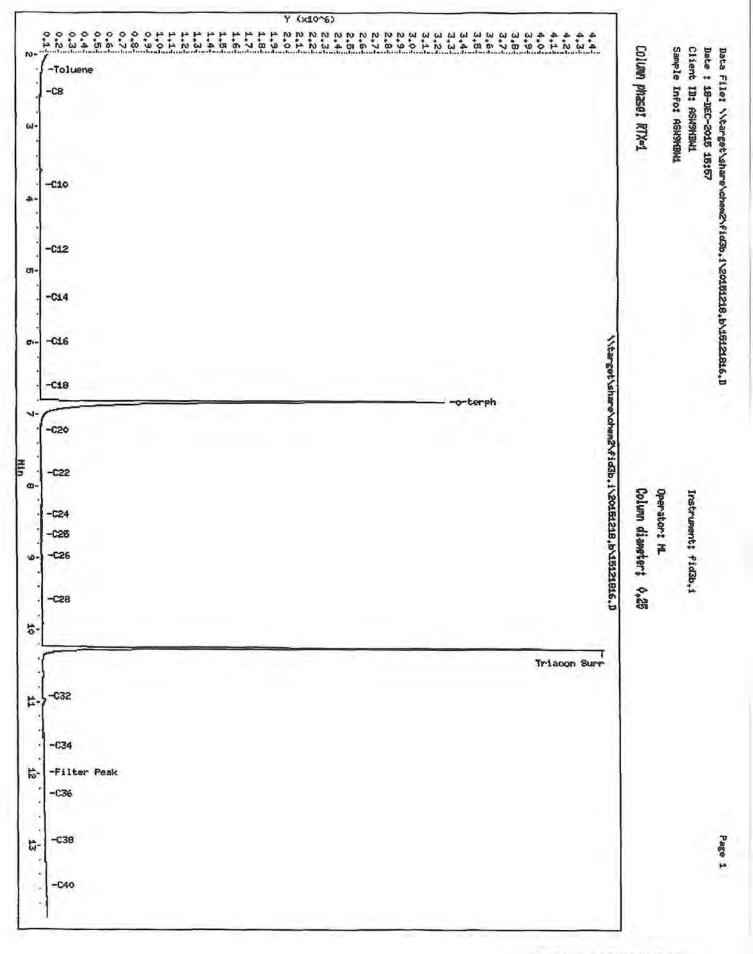
(OTER)

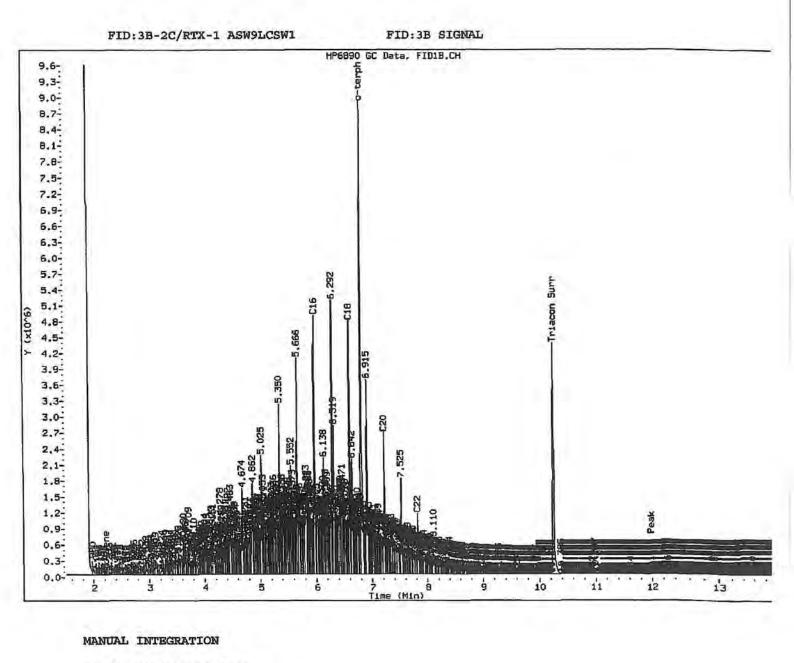
QC Report No: ASW9-KTA Project: PacifiCorp GW Investigation

| Client ID  | OTER  | TOT OUT |
|------------|-------|---------|
| MB-121815  | 83.2% | 0       |
| LCS-121815 | 86.5% | 0       |
| MW-6       | 84.6% | 0       |
| MW-5       | 81.8% | 0       |
| MW-4       | 83.3% | 0       |
| MW-1       | 86.0% | 0       |
| MW-3       | 85.2% | 0       |
| DUP-GW     | 88.8% | 0       |

|               | LCS/MB LIMITS             | QC LIMITS |
|---------------|---------------------------|-----------|
| = o-Terphenyl | (50-150)                  | (50-150)  |
|               | Design Market 1 antorna a |           |

Prep Method: SW3510C Log Number Range: 15-24611 to 15-24616

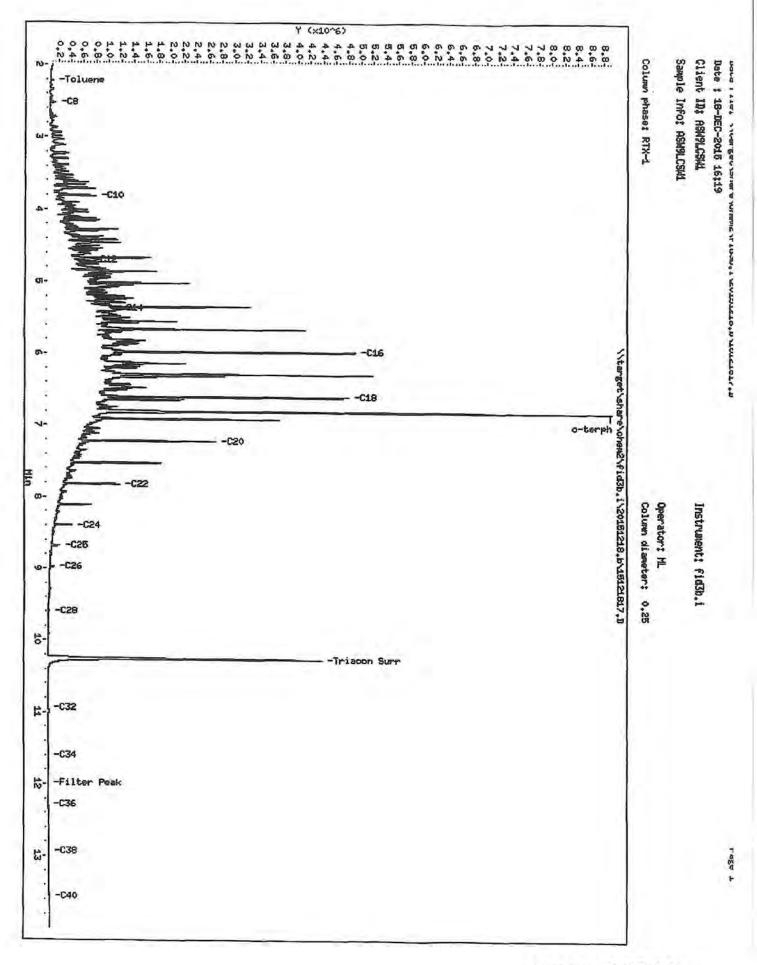


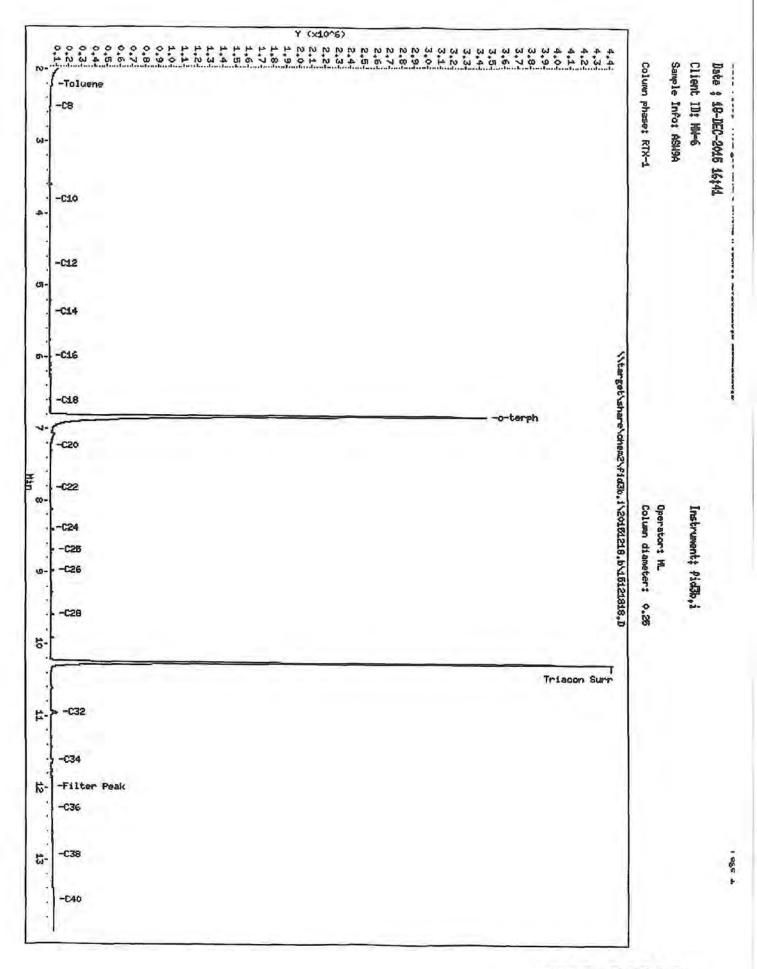


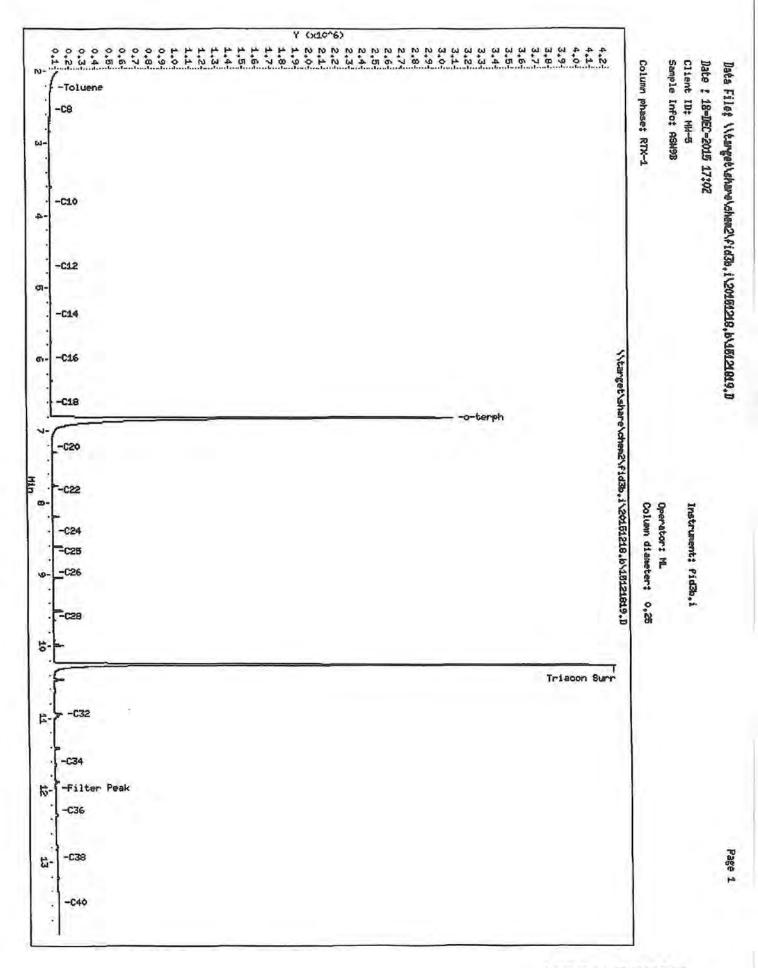
- 1. Baseline correction
- 3. Peak not found
- 5 Skimmed surrogate

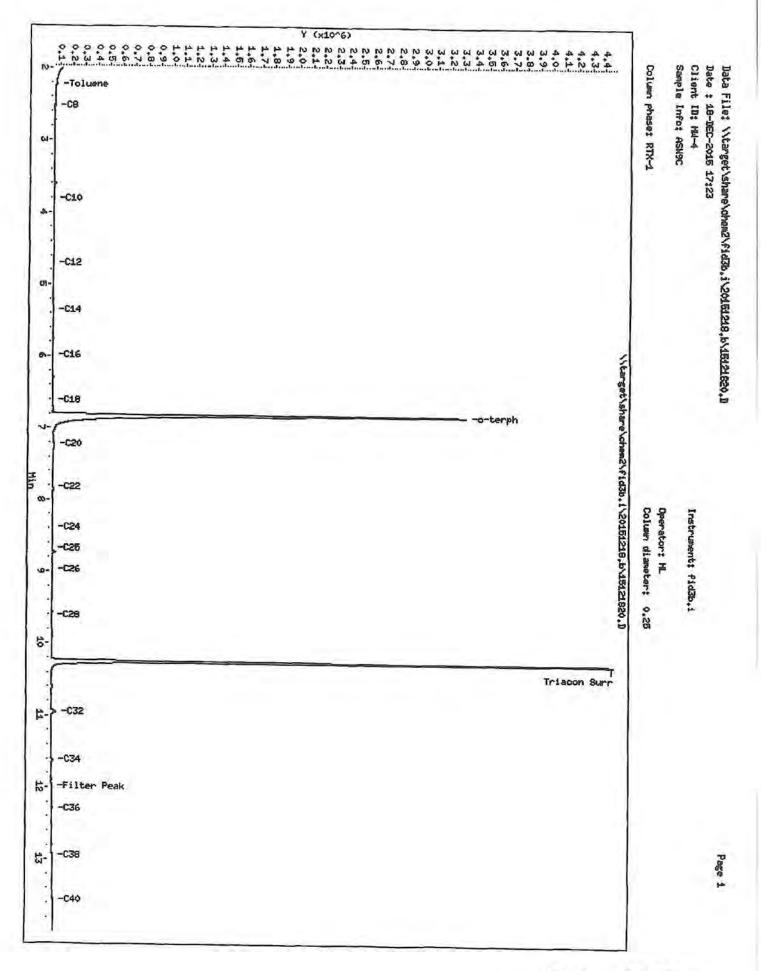
Analyst: ML

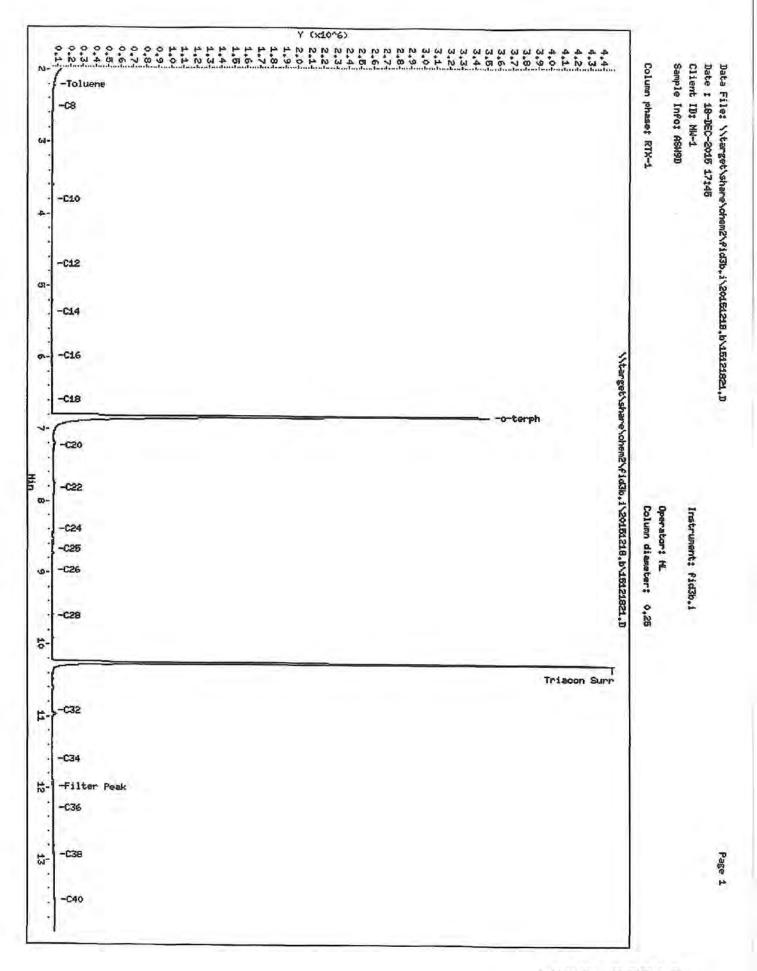
ASW9:00013

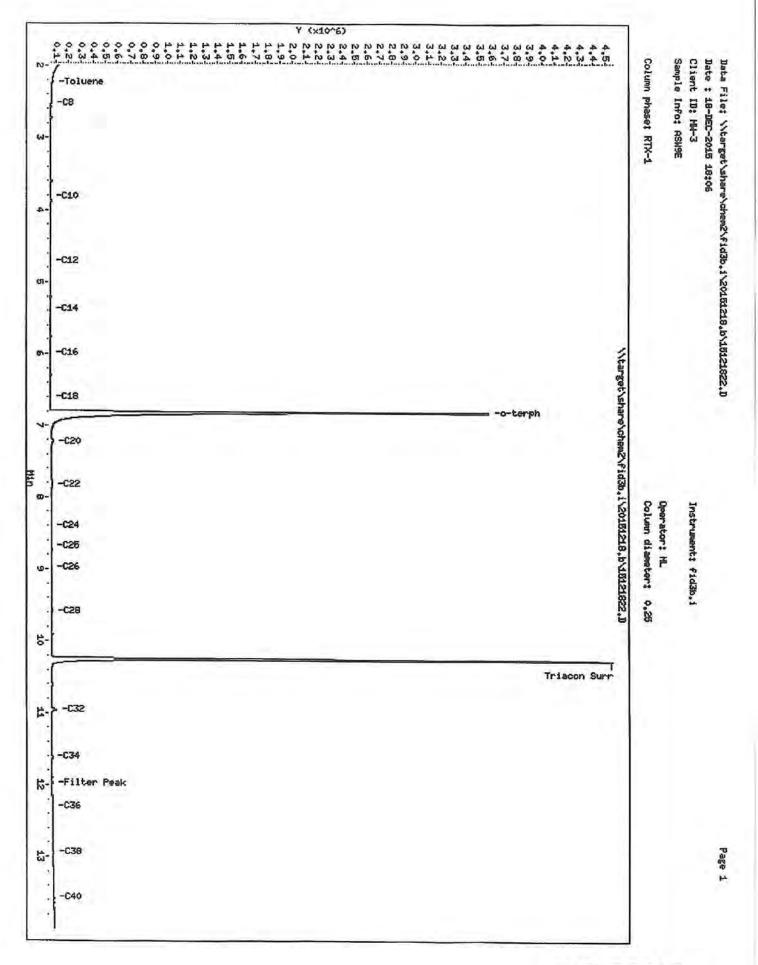


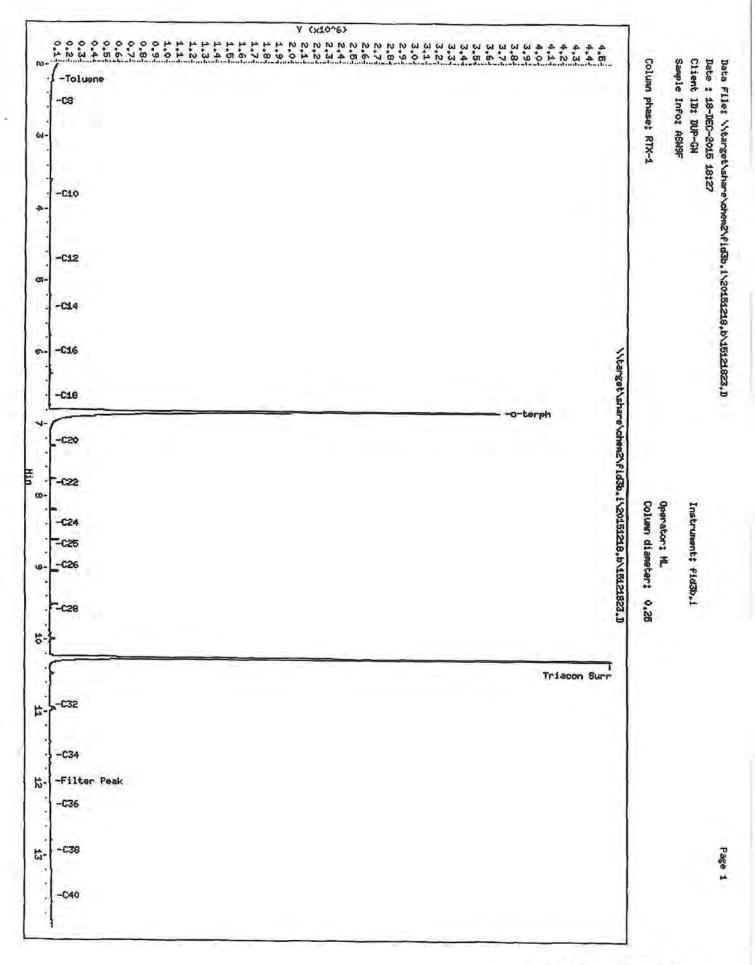












| Field_Collection_<br>Start_Date | Field_Collection_<br>Start_Time | Sample_ID | Sample_M<br>atrix | Sample_Preparation_<br>Method | Result_Parameter_Name | Result_<br>Value | Result_Value_<br>Units | Result_Reporting<br>_Limit | Result_Detection_<br>Limit | Result_Detection_<br>Limit_Type | Result_Data<br>_Qualifier | Result_Method |
|---------------------------------|---------------------------------|-----------|-------------------|-------------------------------|-----------------------|------------------|------------------------|----------------------------|----------------------------|---------------------------------|---------------------------|---------------|
| 12/16/2015                      | 10:25:00                        | MW-6      | Water             | SW3510C                       | Diesel Range Organics | 0.1              | mg/l                   | 0.1                        | 0.03                       | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 10:25:00                        | MW-6      | Water             | SW3510C                       | Mineral Oil           | 0.2              | mg/l                   | 0.2                        | 0.06                       | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 10:25:00                        | MW-6      | Water             | SW3510C                       | Heavy Fuel Oil        | 0.2              | mg/l                   | 0.2                        | 0                          | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 11:05:00                        | MW-5      | Water             | SW3510C                       | Diesel Range Organics | 0.1              | mg/l                   | 0.1                        | 0.03                       | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 11:05:00                        | MW-5      | Water             | SW3510C                       | Mineral Oil           | 0.2              | mg/l                   | 0.2                        | 0.06                       | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 11:05:00                        | MW-5      | Water             | SW3510C                       | Heavy Fuel Oil        | 0.2              | mg/l                   | 0.2                        | 0                          | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 12:05:00                        | MW-4      | Water             | SW3510C                       | Diesel Range Organics | 0.1              | mg/l                   | 0.1                        | 0.03                       | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 12:05:00                        | MW-4      | Water             | SW3510C                       | Mineral Oil           | 0.2              | mg/l                   | 0.2                        | 0.06                       | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 12:05:00                        | MW-4      | Water             | SW3510C                       | Heavy Fuel Oil        | 0.2              | mg/l                   | 0.2                        | 0                          | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 12:45:00                        | MW-1      | Water             | SW3510C                       | Diesel Range Organics | 0.1              | mg/l                   | 0.1                        | 0.03                       | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 12:45:00                        | MW-1      | Water             | SW3510C                       | Mineral Oil           | 0.2              | mg/l                   | 0.2                        | 0.06                       | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 12:45:00                        | MW-1      | Water             | SW3510C                       | Heavy Fuel Oil        | 0.2              | mg/l                   | 0.2                        | 0                          | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 13:30:00                        | MW-3      | Water             | SW3510C                       | Diesel Range Organics | 0.1              | mg/l                   | 0.1                        | 0.03                       | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 13:30:00                        | MW-3      | Water             | SW3510C                       | Mineral Oil           | 0.2              | mg/l                   | 0.2                        | 0.06                       | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 13:30:00                        | MW-3      | Water             | SW3510C                       | Heavy Fuel Oil        | 0.2              | mg/l                   | 0.2                        | 0                          | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 12:30:00                        | DUP-GW    | Water             | SW3510C                       | Diesel Range Organics | 0.1              | mg/l                   | 0.1                        | 0.03                       | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 12:30:00                        | DUP-GW    | Water             | SW3510C                       | Mineral Oil           | 0.2              | mg/l                   | 0.2                        | 0.06                       | MDL                             | U                         | NWTPH-Dx      |
| 12/16/2015                      | 12:30:00                        | DUP-GW    | Water             | SW3510C                       | Heavy Fuel Oil        | 0.2              | mg/l                   | 0.2                        | 0                          | MDL                             | U                         | NWTPH-Dx      |

#### EDD-EIM Data Spreadsheet - KTA Sampling at PacifiCorp, Chehalis WA Data from 3rd Quarterly Sampling Event

#### December 16th, 2015

\*\*Duplicate sample collected at MW-5

#### APPENDIX H

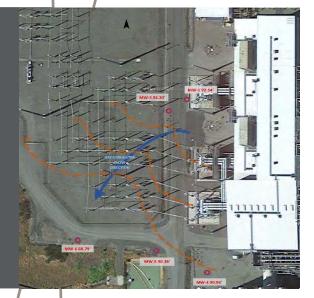
#### GROUNDWATER MONITORING REPORT 4<sup>TH</sup> QUARTERLY EVENT

**MARCH 2016** 



Groundwater Monitoring Report 4<sup>th</sup> Quarterly Event – March 2016 Rocky Mountain Power Division of PacifiCorp Chehalis, WA Plant

Clear Water Services Project 15KTA1



Prepared for KTA Associates, Inc.



