PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY

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 for review under the VCP? Please check all that apply.

- ☐ 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 completed independent remedial action?

☒ Yes ☐ No

Please note that Ecology's opinion will be limited to:

- Whether the planned or completed remedial action at the site meets the substantive requirements of the Model Toxics Control Act (MTCA), and/or
- 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:

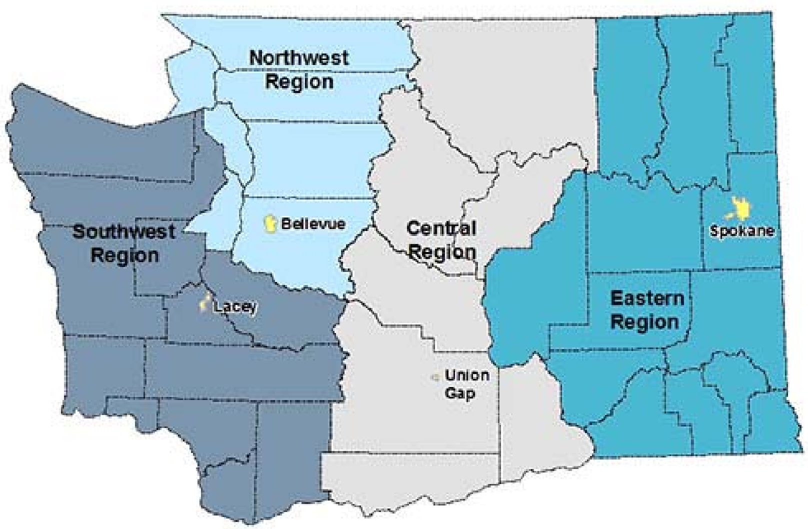
Organization: PacifiCorp Rocky Mountain Power Chehalis Power Plant

Mailing address: 1813 Bishop Road

City: Chehalis	State: WA	Zip code: 98532
Phone: 360-748-1300	Fax: 360-740-1891	E-mail: mark_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.



Northwest Region: Attn: VCP Coordinator 3190 160th Ave. SE Bellevue, WA 98008-5452	**Central Region:** Attn: VCP Coordinator 1250 West Alder St. Union Gap, WA 98903-0009
Southwest Region: Attn: VCP Coordinator P.O. Box 47775 Olympia, WA 98504-7775	**Eastern Region:** Attn: VCP Coordinator N. 4601 Monroe Spokane WA 99205-1295

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

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

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

KTA

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

COMMON ACRONYMS

ASTM	American Society for Testing and Materials
bgs	below ground surface
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
PCB	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.

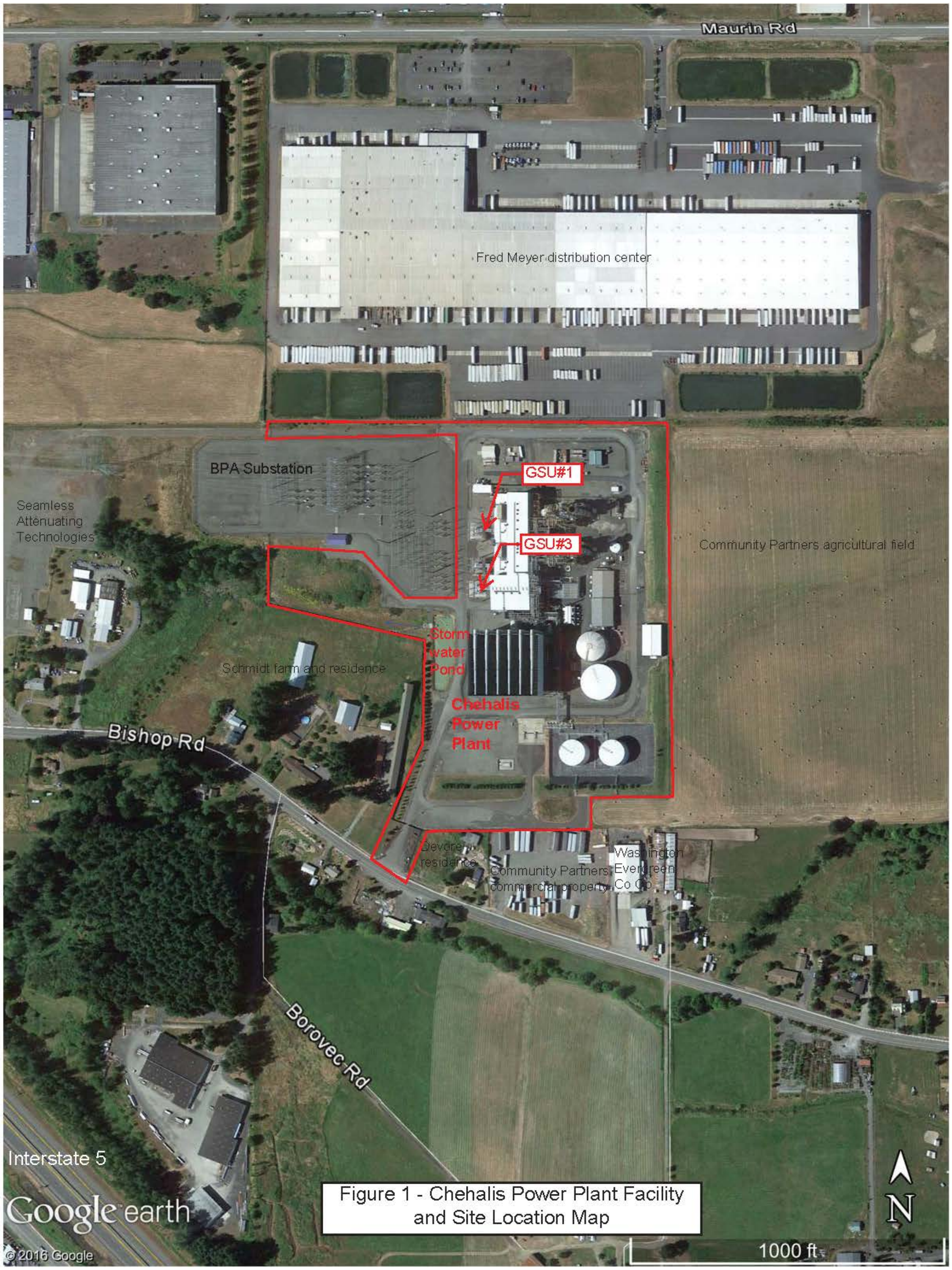


Figure 1 - Chehalis Power Plant Facility and Site Location Map

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 19th 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

Figure 2 – Transformer Oil Spill Cleanup

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 of mineral oil. Some oily water reached the stormwater pond. However, PacifiCorp personnel had shut-off 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.

Figure 3 – Stormwater Pond Cleanup after GSU#3 Spill

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 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 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.

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

2.2.3 Soil Cleanup Sampling and Status

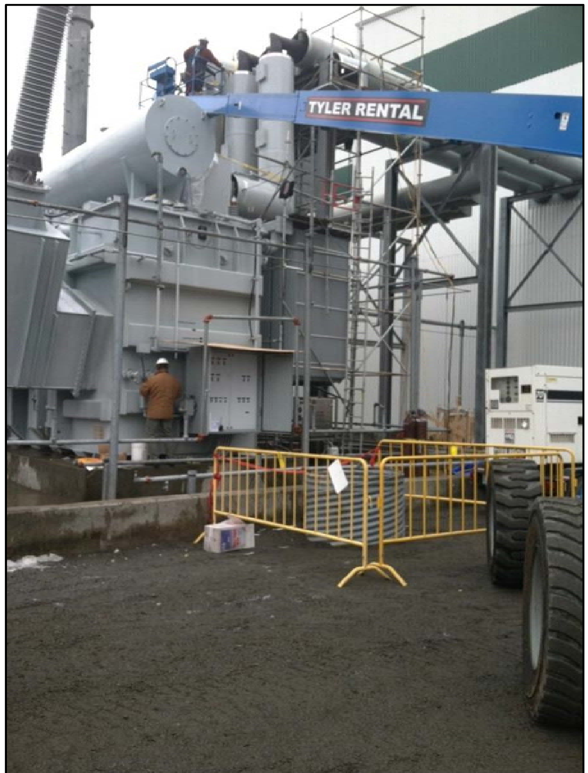


Figure 4 – Installation of New GSU#3 with Groundwater Monitoring Culvert

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 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 informally in the following months of 2014. Minimal oil droplets were observed as 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.

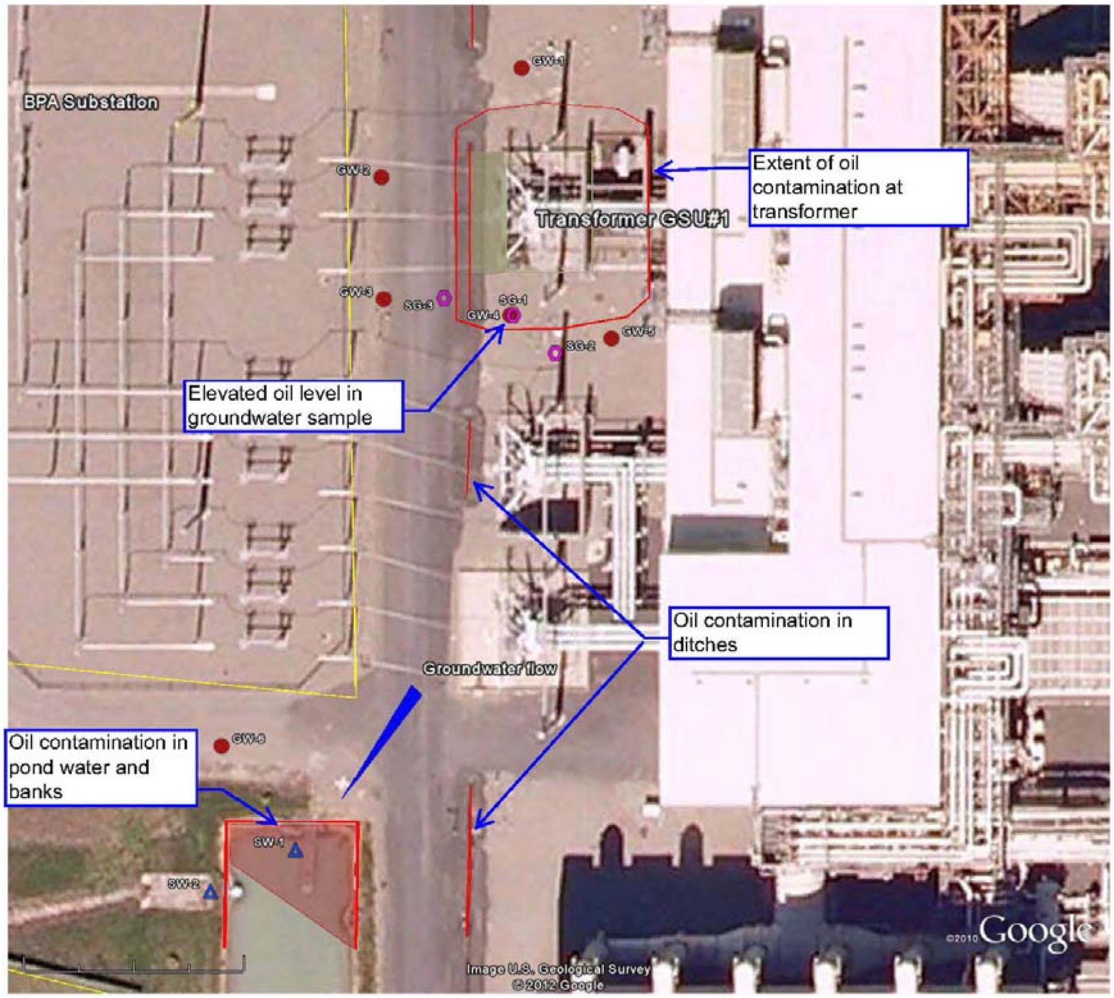


Figure 5 – GSU#1 Oil Spill Extent of Contamination and 2011 Groundwater and Soil Sampling Locations

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.

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

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

ND = not detected, NA = not applicable, µg/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

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.

Figure 6 – Installing Well MW-1 by GSU#1 Containment Structure

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 µg/L, which is below the MTCA Method A cleanup level of 500 µg/L for groundwater. As previously described, the NWTPH-Dx concentration in GW-4 in 2011 in the same location was 1100 µg/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.

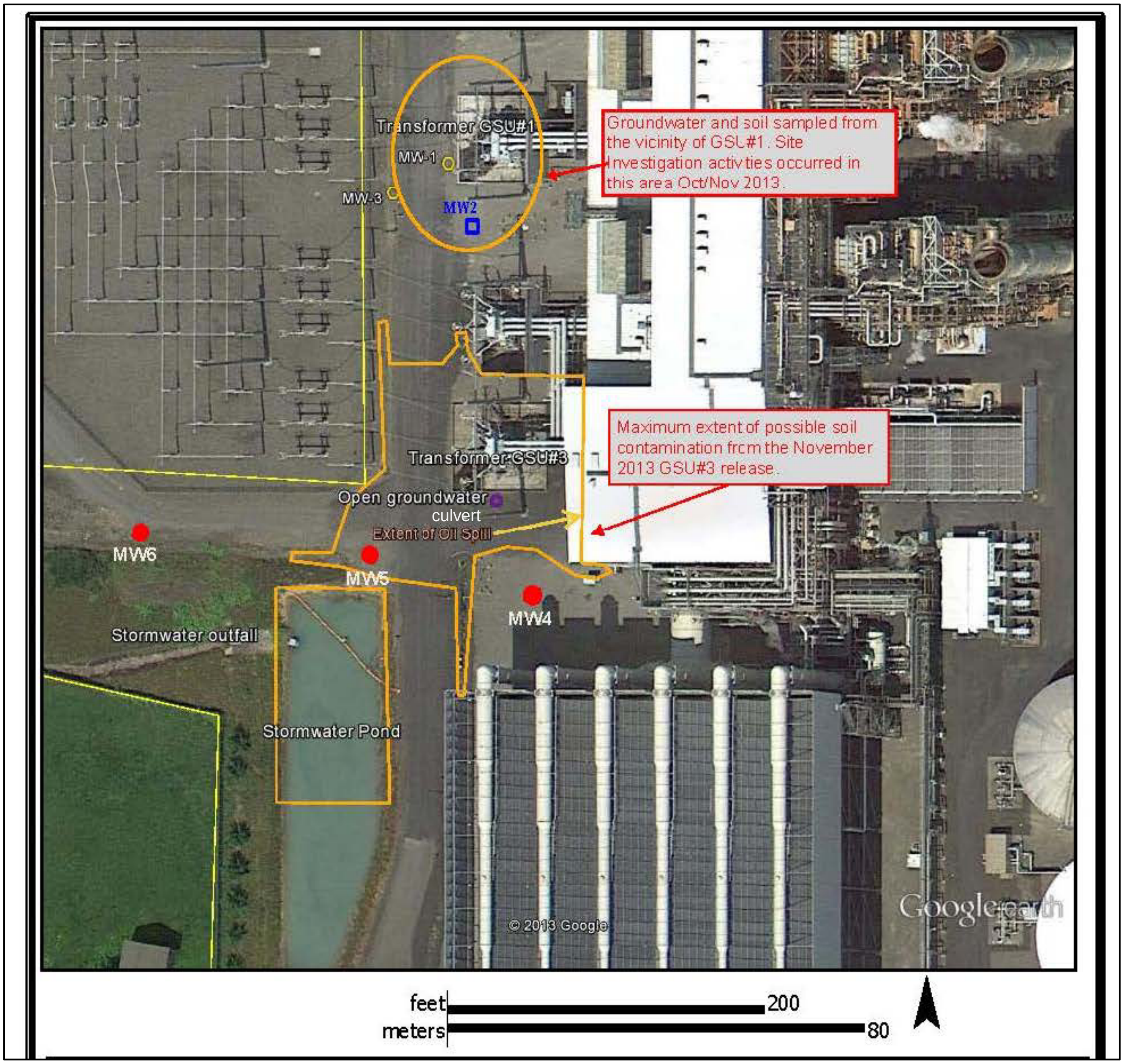


Figure 7 – GSU#3 Oil Spill Extent of Contamination and 2013-2015 Groundwater and Soil Sampling Locations

3.3.1 2015 Investigation Process

Figure 8 – Installing Well MW-5 by Pond

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 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 pre-determined, 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 range from C24 to C38. Combined, 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.

Table 3-3 – Soil Sampling Results 2013-2016

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

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 µg/L, which is below the MTCA Method A cleanup level of 500 µg/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.

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-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

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 3rd 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.**

Table 3-5 - Water Level Measurements and Groundwater Elevations

Event Date		4/15/2015		7/8/2015		12/16/2015		3/22/2016	
Well ID	**[1]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 WL Change between quarterly groundwater evaluations (ft)									
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

[1]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).

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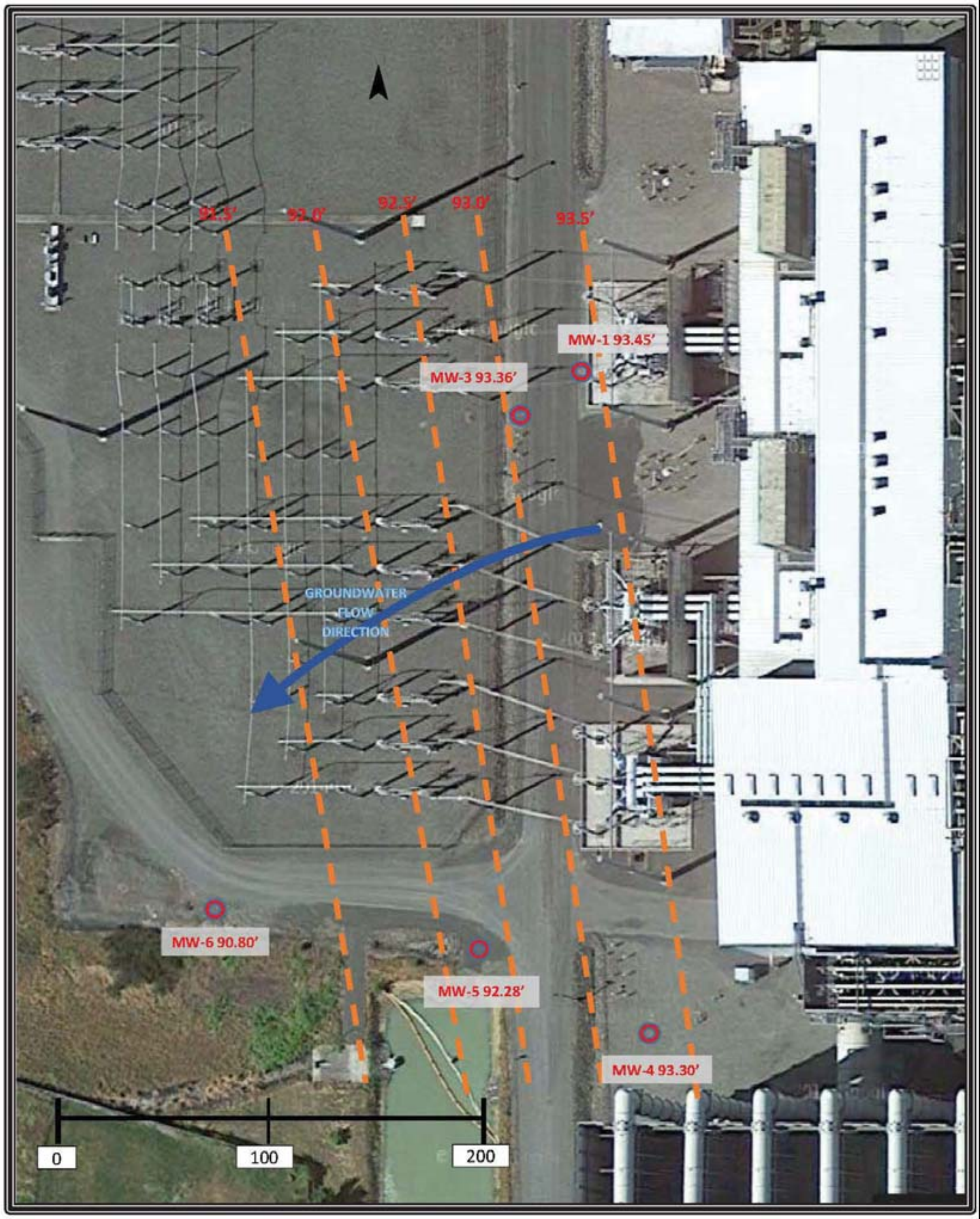

Figure 9 – Groundwater Elevations and Flow Direction December 2015

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.

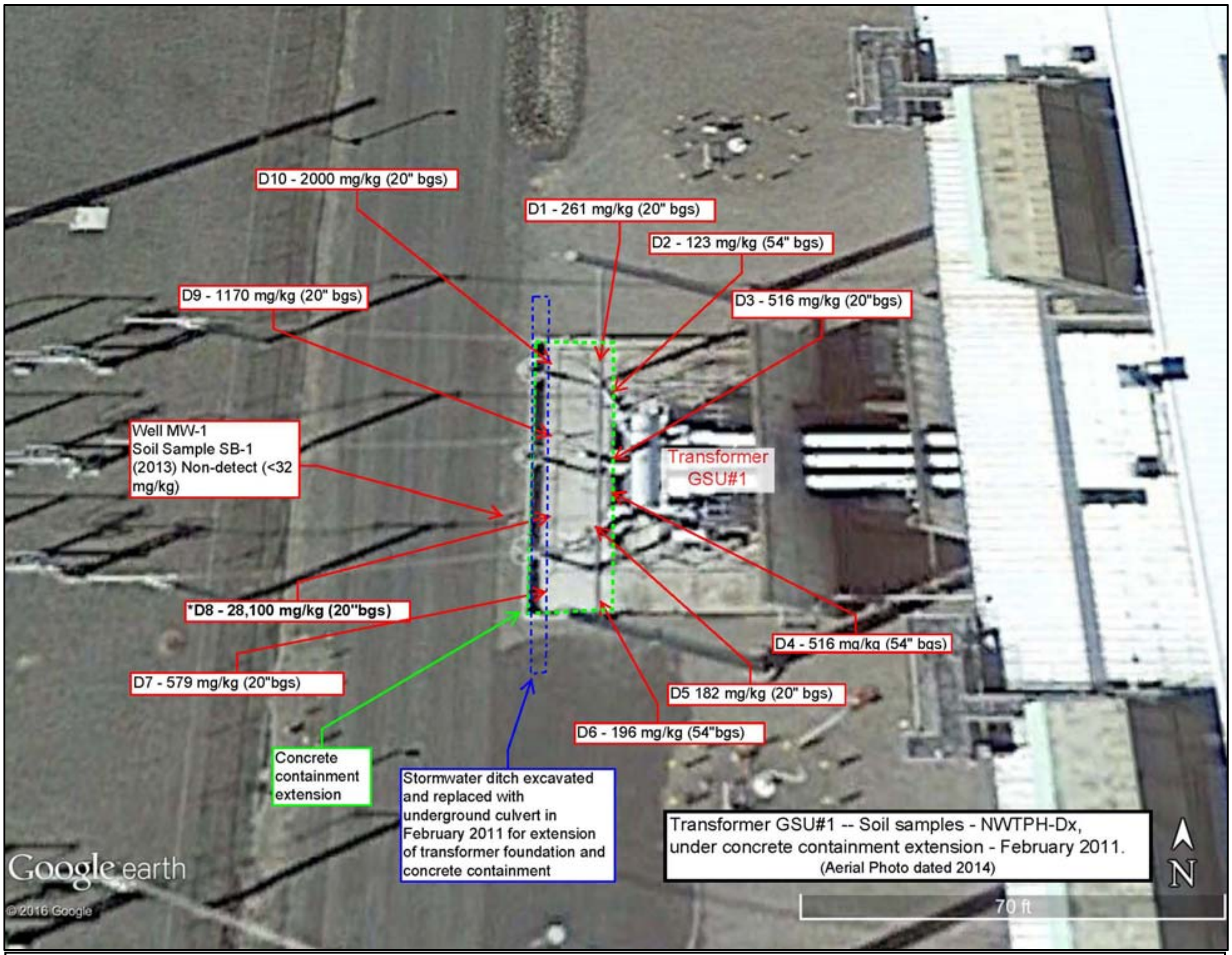

Figure 10 – GSU#1 Soil Contamination under Concrete Containment - 2011

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 µg/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 µg/l levels, which is below the MTCA A level of 500 µg/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 µg/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 µg/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

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

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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.

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

NOV 2 9 2012

CHEHALIS POWER PLANT

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

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

COPY

Dear Mr. Sanchez:

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 Step-up Transformer No. 1 (GSU #1) Oil Spill, August 2012.

6. KTA Associates, Inc., Cleanup Action Report for Chehalis Power Plant Generator Step-up 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, open-top, 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:

1. 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: www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm. If you have any questions about this opinion, please contact me by phone at (360) 407-6265 or by e-mail at hqiu461@ecy.wa.gov.

Sincerely,

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'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 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.

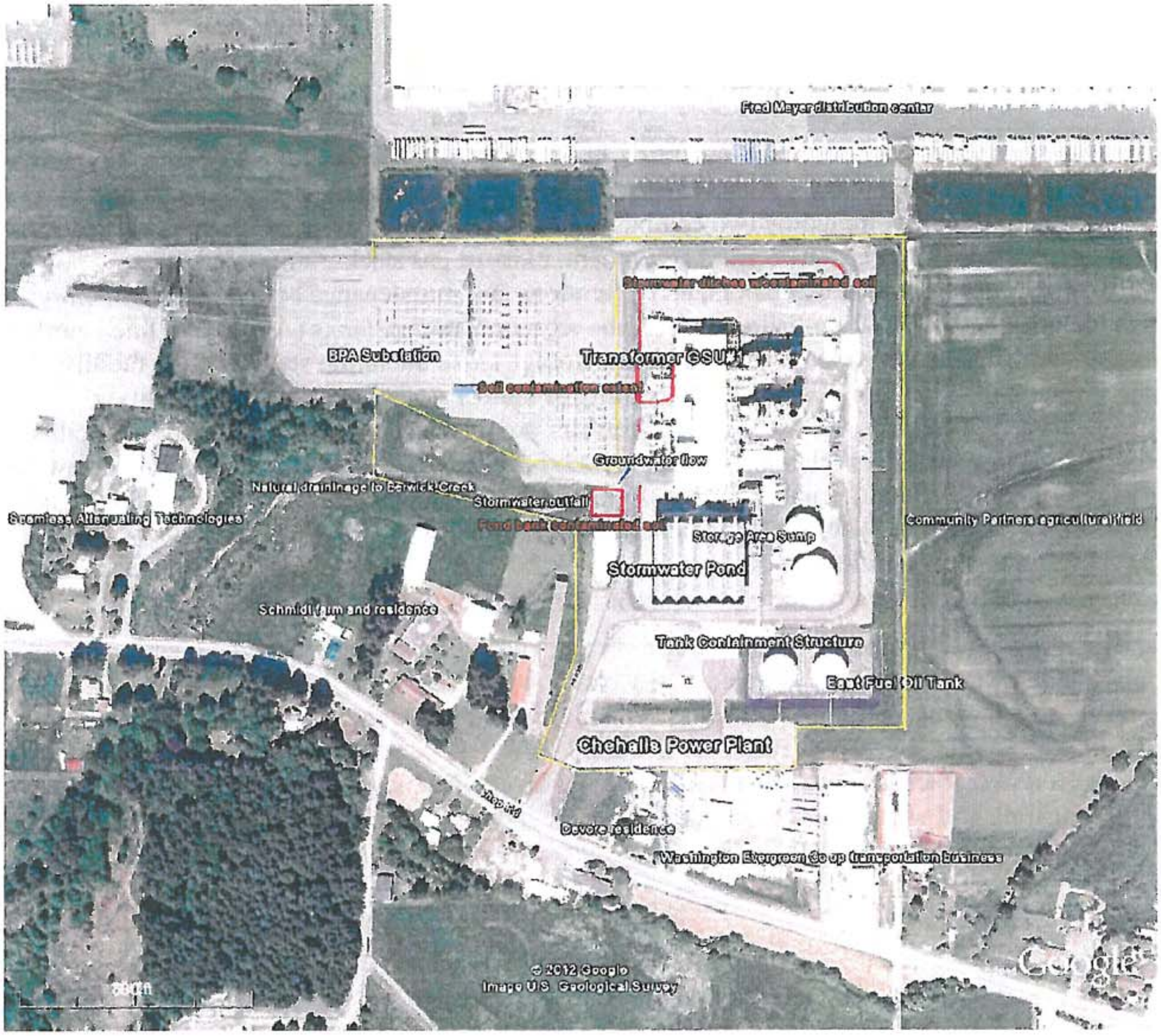


Fig 1. Location of Chehalis Power Generation Plant

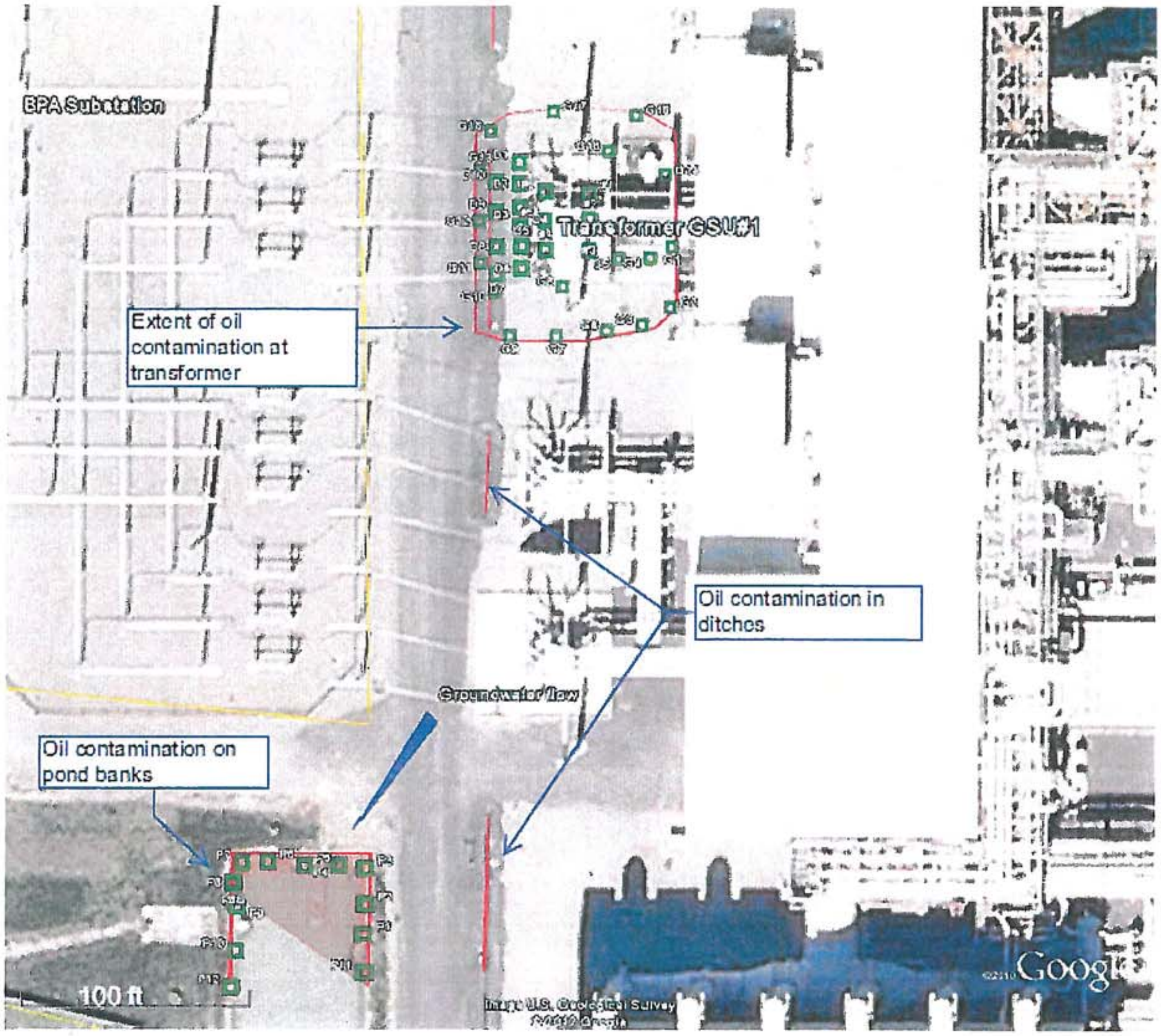


Fig. 2 Sampling locations for soil around the GSU#1 containment, and for the Stormwater pond

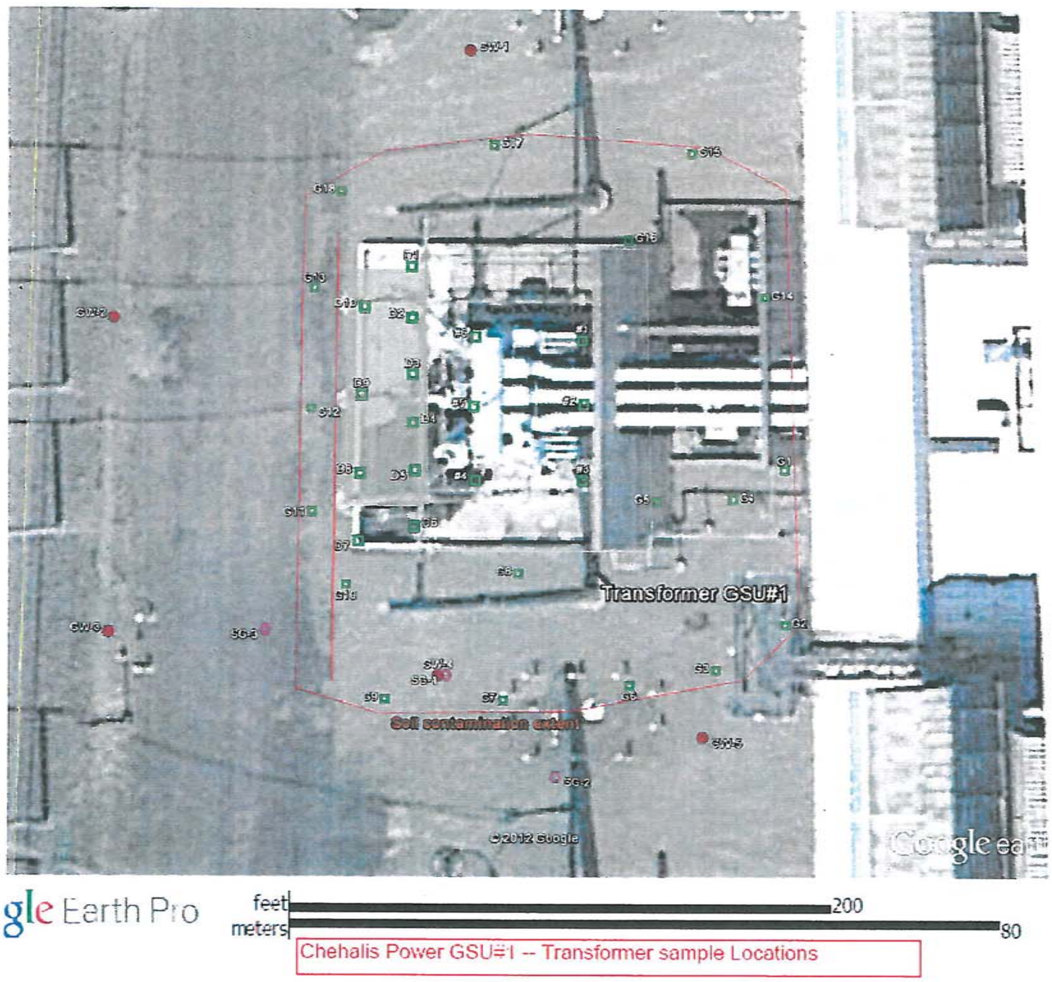


Fig.3 Soil Confirmation sample locations and groundwater Site Investigation Surrounding GSU#1

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

PACIFICORP ENERGY
A DIVISION OF PACIFICORP

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.

<u>Spill Incident</u>

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.

<u>Spill Response</u>

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,

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

PACIFICORP ENERGY
A DIVISION OF PACIFICORP

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,

M Miller P75K51

Mark A. Miller
Manager, Gas Plant

cc:

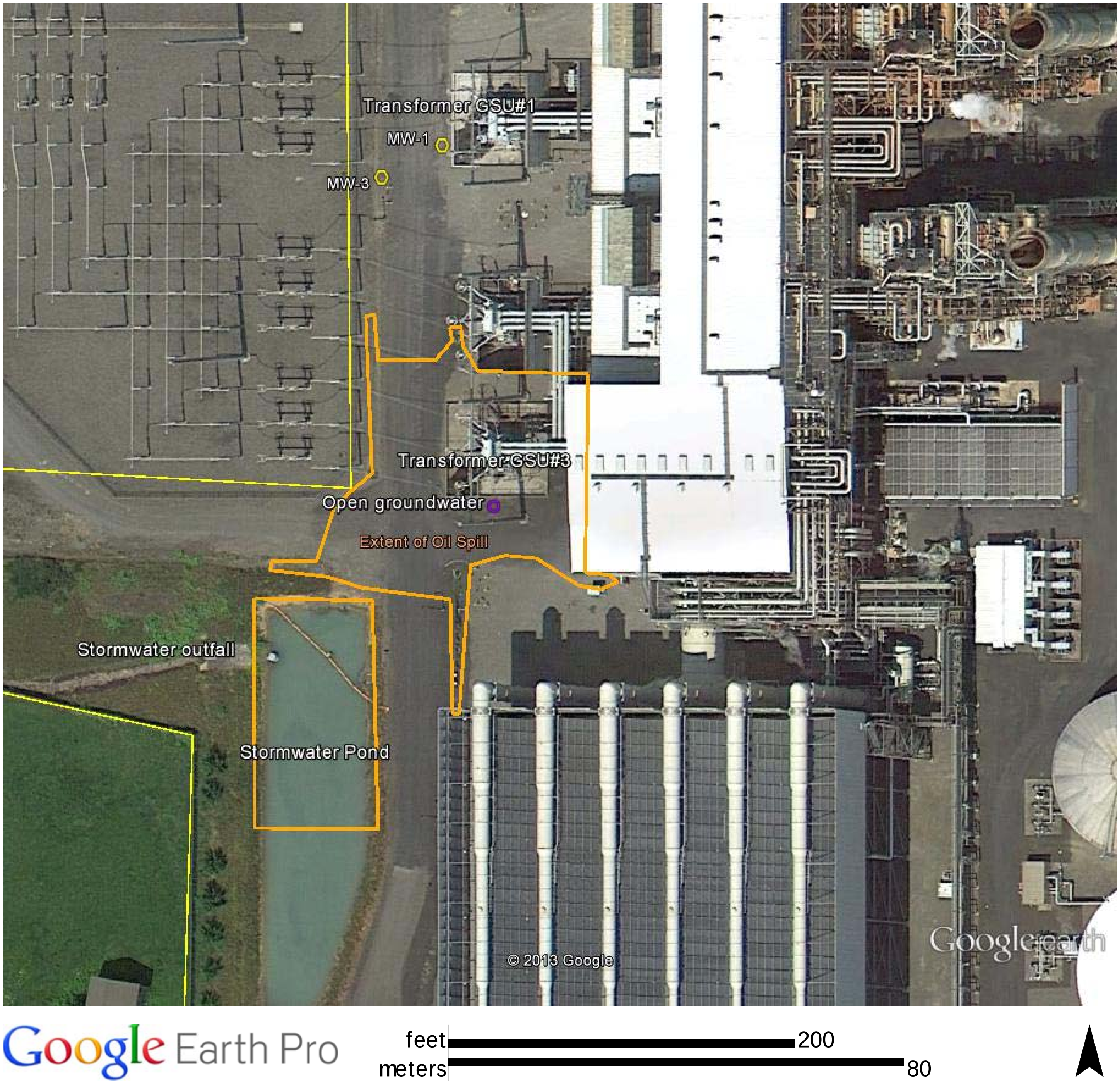
Bill Teitzel
Code Compliance Supervisor
Lewis County Public Health and Social Services
2025 NE Kresky Avenue
Chehalis, WA 98532-2626

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



Chehalis Power Plant
Transformer GSU#3 Oil Spill
Extent of Contamination

Attachment 3

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

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

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. 9th, 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

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~~ waste 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.

<u>Sampling and Laboratory Analyses</u>

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.

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.

Randy Legler
Operation Manager, Emergency Response
CCS


N
#1
#2
#3
#4
#5
#6
#7
#8
9
#10
#11
#12
#13
#14
#15
GSU #3
Confirmation Sample
Map.
See Key for GPS Loc.
Imagery Date: 7/5/2012 lat 46.621877° lon -122.915813° elev 244 ft eye alt 425 ft

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

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

CCS
55 International Way
Longview, WA 98632

Sampled By: Randy Legler

DAL Project No.: 131224-05

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

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

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

DIESEL & OIL
ANALYTICAL RESULTS

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											

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Longview, WA 98632

Sampled By: Randy Legler

DAL Project No.: 131224-05

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

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

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

DIESEL & OIL
ANALYTICAL RESULTS

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										

DRAGON ANALYTICAL LABORATORY

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(360) 866-0543

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

CCS
DAL Project No.: 131224-05

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	46.621846-122.915857
2-FBP	50-150	97.8	146	114	112	103	72.9	95.8	117	108

Surrogate	Limits (%)	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
2-FBP	50-150	84.3	133	83.6	96.3	88.9	99.6	109

LABORATORY CONTROL SAMPLE AND MATRIX SPIKE

QC Batch ID: 140107-Fuels

Analyte	MS/MSD Limits (%)	MS/MSD Level (mg/kg)	Sample Conc. (mg/kg)	MS Recovery (mg/kg)	MS Percent Recovery	MSD Recovery (mg/kg)	MSD Percent Recovery	MS/MSD RPD Limits	RPD	LCS Limits (%)	LCS Level (mg/kg)	LCS Recovery (mg/kg)	LCS Percent 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 #	GPS Coordinate	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**

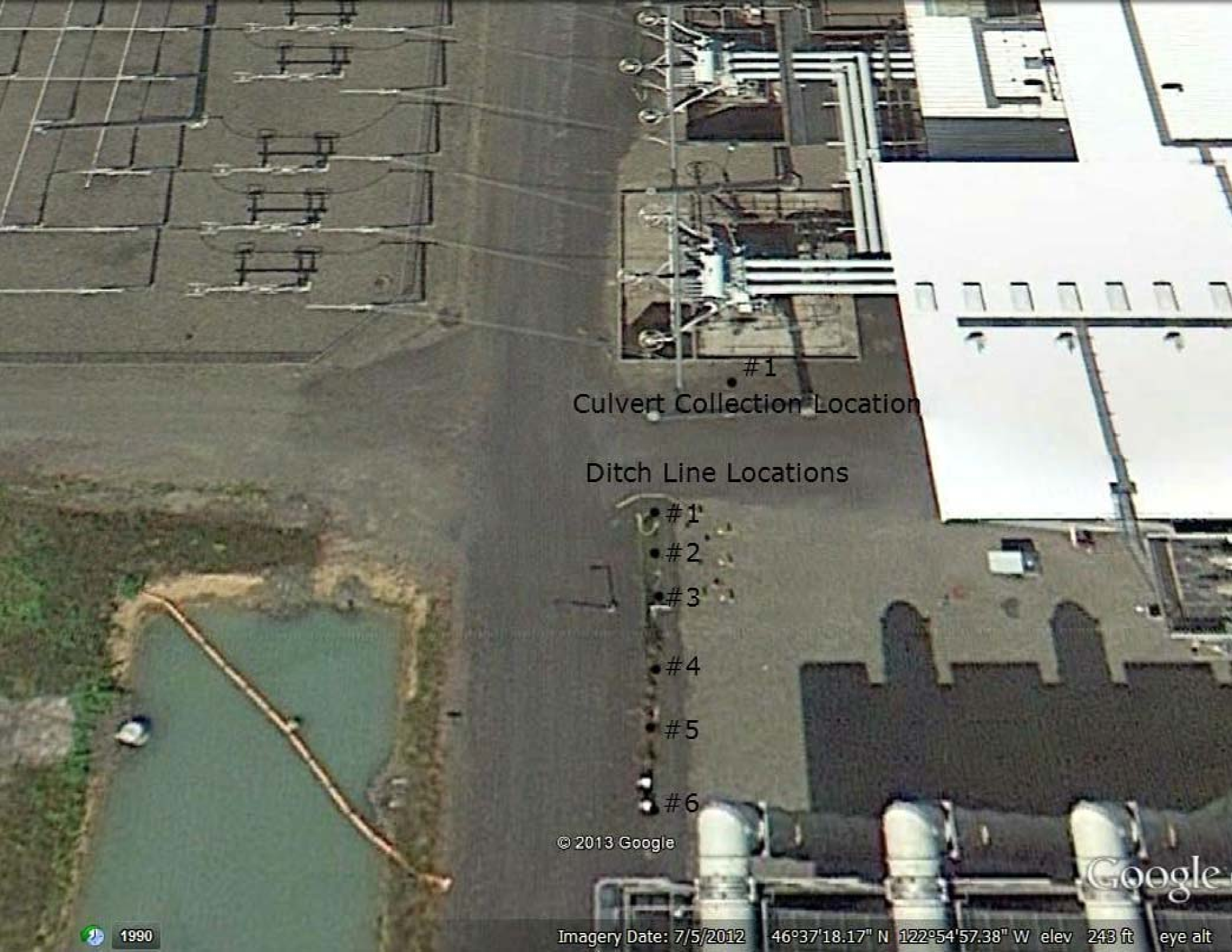
Roadway Locations

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


#1
#2
#3
#4
#5
#6
#7
#8
#9
#10
#11
#12
Pond Sample Locations
© 2013 Google
Google
1990
Imagery Date: 7/5/2012 46°37'16.26" N 122°54'56.95" W elev 244 ft eye alt


#1
Culvert Collection Location
Ditch Line Locations
#1
#2
#3
#4
#5
#6
© 2013 Google
Google
1990
Imagery Date: 7/5/2012
46°37'18.17" N 122°54'57.38" W elev 243 ft eye alt


#2
#1
#3
#4
#5
#6
Roadway Sample Locations
© 2013 Google
Google
1990
Imagery Date: 7/5/2012
46°37'18.17" N 122°54'57.38" W elev 243 ft
eye alt


North Pond Ditch Locations
#2
#5
#1
#4
#3
© 2013 Google
Google
1990
Imagery Date: 7/5/2012
46°37'18.25" N 122°54'58.12" W elev 243 ft
eye alt

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

CCS
55 International Way
Longview, WA 98632

Sampled By: Stephen Shore

DAL Project No.: 131224-04

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

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

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

DIESEL & OIL
ANALYTICAL RESULTS

Sample Identification	CAS No.	MRL	Method Blank	N46.621231 E-122.916347	N46.621252 E-122.916329	N46.621308 E-122.916317	N46.621510 E-122.916142	N46.621530 E-122.916411	N46.621623 E-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									

DRAGON ANALYTICAL LABORATORY

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Longview, WA 98632

Sampled By: Stephen Shore

DAL Project No.: 131224-04

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

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

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

DIESEL & OIL
ANALYTICAL RESULTS

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									

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

CCS
DAL Project No.: 131224-04

Project Name: Pond
Project No.: 9313352

DIESEL & OIL
QUALITY CONTROL RESULTS

SURROGATE RECOVERY

Surrogate	Limits (%)	Method Blank	N46.621231 E-122.916347	N46.621252 E-122.916329	N46.621308 E-122.916317	N46.621510 E-122.916142	N46.621530 E-122.916411	N46.621623 E-122.916377
2-FBP	50-150	94.7	108	95.6	81.8	65.0	89.9	73.2

Surrogate	Limits (%)		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
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

Analyte	MS/MSD Limits (%)	MS/MSD Level (mg/kg)	Sample Conc. (mg/kg)	MS Recovery (mg/kg)	MS Percent Recovery	MSD Recovery (mg/kg)	MSD Percent Recovery	MS/MSD RPD Limits	RPD	LCS Limits (%)	LCS Level (mg/kg)	LCS Recovery (mg/kg)	LCS Percent 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.

DRAGON ANALYTICAL LABORATORY

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(360) 866-0543

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

CCS
55 International Way
Longview, WA 98632

Sampled By: Stephen Shore

DAL Project No.: 131224-02

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

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

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

DIESEL & OIL
ANALYTICAL RESULTS

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									

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Mobile Environmental Laboratory

CCS
DAL Project No.: 131224-02

Project Name: Ditch Line
Project No.: 9313352

DIESEL & OIL
QUALITY CONTROL RESULTS

SURROGATE RECOVERY

Surrogate	Limits (%)	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
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

Analyte	MS/MSD Limits (%)	MS/MSD Level (mg/kg)	Sample Conc. (mg/kg)	MS Recovery (mg/kg)	MS Percent Recovery	MSD Recovery (mg/kg)	MSD Percent Recovery	MS/MSD RPD Limits	RPD	LCS Limits (%)	LCS Level (mg/kg)	LCS Recovery (mg/kg)	LCS Percent 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.

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55 International Way
Longview, WA 98632

Sampled By: Stephen Shore

DAL Project No.: 131224-01

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

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

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

DIESEL & OIL
ANALYTICAL RESULTS

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									

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Mobile Environmental Laboratory

CCS
DAL Project No.: 131224-01

Project Name: Roadway
Project No.: 9313352

DIESEL & OIL
QUALITY CONTROL RESULTS

SURROGATE RECOVERY

Surrogate	Limits (%)	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
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

Analyte	MS/MSD Limits (%)	MS/MSD Level (mg/kg)	Sample Conc. (mg/kg)	MS Recovery (mg/kg)	MS Percent Recovery	MSD Recovery (mg/kg)	MSD Percent Recovery	MS/MSD RPD Limits	RPD	LCS Limits (%)	LCS Level (mg/kg)	LCS Recovery (mg/kg)	LCS Percent 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.

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Longview, WA 98632

Sampled By: Stephen Shore

DAL Project No.: 131224-03

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

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

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

DIESEL & OIL
ANALYTICAL RESULTS

Sample Identification	CAS No.	MRL	Method Blank	N46.621926 E-122.916229	N46.621681 E-122.916334	N46.621618 E-122.916128	N46.621716 E-122.916256	N46.621717 E-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								

DRAGON ANALYTICAL LABORATORY

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Mobile Environmental Laboratory

CCS
DAL Project No.: 131224-03

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

DIESEL & OIL
QUALITY CONTROL RESULTS

SURROGATE RECOVERY

Surrogate	Limits (%)	Method Blank	N46.621926 E-122.916229	N46.621681 E-122.916334	N46.621618 E-122.916128	N46.621716 E-122.916256	N46.621717 E-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

Analyte	MS/MSD Limits (%)	MS/MSD Level (mg/kg)	Sample Conc. (mg/kg)	MS Recovery (mg/kg)	MS Percent Recovery	MSD Recovery (mg/kg)	MSD Percent Recovery	MS/MSD RPD Limits	RPD	LCS Limits (%)	LCS Level (mg/kg)	LCS Recovery (mg/kg)	LCS Percent 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 5th 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 µg/L, below the groundwater MTCA A cleanup level of 500 µg/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.

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

Contact Information

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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

Table of Contents

Appendices

Tables

Figures

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 28th and 29th, 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 Geology

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 Hydrogeology

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 23rd through May 25th, 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.

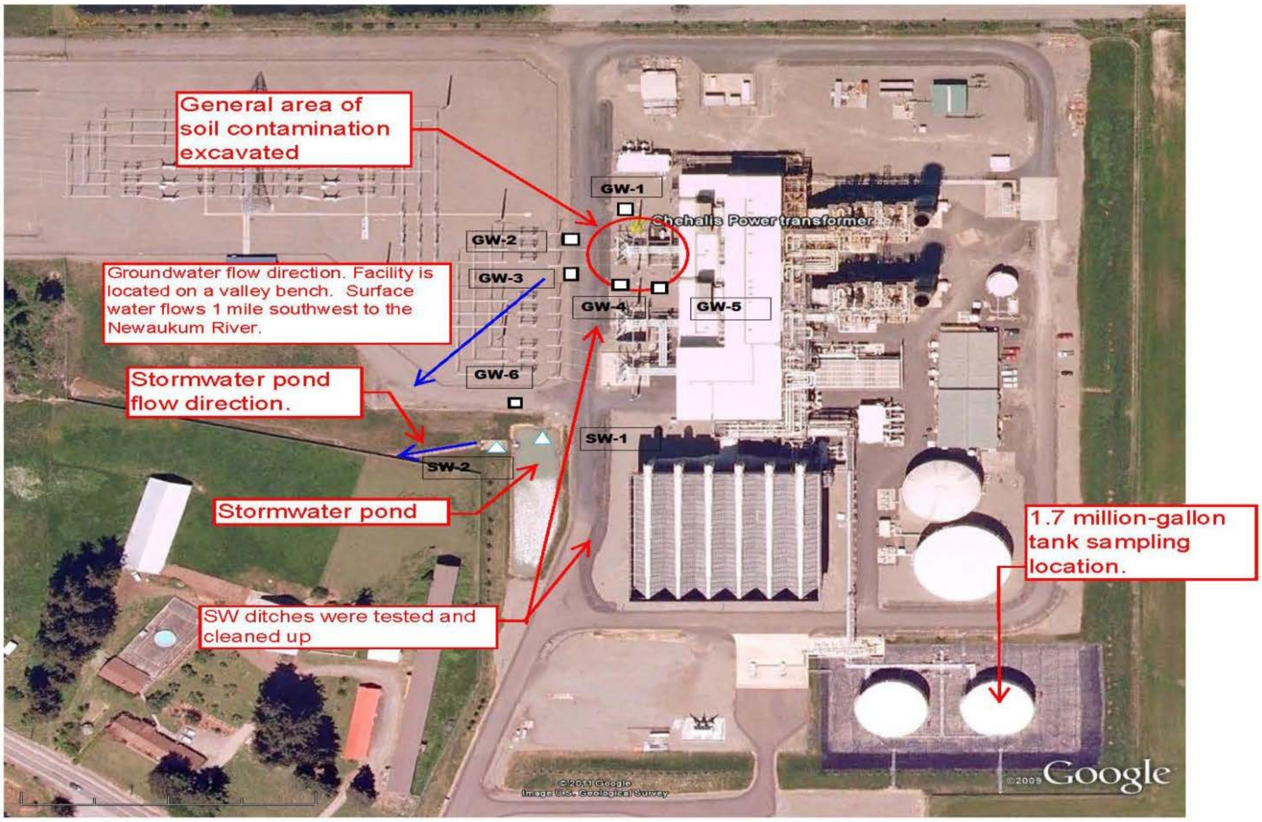
Cardno TEC completed the following activities during the SI:

- 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.

Figure 2-1 May 2011 SI Sampling Locations



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.

Figure 3-1 Groundwater Sampling Locations

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 direct-push 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.

Table 3-1 Monitoring Well Construction detail

Location	Completion Type	Final Depth to water (bgs)[1]	Total Depth (bgs)[1]	Screen Length (bgs)[1]	Sand Pack (bgs)[1]	Bentonite Seal (bgs)[1]	Surface Seal (bgs)[1]
GW-1	Flush Mount	5	17	4.5-17	3-17	2-3	0-2
GW-2	NA	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]
GW-3	Flush Mount	~18 to 20[2]	19	4-19	3-19	2-3	0-2

Notes:
[1] bgs - below grade surface [2] Water level collected from boring log, well was dry after completion
[3] 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.

Table 3-2 Monitoring Well Survey Details

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).

Table 3-3 Monitoring Well Water Quality Readings

Sample ID	Depth to water feet btoc)[1]	Depth to product (feet btoc)[1]	Screened interval (feet btoc)[1]	Time	Temp (°C)	pH	Sp. Cond.[3]	Turbidity[4]	DO[5]
GW1-110113	5.10	ND[2]	4.5-17	1040	16.08	6.72	0.196	83	0.86
GW2-102913	13.00	ND[2]	NA[6]	NA[6]	NA[6]	NA[6]	NA[6]	NA[6]	NA[6]
GW3-110113	13.50	ND[2]	4-19	1310	14.2	6.39	25.5	545	10.20

Notes:
[1] feet (btoc) – below top of casing
[2] ND – not detected
[3] mS/cm – milli seimens/centimeter
[4] NTU – nephelometric turbidity units
[5] mg/L – milligrams per liter
[6] 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[1])	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:
[1] 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 Utility Location

All underground utilities were located and marked by PacifiCorp personnel prior to Geoprobe® 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.

Table 4-1 Groundwater Sample Results and Screening Levels

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

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.

Table 4-2 Soil Sample Results and Screening Levels

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.*

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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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LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 01 November 2013
Project Name: PacifiCorp Groundwater Investigation
Site Name: PacifiCorp
Sample Location X-Ref ID: (field well ID) MW-3 (1040)
Unique ID: MW3-110113
Sampler(s) B. Rupert

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth____
Purge Style: Peristaltic / Bladder / Submersible /Other____
Mid Screen Depth (ft btoc): 15
Pump Intake (ft btoc) 16.35 to 18
QC Sample: Y / N Type: ES Sample

Parameters: NWTPH-Dx

TD = 19.20'

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. ©	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
		Stabilization Requirements		(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
0908			[1] 13.50						Initial water level, pre-pumping
1010	~100mL	~100mL	15.51 (1)	14.34	6.88	1.25	12	5.59	~~(1)~~ (2)
1015	~100mL	~500mL	15.90	14.20	7.21	1.28	12	5.36	
1020	~100mL	~1000mL	16.30	14.17	7.23	1.44	9	5.23	
1030	~100mL	~1500mL	16.71	14.08	7.35	1.49	7	5.14	
~~1040~~ 1035	~100mL	~2000mL	17.15	14.08	7.40	1.56	9	5.00	
~1040	~100mL	~2500mL	17.61	14.05	7.37	1.59	8	4.93	took sample
									Due to low water
									level & little to no
									Recharge / original
									Samples Collected
[1] Water Level Measurements in these boxes must match !									at start were not kept.
1040		~2500mL	[1] 13.50	14.05	7.37	1.59	8	4.93	
(DUP)									

Additional Comments: (1) Note: took sample first before purging Due to low WL (2-500mL Amber)
(2) Air bubbles noted in sample Line - maybe cause for high DO Readings.

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 01 November 2013
Project Name: PacifiCorp Groundwater Investigation
Site Name: PacifiCorp
Sample Location X-Ref ID: (field well ID) MW-1 (1150)
Unique ID: MW1-110113
Sampler(s) B. Rupert

Parameters: NWTPH-Dx

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth____
Purge Style: Peristaltic / Bladder / Submersible /Other____
Mid Screen Depth (ft btoc): 10.75
Pump Intake (ft btoc) 10.50
QC Sample: Y / N Type: ES Sample

TD = 16.74

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. ©	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1055			[1] 5.10						Initial water level, pre-pumping
1100	~100mL	~100mL	5.41	15.31	7.08	0.288	97	2.62	
1105	~100mL	~500mL	5.92	15.44	6.98	0.259	93	1.77	
1110	~100mL	~1000mL	6.58	15.64	6.91	0.245	86	1.46	
1115	~100mL	~1500mL	6.86	15.75	6.89	0.237	83	1.31	
1120	~100mL	~2000mL	7.22	15.88	6.91	0.215	82	1.05	
1125	~100mL	~2500mL	7.35	16.02	6.78	0.208	83	0.96	
1130	~100mL	~3000mL	7.49	16.01	6.75	0.203	83	0.91	
1135	~100mL	~3500mL	7.70	16.03	6.74	0.200	83	0.87	
1140	~100mL	~4000mL	7.84	16.06	6.73	0.199	83	0.86	
1145	~100mL	~4500mL	7.97	16.08	6.72	0.196	83	0.86	
[1]Water Level Measurements in these boxes must match !									
1150		~4500mL	[1] 5.10	16.08	6.72	0.196	83	0.96	
(DUP) N/A		N/A							

Additional Comments:

Monitoring Well Development Form

Project No. : 090154	**Site and Location ID :** PacifiCorp MW-3	**Date :** 10·29·13
Date Installed : 10·29·13	**Personnel Conducting Development :** CDI (Floyd & Pilmor), Metallo (CTEC)	
Devlopment Method(s) Used :		
[1] **Total Well Depth (FT) (TOC):** 19.20'	[2] **Initial Water Level (FT):** Dry	[3] **Length of Static Water Column (FT) :**
Well Diameter (IN) : 2"	[4] **Conversion Factor (see below) : Circle One** [1"= .04 2"= .16 4"= .65 6"=1.5 8"=2.6]	**Casing Volume CV (GAL) =**
Casing Volume CV (GAL) = (1 – 2 = 3; 3 x 4 = 1 CV) :		

DATE	TIME	WL (FT)	TOTAL VOL REMOVED (GAL)	TURBIDITY (NTU) / SED. MEASURE (ImHoff Cone)	COMMENTS (recharge rate, water color, suspended sediments, other)
10·29	1415	Dry	0	0	Well 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):** NA	**DATE / TIME:** 10·29·13 1600

Well Developer Signature: [signature]

Cardno TEC

Monitoring Well Development Form

Project No. : 090154	Site and Location ID : PacifiCorp MW1	Date : 10.29.13
Date Installed : 10.28.13	Personnel Conducting Development : CDI (Floyd/Pilmor) Metallo CTEC	
Devlopment Method(s) Used : 2" surge tool, submersible 12-v pump		
[1] Total Well Depth (FT) (TOC): 16.75	[2] Initial Water Level (FT): 4.87'	[3] Length of Static Water Column (FT) : 11.88
Well Diameter (IN) : 2"	[4] Conversion Factor (see below) : Circle One [1"= .04 2"= .16 4"= .65 6"=1.5 8"=2.6]	Casing Volume CV (GAL) = 1.9 gal.
Casing Volume CV (GAL) = (1 – 2 = 3; 3 x 4 = 1 CV) :		

DATE	TIME	WL (FT)	TOTAL VOL REMOVED (GAL)	TURBIDITY (NTU) / SED. MEASURE (ImHoff Cone)	COMMENTS (recharge rate, water color, suspended sediments, other)
~~10.29.13~~	~~1415~~	~~DRY~~	~~0~~	~~0~~	~~TD well casing = 19.20'~~ DM
10.29	1425	Pumping	~2.5	>1000 NTU	V. muddy, thick, well ran dry after 2.5 gals
10.29	1535	Pumping	~8	~700 NTU	clearing, ~4 CVs removed

FINAL WELL MEASUREMENTS

TOTAL DEPTH (FT): 16.75	WATER LEVEL (FT):	DATE / TIME: 1535 10.29

Well Developer Signature: [signature]

ATTACHMENT B

WATER QUALITY AND WELL DEVELOPMENT FIELD SHEETS

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Cardno TEC

GEOLOGIC BOREHOLE LOG

Borehole / Well ID: SB-1 / MW-1	Site ID: GSU #1 PacifiCorp	Page 1 of 2
Location Description: ~5'W off Northface of Cont. wall	WL (FT) 1st: 5.89'	Date/Time: 10·28·13 (1540)
Drill Rig Type / Drill Method: Geoprobe 7730D (CDI # W-180) track rig	WL (FT) 2nd: 4.87'	Date/Time: 10·29·13 (1305)
Establishing Company: Cardno TEC	Geologist: DC Metallo	Drilling Company: Cascade
Drilling Foreman: Eli Floyd	Ground Surface Elevation: TBD	Datum: Grade surface
Sampling Device: geoprobe 5' macro-core	Borehole diameter (in) 2"	Total Depth (Feet): 30'
Date/Time Drilling Started: 10·28·13 (1100)	Date/Time Total Depth Reached: 10·28·13 (~1215)	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	USCS	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/ lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Weather, Time
0'–2'	100% ↓				FILL (GW/SW)		0-1.7' Surface Fill Material Dary Grey 2.5Y 4/1, Sl. moist to wet 1.5-1.7' bgs. Sandy silty well graded GRAVEL and f-c SAND	Sheen test Neg. @ 1.5-1.7'
2'–5'		4'-5'			SM/CL		1.7-5' Dark Grey (2.5Y 4/1) and Olive Brown (2.5Y 4/4), Sl. moist, mottled w/ browns, reds, greys, SILT and silty lean CLAY (SM/CL) w/ vf-fg sand, tr. cg sand, tr. v. small pebbles	- Sheen test negative @ 4-5 - Sample *SB1-5-102813 (1115)
5'–8'	75% ↓				SM/SP	▼ (Final) ∇ (initial)	5-8' (2.5Y 4/3) Olive Brown, Sl. moist - moist (wet bottom 6") silty vf-fg SAND and poorly graded vf-fg SAND w/ s-L pebble size gravel (esp top 1.5'), high silt content	- Sheen test Negative @ 7-8'
8'–10'					NR		8-10' No Recovery - gravelly	
10'–15'	75% ↓				SM / SP		10-15' Dark Yellowish Brown (10YR 4/4) v. moist - wet, silty f-mg SAND (SM), few layers of sand SILT and layers of (SP) SAND, little s-L gravel esp. top half of section	10-15' No sheen
15'–18'	75% ↓				GM		15-20' Light Olive Brown (2.5Y 5/4) and Brown (10YR 4/3), wet 15-~16.5' Sl. moist 16.5-20, silty GRAVEL (GM) w/ silty vf-cg sand	15-20' No Sheen

Cardno TEC

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: SB-1 / MW-1

Page 2 of 2

Depth (feet)	% Recov	Sample Depth	Blow Counts	PID (PPM)	USCS Code	Lithologic Codes	Lithology Description SOIL TYPE, modifiers/grain size, sorting, color, cement/ lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Weather, Time
18–20					GM		15-20' cont'ed; S-L pebble size gravels (black, pink/red, angular to sub rounded)	20-25' No sheen
20–25	90% ↓				GM / SM		20-25' Light Olive Brown (2.5Y 5/3) and Brown (10YR 5/3) moist to wet (intermixed), silty S-L pebble size GRAVEL and silty vf-cg SAND, gravels are angular to sub angular	
25–30	90% ↓				GM / SM		25-30' Same as above, moist - wet (interfingered)	25-30' No sheen

- Boring terminated @ 30 bgs
- Perched water ~~4-5~~ DM w/in 0-5' range
- Water table ~14' bgs
- Drillers hit refusal on driving large bore casing (casing needed for const. of well) @ ~17' bgs
- Well Const. Detail:

TD = 17'

Screen = 0.10" slot/pre-pack w/ 20-40 sand

Screen interval = 17 - 4.5 2" dia PVC

Sand 17'-3'

Additional Comments :

Bentonite Seal (small chips) ~~3.5 - 2.5~~ DM 3'-2'

Concrete = ~~2.5 - 0'~~ DM 2 - 0'

Completion = Flush mount (8") w/ lockable expansion plug

Cardno TEC

GEOLOGIC BOREHOLE LOG

Borehole / Well ID: SB-2 / MW-2	Site ID: PacifiCorp	Page 1 of 2
Location Description: ~22' ~~West~~ South of GSU-1 cont. wall	WL (FT) 1st: ~5'	Date/Time: ~1445
Drill Rig Type / Drill Method: Geoprobe 7730 D track mount (CDI W-180)	WL (FT) 2nd:	Date/Time:
Establishing Company: Cardno TEC	Geologist: DC Metallo	Drilling Company: Cascade
Drilling Foreman: Eli Floyd	Ground Surface Elevation: TBD	Datum: Grade
Sampling Device: 5' Macro-core	Borehole diameter (in) 2"	Total Depth (Feet): 30'
Date/Time Drilling Started: 10/28/2013 (1438)	Date/Time Total Depth Reached: 10.28.13 (1545)	

Depth (feet)	Sampling % Recov	Sample Depth	Blow Counts	PID	USCS	Lithologic Codes	Lithology Description SOIL TYPE, modifiers/grain size, sorting, color, cement/ lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Weather, Time
0'	50%				FILL	Fill Material	0'-1.2' Dark Grey (2.5Y 4/1), dry, silty Sandy GRAVEL (S-L pebble, angular) FILL	
2'	↓				ML		1.2'-2.3' Dark Grey (2.5Y 4/1), sl. moist SILT w/ little vf-fg sand, mottled	2.3-2.5 No Sheen
	--				SM/SW		2.3'-2.5' Dark Olive Brown 2.5Y 3/3 v. moist - wet silty SAND & well graded f-vcg SAND (SW)	
4'					NR	∇	2.5'-5' No Recovery - gravels (likely Fill material)	Sample *SB2-6-102813 (1450) Collected
6'	75%	X			SW		5-6' Very Dark Greyish Brown (2.5Y 3/2) v. moist - wet f-cg well graded SAND, w/ tr. silt & tr. s. pebbles	5-6.5' No Sheen
	↓				GM		6'-8' Dark Yellowish Brown (10YR 4/4), mottled w/ yellows, browns, greys, reds, moist, silty sandy GRAVEL (GM), S-L pebble size gravel, sub rounded to sub angular	6.5-8' No Sheen
8'-10'					NR		8'-10' No Recovery - gravels	
10'-14'	75% ↓				SM / GM		10'-15' Dark Yellowish Brown (10YR 4/6) v. moist to mostly wet, silty vf-mg SAND (SM) and S-L pebble silty GRAVEL (GM)	10-15' No sheen
16'-18'	90% ↓				SM / GM		15'-20' Dark Yellowish Brown (10YR 4/4) v. moist to wet silty vf-mg SAND (SM) and silty S-L pebble size GRAVEL (GM), mottled w/ reds, browns, black)	15-20 No Sheen

Cardno TEC

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: SB-2 / MW-2

Depth (feet)	Sampling: % Recov	Sampling: Sample Depth	Sampling: Blow Counts	Sampling: PID (PPM)	USCS Code	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/ lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Weather, Time
18'					SM / GM			
20'								
22'	60% ↓				GM		20-25' Dark Yellowish Brown (10YR 4/4), v. moist - wet, silty s-L pebble size GRAVEL (GM), w/ tr-little f-cg sand, pebbles sub-rounded to angular	20-25' No sheen
24'								
26'	75%				GM		25-30' Dark Yellowish Brown (10YR 4/4) v. moist w/ "stringers" of wet b/w gravel, silty S-L rounded to sub angular pebble size GRAVEL (GM), mottled w/ yellows, greens, black, greys, red.	25-30' No Sheen
28'								
30'								
							- Boring terminated 30' • wet at ~23' 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. PacifiCorp asked us to halt construction on MW-2 until they determine ~~what~~ whether a utility was encountered.

Cardno TEC

GEOLOGIC BOREHOLE LOG

Borehole / Well ID: SB-3 / MW-3	Site ID: PacifiCorp	Page 1 of 2
Location Description: Across road (W) from SB1 & S ~15', next to hydrant	WL (FT) 1st: Dry	Date/Time: 10·29 (1400)
Drill Rig Type / Drill Method: Geoprobe 7730D track mount - CDI W-180	WL (FT) 2nd:	Date/Time:
Establishing Company: Cardno TEC	Geologist: DC Metallo	Drilling Company: Cascade
Drilling Foreman: Eli Floyd	Ground Surface Elevation: TBD	Datum: Grade
Sampling Device: 5' Macro-core	Borehole diameter (in) 2"	Total Depth (Feet): 28'
Date/Time Drilling Started: 10·29·13 (1055)	Date/Time Total Depth Reached: 10·29·13 (~1200)	

Depth (feet)	% Recov	Sample Depth	Blow Counts	PID	USCS	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/ lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Weather, Time
0–2	90%				FILL		0-2' Greyish Brown (2.5Y 5/2), dry, sand/gravel mix, S-L subangular/anuglar gravel, FILL material	No Sheen @ 2'
2–5		3.5–5.5 (X)			CH / ~~MH~~		2-5' Light Olive Brown (2.5Y 5/4) sl. moist, ~~SILT~~ ~~and~~ DM CLAY (~~MH~~-CH) mostly clay, mottled color, very stiff/tight	-Sampled ~3.5' to 5.5' * SB3-5-102913 (1100)
5–6.5	90%				CH		5-6.5 Same as above	No sheen @ 5'
6.5–10					GM / GC		6.5-10' Yellowish Brown (10YR 5/4) sl. moist - moist, silty-clayey S-L pebble size GRAVEL, mottled coloring (reds, greens, browns, greys) little c-vcg sand	No Sheen 7-9'
10–14	90%				SM		10-14' Brown (10YR 4/3), v. moist to mostly wet, silty f-mg SAND (sm) little c-vcg sand and little s-m pebble size gravel	No Sheen 11-12'
14–15					GM		14-15' Brown (10YR 5/3), moist - v. moist (although dry bottom ~2") silty-sandy GRAVEL (GM), mottled	No Sheen 14-15'
15–18	90%				GM / SM			

Cardno TEC

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: SB-3/MW-3

Depth (feet)	Sampling: % Recov	Sampling: Sample Depth	Sampling: Blow Counts	Sampling: PID (PPM)	USCS Code	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Weather, Time
18–20					GM / SM		15-20' Dark Yellowish Brown (10YR 4/4) moist w/ distinct zones (interfingers) of wet silty S-L pebble size GRAVEL (GM) and silty f-cg SAND (SM), several 2-3" zones of poorly graded C-VCg Sand	15-20' No Sheen
20–24	60%				SW / GM		20-23.5 Yellowish Brown (10YR 5/4) moist - to stringers of wet, silty/sandy GRAVEL (GM), S-L sub-rounded to sub-angular pebbles, ~2" zone of f-vc well graded Sand (SW)	20-23' No Sheen
24–25	0%				NR		23.5-25' No Recovery, gravels	
25–28	100%				SM / GM		25-26.5' Brown (10YR 4/3) wet, silty vf-c SAND, w/ some S-M pebble size gravel 26.5'-28' Same as above w/ GRAVEL predominant (GM), v. moist to sl. moist at ~27.8'	25-28' No sheen
28–36							- Boring terminated @ 28' a refusal, likely gravels - Well Const. Info: • ~~Well~~ DRIVE Casing (steel Geoprobe) TD @ 19' bgs - Refusal @ 19' • Screen = 0.01" slot/pre-pack w/ 20-40 Sand	

Additional Comments :

• Well Casing Screened = 2" Sch 40 PVC 19-4'

• Sand Pack 19'-3'

• Bentonite Seal: (small chips) 3-2'

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

ATTACHMENT C
ANALYTICAL RESULTS
GROUNDWATER

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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

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
M	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.
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/CertificationDrinkingWaterLabs/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/PublicParticipationandPermitSupport/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/EnvironmentalLaboratoryAccreditation/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	T104704427-08-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	**Service Request No.:**	K1311913
Project:	PacifiCorp-Chehalis Power Groundwater	**Date Received:**	11/01/13
Sample Matrix:	Water		

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.

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

Approved by Howard Holm

Chain of Custody

ALS Environmental

CHAIN OF CUSTODY

SR# K1311?? PAGE 1 OF 1 COC# 002

1317 South 13th Ave., Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

PROJECT NAME: PacifiCorp - Chehalis Power Groundwater
PROJECT NUMBER:
PROJECT MANAGER: Lenora Westbrook
COMPANY NAME: KTA Associates, Inc
ADDRESS:
CITY/STATE/ZIP:
E-MAIL ADDRESS: LWestbrook@KTAINC.net
PHONE #: 360-250-7694 FAX #:
SAMPLER'S SIGNATURE: [signature] / [signature]

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐ SIM PAH☐	Volatile Organics 624☐ 8260☐ 8021☐ BTEX☐	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCBs Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081☐ 8141☐ 8151☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	Metals, Total or Dissolved (See List below)	Cyanide☐ Hex-Chrom☐	(circle) pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS, Turb.	(circle) NH_3-N, COD, TKN, TOC, DOC, NO_2+NO_3, T-Phos	TOX 9020☐ AOX 1650☐ 506☐	Alkalinity☐ CO_3☐ HCO_3☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases RSK 175☐ CO_2☐ Methane☐ Ethane☐ Ethene☐	NWTPH-Dx/NWTPH SGT			REMARKS
~~MW-2~~ MW2-102913	10-29-13	1345		W	2																X			very turbid
MW1-110113	11/1/13	1150		W	2																X			
MW3-110113	11/1/13	1040		W	2																X			

[initials]

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. CLP Like Summary (no raw data)

___ IV. Data Validation Report

___ V. EDD

INVOICE INFORMATION

P.O. # ____________

Bill To: ____________

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 day

X Standard (15 working days)

___ Provide FAX Results

Requested Report Date ____________

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

***INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: ______ (CIRCLE ONE)**

SPECIAL INSTRUCTIONS/COMMENTS:

*Ask KTA (Lenora) Re: Reporting Requirements

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:	
Signature: [signature]	Date/Time: 11/1/13 1325	Signature: K Smith	Date/Time: 11/1/13 1330	Signature	Date/Time	Signature	Date/Time
Printed Name: Brian Rupert	Firm: Cardno TEC	Printed Name: K Smith	Firm: ALS	Printed Name	Firm	Printed Name	Firm

ALS

PC HH

Cooler Receipt and Preservation Form

Client / Project: KTA, INC. Service Request K13 11913

Received: NOV. 1, 2013 Opened: 11/1 By: SD Unloaded: 11/1 By: SD

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? ______
   If present, were custody seals intact? Y **N** If present, were they signed and dated? Y **N**

Raw Cooler Temp	Corrected. Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
0.0	0.2	1.1	1.3	0.2	313			

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* ***Wet Ice*** *Dry Ice* *Sleeves* ______
5. Were custody papers properly filled out (ink, signed, etc.)? NA **Y** N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA **Y** N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA **Y** N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA **Y** N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA **Y** N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* **NA** Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* **NA** Y N
12. Was C12/Res negative? **NA** Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: ______

Page ____ *of* ____

Diesel and Residual Range Organics

Organic Analysis:

Diesel and Residual Range Organics - Silica Gel Treated

Summary Package

Sample and QC Results

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater
Service Request: K1311913

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

Sample Name	Lab Code	Date Collected	Date Received
MW2-102913	K1311913-001	10/29/2013	11/01/2013
MW1-110113	K1311913-002	11/01/2013	11/01/2013
MW3-110113	K1311913-003	11/01/2013	11/01/2013
MW3-110113	KWG1312533-1	11/01/2013	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: Lorne E Portwood

Name: Lorne Portwood

Date: 11/14/13

Title:

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:**	ug/L
Lab Code:	K1311913-001	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	NWTPH-Dx		

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:

ALS Group USA, Corp. dba ALS Environmental

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: MW1-110113
Lab Code: K1311913-002

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA

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:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

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

Service Request: K1311913
Date Collected: NA
Date Received: NA

Diesel and Residual Range Organics - Silica Gel Treated

Sample Name: Method Blank
Lab Code: KWG1312533-3

Units: ug/L
Basis: NA

Extraction Method: EPA 3510C
Analysis Method: 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

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

Service Request: K1311913

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

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp. dba ALS Environmental

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
Lab Code: K1311913-003

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA

Level: Low
Extraction Lot: KWG1312533

			MW3-110113DUP KWG1312533-1 Duplicate Sample			
Analyte Name	**MRL**	**Sample Result**	**Result**	**Average**	**Relative Percent Difference**	**RPD Limit**
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: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG1312533

	Lab Control Sample KWG1312533-2 Lab Control Spike			
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**
Diesel Range Organics (DRO)	3490	3200	109	46-140
Residual Range Organics (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.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	KTA Associates	**Service Request:**	K1311913
Project:	PacifiCorp-Chehalis Power Groundwater	**Date Extracted:**	11/04/2013
Sample Matrix:	Water	**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:	EPA 3510C	**Level:**	Low
Analysis Method:	NWTPH-Dx	**Extraction Lot:**	KWG1312533

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	KTA Associates	**Service Request:**	K1311913
Project:	PacifiCorp-Chehalis Power Groundwater	**Date Extracted:**	11/04/2013
Sample Matrix:	Water	**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:**	Low
Analysis Method:	NWTPH-Dx	**Extraction Lot:**	KWG1312533

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater

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

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

Calibration ID: CAL12766
Instrument ID: GC21

Column: ZB-1

Level ID	File ID	Level ID	File ID
A	J:\GC21\DATA\091013F\0910F072.D	I	J:\GC21\DATA\091013F\0910F096.D
B	J:\GC21\DATA\091013F\0910F074.D	J	J:\GC21\DATA\091013F\0910F098.D
C	J:\GC21\DATA\091013F\0910F076.D	K	J:\GC21\DATA\091013F\0910F100.D
D	J:\GC21\DATA\091013F\0910F078.D	L	J:\GC21\DATA\091013F\0910F102.D
E	J:\GC21\DATA\091013F\0910F080.D	M	J:\GC21\DATA\091013F\0910F104.D
F	J:\GC21\DATA\091013F\0910F082.D	N	J:\GC21\DATA\091013F\0910F106.D
G	J:\GC21\DATA\091013F\0910F092.D		
H	J:\GC21\DATA\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	H	50	924	I	200	965	J	500	972
	K	2000	989	L	5000	1030	M	20000	916	N	50000	920			
Residual Range Organics (RRO)	A	20	968	B	50	756	C	200	699	D	500	627	E	2000	615
	F	5000	588												
o-Terphenyl				G	1.0	1300	H	2.5	1190	I	10	1260	J	25	1280
	K	100	1280	L	250	1330									
n-Triacontane				G	1.0	938	H	2.5	919	I	10	1050	J	25	1080
	K	100	1070	L	250	1160									

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater

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

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

Calibration ID: CAL12766
Instrument ID: GC21

Column: ZB-1

Analyte Name	Compound Type	Calibration Evaluation: 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
Project: PacifiCorp-Chehalis Power Groundwater

Service Request: K1311913
Calibration Date: 09/10/2013
Date Analyzed: 09/11/2013

Second Source Calibration Verification
Diesel and Residual Range Organics - Silica Gel Treated

Calibration Type: External Standard
Analysis Method: NWTPH-Dx

Calibration ID: CAL12766
Units: ppm

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.

† **SPCC Compound** ‡ **CCC Compound**

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: External Standard
Analysis Method: NWTPH-Dx

Calibration Date: 09/10/2013
Calibration ID: CAL12766
Analysis Lot: KWG1312715
Units: ppm
Column ID: ZB-1

File ID: J:\GC21\DATA\111313F\1113F012.D
J:\GC21\DATA\111313F\1113F014.D

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.

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: External Standard
Analysis Method: 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.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater

Service Request: K1311913

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

QA/QC Results

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

Diesel and Residual Range Organics - Silica Gel Treated

Validation Package

Organic Analysis:

Diesel and Residual Range Organics - Silica Gel Treated

Validation Package

QC Reports

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

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

Service Request: K1311913

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	Sur1	Sur2	
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	50-150
Sur2 = n-Triacontane	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
Lab Code: K1311913-003

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA

Level: Low
Extraction Lot: KWG1312533

			MW3-110113DUP KWG1312533-1 Duplicate Sample			
Analyte Name	**MRL**	**Sample Result**	**Result**	**Average**	**Relative Percent Difference**	**RPD Limit**
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.

ALS Group USA, Corp. dba ALS Environmental

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: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG1312533

	Lab Control Sample KWG1312533-2 Lab Control Spike			
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**
Diesel Range Organics (DRO)	3490	3200	109	46-140
Residual Range Organics (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.

QA/QC Report

Client:	KTA Associates	**Service Request:**	K1311913
Project:	PacifiCorp-Chehalis Power Groundwater	**Date Extracted:**	11/04/2013
Sample Matrix:	Water	**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:	EPA 3510C	**Level:**	Low
Analysis Method:	NWTPH-Dx	**Extraction Lot:**	KWG1312533

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

Client:	KTA Associates	**Service Request:**	K1311913
Project:	PacifiCorp-Chehalis Power Groundwater	**Date Extracted:**	11/04/2013
Sample Matrix:	Water	**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:**	Low
Analysis Method:	NWTPH-Dx	**Extraction Lot:**	KWG1312533

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:

Diesel and Residual Range Organics - Silica Gel Treated

Validation Package

Raw Data

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:**	ug/L
Lab Code:	K1311913-001	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	NWTPH-Dx		

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:

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\111313F\1113F036.D Vial: 9
Acq On : 13 Nov 2013 3:09 pm Operator: DVaillenco
Sample : K1311913-001 Inst : GC21
Misc : Multiplr: 1.00
IntFile : rteint.p
Quant 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

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	2.89	30629	54.019 ppm
Spiked Amount 50.000	Recovery	=	108.04%
2) S o-Terphenyl	5.57	88863	69.792 ppm
Spiked Amount 50.000	Recovery	=	139.58%
3) S n-Triacontane	7.75	80077	77.302 ppm
Spiked Amount 50.000	Recovery	=	154.60%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	175859	152.787 ppm
5) H C10-C25ex DRO [AK102]	3.23	174588	154.257 ppm
6) H C10-C28in DRO [8015]	3.13	218133	192.468 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	171676	177.816 ppm
8) H C25-C36in RRO [NWTPH]	6.66	137500	216.177 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	182680	197.480 ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

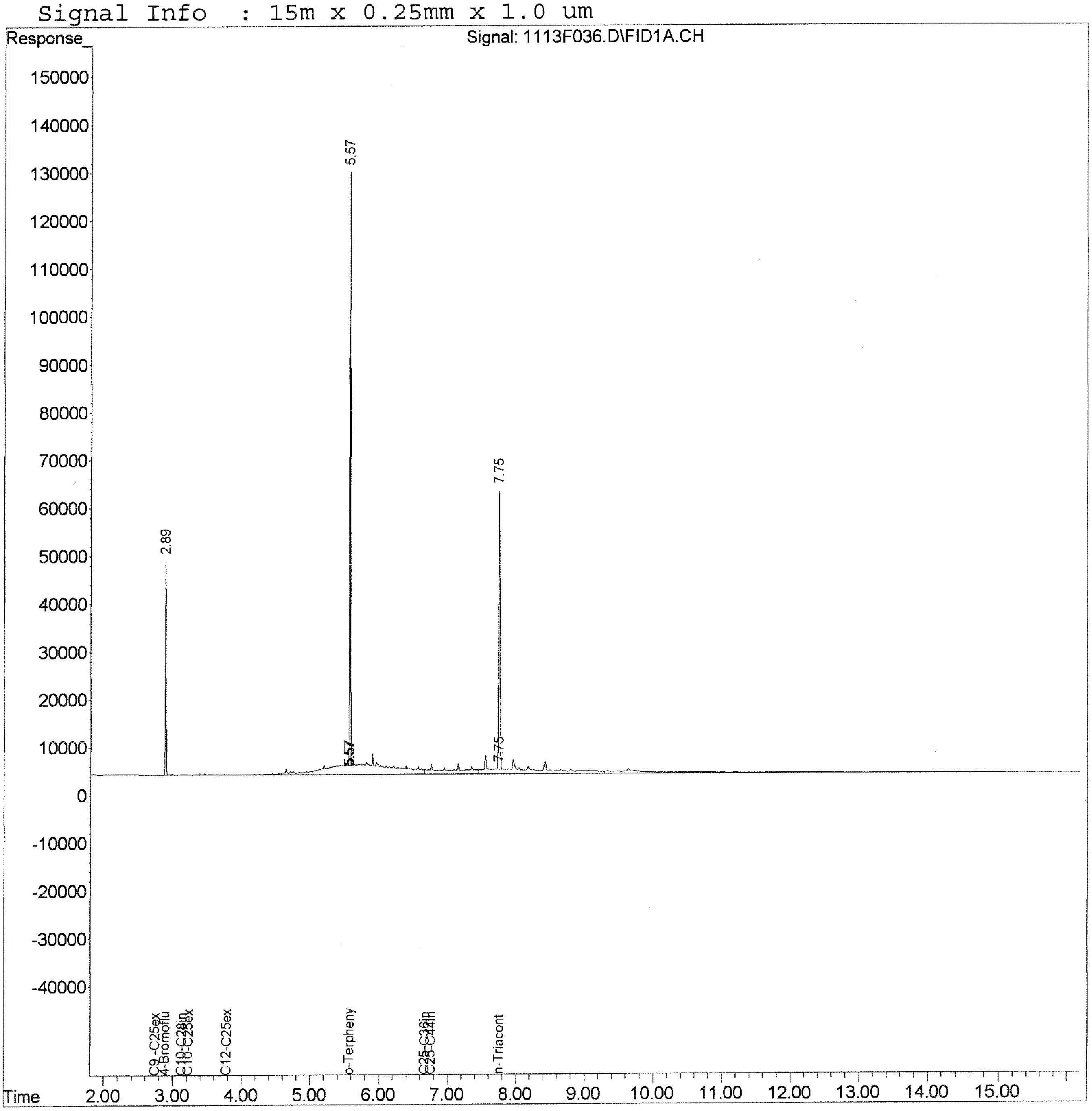
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\111313F\1113F036.D
Acq On : 13 Nov 2013 3:09 pm
Sample : K1311913-001
Misc :
IntFile : rteint.p
Quant Time: Nov 14 8:15 2013 Quant Results File: 091013FSRO.RES

Vial: 9
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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



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:**	ug/L
Lab Code:	K1311913-002	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	NWTPH-Dx		

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:

Exception Report

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

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

Secondary Review: ____________

Quantitation Report

Data File:	J:\GC21\DATA\111313F\1113F038.D			**Instrument:**	GC21
Acqu Date:	11/13/2013 15:31	**Quant Date:**	11/14/2013 08:15	**Vial:**	10
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	K1311913-002			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**	11/01/2013	**Receive Date:**	11/01/2013

Analysis Lot:	KWG1312715	**Prep Lot:**	KWG1312533	**Report Group:**	K1311913
Analysis Method:	NWTPH-Dx	**Prep Method:**	EPA 3510C		
		Prep Date:	11/04/2013		
Prep Ref:	1302599				

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:	Diesel and Residual Range Organics - Silica Gel Treated	**Report List ID:**	LJ1365
		Method ID:	MJ227
MB Ref:	J:\GC21\DATA\111313F\1113F034.D	**Quant based on Report List**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.58	0.01	87028	68.35	137	50-150	OK	
n-Triacontane	7.75	0.00	76930	74.26	149	50-150	OK	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		8416	8.72	19	J	
Residual Range Organics (RRO)	6.66		15558	11.45	24	J	

Prep Amount:	470 mL	**Dilution:**	1.0
Prep Final Vol:	1 mL	**Unit Factor:**	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

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 (Not Reviewed)

Data File : J:\GC21\DATA\111313F\1113F038.D Vial: 10
Acq On : 13 Nov 2013 3:31 pm Operator: DVaillenco
Sample : K1311913-002 Inst : GC21
Misc : Multiplr: 1.00
IntFile : rteint.p
Quant 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

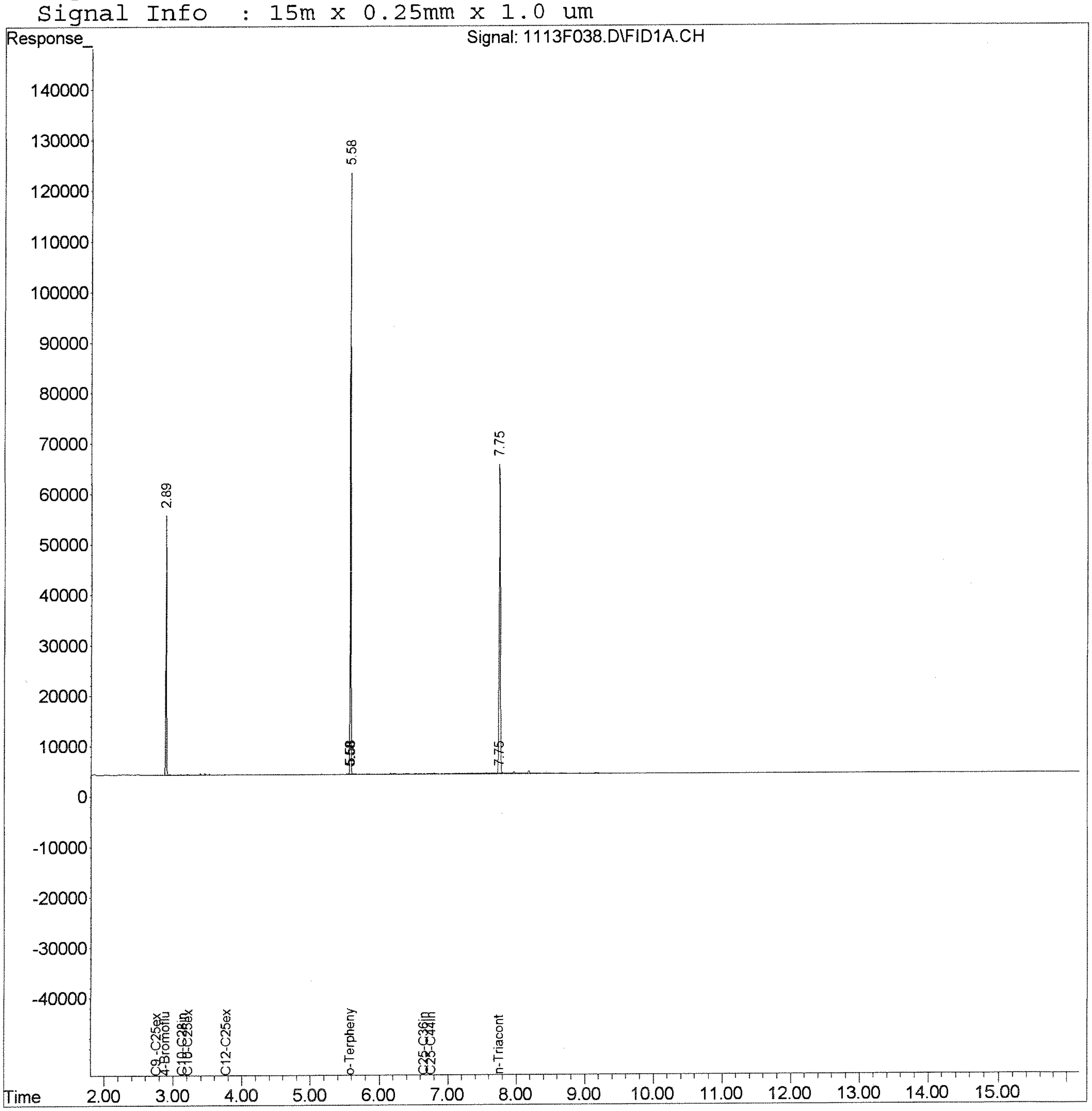
Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	2.89	35514	62.634 ppm
Spiked Amount 50.000	Recovery	=	125.27%
2) S o-Terphenyl	5.58	87028	68.351 ppm
Spiked Amount 50.000	Recovery	=	136.70%
3) S n-Triacontane	7.75	76930	74.264 ppm
Spiked Amount 50.000	Recovery	=	148.53%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	11806	10.257 ppm
5) H C10-C25ex DRO [AK102]	3.23	10927	9.655 ppm
6) H C10-C28in DRO [8015]	3.13	15595	13.760 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	8416	8.717 ppm
8) H C25-C36in RRO [NWTPH]	6.66	15558	11.453 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	20041	16.419 ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (Not Reviewed)

```
Data File : J:\GC21\DATA\111313F\1113F038.D              Vial: 10
Acq On    : 13 Nov 2013   3:31 pm                    Operator: DVaillenco
Sample    : K1311913-002                             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
```



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:**	ug/L
Lab Code:	K1311913-003	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	NWTPH-Dx		

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:

Exception Report

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

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

Secondary Review:

Printed: 11/14/2013 09:18:36
u:\Stealth\Crystal.rpt\except2.rpt

Quantitation Report

Data File:	J:\GC21\DATA\111313F\1113F040.D			**Instrument:**	GC21
Acqu Date:	11/13/2013 15:54	**Quant Date:**	11/14/2013 08:15	**Vial:**	11
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	K1311913-003			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**	11/01/2013	**Receive Date:**	11/01/2013

Analysis Lot:	KWG1312715	**Prep Lot:**	KWG1312533	**Report Group:**	K1311913
Analysis Method:	NWTPH-Dx	**Prep Method:**	EPA 3510C		
		Prep Date:	11/04/2013		
Prep Ref:	1302600				

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:	Diesel and Residual Range Organics - Silica Gel Treated	**Report List ID:**	LJ1365
		Method ID:	MJ227
MB Ref:	J:\GC21\DATA\111313F\1113F034.D	**Quant based on Report List**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.58	0.01	70016	54.99	110	50-150	OK	
n-Triacontane	7.75	0.00	60222	58.14	116	50-150	OK	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		17318	17.94	37	J	
Residual Range Organics (RRO)	6.66		22511	23.13	48	J	

Prep Amount:	480 mL	**Dilution:**	1.0
Prep Final Vol:	1 mL	**Unit Factor:**	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

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\1113F040.D Vial: 11
Acq On : 13 Nov 2013 3:54 pm Operator: DVaillenco
Sample : K1311913-003 Inst : GC21
Misc : Multiplr: 1.00
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

Compound	R.T.	Response	Conc Units
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) H C9 -C25ex DRO [TPH-Diesel]	2.75	21251	18.463 ppm
5) H C10-C25ex DRO [AK102]	3.23	20087	17.748 ppm
6) H C10-C28in DRO [8015]	3.13	28225	24.904 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	17318	17.937 ppm
8) H C25-C36in RRO [NWTPH]	6.66	22511	23.126 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	28155	25.452 ppm

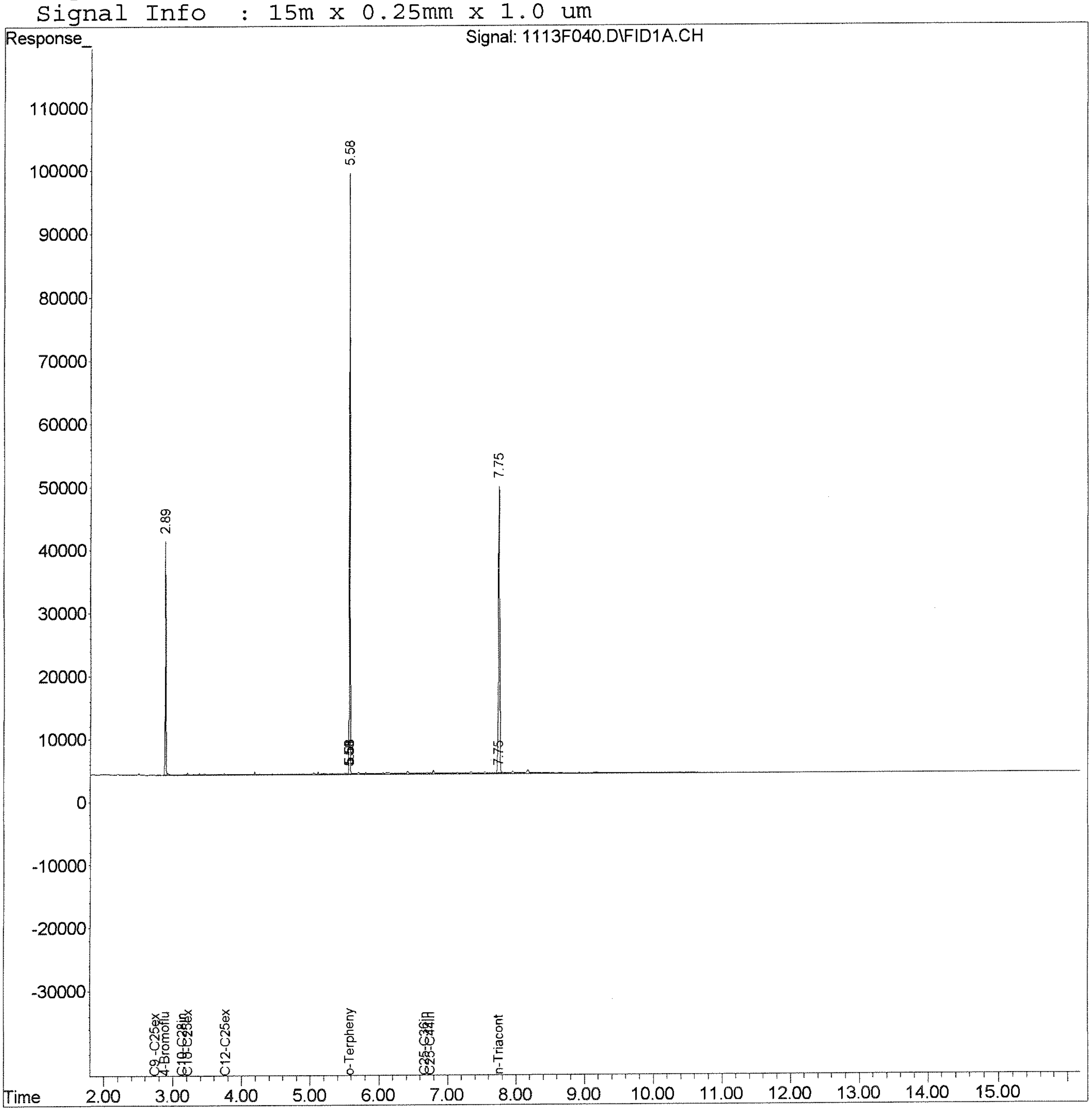
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\111313F\1113F040.D Vial: 11
Acq On : 13 Nov 2013 3:54 pm Operator: DVaillenco
Sample : K1311913-003 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



ALS Group USA, Corp. dba ALS Environmental

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
Lab Code: KWG1312533-1

Units: ug/L
Basis: NA

Extraction Method: EPA 3510C
Analysis Method: 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:

Exception Report

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

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

Primary Review: ________

Secondary Review: ________

Quantitation Report

Data File:	J:\GC21\DATA\111313F\1113F042.D			**Instrument:**	GC21
Acqu Date:	11/13/2013 16:16	**Quant Date:**	11/14/2013 08:15	**Vial:**	12
Run Type:	DUP			**Dilution:**	1.0
Lab ID:	KWG1312533-1			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	WATER
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312715	**Prep Lot:**	KWG1312533	**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**	EPA 3510C		
Prep Ref:	1302601	**Prep Date:**	11/04/2013		

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:		**Method ID:**	MJ227
MB Ref:	J:\GC21\DATA\111313F\1113F034.D	**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.58	0.01	68845	54.07	108	50-150	OK	
n-Triacontane	7.75	0.00	59460	57.40	115	50-150	OK	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		14433	12.54	270	U	
Diesel Range Organics (DRO)	3.78		10419	10.79	23.0	J	
Residual Range Organics (RRO)	6.66		16834	13.60	28.9	J	
C25 - C44 RRO	6.76		22250	18.88	540	U	

Prep Amount:	470 mL	**Dilution:**	1.0
Prep Final Vol:	1 mL	**Unit Factor:**	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

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\1113F042.D Vial: 12
Acq On : 13 Nov 2013 4:16 pm Operator: DVaillenco
Sample : K1311913-003DUP Inst : GC21
Misc : Multiplr: 1.00
IntFile : rteint.p
Quant 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 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			
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	Recovery	=	114.80%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	14433	12.539 ppm
5) H C10-C25ex DRO [AK102]	3.23	13172	11.638 ppm
6) H C10-C28in DRO [8015]	3.13	17680	15.600 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	10419	10.792 ppm
8) H C25-C36in RRO [NWTPH]	6.66	16834	13.595 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	22250	18.878 ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

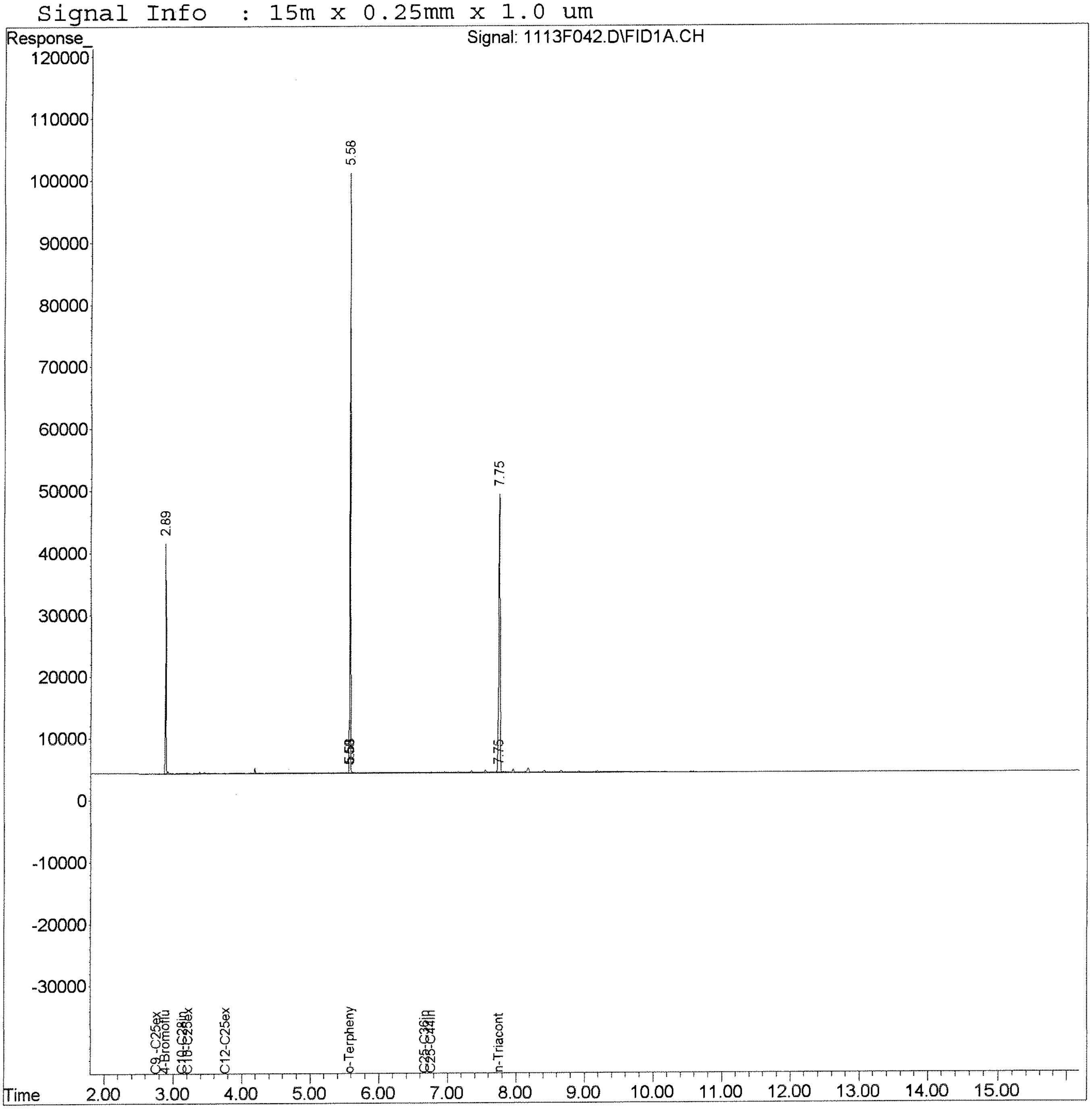
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\111313F\1113F042.D
Acq On : 13 Nov 2013 4:16 pm
Sample : K1311913-003DUP
Misc :
IntFile : rteint.p
Quant Time: Nov 14 8:15 2013 Quant Results File: 091013FSRO.RES

Vial: 12
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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



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:**	ug/L
Lab Code:	KWG1312533-3	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	NWTPH-Dx		

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:

Exception Report

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

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

Primary Review: 11/14/13

Secondary Review: ______

Printed: 11/14/2013 09:18:27
u:\Stealth\Crystal.rpt\except2.rpt

Quantitation Report

Data File:	J:\GC21\DATA\111313F\1113F034.D			**Instrument:**	GC21
Acqu Date:	11/13/2013 14:47	**Quant Date:**	11/14/2013 08:15	**Vial:**	8
Run Type:	MB			**Dilution:**	1.0
Lab ID:	KWG1312533-3			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	WATER
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312715	**Prep Lot:**	KWG1312533	**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**	EPA 3510C		
Prep Ref:	1302603	**Prep Date:**	11/04/2013		

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ227
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.58	0.01	62617	49.18	98	50-150	OK	
n-Triacontane	7.75	0.00	56490	54.53	109	50-150	OK	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		5667	4.92	250	U	
Diesel Range Organics (DRO)	3.78		2820	2.92	11	U	
Residual Range Organics (RRO)	6.66		9055	0.5350	19	U	
C25 - C44 RRO	6.76		15220	11.05	500	U	

Prep Amount:	500 mL	**Dilution:**	1.0
Prep Final Vol:	1 mL	**Unit Factor:**	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

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\1113F034.D Vial: 8
Acq On : 13 Nov 2013 2:47 pm Operator: DVaillenco
Sample : KQ1313041-03MB Inst : GC21
Misc : Multiplr: 1.00
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

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	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) H C9 -C25ex DRO [TPH-Diesel]	2.75	5667	4.924 ppm
5) H C10-C25ex DRO [AK102]	3.23	4881	4.313 ppm
6) H C10-C28in DRO [8015]	3.13	6350	5.603 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	2820	2.921 ppm
8) H C25-C36in RRO [NWTPH]	6.66	9055	0.535 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	15220	11.052 ppm

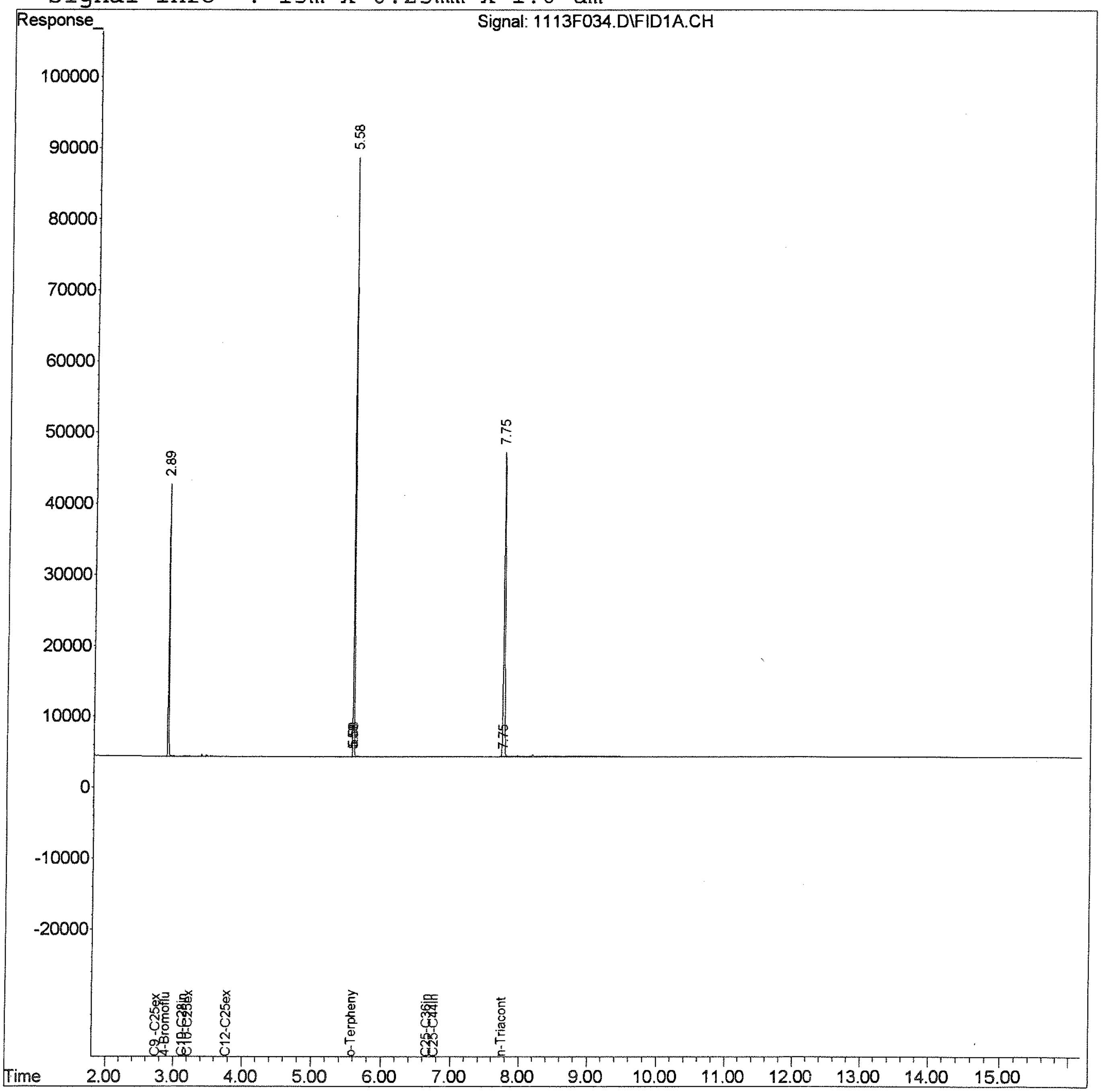
(f)=RT Delta > 1/2 Window (m)=manual int.