KTA Associates, Inc A Professional Environmental Service Corporation

And for Rocky Mountain Power



**April 2016** 

## Groundwater Monitoring Report 4<sup>th</sup> Quarterly Event – March 2016

## **FINAL REPORT**

## Rocky Mountain Power Chehalis, WA Plant

**Clear Water Services Project 15KTA1** 

# April 2016

**Prepared for:** 

**KTA Associates, Inc.** 

And

Rocky Mountain Power Division of PacifiCorp

### **Document Information**

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# Abbreviations and Acronyms

| amsl       | (feet) above mean sea level                           |
|------------|-------------------------------------------------------|
| AST        | above ground storage tank                             |
| bgs        | below ground surface                                  |
| CCS        | Cowlitz Clean Sweep                                   |
| CoC        | chain of custody                                      |
| CWS        | Clear Water Services                                  |
| DO         | dissolved oxygen                                      |
| DOE        | (WA) Department of Ecology                            |
| DOT        | Department of Transportation                          |
| DRO        | Diesel Range Organics                                 |
| GSU        | Generator Set-Up Unit                                 |
| IDW        | investigation-derived waste                           |
| IFP        | interface probe                                       |
| ISGP       | Industrial Stormwater General Permit                  |
| KTA        | KTA Associates, Inc.                                  |
| mg/kg      | milligrams per kilograms (parts per million)          |
| mg/L       | milligrams per liter (parts per million)              |
| MTCA       | Model Toxics Control Act                              |
| MW         | Monitoring Well                                       |
| MWIR       | Monitoring Well Installation and Support Tasks Report |
| PVC        | polyvinyl chloride                                    |
| RMP        | Rocky Mountain Power (Division of PacifiCorp)         |
| RRO        | Residual Range Organics                               |
| SB         | Soil Boring                                           |
| SI         | Site Investigation                                    |
| TPH-Dx     | Total Petroleum Hydrocarbons – Diesel Extended Range  |
| VCP        | Voluntary Clean-up Program (WADoE)                    |
| WAC        | Washington Administration Code                        |
| WADoE      | Washington State Department of Ecology                |
| µg/L       | micrograms per liter (parts per billion)              |
| April 2016 | Clear Water Services                                  |

### 1 Introduction

#### 1.1 **Purpose and Objective**

Clear Water Services (CWS) was contracted by KTA Associates, Inc. (KTA) to conduct a site investigation at PacifiCorp's Rocky Mountain Power (RMP) Chehalis, WA power plant. Site investigation activities focused on the assessment of potential impacts to subsurface soil and shallow groundwater within certain areas of the plant that were previously exposed to Mineral Oil releases in 2011 and 2013. These releases were due to malfunctions with the plant's Generator Step-up Unit (GSU)s #1 and #3. Mineral Oil is used as insulating fluid in these GSU transformers.

The primary objective of this project is to determine if any residual impacts from Mineral Oil releases exists in the subsurface soil and shallow groundwater at concentrations above Washington Department of Ecology's (WADOE) Model Toxics Control Act (MTCA) regulatory limits. Site investigation activities are being conducted under WA DoE's Voluntary Cleanup Program (VCP).

This project is divided into two main phases. The first phase included monitoring well installation, in conjunction with various sampling and support tasks. The outcome of soil boring / monitoring well installation activities and associated environmental sampling results are included within the *Monitoring Well Installation and Support Tasks Report (MWIR)* (Cardno, May 2015).

The second phase of this project involves groundwater monitoring, conducted on a quarterly basis. Previous monitoring events were completed in April, July and December of 2015. The current, and final scheduled, monitoring event was complete in March 2016. This Groundwater Monitoring Report (*GWMR*) details field methods, water level measurements, groundwater table elevations, flow direction assessment and sampling results for the forth quarterly field event. All field efforts, in support of this forth quarterly groundwater monitoring event, were conducted on 22 March, 2016.

#### 1.2 Scope of Work

To meet the above stated objectives, the scope of work for quarterly groundwater monitoring consisted of the following field activities:

- Coordination of pre- (field) mobilization tasks,
- Collection of static groundwater level measurements,
- Sampling of five groundwater monitoring wells,
- Handling of project collected environmental samples,

- Documentation of field activities,
- Containment of investigation derived waste (IDW), and
- Generation of an event-specific groundwater monitoring report.

Prominent site features and well locations are shown on Figure 1.

#### 1.3 Report Organization

This *GWMR* is organized into the following five sections:

- > Section 1.0 Introduction
- > Section 2.0 Site Background
- > Section 3.0 Field Efforts
- > Section 4.0 Analytical Results
- > Section 5.0 References

Discussions regarding the procedures and methods utilized for the groundwater monitoring tasks and subsequent results of the data collected are presented in the main text of this *GWMR*. Health & Safety Tailgate Forms, Monitoring Well Sampling and Water Quality Measurement Forms, Field Notebook entries, and the Analytical Report (along with the electronic data deliverable formatted for submission to WADoE's Environmental Information Management system) are presented as Appendices A through D, respectively.

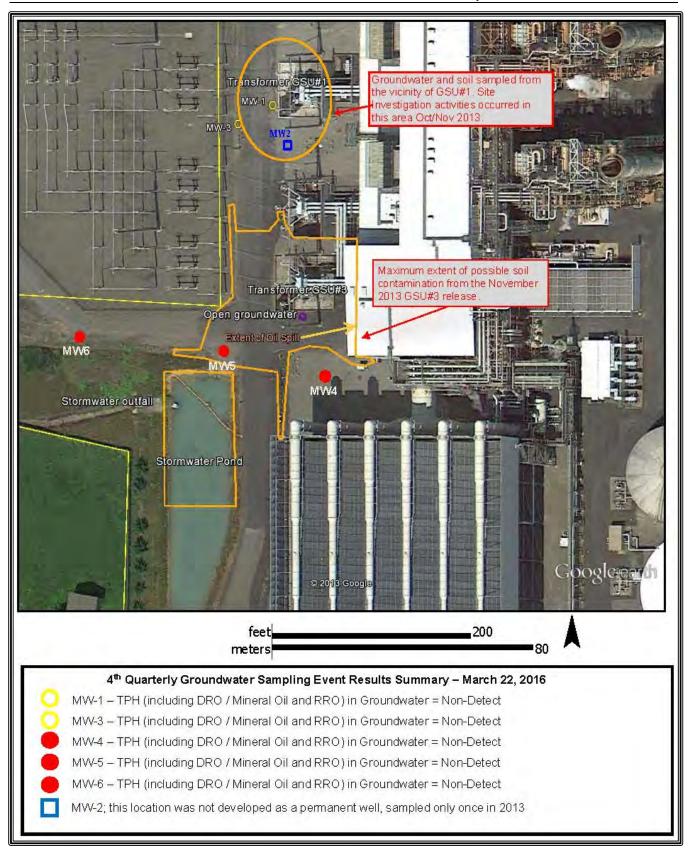


Figure 1. Site Map with Monitoring Well and Prominent Features

### 2 Site Background

#### 2.1 Site Description

Rocky Mountain Power owns and maintains a natural gas-fired combined cycle power plant, which produces 520-megawatts of electricity. The plant is located at 1813 Bishop Road, Chehalis, Washington, in the Chehalis River Valley.

The Chehalis River Valley is considered a rural area, with approximately 7,000 residents living in and around the city. The plant is located 3 miles south of town, which consists mostly of small parks, farms, small pockets of light industrial areas, and a few housing subdivisions.

#### 2.1.1 <u>Geology</u>

The overall soil-type distribution at the site consists of low permeability silt and clay layer underlain by 45 to 50 feet of water-bearing sand and gravel, underlain by a silt and clay aquitard. These soil-types are consistent with regional geologic mapping by Weigle and Foxworthy (1962) and a regional study for the Chehalis Generation facility (Dames and Moore 1994). These regional studies classify the upper 50 feet of soil in the area of the site as recent alluvium and glaciofluvial sediments. The aquitard found at approximately 50 feet bgs is widespread, is often described as blue-gray, clayey silt, and is reported to be more than 100 feet thick (Dames and Moore 1994).

#### 2.1.2 <u>Hydrogeology</u>

The groundwater flow direction beneath the site is assumed to travel south/southwest towards Bishop Road and Berwick Creek. Regional investigations conducted by others (Dames and Moore 1994) have categorized the shallow aquifer in the area as unconfined or semi-confined. However, the shallow aquifer appears to exhibit the characteristics of a confined or semiconfined system, primarily due to the low permeably silt cap immediately above the aquifer.

#### 2.2 Previous Mineral Oil Releases and Site Cleanup Efforts

Cowlitz Clean Sweep (CCS) completed a site cleanup (CCS 2011) at the RMP Chehalis Plant during the months of January through March, 2011. CCS removed floating product from the stormwater pond and ditch lines using oil booms, absorbent material, an oil skimmer and vacuum truck. The stormwater ditch lines were cleaned by removing impacted material down to the clay layer.

CCS sampled affected areas and ditches for analysis to determine the extent of oil contamination; additional soil and water sampling was conducted after cleanup.

The main excavation occurred at or near GSU-1, the first plant transformer that caught fire and subsequently released mineral oil to the surrounding areas. Impacted soil was removed to a depth of six inches below the static groundwater line using olfactory methods (i.e., visual).

During the excavation, free product was noted floating on top of the water and absorbent materials were deployed in the excavation area to remove the product. All excavated materials were loaded onto waiting dump trucks and taken to the Weyerhaeuser transfer station located in Longview, WA for disposal.

Once the excavations had been completed, the area around the GSU-1 transformer was backfilled with clean material and compacted to the required 95% compaction. All ditch lines were relined with clean gravel to prevent sediment loss and water quality issues.

Water collected during excavation activities completed near and around the transformer area was pumped to an on-site 1.7 million gallon diesel above ground storage tank (AST) and the AST containment area.

CCS removed 845 tons of rock and soil and 8,869 gallons of water from affected areas during excavation activities. CCS backfilled the excavations with 92 tons of 2 to 4 inch quarry spalls and 462 tons of 1 ¼" rock to help achieve the required 95% compaction standard.

Most recently, GSU-3 experienced a similar malfunction in late 2013 to the one that occurred at GSU-1 in early 2011. Consequently, this malfunction caused the release of mineral oil around the base of the transformer unit and impacted the surface areas adjacent to it, the roadway and ditches and the area around the southwest corner of the plant building. The management of the release of mineral oil at GSU-3 was approached by RMP and conducted by CCS in a similar fashion to the previous cleanup at GSU-1.

#### 2.3 Previous Site Investigations

A Site Investigation (SI) was completed at the RMP-Chehalis Plant on May 23<sup>rd</sup> through May 25<sup>th</sup>, 2011. The SI was conducted to determine the following:

- If groundwater had been impacted from the mineral oil spill;
- If the water contained in the large AST, which was collected during excavation activities, exceeded any regulatory levels, and;
- If surface water in the stormwater pond had been impacted from the mineral oil spill.

The following activities were completed during the 2011 SI:

- Six temporary monitoring wells were installed and sampled within the shallow water bearing zone;
- Two water samples were collected from the AST at varying depths;
- Two surface water samples were collected from the stormwater pond, and;
- Three surface soil samples were collected downgradient of the mineral oil spill.

The results of the 2011 SI are summarized as follows:

- One groundwater sample (GW-4) had a detection of Mineral Oil at 1100 μg/L, which exceeded the MTCA Method A Groundwater Cleanup Level of 500 μg/L;
- One AST water sample (TS2) had a detection of Mineral Oil at 440 µg/L, which did not exceed the MTCA Method A Groundwater Cleanup Level;
- One surface water sample (SW1) had a detection of Mineral Oil at 360 µg/L, which did not exceed the MTCA Method A Groundwater Cleanup Level, and;
- One soil sample (SG1) had a detection of Mineral Oil at 160 mg/kg, which did not exceed the MTCA Method A Soil Cleanup Level of **4000 mg/Kg**.

Subsequent to the 2011 SI, a follow-up field investigation was undertaken in October and November of 2013. These follow-up tasks were conducted after a review of all field efforts and sampling results to date by WADOE VCP staff. The VCP stakeholders identified two hot spots near GSU#1. With concurrence from WADOE VCP staff, PacifiCorp and KTA agreed to investigate soil and groundwater at these two areas. This was undertaken to characterize the local groundwater flow to determine if the mineral oil released from GSU-1 had any longer-term impacts to the deeper subsurface soils, vadose zone and/or the local shallow groundwater from areas with previously identified concentrations of mineral oil above regulatory limits. The *Groundwater Investigation Report* (Cardno, 2014) presented data from this effort. Main investigative tasks and sampling results contained in this report are summarized below;

The following activities were completed during the 2013 SI:

- Drill, characterize and sample subsurface soil from 3 locations to ~30-feet below grade surface. Soil samples from the borings at SB-1 thru SB-3 were analyzed for mineral oil.
- Install permanent wells at two of the drilling locations, MW-1 and MW-3. Due to utility interferences, a well was not set at the location for MW-2. These activities took place on October 28 and 29, 2013.
- A (relative) survey of the monitoring well casing elevations was conducted to aid in the determination of groundwater flow direction.
- Groundwater was sampled from site wells MW-1 and MW-3. A one-time groundwater sample was collected at MW-2 during the extraction of the drill rods. These activities took place on November 1, 2013 – except for the MW-2 sample, which was collected earlier (10/29/2013).

The results of the 2013 SI are summarized as follows:

- One groundwater sample (MW-2) had a detection of Mineral Oil at 380 μg/L, which is below the MTCA Method A Groundwater Cleanup Level for Diesel Range Organics (DRO) – Mineral Oil of 500 μg/L.
- There were no detections of Mineral Oil in any of the subsurface soil samples.

Following the release of Mineral Oil from GSU#3 in November 2013 and the ensuing site cleanup efforts, RMP continued its environmental protection efforts in conjunction with their ongoing VCP actions. Through cooperative agreements between RMP and WADOE, a site investigation, similar to those previously implemented at the GSU#1 area, was implemented in the areas adjacent to and downgradient from GSU#3. Results of subsurface soil and electrical vault in-flow water sampling are presented in the *MWIR* (Cardno, May 2015). These SI efforts were undertaken on April 7-15, 2015.

The following activities were completed during the 2015 SI:

- Subsurface soil from 3 locations to ~30-feet below grade surface was characterized and sampled. Soil samples from the borings at SB-4 thru SB-6 were analyzed for Northwest Total Petroleum Hydrocarbon – Diesel range extended (NWTPH-Dx) / Mineral Oil.
- Permanent wells were installed at all three 2015 boring locations. These wells are MW-4, MW-5 and MW-6. The three new wells, along with the two previous wells (MW-1 and MW-3) were developed / re-developed. These activities took place on April 7 9, 2015.
- A (relative) elevation survey of the monitoring well casings was conducted to aid in the determination of groundwater flow direction. This was completed on April 15, 2015.
- A one-time sampling event was completed to test in-flow water within four deep electrical vaults adjacent to GSU's #1 and #3. Water samples from these vaults was submitted for NWTPH-Dx / Mineral Oil. These activities took place on April 7, 2015. Figure 2 shows the location of these electrical vaults at the site relative to the GSUs and other site features.

The Results presented in the 2015 *MWIR* are summarized as follows:

- Soil from a depth of 5' bgs collected at SB-5 had a detection of DRO at 6.7 mg/Kg, which is below the MTCA Method A Soil Cleanup Level of **4,000 mg/Kg**.
- Electrical vault in-flow water from EMHM003 had a detection of DRO at 120 µg/L, which is below the MTCA Method A Groundwater Cleanup Level of **500 µg/L**.
- Electrical vault in-flow water from EMHC002 and its Duplicate (DUP-vault) had detections of DRO, both at 110  $\mu$ g/L, which are below the MTCA Method A Groundwater Cleanup Level of **500 \mug/L**.
- Electrical vault in-flow water from EMHC001 had detections of DRO, Mineral Oil and Residual Range Organics (RRO) at 1900 µg/L, 1300 µg/L and 320 µg/L, respectively. DRO and Mineral Oil detections exceed the MTCA Method A Groundwater Cleanup Level, but are, comparatively, below the 10,000 µg/L Industrial Stormwater General Permit (ISGP) Stormwater Benchmark for TPH.

#### Groundwater Monitoring Report 4<sup>th</sup> Quarterly Event – March 2016 Rocky Mountain Power, Chehalis Plant

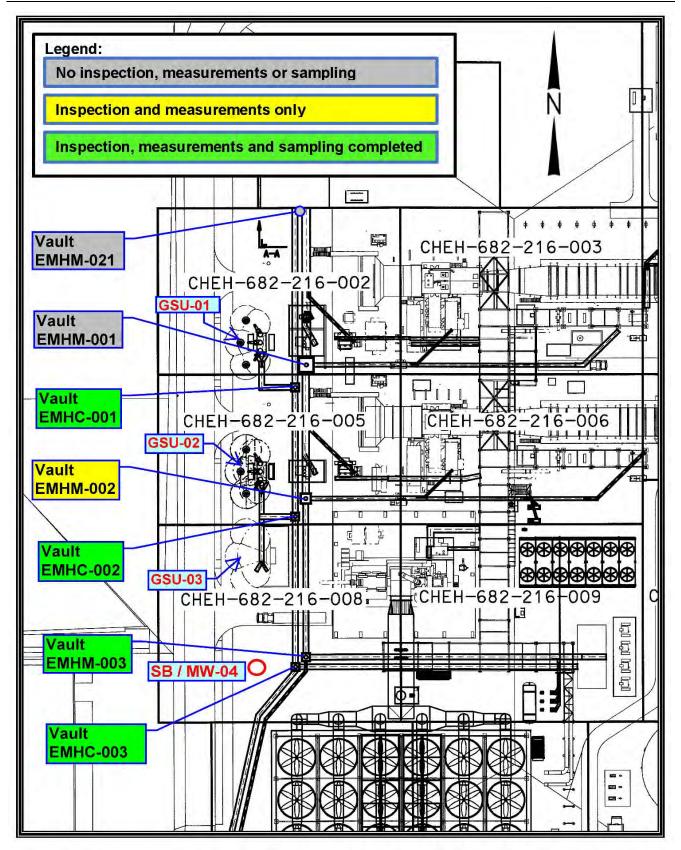


Figure 2. Electrical Vault / In-Flow Water Sampling Locations

## 3 Field Efforts

Section 3 details the field efforts that were employed during the March 2016 quarterly groundwater sampling event and support tasks. These tasks included pre-field mobilization planning, collection of static groundwater level measurements, sampling of five monitoring wells, handling of project collected environmental samples, documentation of field activities and containment of investigation-derived waste (IDW). Any discrepancies between the *Groundwater Investigation and Quarterly Monitoring Work Plan 2015/2016* (Cardno, April 2015) and the actual field methodologies utilized are also described in this section.

### 3.1 Pre-Field Mobilization Planning

The forth quarterly groundwater monitoring event was scheduled for and conducted on March 22, 2016. CWS coordinated the scheduling of this event with RMP and KTA staff to minimize any logistical impacts to plant operations and to the sampling event itself. The overall schedule had been discussed and approved during the planning phase and at the Kick-Off Meeting held on 13 March, 2015. Pre-field mobilization items included consideration of and preparation for health and safety concerns, scheduling staff, coordination with the analytical testing facility and reservation / ordering / procurement / rental of all necessary field sampling equipment, monitoring instruments, personal protective equipment, and field consumables.

Several days prior to initiation of groundwater sampling, CWS was in direct contact with the RMP Environmental / Safety Analyst and the KTA Project Manager to finalize event coordination, site access and to receive the latest health & safety and site condition reports. The laboratory was consulted during this period and an order was placed for the sampling containers, as well as other necessary laboratory supplies. CWS retrieved the containers and supplies directly from the laboratory during mobilization to the RMP site.

#### 3.1.1 <u>Health and Safety</u>

A Site Specific Health and Safety Plan was drafted for the groundwater sampling events and is included as an Appendix to the *Groundwater Investigation and Quarterly Monitoring Work Plan*, *2015/2016* (Cardno, April 2015). CWS adopted the appropriate sections of this plan. At a minimum this Health and Safety Plan provides emergency contact information, routes to the nearest medical and/or aid facilities, site specific work tasks and environmental /physical hazard information. Prior to the initiation of any field tasks, it is a mandatory requirement to conduct a Tailgate Safety Meeting. The purpose of the Tailgate Safety Meetings is to review any expected site specific hazards, general task hazards, current / changed site conditions, to receive a briefing from the RMP site representative, to discuss emergency procedures, and to review the daily work / task schedule. Such a Tailgate meeting was conducted on March 22, 2016, preceding the start of groundwater sampling tasks. A completed Health and Safety Tailgate Meeting Form is included in Appendix A.

#### 3.2 Groundwater Level Measurements and Flow Direction Assessment

Prior to sample collection, each monitoring well was opened and its expansion plug was removed. Ample time was allotted for each well to equilibrate to the current ambient air pressure. An electronic interface probe was used to check for the presence/thickness of any accumulated free-phase hydrocarbon product and to measure the distance from the top edge of the PVC well casing to the surface of the water table (static water level) within each monitoring well. No hydrocarbon product was detected (to a minimum thickness of 0.01') at any of the project wells, or was otherwise visually observed in the purge water, observation well or the collected samples.

The southwest corner of the GSU-1 containment wall was assigned an elevation of 100.00 feet above mean-sea level. A level survey was conducted to accurately determine the elevation of each monitoring well casing, using the assigned elevation of the GSU-1 containment wall corner as a benchmark. Water level measurements were subtracted from their well casing elevations to calculate (relative) elevation of the groundwater table beneath each well location. Site groundwater elevations were highest at MW-1 and lowest at MW-6, at 94.23 and 91.88 feet above mean-sea level (amsl), respectively. On average the water table was 0.69 feet higher than during the previous round of sampling, with the least difference of 0.23 feet (higher) noted at MW-3 and the greatest difference of 1.08 feet (higher) noted at MW-6. Groundwater gradient was 0.0077 ft/ft, or 0.77%. Table 1 lists the well casing elevations, depth to product, static water level measurements and groundwater elevations calculated for this quarterly event.

Groundwater elevation contours were constructed and the flow direction was assessed. As noted during previous sampling rounds, groundwater flow this round was noted to be east to west. A steepening gradient was noted toward the northern end and more even contour spacing was noted toward the southern end of the site. As seen in previous sampling rounds the groundwater table is deflected southwesterly, flowing towards a small stream basin offsite in the same direction. Figure 3 shows the generalized groundwater flow direction along with the elevation contours.

| Location                         | Top PVC Well<br>Casing<br>(ft amsl) | Depth to Product<br>(ft) | Static Water Level<br>Measurements (ft) | Groundwater<br>Elevation (ft amsl) |
|----------------------------------|-------------------------------------|--------------------------|-----------------------------------------|------------------------------------|
| SW corner GSU-1 containment wall | 100.00 <sup>1</sup>                 | NA                       | NA                                      | NA                                 |
| MW-1                             | 97.76                               | Not Detected             | 3.53                                    | 94.23                              |
| MW-3                             | 97.57                               | Not Detected             | 3.98                                    | 93.59                              |
| MW-4                             | 97.64                               | Not Detected             | 3.77                                    | 93.87                              |
| MW-5                             | 97.08                               | Not Detected             | 4.02                                    | 93.06                              |
| MW-6                             | 96.18                               | Not Detected             | 4.30                                    | 91.88                              |

#### Table 1. Water Level Measurements and Groundwater Elevations

<sup>1</sup>All elevations are relative, as they are referenced to the top of the SW corner of the GSU-1 containment wall. This reference location has been assigned an elevation of 100.00' amsl.

#### 3.3 Groundwater Sampling

Groundwater sampling events were scheduled for completion on a quarterly basis. This forth event was completed on March 22, 2016. Previous groundwater sampling events were conducted on (1) April 15<sup>th</sup>, (2) July 8<sup>th</sup>, and (3) December 16<sup>th</sup>, 2015. There are no additional groundwater sampling events scheduled. Groundwater sampling activities were conducted using U.S. Environmental Protection Agency Low-Flow Sampling Techniques (USEPA, 1996, Rev 2010) (where pumping rates are matched to achieve minimal drawdown of the water column during pumping) and WA Department of Ecology (WADOE, 2011) accepted methodology. Groundwater samples at the RMP-Chehalis Plant were collected and analyzed for mineral oil using the Northwest total petroleum hydrocarbons – diesel extended range (NWTPH-Dx) method. Monitoring well locations are presented on Figure 1.

Prior to sampling, all five site monitoring wells were properly and effectively developed / redeveloped on April 9, during the 2015 SI field event. All monitoring wells were allowed to settle and equilibrate for at least three days prior to initial sampling activities. Well construction and development details are included in the MWIR (Cardno, May 2015). Monitoring wells were not re-developed between or prior to quarterly sampling rounds.

A peristaltic pump, setup with dedicated platinum-cured Tygon® tubing, connected to dedicated, Teflon®-lined polyethylene tubing, was used to purge groundwater and to obtain samples at each well location. Monitoring wells were purged until water quality readings had stabilized or a maximum of three casing volumes had been removed. Water quality parameter measurements were recorded during sample purging (stabilization assessment) and included: specific conductivity, temperature, pH, dissolved oxygen (DO) and turbidity. A summary of the final water quality measurements collected prior to sampling are presented in Table 2.

| **Well ID           | Date /<br>Sample<br>Time | Average<br>Purge<br>Rate<br>(ml/min) | Total<br>Purge<br>Volume<br>(gal) | Temp.<br>(C°) | рН   | Sp. Cond<br>(µS/cm) | Turbidity<br>(NTU) | Dissolved<br>Oxygen<br>(mg/L) |
|---------------------|--------------------------|--------------------------------------|-----------------------------------|---------------|------|---------------------|--------------------|-------------------------------|
| MW-1                | 3/22/16<br>(1130)        | 100                                  | 2                                 | 12.2          | 6.69 | 158.7               | 2.7                | 1.82                          |
| <sup>a</sup> DUP-GW | 3/22/16<br>(1600)        | 100                                  | 2                                 | 12.2          | 6.69 | 158.7               | 2.7                | 1.82                          |
| MW-3                | 3/22/16<br>(1250)        | 100                                  | 1.5                               | 11.3          | 6.23 | 115.7               | 8.30               | 2.50                          |
| MW-4                | 3/22/16<br>(1010)        | 100                                  | 1.5                               | 10.3          | 6.63 | 89.6                | 10.9               | 0.51                          |
| MW-5                | 3/22/16<br>(1445)        | 100                                  | 1                                 | 12.0          | 6.51 | 128.9               | 3.9                | 0.95                          |
| MW-6                | 3/22/16<br>(1400)        | 100                                  | 1.5                               | 13.4          | 6.31 | 139.6               | 17.1               | 2.27                          |

**Table 2 Summary of Water Quality Measurements** 

\*\*All wells are 2-inch diameter Sch40 PVC

<sup>a</sup>Duplicate sample was collected at MW-1

Samples were collected from either mid-screen depth or from the middle of the existing water column, depending on which of these two scenarios occurred at the time of sampling. Table 3 lists water sampling information; including parameters, testing methods and number of samples and duplicates. Sampling and water quality information collected at each well included average purge rate, water level, parameter measurements and cumulative volume of groundwater purged from well at each well volume interval. Detailed well measurement, purging and sampling information is contained on the Monitoring Well Sampling and Water Quality Measurement Forms, which are include in Appendix B.

| Sample Type                                 | Analytical  | Sample | Analytical | No. of  | No. of     |
|---------------------------------------------|-------------|--------|------------|---------|------------|
|                                             | Parameter   | Matrix | Method     | Samples | Duplicates |
| Quarterly<br>Groundwater<br>Sampling Events | Mineral Oil | Water  | NWTPH-Dx   | 5       | 1          |

#### Table 3. Groundwater Sample Collection Information

### 3.4 Sample Handling, Field Documentation and Quality Assurance

This section discussed field documentation and procedures used to handle and manage the environmental samples collected for laboratory analysis. Project quality assurance methods are also detailed.

#### 3.4.1 Field Documentation

A logbook was used to document sampling and other support procedures performed during field activities. More specifically, the Field Activities Logbook entries provide a record of specific sample locations and collection information, any subcontractor activities, noting their role(s), describing the major equipment used at each sampling location and providing noteworthy observations, description of problems, or incidents and their resolutions. Completed field forms, planning and safety documents and the Field Activities Logbook were all stored in a weather-proof file box, maintained on site, during all project work activities. Field Activity Logbook entries are included in Appendix C.

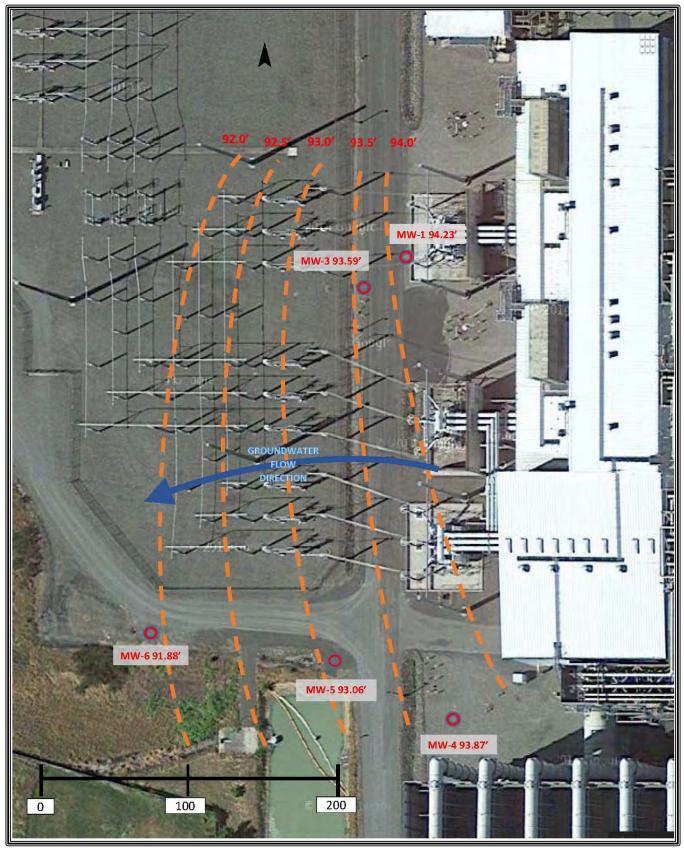


Figure 3. Groundwater Elevations and Flow Direction

#### 3.4.2 Sample Handling Procedures

Disposable nitrile gloves were used by personnel when collecting and handling of any samples. Gloves were changed frequently and in between each sample collection to avoid cross contamination. Samples were collected into certified clean, laboratory supplied containers, with pre-measured amounts of preservatives, as appropriate.

Once the samples were collected they were appropriately labeled and placed into an insulated cooler containing ice. This was done to keep the samples out of the direct sunlight and to maintain a temperature of as close to four degrees centigrade as possible. All project samples were hand-delivered to the contracted laboratory, Analytical Resources, Incorporated (ARI) laboratory in Tukwila, WA.

#### 3.4.2.1 Sample Identification, Labeling and Chain of Custody

Samples were identified by their location and corresponding date of collection. Any quality control samples (e.g. duplicates) were also properly denoted. Sample identification numbers, including sample media type, location number, and other pertinent descriptions were recorded on field sheets completed for each location and sample.

Chain of Custody (CoC) forms, detailing sample container, collection and possession information, were completed and accompanied each cooler shipment from the field to the laboratory. Date, time, sample identification, number of containers, analysis to be performed, and sampler/s in possession were recorded on each CoC. CoC records are included in Appendix D.

#### 3.4.3 **Quality Assurance Methods**

#### 3.4.3.1 Instrument Calibration

All field instruments that required a zeroing and/or a user calibration were appropriately calibrated prior to or at the start of each day's deployment per the instrument manufacturer's instructions. Calibration checks against standards were performed at the beginning and periodically throughout each field day (if necessary / required) to verify equipment operation. Any calibration data was recorded in the field logbook. All calibration media (e.g. gas, liquid or otherwise) was properly stored and managed per manufacturer's recommendations and according to applicable RMP Plant requirements.

#### 3.4.3.2 Decontamination Procedures

Non-disposable equipment (e.g. interface probe) was decontaminated prior to its initial use and after completing a particular sampling or logging task. Decontamination wash consisted of the following:

- > non-phosphate detergent (Alconox) and water wash;
- > tap water rinse; and

- > De-ionized water rinse.
- > Drilling rigs, support vehicles, drill works, connection rods, augers and other large pieces of equipment would be decontaminated by power washing with a high-pressure steam cleaner only as described in Section 4 of the 2015 Project Work Plan (Cardno, April 2015).

Decontamination of appropriate equipment was conducted in the field during this quarterly groundwater sampling round, as specified above.

#### 3.5 Investigation Derived Waste

Investigation-derived waste (IDW) generated during this quarterly groundwater sampling event consisted of excess purge water produced during well pumping, decontamination rinse, and general sampling waste debris (spent gloves, paper, etc.). All purge water was containerized into a Department of Transportation (DOT)-17H approved open head 55-gallon drum. A "common" purge water collection drum was initiated during the first quarterly sampling event in April, 2015. This drum was properly labeled with its media contents, date of generation, location of origin, and contents' owner. The drum was sealed with a solid lid, complete with fitted gasket, which was secured with a bolted band and placed onto a pallet. Purge water from each subsequent sampling round has been added to this "common" drum.

Approximately 9.5 gallons of purge water was generated during this quarterly sampling event. All purge water was placed into the "common" groundwater event drum, which is stored onsite during and between sampling rounds. To date approximately 34 gallons of purge water has been contained in this drum.

The purge water drum/pallet placement was approved by the RMP Environmental / Safety Analyst – Project Manager. The storage location is secure and wholly within the Rocky Mountain Power Chehalis – Plant property boundary. Additional IDW tasks, including testing, further staging, manifesting and disposal are being managed directly by RMP. No IDW was transported off of the site, nor manifested by CWS.

#### 3.6 Project Work Plan Discrepancies

No significant or substantive changes, modifications, or revisions to the Project Work Plan (PWP) (Cardno, April 2015) were instituted, nor were there any discrepancies between the actual field tasks as performed and their description in the PWP. Groundwater sampling, sample management and related event tasks, were conducted and completed in accordance with methodologies as described in the PWP.

## 4 Analytical Results

This section summarizes the results of the groundwater sampling activities completed at the RMP Chehalis Plant on March 22<sup>nd</sup>, 2016. Samples were analyzed for mineral oil using Northwest methods for total petroleum hydrocarbons – diesel extended range (NWTPH-Dx). These results are compared to the appropriate WA DoE MTCA Method A Cleanup Levels (WAC 173-340). The complete analytical report, including the CoC forms and electronic data deliverable summary table, are included in Appendices D-1 and D-2, respectively.

#### 4.1 Comparison of Project Results to Regulatory Guidance

Assessment of mineral oil in groundwater sample data results are compared to permissible values listed for WA DoE MTCA Method A Cleanup Levels for Groundwater (WAC 173-340-720). MTCA's definition of Mineral Oil means non-PCB mineral oil, typically used as an insulator and coolant in electrical devices such as transformers and capacitors measured using NWTPH-Dx. The MTCA Method A Groundwater Cleanup Level for Mineral Oil of **500 µg/L** is based on protection from noncarcinogenic effects during drinking water use. Additional PCB testing requirements listed under the MTCA groundwater section (173-340-720) do not apply to project sampling because RMP can demonstrate that: (1) The release originated from an electrical device that was manufactured after July 1, 1979; or (2) oil containing PCBs was never used in the equipment suspected as the source of the release; or (3) it can be documented that the oil released was recently tested and did not contain PCBs.

#### 4.2 Groundwater Sampling Results

Five groundwater samples, along with one duplicate (duplicate from MW-1) were submitted to ARI Labs for Mineral Oil analysis via NWTPH-Dx. Results are reported as Diesel Range Organics (DRO), Mineral Oil and Residual Range Organics (RRO) / heavy fuel oil / motor oil. DRO quantitation would be noted on chromatograph peaks in the range from C12 to C24. Mineral Oil quantitation would be noted on chromatograph peaks in the range from C16 to C34. RRO quantitation was noted on chromatograph peaks in the range from C24 to C38. Combined, the DRO/RRO results would indicate the total diesel range extended (Dx) identified in a particular sample. Mineral Oil, therefore, is a subset of the total DRO/RRO concentration.

There were no reportable detections of DRO/RRO or Mineral Oil at any of the project tested well locations, including field quality control samples (duplicates), during this quarterly groundwater sampling event. Groundwater sampling results are presented in Table 4.

| Sample ID | Parameter   | Detection Limit<br>µg/L | Reporting<br>Limit μg/L | Result Value<br>µg/L | Data<br>Qualifier |
|-----------|-------------|-------------------------|-------------------------|----------------------|-------------------|
| MW-1      | DRO         | 30                      | 100                     | <100                 | U                 |
| MW-1      | Mineral Oil | 100                     | 200                     | <200                 | U                 |
| MW-1      | RRO         | 60                      | 200                     | <200                 | U                 |
| DUP-GW    | DRO         | 30                      | 100                     | <100                 | U                 |
| DUP-GW    | Mineral Oil | 100                     | 200                     | <200                 | U                 |
| DUP-GW    | RRO         | 60                      | 200                     | <200                 | U                 |
| MW-3      | DRO         | 30                      | 100                     | <100                 | U                 |
| MW-3      | Mineral Oil | 100                     | 200                     | <200                 | U                 |
| MW-3      | RRO         | 60                      | 200                     | <200                 | U                 |
| MW-4      | DRO         | 30                      | 100                     | <100                 | U                 |
| MW-4      | Mineral Oil | 100                     | 200                     | <200                 | U                 |
| MW-4      | RRO         | 60                      | 200                     | <200                 | U                 |
| MW-5      | DRO         | 30                      | 100                     | <100                 | U                 |
| MW-5      | Mineral Oil | 100                     | 200                     | <200                 | U                 |
| MW-5      | RRO         | 60                      | 200                     | <200                 | U                 |
| MW-6      | DRO         | 30                      | 100                     | <100                 | U                 |
| MW-6      | Mineral Oil | 100                     | 200                     | <200                 | U                 |
| MW-6      | RRO         | 60                      | 200                     | <200                 | U                 |

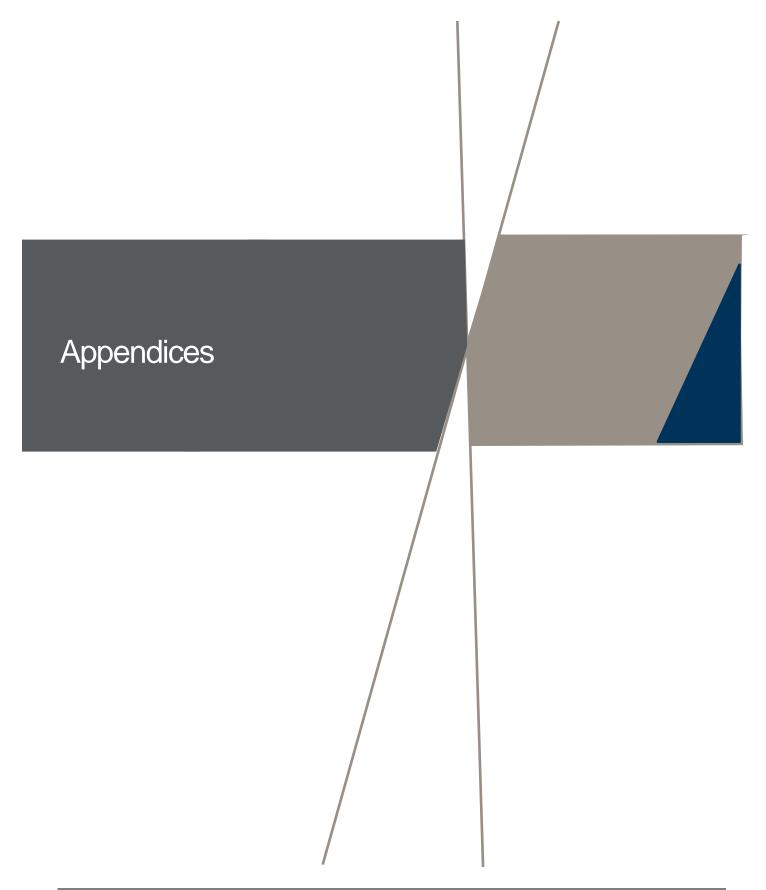
Table 4. Groundwater Sampling Results

U = non-detect Du

Duplicate collected at MW-1

### 5 References

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- Cardno TEC 2014. PacifiCorp Groundwater Investigation (Report), PacifiCorp Chehalis Plant
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- Washington State Department of Ecology (WA DoE) 2007. *Model Toxics Control Act.* Cleanup screening levels for TPH is soil and groundwater.
- WA DoE 2008. Minimum Standards for Construction and Maintenance of Wells. Washington Administration Code 173-160 & 173-162.
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# APPENDIX A HEALTH AND SAFETY TAILGATE FORM

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### Attachment 1 Daily Health and Safety Tailgate Meeting Form

DAILY HEALTH AND SAFETY TAILGATE MEETING FORM Project Health and Safety Manager Conducting Meeting : Date: 3/22/16 Weather: Partly/mostly Sunny,~40-45; Stiff Personnel In Attendance : Dave Metallo Brad Kwasnowski (Cardno) (CLUS) Meeting Minutes (Brief description of topics, special concerns and sites discussed): - Checked/signed in w/ front office steff, speek w/our plant Contact Jeremy Smith - receive lastest update, re: plant a Currier current work tasks, etc. at the site - all good - Hypothermie, windy, cold conditions - Slip-trips-falls - Gw sampling work tasks - PPE (required) - Emerg. rally point (front gate avea) - Electrical hazards/overhead lines Monitoring - Lifting, proper techniques Signature of Attendees' : - Metallo "THE BEST JOB IS ONE DONE SAFELY ! "

### APPENDIX B

### MONITORING WELL SAMPLING AND WATER QUALITY MEASUREMENT FORMS

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## CLEAR WATER SERVICES LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

page 1 of 1

| Project Name:_                  | PacifiCorp Qu          | arterly GV                                                 | / Investigation                | on          | Date: 3                                                                     | 22.201               | 6                   |               |                                  |  |  |
|---------------------------------|------------------------|------------------------------------------------------------|--------------------------------|-------------|-----------------------------------------------------------------------------|----------------------|---------------------|---------------|----------------------------------|--|--|
| Site Name: C                    |                        | LNAPL: Y                                                   |                                | NPL: Y (N)  | _ Depth to Pi                                                               | roduct (ft btoc):    |                     |               |                                  |  |  |
| Sample Location                 |                        | Product Thickness (ft): 0.00 Depth to Water (ft btoc) 3.53 |                                |             |                                                                             |                      |                     |               |                                  |  |  |
| Sampler(s): D                   |                        |                                                            |                                |             | Well Screen Interval: <u>17 - 4.5</u> Mid Screen Depth (ft btoc): <u>10</u> |                      |                     |               |                                  |  |  |
|                                 |                        |                                                            |                                |             |                                                                             |                      | otoc): 16.75        |               |                                  |  |  |
| QC Sample: () N Type: Duplicate |                        |                                                            |                                |             | Purge Style:                                                                | Peristaltic/         | Bladder / Subr      | nersible /Oth | er:                              |  |  |
| Time                            | Purge Rate<br>(ml/min) | Total<br>Purge<br>(gal)                                    | Depth to<br>Water<br>(ft btoc) | Temp.<br>°C | рН                                                                          | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L)  | Comments                         |  |  |
|                                 | Stabiliz               | ation Req                                                  | uirements                      | (±10%)      | (±0.2)                                                                      | (±10%)               | (± 10 %)            | (±10%)        |                                  |  |  |
| 1031                            |                        |                                                            | 13.53                          |             |                                                                             |                      |                     |               | Initial water level, pre-pumping |  |  |
| 1045                            | 100                    | 500 ml                                                     | 5.02                           | 12.1        | 6.75                                                                        | 165.0                | 3.4                 | 3.35          | Pump Speed = 0.5                 |  |  |
|                                 |                        |                                                            |                                | 10 1        | 1 -11                                                                       | 11/1 2               | 05                  | 077           |                                  |  |  |

| 075             |       | 500 mT | 5.02                  | 12.1         | 6.15         | 163.0       | 0.1          | 5.55 | Tump Upeed = U.J |
|-----------------|-------|--------|-----------------------|--------------|--------------|-------------|--------------|------|------------------|
| 1050            | 100   | 500    | 5.35                  | 12.1         | 6.74         | 164.3       | 3.5          | 2.73 |                  |
| 1055            | 100   | 500    | 5.57                  | 12.1         | 6.73         | 162.6       | 3.6          | 2.50 |                  |
| 1100            | 100   | 500    | 5.69                  | 12.2         | 6.72         | 162.2       | 4.2          | 2.30 |                  |
| 1105            | 100   | 500    | 5.76                  | 12.3         | 6.70         | 160.1       | 2.9          | 2.08 |                  |
| 1110            | 100   | 500    | 5.83                  | 12.2         | 6.71         | 160.0       | 2.8          | 1.98 |                  |
| 1115            | 100   | 500    | 5,87                  | 12.2         | 670          | 159.4       | 3.000        | 1.86 |                  |
| 1120            | 100   | 500    | 5.89                  | 12.2         | 6.69         | 158.7       | 2.7          | 1.82 |                  |
|                 |       |        |                       |              |              |             |              |      |                  |
|                 |       |        |                       |              |              |             |              |      |                  |
|                 |       |        | <sup>1</sup> Water Le | evel Measure | ements in th | ese boxes r | nust match ! |      |                  |
| 1130            |       | ~290.1 | 13.53                 | 12.2         | 6.69         | 158.7       | 2.7          | 1.82 | MW-7             |
| (DUP) 1600      |       |        |                       |              |              |             |              |      | DUP-GW           |
| Additional Comm | ents: |        |                       |              |              | o a Mariada |              |      |                  |