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
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



ALS Group USA, Corp. dba ALS Environmental

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:**	ug/L
Lab Code:	KWG1312533-2	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	NWTPH-Dx		

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:

Exception Report

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

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

Primary Review: 11/14/13

Secondary Review:

Quantitation Report

Data File:	J:\GC21\DATA\111313F\1113F032.D			**Instrument:**	GC21
Acqu Date:	11/13/2013 14:24	**Quant Date:**	11/14/2013 08:15	**Vial:**	7
Run Type:	LCS			**Dilution:**	1.0
Lab ID:	KWG1312533-2			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	WATER
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312715	**Prep Lot:**	KWG1312533	**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**	EPA 3510C		
Prep Ref:	1302602	**Prep Date:**	11/04/2013		

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ227
MB Ref:	J:\GC21\DATA\111313F\1113F034.D	**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.58	0.01	75517	59.31	119	50-150	OK	
n-Triacontane	7.75	0.00	65945	63.66	127	50-150	OK	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		2026384	1,761	3520		
Diesel Range Organics (DRO)	3.78		1684045	1,744	3490		
Residual Range Organics (RRO)	6.66		615581	1,019	2040		
C25 - C44 RRO	6.76		897223	992.96	1990		

Prep Amount:	500 mL	**Dilution:**	1.0
Prep Final Vol:	1 mL	**Unit Factor:**	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

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
Acq On : 13 Nov 2013 2:24 pm
Sample : KQ1313041-02LCS
Misc :
IntFile : rteint.p
Quant Time: Nov 14 08:15:22 2013 Quant Results File: 091013FSRO.RES

Vial: 7
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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

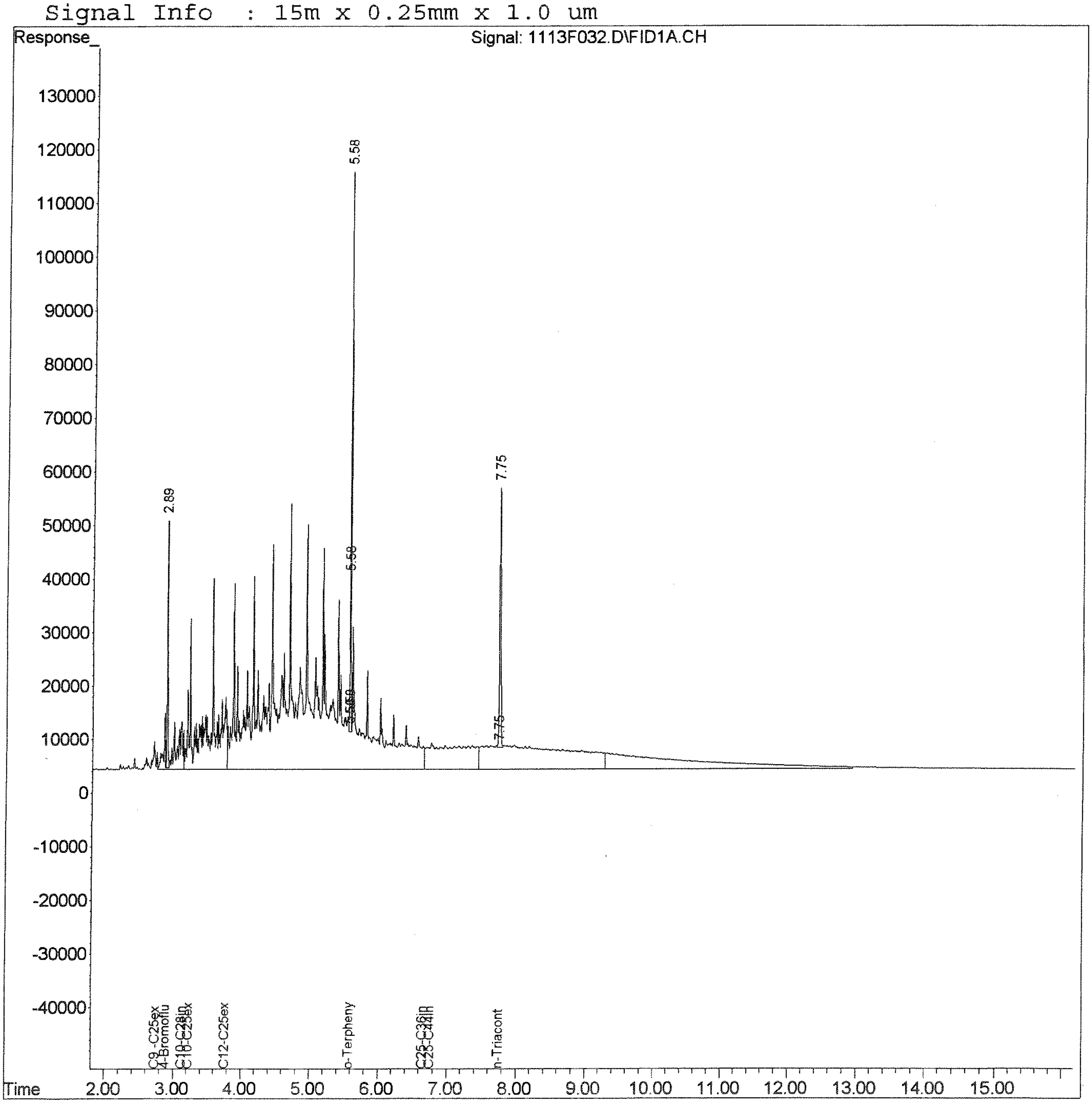
Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
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) H C9 -C25ex DRO [TPH-Diesel]	2.75	2026384	1760.536 ppm
5) H C10-C25ex DRO [AK102]	3.23	1957048	1729.144 ppm
6) H C10-C28in DRO [8015]	3.13	2153984	1900.552 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	1684045	1744.276 ppm
8) H C25-C36in RRO [NWTPH]	6.66	615581	1018.812 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	897223	992.959 ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\111313F\1113F032.D                Vial: 7
Acq On    : 13 Nov 2013   2:24 pm                      Operator: DVaillenco
Sample    : KQ1313041-02LCS                            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
```



Organic Analysis:

Diesel and Residual Range Organics - Silica Gel Treated

Validation Package

Standards Data

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater

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

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

Calibration ID: CAL12766
Instrument ID: GC21

Column: ZB-1

Level ID	File ID
A	J:\GC21\DATA\091013F\0910F072.D
B	J:\GC21\DATA\091013F\0910F074.D
C	J:\GC21\DATA\091013F\0910F076.D
D	J:\GC21\DATA\091013F\0910F078.D
E	J:\GC21\DATA\091013F\0910F080.D
F	J:\GC21\DATA\091013F\0910F082.D
G	J:\GC21\DATA\091013F\0910F092.D
H	J:\GC21\DATA\091013F\0910F094.D
I	J:\GC21\DATA\091013F\0910F096.D
J	J:\GC21\DATA\091013F\0910F098.D
K	J:\GC21\DATA\091013F\0910F100.D
L	J:\GC21\DATA\091013F\0910F102.D
M	J:\GC21\DATA\091013F\0910F104.D
N	J:\GC21\DATA\091013F\0910F106.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	H	50	924	I	200	965	J	500	972
	K	2000	989	L	5000	1030	M	20000	916	N	50000	920			
Residual Range Organics (RRO)	A	20	968	B	50	756	C	200	699	D	500	627	E	2000	615
	F	5000	588												
o-Terphenyl				G	1.0	1300	H	2.5	1190	I	10	1260	J	25	1280
	K	100	1280	L	250	1330									
n-Triacontane				G	1.0	938	H	2.5	919	I	10	1050	J	25	1080
	K	100	1070	L	250	1160									

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater

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

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

Calibration ID: CAL12766
Instrument ID: GC21

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.

QA/QC Results

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater

Service Request: K1311913
Calibration Date: 09/10/2013
Date Analyzed: 09/11/2013

Second Source Calibration Verification
Diesel and Residual Range Organics - Silica Gel Treated

Calibration Type: External Standard
Analysis Method: NWTPH-Dx

Calibration ID: CAL12766
Units: ppm

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.

† **SPCC Compound** ‡ **CCC Compound**

Injection Log

Directory: j:\GC21\data\091013F

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	90	0910F002.D	1.	DCM		09/10/22013 7:04
2	90	0910F004.D	1.	DCM		09/10/22013 7:26
3	90	0910F006.D	1.	DCM		09/10/22013 7:48
4	90	0910F008.D	1.	DCM		09/10/22013 8:10
5	97	0910F010.D	1.	RRO CCV CHK		09/10/22013 8:32
6	96	0910F012.D	1.	DRO CCV CHK		09/10/22013 8:55
7	90	0910F014.D	1.	DCM		09/10/22013 9:17
8	90	0910F016.D	1.	DCM		09/10/22013 9:39
9	90	0910F018.D	1.	DCM	091013FSRO	09/10/22013 10:0
10	90	0910F020.D	1.	DCM		09/10/22013 10:2
11	90	0910F022.D	1.	DCM		09/10/22013 10:4
12	90	0910F024.D	1.	DCM	CAL12766	09/10/22013 11:0
13	90	0910F026.D	1.	DCM		09/10/22013 12:1
14	90	0910F028.D	1.	DCM		09/10/22013 12:3
15	90	0910F030.D	1.	DCM		09/10/22013 12:5
16	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 @ 1000ppm | SVF01-42I		09/10/22013 2:25
20	96	0910F040.D	1.	DRO @ 1000/50ppm | SVF01-37K		09/10/22013 2:47
21	86	0910F042.D	1.	IB		09/10/22013 3:09
22	90	0910F044.D	1.	DCM	NR	09/10/22013 3:32
23	90	0910F046.D	1.	DCM	column compdone	09/10/22013 3:54
24	90	0910F048.D	1.	DCM		09/10/22013 4:58
25	90	0910F050.D	1.	DCM/~~IB~~		09/10/22013 5:20
26	1	0910F052.D	1.	AK103 @ 20ppm | SVF01-38M	not used for SRO Cals	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
30	5	0910F060.D	1.	AK103 @2000ppm | SVF01-38I	9/11/13	09/10/22013 7:11
31	6	0910F062.D	1.	AK103 @ 5000ppm | SVF01-38H		09/10/22013 7:33
32	90	0910F064.D	1.	DCM - CARRYOVER		09/10/22013 7:55
33	90	0910F066.D	1.	DCM - CARRYOVER		09/10/22013 8:18
34	7	0910F068.D	1.	AK ICV @ 1000ppm | SVF01-41K		09/10/22013 8:40
35	90	0910F070.D	1.	DCM	9/11/13	09/10/22013 9:02
36	8	0910F072.D	1.	RRO @ 20ppm | SVF01-40N		09/10/22013 9:24
37	9	0910F074.D	1.	RRO @ 50ppm | SVF01-40M		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	13	0910F082.D	1.	RRO @ 5000ppm | SVF01-40I		09/10/22013 11:1
42	90	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 12:2
45	90	0910F090.D	1.	DCM		09/11/22013 12:4
46	15	0910F092.D	1.	DRO @ 20/1.0ppm | SVF01-42H		09/11/22013 1:07
47	16	0910F094.D	1.	DRO @ 50/2.5ppm | SVF01-42G		09/11/22013 1:29
48	17	0910F096.D	1.	DRO @ 200/10ppm | SVF01-42F		09/11/22013 1:51
49	18	0910F098.D	1.	DRO @ 500/25ppm | SVF01-42E		09/11/22013 2:14
50	19	0910F100.D	1.	DRO @ 2000/100ppm | SVF01-42D		09/11/22013 2:36
51	20	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	22	0910F106.D	1.	DRO @ 50000ppm | SVF01-42A		09/11/22013 3:42
54	90	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

11 Sep 2013 07:04

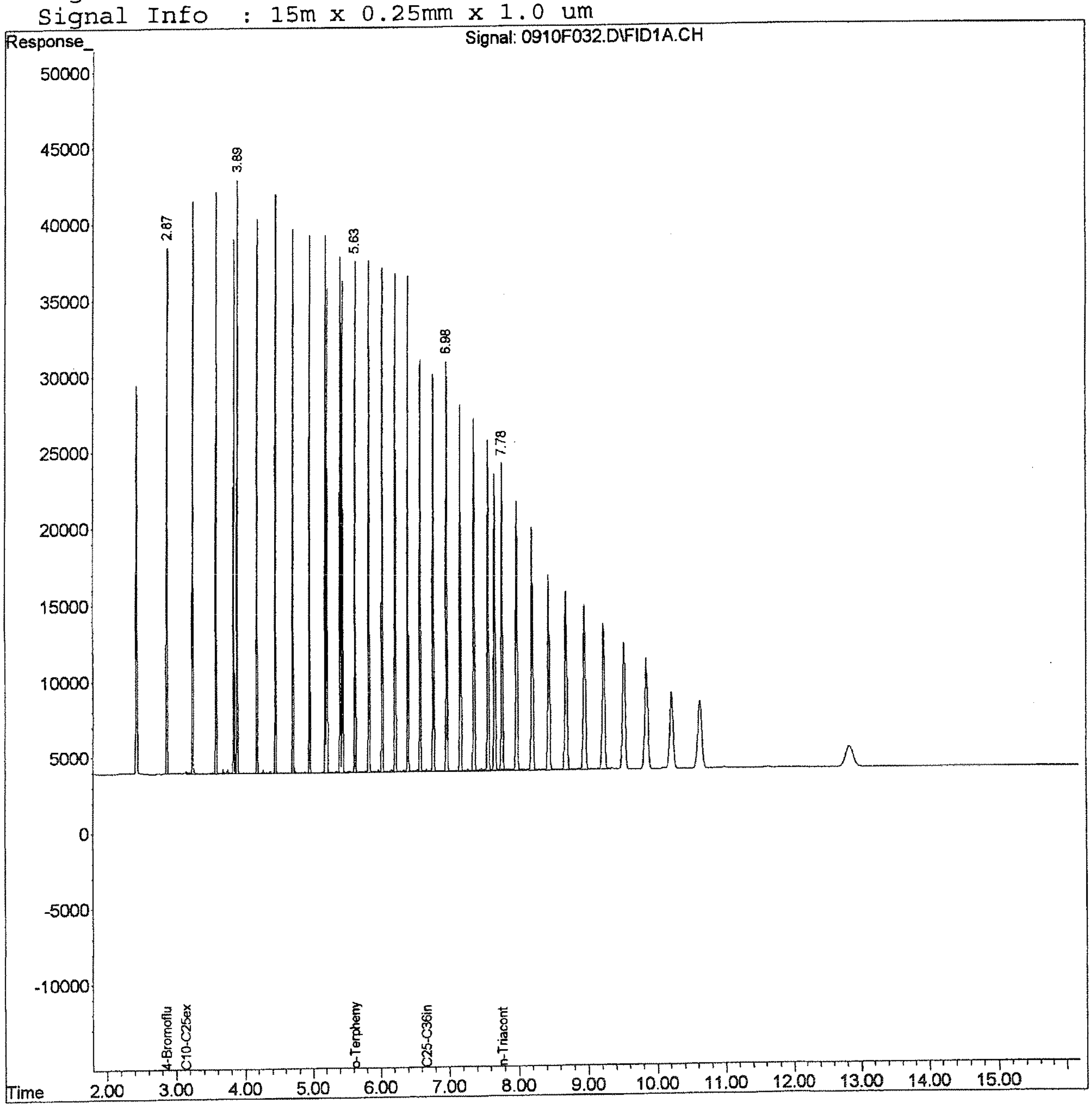
Quantitation Report (Not Reviewed)

Data File : J:\GC21\DATA\091013F-AK\0910F032.D
Acq On : 10 Sep 2013 1:18 pm
Sample : ALIPHATICS MARKER | SVF01-34L
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:25 2013 Quant Results File: 091013FAKO.RES

Vial: 91
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

Quant Method : J:\GC21\METHODS\091013FAKO.M (RTE Integrator)
Title : AK102/AK103 Semivolatile Range Organics CAL
Last Update : Wed Sep 11 07:19:17 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



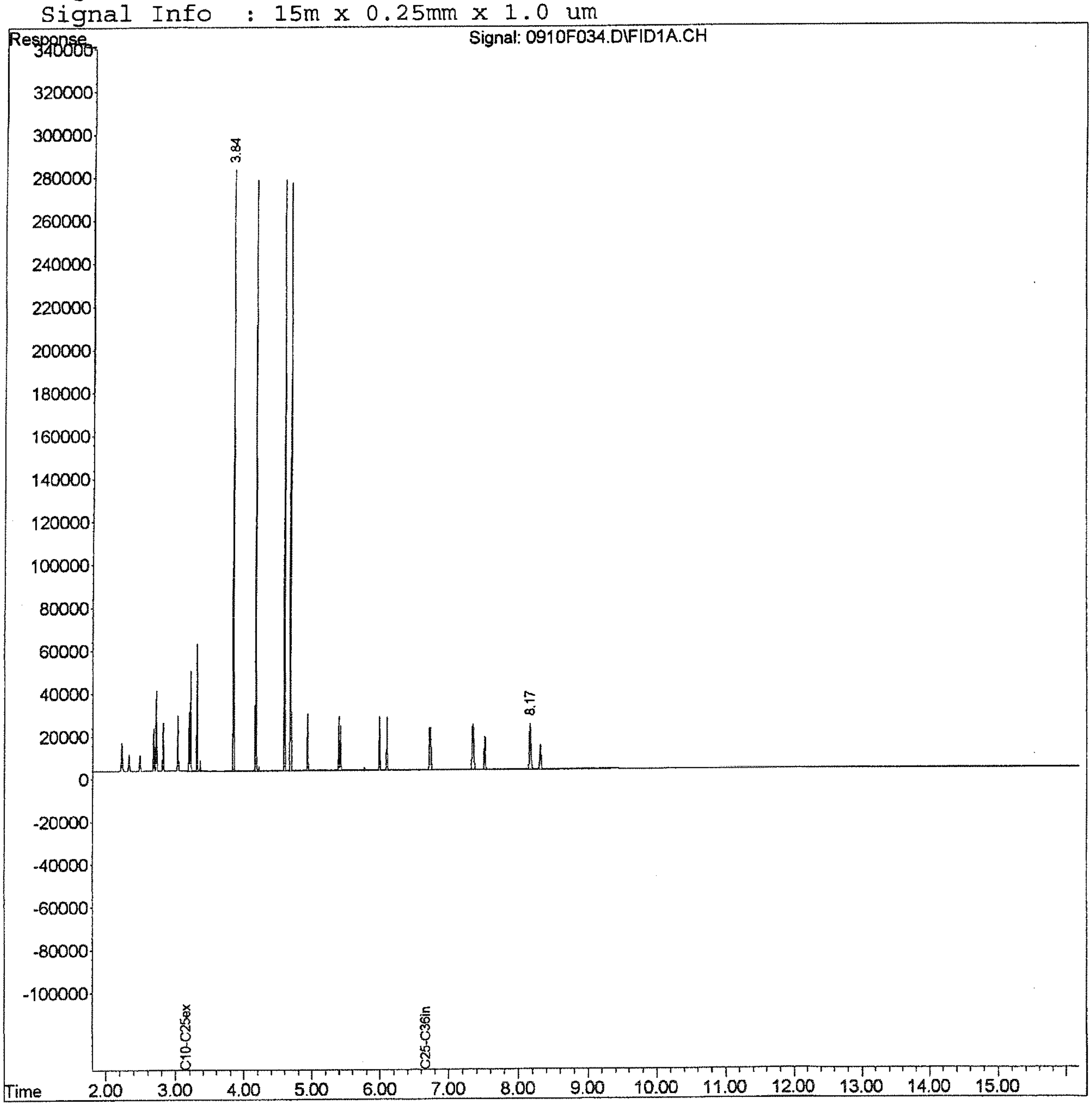
Quantitation Report (Not Reviewed)

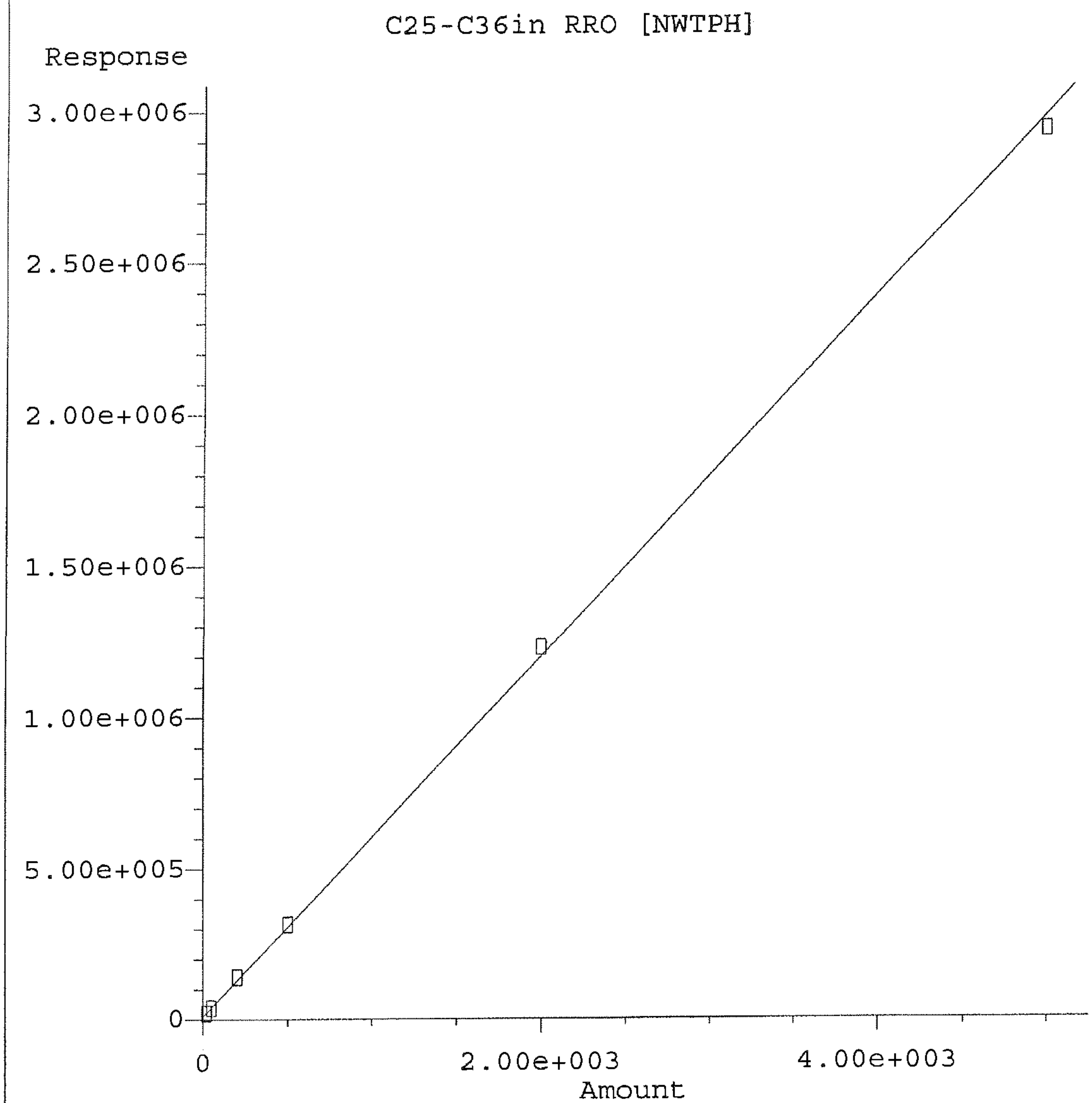
Data File : J:\GC21\DATA\091013F-AK\0910F034.D
Acq On : 10 Sep 2013 1:40 pm
Sample : AROMATICS MARKER | SVF01-29C
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:25 2013 Quant Results File: 091013FAKO.RES

Vial: 92
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

Quant Method : J:\GC21\METHODS\091013FAKO.M (RTE Integrator)
Title : AK102/AK103 Semivolatile Range Organics CAL
Last Update : Wed Sep 11 07:19:17 2013
Response via : Single Level Calibration
DataAcq Meth : SVF_FB.M

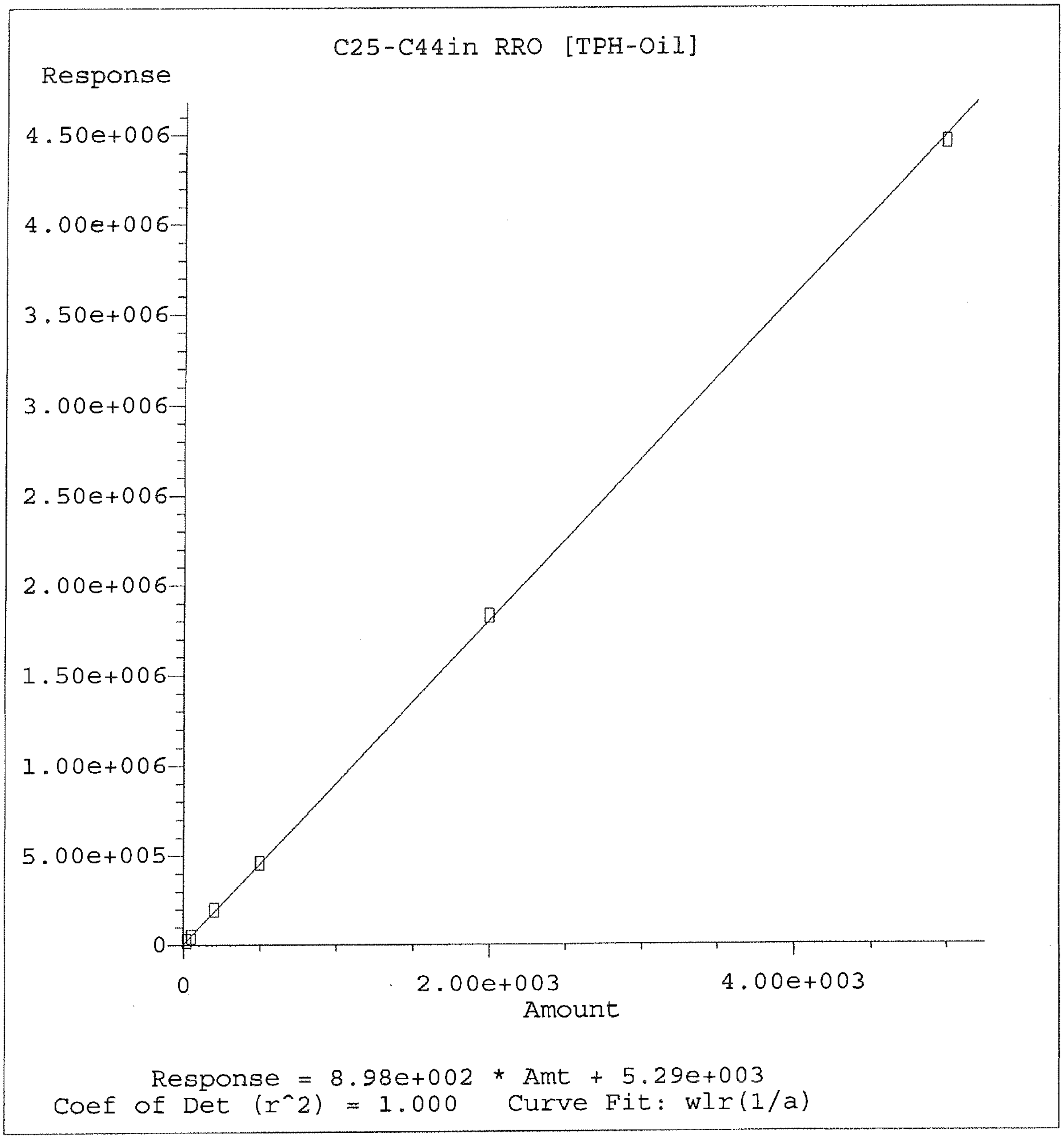
Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um





Response = 5.96e+002 * Amt + 8.74e+003
Coef of Det (r^2) = 0.999 Curve Fit: wlr(1/a)

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

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F050.D
Acq On : 10 Sep 2013 5:20 pm
Sample : DCM 15B
Misc :
IntFile : rteint.p
Quant Time: Sep 11 08:39:35 2013 Quant Results File: 091013FSRO.RES

Vial: 90
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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			
4)	H	C9 -C25ex DRO [TPH-Diesel]	2.77	5537	4.811 ppm
5)	H	C10-C25ex DRO [AK102]	3.15	4971	4.392 ppm
6)	H	C10-C28in DRO [8015]	3.15	7169	6.326 ppm
7)	H	C12-C25ex DRO [NWTPH]	3.79	3571	3.699 ppm
8)	H	C25-C36in RRO [NWTPH]	6.68	10640	3.196 ppm
9)	H	C25-C44in RRO [TPH-Oil]	6.78	17001	13.034 ppm

9/11/13

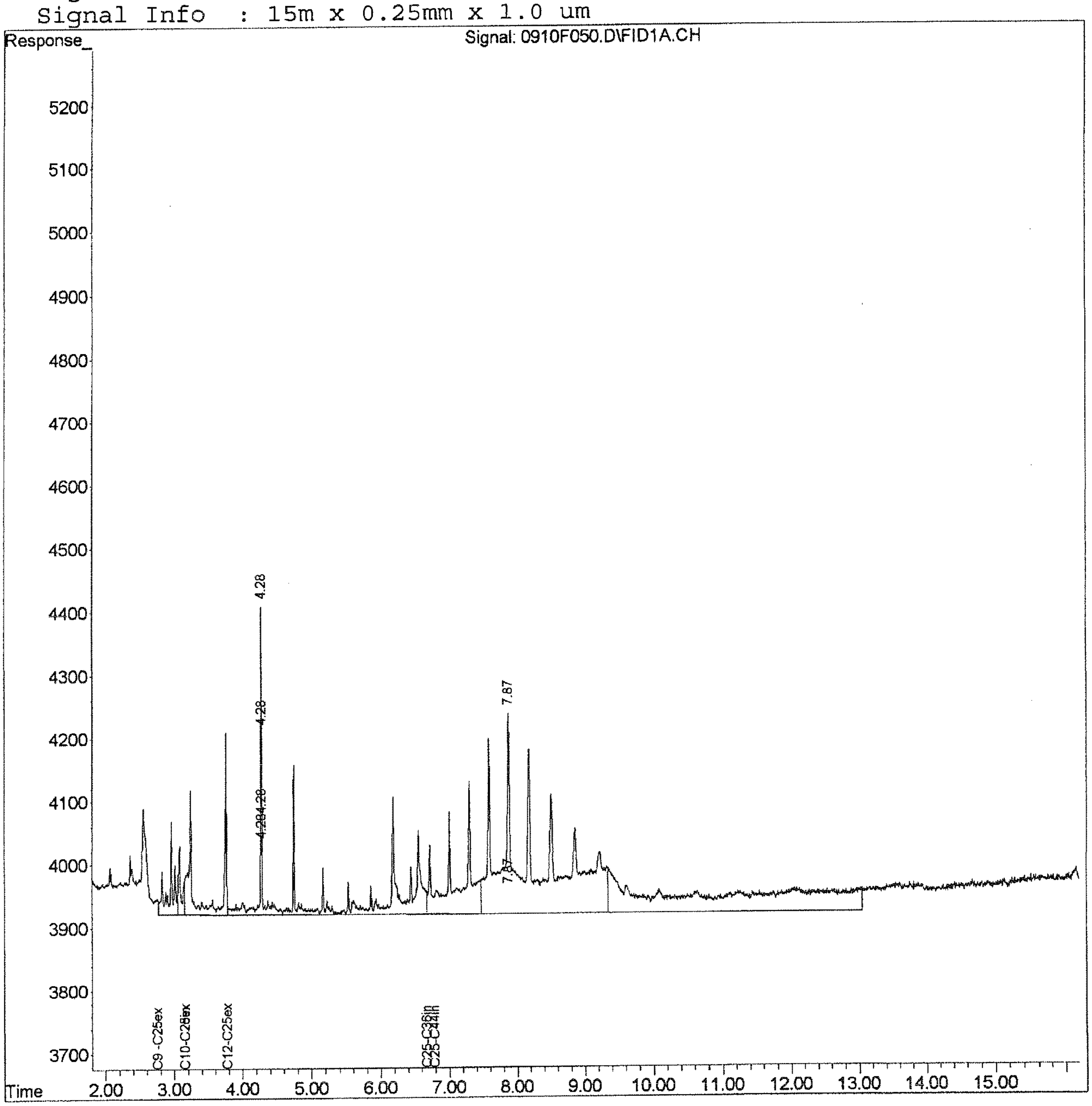
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report   (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F050.D   Vial: 90
Acq On   : 10 Sep 2013   5:20 pm   Operator: DVaillenco
Sample   : DCM   Inst   : GC21
Misc   :   Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Sep 11 8:43 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 : 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



Quantitation Report (Not Reviewed)

Data File : J:\GC21\DATA\091013F\0910F072.D
Acq On : 10 Sep 2013 9:24 pm
Sample : RRO @ 20ppm | SVF01-40N
Misc :
IntFile : rteint.p
Quant Time: Sep 11 08:27:18 2013 Quant Results File: 091013FSRO.RES

Vial: 8
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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

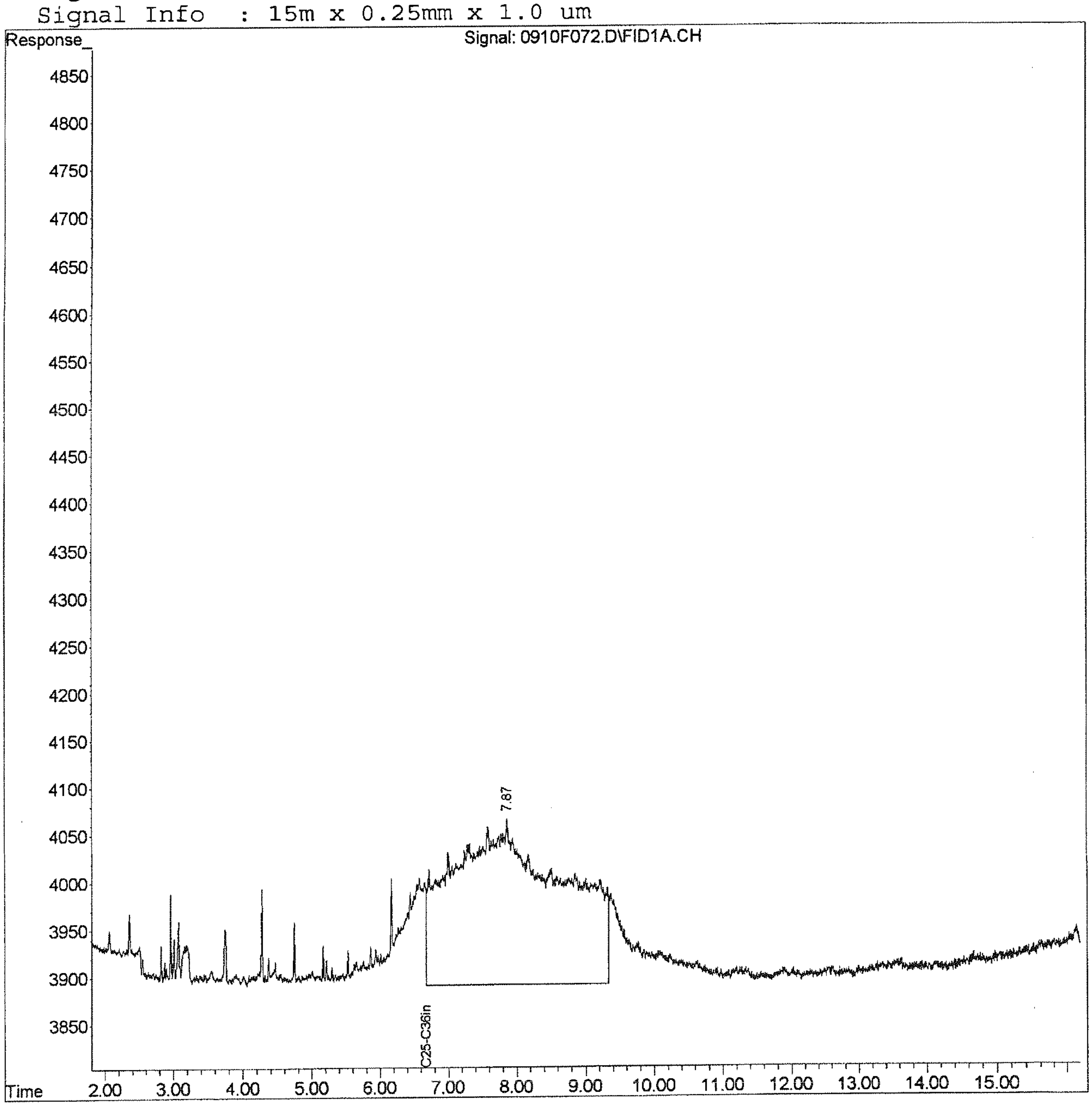
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
8) H C25-C36in RRO [NWTPH]	6.68	19355	12.110 ppm

9/13/13

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (Not Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F072.D          Vial: 8
Acq On    : 10 Sep 2013   9:24 pm                Operator: DVaillenco
Sample    : RRO @ 20ppm | SVF01-40N              Inst     : GC21
Misc      :                                      Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Sep 11  8:31 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
DataAcq Meth : SVF_FB.M

Volume Inj.  : 1 uL
Signal Phase : ZB-1
Signal Info  : 15m x 0.25mm x 1.0 um
```



Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F074.D
Acq On : 10 Sep 2013 9:46 pm
Sample : RRO @ 50ppm | SVF01-40M
Misc :
IntFile : rteint.p
Quant Time: Sep 11 08:27:19 2013 Quant Results File: 091013FSRO.RES

Vial: 9
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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

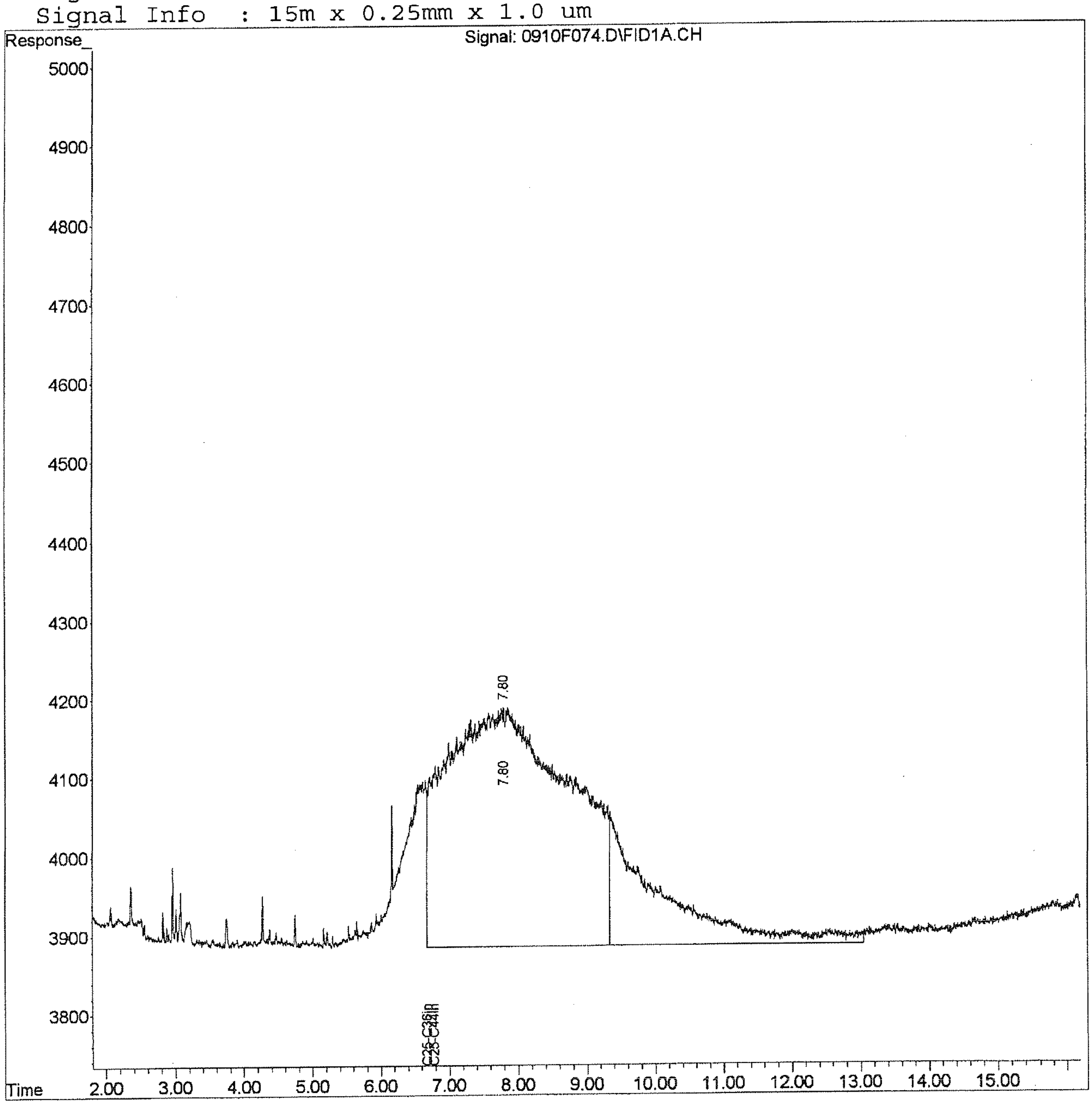
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
8) H C25-C36in RRO [NWTPH]	6.68	37796	44.867 ppm
9) H C25-C44in RRO [TPH-Oil]	6.78	46305	16.227 ppm

DV 9/11/13
W

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

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F074.D          Vial: 9
Acq On    : 10 Sep 2013   9:46 pm               Operator: DVaillenco
Sample    : RRO @ 50ppm | SVF01-40M             Inst     : GC21
Misc      :                                     Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Sep 11  8:31 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
DataAcq Meth : SVF_FB.M

Volume Inj.  : 1 uL
Signal Phase : ZB-1
Signal Info  : 15m x 0.25mm x 1.0 um
```



Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F076.D
Acq On : 10 Sep 2013 10:09 pm
Sample : RRO @ 200ppm | SVF01-40L
Misc :
IntFile : rteint.p
Quant Time: Sep 11 08:27:19 2013 Quant Results File: 091013FSRO.RES

Vial: 10
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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

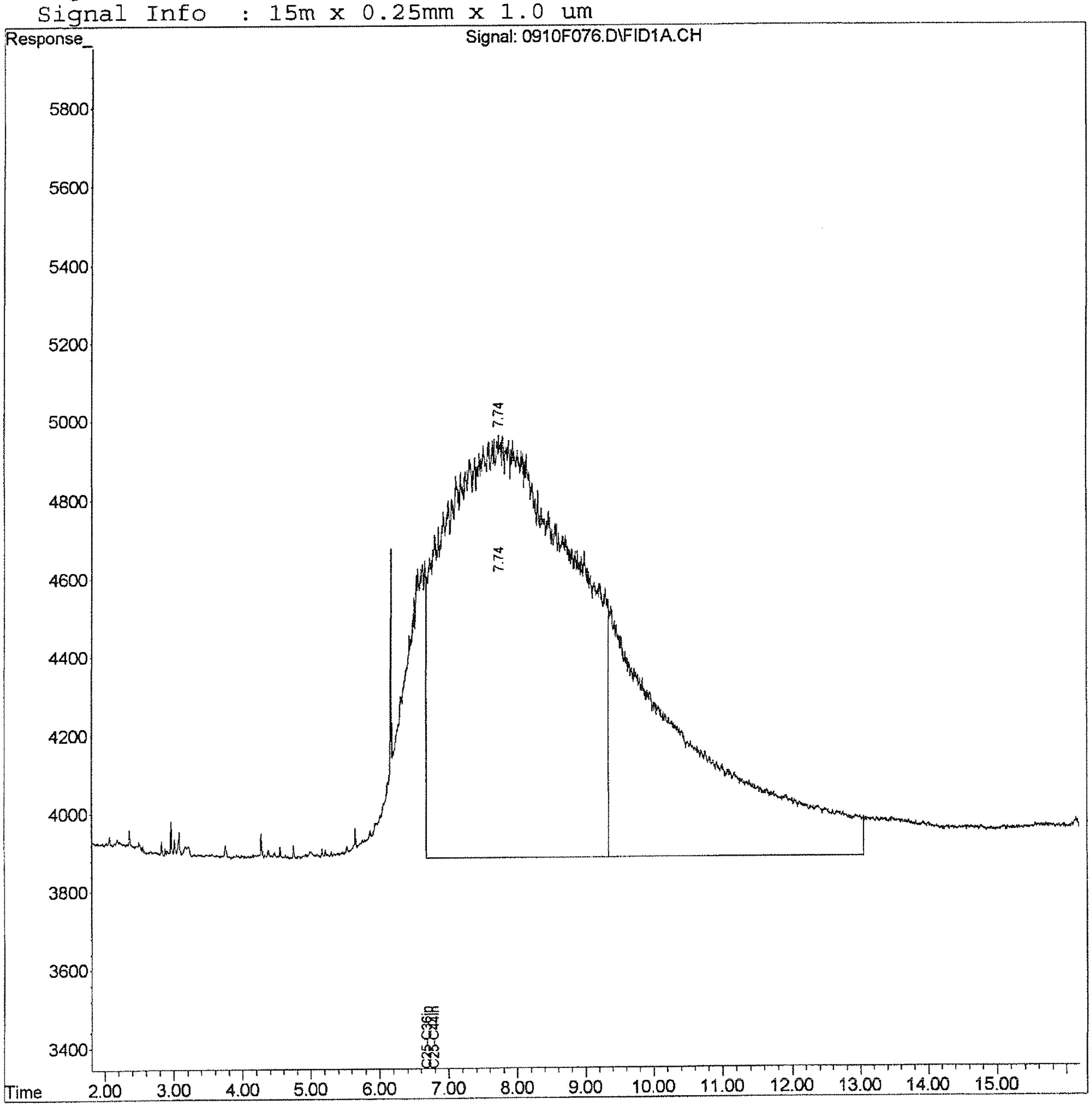
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
8) H C25-C36in RRO [NWTPH]	6.68	139742	225.957 ppm
9) H C25-C44in RRO [TPH-Oil]	6.78	194795	194.322 ppm

DV 9/11/13
AW

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

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F076.D          Vial: 10
Acq On    : 10 Sep 2013  10:09 pm                Operator: DVaillenco
Sample    : RRO @ 200ppm | SVF01-40L             Inst    : GC21
Misc      :                                      Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Sep 11  8:31 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
DataAcq Meth : SVF_FB.M

Volume Inj.  : 1 uL
Signal Phase : ZB-1
Signal Info  : 15m x 0.25mm x 1.0 um
```



Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F078.D              Vial: 11
Acq On    : 10 Sep 2013  10:31 pm                    Operator: DVaillenco
Sample    : RRO @ 500ppm | SVF01-40K                 Inst    : GC21
Misc      :                                          Multiplr: 1.00
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) H C25-C36in RRO [NWTPH]	6.68	313687	534.940 ppm
9) H C25-C44in RRO [TPH-Oil]	6.78	458059	510.072 ppm

DV 9/11/13

W

(f)=RT Delta > 1/2 Window (m)=manual int.

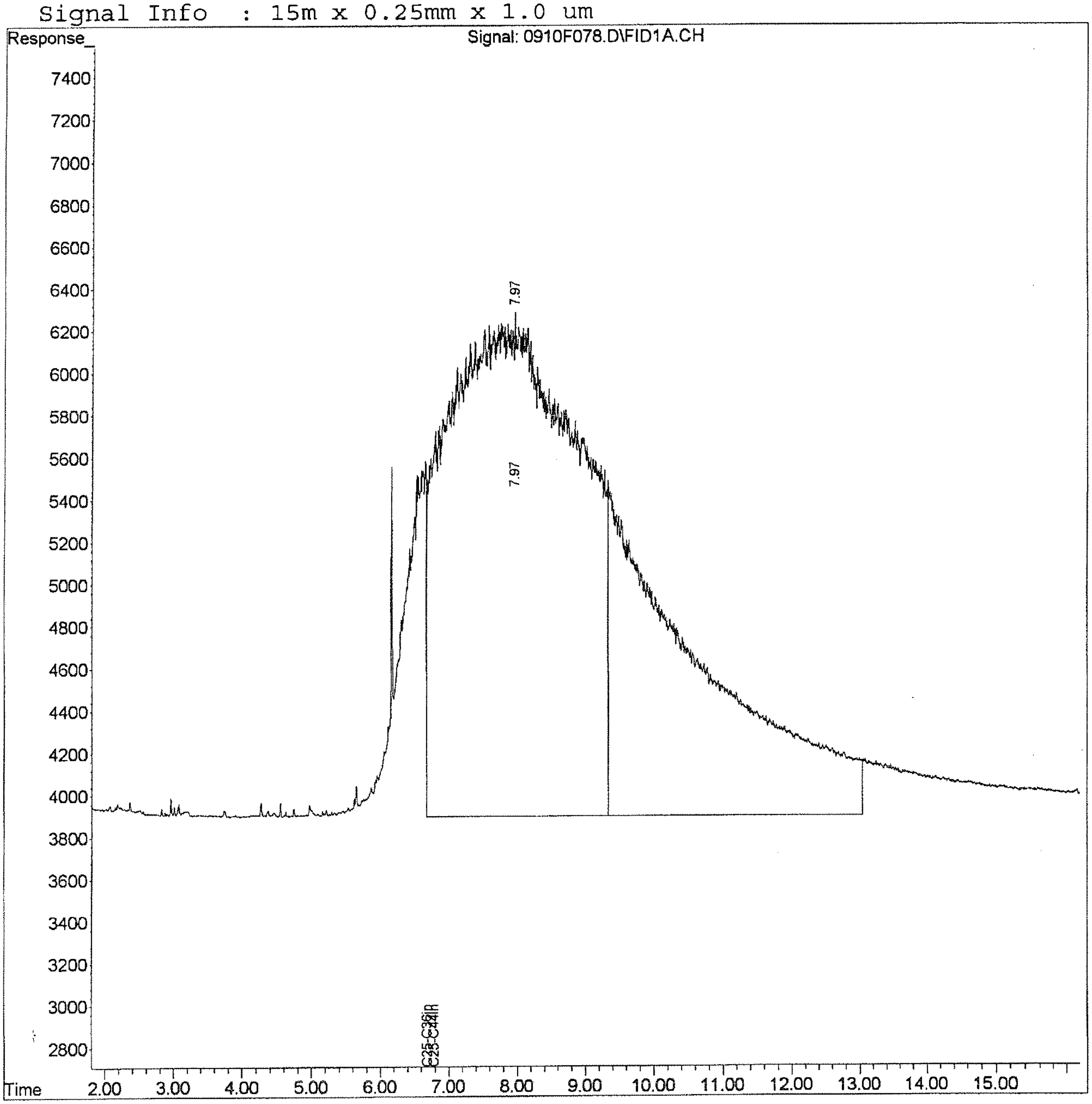
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F078.D
Acq On : 10 Sep 2013 10:31 pm
Sample : RRO @ 500ppm | SVF01-40K
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:31 2013 Quant Results File: 091013FSRO.RES

Vial: 11
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F080.D
Acq On : 10 Sep 2013 10:53 pm
Sample : RRO @ 2000ppm | SVF01-40J
Misc :
IntFile : rteint.p
Quant Time: Sep 11 08:27:21 2013 Quant Results File: 091013FSRO.RES

Vial: 12
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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) H C25-C36in RRO [NWTPH]	6.68	1229679	2162.043	ppm
9) H C25-C44in RRO [TPH-Oil]	6.78	1830314	2155.912	ppm

DV 9/11/13
W

(f)=RT Delta > 1/2 Window (m)=manual int.
0910F080.D 091013FSRO.M Wed Sep 11 08:41:29 2013 Page 1

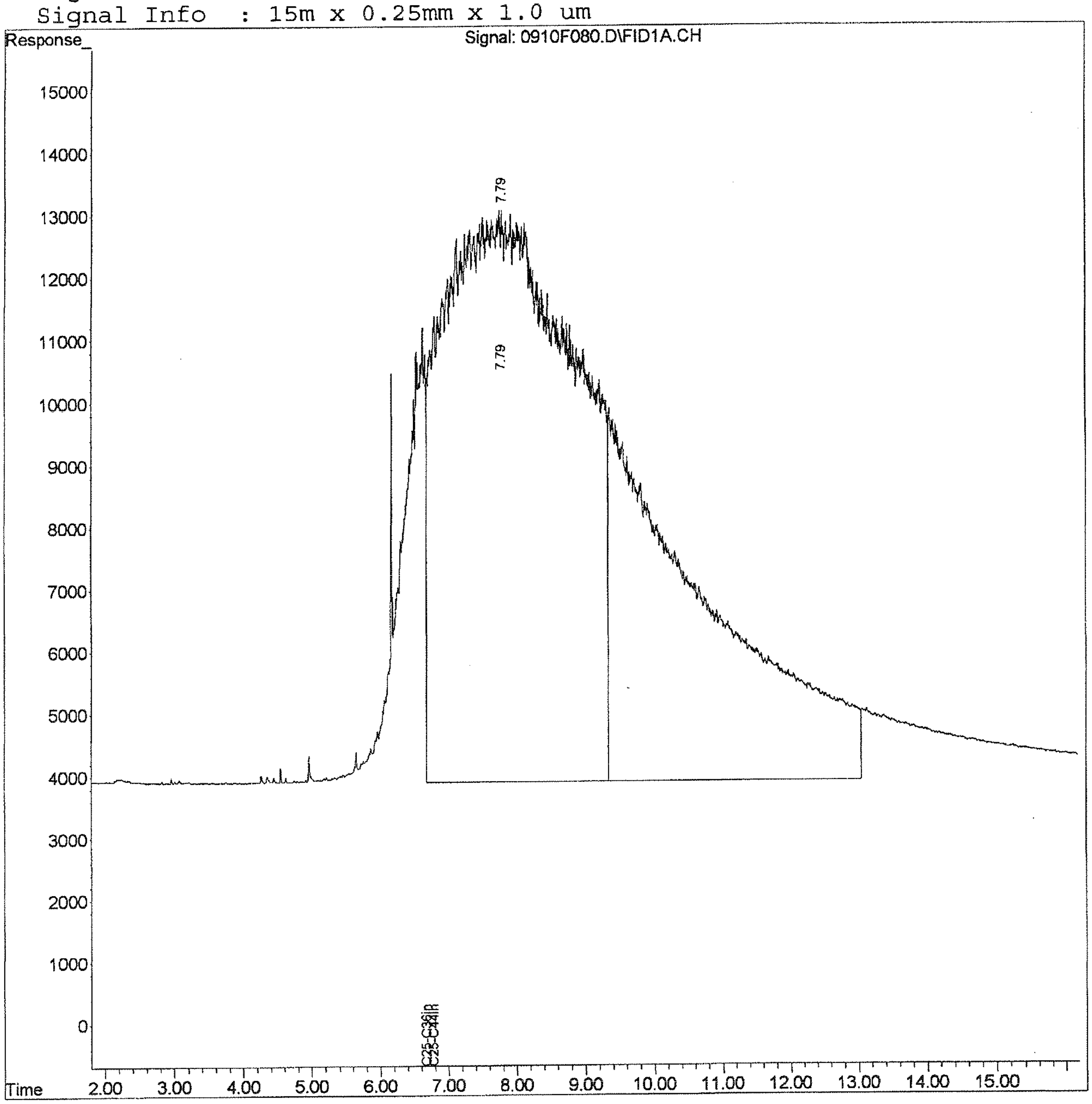
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F080.D
Acq On : 10 Sep 2013 10:53 pm
Sample : RRO @ 2000ppm | SVF01-40J
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:32 2013 Quant Results File: 091013FSRO.RES

Vial: 12
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F082.D
Acq On : 10 Sep 2013 11:15 pm
Sample : RRO @ 5000ppm | SVF01-40I
Misc :
IntFile : rteint.p
Quant Time: Sep 11 08:27:21 2013 Quant Results File: 091013FSRO.RES

Vial: 13
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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) H C25-C36in RRO [NWTPH]	6.68	2940279	5200.631	ppm
9) H C25-C44in RRO [TPH-Oil]	6.78	4458165	5307.674	ppm

DV 9/11/13

(f)=RT Delta > 1/2 Window (m)=manual int.

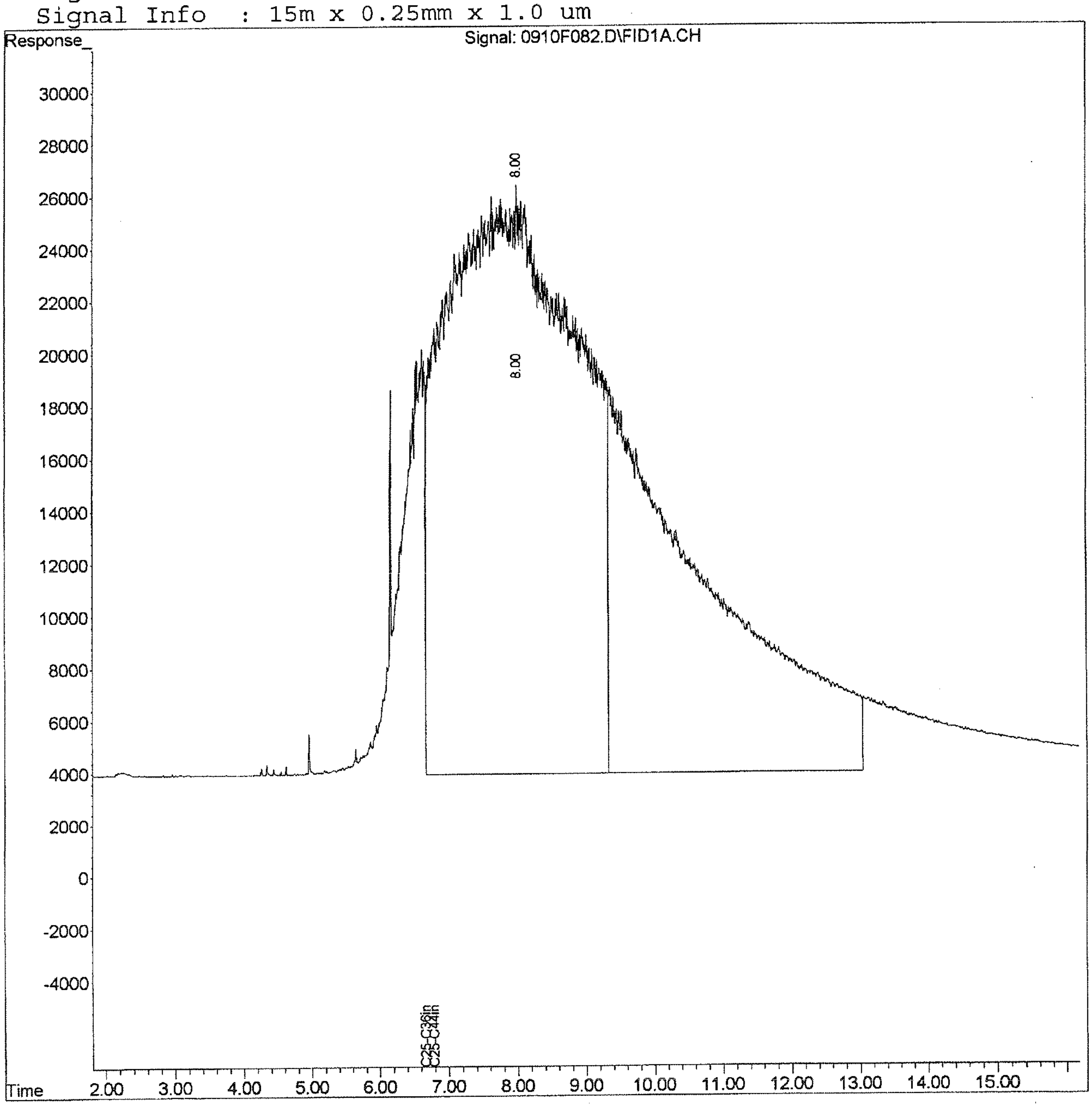
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F082.D
Acq On : 10 Sep 2013 11:15 pm
Sample : RRO @ 5000ppm | SVF01-40I
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:32 2013 Quant Results File: 091013FSRO.RES

Vial: 13
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F088.D          Vial: 14
Acq On    : 11 Sep 2013  12:22 am                Operator: DVaillenco
Sample    : RRO @ 1000ppm | SVF01-42J            Inst    : GC21
Misc      :                                      Multiplr: 1.00
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
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
8) H C25-C36in RRO [NWTPH]	6.68	598693	990.459 ppm
9) H C25-C44in RRO [TPH-Oil]	6.78	871184	963.971 ppm

DV 9/11/13

W

(f)=RT Delta > 1/2 Window (m)=manual int.

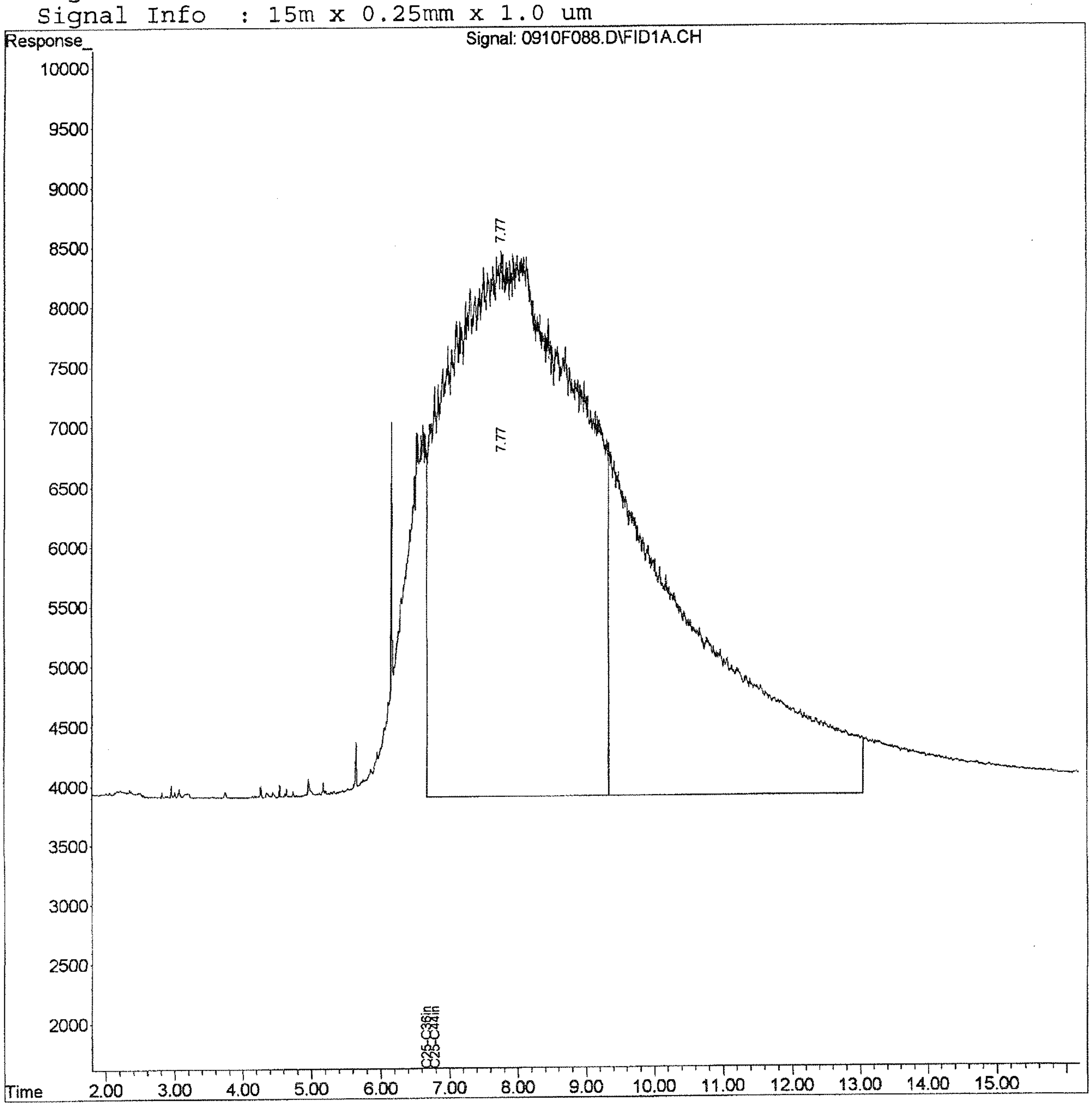
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F088.D
Acq On : 11 Sep 2013 12:22 am
Sample : RRO @ 1000ppm | SVF01-42J
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:43 2013 Quant Results File: 091013FSRO.RES

Vial: 14
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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 : 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



Quantitation Report (Not Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F092.D          Vial: 15
Acq On    : 11 Sep 2013   1:07 am                Operator: DVaillenco
Sample    : DRO @ 20/1.0ppm | SVF01-42H          Inst    : GC21
Misc      :                                      Multiplr: 1.00
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
```

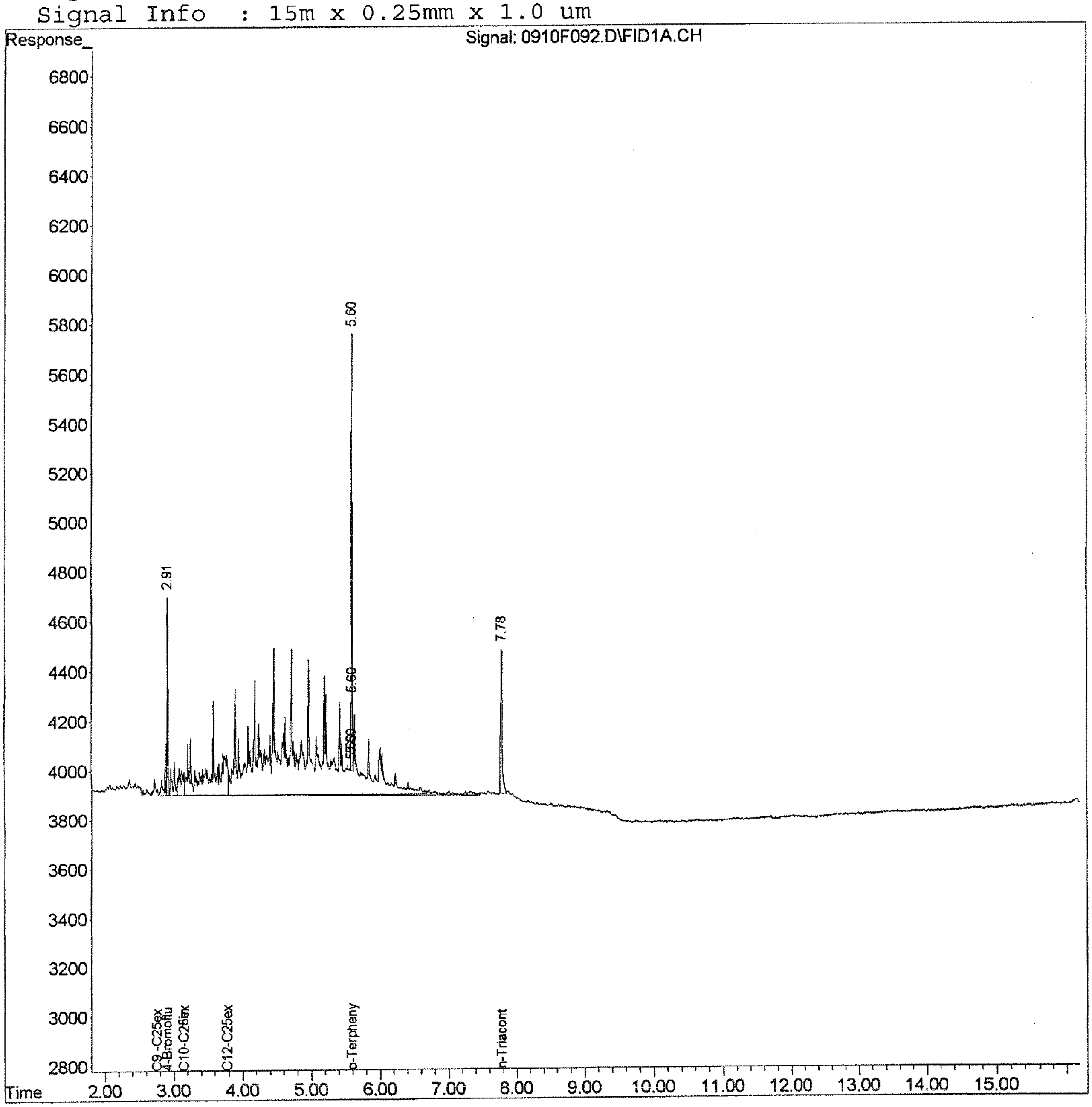
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	2.91	604	0.982 ppm
Spiked Amount 50.000	Recovery	=	1.96%
2) S o-Terphenyl	5.60	1301	0.942 ppm
Spiked Amount 50.000	Recovery	=	1.88%
3) S n-Triacontane	7.78	938	0.806 ppm
Spiked Amount 50.000	Recovery	=	1.61%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.77	24578	19.880 ppm
5) H C10-C25ex DRO [AK102]	3.15	24015	19.821 ppm
6) H C10-C28in DRO [8015]	3.15	24638	20.427 ppm
7) H C12-C25ex DRO [NWTPH]	3.79	20209	19.538 ppm

DV 9/11/13

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (Not Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F092.D          Vial: 15
Acq On    : 11 Sep 2013   1:07 am               Operator: DVaillenco
Sample    : DRO @ 20/1.0ppm | SVF01-42H         Inst    : GC21
Misc      :                                     Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Sep 11  8:32 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
DataAcq Meth : SVF_FB.M

Volume Inj.  : 1 uL
Signal Phase : ZB-1
Signal Info  : 15m x 0.25mm x 1.0 um
```



Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F094.D
Acq On : 11 Sep 2013 1:29 am
Sample : DRO @ 50/2.5ppm | SVF01-42G
Misc :
IntFile : rteint.p
Quant Time: Sep 11 08:27:22 2013 Quant Results File: 091013FSRO.RES

Vial: 16
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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	1315	2.137 ppm
Spiked Amount 50.000	Recovery	=	4.27%
2) S o-Terphenyl	5.60	2972	2.152 ppm
Spiked Amount 50.000	Recovery	=	4.30%
3) S n-Triacontane	7.78	2298	1.975 ppm
Spiked Amount 50.000	Recovery	=	3.95%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.77	55268	44.704 ppm
5) H C10-C25ex DRO [AK102]	3.15	54253	44.778 ppm
6) H C10-C28in DRO [8015]	3.15	55017	45.614 ppm
7) H C12-C25ex DRO [NWTPH]	3.79	46183	44.650 ppm

9/11/13

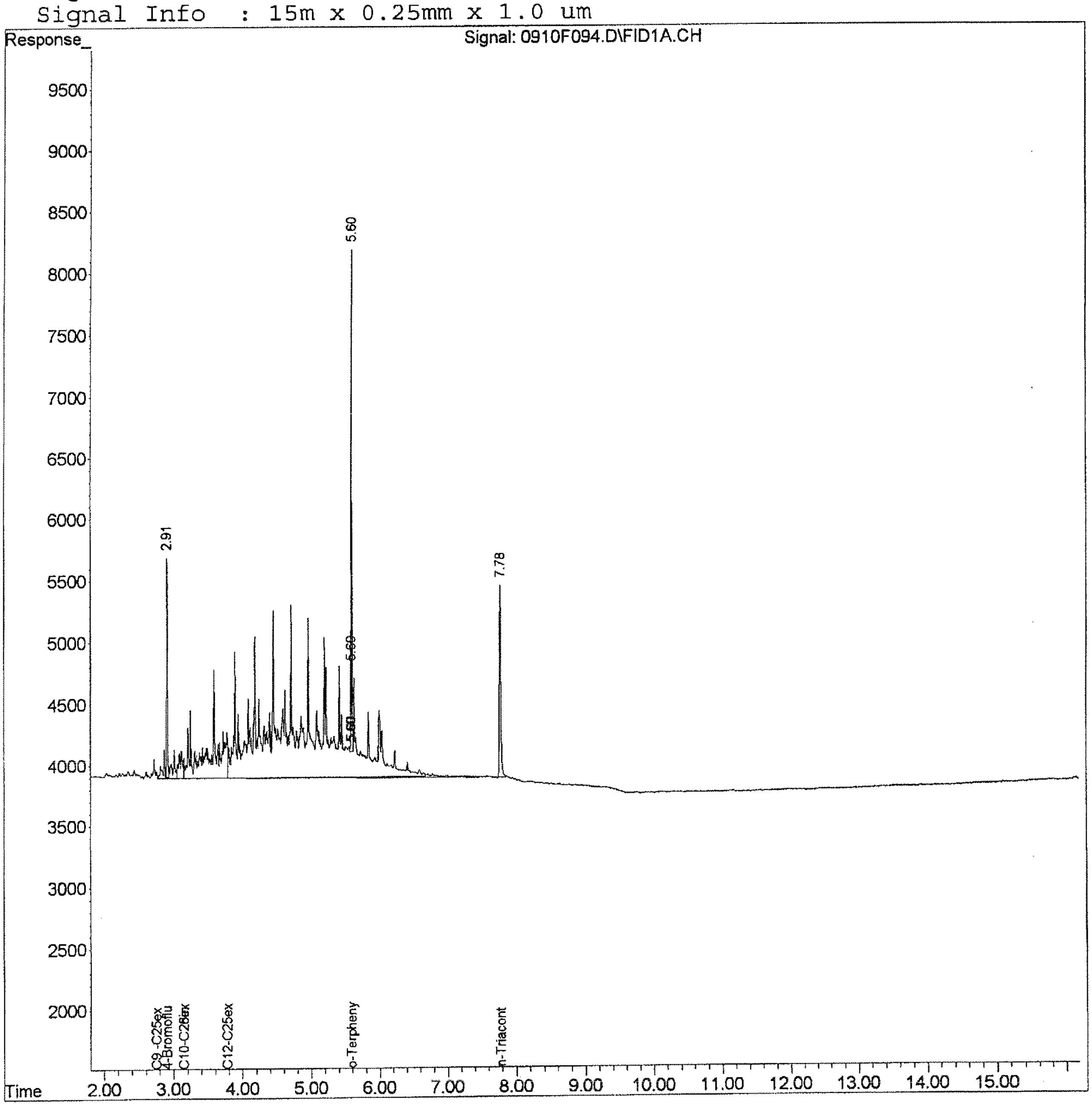
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F094.D
Acq On : 11 Sep 2013 1:29 am
Sample : DRO @ 50/2.5ppm | SVF01-42G
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:41 2013 Quant Results File: 091013FSRO.RES

Vial: 16
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F096.D
Acq On : 11 Sep 2013 1:51 am
Sample : DRO @ 200/10ppm | SVF01-42F
Misc :
IntFile : rteint.p
Quant Time: Sep 11 08:27:23 2013 Quant Results File: 091013FSRO.RES

Vial: 17
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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

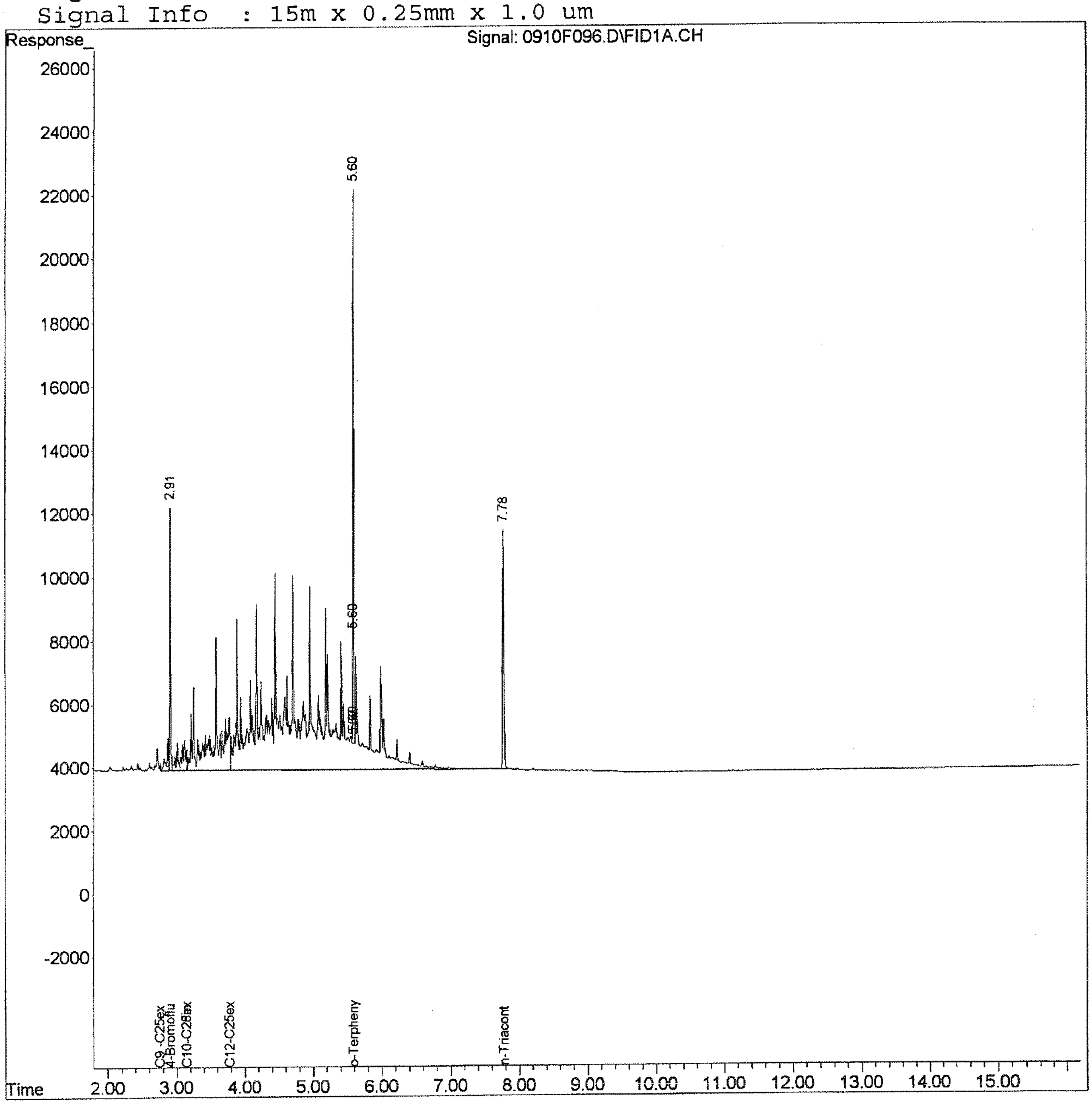
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	2.91	5719	9.295 ppm
Spiked Amount 50.000	Recovery	=	18.59%
2) S o-Terphenyl	5.60	12576	9.106 ppm
Spiked Amount 50.000	Recovery	=	18.21%
3) S n-Triacontane	7.78	10475	9.001 ppm
Spiked Amount 50.000	Recovery	=	18.00%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.77	229949	185.996 ppm
5) H C10-C25ex DRO [AK102]	3.15	226348	186.817 ppm
6) H C10-C28in DRO [8015]	3.15	227285	188.438 ppm
7) H C12-C25ex DRO [NWTPH]	3.79	193042	186.632 ppm

DV 9/11/13

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F096.D                Vial: 17
Acq On    : 11 Sep 2013   1:51 am                     Operator: DVaillenco
Sample    : DRO @ 200/10ppm | SVF01-42F               Inst    : GC21
Misc      :                                           Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Sep 11  8:33 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
DataAcq Meth : SVF_FB.M

Volume Inj.  : 1 uL
Signal Phase : ZB-1
Signal Info  : 15m x 0.25mm x 1.0 um
```



Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F098.D Vial: 18
Acq On : 11 Sep 2013 2:14 am Operator: DVaillenco
Sample : DRO @ 500/25ppm | SVF01-42E Inst : GC21
Misc : Multiplr: 1.00
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

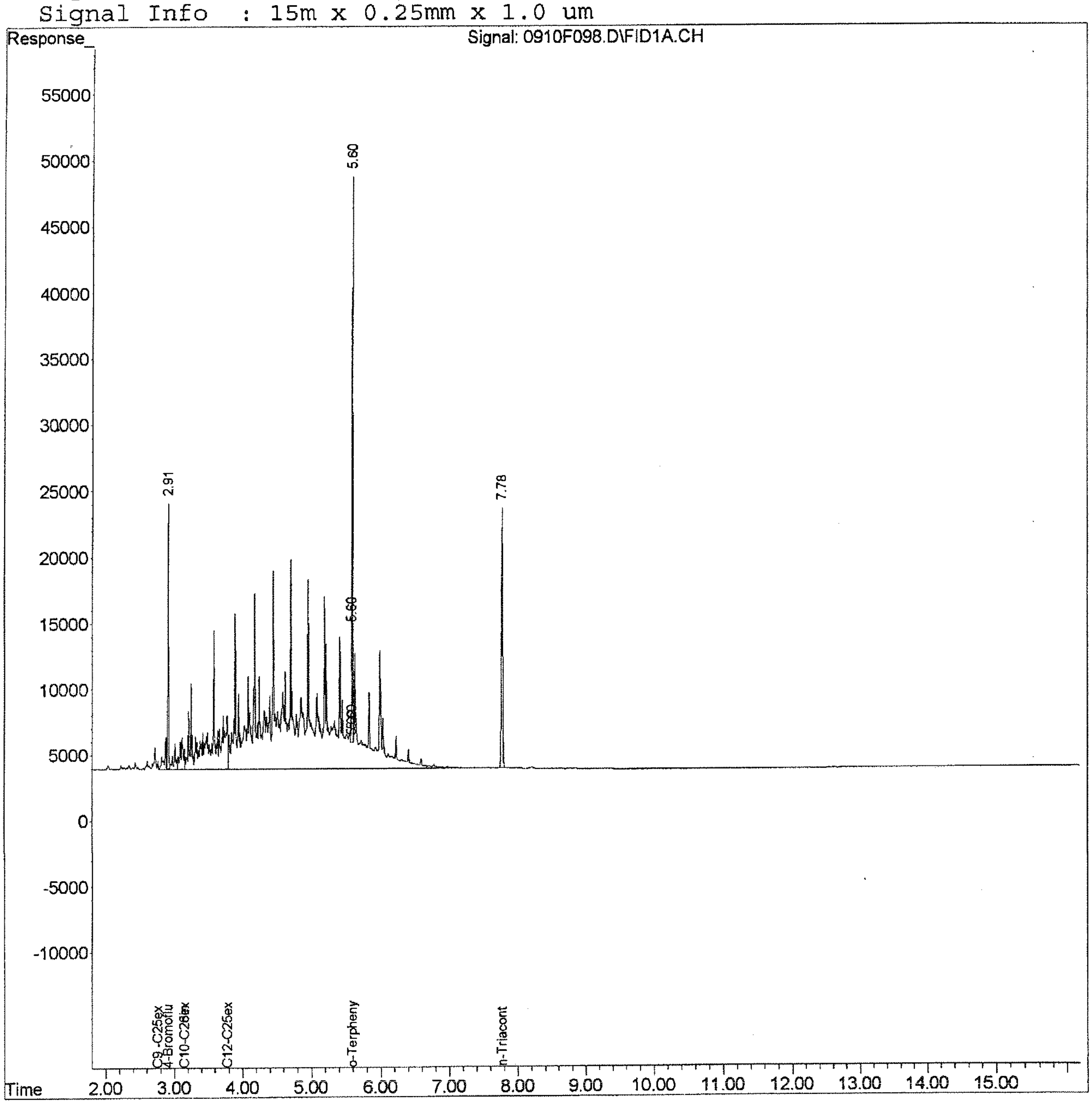
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	2.91	14133	22.970 ppm
Spiked Amount 50.000	Recovery	=	45.94%
2) S o-Terphenyl	5.60	31947	23.131 ppm
Spiked Amount 50.000	Recovery	=	46.26%
3) S n-Triacontane	7.78	26993	23.196 ppm
Spiked Amount 50.000	Recovery	=	46.39%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.77	577353	466.997 ppm
5) H C10-C25ex DRO [AK102]	3.15	568516	469.226 ppm
6) H C10-C28in DRO [8015]	3.15	565932	469.204 ppm
7) H C12-C25ex DRO [NWTPH]	3.79	486113	469.972 ppm

BV 9/11/13
VM

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F098.D              Vial: 18
Acq On    : 11 Sep 2013   2:14 am                    Operator: DVaillenco
Sample    : DRO @ 500/25ppm | SVF01-42E              Inst    : GC21
Misc      :                                          Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Sep 11  8:33 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
DataAcq Meth : SVF_FB.M

Volume Inj.  : 1 uL
Signal Phase : ZB-1
Signal Info  : 15m x 0.25mm x 1.0 um
```



Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F100.D              Vial: 19
Acq On    : 11 Sep 2013   2:36 am                    Operator: DVaillenco
Sample    : DRO @ 2000/100ppm | SVF01-42D            Inst    : GC21
Misc      :                                          Multiplr: 1.00
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	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
Spiked Amount 50.000		Recovery =	184.35%	
Target Compounds				
4) H C9 -C25ex DRO [TPH-Diesel]	2.77	2338660	1891.644	ppm
5) H C10-C25ex DRO [AK102]	3.15	2304139	1901.726	ppm
6) H C10-C28in DRO [8015]	3.15	2286866	1896.000	ppm
7) H C12-C25ex DRO [NWTPH]	3.79	1977802	1912.131	ppm

DV 9/11/13

(f)=RT Delta > 1/2 Window (m)=manual int.

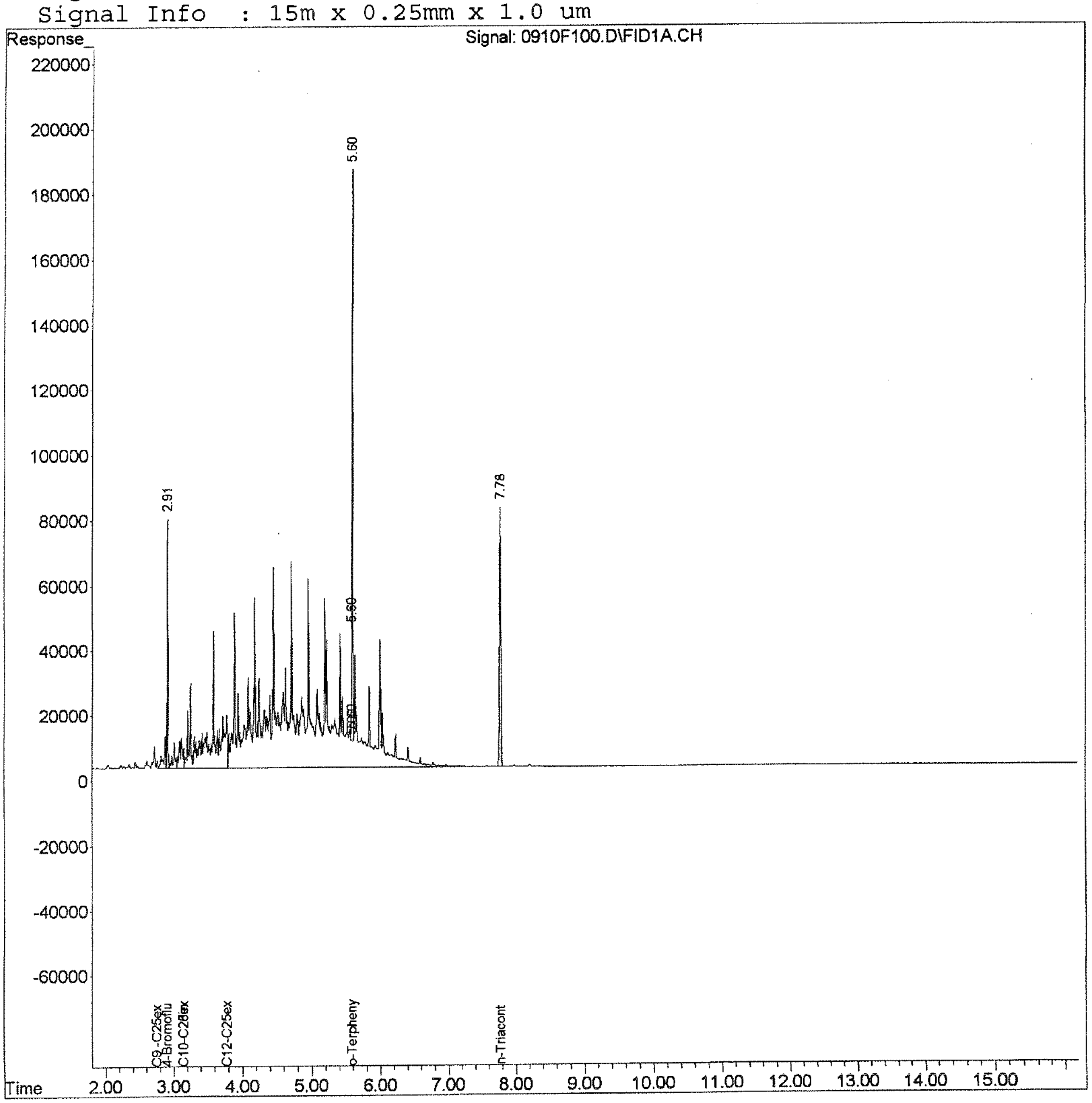
0910F100.D 091013FSRO.M Wed Sep 11 08:41:33 2013 Page 1

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F100.D Vial: 19
Acq On : 11 Sep 2013 2:36 am Operator: DVaillenco
Sample : DRO @ 2000/100ppm | SVF01-42D Inst : GC21
Misc : Multiplr: 1.00
IntFile : rteint.p
Quant Time: Sep 11 8:33 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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

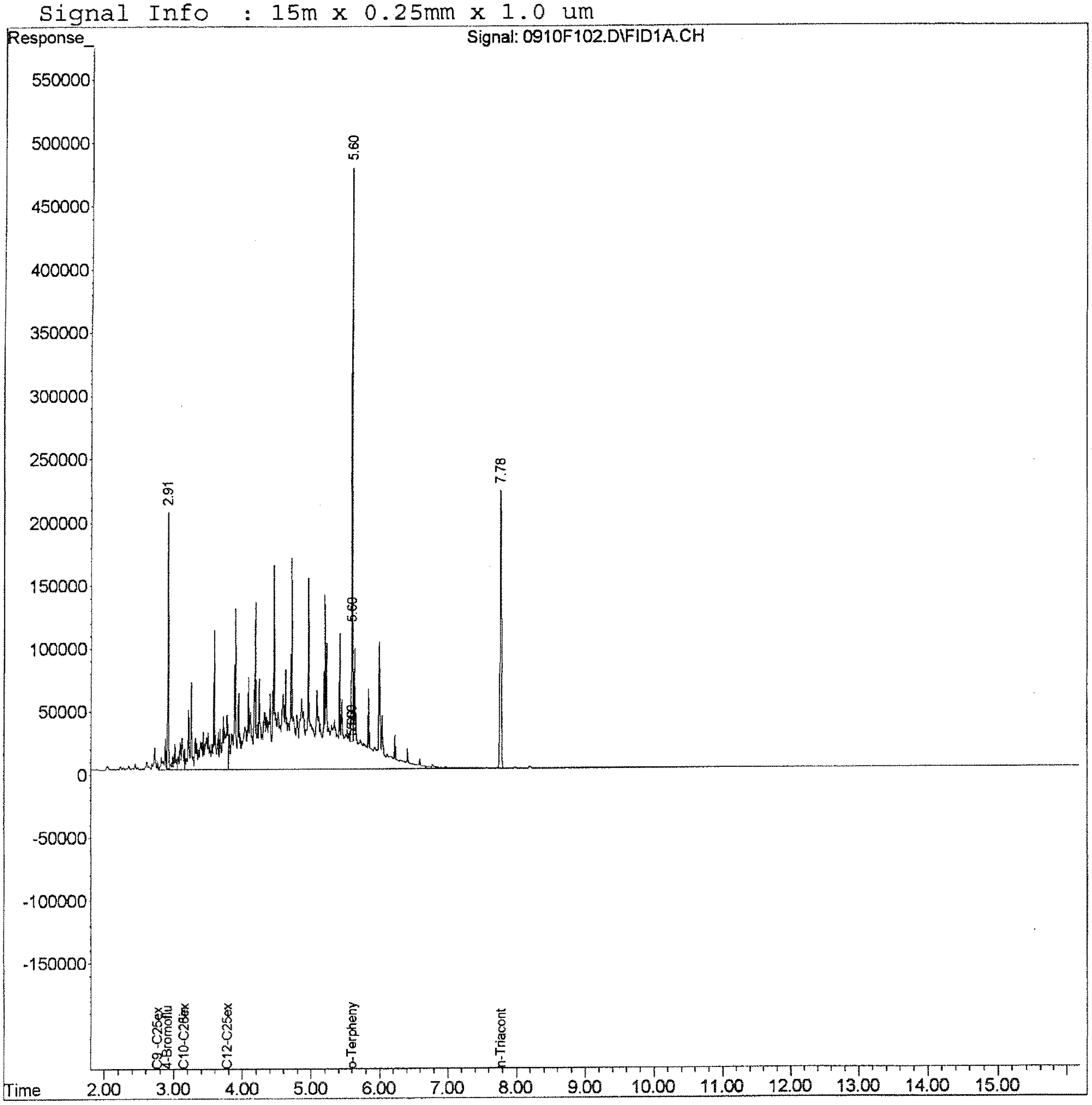
```
Data File : J:\GC21\DATA\091013F\0910F102.D                  Vial: 20
Acq On    : 11 Sep 2013   2:58 am                        Operator: DVaillenco
Sample    : DRO @ 5000/250ppm |SVF01-42C                 Inst    : GC21
Misc      :                                              Multiplr: 1.00
IntFile   : 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
```

Compound	R.T.	Response	Conc Units
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) H C9 -C25ex DRO [TPH-Diesel]	2.77	6082016	4919.487 ppm
5) H C10-C25ex DRO [AK102]	3.15	5991866	4945.399 ppm
6) H C10-C28in DRO [8015]	3.15	5949044	4932.246 ppm
7) H C12-C25ex DRO [NWTPH]	3.79	5137007	4966.437 ppm

DV 9/11/13

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F102.D              Vial: 20
Acq On    : 11 Sep 2013   2:58 am                    Operator: DVaillenco
Sample    : DRO @ 5000/250ppm |SVF01-42C             Inst    : GC21
Misc      :                                          Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Sep 11  8:33 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
DataAcq Meth : SVF_FB.M

Volume Inj.  : 1 uL
Signal Phase : ZB-1
Signal Info  : 15m x 0.25mm x 1.0 um
```



Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F104.D
Acq On : 11 Sep 2013 3:20 am
Sample : DRO @ 20000ppm | SVF01-42B
Misc :
IntFile : rteint.p
Quant Time: Sep 11 08:27:26 2013 Quant Results File: 091013FSRO.RES

Vial: 21
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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				
4) H	C9 -C25ex DRO [TPH-Diesel]	2.77	21837193	17663.187	ppm
5) H	C10-C25ex DRO [AK102]	3.15	21490250	17737.021	ppm
6) H	C10-C28in DRO [8015]	3.15	21322154	17677.818	ppm
7) H	C12-C25ex DRO [NWTPH]	3.79	18316100	17707.929	ppm

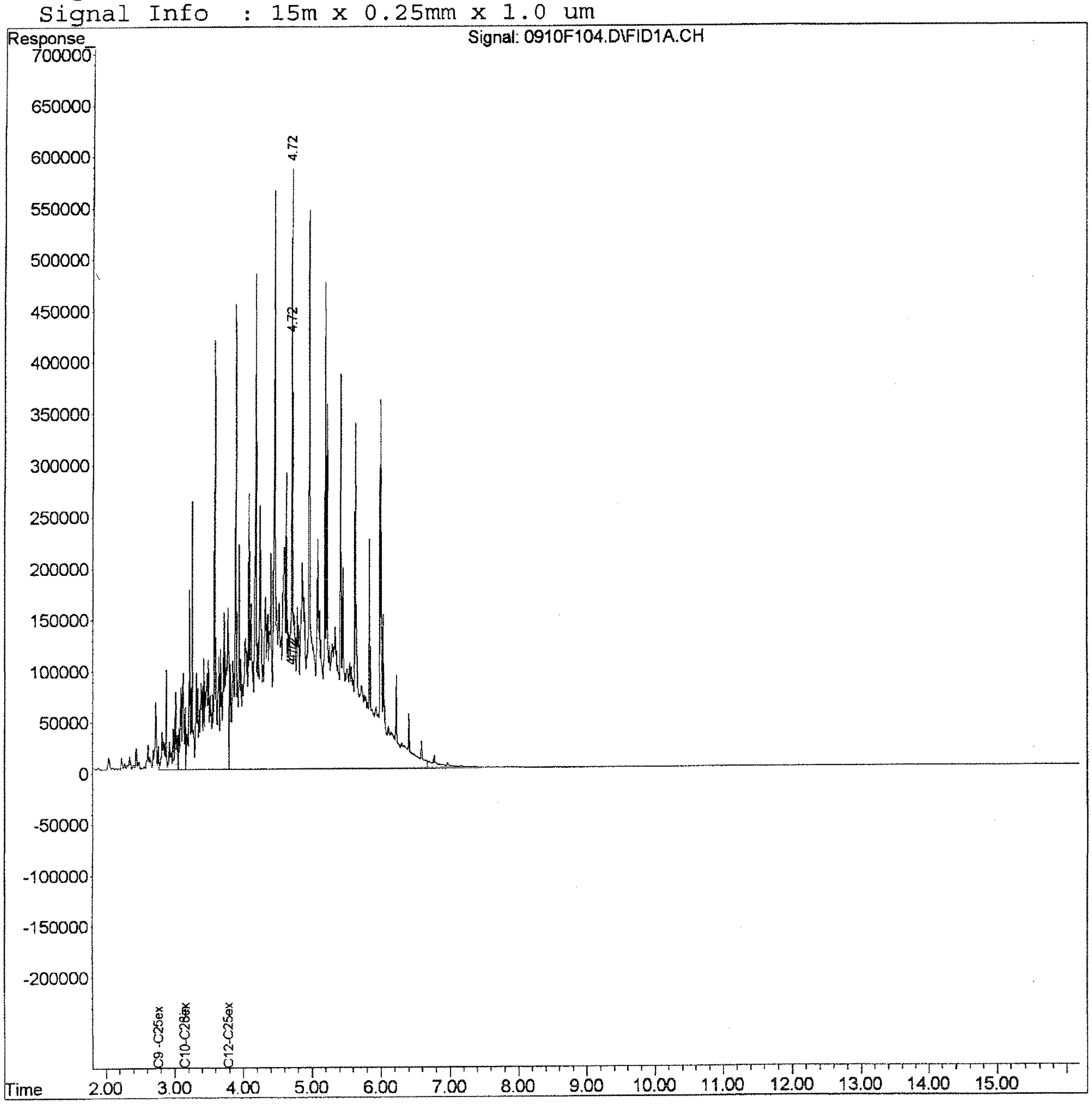
DV 9/11/13
JM

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F104.D Vial: 21
Acq On : 11 Sep 2013 3:20 am Operator: DVaillenco
Sample : DRO @ 20000ppm | SVF01-42B Inst : GC21
Misc : Multiplr: 1.00
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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

```
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                  Inst    : GC21
Misc      :                                             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
```

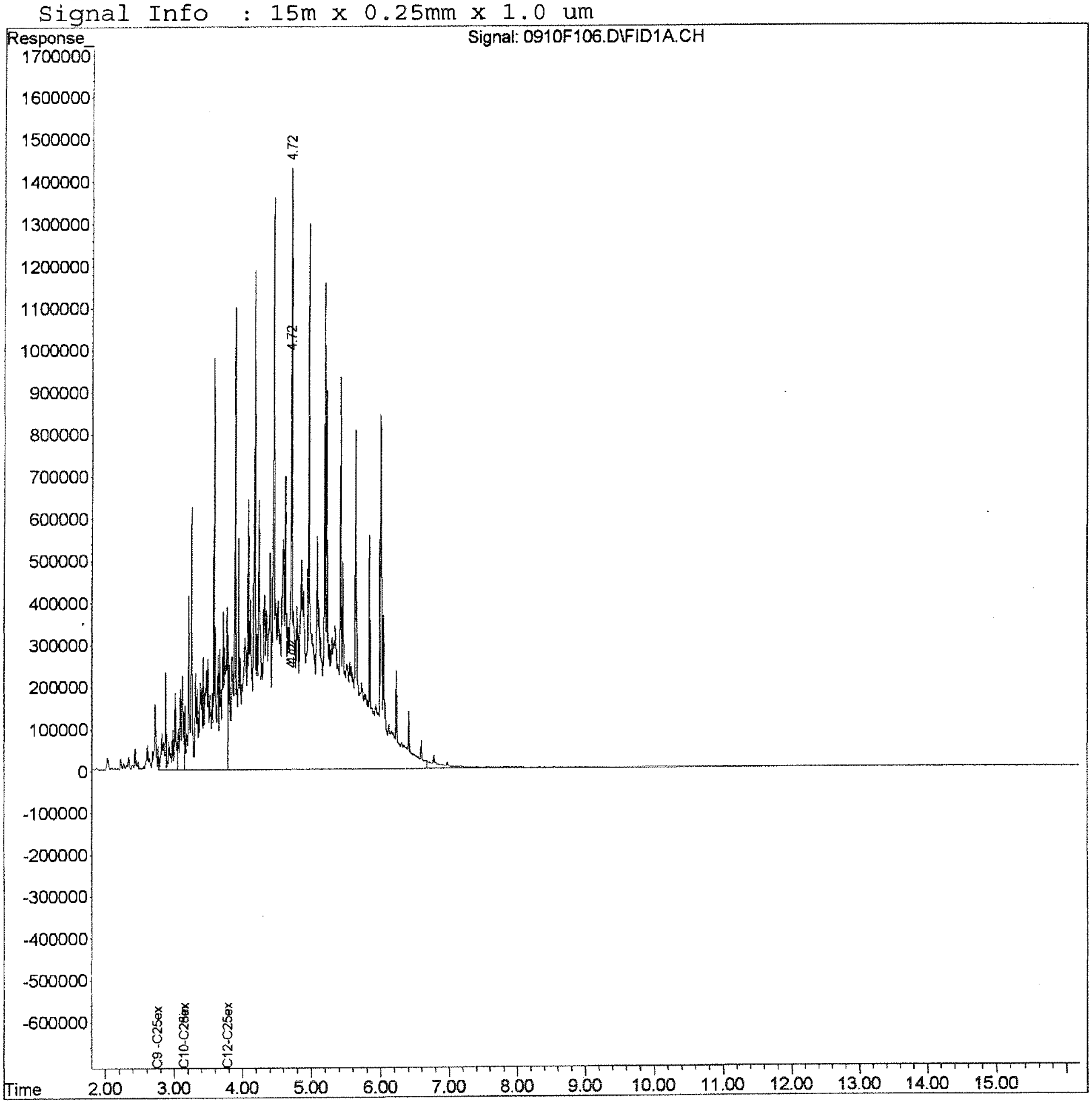
	Compound	R.T.	Response	Conc Units
	System Monitoring Compounds			
	Target Compounds			
4) H	C9 -C25ex DRO [TPH-Diesel]	2.77	54586420	44152.660 ppm
5) H	C10-C25ex DRO [AK102]	3.15	53743718	44357.485 ppm
6) H	C10-C28in DRO [8015]	3.15	53344566	44227.030 ppm
7) H	C12-C25ex DRO [NWTPH]	3.79	46005174	44477.609 ppm

DV 9/11/13

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

```
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                 Inst    : GC21
Misc      :                                            Multiplr: 1.00
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
DataAcq Meth : SVF_FB.M

Volume Inj.  : 1 uL
Signal Phase : ZB-1
Signal Info  : 15m x 0.25mm x 1.0 um
```



Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F110.D              Vial: 23
Acq On    : 11 Sep 2013   4:27 am                     Operator: DVaillenco
Sample    : DRO ICV @ 1000ppm | SVF01-42K             Inst    : GC21
Misc      :                                           Multiplr: 1.00
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
```