# EAR WATER LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

PAGE 1 OF 1

Date: 3.22.2016 Project Name: <u>PacifiCorp Quarterly GW Investigation</u> N\_\_\_ Depth to Product (ft btoc): <u>//A</u> LNAPL: Y \_\_\_\_(N)\_\_\_ DNAPL: Y \_\_ Site Name: Chehalis Plant GSU's Sample Location ID:  $_MW-3$ Product Thickness (ft): 0.00 \_Depth to Water (ft btoc) 3.93Well Screen Interval: 19-4' Mid Screen Depth (ft btoc): <u>1.5</u> Sampler(s): D. Metallo, B. Kwasnowski Pump Intake (ft btoc): <u>11.5</u> Parameters: NWTPH-Dx / Mineral Oil Total Depth (ft btoc): 19.22 Purge Style: (Peristaltic) / Bladder / Submersible /Other:

| Time  | Purge Rate<br>(ml/min) | Total<br>Purge<br>(gal) | Depth to<br>Water<br>(ft btoc) | Temp.<br>°C  | рН          | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L) | Comments                         |
|-------|------------------------|-------------------------|--------------------------------|--------------|-------------|----------------------|---------------------|--------------|----------------------------------|
|       | Stabiliz               | ation Req               | uirements                      | (±10%)       | (±0.2)      | (±10%)               | (± 10 %)            | (±10%)       |                                  |
| 1215  |                        |                         | 13.98                          |              |             |                      |                     |              | Initial water level, pre-pumping |
| 12.20 | 100                    | 500 ml                  | 5.19                           | 11.4         | 6.27        | 124                  | 6.10                | 3.29         | Pump Speed = 0.5                 |
| 1225  | 100                    | 500                     |                                | 11.1         | 6.23        | 116.5                | 8.50                | 2.93         |                                  |
| 1230  | 100                    | 500                     | 7.02                           | 11.0         | 6.22        | 115.4                | 8.70                | 2.82         |                                  |
| 1235  | 100                    | 500                     | 7.76                           | 11.1         | 6.22        | 115.7                | 7.10                | 2.69         |                                  |
| 1240  | 100                    | 500                     | 9.18                           | 11.3         | 6.25        | 115.3                | 8,20                | 2.55         |                                  |
| 1245  | 100                    | 500                     | 9,45                           | 11.3         | 6.23        | 1157                 | 8,30                | 2.50         |                                  |
|       |                        |                         |                                |              |             |                      |                     |              |                                  |
|       |                        |                         | <sup>1</sup> Water Le          | evel Measure | ments in th | lese boxes r         | must match !        |              | I                                |
| 1250  |                        | ~1.592                  | 13.98                          | 11.3         | 6.23        | 115.7                | 8.30                | 2.50         | MW-3                             |
| (DUP) |                        |                         |                                |              |             |                      |                     |              |                                  |

# CLEAR WATER SERVICES LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

| Project Name:_                        | PacifiCorp Qu          | arterly GW              | V Investigation                | on             | Date: 3.3    | 22.16                |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |
|---------------------------------------|------------------------|-------------------------|--------------------------------|----------------|--------------|----------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Site Name: Ch                         | ehalis Plant G         | iSU's                   |                                |                | LNAPL: Y _   | DNA                  | NPL: Y              | _ Depth to Pr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | roduct (ft btoc): NA             |
| Sample Location ID: <u>MW - 4</u>     |                        |                         |                                |                | Product Thic | kness (ft): <u>(</u> | ).00 De             | pth to Water                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | (ft btoc) 3.77'                  |
| Sampler(s): D. Metallo, B. Kwasnowski |                        |                         |                                |                | Well Screen  | Interval: 2:         | 5 <b>-5</b> Mi      | d Screen Dep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | oth (ft btoc):_/4.80 ′           |
| Parameters: N                         |                        |                         | Pump Intake                    | e (ft btoc): 🤳 | <b>5'</b> To | tal Depth (ft b      | otoc): 24.80'       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |
| QC Sample: Y                          | N Type:                | AN                      |                                | (10)           | Purge Style: | Peristaltic/         | Bladder / Subr      | nersible /Oth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | er:                              |
| Time                                  | Purge Rate<br>(ml/min) | Total<br>Purge<br>(gal) | Depth to<br>Water<br>(ft btoc) | Temp.<br>°C    | рН           | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Comments                         |
|                                       | Stabiliz               | ation Req               | uirements                      | (±10%)         | (±0.2)       | (±10%)               | (± 10 %)            | (±10%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                  |
| 0930                                  |                        |                         | 13.77                          |                |              |                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Initial water level, pre-pumping |
| 0940                                  | 100                    | 500                     | 3.88                           | 10.0           | 6.69         | 91.3                 | .                   | 2.56                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Pirmp Speed = 0,5                |
| 0945                                  | 100                    | 500                     | -                              | 9.7            | 6.65         | 89.9                 | 11.1                | 1.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |
| 0950                                  | 100                    | 500                     | 3,96                           | 10.3           | 6.63         | 89.9                 | 11.6                | 0.66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |
| 0955                                  | 100                    | 500                     | 3.98                           | 10.3           | 664          | 89.5                 | 11-1                | 0.54                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |
| 1000                                  | 100                    | 500                     |                                | 10.3           | 6.63         | 89.6                 | 11-1                | 0.51                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |
| 1005                                  | 100                    | 500                     | 3.98                           | 10.3           | 6.63         | 89.6                 | 10.9                | 0.51                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |
|                                       |                        |                         |                                |                |              |                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |
|                                       |                        |                         | -                              |                |              |                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |
|                                       | ×                      |                         | <sup>1</sup> Water Le          | evel Measur    | ements in th | lese boxes r         | nust match !        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |
| 1010                                  |                        | ~1.59                   | 13:77                          | 10.3           | 6-63         | 89.6                 | 10.9                | 0.51                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | MW-4                             |
| (DUP)                                 |                        |                         |                                |                |              |                      |                     | The state of the s |                                  |

# CLEAR WATER LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

| Project Name: PacifiCorp Quarterly GW Investigation | Date: 3.22.2016                                                           |  |  |  |  |
|-----------------------------------------------------|---------------------------------------------------------------------------|--|--|--|--|
| Site Name:Chehalis Plant GSU's                      | LNAPL: Y (N) DNAPL: Y (N) Depth to Product (ft btoc): ////                |  |  |  |  |
| Sample Location ID:                                 | Product Thickness (ft): $O.00$ Depth to Water (ft btoc) $4.02$            |  |  |  |  |
| Sampler(s): D. Metallo, B. Kwasnowski               | Well Screen Interval: <u>25-5</u> Mid Screen Depth (ft btoc): <u>15-3</u> |  |  |  |  |
| Parameters:NWTPH-Dx / Mineral Oil                   | Pump Intake (ft btoc): <u>15</u> Total Depth (ft btoc): <u>25.29</u>      |  |  |  |  |
| QC Sample: Y /N Type:                               | Purge Style: Peristaltic/ Bladder / Submersible /Other:                   |  |  |  |  |
| Total Depth to                                      |                                                                           |  |  |  |  |

PAGE 1\_ OF 1\_

| Time  | Purge Rate<br>(ml/min) | Total<br>Purge<br>(gal) | Depth to<br>Water<br>(ft btoc) | Temp.<br>°C  | рН           | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L) | Comments                         |
|-------|------------------------|-------------------------|--------------------------------|--------------|--------------|----------------------|---------------------|--------------|----------------------------------|
|       | Stabiliz               | ation Req               | uirements                      | (±10%)       | (±0.2)       | (±10%)               | (± 10 %)            | (±10%)       |                                  |
| 1414  |                        |                         | 14.02                          |              |              |                      |                     |              | Initial water level, pre-pumping |
| 1420  | 100                    | 500 ml                  | 4.17                           | 12.8         | 6.51         | 129.2                | 3.7                 | 1.59         | Pump Speed = 0.5                 |
| 1425  | 100                    | 500                     | 4.17                           | 12.6 DM      | 6.51         | 128.9                | 3.5                 | 1.15         |                                  |
| 1430  | 100                    | 500                     |                                | 12.5         | 6.50         | 129.0                | 4.0                 | 1.00         |                                  |
| 1435  | 100                    | 500                     | 4.19                           | 12.0         | 6.51         | 128.9                | 3.8                 | 0.97         |                                  |
| 1440  | 100                    | 500                     | 4.26                           | 12.6         | 6.51         | 128.9                | 3.9                 | 0.95         |                                  |
|       |                        |                         | _                              |              |              |                      | , .<br>             |              |                                  |
|       |                        |                         |                                |              |              |                      |                     |              |                                  |
|       |                        |                         |                                |              |              |                      |                     |              |                                  |
|       |                        |                         |                                |              |              |                      |                     |              |                                  |
|       |                        |                         |                                |              |              |                      |                     | 1            |                                  |
|       |                        |                         |                                | evel Measure | ements in th | nese boxes i         | must match !        |              | · ·                              |
| 1445  |                        | Igal                    | 14.02                          | 12.0         | 6.51         | 128.9                | 3.9                 | 0,95         | MW-5                             |
| (DUP) |                        |                         |                                |              |              |                      |                     |              |                                  |

# CLEAR WATER SERVICES LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

page <u>1</u> of <u>1</u>

| Project Name:                         | / Investigation                       | on                      | Date: 3-22-2016                |              |                                                          |                      |                     |                 |                                  |
|---------------------------------------|---------------------------------------|-------------------------|--------------------------------|--------------|----------------------------------------------------------|----------------------|---------------------|-----------------|----------------------------------|
| Site Name: <u>Ch</u>                  |                                       |                         |                                |              | LNAPL: Y (N) DNAPL: Y (N) Depth to Product (ft btoc): NA |                      |                     |                 |                                  |
| Sample Location ID:                   |                                       |                         |                                |              |                                                          |                      |                     | pth to Water    | (ft btoc) <u>4.30</u>            |
| Sampler(s): D. Metallo, B. Kwasnowski |                                       |                         |                                |              | Well Screen                                              | Interval: 2          | <u>5-5'</u> Mic     | d Screen Dep    | oth (ft btoc): <u>15</u>         |
| Parameters: NWTPH-Dx / Mineral Oil    |                                       |                         |                                |              | Pump Intake                                              | (ft btoc):           | <u>15'</u> Tot      | tal Depth (ft b | toc): 25.10                      |
| QC Sample: Y                          | / N Type:                             | NA                      | 2                              |              | Purge Style:                                             | Peristaltic/         | Bladder / Subn      | nersible /Othe  | ər:                              |
| Time                                  | Purge Rate<br>(ml/min)                | Total<br>Purge<br>(gal) | Depth to<br>Water<br>(ft btoc) | Temp.<br>°C  | рН                                                       | Sp. Cond.<br>(µS/cm) | Turbidity<br>(NTUs) | DO<br>(mg/L)    | Comments                         |
|                                       | Stabiliz                              | ation Req               | uirements                      | (±10%)       | (±0.2)                                                   | (±10%)               | (± 10 %)            | (±10%)          |                                  |
| 1320                                  |                                       |                         | 14,30                          |              |                                                          |                      |                     |                 | Initial water level, pre-pumping |
| 1330                                  | 100                                   | 500 ml                  | -                              | 12.0         | 6.31                                                     | 139.5                | 11.9                | 2.45            | Pump Speed = 0.5                 |
| 1335                                  | 100                                   | 500                     | 4.50                           | 12.3         | 6.31                                                     | 139.6                | 11.8                | 2.28            |                                  |
| 1340                                  | 100                                   | 500                     |                                | 12.8         | 6.32                                                     | 139.6                | 12.4                | 2.30            |                                  |
| 1345                                  | 100                                   | 500                     | 4.50                           | 13.2         | 6.32                                                     | 139.4                | 16.1                | 2.24            |                                  |
| 1350                                  | 100                                   | 500                     |                                | 13.2         | 6.31                                                     | 140,1                | 16.8                | 2.26            |                                  |
| 1355                                  | 100                                   | 500                     | 4.52                           | 13:4         | 6-31                                                     | 139.6                | 17.1                | 2.27            |                                  |
|                                       |                                       | N - 4                   |                                |              |                                                          |                      |                     |                 |                                  |
|                                       |                                       |                         |                                |              |                                                          |                      |                     |                 |                                  |
|                                       |                                       |                         |                                |              |                                                          |                      |                     |                 |                                  |
|                                       | · · · · · · · · · · · · · · · · · · · |                         |                                |              |                                                          |                      |                     |                 |                                  |
|                                       |                                       | ·                       | <sup>1</sup> Water Le          | evel Measure | ements in th                                             | ese boxes r          | nust match !        |                 |                                  |
| 1400                                  |                                       | 1.5                     | 1 4.30                         | 13.4         | 6.31                                                     | 139.6                | 17.1                | 2.27            | MW-6                             |
| (DUP) NA                              |                                       |                         |                                |              |                                                          |                      |                     |                 | eductor class HighEld            |

# APPENDIX C FIELD LOGBOOK ENTRIES

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3-22-16 PacifiCorp 2016 4th Quarterly GW Sampl. Event 51 - Dave Motallo w/ Clear Water Services - Brad Kwasnowski w/ Cardno - Weather: Partly Cloudy w/ Sun breaks, 43° at 0830 arrival, strong westerly breeze - Left Cardwo Shop at ~0650, mobilize down to ARI Lebs in Tukwila, WA to pickup analytical bottles, COC's, etc. - Mob south to Pac filorp site in Chehalis, WA - Arrived ~ 0830 0900 - Signed in at front desk - Spoke w/ Jeremy Smith - Env Mag. - Received plant update / safety briefing From Jereny - Signed out Plant Radio #9 - Mob back around west side of plant to set up on Manitoring well's wear GSU'S 14-3 - Conduct on-site Tailgate Health " Safety Meeting b/w Metallo & Kwasnowski \* See Tailgate Hars form for details - Dem n

| 52 Pacifi Corp 2016 4th Oterly Event                                                                          | · PacifiCorp 2016 4th Qt Event 3.22.16                                                                  |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| - Multimeter Water Quality measurement =<br>instrument is a VSI Pro DDS unit<br>Sonde = 14L103125 626909 - 10 | many the work and I                                                                                     |
| havd set = 14m101509 Geotech # 5011                                                                           | • - MW-1 (1035)                                                                                         |
| · rental from Geotech in Kirkland, WA =                                                                       |                                                                                                         |
| - Readied Sampling gear, meters,                                                                              | · Smpl Intake Doth= 10.5'                                                                               |
| - Readied Sampling gear, meters,<br>paperwork, bottles, supplies, etc.                                        | - Jell - Jumps nele + 100 m1/min                                                                        |
| - * Purge Water; common 55-gal<br>drum (used since Oteunt #1) has been                                        |                                                                                                         |
| drum (used Since Oteunt #7) has been                                                                          | Time Temp pH Spland Turb DO                                                                             |
| place on south side of GSU#3 mean                                                                             | 1130 12.2 6.69 158.7 2.7 1.82                                                                           |
| - MW-4 (0930)                                                                                                 | * Dul to Sail Due Civi (1100)                                                                           |
| - Dpth to Prod. = NA Thickness = 0.00'                                                                        | - Clean up around well head, load gear                                                                  |
| • Dpth to Water = 3.77' TD = 24.80'                                                                           | move to next well                                                                                       |
| · Smpl. Intake Dpth = 15'                                                                                     |                                                                                                         |
| · Peri-pump rate = 100 m1/min                                                                                 | - Jeverny and Lewisra Westbrook are or                                                                  |
| · Total Purge Vol. = 1.5 gals                                                                                 | <ul> <li>Jeverny and Lensra Westbrook are of<br/>site to inspector today's event. Discussion</li> </ul> |
| - Final WQ Readings:                                                                                          |                                                                                                         |
| - Final WQ Readings:<br>Time Temp pH SP.Cond Turb The DO Mg/L<br>1010 10.3 6.63 89.6 10.9 0.51                |                                                                                                         |
| 1010 10.3 6.63 89.6 10.9 0.51                                                                                 |                                                                                                         |
| · Smpl ID = MW-4 Time = (1010)                                                                                |                                                                                                         |
|                                                                                                               | Rite in the Rain                                                                                        |
|                                                                                                               | Rile in the Rais                                                                                        |

PacifiCorp 2016 4th Oter GW EVNT PacifiCorp 2016 4th Oterly 3.22.16 GW EVNt 54 3.22.16 55 - MW-3 (1215) - MW-5 (1409) . Dpth to Prot = NA Thickness = 0.00 · Dpth to Prod = NA Prod. Thickness = 0.00 , Dpth to Wtr = 3.98 TD = 19.22 · Dpth to Wtr = 4.02 TD = 25.29' · Smpl Intake Dpth = 11.5 · Smpl. Intake Depth = 15' · Peri-pump Rete = 100 mi/min · Peri - pump Rate = 100 ml/min · Tot. Purge Vol. = 1.5 gal · Total Purge Vol = ~/gal · Final WQ Readings : · Final WQ Readings : SP. Cond Turb Time Temp PH Do Time Temp pH Sp Cond. Turb DO 6.23 115.7 8.30 2.50 1250 11.3 1445 12.0 6.51 128.9 3.9 0.95 Smp/ ID = MW-3 Smp/ Time = (1250) Smpl ID = MW-5 Smpl. Time (1445) - Clean up around site, mob to vert site - Clean up around the site, powered off multi-meter - clean meter -MW-6 (1318) and place it back in its case. · Dath to Prod = NA Prod. Thickness = 0.00' Cleen/decon IFP (cleaned b/w · Dpth to Wtr = 4.30' P TD = 25.10' wells and prior to use today). · Smpl Intake Dpth = 15' · Peri - Pump Rate = 100 ml/min - Packaged Samples for transport, · Total Purge Vol. = 1.5 gals checked labels, place into insulated · Final WQ Readings: Time Temp pH Sp. Cond. Turb Coolers Will take Samples to ARI Labs Do In Tukevila, WA. 1400 13.4 6.31 139.6 17.1 2.27 Smpl. ID = MW-6 Smpl. Time (1400) - Emptied remaining Parge / decon water into staged 55-gal drum. - clean up around well, mob to mext location. DCM-Dem Rite in the Rain.

3.22.16 PacifiCorp 2016 4th derily Gw Event 3.22.16 56 PacifiCorp 2016 4th Qterly GWEvent 57 - Today's event generated ~ 9.5/10 gallons - thoroughly iced samples, added water of process water. This brings the total to provid an ice-bath. Added cushioning drum contents from (4) Gu sampling meterial to provide additional safety events to ~ 34 gals. The Collection for transport to ARI Labs. Seal cooler Drum was re-sealed w/ its lid, gasket and steel bolted band. - Completed & QC'ed C.O.C. Form - Mob back to Lab., arrived ~ (1700) - Reviewed Coc w/ Sample Recing Staff - Note: Conducted visual inspection of open observation well at the south ----side of GSU#3, Several times today. · Signed Custody over to ARI (1704) · Coder/Sample Temp. = 4.6°C No visual Sheen and for oil only droplets were Noted/observed. Water in the well was clear and the bottom was visible, - Mobied to Cardno-GS Shop to drop off geor and clear out var. - Mobied around to Admin Office after packing geor into van and readying contents for travel. Returned plant radio to control room. Touched base w/ Jeremy Smith, conducted an event - mail · Notified Lemora Westbrook that the Samples had been submitted to the lab. debrief. Signed out in Visitor Log 4th Qterly GW Sampling Completed (~1515)DCM-- Leave site and head to convenience store to purchase additional ice for samples Dem Rite in the Rain

# APPENDIX D ANALYTICAL REPORT (D-1)

And

### ELECTRONIC DATA DELIVERABLE SUMMARY (D-2)

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01 April 2016

Lenora Westbrook KTA Associates, Inc 800 Fifth Avenue Suite 4100 Seattle, WA 98104

RE: PacifiCorp GW Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s) Associated SDG ID(s)

16C0025

N/A

-----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the reqirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

Mark Harris, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6201

Analytical Chemists and Consultants **Analytical Resources, Incorporated** 4611 South 134th Place, Suite 100 206-695-6200 206-695-6201 (fax) Notes/Comments Tukwila, WA 98168 www.arilabs.com Printed Name Date & Time Received by (Signature) Company. Analysis Requested Relinguished by Printed Name Cooler 4, 6 Temps: 4, 6 Date & Time (Signature) Company Present? 5 3-22-16 1705 Meri MWTPh No. of Coolers: Page: Date & Time **3-22-16** ( ~ 7 ちたい DX D t No Containers Printed Name Chain of Custody Record & Laboratory Analysis Request (Signature) Received by Bamphers. D. Metallo B. Kwasnuwski 5 2 2 3 2 0 KTA. INC. 300-250-7694 Turn-around Requested Of and a rd Client Project Name: Reifi Corp GW INVESTIGATION Matrix Clear Water Services 1704 3 3 3 3 3 3 Dave Metallo 3 22.16 1600 3 22.16 1445 3.22-16 1400 3.22-16 1250 1130 Time 3.22.16 1010 Date & Time 3 - 22 - 16 ( Client Contact: LeNora Westbrock 3.22.16 Date Relinguished (Signature) Comments/Special Instructions 2002 Sample ID ARI Assigned Number ARI Client Company: DuP-GW MM- MW NW - S MW-H MW-3 Client Project #: MW-1

id services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or comits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program sets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for ned agreement between ARI and the Client. Page 2 of 36

mple Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate ention schedules have been established by work-order or contract

| Analytical Resources, Incorporated<br>Analytical Chemists and Consultant                                                   | Cooler Rece                                                                   | eipt Fo                   | orm     |       |
|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------|---------|-------|
| ARI Client: KTA INC,<br>COC No(s): N<br>Assigned ARI Job No: 16C0025<br>Preliminary Examination Phase:                     | Project Name: Parcifico<br>NA Delivered by: Fed-Ex UPS Courie<br>Tracking No: | F Hand Deliver            |         | gutin |
| Were intact, properly signed and dated custody seals a                                                                     | attached to the outside of to cooler?                                         | YE                        | s NO    | >     |
| Were custody papers included with the cooler?                                                                              |                                                                               | YE                        | S NO    | -     |
| Were custody papers properly filled out (ink, signed, etc<br>Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °<br>Time: | c.)<br>°C for chemistry) 4,6                                                  | YE                        | NO      |       |
| If cooler temperature is out of compliance fill out form 0                                                                 |                                                                               | ——     ——<br>Temn Gun ID# | 0005276 | ,     |
|                                                                                                                            |                                                                               | 1705                      |         |       |
| Complete custor                                                                                                            | dy forms and attach all shipping documents                                    |                           |         |       |
| Log-In Phase:                                                                                                              |                                                                               | · · · ·                   | ·····   | -     |
| Was a temperature blank included in the cooler?                                                                            | bble With Wet Ice Gel Packs Baggies Foam Bl                                   | oćk Paper Oth             | YES NO  |       |
| Was sufficient ice used (if appropriate)?                                                                                  |                                                                               | NA C                      | YES NO  |       |
| Were all bottles sealed in individual plastic bags?                                                                        |                                                                               |                           | YES NO  |       |
| Did all bottles arrive in good condition (unbroken)?                                                                       |                                                                               |                           | NO NO   |       |
| Were all bottle labels complete and legible?                                                                               |                                                                               | (                         | YES NO  |       |
| Did the number of containers listed on COC match with                                                                      | the number of containers received?                                            |                           | YES NO  |       |
| Did all bottle labels and tags agree with custody papers                                                                   |                                                                               | (                         | YES NO  |       |
| Were all bottles used correct for the requested analyses                                                                   | s?                                                                            | (                         | YES NO  |       |
| Do any of the analyses (bottles) require preservation? (a                                                                  | attach preservation sheet, excluding VOCs)                                    | NA                        | YES NO  |       |
| Were all VOC vials free of air bubbles?                                                                                    |                                                                               |                           | YES NO  |       |
| Was sufficient amount of sample sent in each bottle?                                                                       |                                                                               | $\smile$                  | NO NO   |       |

| Date VOC Trip Blank was made at A     | RI  |                       | (NA) |
|---------------------------------------|-----|-----------------------|------|
| Was Sample Split by ARI : 🖓           | YES | Date/Time: Equipment: |      |
| Samples Logged by: $\_ T \mathcal{R}$ |     | Date: 3.23-16Time     | 0924 |

\*\* Notify Project Manager of discrepancies or concerns \*\*

| Sample ID on Bottle           | Sample ID on COC        | Sample ID on Bottle                    | Sample ID on COC |
|-------------------------------|-------------------------|----------------------------------------|------------------|
|                               |                         |                                        |                  |
|                               | ,                       |                                        |                  |
|                               |                         |                                        |                  |
| <u>,</u> )                    |                         |                                        |                  |
| Additional Notes, Discrepanci | es, & Resolutions:      | ······································ |                  |
|                               | æ                       |                                        |                  |
|                               |                         |                                        |                  |
|                               |                         |                                        |                  |
| By: D                         | ate:                    |                                        |                  |
| Small Air Bubbles Pesbub      | bles' LARGE A'r Bubbles | Small $\rightarrow$ "sm" (< 2 mm)      |                  |
| = 2mm 2-4 m                   | m>4 <i>m</i> m          | Peabubbles → "pb" (2 to < 4 mm)        |                  |
| · · • • •                     | . 890                   | Large $\rightarrow$ "lg" (4 to < 6 mm) |                  |
|                               |                         | Headspace → "hs" (>6 mm)               |                  |

Split by:\_

|                             | ANALYTICAL REPORT FOR SAMPLES        |                   |
|-----------------------------|--------------------------------------|-------------------|
| Seattle WA, 98104           | Project Manager: Lenora Westbrook    | 01-Apr-2016 09:29 |
| 800 Fifth Avenue Suite 4100 | Project Number: [none]               | Reported:         |
| KTA Associates, Inc         | Project: PacifiCorp GW Investigation |                   |

| Sample ID | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-----------|---------------|--------|-------------------|-------------------|
| MW-4      | 16C0025-01    | Water  | 22-Mar-2016 10:10 | 22-Mar-2016 17:05 |
| MW-1      | 16C0025-02    | Water  | 22-Mar-2016 11:30 | 22-Mar-2016 17:05 |
| MW-3      | 16C0025-03    | Water  | 22-Mar-2016 12:50 | 22-Mar-2016 17:05 |
| MW-6      | 16C0025-04    | Water  | 22-Mar-2016 14:00 | 22-Mar-2016 17:05 |
| MW-5      | 16C0025-05    | Water  | 22-Mar-2016 14:45 | 22-Mar-2016 17:05 |
| DUP-GW    | 16C0025-06    | Water  | 22-Mar-2016 16:00 | 22-Mar-2016 17:05 |
|           |               |        |                   |                   |

Analytical Resources, Inc.



KTA Associates, Inc 800 Fifth Avenue Suite 4100 Seattle WA, 98104 Project: PacifiCorp GW Investigation Project Number: [none] Project Manager: Lenora Westbrook

**Reported:** 01-Apr-2016 09:29

These analyses proceeded without incident of note.

Analytical Resources, Inc.



| KTA Associates, Inc         | Project: PacifiCorp GW Investigation |           |  |  |  |  |
|-----------------------------|--------------------------------------|-----------|--|--|--|--|
| 800 Fifth Avenue Suite 4100 | Project Number: [none]               | Reported: |  |  |  |  |
| Seattle WA, 98104           | 01-Apr-2016 09:29                    |           |  |  |  |  |
| MW-4                        |                                      |           |  |  |  |  |
|                             | 16C0025-01 (Water)                   |           |  |  |  |  |
| Petroleum Hydrocarbons      |                                      |           |  |  |  |  |
| Method: NWTPH-Dx            |                                      |           |  |  |  |  |

| nstrument: FID4 Analyzed: 29-Mar-2016 13:27 |                                          |               |          |           |           |        |       |       |
|---------------------------------------------|------------------------------------------|---------------|----------|-----------|-----------|--------|-------|-------|
| Sample Preparation:                         | Preparation Method: EPA 3510C Separation | atory Funnel  |          |           |           |        |       |       |
|                                             | Sample Size: 50                          | 00 mL         |          |           |           |        |       |       |
|                                             | Prepared: 25-Mar-2016                    | Final Volume: | l mL     |           |           |        |       |       |
|                                             |                                          |               |          | Detection | Reporting |        |       |       |
| Analyte                                     |                                          | CAS Number    | Dilution | Limit     | Limit     | Result | Units | Notes |
| Diesel Range Organics (C12                  | 2-C24)                                   |               | 1        | 0.03      | 0.10      | ND     | mg/L  | U     |
| Motor Oil Range Organics (                  | (C24-C38)                                |               | 1        | 0.06      | 0.20      | ND     | mg/L  | U     |
| Mineral Oil Range Organics                  | s (C16-C28)                              |               | 1        | 0.10      | 0.20      | ND     | mg/L  | U     |
| Surrogate: o-Terphenyl                      |                                          |               |          |           | 50-150 %  | 87.6   | %     |       |

Analytical Resources, Inc.

# Data File: \\target\share\chem2\fid4a.i\20160329.b\16032908.D Date : 29-MAR-2016 13:27 Client ID: MW-4 Sample Info: 16C0025-01

Column phase: RTX-1

#### Instrument: fid4a.i

Operator: ML Column diameter: 0.25

|                                                                               | ramin pridoct inti |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
|-------------------------------------------------------------------------------|--------------------|------|-------|--------------|------|----------|---------------------------------------|---------------------------------------|-------------|--------------|-------------|--------------|------------------------------|------|-------------|--------|-------------|
| а <i>и</i> ·                                                                  |                    |      |       |              | 11.  | target\: | share∖cher<br>⊢ c                     | ∩2\fid4a.i                            | 1\2016032   | 9,b\16032    | :908.D      | ,            |                              |      |             |        |             |
| 9,4÷<br>9,2÷                                                                  |                    |      |       |              |      |          | o-terph                               |                                       |             |              |             | Triacon Surr |                              |      |             |        |             |
| 9.2-<br>9.0-                                                                  |                    |      |       |              |      |          | t                                     |                                       |             |              |             | и<br>С       |                              |      |             |        |             |
| l 8₊8÷                                                                        |                    |      |       |              |      |          | 6                                     |                                       |             |              |             | _ ð          |                              |      |             |        |             |
| 8.6-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             | [ ē          |                              |      |             |        |             |
| 8.4                                                                           |                    |      |       |              |      |          |                                       |                                       |             |              |             | ⊢            |                              |      |             |        |             |
| 8.4<br>8.2<br>7.8<br>7.6<br>7.4<br>7.4<br>7.2<br>6.8<br>6.6                   |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 8.0-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 7 6                                                                           |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 7.4                                                                           |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 7.2                                                                           |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 7.0-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 6.8-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 6.6                                                                           |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 6.4-<br>6.2-                                                                  |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 6,2-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 5.8-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 5.6-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 5,4                                                                           |                    |      |       |              |      |          | 1                                     |                                       |             |              |             |              |                              |      |             |        |             |
| 5,2-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| ធ្ល 5₊0                                                                       |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 6.0                                                                           |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 8 4.6                                                                         |                    |      |       |              |      |          |                                       |                                       |             |              |             | h            |                              |      |             |        |             |
| × 4.4                                                                         |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| × 4,2-                                                                        |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 4.0-<br>3.8-<br>3.6-<br>3.4<br>3.2-<br>2.8<br>2.6<br>2.4<br>2.4<br>2.2<br>2.0 |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 3.6-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 3.4-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 3.2-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 3.0-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 2,8                                                                           |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 2,6-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 2+4-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 2.0                                                                           |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 1.8-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 1.8-<br>1.6-                                                                  |                    |      |       |              |      |          |                                       |                                       |             |              |             |              |                              |      |             |        |             |
| 1.4-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             | Ű            | ¥                            |      |             |        |             |
| 1,2                                                                           |                    |      |       |              |      |          |                                       |                                       |             |              |             |              | ě                            |      |             |        |             |
| 1,0-                                                                          |                    |      |       |              |      |          |                                       |                                       |             |              |             |              | <u>c</u>                     |      |             |        |             |
| 1.4<br>1.2<br>1.0<br>0.8<br>0.6                                               |                    | 0    | N     | <del></del>  | .0   | m        |                                       | N                                     |             | 10 10        | 8<br>0<br>1 | <u>и</u> Л   | 6 1<br>4<br>4                | ω    | 0           |        |             |
| 0.6-                                                                          | Ϋ́                 | -C10 | -012  | -014         | -016 | -C18     | l s                                   | -022                                  |             | -C26<br>-C26 | Ŷ           |              | -C34<br>-Filter Peak<br>-C36 | 8C)- | -040<br>040 |        |             |
| , ** · · -                                                                    | A                  |      | ····· | . : <u>.</u> |      |          | · · · · · · · · · · · · · · · · · · · | _                                     | <del></del> |              | بمم الم     | إلربيني      |                              |      |             |        | <del></del> |
|                                                                               | 2                  | 3    | 4     |              | 5    |          | 6                                     | , , , , , , , , , , , , , , , , , , , |             | 8            | 9           |              | 10                           | 1    | 1           | <br>12 |             |
|                                                                               |                    |      |       |              |      |          |                                       | Min                                   |             |              |             |              |                              |      |             |        |             |

Page 1

#### Analytical Resources Inc. TPH Quantitation Report

 Data file: 20160329.b/16032908.D
 ARI ID: 16C0025-01

 Method: 20160329.b/FID4TPH.m
 Client ID: MW-4

 Instrument: fid4a.i, ML
 Injection: 29-MAR-2016 13:27

 Report Date: 03/30/2016
 Dilution Factor: 1

 Macro: 15-MAR-2016
 Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

| Compound     | RT        | Shift  | FII<br>Height                          | :4A RESUI<br>Area | JTS<br>Method                          | Range                                 | Total Area                             | Conc          |
|--------------|-----------|--------|----------------------------------------|-------------------|----------------------------------------|---------------------------------------|----------------------------------------|---------------|
| Toluene      | <br>1.664 | 0.003  | ====================================== | <br>5905          | -===================================== | (Tol-C12)                             | ====================================== | =====<br>3.47 |
| C8           | 1.902     | -0.009 | 803                                    | 1201              |                                        | (C12-C24)                             | 116133                                 | 5.60          |
| C10          | 3.018     | 0.000  | 1043                                   | 1290              |                                        | (C24-C38)                             | 156832                                 | 9.63          |
| C12          | 3.815     | -0.015 | 1018                                   | 4344              |                                        | (C10-C25)                             | 159652                                 | 6.46          |
| C14          | 4.484     | -0.021 | 562                                    | 1955              |                                        | (,                                    |                                        |               |
| C16          | 5.121     | 0.017  | 560                                    |                   | OR.DIES                                | (C10-C28)                             | 210272                                 | 8.46          |
| C18          | 5.702     | -0.019 | 552                                    | 2664              | İ                                      | , , , , , , , , , , , , , , , , , , , |                                        |               |
| C20          | 6.355     | -0.017 | 760                                    | 1383              | Ì                                      |                                       |                                        |               |
| C22          | 6.971     | -0.044 | 1162                                   | 8268              | MIN.OIL                                | (C16-C28)                             | 297636                                 | 12.13         |
| C24          |           |        |                                        |                   | 1                                      |                                       |                                        |               |
| C25          | 7.953     | 0.024  | 614                                    | 1109              | Ì                                      |                                       |                                        |               |
| C26          | 8.231     | 0.012  | 563                                    | 1896              | CA ORO (                               | C23-C32)                              | 2342674                                | 180.58        |
| C28          | 8.753     | 0.002  | 12460                                  | 16087             |                                        |                                       |                                        |               |
| C32          | 9.682     | 0.016  | 4872                                   | 19553             |                                        |                                       |                                        |               |
| C34          | 10.088    | 0.013  | 1436                                   | 8424              |                                        |                                       |                                        |               |
| Filter Peak  | 10.264    | 0.001  | 964                                    | 3625              | CREOSOT                                | (C12-C22)                             | 93237                                  | 4.62          |
| C36          | 10.481    | 0.014  | 1254                                   | 3325              | 1                                      |                                       |                                        |               |
| C38          | 10.854    | 0.009  | 1226                                   | 4335              | 1                                      |                                       |                                        |               |
| C40          | 11.234    | 0.016  | 1195                                   | 10262             | 1                                      |                                       |                                        |               |
| o-terph      | 5.902     | -0.003 | 924371                                 | 1097633           | 1                                      |                                       |                                        |               |
| Triacon Surr | 9.236     | -0.002 | 854941                                 | 927624            | NAS DIES                               | (C10-C24)                             | 155511                                 | 6.30          |
| Range Times: |           |        | ====================================== |                   |                                        |                                       | ====================================== | 5)            |

| Surrogate   | Area    | Amount | %Rec |
|-------------|---------|--------|------|
|             |         |        |      |
| o-Terphenyl | 1097633 | 39.4   | 87.6 |
| Triacontane | 927624  | 37.9   | 84.1 |

#### M Indicates the peak was manually integrated

| Analyte      | RF      | Curve Date  |
|--------------|---------|-------------|
| o-Terph Surr | 27860.2 | 09-MAR-2016 |
| Triacon Surr | 24501.7 | 15-MAR-2016 |
| Gas          | 24336.2 | 24-FEB-2016 |
| Diesel       | 20753.0 | 15-MAR-2016 |
| Motor Oil    | 16287.0 | 15-MAR-2016 |
| AK102        | 24728.0 | 15-MAR-2016 |
| Min Oil      | 24546.8 | 29-MAR-2016 |
| OR Diesel    | 24858.0 | 15-MAR-2016 |
| NAS Diesel   | 24665.0 | 15-MAR-2016 |
| Bunker C     | 12969.0 | 14-MAR-2016 |
| Creosote     | 20176.0 | 29-FEB-2016 |
| CA ORO       | 12973.0 | 14-MAR-2016 |



| KTA Associates, Inc                        | Project: PacifiCorp GW Investigation |           |
|--------------------------------------------|--------------------------------------|-----------|
| 800 Fifth Avenue Suite 4100                | Project Number: [none]               | Reported: |
| Seattle WA, 98104                          | 01-Apr-2016 09:29                    |           |
|                                            | MW-1<br>16C0025-02 (Water)           |           |
| Petroleum Hydrocarbons<br>Method: NWTPH-Dx |                                      |           |

| Instrument: FID4           |                                                                    | Analyzed: 29-Mar-2016 13:50 |          |           |           |        |       |       |
|----------------------------|--------------------------------------------------------------------|-----------------------------|----------|-----------|-----------|--------|-------|-------|
| Sample Preparation:        | ample Preparation: Preparation Method: EPA 3510C Separatory Funnel |                             |          |           |           |        |       |       |
|                            | Preparation Batch: BEC0042                                         | Sample Size: 50             | 00 mL    |           |           |        |       |       |
|                            | Prepared: 25-Mar-2016                                              | Final Volume: 1             | mL       |           |           |        |       |       |
|                            |                                                                    |                             |          | Detection | Reporting |        |       |       |
| Analyte                    |                                                                    | CAS Number                  | Dilution | Limit     | Limit     | Result | Units | Notes |
| Diesel Range Organics (C12 | 2-C24)                                                             |                             | 1        | 0.03      | 0.10      | ND     | mg/L  | U     |
| Motor Oil Range Organics ( | C24-C38)                                                           |                             | 1        | 0.06      | 0.20      | ND     | mg/L  | U     |
| Mineral Oil Range Organics | s (C16-C28)                                                        |                             | 1        | 0.10      | 0.20      | ND     | mg/L  | U     |
| Surrogate: o-Terphenyl     |                                                                    |                             |          |           | 50-150 %  | 90.9   | %     |       |

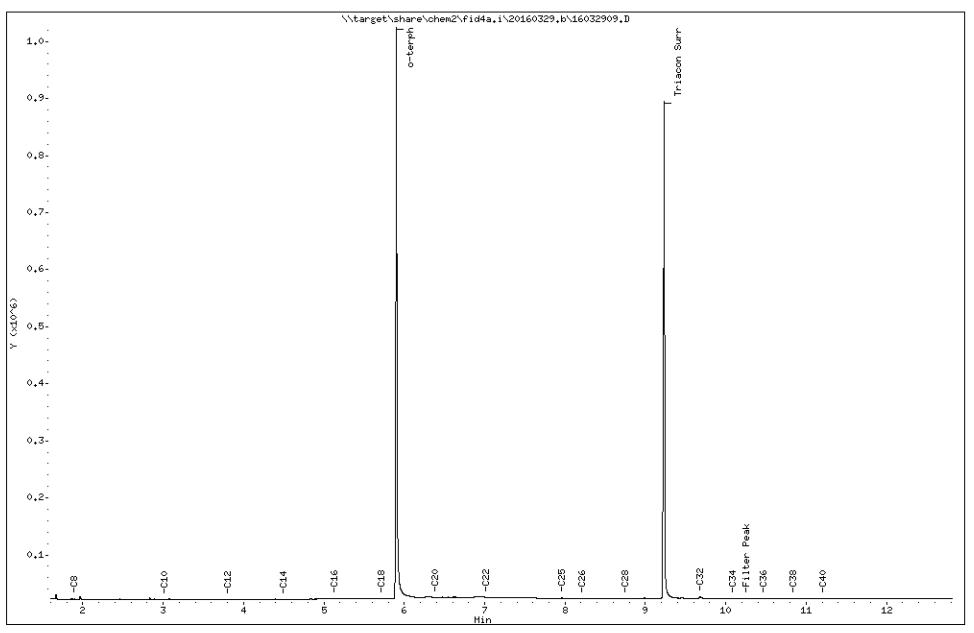
Analytical Resources, Inc.

# Data File: \\target\share\chem2\fid4a.i\20160329.b\16032909.D Date : 29-MAR-2016 13:50 Client ID: MW-1 Sample Info: 16C0025-02

Column phase: RTX-1

#### Instrument: fid4a.i

Operator: ML Column diameter: 0.25



Page 1

#### Analytical Resources Inc. TPH Quantitation Report

 Data file: 20160329.b/16032909.D
 ARI ID: 16C0025-02

 Method: 20160329.b/FID4TPH.m
 Client ID: MW-1

 Instrument: fid4a.i, ML
 Injection: 29-MAR-2016 13:50

 Report Date: 03/30/2016
 Dilution Factor: 1

 Macro: 15-MAR-2016
 Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

|              |                    |           | FIL                                    | :4A RESUI | LTS        |             |                                        |        |
|--------------|--------------------|-----------|----------------------------------------|-----------|------------|-------------|----------------------------------------|--------|
| Compound     | RT                 | Shift     | Height                                 | Area      | Method     | Range       | Total Area                             | Conc   |
| Toluene      | 1.665              | 0.004     | 8768                                   | <br>6693  |            | (Tol-C12)   | <br>62980                              | 2.59   |
| C8           | 1.901              | -0.009    | 980                                    | 1370      | WATPHD     | (C12-C24)   | 401761                                 | 19.36  |
| C10          | 3.017              | -0.000    | 500                                    | 670       | WATPHM     | (C24-C38)   | 251875                                 | 15.46  |
| C12          | 3.811              | -0.019    | 674                                    | 2413      | AK102      | (C10-C25)   | 446941                                 | 18.07  |
| C14          | 4.505              | 0.001     | 514                                    | 701       | 1          |             |                                        |        |
| C16          | 5.141              | 0.037     | 1087                                   | 3612      | OR.DIES    | (C10-C28)   | 519769                                 | 20.91  |
| C18          | 5.716              | -0.004    | 1853                                   | 2371      | 1          |             |                                        |        |
| C20          | 6.385              | 0.013     | 4140                                   | 5949      | 1          |             |                                        |        |
| C22          | 7.018              | 0.003     | 4163                                   | 19544     | MIN.OIL    | (C16-C28)   | 634836                                 | 25.86  |
| C24          |                    |           |                                        |           | 1          |             |                                        |        |
| C25          | 7.963              | 0.033     | 2781                                   | 21651     | 1          |             |                                        |        |
| C26          | 8.220              | 0.001     | 1542                                   | 7759      | CA ORO (   | C23-C32)    | 2746261                                | 211.69 |
| C28          | 8.750              | -0.001    | 1780                                   | 2394      | 1          |             |                                        |        |
| C32          | 9.682              | 0.016     | 4626                                   | 26216     | 1          |             |                                        |        |
| C34          | 10.090             | 0.016     | 1339                                   | 8493      |            |             |                                        |        |
| Filter Peak  | 10.257             | -0.006    | 1404                                   | 3197      | CREOSOT    | (C12-C22)   | 314265                                 | 15.58  |
| C36          | 10.474             | 0.006     | 1293                                   | 2868      | 1          |             |                                        |        |
| C38          | 10.849             | 0.003     | 1382                                   | 3050      |            |             |                                        |        |
| C40          | 11.213             | -0.005    | 1483                                   | 3876      |            |             |                                        |        |
| o-terph      | 5.903              | -0.002    | 1002914                                | 1140051   |            |             |                                        |        |
| Triacon Surr | 9.235              | -0.003    | 873568                                 | 955437    | NAS DIES   | (C10-C24)   | 424915                                 | 17.23  |
| Range Times: | ========<br>NW Die | esel(3.83 | ====================================== | AK102     | (3.02 - 7. | 93) Jet A(3 | ====================================== | ====   |
|              | NW M.              | Oil(7.63  | - 10.85)                               | AK103(7   | 7.93 - 10. | 47) OR Dies | sel(3.02 - 8.7                         | 5)     |

| Surrogate   | Area    | Amount | <sup>⊗</sup> Rec |
|-------------|---------|--------|------------------|
|             |         |        |                  |
| o-Terphenyl | 1140051 | 40.9   | 90.9             |
| Triacontane | 955437  | 39.0   | 86.7             |

#### M Indicates the peak was manually integrated

| Analyte      | RF      | Curve Date  |
|--------------|---------|-------------|
| o-Terph Surr | 27860.2 | 09-MAR-2016 |
| Triacon Surr | 24501.7 | 15-MAR-2016 |
| Gas          | 24336.2 | 24-FEB-2016 |
| Diesel       | 20753.0 | 15-MAR-2016 |
| Motor Oil    | 16287.0 | 15-MAR-2016 |
| AK102        | 24728.0 | 15-MAR-2016 |
| Min Oil      | 24546.8 | 29-MAR-2016 |
| OR Diesel    | 24858.0 | 15-MAR-2016 |
| NAS Diesel   | 24665.0 | 15-MAR-2016 |
| Bunker C     | 12969.0 | 14-MAR-2016 |
| Creosote     | 20176.0 | 29-FEB-2016 |
| CA ORO       | 12973.0 | 14-MAR-2016 |



| KTA Associates, Inc         | Project: PacifiCorp GW Investigation |                             |
|-----------------------------|--------------------------------------|-----------------------------|
| 800 Fifth Avenue Suite 4100 | Project Number: [none]               | Reported:                   |
| Seattle WA, 98104           | Project Manager: Lenora Westbrook    | 01-Apr-2016 09:29           |
|                             | MW-3                                 |                             |
|                             | 16C0025-03 (Water)                   |                             |
| Petroleum Hydrocarbons      |                                      |                             |
| Method: NWTPH-Dx            |                                      |                             |
| Instrument: FID4            |                                      | Analyzed: 29-Mar-2016 14:13 |

| Sample Preparation:        | Preparation Method: EPA 3510C Separa | atory Funnel    |          |           |           |        |       |       |
|----------------------------|--------------------------------------|-----------------|----------|-----------|-----------|--------|-------|-------|
|                            | Preparation Batch: BEC0042           | Sample Size: 5  | 00 mL    |           |           |        |       |       |
|                            | Prepared: 25-Mar-2016                | Final Volume: 1 | mL       |           |           |        |       |       |
|                            |                                      |                 |          | Detection | Reporting |        |       |       |
| Analyte                    |                                      | CAS Number      | Dilution | Limit     | Limit     | Result | Units | Notes |
| Diesel Range Organics (C12 | 2-C24)                               |                 | 1        | 0.03      | 0.10      | ND     | mg/L  | U     |
| Motor Oil Range Organics ( | C24-C38)                             |                 | 1        | 0.06      | 0.20      | ND     | mg/L  | U     |
| Mineral Oil Range Organics | (C16-C28)                            |                 | 1        | 0.10      | 0.20      | ND     | mg/L  | U     |
| Surrogate: o-Terphenyl     |                                      |                 |          |           | 50-150 %  | 91.1   | %     |       |

Analytical Resources, Inc.