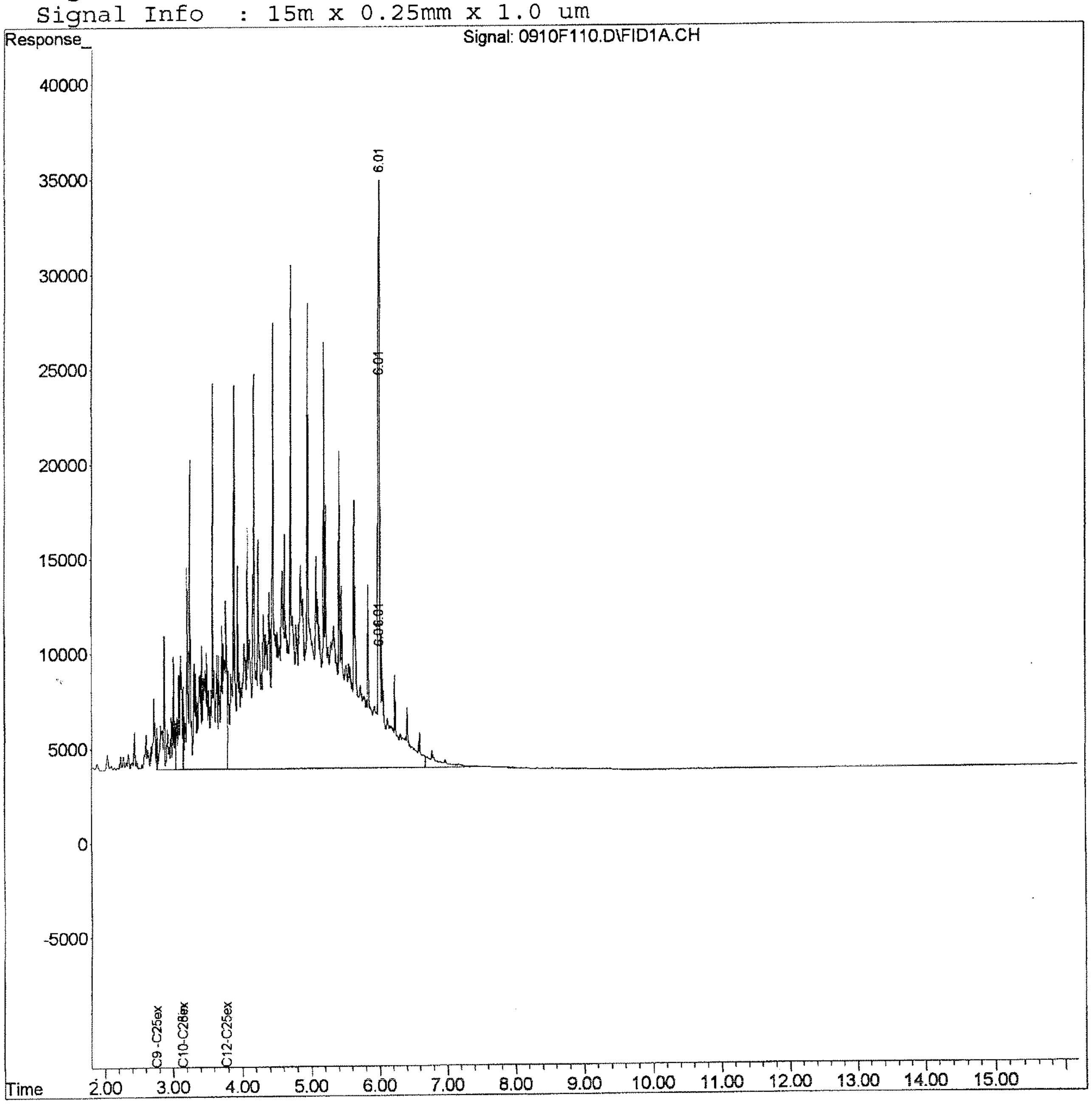
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.77	1173351	1019.415 ppm
5) H C10-C25ex DRO [AK102]	3.15	1147865	1014.193 ppm
6) H C10-C28in DRO [8015]	3.15	1138726	1004.747 ppm
7) H C12-C25ex DRO [NWTPH]	3.79	963886	998.360 ppm

DV 9/11/13

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F110.D          Vial: 23
Acq On    : 11 Sep 2013   4:27 am               Operator: DVaillenco
Sample    : DRO ICV @ 1000ppm | SVF01-42K       Inst     : GC21
Misc      :                                     Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Sep 11  8:43 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 : 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
```



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: External Standard
Analysis Method: NWTPH-Dx

Calibration Date: 09/10/2013
Calibration ID: CAL12766
Analysis Lot: KWG1312715
Units: ppm
Column ID: ZB-1

File ID: J:\GC21\DATA\111313F\1113F012.D
J:\GC21\DATA\111313F\1113F014.D

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.

Exception Report

Data File: J:\GC21\DATA\111313F\1113F012.D
Lab ID: KWG1312715-1
RunType: CCV
Matrix: NOT APPLICABLE

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

Secondary Review:

Quantitation Report

Data File:	J:\GC21\DATA\111313F\1113F012.D			**Instrument:**	GC21
Acqu Date:	11/13/2013 10:41	**Quant Date:**	11/14/2013 08:15	**Vial:**	96
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312715-1			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/14/2013

Analysis Lot:	KWG1312715	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ227
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.57		69767	54.79		50-150	NA	
n-Triacontane	7.75		56197	54.25		50-150	NA	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		1223378	1,063			
Diesel Range Organics (DRO)	3.78		1026098	1,063			
Residual Range Organics (RRO)			7734				NR
C25 - C44 RRO	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

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\1113F012.D Vial: 96
Acq On : 13 Nov 2013 10:41 am Operator: DVaillenco
Sample : DRO @ 1000/50ppm | SVF01-44J Inst : GC21
Misc : 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

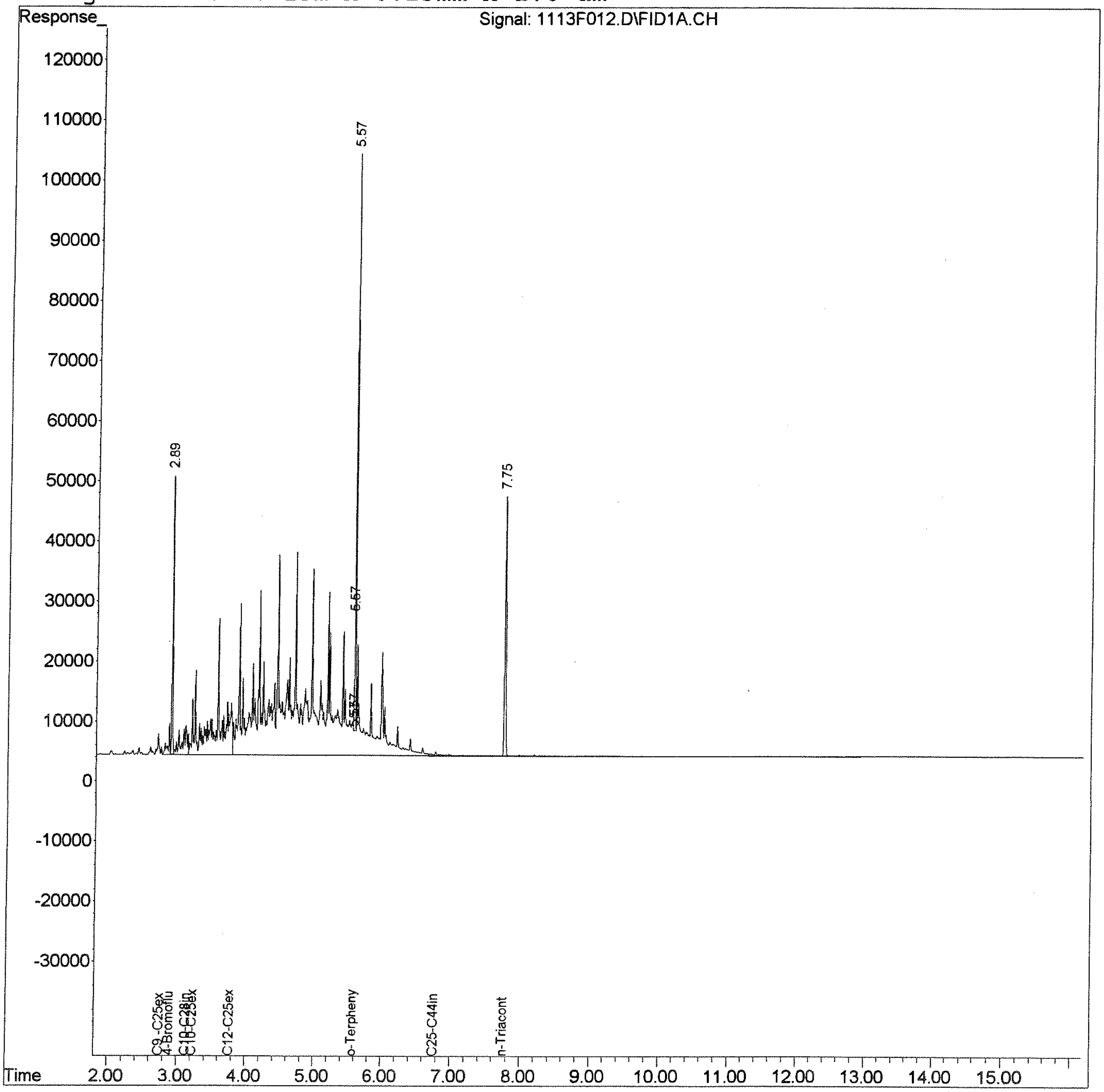
Compound	R.T.	Response	Conc	Units
System Monitoring Compounds				
1) S 4-Bromofluorobenzene	2.89	33439	58.974	ppm
Spiked Amount 50.000	Recovery	=	117.95%	
2) S o-Terphenyl	5.57	69767	54.794	ppm
Spiked Amount 50.000	Recovery	=	109.59%	
3) S n-Triacontane	7.75	56197	54.249	ppm
Spiked Amount 50.000	Recovery	=	108.50%	
Target Compounds				
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	1223378	1062.879	ppm
5) H C10-C25ex DRO [AK102]	3.23	1188549	1050.139	ppm
6) H C10-C28in DRO [8015]	3.13	1193932	1053.457	ppm
7) H C12-C25ex DRO [NWTPH]	3.78	1026098	1062.797	ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	14240	9.961	ppm

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\111313F\1113F012.D Vial: 96
Acq On : 13 Nov 2013 10:41 am Operator: DVaillenco
Sample : DRO @ 1000/50ppm | SVF01-44J 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



Exception Report

Data File: J:\GC21\DATA\111313F\1113F014.D
Lab ID: KWG1312715-1
RunType: CCV
Matrix: NOT APPLICABLE

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

Secondary Review:

Quantitation Report

Data File:	J:\GC21\DATA\111313F\1113F014.D			**Instrument:**	GC21
Acqu Date:	11/13/2013 11:03	**Quant Date:**	11/14/2013 08:23	**Vial:**	97
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312715-1			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/14/2013

Analysis Lot:	KWG1312715	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ227
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl			0			50-150	NA	NR
n-Triacontane			0d			50-150	NA	NR

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		89425	77.69			
Diesel Range Organics (DRO)	3.78		87889	91.03			NR
Residual Range Organics (RRO)	6.66		595332	984.82			
C25 - C44 RRO	6.76		882431	976.49			

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

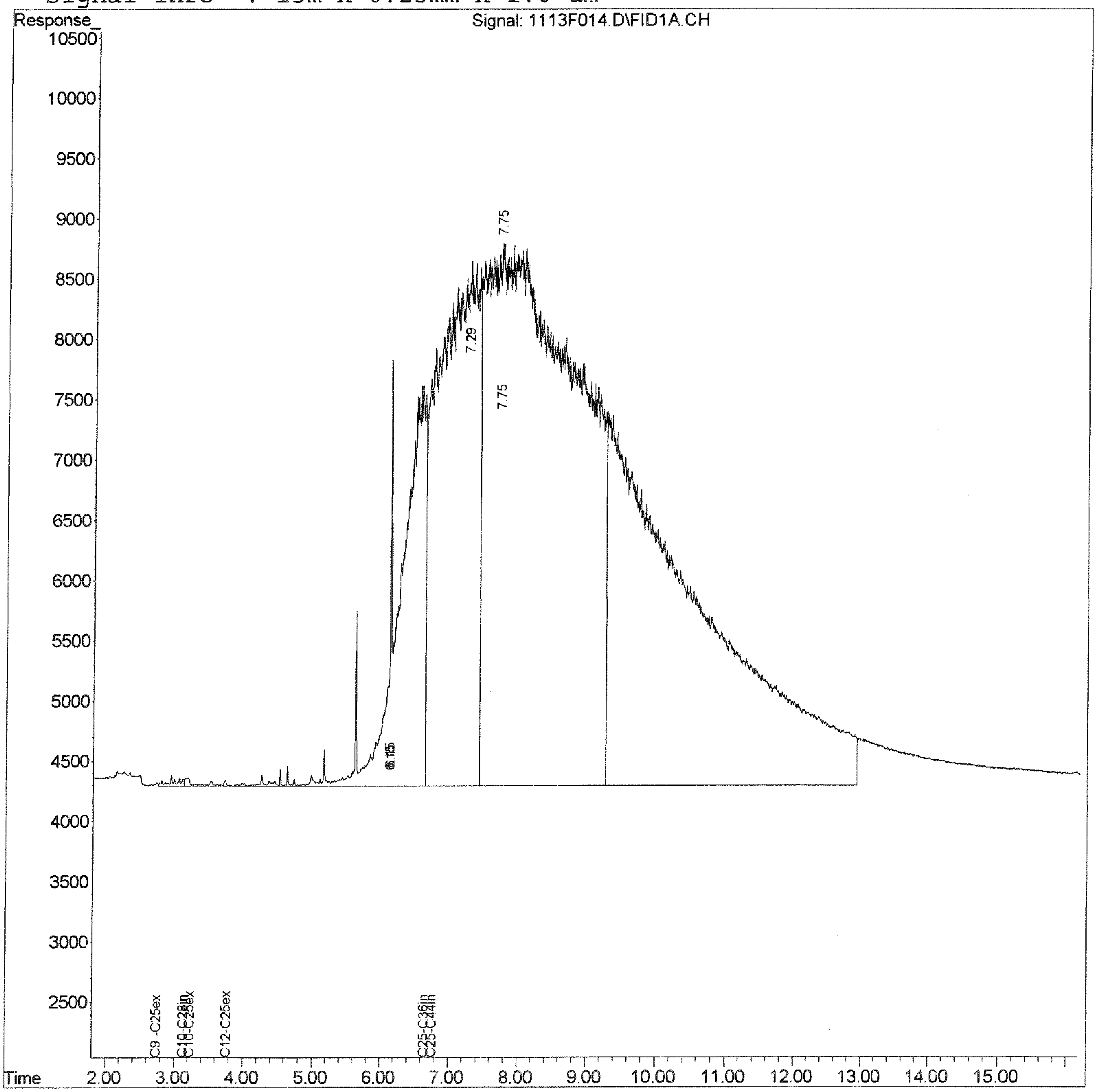
*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\111313F\1113F014.D                Vial: 97
Acq On    : 13 Nov 2013  11:03 am                      Operator: DVaillenco
Sample    : RRO @ 1000ppm | SVF01-42I                  Inst    : GC21
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
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	89425	77.693 ppm
5) H C10-C25ex DRO [AK102]	3.23	88684	78.357 ppm
6) H C10-C28in DRO [8015]	3.13	267662	236.170 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	87889	91.032 ppm
8) H C25-C36in RRO [NWTPH]	6.66	595332	984.816 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	882431	976.492 ppm

```
Data File : J:\GC21\DATA\111313F\1113F014.D                 Vial: 97
Acq On    : 13 Nov 2013  11:03 am                       Operator: DVaillenco
Sample    : RRO @ 1000ppm | SVF01-42I                   Inst    : GC21
Misc      :                                             Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Nov 14  8:23 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 : 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
```



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: External Standard
Analysis Method: 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.

Exception Report

Data File: J:\GC21\DATA\111313F\1113F044.D
Lab ID: KWG1312715-2
RunType: CCV
Matrix: NOT APPLICABLE

Date Acquired: 11/13/2013 16:38
Date Quantitated: 11/14/2013 08:15
Batch ID: KWG1312715
Analysis Method: NWTPH-Dx
MethodJoinID: 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: 11/14/13

Secondary Review: ______________

Quantitation Report

Data File:	J:\GC21\DATA\111313F\1113F044.D			**Instrument:**	GC21
Acqu Date:	11/13/2013 16:38	**Quant Date:**	11/14/2013 08:15	**Vial:**	96
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312715-2			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/14/2013

Analysis Lot:	KWG1312715	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ227
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	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	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		1134870	985.98			
Diesel Range Organics (DRO)	3.78		953801	987.91			
Residual Range Organics (RRO)			7376				NR
C25 - C44 RRO	6.76		16085	12.02			

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

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\111313F\1113F044.D                Vial: 96
Acq On    : 13 Nov 2013   4:38 pm                     Operator: DVaillenco
Sample    : DRO @ 1000/50ppm | SVF01-44J              Inst    : GC21
Misc      :                                           Multiplr: 1.00
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
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	2.89	30520	53.826 ppm
Spiked Amount 50.000		Recovery =	107.65%
2) S o-Terphenyl	5.58	64367	50.553 ppm
Spiked Amount 50.000		Recovery =	101.11%
3) S n-Triacontane	7.75	52753	50.925 ppm
Spiked Amount 50.000		Recovery =	101.85%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	1134870	985.983 ppm
5) H C10-C25ex DRO [AK102]	3.23	1102522	974.130 ppm
6) H C10-C28in DRO [8015]	3.13	1107650	977.327 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	953801	987.914 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	16085	12.015 ppm

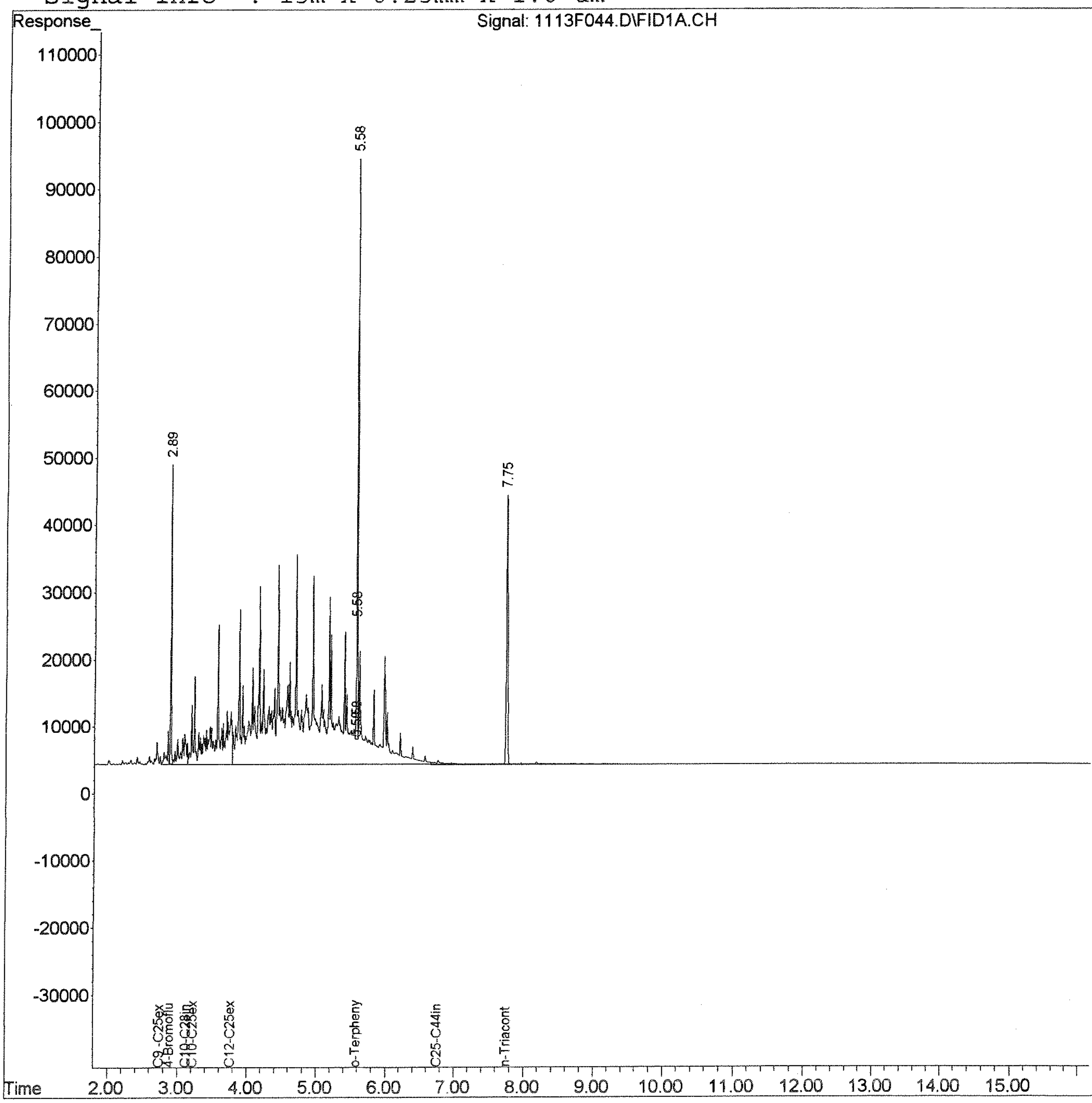
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\111313F\1113F044.D Vial: 96
Acq On : 13 Nov 2013 4:38 pm Operator: DVaillenco
Sample : DRO @ 1000/50ppm | SVF01-44J 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



Exception Report

Data File: J:\GC21\DATA\111313F\1113F046.D
Lab ID: KWG1312715-2
RunType: CCV
Matrix: NOT APPLICABLE

Date Acquired: 11/13/2013 17:00
Date Quantitated: 11/14/2013 08:34
Batch ID: KWG1312715
Analysis Method: NWTPH-Dx
MethodJoinID: 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: 11/14/13
Secondary Review:

Quantitation Report

Data File:	J:\GC21\DATA\111313F\1113F046.D			**Instrument:**	GC21
Acqu Date:	11/13/2013 17:00	**Quant Date:**	11/14/2013 08:34	**Vial:**	97
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312715-2			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/14/2013

Analysis Lot:	KWG1312715	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ227
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl			0			50-150	NA	NR
n-Triacontane			0d			50-150	NA	NR

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		101159	87.89			
Diesel Range Organics (DRO)	3.78		99686	103.25			NR
Residual Range Organics (RRO)	6.66		639707	1,059			
C25 - C44 RRO	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

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\1113F046.D
Acq On : 13 Nov 2013 5:00 pm
Sample : RRO@ 1000ppm | SVF01-42I
Misc :
IntFile : rteint.p
Quant Time: Nov 14 08:15:28 2013 Quant Results File: 091013FSRO.RES

Vial: 97
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

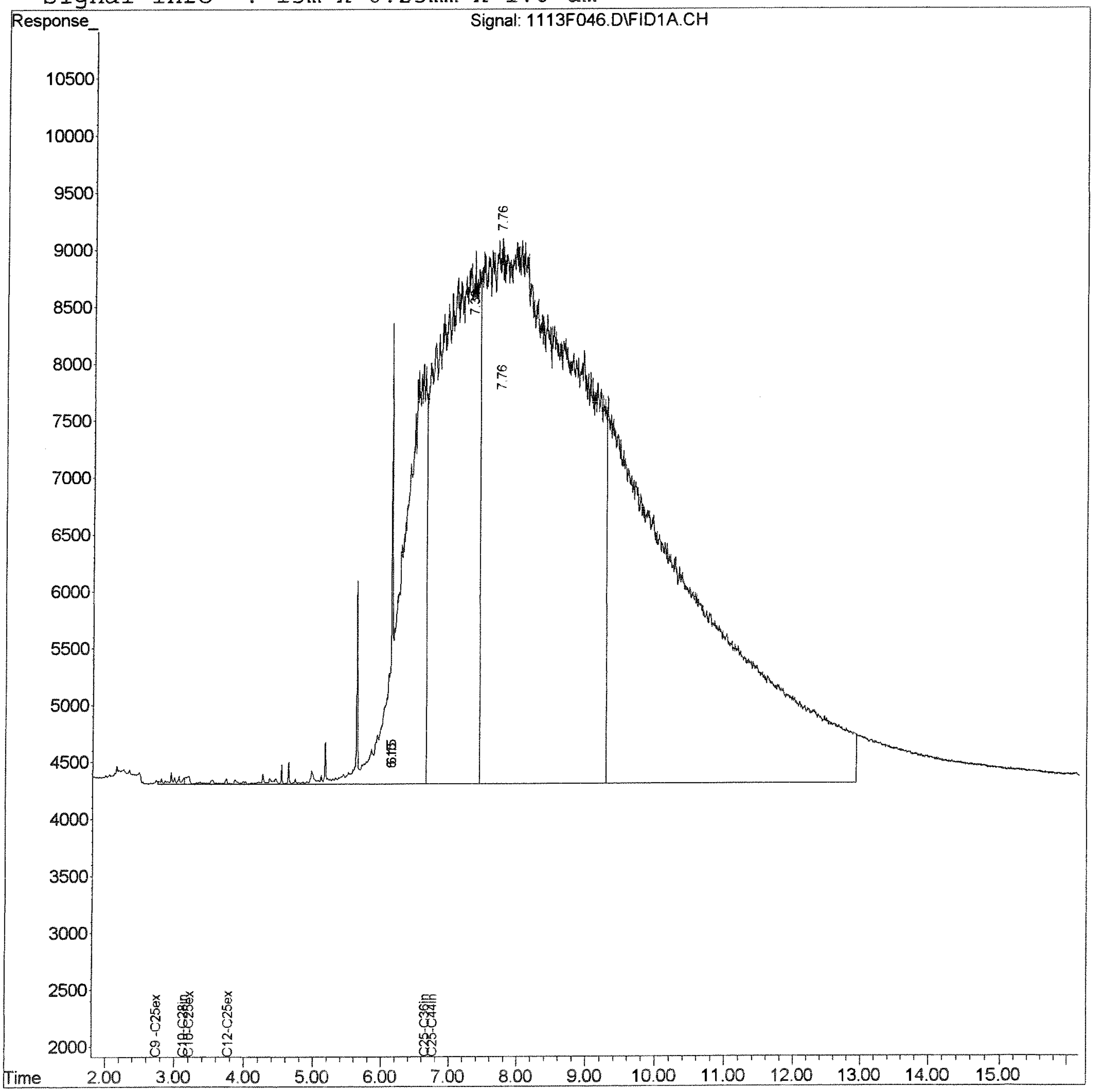
Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator)
Title : 8015/NWTPH Semivolatile Range Organics CAL12766
Last Update : Thu Nov 14 08:13:14 2013
Response via : Initial Calibration
DataAcq Meth : SVF_FB.M

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) H C9 -C25ex DRO [TPH-Diesel]	2.75	101159	87.888	ppm
5) H C10-C25ex DRO [AK102]	3.23	100457	88.759	ppm
6) H C10-C28in DRO [8015]	3.13	293562	259.022	ppm
7) H C12-C25ex DRO [NWTPH]	3.78	99686	103.251	ppm
8) H C25-C36in RRO [NWTPH]	6.66	639707	1059.316	ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	946539	1047.861	ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Data File : J:\GC21\DATA\111313F\1113F046.D              Vial: 97
Acq On    : 13 Nov 2013   5:00 pm                    Operator: DVaillenco
Sample    : RRO@  1000ppm | SVF01-42I                Inst     : GC21
Misc      :                                          Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Nov 14  8:34 2013  Quant Results File: 091013FSRO.RES

Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator)
Title        : 8015/NWTPH Semivolatile Range Organics CAL12766
Last Update  : 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
```



Organic Analysis:

Diesel and Residual Range Organics - Silica Gel Treated

Validation Package

Sample Prep and Screen Data

Preparation Information

Group ID:	KWG1312533	**Prep Method:**	~~Method~~ EPA 3510C	**Prep Date:**	11/04/13 08:45
Department:	Semivoa GC				

Lab Code	Client ID	Product	Matrix	Amt. Ext.	Final Vol.	Solids
K1311913-001	MW2-102913	NWTPH-Dx NW TPH SGT	WATER	470mL	1mL	
K1311913-002	MW1-110113	NWTPH-Dx NW TPH SGT	WATER	470mL	1mL	
K1311913-003	MW3-110113	NWTPH-Dx NW TPH SGT	WATER	480mL	1mL	
KWG1312533-1	Duplicate	NWTPH-Dx NW TPH SGT	WATER	470mL	1mL	
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	K1311913-0~~01~~ 3 *	KQ1313041-01
KWG1312533-2		KQ1313041-02
KWG1312533-3		KQ1313041-03

Lab Code	Prep Event ID	Surrogate Solution ID	Amount Added	Spike Solution ID	Amount Added	Witness
K1311913-001	1302598					KClark
K1311913-002	1302599					KClark
K1311913-003	1302600					KClark
KWG1312533-1	1302601					KClark
KWG1312533-2	1302602					KClark
KWG1312533-3	1302603					KClark

Comments: * Changed Parent info to reflect RAW B.S. [initials] 11/11/13

Started By: HSteele   Assisted By: Training Yes No
Completed By: JJohnson   Assisted By: Yes No
Reviewed By: EB   Date: 11-11-13   Storage:

Chain of Custody

Relinquished By: KC   Date: 11/8/13   Extracts Examined
Received By: Date: Yes No

Preparation Information Benchsheet

Prep Run:	195978	**Prep Workflow:**	TPHextAq (14)	**Status:**	Draft	**Prep Date:**	11/04/2013 07:01
Team:	Semivoa GC	**Prep Method:**	Method	**Current Step:**	Extraction	**Due Date:**	11/07/2013
Analyst:	HSTEELE	**Rush/NPDES:**	N/A			**Hold Date:**	11/12/2013

Lab Code	Client ID	Bottle #	✓	Initial Amount mL	pH Initial	pH Adj 1	Inter. Volume	Final Volume mL	Surr Amt ul	Spike Amt ul	TestNo List
K1311913-001	MW2-102913	.02	✓	470	<2	NA	NA	1	100	—	NW TPH SGT
K1311913-002	MW1-110113	.02	✓	470	<2			1		—	NW TPH SGT
K1311913-003	MW3-110113	.02	✓	480	<2			1		—	NW TPH SGT
K1311913-~~001~~: KQ1313041-01	Duplicate 003	~~.02~~ 1	✓	410	<2			1		—	NW TPH SGT
KQ1313041-02	Lab Control Sample	—	—	500	NA	<2		1		100	NW TPH SGT
KQ1313041-03	Method Blank	—	—	500	NA	<2		1		—	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 Solutions **Witness:** KClark 11/4/13

SURR: SVF01-446 500ppm ex: 3/25/14 100ul (epp)
SPIKE: SVF01- 37H 10000/8000ppm ex: 12/26/13 100ul (epp)

Preparation Steps

Step	Started	Finished	By	Assisted By	Training?	Comments
Extraction	① ~~10~~ 11-4-13	11-4-13	TS			

Comments

① OE 11-4-13 TS, e Produced emulsion - very murky - fine sediment
* used sample 003 instead of 001 for dup.

Additional Prep Information For Fuels by 3510

Service Request # K1311913 Work Group # 195978

Batch Start (Time/Date/Initial): 0845 / 11-4-13 / HS

Batch Stop (Time/Date/Initial): 0930 / 11-4-13 / HS

DCM Lot # DJ 358 HCl Lot # 52080

Sulfate Lot # 132318 Glass Wool Lot # 20911999

S-Evap Thermometer ID: X-SVM-026 Date/Time/Initial: 1100 / 11-4-13 / HS

Temp as measured: 73 °C Correction factor: — °C Adjusted temp: — °C

N-Evap Thermometer ID: DWB-12 Date/Time/Initial: 1350 / 11-4-13 / HS

Temp as measured: 32 °C Correction factor: — °C Adjusted temp: — °C

Acid Cleanup (Date/Time/Initial): 1345 11/8/13 KC Lot #: 53002

Silica Gel Cleanup (Date/Time/Initial): 1415 11/8/13 JJ/KC Lot #: VH21B

Vial: Clear Storage: DWL Archive: —

Comments/Observations:

QC Requirements

AK 102/103	MS/DMS + LCS/DLCS every 20 samples
NWTPH-DX.-HCID	Duplicate every 10 samples – LCS/MB every 20 samples
8015-DRO	MS/DMS + LCS/MB every 20 samples
If insufficient sample for MS/DMS or Dup include a DLCS with the batch	

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 bench sheets
- ☐ Sample IDs have been checked—Bottle numbers appended if required
- ☐ Names present for: Started by, Completed by, relinquished by, and witnessed by.
- ☐ Training has been circled
- ☐ Extract Storage recorded
- ☐ Additional Prep 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

R:\Extractions\Active Benchsheets\SVG\Fuels 3510.doc EXT-3510 Rev. 9

Reviewed by: Elissa Bruno 12/27/12

Injection Log

Directory: J:\GC21\data\111313F

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	90	1113F002.D	1.	DCM		11/13/22013 8:5
2	90	1113F004.D	1.	DCM		11/13/22013 9:12
3	90	1113F006.D	1.	DCM		11/13/22013 9:34
4	91	1113F008.D	1.	ALIPHATICS MARKER | SVF01-34L	Run#3676020	11/13/22013 9:5
5	92	1113F010.D	1.	AROMATICS MARKER | SVF01-29C		11/13/22013 10:1
6	96	1113F012.D	1.	DRO @ 1000/50ppm | SVF01-44J	CAL 127ee	11/13/22013 10:4
7	97	1113F014.D	1.	RRO @ 1000ppm | SVF01-42I		11/13/22013 11:0
8	87	1113F016.D	1.	IB		11/13/22013 11:2
9	90	1113F018.D	1.	DCM		11/13/22013 11:4
10	1	1113F020.D	1.	KQ1313114-01LCS		11/13/22013 12:1
11	2	1113F022.D	1.	KQ1313114-02DLCS		11/13/22013 12:3
12	3	1113F024.D	1.	KQ1313114-03MB		11/13/22013 12:5
13	4	1113F026.D	1.	K1311465-001		11/13/22013 1:17
14	5	1113F028.D	1.	K1311465-002	K1311960 SM 11/14/13 EE	11/13/22013 1:39
15	6	1113F030.D	1.	K1311465-003		11/13/22013 2:02
16	7	1113F032.D	1.	KQ1313041-02LCS		11/13/22013 2:24
17	8	1113F034.D	1.	KQ1313041-03MB		11/13/22013 2:47
18	9	1113F036.D	1.	K1311913-001		11/13/22013 3:09
19	10	1113F038.D	1.	K1311913-002		11/13/22013 3:31
20	11	1113F040.D	1.	K1311913-003		11/13/22013 3:54
21	12	1113F042.D	1.	K1311913-003DUP	KWG1312215	11/13/22013 4:16
22	96	1113F044.D	1.	DRO @ 1000/50ppm | SVF01-44J		11/13/22013 4:38
23	97	1113F046.D	1.	RRO@ 1000ppm | SVF01-42I		11/13/22013 5:00
24	86	1113F048.D	1.	IB		11/13/22013 5:23
25	14	1113F050.D	1.	LT MINERAL OIL | HCV2-86B		11/13/22013 5:45
26	15	1113F052.D	1.	HVY MINERAL OIL | HCV2-86D		11/13/22013 6:08
27	86	1113F054.D	1.	IB		11/13/22013 6:30
28	16	1113F056.D	1.	KQ1313404-01LCS	KWG1312546	11/13/22013 6:52
29	17	1113F058.D	1.	KQ1313404-02DLCS	KWG1312546	11/13/22013 7:14
30	18	1113F060.D	1.	KQ1313404-03MB	KWG1312546	11/13/22013 7:36
31	19	1113F062.D	1.	K1312117-001 @ 5X		11/13/22013 7:59
32	20	1113F064.D	1.	K1312117-002 @ 5X		11/13/22013 8:22
33	21	1113F066.D	1.	K1312117-004 @ 5X		11/13/22013 8:44
34	22	1113F068.D	1.	K1312117-005 @ 5X		11/13/22013 9:06
35	23	1113F070.D	1.	K1312117-003 @ 5X		11/13/22013 9:28
36	96	1113F072.D	1.	DRO @ 1000/50ppm | SVF01-44J		11/13/22013 9:51
37	97	1113F074.D	1.	RRO @ 1000ppm | SVF01-42I		11/13/22013 10:1
38	86	1113F076.D	1.	IB		11/13/22013 10:3
39	90	1113F078.D	1.	DCM		11/13/22013 10:5
40	90	1113F080.D	1.	DCM		11/13/22013 11:2
41	90	1113F082.D	1.	DCM		11/13/22013 11:4
42	90	1113F084.D	1.	DCM		11/14/22013 12:0
43	90	1113F086.D	1.	DCM		11/14/22013 12:2
44	90	1113F088.D	1.	DCM		11/14/22013 12:4
45	90	1113F090.D	1.	DCM		11/14/22013 1:12
46	90	1113F092.D	1.	DCM		11/14/22013 1:34
47	90	1113F094.D	1.	DCM		11/14/22013 1:57
48	90	1113F096.D	1.	DCM		11/14/22013 2:19
49	90	1113F098.D	1.	DCM		11/14/22013 2:41
50	90	1113F100.D	1.	DCM		11/14/22013 3:04
51	90	1113F102.D	1.	DCM		11/14/22013 3:26
52	90	1113F104.D	1.	DCM		11/14/22013 3:49
53	90	1113F106.D	1.	DCM		11/14/22013 4:11
54	90	1113F108.D	1.	DCM		11/14/22013 4:34
55	90	1113F110.D	1.	DCM		11/14/22013 4:56

Injection Log

Directory: J:\GC21\data\111313F

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
56	90	1113F112.D	1.	DCM		11/14/22013 5:1[illegible]
57	90	1113F114.D	1.	DCM		11/14/22013 5:4[illegible]
58	90	1113F116.D	1.	DCM		11/14/22013 6:0[illegible]
59	90	1113F118.D	1.	DCM		11/14/22013 6:2[illegible]
60	90	1113F120.D	1.	DCM		11/14/22013 6:4[illegible]
61	90	1113F122.D	1.	DCM		11/14/22013 7:1[illegible]
62	90	1113F124.D	1.	DCM		11/14/22013 7:3[illegible]

Quantitation Report (Not Reviewed)

Data File : J:\GC21\DATA\111313F\1113F008.D
Acq On : 13 Nov 2013 9:56 am
Sample : ALIPHATICS MARKER | SVF01-34L
Misc :
IntFile : rteint.p
Quant Time: Nov 14 08:15:11 2013 Quant Results File: 091013FSRO.RES

Vial: 91
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

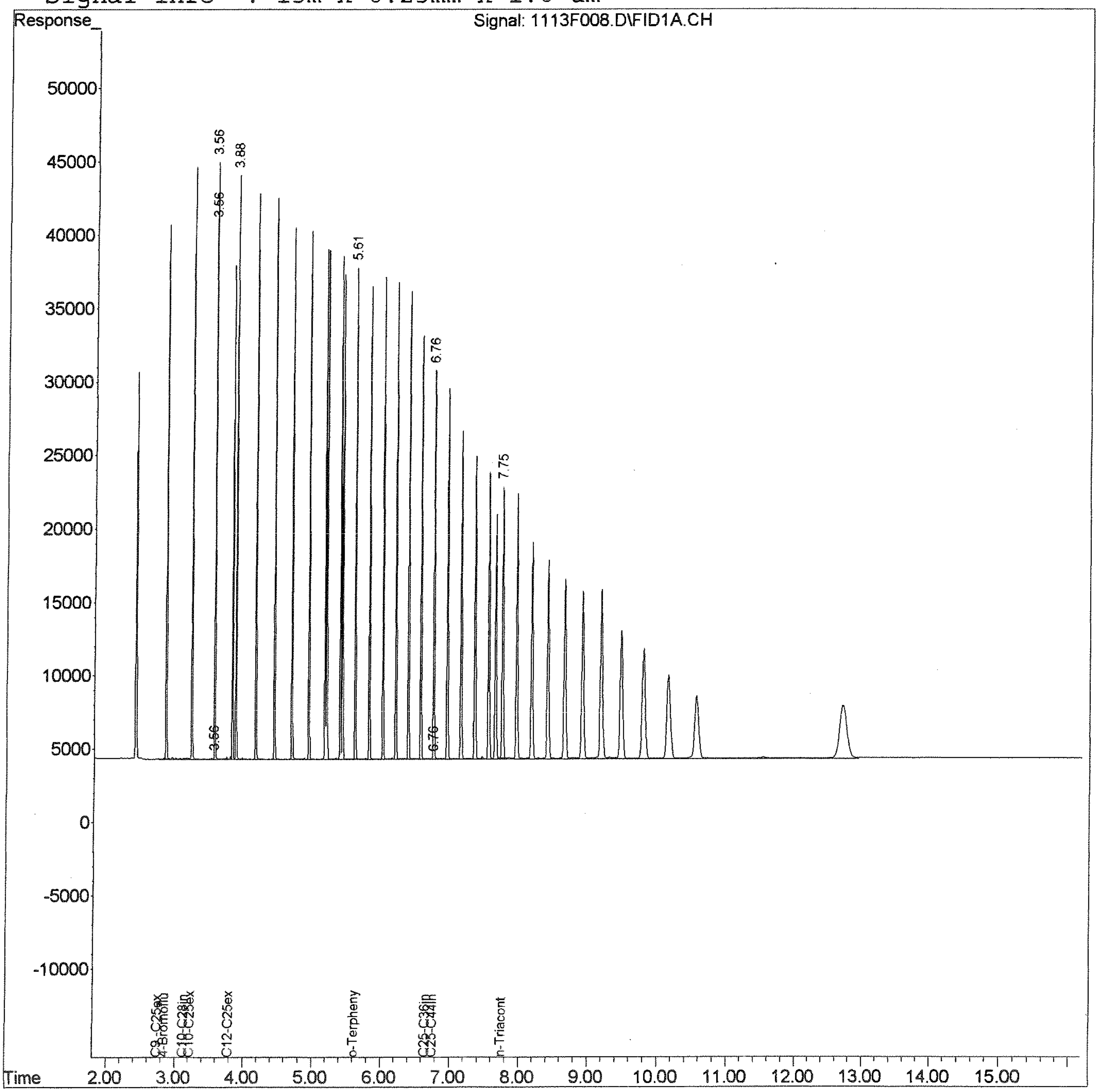
Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator)
Title : 8015/NWTPH Semivolatile Range Organics CAL12766
Last Update : Thu Nov 14 08:13:14 2013
Response via : Initial Calibration
DataAcq Meth : SVF_FB.M

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			
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	Recovery	=	47.96%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	441033	383.172 ppm
5) H C10-C25ex DRO [AK102]	3.23	439733	388.525 ppm
6) H C10-C28in DRO [8015]	3.13	543520	479.571 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	386705	400.536 ppm
8) H C25-C36in RRO [NWTPH]	6.66	303043	494.102 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	424639	466.846 ppm

Quantitation Report (Not Reviewed)

```
Data File : J:\GC21\DATA\111313F\1113F008.D                 Vial: 91
Acq On    : 13 Nov 2013   9:56 am                       Operator: DVaillenco
Sample    : ALIPHATICS MARKER | SVF01-34L               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
```



Quantitation Report (Not Reviewed)

```
Data File : J:\GC21\DATA\111313F\1113F010.D              Vial: 92
Acq On    : 13 Nov 2013  10:18 am                    Operator: DVaillenco
Sample    : AROMATICS MARKER | SVF01-29C             Inst    : GC21
Misc      :                                          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
```

	Compound	R.T.	Response	Conc Units
	System Monitoring Compounds			
	Target Compounds			
4) H	C9 -C25ex DRO [TPH-Diesel]	2.75	254308	220.944 ppm
5) H	C10-C25ex DRO [AK102]	3.23	245219	216.663 ppm
6) H	C10-C28in DRO [8015]	3.13	267645	236.155 ppm
7) H	C12-C25ex DRO [NWTPH]	3.78	222697	230.662 ppm
8) H	C25-C36in RRO [NWTPH]	6.66	43919	59.067 ppm
9) H	C25-C44in RRO [TPH-Oil]	6.76	53991	54.214 ppm

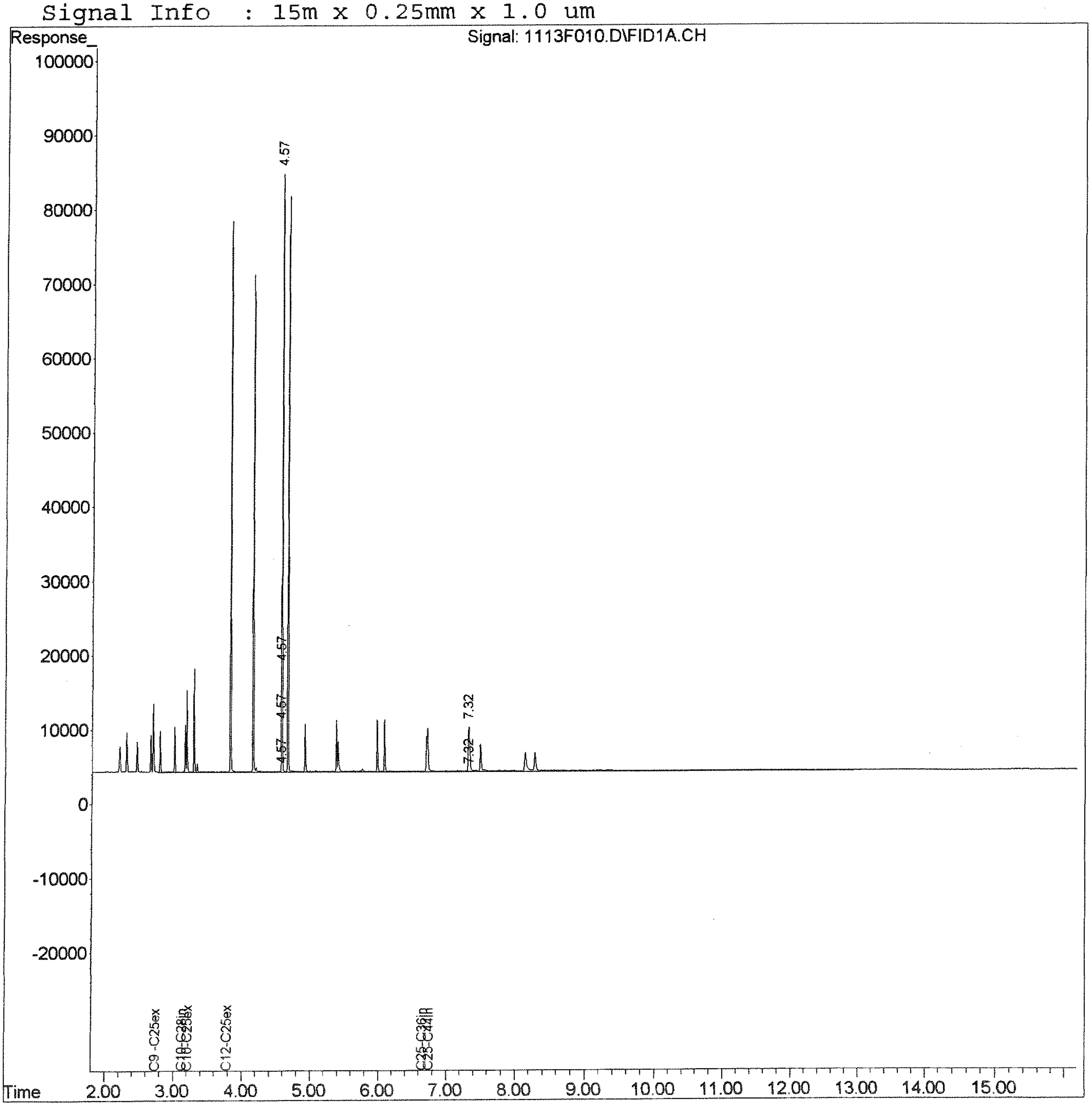
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : J:\GC21\DATA\111313F\1113F010.D Vial: 92
Acq On : 13 Nov 2013 10:18 am Operator: DVaillenco
Sample : AROMATICS MARKER | SVF01-29C 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



Exception Report

Data File: J:\GC21\DATA\111313F\1113F016.D
Lab ID: KWG1312715-4
RunType: IB
Matrix: NOT APPLICABLE

Date Acquired: 11/13/2013 11:25
Date Quantitated: 11/14/2013 08:15
Batch ID: KWG1312715
Analysis Method: NWTPH-Dx
MethodJoinID: 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: [signature] 11/14/13

Secondary Review: [signature]

Printed: 11/14/2013 09:18:03
u:\Stealth\Crystal.rpt\except2.rpt

Quantitation Report

Data File:	J:\GC21\DATA\111313F\1113F016.D			**Instrument:**	GC21
Acqu Date:	11/13/2013 11:25	**Quant Date:**	11/14/2013 08:15	**Vial:**	87
Run Type:	IB			**Dilution:**	1.0
Lab ID:	KWG1312715-4			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/14/2013

Analysis Lot:	KWG1312715	**Prep Lot:**		**Report Group:**
Analysis Method:	NWTPH-Dx	**Prep Method:**		
Prep Ref:		**Prep Date:**		

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ227
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl			0			50-150	NA	
n-Triacontane			0			50-150	NA	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		3002	2.61			
Diesel Range Organics (DRO)	3.78		1721	1.78			
Residual Range Organics (RRO)			7070				
C25 - C44 RRO	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

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

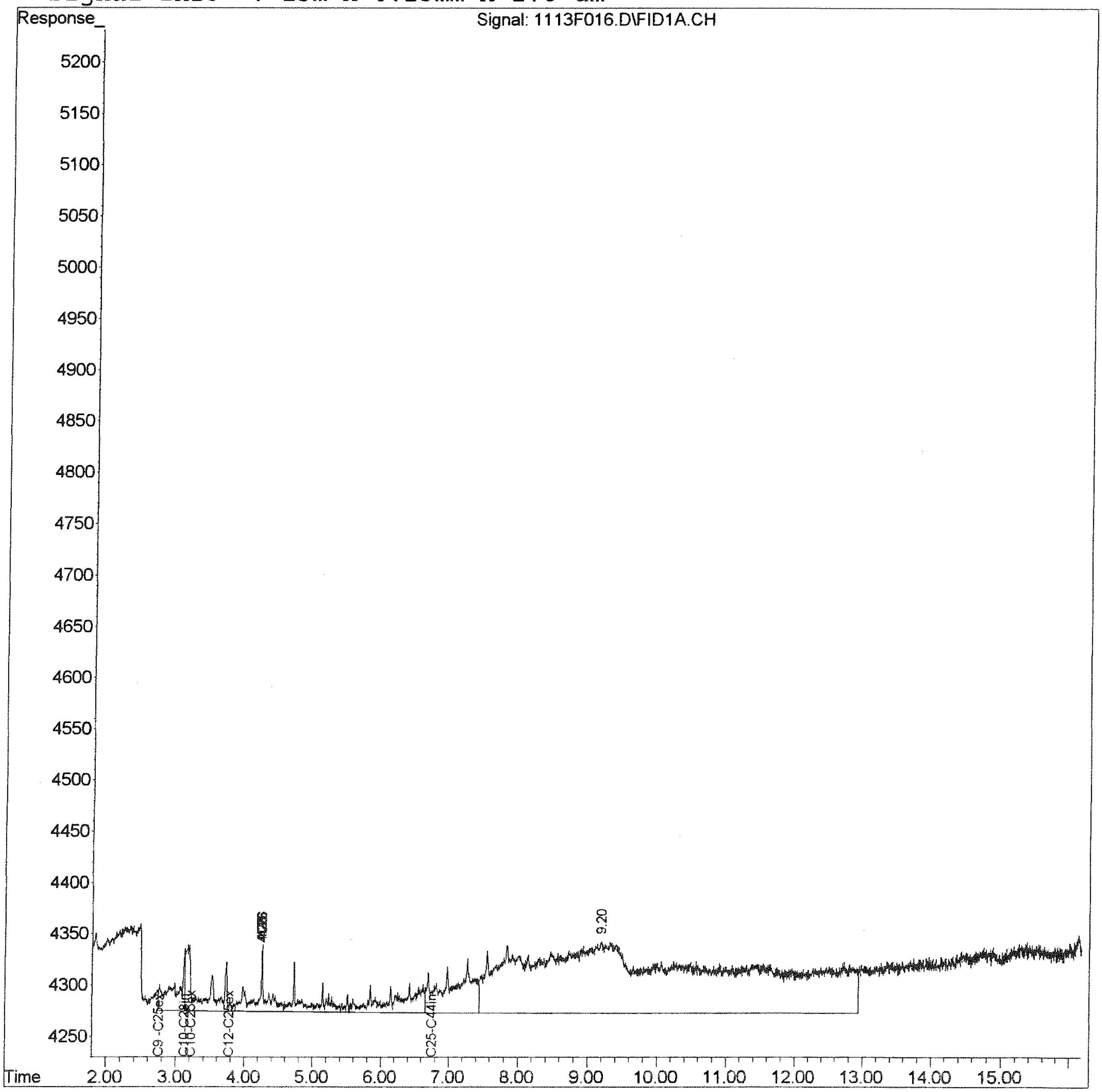
Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\111313F\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			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	3002	2.608 ppm
5) H C10-C25ex DRO [AK102]	3.23	2496	2.205 ppm
6) H C10-C28in DRO [8015]	3.13	3731	3.292 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	1721	1.783 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	16441	12.411 ppm

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  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
```



Exception Report

Data File: J:\GC21\DATA\111313F\1113F048.D
Lab ID: KWG1312715-5
RunType: IB
Matrix: NOT APPLICABLE

Date Acquired: 11/13/2013 17:23
Date Quantitated: 11/14/2013 08:15
Batch ID: KWG1312715
Analysis Method: NWTPH-Dx
MethodJoinID: 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: 11/14/13

Secondary Review:

Quantitation Report

Data File:	J:\GC21\DATA\111313F\1113F048.D			**Instrument:**	GC21
Acqu Date:	11/13/2013 17:23	**Quant Date:**	11/14/2013 08:15	**Vial:**	86
Run Type:	IB			**Dilution:**	1.0
Lab ID:	KWG1312715-5			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/14/2013

Analysis Lot:	KWG1312715	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
		Prep Date:			
Prep Ref:					

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ227
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits	Rpt?
o-Terphenyl			0			50-150	NA
n-Triacontane			0			50-150	NA

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		2774	2.41			
Diesel Range Organics (DRO)	3.78		1427	1.48			
Residual Range Organics (RRO)			4990				
C25 - C44 RRO	6.76		9248	4.40			

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

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\111313F\1113F048.D
Acq On : 13 Nov 2013 5:23 pm
Sample : IB
Misc :
IntFile : rteint.p
Quant Time: Nov 14 08:15:29 2013 Quant Results File: 091013FSRO.RES

Vial: 86
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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

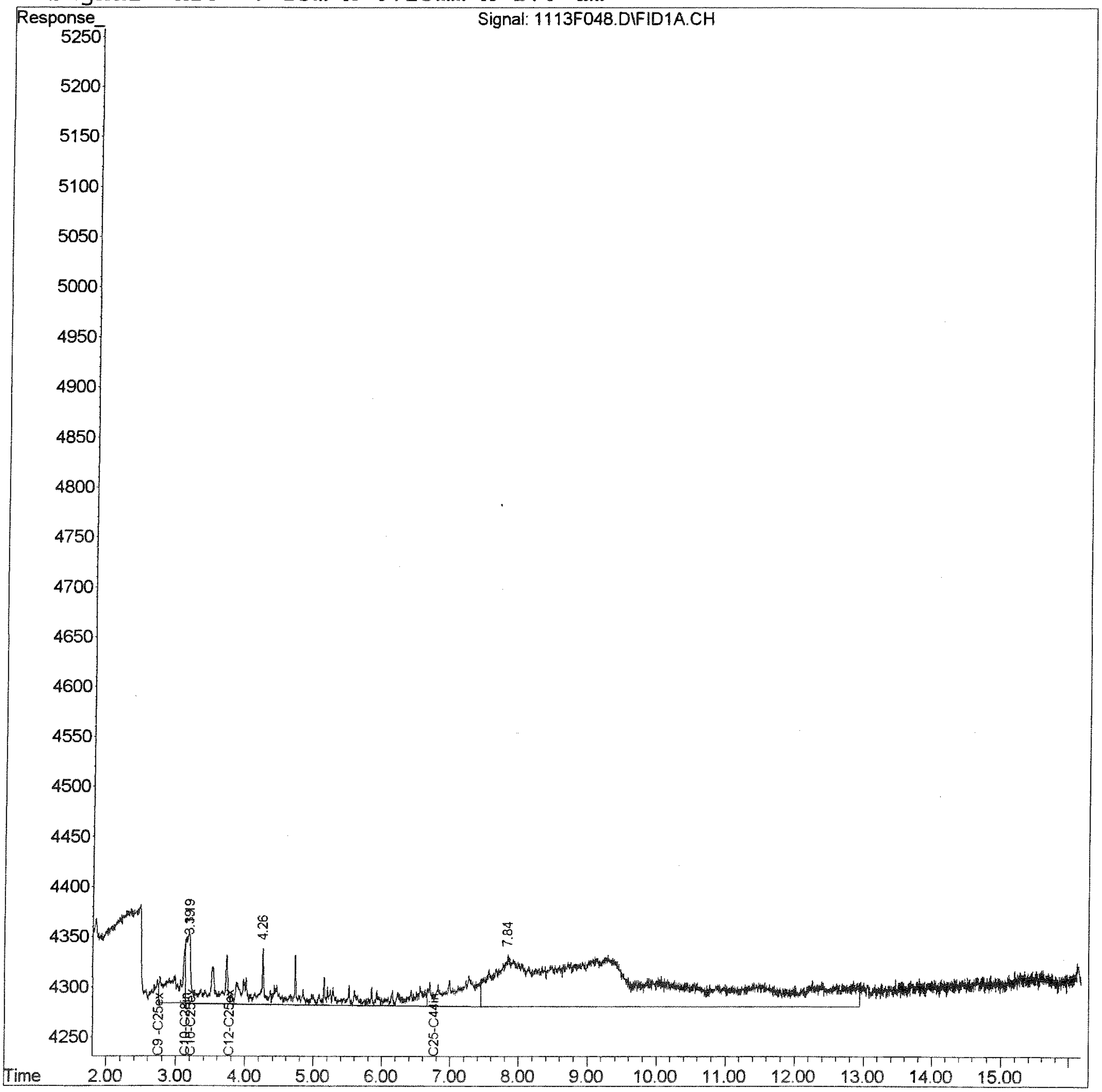
Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um

	Compound	R.T.	Response	Conc Units
	System Monitoring Compounds			
	Target Compounds			
4) H	C9 -C25ex DRO [TPH-Diesel]	2.75	2774	2.410 ppm
5) H	C10-C25ex DRO [AK102]	3.23	2238	1.977 ppm
6) H	C10-C28in DRO [8015]	3.13	3011	2.657 ppm
7) H	C12-C25ex DRO [NWTPH]	3.78	1427	1.478 ppm
9) H	C25-C44in RRO [TPH-Oil]	6.76	9248	4.403 ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\111313F\1113F048.D                Vial: 86
Acq On    : 13 Nov 2013   5:23 pm                      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
```



ATTACHMENT D

ANALYTICAL RESULTS

SUBSURFACE SOIL

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1317 South 13th 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

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
M	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.
- 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/CertificationDrinkingWaterLabs/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/PublicParticipationandPermitSupport/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/EnvironmentalLaboratoryAccreditation/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	**Service Request No.:**	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	**Date Received:**	11/01/13
Sample Matrix:	Soil		

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 Howard Holmes

Chain of Custody

ALS Environmental

CHAIN OF CUSTODY

1317 South 13th Ave., Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

SR# K1311914

PAGE 1 OF 1 COC# 001

PROJECT NAME: PacifiCorp - Chehalis Power Groundwater
PROJECT NUMBER:
PROJECT MANAGER: Lenora Westbrook
COMPANY NAME: KTA, INC.
ADDRESS:
CITY/STATE/ZIP:
E-MAIL ADDRESS: LWestbrook@KTAInc.net
PHONE # 360-250-7694 FAX #
SAMPLER'S SIGNATURE: Dave Metallo [signature]

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS		Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐ SIM PAH☐	Volatile Organics 624☐ 8260☐ 8021☐ BTEX☐	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCBs Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081☐ 8141☐ 8151☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	Metals, Total or Dissolved (See List below)	Cyanide☐ Hex-Chrom☐	(circle) pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS, Turb.	(circle) NH_3-N, COD, TKN, TOC, DOC, NO_2+NO_3, T-Phos	TOX 9020☐ AOX 1650☐ 506☐	Alkalinity☐ CO_3☐ HCO_3☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases RSK 175☐ Methane☐ Ethane☐ Ethene☐ CO_2☐	NWTPH-Dx/NWTPH SGT	TS Met/Total Solids		REMARKS
SB1-5-102813	10-28-13	1115		S	1																	X	X		
SB2-6-102813	10-28-13	1450		S	1																	X	X		
SB3-5-102913	10-29-13	1100		S	1																	X	X		

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required
___ II. Report Dup., MS, MSD as required
___ III. CLP Like Summary (no raw data)
___ IV. Data Validation Report
___ V. EDD

INVOICE INFORMATION

P.O. # ________
Bill To: ________

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 day
_X_ Standard (15 working days)
___ Provide FAX Results

________ Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

***INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: ________ (CIRCLE ONE)**

SPECIAL INSTRUCTIONS/COMMENTS:

Ask KTA (Lenora) Re: Reporting Requirements.

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:	
Signature: [signature]	Date/Time: 10-29-13	Signature: [signature]	Date/Time: 11/1/13 1330	Signature:	Date/Time:	Signature:	Date/Time:
Printed Name: Dave Metallo	Firm: CTEC	Printed Name: V Smith	Firm: ALS	Printed Name:	Firm:	Printed Name:	Firm:

ALS

PC H2

Cooler Receipt and Preservation Form

Client / Project: KTA, INC. Service Request K13 11914

Received: NOV. 1, 2013 Opened: 11/1 By: SD Unloaded: 11/1 By: SD

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? ______
   If present, were custody seals intact? Y **N** If present, were they signed and dated? Y **N**

Raw Cooler Temp	Corrected. Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
0.0	0.2	1.1	1.3	+0.2	313			

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs **Wet Ice** Dry Ice Sleeves ______
5. Were custody papers properly filled out (ink, signed, etc.)? NA **Y** N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA **Y** N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA **Y** N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA **Y** N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA **Y** N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* **NA** Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* **NA** Y N
12. Was C12/Res negative? **NA** Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: ______

Page ____ *of* ____

Total Solids

Analytical Results

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

Service Request: K1311914

Total Solids

Prep Method: NONE
Analysis Method: 160.3M
Test Notes:

Units: PERCENT
Basis: Wet

Sample Name	Lab Code	Date Collected	Date Received	Date Analyzed	Result	Result Notes
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	

COLUMBIA ANALYTICAL SERVICES, INC.

EPA Method 160.3 - Total Solids

Group ID:	KWG1312630		368137		
Analyst:	PFaiman			**Reviewed By:**	BDC
Date Acquired:	11/12/2013 16:24	**Oven TempStart:**	105 DEG C	**Date Reviewed:**	11/13/13
Date Completed:	11/13/2013 08:10	**Oven TempEnd:**	105 DEG C		

#	Lab Code	Client ID	Matrix	Tare	Tare+Wet	Tare+Dry	% Solids	QC Ref Sample	Comments
1	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
5	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
11	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 x̄ 96.0
19	KWG1312630-1	Duplicate Client Sample	SEDIMENT	1.39g	14.88g	8.04g	49.3	K1311369-002	K-BALANCE-16 K-OVEN-07 49.0 1
20	KWG1312630-2	Duplicate Client Sample	SOIL	1.36g	14.36g	14.35g	99.9	K1311580-001	K-BALANCE-16 K-OVEN-07 99.9 <1
21	KWG1312630-3	Continuing Calibration Verification	PAPERBOA	1.00g	1.00g	g			K-BALANCE-16
22	KWG1312630-4	Continuing Calibration Verification	PAPERBOA	100.00g	100.00g	g			K-BALANCE-16
23	KWG1312630-5	Continuing Calibration Verification	PAPERBOA	1.0g	1.00g	g			K-BALANCE-16

Group ID:	KWG1312630				
Analyst:	PFaiman			**Reviewed By:**	BDK
Date Acquired:	11/12/2013 16:24	**Oven TempStart:**	105 DEG C	**Date Reviewed:**	11/13/13
Date Completed:	11/13/2013 08:10	**Oven TempEnd:**	105 DEG C		

#	Lab Code	Client ID	Matrix	Tare	Tare+Wet	Tare+Dry	% Solids	QC Ref Sample	Comments
24	KWG1312630-6	Continuing Calibration Verific ation	PAPERBOA	100.00g	100.00g	g			K-BALANCE-16

Analytical Results Summary

Instrument Name: K-Balance-16 **Analyst:** PFAIMAN **Analysis Lot:** 368137 **Method/Testcode:** TS-MET/Total Solids

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K1311369-002	Solids, Total	N/A		Sediment	48.60 Percent	g	48.6 Percent						11/12/13 16:24:00	N	V
K1311369-004	Solids, Total	N/A		Sediment	33.30 Percent	g	33.3 Percent						11/12/13 16:24:00	N	V
K1311369-006	Solids, Total	N/A		Sediment	51.90 Percent	g	51.9 Percent						11/12/13 16:24:00	N	V
K1311369-008	Solids, Total	N/A		Sediment	82.30 Percent	g	82.3 Percent						11/12/13 16:24:00	N	V
K1311580-001	Solids, Total	N/A		Soil	99.90 Percent	g	99.9 Percent						11/12/13 16:24:00	N	IV
K1311580-002	Solids, Total	N/A		Soil	94.50 Percent	g	94.5 Percent						11/12/13 16:24:00	N	IV
K1311580-003	Solids, Total	N/A		Soil	96.40 Percent	g	96.4 Percent						11/12/13 16:24:00	N	IV
K1311580-004	Solids, Total	N/A		Soil	99.70 Percent	g	99.7 Percent						11/12/13 16:24:00	N	IV
K1311879-001	Solids, Total	N/A		Soil	95.00 Percent	g	95.0 Percent						11/12/13 16:24:00	N	IV
K1311880-001	Solids, Total	N/A		Soil	98.10 Percent	g	98.1 Percent						11/12/13 16:24:00	N	IV
K1311914-001	Solids, Total	N/A		Soil	78.90 Percent	g	78.9 Percent						11/12/13 16:24:00	N	IV
K1311914-002	Solids, Total	N/A		Soil	82.50 Percent	g	82.5 Percent						11/12/13 16:24:00	N	IV
K1311914-003	Solids, Total	N/A		Soil	77.60 Percent	g	77.6 Percent						11/12/13 16:24:00	N	IV
K1311979-001	Solids, Total	N/A		Soil	99.10 Percent	g	99.1 Percent						11/12/13 16:24:00	N	V
K1311979-002	Solids, Total	N/A		Soil	95.90 Percent	g	95.9 Percent						11/12/13 16:24:00	N	V
K1311995-001	Solids, Total	N/A		Soil	95.90 Percent	g	95.9 Percent						11/12/13 16:24:00	N	IV
K1311995-002	Solids, Total	N/A		Soil	96.10 Percent	g	96.1 Percent						11/12/13 16:24:00	N	IV
K1312071-001	Solids, Total	N/A		Paperboard	96.10 Percent	g	96.1 Percent						11/12/13 16:24:00	N	V
KQ1313533-01	Solids, Total	DUP	K1311369-002	Sediment	49.30 Percent	g	49.3 Percent					1	11/12/13 16:24:00	N	V
KQ1313533-02	Solids, Total	DUP	K1311580-001	Soil	99.90 Percent	g	99.9 Percent					<1	11/12/13 16:24:00	N	IV

11/13/13 pf

BPK
11/13/13

14

# indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Diesel and Residual Range Organics

Organic Analysis:

Diesel and Residual Range Organics - Silica Gel Treated

Summary Package

Sample and QC Results

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater

Service Request: K1311914

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 E Pertwood

Name: Lonn Pertwood

Date: 11/14/13

Title:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

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

Service Request: K1311914
Date Collected: 10/28/2013
Date Received: 11/01/2013

Diesel and Residual Range Organics - Silica Gel Treated

Sample Name: SB1-5-102813
Lab Code: K1311914-001

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry

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	87	50-150	11/08/13	Acceptable
n-Triacontane	93	50-150	11/08/13	Acceptable

Comments:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

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

Service Request: K1311914
Date Collected: 10/28/2013
Date Received: 11/01/2013

Diesel and Residual Range Organics - Silica Gel Treated

Sample Name: SB2-6-102813
Lab Code: K1311914-002

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction 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:

ALS Group USA, Corp. dba ALS Environmental

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:	EPA 3550B	**Level:**	Low
Analysis Method:	NWTPH-Dx		

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:	EPA 3550B	**Level:**	Low
Analysis Method:	NWTPH-Dx		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction 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:

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

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

Service Request: K1311914

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

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	KTA Associates	**Service Request:**	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	**Date Extracted:**	11/06/2013
Sample Matrix:	Soil	**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:**	Low
Analysis Method:	NWTPH-Dx	**Extraction Lot:**	KWG1312475

Analyte Name	MRL	Sample Result	SB3-5-102913DUP KWG1312475-3 Duplicate Sample Result	Average	Relative Percent Difference	RPD Limit
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.

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater
Sample 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: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG1312475

	Lab Control Sample KWG1312475-1 **Lab Control Spike**			
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**
Diesel Range Organics (DRO)	219	267	82	42-134
Residual Range Organics (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 Associates	**Service Request:**	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	**Date Extracted:**	11/06/2013
Sample Matrix:	Soil	**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:**	Low
Analysis Method:	NWTPH-Dx	**Extraction Lot:**	KWG1312475

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	KTA Associates	**Service Request:**	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	**Date Extracted:**	11/06/2013
Sample Matrix:	Soil	**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:**	Low
Analysis Method:	NWTPH-Dx	**Extraction Lot:**	KWG1312475

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater

Service Request: K1311914
Calibration Date: 09/10/2013

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

Calibration ID: CAL12766
Instrument ID: GC21

Column: ZB-1

Level ID	File ID
A	J:\GC21\DATA\091013F\0910F072.D
B	J:\GC21\DATA\091013F\0910F074.D
C	J:\GC21\DATA\091013F\0910F076.D
D	J:\GC21\DATA\091013F\0910F078.D
E	J:\GC21\DATA\091013F\0910F080.D
F	J:\GC21\DATA\091013F\0910F082.D
G	J:\GC21\DATA\091013F\0910F092.D
H	J:\GC21\DATA\091013F\0910F094.D

Level ID	File ID
I	J:\GC21\DATA\091013F\0910F096.D
J	J:\GC21\DATA\091013F\0910F098.D
K	J:\GC21\DATA\091013F\0910F100.D
L	J:\GC21\DATA\091013F\0910F102.D
M	J:\GC21\DATA\091013F\0910F104.D
N	J:\GC21\DATA\091013F\0910F106.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	H	50	924	I	200	965	J	500	972
	K	2000	989	L	5000	1030	M	20000	916	N	50000	920			
Residual Range Organics (RRO)	A	20	968	B	50	756	C	200	699	D	500	627	E	2000	615
	F	5000	588												
o-Terphenyl				G	1.0	1300	H	2.5	1190	I	10	1260	J	25	1280
	K	100	1280	L	250	1330									
n-Triacontane				G	1.0	938	H	2.5	919	I	10	1050	J	25	1080
	K	100	1070	L	250	1160									

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater

Service Request: K1311914
Calibration Date: 09/10/2013

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

Calibration ID: CAL12766
Instrument ID: GC21

Column: ZB-1

Analyte Name	Compound Type	Calibration Evaluation				
		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	**Calibration Date:**	09/10/2013
		Date Analyzed:	09/11/2013

Second Source Calibration Verification
Diesel and Residual Range Organics - Silica Gel Treated

Calibration Type:	External Standard	**Calibration ID:**	CAL12766
Analysis Method:	NWTPH-Dx	**Units:**	ppm
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.

† **SPCC Compound** ‡ **CCC Compound**

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: External Standard
Analysis Method: NWTPH-Dx

Calibration Date: 09/10/2013
Calibration ID: CAL12766
Analysis Lot: KWG1312552
Units: ppm

File ID: J:\GC21\DATA\110813F\1108F020.D
J:\GC21\DATA\110813F\1108F022.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	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.

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
Analysis Method: NWTPH-Dx

Calibration Date: 09/10/2013
Calibration ID: CAL12766
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

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

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
Analysis Method: NWTPH-Dx

Calibration Date: 09/10/2013
Calibration ID: CAL12766
Analysis Lot: KWG1312552
Units: ppm

File ID: J:\GC21\DATA\110813F\1108F086.D
J:\GC21\DATA\110813F\1108F088.D

Column ID: ZB-1

Analyte Name	Expected	Result	Average RF	CCV 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.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater

Service Request: K1311914

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

Analysis Method: NWTPH-Dx

Analysis Lot: KWG1312552
Instrument ID: GC21
Column: 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

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

Service Request: K1311914
Date Extracted: 11/06/2013

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

Extraction Method: EPA 3550B
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:

Diesel and Residual Range Organics - Silica Gel Treated

Validation Package

Organic Analysis:

Diesel and Residual Range Organics - Silica Gel Treated

Validation Package

QC Reports

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

Service Request: K1311914

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

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp. dba ALS Environmental

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
Lab Code: K1311914-003

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry

Level: Low
Extraction Lot: KWG1312475

Analyte Name	MRL	Sample Result	SB3-5-102913DUP KWG1312475-3 Duplicate Sample Result	Average	Relative Percent Difference	RPD Limit
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 Associates	**Service Request:**	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	**Date Extracted:**	11/06/2013
Sample Matrix:	Soil	**Date Analyzed:**	11/08/2013

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

Extraction Method:	EPA 3550B	**Units:**	mg/Kg
Analysis Method:	NWTPH-Dx	**Basis:**	Dry
		Level:	Low
		Extraction Lot:	KWG1312475

	Lab Control Sample KWG1312475-1 **Lab Control Spike**			
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**
Diesel Range Organics (DRO)	219	267	82	42-134
Residual Range Organics (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 Associates	**Service Request:**	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	**Date Extracted:**	11/06/2013
Sample Matrix:	Soil	**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:**	Low
Analysis Method:	NWTPH-Dx	**Extraction Lot:**	KWG1312475

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	KTA Associates	**Service Request:**	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	**Date Extracted:**	11/06/2013
Sample Matrix:	Soil	**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:**	Low
Analysis Method:	NWTPH-Dx	**Extraction Lot:**	KWG1312475

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:

Diesel and Residual Range Organics - Silica Gel Treated

Validation Package

Raw Data

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

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

Service Request: K1311914
Date Collected: 10/28/2013
Date Received: 11/01/2013

Diesel and Residual Range Organics - Silica Gel Treated

Sample Name: SB1-5-102813
Lab Code: K1311914-001

Units: mg/Kg
Basis: Dry

Extraction Method: EPA 3550B
Analysis Method: 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	87	50-150	11/08/13	Acceptable
n-Triacontane	93	50-150	11/08/13	Acceptable

Comments:

Exception Report

Data File: J:\GC21\DATA\110813F\1108F050.D
Lab ID: K1311914-001
RunType: SMPL
Matrix: SOIL

Date Acquired: 11/08/2013 16:10
Date Quantitated: 11/09/2013 11:35
Batch ID: KWG1312552
Analysis Method: NWTPH-Dx
ListJoinID: 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	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: 11/11/13

Secondary Review:

Printed: 11/11/2013 08:36:56
u:\Stealth\Crystal.rpt\except2.rpt

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F050.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 16:10	**Quant Date:**	11/09/2013 11:35	**Vial:**	13
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	K1311914-001			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**	IV	**Matrix:**	SOIL
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**	10/28/2013	**Receive Date:**	11/01/2013

Analysis Lot:	KWG1312552	**Prep Lot:**	KWG1312475	**Report Group:**	K1311914
Analysis Method:	NWTPH-Dx	**Prep Method:**	EPA 3550B		
Prep Ref:	1302249	**Prep Date:**	11/06/2013		

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:	Diesel and Residual Range Organics - Silica Gel Treated	**Report List ID:**	LJ10933
		Method ID:	MJ1081
MB Ref:	J:\GC21\DATA\110813F\1108F040.D	**Quant based on Report List**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.58	0.00	27755	21.80	87	50-150	OK	
n-Triacontane	7.75	0.00	24159	23.32	93	50-150	OK	

Target Compounds

Final Conc. Units: mg/Kg Dry Weight

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		6635	6.87	2.9	J	
Residual Range Organics (RRO)	6.66		36864	47.22	20	J	

Prep Amount:	30.272 g	**Dilution:**	1.0
Prep Final Vol:	10 mL	**Unit Factor:**	1
Solids:	78.9 %		

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

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\1108F050.D          Vial: 13
Acq On    : 08 Nov 2013   4:10 pm                Operator: DVaillenco
Sample    : K1311914-001 SGT                     Inst    : GC21
Misc      :                                      Multiplr: 1.00
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
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	2.89	11850	20.899 ppm
Spiked Amount 50.000	Recovery	=	41.80%
2) S o-Terphenyl	5.58	27755	21.798 ppm
Spiked Amount 50.000	Recovery	=	43.60%
3) S n-Triacontane	7.75	24159	23.322 ppm
Spiked Amount 50.000	Recovery	=	46.64%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	9223	8.013 ppm
5) H C10-C25ex DRO [AK102]	3.23	7850	6.936 ppm
6) H C10-C28in DRO [8015]	3.13	13720	12.106 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	6635	6.872 ppm
8) H C25-C36in RRO [NWTPH]	6.66	36864	47.223 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	103853	109.724 ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

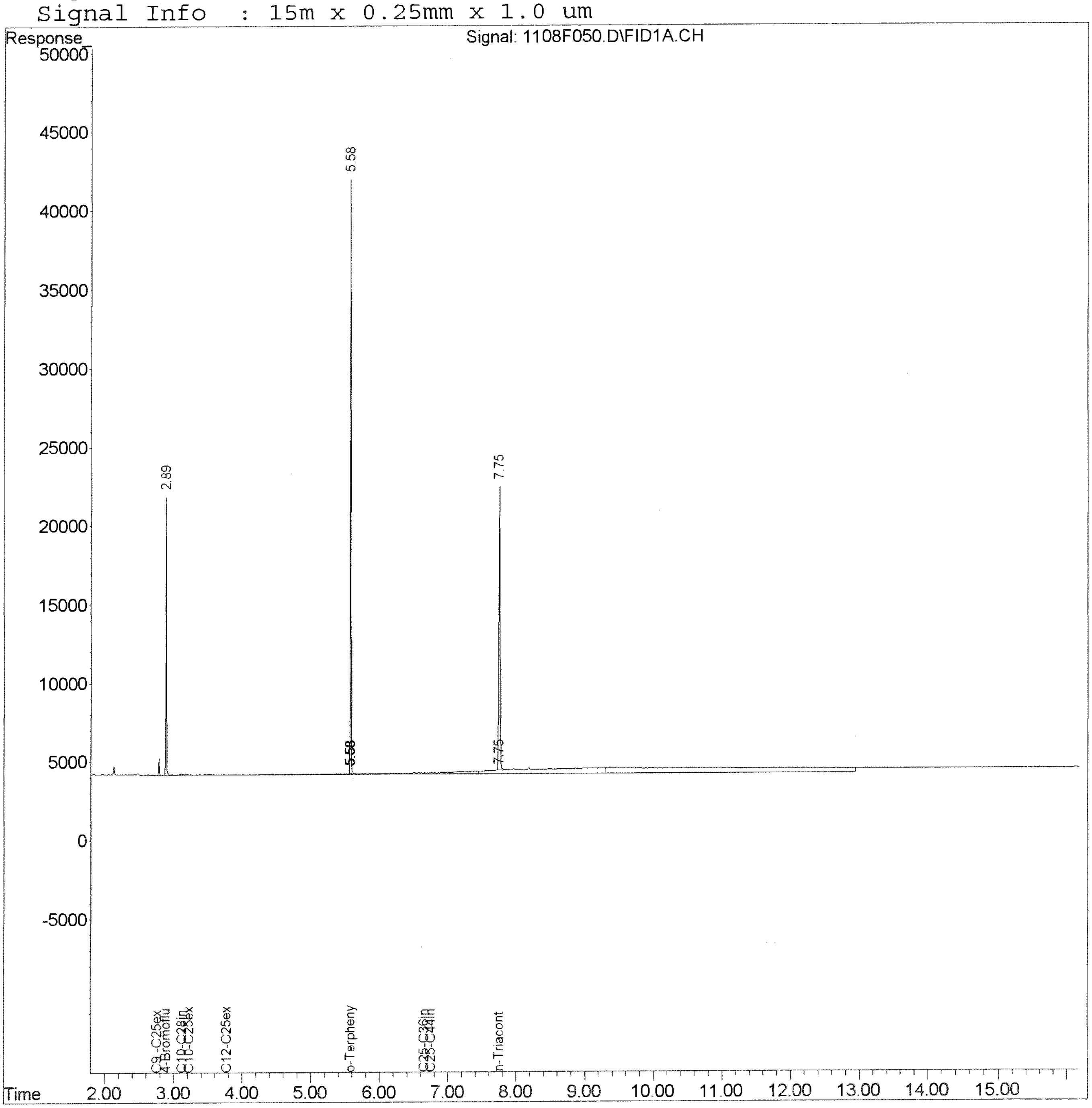
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\110813F\1108F050.D
Acq On : 08 Nov 2013 4:10 pm
Sample : K1311914-001 SGT
Misc :
IntFile : rteint.p
Quant Time: Nov 9 11:35 2013 Quant Results File: 091013FSRO.RES

Vial: 13
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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



ALS Group USA, Corp. dba ALS Environmental

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:	EPA 3550B	**Level:**	Low
Analysis Method:	NWTPH-Dx		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction 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:

Exception Report

Data File: J:\GC21\DATA\110813F\1108F066.D
Lab ID: K1311914-002
RunType: SMPL
Matrix: SOIL

Date Acquired: 11/08/2013 19:07
Date Quantitated: 11/09/2013 11:35
Batch ID: KWG1312552
Analysis Method: NWTPH-Dx
ListJoinID: 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	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:	J:\GC21\DATA\110813F\1108F066.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 19:07	**Quant Date:**	11/09/2013 11:35	**Vial:**	16
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	K1311914-002			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**	IV	**Matrix:**	SOIL
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**	10/28/2013	**Receive Date:**	11/01/2013

Analysis Lot:	KWG1312552	**Prep Lot:**	KWG1312475	**Report Group:**	K1311914
Analysis Method:	NWTPH-Dx	**Prep Method:**	EPA 3550B		
		Prep Date:	11/06/2013		
Prep Ref:	1302250				

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:	Diesel and Residual Range Organics - Silica Gel Treated	**Report List ID:**	LJ10933
		Method ID:	MJ1081
MB Ref:	J:\GC21\DATA\110813F\1108F040.D	**Quant based on Report List**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits	Rpt?
o-Terphenyl	5.58	0.00	32795	25.76	103	50-150 OK	
n-Triacontane	7.75	0.00	29195	28.18	113	50-150 OK	

Target Compounds

Final Conc. Units: mg/Kg Dry Weight

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		5308	5.50	2.2	U	
Residual Range Organics (RRO)	6.66		9818	1.82	4.7	U	

Prep Amount:	30.320 g	**Dilution:**	1.0
Prep Final Vol:	10 mL	**Unit Factor:**	1
Solids:	82.5 %		

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

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 (Not Reviewed)

Data File : J:\GC21\DATA\110813F\1108F066.D
Acq On : 08 Nov 2013 7:07 pm
Sample : K1311914-002SGT
Misc :
IntFile : rteint.p
Quant Time: Nov 09 11:35:37 2013 Quant Results File: 091013FSRO.RES

Vial: 16
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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

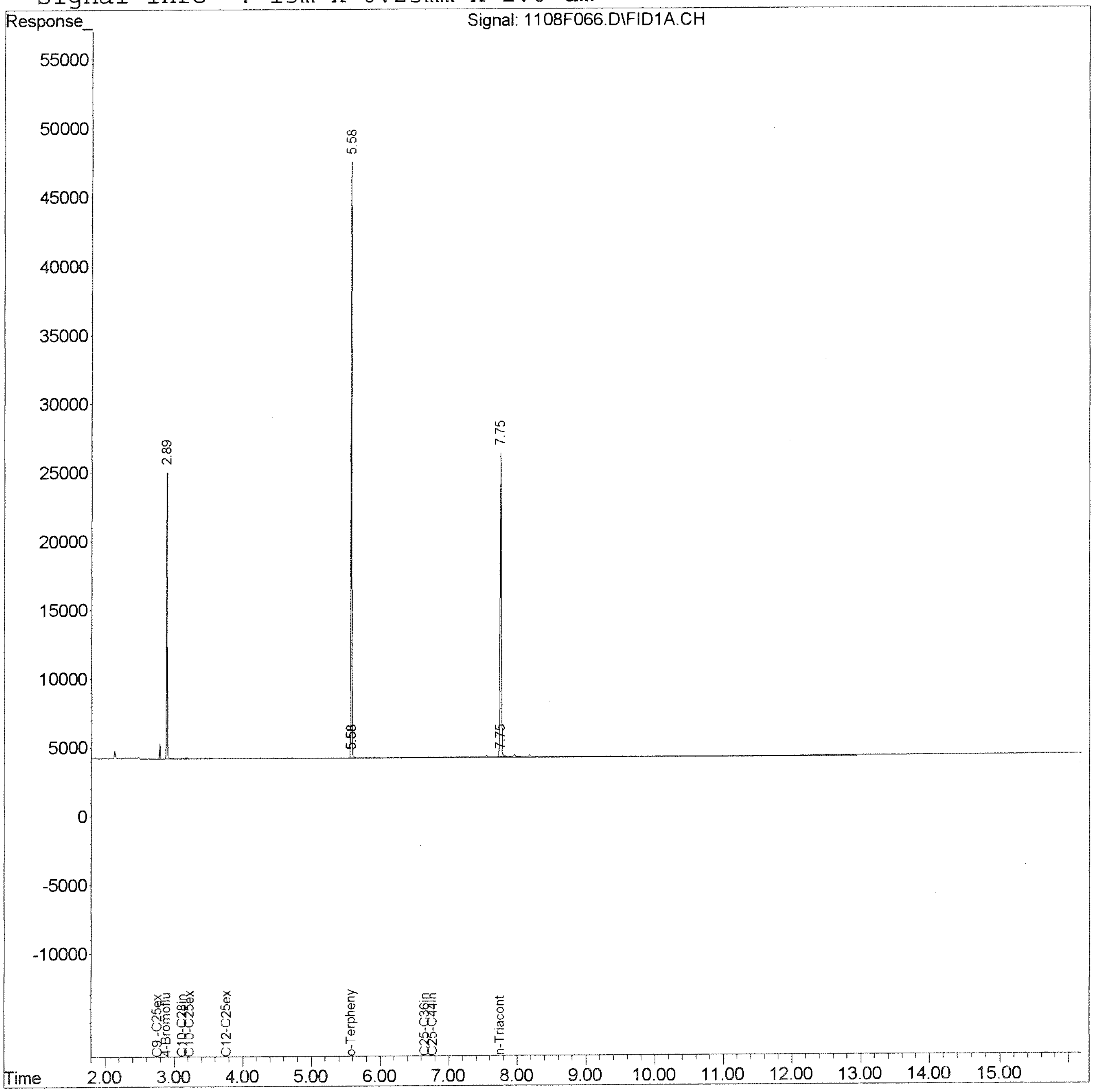
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	2.89	14361	25.328 ppm
Spiked Amount 50.000	Recovery	=	50.66%
2) S o-Terphenyl	5.58	32795	25.757 ppm
Spiked Amount 50.000	Recovery	=	51.51%
3) S n-Triacontane	7.75	29195	28.183 ppm
Spiked Amount 50.000	Recovery	=	56.37%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	8176	7.103 ppm
5) H C10-C25ex DRO [AK102]	3.23	6683	5.905 ppm
6) H C10-C28in DRO [8015]	3.13	9128	8.054 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	5308	5.498 ppm
8) H C25-C36in RRO [NWTPH]	6.66	9818	1.816 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	21350	17.876 ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

Data File : J:\GC21\DATA\110813F\1108F066.D Vial: 16
Acq On : 08 Nov 2013 7:07 pm Operator: DVaillenco
Sample : K1311914-002SGT Inst : GC21
Misc : Multiplr: 1.00
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



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:	EPA 3550B	**Level:**	Low
Analysis Method:	NWTPH-Dx		

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:

Exception Report

Data File: J:\GC21\DATA\110813F\1108F052.D
Lab ID: K1311914-003
RunType: SMPL
Matrix: SOIL

Date Acquired: 11/08/2013 16:32
Date Quantitated: 11/09/2013 11:35
Batch ID: KWG1312552
Analysis Method: NWTPH-Dx
ListJoinID: 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	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: [signature]

Secondary Review: [signature]

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F052.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 16:32	**Quant Date:**	11/09/2013 11:35	**Vial:**	14
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	K1311914-003			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**	IV	**Matrix:**	SOIL
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**	10/29/2013	**Receive Date:**	11/01/2013

Analysis Lot:	KWG1312552	**Prep Lot:**	KWG1312475	**Report Group:**	K1311914
Analysis Method:	NWTPH-Dx	**Prep Method:**	EPA 3550B		
		Prep Date:	11/06/2013		
Prep Ref:	1302251				

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:	Diesel and Residual Range Organics - Silica Gel Treated	**Report List ID:**	LJ10933
		Method ID:	MJ1081
MB Ref:	J:\GC21\DATA\110813F\1108F040.D	**Quant based on Report List**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.58	0.00	31998	25.13	101	50-150	OK	
n-Triacontane	7.75	0.00	28676	27.68	111	50-150	OK	

Target Compounds

Final Conc. Units: mg/Kg Dry Weight

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		4932	5.11	2.3	U	
Residual Range Organics (RRO)	6.66		15537	11.42	5.0	U	

Prep Amount:	30.405 g	**Dilution:**	1.0
Prep Final Vol:	10 mL	**Unit Factor:**	1
Solids:	77.6 %		

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

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)

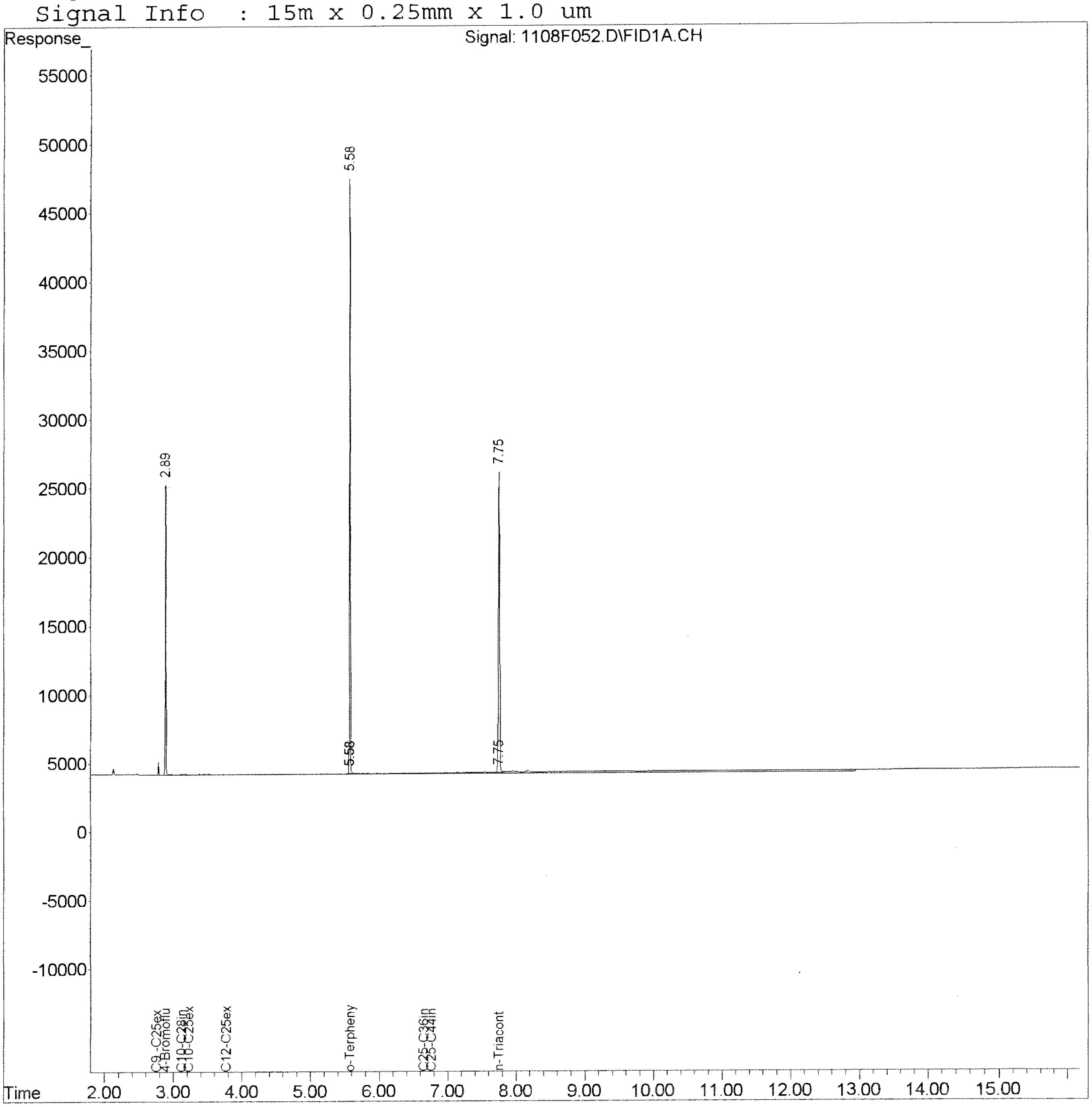
```
Data File : J:\GC21\DATA\110813F\1108F052.D              Vial: 14
Acq On    : 08 Nov 2013   4:32 pm                    Operator: DVaillenco
Sample    : K1311914-003 SGT                         Inst    : GC21
Misc      :                                          Multiplr: 1.00
IntFile   : rteint.p
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
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	2.89	13964	24.628 ppm
Spiked Amount 50.000	Recovery	=	49.26%
2) S o-Terphenyl	5.58	31998	25.131 ppm
Spiked Amount 50.000	Recovery	=	50.26%
3) S n-Triacontane	7.75	28676	27.682 ppm
Spiked Amount 50.000	Recovery	=	55.36%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	7335	6.373 ppm
5) H C10-C25ex DRO [AK102]	3.23	6066	5.360 ppm
6) H C10-C28in DRO [8015]	3.13	9215	8.131 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	4932	5.108 ppm
8) H C25-C36in RRO [NWTPH]	6.66	15537	11.417 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	41571	40.387 ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\110813F\1108F052.D          Vial: 14
Acq On    : 08 Nov 2013   4:32 pm                Operator: DVaillenco
Sample    : K1311914-003 SGT                     Inst    : GC21
Misc      :                                      Multiplr: 1.00
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
```



ALS Group USA, Corp. dba ALS Environmental

Analytical Results

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

Service Request: K1311914
Date Collected: 10/29/2013
Date Received: 11/01/2013

Diesel and Residual Range Organics - Silica Gel Treated

Sample Name: SB3-5-102913DUP
Lab Code: KWG1312475-3

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry

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
o-Terphenyl	98	50-150	11/08/13	Acceptable
n-Triacontane	99	50-150	11/08/13	Acceptable

Comments:

Exception Report

Data File: J:\GC21\DATA\110813F\1108F054.D
Lab ID: KWG1312475-3
RunType: DUP
Matrix: SOIL

Date Acquired: 11/08/2013 16:54
Date Quantitated: 11/09/2013 11:35
Batch ID: KWG1312552
Analysis Method: NWTPH-Dx
MethodJoinID: 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	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	x	

Primary Review: ____________

Secondary Review: ____________

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F054.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 16:54	**Quant Date:**	11/09/2013 11:35	**Vial:**	15
Run Type:	DUP			**Dilution:**	1.0
Lab ID:	KWG1312475-3			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	SOIL
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**		**Receive Date:**	11/07/2013

Analysis Lot:	KWG1312552	**Prep Lot:**	KWG1312475	**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**	EPA 3550B		
		Prep Date:	11/06/2013		
Prep Ref:	1302254				

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1081
MB Ref:	J:\GC21\DATA\110813F\1108F040.D	**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.58	0.00	31145	24.46	98	50-150	OK	
n-Triacontane	7.75	0.00	25525	24.64	99	50-150	OK	

Target Compounds

Final Conc. Units: mg/Kg Wet Weight

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		7195	7.45	2.48	J	
Residual Range Organics (RRO)	6.66		13724	8.37	3.9	U	

Prep Amount:	30.020 g	**Dilution:**	1.0
Prep Final Vol:	10 mL	**Unit Factor:**	1
Solids:	%		

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

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

Data File:	J:\GC21\DATA\110813F\1108F054.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 16:54	**Quant Date:**	11/09/2013 11:35	**Vial:**	15
Run Type:	DUP			**Dilution:**	1.0
Lab ID:	KWG1312475-3			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	SOIL
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**		**Receive Date:**	11/07/2013

Analysis Lot:	KWG1312552	**Prep Lot:**	KWG1312475	**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**	EPA 3550B		
		Prep Date:	11/06/2013		
Prep Ref:	1302254				

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1081
MB Ref:	J:\GC21\DATA\110813F\1108F040.D	**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.58	0.00	31145	24.46	98	50-150	OK	
n-Triacontane	7.75	0.00	25525	24.64	99	50-150	OK	

Target Compounds

Final Conc. Units: mg/Kg Dry Weight

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		7195	7.45	3.20	J	
Residual Range Organics (RRO)	6.66		13724	8.37	5.1	U	

Prep Amount:	30.020 g	**Dilution:**	1.0
Prep Final Vol:	10 mL	**Unit Factor:**	1
Solids:	77.6 %		

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

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

Data File:	J:\GC21\DATA\110813F\1108F054.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 16:54	**Quant Date:**	11/09/2013 11:35	**Vial:**	15
Run Type:	DUP			**Dilution:**	1.0
Lab ID:	KWG1312475-3			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	SOIL
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**		**Receive Date:**	11/07/2013

Analysis Lot:	KWG1312552	**Prep Lot:**	KWG1312475	**Report Group:**	
Analysis Method:	8015C	**Prep Method:**	EPA 3550B		
		Prep Date:	11/06/2013		
Prep Ref:	1302254				

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1082
MB Ref:	J:\GC21\DATA\110813F\1108F040.D	**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits	Rpt?
4-Bromofluorobenzene	2.89	0.00	13761	24.27	97	70-129 OK	
o-Terphenyl	5.58	0.00	31145	24.46	98	51-126 OK	
n-Triacontane	7.75	0.00	25525	24.64	99	50-150 OK	

Target Compounds

Final Conc. Units: mg/Kg Dry Weight

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C10 - C25 DRO	3.23		8579	7.58	3.25	J	
C10 - C28 DRO	3.13		11984	10.57	4.54	J	
Diesel Range Organics (DRO)	3.78		7195	7.45	3.20	J	
Residual Range Organics (RRO)	6.66		13724	8.37	5.1	U	

Prep Amount:	30.020 g	**Dilution:**	1.0
Prep Final Vol:	10 mL	**Unit Factor:**	1
Solids:	77.6 %		

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

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\1108F054.D
Acq On : 08 Nov 2013 4:54 pm
Sample : K1311914-003DUP SGT
Misc :
IntFile : rteint.p
Quant Time: Nov 09 11:35:32 2013 Quant Results File: 091013FSRO.RES

Vial: 15
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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	13761	24.269 ppm
Spiked Amount 50.000	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%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	9744	8.466 ppm
5) H C10-C25ex DRO [AK102]	3.23	8579	7.580 ppm
6) H C10-C28in DRO [8015]	3.13	11984	10.574 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	7195	7.452 ppm
8) H C25-C36in RRO [NWTPH]	6.66	13724	8.374 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	32847	30.675 ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

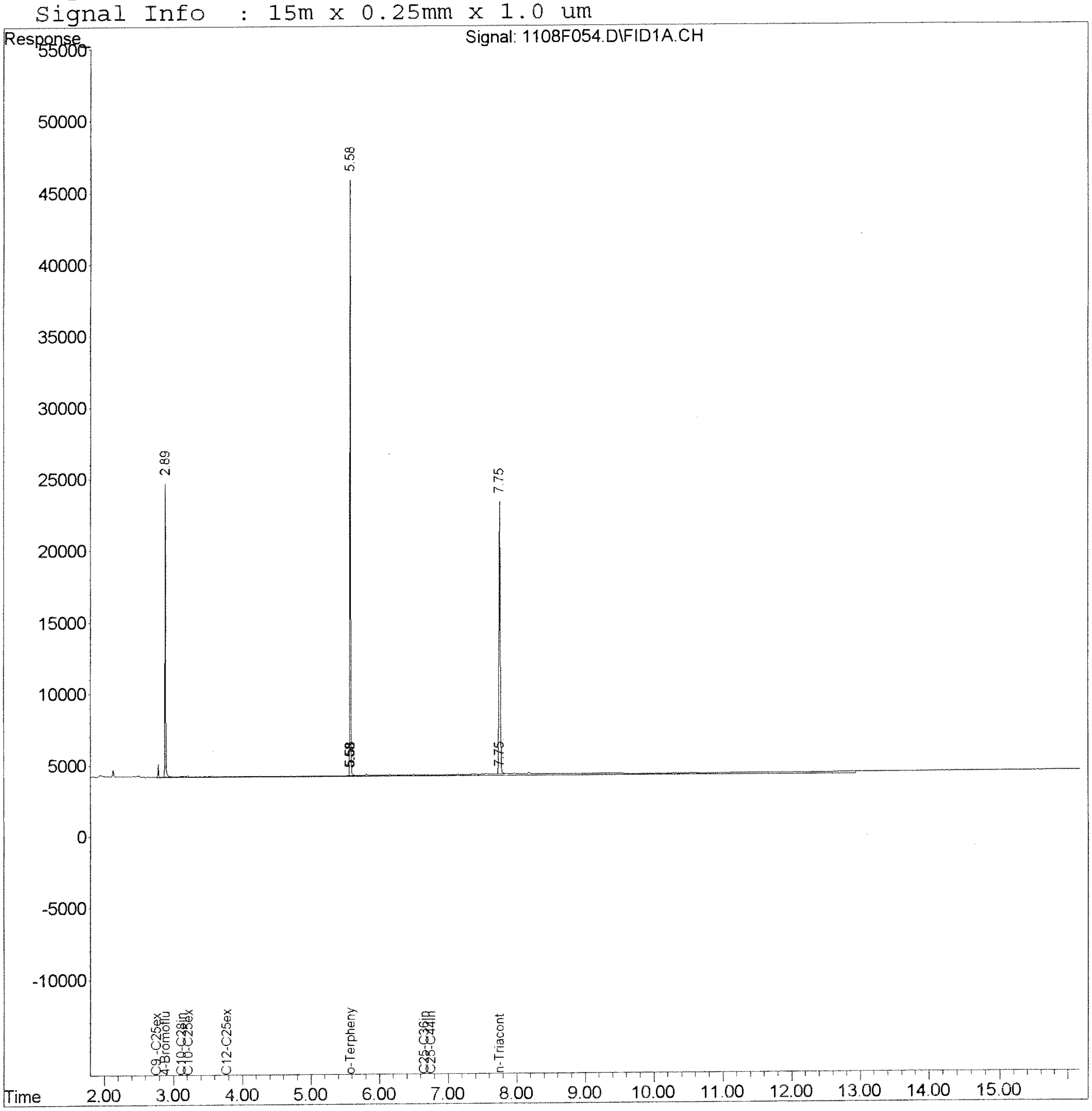
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\110813F\1108F054.D
Acq On : 08 Nov 2013 4:54 pm
Sample : K1311914-003DUP SGT
Misc :
IntFile : rteint.p
Quant Time: Nov 9 11:35 2013 Quant Results File: 091013FSRO.RES

Vial: 15
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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



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:	EPA 3550B	**Level:**	Low
Analysis Method:	NWTPH-Dx		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction 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:

Exception Report

Data File: J:\GC21\DATA\110813F\1108F040.D
Lab ID: KWG1312475-2
RunType: MB
Matrix: SOIL

3Grt

Date Acquired: 11/08/2013 14:19
Date Quantitated: 11/09/2013 11:35
Batch ID: KWG1312552
Analysis Method: NWTPH-Dx
MethodJoinID: 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	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	x	

Primary Review: 11/11/13

Secondary Review:

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F040.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 14:19	**Quant Date:**	11/09/2013 11:35	**Vial:**	8
Run Type:	MB			**Dilution:**	1.0
Lab ID:	KWG1312475-2			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	SOIL
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**		**Receive Date:**	11/07/2013

Analysis Lot:	KWG1312552	**Prep Lot:**	KWG1312475	**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**	EPA 3550B		
Prep Ref:	1302253	**Prep Date:**	11/06/2013		

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1081
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.58	0.00	32601	25.60	102	50-150	OK	
n-Triacontane	7.75	0.00	26906	25.97	104	50-150	OK	

Target Compounds

Final Conc. Units: mg/Kg Wet Weight

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		4767	4.94	1.8	U	
Residual Range Organics (RRO)			8634		3.9	U	

Prep Amount:	30.408 g	**Dilution:**	1.0
Prep Final Vol:	10 mL	**Unit Factor:**	1
Solids:	%		

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

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
c: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F040.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 14:19	**Quant Date:**	11/09/2013 11:35	**Vial:**	8
Run Type:	MB			**Dilution:**	1.0
Lab ID:	KWG1312475-2			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	SOIL
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**		**Receive Date:**	11/07/2013

Analysis Lot:	KWG1312552	**Prep Lot:**	KWG1312475	**Report Group:**	
Analysis Method:	8015C	**Prep Method:**	EPA 3550B		
Prep Ref:	1302253	**Prep Date:**	11/06/2013		

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1082
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene	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	

Target Compounds

Final Conc. Units: mg/Kg Wet Weight

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C10 - C25 DRO	3.23		6178	5.46	2.0	U	
C10 - C28 DRO	3.13		8085	7.13	2.6	U	
Diesel Range Organics (DRO)	3.78		4767	4.94	1.8	U	
Residual Range Organics (RRO)			8634		3.9	U	

Prep Amount:	30.408 g	**Dilution:**	1.0
Prep Final Vol:	10 mL	**Unit Factor:**	1
Solids:	%		

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

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\1108F040.D                Vial: 8
Acq On    : 08 Nov 2013   2:19 pm                      Operator: DVaillenco
Sample    : KQ1313225-04MB SGT                         Inst     : GC21
Misc      : KWG1312475                                 Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Nov 09 11:35:26 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	14214	25.068 ppm
Spiked Amount 50.000	Recovery	=	50.14%
2) S o-Terphenyl	5.58	32601	25.604 ppm
Spiked Amount 50.000	Recovery	=	51.21%
3) S n-Triacontane	7.75	26906	25.974 ppm
Spiked Amount 50.000	Recovery	=	51.95%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	7391	6.421 ppm
5) H C10-C25ex DRO [AK102]	3.23	6178	5.459 ppm
6) H C10-C28in DRO [8015]	3.13	8085	7.134 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	4767	4.937 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	24628	21.525 ppm