# Data File: \\target\share\chem2\fid4a.i\20160329.b\16032910.D Date : 29-MAR-2016 14:13 Client ID: MW-3 Sample Info: 16C0025-03

Column phase: RTX-1

#### Instrument: fid4a.i

Operator: ML Column diameter: 0,25

|                                        |         |          |      |      | 111 | target\: | share\cl     | hem2\fi | d4a₊i\2       | 0160329          | 9.b\160; | 32910,D      |           |              |                      |              |    |     |    |       |
|----------------------------------------|---------|----------|------|------|-----|----------|--------------|---------|---------------|------------------|----------|--------------|-----------|--------------|----------------------|--------------|----|-----|----|-------|
| 9,9-                                   |         |          |      |      |     | -        | l<br>o-terph |         |               |                  |          |              |           | L<br>L       |                      |              |    |     |    |       |
| 9,6-                                   |         |          |      |      |     |          | -te          |         |               |                  |          |              |           | Triacon Surr |                      |              |    |     |    |       |
| 9,3-                                   |         |          |      |      |     |          | ò            |         |               |                  |          |              |           | 00<br>00     |                      |              |    |     |    |       |
| 9.0-                                   |         |          |      |      |     |          |              |         |               |                  |          |              | F         | Tri          |                      |              |    |     |    |       |
| 8.7-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 8.4-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 8,1-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 7.8-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 7,5-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 7,2-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 6,9-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 6.6-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 6,3-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 6.0-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 5.7-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| _5.4<br>ب                              |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| ດ<br>ດີ<br>0<br>5₊1-<br>0<br>×<br>4₊8- |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 5<br>8 4.8-<br>≻ 4.5-                  |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 4,9-<br>4,2-                           |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
|                                        |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 3,9-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 3.6-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 3.3-<br>7 ^                            |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 3₊0-<br>2₊7-                           |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 2.4-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 2.1-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 1,8-                                   |         |          |      |      |     |          |              |         |               |                  |          |              | ļ         |              |                      |              |    |     |    |       |
| 1.5-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              |                      |              |    |     |    |       |
| 1,2-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              | e<br>A               |              |    |     |    |       |
| 0,9-                                   |         |          |      |      |     |          |              |         |               |                  |          |              |           |              | ۵.<br>بر             |              |    |     |    |       |
| 0.6-                                   | ~       | 9        | Ŋ    | 4    | بې  | œ        | )<br>2       | 2       | N             |                  | و ړ      | 8            |           | -032         | -C34<br>-Filter Peak | 9<br>9       | 2  |     |    |       |
| 0,3                                    | දී<br>L | <br>-010 | -012 | -014 |     | -C18     |              | 3       | -052          | _                | -C26     | -U28<br>-U28 | ][        | Ŷ            | Ϋ́ ̈́̈́̈́            | -036<br>-038 |    |     |    |       |
|                                        | ź       | <br>3    | 4    | ÷ .  | 5   | · · · ·  | 6            |         | 7<br>Ž<br>Min | <del>. ? .</del> | 8        | . • . • – .  | <u>بہ</u> |              | 10                   |              | 11 | • • | 12 | · · · |

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#### Analytical Resources Inc. TPH Quantitation Report

 Data file: 20160329.b/16032910.D
 ARI ID: 16C0025-03

 Method: 20160329.b/FID4TPH.m
 Client ID: MW-3

 Instrument: fid4a.i, ML
 Injection: 29-MAR-2016 14:13

 Report Date: 03/30/2016
 Dilution Factor: 1

 Macro: 15-MAR-2016
 Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

| Compound     | RT               | Shift  | FII<br>Height                          | :4A RESUI<br>Area | JTS<br>Method                          | Range     | Total Area                             | Conc   |
|--------------|------------------|--------|----------------------------------------|-------------------|----------------------------------------|-----------|----------------------------------------|--------|
| Toluene      | =======<br>1.667 | 0.006  | ====================================== | <br>9058          | ====================================== | (Tol-C12) | ====================================== | 2.40   |
| C8           | 1.904            | -0.007 | 984                                    | 1388              | WATPHD                                 | (C12-C24) | 119533                                 | 5.76   |
| C10          | 3.018            | 0.001  | 404                                    | 444               | WATPHM                                 | (C24-C38) | 202106                                 | 12.41  |
| C12          | 3.804            | -0.026 | 936                                    | 3713              | AK102                                  | (C10-C25) | 143338                                 | 5.80   |
| C14          | 4.503            | -0.002 | 349                                    | 652               |                                        |           |                                        |        |
| C16          | 5.127            | 0.023  | 709                                    | 4255              | OR.DIES                                | (C10-C28) | 186611                                 | 7.51   |
| C18          | 5.700            | -0.020 | 704                                    | 2732              | 1                                      |           |                                        |        |
| C20          | 6.390            | 0.018  | 812                                    | 1123              |                                        |           |                                        |        |
| C22          | 6.970            | -0.045 | 1202                                   | 9182              | MIN.OIL                                | (C16-C28) | 315655                                 | 12.86  |
| C24          |                  |        |                                        |                   | 1                                      |           |                                        |        |
| C25          | 7.918            | -0.012 | 634                                    | 621               | 1                                      |           |                                        |        |
| C26          | 8.235            | 0.016  | 699                                    | 2323              | CA ORO (                               | C23-C32)  | 2416687                                | 186.29 |
| C28          | 8.730            | -0.021 | 1638                                   | 5340              | 1                                      |           |                                        |        |
| C32          | 9.677            | 0.011  | 5930                                   | 26004             | 1                                      |           |                                        |        |
| C34          | 10.080           | 0.006  | 1851                                   | 9955              | 1                                      |           |                                        |        |
| Filter Peak  | 10.258           | -0.005 | 1307                                   | 1669              | CREOSOT                                | (C12-C22) | 96796                                  | 4.80   |
| C36          | 10.465           | -0.002 | 1728                                   | 5228              | 1                                      |           |                                        |        |
| C38          | 10.836           | -0.009 | 1660                                   | 9216              | 1                                      |           |                                        |        |
| C40          | 11.205           | -0.014 | 1698                                   | 9508              | 1                                      |           |                                        |        |
| o-terph      | 5.901            | -0.004 | 974171                                 | 1142530           | 1                                      |           |                                        |        |
| Triacon Surr | 9.235            | -0.003 | 882672                                 | 962502            | NAS DIES                               | (C10-C24) | 136135                                 | 5.52   |
| Range Times: |                  |        | ====================================== |                   |                                        |           | ====================================== | 5)     |

| Surrogate   | Area    | Amount | %Rec |
|-------------|---------|--------|------|
|             |         |        |      |
| o-Terphenyl | 1142530 | 41.0   | 91.1 |
| Triacontane | 962502  | 39.3   | 87.3 |

#### M Indicates the peak was manually integrated

| Analyte      | RF      | Curve Date  |
|--------------|---------|-------------|
| o-Terph Surr | 27860.2 | 09-MAR-2016 |
| Triacon Surr | 24501.7 | 15-MAR-2016 |
| Gas          | 24336.2 | 24-FEB-2016 |
| Diesel       | 20753.0 | 15-MAR-2016 |
| Motor Oil    | 16287.0 | 15-MAR-2016 |
| AK102        | 24728.0 | 15-MAR-2016 |
| Min Oil      | 24546.8 | 29-MAR-2016 |
| OR Diesel    | 24858.0 | 15-MAR-2016 |
| NAS Diesel   | 24665.0 | 15-MAR-2016 |
| Bunker C     | 12969.0 | 14-MAR-2016 |
| Creosote     | 20176.0 | 29-FEB-2016 |
| CA ORO       | 12973.0 | 14-MAR-2016 |



| KTA Associates, Inc         | Project: PacifiCorp GW Investigation |                   |
|-----------------------------|--------------------------------------|-------------------|
| 800 Fifth Avenue Suite 4100 | Project Number: [none]               | Reported:         |
| Seattle WA, 98104           | Project Manager: Lenora Westbrook    | 01-Apr-2016 09:29 |
|                             | <b>MW-6</b>                          |                   |
|                             | 16C0025-04 (Water)                   |                   |
|                             | 1000023-04 (Water)                   |                   |
| Petroleum Hydrocarbons      |                                      |                   |
| Method: NWTPH-Dx            |                                      |                   |

| Method: NWIPH-DX           |                                      |                 |          |           |           |        |            |                |
|----------------------------|--------------------------------------|-----------------|----------|-----------|-----------|--------|------------|----------------|
| Instrument: FID4           |                                      |                 |          |           |           | Analy  | /zed: 29-N | /ar-2016 14:36 |
| Sample Preparation:        | Preparation Method: EPA 3510C Separa | atory Funnel    |          |           |           |        |            |                |
|                            | Preparation Batch: BEC0042           | Sample Size: 50 | 00 mL    |           |           |        |            |                |
|                            | Prepared: 25-Mar-2016                | Final Volume:   | l mL     |           |           |        |            |                |
|                            |                                      |                 |          | Detection | Reporting |        |            |                |
| Analyte                    |                                      | CAS Number      | Dilution | Limit     | Limit     | Result | Units      | Notes          |
| Diesel Range Organics (C12 | 2-C24)                               |                 | 1        | 0.03      | 0.10      | ND     | mg/L       | U              |
| Motor Oil Range Organics ( | (C24-C38)                            |                 | 1        | 0.06      | 0.20      | ND     | mg/L       | U              |
| Mineral Oil Range Organics | s (C16-C28)                          |                 | 1        | 0.10      | 0.20      | ND     | mg/L       | U              |
| Surrogate: o-Terphenyl     |                                      |                 |          |           | 50-150 %  | 79.3   | %          |                |

Analytical Resources, Inc.

# Data File: \\target\share\chem2\fid4a.i\20160329.b\16032911.D Date : 29-MAR-2016 14:36 Client ID: MW-6 Sample Info: 16C0025-04

Column phase: RTX-1

#### Instrument: fid4a.i

Operator: ML Column diameter: 0.25

|                                                      |            |         |      |      |      |      | target\ | share'   | chem2 | \fid4a.i      | \201603 | 329.b\1 | 60329:         | 11.D    |                   |      |                      |      |      |        |       |
|------------------------------------------------------|------------|---------|------|------|------|------|---------|----------|-------|---------------|---------|---------|----------------|---------|-------------------|------|----------------------|------|------|--------|-------|
| 8.4-                                                 |            |         |      |      |      |      | Ŭ       | o-terph  |       |               |         | •       |                |         | T<br>Triacon Surr |      |                      |      |      |        |       |
| 8.2<br>8.0<br>7.8<br>7.6                             |            |         |      |      |      |      |         | te       |       |               |         |         |                |         | 0                 |      |                      |      |      |        |       |
| 8.0-<br>7 0 <sup>-1</sup>                            |            |         |      |      |      |      |         | - J      |       |               |         |         |                |         | l õ               |      |                      |      |      |        |       |
| 7 6                                                  |            |         |      |      |      |      |         |          |       |               |         |         |                |         | , a               |      |                      |      |      |        |       |
| 7.4                                                  |            |         |      |      |      |      |         |          |       |               |         |         |                |         | <b>⊢</b>          |      |                      |      |      |        |       |
| 7.4-<br>7.2-                                         |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 7.0-                                                 |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 7.0-<br>6.8-                                         |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 6.6                                                  |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 6.4                                                  |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 6,2                                                  |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 6.0-                                                 |            |         |      |      |      |      |         |          |       |               |         |         |                |         | 1                 |      |                      |      |      |        |       |
| 6.0<br>5.8<br>5.6<br>5.4<br>5.2<br>5.0<br>4.8        |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 5.6-                                                 |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 5,4-                                                 |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 5,2-                                                 |            |         |      |      |      |      |         | Í        |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| -0₊0-<br>⊿ o                                         |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 4.6-                                                 |            |         |      |      |      |      |         | 1        |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| မ်း<br>မြို့ 4.4-                                    |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| G 4.4<br>G 4.2<br>0<br>↓ 4.2<br>↓ 4.0                |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| ĕ 4.0-                                               |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| ≻ 3,8-                                               |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 3.6-                                                 |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
|                                                      |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 3.4<br>3.2<br>2.8<br>2.6<br>2.4<br>2.2<br>2.0<br>1.8 |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 3.0-                                                 |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 2,8-                                                 |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 2,6-                                                 |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 2,4                                                  |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 2,2-                                                 |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 2.0-                                                 |            |         |      |      |      |      |         |          |       |               |         |         |                |         | Į.                |      |                      |      |      |        |       |
| 4 6                                                  |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 1 4                                                  |            |         |      |      |      |      |         | ll –     |       |               |         |         |                |         |                   |      |                      |      |      |        |       |
| 1.2-                                                 |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      | ž                    |      |      |        |       |
| 1.0-                                                 |            |         |      |      |      |      |         |          |       |               |         |         |                |         |                   |      | Ŭ<br>L               |      |      |        |       |
| 0.8-                                                 |            |         |      |      |      |      |         | K        |       |               |         |         |                |         |                   |      | c<br>Đ               |      |      |        |       |
| 0.6-                                                 | ~          |         | Q    | ¢,   | 4    | بې   | œ       | II.      | 2     | N             |         | ត្រូ    | 9              | -C28    | 2<br>2<br>3<br>3  | ¥.   | 51t<br>36            | g    | 유    |        |       |
| 1.6<br>1.4<br>1.2<br>1.0<br>0.8<br>0.6               | ۲          |         | -010 | -012 | -014 | -016 | -C18    | \        | -050  | -022          |         | -025    | -026           | Ÿ       | <sup>י</sup>      | -034 | -Filter Peak<br>-C36 | -038 | -040 |        |       |
| :                                                    | <u>+</u> 2 | · · · · | 3    | 4    |      | 5    | ••••••  | ہے۔<br>ف | • •   | ,<br>Ż<br>Min |         |         | <del>.</del> . | · • • • |                   | 10   |                      | . 1  | 1    | <br>12 | • • • |
|                                                      | -          |         | -    | •    |      | -    |         | -        |       | Min           |         |         |                | -       |                   |      |                      | -    |      |        |       |

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#### Analytical Resources Inc. TPH Quantitation Report

 Data file: 20160329.b/16032911.D
 ARI ID: 16C0025-04

 Method: 20160329.b/FID4TPH.m
 Client ID: MW-6

 Instrument: fid4a.i, ML
 Injection: 29-MAR-2016 14:36

 Report Date: 03/30/2016
 Dilution Factor: 1

 Macro: 15-MAR-2016
 Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

| Compound     | RT     | Shift  | FID<br>Height        | :4A RESUI<br>Area                      | LTS<br>Method                          | Range       | Total Area                     | Conc   |
|--------------|--------|--------|----------------------|----------------------------------------|----------------------------------------|-------------|--------------------------------|--------|
| Toluene      | 1.638  | -0.024 | 8108 8               | ====================================== | -===================================== | (Tol-C12)   | 45870                          | 1.88   |
| C8           | 1.881  | -0.029 | 999                  | 1476                                   | WATPHD                                 | (C12-C24)   | 140501                         | 6.77   |
| C10          | 3.015  | -0.003 | 326                  | 340                                    | WATPHM                                 | (C24-C38)   | 302067                         | 18.55  |
| C12          | 3.813  | -0.017 | 470                  | 2101                                   | AK102                                  | (C10-C25)   | 157300                         | 6.36   |
| C14          | 4.500  | -0.005 | 343                  | 947                                    | 1                                      |             |                                |        |
| C16          | 5.108  | 0.004  | 552                  | 409                                    | OR.DIES                                | (C10-C28)   | 209828                         | 8.44   |
| C18          | 5.705  | -0.015 | 727                  | 4226                                   | 1                                      |             |                                |        |
| C20          | 6.411  | 0.039  | 957                  | 1044                                   |                                        |             |                                |        |
| C22          | 7.053  | 0.038  | 751                  | 1077                                   | MIN.OIL                                | (C16-C28)   | 297945                         | 12.14  |
| C24          |        |        |                      |                                        |                                        |             |                                |        |
| C25          | 7.945  | 0.015  | 738                  | 1664                                   |                                        |             |                                |        |
| C26          | 8.230  | 0.011  | 778                  | 3413                                   | CA ORO (                               | (C23-C32)   | 2197728                        | 169.41 |
| C28          | 8.751  | 0.001  | 5159                 | 8462                                   |                                        |             |                                |        |
| C32          | 9.666  | 0.001  | 7992                 | 29103                                  |                                        |             |                                |        |
| C34          | 10.066 | -0.009 | 4089                 | 18708                                  | 1                                      |             |                                |        |
| Filter Peak  | 10.270 | 0.007  | 2666                 | 9940                                   | CREOSOT                                | (C12-C22)   | 117970                         | 5.85   |
| C36          | 10.456 | -0.011 | 3708                 | 10854                                  | 1                                      |             |                                |        |
| C38          | 10.831 | -0.014 | 3393                 | 13178                                  | 1                                      |             |                                |        |
| C40          | 11.206 | -0.012 | 2916                 | 12950                                  | 1                                      |             |                                |        |
| o-terph      | 5.901  | -0.004 | 820470               | 993409                                 | 1                                      |             |                                |        |
| Triacon Surr |        | -0.004 | 820152               | 865390                                 | NAS DIES                               | G (C10-C24) | 152153                         | 6.17   |
| Range Times: | NW Die |        | - 7.634)<br>- 10.85) |                                        | (3.02 - 7.<br>7.93 - 10.               |             | 3.02 - 5.72)<br>sel(3.02 - 8.7 | 5)     |

| Surrogate   | Area   | Amount | <sup>%</sup> Rec |  |
|-------------|--------|--------|------------------|--|
|             |        |        |                  |  |
| o-Terphenyl | 993409 | 35.7   | 79.2             |  |
| Triacontane | 865390 | 35.3   | 78.5             |  |

#### M Indicates the peak was manually integrated

| Analyte      | RF      | Curve Date  |
|--------------|---------|-------------|
| o-Terph Surr | 27860.2 | 09-MAR-2016 |
| Triacon Surr | 24501.7 | 15-MAR-2016 |
| Gas          | 24336.2 | 24-FEB-2016 |
| Diesel       | 20753.0 | 15-MAR-2016 |
| Motor Oil    | 16287.0 | 15-MAR-2016 |
| AK102        | 24728.0 | 15-MAR-2016 |
| Min Oil      | 24546.8 | 29-MAR-2016 |
| OR Diesel    | 24858.0 | 15-MAR-2016 |
| NAS Diesel   | 24665.0 | 15-MAR-2016 |
| Bunker C     | 12969.0 | 14-MAR-2016 |
| Creosote     | 20176.0 | 29-FEB-2016 |
| CA ORO       | 12973.0 | 14-MAR-2016 |



| KTA Associates, Inc      | Project: PacifiCorp GW Investigation            |                             |
|--------------------------|-------------------------------------------------|-----------------------------|
| 800 Fifth Avenue Suite 4 | 100 Project Number: [none]                      | Reported:                   |
| Seattle WA, 98104        | Project Manager: Lenora Westbrook               | 01-Apr-2016 09:29           |
|                          | MW-5                                            |                             |
|                          | 16C0025-05 (Water)                              |                             |
| Petroleum Hydrocarbo     | ns                                              |                             |
| Method: NWTPH-Dx         |                                                 |                             |
| Instrument: FID4         |                                                 | Analyzed: 29-Mar-2016 14:59 |
| Sample Preparation:      | Preparation Method: EPA 3510C Separatory Funnel |                             |

| Preparation Batch: BEC0042<br>Prepared: 25-Mar-2016 | Sample Size: 500 mL<br>Final Volume: 1 mL |          |           |           |        |       |       |
|-----------------------------------------------------|-------------------------------------------|----------|-----------|-----------|--------|-------|-------|
|                                                     |                                           |          | Detection | Reporting |        |       |       |
| Analyte                                             | CAS Number                                | Dilution | Limit     | Limit     | Result | Units | Notes |
| Diesel Range Organics (C12-C24)                     |                                           | 1        | 0.03      | 0.10      | ND     | mg/L  | U     |
| Motor Oil Range Organics (C24-C38)                  |                                           | 1        | 0.06      | 0.20      | ND     | mg/L  | U     |
| Mineral Oil Range Organics (C16-C28)                |                                           | 1        | 0.10      | 0.20      | ND     | mg/L  | U     |
| Surrogate: o-Terphenyl                              |                                           |          |           | 50-150 %  | 81.6   | %     |       |

Analytical Resources, Inc.

# Data File: \\target\share\chem2\fid4a.i\20160329.b\16032912.D Date : 29-MAR-2016 14:59 Client ID: MW-5 Sample Info: 16C0025-05

Column phase: RTX-1

#### Instrument: fid4a.i

Operator: ML Column diameter: 0.25

|                                                                    | (\target)       | share\chem2\fid4a.i\20160329.b\16032912.D |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------|-----------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8.4-<br>8.2-<br>8.0-<br>7.8-<br>7.6-                               | <i>intarget</i> | share\chem2\f1d4a.1\20160329.b\16032912.D | Triacon Surr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 8.2<br>8.0<br>7.8<br>7.6<br>7.4<br>7.2<br>7.0<br>6.8<br>6.6<br>6.4 |                 |                                           | È                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 6.4<br>6.2<br>6.0<br>5.8<br>5.6<br>5.4<br>5.2                      |                 |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 5.0:<br>4.8:<br>4.6:                                               |                 |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| ⊖ 4.2-<br>× 4.0-<br>× 3.8-<br>3.6-                                 |                 |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 3.4<br>3.2<br>3.0<br>2.8<br>2.6<br>2.4<br>2.2<br>2.0<br>1.8        |                 |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 2.0<br>1.8<br>1.6<br>1.4<br>1.2<br>1.0<br>0.8                      |                 |                                           | ,<br><del>,</del><br><del>,</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 0.6: 0<br>0.4: 약 각                                                 |                 |                                           | -C.32<br>-C.32<br>-C.34<br>-C.36<br>-C.38<br>-C.38<br>-C.38<br>-C.38<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.32<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33<br>-C.33 |
| 2 3                                                                | 4 5             | 6 7 8 9<br>Min                            | 10 11 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Page 1

#### Analytical Resources Inc. TPH Quantitation Report

 Data file: 20160329.b/16032912.D
 ARI ID: 16C0025-05

 Method: 20160329.b/FID4TPH.m
 Client ID: MW-5

 Instrument: fid4a.i, ML
 Injection: 29-MAR-2016 14:59

 Report Date: 03/30/2016
 Dilution Factor: 1

 Macro: 15-MAR-2016
 Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

| Compound     | RT     | Shift  | FID<br>Height                          | :4A RESUI<br>Area | LTS<br>Method            | Range       | Total Area                     | Conc   |
|--------------|--------|--------|----------------------------------------|-------------------|--------------------------|-------------|--------------------------------|--------|
| Toluene      | 1.666  | 0.005  | 4030                                   | 4050              | WATPHG                   | (Tol-C12)   | 42359                          | 1.74   |
| C8           | 1.902  | -0.008 | 945                                    | 1442              | WATPHD                   | (C12-C24)   | 119463                         | 5.76   |
| C10          | 3.018  | 0.001  | 297                                    | 316               | WATPHM                   | (C24-C38)   | 213317                         | 13.10  |
| C12          | 3.817  | -0.013 | 311                                    | 943               | AK102                    | (C10-C25)   | 135623                         | 5.48   |
| C14          | 4.487  | -0.018 | 163                                    | 463               | 1                        |             |                                |        |
| C16          | 5.096  | -0.008 | 277                                    | 226               | OR.DIES                  | (C10-C28)   | 185989                         | 7.48   |
| C18          | 5.703  | -0.018 | 512                                    | 1260              | 1                        |             |                                |        |
| C20          | 6.374  | 0.002  | 1128                                   | 4491              | 1                        |             |                                |        |
| C22          | 7.029  | 0.014  | 1207                                   | 3614              | MIN.OIL                  | (C16-C28)   | 323247                         | 13.17  |
| C24          |        |        |                                        |                   |                          |             |                                |        |
| C25          | 7.911  | -0.019 | 899                                    | 1496              | 1                        |             |                                |        |
| C26          | 8.241  | 0.021  | 856                                    | 4526              | CA ORO (                 | (C23-C32)   | 2190857                        | 168.88 |
| C28          | 8.751  | -0.000 | 1603                                   | 1754              | 1                        |             |                                |        |
| C32          | 9.679  | 0.013  | 5052                                   | 26173             | 1                        |             |                                |        |
| C34          | 10.081 | 0.006  | 1731                                   | 10114             | 1                        |             |                                |        |
| Filter Peak  | 10.259 | -0.004 | 1373                                   | 3296              | CREOSOT                  | (C12-C22)   | 81804                          | 4.05   |
| C36          | 10.471 | 0.003  | 1627                                   | 5089              | 1                        |             |                                |        |
| C38          | 10.843 | -0.003 | 1652                                   | 9755              | 1                        |             |                                |        |
| C40          | 11.221 | 0.002  | 1691                                   | 7838              | 1                        |             |                                |        |
| o-terph      | 5.902  | -0.003 | 822241                                 | 1023545           | 1                        |             |                                |        |
| Triacon Surr | 9.234  | -0.004 | 806877                                 | 865432            | NAS DIES                 | G (C10-C24) | 127847                         | 5.18   |
| Range Times: |        |        | ====================================== |                   | (3.02 - 7.<br>7.93 - 10. |             | 3.02 - 5.72)<br>sel(3.02 - 8.7 | 5)     |

| Surrogate   | Area    | Amount | %Rec |  |
|-------------|---------|--------|------|--|
|             |         |        |      |  |
| o-Terphenyl | 1023545 | 36.7   | 81.6 |  |
| Triacontane | 865432  | 35.3   | 78.5 |  |

#### M Indicates the peak was manually integrated

| Analyte      | RF      | Curve Date  |
|--------------|---------|-------------|
| o-Terph Surr | 27860.2 | 09-MAR-2016 |
| Triacon Surr | 24501.7 | 15-MAR-2016 |
| Gas          | 24336.2 | 24-FEB-2016 |
| Diesel       | 20753.0 | 15-MAR-2016 |
| Motor Oil    | 16287.0 | 15-MAR-2016 |
| AK102        | 24728.0 | 15-MAR-2016 |
| Min Oil      | 24546.8 | 29-MAR-2016 |
| OR Diesel    | 24858.0 | 15-MAR-2016 |
| NAS Diesel   | 24665.0 | 15-MAR-2016 |
| Bunker C     | 12969.0 | 14-MAR-2016 |
| Creosote     | 20176.0 | 29-FEB-2016 |
| CA ORO       | 12973.0 | 14-MAR-2016 |



| DUP-GW                      |                                      |                   |  |  |  |  |  |
|-----------------------------|--------------------------------------|-------------------|--|--|--|--|--|
| Seattle WA, 98104           | Project Manager: Lenora Westbrook    | 01-Apr-2016 09:29 |  |  |  |  |  |
| 800 Fifth Avenue Suite 4100 | Project Number: [none]               | Reported:         |  |  |  |  |  |
| KTA Associates, Inc         | Project: PacifiCorp GW Investigation |                   |  |  |  |  |  |
|                             |                                      |                   |  |  |  |  |  |

#### 16C0025-06 (Water)

| Petroleum Hydrocart                  | oons                                                                                        |                                                    |          |                    |                    |        |            |                |
|--------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------|----------|--------------------|--------------------|--------|------------|----------------|
| Method: NWTPH-Dx<br>Instrument: FID4 |                                                                                             |                                                    |          |                    |                    | Anal   | yzed: 29-N | Mar-2016 15:22 |
| Sample Preparation:                  | Preparation Method: EPA 3510C Separa<br>Preparation Batch: BEC0042<br>Prepared: 25-Mar-2016 | atory Funnel<br>Sample Size: 50<br>Final Volume: 1 |          |                    |                    |        |            |                |
| Analyte                              |                                                                                             | CAS Number                                         | Dilution | Detection<br>Limit | Reporting<br>Limit | Result | Units      | Notes          |
| Diesel Range Organics (C12           | 2-C24)                                                                                      |                                                    | 1        | 0.03               | 0.10               | ND     | mg/L       | U              |
| Motor Oil Range Organics (           |                                                                                             | 1                                                  | 0.06     | 0.20               | ND                 | mg/L   | U          |                |
| Mineral Oil Range Organics           | s (C16-C28)                                                                                 |                                                    | 1        | 0.10               | 0.20               | ND     | mg/L       | U              |
| Surrogate: o-Terphenyl               |                                                                                             |                                                    |          |                    | 50-150 %           | 78.9   | %          |                |

Analytical Resources, Inc.