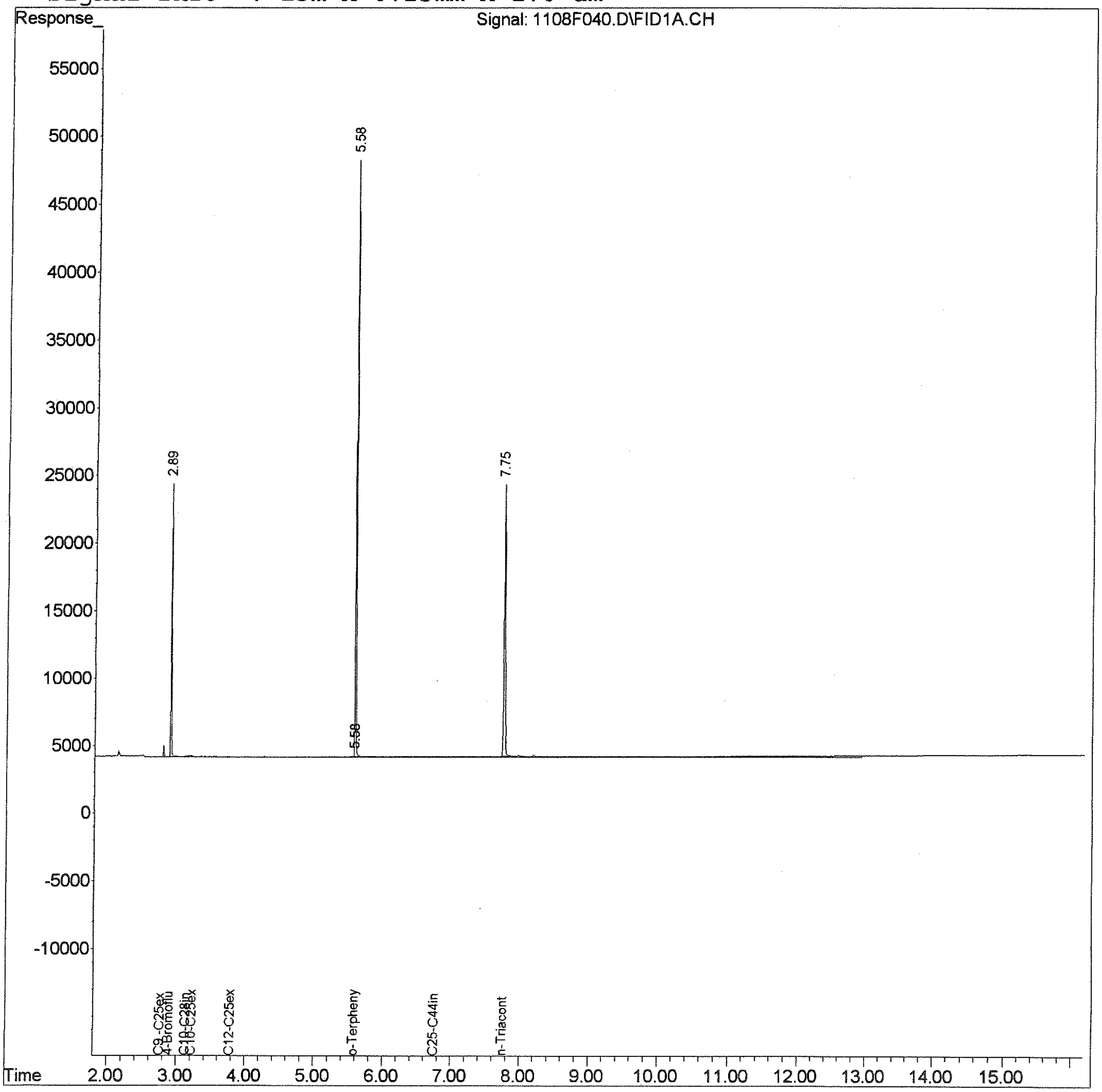
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\110813F\1108F040.D Vial: 8
Acq On : 08 Nov 2013 2:19 pm Operator: DVaillenco
Sample : KQ1313225-04MB SGT Inst : GC21
Misc : KWG1312475 Multiplr: 1.00
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



ALS Group USA, Corp. dba ALS Environmental

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:	EPA 3550B	**Level:**	Low
Analysis Method:	NWTPH-Dx		

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:

Exception Report

Data File: J:\GC21\DATA\110813F\1108F038.D
Lab ID: KWG1312475-1
RunType: LCS
Matrix: SOIL

Date Acquired: 11/08/2013 13:57
Date Quantitated: 11/09/2013 11:35
Batch ID: KWG1312552
Analysis Method: NWTPH-Dx
MethodJoinID: 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	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	x	

Primary Review: 11/11/13

Secondary Review:

Printed: 11/11/2013 08:36:38
u:\Stealth\Crystal.rpt\except2.rpt

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F038.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 13:57	**Quant Date:**	11/09/2013 11:35	**Vial:**	7
Run Type:	LCS			**Dilution:**	1.0
Lab ID:	KWG1312475-1			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	SOIL
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**		**Receive Date:**	11/07/2013

Analysis Lot:	KWG1312552	**Prep Lot:**	KWG1312475	**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**	EPA 3550B		
Prep Ref:	1302252	**Prep Date:**	11/06/2013		

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1081
MB Ref:	J:\GC21\DATA\110813F\1108F040.D	**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.58	0.00	29347	23.05	92	50-150	OK	
n-Triacontane	7.75	0.00	24157	23.32	93	50-150	OK	

Target Compounds

Final Conc. Units: mg/Kg Wet Weight

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		634570	657.27	219		
Residual Range Organics (RRO)	6.66		236817	382.92	128		

Prep Amount:	30.000 g	**Dilution:**	1.0
Prep Final Vol:	10 mL	**Unit Factor:**	1
Solids:	%		

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

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

Data File:	J:\GC21\DATA\110813F\1108F038.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 13:57	**Quant Date:**	11/09/2013 11:35	**Vial:**	7
Run Type:	LCS			**Dilution:**	1.0
Lab ID:	KWG1312475-1			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	SOIL
Prod Code:	NWTPH-Dx NW TPH	**Collect Date:**		**Receive Date:**	11/07/2013

Analysis Lot:	KWG1312552	**Prep Lot:**	KWG1312475	**Report Group:**	
Analysis Method:	8015C	**Prep Method:**	EPA 3550B		
Prep Ref:	1302252	**Prep Date:**	11/06/2013		

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1082
MB Ref:	J:\GC21\DATA\110813F\1108F040.D	**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene	2.89	0.00	13106	23.11	92	70-129	OK	
o-Terphenyl	5.58	0.00	29347	23.05	92	51-126	OK	
n-Triacontane	7.75	0.00	24157	23.32	93	50-150	OK	

Target Compounds

Final Conc. Units: mg/Kg Wet Weight

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C10 - C25 DRO	3.23		740258	654.05	218		
C10 - C28 DRO	3.13		817138	721.00	240		
Diesel Range Organics (DRO)	3.78		634570	657.27	219		
Residual Range Organics (RRO)	6.66		236817	382.92	128		

Prep Amount:	30.000 g	**Dilution:**	1.0
Prep Final Vol:	10 mL	**Unit Factor:**	1
Solids:	%		

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

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\1108F038.D Vial: 7
Acq On : 08 Nov 2013 1:57 pm Operator: DVaillenco
Sample : 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

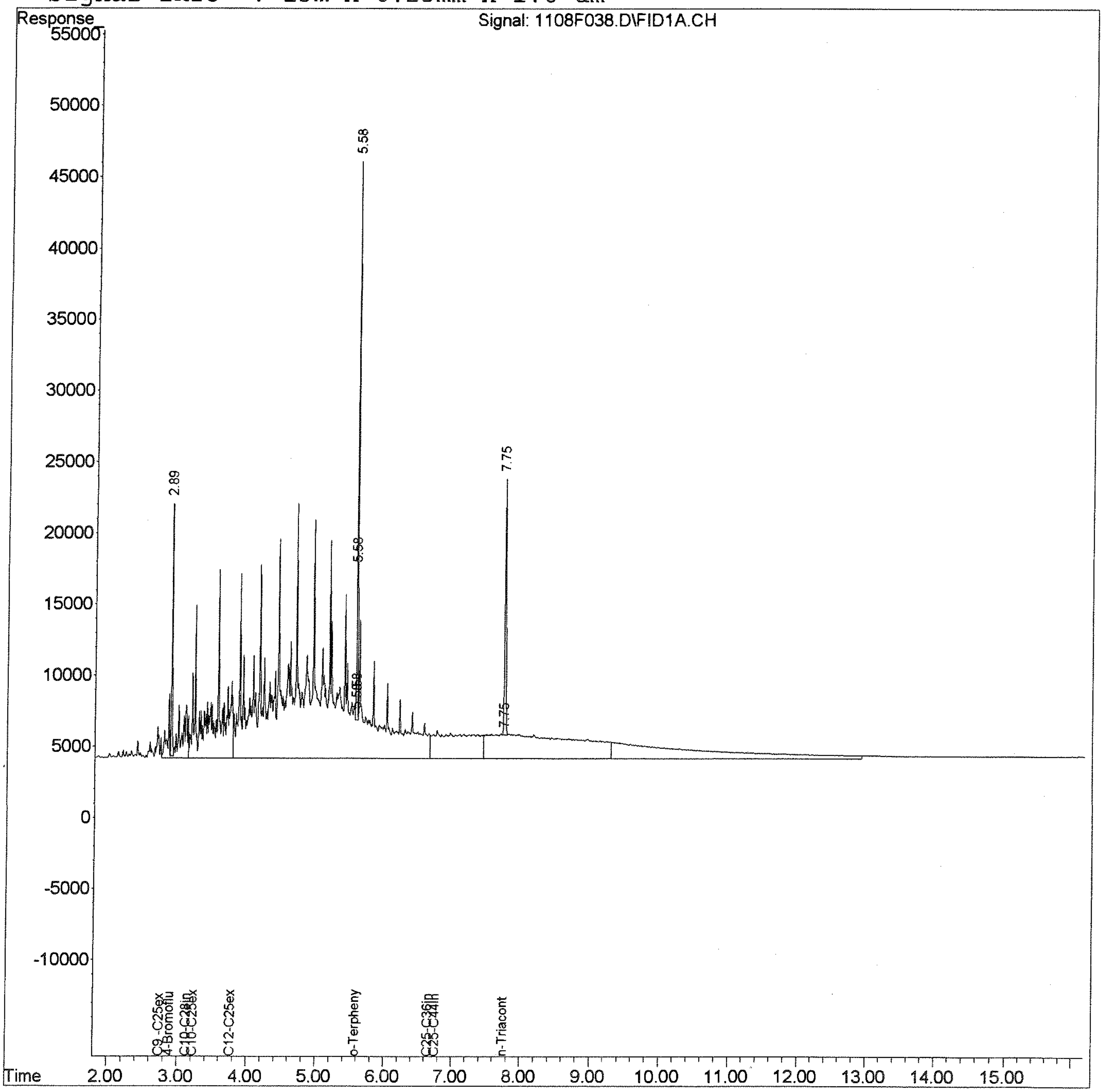
Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	2.89	13106	23.114 ppm
Spiked Amount 50.000	Recovery	=	46.23%
2) S o-Terphenyl	5.58	29347	23.049 ppm
Spiked Amount 50.000	Recovery	=	46.10%
3) S n-Triacontane	7.75	24157	23.320 ppm
Spiked Amount 50.000	Recovery	=	46.64%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	769057	668.162 ppm
5) H C10-C25ex DRO [AK102]	3.23	740258	654.053 ppm
6) H C10-C28in DRO [8015]	3.13	817138	720.996 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	634570	657.266 ppm
8) H C25-C36in RRO [NWTPH]	6.66	236817	382.917 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	345587	378.839 ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\110813F\1108F038.D                 Vial: 7
Acq On    : 08 Nov 2013   1:57 pm                      Operator: DVaillenco
Sample    : KQ1313225-03LCS SGT                        Inst    : GC21
Misc      : KWG1312475                                 Multiplr: 1.00
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
```



Organic Analysis:

Diesel and Residual Range Organics - Silica Gel Treated

Validation Package

Standards Data

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater

Service Request: K1311914
Calibration Date: 09/10/2013

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

Calibration ID: CAL12766
Instrument ID: GC21

Column: ZB-1

Level ID	File ID	Level ID	File ID
A	J:\GC21\DATA\091013F\0910F072.D	I	J:\GC21\DATA\091013F\0910F096.D
B	J:\GC21\DATA\091013F\0910F074.D	J	J:\GC21\DATA\091013F\0910F098.D
C	J:\GC21\DATA\091013F\0910F076.D	K	J:\GC21\DATA\091013F\0910F100.D
D	J:\GC21\DATA\091013F\0910F078.D	L	J:\GC21\DATA\091013F\0910F102.D
E	J:\GC21\DATA\091013F\0910F080.D	M	J:\GC21\DATA\091013F\0910F104.D
F	J:\GC21\DATA\091013F\0910F082.D	N	J:\GC21\DATA\091013F\0910F106.D
G	J:\GC21\DATA\091013F\0910F092.D		
H	J:\GC21\DATA\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	H	50	924	I	200	965	J	500	972
	K	2000	989	L	5000	1030	M	20000	916	N	50000	920			
Residual Range Organics (RRO)	A	20	968	B	50	756	C	200	699	D	500	627	E	2000	615
	F	5000	588												
o-Terphenyl				G	1.0	1300	H	2.5	1190	I	10	1260	J	25	1280
	K	100	1280	L	250	1330									
n-Triacontane				G	1.0	938	H	2.5	919	I	10	1050	J	25	1080
	K	100	1070	L	250	1160									

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

Client: KTA Associates
Project: PacifiCorp-Chehalis Power Groundwater

Service Request: K1311914
Calibration Date: 09/10/2013

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

Calibration ID: CAL12766
Instrument ID: GC21

Column: ZB-1

Analyte Name	Compound Type	Calibration Evaluation				
		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:**	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	**Calibration Date:**	09/10/2013
		Date Analyzed:	09/11/2013

Second Source Calibration Verification
Diesel and Residual Range Organics - Silica Gel Treated

Calibration Type:	External Standard	**Calibration ID:**	CAL12766
Analysis Method:	NWTPH-Dx	**Units:**	ppm
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.

† **SPCC Compound** ‡ **CCC Compound**

Injection Log

Directory: j:\GC21\data\091013F

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	90	0910F002.D	1.	DCM		09/10/22013 7:04
2	90	0910F004.D	1.	DCM		09/10/22013 7:26
3	90	0910F006.D	1.	DCM		09/10/22013 7:48
4	90	0910F008.D	1.	DCM		09/10/22013 8:10
5	97	0910F010.D	1.	RRO CCV CHK		09/10/22013 8:32
6	96	0910F012.D	1.	DRO CCV CHK		09/10/22013 8:55
7	90	0910F014.D	1.	DCM		09/10/22013 9:17
8	90	0910F016.D	1.	DCM		09/10/22013 9:39
9	90	0910F018.D	1.	DCM	091013F5RO	09/10/22013 10:0
10	90	0910F020.D	1.	DCM		09/10/22013 10:2
11	90	0910F022.D	1.	DCM		09/10/22013 10:4
12	90	0910F024.D	1.	DCM	CAL12766	09/10/22013 11:0
13	90	0910F026.D	1.	DCM		09/10/22013 12:1
14	90	0910F028.D	1.	DCM		09/10/22013 12:3
15	90	0910F030.D	1.	DCM		09/10/22013 12:5
16	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 @ 1000ppm | SVF01-42I		09/10/22013 2:25
20	96	0910F040.D	1.	DRO @ 1000/50ppm | SVF01-37K		09/10/22013 2:47
21	86	0910F042.D	1.	IB		09/10/22013 3:09
22	90	0910F044.D	1.	DCM	NE	09/10/22013 3:32
23	90	0910F046.D	1.	DCM		09/10/22013 3:54
24	90	0910F048.D	1.	DCM	column comp done	09/10/22013 4:58
25	90	0910F050.D	1.	DCM/IB		09/10/22013 5:20
26	1	0910F052.D	1.	AK103 @ 20ppm | SVF01-38M	not used for SRO Cal's	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
30	5	0910F060.D	1.	AK103 @2000ppm | SVF01-38I	9/11/13	09/10/22013 7:11
31	6	0910F062.D	1.	AK103 @ 5000ppm | SVF01-38H		09/10/22013 7:33
32	90	0910F064.D	1.	DCM - CARRYOVER		09/10/22013 7:55
33	90	0910F066.D	1.	DCM - CARRYOVER		09/10/22013 8:18
34	7	0910F068.D	1.	AK ICV @ 1000ppm | SVF01-41K		09/10/22013 8:40
35	90	0910F070.D	1.	DCM	9/11/13	09/10/22013 9:02
36	8	0910F072.D	1.	RRO @ 20ppm | SVF01-40N		09/10/22013 9:24
37	9	0910F074.D	1.	RRO @ 50ppm | SVF01-40M		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	13	0910F082.D	1.	RRO @ 5000ppm | SVF01-40I		09/10/22013 11:1
42	90	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 12:2
45	90	0910F090.D	1.	DCM		09/11/22013 12:4
46	15	0910F092.D	1.	DRO @ 20/1.0ppm | SVF01-42H		09/11/22013 1:07
47	16	0910F094.D	1.	DRO @ 50/2.5ppm | SVF01-42G		09/11/22013 1:29
48	17	0910F096.D	1.	DRO @ 200/10ppm | SVF01-42F		09/11/22013 1:51
49	18	0910F098.D	1.	DRO @ 500/25ppm | SVF01-42E		09/11/22013 2:14
50	19	0910F100.D	1.	DRO @ 2000/100ppm | SVF01-42D		09/11/22013 2:36
51	20	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	22	0910F106.D	1.	DRO @ 50000ppm | SVF01-42A		09/11/22013 3:42
54	90	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

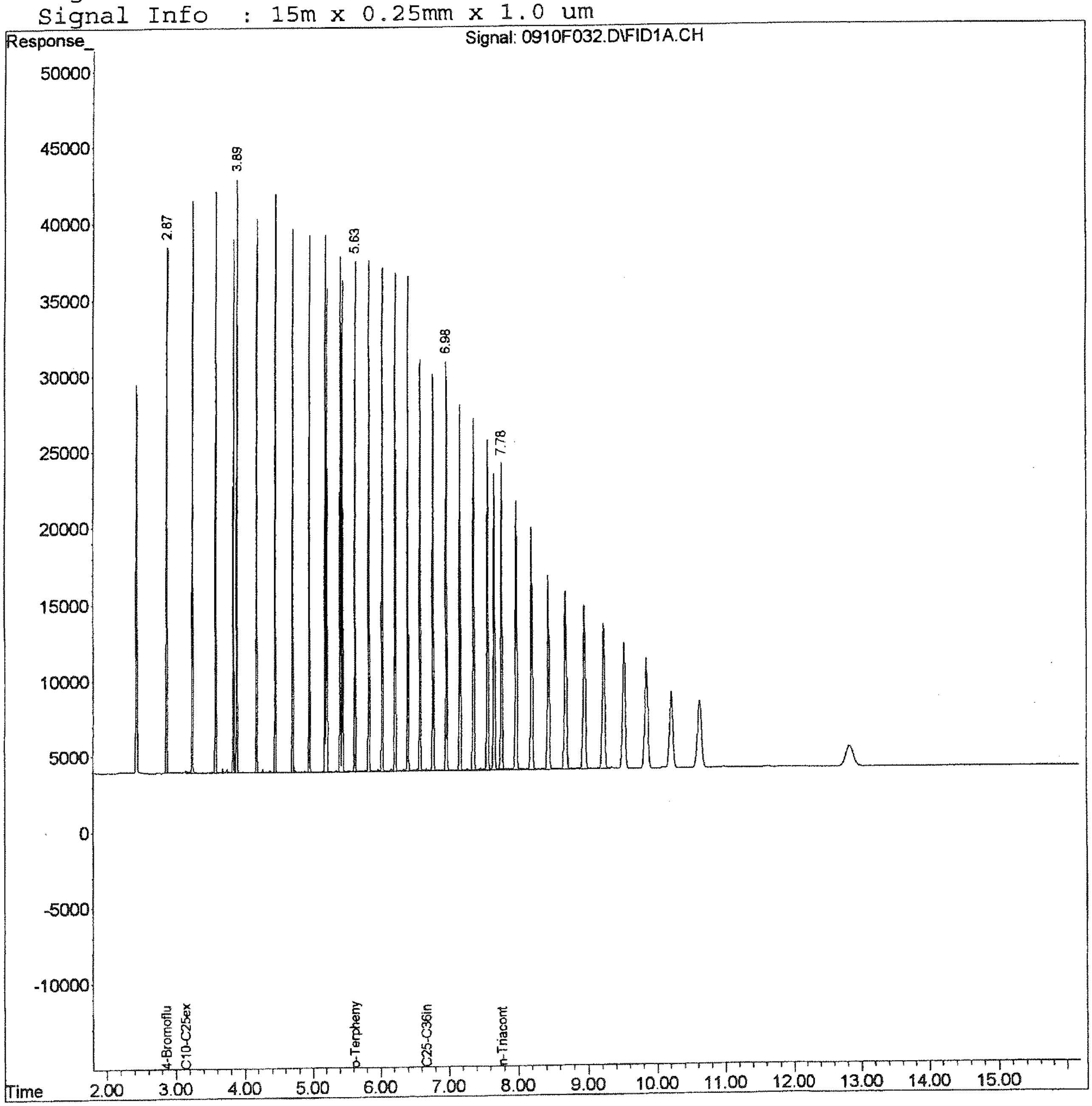
Quantitation Report (Not Reviewed)

Data File : J:\GC21\DATA\091013F-AK\0910F032.D
Acq On : 10 Sep 2013 1:18 pm
Sample : ALIPHATICS MARKER | SVF01-34L
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:25 2013 Quant Results File: 091013FAKO.RES

Vial: 91
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

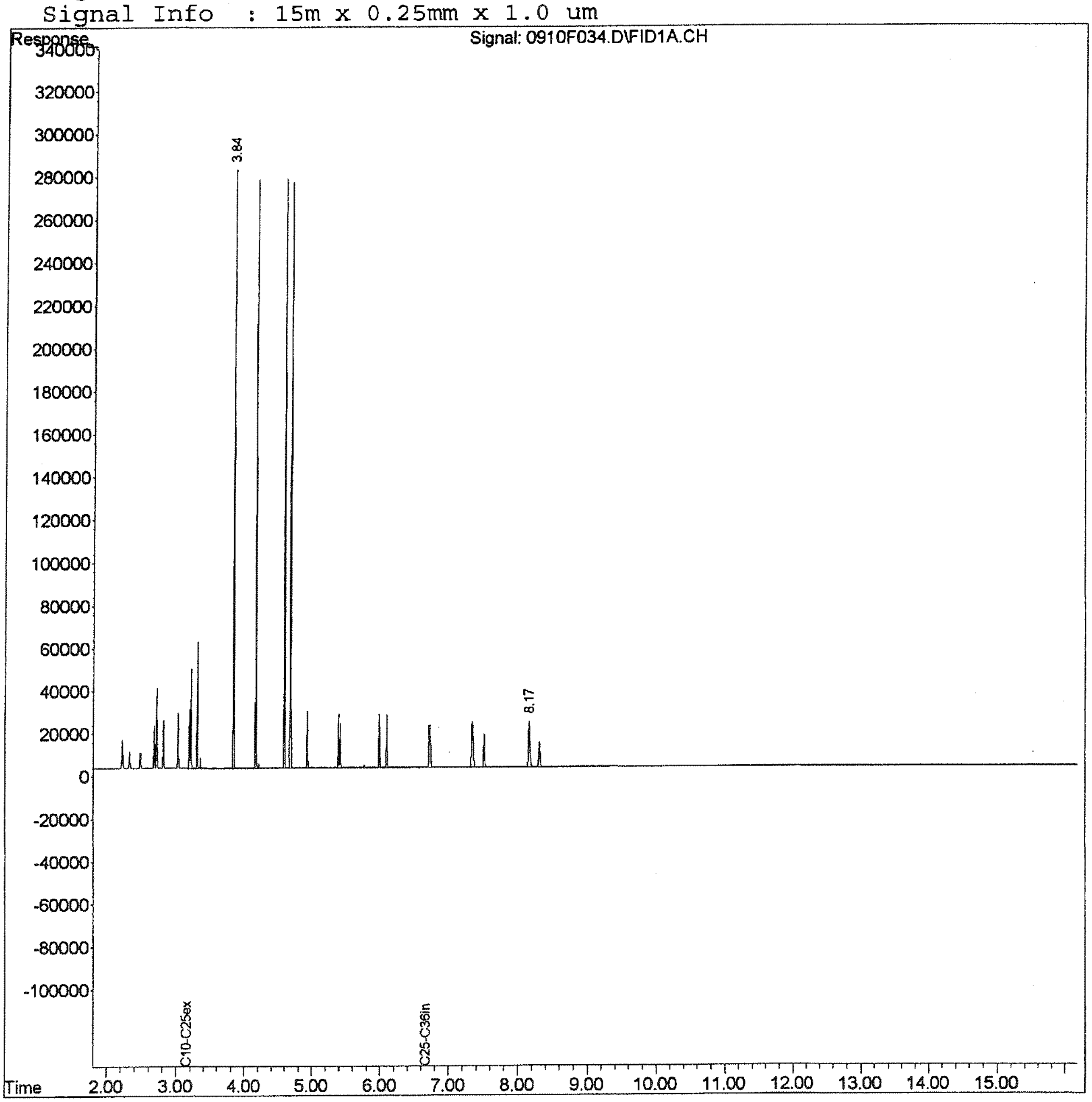
Quant Method : J:\GC21\METHODS\091013FAKO.M (RTE Integrator)
Title : AK102/AK103 Semivolatile Range Organics CAL
Last Update : Wed Sep 11 07:19:17 2013
Response via : Single Level Calibration
DataAcq Meth : SVF_FB.M

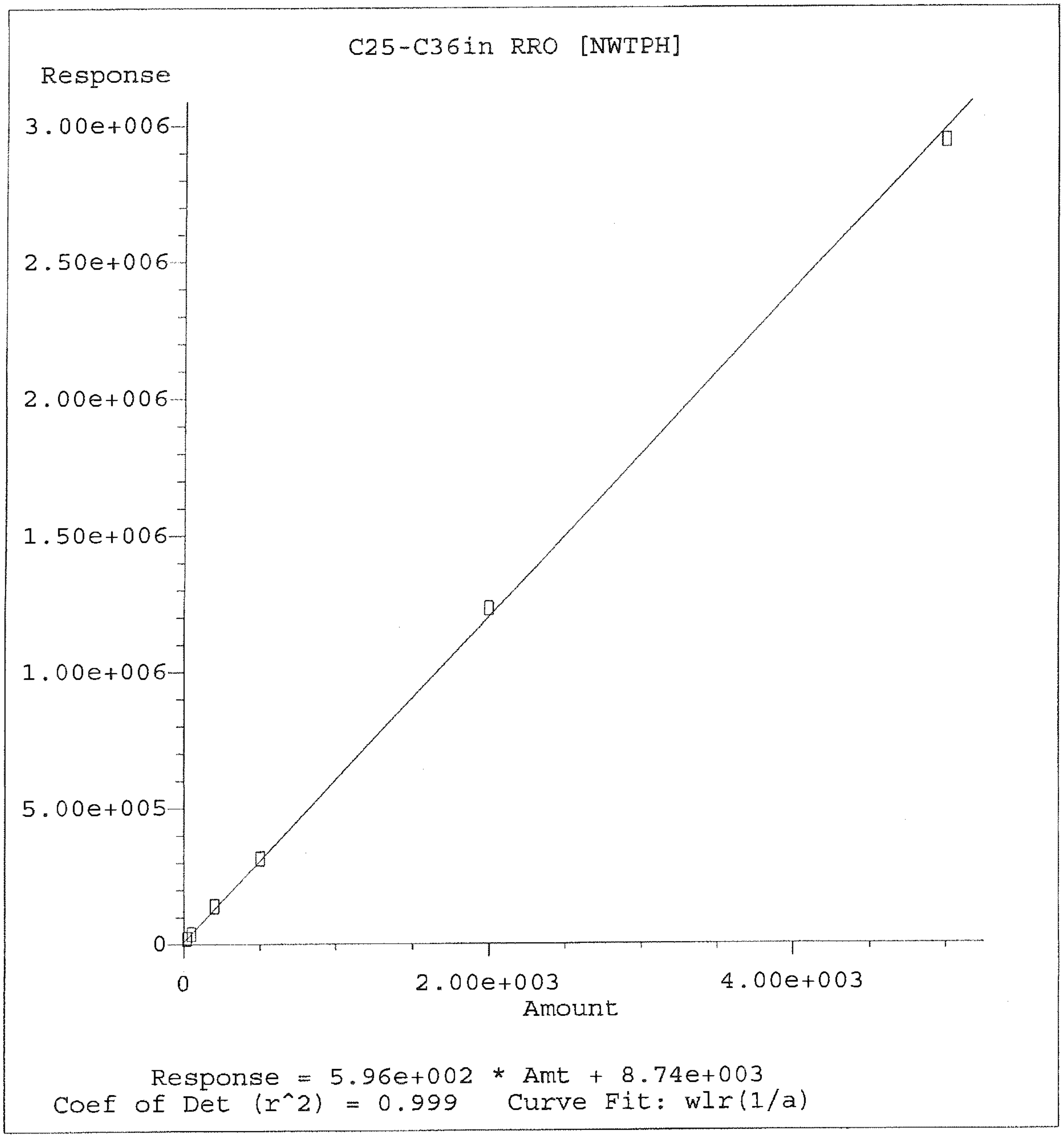
Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



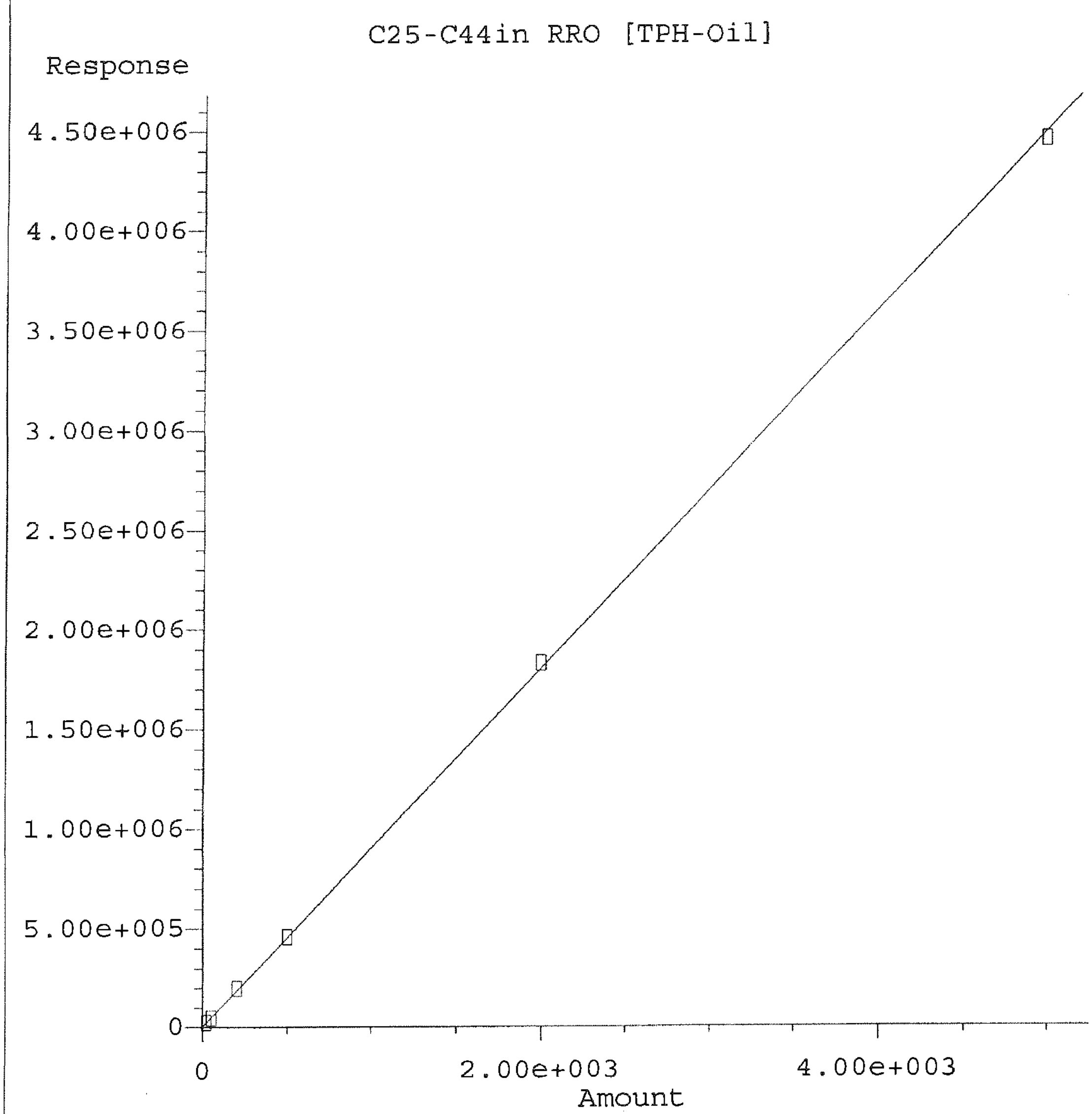
Quantitation Report (Not Reviewed)

```
Data File : J:\GC21\DATA\091013F-AK\0910F034.D              Vial: 92
Acq On    : 10 Sep 2013   1:40 pm                       Operator: DVaillenco
Sample    : AROMATICS MARKER | SVF01-29C                Inst     : GC21
Misc      :                                             Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Sep 11  8:25 2013  Quant Results File: 091013FAKO.RES

Quant Method : J:\GC21\METHODS\091013FAKO.M (RTE Integrator)
Title        : AK102/AK103 Semivolatile Range Organics CAL
Last Update  : Wed Sep 11 07:19:17 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
```





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



Response = 8.98e+002 * Amt + 5.29e+003
Coef of Det (r^2) = 1.000 Curve Fit: wlr(1/a)

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

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F050.D
Acq On : 10 Sep 2013 5:20 pm
Sample : DCM 15B
Misc :
IntFile : rteint.p
Quant Time: Sep 11 08:39:35 2013 Quant Results File: 091013FSRO.RES

Vial: 90
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

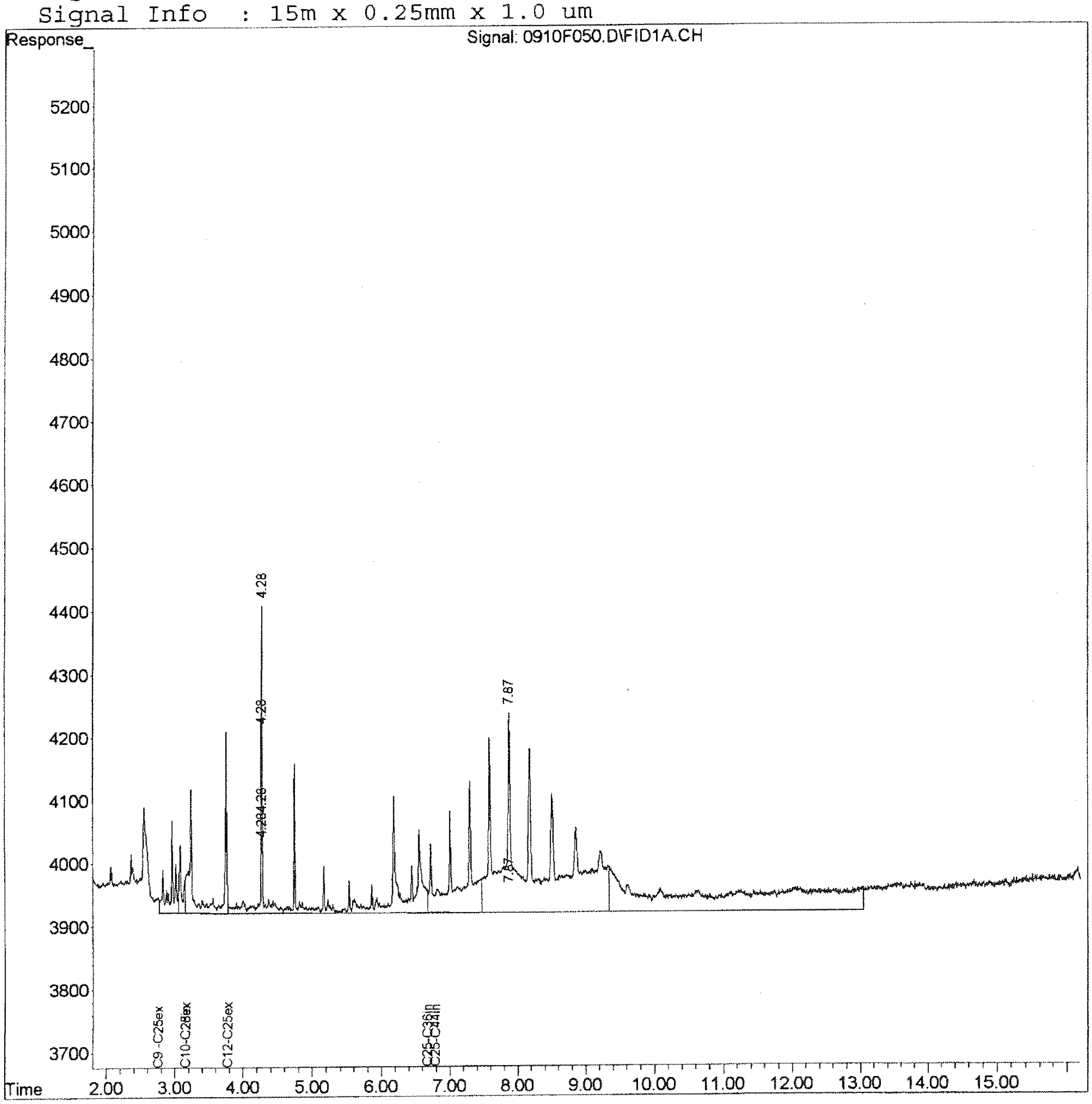
Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator)
Title : 8015/NWTPH Semivolatile Range Organics CAL
Last Update : Wed Sep 11 08:39:03 2013
Response via : Initial Calibration
DataAcq Meth : SVF_FB.M

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			
4) H	C9 -C25ex DRO [TPH-Diesel]	2.77	5537	4.811 ppm
5) H	C10-C25ex DRO [AK102]	3.15	4971	4.392 ppm
6) H	C10-C28in DRO [8015]	3.15	7169	6.326 ppm
7) H	C12-C25ex DRO [NWTPH]	3.79	3571	3.699 ppm
8) H	C25-C36in RRO [NWTPH]	6.68	10640	3.196 ppm
9) H	C25-C44in RRO [TPH-Oil]	6.78	17001	13.034 ppm

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F050.D              Vial: 90
Acq On    : 10 Sep 2013   5:20 pm                   Operator: DVaillenco
Sample    : DCM                                     Inst    : GC21
Misc      :                                         Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Sep 11  8:43 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 : 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
```



Quantitation Report (Not Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F072.D              Vial: 8
Acq On    : 10 Sep 2013   9:24 pm                    Operator: DVaillenco
Sample    : RRO @ 20ppm | SVF01-40N                  Inst    : GC21
Misc      :                                          Multiplr: 1.00
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
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
8) H C25-C36in RRO [NWTPH]	6.68	19355	12.110 ppm

DV 9/13/13

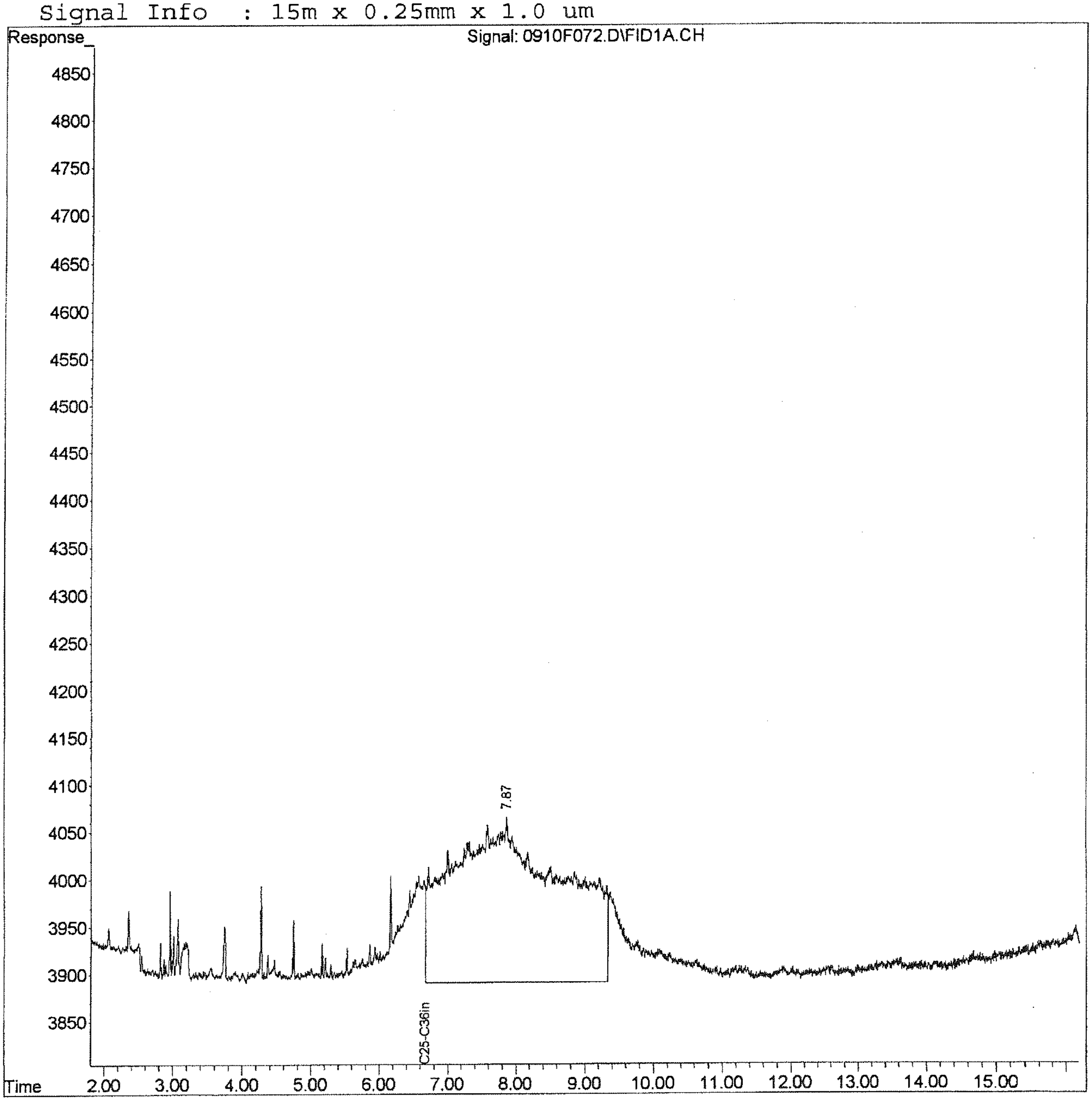
Quantitation Report (Not Reviewed)

Data File : J:\GC21\DATA\091013F\0910F072.D
Acq On : 10 Sep 2013 9:24 pm
Sample : RRO @ 20ppm | SVF01-40N
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:31 2013 Quant Results File: 091013FSRO.RES

Vial: 8
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F074.D                    Vial: 9
Acq On    : 10 Sep 2013   9:46 pm                          Operator: DVaillenco
Sample    : RRO @ 50ppm | SVF01-40M                        Inst    : GC21
Misc      :                                                Multiplr: 1.00
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
```

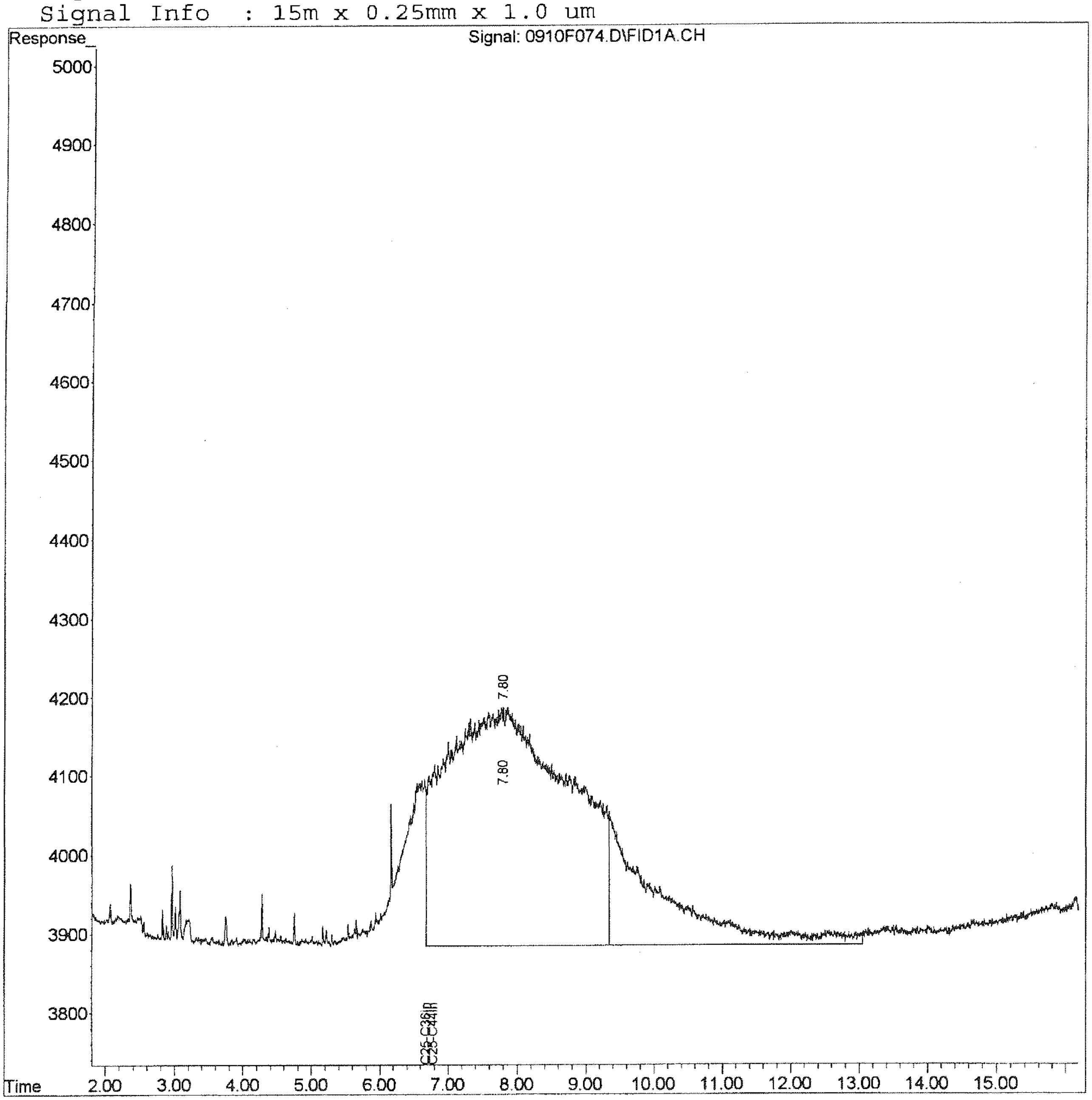
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
8) H C25-C36in RRO [NWTPH]	6.68	37796	44.867 ppm
9) H C25-C44in RRO [TPH-Oil]	6.78	46305	16.227 ppm

W 9/11/13

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F074.D                 Vial: 9
Acq On    : 10 Sep 2013   9:46 pm                       Operator: DVaillenco
Sample    : RRO @ 50ppm | SVF01-40M                     Inst    : GC21
Misc      :                                             Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Sep 11  8:31 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
DataAcq Meth : SVF_FB.M

Volume Inj.  : 1 uL
Signal Phase : ZB-1
Signal Info  : 15m x 0.25mm x 1.0 um
```



Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F076.D                Vial: 10
Acq On    : 10 Sep 2013  10:09 pm                      Operator: DVaillenco
Sample    : RRO @ 200ppm | SVF01-40L                   Inst    : GC21
Misc      :                                            Multiplr: 1.00
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) H C25-C36in RRO [NWTPH]	6.68	139742	225.957 ppm
9) H C25-C44in RRO [TPH-Oil]	6.78	194795	194.322 ppm

DV 9/11/13
AW

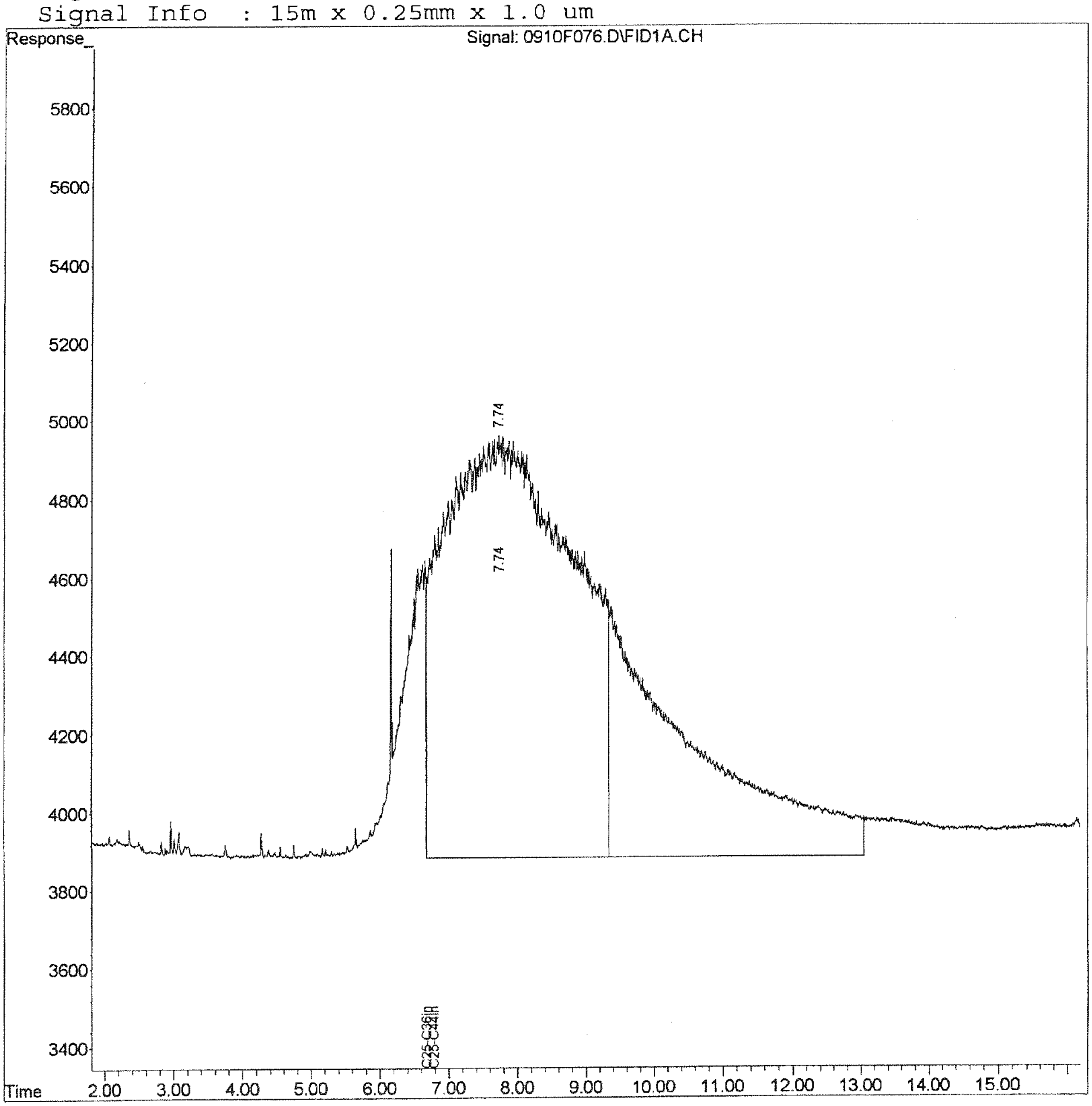
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report   (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F076.D   Vial: 10
Acq On   : 10 Sep 2013 10:09 pm   Operator: DVaillenco
Sample   : RRO @ 200ppm | SVF01-40L   Inst   : GC21
Misc   :   Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Sep 11 8:31 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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F078.D               Vial: 11
Acq On    : 10 Sep 2013  10:31 pm                     Operator: DVaillenco
Sample    : RRO @ 500ppm | SVF01-40K                  Inst     : GC21
Misc      :                                           Multiplr: 1.00
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) H C25-C36in RRO [NWTPH]	6.68	313687	534.940 ppm
9) H C25-C44in RRO [TPH-Oil]	6.78	458059	510.072 ppm

DV 9/11/13

(f)=RT Delta > 1/2 Window (m)=manual int.

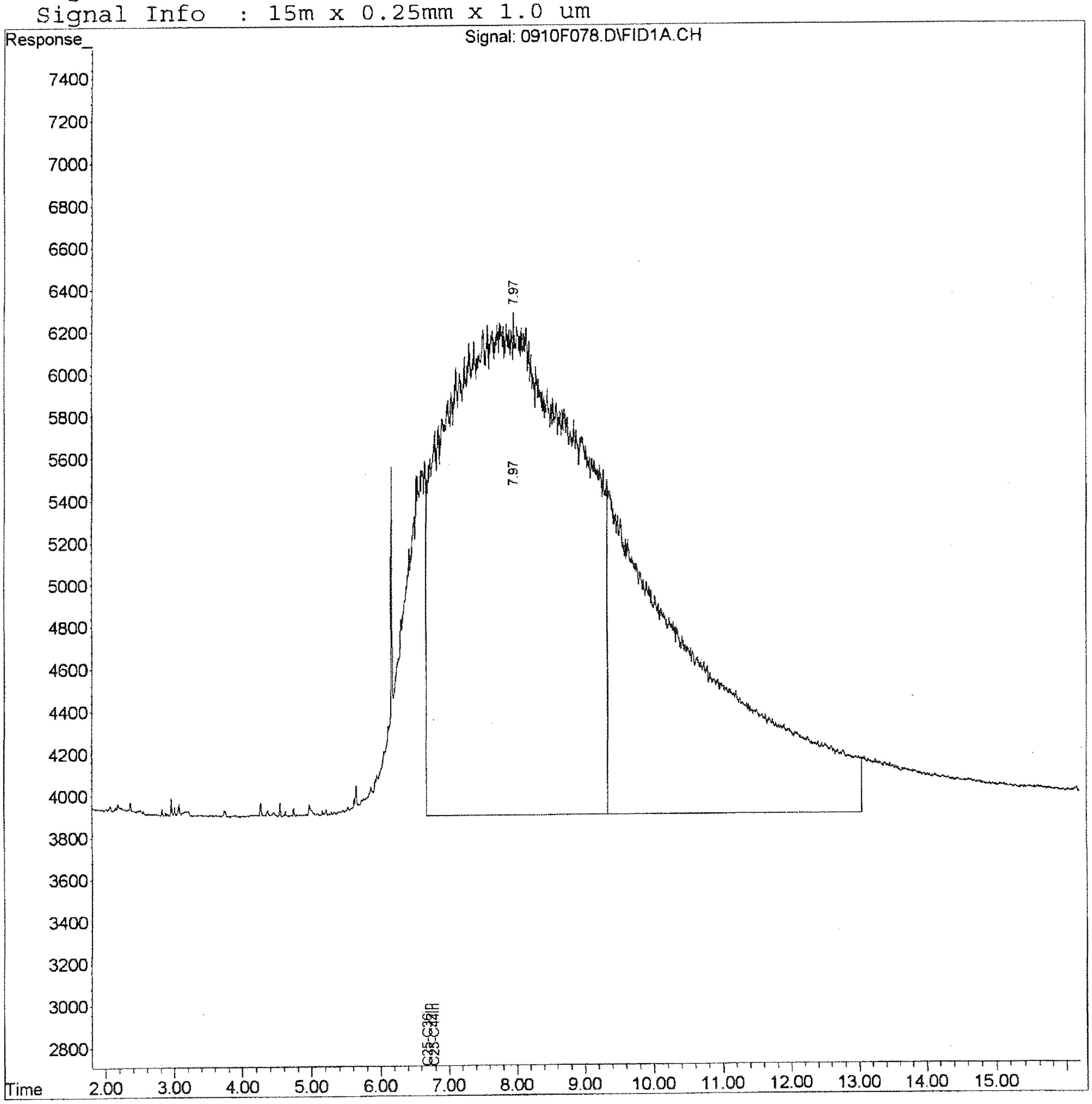
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F078.D
Acq On : 10 Sep 2013 10:31 pm
Sample : RRO @ 500ppm | SVF01-40K
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:31 2013 Quant Results File: 091013FSRO.RES

Vial: 11
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F080.D          Vial: 12
Acq On    : 10 Sep 2013  10:53 pm                Operator: DVaillenco
Sample    : RRO @ 2000ppm | SVF01-40J            Inst     : GC21
Misc      :                                      Multiplr: 1.00
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
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) H C25-C36in RRO [NWTPH]	6.68	1229679	2162.043 ppm
9) H C25-C44in RRO [TPH-Oil]	6.78	1830314	2155.912 ppm

DV 9/11/13

W

(f)=RT Delta > 1/2 Window (m)=manual int.

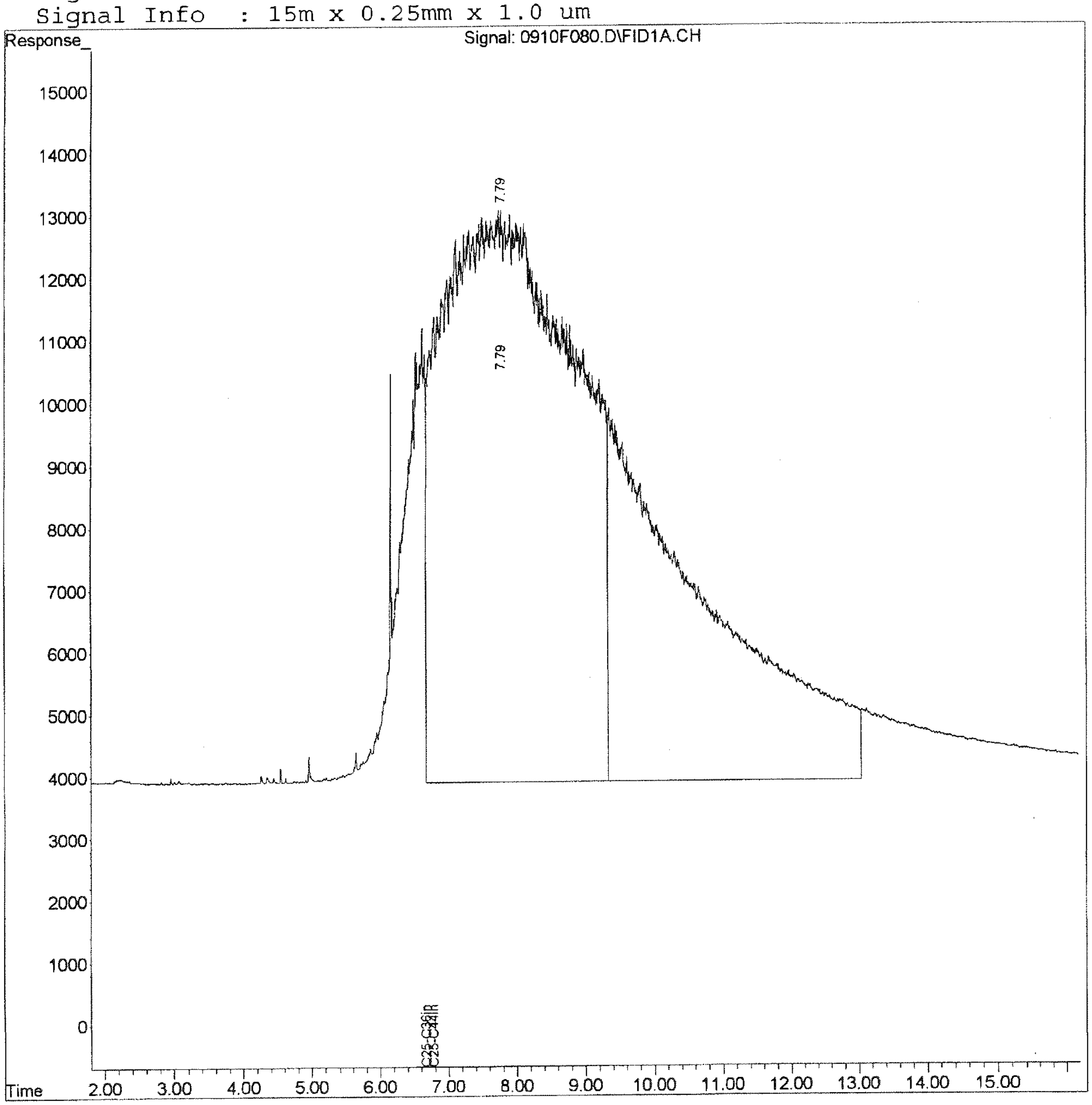
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F080.D
Acq On : 10 Sep 2013 10:53 pm
Sample : RRO @ 2000ppm | SVF01-40J
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:32 2013 Quant Results File: 091013FSRO.RES

Vial: 12
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F082.D                  Vial: 13
Acq On    : 10 Sep 2013  11:15 pm                         Operator: DVaillenco
Sample    : RRO @ 5000ppm | SVF01-40I                     Inst     : GC21
Misc      :                                               Multiplr: 1.00
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
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) H C25-C36in RRO [NWTPH]	6.68	2940279	5200.631 ppm
9) H C25-C44in RRO [TPH-Oil]	6.78	4458165	5307.674 ppm

DV 9/11/13

(f)=RT Delta > 1/2 Window (m)=manual int.

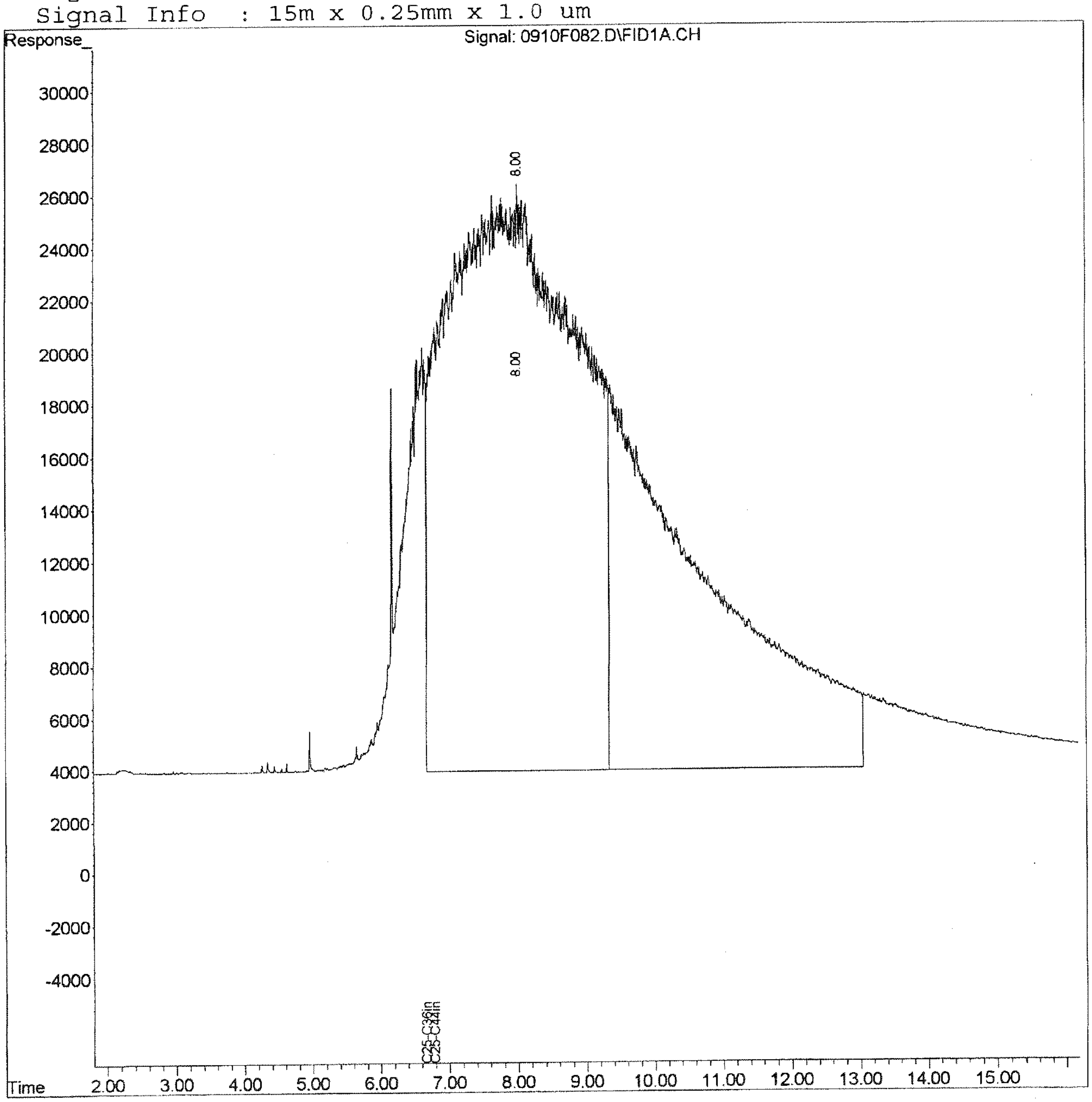
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F082.D
Acq On : 10 Sep 2013 11:15 pm
Sample : RRO @ 5000ppm | SVF01-40I
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:32 2013 Quant Results File: 091013FSRO.RES

Vial: 13
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F088.D            Vial: 14
Acq On    : 11 Sep 2013  12:22 am                 Operator: DVaillenco
Sample    : RRO @ 1000ppm | SVF01-42J             Inst    : GC21
Misc      :                                       Multiplr: 1.00
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
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
8) H C25-C36in RRO [NWTPH]	6.68	598693	990.459 ppm
9) H C25-C44in RRO [TPH-Oil]	6.78	871184	963.971 ppm

DV 9/11/13

(f)=RT Delta > 1/2 Window (m)=manual int.

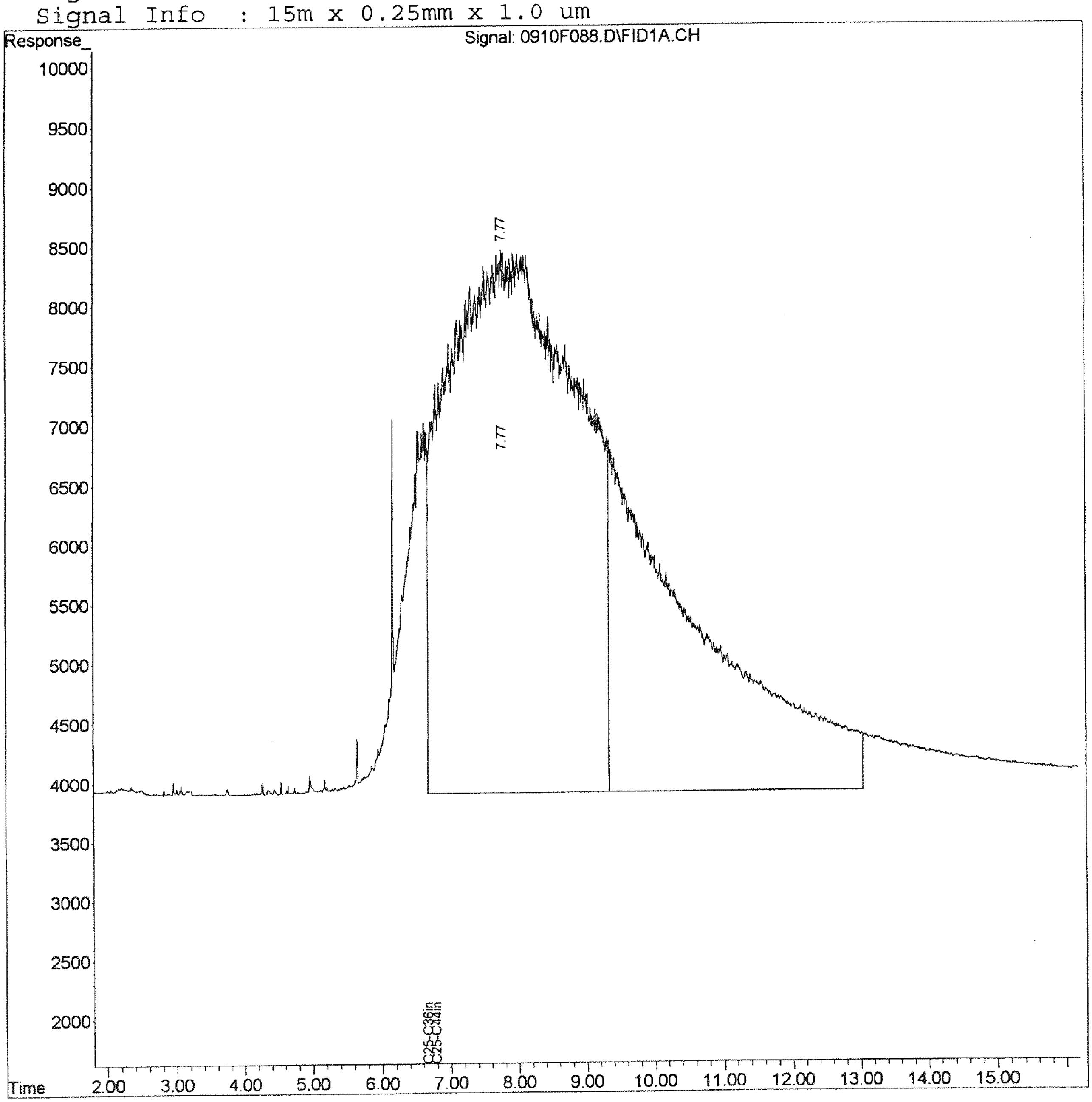
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F088.D
Acq On : 11 Sep 2013 12:22 am
Sample : RRO @ 1000ppm | SVF01-42J
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:43 2013 Quant Results File: 091013FSRO.RES

Vial: 14
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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 : 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



Quantitation Report (Not Reviewed)

Data File : J:\GC21\DATA\091013F\0910F092.D Vial: 15
Acq On : 11 Sep 2013 1:07 am Operator: DVaillenco
Sample : DRO @ 20/1.0ppm | SVF01-42H Inst : GC21
Misc : Multiplr: 1.00
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

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	2.91	604	0.982 ppm
Spiked Amount 50.000	Recovery	=	1.96%
2) S o-Terphenyl	5.60	1301	0.942 ppm
Spiked Amount 50.000	Recovery	=	1.88%
3) S n-Triacontane	7.78	938	0.806 ppm
Spiked Amount 50.000	Recovery	=	1.61%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.77	24578	19.880 ppm
5) H C10-C25ex DRO [AK102]	3.15	24015	19.821 ppm
6) H C10-C28in DRO [8015]	3.15	24638	20.427 ppm
7) H C12-C25ex DRO [NWTPH]	3.79	20209	19.538 ppm

DJ 9/12/13

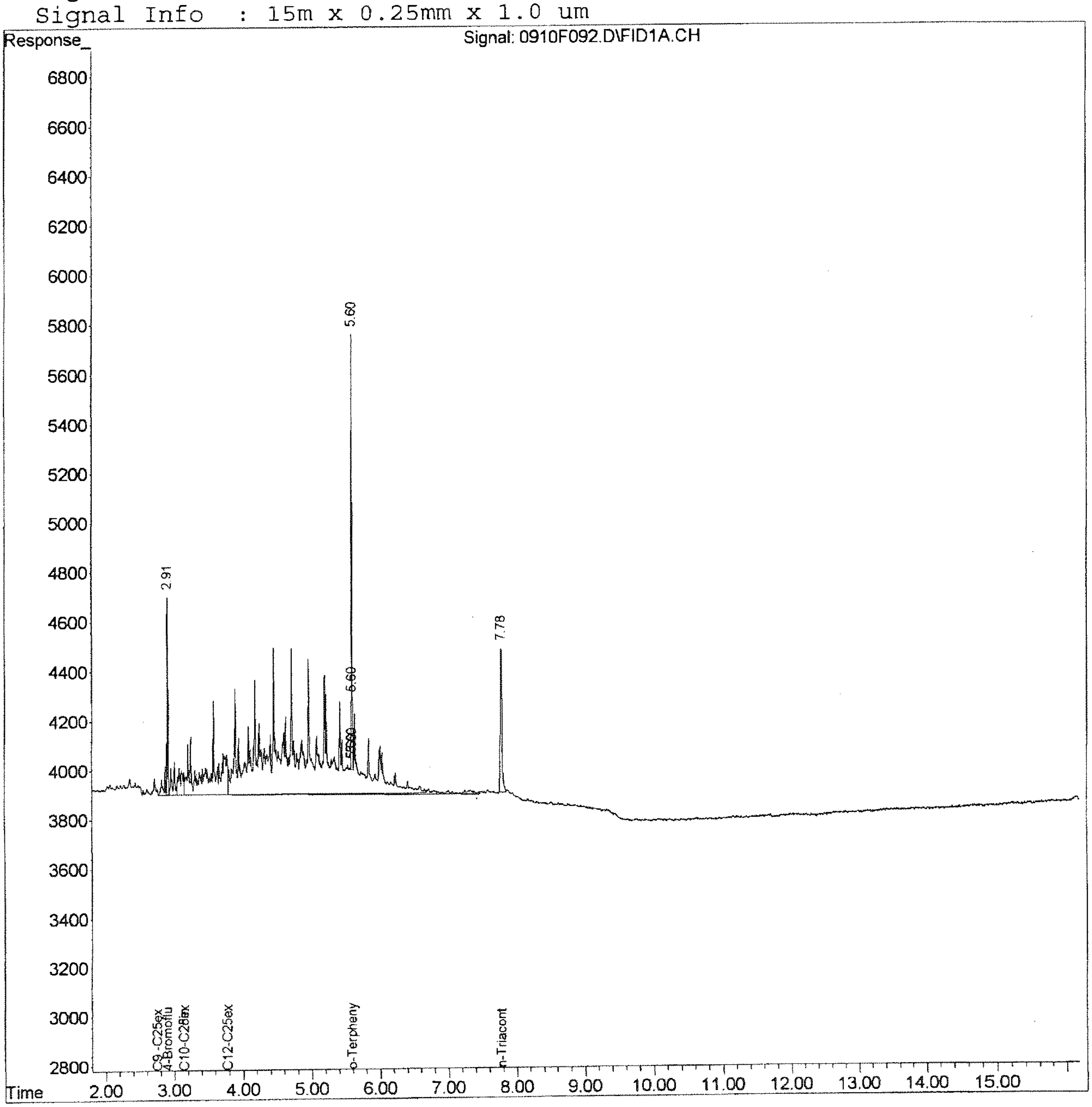
(f)=RT Delta > 1/2 Window (m)=manual int.
0910F092.D 091013FSRO.M Wed Sep 11 08:41:31 2013 Page 1

Quantitation Report (Not Reviewed)

Data File : J:\GC21\DATA\091013F\0910F092.D Vial: 15
Acq On : 11 Sep 2013 1:07 am Operator: DVaillenco
Sample : DRO @ 20/1.0ppm | SVF01-42H Inst : GC21
Misc : Multiplr: 1.00
IntFile : rteint.p
Quant Time: Sep 11 8:32 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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F094.D
Acq On : 11 Sep 2013 1:29 am
Sample : DRO @ 50/2.5ppm | SVF01-42G
Misc :
IntFile : rteint.p
Quant Time: Sep 11 08:27:22 2013 Quant Results File: 091013FSRO.RES

Vial: 16
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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	1315	2.137 ppm
Spiked Amount 50.000	Recovery	=	4.27%
2) S o-Terphenyl	5.60	2972	2.152 ppm
Spiked Amount 50.000	Recovery	=	4.30%
3) S n-Triacontane	7.78	2298	1.975 ppm
Spiked Amount 50.000	Recovery	=	3.95%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.77	55268	44.704 ppm
5) H C10-C25ex DRO [AK102]	3.15	54253	44.778 ppm
6) H C10-C28in DRO [8015]	3.15	55017	45.614 ppm
7) H C12-C25ex DRO [NWTPH]	3.79	46183	44.650 ppm

DV 9/11/13
VJ

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

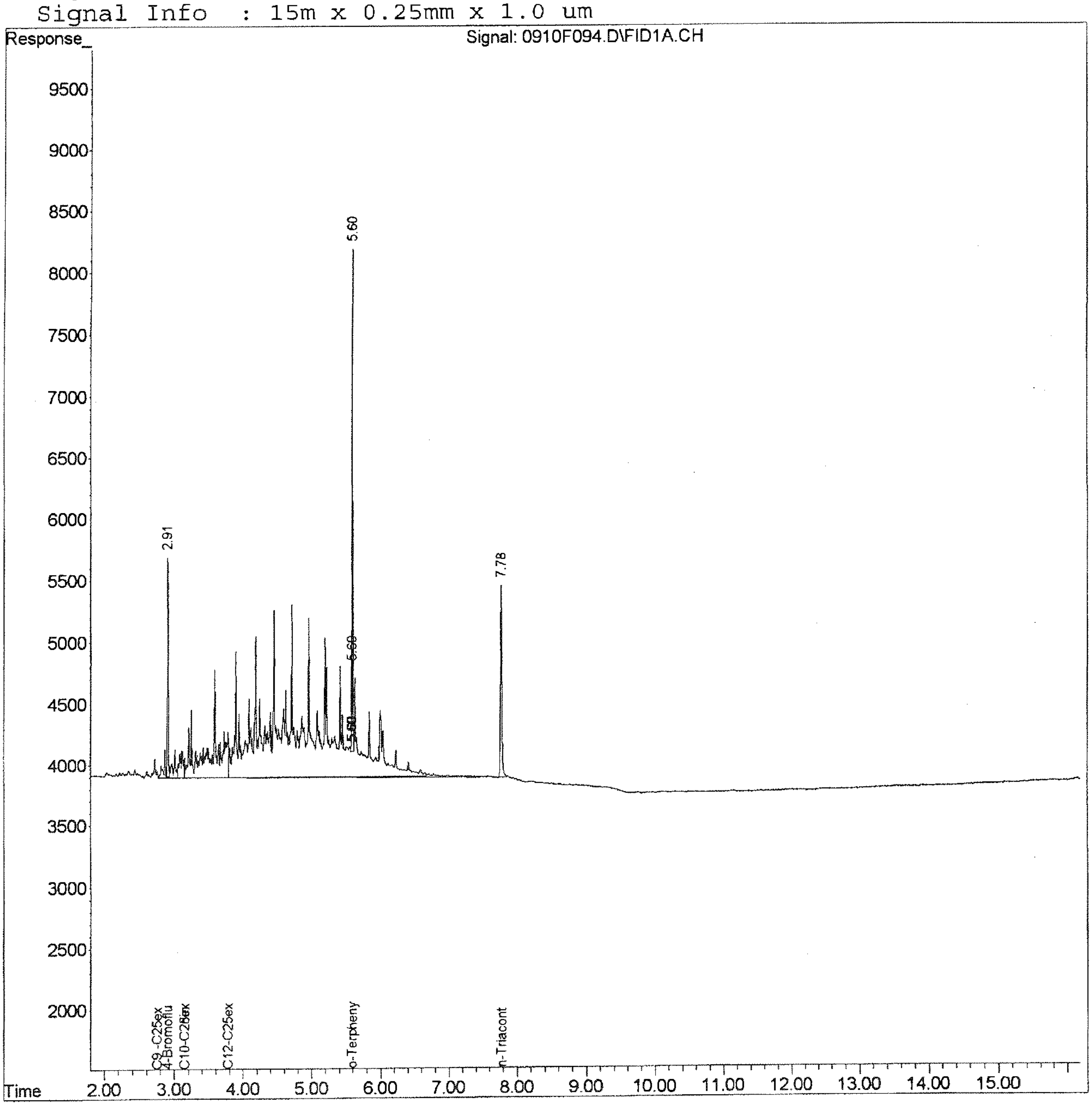
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F094.D
Acq On : 11 Sep 2013 1:29 am
Sample : DRO @ 50/2.5ppm | SVF01-42G
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:41 2013 Quant Results File: 091013FSRO.RES

Vial: 16
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F096.D   Vial: 17
Acq On : 11 Sep 2013 1:51 am   Operator: DVaillenco
Sample : DRO @ 200/10ppm | SVF01-42F   Inst : GC21
Misc :   Multiplr: 1.00
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			
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) H C9 -C25ex DRO [TPH-Diesel]	2.77	229949	185.996 ppm
5) H C10-C25ex DRO [AK102]	3.15	226348	186.817 ppm
6) H C10-C28in DRO [8015]	3.15	227285	188.438 ppm
7) H C12-C25ex DRO [NWTPH]	3.79	193042	186.632 ppm

DV 9/11/13 W

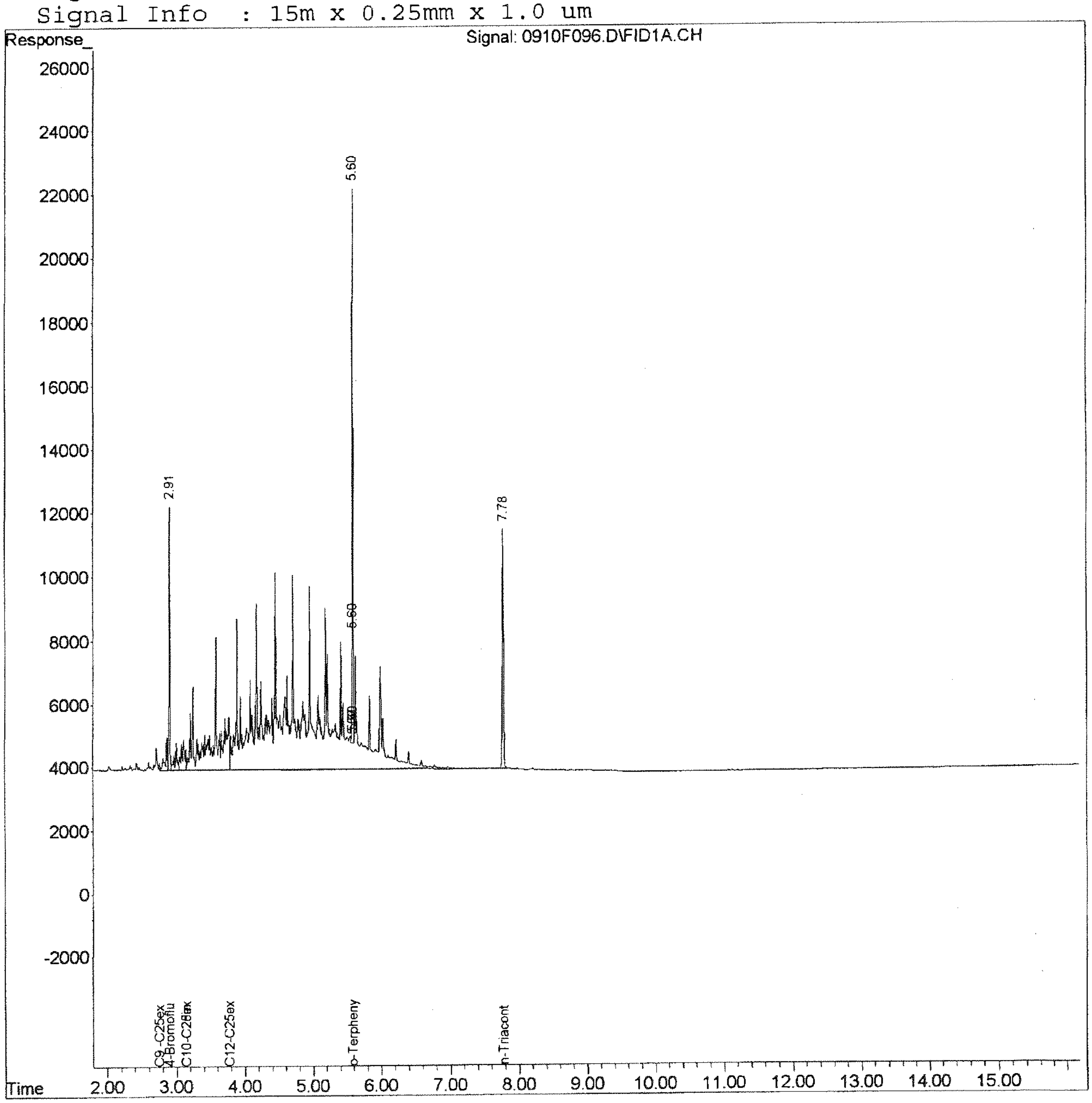
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F096.D
Acq On : 11 Sep 2013 1:51 am
Sample : DRO @ 200/10ppm | SVF01-42F
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:33 2013 Quant Results File: 091013FSRO.RES

Vial: 17
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F098.D Vial: 18
Acq On : 11 Sep 2013 2:14 am Operator: DVaillenco
Sample : DRO @ 500/25ppm | SVF01-42E Inst : GC21
Misc : Multiplr: 1.00
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
Spiked Amount 50.000	Recovery	=	46.39%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.77	577353	466.997 ppm
5) H C10-C25ex DRO [AK102]	3.15	568516	469.226 ppm
6) H C10-C28in DRO [8015]	3.15	565932	469.204 ppm
7) H C12-C25ex DRO [NWTPH]	3.79	486113	469.972 ppm

BN 9/11/13
VM

(f)=RT Delta > 1/2 Window (m)=manual int.

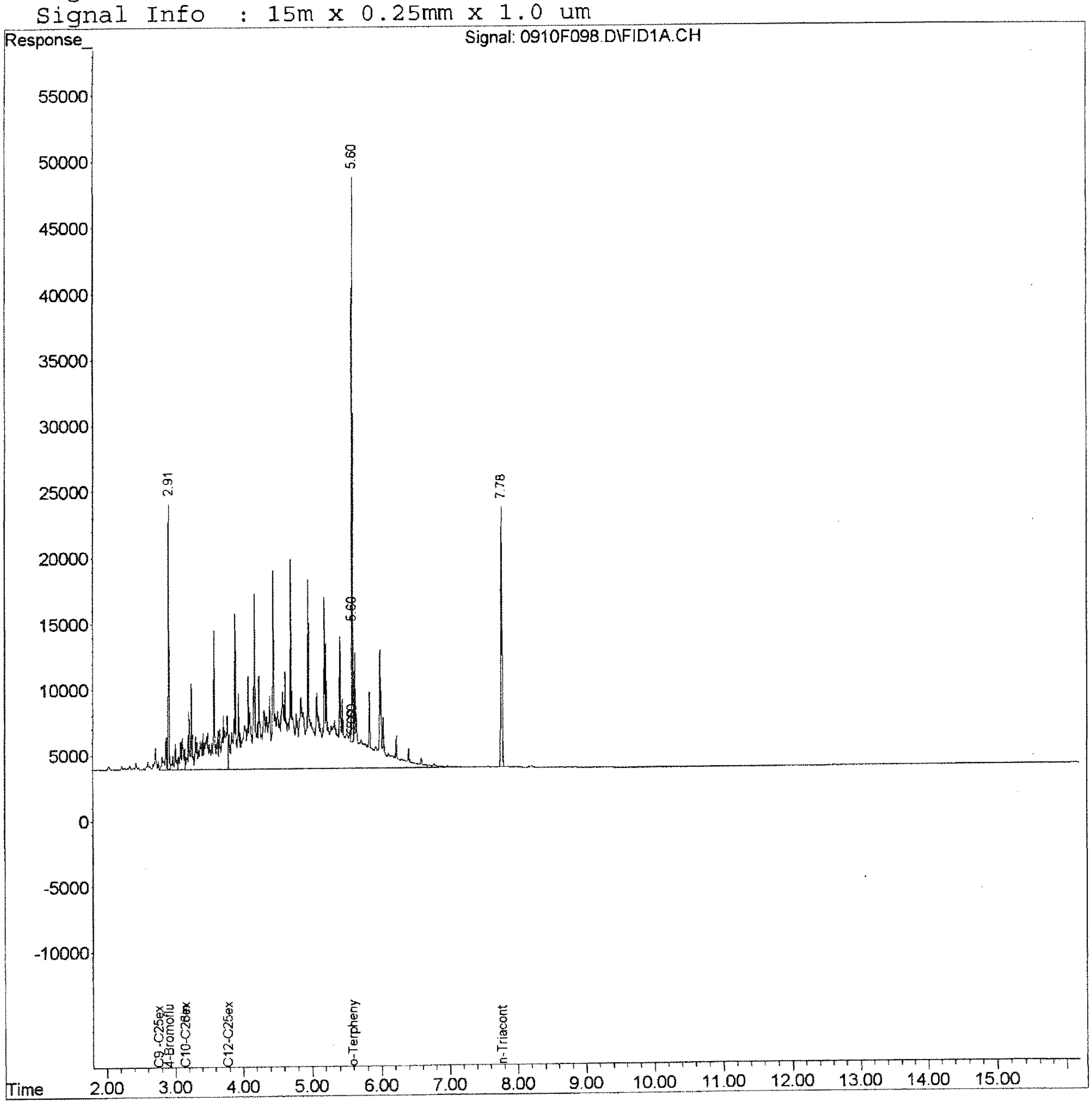
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F098.D
Acq On : 11 Sep 2013 2:14 am
Sample : DRO @ 500/25ppm | SVF01-42E
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:33 2013 Quant Results File: 091013FSRO.RES

Vial: 18
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F100.D
Acq On : 11 Sep 2013 2:36 am
Sample : DRO @ 2000/100ppm | SVF01-42D
Misc :
IntFile : rteint.p
Quant Time: Sep 11 08:27:24 2013 Quant Results File: 091013FSRO.RES

Vial: 19
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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	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
Spiked Amount 50.000	Recovery	=	184.35%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.77	2338660	1891.644 ppm
5) H C10-C25ex DRO [AK102]	3.15	2304139	1901.726 ppm
6) H C10-C28in DRO [8015]	3.15	2286866	1896.000 ppm
7) H C12-C25ex DRO [NWTPH]	3.79	1977802	1912.131 ppm

DV 9/11/13

(f)=RT Delta > 1/2 Window (m)=manual int.

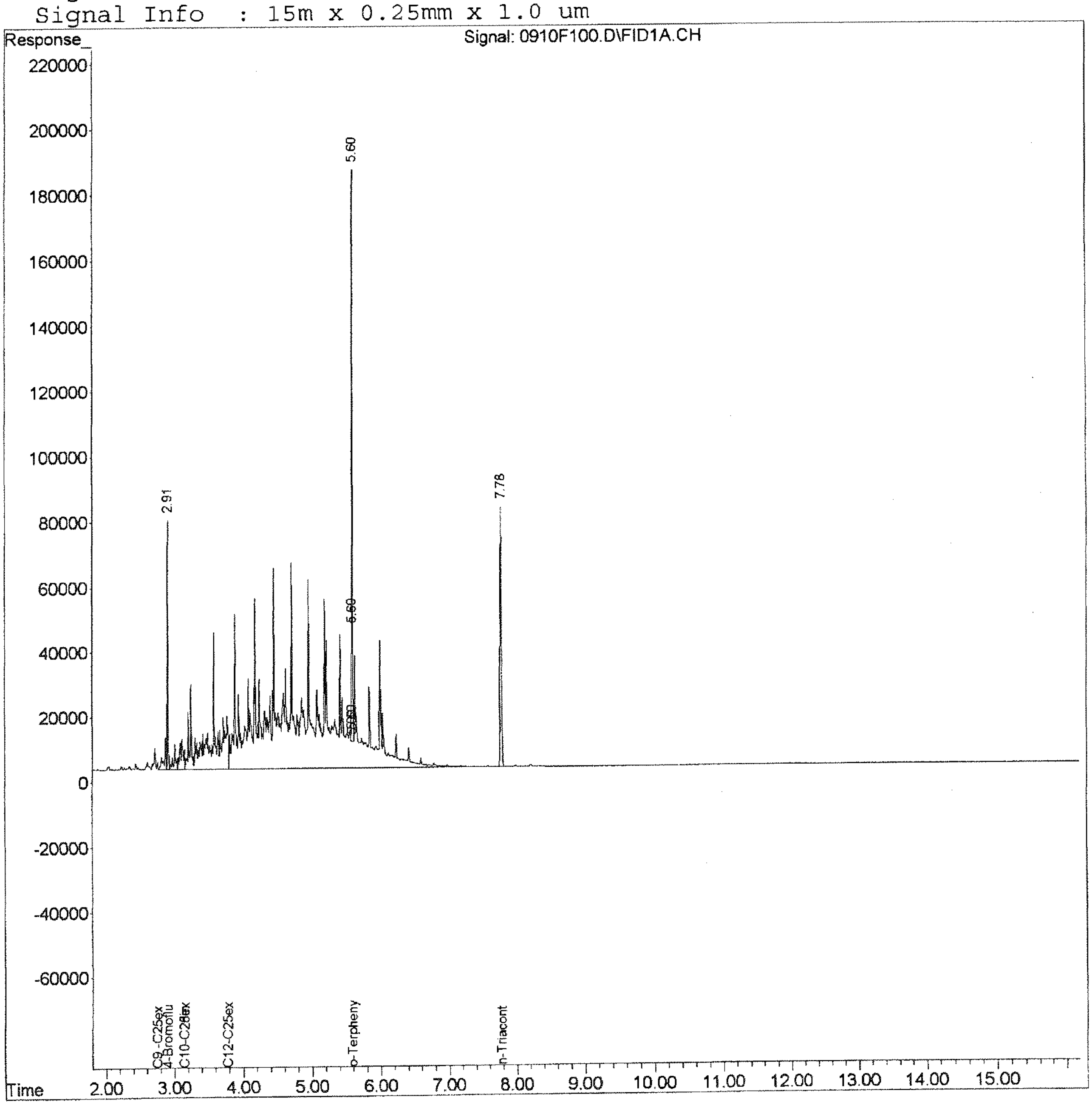
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F100.D
Acq On : 11 Sep 2013 2:36 am
Sample : DRO @ 2000/100ppm | SVF01-42D
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:33 2013 Quant Results File: 091013FSRO.RES

Vial: 19
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F102.D                Vial: 20
Acq On    : 11 Sep 2013   2:58 am                       Operator: DVaillenco
Sample    : DRO @ 5000/250ppm |SVF01-42C                Inst    : GC21
Misc      :                                             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
```

Compound	R.T.	Response	Conc Units
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) H C9 -C25ex DRO [TPH-Diesel]	2.77	6082016	4919.487 ppm
5) H C10-C25ex DRO [AK102]	3.15	5991866	4945.399 ppm
6) H C10-C28in DRO [8015]	3.15	5949044	4932.246 ppm
7) H C12-C25ex DRO [NWTPH]	3.79	5137007	4966.437 ppm

9/11/13

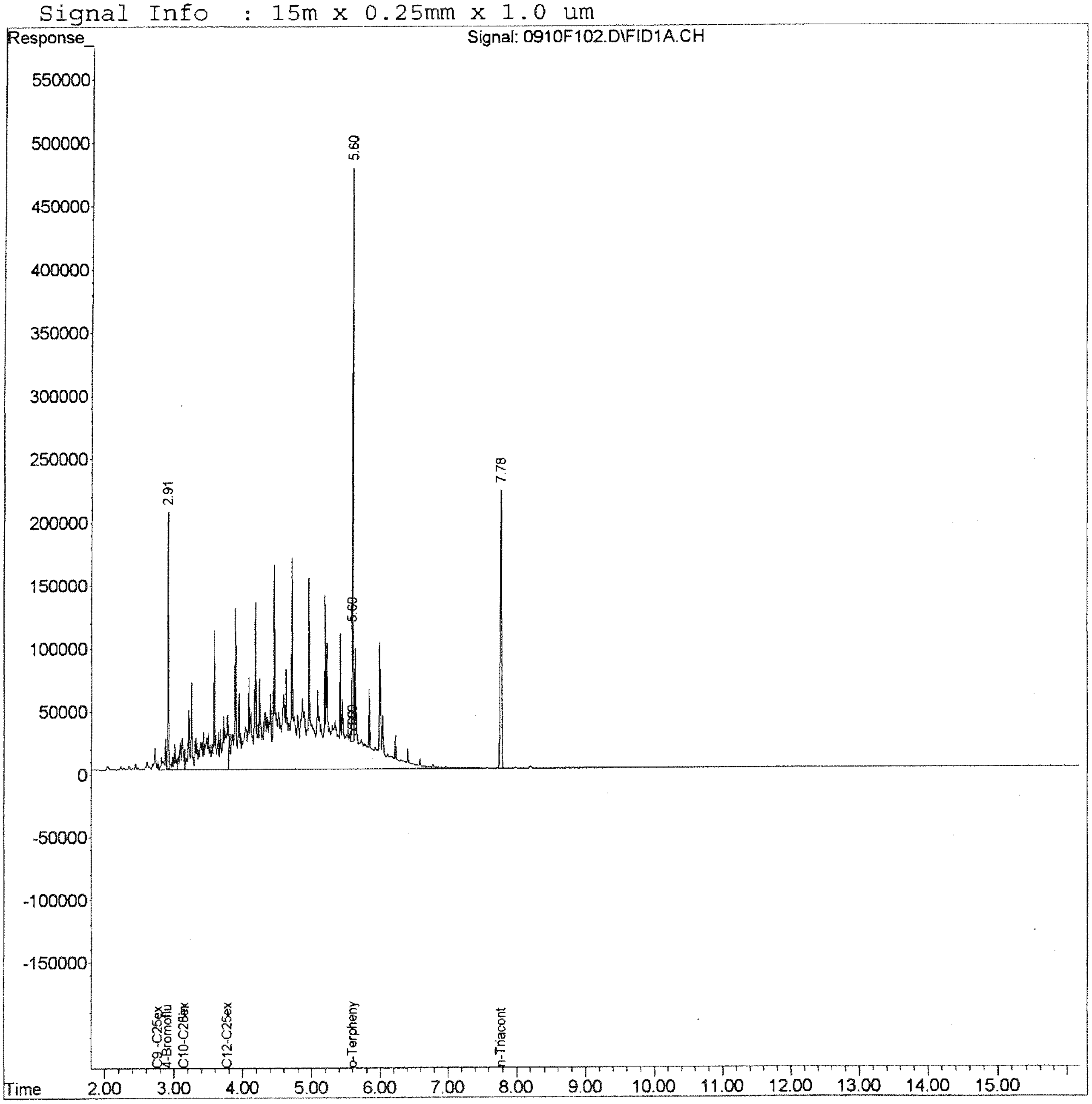
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F102.D
Acq On : 11 Sep 2013 2:58 am
Sample : DRO @ 5000/250ppm |SVF01-42C
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:33 2013 Quant Results File: 091013FSRO.RES

Vial: 20
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F104.D
Acq On : 11 Sep 2013 3:20 am
Sample : DRO @ 20000ppm | SVF01-42B
Misc :
IntFile : rteint.p
Quant Time: Sep 11 08:27:26 2013 Quant Results File: 091013FSRO.RES

Vial: 21
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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				
4) H	C9 -C25ex DRO [TPH-Diesel]	2.77	21837193	17663.187	ppm
5) H	C10-C25ex DRO [AK102]	3.15	21490250	17737.021	ppm
6) H	C10-C28in DRO [8015]	3.15	21322154	17677.818	ppm
7) H	C12-C25ex DRO [NWTPH]	3.79	18316100	17707.929	ppm

DV 9/11/13

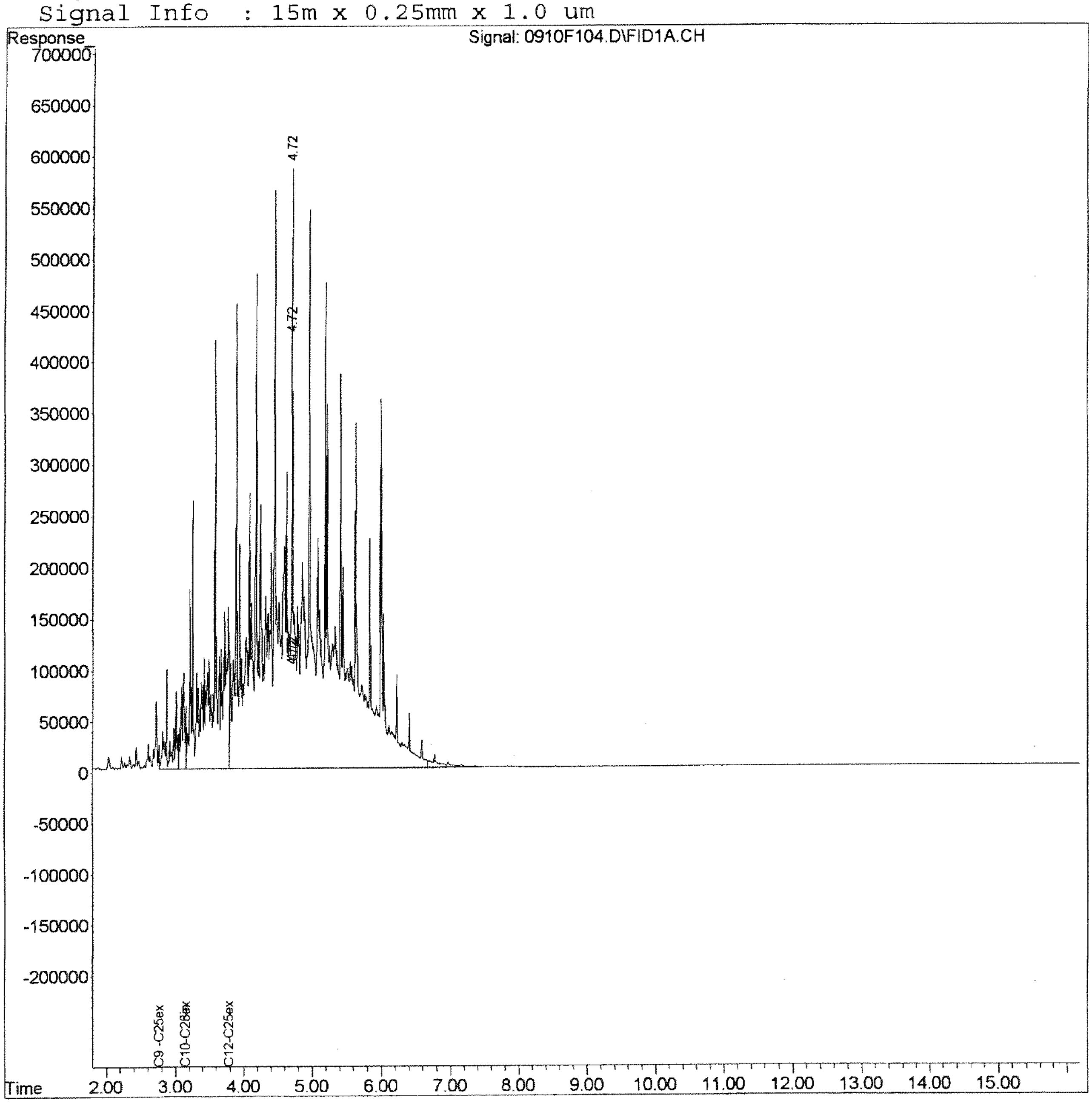
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F104.D Vial: 21
Acq On : 11 Sep 2013 3:20 am Operator: DVaillenco
Sample : DRO @ 20000ppm | SVF01-42B Inst : GC21
Misc : Multiplr: 1.00
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
DataAcq Meth : SVF_FB.M

Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um



Quantitation Report (QT Reviewed)

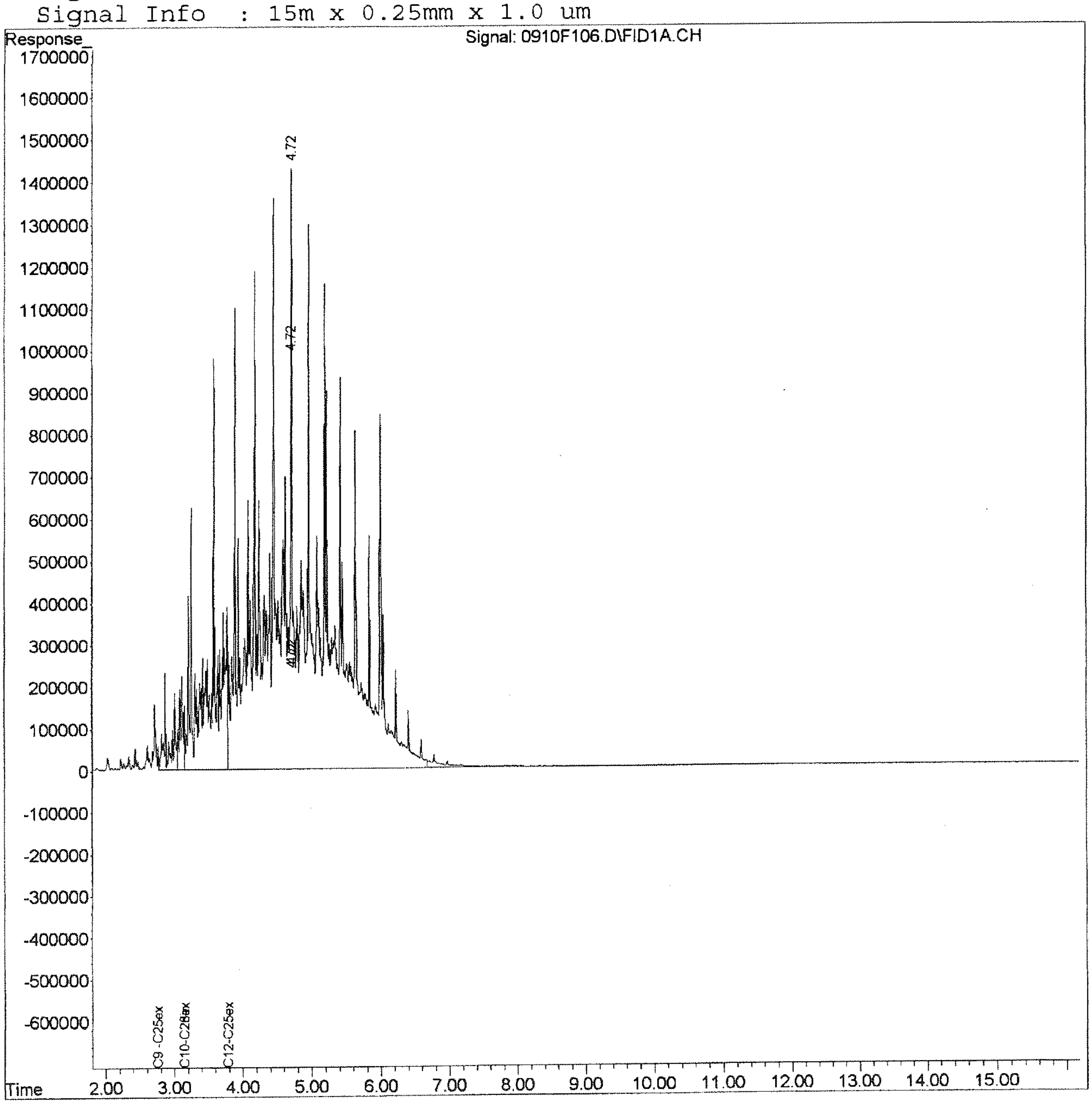
```
Data File : J:\GC21\DATA\091013F\0910F106.D                  Vial: 22
Acq On    : 11 Sep 2013   3:42 am                       Operator: DVaillenco
Sample    : DRO @ 50000ppm | SVF01-42A                  Inst     : GC21
Misc      :                                             Multiplr: 1.00
IntFile   : 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
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.77	54586420	44152.660 ppm
5) H C10-C25ex DRO [AK102]	3.15	53743718	44357.485 ppm
6) H C10-C28in DRO [8015]	3.15	53344566	44227.030 ppm
7) H C12-C25ex DRO [NWTPH]	3.79	46005174	44477.609 ppm

DV 9/11/13

Quantitation Report (QT Reviewed)

```
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             Inst    : GC21
Misc      :                                        Multiplr: 1.00
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
DataAcq Meth : SVF_FB.M

Volume Inj.  : 1 uL
Signal Phase : ZB-1
Signal Info  : 15m x 0.25mm x 1.0 um
```



Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\091013F\0910F110.D              Vial: 23
Acq On    : 11 Sep 2013   4:27 am                    Operator: DVaillenco
Sample    : DRO ICV @ 1000ppm | SVF01-42K            Inst    : GC21
Misc      :                                          Multiplr: 1.00
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
```

	Compound	R.T.	Response	Conc Units
	System Monitoring Compounds			
	Target Compounds			
4) H	C9 -C25ex DRO [TPH-Diesel]	2.77	1173351	1019.415 ppm
5) H	C10-C25ex DRO [AK102]	3.15	1147865	1014.193 ppm
6) H	C10-C28in DRO [8015]	3.15	1138726	1004.747 ppm
7) H	C12-C25ex DRO [NWTPH]	3.79	963886	998.360 ppm

DV 9/11/13

(f)=RT Delta > 1/2 Window (m)=manual int.

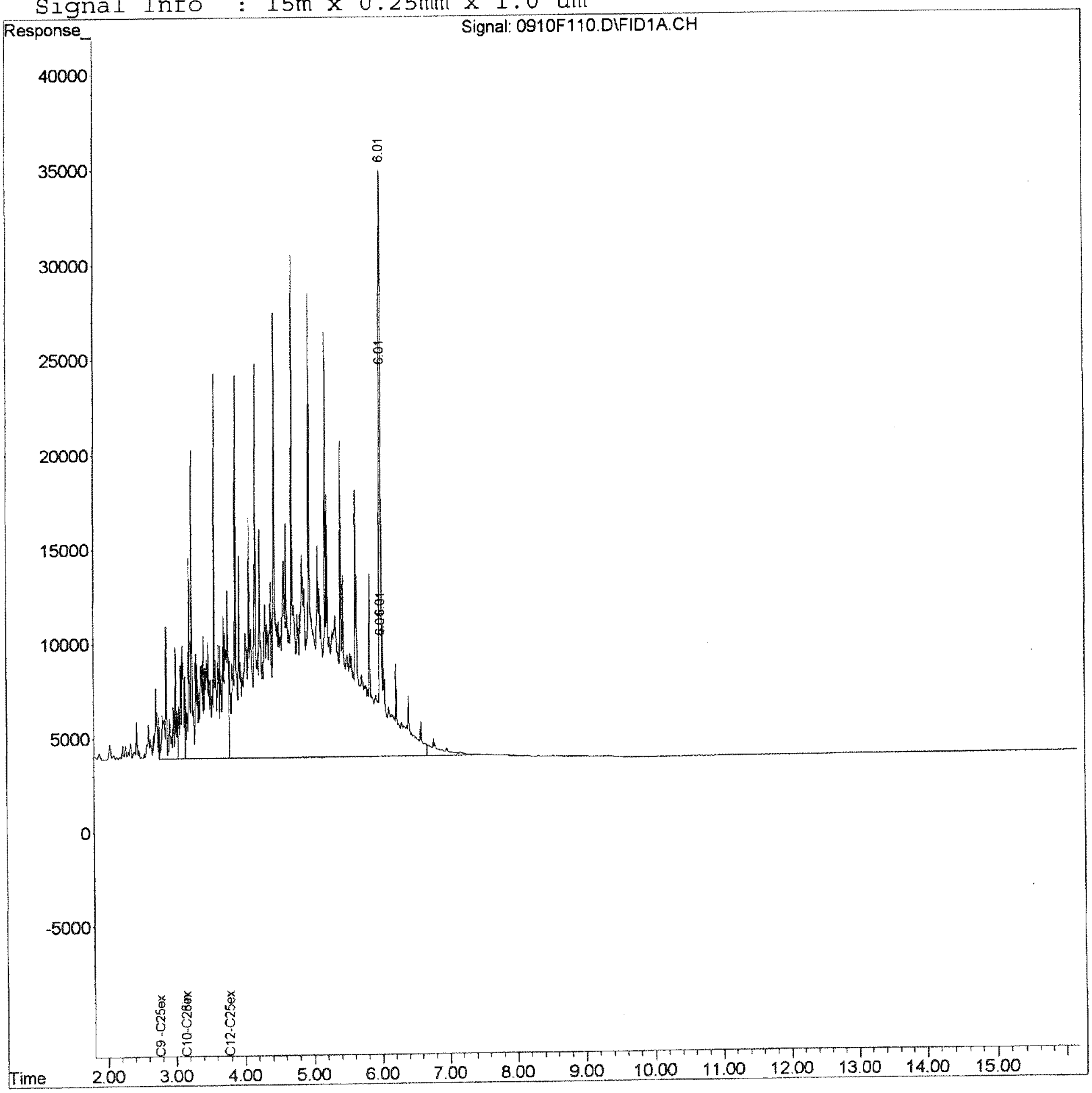
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\091013F\0910F110.D
Acq On : 11 Sep 2013 4:27 am
Sample : DRO ICV @ 1000ppm | SVF01-42K
Misc :
IntFile : rteint.p
Quant Time: Sep 11 8:43 2013 Quant Results File: 091013FSRO.RES

Vial: 23
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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 : 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



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: External Standard
Analysis Method: NWTPH-Dx

Calibration Date: 09/10/2013
Calibration ID: CAL12766
Analysis Lot: KWG1312552
Units: ppm

File ID: J:\GC21\DATA\110813F\1108F020.D
J:\GC21\DATA\110813F\1108F022.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	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.D
Lab ID: KWG1312552-1
RunType: CCV
Matrix: NOT APPLICABLE

Date Acquired: 11/08/2013 10:31
Date Quantitated: 11/09/2013 11:35
Batch ID: KWG1312552
Analysis Method: NWTPH-Dx
MethodJoinID: 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: 11/11/13

Secondary Review: ____________

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F020.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 10:31	**Quant Date:**	11/09/2013 11:35	**Vial:**	96
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-1			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1081
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.58		68877	54.10		50-150	NA	
n-Triacontane	7.75		51602	49.81		50-150	NA	

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		995462	1,031			
Residual Range Organics (RRO)	6.66		10512	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

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

Data File:	J:\GC21\DATA\110813F\1108F020.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 10:31	**Quant Date:**	11/09/2013 11:35	**Vial:**	96
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-1			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ1082
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene	2.89		31677	55.87		70-129	NA	
o-Terphenyl	5.58		68877	54.10		51-126	NA	
n-Triacontane	7.75		51602	49.81		50-150	NA	

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C10 - C25 DRO	3.23		1150291	1,016			
C10 - C28 DRO	3.13		1157033	1,021			
Diesel Range Organics (DRO)	3.78		995462	1,031			
Residual Range Organics (RRO)	6.66		10512	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

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

Data File:	J:\GC21\DATA\110813F\1108F020.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 10:31	**Quant Date:**	11/09/2013 11:35	**Vial:**	96
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-1			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ745
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene	2.89	?	31677	55.87		50-150	NA	
o-Terphenyl	5.58	?	68877	54.10		55-133	NA	
n-Triacontane	7.75	?	51602	49.81		54-136	NA	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		1183666	1,028			
C10 - C25 DRO	3.23		1150291	1,016			
C10 - C28 DRO	3.13		1157033	1,021			
Diesel Range Organics (DRO)	3.78		995462	1,031			
Residual Range Organics (RRO)	6.66		10512	2.98			NR
C25 - C44 RRO	6.76		18884	15.13			

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

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\110813F\1108F020.D Vial: 96
Acq On : 08 Nov 2013 10:31 am Operator: DVaillenco
Sample : DRO @ 1000/50ppm | SVF01-44J Inst : GC21
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

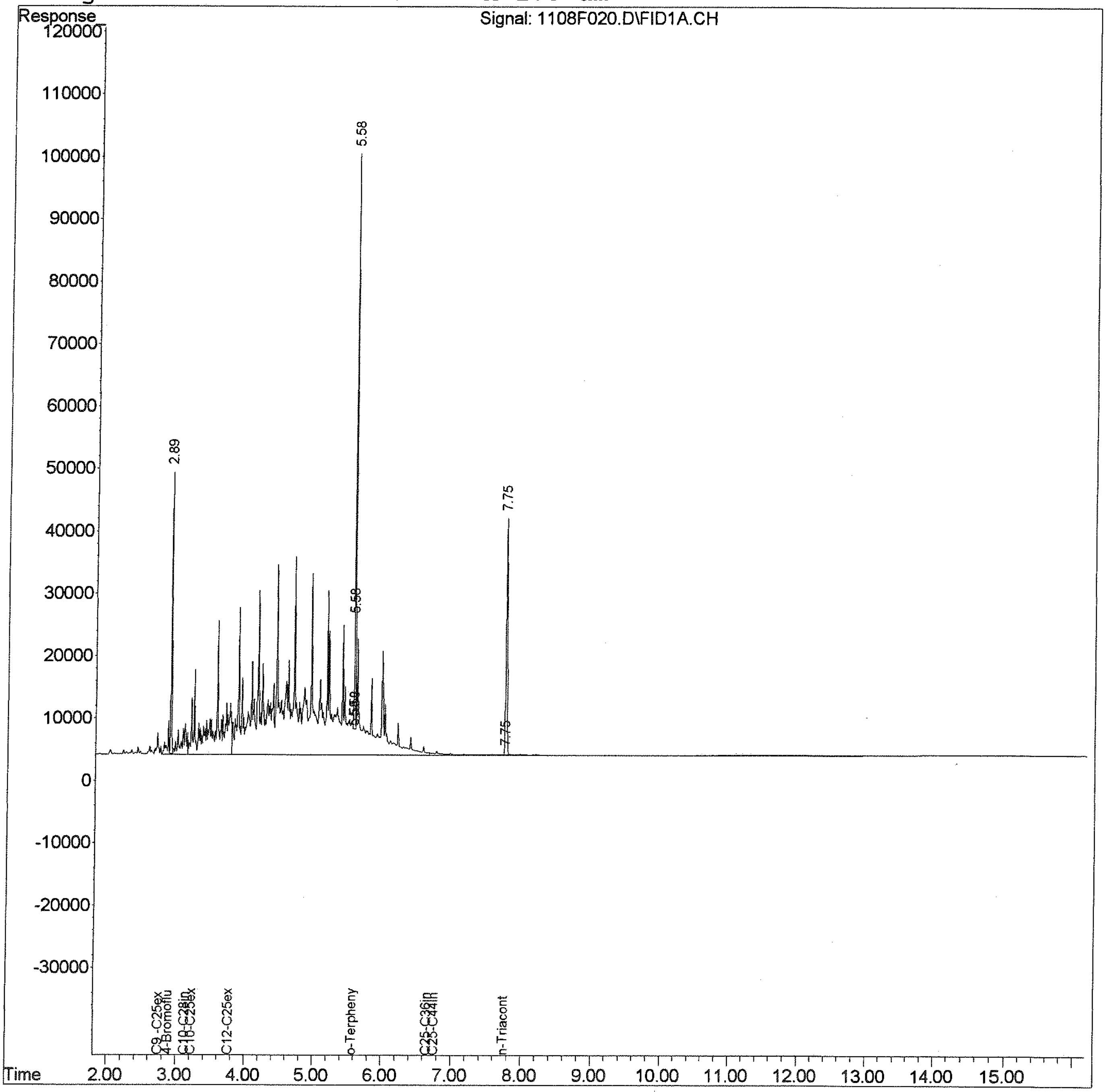
Compound	R.T.	Response	Conc	Units
System Monitoring Compounds				
1) S 4-Bromofluorobenzene	2.89	31677	55.867	ppm
Spiked Amount 50.000	Recovery	=	111.73%	
2) S o-Terphenyl	5.58	68877	54.095	ppm
Spiked Amount 50.000	Recovery	=	108.19%	
3) S n-Triacontane	7.75	51602	49.814	ppm
Spiked Amount 50.000	Recovery	=	99.63%	
Target Compounds				
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	1183666	1028.377	ppm
5) H C10-C25ex DRO [AK102]	3.23	1150291	1016.336	ppm
6) H C10-C28in DRO [8015]	3.13	1157033	1020.900	ppm
7) H C12-C25ex DRO [NWTPH]	3.78	995462	1031.065	ppm
8) H C25-C36in RRO [NWTPH]	6.66	10512	2.981	ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	18884	15.131	ppm

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\110813F\1108F020.D Vial: 96
Acq On : 08 Nov 2013 10:31 am Operator: DVaillenco
Sample : DRO @ 1000/50ppm | SVF01-44J Inst : GC21
Misc : Multiplr: 1.00
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



Exception Report

Data File: J:\GC21\DATA\110813F\1108F022.D
Lab ID: KWG1312552-1
RunType: CCV
Matrix: NOT APPLICABLE

Date Acquired: 11/08/2013 10:58
Date Quantitated: 11/09/2013 11:35
Batch ID: KWG1312552
Analysis Method: NWTPH-Dx
MethodJoinID: 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: 11/11/13

Secondary Review: ______

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F022.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 10:58	**Quant Date:**	11/09/2013 11:35	**Vial:**	97
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-1			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
		Prep Date:			
Prep Ref:					

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1081
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl			0			50-150	NA	NR
n-Triacontane			0			50-150	NA	NR

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		92082	95.38			NR
Residual Range Organics (RRO)	6.66		623370	1,032			

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

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F022.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 10:58	**Quant Date:**	11/09/2013 11:35	**Vial:**	97
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-1			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ1082
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene			0			70-129	NA	
o-Terphenyl			0			51-126	NA	NR
n-Triacontane			0			50-150	NA	NR

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C10 - C25 DRO	3.23		93267	82.41			
C10 - C28 DRO	3.13		280944	247.89			
Diesel Range Organics (DRO)	3.78		92082	95.38			NR
Residual Range Organics (RRO)	6.66		623370	1,032			

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

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F022.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 10:58	**Quant Date:**	11/09/2013 11:35	**Vial:**	97
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-1			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
		Prep Date:			
Prep Ref:					

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ745
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene			0			50-150	NA	
o-Terphenyl			0			55-133	NA	NR
n-Triacontane			0			54-136	NA	NR

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		94841	82.40			
C10 - C25 DRO	3.23		93267	82.41			
C10 - C28 DRO	3.13		280944	247.89			
Diesel Range Organics (DRO)	3.78		92082	95.38			NR
Residual Range Organics (RRO)	6.66		623370	1,032			
C25 - C44 RRO	6.76		931913	1,032			

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

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\110813F\1108F022.D Vial: 97
Acq On : 08 Nov 2013 10:58 am Operator: DVaillenco
Sample : RRO @ 1000ppm | SVF01-42I Inst : GC21
Misc : Multiplr: 1.00
IntFile : rteint.p
Quant Time: Nov 09 11:35:18 2013 Quant Results File: 091013FSRO.RES

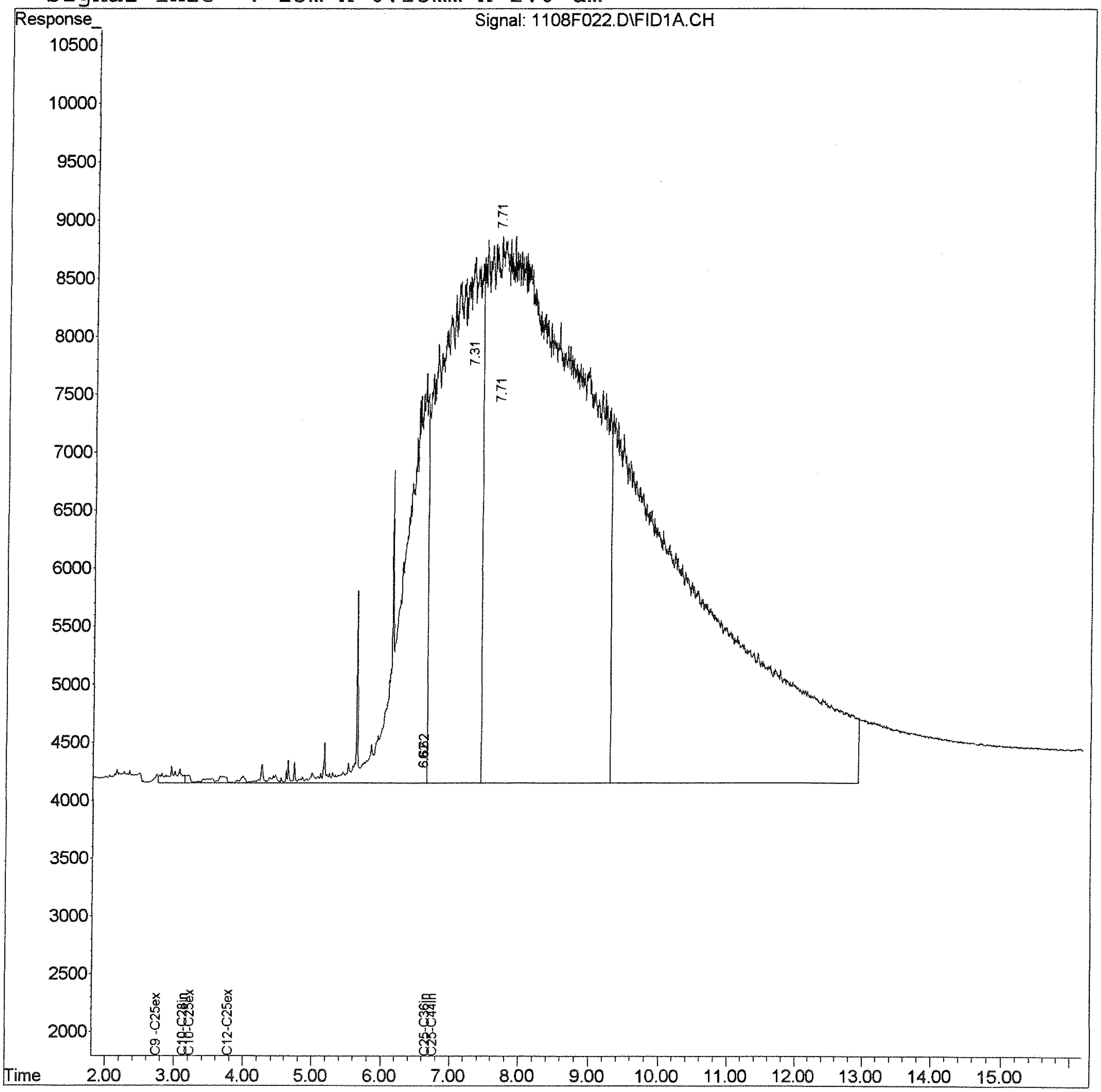
Quant Method : J:\GC21\METHODS\091013FSRO.M (RTE Integrator)
Title : 8015/NWTPH Semivolatile Range Organics CAL12766
Last Update : Sat Nov 09 11:34:59 2013
Response via : Initial Calibration
DataAcq Meth : SVF_FB.M

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) H C9 -C25ex DRO [TPH-Diesel]	2.75	94841	82.398	ppm
5) H C10-C25ex DRO [AK102]	3.23	93267	82.406	ppm
6) H C10-C28in DRO [8015]	3.13	280944	247.889	ppm
7) H C12-C25ex DRO [NWTPH]	3.78	92082	95.375	ppm
8) H C25-C36in RRO [NWTPH]	6.66	623370	1031.888	ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	931913	1031.579	ppm

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\110813F\1108F022.D                Vial: 97
Acq On    : 08 Nov 2013  10:58 am                      Operator: DVaillenco
Sample    : RRO @ 1000ppm | SVF01-42I                  Inst    : GC21
Misc      :                                            Multiplr: 1.00
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
```



QA/QC Results

Client:	KTA Associates	**Service Request:**	K1311914
Project:	PacifiCorp-Chehalis Power Groundwater	**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\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

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

Exception Report

Data File: J:\GC21\DATA\110813F\1108F056.D
Lab ID: KWG1312552-2
RunType: CCV
Matrix: NOT APPLICABLE

Date Acquired: 11/08/2013 17:17
Date Quantitated: 11/09/2013 11:35
Batch ID: KWG1312552
Analysis Method: NWTPH-Dx
MethodJoinID: 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: 11/11/13

Secondary Review:

Printed: 11/11/2013 08:37:05
u:\Stealth\Crystal.rpt\except2.rpt

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F056.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 17:17	**Quant Date:**	11/09/2013 11:35	**Vial:**	96
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-2			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ1081
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl	5.58		67242	52.81		50-150	NA	
n-Triacontane	7.75		56899	54.93		50-150	NA	

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		981468	1,017			
Residual Range Organics (RRO)	6.66		9903	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

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

Data File:	J:\GC21\DATA\110813F\1108F056.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 17:17	**Quant Date:**	11/09/2013 11:35	**Vial:**	96
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-2			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
		Prep Date:			
Prep Ref:					

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1082
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%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 Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C10 - C25 DRO	3.23		1135647	1,003			
C10 - C28 DRO	3.13		1142117	1,008			
Diesel Range Organics (DRO)	3.78		981468	1,017			
Residual Range Organics (RRO)	6.66		9903	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

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

Data File:	J:\GC21\DATA\110813F\1108F056.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 17:17	**Quant Date:**	11/09/2013 11:35	**Vial:**	96
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-2			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
		Prep Date:			
Prep Ref:					

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ745
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene	2.89	?	31635	55.79		50-150	NA	
o-Terphenyl	5.58	?	67242	52.81		55-133	NA	
n-Triacontane	7.75	?	56899	54.93		54-136	NA	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		1169024	1,016			
C10 - C25 DRO	3.23		1135647	1,003			
C10 - C28 DRO	3.13		1142117	1,008			
Diesel Range Organics (DRO)	3.78		981468	1,017			
Residual Range Organics (RRO)	6.66		9903	1.96			NR
C25 - C44 RRO	6.76		17212	13.27			

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

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
```

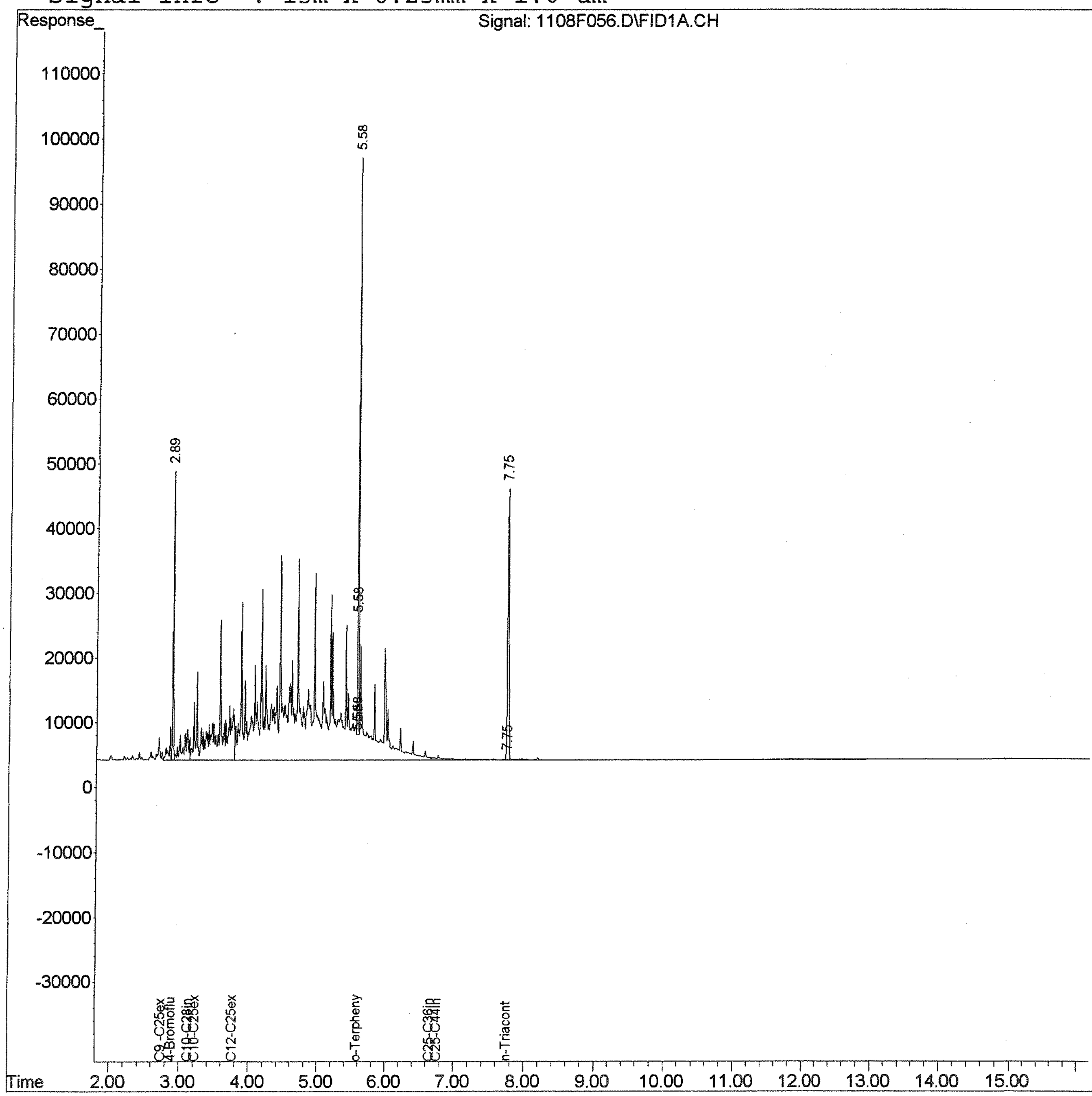
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	2.89	31635	55.793 ppm
Spiked Amount 50.000	Recovery	=	111.59%
2) S o-Terphenyl	5.58	67242	52.811 ppm
Spiked Amount 50.000	Recovery	=	105.62%
3) S n-Triacontane	7.75	56899	54.927 ppm
Spiked Amount 50.000	Recovery	=	109.85%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	1169024	1015.656 ppm
5) H C10-C25ex DRO [AK102]	3.23	1135647	1003.398 ppm
6) H C10-C28in DRO [8015]	3.13	1142117	1007.739 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	981468	1016.571 ppm
8) H C25-C36in RRO [NWTPH]	6.66	9903	1.959 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	17212	13.269 ppm

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 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



Exception Report

Data File: J:\GC21\DATA\110813F\1108F058.D
Lab ID: KWG1312552-2
RunType: CCV
Matrix: NOT APPLICABLE

Date Acquired: 11/08/2013 17:39
Date Quantitated: 11/11/2013 07:41
Batch ID: KWG1312552
Analysis Method: NWTPH-Dx
MethodJoinID: 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: 11/11/13

Secondary Review:

Printed: 11/11/2013 08:37:08
u:\Stealth\Crystal.rpt\except2.rpt

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F058.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 17:39	**Quant Date:**	11/11/2013 07:41	**Vial:**	97
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-2			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ1081
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl			0			50-150	NA	NR
n-Triacontane			0d			50-150	NA	NR

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		100092	103.67			NR
Residual Range Organics (RRO)	6.66		671644	1,113			

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

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F058.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 17:39	**Quant Date:**	11/11/2013 07:41	**Vial:**	97
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-2			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
		Prep Date:			
Prep Ref:					

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1082
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene			0			70-129	NA	
o-Terphenyl			0			51-126	NA	NR
n-Triacontane			0d			50-150	NA	NR

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
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)	6.66		671644	1,113			

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

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F058.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 17:39	**Quant Date:**	11/11/2013 07:41	**Vial:**	97
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-2			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ745
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene			0			50-150	NA	.
o-Terphenyl			0			55-133	NA	NR
n-Triacontane			0d			54-136	NA	NR

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	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)	6.66		671644	1,113			
C25 - C44 RRO	6.76		1015462	1,125			

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

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\110813F\1108F058.D Vial: 97
Acq On : 08 Nov 2013 5:39 pm Operator: DVaillenco
Sample : RRO @ 1000ppm | SVF01-43I 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

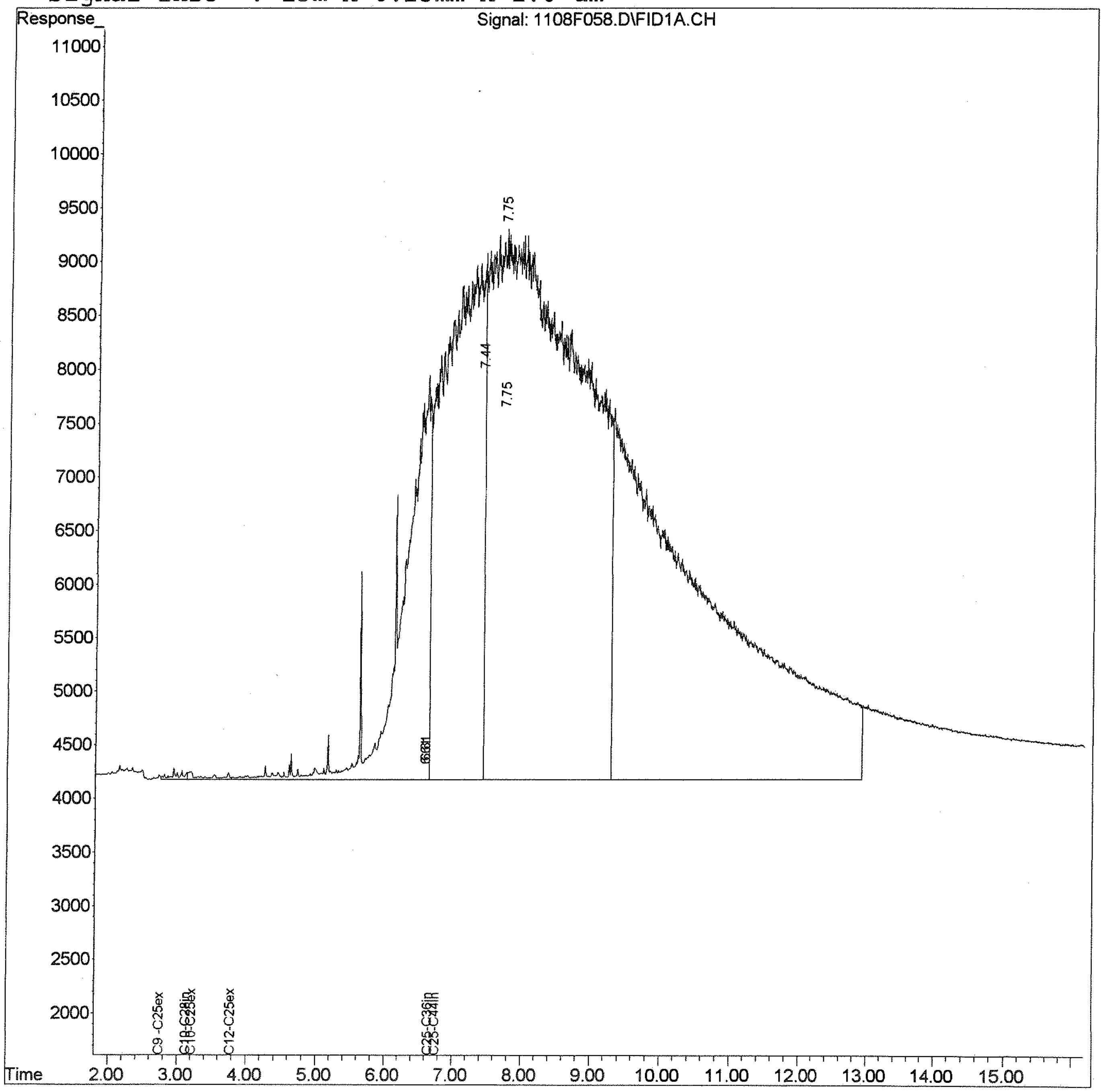
Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	101990	88.610 ppm
5) H C10-C25ex DRO [AK102]	3.23	101181	89.398 ppm
6) H C10-C28in DRO [8015]	3.13	299930	264.641 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	100092	103.672 ppm
8) H C25-C36in RRO [NWTPH]	6.66	671644	1112.934 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	1015462	1124.591 ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report   (QT Reviewed)

```
Data File : J:\GC21\DATA\110813F\1108F058.D              Vial: 97
Acq On    : 08 Nov 2013   5:39 pm                    Operator: DVaillenco
Sample    : RRO @ 1000ppm | SVF01-43I                Inst    : GC21
Misc      :                                          Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Nov 11  7:41 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
```



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
Analysis Method: NWTPH-Dx

Calibration Date: 09/10/2013
Calibration ID: CAL12766
Analysis Lot: KWG1312552
Units: ppm

File ID: J:\GC21\DATA\110813F\1108F086.D
J:\GC21\DATA\110813F\1108F088.D

Column ID: ZB-1

Analyte Name	Expected	Result	Average RF	CCV 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.D
Lab ID: KWG1312552-3
RunType: CCV
Matrix: NOT APPLICABLE

Date Acquired: 11/08/2013 22:49
Date Quantitated: 11/09/2013 11:35
Batch ID: KWG1312552
Analysis Method: NWTPH-Dx
MethodJoinID: 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: 11/11/13

Secondary Review:

Printed: 11/11/2013 08:37:44
u:\Stealth\Crystal.rpt\except2.rpt

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F086.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 22:49	**Quant Date:**	11/09/2013 11:35	**Vial:**	96
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-3			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ1081
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits	Rpt?
o-Terphenyl	5.58		68972	54.17		50-150 NA	
n-Triacontane	7.75		57783	55.78		50-150 NA	

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		1016785	1,053			
Residual Range Organics (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

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

Data File:	J:\GC21\DATA\110813F\1108F086.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 22:49	**Quant Date:**	11/09/2013 11:35	**Vial:**	96
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-3			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ1082
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene	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	

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C10 - C25 DRO	3.23		1177212	1,040			
C10 - C28 DRO	3.13		1183036	1,044			
Diesel Range Organics (DRO)	3.78		1016785	1,053			
Residual Range Organics (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

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

Data File:	J:\GC21\DATA\110813F\1108F086.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 22:49	**Quant Date:**	11/09/2013 11:35	**Vial:**	96
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-3			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ745
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene	2.89	?	32959	58.13		50-150	NA	
o-Terphenyl	5.58	?	68972	54.17		55-133	NA	
n-Triacontane	7.75	?	57783	55.78		54-136	NA	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		1211864	1,053			
C10 - C25 DRO	3.23		1177212	1,040			
C10 - C28 DRO	3.13		1183036	1,044			
Diesel Range Organics (DRO)	3.78		1016785	1,053			
Residual Range Organics (RRO)			8194				
C25 - C44 RRO	6.76		19517	15.84			

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

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\110813F\1108F086.D   Vial: 96
Acq On : 08 Nov 2013 10:49 pm   Operator: DVaillenco
Sample : DRO @ 1000/50ppm | SVF01-44J   Inst : GC21
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

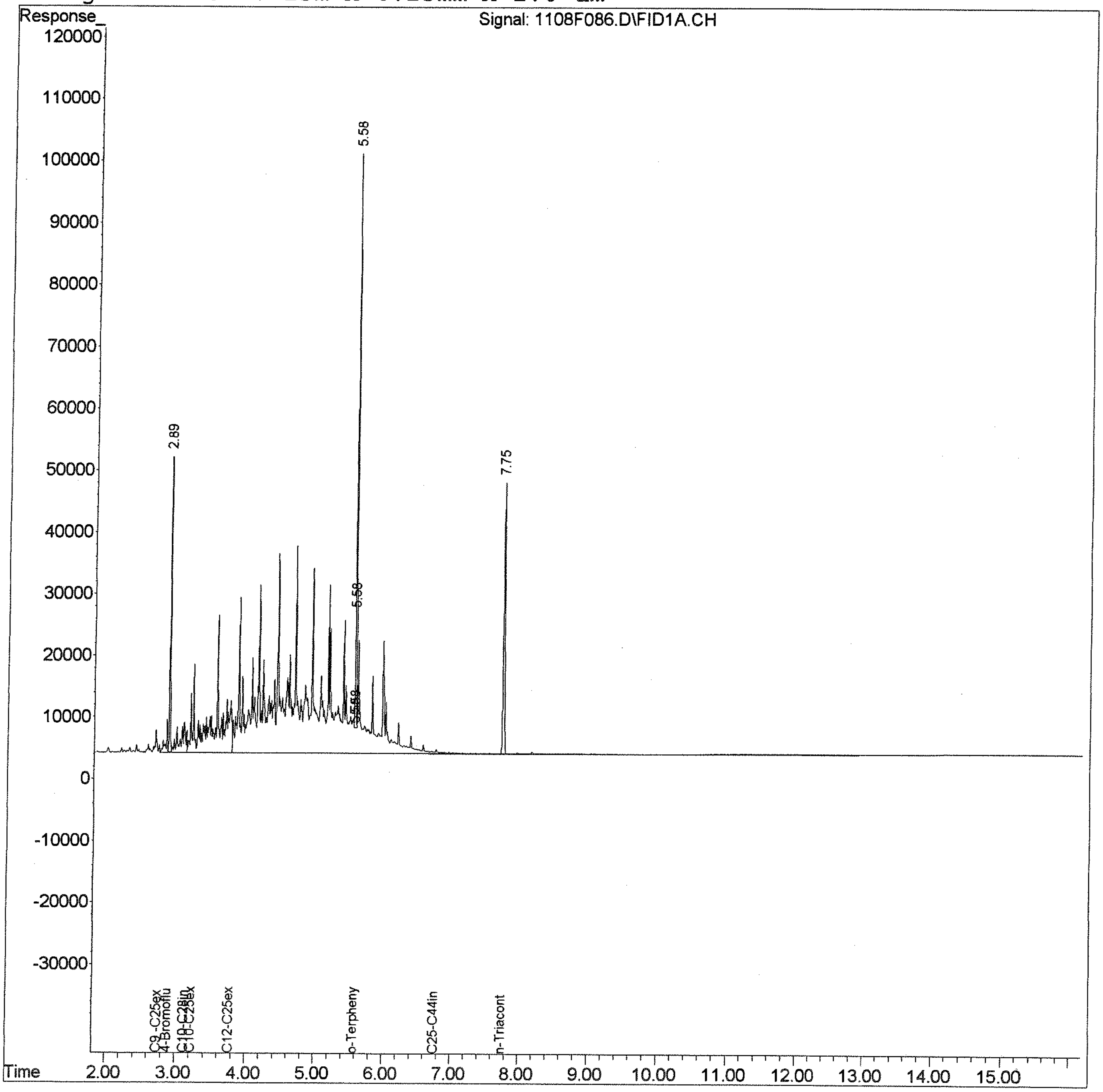
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
1) S 4-Bromofluorobenzene	2.89	32959	58.128 ppm
Spiked Amount 50.000	Recovery	=	116.26%
2) S o-Terphenyl	5.58	68972	54.170 ppm
Spiked Amount 50.000	Recovery	=	108.34%
3) S n-Triacontane	7.75	57783	55.780 ppm
Spiked Amount 50.000	Recovery	=	111.56%
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	1211864	1052.876 ppm
5) H C10-C25ex DRO [AK102]	3.23	1177212	1040.122 ppm
6) H C10-C28in DRO [8015]	3.13	1183036	1043.843 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	1016785	1053.151 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	19517	15.835 ppm

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\110813F\1108F086.D
Vial: 96
Acq On : 08 Nov 2013 10:49 pm
Operator: DVaillenco
Sample : DRO @ 1000/50ppm | SVF01-44J
Inst : GC21
Misc :
Multiplr: 1.00
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



Exception Report

Data File: J:\GC21\DATA\110813F\1108F088.D
Lab ID: KWG1312552-3
RunType: CCV
Matrix: NOT APPLICABLE

Date Acquired: 11/08/2013 23:11
Date Quantitated: 11/11/2013 07:37
Batch ID: KWG1312552
Analysis Method: NWTPH-Dx
MethodJoinID: 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: 11/11/13

Secondary Review:

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F088.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 23:11	**Quant Date:**	11/11/2013 07:37	**Vial:**	97
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-3			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1081
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl			0			50-150	NA	NR
n-Triacontane			0d			50-150	NA	

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		102206	105.86			
Residual Range Organics (RRO)	6.66		664801	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

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

Data File:	J:\GC21\DATA\110813F\1108F088.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 23:11	**Quant Date:**	11/11/2013 07:37	**Vial:**	97
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-3			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1082
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene			0			70-129	NA	
o-Terphenyl			0			51-126	NA	NR
n-Triacontane			0d			50-150	NA	

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C10 - C25 DRO	3.23		103354	91.32			
C10 - C28 DRO	3.13		304533	268.70			NR
Diesel Range Organics (DRO)	3.78		102206	105.86			
Residual Range Organics (RRO)	6.66		664801	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

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

Data File:	J:\GC21\DATA\110813F\1108F088.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 23:11	**Quant Date:**	11/11/2013 07:37	**Vial:**	97
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	KWG1312552-3			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
		Prep Date:			
Prep Ref:					

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ745
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene			0			50-150	NA	
o-Terphenyl			0			55-133	NA	NR
n-Triacontane			0d			54-136	NA	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		104159	90.49			
C10 - C25 DRO	3.23		103354	91.32			
C10 - C28 DRO	3.13		304533	268.70			NR
Diesel Range Organics (DRO)	3.78		102206	105.86			
Residual Range Organics (RRO)	6.66		664801	1,101			
C25 - C44 RRO	6.76		998646	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

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)

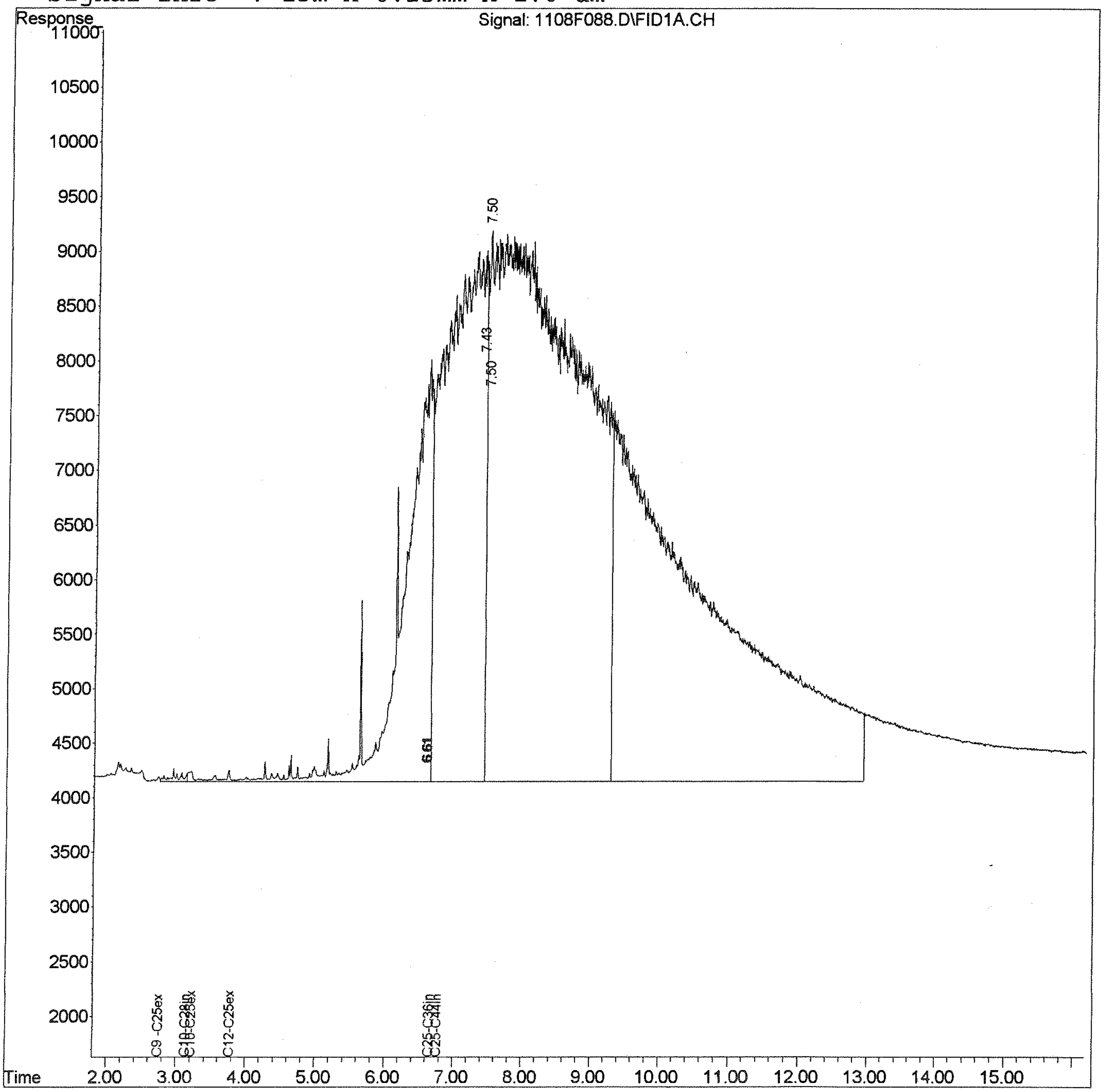
```
Data File : J:\GC21\DATA\110813F\1108F088.D              Vial: 97
Acq On    : 08 Nov 2013  11:11 pm                  Operator: DVaillenco
Sample    : RRO @ 1000ppm | SVF01-43I              Inst    : GC21
Misc      :                                        Multiplr: 1.00
IntFile   : rteint.p
Quant 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
```

	Compound	R.T.	Response	Conc	Units
	System Monitoring Compounds				
	Target Compounds				
4) H	C9 -C25ex DRO [TPH-Diesel]	2.75	104159	90.494	ppm
5) H	C10-C25ex DRO [AK102]	3.23	103354	91.318	ppm
6) H	C10-C28in DRO [8015]	3.13	304533	268.703	ppm
7) H	C12-C25ex DRO [NWTPH]	3.78	102206	105.861	ppm
8) H	C25-C36in RRO [NWTPH]	6.66	664801	1101.446	ppm
9) H	C25-C44in RRO [TPH-Oil]	6.76	998646	1105.871	ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\110813F\1108F088.D              Vial: 97
Acq On    : 08 Nov 2013  11:11 pm                    Operator: DVaillenco
Sample    : RRO @ 1000ppm | SVF01-43I                Inst    : GC21
Misc      :                                          Multiplr: 1.00
IntFile   : rteint.p
Quant Time: Nov 11  7:37 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 : 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
```



Organic Analysis:

Diesel and Residual Range Organics - Silica Gel Treated

Validation Package

Sample Prep and Screen Data

Preparation Information

Group ID:	KWG1312475	Prep Method:	EPA 3550B	Prep Date:	11/06/13 19:30
Department:	Semivoa GC				

Lab Code	Client ID	Product	Matrix	Amt. Ext.	Final Vol.	Solids
K1311604-001	SS-1-1S	8015C DRO	SEDIMENT	30.172g	10mL	97.8
K1311604-002	SS-2-1S	8015C DRO	SEDIMENT	30.408g	10mL	92.3
K1311914-001	SB1-5-102813	NWTPH-Dx NW TPH SGT	SOIL	30.272g	10mL	
K1311914-002	SB2-6-102813	NWTPH-Dx NW TPH SGT	SOIL	30.320g	10mL	
K1311914-003	SB3-5-102913	NWTPH-Dx NW TPH SGT	SOIL	30.405g	10mL	
KWG1312475-1	Lab Control Sample	NWTPH-Dx NW TPH SGT	SOIL	30.000g	10mL	
KWG1312475-2	Method Blank	NWTPH-Dx NW TPH SGT	SOIL	30.408g	10mL	
KWG1312475-3	Duplicate	NWTPH-Dx NW TPH SGT	SOIL	30.020g	10mL	
KWG1312475-4	Matrix Spike	8015C DRO	SEDIMENT	30.345g	10mL	92.3
KWG1312475-5	Duplicate Matrix Spike	8015C DRO	SEDIMENT	30.324g	10mL	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

Lab Code	Prep Event ID	Surrogate Solution ID	Amount Added	Spike Solution ID	Amount Added	Witness
K1311604-001	1302247					NCisney
K1311604-002	1302248					NCisney
K1311914-001	1302249					NCisney
K1311914-002	1302250					NCisney
K1311914-003	1302251					NCisney
KWG1312475-1	1302252					NCisney
KWG1312475-2	1302253					NCisney
KWG1312475-3	1302254					NCisney
KWG1312475-4	1302255					NCisney
KWG1312475-5	1302256					NCisney

Comments:

Started By: JJohnson Assisted By: Training: Yes No

Completed By: JJohnson Assisted By: CVecchitto Yes No

Reviewed By: [signature] Date: 11/11/13 Storage:

Chain of Custody

Relinquished By: JJohnson Date: 11/7/13

Received By: Date:

Extracts Examined: Yes No

Preparation Information Benchsheet

Prep Run: 196297
Team: Semivoa GC
Analyst: JJohnson
Prep Workflow: OrgExtS (14)
Prep Method: EPA 3550B
Rush/NPDES: N/A
Status: Draft
Current Step: Extraction
Prep Date: 11/06/2013 13:00
Due Date: 11/01/2013
Hold Date: 11/06/2013

	Lab Code	Client ID	Bottle #	✓	Target Amt	Initial Amount g	Inter. Volume	Final Volume ML	Surr Amt uL	Spike Amt uL	TestNo List
C	K1311914-001	SB1-5-102813	.01	✓	30 g	30.272	N/A	10	500	—	NW TPH SGT
✗ S/C	K1311914-002	SB2-6-102813	.01	✓	30 g	30.320		10		—	NW TPH SGT
C	K1311914-003	SB3-5-102913	.01	✓	30 g	30.405		10		—	NW TPH SGT
RO	K1311604-001	SS-1-1S	.01	✓	30 g	30.172		10		—	DRO
RO	K1311604-002	SS-2-1S	.01	✓	30 g	30.408		10		—	DRO
C	K1311914-003: KQ1313225-05	Duplicate	.01	✓	30 g	30.020		10		—	NW TPH SGT
RO	K1311604-002: KQ1313225-06	Matrix Spike	.01	✓	30 g	30.345		10		500	DRO
	K1311604-002: KQ1313225-07	Duplicate Matrix Spike	.01	✓	30 g	30.324		10		500	DRO
	KQ1313225-03	Lab Control Sample			30 g	30.00		10		500	NW TPH SGT
	KQ1313225-04	Method Blank			30 g	30.408		10		—	NW TPH 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: NCisney 11-6-13

Surr: SVF01-44G Exp. 3/25/14 500 ppm 500 uL (epp)

Spike: SVF01-37H Exp 12/26/13 16000/8000 ppm 500 uL (epp)

Preparation Steps

Step	Started	Finished	By	Assisted By	Training?	Comments
Extraction						
Final Volume						

Comments

C = Clay-like sample, S = Sand in sample, R = Rocks in sample, O = organic matter in sample, ✗ = Sample boiled low on S-Evap

QUALITY TRACKING FORM

WORK ORDER #:	1LV3 11604	EXTRACT LOCATION:	Arrested Development
TEST:	8015C DRO w/ SGT	DATE REQUESTED:	11/6/13
SAMPLE #:	1 & 2	DATE DESIRED:	ASAP
MATRIX:	soil	REQUESTED BY:	Dave V.

QUALITY DEFICIENCY: (DOES PC NEED TO BE NOTIFIED? YES ☐ NO ☐)
Notified on/ by: ______________________

High surrogates, even after re-clean

CORRECTIVE ACTION NEEDED:

Please re-extract samples 1 and 2 with appropriate QC

ANALYST: ____________
DATE COMPLETED: ____________

REASON FOR QTF/OUTCOME: (copy to prep lab 'Work Order' box)

- ☐ Reext/Prep. Technique (A)
- ☐ Reext/Matrix (B)
- ☐ Reext/GPC Loss (C)
- ☐ Reext/ASE (D)
- ☐ Clean-up Needed (E)
- ☐ HT Missed (Primary) (F)
- ☐ HT Missed Upon Reext. (G)
- ☐ Other (H)____________
- ☐ 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 # K1311914 Work Group # KQ1313225

Extraction (3550):

Date/Time/Initials Weighed: 11/6/13 1610 KC Balance ID: K-BAL-03 Calibration Verified ☒

Storage Location (if not extracted same day): ——

Sulfate Lot # 132318 Matrix Sand Lot # 052113

DCM Lot # DJ358

Sonic Horns Tuned (Initial/Date): 11/6/13 JJ

Extraction Start (Date/Time/Initials): 11/6/13 ~~1830~~ 1950 JJ ee 11/6/13 JJ Extraction Stop(Date/Time/Initials): 11/6/13 2030 JJ

S-Evap Thermometer ID: ~~B~~ DWB-10 ee 11/6/13 JJ S-Evap (Date/Time/Initial): 11/6/13 2005 JJ
Temp as measured: 75 °C Correction factor: 0.0 °C Adjusted temp: 75 °C

N-Evap Thermometer ID: —— N-Evap (Date/Time/Initial): ——
Temp as measured: —— °C Correction factor: —— °C Adjusted temp: —— °C

Cleanups: (Check paperwork to see if cleanups are necessary)

Sulfuric Acid Clean-up (3665) (Date/Time/Initials): 11/7/13 20:00 JJ cv Acid Lot # 53002

Silica Gel Clean-up (3630) (Date/Time/Initials): 11/7/13 20:45 JJ cv Silica Gel Lot # VH21B

Archive:

Vial: Clear Vial Storage: ~~B~~ DWL ee 11/6/13 JJ

Archived Extract Storage: Stellar

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 bench sheets
- ☐ Sample IDs have been checked—Bottle numbers appended if required
- ☐ Names present for: Started by, Completed by, relinquished by, and witnessed by.
- ☐ Training has been circled
- ☐ Extract Storage recorded
- ☐ Additional Prep 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

R:\Extractions\Active Benchsheets\SVG\Fuels 3550.doc SOP: PET-SVF Rev. 12
Reviewed By: Elissa Bruno 12/27/12

Preparation Information

Group ID:	KWG1312475	**Prep Method:**	EPA 3550B	**Prep Date:**	11/06/13 19:30
Department:	Semivoa GC				

Lab Code	Client ID	Product	Matrix	Amt. Ext.	Final Vol.	Solids
K1311604-001	SS-1-1S	8015C DRO	SEDIMENT	30.172g	10mL	97.8
K1311604-002	SS-2-1S	8015C DRO	SEDIMENT	30.408g	10mL	92.3
K1311914-001	SB1-5-102813	NWTPH-Dx NW TPH SGT	SOIL	30.272g	10mL	
K1311914-002	SB2-6-102813	NWTPH-Dx NW TPH SGT	SOIL	30.320g	10mL	
K1311914-003	SB3-5-102913	NWTPH-Dx NW TPH SGT	SOIL	30.405g	10mL	
KWG1312475-1	Lab Control Sample	NWTPH-Dx NW TPH SGT	SOIL	30.000g	10mL	
KWG1312475-2	Method Blank	NWTPH-Dx NW TPH SGT	SOIL	30.408g	10mL	
KWG1312475-3	Duplicate	NWTPH-Dx NW TPH SGT	SOIL	30.020g	10mL	
KWG1312475-4	Matrix Spike	8015C DRO	SEDIMENT	30.345g	10mL	92.3
KWG1312475-5	Duplicate Matrix Spike	8015C DRO	SEDIMENT	30.324g	10mL	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

Lab Code	Prep Event ID	Surrogate Solution ID	Amount Added	Spike Solution ID	Amount Added	Witness
K1311604-001	1302247					NCisney
K1311604-002	1302248					NCisney
K1311914-001	1302249					NCisney
K1311914-002	1302250					NCisney
K1311914-003	1302251					NCisney
KWG1312475-1	1302252					NCisney
KWG1312475-2	1302253					NCisney
KWG1312475-3	1302254					NCisney
KWG1312475-4	1302255					NCisney
KWG1312475-5	1302256					NCisney

Comments: 604-524 11/14 914-11/14

Started By: JJohnson Assisted By: ______ Training Yes No

Completed By: JJohnson Assisted By: ______ Yes No

Reviewed By: ______ Date: ______ Storage: ______

Chain of Custody

Relinquished By: JJohnson Date: 11/7/13

Received By: [signature] Date: 11/8/13

Extracts Examined Yes No

Printed: 11/07/2013 21:50:49 n:\Stealth\Crystal.rpt\prep1.rpt

Injection Log

Directory: J:\GC21\DATA\110813F

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	90	1108F002.D	1.	DCM		11/08/22013 7:12
2	90	1108F004.D	1.	DCM		11/08/22013 7:34
3	90	1108F006.D	1.	DCM		11/08/22013 7:56
4	90	1108F008.D	1.	DCM		11/08/22013 8:18
5	90	1108F010.D	1.	DCM		11/08/22013 8:40
6	90	1108F012.D	1.	DCM		11/08/22013 9:03
7	90	1108F014.D	1.	DCM		11/08/22013 9:25
8	91	1108F016.D	1.	ALIPHATICS MARKER | SVF01-34L		11/08/22013 9:47
9	92	1108F018.D	1.	AROMATICS MARKER | SVF01-29C		11/08/22013 10:09
10	96	1108F020.D	1.	DRO @ 1000/50ppm | SVF01-44J		11/08/22013 10:3
11	97	1108F022.D	1.	RRO @ 1000ppm | SVF01-42I		11/08/22013 10:5
12	86	1108F024.D	1.	IB		11/08/22013 11:2
13	1	1108F026.D	1.	KQ1313193-01LCS	KWG1312460	11/08/22013 11:4
14	2	1108F028.D	1.	KQ1313193-02DLCS	KWG1312460	11/08/22013 12:0
15	3	1108F030.D	1.	KQ1313193-03MB	KWG1312460	11/08/22013 12:2
16	4	1108F032.D	1.	K1312000-001		11/08/22013 12:5
17	5	1108F034.D	1.	K1312000-002		11/08/22013 1:12
18	6	1108F036.D	1.	K1312000-003		11/08/22013 1:34
19	7	1108F038.D	1.	KQ1313225-03LCS SGT	KWG1312475	11/08/22013 1:57
20	8	1108F040.D	1.	KQ1313225-04MB SGT	KWG1312475	11/08/22013 2:19
21	9	1108F042.D	1.	K1311604-002 SGT		11/08/22013 2:41
22	10	1108F044.D	1.	K1311604-002MS SGT		11/08/22013 3:03
23	11	1108F046.D	1.	K1311604-002DMS SGT		11/08/22013 3:26
24	12	1108F048.D	1.	K1311604-001 SGT		11/08/22013 3:48
25	13	1108F050.D	1.	K1311914-001 SGT		11/08/22013 4:10
26	14	1108F052.D	1.	K1311914-003 SGT		11/08/22013 4:32
27	15	1108F054.D	1.	K1311914-003DUP SGT		11/08/22013 4:54
28	96	1108F056.D	1.	DRO @ 1000/50ppm | SVF01-44J		11/08/22013 5:17
29	97	1108F058.D	1.	RRO @ 1000ppm | SVF01-43I		11/08/22013 5:39
30	26	1108F060.D	1.	LT MINERAL OIL @ 2000ppm | HC2-87B	NOT FOR QUANT	11/08/22013 6:01
31	27	1108F062.D	1.	HVY MIN OIL @ 2000ppm | HC2-87D	NOT FOR QUANT	11/08/22013 6:23
32	86	1108F064.D	1.	IB		11/08/22013 6:46
33	16	1108F066.D	1.	K1311914-002SGT		11/08/22013 7:07
34	17	1108F068.D	1.	KWG1312450-01LCS		11/08/22013 7:30
35	18	1108F070.D	1.	KWG1312450-02DLCS		11/08/22013 7:52
36	19	1108F072.D	1.	KWG1312450-03MB		11/08/22013 8:14
37	20	1108F074.D	1.	K1311252-005		11/08/22013 8:36
38	21	1108F076.D	1.	K1311252-002		11/08/22013 8:59
39	22	1108F078.D	1.	K1311252-003		11/08/22013 9:20
40	23	1108F080.D	1.	K1311252-004		11/08/22013 9:43
41	24	1108F082.D	1.	K1311252-006		11/08/22013 10:0
42	25	1108F084.D	1.	K1311252-001		11/08/22013 10:2
43	96	1108F086.D	1.	DRO @ 1000/50ppm | SVF01-44J		11/08/22013 10:4
44	97	1108F088.D	1.	RRO @ 1000ppm | SVF01-43I		11/08/22013 11:1
45	86	1108F090.D	1.	IB		11/08/22013 11:3
46	28	1108F092.D	1.	SURR CHK @ 10X SVF01-46A		11/08/22013 11:5
47	90	1108F094.D	1.	DCM		11/09/22013 12:1
48	90	1108F096.D	1.	DCM		11/09/22013 12:4
49	90	1108F098.D	1.	DCM		11/09/22013 1:03
50	90	1108F100.D	1.	DCM		11/09/22013 1:25
51	90	1108F102.D	1.	DCM		11/09/22013 1:47
52	90	1108F104.D	1.	DCM		11/09/22013 2:09
53	90	1108F106.D	1.	DCM		11/09/22013 2:31

Run II 367524

CAL-12764

KWG1312552

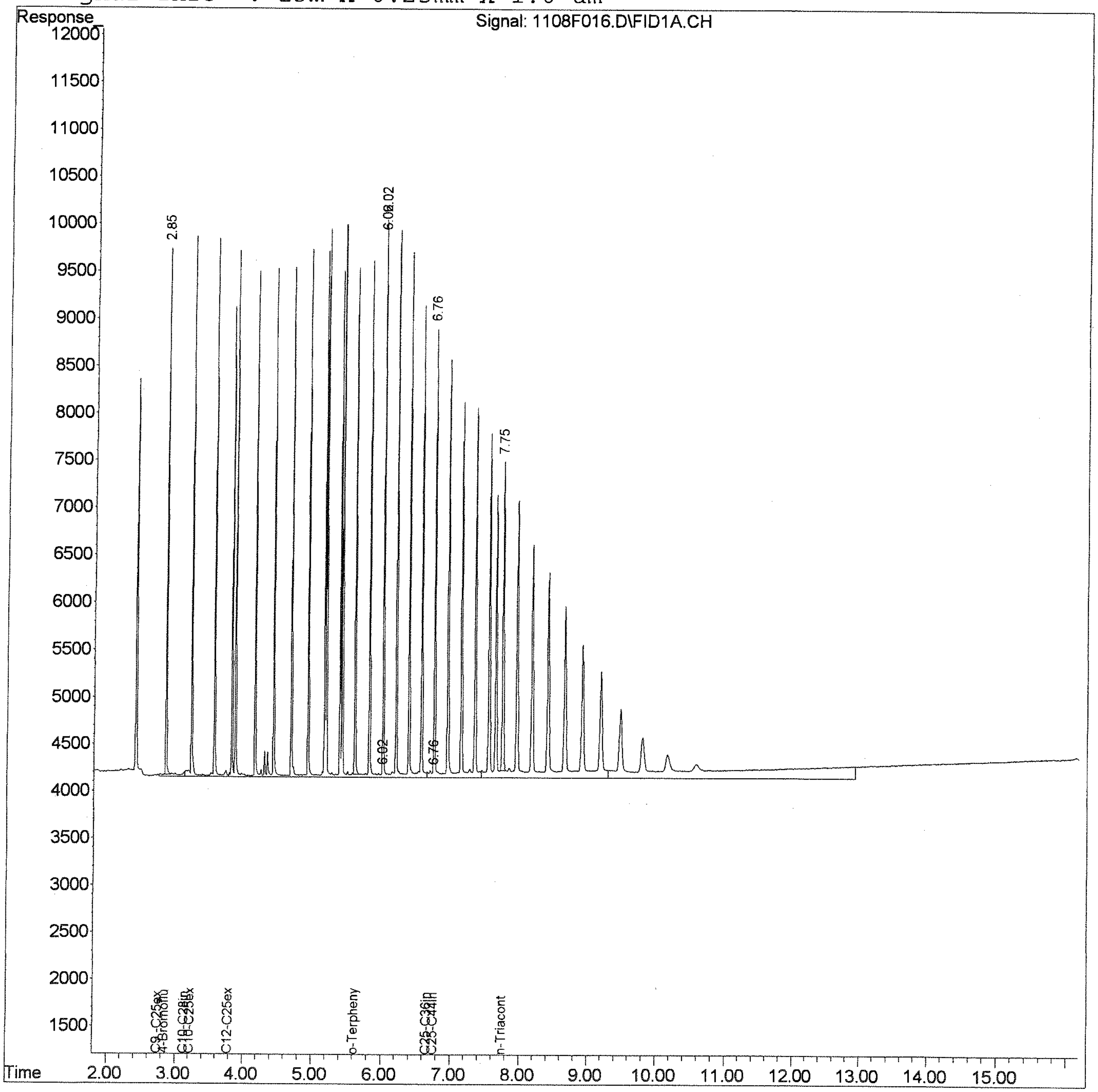
Quantitation Report (Not Reviewed)

Data File : J:\GC21\DATA\110813F\1108F016.D
Acq On : 08 Nov 2013 9:47 am
Sample : ALIPHATICS MARKER | SVF01-34L
Misc :
IntFile : rteint.p
Quant Time: Nov 9 11:35 2013 Quant Results File: 091013FSRO.RES

Vial: 91
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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



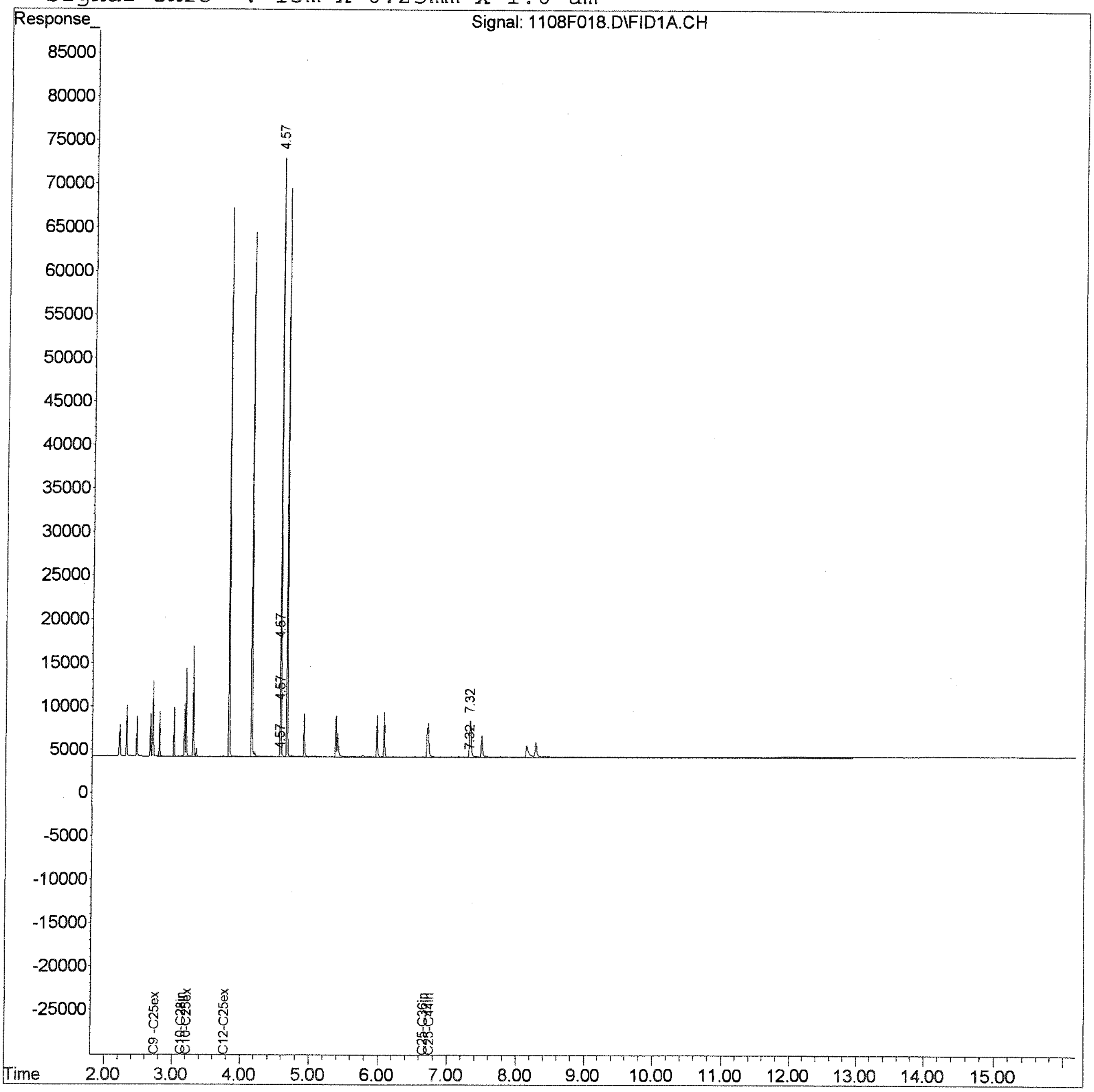
Quantitation Report (Not Reviewed)

Data File : J:\GC21\DATA\110813F\1108F018.D
Acq On : 08 Nov 2013 10:09 am
Sample : AROMATICS MARKER | SVF01-29C
Misc :
IntFile : rteint.p
Quant Time: Nov 9 11:35 2013 Quant Results File: 091013FSRO.RES

Vial: 92
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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



Exception Report

Data File: J:\GC21\DATA\110813F\1108F024.D
Lab ID: KWG1312552-4
RunType: IB
Matrix: NOT APPLICABLE

Date Acquired: 11/08/2013 11:21
Date Quantitated: 11/09/2013 11:35
Batch ID: KWG1312552
Analysis Method: NWTPH-Dx
MethodJoinID: 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: 11/11/13

Secondary Review:

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F024.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 11:21	**Quant Date:**	11/09/2013 11:35	**Vial:**	86
Run Type:	IB			**Dilution:**	1.0
Lab ID:	KWG1312552-4			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ1081
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl			0			50-150	NA	
n-Triacontane			0			50-150	NA	

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (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

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

Data File:	J:\GC21\DATA\110813F\1108F024.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 11:21	**Quant Date:**	11/09/2013 11:35	**Vial:**	86
Run Type:	IB			**Dilution:**	1.0
Lab ID:	KWG1312552-4			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**
Analysis Method:	8015C	**Prep Method:**		
		Prep Date:		
Prep Ref:				

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1082
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene			0			70-129	NA	
o-Terphenyl			0			51-126	NA	
n-Triacontane			0			50-150	NA	

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C10 - C25 DRO	3.23		3855	3.41			
C10 - C28 DRO	3.13		5756	5.08			
Diesel Range Organics (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

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

Data File:	J:\GC21\DATA\110813F\1108F024.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 11:21	**Quant Date:**	11/09/2013 11:35	**Vial:**	86
Run Type:	IB			**Dilution:**	1.0
Lab ID:	KWG1312552-4			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
		Prep Date:			
Prep Ref:					

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ745
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene			0			50-150	NA	
o-Terphenyl			0			55-133	NA	
n-Triacontane			0			54-136	NA	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		4273	3.71			
C10 - C25 DRO	3.23		3855	3.41			
C10 - C28 DRO	3.13		5756	5.08			
Diesel Range Organics (DRO)	3.78		3093	3.20			
Residual Range Organics (RRO)	6.66		9821	1.82			
C25 - C44 RRO	6.76		30923	28.53			

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

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\110813F\1108F024.D
Acq On : 08 Nov 2013 11:21 am
Sample : IB
Misc :
IntFile : rteint.p
Quant Time: Nov 09 11:35:19 2013 Quant Results File: 091013FSRO.RES

Vial: 86
Operator: DVaillencc
Inst : GC21
Multiplr: 1.00

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

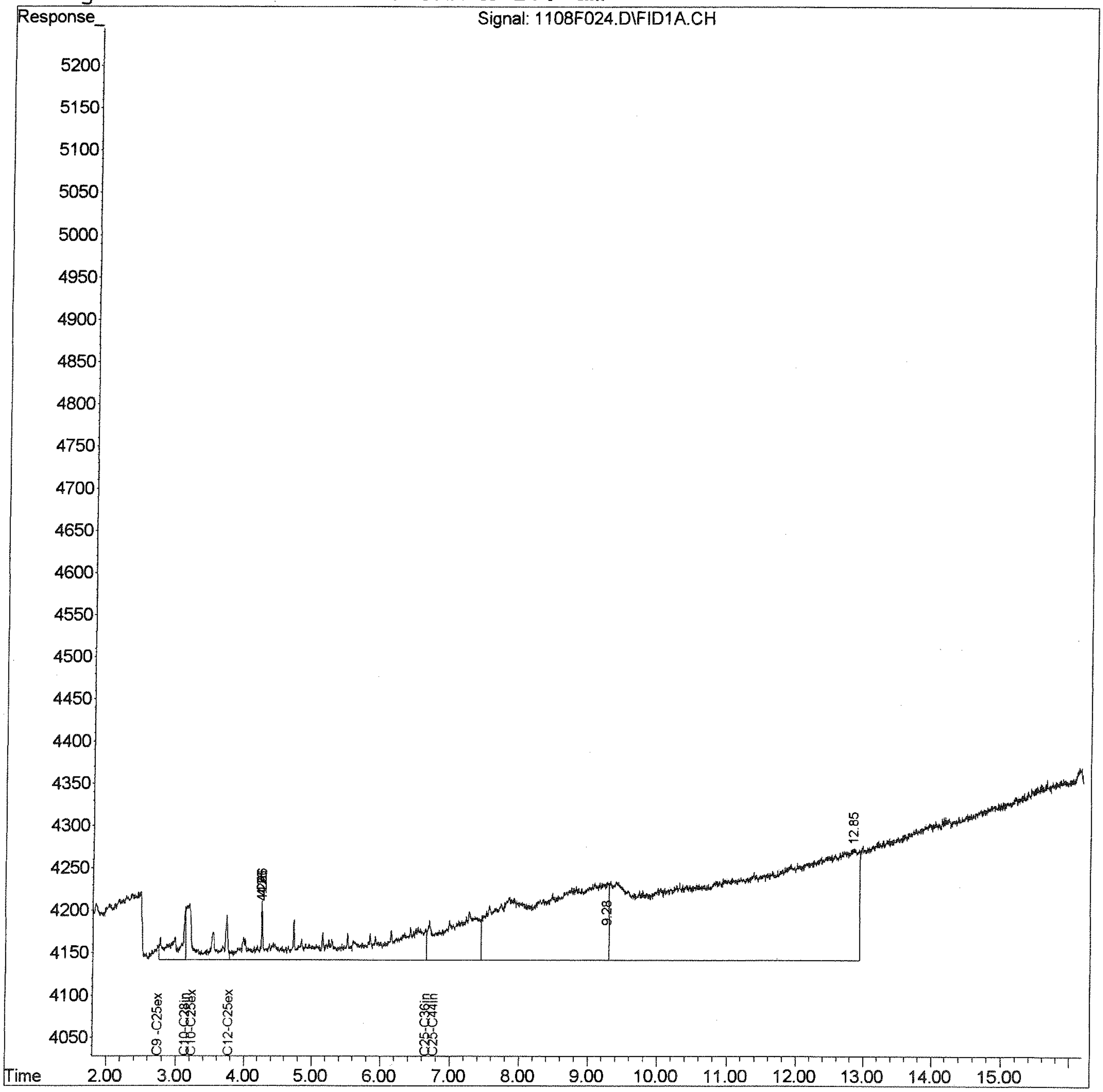
Volume Inj. : 1 uL
Signal Phase : ZB-1
Signal Info : 15m x 0.25mm x 1.0 um

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	4273	3.712 ppm
5) H C10-C25ex DRO [AK102]	3.23	3855	3.406 ppm
6) H C10-C28in DRO [8015]	3.13	5756	5.079 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	3093	3.204 ppm
8) H C25-C36in RRO [NWTPH]	6.66	9821	1.821 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	30923	28.533 ppm

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

```
Data File : J:\GC21\DATA\110813F\1108F024.D                Vial: 86
Acq On    : 08 Nov 2013  11:21 am                      Operator: DVaillenco
Sample    : IB                                         Inst    : GC21
Misc      :                                            Multiplr: 1.00
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
```



Exception Report

Data File:	J:\GC21\DATA\110813F\1108F064.D		**Date Acquired:**	11/08/2013 18:46
Lab ID:	KWG1312552-5		**Date Quantitated:**	11/09/2013 11:35
RunType:	IB		**Batch ID:**	KWG1312552
Matrix:	NOT APPLICABLE		**Analysis Method:**	NWTPH-Dx
			MethodJoinID:	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:

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F064.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 18:46	**Quant Date:**	11/09/2013 11:35	**Vial:**	86
Run Type:	IB			**Dilution:**	1.0
Lab ID:	KWG1312552-5			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
		Prep Date:			
Prep Ref:					

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1081
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl			0			50-150	NA	
n-Triacontane			0			50-150	NA	

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		2806	2.91			
Residual Range 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: check for co-elution

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F064.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 18:46	**Quant Date:**	11/09/2013 11:35	**Vial:**	86
Run Type:	IB			**Dilution:**	1.0
Lab ID:	KWG1312552-5			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
		Prep Date:			
Prep Ref:					

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
		Method ID:	MJ1082
MB Ref:		**Quant based on Method**	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene			0			70-129	NA	
o-Terphenyl			0			51-126	NA	
n-Triacontane			0			50-150	NA	

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C10 - C25 DRO	3.23		3453	3.05			
C10 - C28 DRO	3.13		5538	4.89			
Diesel Range Organics (DRO)	3.78		2806	2.91			
Residual Range 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
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NR: Analyte not reported from this analysis

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e: Result >= MRL, but MRL less than low point of ICAL
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Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F064.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 18:46	**Quant Date:**	11/09/2013 11:35	**Vial:**	86
Run Type:	IB			**Dilution:**	1.0
Lab ID:	KWG1312552-5			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLE
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ745
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene			0			50-150	NA	
o-Terphenyl			0			55-133	NA	
n-Triacontane			0			54-136	NA	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		3841	3.34			
C10 - C25 DRO	3.23		3453	3.05			
C10 - C28 DRO	3.13		5538	4.89			
Diesel Range Organics (DRO)	3.78		2806	2.91			
Residual Range Organics (RRO)	6.66		12167	5.76			
C25 - C44 RRO	6.76		34703	32.74			

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

Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\110813F\1108F064.D
Acq On : 08 Nov 2013 6:46 pm
Sample : IB
Misc :
IntFile : rteint.p
Quant Time: Nov 09 11:35:37 2013 Quant Results File: 091013FSRO.RES

Vial: 86
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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) H	C9 -C25ex DRO [TPH-Diesel]	2.75	3841	3.337 ppm
5) H	C10-C25ex DRO [AK102]	3.23	3453	3.051 ppm
6) H	C10-C28in DRO [8015]	3.13	5538	4.886 ppm
7) H	C12-C25ex DRO [NWTPH]	3.78	2806	2.906 ppm
8) H	C25-C36in RRO [NWTPH]	6.66	12167	5.760 ppm
9) H	C25-C44in RRO [TPH-Oil]	6.76	34703	32.741 ppm

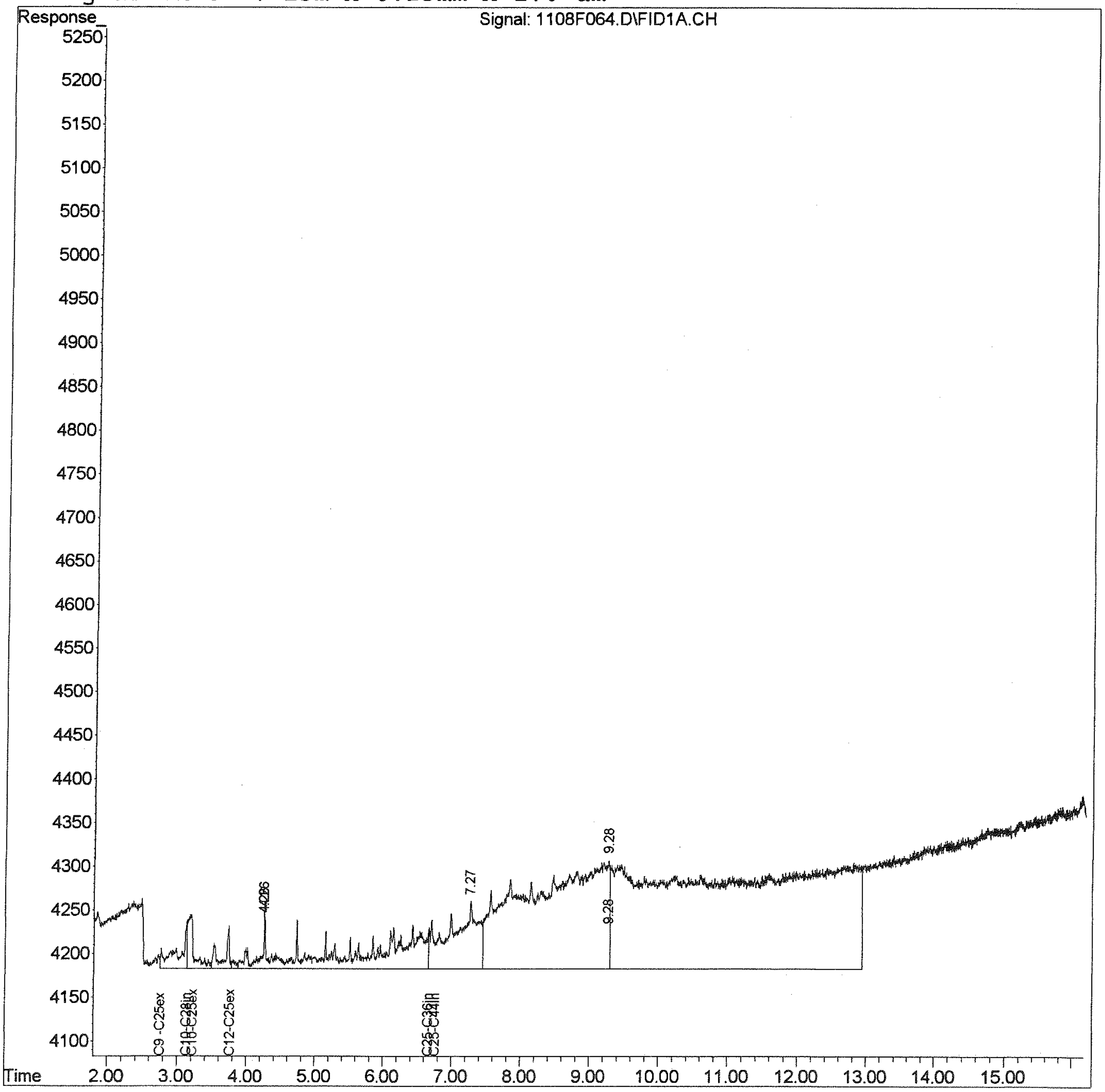
Quantitation Report (QT Reviewed)

Data File : J:\GC21\DATA\110813F\1108F064.D
Acq On : 08 Nov 2013 6:46 pm
Sample : IB
Misc :
IntFile : rteint.p
Quant Time: Nov 9 11:35 2013 Quant Results File: 091013FSRO.RES

Vial: 86
Operator: DVaillenco
Inst : GC21
Multiplr: 1.00

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



Exception Report

Data File:	J:\GC21\DATA\110813F\1108F090.D		**Date Acquired:**	11/08/2013 23:34
Lab ID:	KWG1312552-6		**Date Quantitated:**	11/09/2013 11:35
RunType:	IB		**Batch ID:**	KWG1312552
Matrix:	NOT APPLICABLE		**Analysis Method:**	NWTPH-Dx
			MethodJoinID:	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: ____________

Printed: 11/11/2013 08:37:50

u:\Stealth\Crystal.rpt\except2.rpt

Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F090.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 23:34	**Quant Date:**	11/09/2013 11:35	**Vial:**	86
Run Type:	IB			**Dilution:**	1.0
Lab ID:	KWG1312552-6			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	NWTPH-Dx	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ1081
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
o-Terphenyl			0			50-150	NA	
n-Triacontane			0			50-150	NA	

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
Diesel Range Organics (DRO)	3.78		3451	3.57			
Residual Range Organics (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

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

Data File:	J:\GC21\DATA\110813F\1108F090.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 23:34	**Quant Date:**	11/09/2013 11:35	**Vial:**	86
Run Type:	IB			**Dilution:**	1.0
Lab ID:	KWG1312552-6			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ1082
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene			0			70-129	NA	
o-Terphenyl			0			51-126	NA	
n-Triacontane			0			50-150	NA	

Target Compounds

Final Conc. Units:

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C10 - C25 DRO	3.23		4269	3.77			
C10 - C28 DRO	3.13		6129	5.41			
Diesel Range Organics (DRO)	3.78		3451	3.57			
Residual Range Organics (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

D: Result from dilution
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Quantitation Report

Data File:	J:\GC21\DATA\110813F\1108F090.D			**Instrument:**	GC21
Acqu Date:	11/08/2013 23:34	**Quant Date:**	11/09/2013 11:35	**Vial:**	86
Run Type:	IB			**Dilution:**	1.0
Lab ID:	KWG1312552-6			**Soln Conc. Units:**	ppm

Bottle ID:		**Tier:**		**Matrix:**	NOT APPLICABLI
Prod Code:	NWTPH-DX NW TPH	**Collect Date:**		**Receive Date:**	11/11/2013

Analysis Lot:	KWG1312552	**Prep Lot:**		**Report Group:**	
Analysis Method:	8015C	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	J:\GC21\METHODS\091013FSRO.M	**Calibration ID:**	CAL12766
Title:			
MB Ref:		**Method ID:**	MJ745
		Quant based on Method	

Surrogate Compounds

Parameter Name	RT	RT Dev	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
4-Bromofluorobenzene			0			50-150	NA	
o-Terphenyl			0			55-133	NA	
n-Triacontane			0			54-136	NA	

Target Compounds

Final Conc. Units: ug/L

Parameter Name	RT	RT Dev	Response	Solution Conc	Final Conc	Q	Rpt?
C9 - C24 DRO	2.75		4734	4.11			
C10 - C25 DRO	3.23		4269	3.77			
C10 - C28 DRO	3.13		6129	5.41			
Diesel Range Organics (DRO)	3.78		3451	3.57			
Residual Range Organics (RRO)			7576				
C25 - C44 RRO	6.76		20553	16.99			

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

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

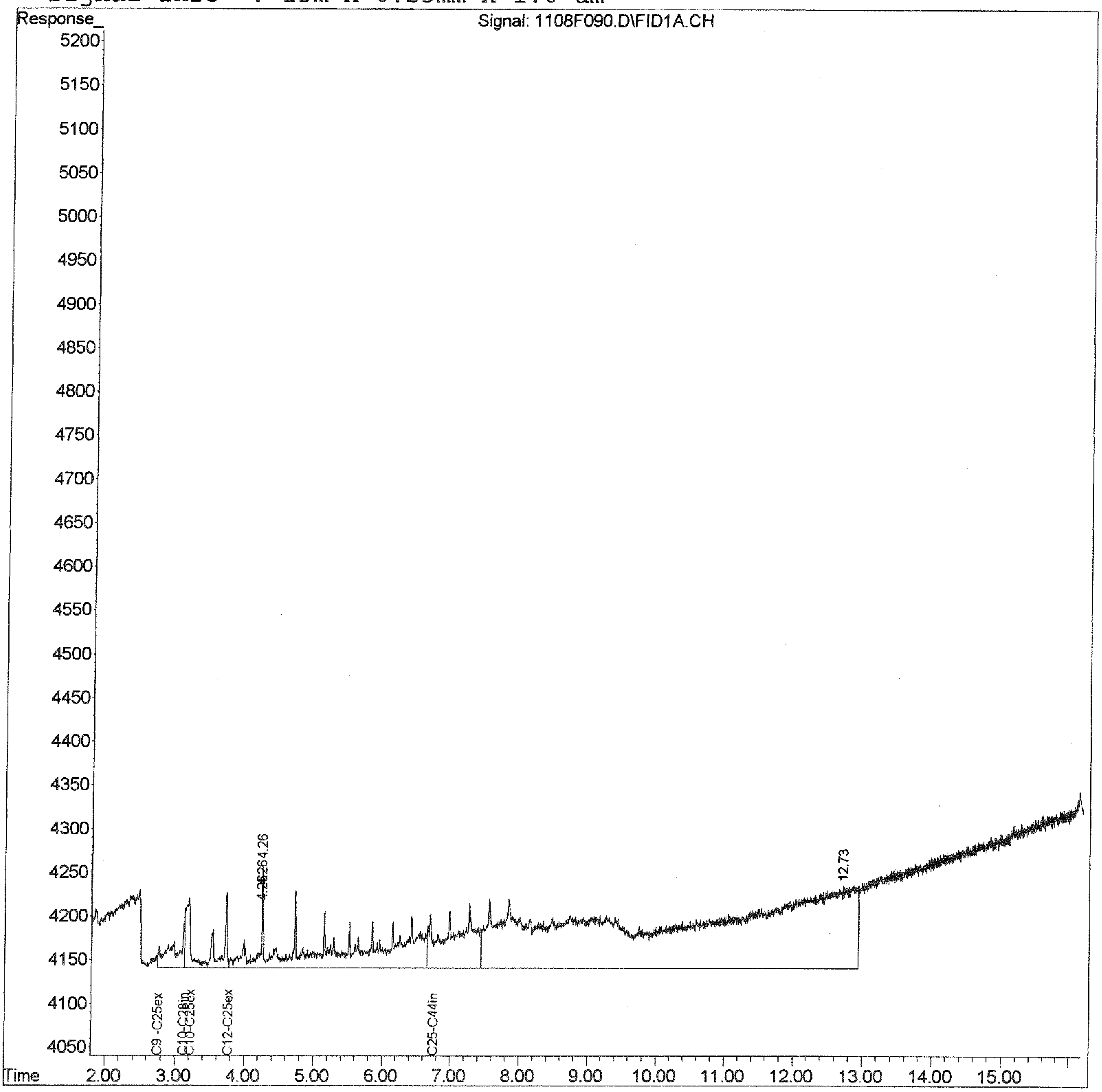
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
4) H C9 -C25ex DRO [TPH-Diesel]	2.75	4734	4.113 ppm
5) H C10-C25ex DRO [AK102]	3.23	4269	3.772 ppm
6) H C10-C28in DRO [8015]	3.13	6129	5.408 ppm
7) H C12-C25ex DRO [NWTPH]	3.78	3451	3.574 ppm
9) H C25-C44in RRO [TPH-Oil]	6.76	20553	16.989 ppm