# Data File: \\target\share\chem2\fid4a.i\20160329.b\16032913.D Date : 29-MAR-2016 15:22 Client ID: DUP-GW Sample Info: 16C0025-06

Column phase: RTX-1

#### Instrument: fid4a.i

Operator: ML Column diameter: 0,25

| V/Larget/uhare/solone2/11d4a,1/20160329,0/16032913,0           0.64           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44           0.44 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>tangat\.</th> <th>:hana\r</th> <th></th> <th>4a i\20</th> <th>460729</th> <th>6516032</th> <th>917 D</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |          |   |   |     |    | tangat\. | :hana\r       |             | 4a i\20   | 460729 | 6516032    | 917 D |                |                                                                    |           |          |        |         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------|---|---|-----|----|----------|---------------|-------------|-----------|--------|------------|-------|----------------|--------------------------------------------------------------------|-----------|----------|--------|---------|
| -co<br>-co<br>-co<br>-co<br>-co<br>-co<br>-co<br>-co<br>-co<br>-co                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 8.6-        |          |   |   |     | 11 | cangeux  | snarevo<br>는동 | anemz \f 10 | 78+1 YZV) | 10/323 | *10 110/32 | U+C+V | £              |                                                                    |           |          |        |         |
| -co<br>-co<br>-co<br>-co<br>-co<br>-co<br>-co<br>-co<br>-co<br>-co                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 8,4-        |          |   |   |     |    |          | en l          |             |           |        |            |       | δu             |                                                                    |           |          |        |         |
| -co<br>-co<br>-co<br>-co<br>-co<br>-co<br>-co<br>-co<br>-co<br>-co                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 8.24        |          |   |   |     |    |          | ł             |             |           |        |            |       | S              |                                                                    |           |          |        |         |
| 7.44         7.2         7.4         7.2         6.6         6.4         6.2         6.0         5.8         5.4         5.3         5.4         5.4         5.4         6.4         6.4         6.4         6.4         6.4         6.4         6.4         6.4         6.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4 <td< td=""><td>8.0-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>i ac</td><td></td><td></td><td></td><td></td><td></td></td<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 8.0-        |          |   |   |     |    |          |               |             |           |        |            |       | i ac           |                                                                    |           |          |        |         |
| 7.44         7.2         7.4         7.2         6.6         6.4         6.2         6.0         5.8         5.4         5.3         5.4         5.4         5.4         6.4         6.4         6.4         6.4         6.4         6.4         6.4         6.4         6.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4         7.4 <td< td=""><td>7.8-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>ΓĔ</td><td></td><td></td><td></td><td></td><td></td></td<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 7.8-        |          |   |   |     |    |          |               |             |           |        |            |       | ΓĔ             |                                                                    |           |          |        |         |
| 7.22<br>7.0<br>6.6<br>6.6<br>6.4<br>6.2<br>6.0<br>5.8<br>5.6<br>5.4<br>5.4<br>5.2<br>5.0<br>6.0<br>4.4<br>4.4<br>6.4<br>4.6<br>4.4<br>5.2<br>5.0<br>5.2<br>5.0<br>5.2<br>5.2<br>5.0<br>5.2<br>5.2<br>5.2<br>5.2<br>5.2<br>5.2<br>5.2<br>5.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 7.6-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 7.4-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 7.24        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 7+V-<br>6 0 |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| 6.4<br>6.2<br>6.0<br>5.6<br>5.4<br>5.2<br>5.2<br>5.5<br>5.4<br>5.4<br>5.4<br>5.4<br>5.5<br>5.5<br>5.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 6.6-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| - C13<br>- C13<br>- C13<br>- C13<br>- C13<br>- C13<br>- C14<br>- C14<br>- C14<br>- C15<br>- C15<br>- C14<br>- C15<br>- C14<br>- C15<br>- C14<br>- C15<br>- C1 | 6.4-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| -C13<br>-C14<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15                                                                                                                                                                                                                                                                                                                   | 6.2-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| -C13<br>-C14<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15                                                                                                                                                                                                                                                                                                                   | 6.0-        |          |   |   |     |    |          |               |             |           |        |            |       | i i            |                                                                    |           |          |        |         |
| -C13<br>-C14<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15<br>-C15                                                                                                                                                                                                                                                                                                                   | 5.8-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| -C12 =                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 5.64        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| -C12 =                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 5,4-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| -C12 =                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 5,2-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| $ \begin{array}{c} (g_{0}, 0, 4, 4, 6, 6, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4.8-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| > 4.0<br>> 4.0<br>> 4.0<br>> 3.8<br>3.6<br>3.4<br>3.2<br>3.6<br>3.4<br>3.2<br>3.6<br>3.4<br>3.2<br>3.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | G 4.6-      |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| > 4.0<br>> 4.0<br>> 4.0<br>> 3.8<br>3.6<br>3.4<br>3.2<br>3.6<br>3.4<br>3.2<br>3.6<br>3.4<br>3.2<br>3.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0 4.4       |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| > 4.0<br>> 4.0<br>> 4.0<br>> 3.8<br>3.6<br>3.4<br>3.2<br>3.6<br>3.4<br>3.2<br>3.6<br>3.4<br>3.2<br>3.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6<br>2.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| 2.6<br>3.4<br>3.2<br>3.2<br>4.4<br>4.4<br>1.2<br>1.6<br>1.6<br>1.6<br>1.6<br>1.6<br>1.6<br>1.7<br>1.7<br>1.7<br>1.7<br>1.7<br>1.7<br>1.7<br>1.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | > 4₊0÷      |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| 3.4<br>3.2<br>3.2<br>3.2<br>3.2<br>4.5<br>5.5<br>5.5<br>5.5<br>5.5<br>5.5<br>5.5<br>5.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.8-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| 2.2<br>2.8<br>2.8<br>2.8<br>2.8<br>2.4<br>2.2<br>1.4<br>1.2<br>1.4<br>1.2<br>1.4<br>1.2<br>1.4<br>1.2<br>1.5<br>1.4<br>1.4<br>1.2<br>1.5<br>1.4<br>1.4<br>1.5<br>1.4<br>1.5<br>1.5<br>1.5<br>1.4<br>1.5<br>1.5<br>1.5<br>1.5<br>1.5<br>1.5<br>1.5<br>1.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3.6-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| 1.6<br>1.6<br>1.6<br>1.6<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3,4-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| 1.6<br>1.6<br>1.6<br>1.6<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3,2-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| 1.6<br>1.6<br>1.6<br>1.6<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2.83        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| 1.6<br>1.6<br>1.6<br>1.6<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2.6-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| 1.6<br>1.6<br>1.6<br>1.6<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2,4         |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| 1.6<br>1.6<br>1.6<br>1.6<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4<br>1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2.2-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| 1.6<br>1.4<br>1.4<br>1.2<br>1.0<br>0.6<br>0.6<br>0.4<br>1.2<br>1.0<br>0.6<br>0.4<br>1.2<br>1.0<br>0.6<br>0.6<br>0.6<br>0.4<br>1.2<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6<br>0.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2.0-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
| 1.4<br>1.2<br>1.0<br>0.8<br>0.4<br>0.4<br>0.4<br>0.4<br>0.4<br>0.4<br>0.4<br>0.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1,8-        |          |   |   |     |    |          |               |             |           |        |            |       | íl –           |                                                                    |           |          |        |         |
| 1.2<br>1.2<br>1.0<br>0.8<br>0.8<br>0.4<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1.6-        |          |   |   |     |    |          |               |             |           |        |            |       |                |                                                                    |           |          |        |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1,4-        |          |   |   |     |    |          |               |             |           |        |            |       |                | ¥                                                                  |           |          |        |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.2-        |          |   |   |     |    |          |               |             |           |        |            |       |                | ů<br>L                                                             |           |          |        |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.8-        |          |   |   |     |    |          |               |             |           |        |            |       |                | ç.                                                                 |           |          |        |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.6-        |          | 0 | N | 4   | ي  | ω        |               | ្ល          | 8         |        | ပ္ ဖ       | œ     | <u>ມ</u>       | ه <u>ا</u> لآ                                                      | ,         | Ģ        |        |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.4         | ů<br>Y   | Į | 험 | 험   | 험  | 전        |               | ř           | Ϋ́        |        | 8 <u>8</u> | 2     | ך <sup>ץ</sup> | 1 I<br>1 I<br>1 I<br>1 I<br>1 I<br>1 I<br>1 I<br>1 I<br>1 I<br>1 I | 8 8       | <u> </u> |        |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ي.<br>·     | <u>•</u> |   |   | · · |    |          | <br>6         |             | ż         |        | s<br>k     |       | ·              |                                                                    | · · · · · | 11<br>11 | <br>12 | · · · · |

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#### Analytical Resources Inc. TPH Quantitation Report

 Data file: 20160329.b/16032913.D
 ARI ID: 16C0025-06

 Method: 20160329.b/FID4TPH.m
 Client ID: DUP-GW

 Instrument: fid4a.i, ML
 Injection: 29-MAR-2016 15:22

 Report Date: 03/30/2016
 Dilution Factor: 1

 Macro: 15-MAR-2016
 Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

| Compound     | RT     | Shift  | FID<br>Height                          | :4A RESUI<br>Area | LTS<br>Method                          | Range                                        | Total Area                     | Conc   |
|--------------|--------|--------|----------------------------------------|-------------------|----------------------------------------|----------------------------------------------|--------------------------------|--------|
| Toluene      | 1.668  | 0.006  | 5110                                   | 5928              | -===================================== | (Tol-C12)                                    | 39963                          | 1.64   |
| C8           | 1.905  | -0.005 | 921                                    | 1380              | WATPHD                                 | (C12-C24)                                    | 380337                         | 18.33  |
| C10          | 3.019  | 0.001  | 282                                    | 330               | WATPHM                                 | (C24-C38)                                    | 297119                         | 18.24  |
| C12          | 3.814  | -0.016 | 328                                    | 1117              | AK102                                  | (C10-C25)                                    | 412968                         | 16.70  |
| C14          | 4.504  | -0.000 | 251                                    | 444               | 1                                      |                                              |                                |        |
| C16          | 5.126  | 0.022  | 830                                    | 735               | OR.DIES                                | (C10-C28)                                    | 492131                         | 19.80  |
| C18          | 5.704  | -0.016 | 1796                                   | 9709              | 1                                      |                                              |                                |        |
| C20          | 6.376  | 0.004  | 3871                                   | 3256              |                                        |                                              |                                |        |
| C22          | 7.016  | 0.001  | 4121                                   | 16070             | MIN.OIL                                | (C16-C28)                                    | 604538                         | 24.63  |
| C24          |        |        |                                        |                   |                                        |                                              |                                |        |
| C25          | 7.964  | 0.035  | 2482                                   | 16957             |                                        |                                              |                                |        |
| C26          | 8.225  | 0.006  | 1740                                   | 6979              | CA ORO (                               | C23-C32)                                     | 2460150                        | 189.64 |
| C28          | 8.728  | -0.023 | 2040                                   | 9128              |                                        |                                              |                                |        |
| C32          | 9.679  | 0.013  | 4557                                   | 14376             |                                        |                                              |                                |        |
| C34          | 10.089 | 0.014  | 1656                                   | 9511              |                                        |                                              |                                |        |
| Filter Peak  | 10.245 | -0.018 | 2960                                   | 11016             | CREOSOT                                | (C12-C22)                                    | 284444                         | 14.10  |
| C36          | 10.473 | 0.005  | 1647                                   | 3922              |                                        |                                              |                                |        |
| C38          | 10.843 | -0.003 | 1766                                   | 8551              |                                        |                                              |                                |        |
| C40          | 11.230 | 0.012  | 2241                                   | 20760             |                                        |                                              |                                |        |
| o-terph      | 5.901  | -0.004 | 851539                                 | 989440            |                                        |                                              |                                |        |
| Triacon Surr | 9.233  | -0.005 | 766746                                 | 841431            | NAS DIES                               | (C10-C24)                                    | 388363                         | 15.75  |
| Range Times: |        |        | ====================================== |                   | (3.02 - 7.<br>7.93 - 10.               | <i>,</i> , , , , , , , , , , , , , , , , , , | 3.02 - 5.72)<br>sel(3.02 - 8.7 | 5)     |

| Surrogate   | Area   | Amount | %Rec |
|-------------|--------|--------|------|
|             |        |        |      |
| o-Terphenyl | 989440 | 35.5   | 78.9 |
| Triacontane | 841431 | 34.3   | 76.3 |

M Indicates the peak was manually integrated

| Analyte      | RF      | Curve Date  |
|--------------|---------|-------------|
| o-Terph Surr | 27860.2 | 09-MAR-2016 |
| Triacon Surr | 24501.7 | 15-MAR-2016 |
| Gas          | 24336.2 | 24-FEB-2016 |
| Diesel       | 20753.0 | 15-MAR-2016 |
| Motor Oil    | 16287.0 | 15-MAR-2016 |
| AK102        | 24728.0 | 15-MAR-2016 |
| Min Oil      | 24546.8 | 29-MAR-2016 |
| OR Diesel    | 24858.0 | 15-MAR-2016 |
| NAS Diesel   | 24665.0 | 15-MAR-2016 |
| Bunker C     | 12969.0 | 14-MAR-2016 |
| Creosote     | 20176.0 | 29-FEB-2016 |
| CA ORO       | 12973.0 | 14-MAR-2016 |



KTA Associates, Inc 800 Fifth Avenue Suite 4100 Seattle WA, 98104 Project: PacifiCorp GW Investigation Project Number: [none] Project Manager: Lenora Westbrook

**Reported:** 01-Apr-2016 09:29

# Petroleum Hydrocarbons - Quality Control

# Batch BEC0042 - EPA 3510C Separatory Funnel

Instrument: FID4

| Analyte                              | Result | Detection<br>Limit | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC         | %REC<br>Limits | RPD  | RPD<br>Limit | Notes |
|--------------------------------------|--------|--------------------|--------------------|-------|----------------|------------------|--------------|----------------|------|--------------|-------|
| Blank (BEC0042-BLK1)                 |        |                    |                    | Prep  | ared: 25-Mar   | -2016 Ana        | alyzed: 29-1 | Mar-2016 1     | 2:42 |              |       |
| Diesel Range Organics (C12-C24)      | ND     |                    | 0.10               | mg/L  |                |                  |              |                |      |              | U     |
| Motor Oil Range Organics (C24-C38)   | ND     |                    | 0.20               | mg/L  |                |                  |              |                |      |              | U     |
| Mineral Oil Range Organics (C16-C28) | ND     |                    | 0.20               | mg/L  |                |                  |              |                |      |              | U     |
| Surrogate: o-Terphenyl               | 0.0724 |                    |                    | mg/L  | 0.0900         |                  | 80.4         | 50-150         |      |              |       |

Analytical Resources, Inc.

#### Data File: \\target\share\chem2\fid4a.i\20160329.b\16032906.D Date : 29-MAR-2016 12:42 Client ID: Blank Sample Info: BEC0042-BLK1

Column phase: RTX-1

#### Instrument: fid4a.i

Operator: ML Column diameter: 0.25

|                                                                                                                            |   |         |      |           |       | ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ | target | share'  | \chem2 | 2\fid4a₊: | 1\201603 | 29.b\1 | 60329 | 06.D    |                  |                              |      |       |    |       |
|----------------------------------------------------------------------------------------------------------------------------|---|---------|------|-----------|-------|-----------------------------------------|--------|---------|--------|-----------|----------|--------|-------|---------|------------------|------------------------------|------|-------|----|-------|
| 8.0<br>7.8<br>7.6<br>7.4<br>7.0<br>6.8<br>6.4<br>6.2<br>6.0<br>5.8<br>5.6<br>5.4<br>5.4<br>5.4<br>5.4<br>5.4<br>5.4<br>5.4 |   |         |      |           |       |                                         | -      | o-terph |        |           |          |        |       |         | Γ£               |                              |      |       |    |       |
| 7.6-                                                                                                                       |   |         |      |           |       |                                         |        | t<br>t  |        |           |          |        |       |         | Triacon Surr     |                              |      |       |    |       |
| 7.4-                                                                                                                       |   |         |      |           |       |                                         |        | Ò       |        |           |          |        |       |         | 0<br>0<br>0<br>0 |                              |      |       |    |       |
| 7,2-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         | Li.              |                              |      |       |    |       |
| 7.0-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         | 1.               |                              |      |       |    |       |
| 6.8-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 6.6-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 6.4-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 6.2-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 5.8-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 5.6-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 5,4-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         | 1                |                              |      |       |    |       |
| 5.2-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 5.0-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 4.8-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 4.6-                                                                                                                       |   |         |      |           |       |                                         |        | 1       |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 4.4<br>(G 4.2<br>4.0<br>3.8<br>3.8<br>3.6                                                                                  |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| G 4.2<br>4.0<br>3.8<br>7 × 7                                                                                               |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| <sup>3</sup> ,8-                                                                                                           |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| ≻ 3,6                                                                                                                      |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 3.4-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         | 1                |                              |      |       |    |       |
| 3,2-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 3.0-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 2.8-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 2.4-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 2,2-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 2.0-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 1.8                                                                                                                        |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 1.6-                                                                                                                       |   |         |      |           |       |                                         |        | ĥ       |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 1.4-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  |                              |      |       |    |       |
| 1,2-                                                                                                                       |   |         |      |           |       |                                         |        |         |        |           |          |        |       |         |                  | - <u>*</u><br>0              |      |       |    |       |
| 0.8-                                                                                                                       |   |         |      |           |       |                                         |        | ll –    |        |           |          |        |       |         |                  | ۵<br>د                       |      |       |    |       |
| 3.4<br>3.2<br>2.8<br>2.6<br>2.4<br>2.2<br>2.0<br>1.8<br>1.6<br>1.4<br>1.2<br>1.0<br>0.8<br>0.6<br>0.4                      |   |         | 0    | N         | 4     | ى<br>ە                                  | œ      | II –    | 0      | N         | +        | ശ      | G     | ω       | ll –             | -C34<br>-Filter Peak<br>-C36 | ω    |       |    |       |
| 0,4                                                                                                                        | ۳ |         | -C10 | -012      | -C14  | -C16                                    | -018   | R       | -020   | -022      | -024     | -025   | -026  | -028    | N.               | -C34<br>-Filt<br>-C36        | -038 |       |    |       |
| · <del>·</del>                                                                                                             | ż | · · · · | · ;  | · · · · 4 | · · · |                                         | • • •  | ۱<br>6  | • •    | ,<br>Min  |          |        | • •   | · · · • | منعن ا           | 10                           |      | <br>L | 12 | • • • |

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#### Analytical Resources Inc. TPH Quantitation Report

Data file: 20160329.b/16032906.DARI ID: BEC0042-BLK1Method: 20160329.b/FID4TPH.mClient ID: BlankInstrument: fid4a.i, MLInjection: 29-MAR-2016 12:42Report Date: 03/30/2016Dilution Factor: 1Macro: 15-MAR-2016Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

| Compound     | RT                 | Shift     | FII<br>Height | ):4A RESUI<br>Area | ITS<br>Method | Range        | Total Area   | Conc   |
|--------------|--------------------|-----------|---------------|--------------------|---------------|--------------|--------------|--------|
|              |                    |           |               |                    |               |              |              | =====  |
| Toluene      | 1.666              | 0.005     | 4919          | 7242               | WATPHG        | (Tol-C12)    | 140931       | 5.79   |
| C8           | 1.903              | -0.008    | 1475          | 3025               | WATPHD        | (C12-C24)    | 32829        | 1.58   |
| C10          | 3.019              | 0.001     | 1175          | 2157               | WATPHM        | (C24-C38)    | 84293        | 5.18   |
| C12          | 3.839              | 0.009     | 758           | 7309               | AK102         | (C10-C25)    | 85929        | 3.47   |
| C14          | 4.488              | -0.017    | 290           | 952                |               |              |              |        |
| C16          | 5.110              | 0.006     | 229           | 393                | OR.DIES       | (C10-C28)    | 91670        | 3.69   |
| C18          | 5.704              | -0.017    | 264           | 725                |               |              |              |        |
| C20          | 6.326              | -0.046    | 317           | 924                |               |              |              |        |
| C22          | 7.003              | -0.012    | 323           | 1325               | MIN.OIL       | (C16-C28)    | 174743       | 7.12   |
| C24          | 7.631              | -0.003    | 235           | 1025               |               |              |              |        |
| C25          | 7.942              | 0.012     | 28            | 16                 |               |              |              |        |
| C26          | 8.244              | 0.025     | 42            | 77                 | CA ORO        | (C23-C32)    | 2076160      | 160.04 |
| C28          | 8.753              | 0.002     | 1315          | 3015               | 1             |              |              |        |
| C32          |                    |           |               |                    | 1             |              |              |        |
| C34          | 10.077             | 0.002     | 633           | 1567               |               |              |              |        |
| Filter Peak  | 10.266             | 0.003     | 730           | 2404               | CREOSOT       | (C12-C22)    | 30745        | 1.52   |
| C36          | 10.466             | -0.001    | 699           | 1449               |               |              |              |        |
| C38          | 10.853             | 0.007     | 892           | 3934               |               |              |              |        |
| C40          |                    |           |               |                    |               |              |              |        |
| o-terph      | 5.902              | -0.003    | 772830        | 1008669            |               |              |              |        |
| Triacon Surr | 9.234              | -0.005    | 783797        | 855985             | NAS DIES      | S (C10-C24)  | 85784        | 3.48   |
| Range Times: | ========<br>NW Die | sel(3.830 | - 7.634)      | AK102              | (3.02 - 7.    | .93) Jet A(3 | 3.02 - 5.72) |        |