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  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
```



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

PACIFICORP ENERGY
A DIVISION OF 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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Project Manager, Dave Metallo, LHG

Document Control

Version	Date	Author	Author Initials	Reviewer	Reviewer Initials
001	5/22/2015	Dave Metallo	DCM	L. Westbrook (KTA)	

Table of Contents

Appendices

Tables

Figures

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)

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.

2013 Monitoring Well Locations:

- MW-1 – Mineral Oil in groundwater - ND ug/L, in Soil - ND mg/kg
- MW-2 – Mineral Oil in groundwater - 380 ug/L, in Soil - ND mg/kg; **no well installed
- MW-3 – Mineral Oil in groundwater - ND ug/L, in Soil - ND mg/kg

New 2015 Soil Boring / Monitoring Well Locations:

- SB / MW-4 – near southwest corner of transformer building, east side gradient to impact area
- SB / MW-5 – driveway entrance area to stormwater pond, downgradient of impact area
- SB / MW-6 –West ~200' of transformer unit GSU-3 (outside of impact area, boundary location)

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 Geology

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 Hydrogeology

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 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 23rd through May 25th, 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 µg/L, which is below the MTCA Method A Cleanup Level for TPH-Dx of 500 µg/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 Utility Clearance Event

All drilling locations were cleared for utility contact concerns by PC Chehalis plant staff, a third-party, 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 Health and Safety

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 Lithological Description

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.

Table 1. Soil Sample Collection Information

Sample Type	Analytical Parameter	Sample Matrix	Analytical Method	[1]No. of Samples	No. of Duplicates
Soil Boring Samples	Mineral Oil	Soil	NWTPH-Dx	3	1
	Total Solids	Soil	EPA 150.1	3	1

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.

Table 2. Subsurface Soil Sample Descriptions

Sample ID	Boring ID	Sample Depth (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-01-040715	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 <u>Monitoring Well Installation and Completion Activities</u>

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.

Table 3 Monitoring Well Construction Detail

Well ID	Surface Completion	Total Boring Depth (ft bgs)	Bottom End Cap Depth (ft bgs)[2]	Screen Length (ft bgs)	10/20 Sand Filter Pack (ft bgs)	Bentonite Seal (ft bgs)	Concrete Surface Seal (ft bgs)
MW-4	flush mount	31.5[1]	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

[1] 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. [2] Bottom end caps are six inches long and extend from 25.5 to 25 feet bgs.

3.3.2 Monitoring Well Development

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 Re-Development of Existing Monitoring Wells

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.

Table 4 Summary of Well Development

Well ID	Installation Date	Development Method	Total Well Casing Depth (ft TOC)	Initial Water Level (ft TOC)	Static Water Column Height (ft)	Well Casing Volume (gal)	Total Volume Removed (gal)	Resultant Turbidity
MW-1	10/2013	Sub-pump & surge action	16.90	4.80	12.10	1.94	10	Brownish tint, mostly 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 sub-pump w/ 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 tint, nearly 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.

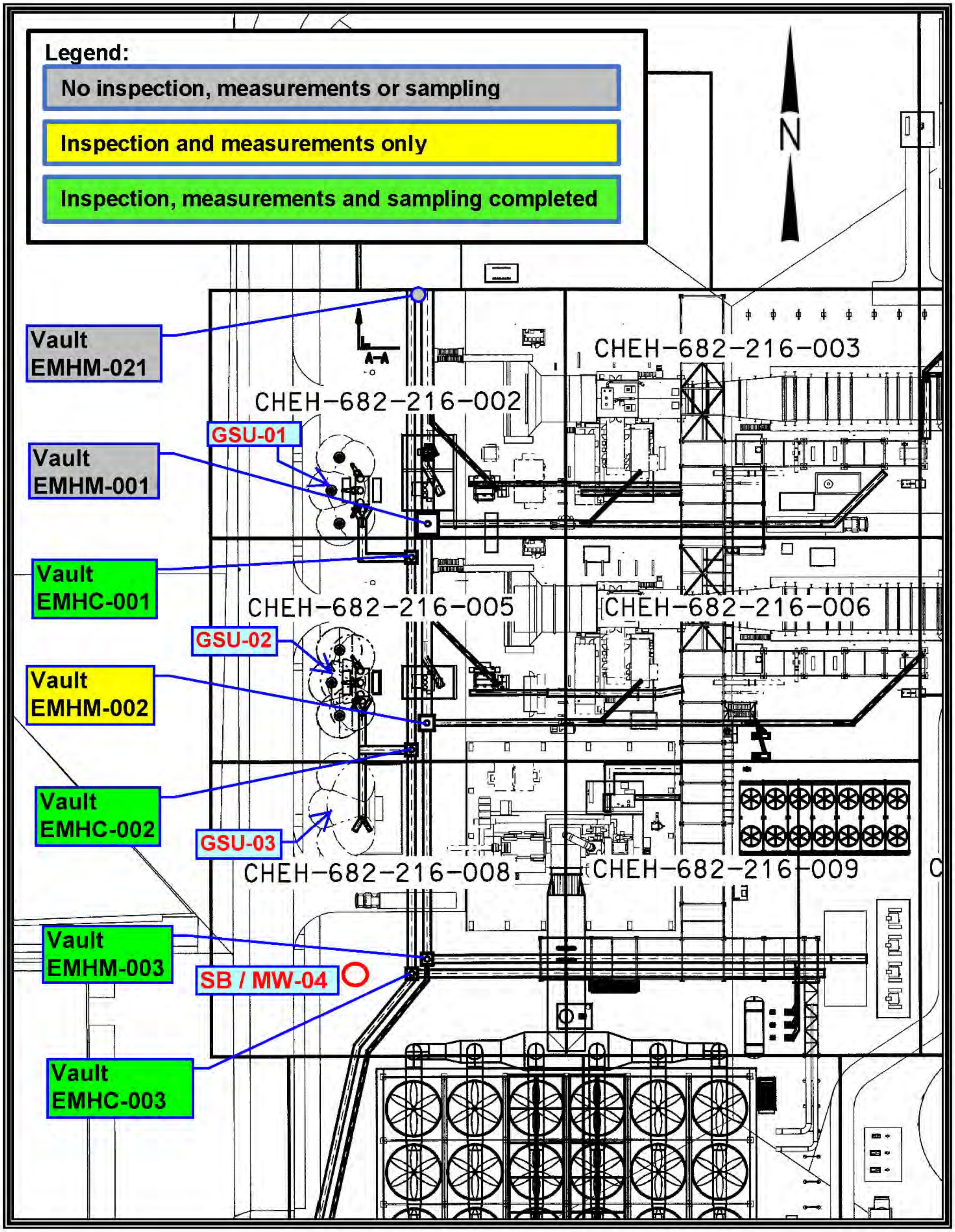

Figure 2. Electrical Vault Locations

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.

Table 5. Electrical Vault Measurements and Sample Collection Information

Vault ID	Depth to Product (ft)	Depth to Water (ft)	Total Vault Depth (ft)	Water Column Height (ft)	Visual Sheen Noted (Y/N)	Sample Collected for Analysis	Duplicate Sample Collected
EMHC-001	12.69	12.71	14.05	1.34	Possible 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 sheen	Yes	No

Table 5. Electrical Vault Measurements and Sample Collection Information

Vault ID	Depth to Product (ft)	Depth to Water (ft)	Total Vault Depth (ft)	Water Column Height (ft)	Visual Sheen Noted (Y/N)	Sample Collected for Analysis	Duplicate Sample Collected
EMHC-003	18.37	18.38	19.73	1.35	Possible sheen	Yes	No

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.

Table 6. Monitoring Well Survey Data

Location	Top PVC Casing (ft amsl)	Backshot at start of survey event (ft)	Backshot at end of survey event (ft)
SW corner GSU-1 containment wall	100.00[1]	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

[1]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 <u>Sample Handling Procedures</u>

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.

Table 7. Subsurface Soil Sampling Results

Sample ID	Parameter	Detection Limit mg/Kg	Reporting Limit mg/Kg	Result Value mg/Kg	Data 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

Table 7. Subsurface Soil Sampling Results

Sample ID	Parameter	Detection Limit mg/Kg	Reporting Limit mg/Kg	Result Value mg/Kg	Data 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

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 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 µg/L), EMHC-002 (110 µg/L), and in the EMHC-002 Duplicate (110 µg/L). DRO detections at these vaults were below the MTCA Method A Groundwater Cleanup Level of **500** µg/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 µg/L, 1300 µg/L and 320 µg/L, respectively. The RRO concentration was below the MTCA Method A Groundwater Cleanup Level of **500** µg/L. Although the DRO and Mineral Oil concentrations exceed the MTCA groundwater cleanup level threshold, they are well below the **10,000** µg/L ISGP Stormwater Benchmark for TPH. Electrical vault in-flow water sampling results are presented in Table 8.

Table 8. Electrical Vault In-Flow Water Sampling Results

Sample ID	Parameter	Detection Limit µg/L	Reporting Limit µg/L	Result Value µg/L	Data 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**	

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.

Appendices

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APPENDIX A

UTILITY CLEARANCE DOCUMENTATION

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ALL COUNTY LOCATING SERVICES, LLC.

1707 N.W. 4th Street, Battle Ground, WA 98604
OR: 503-975-2444 • WA: 360-281-9004
Fax: 360-666-3487
e-mail: allcountylocating@comcast.net
www.allcounty-locatingservices.com

INV.# 7753

For those who needed it done - yesterday!

PRIVATE WORK REQUEST

Customer: KTA Associates, Inc **Date:** 3-18-15 ?

2825 Eastlake Ave East Ste#300 **P.O.#:**

Seattle, WA. 98102 **Job #:** pacific corp. power plant

Billing Address: PAB 872-704-228th AVENUE SAMMAMISH WA, 98074

Date Requested: 3-18-15 **Requested By:** Dave Metallo

Locate/Site Address: 1813 Bishop Rd Chehalis, WA. 98532

Description of Locating Private Utilities: Locate 3-Areas for drilling wells

Off. Tel.: 206-267-1400 **Cell #:** 206-794-0095 **Fax #:** 206-267-1401

Date Completed: 3-18-15 **Site Contact:** Dave Metallo 206-794-0095

Activity Summary: Located Power & Com. out of 2. Vaults At Generator Building Near Cooling tower #5 in Dock Area #6/7/8 Areas - ok. Plastic Water/Fire Lines in Area

Please Note: This locate is being performed on private property at the customer's request. All County Locating Services, LLC has no knowledge of, and customer has not furnished as-installed plans, drawings or information of other utilities and the area of the requested locate. All County Locating Services, LLC, shall not be liable for damage to any type of utility, or any loss or injury caused by such damage.

*Charges outstanding over 30 days from the date of service are subject to a 1½% FINANCE CHARGE PER MONTH or annual percentage rate of 18%. Customer agrees to pay accrued expenses in the event of collection.

Method of-Payment: ☐C/C ☐Visa ☐Master Card ☐ Other

~~☐To be Billed~~ ☐Cash ☐Check - #

☑Comm. ☐Res. ☐PAID IN FULL - Initials

☐Traffic - Lt. ☑Traffic – Heavy ☐Wet ☑ Dry

Customer Signature: Jen Westbrook

Locator's Signature: Bill E. Key

THIS IS YOUR INVOICE, TOTAL AMOUNT DUE ON COMPLETION OF SERVICES

Travel 3.0 hrs. @ **$65.00** = 195.-

Man Hrs. 2.0 hrs. @ **$65.00** = 130

Total = 325.00

Note: Minimum l-hour labor charges apply. Travel is computed from our home office or from the last job site - whichever is less. If travel is greater than one hour, round trip will be charged.

Thank You For Your Business!

Print Form

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

Committed to Safety, Quality
Productivity and Service

Regulatory Information Form

Please complete **all fields** in this form. It must be returned no later than **3-Business days** before project start date or **the project will be rescheduled**.

Thank you for your time and attention in this project. We look forward to working with you.

JOB DESCRIPTION

CDI JOB #:	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

LEGAL DESCRIPTION

TOWNSHIP:	13N
RANGE:	2W
SECTION:	10
QTR/QTR:	
QTR:	SW
TAX LOT/PARCEL#:	017774006005
COUNTY:	Lewis
SITE OWNER NAME:	PacifiCorp Energy
SITE OWNER ADDRESS:	1813 Bishop Rd
CITY, STATE, ZIP:	Chehalis, WA 98532

COMPANY INFORMATION

COMPANY:	KTA Associates Inc.
ADDRESS:	800 Fifth Avenue, Suite 4100
CITY, STATE, ZIP:	Seattle, WA 98104
OFFICE CONTACT:	Lenora Westbrook
PHONE:	877-736-1499
EMAIL:	lwestbrook@ktainc.net
BILL TO NAME:	Ken Taylor
ADDRESS:	704 228th Avenue NE, PMB 872
CITY, STATE, ZIP:	Sammamish, WA 98074

SITE CONDITIONS

TRAFFIC CONTROL:	Restricted in plant area
WORK HOUR RESTRICTION:	none
PREVAILING WAGE: (Y/N)	N
CUTTINGS CONTAINMENT:	place into drums
SURFACE:	gravel, packed roads
SPECIAL SITE CONDITIONS:	working in vicinity of high voltage lines, 5

SCOPE OF WORK CONFIRMATION
Cascade Drilling Bid No. 9210 R-2

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 Kwasnowski (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, third party locates
- Drillers took the PC Safety course (required)
- The group sat down w/ Jeremy Smith (Plant Enviro/Safety) for a safety discussion - KO Safety Meeting

Signature of Attendees' :

D. Metallo, Len Westbrook
Joe Sta...
Don Dod...

"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	**Weather:** Partly Cldy, clearing, 45-60, lite breezy
Personnel In Attendance : Joe, Don, Derek (CDI Portland) D Metallo, B. Kwasnowski	
Meeting Minutes (Brief description of topics, special concerns and sites discussed): — Site access — Rigging/Cable L.O.F. — ~~Pinche~~ Pinch points — Proper lifting techniques — Proper House keeping — Fire protection/F.A. kits — Proper use of required PPE — S/T/Fs — Energized lines (hydraulic, water) — Site/Personnel Comm — listen up for directions via plant radio — HSP in file box	
Signature of Attendees' : Derek Aarnodt	
"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 Cascade Drilling, L.P.
Drill Rig Type CME-85 twin axle

Inspection Items	Yes	No	N/A
1. Drill rig cleaned	✓		
2. Auger flights	✓		
3. Extra Auger heads (extra bits)	✓		
4. Drill rods	✓		
5. Subs	✓		
6. Timbers (leveling boards)	✓		
7. Auger bolts	✓		
8. Air filters	✓		
9. Fire extinguisher (charged) Cabs, deck	✓		
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:			
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		✓	

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	✓		
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
— Also on-site, CDI support trucks (2) and decon trailer – all insp'ed and found to be in good, functional, working order w/ all visible safety devices / features in place
Support Truck 1 (#508)
Support Truck 2 (# 425)
Decon Trailer (#206)

Inspector's Signature: [signature] Date 4·7·15

Contractor Representative Signature: [signature] Date 4-7-15

503-775-4099

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

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 Cardno TEC | PROJECT NO | DATE 7 Apr 15 | DAY TUE

JOB LOCATION Pacific Corp Chehalis | DIG ALERT # | CD-LP# 101-15-0075

Well # Bore #	Depth Drilled	DESCRIPTION OF WORK (Please explain reasons for Down Time and Standby Time and Shop Time)	Start	Stop	Total Hrs	Charge Hrs
		AM Shop Time	530	630		
		Travel to Site	630	900		
		Safety Meeting	900	1030		
MW-4	30	Drill MW-4 to 30' continuous Sample to 6' then every 5'	1030			
		to 30. Set 2" well to 25' 9 Samples		430		
		clean-up	430	500		
		Travel to Shop	500	530		
		PM Shop Time				
Total Ft.		TOTAL CHARGEABLE RIG HOURS	11.5			

RIG ENGINE HOURS: START | STOP | TOTAL

EQUIPMENT

DRILL RIG #	1211	COMPRESSOR/JACKHAMMER	
SUPPORT TRUCK #	508	SNOW FENCE RENTAL	
SUPPORT TRUCK #	425	CONTINUOUS SAMPLER	to 6'
TRAILER #	206	CONTINUOUS SAMPLER FOOTAGE	
BOBCAT		# OF CORE CUTS	
AUTO HAMMER		# OF BULLDOG CUTS	
GROUT MIXER		# OF SERVICE RUNS	
GROUT PUMP		# OF SAW CUTS	
PERISTALTIC PUMP		PORTABLE RESTROOM	
FORKLIFT/HOPPER			

CASING

	2	4
TYPE___SLOT___		
20' SCREEN		
10' SCREEN	2	
5' SCREEN		
20' BLANK		
10' BLANK		
5' BLANK	2	
5' PP SCREEN		
10' PP SCREEN		
SLIP CAP		
THREADED CAPS	1	
LOCKING CAPS	1	
DRIVE SHOE		
CENTRALIZERS		
LOCKS		

MATERIALS

ITEM	QTY	ITEM	QTY
SAND	15	WELL COVER 8"	
READYMIX		WELL COVER 12"	
QUICKSET		MONUMENT CASING	
PORTLAND		BOLLARDS	
ASPHALT		DRUMS	2
BENTONITE GROUT		HOLE COVER PLATES	
BENTONITE CHIPS		PLASTIC SHEETING	
BENTONITE POWDER		TRAFFIC CONTROL	
BENTONITE PELLETS	1	CORE BOXES	
BENTONITE GRANULAR		PLYWOOD	
SAMPLER TUBES		WATER SAMPLES	
SHELBY TUBES		HYDROPUNCH SAMPLES	
PROBE POINTS		AUGER PLUGS	
GW PROBE POINTS		DRILL OUT BITS	
MACRO LINERS			
SAMPLER SHOE			

LABOR

CREW WITH PER DIEM 3 | CHARGEABLE EXTRA LABOR HRS

NAME	SIGNATURE	SHOP	DRILL	TOTAL HRS
J Staloch ✗				11.5
Derek Aamondt ✗				11.5
Don Dobson ✗				11.5

UTILITIES FOUND OR HIT

REMARKS

Client Signature [signature] Operator Signature [signature]

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

CLIENT Cardno TEC | PROJECT NO | DATE 8 April 15 | DAY WED

JOB LOCATION Pacific Corp Chahal's | DIG ALERT # | CD-LP# 101-15-0075

Well # / Bore #	Depth Drilled	DESCRIPTION OF WORK — Please explain reasons for Down Time and Standby Time and Shop Time	Start	Stop	Total Hrs	Charge Hrs
		AM Shop Time	~~700~~	~~730~~		
		Travel to Site	700	730	.5	
		Safety Meeting	730	800	.5	
4	~~25~~	chip / finish MW4	800	830	.5	
6	25	Drill MW6 to 25' continuous sample to 6, every	830			
		5 after 6, 25' TD, set and built 2" well		1230	4	
		lunch	1230	100	–	
5	25	Move and Drill MW-5 to 25' continuous to 6' every	100			
		5 after, set and built 2" well		430	3.5	
		clean-up	430	500	.5	
		Travel to Shop	500	530	.5	
		PM Shop Time	5			
Total Ft.		TOTAL CHARGEABLE RIG HOURS 9.5				

RIG ENGINE HOURS: START | STOP | TOTAL 10

EQUIPMENT

DRILL RIG #	1211	COMPRESSOR/JACKHAMMER	
SUPPORT TRUCK #	508	SNOW FENCE RENTAL	
SUPPORT TRUCK #	425	CONTINUOUS SAMPLER	
TRAILER #	206	CONTINUOUS SAMPLER FOOTAGE	12
BOBCAT		# OF CORE CUTS	
AUTO HAMMER		# OF BULLDOG CUTS	
GROUT MIXER		# OF SERVICE RUNS	
GROUT PUMP		# OF SAW CUTS	
PERISTALTIC PUMP		PORTABLE RESTROOM	
FORKLIFT/HOPPER		# of Samples	14

LABOR

CREW WITH PER DIEM 3 ~~#~~ | CHARGEABLE EXTRA LABOR HRS

NAME	SIGNATURE	SHOP	DRILL	TOTAL HRS
J Staloch	~~#~~			10
Derek Aarnodt	~~#~~			10
Don Dodson	~~#~~			10

CASING

TYPE 4/8 SLOT .010	2	4	
20' SCREEN			
10' SCREEN	4		
5' SCREEN			
20' BLANK			
10' BLANK			
5' BLANK	2		
5' PP SCREEN			
10' PP SCREEN			
SLIP CAP			
THREADED CAPS	3		
LOCKING CAPS			
DRIVE SHOE			
CENTRALIZERS			
LOCKS			

UTILITIES FOUND OR HIT

MATERIALS

ITEM	QTY	ITEM	QTY
SAND	31	WELL COVER 8"	
READYMIX		WELL COVER 12"	
QUICKSET		MONUMENT CASING	
PORTLAND		BOLLARDS	
ASPHALT		DRUMS	
BENTONITE GROUT		HOLE COVER PLATES	
BENTONITE CHIPS	2	PLASTIC SHEETING	
BENTONITE POWDER		TRAFFIC CONTROL	
BENTONITE PELLETS		CORE BOXES	
BENTONITE GRANULAR		PLYWOOD	
SAMPLER TUBES		WATER SAMPLES	
SHELBY TUBES		HYDROPUNCH SAMPLES	
PROBE POINTS "		AUGER PLUGS	
GW PROBE POINTS		DRILL OUT BITS	
MACRO LINERS			
SAMPLER SHOE			

REMARKS

Client Signature ____________________ Operator Signature ____________________

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

CLIENT Cardno TEC | PROJECT NO | DATE 9 April 15 | DAY Thur

JOB LOCATION Pacific Corp Chehalis | DIG ALERT# | CD-LP# 101-15-0075

Well # / Bore #	Depth Drilled	DESCRIPTION OF WORK — Please explain reasons for Down Time and Standby Time and Shop Time	Start	Stop	Total Hrs	Charge Hrs
		AM Shop Time				
		Travel to Site	700	730		
		SAFETY Meeting	730	800		
		chip up MW-5	800	830		
		Don and Derek set well box's	830	200		
		JOE Developed MW-6	830	1000		
		Developed MW-1	1000	1100		
		MW 3	1100	1200		
		MW 4	1200	100		
		MW5	100	200		
		clean-up / get trucks Road Ready	200	230		
		Mob to town	230	300		
		lunch	300	330	–	
		mob chehalis WA to clackamas or	330	530		
		Travel to Shop				
		PM Shop Time	530	600		
Total Ft.		TOTAL CHARGEABLE RIG HOURS 10.0				

RIG ENGINE HOURS: START | STOP | TOTAL

EQUIPMENT

DRILL RIG #	1211	COMPRESSOR/JACKHAMMER	
SUPPORT TRUCK #	508	SNOW FENCE RENTAL	
SUPPORT TRUCK #	425	CONTINUOUS SAMPLER	
TRAILER #	206	CONTINUOUS SAMPLER FOOTAGE	
BOBCAT		# OF CORE CUTS	
AUTO HAMMER		# OF BULLDOG CUTS	
GROUT MIXER		# OF SERVICE RUNS	
GROUT PUMP		# OF SAW CUTS	
PERISTALTIC PUMP		PORTABLE RESTROOM	
FORKLIFT/HOPPER			

LABOR

CREW WITH PER DIEM Ø | CHARGEABLE EXTRA LABOR HRS

NAME	SIGNATURE	SHOP	DRILL	TOTAL HRS
Joe Stalock				10.5
Derek Aarnodt				10.5
Don Dodson				10.5

CASING

	2	4
TYPE__SLOT__		
20' SCREEN		
10' SCREEN		
5' SCREEN		
20' BLANK		
10' BLANK		
5' BLANK		
5' PP SCREEN		
10' PP SCREEN		
SLIP CAP		
THREADED CAPS		
LOCKING CAPS		
DRIVE SHOE		
CENTRALIZERS		
LOCKS	3	

UTILITIES FOUND OR HIT

MATERIALS

ITEM	QTY	ITEM	QTY
SAND		WELL COVER 8"	3
READYMIX	8	WELL COVER 12"	
QUICKSET	16	MONUMENT CASING	
PORTLAND		BOLLARDS	
ASPHALT		DRUMS	13
BENTONITE GROUT		HOLE COVER PLATES	
BENTONITE CHIPS	1	PLASTIC SHEETING	
BENTONITE POWDER		TRAFFIC CONTROL	
BENTONITE PELLETS		CORE BOXES	
BENTONITE GRANULAR		PLYWOOD	
SAMPLER TUBES		WATER SAMPLES	
SHELBY TUBES		HYDROPUNCH SAMPLES	
PROBE POINTS	"	AUGER PLUGS	
GW PROBE POINTS		DRILL OUT BITS	
MACRO LINERS		Sona Tube	3
SAMPLER SHOE			

REMARKS

Client Signature__________ Operator Signature__________

APPENDIX C

GEOLOGIC BOREHOLE LOGS

AND

WELL CONSTRUCTION DIAGRAMS

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GEOLOGIC BOREHOLE LOG

Borehole / Well ID: SB4 / MW-4	Site ID: GSU #3 - PacifiCorp	Page 1 of 2
Location Description: S-SE of GSU3, near NW corner of evap. tower	WL (FT) 1st: 24.25	Date/Time: 1315
Drill Rig Type / Drill Method: HSA w/ CME-85 twin axle truck	WL (FT) 2nd: 4.9	Date/Time: 4.15.15 (1145)
Establishing Company: Cardno	Geologist: D.C. Metallo, LHG	Drilling Company: Cascade Drilling (Portland)
Drilling Foreman: Joe Staloch	Ground Surface Elevation:	Datum: Grade Surface
Sampling Device: 1.5' Split spoon	Borehole diameter (in) 8.25"	Total Depth (Feet): 30' (sample to 31.5')
Date/Time Drilling Started: 4-7-15 (1045)	Date/Time Total Depth Reached: 4-7-15 (1235)	

Depth (feet)	% Recov	Sample Depth	Blow Counts	PID	USCS	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Weather, Time
0	75		6, 16, 16		FILL (GM)		0-1.5' Dark Greyish Brown (2.5Y 4/2), dry, sandy vf-fg silty GRAVEL GM, Fill material sub-angular material	* Sample Continuous 0-6' bgs, start in at 10' sample every 5'. 0-1.5' Sheen test negative
2	50		8, 6, 12		FILL GM-SM		1.5-3' Same as above, greater sand content, FILL (GM-SM)	1.5-3 Sheen test negative
4	50		4, 4, 25		ML-CL		3.0-4.5' Greyish Brown (2.5Y 5/2) vfg Sand w/ ~~little~~ silt ~~silty~~ (ML) + Clay (CL) w/ trace small pebble size gravel, moist	3-4.5 sheen test negative
6	80	X	6, 10, 12		ML-CL	Moist	4.5-6' Yellowish Brown (10YR 5/4) Silt (ML) and silty CLAY (CL) w/ vf-fg sand and little S-M pebble size gravel, mottled appearance	* Sample collected at (1130) SB4 5-040715. 4.5-6 No Sheen
8	50		4, 8, 10		SM-GC		6-7.5 Yellowish Brown (10YR 5/4), moist, silty f-cg SAND and clayey S-M pebble size GRAVEL (SM-GC)	6-7.5' No sheen
10			DM, 4, 5, 7					
10-12	100		4, 5, 7		SM-GC		10-11.5', moist, Yellowish Brown (10YR 5/6) silty f-cg SAND and clayey GRAVEL (SM-GC)	10-11.5' No sheen
14								
16	80		40, 50/1, NA		GM-GC		15-16.5', v. moist-wet, Yellowish Brown (10YR 5/4) silty + vf-mg sandy S-L pebble size GRAVEL (GM-GC)	15-16.5' No sheen
18								

* Collected one add. cont. sample 6-7.5' (logging only)

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GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: SB4 / MW-4

Depth (feet)	Sampling: % Recov	Sampling: Sample Depth	Sampling: Blow Counts	Sampling: PID (PPM)	USCS Code	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/ lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Weather, Time
18								
20			25 25 35		GM-GC		20-21.5', wet, Yellowish Brown (10YR 5/4), clayey S-L sub rounded to sub angular GRAVEL and clayey GRAVEL (GM-GC)	20-21.5' No Sheen
22								
24					▽			
26			18 40 40		SM-GM		25-26.5', wet, Dark Greyish Brown (10YR 4/2), silty well graded f-vcg SAND and silty S-M pebble size GRAVEL (SM-GM)	25-26.5' No Sheen
28								
30			50/3 NA NA		SM-GM		30-31.5', Brown (10YR 4/3) wet, silty fg SAND and silty poorly graded GRAVEL (SM-GM), much less fines than interval above	
32							- Boring terminated at 31.5 - Well Construction (meas. = bgs) - TD 31.5' - back fill 31.5-26.5 - bottom Seal - bent. pellets 26.5 - Filter Pack 26.5-4 (10-20 Sand) - Upper Seal (Chips) 4-3'	- Screen; 2" 0.01" slot 25-5' sch 40

- Concrete: 3-0
- Surface Completion: flush monument 8" dia

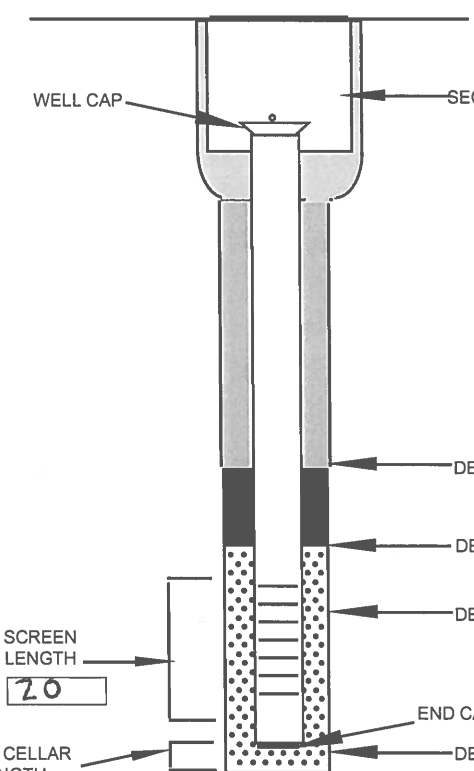
Additional Comments :

(*) A duplicate soil sample was collected/split w/ the normal sample that was collected at 5'

CONSTRUCTION DETAILS for WELLS COMPLETED BELOW GRADE

WELL ID:	MW-4	WELL CONSTR. START DATE/TIME:	4-7-15 (~1330)
		WELL CONSTR. COMPLETION DATE/TIME:	4-7-15
FIELD REPRESENTATIVE:	DC Metallo	TYPE OF FILTER PACK:	Clean Sand
		GRADIATION:	10-20
DRILLING CONTRACTOR:	Cascade	AMOUNT OF FILTER PACK USED:	~~1 5gal bucket~~ 16 50-lb bags
DRILLING TECHNIQUE/ AUGER SIZE AND TYPE:	HSA 8.25 X 4.25 X 5' Sections	TYPE OF BENTONITE USED:	pellets
BOREHOLE DIAMETER:	8.25"	AMOUNT OF BENTONITE USED:	1 5-gal bucket
		TYPE OF CEMENT USED:	Redi-mix
BORE HOLE ID :	SB4	GROUT MATERIALS USED:	NA
SCREEN MATERIAL:	PVC sch 40	SECURITY CASING DIMENSION:	8" dia. x 12" skirt
SCREEN DIAMETER:	2"	TYPE OF CAP:	locking expansion
		TYPE OF END CAP:	threaded-flat w/ 4" sump
SCREEN INTERVA(FT):	25-5	COMMENTS:	inital WL = 24.25' in HSAs - difficult sand filter placement
CASING MATERIAL:	PVC sch40		
CASING DIAMETER:	2"		

SPECIAL CONDITIONS
(describe and draw)



SECURITY BOX: 8" dia X 12" skirt w/ bolted lid

NOT TO SCALE

LEGEND
- GROUT
- BENTONITE SEAL
- FILTER PACK

DEPTH TO TOP OF BENTONITE SEAL	3'
DEPTH TO TOP OF FILTER PACK	4'
DEPTH TO TOP OF SCREEN	5'
SCREEN LENGTH	20
DEPTH TO BASE OF WELL	25.5'
SAND CELLAR LENGTH	1'
BOREHOLE DEPTH	31.5'-26.5 bentonite seal

INSTALLED BY: Joe Staloch INSTALLATION OBSERVED BY: DC Metallo

NOTES / OBSERVATIONS: bentonite bottom seal = 31.5-26.5', 26.5-25.5 10-20 Sand

RESOURCE PROTECTION WELL REPORT

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

CURRENT

Notice of Intent No. RE11198

Construction/Decommission 101-15-0075(9210)

[X] Construction

[ ] Decommission *ORIGINAL INSTALLATION Notice of Intent Number* ______

Type of Well

[X] Resource Protection

[ ] Geotechnical Soil Boring

Property Owner: PacifiCorp Energy

Site Address: 1813 Bishop Rd

City: Chehalis County: Lewis

Consulting Firm: KTA Associates

Unique Ecology Well ID Tag No. BHV 148

Location 1/4 NE 1/4 SW Sec 10 Twn 13N R 2W EWM or WWM

Lat/Long (s,t,r still Required) Lat Deg ______ Lat Min/Sec ______ Long Deg ______ Long Min/Sec ______

Tax Parcel No. ______

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards Materials used and the information reported above are true to my best knowledge and belief

[X] Driller [ ] Trainee Name (Print) Joe Staloch

Driller/Trainee Signature Joseph R Staloch

Driller/Trainee License No. 2749

If trainee, licensed driller's Signature and License No. ______

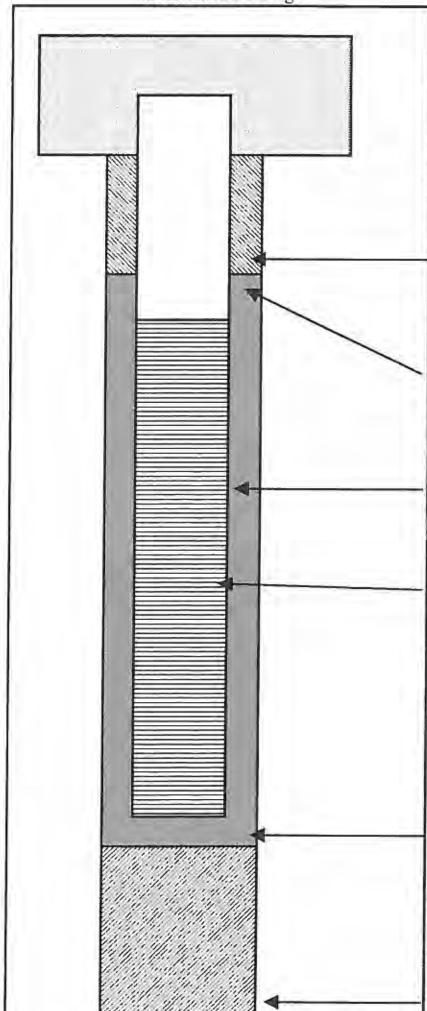
Cased Diameter 8.25" Static Level 5'

Work/Decommission Start Date 04/07/2015

Work/Decommission End Date 04/09/2015

Construction/Design

Well Name: MW-4



Concrete Surface Seal Depth	0 - 3	FT
Blank Casing (dia x dep)	2 " 0 x 5	FT
Material	Sch 40 PVC	
Backfill		FT
Type		
Seal	3 - 4	FT
Material	Bentonite Chips	
Gravel Pack	4 - 25	FT
Material	10X20 Silica sand	
Screen (dia x dep)	2 " 5 x 25	FT
Slot Size	.010	
Material	Sch 40 PVC	
Well Depth	25	FT
Backfill		
Material		
Total Hole Depth	25	FT

Formation Description

0 - 2 FT	Crushed rock
2 - 15 FT	Brown clay and gravel
15 - 25 FT	wet brown silty gravel
- FT	
- FT	
- FT	
- FT	
- FT	
- FT	
- FT	

Scale 1" = 5'

Page 1 of 1

ECY 050-12 (Rec=v 2/01)

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GEOLOGIC BOREHOLE LOG

Borehole / Well ID: SB5 / MW-5	Site ID: GSU#3 PacifiCorp	Page 1 of 2
Location Description: Near gravel pathway entry to SW pond		WL (FT) 1st: ~14-15' Date/Time:
Drill Rig Type / Drill Method: HSA CME-85 on twin axle truck		WL (FT) 2nd: 4.98' Date/Time: 4.15.15
Establishing Company: Cardno	Geologist: D.C. Metallo, LHG	Drilling Company: Cascade Drilling (Portland)
Drilling Foreman: Joe Staloch	Ground Surface Elevation:	Datum: Grade Surface
Sampling Device: 1.5' x 2" SS Sampler	Borehole diameter (in) 8.25"	Total Depth (Feet): 26.5
Date/Time Drilling Started: 4.8.15 (1320)	Date/Time Total Depth Reached: ~~8~~ 4.8.15 (~1545)	

Depth (feet)	% Recov	Sample Depth	Blow Counts	PID	USCS	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/ lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Weather, Time
0	40		5, 9, 6		FILL (CL)		0-1.5' Brown (10YR 4/3), sl. moist, & silty Clay (CL) w/ gravel (little) s-m pebble size, FILL material	0-1.5' No sheen
2	0		4, 4, 4		NR (Fill?)		1.5-3' No recovery - likely large gravel	
4	20		5, 10, 12		CL		3-4.5' Dark Yellowish Brown (10YR 4/4), moist, silty, ~~gra~~ CLAY (CL) w/ little s-m pebble size gravel, sub-round to sub-angular	3-4.5 No Sheen
6	75	X	3, 6, 20		CL		4.5-6' Yellowish Brown (10 YR 5/4), moist, silty CLAY (CL) w/ little to ~~some S-M~~ m-vc g sand + s pebble size gravel, mottled appearance, stiff to v. stiff	* SB5-5-040815 (1345) 4.5-6 No sheen
8								
10	50		5, 10, 6		GM GC		10-11.5 Brown (10YR 4/3), v. moist, clayey/silty GRAVEL w/ s-l pebble sizes, mostly sub rounded to sub angular, med. dense, (GM-GC)	10-11.5' No Sheen
12								GW encountered b/w 11.5 & 15'
14					∇?			
16	50		12, 15, 21		SM-GM		15-16.5' Yellowish Brown (10YR 5/4), wet, silty f-vcg SAND and silty s-m pebble size GRAVEL (SM-GM), loose to med. dense	No sheen 16.5'
18								

Log continuously to 6' bgs, then at 10' bgs log every 5' interval

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GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: SB5 / MW-5

Depth (feet)	Sampling: % Recov	Sampling: Sample Depth	Sampling: Blow Counts	Sampling: PID (PPM)	USCS Code	Lithologic Codes	Lithology Description SOIL TYPE, modifiers/grain size, sorting, color, cement/ lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Weather, Time
18								
20			28 50/0 NA		GM		20-21.5' Yellowish Brown (10 YR 5/4), wet, Very similar composition to interval logged above except v. loose/loose and less silt/sand fraction	21.5' No Sheen
22								
24								Mildly difficult drilling through heavy gravels
26			15 15 20		GM		25-26.5' Dark Greyish Brown (2.5Y 4/2), wet, silty S-L pebble size GRAVEL, with some f-c g sand, loose- med. dense	26.5' No Sheen
							– Boring terminated at 26.5'	(1450)
28							– Well Const. Detail:	
							TD = 26.5'	
							Screen = 2" 0.01" slot 25-5'	sch 40
							Filter pack = 26.5 - 4' 10-20 clean sand	
							Bent. Seal = Chips 4'-3'	
							Concrete Seal = Redi-Mix 3-0	
							Surface Completion = 8" flush mount w/ 12" skirt	

Additional Comments :

CONSTRUCTION DETAILS for WELLS COMPLETED BELOW GRADE

WELL ID: MW-5

WELL CONSTR. START DATE/TIME: 4-3-15 (~1600)
WELL CONSTR. COMPLETION DATE/TIME: 4-8-15 (~1700)

FIELD REPRESENTATIVE: DC Metallo

DRILLING CONTRACTOR: Cascade

DRILLING TECHNIQUE/ AUGER SIZE AND TYPE: Hollow Stem Auger X 5'

BOREHOLE DIAMETER: 8.25"

BORE HOLE ID : 4.25"

SCREEN MATERIAL: Sch 40 PVC

SCREEN DIAMETER: 2"

SCREEN INTERVA(FT): 25-5

CASING MATERIAL: Sch 40 PVC

CASING DIAMETER: 2"

TYPE OF FILTER PACK: Clean Sand

GRADIATION: 10-20

AMOUNT OF FILTER PACK USED: ~16 50-lb bags

TYPE OF BENTONITE USED: Chips

AMOUNT OF BENTONITE USED: 1 50-lb bag

TYPE OF CEMENT USED: Redi-Mix

GROUT MATERIALS USED: NA

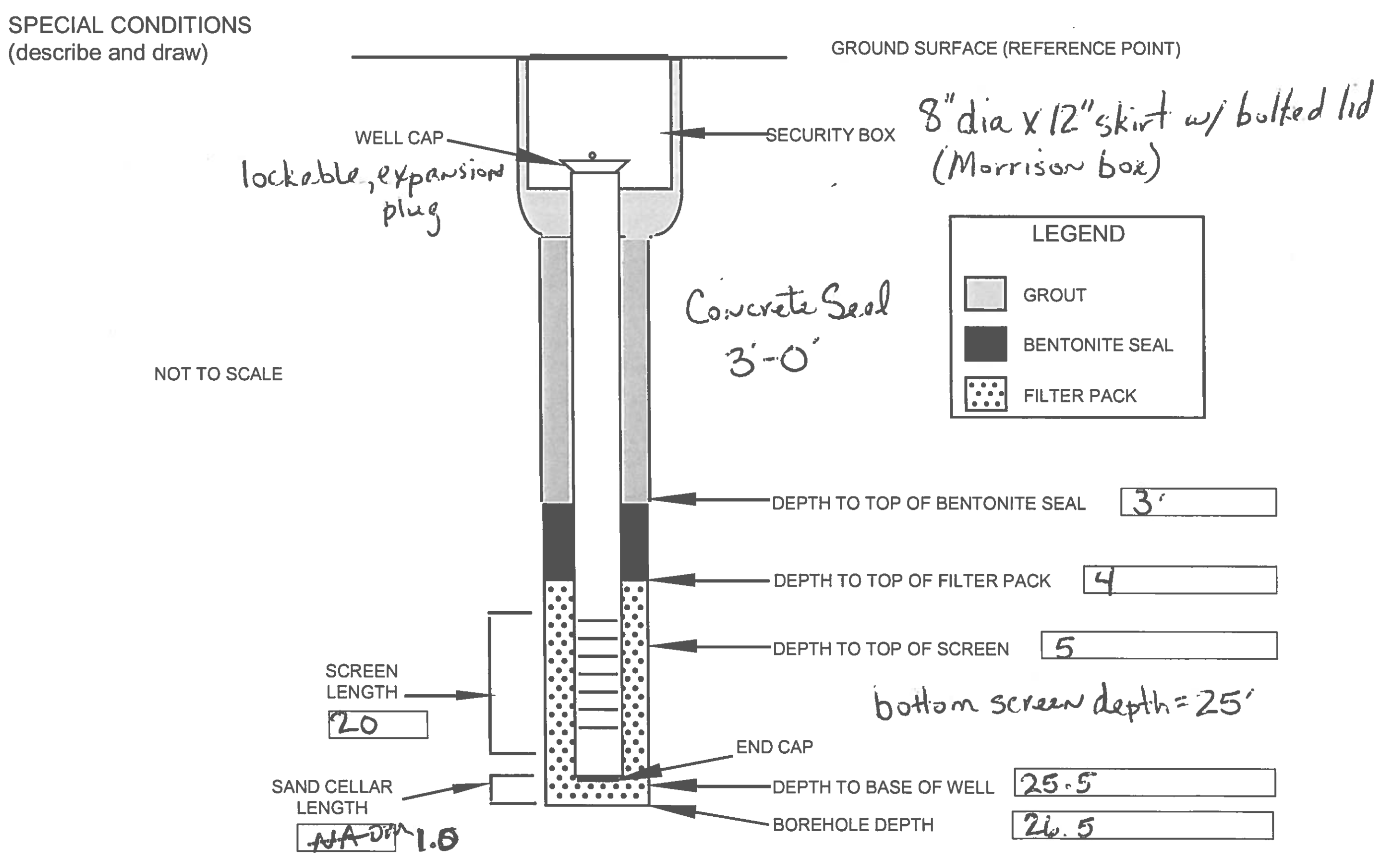
SECURITY CASING DIMENSION: 8" dia x 12" skirt

TYPE OF CAP: locking expansion

TYPE OF END CAP: thread-cone w/ ~4" sump

COMMENTS: very difficult filterpack placement. Required ~~letting~~ settlement over night

SPECIAL CONDITIONS (describe and draw)



INSTALLED BY: Joe Staloch INSTALLATION OBSERVED BY: DC Metallo

NOTES / OBSERVATIONS:

RESOURCE PROTECTION WELL REPORT

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

CURRENT
Notice of Intent No. RE11198

Construction/Decommission 101-15-0075(9210)

[X] Construction
[ ] Decommission *ORIGINAL INSTALLATION Notice of Intent Number* ______

Type of Well
[X] Resource Protection
[ ] Geotechnical Soil Boring

Property Owner: PacifiCorp Energy
Site Address: 1813 Bishop Rd
City: Chehalis County: Lewis

Consulting Firm: KTA Associates

Unique Ecology Well ID Tag No.: BHV 149

Location 1/4 NE 1/4 SW Sec 10 Twn 13N R 2W EWM or WWM

Lat/Long (s,t,r still Required) Lat Deg ______ Lat Min/Sec ______
Long Deg ______ Long Min/Sec ______

Tax Parcel No. ______

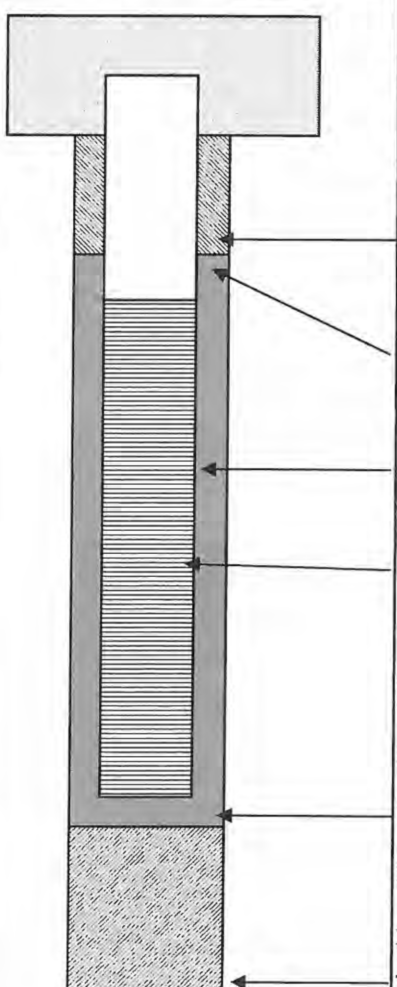
WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards Materials used and the information reported above are true to my best knowledge and belief

[X] Driller [ ] Trainee Name (Print) Joe Staloch
Driller/Trainee Signature: Joseph R Staloch
Driller/Trainee License No. 2749

If trainee, licensed driller's Signature and License No. ______

Cased Diameter 8.25" Static Level 5'
Work/Decommission Start Date 04/08/2015
Work/Decommission End Date 04/09/2015

Construction/Design **Well Name:** MW-5 Formation Description



Concrete Surface Seal Depth	0 - 3	FT
Blank Casing (dia x dep)	2 " 0 x 5	FT
Material	Sch 40 PVC	
Backfill		FT
Type		
Seal	3 - 4	FT
Material	Bentonite Chips	
Gravel Pack	4 - 25	FT
Material	10X20 Silica sand	
Screen (dia x dep)	2 " 5 x 25	FT
Slot Size	.010	
Material	Sch 40 PVC	
Well Depth	25	FT
Backfill		
Material		
Total Hole Depth	25	FT

Formation Description	
0 - 2 FT	Gravel and cobbles
2 - 10 FT	Clay and gravel
10 - 25 FT	wet brown silty gravel
- FT	
- FT	
- FT	
- FT	
- FT	
- FT	
- FT	

Scale 1" = 5'

Page 1 of 1

ECY 050-12 (Rec=v 2/01)

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GEOLOGIC BOREHOLE LOG

Borehole / Well ID: SB6 / MW-6	Site ID: PacifiCorp GSU#3		Page 1 of 2
Location Description: Along access rd. to BP Building, ~210' from ditch		WL (FT) 1st: ~10	Date/Time:
Drill Rig Type / Drill Method: HSA w CME-85 twin axle rig		WL (FT) 2nd: 5.07	Date/Time: 4.15.15 (1345)
Establishing Company: Cardno	Geologist: D.C. Metallo, LHG		Drilling Company: Cascade Drilling (Portland)
Drilling Foreman: Joe Staloch	Ground Surface Elevation:		Datum: Grade Surface
Sampling Device: 1.5' x 2" SS	Borehole diameter (in) 8.25		Total Depth (Feet): 26.5
Date/Time Drilling Started: 4.8.15 (0825)	Date/Time Total Depth Reached: 4.8.15 (1020) @ 26.5'		

Depth (feet) 0	Sampling % Recov	Sample Depth	Blow Counts	PID	USCS	Lithologic Codes	Lithology Description SOIL TYPE, modifiers/grain size, sorting, color, cement/ lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Weather, Time
0–1.5	50		3, 3, 2		Fill (CL)		0-1.5' Sl. moist, Yellowish Brown (10 YR 5/4), gravelly CLAY (CL) Fill material, mottled color, M-L pebble size gravel,	- No sheen at 1.5'
2								
1.5–3	40		7, 14, 7		Fill (CL)		1.5-3 same as above, moist to v. moist	- No sheen @ 3'
4								
3–4.5	100	X	1, 3, 7		CL		3-4.5 Yellowish Brown (10YR 5/6), v. moist to moist, Sandy silty CLAY (CL) w/ little S-L pebble size gravel and some f-cg sand, mottled, blackish granular material (~2/3 mm) thick near bottom	- No sheen @ 4.5'
4.5–6	50		17, 7, 10		CL		4.5-6 Same as above,	- No sheen @ 6'
6								* Sample at 4' SB6-4-040815 (0900) Sample comp'ed from 3.5-5'
8								
10					▽			
10–11.5	50		4, 4, 19		SM-GM		10-11.5' Yellowish Brown (10 YR 5/6), wet, silty & clayey, v. loose S-M pebble size GRAVEL (GM) and silty vf-vcg SAND (SM),	- Wet @ 10' SS dripping - No sheen @ 11.5'
12								
14								
15–16.5	70		13, 25, 40		SM-GM		15-16.5' Same as above, slightly less wet	- No sheen @ 16.5'
16								
18								

* Continuous sampling 0-6' bgs, then every 5' starting at 10' bgs

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Shaping the Future

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: SB6/MW-6

Depth (feet)	Sampling: % Recov	Sampling: Sample Depth	Sampling: Blow Counts	Sampling: PID (PPM)	USCS Code	Lithologic Codes	Lithology Description (SOIL TYPE, modifiers/grain size, sorting, color, cement/ lithification, moisture content, porosity, permeability/fracturing)	Remarks: Drilling Problems, Equipment, Water levels, Weather, Time
18								
20	70		15 25 35		GM SP		20-21.5' Dark Yellowish Brown (10YR 4/4) wet, layered sections of vcg SAND w/ little silt/fines (SP) and vf-f gcg SAND and silty M-L pebble size GRAVEL (GM)	No sheen @ 21.5'
22								
24								
26			7 15 26		GM-SM		25-26.5' Brown (10YR5/3), wet silty well graded GRAVEL (GM) and (lesser %) silty fg SAND (sm) w/ some M-vcg sand throughout, loose	26.5' No sheen
28								

- Boring Terminated 26.5' @ (1020)

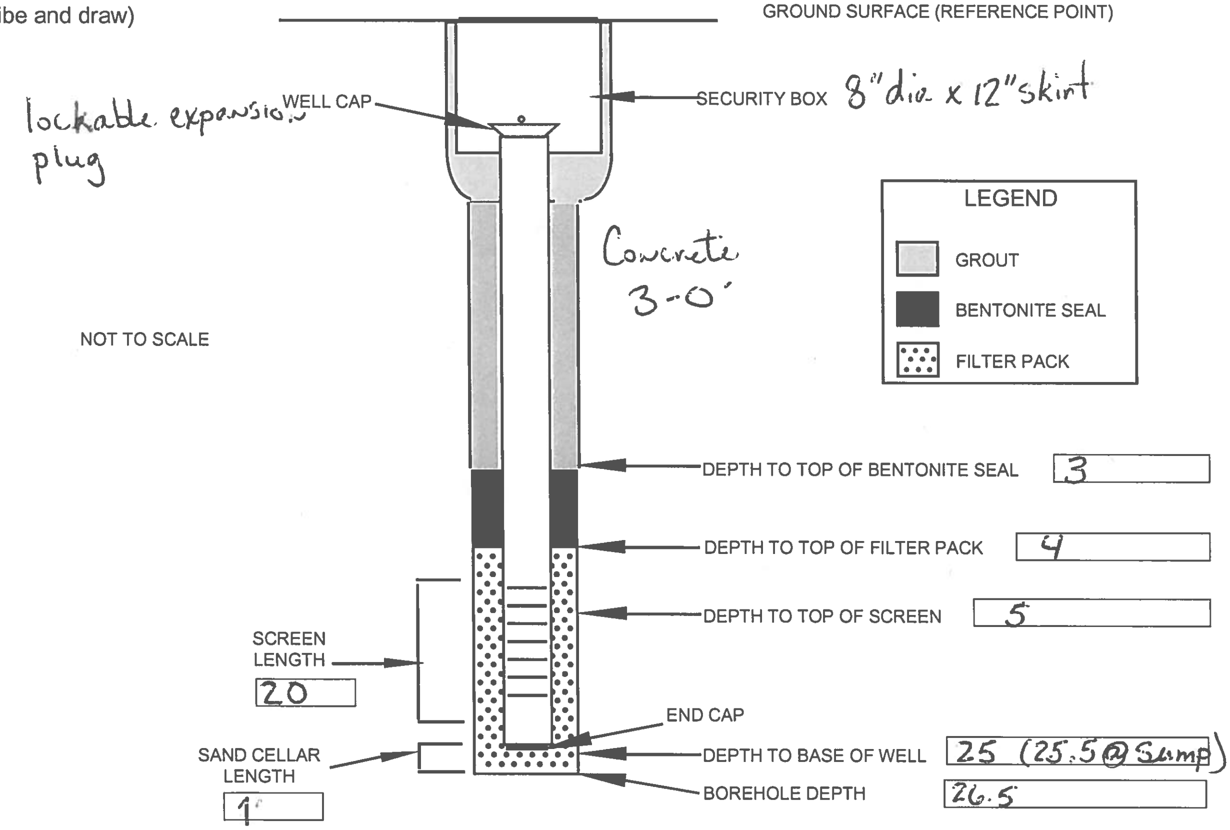
- Const. Info
  - TD = 26.5'
  - Screen (2" 0.01" slotted) 25-5'
  - Filter Pack (10-20 clean sand) = 26.5 - 4'
  - Bent. Seal: 4-3
  - Concrete: 3-0'
  - Surface Completion: 8" dia x 12" skirt

Additional Comments :

CONSTRUCTION DETAILS for WELLS COMPLETED BELOW GRADE

WELL ID:	MW-6
WELL CONSTR. START DATE/TIME:	4·8·15 (~1035)
WELL CONSTR. COMPLETION DATE/TIME:	4·8·15 ( )
FIELD REPRESENTATIVE:	DC Metallo
DRILLING CONTRACTOR:	Cascade
DRILLING TECHNIQUE/ AUGER SIZE AND TYPE:	HSA 5' X 8.25" X 4.25"
BOREHOLE DIAMETER:	8.25"
BORE HOLE ID :	4.25"
SCREEN MATERIAL:	Sch 40 PVC
SCREEN DIAMETER:	2"
SCREEN INTERVA(FT):	25 - 5
CASING MATERIAL:	Sch 40 PVC
CASING DIAMETER:	2"
TYPE OF FILTER PACK:	Clean 10-20 Sand
GRADIATION:	10-20
AMOUNT OF FILTER PACK USED:	15.5 50 lb bags
TYPE OF BENTONITE USED:	Chips
AMOUNT OF BENTONITE USED:	50 lbs
TYPE OF CEMENT USED:	Readi-Mix
GROUT MATERIALS USED:	NA
SECURITY CASING DIMENSION:	8" dia X 12" Skirt
TYPE OF CAP:	Cone threaded, 4" sump
TYPE OF END CAP:	Expansion-locking
COMMENTS:	Easier sand pack placement ~~comparred~~ compared to MW-4

SPECIAL CONDITIONS
(describe and draw)



INSTALLED BY: Joe Staloch INSTALLATION OBSERVED BY: DC Metallo

NOTES / OBSERVATIONS:

RESOURCE PROTECTION WELL REPORT

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

CURRENT

Notice of Intent No. RE11198

Construction/Decommission 101-15-0075(9210)

☒ Construction

☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* ______

Type of Well

☒ Resource Protection

☐ Geotechnical Soil Boring

Property Owner: PacifiCorp Energy

Site Address: 1813 Bishop Rd

City: Chehalis County: Lewis

Consulting Firm: KTA Associates

Unique Ecology Well ID Tag No.: BHV 150

Location 1/4 NE 1/4 SW Sec 10 Twn 13N R 2W ☐ EWM or WWM

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards Materials used and the information reported above are true to my best knowledge and belief

Lat/Long (s,t,r still Required) Lat Deg ______ Lat Min/Sec ______ Long Deg ______ Long Min/Sec ______

Tax Parcel No. ______

☒ Driller ☐ Trainee Name (Print) Joe Staloch

Driller/Trainee Signature [signature]

Driller/Trainee License No. 2749

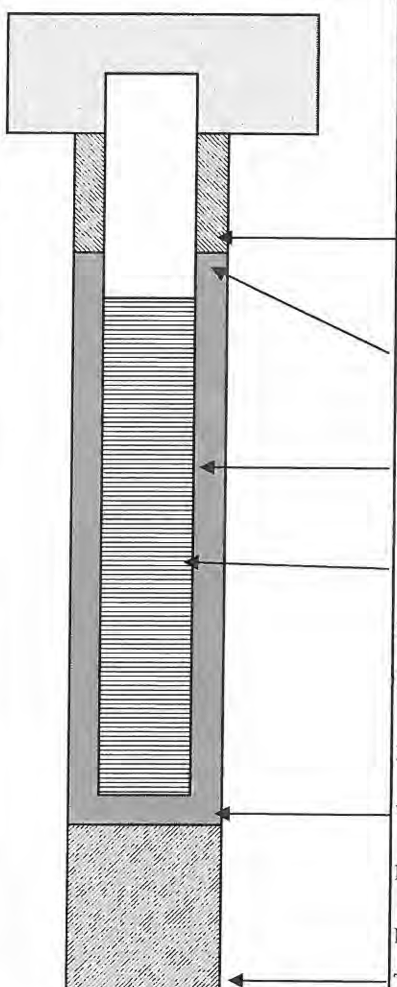
Cased Diameter 8.25" Static Level 5'

If trainee, licensed driller's Signature and License No. ______

Work/Decommission Start Date 04/08/2015

Work/Decommission End Date 04/09/2015

Construction/Design



Well Name: MW-6

Construction		Formation Description
Concrete Surface Seal Depth	0 - 3 FT	0 - 2 FT Gravel and cobbles
Blank Casing (dia x dep)	2 " 0 x 5 FT	2 - 10 FT Clay and gravel
Material	Sch 40 PVC	
Backfill	FT	10 - 25 FT wet brown silty gravel
Type		
Seal	3 - 4 FT	- FT
Material	Bentonite Chips	
Gravel Pack	4 - 25 FT	- FT
Material	10X20 Silica sand	- FT
Screen (dia x dep)	2 " 5 x 25 FT	- FT
Slot Size	.010	
Material	Sch 40 PVC	- FT
Well Depth	25 FT	- FT
Backfill		
Material		- FT
Total Hole Depth	25 FT	

Scale 1" = 5'

Page 1 of 1

ECY 050-12 (Rec=v 2/01)

APPENDIX D

MONITORING WELL DEVELOPMENT FORMS

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Cardno
Shaping the Future

Monitoring Well Development Form MW-1		
Project No. : 90369-002	Site and Location ID: GSU#1/MW-1	Date: 4/9/15
Date Installed : Oct. 2013	Personnel Conducting Development : CDI, Bob Staloch	
Development Method(s) Used : Well Pump with Surge Action		
[1] Total Well Depth (FT) (TOC): 16.9	[2] Initial Water Level (FT): 4.8	[3] Length of Static Water Column (FT) : 12.1
Well Diameter (IN) : 2	[4] Conversion Factor (see below) : Circle One [1"= .04 2"= .16 4"= .65 6"=1.5 8"=2.6]	Casing Volume CV (GAL) = 1.94 gal
Casing Volume CV (GAL) = (1 – 2 = 3; 3 x 4 = 1 CV) : 12.1 X 0.16		

DATE	TIME	WL (FT)	TOTAL VOL REMOVED (GAL)	TURBIDITY (NTU) / SED. MEASURE (ImHoff Cone)	COMMENTS (recharge rate, water color, suspended sediments, other)
4/9	1000	4.8	4		ran Dry after 4 gal cleared up in less than a gal
	1045		6		ran Dry after 2 min and 2 gal brn tint for a second then cleared

FINAL WELL MEASUREMENTS

TOTAL DEPTH (FT): 17	WATER LEVEL (FT): Dry	DATE / TIME: 4-9 @ 1047

Reviewed by: [signature]
Well Developer Signature: ______________________.

Cardno
Shaping the Future

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 2013	Personnel Conducting Development : CDI, Bob Staloch	
Development Method(s) Used : well Pump		
1 Total Well Depth (FT) (TOC): 19.4	2 Initial Water Level (FT): 5.2	3 Length of Static Water Column (FT) : 14.2
Well Diameter (IN) : 2	4 Conversion Factor (see below) : Circle One [1"= .04 2"= .16 4"= .65 6"=1.5 8"=2.6]	Casing Volume CV (GAL) = 2.27
Casing Volume CV (GAL) = (1 – 2 = 3; 3 x 4 = 1 CV) :		

DATE	TIME	WL (FT)	TOTAL VOL REMOVED (GAL)	TURBIDITY (NTU) / SED. MEASURE (ImHoff Cone)	COMMENTS (recharge rate, water color, suspended sediments, other)
4-9	1103		0		pumped clean from the start
	1110		4.5		Dry After 4½ gallons
	1140				Restrt
	1141		5.0		pumped ½ gal and hole went Dry

FINAL WELL MEASUREMENTS

TOTAL DEPTH (FT): 19.4	WATER LEVEL (FT): Dry	DATE / TIME: 4-9-15@1141

Well Developer Signature: Reviewed by: [signature]

Cardno®
Shaping the Future

Monitoring Well Development Form MW-4

Project No. : 90369-002	**Site and Location ID:** PacifiCorp MW4	**Date:** 4-7-15
Date Installed : 4.7.15	**Personnel Conducting Development :** Cascade; Bob Staloch, Derek Aamodt	
Development Method(s) Used : Surge block		
[1] Total Well Depth (FT) (TOC): NA	**[2] Initial Water Level (FT):** NA	**[3] Length of Static Water Column (FT) :** NA
Well Diameter (IN) : 2	**[4] Conversion Factor (see below) : Circle One** [1"= .04 2"= .16 4"= .65 6"=1.5 8"=2.6]	**Casing Volume CV (GAL) =**
Casing Volume CV (GAL) = (1 – 2 = 3; 3 x 4 = 1 CV) :		

DATE	TIME	WL (FT)	TOTAL VOL REMOVED (GAL)	TURBIDITY (NTU) / SED. MEASURE (ImHoff Cone)	COMMENTS (recharge rate, water color, suspended sediments, other)
4.7.15	~1615	~5'	NA	>	Surge only, very muddy water entire screen length (25-5) ~20 mins
					* Will continue development on 4/9 - See Pg 2

FINAL WELL MEASUREMENTS

TOTAL DEPTH (FT):	WATER LEVEL (FT):	DATE / TIME:

Well Developer Signature: [signature]

Cardno®
Shaping the Future

Monitoring Well Development Form MW-4		
Project No. : 090369-002	Site and Location ID: PacifiCorp/GSU3	Date: 4-9-15
Date Installed : 4-7-15	Personnel Conducting Development : CDI, Bob Staloch	
Development Method(s) Used : Pump with Surge Action		
[1] Total Well Depth (FT) (TOC): 22	[2] Initial Water Level (FT): 5.8	[3] Length of Static Water Column (FT) : 16.2'
Well Diameter (IN) : 2	[4] Conversion Factor (see below) : Circle One [1"= .04 2"= .16 4"= .65 6"=1.5 8"=2.6]	Casing Volume CV (GAL) = ~~2.59~~ DM 3.14
Casing Volume CV (GAL) = (1 – 2 = 3; 3 x 4 = 1 CV) : 25.4 – 5.8 = 19.6 X 0.16 = 3.14		

DATE	TIME	WL (FT)	TOTAL VOL REMOVED (GAL)	TURBIDITY (NTU) / SED. MEASURE (ImHoff Cone)	COMMENTS (recharge rate, water color, suspended sediments, other)
4-9	1204				Thick mud. Fine brn sand
	1217		10		½ as muddy
	1240		30		clear
DCM 4-7 ~~4-8~~-15	~1600	~4.5	NA	>9999	extremely muddy, thick water
					used surge tool over entire length of screen section – via hand-over-hand w/ surge block connected to PVC rods – surged for ~30 mins at any easy, steady rate — DCM

FINAL WELL MEASUREMENTS

TOTAL DEPTH (FT): 25.4	WATER LEVEL (FT): 10	DATE / TIME: 4-9 - 1245

Well Developer Signature: Review By: [signature]

Cardno
Shaping the Future

Monitoring Well Development Form MW-5		
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 : Well Pump with Surge Action		
[1] Total Well Depth (FT) (TOC): 23.5	[2] Initial Water Level (FT): 4.6	[3] Length of Static Water Column (FT) : 18.90
Well Diameter (IN) : 2	[4] Conversion Factor (see below) : Circle One [1"= .04 2"= .16 4"= .65 6"=1.5 8"=2.6]	Casing Volume CV (GAL) = 3.02
Casing Volume CV (GAL) = (1 – 2 = 3; 3 x 4 = 1 CV) :		

DATE	TIME	WL (FT)	TOTAL VOL REMOVED (GAL)	TURBIDITY (NTU) / SED. MEASURE (ImHoff Cone)	COMMENTS (recharge rate, water color, suspended sediments, other)
4.9	100				Thick Mud Fine Brn Sand
	117		~20		½ as Dirty
	152		45		End Pumped clear
4.8.15	~1630	3-4'	NA	79999	Water very thick + turbid, Used surge tool to flush formation water in + out of filter pack. Surged for about 30 mins - DCM

FINAL WELL MEASUREMENTS

TOTAL DEPTH (FT): 25.5	WATER LEVEL (FT): 7.6	DATE / TIME: 4/9 @ 154

Well Developer Signature: Reviewed By: [signature]

Cardno®
Shaping the Future

Monitoring Well Development Form MW-6		
Project No. : 90369-002	Site and Location ID: GSU#3 / MW-6	Date: 9 April 15
Date Installed : 4.8.15	Personnel Conducting Development : CDI, Bob Staloch	
Development Method(s) Used : Well Pump with Surge Action		
[1] Total Well Depth (FT) (TOC): 25'	[2] Initial Water Level (FT): 5.5	[3] Length of Static Water Column (FT) : 19.5
Well Diameter (IN) : 2	[4] Conversion Factor (see below) : Circle One [1"= .04 2"= .16 4"= .65 6"=1.5 8"=2.6]	Casing Volume CV (GAL) = ~~3.3~~ DM 3.12
Casing Volume CV (GAL) = (1 – 2 = 3; 3 x 4 = 1 CV) :		

DATE	TIME	WL (FT)	TOTAL VOL REMOVED (GAL)	TURBIDITY (NTU) / SED. MEASURE (ImHoff Cone)	COMMENTS (recharge rate, water color, suspended sediments, other)
4/9	9:13		5		Fine silty sand Dirty Deep Brn Chocolate Milk Choklet
	936		25		½ as clean as when started Getting better
	1000		45		brn Tint almost clear
					original Depth tag 23
					final tag 25

FINAL WELL MEASUREMENTS

TOTAL DEPTH (FT): 25	WATER LEVEL (FT): 14	DATE / TIME: 4-9 / 1000

Well Developer Signature: Review By: [signature] Metallo

APPENDIX E

FIELD LOGBOOK ENTRIES

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PacifiCorp - 2015 GW Invest 4·6·15

— Load Cardno Van w/ gear, equipment and necessary supplies to conduct ground water monitoring well install/const. & devel. task, surveying and elec. vault sampling at the PacifiCorp Plant in Chehalis, WA. Also load H&S and personal gear.

— D. Metallo and B. Kwasnowski leave Seattle - Eastlake shop at ~ 1345. Head down to Tukwila - ARI Labs

- Arrive at Lab, pick up bottles, coolers, supplies
- continue driving down to PC plant

— Arrive at PC plant ~ 1600, mob onto site and drop off majority of supplies/gear at Receiving Shop - store gear here for the night. — Mob off site ~ 1620

— Head over to Home Depot to purchase remaining H&S supplies

— Mob over to Hotel (Olympic) in Centralia

DCM

PacifiCorp - 2015 GW Invest

4·7·15

— Weather: Overcast, 50-lo 60s, lite Rain v. lite wind - forecast for rain throughout the day, clearing later and nice (hopefully) for tomorrow

— Mob over to grocery store, bought ice & water for today's event

— Arrive at PC plant ~0800, load gear back into Van from Receiving Bay, spoke w/ Jeremy Smith - touched base on current issues

— Drillers (Cascade Drilling, LP - Portland) arrive onsite ~ 0845

- ~~Don~~ Joe Staloch (driller)
- Don Dodson (support)
- Derek Aamodt (support)

— Conduct H&S trainings / ~~discussing~~ discussions, KO H&S Mtg, drillers sat through PC required training

DCM

PacifiCorp 2015 4.7.15

- Mob around to project area to South + West of GSU-3