NW M.Oil(7.63 - 10.85) AK102(3.02 - 7.55) OEC A(3.02 - 3.72)NW M.Oil(7.63 - 10.85) AK103(7.93 - 10.47) OR Diesel(3.02 - 8.75)

| Surrogate   | Area    | Amount | %Rec |
|-------------|---------|--------|------|
| o-Terphenyl | 1008669 | 36.2   | 80.5 |
| Triacontane | 855985  | 34.9   | 77.6 |

#### M Indicates the peak was manually integrated

| Analyte      | RF      | Curve Date  |
|--------------|---------|-------------|
| o-Terph Surr | 27860.2 | 09-MAR-2016 |
| Triacon Surr | 24501.7 | 15-MAR-2016 |
| Gas          | 24336.2 | 24-FEB-2016 |
| Diesel       | 20753.0 | 15-MAR-2016 |
| Motor Oil    | 16287.0 | 15-MAR-2016 |
| AK102        | 24728.0 | 15-MAR-2016 |
| Min Oil      | 24546.8 | 29-MAR-2016 |
| OR Diesel    | 24858.0 | 15-MAR-2016 |
| NAS Diesel   | 24665.0 | 15-MAR-2016 |
| Bunker C     | 12969.0 | 14-MAR-2016 |
| Creosote     | 20176.0 | 29-FEB-2016 |
| CA ORO       | 12973.0 | 14-MAR-2016 |



KTA Associates, Inc 800 Fifth Avenue Suite 4100 Seattle WA, 98104 Project: PacifiCorp GW Investigation Project Number: [none] Project Manager: Lenora Westbrook

**Reported:** 01-Apr-2016 09:29

# Petroleum Hydrocarbons - Quality Control

# Batch BEC0042 - EPA 3510C Separatory Funnel

Instrument: FID4

| Analyte                              | Result | Detection<br>Limit | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC         | %REC<br>Limits | RPD  | RPD<br>Limit | Notes |
|--------------------------------------|--------|--------------------|--------------------|-------|----------------|------------------|--------------|----------------|------|--------------|-------|
| LCS (BEC0042-BS1)                    |        |                    |                    | Prep  | ared: 25-Mar   | -2016 Ana        | alyzed: 29-1 | Mar-2016 13    | 3:04 |              |       |
| Diesel Range Organics (C12-C24)      | 2.63   |                    | 0.10               | mg/L  | 3.00           |                  | 87.6         | 70-120         |      |              |       |
| Motor Oil Range Organics (C24-C38)   | ND     |                    | 0.20               | mg/L  |                |                  |              | 30-160         |      |              | U     |
| Mineral Oil Range Organics (C16-C28) | 1.25   |                    | 0.20               | mg/L  |                |                  |              | 30-160         |      |              |       |
| Surrogate: o-Terphenyl               | 0.0768 |                    |                    | mg/L  | 0.0900         |                  | 85.3         | 50-150         |      |              |       |

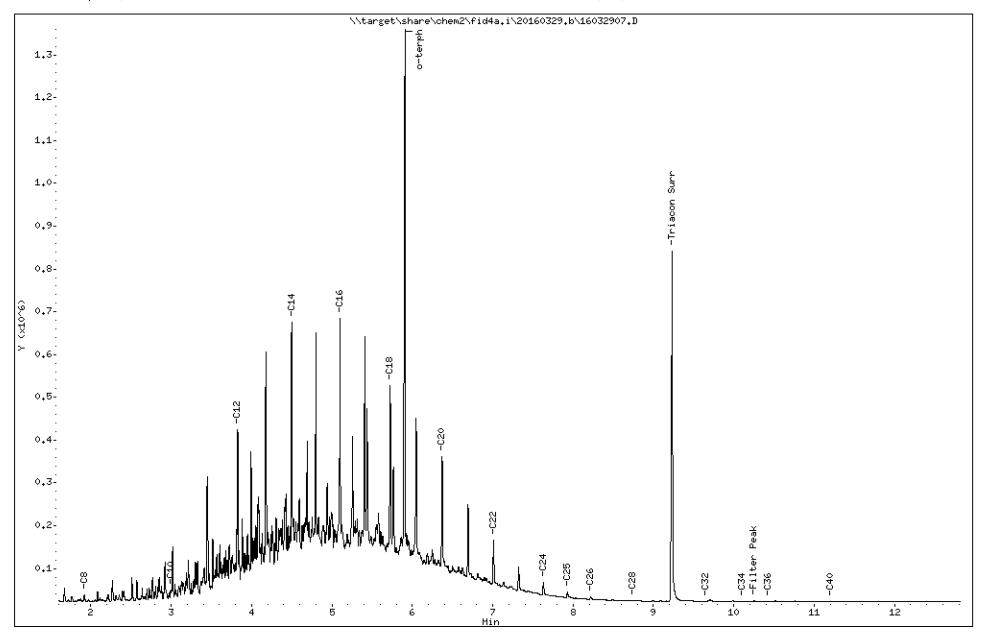
Analytical Resources, Inc.

#### Data File: \\target\share\chem2\fid4a.i\20160329.b\16032907.D Date : 29-MAR-2016 13:04 Client ID: LCS Sample Info: BEC0042-BS1

Column phase: RTX-1

#### Instrument: fid4a.i

Operator: ML Column diameter: 0.25



Page 1

#### Analytical Resources Inc. TPH Quantitation Report

Data file: 20160329.b/16032907.D ARI ID: BEC0042-BS1 Method: 20160329.b\FID4TPH.m Client ID: LCS Injection: 29-MAR-2016 13:04 Instrument: fid4a.i, ML Report Date: 03/30/2016 Dilution Factor: 1 Macro: 15-MAR-2016 Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

|              |                                                                                                                                                  |        | FII     | C:4A RESUI | JTS          |           |            |         |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------|------------|--------------|-----------|------------|---------|
| Compound     | RT                                                                                                                                               | Shift  | Height  | Area       | Method       | Range     | Total Area | Conc    |
| Toluene      | 1.670                                                                                                                                            | 0.009  | 31065   | 22206      | <br>  WATPHG | (Tol-C12) | 4130180    | 169.71  |
| C8           | 1.919                                                                                                                                            | 0.008  | 15638   | 12962      | WATPHD       | (C12-C24) | 27272365   | 1314.14 |
| C10          | 2.993                                                                                                                                            | -0.025 | 25987   | 115285     | WATPHM       | (C24-C38) | 406938     | 24.99   |
| C12          | 3.828                                                                                                                                            | -0.002 | 401325  | 476256     | AK102        | (C10-C25) | 30694758   | 1241.30 |
| C14          | 4.498                                                                                                                                            | -0.007 | 652361  | 755597     | 1            |           |            |         |
| C16          | 5.100                                                                                                                                            | -0.004 | 660912  | 847698     | OR.DIES      | (C10-C28) | 30952460   | 1245.17 |
| C18          | 5.725                                                                                                                                            | 0.005  | 504665  | 715179     | 1            |           |            |         |
| C20          | 6.371                                                                                                                                            | -0.001 | 339823  | 626563     | I            |           |            |         |
| C22          | 7.011                                                                                                                                            | -0.004 | 143310  | 307962     | MIN.OIL      | (C16-C28) | 15310114   | 623.71  |
| C24          | 7.631                                                                                                                                            | -0.003 | 44655   | 166963     | 1            |           |            |         |
| C25          | 7.929                                                                                                                                            | -0.001 | 22660   | 71103      | 1            |           |            |         |
| C26          | 8.219                                                                                                                                            | -0.000 | 10774   | 30691      | CA ORO (     | C23-C32)  | 33779391   | 2603.82 |
| C28          | 8.749                                                                                                                                            | -0.002 | 3077    | 7462       | 1            |           |            |         |
| C32          | 9.649                                                                                                                                            | -0.016 | 570     | 630        | 1            |           |            |         |
| C34          | 10.111                                                                                                                                           | 0.036  | 166     | 515        | 1            |           |            |         |
| Filter Peak  | 10.254                                                                                                                                           | -0.009 | 1837    | 3208       | CREOSOT      | (C12-C22) | 26172644   | 1297.22 |
| C36          | 10.423                                                                                                                                           | -0.045 | 146     | 533        | 1            |           |            |         |
| C38          |                                                                                                                                                  |        |         |            | 1            |           |            |         |
| C40          | 11.209                                                                                                                                           | -0.009 | 290     | 294        | 1            |           |            |         |
| o-terph      | 5.909                                                                                                                                            | 0.004  | 1211204 | 1070652    | 1            |           |            |         |
| Triacon Surr |                                                                                                                                                  | -0.005 | 819719  | 902783     | NAS DIES     | (C10-C24) | 30617451   | 1241.33 |
|              | Range Times: NW Diesel(3.830 - 7.634) AK102(3.02 - 7.93) Jet A(3.02 - 5.72)<br>NW M.Oil(7.63 - 10.85) AK103(7.93 - 10.47) OR Diesel(3.02 - 8.75) |        |         |            |              |           |            |         |

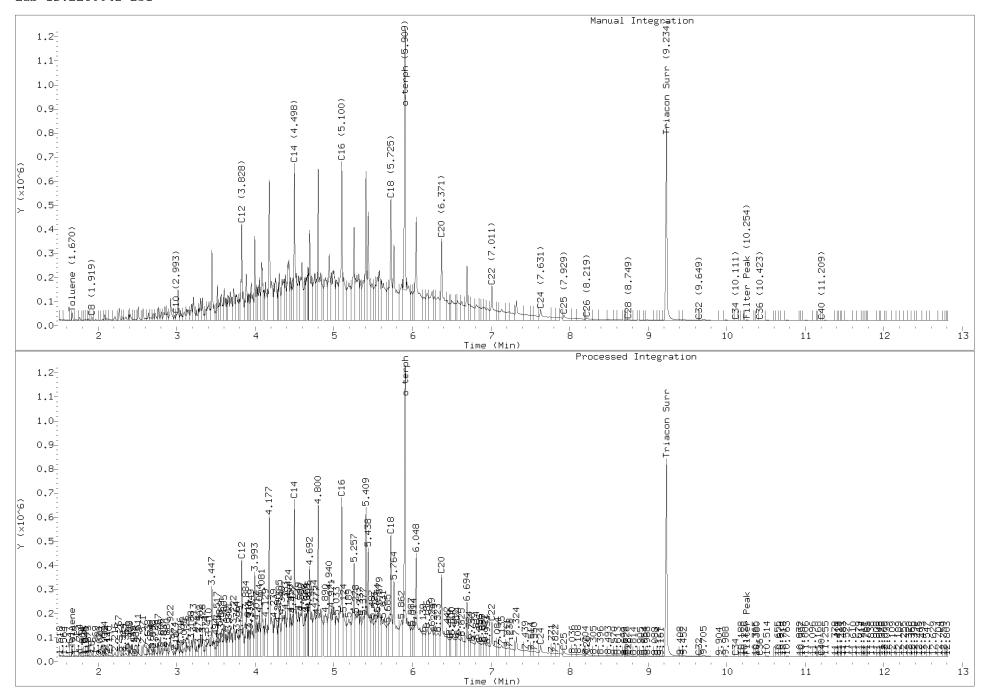
| Surrogate                  | Area              | Amount           | %Rec   |
|----------------------------|-------------------|------------------|--------|
| o-Terphenyl<br>Triacontane | 1070652<br>902783 | <br>38.4<br>36.8 | 85.4 M |

#### M Indicates the peak was manually integrated

| Analyte      | RF      | Curve Date  |
|--------------|---------|-------------|
| o-Terph Surr | 27860.2 | 09-MAR-2016 |
| Triacon Surr | 24501.7 | 15-MAR-2016 |
| Gas          | 24336.2 | 24-FEB-2016 |
| Diesel       | 20753.0 | 15-MAR-2016 |
| Motor Oil    | 16287.0 | 15-MAR-2016 |
| AK102        | 24728.0 | 15-MAR-2016 |
| Min Oil      | 24546.8 | 29-MAR-2016 |
| OR Diesel    | 24858.0 | 15-MAR-2016 |
| NAS Diesel   | 24665.0 | 15-MAR-2016 |
| Bunker C     | 12969.0 | 14-MAR-2016 |
| Creosote     | 20176.0 | 29-FEB-2016 |
| CA ORO       | 12973.0 | 14-MAR-2016 |

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#### TPH Manual Integrations Report Datafile: FID4A, 20160329.b/16032907.D Injection: 29-MAR-2016 13:04 Lab ID:BEC0042-BS1





KTA Associates, Inc 800 Fifth Avenue Suite 4100 Seattle WA, 98104

## Project: PacifiCorp GW Investigation Project Number: [none] Project Manager: Lenora Westbrook

**Reported:** 01-Apr-2016 09:29

# Certified Analyses included in this Report

| Analyte                                  | Certifications       |        |         |
|------------------------------------------|----------------------|--------|---------|
| NWTPH-Dx in Water                        |                      |        |         |
| Diesel Range Organics (C12-C24)          | DoD-ELAP,NELAP,WADOE |        |         |
| Diesel Range Organics (C10-C25)          | DoD-ELAP,NELAP,WADOE |        |         |
| Diesel Range Organics (Tol-C18)          | DoD-ELAP,NELAP,WADOE |        |         |
| Diesel Range Organics (C10-24)           | DoD-ELAP,NELAP,WADOE |        |         |
| Diesel Range Organics (C10-C28)          | DoD-ELAP,NELAP,WADOE |        |         |
| Motor Oil Range Organics (C24-C38)       | DoD-ELAP,NELAP,WADOE |        |         |
| Motor Oil Range Organics (C25-C36)       | DoD-ELAP,NELAP,WADOE |        |         |
| Motor Oil Range Organics (C24-C40)       | DoD-ELAP,NELAP,WADOE |        |         |
| Mineral Spirits Range Organics (Tol-C12) | DoD-ELAP,NELAP,WADOE |        |         |
| Mineral Oil Range Organics (C16-C28)     | DoD-ELAP,NELAP,WADOE |        |         |
| Kerosene Range Organics (Tol-C18)        | DoD-ELAP,NELAP,WADOE |        |         |
| JP8 Range Organics (C8-C18)              | DoD-ELAP,NELAP,WADOE |        |         |
| JP5 Range Organics (C10-C16)             | DoD-ELAP,NELAP,WADOE |        |         |
| JP4 Range Organics (Tol-C14)             | DoD-ELAP,NELAP,WADOE |        |         |
| Jet-A Range Organics (C10-C18)           | DoD-ELAP,NELAP,WADOE |        |         |
| Creosote Range Organics (C12-C22)        | DoD-ELAP,NELAP,WADOE |        |         |
| Bunker C Range Organics (C10-C38)        | DoD-ELAP,NELAP,WADOE |        |         |
| Stoddard Range Organics (C8-C12)         | DoD-ELAP,NELAP,WADOE |        |         |
| Transformer Oil Range Organics (C12-C28) | DoD-ELAP,NELAP,WADOE |        |         |
| Code Description                         |                      | Number | Evnires |

| Code     | Description                                        | Number   | Expires    |
|----------|----------------------------------------------------|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 05/06/2016 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2016 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 03/30/2017 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2016 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2016 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2016 |
|          |                                                    |          |            |

Analytical Resources, Inc.



KTA Associates, Inc 800 Fifth Avenue Suite 4100 Seattle WA, 98104 Project: PacifiCorp GW Investigation Project Number: [none] Project Manager: Lenora Westbrook

**Reported:** 01-Apr-2016 09:29

### **Notes and Definitions**

UThis analyte is not detected above the applicable reporting or detection limit.DETAnalyte DETECTEDNDAnalyte NOT DETECTED at or above the reporting limitNRNot ReporteddrySample results reported on a dry weight basisRPDRelative Percent Difference[2C]Indicates this result was quantified on the second column on a dual column analysis.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6201

|                      | Analysis              | Matrix  | Definition   |
|----------------------|-----------------------|---------|--------------|
| Analysis Definitions | TPH NW (Extractables) | (Water) | B-Flags used |
|                      | TPH NW (Extractables) | (Water) | D-Flags used |
|                      | TPH NW (Extractables) | (Water) | U-Flags used |

| LabNumber   | Analysis              | Analyte                                  | Exception      |
|-------------|-----------------------|------------------------------------------|----------------|
| BEC0042-BS1 | TPH NW (Extractables) | Bunker C Range Organics (C10-C38)        | No spike level |
|             | TPH NW (Extractables) | Creosote Range Organics (C12-C22)        | No spike level |
|             | TPH NW (Extractables) | Diesel Range Organics (Tol-C18)          | No spike level |
|             | TPH NW (Extractables) | Jet-A Range Organics (C10-C18)           | No spike level |
|             | TPH NW (Extractables) | JP4 Range Organics (Tol-C14)             | No spike level |
|             | TPH NW (Extractables) | JP5 Range Organics (C10-C16)             | No spike level |
|             | TPH NW (Extractables) | JP8 Range Organics (C8-C18)              | No spike level |
|             | TPH NW (Extractables) | Kerosene Range Organics (Tol-C18)        | No spike level |
|             | TPH NW (Extractables) | Mineral Oil Range Organics (C16-C28)     | No spike level |
|             | TPH NW (Extractables) | Mineral Spirits Range Organics (Tol-C12) | No spike level |
|             | TPH NW (Extractables) | Motor Oil Range Organics (C24-C38)       | No spike level |
|             | TPH NW (Extractables) | Motor Oil Range Organics (C24-C40)       | No spike level |
|             | TPH NW (Extractables) | Motor Oil Range Organics (C25-C36)       | No spike level |
|             | TPH NW (Extractables) | Residual Range Organics (C23-C32)        | No spike level |
|             | TPH NW (Extractables) | Stoddard Range Organics (C8-C12)         | No spike level |
|             | TPH NW (Extractables) | Transformer Oil Range Organics (C12-C28) | No spike level |

| LabNumber    | Analysis              | Analyte                            | Exception                   |  |  |
|--------------|-----------------------|------------------------------------|-----------------------------|--|--|
| SEC0055-CCV2 | TPH NW (Extractables) | Motor Oil Range Organics (C24-C40) | Exceeds lower control limit |  |  |

| LabNumber    | Analysis              | Analyte                            | Exception                   |  |  |
|--------------|-----------------------|------------------------------------|-----------------------------|--|--|
| SEC0055-ICV2 | TPH NW (Extractables) | Motor Oil Range Organics (C24-C40) | Exceeds lower control limit |  |  |

# **APPENDIX D-2**

# Electronic Data Deliverable Spreadsheet

#### EDD-EIM Data Spreadsheet - KTA Sampling at PacifiCorp, Chehalis WA

Data from 4th Quarterly Sampling Event

#### March 22nd, 2016

| Sample_ID | Field_Collection_<br>Start_Date | Field_Collection_<br>Start_Time | Sample_<br>Matrix | Sample_Preparation_<br>Method | Result_Parameter_Name    | Result_Value | Result_Value_<br>Units | Result_Reporting<br>_Limit | Result_Detection_<br>Limit | Result_Detection_<br>Limit_Type | Result_Method | Result_Data<br>_Qualifier |  |
|-----------|---------------------------------|---------------------------------|-------------------|-------------------------------|--------------------------|--------------|------------------------|----------------------------|----------------------------|---------------------------------|---------------|---------------------------|--|
| MW-1      | 03/22/2016                      | 11:30:00                        | Water             | SW3510C                       | Diesel Range Organics    | 0.10         | mg/l                   | 0.10                       | 0.03                       | MDL                             | NWTPH-Dx      | J,U                       |  |
| MW-1      | 03/22/2016                      | 11:30:00                        | Water             | SW3510C                       | Mineral Oil              | 0.20         | mg/l                   | 0.20                       | 0.10                       | MDL                             | NWTPH-Dx      | U                         |  |
| MW-1      | 03/22/2016                      | 11:30:00                        | Water             | SW3510C                       | Motor Oil Range Organics | 0.20         | mg/l                   | 0.20                       | 0.06                       | MDL                             | NWTPH-Dx      | U                         |  |
| MW-3      | 03/22/2016                      | 12:50:00                        | Water             | SW3510C                       | Diesel Range Organics    | 0.10         | mg/l                   | 0.10                       | 0.03                       | MDL                             | NWTPH-Dx      | U                         |  |
| MW-3      | 03/22/2016                      | 12:50:00                        | Water             | SW3510C                       | Mineral Oil              | 0.20         | mg/l                   | 0.20                       | 0.10                       | MDL                             | NWTPH-Dx      | U                         |  |
| MW-3      | 03/22/2016                      | 12:50:00                        | Water             | SW3510C                       | Motor Oil Range Organics | 0.20         | mg/l                   | 0.20                       | 0.06                       | MDL                             | NWTPH-Dx      | U                         |  |
| MW-4      | 03/22/2016                      | 10:10:00                        | Water             | SW3510C                       | Diesel Range Organics    | 0.10         | mg/l                   | 0.10                       | 0.03                       | MDL                             | NWTPH-Dx      | U                         |  |
| MW-4      | 03/22/2016                      | 10:10:00                        | Water             | SW3510C                       | Mineral Oil              | 0.20         | mg/l                   | 0.20                       | 0.10                       | MDL                             | NWTPH-Dx      | U                         |  |
| MW-4      | 03/22/2016                      | 10:10:00                        | Water             | SW3510C                       | Motor Oil Range Organics | 0.20         | mg/l                   | 0.20                       | 0.06                       | MDL                             | NWTPH-Dx      | U                         |  |
| MW-5      | 03/22/2016                      | 14:45:00                        | Water             | SW3510C                       | Diesel Range Organics    | 0.10         | mg/l                   | 0.10                       | 0.03                       | MDL                             | NWTPH-Dx      | U                         |  |
| MW-5      | 03/22/2016                      | 14:45:00                        | Water             | SW3510C                       | Mineral Oil              | 0.20         | mg/l                   | 0.20                       | 0.10                       | MDL                             | NWTPH-Dx      | U                         |  |
| MW-5      | 03/22/2016                      | 14:45:00                        | Water             | SW3510C                       | Motor Oil Range Organics | 0.20         | mg/l                   | 0.20                       | 0.06                       | MDL                             | NWTPH-Dx      | U                         |  |
| MW-6      | 03/22/2016                      | 14:00:00                        | Water             | SW3510C                       | Diesel Range Organics    | 0.10         | mg/l                   | 0.10                       | 0.03                       | MDL                             | NWTPH-Dx      | U                         |  |
| MW-6      | 03/22/2016                      | 14:00:00                        | Water             | SW3510C                       | Mineral Oil              | 0.20         | mg/l                   | 0.20                       | 0.10                       | MDL                             | NWTPH-Dx      | U                         |  |
| MW-6      | 03/22/2016                      | 14:00:00                        | Water             | SW3510C                       | Motor Oil Range Organics | 0.20         | mg/l                   | 0.20                       | 0.06                       | MDL                             | NWTPH-Dx      | U                         |  |
| DUP-GW    | 03/22/2016                      | 16:00:00                        | Water             | SW3510C                       | Diesel Range Organics    | 0.10         | mg/l                   | 0.10                       | 0.03                       | MDL                             | NWTPH-Dx      | J,U                       |  |
| DUP-GW    | 03/22/2016                      | 16:00:00                        | Water             | SW3510C                       | Mineral Oil              | 0.20         | mg/l                   | 0.20                       | 0.10                       | MDL                             | NWTPH-Dx      | U                         |  |
| DUP-GW    | 03/22/2016                      | 16:00:00                        | Water             | SW3510C                       | Motor Oil Range Organics | 0.20         | mg/l                   | 0.20                       | 0.06                       | MDL                             | NWTPH-Dx      | U                         |  |

\*\*Duplicate sample collected at MW-1

#### Result\_Additional\_Comment

U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit. U : This analyte is not detected above the applicable reporting or detection limit.

U : This analyte is not detected above the applicable reporting or detection limit.