- Set up on MW-4 (1025)
  - 8.25" OD X 4.25" ID HSA's
  - Using 1.5' x 2" Split barrel samplers
  - Sample continuous 0'-6' bgs, then starting at 10' bgs sample every 5' to 30' bgs (projected TD)

- 0-1.5 FILL (GM) dry no sheen
  1.5-3 Fill (GM-SM) dry no sheen
  3-4.5 ML-CL moist no sheen
  4.5-6 ~~SM-GC~~ CL moist no sheen
  * Sample SB4-5-040715 (1130)
  6-7.5 SM-GC moist no sheen
  10-11.5 SM-GC moist no sheen
  15-16.5 v.moist-wet GM-GC no sheen
  20-21.5 GM-GC wet no sheen
  25-26.5 SM-GM wet no sheen
  30-31.5 SM-GM wet no sheen
  - Boring terminated at 31.5'

- Well ~~Construction De~~ DM

- Drillers break for lunch (~1245)

DCM

PacifiCorp 2015 4.7.15

- Collect WL through HSAs, 24.25' to grade - cutter head may be sealing off water from freely entering borehole

- Drillers back from Lunch (~1330)

- Begin Setting MW4:
  Bottom Seal = 31.5-26.5' bent. pellets
  Filter Pack (10-20 clean sand) 26.5-4'
  Screen: 2" PVC 0.01" Slot 25-5'
  Bottom Cap: Flat, threaded w/ ~5" sump

* Having issues w/ setting filter pack, borehole seems to be taking an excessive amount of sand - Not certain why, ~15/16 50-lb bags

- While drillers are completing sand pack placement Cardno conducts elec. vault groundwater I&I sampling of accumulated gw water
  - Lenora Westbrook directed the efforts re: which vaults to be sampled

DCM

- Vault Sampling: see Fig 2 of 2015 Work Plan

Vault ID	Depth Prod.	Depth GW	TD
EMHC-003	Sheen 0.01' thick ~~om NA~~ 18.37	18.38	19.73
EMHM-003	13.61 (?)	13.62	14.15
EMHC-002	NA	9.43	12.41
DUP Sample (EMHC-002)			
EMHM-002	(NO Sample)	9.12	12.16
EMHC-001	Sheen 0.02 thick ~~om NA~~ 12.69	12.71	14.05
EMHM-001	NO Measurements or Sample		
EMHM-021	Too far north, no meas. or smpl.		

- Collected Samples for NWTPH-Dx (Mineral Oil) analysis at: EMHC-003 (1525), EMHM-003 (1515), EMHC-002 (1535), Duplicate at EMHC002 (1345), and EMHC-001 (1640)

- Vault EMHM-001 was not opened or measured. Contents of this vault drain into EMHC-001.

- Vault EMHM-021 was too far north from GSU#1, no meas or sample collected.

- Drill crew performed pre-completion well development tasks at MW-4 using hand operated surge tool. They surged entire length of screen section for ~30 mins to aid filter pack settlement. Water remains v. turbid. Let well stand as-is for the night

- Demob site for the evening; close/seal all IDW drums, pump out decon water from decon trailer + containerize into a drum.

- Tower drill rig mast down, clean up around site

- Take majority of Cardno gear + offload to receiving area - store there for the night.

DCM

– Arrive at PC Plant (0715), checked in, mob over to receiving area & re-loaded gear into van.

– Weather: Partly cloudy, clearing w/ expected sun for most of day, 45-60°, lite breeze

– Drillers arrive ~0725

– Conduct tailgate H+S Meeting; covering drilling safety, site concerns, improvements from yesterdays events, plant/elec. safety, carrying a plant radio
Attendees: Joe, Don, Derek from CDI & Metallo & Kwasnowski from Cardno

– All personnel mob around to project site to get setup, safety gear on, rigs warmed up, etc.

– Jeremy Smith checked in w/ us ~0805
- walked over to review next two drill locations w/ him & Cascade

DCM

– ~~Appears~~ Appears that the Sand pack at MW-4 has stabilized and is firm, remove a certain amount to bring top Sand pack to 4' bgs, and bentonite seal and hydrate. Will let stand and firm up. Move rig off to next drilling location

– Set up on SB6 (0830)
- 8.25" OD x 4.25" ID HSAs
- 1.5' x 2" SS samplers
- Sample continuously 0-6' bgs, then starting at 10' bgs, Sample every 5' interval down to total depth

• 0-1.5'	Fill	moist	NO mineral oil sheen
• 1.5-3'	Fill (CL)	moist	No sheen
• 3-4.5'	CL	v. moist	No sheen
• 4.5-6	CL	v. moist	No sheen

* Sample comp 3.5-5'
SB6-4-040815 (0900)

• 10-11.5'	SM-GM	Wet	No sheen
• 15-16.5'	SM-GM	wet/v. moist	No sheen
• 20-21.5'	GM/SP	wet	No sheen
• 25-26.5'	GM-SM	wet	No sheen

DCM

- Boring SB6 Terminated 26.5' @ (1020)

- MW-6 Well Construction Info:
  - TD borehole = 26.5'
  - Screen: 2" sch 40 0.01" slotted 25-5'
  - Filter Pack: 10-20 clean sand 26.5-4
  - Well Sump: ~25.5-25'
  - Bentonite Seal: 4-3' chips, hydrated
  - Surface Completion: Concrete 3-0' w/ 8" flush monument w/ 12" skirt

* well monument work will be completed later today or tomorrow

- Demob drill rig from MW-6 and set up on MW-5

- Set up on MW-5
  - Using 8.25" OD x 4.25" ID HSAs
  - 1.5' x 2" split barrel samplers, using SPT methods - blow counts rec'ed on bore logs
  - Sample soil continuously 0-6' bgs, then starting at 10' sample every 5' (including the 10' interval) thereafter until total/end depth is reached

DCM

0-1.5'	FILL (CL)	sl. moist	No sheen
1.5-3'	No Rec./FILL	—	—
3-4.5'	CL	moist	no sheen
4.5-6'	CL	moist	no sheen

* Sample Collected 5-6' SB5-5-040815 (1345)

10-11.5'	GM-GC	v. moist	no sheen
15-16.5'	SM-GM	wet	no sheen

* ∇ GW encountered b/w 11.5 & 15' bgs

20-21.5'	GM	wet	no sheen
25-26.5'	GM	wet	no sheen

* See boring log for more detail

- Boring SB5 terminated at 26.5'

- MW5 Well Construction Details
  - TD = 26.5'
  - Screen = 2", 0.01" slot sch 40 25-5'
  - Filter Pack = 10-20 clean sand 26.5-4'
  - Bentonite Seal = 4-3' chips
  - Concrete Seal = 3-0' Redi-mix
  - Surface Completion = 8" Morrison flush vault w/ 12" skirt
  - lockable expansion plug

DCM

* Filter pack placement at MW-5 is providing difficulties similar to MW-4, using hand surge methods to aid settlement of the filter pack - water still v. turbid

- will ~~let this~~ the completion of this well be suspended until tomorrow to allow the filter pack material to stabilize + settle

- Close up lids/bands on all drums, all drums ~~palle~~ placed on pallets, near each well

- Clean up around site, pick up all debris (if any), tools, gear, etc.

- Check in w/ Lenora Westbrook, brief her on current status
  - CDI will come back tomorrow, 4.9, to complete well construction and development/re-development tasks

- All enviro-samples have been maintained on ice, in a single cooler, managed under

DCM

customary C.o.C. procedures. Cardno ~~w~~ will deliver the project samples to ARI tomorrow

- Sign CDI daily logs, give driller final instructions for tomorrows tasks

- Mob over to Plant office, turn it in assigned plant radio, leave GW sampl. supplies in Jeremy Smith's office, secure gear in Cardno van and get ready for transport back to Seattle

- Leave Site ~ 1700

DCM

4.15.15

PacifiCorp 2015 Field Survey

- Level elevation (relative) survey of all 5 monitoring wells; MW-1, 3, 4, 5 & 6
- will use the same (assigned) 100.00 elv. point from 2013. SW corner, top of concrete (~2' high) retaining wall for GSU-1.
- Set up tripod near SE corner of BPA Yard Fence, just to north of MW-5

Top PVC casing elev. shots

	1st loop of shots	2ND loop of shots	
MW6	= 6.96'	6.95'	(better shot)
MW5	= 6.05'	6.05'	
① MW4	= 5.49'	5.49'	① 5.49'
MW3	= 5.56'	5.57'	(better shot)
MW1	= 5.37'	5.37'	
100' corner	= 3.13	3.13'	

1st loop of shots

~~SE~~ DM 2ND loop of shots

Instrument Ht. = 103.13

Relative Elev's for Well Casings (I.H. - Shot)

MW1 = 97.76' MW4 = 97.64' MW6 = 96.18'

MW3 = 97.57' MW5 = 97.08'

APPENDIX F

LABORTORY CHAIN OF CUSTODY FORMS

AND

ANALYTICAL REPORT

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AE90	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: KTA, INC.	Phone: 360-250-7694	Date: 4.8.15	Ice Present? Yes
Client Contact: Lenora Westbrook		No. of Coolers: 1	Cooler Temps: 4.4
Client Project Name: PacifiCorp – Chehalis			
Client Project #:	Samplers: DC Metallo, B. Kwasnowski		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Mineral Oil NW-TPH-Dx								Notes/Comments
SB4-5-040715	4.7.15	1130	S	1	X								
SBDUP-01-040715	4.7.15	1200	S	1	X								
SB6-4-040815	4.8.15	0900	S	1	X								
SB5-5-040815	4.8.15	1345	S	1	X								
EMHC003-VAULT	4.7.15	1525	W	2	X								
EMHM003-VAULT	4.7.15	1515	W	2	X								
EMHC002-VAULT	4.7.15	1535	W	2	X								
EMHC001-VAULT	4.7.15	1640	W	2	X								
DUP-VAULT	4.7.15	1345	W	2	X								

Comments/Special Instructions	Relinquished by	Received by	Relinquished by	Received by
	(Signature) D Metallo	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Dave Metallo	Printed Name: A. Valgardsen	Printed Name:	Printed Name:
	Company: Cardno	Company: ARI	Company:	Company:
	Date & Time: 4.9.15 (1257)	Date & Time: 4/9/15 1257	Date & Time:	Date & Time:

AE90 : 00002

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.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

15 April 2015

Lenora Westbrook
KTA Associates, Inc.
3530 32nd 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.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

Enclosures

cc: Dave Metallo, Cardno-GS
File AE90

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number: AE90	Turn-around Requested: Standard
ARI Client Company: KTA, INC.	Phone: 360-250-7694
Client Contact: Lenora Westbrook	
Client Project Name: PacifiCorp - Chehalis	
Client Project #:	Samplers: DC Metallo, B.Kwasnowski

Page: 1	of 1
Date: 4.8.15	Ice Present? Yes
No. of Coolers: 1	Cooler Temps: 4.4

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Mineral Oil NW-TPH-Dx								Notes/Comments
SB4-5-040715	4.7.15	1130	S	1	X								
SBDUP-01-040715	4.7.15	1200	S	1	X								
SB6-4-040815	4.8.15	0900	S	1	X								
SB5-5-040815	4.8.15	1345	S	1	X								
EMHC003-VAULT	4.7.15	1525	W	2	X								
EMHM003-VAULT	4.7.15	1515	W	2	X								
EMHC002-VAULT	4.7.15	1535	W	2	X								
EMHC001-VAULT	4.7.15	1640	W	2	X								
DUP-VAULT	4.7.15	1345	W	2	X								

Comments/Special Instructions	Relinquished by	Received by	Relinquished by	Received by
	(Signature) D. Metallo	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Dave Metallo	Printed Name: A. Valgardsen	Printed Name:	Printed Name
	Company: CardNO	Company: ARI	Company:	Company
	Date & Time: 4.9.15 (1257)	Date & Time: 4/9/15 1257	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.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: KTA, Inc.

Project Name: Pacificorp-Chehalis

COC No(s): NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No: AE90

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?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 1.4
Time: 1257

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90877952

Cooler Accepted by: AV Date: 4/9/15 Time: 1257

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 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)?		YES	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?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Was Sample Split by ARI: NA YES Date/Time: Equipment: Split by:

Samples Logged by: TG Date: 4-9-15 Time: 1330

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm	
			Small → "sm" (< 2 mm)
			Peabubbles → "pb" (2 to < 4 mm)
			Large → "lg" (4 to < 6 mm)
			Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AE90
Client: KTA
Project Event: N/A
Project Name: Pacifi Corp-Chehalis

	Sample ID	ARI Lab ID	ARI 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
3.	SB6-4-040815	AE90C	15-6969	Soil	04/08/15 09:00	04/09/15 12:57
4.	SB5-5-040815	AE90D	15-6970	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	AE90I	15-6975	Water	04/07/15 13:45	04/09/15 12:57

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.

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)**

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

ANALYTICAL RESOURCES INCORPORATED

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

Matrix: Soil

Date Received: 04/09/15

Data Release Authorized:
Reported: 04/14/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	LOQ	Result
MB-041015	Method Blank	04/10/15	04/11/15	1.00	Diesel Range	5.0	< 5.0 U
15-6967	HC ID: ---		FID4A	1.0	Mineral Oil	10	< 10 U
					Motor Oil	10	< 10 U
					o-Terphenyl		88.9%
AE90A	SB4-5-040715	04/10/15	04/11/15	1.00	Diesel Range	6.8	< 6.8 U
15-6967	HC ID: ---		FID4A	1.0	Mineral Oil	14	< 14 U
					Motor Oil Range	14	< 14 U
					o-Terphenyl		77.1%
AE90B	SBDUP-01-040715	04/10/15	04/11/15	1.00	Diesel Range	6.3	< 6.3 U
15-6968	HC ID: ---		FID4A	1.0	Mineral Oil	12	< 12 U
					Motor Oil Range	12	< 12 U
					o-Terphenyl		69.7%
AE90C	SB6-4-040815	04/10/15	04/11/15	1.00	Diesel Range	6.3	< 6.3 U
15-6969	HC ID: ---		FID4A	1.0	Mineral Oil	13	< 13 U
					Motor Oil Range	13	< 13 U
					o-Terphenyl		70.0%
AE90D	SB5-5-040815	04/10/15	04/11/15	1.00	**Diesel Range**	**6.2**	**6.7**
15-6970	HC ID: **DRO**		FID4A	1.0	Mineral Oil	12	< 12 U
					Motor Oil Range	12	< 12 U
					o-Terphenyl		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.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID

Sample ID: LCS-041015
LAB CONTROL

Lab Sample ID: LCS-041015
LIMS ID: 15-6967
Matrix: Soil
Data Release Authorized:
Reported: 04/14/15

QC Report No: AE90-KTA
Project: Pacifi Corp-Chehalis

Date Sampled: NA
Date Received: NA

Date Extracted: 04/10/15
Date Analyzed: 04/11/15 01:48
Instrument/Analyst: FID4A/ML

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	**Lab Control**	**Spike Added**	**Recovery**
Diesel	132	150	88.0%

TPHD Surrogate Recovery	
o-Terphenyl	87.4%

Results reported in mg/kg

FORM III

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Soil
Date Received: 04/09/15

ARI Job: AE90
Project: Pacifi Corp-Chehalis

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep 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	D	04/10/15
15-6968-AE90B	SBDUP-01-040715	7.98 g	1.00 mL	D	04/10/15
15-6969-AE90C	SB6-4-040815	7.95 g	1.00 mL	D	04/10/15
15-6970-AE90D	SB5-5-040815	8.06 g	1.00 mL	D	04/10/15

Basis: D=Dry Weight W=As Received

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: AE90-KTA
Project: Pacifi Corp-Chehalis

Client ID	OTER	TOT OUT
041015MB	88.9%	0
041015LCS	87.4%	0
SB4-5-040715	77.1%	0
SBDUP-01-040715	69.7%	0
SB6-4-040815	70.0%	0
SB5-5-040815	75.4%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 15-6967 to 15-6970

FORM-II TPHD

Data File: /chem3/fid4a.i/20150410.b/15041035.d

Date : 11-APR-2015 01:25

Client ID: AE90MBS1

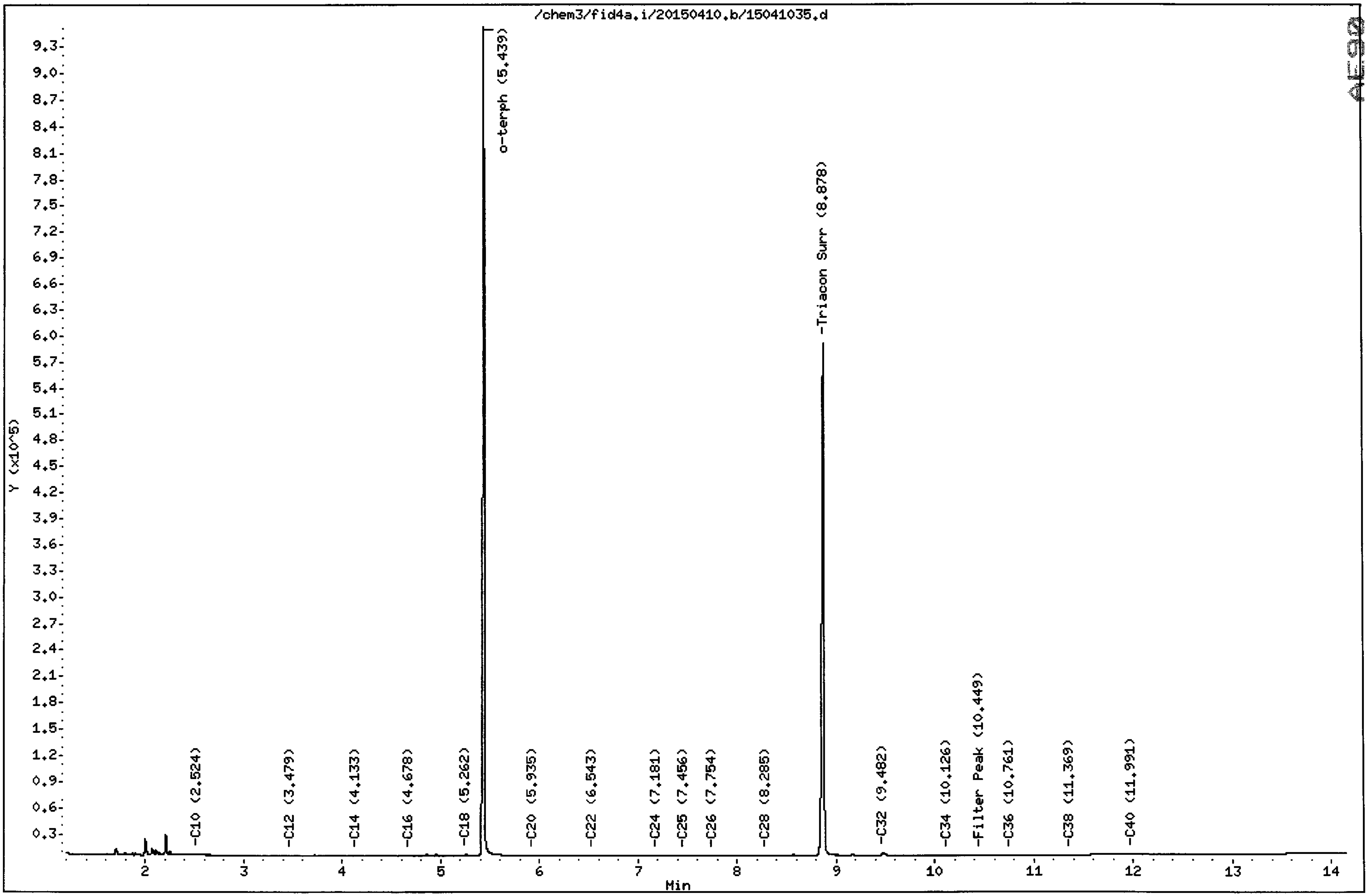
Sample Info: AE90MBS1

Column phase: RTX-1

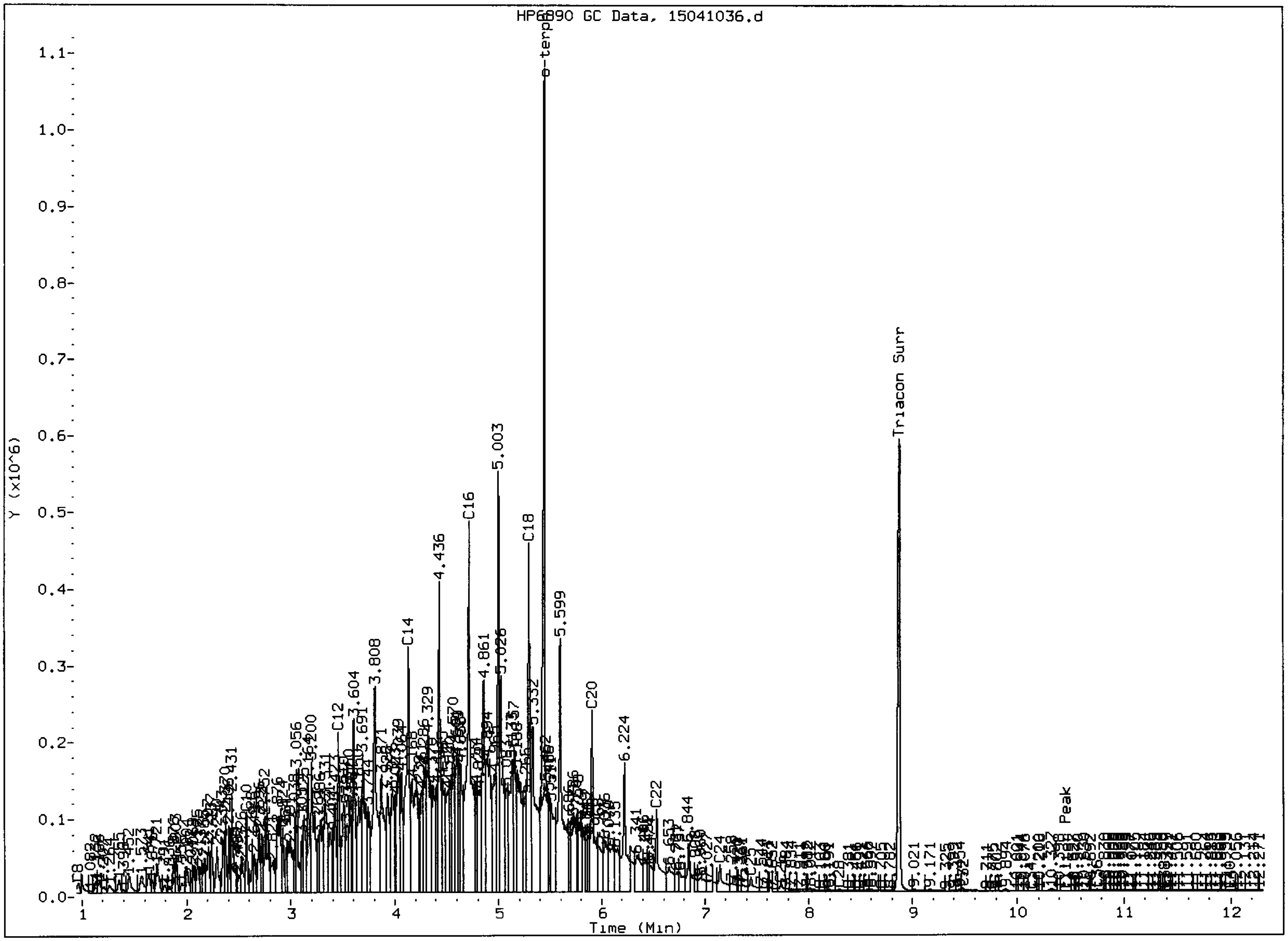
Instrument: fid4a.i

Operator: ML

Column diameter: 0.25



FID:4A-2C/RTX-1 AE90LCSS1 FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: ML

Date: 4/14/15

Data File: /chem3/fid4a.i/20150410.b/15041036.d

Date : 11-APR-2015 01:48

Client ID: AE90LCSS1

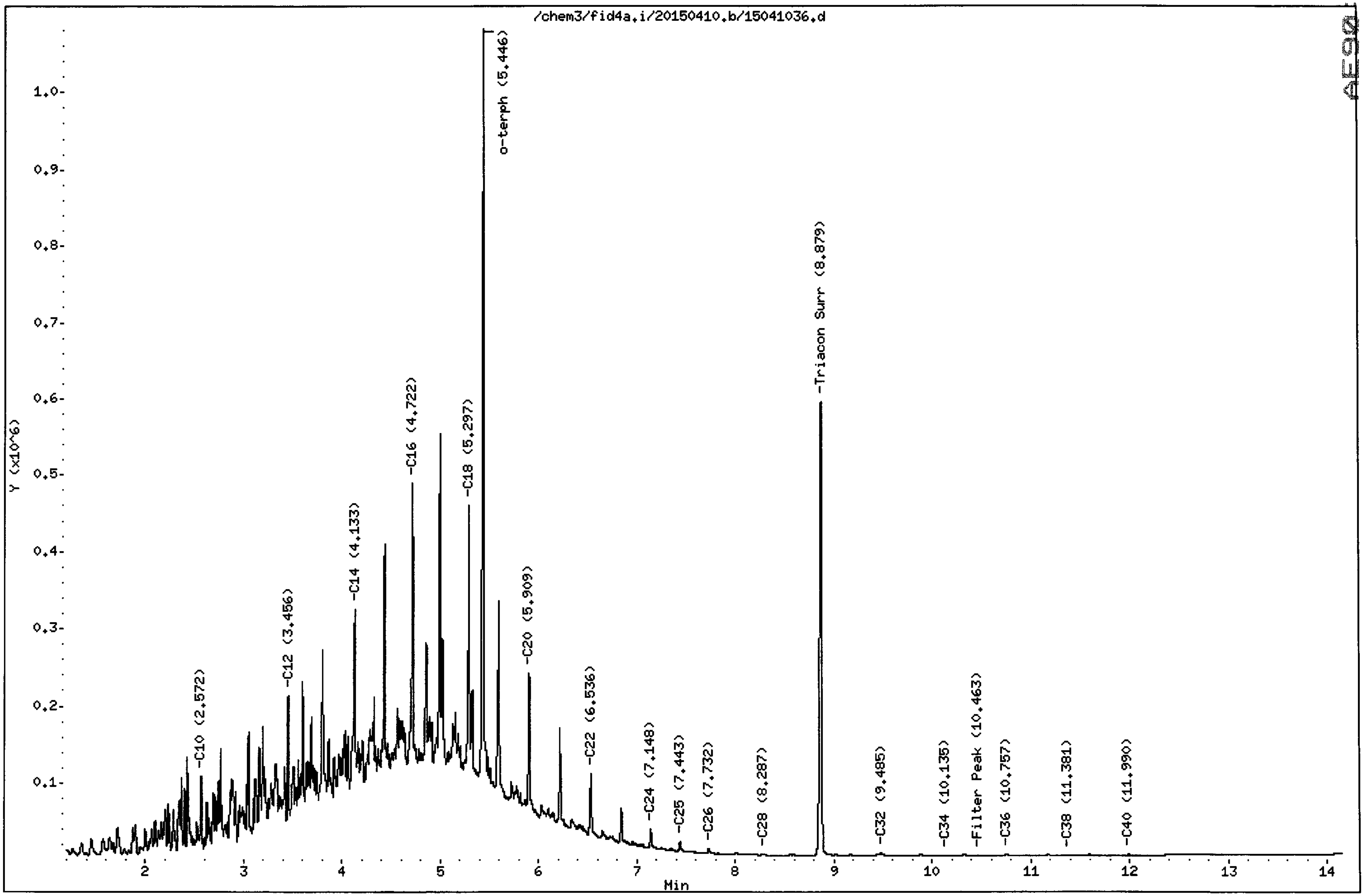
Sample Info: AE90LCSS1

Column phase: RTX-1

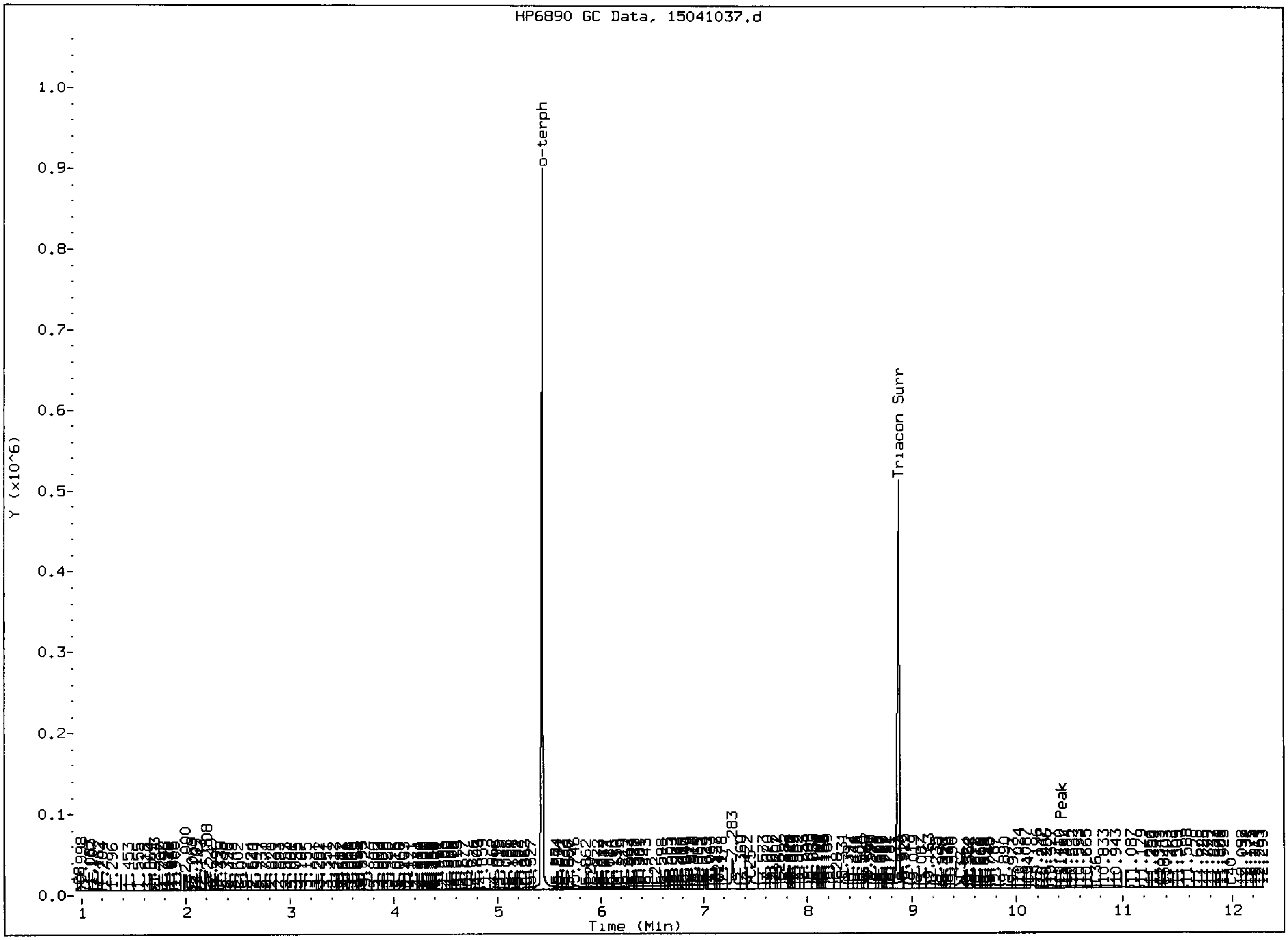
Instrument: fid4a.i

Operator: ML

Column diameter: 0.25



FID:4A-2C/RTX-1 AE90A FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: ML Date: 4/14/15

Data File: /chem3/fid4a.i/20150410.b/15041037.d

Date : 11-APR-2015 02:11

Client ID: SB4-5-040715

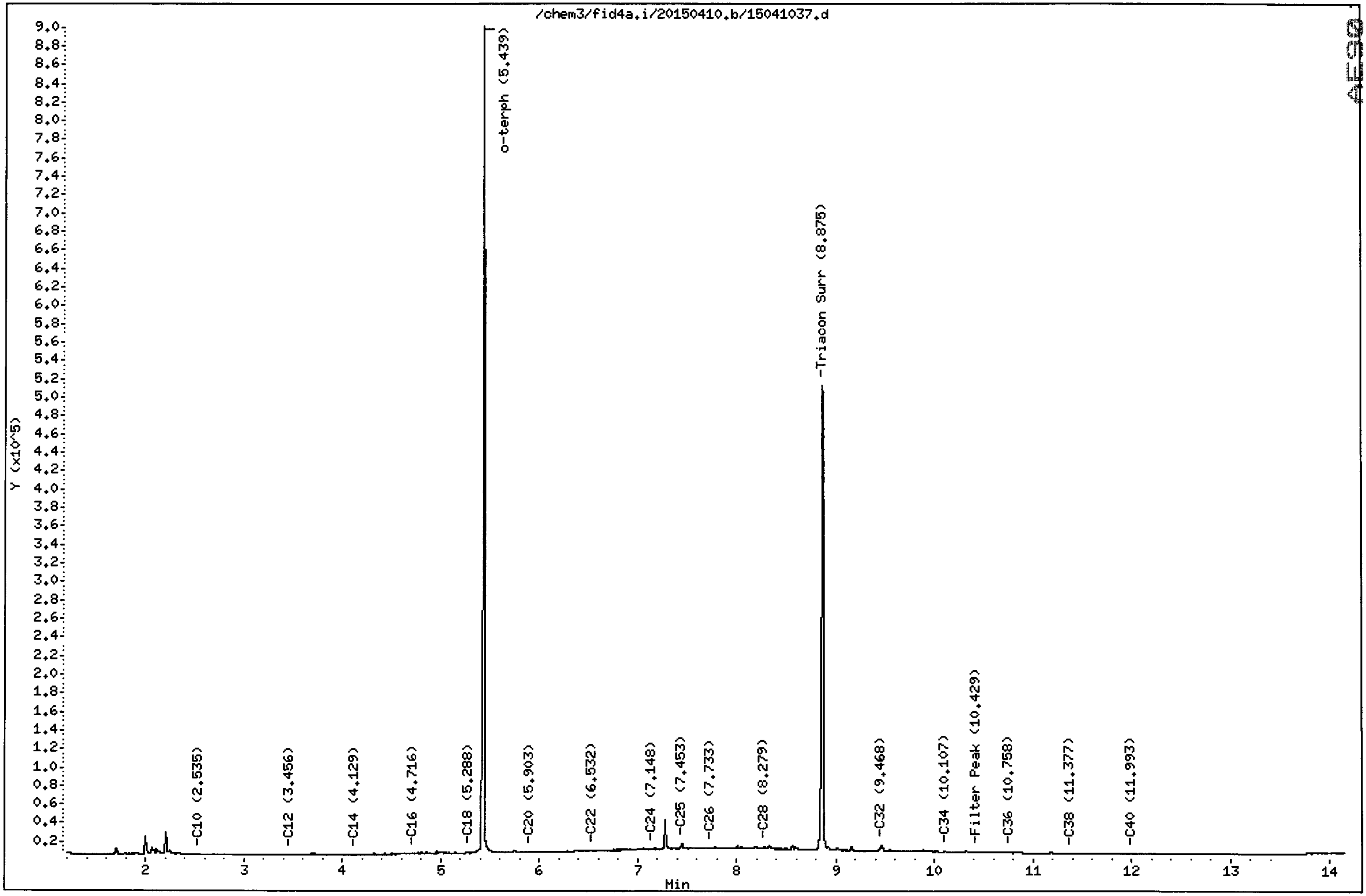
Instrument: fid4a.i

Sample Info: AE90A

Operator: ML

Column phase: RTX-1

Column diameter: 0.25



AE90 00016

Data File: /chem3/fid4a.i/20150410.b/15041038.d

Date : 11-APR-2015 02:34

Client ID: SBDUP-01-040715

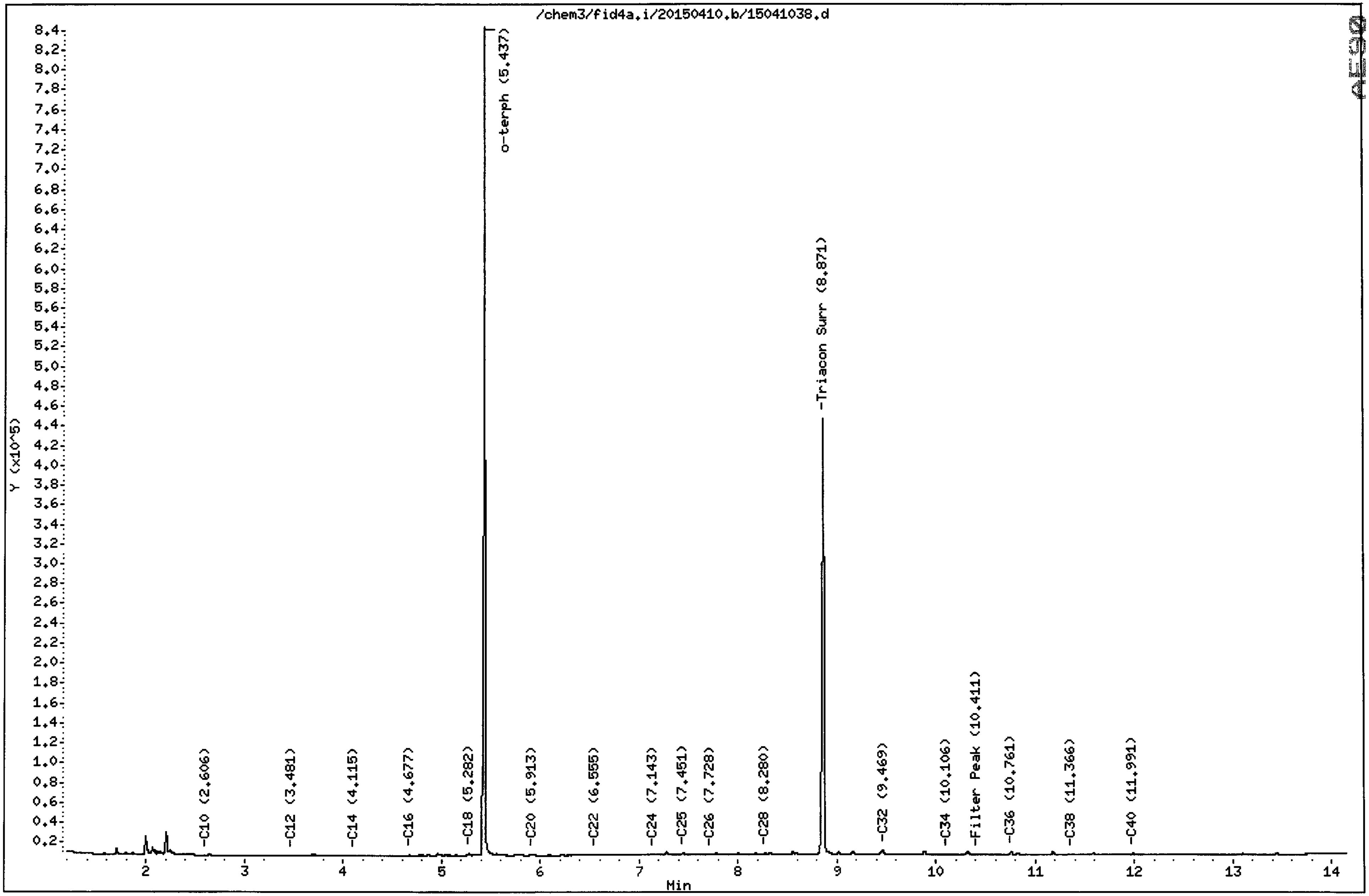
Sample Info: AE90B

Column phase: RTX-1

Instrument: fid4a.i

Operator: ML

Column diameter: 0.25



Data File: /chem3/fid4a.i/20150410.b/15041039.d

Date : 11-APR-2015 02:57

Client ID: SB6-4-040815

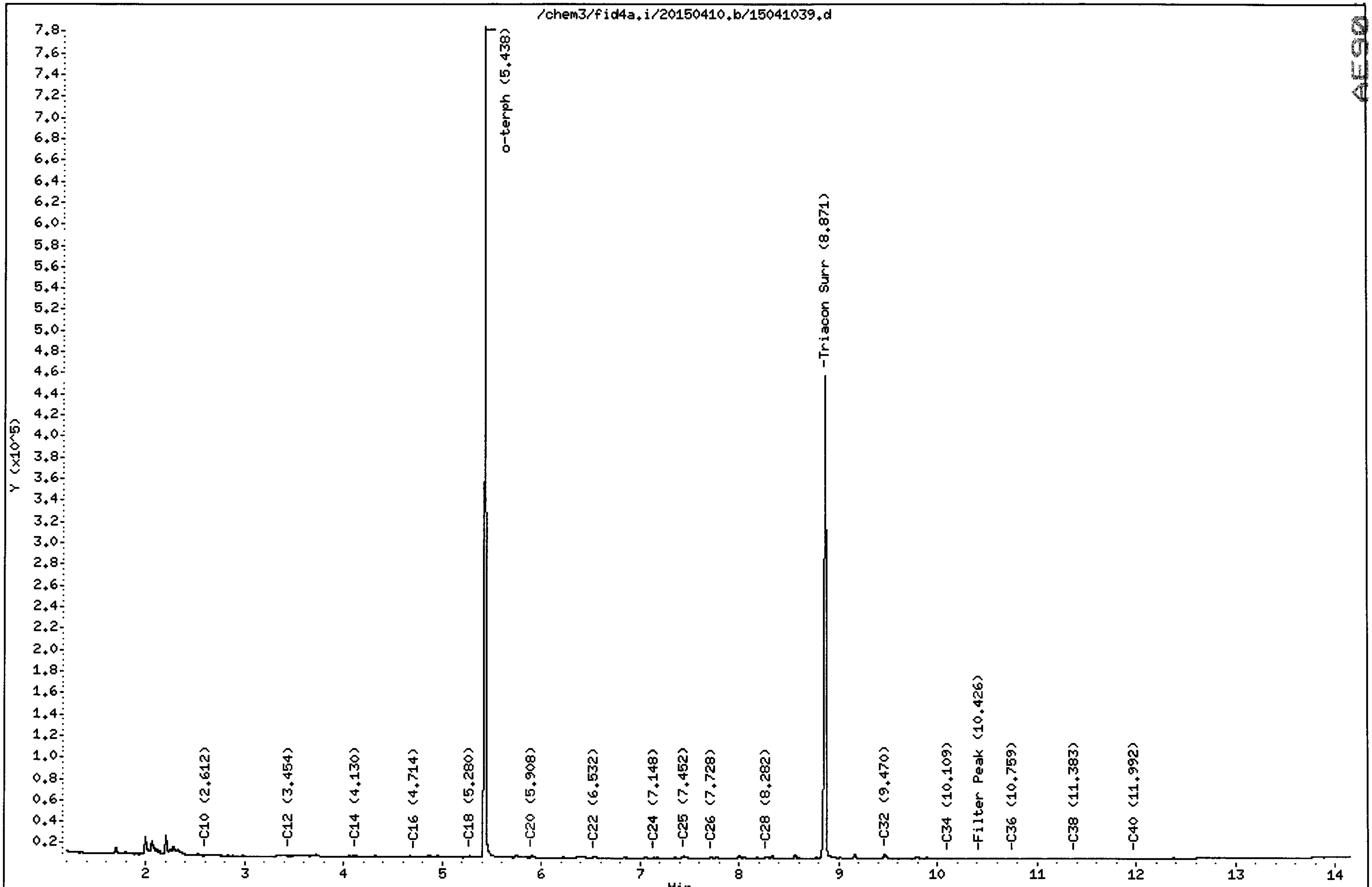
Sample Info: AE90C

Column phase: RTX-1

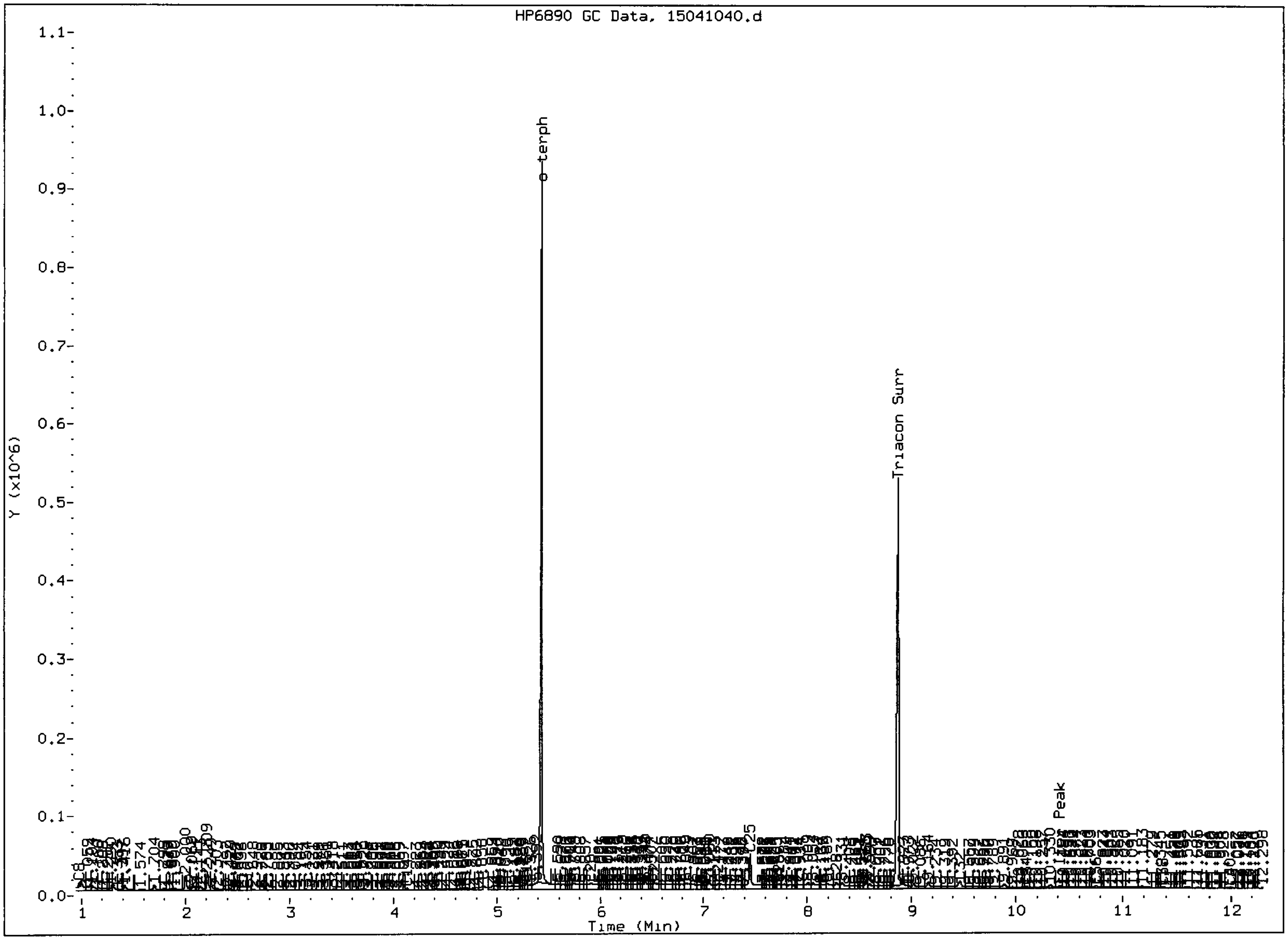
Instrument: fid4a.i

Operator: ML

Column diameter: 0.25



FID:4A-2C/RTX-1 AE90D FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: ML Date: 4/14/15

Data File: /chem3/fid4a.i/20150410.b/15041040.d

Date : 11-APR-2015 03:20

Client ID: SB5-5-040815

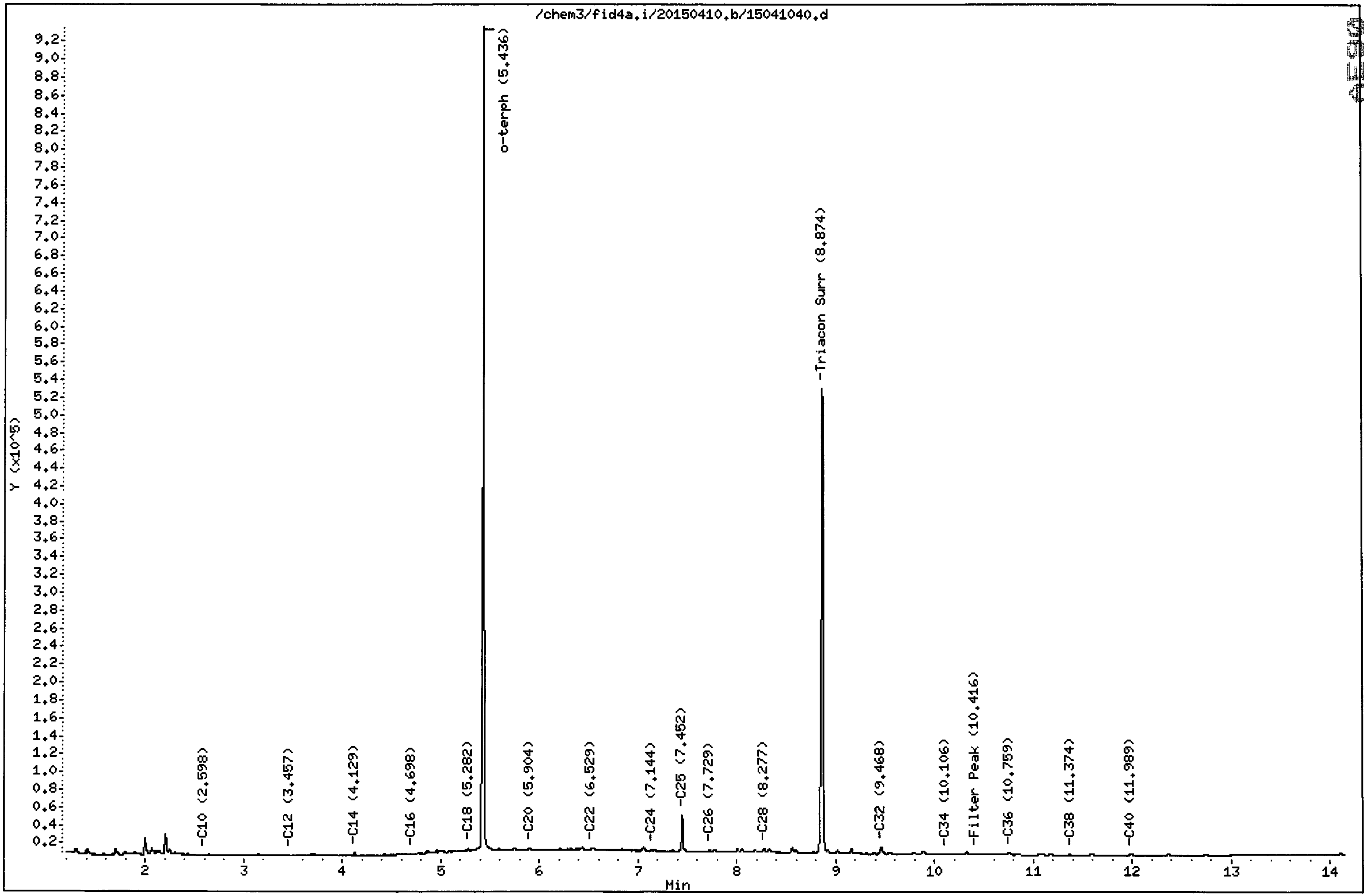
Sample Info: AE90D

Column phase: RTX-1

Instrument: fid4a.i

Operator: ML

Column diameter: 0.25



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3510C

QC Report No: AE90-KTA
Project: Pacifi Corp-Chehalis

Matrix: Water

Date Received: 04/09/15

Data Release Authorized:
Reported: 04/14/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-041115	Method Blank	04/11/15	04/13/15	1.00	Diesel Range	0.10	< 0.10 U
15-6971	HC ID: ---		FID9	1.0	Mineral Oil	0.20	< 0.20 U
					Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		82.9%
AE90E	EMHC003-Vault	04/11/15	04/13/15	1.00	Diesel Range	0.10	< 0.10 U
15-6971	HC ID: ---		FID9	1.0	Mineral Oil	0.20	< 0.20 U
					Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		83.0%
AE90F	EMHM003-Vault	04/11/15	04/13/15	1.00	**Diesel Range**	**0.10**	**0.12**
15-6972	HC ID: **DRO**		FID9	1.0	Mineral Oil	0.20	< 0.20 U
					Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		72.6%
AE90G	EMHC002-Vault	04/11/15	04/13/15	1.00	**Diesel Range**	**0.10**	**0.11**
15-6973	HC ID: **DRO**		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		76.6%
AE90H	EMHC001-Vault	04/11/15	04/13/15	1.00	**Diesel Range**	**0.10**	**1.9**
15-6974	HC ID: **DRO/RRO**		FID9	1.0	**Mineral Oil**	**0.20**	**1.3**
					Motor Oil Range	**0.20**	**0.32**
					o-Terphenyl		74.0%
AE90I	DUP-VAULT	04/11/15	04/13/15	1.00	**Diesel Range**	**0.10**	**0.11**
15-6975	HC ID: **DRO**		FID9	1.0	Mineral Oil	0.20	< 0.20 U
					Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		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.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-041115
LAB CONTROL

Lab Sample ID: LCS-041115
LIMS ID: 15-6971
Matrix: Water
Data Release Authorized:
Reported: 04/14/15

QC Report No: AE90-KTA
Project: Pacifi Corp-Chehalis

Date Sampled: NA
Date Received: NA

Date Extracted: 04/11/15
Date Analyzed: 04/13/15 17:10
Instrument/Analyst: FID9/ML

Sample Amount: 500 mL
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	2.56	3.00	85.3%

TPHD Surrogate Recovery	
o-Terphenyl	73.5%

Results reported in mg/L

FORM III

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: AE90
Matrix: Water
Project: Pacifi Corp-Chehalis
Date Received: 04/09/15

ARI ID	Client ID	Samp Amt	Final Vol	Prep 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

ANALYTICAL RESOURCES INCORPORATED

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

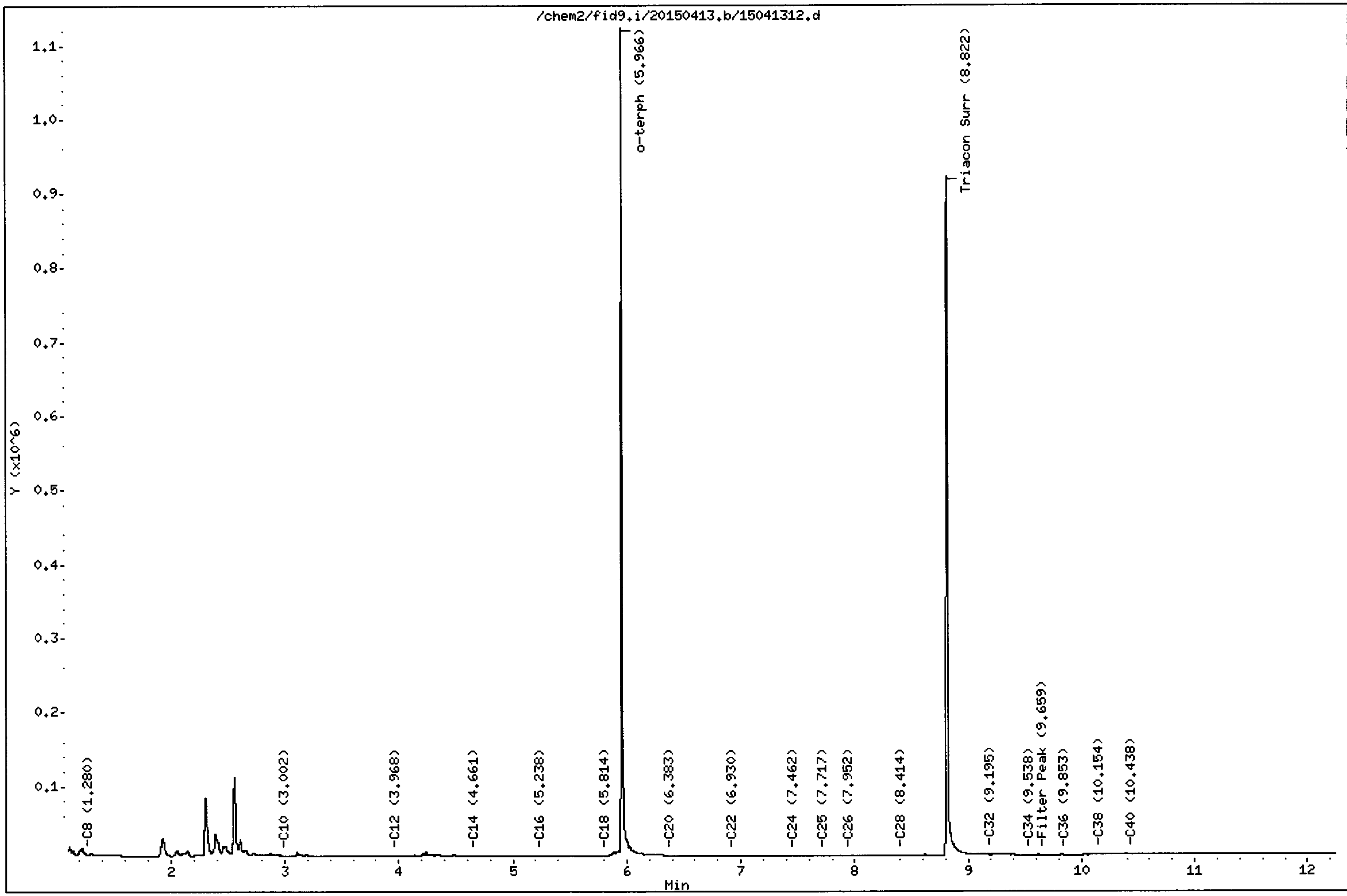
FORM-II TPHD

Data File: /chem2/fid9.i/20150413.b/15041312.d
Date : 13-APR-2015 16:49
Client ID: AE90MBW1
Sample Info: AE90MBW1

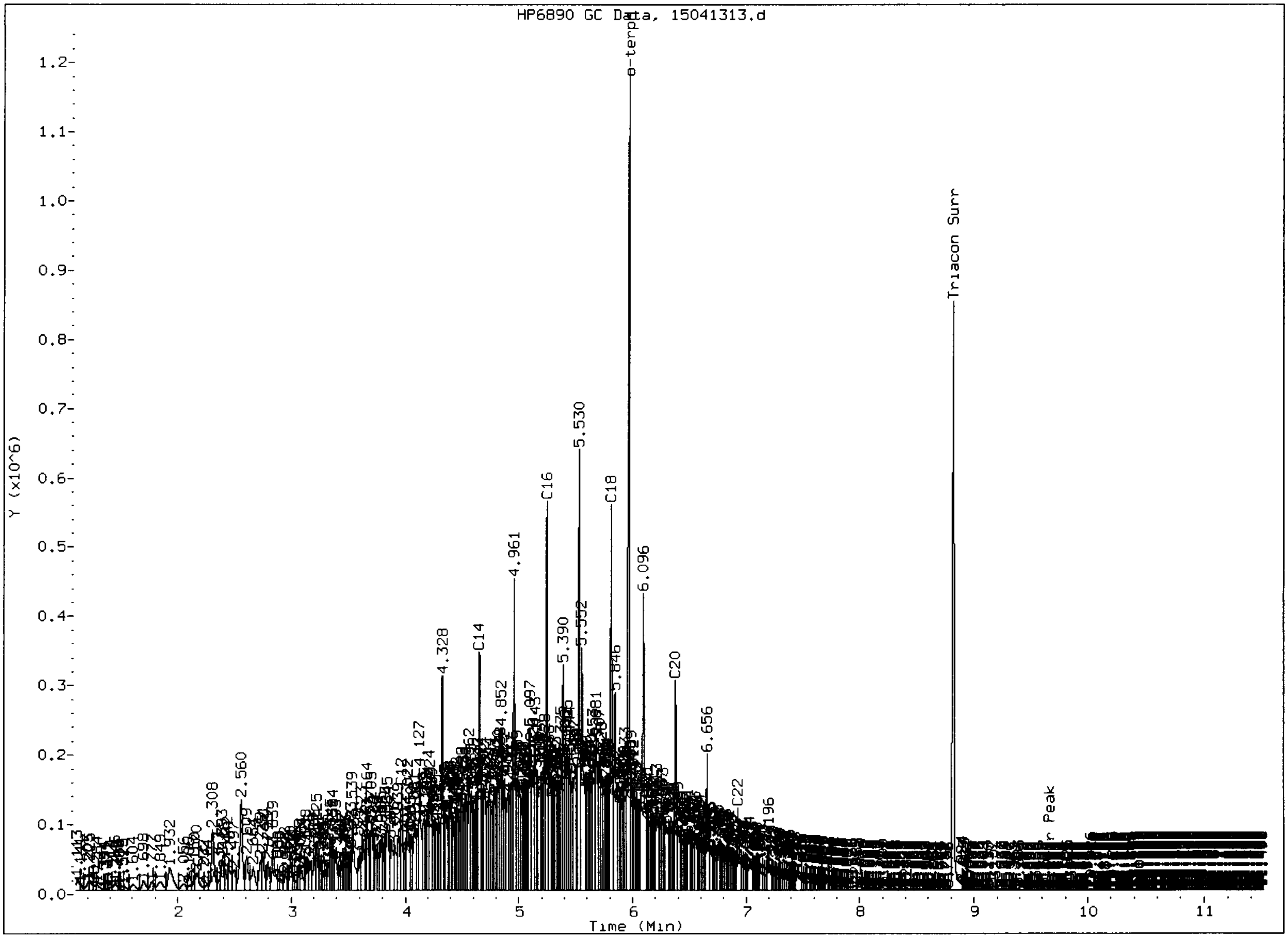
Column phase: RTX-1

Instrument: fid9.i

Operator: ML
Column diameter: 0.25



FID:9A-2C/RTX-1 AE90LCSW1 FID:9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Surrogate Skimmed

Analyst: MC

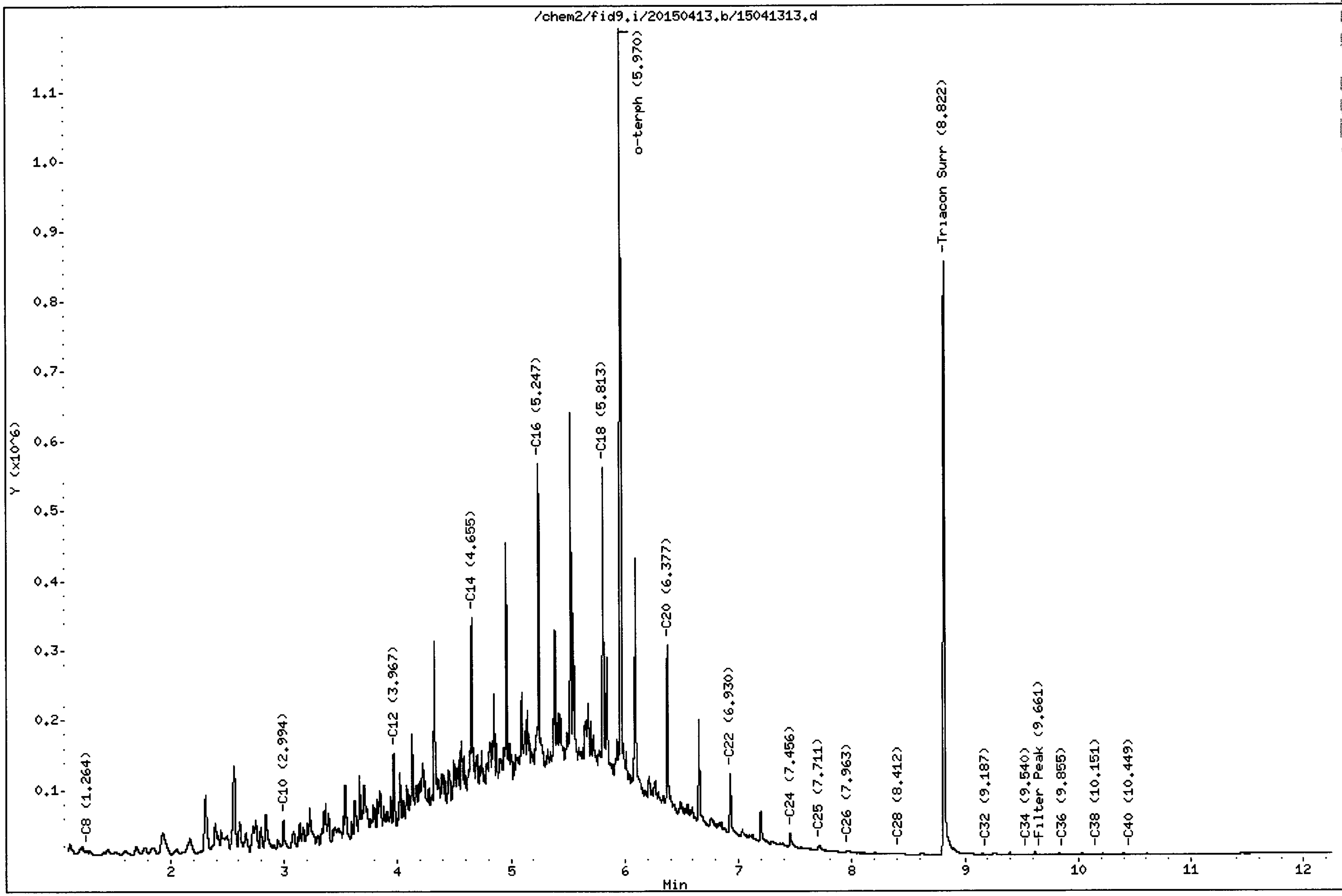
Date: 4/14/15

Data File: /chem2/fid9.i/20150413.b/15041313.d
Date : 13-APR-2015 17:10
Client ID: AE90LCSW1
Sample Info: AE90LCSW1

Column phase: RTX-1

Instrument: fid9.i

Operator: ML
Column diameter: 0.25



Data File: /chem2/fid9.i/20150413.b/15041314.d

Date : 13-APR-2015 17:31

Client ID: EMHC003-Vault

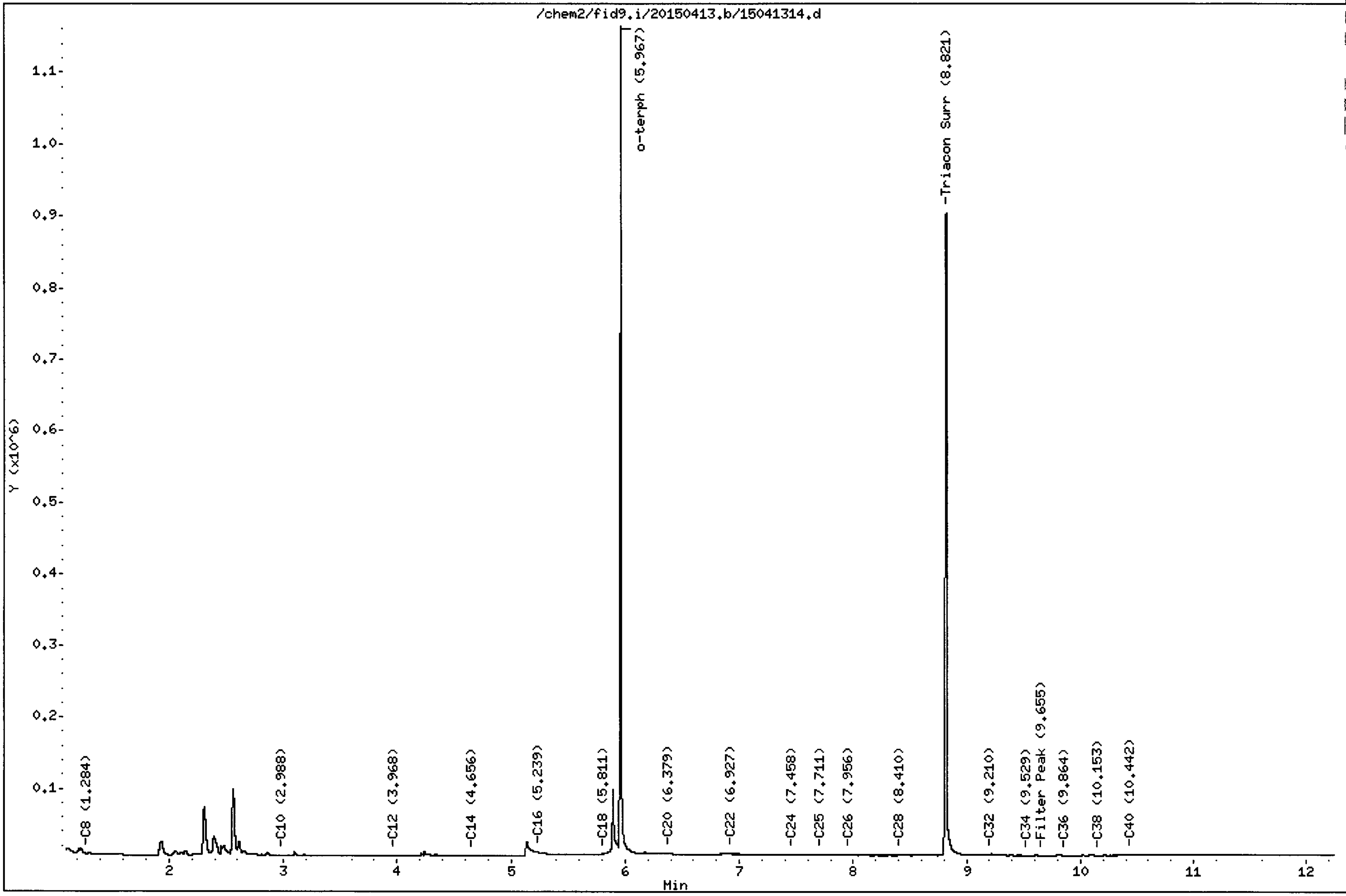
Sample Info: AE90E

Column phase: RTX-1

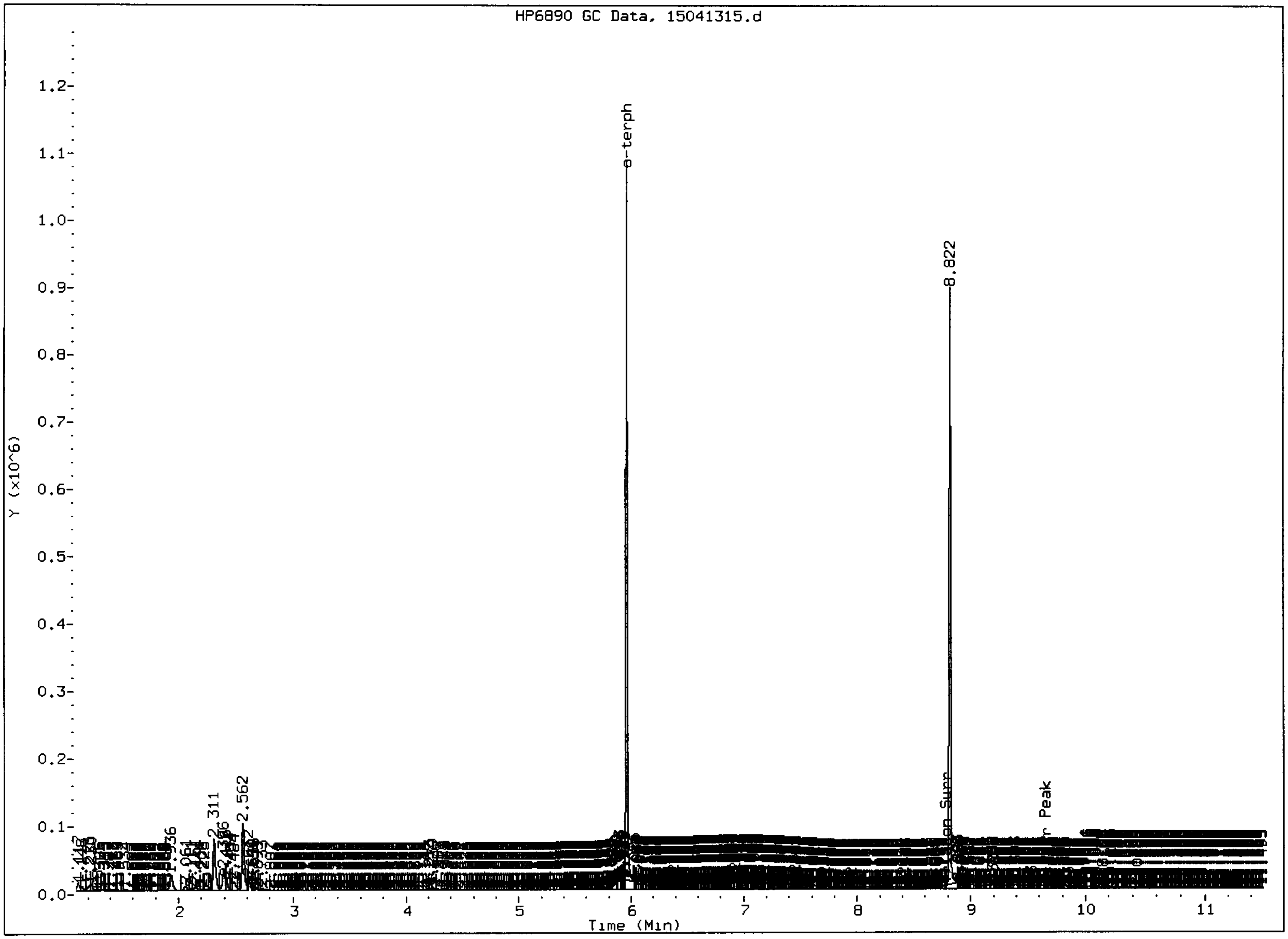
Instrument: fid9.i

Operator: ML

Column diameter: 0.25



FID:9A-2C/RTX-1 AE90F FID:9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Surrogate Skimmed

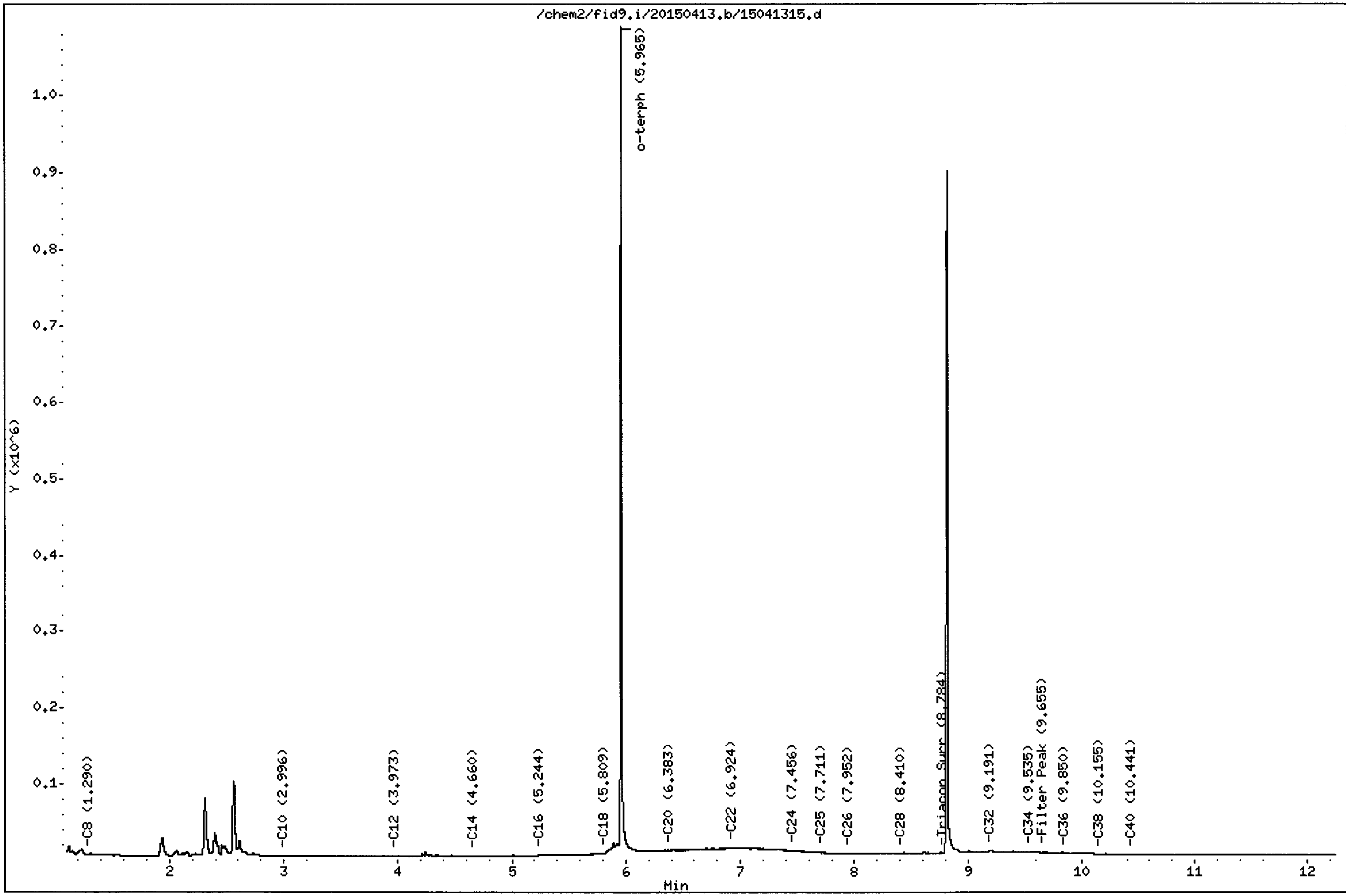
Analyst: MC Date: 4/14/15

Data File: /chem2/fid9.i/20150413.b/15041315.d
Date : 13-APR-2015 17:52
Client ID: EMHM003-Vault
Sample Info: AE90F

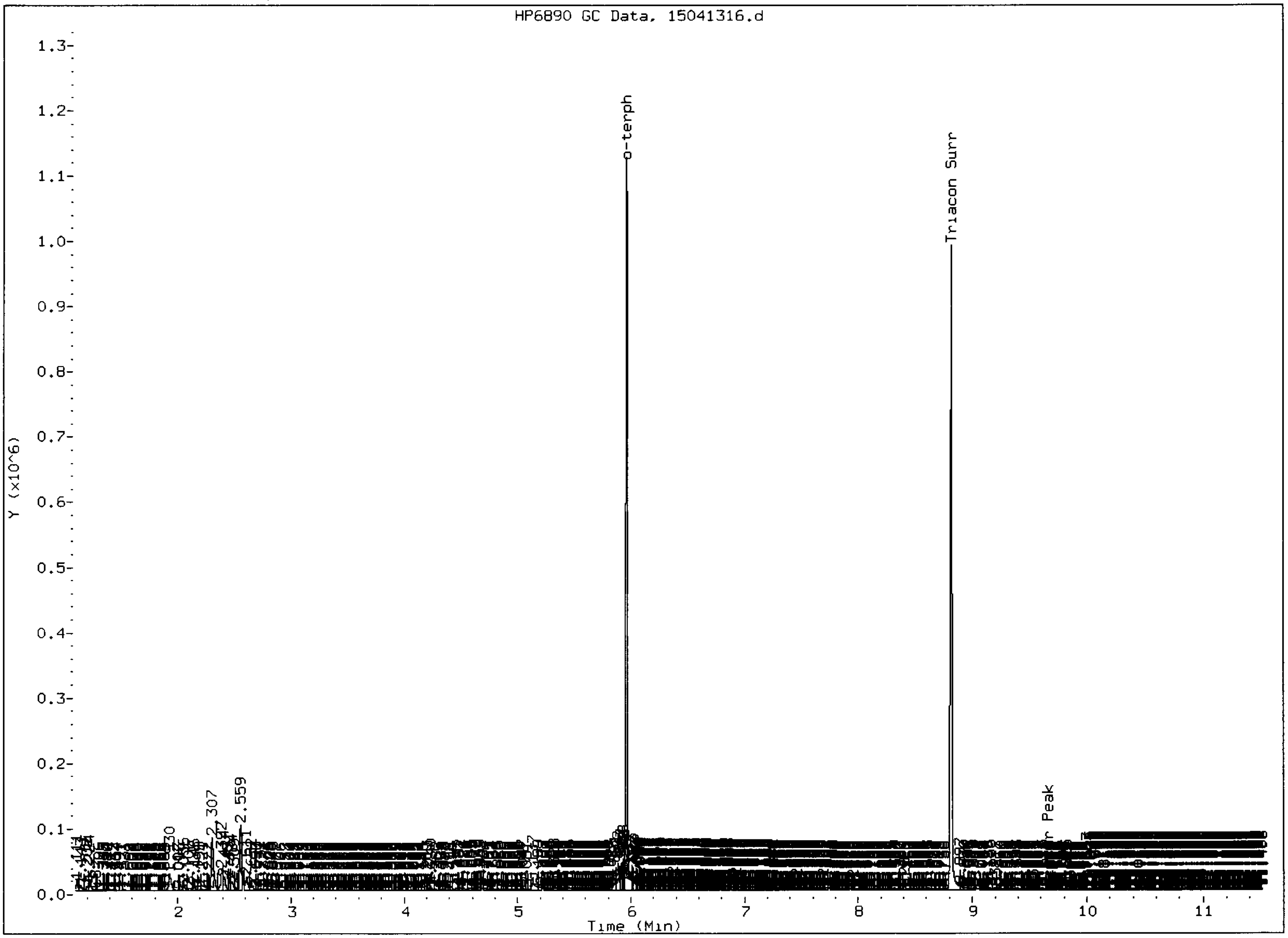
Column phase: RTX-1

Instrument: fid9.i

Operator: ML
Column diameter: 0.25



FID:9A-2C/RTX-1 AE90G FID:9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Surrogate Skimmed

Analyst: __________ Date: __________

Data File: /chem2/fid9.i/20150413.b/15041316.d
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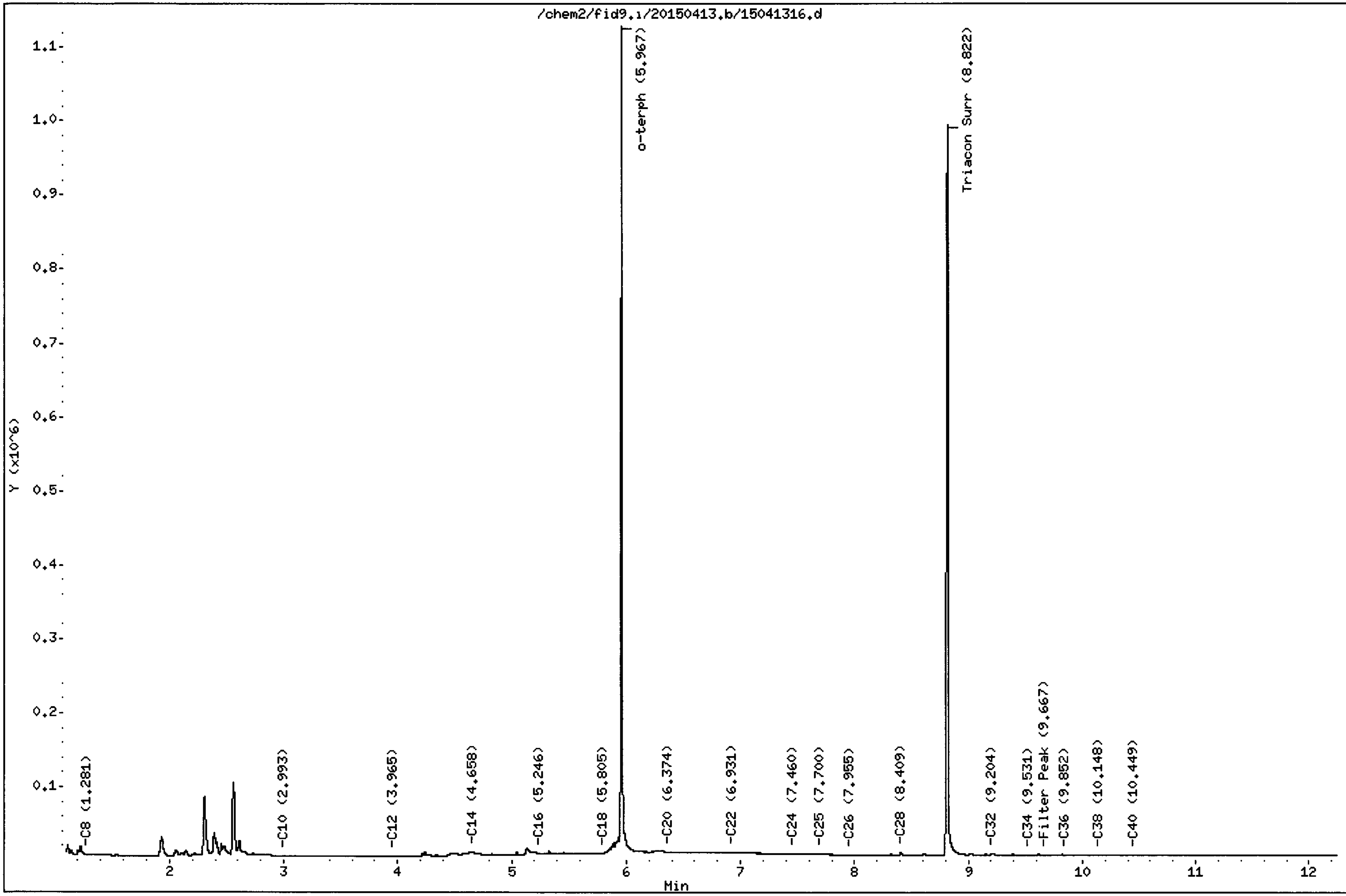
Sample Info: AE90G

Column phase: RTX-1

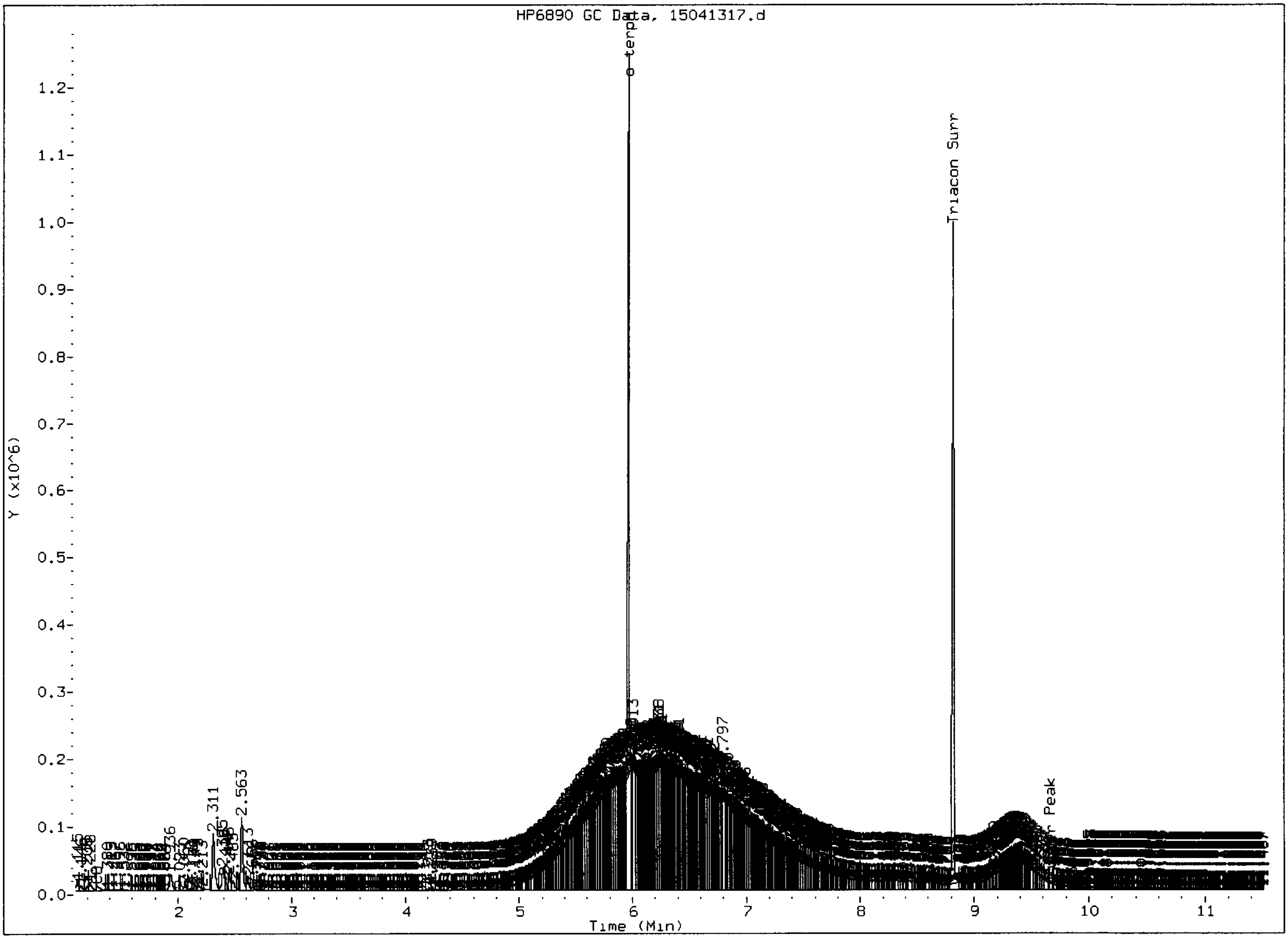
Instrument: fid9.i

Operator: ML
Column diameter: 0.25



AE90 · 00032

FID:9A-2C/RTX-1 AE90H FID:9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Surrogate Skimmed

Analyst: __________ Date: __________

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Instrument: fid9.i

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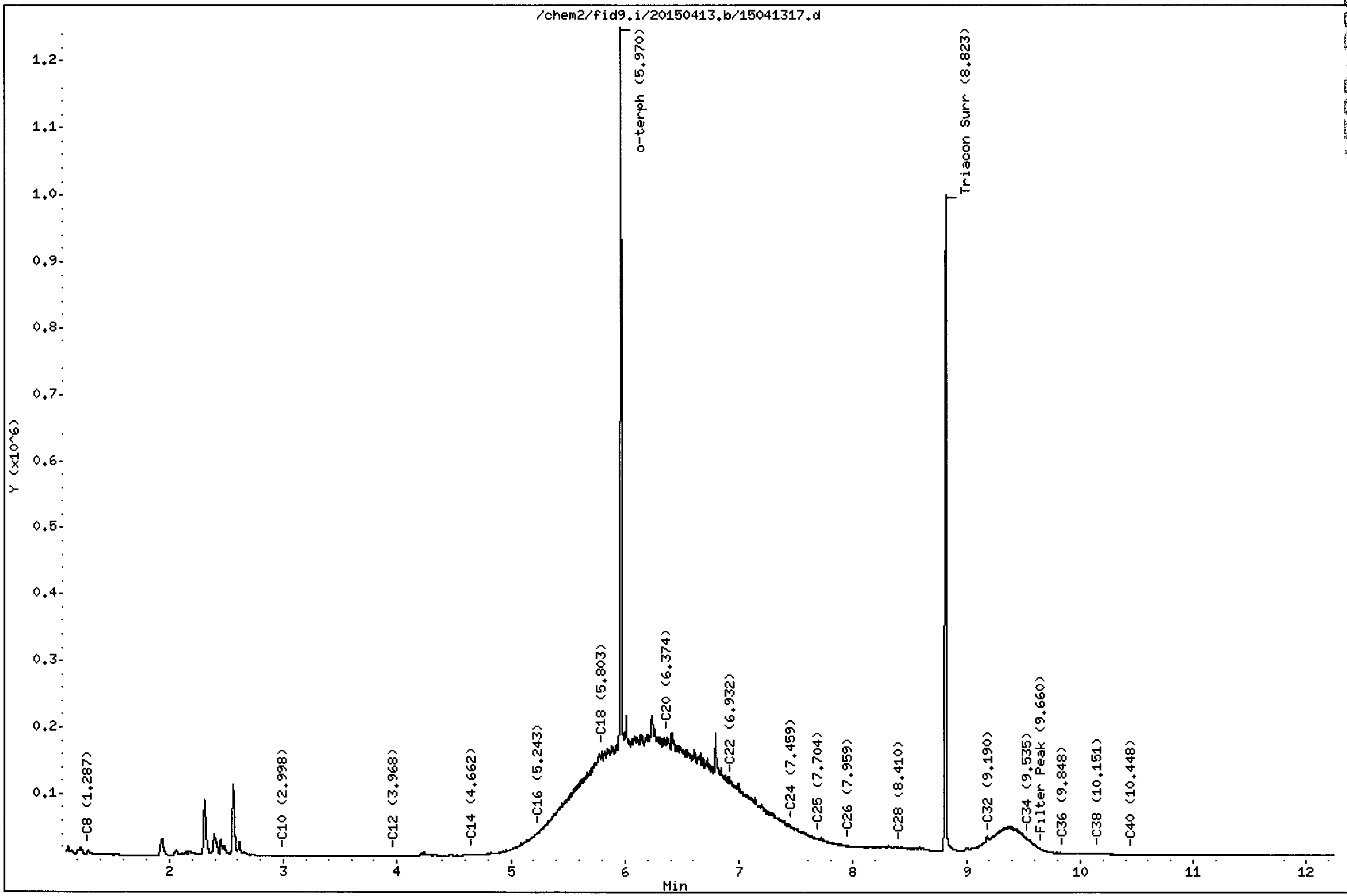

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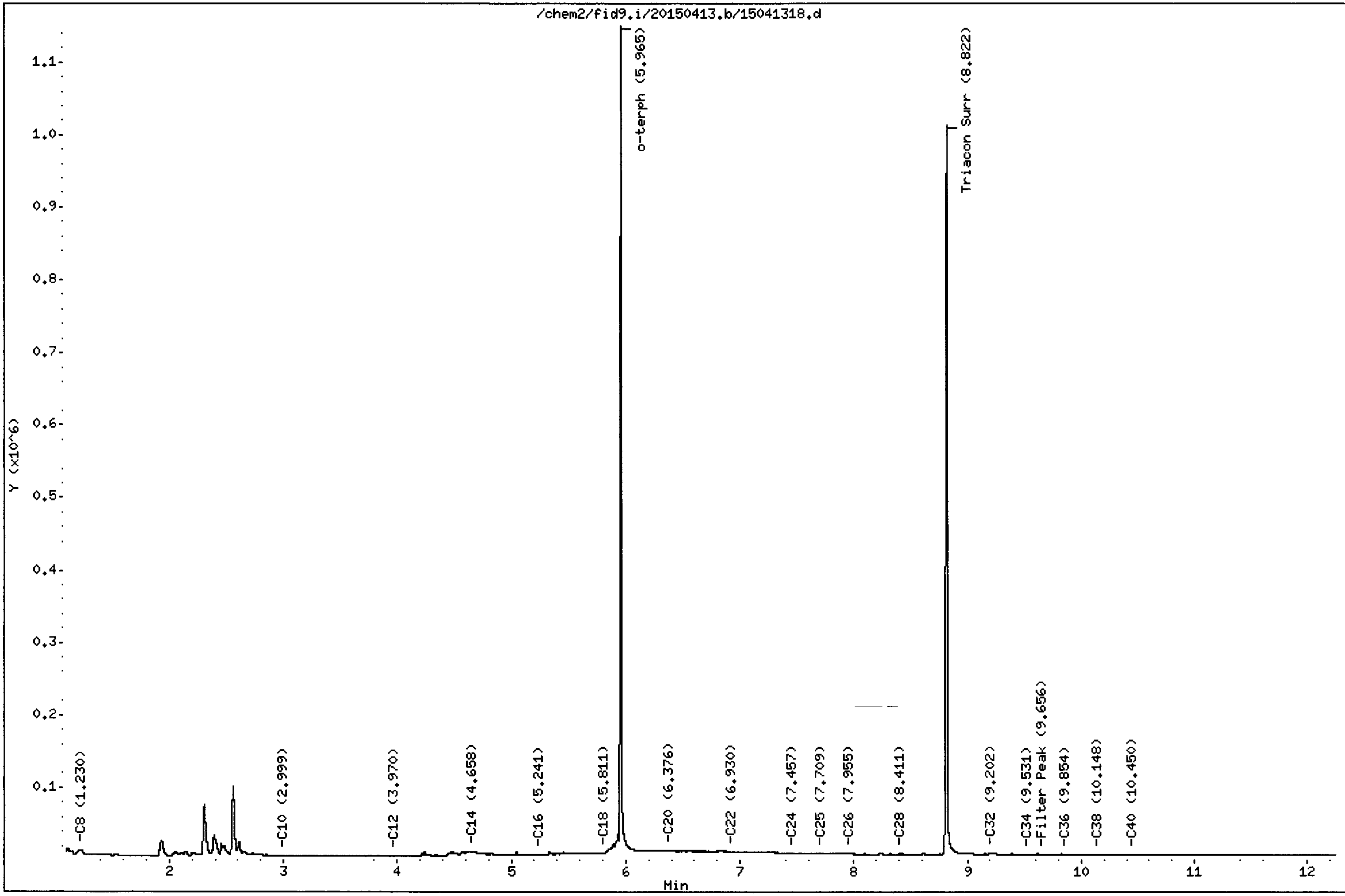
Instrument: fid9.i

Operator: ML

Column diameter: 0.25



AE90:00035

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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
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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
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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
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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

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LOQ	0	MDL	U		NWTPH-Dx	15-6975-AE90I	Analytical Resources Inc (ARI), Seattle WA

APPENDIX E

GROUNDWATER MONITORING REPORT 1ST QUARTERLY EVENT

APRIL 2015

Groundwater Monitoring Report
1st Quarterly Event – April 2015
PacifiCorp
Chehalis, WA Plant

Cardno Project 90369

Prepared for
KTA Associates, Inc.

And for
PacifiCorp

June 2015

Groundwater Monitoring Report
1st Quarterly Event – April 2015

FINAL REPORT

PacifiCorp
Chehalis, WA Plant

Cardno Project 90369

June 2015

Prepared for:

KTA, Associates, Inc.

And

PacifiCorp

Document Information

Prepared for	KTA Associates, Inc.
Project Name	Groundwater Monitoring Report 1st Quarterly Event – April 2015
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Date	08 June 2015

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Document Control

Version	Date	Author	Author Initials	Reviewer	Reviewer Initials
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Table of Contents

Appendices

Appendix A. Health and Safety Tailgate Forms

Appendix B. Monitoring Well Sampling and Water Quality Measurement Forms

Appendix C. Field Logbook Entries

Appendix D. Laboratory Chain-of-Custody Forms and Analytical Report

Tables

Figures

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).

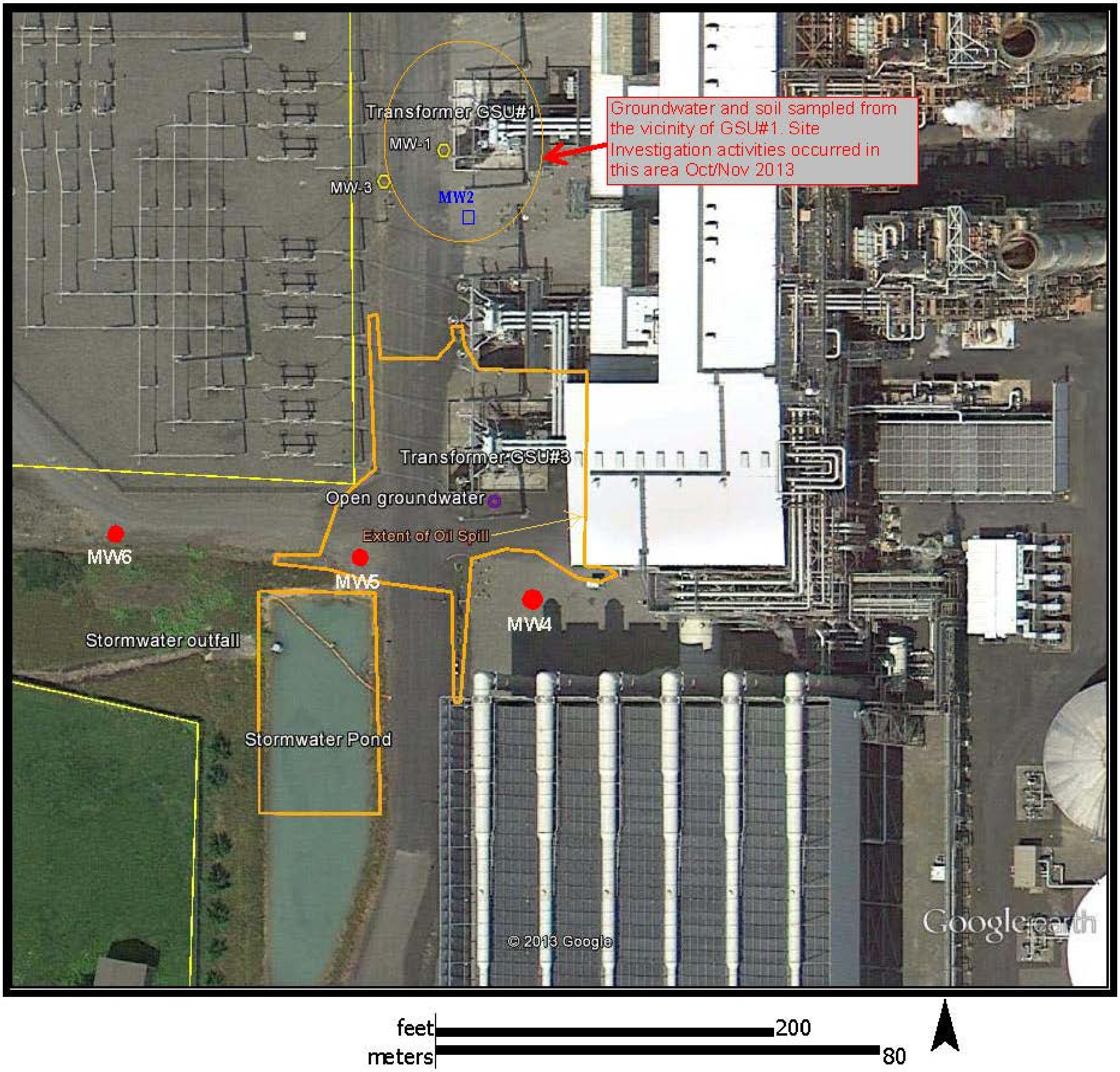
Prominent site features and well locations are shown on Figure 1.

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.



2015 Monitoring Well Sampling Results Summary

- MW-1 – Mineral Oil GW ND, DRO 120 ug/L
- MW-2 – No well installed
- MW-3 – Mineral Oil GW ND ug/L
- MW-4 – Mineral Oil GW ND ug/L
- MW-5 – Mineral Oil GW ND ug/L
- MW-6 – Mineral Oil GW ND ug/L

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 Geology

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 Hydrogeology

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 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 23rd through May 25th, 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 µg/L, which is below the MTCA Method A Groundwater Cleanup Level of 500 µg/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.

Table 1. Water Level Measurements and Groundwater Elevations

Location	Top PVC Well Casing (ft amsl)	Depth to Product (ft)	Static Water Level Measurements (ft)	Groundwater Elevation (ft amsl)
SW corner GSU-1 containment wall	100.00[1]	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

[1]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 3rd quarter 2015 (July – September), 4th quarter 2015 (December) and mid-late 1st 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 / re-developed 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.

Table 2 Summary of Water Quality Measurements

Well ID	Date / Sample Time	Average Purge Rate (ml/min)	Total Purge Volume (gal)	Temp. (C°)	pH	Sp. Cond (µS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)
MW-1	4/15/15 (1015)	~134	3.5	12.8	6.32	164	23.8	1.31
MW-3	4/15/15 (1115)	100	1.5	12.8	6.39	219.1	16.5	5.67
MW-4	4/15/15 (1220)	100	2	11.9	6.33	170.8	11.7	2.4
MW-5	4/15/15 (1330)	100	2	13.8	6.49	132.3	18.0	0.61
MW-6	4/15/15 (1415)	100	1.5	13.8	6.24	150.9	24.8	3.47

**All wells are 2-inch diameter Sch40 PVC

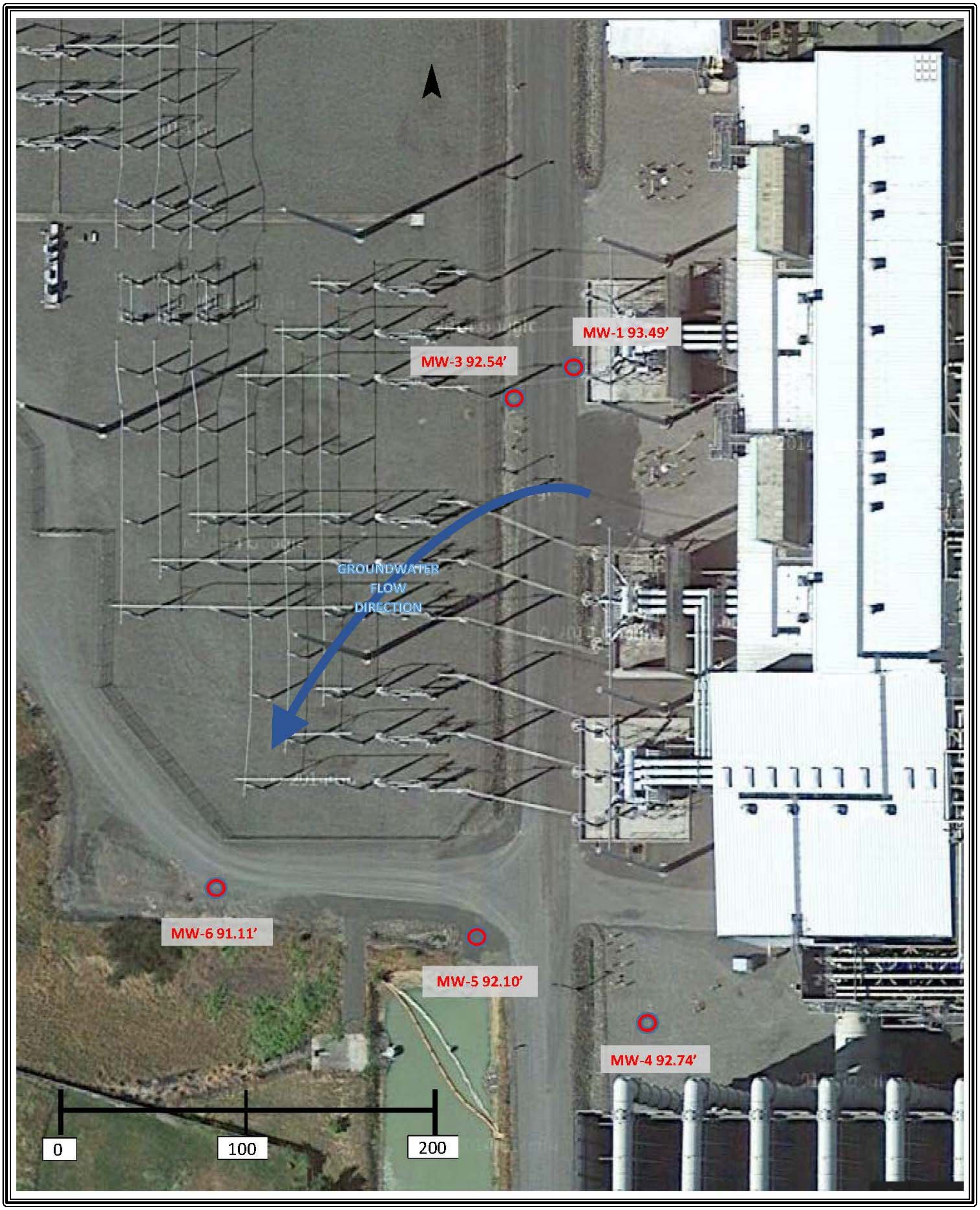


Figure 2. Groundwater Elevations and Flow Direction

Table 3. Groundwater Sample Collection Information

Sample Type	Analytical Parameter	Sample Matrix	Analytical Method	No. of Samples	No. of Duplicates
Quarterly Groundwater 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.

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 µg/L. DRO detection at this well was below the MTCA Method A Groundwater Cleanup Level for Mineral Oil of **500** µg/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.

Table 4. Groundwater Sampling Results

Sample ID	Parameter	Detection Limit µg/L	Reporting Limit µg/L	Result Value µg/L	Data 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

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.*

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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.

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.

Appendices

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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 tasks — Plant/site specific safety concerns — Overhead high voltage lines — Plant (radio) communications, check in w/ Control room & w/ our PC Project Manager contact (Jeremy Smith) — Slip-Trips-Falls — Housekeeping/Clean site — Lifting of heavy coolers — Wearing Proper PPE & known (potential) hazards ~~of~~ related to exposure to groundwater	
Signature of Attendees' : D Metallo [signature]	
"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 AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 15 APRIL 2015
Project Name: PACIFICORP GROUNDWATER INVESTIGATION
Site Name: PACIFICORP
Sample Location ID: MW-1
Unique ID: MW-1
Sampler(s) B. KWASNIEWSKI / D. METALLO
Parameters: NWTPH-Dx

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth NA
Purge Style: Peristaltic / Bladder / Submersible /Other
Mid Screen Depth (ft btoc): 10.50
Pump Intake (ft btoc) 10.50
QC Sample: Y / N Type:
TD = ~~10.55~~ 16.25

Time	Purge Rate (ml/min)	Total Purge ~~(gal)~~ mL	Depth to Water (ft btoc)	Temp. ©	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
8:55			[1] 4.27						Initial water level, pre-pumping
9:20	~200/MIN	~1-L	5.61	12.0	5.63	200.1	60.2	4.33	
9:25	~100	~500mL	5.94	12.2	6.02	171.2	53.3	3.45	
9:27	~250	~500mL	6.52	12.4	6.22	172.3	68.3	3.35	
9:30	~200	~500	6.98	12.4	6.33	172.7	66.6	2.80	
9:33	~200	~500	7.31	12.5	6.37	174.8	81.2	3.03	SLOWED PUMP RATE TO LEVEL 2
9:38	~100	~500	7.35	12.6	6.38	172.7	65.0	2.66	
9:42	~100	~500	7.40	12.7	6.37	171.2	48.5	2.31	
9:47	~100	~500	7.39	1[illegible].7	6.35	168.8	30.[illegible]	1.96	SPEED ON PUMP [illegible] .75
9:52	~100	~500	7.31	12.8	6.35	166.9	32.4	1.67	
9:57	~400	~500	7.37	12.8	6.32	163.5	22.6	1.18	
[1]Water Level Measurements in these boxes must match !									
			[1]						
(DUP)									

Additional Comments:

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LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 15 APRIL 2015
Project Name: PACIFICORP
Site Name:
Sample Location ID: MW-1 (CONTINUED)
Unique ID:
Sampler(s)

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:

Parameters:

Time	Purge Rate (ml/min)	Total Purge ~~(gal)~~ ML	Depth to Water (ft btoc)	Temp. ©	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
			1						Initial water level, pre-pumping
9:57	~100	~500	7.37	12.8	6.32	163.5	22.6	1.18	
10:02	~100	~500	7.37	12.8	6.33	164.4	24.2	1.33	
10:05	~100	~300	7.37	12.8	6.32	164.0	23.8	1.31	
1Water Level Measurements in these boxes must match !									
10:15		~3.5 GAL	1 4.27	12.8	6.32	164.0	23.8	1.31	
(DUP)									

Additional Comments:

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LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 4-15-2015
Project Name: PacifiCorp GW Investigation
Site Name: GSU-3
Sample Location ID: MW-3
Unique ID:
Sampler(s): B. Kwasnowski / D. Metallo
Parameters: TPH-Dx (Mineral Oil)

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth N/A
Purge Style: Peristaltic / Bladder / Submersible /Other
Mid Screen Depth (ft btoc): 11.5
Pump Intake (ft btoc) 11.5
QC Sample: Y / N Type:
TD = 19.21

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. ©	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1025			1 5.03						Initial water level, pre-pumping
10:35	~100	~500 mL	6.15	12.3	6.45	243.5	9.3	6.34	pump speed @ 1
10:40	~100	~500 mL	6.83	12.4	6.45	243.1	9.0	5.89	
10:45	~100	~500 mL	7.51	12.4	6.46	242.3	8.5	5.91	
10:50	~100	~500 mL	8.23	12.4	6.45	239.0	11.8	5.98	pump speed @ 0.5
[illegible]5	~100	~500 mL	8.98	12.6	6.38	210.6	21.3	5.87	
11:00	~100	~500 mL	9.67	12.6	6.37	213.8	16.5	5.75	
11:05	~100	~500 mL	10.35	12.8	6.40	215.3	~~14.6~~ 16.6	5.69	
[illegible]	~100	~500 mL	10.97	12.8	6.39	219.1	16.5	5.67	
[1]Water Level Measurements in these boxes must match !									
1115		~1.5	1 5.03	12.8	6.39	219.1	16.5	5.67	
(DUP) NA									

Additional Comments:

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LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 15 APRIL 2015
Project Name: PACIFICORP
Site Name:
Sample Location ID: MW-4
Unique ID: MW-4
Sampler(s) B KWASNOWSKI / D.METALLO
Parameters: NWTPH-Dx

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Peristaltic / Bladder / Submersible /Other
Mid Screen Depth (ft btoc): 14.82
Pump Intake (ft btoc) 14.82
QC Sample: Y N Type: DUPLICATE

TD = 24.82
(FROM TOP OF PVC CASING)

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. ©	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
11:45			[1] 4.90						Initial water level, pre-pumping
11:50	~100	500 mL	5.09	11.9	6.38	170.6	14.0	5.4	
11:55	~100	500 mL	5.06	11.9	6.36	170.7	13.0	3.5	
12:00	~100	500 mL	5.08	11.9	6.34	170.7	11.0	2.7	
12:05	~1[illegible]	500 mL	5.06	11.9	6.34	170.8	11.2	2.6	
12:10	[illegible]	500 mL	5.06	11.9	6.33	170.8	11.7	2.4	
[1]Water Level Measurements in these boxes must match !									
12:15		2-GAL	[1] 4.90	11.9	6.33	170.8	11.7	2.4	
(DUP) 12:20		" "							DUP ID: DUP-GW

Additional Comments:

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LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 15 April 2015
Project Name: PacifiCorp
Site Name:
Sample Location ID: MW-5
Unique ID: MW-5
Sampler(s) B. Kinasnonski D. Metallo
Parameters: NWTPH-Dx

PID Borehole Reading: N/A
LNAPL: Y __ N x DNAPL: Y __ N x Product Depth —
Purge Style: Peristaltic / Bladder / Submersible /Other
Mid Screen Depth (ft btoc): 15.3
Pump Intake (ft btoc) 15.3
QC Sample: Y N Type: N/A
TD = 25.3

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. ©	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
13:00			[1] 4.98						Initial water level, pre-pumping
13:05	~100	~500 mL	5.13	13.6	6.57	133.0	30.0	1.09	
13:10	~100	~500 mL	5.13	13.6	6.49	132.4	26.0	0.78	
13:15	~100	500 mL	5.13	13.7	6.49	132.5	19.7	0.71	
13:20	~100	~500 mL	5.13	13.7	6.49	131.5	18.6	0.69	
13:25	~100	~500 mL	5.14	13.8	6.49	132.3	18.0	0.61	
[1]Water Level Measurements in these boxes must match !									
13:30		2-GAL	[1] 4.98	13.8	6.49	132.3	18.0	0.61	
(DUP)									

Additional Comments:

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Shaping the Future

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 15 April 2015
Project Name: Pacific Corp
Site Name:
Sample Location ID: MW-6
Unique ID: MW-6
Sampler(s) B. Kwasnowski / D. Artallo
Parameters: NWTPH-Dx

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth —
Purge Style: Peristaltic / Bladder / Submersible /Other
Mid Screen Depth (ft btoc): 15.30
Pump Intake (ft btoc) 15.30
QC Sample: Y / N Type: N/A
TD = 15.30

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. ©	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
13:45			[1] 5.07						Initial water level, pre-pumping
13:50	~100	~500 mL	5.23	13.6	6.24	150.3	25.1	~~2.41~~ 3.93	
13:55	~100	~500 mL	5.27	13.1	6.22	150.3	30.2	3.61	
14:00	~100	~500 mL	5.27	13.8	6.22	150.3	25.9	3.56	
14:05	~100	~500 mL	5.29	13.9	6.23	150.7	25.4	~~4.~~ 3.55	
14:10	~100	~500 mL	5.29	13.8	6.24	150.9	24.8	3.47	
[1]Water Level Measurements in these boxes must match !									
14:15		1.5 Gal	[1] 5.07	13.8	6.24	150.9	24.8	3.47	
(DUP)									

Additional Comments:

APPENDIX C
FIELD LOGBOOK ENTRIES

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- Arrive at Cardno Shop ~0600, load gear, instruments, supplies, survey equip., pallet & tools

- Mob to PacifiCorp Chehalis Plant, arrive ~(0750), check in at front desk, contact Jeremy Smith, pick up bottles, etc that were left in his office since last week
  - check in w/ plant operator, let him know who we are & where/what we're doing today. We are assigned radio #14 for plant comm.

- Conduct brief Health & Safety Tailgate Meeting while parked at Admin Build.
  * See H&S Tailgate form for meeting details

- Mob around to west side of plant to get set-up for Groundwater sampling task. Today ~~is~~ DCM we will be collecting groundwater samples from each of the five existing site wells

DCM

and sending (hand delivering) samples to ARI Labs in Tukwila, WA. All samples will ~~be analyzed~~ DCM be analyzed for Mineral Oil via NWTPH-Dx. We will also conduct an elevation/level-only survey of the 5 wells

- Set up on MW-1 (~0850)
  - WL = 4.27' TD = 16.75
  - Sampl. Intake = 10.50
  - Peristaltic pump • NWTPH-Dx/mineral oil
  - No product via IFP gauging
  - Final WQ Readings =
    Temp = 12.8°C pH = 6.32
    Sp Cond = 164.0 μS/cm Turb = 23.8 NTU
    DO = 1.31 mg/L
    Purge Vol = ~3.5 gal
    Ave Purge Rate = ~100 ml/min
- Sample = MW-1 (1015)

*NOTE: Cascade Drilling left (2) empty 55-gal drums for us to place purge (GW) water into. Placed these drums onto a pallet that Cardno brought to the site - setting along south

DCM

side of GSU#3, near open culvert pipe.
Labeled drum w/ content-type, date,
owner name + content location origin.

— 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
• Ave Purge Rate = 100 ml/min
• Total Purge Vol = ~1.5 gals
• Final WQ Readings:

Temp.	pH	Sp. Cond.	Turb	D.O.
12.8	6.39	219.1	16.5	5.67

* units as per MW-1
- Sample = MW-3 (1115)

— Set up on MW-4 (~1140)
• Depth to product = NA WL = 4.90
• TD = 24.82 Sampl Intake Depth = 14.82
• Peristaltic pump • NWTPH-Dx / mineral oil
• Ave Purge Rate = 100 ml/min
• Total Purge Vol. = ~2 gals
• Final WQ Readings

Temp	pH	Sp. Cond.	Turb	D.O.
11.90	6.33	170.80	11.70	2.40

* Units as per MW-1 DCM

- MW-4 cont'd
- Sample = MW-4 (1215)

* Collected a duplicate sample at this location = DUP-GW (1220)

— Set up on MW-5 (~1255)
• Depth to prod. = NA WL. = 4.98'
• TD = 25.3 Sampl Intake Depth = 15.3
• Peristaltic pump • NWTPH-Dx / mineral oil
• Ave Purge Rate = 100 ml/min
• Total Purge Vol. = ~2 gals
• Final WQ Readings

Temp	pH	Sp. Cond.	Turb	D.O.
13.8	6.49	132.30	18.0	0.61

* Units as per MW-1
• Sample = MW-5 (1330)

— Set up on MW-6 (~1340)
• Depth to prod. = NA • WL = 5.07'
• TD = 25.30 Sampl Intake Depth = 15.30
• Peristaltic pump • NWTPH-Dx / Mineral Oil
• Ave Purge Rate = 100 ml/min
• Total Purge Vol. = 1.5 gals

DCM

MW-6, cont'ed

- Final WQ Readings (units as per MW-1)

Temp	pH	Sp. Cond	Turb	DO
13.80	6.24	150.90	24.80	3.47

- Sample = MW-6 1415

* Transferred all purge water (from all wells) to a single ~~55~~-gal drum (ref.'ed on pg 35). ~ 10.5 gals was generated from this 1st Quarterly GW Sampling Event. Drum lid was replaced + sealed w/ accompanying bolted ring band. Drum is on pallet. There is also (1) empty drum on this pallet.

— Set up and conducted an ~~elev~~ elevation survey (level only) of the top of PVC well casings at all 5 site wells. Used stadia rod and survey grade auto-level : Sokkia Unit model C32 Ser.# 128658 w/ 22x mag. to collect elev. shot data.

DCM

* See Pg 62 of this field log book for survey details

— Completed (2) loops of elev. shot readings closing each to within ≤ 0.01'

— Clean up around site, check samples against CoC for accuracy of times and labeling, etc., Samples iced and had been placed into an insulated cooler.

— Load all gear, remaining supplies, equip., sampler cooler, etc. into van.

— Made sure all well-heads were capped, locked and monument lids bolted.

— All drums lids secured, all drums labeled and on pallets.

— Check back in w/ PC Admin Build, return PC radio, let Jeremy Smith know we are finished sampling and

PacifiCorp 2015 4-15-15

ready to drive back to Seattle.

- Mob off site ~(~~1615~~ 1530 p.m.), drive to ARI Labs
  - arrive ARI Labs ~ (~1700)
  - drop off samples
  - all samples are in good condition @ ~4°C.

- 1st Quarterly GW Sampling Round Completed

DCM

4.15.15

PacifiCorp 2015 Field Survey

- Level elevation (relative) survey of all 5 monitoring wells; MW-1, 3, 4, 5 & 6
- Will use the same (assigned) 100.00 elv. point from 2013. SW corner, top of concrete (~2' high) retaining wall for GSU-1.
- Set up tripod near SE corner of BPA Yard Fence, just to north of MW-5

Top PVC casing elev. shots

MW6 = 6.96'	6.95' (better shot)	
MW5 = 6.05'	6.05'	
① MW 4 = 5.49'	5.49'	① 5.49'
MW 3 = 5.56'	5.57'	(better shot)
MW 1 = 5.37'	5.37'	
100' corner = 3.13	3.13'	
1st loop of shots	~~Se~~ DM 2ND loop of shots	

Instrument Ht. = 103.13

Relative Elev's for Well Casings (I.H. - Shot)

MW1 = 97.76' MW4 = 97.64' MW6 = 96.18'

MW3 = 97.57' MW5 = 97.08'

APPENDIX D

LABORTORY CHAIN OF CUSTODY FORMS

AND

ANALYTICAL REPORT

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Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number:	Turn-around Requested: STANDARD	Page:	of
ARI Client Company: KTA, INC.	Phone: 360-250-7694	Date:	Ice Present?
Client Contact: LENORA WESTBROOK		No. of Coolers:	Cooler Temps:
Client Project Name: PACIFICORP - CHEHALIS			
Client Project #:	Samplers: D. METALLO, B. KWASNOWSKI		

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: NWTPH-Dx (MINERAL OIL)								Notes/Comments
MW-1	4/15/15	10:15	W	2	X								
MW-3	4/15/15	11:15	W	2	X								
MW-4	4/15/15	12:15	W	2	X								
MW-5	4/15/15	13:30	W	2	X								
MW-6	4/15/15	14:15	W	2	X								
DUP-GW	4/15/15	12:20	W	2	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: BRAD KWASNOWSKI	Printed Name: Chris Atwell	Printed Name:	Printed Name:
	Company: CARDNO	Company: ARI	Company:	Company:
	Date & Time: 4/15/15 @ 17:00	Date & Time: 4-15-15 1700	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.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

20 April 2015

Lenora Westbrook
KTA Associates, Inc.
3530 32nd 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

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number: AEJ6	Turn-around Requested: STANDARD	Page	of
ARI Client Company: KTA, INC.	Phone: 360-250-7694	Date	Ice Present? Y
Client Contact: LENORA WESTBROOK		No of Coolers 1	Cooler Temps: 2.7
Client Project Name: PACIFICORP - CHEHALIS			
Client Project #:	Samplers: D METALLO, B. KWASNOWSKI		

Sample ID	Date	Time	Matrix	No Containers	Analysis Requested: NWTPH-Dx (Mineral oil)								Notes/Comments
MW-1	4/15/15	10:15	W	2	X								
MW-3	4/15/15	11:15	W	2	X								
MW-4	4/15/15	12:15	W	2	X								
MW-5	4/15/15	13:30	W	2	X								
MW-6	4/15/15	14:15	W	2	X								
Dup-GW	4/15/15	12:20	W	2	X								

Comments/Special Instructions	Relinquished by	Received by	Relinquished by	Received by
	(Signature)	(Signature)	(Signature)	(Signature)
	Printed Name: Brian Kwasnowski	Printed Name: Chris Atwell	Printed Name	Printed Name
	Company: Carono	Company: ARI	Company	Company
	Date & Time: 4/15/15 @ 17:00	Date & Time: 4-15-15 1700	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

AEJ6 : 00002

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client Cardno

Project Name Pacific Corp Chehalis

COC No(s) NA

Delivered by Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No AEJ6

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? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 2.7
Time 1700

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID# 90877952

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? YES NO

What kind of packing material was used? Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other

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)? YES 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? YES NO

Date VOC Trip Blank was made at ARI. NA

Was Sample Split by ARI NA YES Date/Time Equipment Split by

Samples Logged by CA Date 4-15-15 Time 1713

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By Date

Small Air Bubbles ~ 2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AEJ6
Client: Cardno-TEC
Project Event: N/A
Project Name: Pacific Corp Chehalis

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	MW-1	AEJ6A	15-7423	Water	04/15/15 10:15	04/15/15 17:00
2.	MW-3	AEJ6B	15-7424	Water	04/15/15 11:15	04/15/15 17:00
3.	MW-4	AEJ6C	15-7425	Water	04/15/15 12:15	04/15/15 17:00
4.	MW-5	AEJ6D	15-7426	Water	04/15/15 13:30	04/15/15 17:00
5.	MW-6	AEJ6E	15-7427	Water	04/15/15 14:15	04/15/15 17:00
6.	Dup-GW	AEJ6F	15-7428	Water	04/15/15 12:20	04/15/15 17:00

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.

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)**

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

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3510C
Page 1 of 1

QC Report No: AEJ6-Cardno-TEC
Project: Pacific Corp Chehalis

Matrix: Water

Date Received: 04/15/15

Data Release Authorized: MW
Reported: 04/20/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-041715	Method Blank	04/17/15	04/17/15	1.00	Diesel Range	0.10	< 0.10 U
15-7423	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		93.7%
AEJ6A	MW-1	04/17/15	04/17/15	1.00	**Diesel Range**	**0.10**	**0.12**
15-7423	HC ID: **DRO**		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		92.0%
AEJ6B	MW-3	04/17/15	04/17/15	1.00	Diesel Range	0.10	< 0.10 U
15-7424	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		98.5%
AEJ6C	MW-4	04/17/15	04/17/15	1.00	Diesel Range	0.10	< 0.10 U
15-7425	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		99.4%
AEJ6D	MW-5	04/17/15	04/17/15	1.00	Diesel Range	0.10	< 0.10 U
15-7426	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		102%
AEJ6E	MW-6	04/17/15	04/17/15	1.00	Diesel Range	0.10	< 0.10 U
15-7427	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		102%
AEJ6F	Dup-GW	04/17/15	04/17/15	1.00	Diesel Range	0.10	< 0.10 U
15-7428	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		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.

ANALYTICAL RESOURCES INCORPORATED

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-1	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

FORM-II TPHD

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-041715
LAB CONTROL

Lab Sample ID: LCS-041715
LIMS ID: 15-7423
Matrix: Water
Data Release Authorized: MW
Reported: 04/20/15

QC Report No: AEJ6-Cardno-TEC
Project: Pacific Corp Chehalis

Date Sampled: NA
Date Received: NA

Date Extracted: 04/17/15
Date Analyzed: 04/17/15 17:32
Instrument/Analyst: FID9/ML

Sample Amount: 500 mL
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	2.91	3.00	97.0%

TPHD Surrogate Recovery

o-Terphenyl	82.9%

Results reported in mg/L

FORM III

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: AEJ6
Project: Pacific Corp Chehalis

Matrix: Water
Date Received: 04/15/15

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
15-7423-041715MB1	Method Blank	500 mL	1.00 mL	04/17/15
15-7423-041715LCS1	Lab Control	500 mL	1.00 mL	04/17/15
15-7423-AEJ6A	MW-1	500 mL	1.00 mL	04/17/15
15-7424-AEJ6B	MW-3	500 mL	1.00 mL	04/17/15
15-7425-AEJ6C	MW-4	500 mL	1.00 mL	04/17/15
15-7426-AEJ6D	MW-5	500 mL	1.00 mL	04/17/15
15-7427-AEJ6E	MW-6	500 mL	1.00 mL	04/17/15
15-7428-AEJ6F	Dup-GW	500 mL	1.00 mL	04/17/15

Data File: /chem2/fid9.i/20150417.b/15041708.d

Date : 17-APR-2015 17:11

Client ID: AEJ6MBW1

Sample Info: AEJ6MBW1

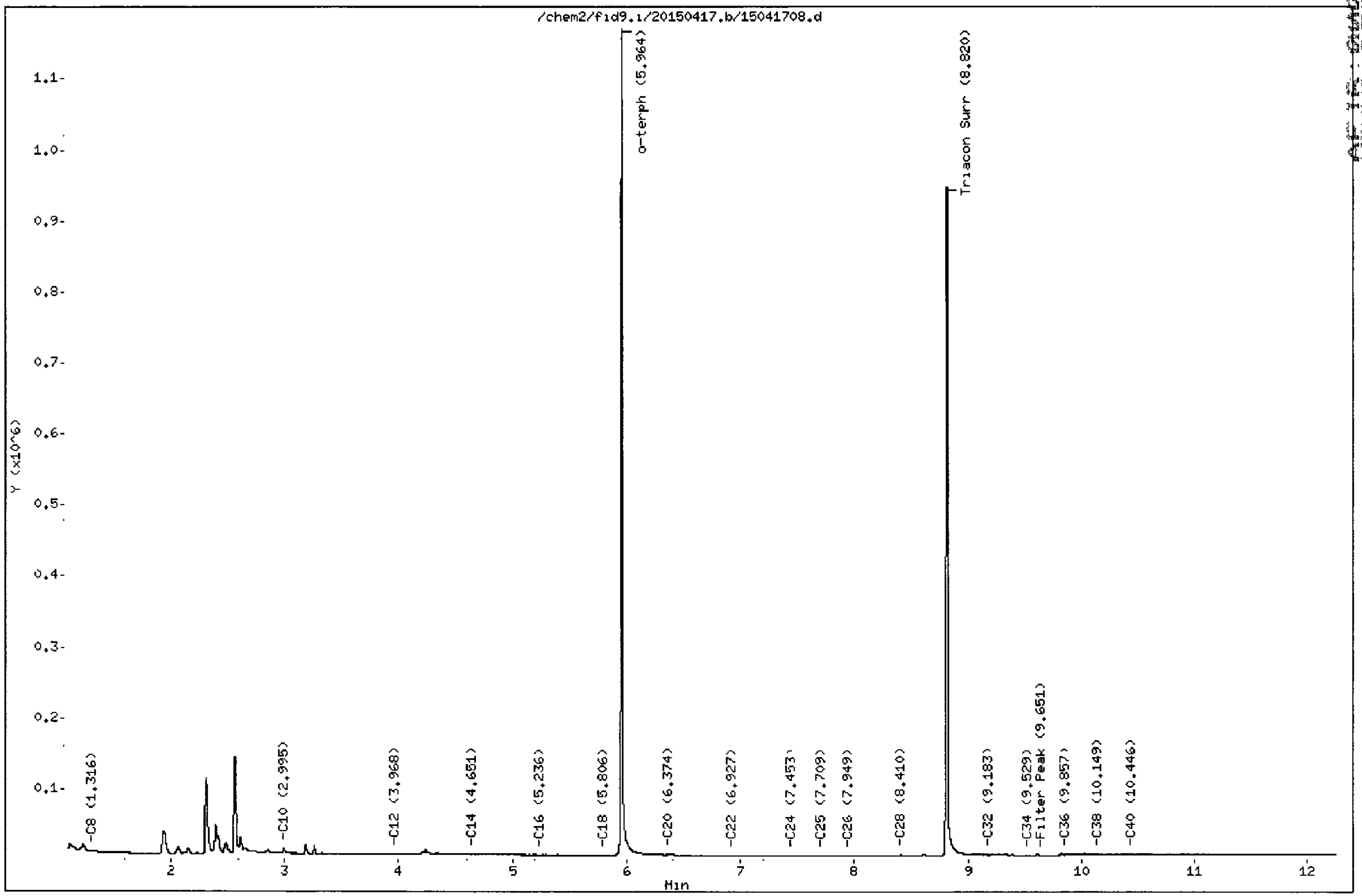
Column phase: RTX-1

Page 1

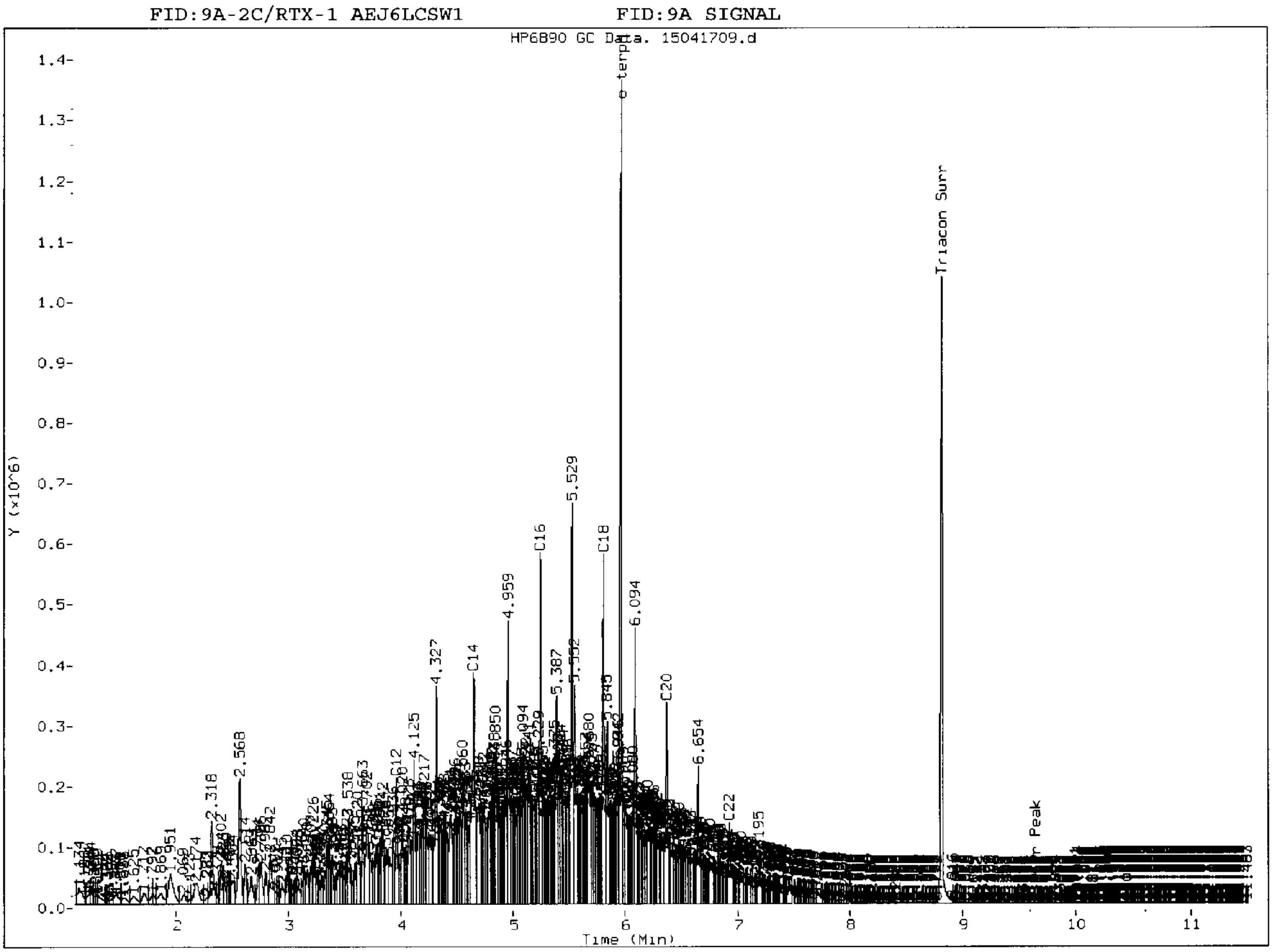
Instrument: fid9.i

Operator: ML

Column diameter: 0.25



AE 16 : 00012



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Surrogate Skimmed

Analyst: ML

Date: 4/20/15

Data File: /chem2/fid9.i/20150417.b/15041709.d

Date : 17-APR-2015 17:32

Client ID: AEJ6LCSW1

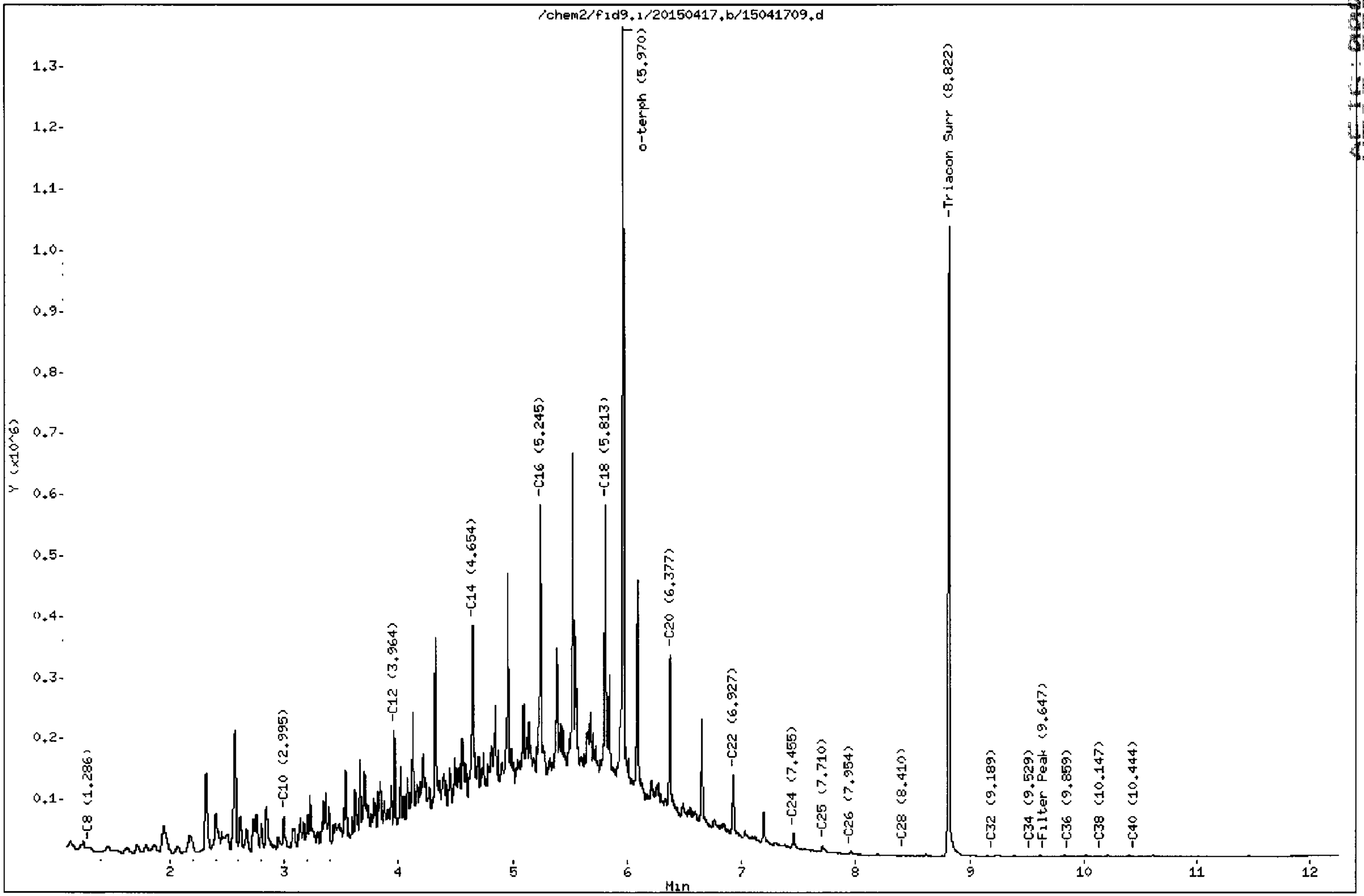
Sample Info: AEJ6LCSW1

Column phase: RTX-1

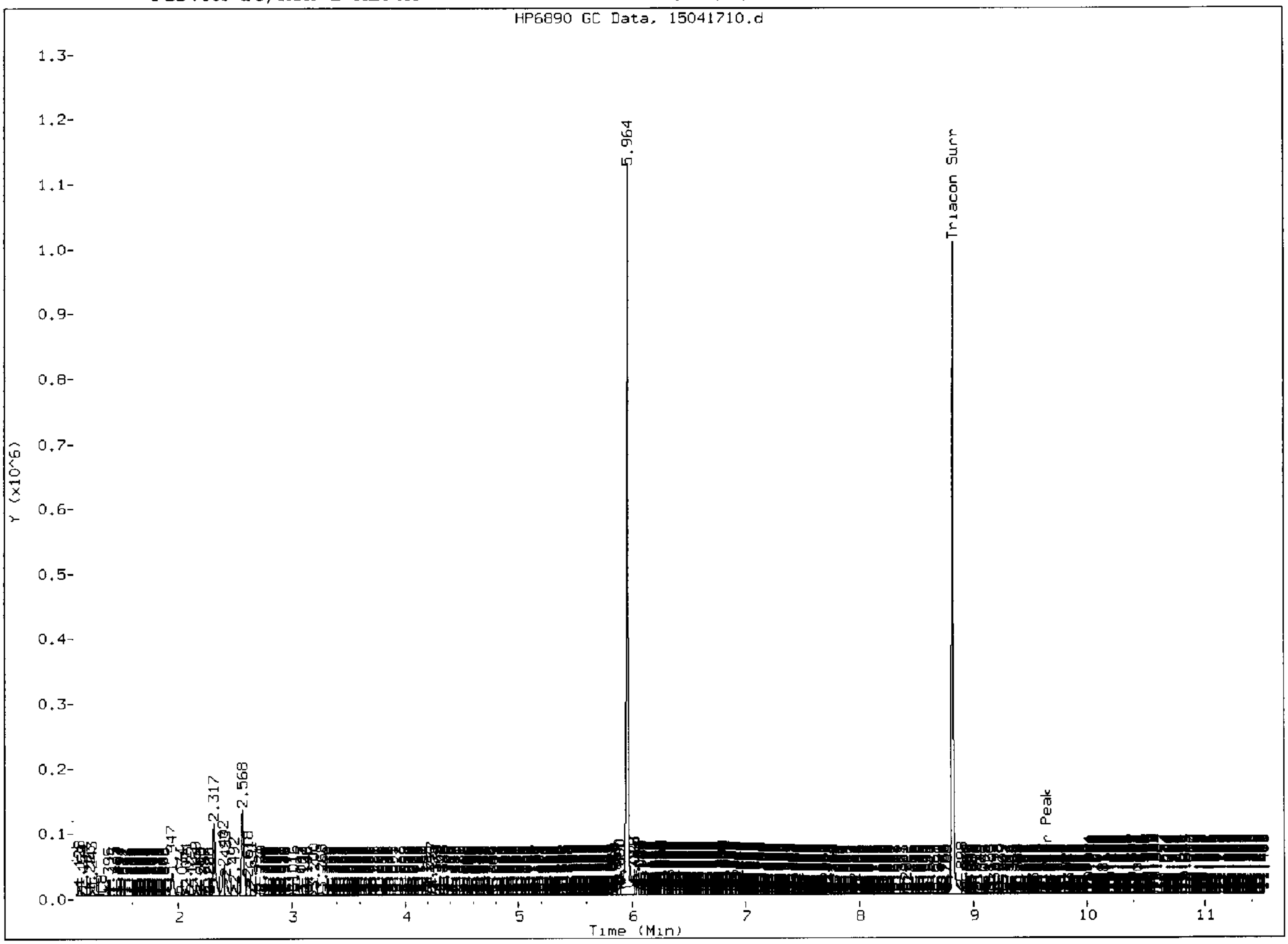
Instrument: fid9.i

Operator: ML

Column diameter: 0.25



FID:9A-2C/RTX-1 AEJ6A FID:9A SIGNAL



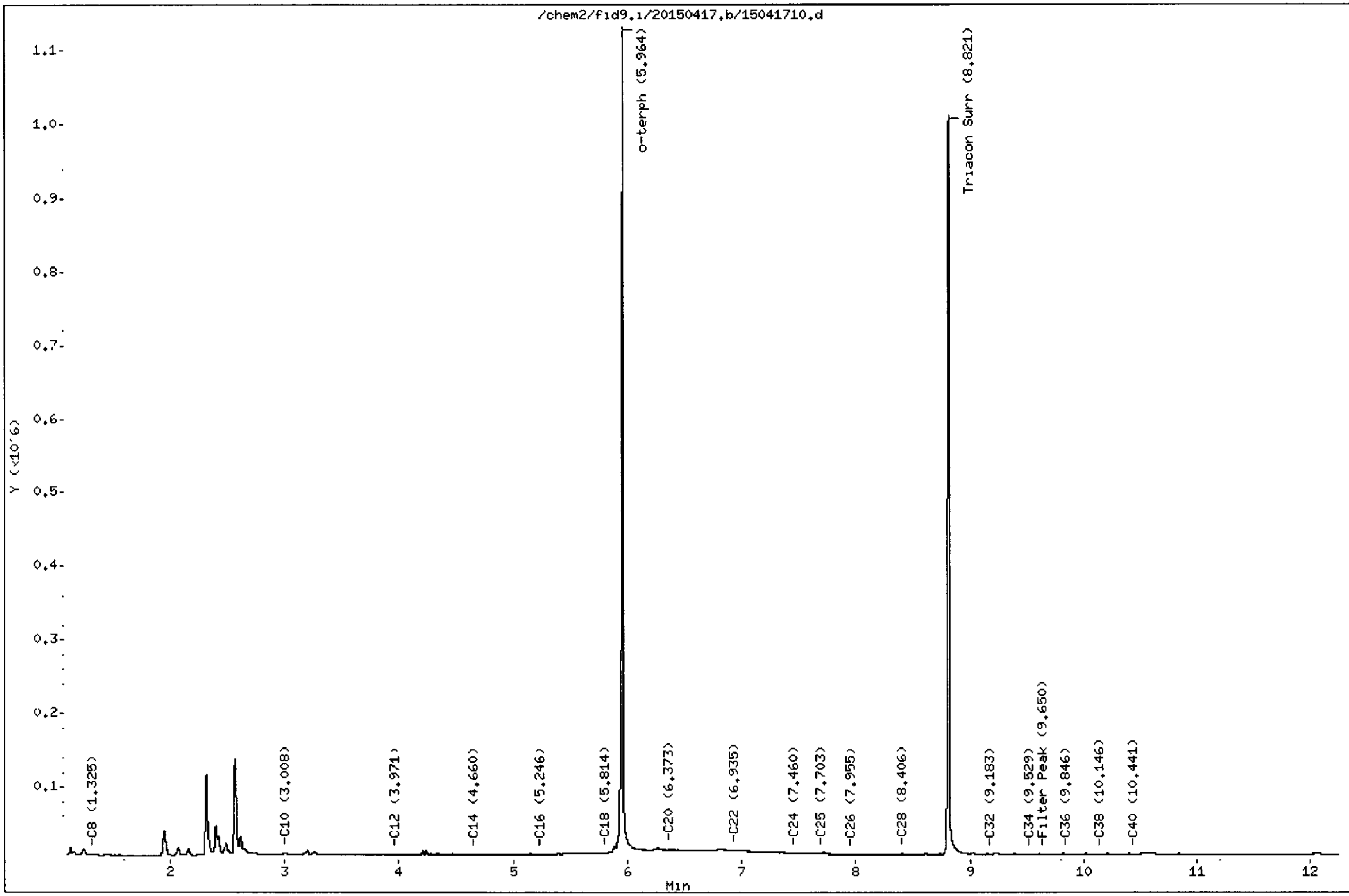
MANUAL INTEGRATION

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/15041710.d
Date : 17-APR-2015 17:53
Client ID: MW-1
Sample Info: AEJ6A
Column phase: RTX-1

Page 1
Instrument: fid9.i
Operator: ML
Column diameter: 0.25



AEJ6 : 00015

Data File: /chem2/fid9.i/20150417.b/15041711.d

Page 1

Date : 17-APR-2015 18:14

Client ID: MW-3

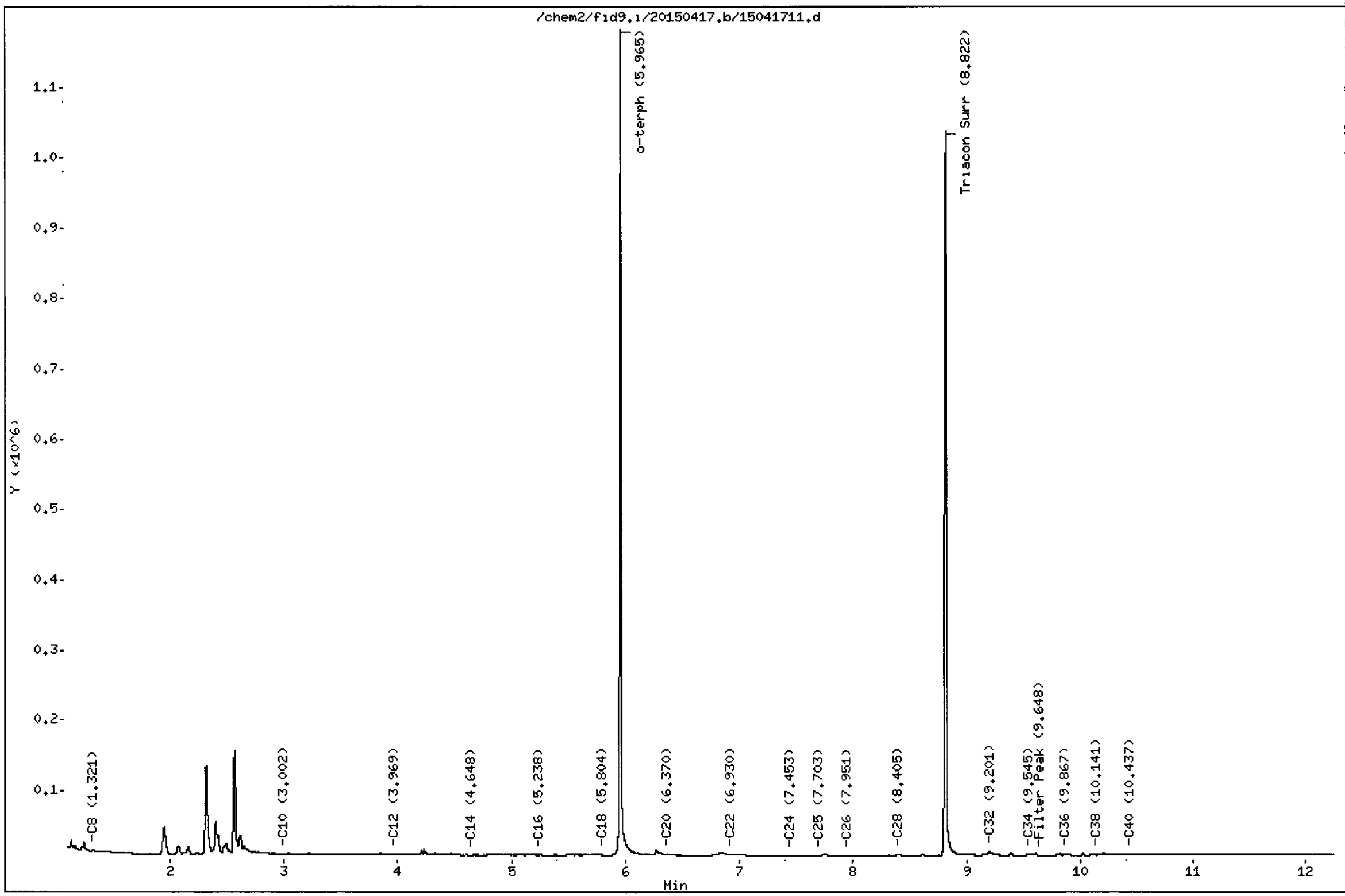
Instrument: fid9.i

Sample Info: AEJ6B

Operator: ML

Column phase: RTX-1

Column diameter: 0.25



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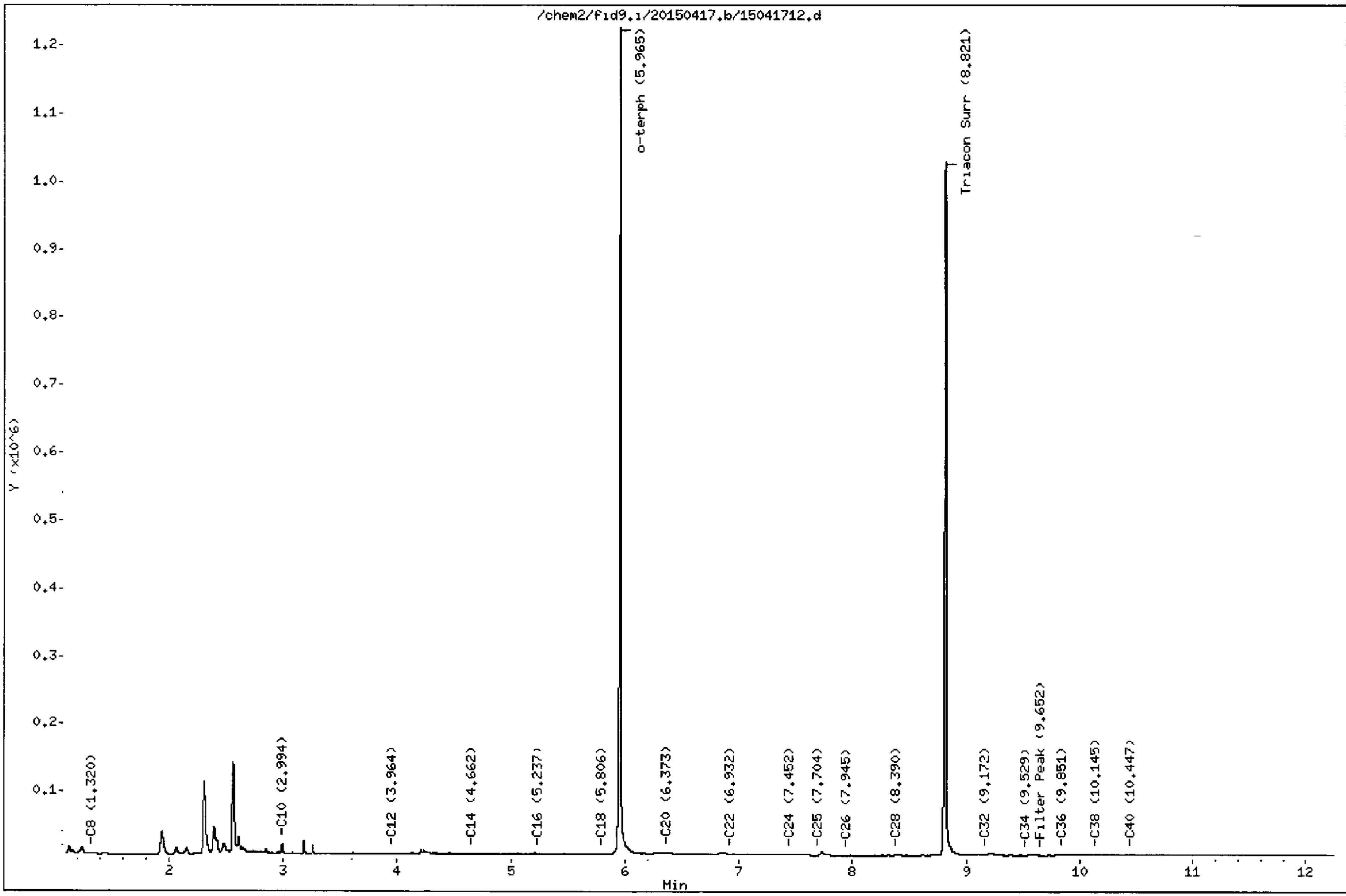

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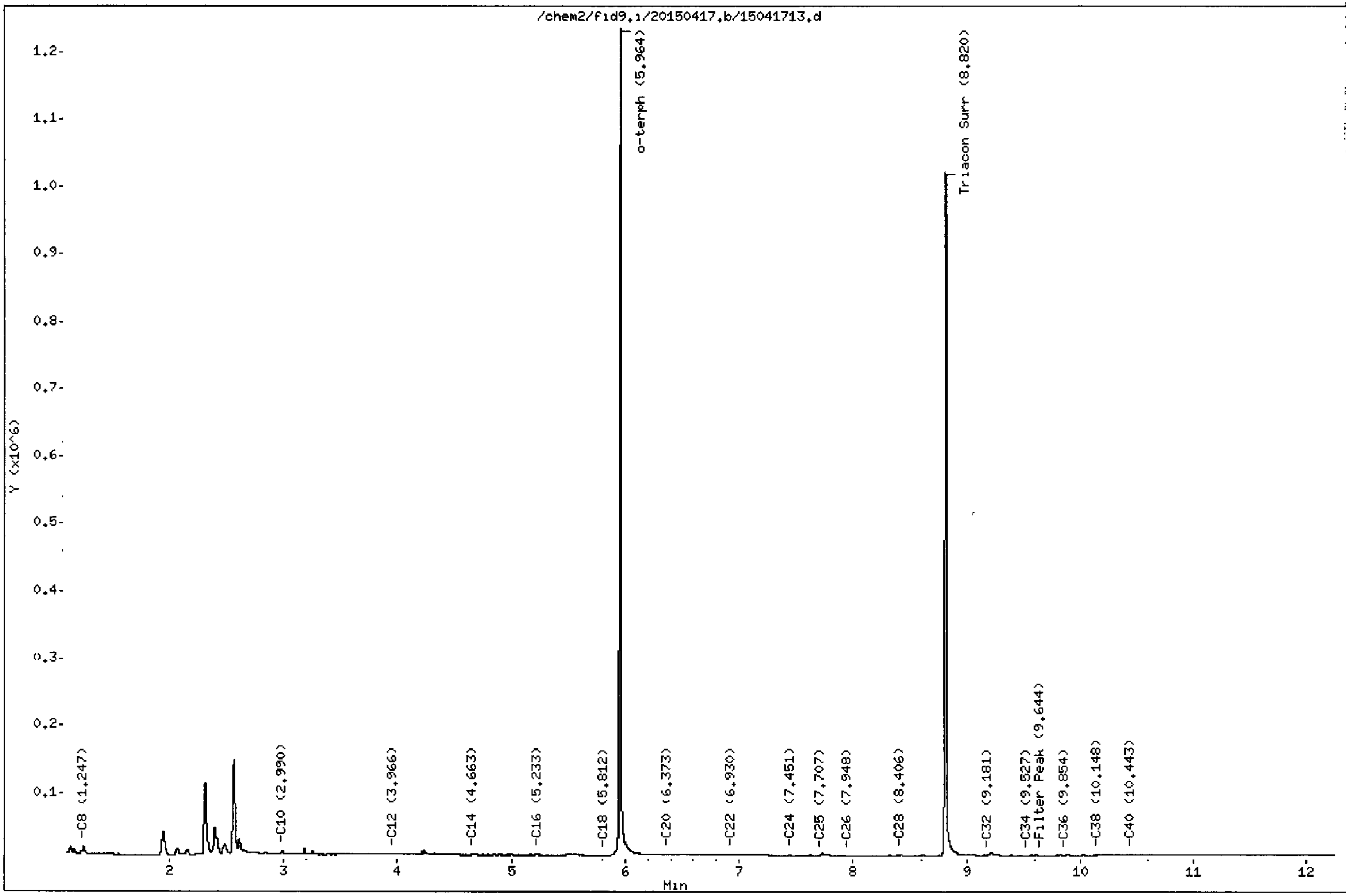

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Sample Info: AEJ6E

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Page 1

Instrument: fid9.i

Operator: ML

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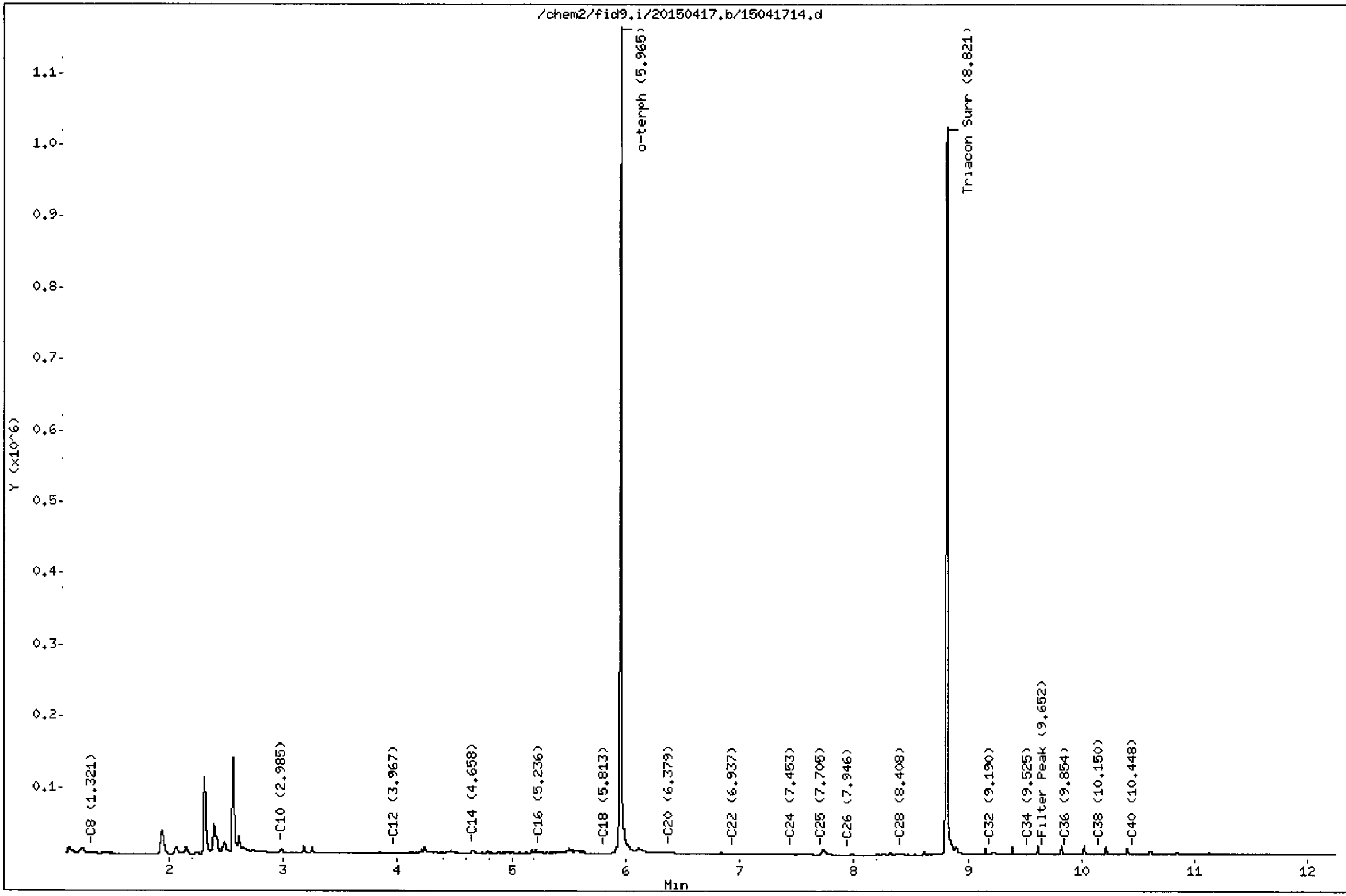

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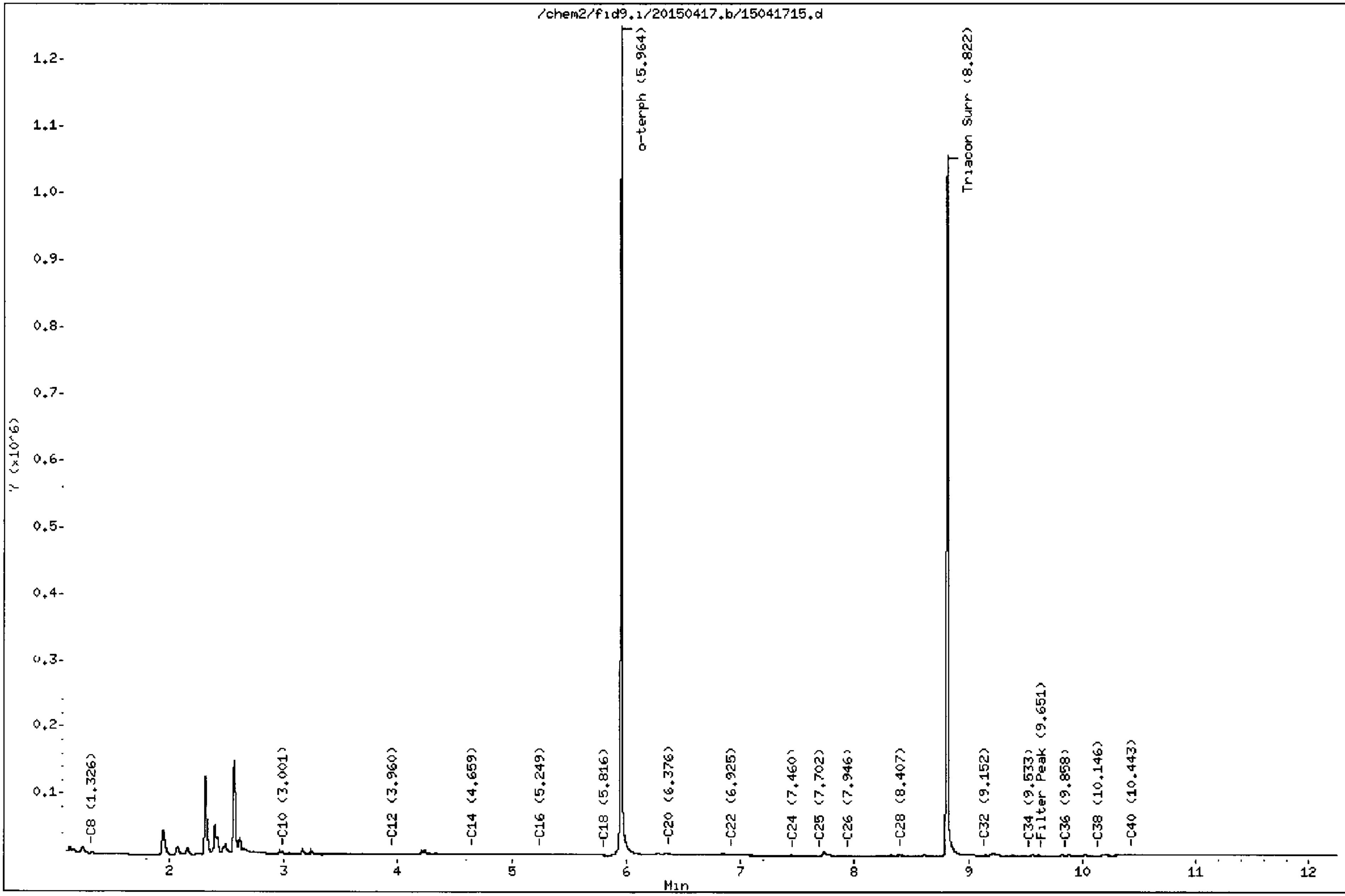

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APPENDIX F

GROUNDWATER MONITORING REPORT 2^{ND} QUARTERLY EVENT

JULY 2015

Groundwater Monitoring Report
2nd Quarterly Event – July 2015
PacifiCorp
Chehalis, WA Plant

Cardno Project 90369

Prepared for
KTA Associates, Inc.

And for
PacifiCorp

July 2015

Groundwater Monitoring Report
2nd Quarterly Event – July 2015

FINAL REPORT

PacifiCorp
Chehalis, WA Plant

Cardno Project 90369

July 2015

Prepared for:

KTA, Associates, Inc.

And

PacifiCorp

Document Information

Prepared for	KTA Associates, Inc.
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Document Control

Version	Date	Author	Author Initials	Reviewer	Reviewer Initials
001	7/24/2015	Dave Metallo	DCM	L. Westbrook (KTA)	

Table of Contents

Appendices

Tables

Figures

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).

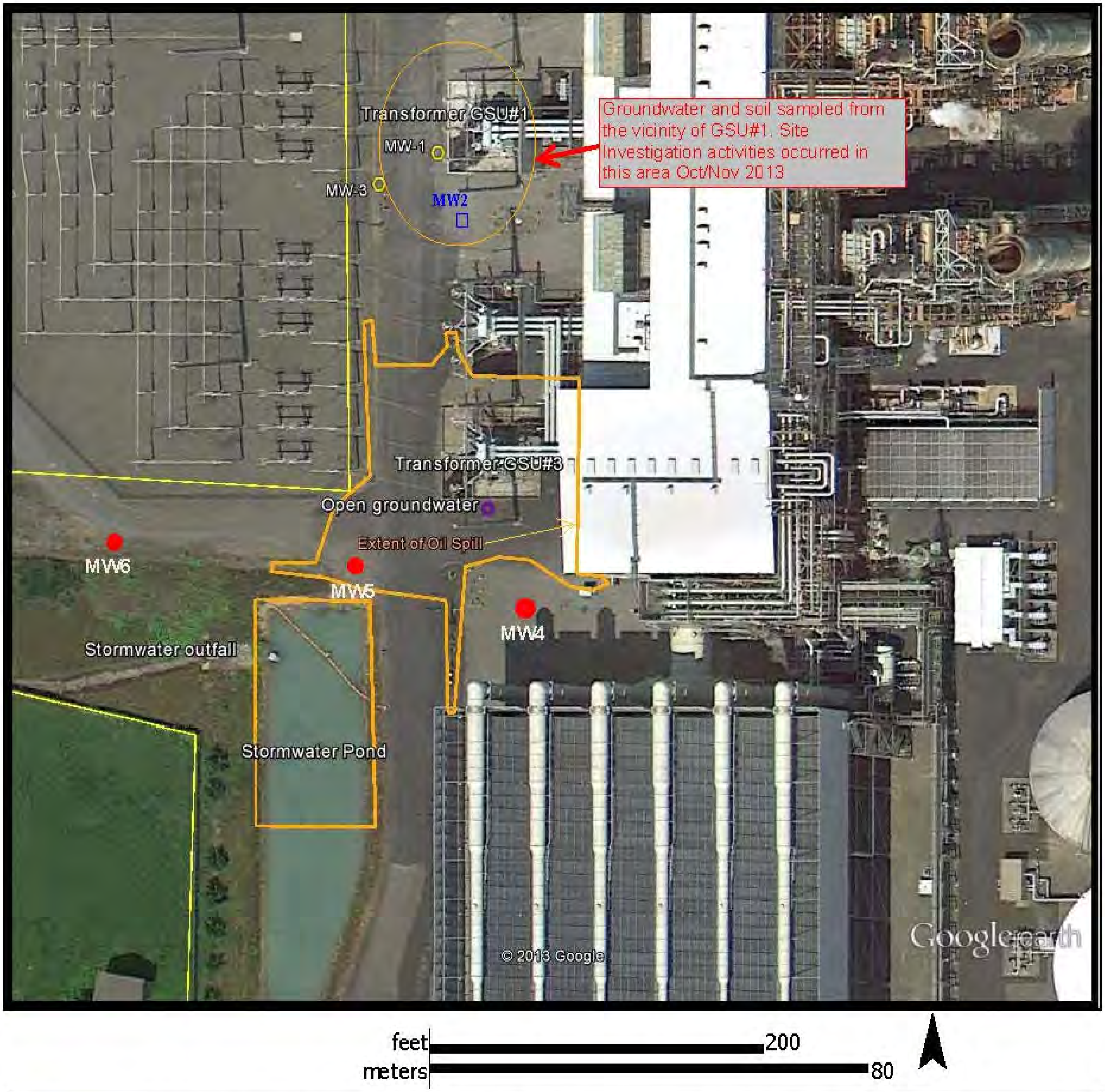
Prominent site features and well locations are shown on Figure 1.

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.



2nd Quarterly Groundwater Sampling Results Summary – July, 2015

- MW-1 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-3 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-4 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-5 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-6 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-2; this location was not developed as a permanent well, sampled only once in 2013

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 Geology

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 Hydrogeology

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 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 23rd through May 25th, 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 µg/L, which are below the MTCA Method A Groundwater Cleanup Level of **500 µg/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.

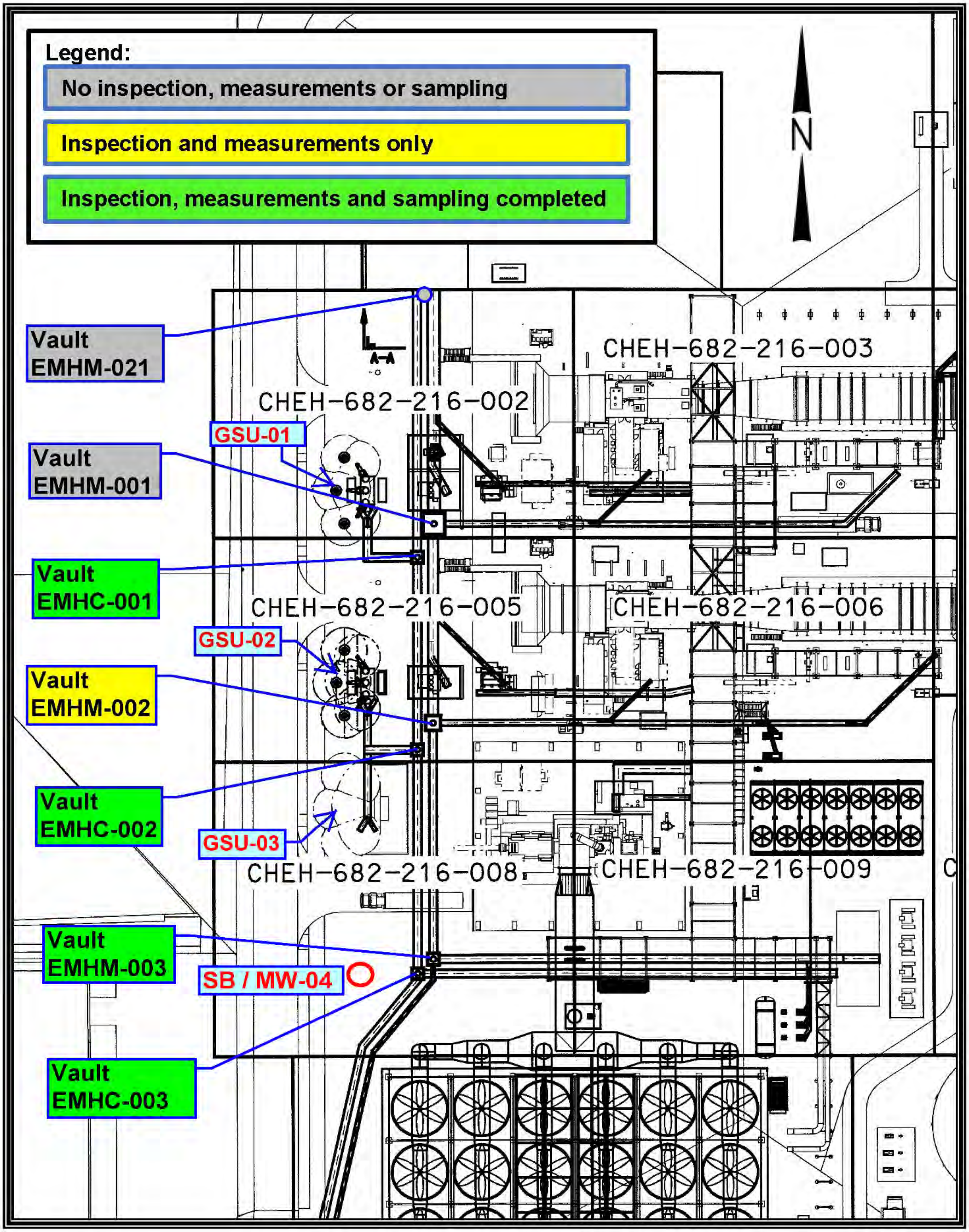


Figure 2. Electrical Vault / In-Flow Water Sampling Locations

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 Health and Safety

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 (≤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.

Table 1. Water Level Measurements and Groundwater Elevations

Location	Top PVC Well Casing (ft amsl)	Depth to Product (ft)	Static Water Level Measurements (ft)	Groundwater Elevation (ft amsl)
SW corner GSU-1 containment wall	100.00[1]	NA	NA	NA
MW-1	97.76	Not Detected	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

[1]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 4th quarter 2015 (December) and mid-late 1st 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 / re-developed 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.

Table 2 Summary of Water Quality Measurements

Well ID	Date / Sample Time	Average Purge Rate (ml/min)	Total Purge Volume (gal)	Temp. (C°)	pH	Sp. Cond (µS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)
[a]MW-1	7/8/15 (1040)	100	1.25	17.0	6.66	183.60	4.60	0.77
MW-3	7/8/15 (0950)	177	2.5	16.8	6.12	171.00	12.20	0.36
MW-4	7/8/15 (1200)	100	2	16.20	6.28	170.80	3.94	0.24
MW-5	7/8/15 (1235)	100	1	18.70	6.39	128.10	11.40	1.00
MW-6	7/8/15 (1310)	100	1	20.10	6.00	135.80	11.30	1.70

**All wells are 2-inch diameter Sch40 PVC [a]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.

Table 3. Groundwater Sample Collection Information

Sample Type	Analytical Parameter	Sample Matrix	Analytical Method	No. of Samples	No. of Duplicates
Quarterly Groundwater 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.

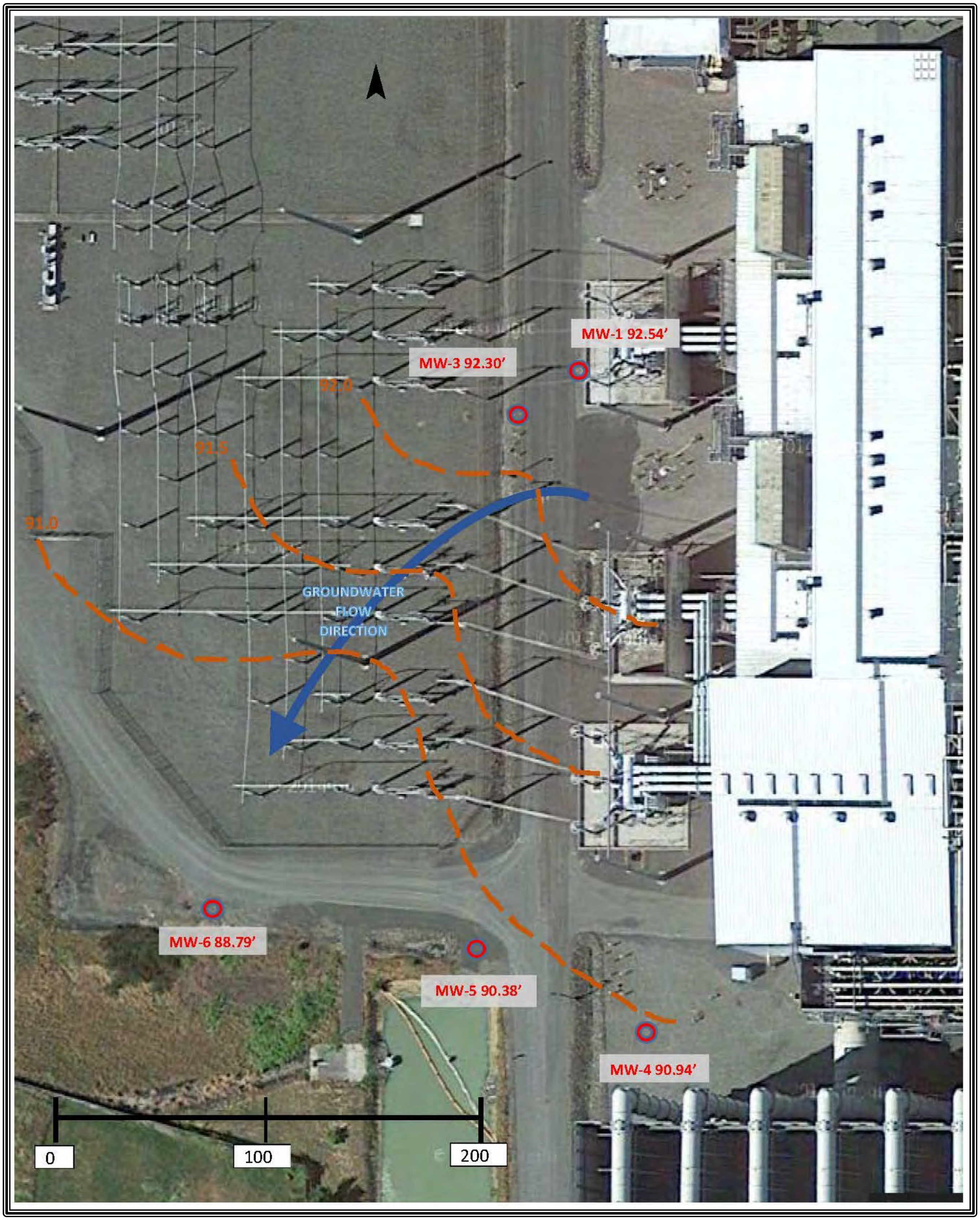


Figure 3. Groundwater Elevations and Flow Direction

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.

Table 4. Groundwater Sampling Results

Sample ID	Parameter	Detection Limit µg/L	Reporting Limit µg/L	Result Value µg/L	Data 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

U = non-detect   Duplicate collected at MW-1

5 References

Cardno 2015. *Groundwater Investigation and Quarterly Monitoring Work Plan 2015/2016, PacifiCorp Chehalis, WA Plant. April 2015*

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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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Washington State Department of Ecology 2011. *Standard Operating Procedure for Purging and Sampling Monitoring Wells, Version 1.0*. Environmental Assessment Program, approved October 4, 2011.

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Appendices

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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 : BRAD KWASNOWSKI
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, REFLECTIVE VESTS, STEEL - TOE BOOTS, AND GLOVES.
- BE AWARE OF HEAVY MACHINERY AND VEHICLES OPERATING AROUND FACILITY
- MAINTAIN GOOD - HOUSEKEEPING
- AVOID SITUATIONS LEADING TO SLIPS, TRIPS, FALLS.
- ENERGIZED POWER - LINES OVERHEAD - BE MINDFUL OF CLEARANCE

Signature of Attendees' :

D Metallo

"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 AND FIELD WATER QUALITY MEASUREMENT FORM

Project Name: PacifiCorp 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: MW-1
Product Thickness (ft): 0.00

Sampler(s) Metallo, 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 TD = 16.75'

QC Sample: Y N Type: Duplicate
Purge Style: Peristaltic / Bladder / Submersible /Other: ______

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
			Stabilization Requirements	(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1010			[1] 5.22						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	~100	500	6.33	17.6	6.67	180.2	4.10	0.86	
1025	~100	500	6.57	17.5	6.66	~~180~~ 181.0	4.20	0.81	
1030	~100	500	6.86	17.4	6.66	182.10	4.70	0.78	
1035	~100	500	7.04	17.0	6.66	183.60	4.60	0.77	
		~1.25							
[1]Water Level Measurements in these boxes must match !									
1040		1.25 gal	[1] 5.22	17.0	6.66	183.60	4.60	0.77	MW-1
(DUP) 1300		—							DUP-GW

Additional Comments: Water Quality inst. = YSI Pro DDS (GeoTech Rental) #5005 14L103129 (sonde)

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Shaping the Future

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Project Name: Pacificorp Groundwater Investigation Date: 8 July 2015

Site Name: Chehalis LNAPL: Y ✓ N __ DNAPL: Y __ N ✓ Depth to Product (ft btoc): 5.26'

Sample Location ID: MW-3 Product Thickness (ft): 0.01' (sheen)

Sampler(s) B. Kwasnowski / D. Metallo Well Screen Interval: 19-5'4' Mid Screen Depth (ft btoc): 11.5

Parameters: NWTPH-Dx Pump Intake (ft btoc): 11.5' TD = 19.21

QC Sample: Y / N Type: Purge Style: Peristaltic / Bladder / Submersible /Other:

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
		Stabilization Requirements		(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
0855			[1] 5.27						Initial water level, pre-pumping
0906	~150	500 ml	5.27	16.3	6.05	151.8	4.3	4.40%	
0912	~150	~500ml	7.07	16.8	5.99	150.0	2.3	~~3.20~~ 0.31	
0917	~150	~1250	8.04	17.1	5.94	148.3	2.6	0.25	Pump @ 0.5 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 ml/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	11.8	0.32	lowered intake ~15'
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	~~11~~ 12.2	0.36	
		~2.5 gals							
[1] Water Level Measurements in these boxes must match !									
0950		~1000	[1] 5.27	16.8	6.12	171.00	12.2	0.36	MW-3
(DUP) NA									

Additional Comments: Sample Time = (0950)

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LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Project Name: PacifiCorp 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: MW-4
Product Thickness (ft): 0.00

Sampler(s) Metallo, Kwasnowski
Well Screen Interval: 25-5 Mid Screen Depth (ft btoc): 14.80'

Parameters: NWTPH-Dx (Mineral Oil)
Pump Intake (ft btoc): 14.80'

TD=24.80

QC Sample: Y / N Type: NA
Purge Style: Peristaltic / Bladder / Submersible /Other:

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
		Stabilization Requirements		(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1121			[1] 6.70						Initial water level, pre-pumping
1125	~100	500	6.80	16.60	6.33	174.0	4.70	0.78	minor damage to concrete well monument
1130	~100	500	6.80	16.70	6.28	174.9	4.80	0.45	Pump 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	6.83	16.20	6.28	170.8	3.94	0.24	
		~2gals							
[1]Water Level Measurements in these boxes must match !									
1200		2gals	[1] 6.70	16.20	6.28	170.8	3.94	0.24	MW-4
(DUP) NA									—

Additional Comments:

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LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Project Name: PacifiCorp GW Investigation

Date: 7.8.2015

Site Name: Chehalis - GSUs

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Depth to Product (ft btoc): NA

Sample Location ID: MW-5

Product Thickness (ft): 0.00

Sampler(s) Metallo, Kwasnowski

Well Screen Interval: 25-5' Mid Screen Depth (ft btoc): 15.3'

Parameters: NWTPH-Dx (Mineral Oil)

Pump Intake (ft btoc): 15.3'

TD=25.3

QC Sample: Y N Type: NA

Purge Style: Peristaltic / Bladder / Submersible /Other: ______

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
		Stabilization Requirements		(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1210			[1] 6.70						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 gal							
[1]Water Level Measurements in these boxes must match !									
1235		1 gal	[1] 6.70	18.70	6.39	128.10	11.40	1.00	MW-5
(DUP) NA									—

Additional Comments:

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LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Project Name: PacifiCorp GW Investigation
Site Name: Chehalis - GSUs
Sample Location ID: MW-6
Sampler(s) Metallo, Kwasnowski
Parameters: NWTPH-Dx (Mineral Oil)
QC Sample: Y / N Type: NA

Date: 7-8-2015
LNAPL: Y ___ N ✓ DNAPL: Y ___ N ✓ Depth to Product (ft btoc): NA
Product Thickness (ft): 0.00
Well Screen Interval: 25-5 Mid Screen Depth (ft btoc): 15.10
Pump Intake (ft btoc): 15.30 TD=25.10
Purge Style: Peristaltic / Bladder / Submersible /Other:

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
		Stabilization Requirements		(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1246			[1]7.39						Initial water level, pre-pumping
1250	~100	500	7.51	20.4	5.95	133.10	9.80	1.68	Pump 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	1.66	
1305	~100	500	7.54	20.1	6.00	135.8	11.30	1.70	
		~1gal							
[1]Water Level Measurements in these boxes must match !									
1310		1gal	[1]7.39	20.1	6.00	135.8	11.30	1.70	MW-6
(DUP) NA									—

Additional Comments:

APPENDIX C
FIELD LOGBOOK ENTRIES

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PacifiCorp 2015 7-8-15
2ND Qter'ly 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 ~0600, mob down to Tukwila to pick up bottles at ARI Labs - Leave lab ~0635 mob down to PacifiCorp Power Plant in Chehalis, WA

- Arrive at PC-Chehalis ~0815, check in at front office
  - Jeremy Smith is out today
  - checked in w/ Plant Mngr (Mark Miller)
  - Stopped by control room and obtained a plant radio for the day

- Conducted tailgate H+S briefing, discussed plant particulars, etc.

DCM

– Set up on MW-3 (~0835)
– readied all sampling gear, PPE, supplies, bottles, forms, etc.

* Using a YSI Pro DDS multi-meter (GeoTech Rental) #5005 (sonde Ser.# 14L103129) to measure water quality readings at all wells today. Same model instrument used last round of sampling.

– Depth to Prod. = 5.26, thickness = 0.01'
· Depth to Water = 5.27' · TD = 19.26'
* Sample Intake = 11.5 · Peristaltic pump
· NWTPH-Dx · Ave pump rate = ~175ml/min
· Total purge vol = 2.5 gals
· Final WQ Readings:

	Temp °C	pH	Sp. Cond µS/cm	Turb NTU	Diss.Ox mg/L
0950	16.8	6.12	171.00	12.2	0.36

Sample = MW-3 (0950)
* lowered to ~13' during purging

— Set up on MW-1 (1005)
· Depth to Product / Thickness = NA
· Depth to Water = 5.22' TD = 16.75'
· Sample Intake = 10.5 Peristaltic pump
· NWTPH-Dx · Ave purge rate = 100 ml/min
· Total purge Vol. = 1.25 gals

DCM

MW-1, cont'd Final Readings;

Temp	pH	Sp. Cond	Turb	DO
17.0	6.66	183.60	4.60	0.77

Units as per MW3
Sample = MW-1 (1040)
*DUP = DUP-GW (1300)

~~Set up on~~ DM Took purge water collected thus far over to drum staging area at SE corner of property. All 2015 SI drums staged here. Placed ~4 gals of purge water into "common" 55-gal drum that was initiated for this purpose last sampling round. Will continue to deposit purge water into this drum until it's full. Drum is setting on a pallet.

– Set up on MW-4 (1110)
· Depth to product / thickness = NA
· WL = 6.70' TD = 24.80'
· Sample Intake = 14.80 · Peristaltic pump
· NWTPH-Dx · Ave Purge Rate = 100ml/min
· Total Purge Vol. = ~2 gals

DCM

MW4 cont'ed

WQ Readings:

Temp	pH	Sp. Cond	Turb	DO
16.20	6.28	170.80	3.94	0.24

* Units as per MW-3

Sample = MW-4 (1200)

– Set up on MW-5 (1205)

- Depth to Product / Thickness = NA
- WL = 6.70 · TD = 25.30
- Sample Intake = 15.30 · Peristaltic pump
- NWTPH-Dx · Ave Purge Rate = 100 ml/min
- Total Purge Vol. = ~1 gal
- Final WQ Readings:

Temp	pH	Sp. Cond	Turb	DO
18.70	6.39	128.10	11.40	1.00

* units as per MW-3

Sample = MW-5 (1235)

– Set up on MW-6 (1240)

- Depth to Product / Thickness = NA
- WL = 7.39 TD = 25.10
- Sample Intake = 15.30 · Peristaltic Pump
- NWTPH-Dx · Ave Purge Rate = 100 ml/min
- Total Purge Vol. = 1 gal

MW6 cont'ed.

- Final WQ Readings:

Temp	pH	Sp. Cond.	Turb	DO
20.1	6.00	135.80	11.30	1.70

* Units as per MW-3

- Sample = MW-6 (1310)

– Mob back over to drum storage area and deliver remaining ~4 gals of purge water to "common" storage drum. Total of ~8 gals from today's event contained in drum – Total Drum Vol. ~18 gals. Re-sealed drum lid and secured band.

– Mob back over to GSU area to collect measurements of lateral distances b/w the various well heads (needed to enhance assessment of water table / GW flow)

- Use a measuring wheel & triangulation calc's to figure distances

MW1 to MW4 = 288'
MW1 to MW5 = 235'
MW1 to MW6 = 305'

DCM

PacifiCorp 2015 2ND Qter'ly GW Event
7.8.15

Well head distance Measurements, Cont'ed;

MW1	to	MW3 =	38'
MW6	to	MW5 =	151'
MW5	to	MW4 =	96'
MW5	to	MW3 =	218'
MW3	to	MW6 =	265'
MW3	to	MW5 =	210'
MW4	to	MW6 =	246

– Load gear into van, head back to Admin office, return plant radio, sign out, call Lenora 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 cushioned, in zip-locks and on ice w/ water bath. COC has been filled out

– Mob back to Seattle, drop samples off at ARI Labs ~1530
- all samples are in good condition @ ~ 5.8°C

✱ 2ND Qter GW Sampling Completed

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: Standard	Page: 1 of 1	
ARI Client Company: KTA, Inc.	Phone: 360-250-7694	Date: 7.8.2015	Ice Present? Yes
Client Contact: Lenora Westbrook		No. of Coolers: 1	Cooler Temps: 5.8
Client Project Name: PacifiCorp GW Investigation			
Client Project #:	Samplers: D. Metallo, B. Kwasnowski		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	NWTPH-Dx Mineral Oil								Notes/Comments
MW-3	7.8.15	0950	W	2	X								
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								
DCM													

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) D Metallo	(Signature) Taylor Streeter	(Signature)	(Signature)
	Printed Name: Dave Metallo	Printed Name: Taylor Streeter	Printed Name:	Printed Name:
	Company: Cardno	Company: ARI	Company:	Company:
	Date & Time: 7.8.15 (1530)	Date & Time: 7-8-15 1530	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.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

15 July 2015

Lenora Westbrook
KTA Associates, Inc.
3530 32nd 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.

Mark D Harris
Project Manager
206/695-6210
markh@arilabs.com

Enclosures

cc: Dave Metallo, Cardno-GS
File AIW9

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number: AIW9	Turn-around Requested: Standard	Page: 1	of 1
ARI Client Company: KTA, Inc.	Phone 360-250-7694	Date: 7.8 2015	Ice Present? Yes
Client Contact: Lenora Westbrook		No. of Coolers: 1	Cooler Temps 5.8
Client Project Name: PacifiCorp GW Investigation			
Client Project #	Samplers: D. Metallo, B. Kwasnowski		

Sample ID	Date	Time	Matrix	No Containers	NWTPH-Dx Mineral Oil								Notes/Comments
MW-3	7.8.15	0950	W	2	X								
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								
DCM													

Comments/Special Instructions	Relinquished by	Received by	Relinquished by	Received by
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name Dave Metallo	Printed Name Taylor Streeter	Printed Name	Printed Name
	Company Cardno	Company ARI	Company	Company
	Date & Time: 7.8.15 (1530)	Date & Time 7-8-15 1530	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

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: KTA, Inc.

COC No(s) ______ NA

Assigned ARI Job No AFW9

Project Name Pacific [illegible] GW Investigation

Delivered by Fed-Ex UPS Courier Hand Delivered Other ______

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? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.8
Time ______

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90877952

Cooler Accepted by TB Date 7-8-15 Time 1530

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 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)? YES 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? YES NO

Date VOC Trip Blank was made at ARI. NA ______

Was Sample Split by ARI. NA YES Date/Time ______ Equipment: ______ Split by: ______

Samples Logged by: TB Date 7-8-15 Time 1532

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~2mm	Peabubbles' 2-4 mm	LARGE Air Bubbles > 4 mm

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AIW9
Client: KTA
Project Event: N/A
Project Name: PacifiCorp GW Investigation

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	MW-3	AIW9A	15-12255	Water	07/08/15 09:50	07/08/15 15:30
2.	MW-1	AIW9B	15-12256	Water	07/08/15 10:40	07/08/15 15:30
3.	MW-4	AIW9C	15-12257	Water	07/08/15 12:00	07/08/15 15:30
4.	MW-5	AIW9D	15-12258	Water	07/08/15 12:35	07/08/15 15:30
5.	MW-6	AIW9E	15-12259	Water	07/08/15 13:10	07/08/15 15:30
6.	DUP-GW	AIW9F	15-12260	Water	07/08/15 13:00	07/08/15 15:30

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.

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)**

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

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3510C

QC Report No: AIW9-KTA
Project: PacifiCorp GW Investigation

Matrix: Water

Date Received: 07/08/15

Data Release Authorized: VJ
Reported: 07/14/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-071015	Method Blank	07/10/15	07/13/15	1.00	Diesel Range	0.10	< 0.10 U
15-12255	HC ID: ---		FID4A	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		82.5%
AIW9A	MW-3	07/10/15	07/13/15	1.00	Diesel Range	0.10	< 0.10 U
15-12255	HC ID: ---		FID4A	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		88.3%
AIW9B	MW-1	07/10/15	07/13/15	1.00	Diesel Range	0.10	< 0.10 U
15-12256	HC ID: ---		FID4A	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		91.7%
AIW9C	MW-4	07/10/15	07/13/15	1.00	Diesel Range	0.10	< 0.10 U
15-12257	HC ID: ---		FID4A	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		85.4%
AIW9D	MW-5	07/10/15	07/13/15	1.00	Diesel Range	0.10	< 0.10 U
15-12258	HC ID: ---		FID4A	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		87.4%
AIW9E	MW-6	07/10/15	07/13/15	1.00	Diesel Range	0.10	< 0.10 U
15-12259	HC ID: ---		FID4A	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		87.3%
AIW9F	DUP-GW	07/10/15	07/13/15	1.00	Diesel Range	0.10	< 0.10 U
15-12260	HC ID: ---		FID4A	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		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.

ANALYTICAL RESOURCES INCORPORATED

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
MW-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
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 15-12255 to 15-12260

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID

Sample ID: LCS-071015
LCS/LCSD

Lab Sample ID: LCS-071015
LIMS ID: 15-12255
Matrix: Water
Data Release Authorized: [signature]
Reported: 07/14/15

QC Report No: AIW9-KTA
Project: PacifiCorp GW Investigation

Date Sampled: NA
Date Received: NA

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 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 Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	2.27	3.00	75.7%	2.28	3.00	76.0%	0.4%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	87.3%	81.0%

Results reported in mg/L
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Water
Date Received: 07/08/15

ARI Job: AIW9
Project: PacifiCorp GW Investigation

ARI ID	Client ID	Samp Amt	Final Vol	Prep 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

Data File: /chem3/fid4a.i/20150713.b/15071307.d

Date : 13-JUL-2015 12:42

Client ID: AIW9HBW1

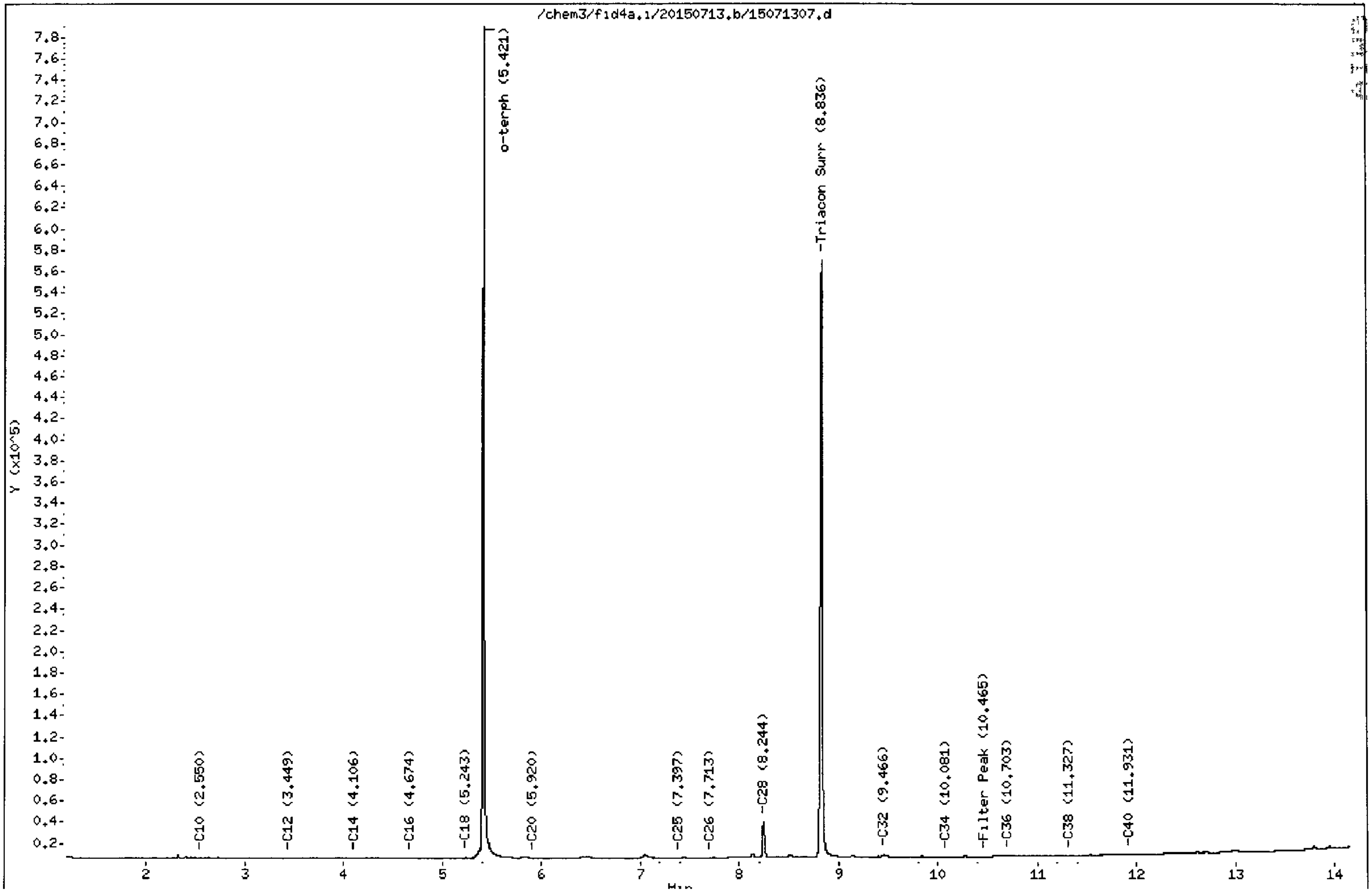
Sample Info: AIW9MBW1

Column phase: RTX-1

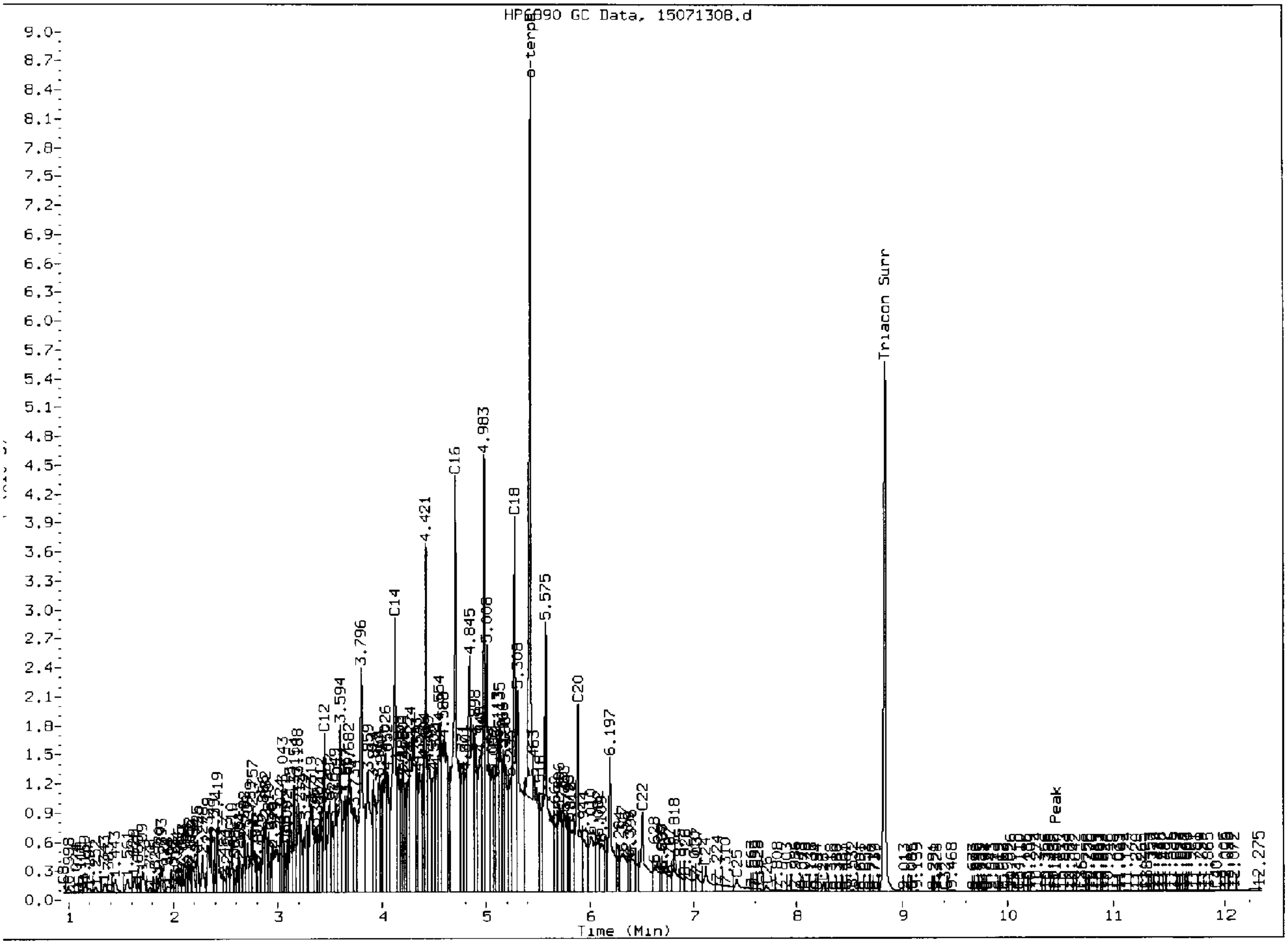
Instrument: fid4a.i

Operator: JW

Column diameter: 0.25



FID:4A-2C/RTX-1 AIW9LCSW1 FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: ML Date: 7/13/15

Data File: /chem3/fid4a.i/20150713.b/15071308.d

Date : 13-JUL-2015 13:06

Client ID: AIW9LCSW1

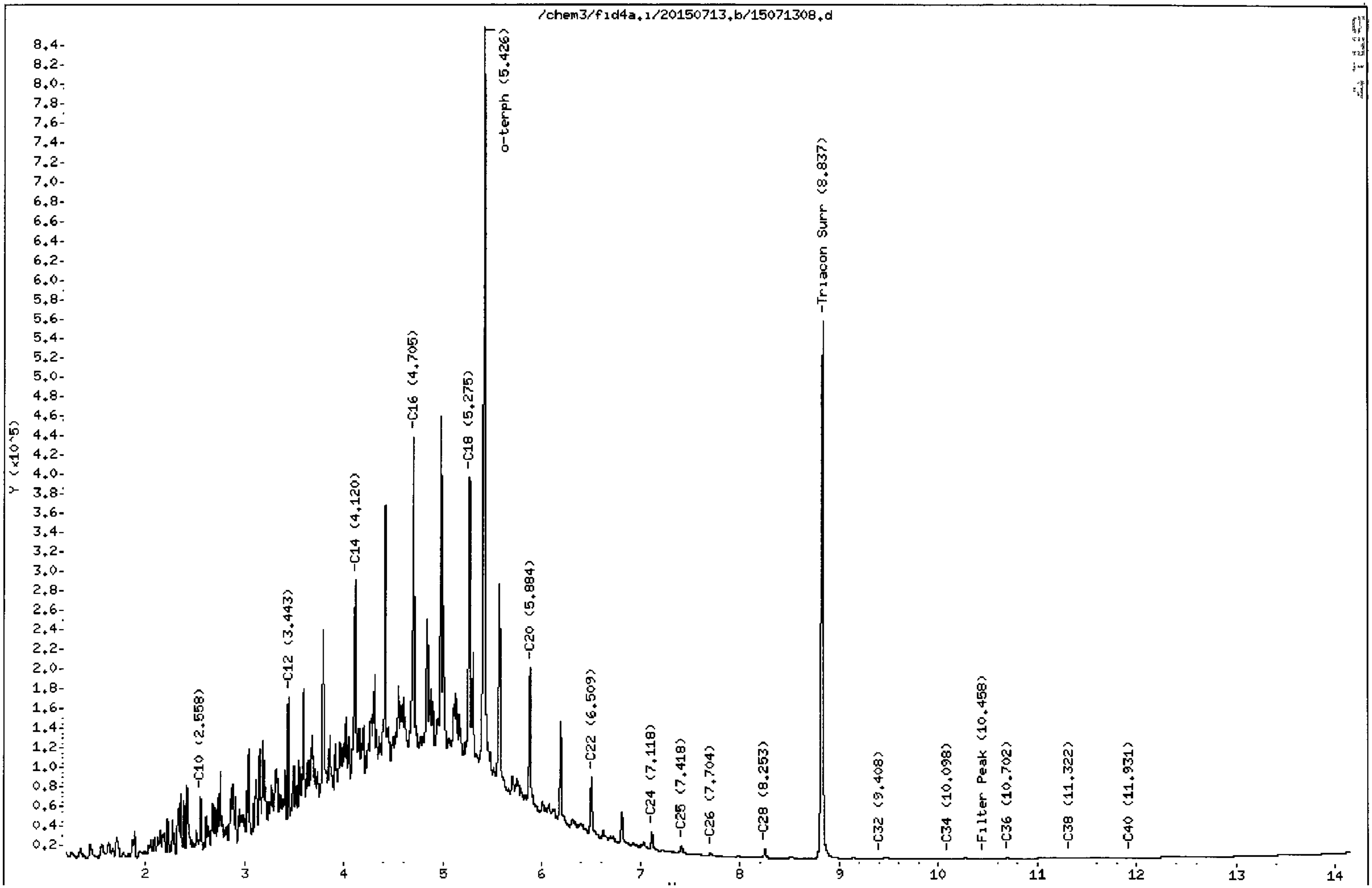
Instrument: fid4a.i

Sample Info: AIW9LCSW1

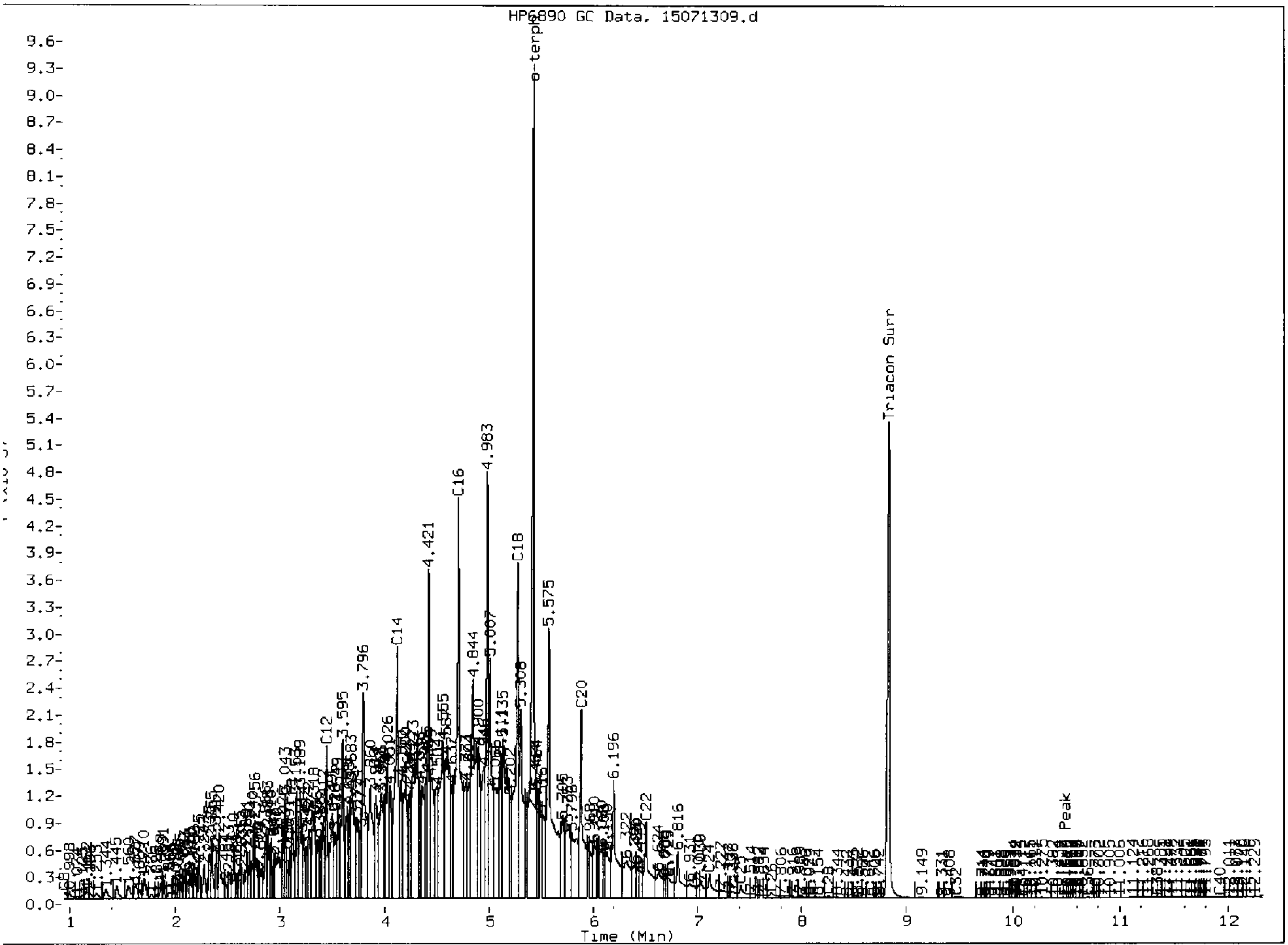
Operator: JW

Column phase: RTX-1

Column diameter: 0.25



FID:4A-2C/RTX-1 AIW9LCSDW1 FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: MM

Date: 7/13/15

Data File: /chem3/fid4a.i/20150713.b/15071309.d

Date : 13-JUL-2015 13:30

Client ID: AIW9LCSDW1

Sample Info: AIW9LCSDW1

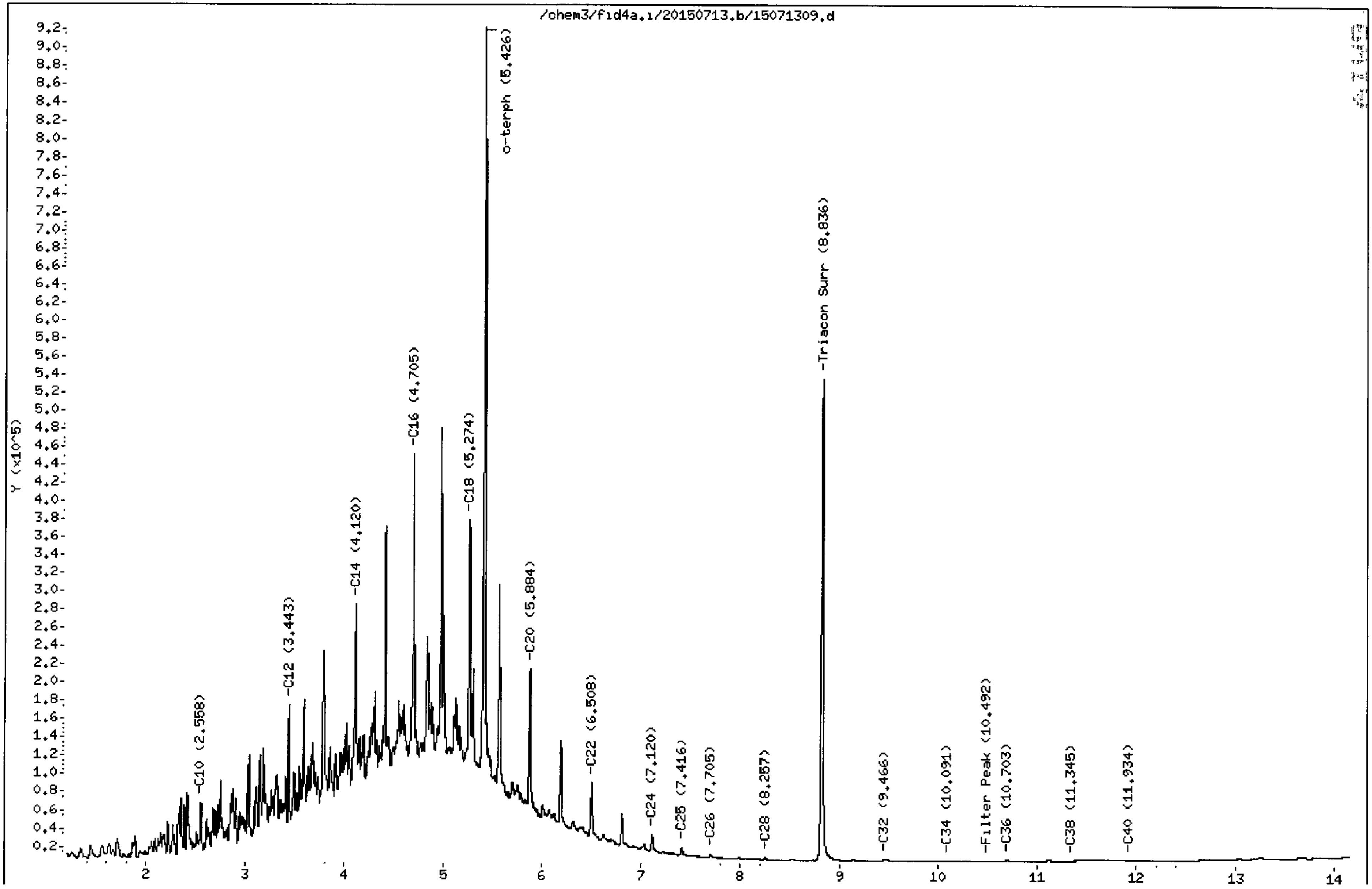
Column phase: RTX-1

Instrument: fid4a.i

Operator: JW

Column diameter: 0.25

/chem3/fid4a.i/20150713.b/15071309.d



Data File: /chem3/fid4a.i/20150713.b/15071311.d

Page 1

Date : 13-JUL-2015 14:18

Client ID: MW-3

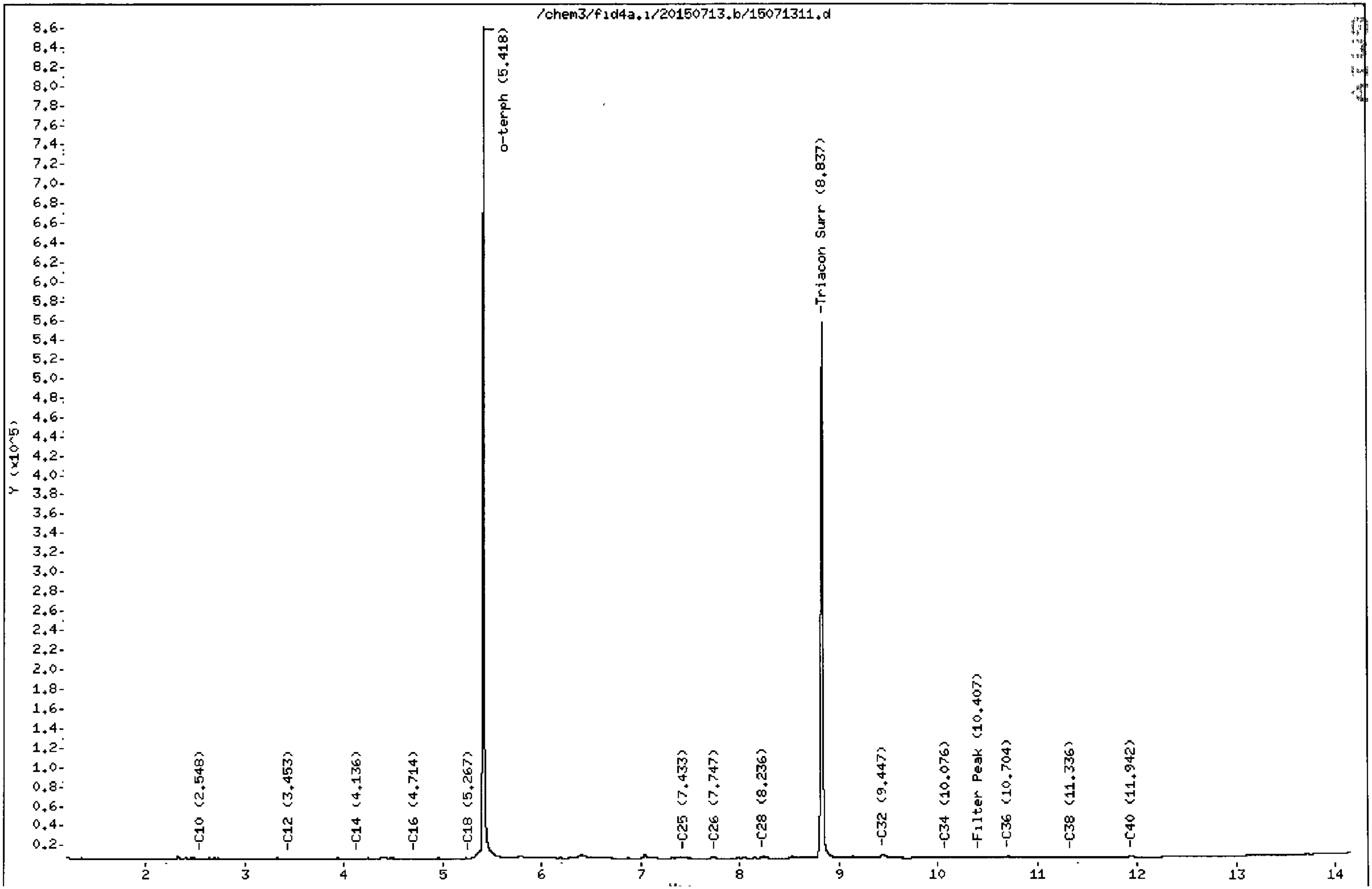
Instrument: fid4a.i

Sample Info: AIW9A

Operator: JW

Column phase: RTX-1

Column diameter: 0.25



Data File: /chem3/fid4a.i/20150713.b/15071312.d

Page 1

Date : 13-JUL-2015 14:42

Client ID: MW-1

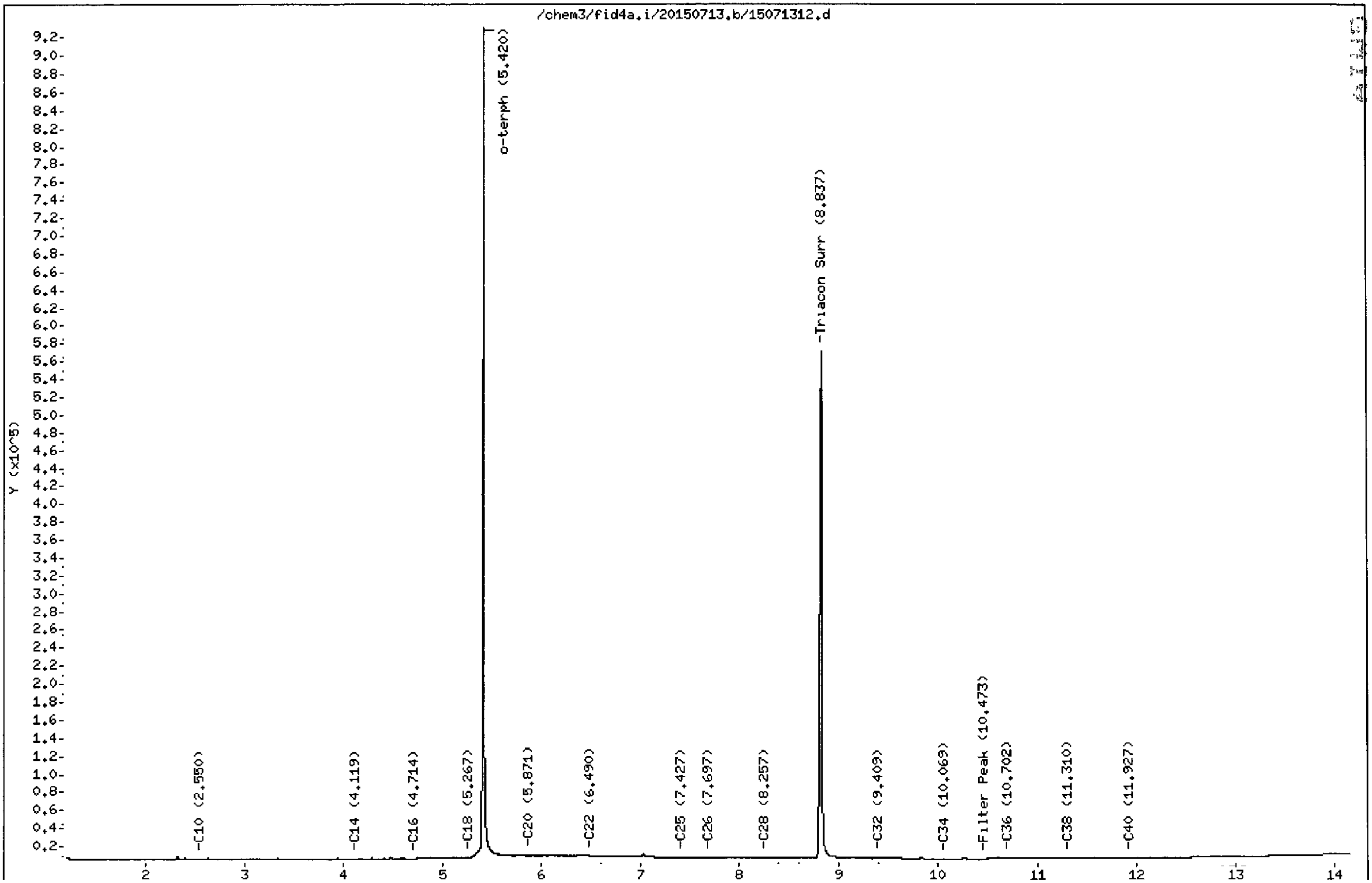
Instrument: fid4a.i

Sample Info: AIW9B

Operator: JW

Column phase: RTX-1

Column diameter: 0.25



Data File: /chem3/fid4a.i/20150713.b/15071313.d

Date : 13-JUL-2015 15:06

Client ID: MW-4

Sample Info: AIW9C

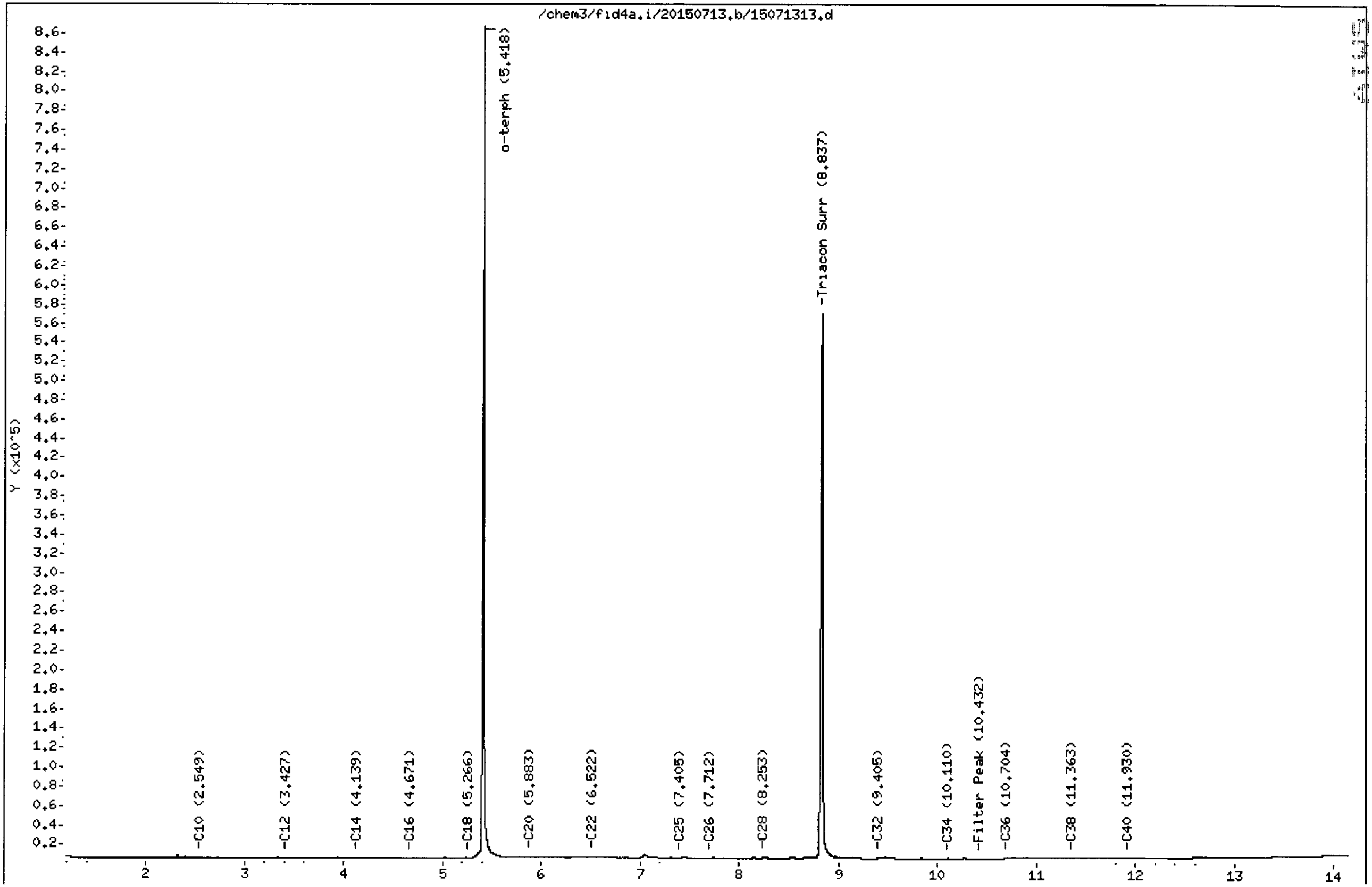
Column phase: RTX-1

Page 1

Instrument: fid4a.i

Operator: JW

Column diameter: 0.25



Data File: /chem3/fid4a.i/20150713.b/15071314.d

Page 1

Date : 13-JUL-2015 15:30

Client ID: MW-5

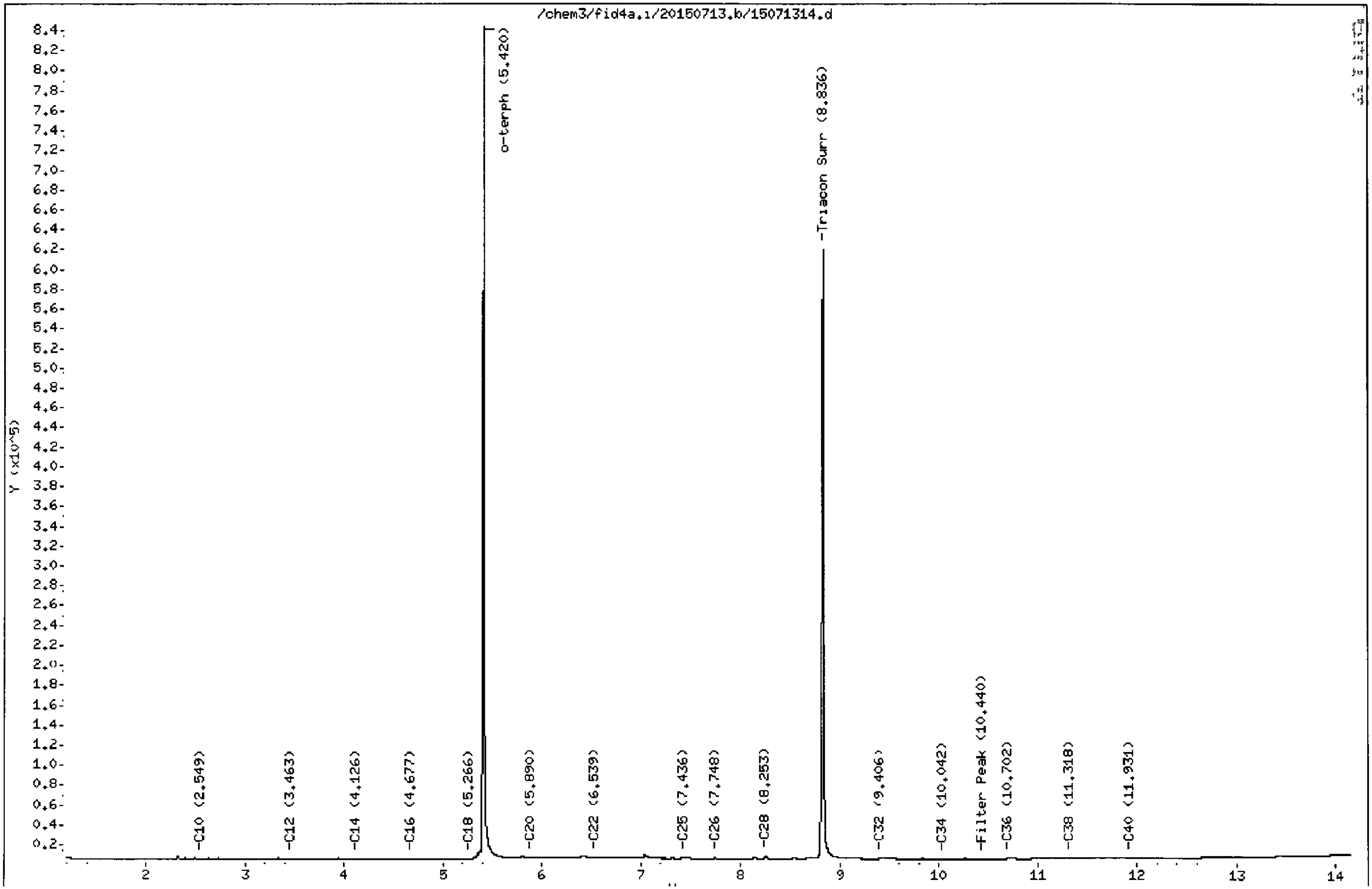
Instrument: fid4a.i

Sample Info: AIW9D

Operator: JW

Column phase: RTX-1

Column diameter: 0.25



Data File: /chem3/fid4a.i/20150713.b/15071315.d

Date : 13-JUL-2015 15:54

Client ID: MW-6

Sample Info: AIW9E

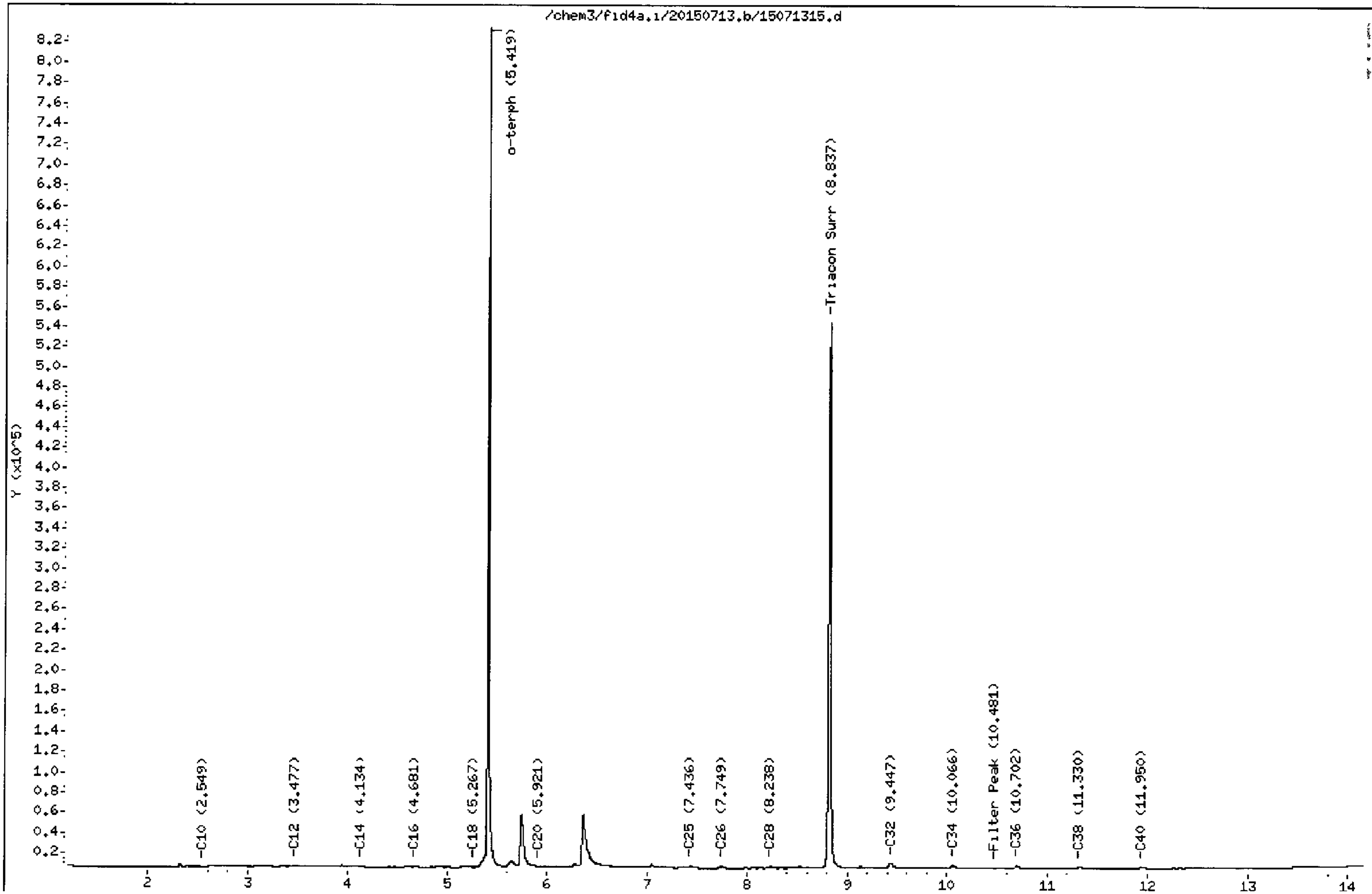
Column phase: RTX-1

Page 1

Instrument: fid4a.i

Operator: JW

Column diameter: 0.25



Data File: /chem3/fid4a.i/20150713.b/15071316.d

Date : 13-JUL-2015 16:18

Client ID: DUP-GW

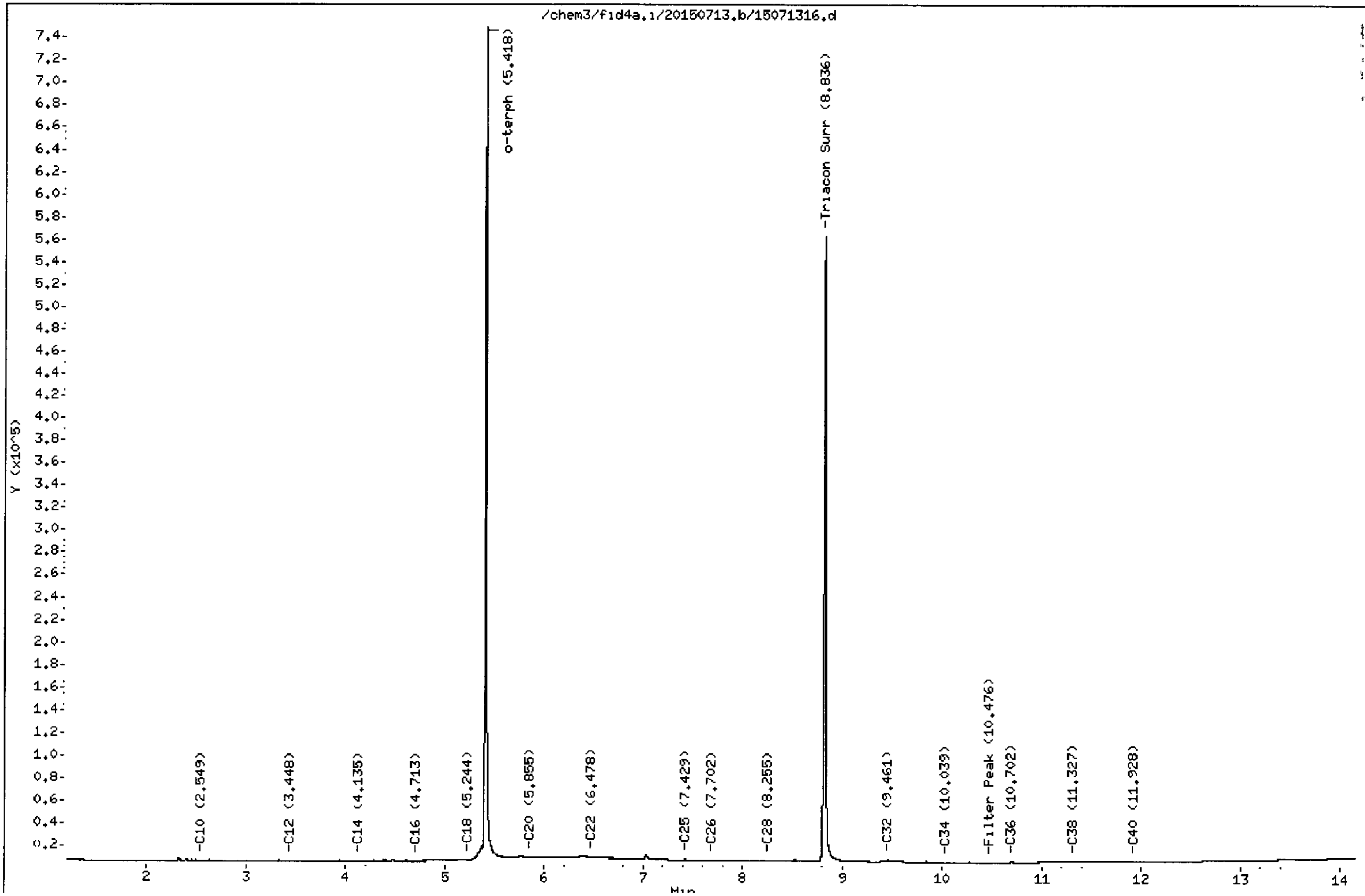
Sample Info: AIW9F

Column phase: RTX-1

Instrument: fid4a.i

Operator: JW

Column diameter: 0.25



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
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 3RD QUARTERLY EVENT

DECEMBER 2015

Groundwater Monitoring Report
3rd Quarterly Event – December 2015
PacifiCorp
Chehalis, WA Plant
Final Report

Clear Water Services Project 15KTA1

Prepared for
KTA Associates, Inc.

And for
PacifiCorp

January 2016

Groundwater Monitoring Report
3rd 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 Initials
001	01/08/2016	Dave Metallo	DCM	L. Westbrook (KTA)	1/20/2016

Table of Contents

Appendices

Tables

Figures

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).

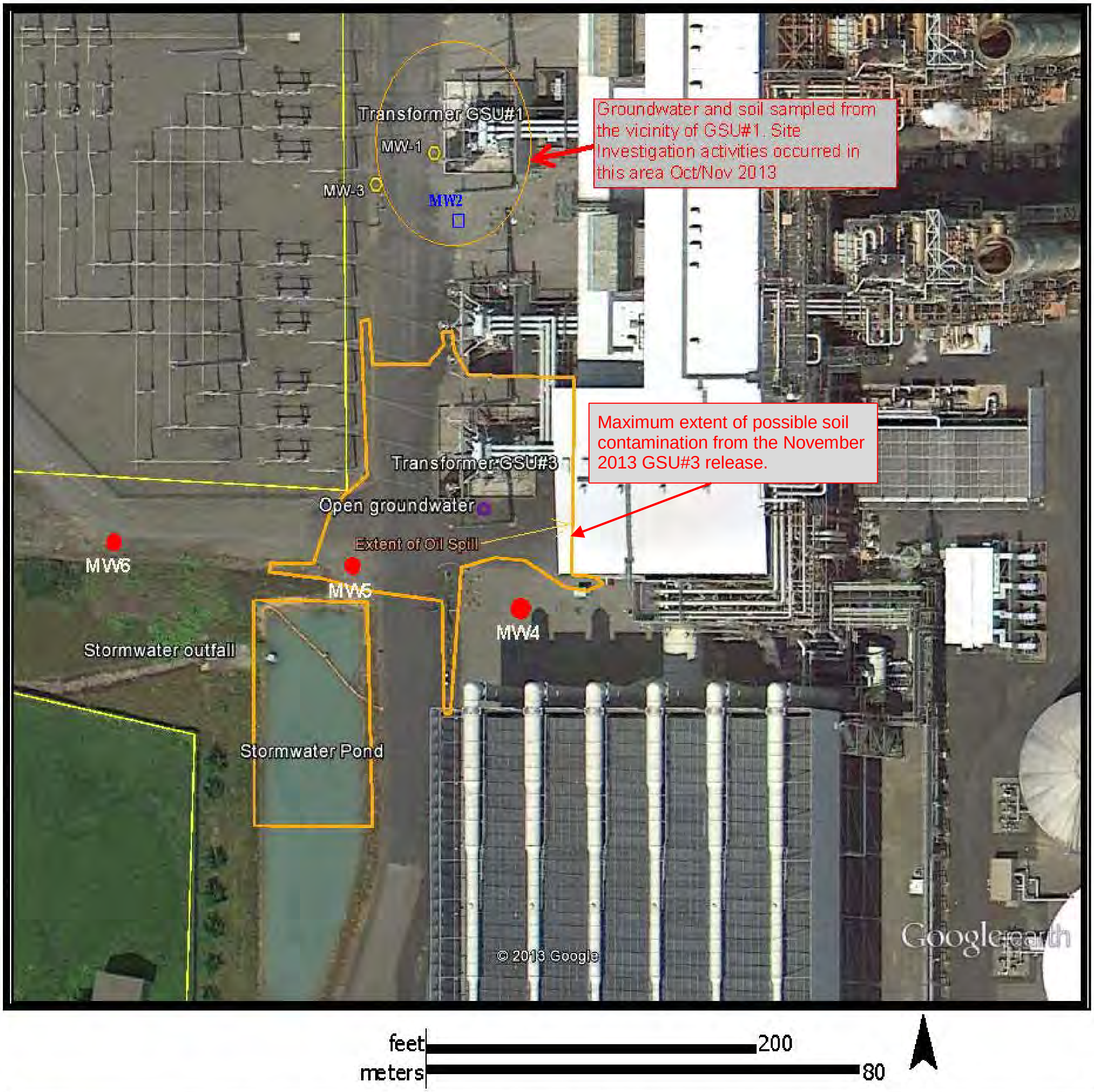
Prominent site features and well locations are shown on Figure 1.

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.



3rd Quarterly Groundwater Sampling Event Results Summary – December, 2015

- MW-1 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-3 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-4 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-5 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-6 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-2; this location was not developed as a permanent well, sampled only once in 2013

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 Geology

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 Hydrogeology

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 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 23rd through May 25th, 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 µg/L, which are below the MTCA Method A Groundwater Cleanup Level of **500 µg/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.

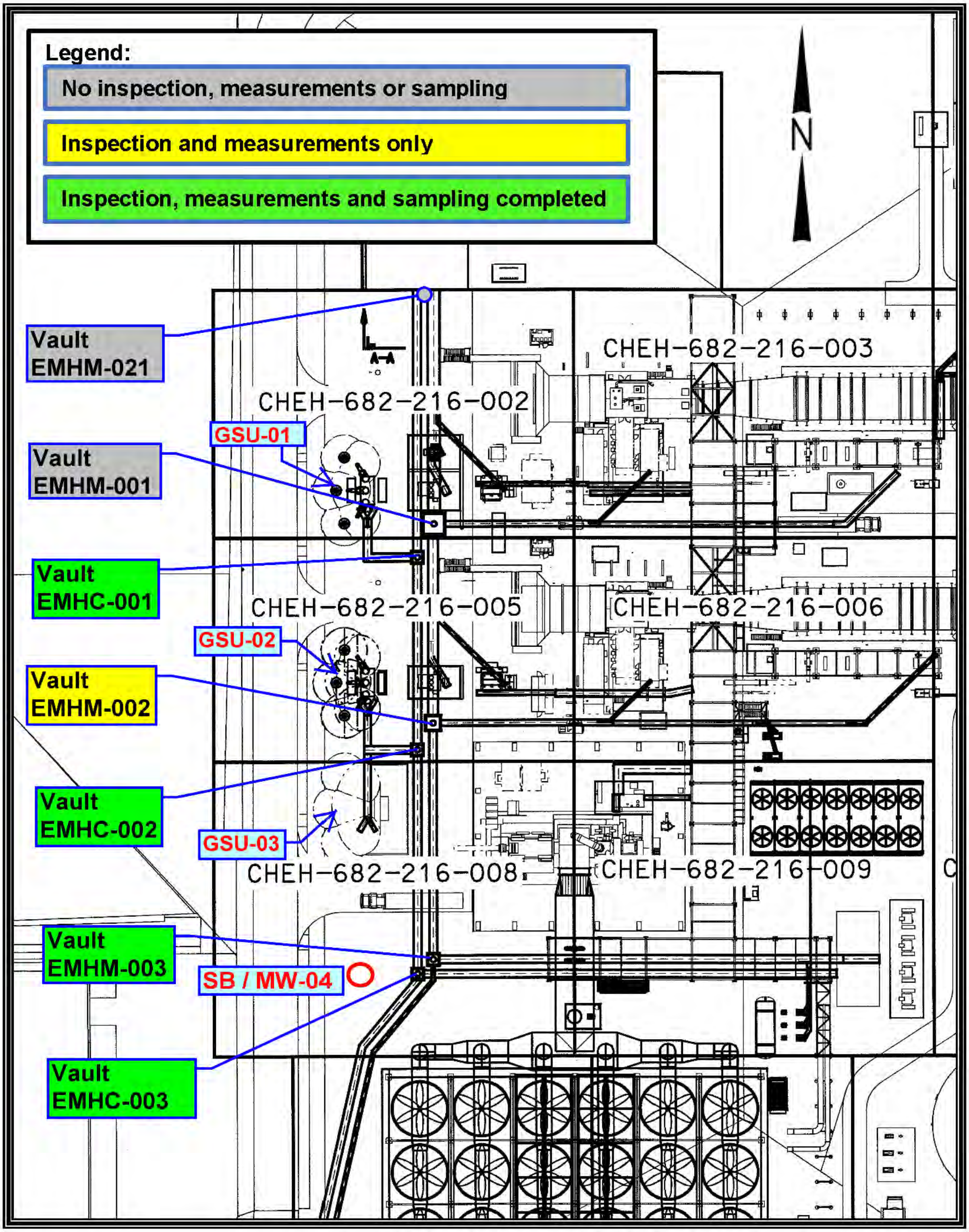


Figure 2. Electrical Vault / In-Flow Water Sampling Locations

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 Health and Safety

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.

Table 1. Water Level Measurements and Groundwater Elevations

Location	Top PVC Well Casing (ft amsl)	Depth to Product (ft)	Static Water Level Measurements (ft)	Groundwater Elevation (ft amsl)
SW corner GSU-1 containment wall	100.00[1]	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

[1]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 15th and the 2nd on July 8th, 2015. The remaining scheduled event is tentatively planned for late 1st 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 / re-developed 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.

Table 2 Summary of Water Quality Measurements

Well ID	Date / Sample Time	Average Purge Rate (ml/min)	Total Purge Volume (gal)	Temp. (C°)	pH	Sp. Cond (µS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)
**MW-1	12/16/15 (1245)	100	1.5	13.49	5.83	119	28	3.61
MW-3	12/16/15 (1330)	100	1	12.10	5.79	109	32	3.85
MW-4	12/16/15 (1205)	100	1.5	11.72	5.79	80	89	3.81
MW-5	12/16/15 (1105)	100	0.5	12.39	5.77	98	28	4.41
[a]DUP-GW	12/16/15 (1230)	100	0.5	12.39	5.77	98	28	4.41
MW-6	12/16/15 (1025)	100	1	12.31	5.77	109	44	5.77

**All wells are 2-inch diameter Sch40 PVC [a]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.

Table 3. Groundwater Sample Collection Information

Sample Type	Analytical Parameter	Sample Matrix	Analytical Method	No. of Samples	No. of Duplicates
Quarterly Groundwater 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.

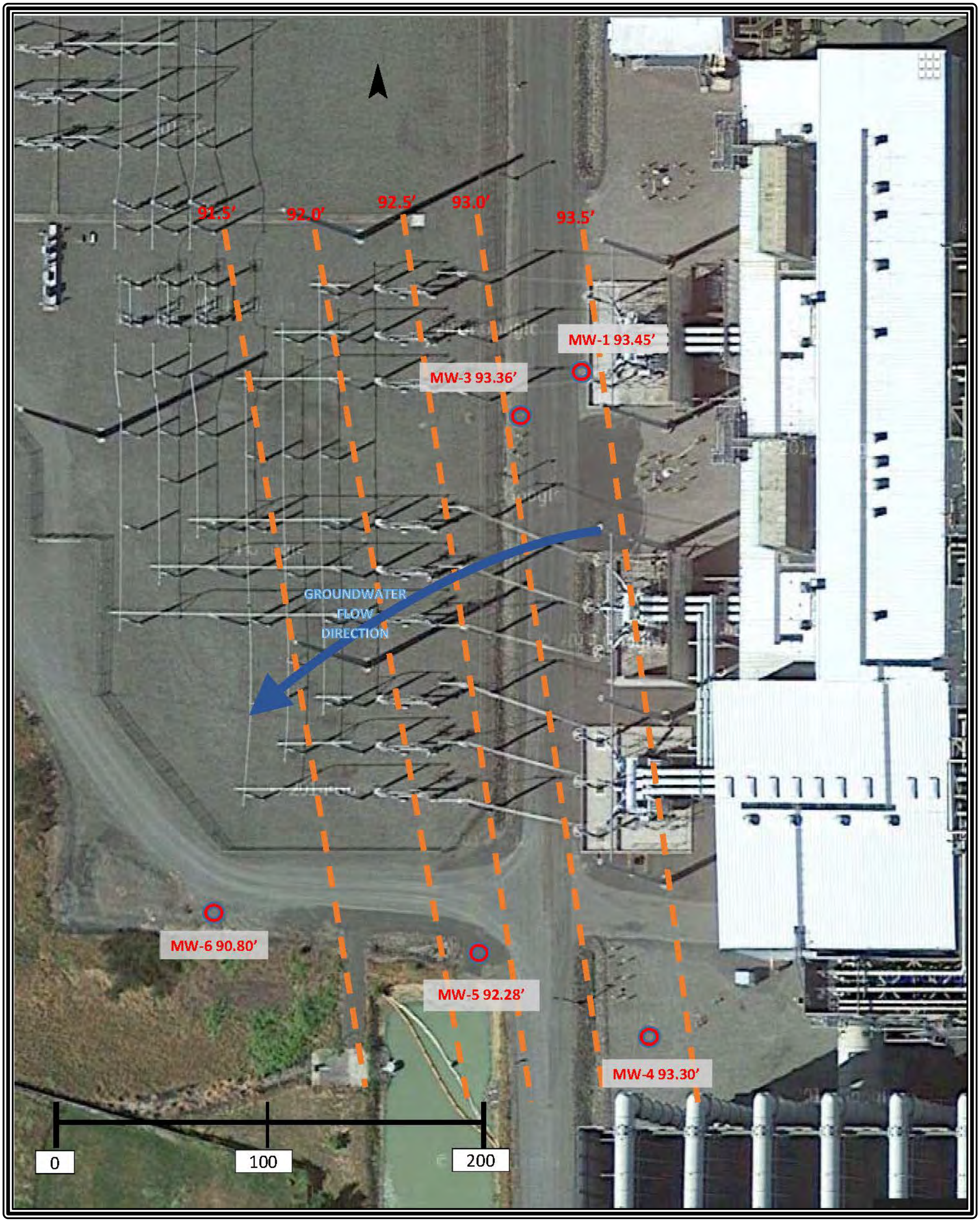


Figure 3. Groundwater Elevations and Flow Direction

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 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 16th, 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.

Table 4. Groundwater Sampling Results

Sample ID	Parameter	Detection Limit µg/L	Reporting Limit µg/L	Result Value µg/L	Data 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

U = non-detect   Duplicate collected at MW-5

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 2015. *Groundwater Quarterly Monitoring Report; 1st Quarterly Event – April 2015, PacifiCorp Chehalis, WA Plant. June, 2015*

Cardno 2015. *Groundwater Quarterly Monitoring Report; 2nd Quarterly Event – July 2015, PacifiCorp Chehalis, WA Plant. July, 2015*

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

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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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WA DoE 2008. Minimum Standards for Construction and Maintenance of Wells. Washington Administration Code 173-160 & 173-162.

WA DoE 2011. *Standard Operating Procedure for Purging and Sampling Monitoring Wells, Version 1.0*. Environmental Assessment Program, approved October 4, 2011.

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.

U.S. Environmental Protection Agency Region 1, 1996, Revised 2010. *Low Flow Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells,* EQASOP-GW 001

Appendices

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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 : 12.16.15	**Weather:** Overcast/clearing, misty, Mid-hi 30's
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 - Proper PPE - Slips-trips-falls - Lifting - Expected work tasks for the day - Potential contaminants in GW - * Electrical hazards/safe working distances - Retrieved Plant Emerg. Radio. keep w/crew throughout day	
Signature of Attendees' : D Metallo [signature]	
"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 GW Investigation
Date: 12·16·2015
Site Name: Chehalis GSUs
LNAPL: Y __ N X DNAPL: Y __ N X Depth to Product (ft btoc): NA
Sample Location ID: MW-1
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: NA
Purge Style: (Peristaltic) / Bladder / Submersible /Other: ______

Time	Purge Rate (ml/min)	Total Purge ~~(gal)~~ ML	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
			Stabilization Requirements	(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1214			[1]4.31						Initial water level, pre-pumping
1220	~100	500	4.45	13.67	5.79	124	36	5.10	Pump Speed=.5
1225	~100	500	4.38	13.52	5.82	124	31	5.11	
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	
1245	~100	500	4.10	13.49	5.83	119	28	3.61	
[1]Water Level Measurements in these boxes must match !									
1245		~1.5gal	[1]4.31	13.49	5.83	119	28	3.61	
(DUP)									

Additional Comments:

CLEAR WATER SERVICES LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Project Name: PacifiCorp GW Investigation
Date: 12.16.2015
Site Name: Chehalis GSUs
LNAPL: Y __ N X DNAPL: Y __ N X Depth to Product (ft btoc): NA
Sample Location ID: MW-3
Product Thickness (ft): 0.00 Depth to Water (ft btoc) 4.21'
Sampler(s) D. Metallo B. Kwasnowski
Well Screen Interval: 19-4' Mid Screen Depth (ft btoc): 11.5
Parameters: NWTPH-Dx Mineral Oil
Pump Intake (ft btoc): 11.5 Total Depth (ft btoc): 19.20'
QC Sample: Y / N Type: NA
Purge Style: Peristaltic / Bladder / Submersible /Other:

Time	Purge Rate (ml/min)	Total Purge ~~(gal)~~ ml	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1302			[1] 4.21						Initial water level, pre-pumping
1310	100	500	5.48	12.68	5.80	116	29.6	3.67	Pump Speed = .5
1315	100	500	6.05	12.39	5.80	113	30.7	4.16	
1320	100	500	6.86	12.13	5.79	110	32.0	3.82	
1325	100	500	7.48	12.10	5.79	109	32.1	3.85	
[1] Water Level Measurements in these boxes must match !									
1330		~1gal	[1] 4.21	12.10	5.79	109	32.1	3.85	MW-3
(DUP) —									

Additional Comments:

CLEAR WATER SERVICES

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Project Name: PacifiCorp GW Investigation
Date: 12.16.2015

Site Name: Chehalis GSUs
LNAPL: Y __ N X DNAPL: Y __ N X Depth to Product (ft btoc): NA

Sample Location ID: MW-4
Product Thickness (ft): 0.00 Depth to Water (ft btoc) 4.34'

Sampler(s) D. Metallo B. Kwasnowski
Well Screen Interval: 25-5' Mid Screen Depth (ft btoc): 14.80

Parameters: NWTPH-Dx Mineral Oil
Pump Intake (ft btoc): 15' Total Depth (ft btoc): 24.80'

QC Sample: Y / N Type: NA
Purge Style: Peristaltic / Bladder / Submersible /Other:

Time	Purge Rate (ml/min)	Total Purge ~~(gal)~~ ml	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (μS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
		Stabilization Requirements		(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1126			[1]4.34						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	5.81	80	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	80	83	3.80	
1200	~100	500	4.45	11.72	5.79	80	89	3.81	
[1]Water Level Measurements in these boxes must match !									
1205		~1.5g	[1]4.34	11.72	5.79	80	89	3.81	MW-4
(DUP) NA									—

Additional Comments: - Possibility of a very lite sheen detected w/ IFP, at limitation of meter

CLEAR WATER SERVICES

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Project Name: PacifiCorp GW Investigation
Date: 12·16·2015

Site Name: Chehalis GSUs
LNAPL: Y (N) DNAPL: Y (N) Depth to Product (ft btoc): NA

Sample Location ID: MW-5
Product Thickness (ft): 0.00 Depth to Water (ft btoc) 4.80'

Sampler(s) D. Metallo, B. Kwasnowski
Well Screen Interval: 25-5' Mid Screen Depth (ft btoc): 15.3'

Parameters: NWTPH-Dx Mineral Oil
Pump Intake (ft btoc): 15' Total Depth (ft btoc): 25.28'

QC Sample: (Y) / N Type: Dup
Purge Style: (Peristaltic) / Bladder / Submersible /Other: ______

Time	Purge Rate (ml/min)	Total Purge ~~(gal)~~ ml	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1038			[1]4.80						Initial water level, pre-pumping
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	5.78	99	28.70	4.86	
1055	~100	500	4.80	12.28	5.77	99	27.50	4.56	
1100	~100	500	4.80	12.39	5.77	98	27.80	4.41	
		~0.5 gal	[1]Water Level Measurements in these boxes must match !						
1105		~~1055~~ DM	[1]4.80	12.39	5.77	98	27.80	4.41	MW-5
(DUP) 1230		~~1230~~ DM							DUP-GW

Additional Comments:

CLEAR WATER SERVICES — **LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM** — PAGE 1 OF 1

Project Name: PacifiCorp GW Investigation

Date: 12-16-2015

Site Name: Chehalis Plant - GSUs

LNAPL: Y __ N __ DNAPL: Y __ N __ Depth to Product (ft btoc): NA

Sample Location ID: MW-6

Product Thickness (ft): 0.00 Depth to Water (ft btoc): 5.~~4~~38'

Sampler(s): Metallo, Kwasnowski

Well Screen Interval: 25-5' Mid Screen Depth (ft btoc): 15.10'

Parameters: NW TPH-Dx (Mineral Oil)

Pump Intake (ft btoc): 15' Total Depth (ft btoc): 25.10

QC Sample: Y / N Type: NA

Purge Style: Peristaltic / Bladder / Submersible / Other:

Time	Purge Rate (ml/min)	Total Purge ~~(gal)~~ ML	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
			[1] 5.~~4~~38						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	
1005	~100	500	5.40	11.95	5.83	126	43.0	6.15	
1010	~100	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] Water Level Measurements in these boxes must match !									
1025		~1 gal	[1] 5.38	12.31	5.77	109	43.5	5.77	MW-6
(DUP) NA									

Additional Comments:

APPENDIX C
FIELD LOGBOOK ENTRIES

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- Dave Motallo w/ Clear Water Srvs
- Brad Kwasnowski - Cardno

- Weather: Mostly Cloudy / overcast but sun is burning off deck cover, ~ hi 30°s, lt. breeze

- Leave Cardno shop ~0700, head down to ARI Labs to pick up bottles, head down to PacifiCorp in Chehalis, WA

- Arrive at Power Plant (~0850)
  - Sign-in at front desk, speak w/ Jeremy Smith
  - Signed out a plant radio from Control Room (#9)
  - Jeremy moved purge water collect. 55-gal drum over to the sampl. area for us

- Conduct Health & Safety Tailgate Meeting on-site. See Tailgate form for details — DCM

12.16.15

PacifiCorp 3rd Qt Smpl Event

- Set up on MW-6 (~0920)
  - readied all Sampling gear, PPE, supplies, bottles, forms, etc.

* Using a Horiba U-52 w/ flo cell rented from INW-GeoTech in Kirkland, WA. Serial No. (sonde) 6DRLGEAT
  (hand set) L7D1288J
  GeoTech # 22004

MW-6 (~0940)

- Dpth to Prod. = NA   thickness = 0.00'
- Dpth to Wtr. = 5.38'   TD = 25.10'
- Smpl Intake Dpth = 15'
- Peristaltic Pump Ave Pump Rate = 100 ml/min
- Total Purge Vol. = ~1 gal
- Final WQ Readings:

Time	Temp °C	pH	SP. Cond µS/cm	Turb NTU	Diss Ox mg/L
1025	12.31	5.77	109	43.5	5.77

Sampl ID = MW-6   Time = (1025)

- Clean up around well, load gear, moved to next well

— DCM —

12.16.15

PacifiCorp 3rd Qt Smpl Event

MW-5 (1033)

- Dpth to Prod = NA   Thickness = 0.00'
- Dpth to Wtr = 4.80'   TD = 25.28'
- Smpl Intake Depth = 15'
- Peristaltic pump ave rate = 100 ml/min
- Total Purge Vol. = ~.5 gals
- Final WQ Readings:

Time	Temp	pH	SpCond	Turb	DO
1105	12.39	5.77	98	27.80	4.41

Sample ID = MW-5   Time (1105)
Duplicate = DUP-GW   (1230)

- Clean up around well head, load gear, move to next well.

MW-4 (1126)

- Dpth to Prod = NA   Thickness = 0.00
- Dpth to Wtr = 4.34'   TD = 24.80'
- Smpl Intake Depth = 15'
- Peristaltic Pump ave. rate = 100 ml/min
- Total purge Vol. = ~1.5 gals
- Final WQ Readings:

Time	Temp	pH	SpCond	Turb	DO
1205	11.72	5.79	80	89	3.81

12·16·15

PacifiCorp 3rd Qt Smpl Event

- MW-4 Cont'ed;
- Smpl ID = MW-4 Time (1205)

MW-1 (1212)

- Dpth To Prod. = NA Thickness = 0.00'
- Dpth To Wtr = ~~15.31'~~ 4.31' TD = 16.75'
- Smpl Intake Dpth = 10.5'
- Peristalic Ave Pump Rate = 100 ml/min
- Total Purge Vol. = ~1.5 gal
- Final WQ Readings:

Time	Temp	pH	Sp. Cond	Turb	DO
—	°C		mS/cm	NTU	Mg/L
1245	13.49	5.83	119	28	3.61

Smpl ID = MW-1 Time (1245)

MW-3 (1255)

- Dpth To Prod = NA Thickness = 0.00'
- Dpth To WTR = 4.21 TD = 19.20
- Smpl Intake Dpth = 11.5'
- Peristaltic Ave Pump Rate = 100 ml/min
- Total Purge Vol. = ~1 gal
- Final WQ Readings:

Time	Temp	pH	Sp. Cond.	Turb	DO
—	°C	unit	mS/cm	NTU	Mg/L
1330	12.10	5.79	109	32.1	3.85

12·16·15

PacifiCorp 3rd Qtr Smpl Event

- MW-3, cont'ed

Sample ID = MW-3 Time (1330)

- Clean up around well head, power down and re-pack Horiba U-52 into its protective case
  - package samples into cooler, ready them for transport to the lab

- Empty remaining purge water into the "Common" purge water collection drum (Staged earlier today to the south of GSU-3) ~5.5 gals of purge water were generated during this event; ~24 gals total. Drum re-sealed.
- Mob around to Admin Office; sign plant radio back into the control room, Speak w/ Jeremy Smith and Lenora Westbrook (Lenora was on site to observe us sampling at MW-3), signed out in the vistor log

- Leave PacifiCorp ~1415

DCM

12.16.15

PacifiCorp 3rd Qterly Smpl Event

- Stop at convenience store to purchase additional ice; iced down samples, cushioned & secure containers and seal cooler for transport

- Review CoC on the way to lab - Good

- Arrive at ARI Labs ~1550
  - Sign over sample custody to sample receiving personnel
  - Samples received in good/undamaged condition
  - Cooler temp. = 4.5°C

- Mob back to Cardno shop to off load gear, clean van.

  - Third Quarterly Sampling Event Completed.

DCM

* Note: No droplets or visual sheen was observed in the observation well near GSU-3 - Water v. clear.

APPENDIX D

LABORATORY CHAIN OF CUSTODY FORMS

AND

ANALYTICAL REPORT

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard	Page: 1	of 1
ARI Client Company: KTA, Inc.	Phone: 360-250-7694	Date: 12-16-2015	Ice Present? Yes
Client Contact: Lenora Westbrook		No. of Coolers: 1	Cooler Temps: 4.5 °C
Client Project Name: PacifiCorp GW Investigation			
Client Project #:	Samplers: D. Metallo B. Kwasnowski		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	NWTPH-Dx Mineral Oil								Notes/Comments
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								
DCM													

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Dave Metallo	Printed Name: Tyler Rankin	Printed Name:	Printed Name:
	Company: Clear Water Services	Company: ARI	Company:	Company:
	Date & Time: 12·16·15 (1550)	Date & Time: 12-16-15 1550	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.

Analytical Resources, Inc.

Bottle Request

Needs By Date: **12/15/2015**

Project Name:	KTA
Project Number:	Chehalis
Client:	Cardno-GS
Contact:	Dave Metallo
ARI PM:	mdh 12/7/15
Date of Request:	12/7/2015
Request Taken By:	
Samples Will Return:	

X	Time & Date of Client Pick Up:	RP
	Time/Date Courier Deliver by:	
	Time/Date Commercial Shipper By:	

Completed By: [illegible]

Date: 12/14/15 — # of Coolers Sent: 1

[ ]	Sending in Boxes is OK	X	Include COCs (1 per 10 Samples)	X	Put Labels on Bottles
[ ]	Coolers are Needed	[ ]	Blue Ice - [ ] warm [ ] cold	[ ]	Loose Labels - [ ] vials only
	# of Coolers: According to need	[ ]	Extra Bubble Wrap	[ ]	Individually Wrap Bottles

# of Trip Blanks (2 per set): [ ]

Total Bottles for All Analyses: ______

# of Samples	# for QC	# for Breakage	Analysis Requested	Sample Matrix	Bottle Size	Bottles Per Sample	Total Bottles	Preservation Lot Number	Bottle Lot Number
6			NWTPH-Dx	Water	500 mL AG	2	12		00061257

Company / Contact: ______

Shipping Address: ______

Phone: ______

Comments: **Fill to the top.**

Analytical Resources, Incorporated
Analytical Chemists and Consultants

21 December 2015

Lenora Westbrook
KTA Associates, Inc.
3530 32nd 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

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number: ASW9	Turn-around Requested: Standard
ARI Client Company: KTA, Inc.	Phone: 360-250-7694
Client Contact: Lenora Westbrook	
Client Project Name: PacifiCorp GW Investigation	
Client Project #:	Samplers: D. Metallo B. Kwasnowski

Page: 1	of 1
Date: 12-16-2015	Ice Present? Yes
No. of Coolers: 1	Cooler Temps:

Sample ID	Date	Time	Matrix	No. Containers	NWTPH-Dx Mineral Oil								Notes/Comments
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								
DCM													

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature)	(Signature)	(Signature)	(Signature)
	Printed Name: Dave Metallo	Printed Name: Tyler Rankin	Printed Name:	Printed Name:
	Company: Clear Water Services	Company: ARI	Company:	Company:
	Date & Time: 12.16.15 (1550)	Date & Time: 12-16-15 1550	Date & Time:	Date & Time:

ASW9 : 00002

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.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: KTA, Inc.

Project Name: PacifiCorp GW Investigation

COC No(s): ______ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: ______

Assigned ARI Job No: ASW9

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?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.5
Time: ______

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D005276

Cooler Accepted by: TR 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 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)?		YES	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?		YES	NO
Date VOC Trip Blank was made at ARI	NA	______	

Was Sample Split by ARI: NA YES Date/Time: ______ Equipment: ______ Split by: ______

Samples Logged by: TR Date: 12-16-15 Time: 1647

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm	
			Small → "sm" (< 2 mm)
			Peabubbles → "pb" (2 to < 4 mm)
			Large → "lg" (4 to < 6 mm)
			Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: ASW9
Client: KTA
Project Event: N/A
Project Name: PacifiCorp GW Investigation

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
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

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.

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)**

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

ANALYTICAL RESOURCES INCORPORATED

QC Report No: ASW9-KTA
Project: PacifiCorp GW Investigation

Matrix: Water

Date Received: 12/16/15

Data Release Authorized: [signature]
Reported: 12/21/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-121815	Method Blank	12/18/15	12/18/15	1.00	Diesel Range	0.10	< 0.10 U
15-24611	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		83.2%
ASW9A	MW-6	12/18/15	12/18/15	1.00	Diesel Range	0.10	< 0.10 U
15-24611	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		84.6%
ASW9B	MW-5	12/18/15	12/18/15	1.00	Diesel Range	0.10	< 0.10 U
15-24612	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		81.8%
ASW9C	MW-4	12/18/15	12/18/15	1.00	Diesel Range	0.10	< 0.10 U
15-24613	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		83.3%
ASW9D	MW-1	12/18/15	12/18/15	1.00	Diesel Range	0.10	< 0.10 U
15-24614	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		86.0%
ASW9E	MW-3	12/18/15	12/18/15	1.00	Diesel Range	0.10	< 0.10 U
15-24615	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		85.2%
ASW9F	DUP-GW	12/18/15	12/18/15	1.00	Diesel Range	0.10	< 0.10 U
15-24616	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					Mineral Oil	0.20	< 0.20 U
					o-Terphenyl		88.8%

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.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID

Sample ID: LCS-121815
LAB CONTROL

Lab Sample ID: LCS-121815
LIMS ID: 15-24611
Matrix: Water
Data Release Authorized:
Reported: 12/21/15

QC Report No: ASW9-KTA
Project: PacifiCorp GW Investigation

Date Sampled: NA
Date Received: NA

Date Extracted: 12/18/15
Date Analyzed: 12/18/15 16:19
Instrument/Analyst: FID3B/ML

Sample Amount: 500 mL
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	2.37	3.00	79.0%

TPHD Surrogate Recovery	
o-Terphenyl	86.5%

Results reported in mg/L

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: ASW9
Matrix: Water
Project: PacifiCorp GW Investigation
Date Received: 12/16/15

ARI ID	Client ID	Samp Amt	Final Vol	Prep 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

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

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
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 15-24611 to 15-24616

Data File: \\target\share\chem2\fid3b.i\20151218.b\15121816.D

Page 1

Date : 18-DEC-2015 15:57

Client ID: ASW9MBW1

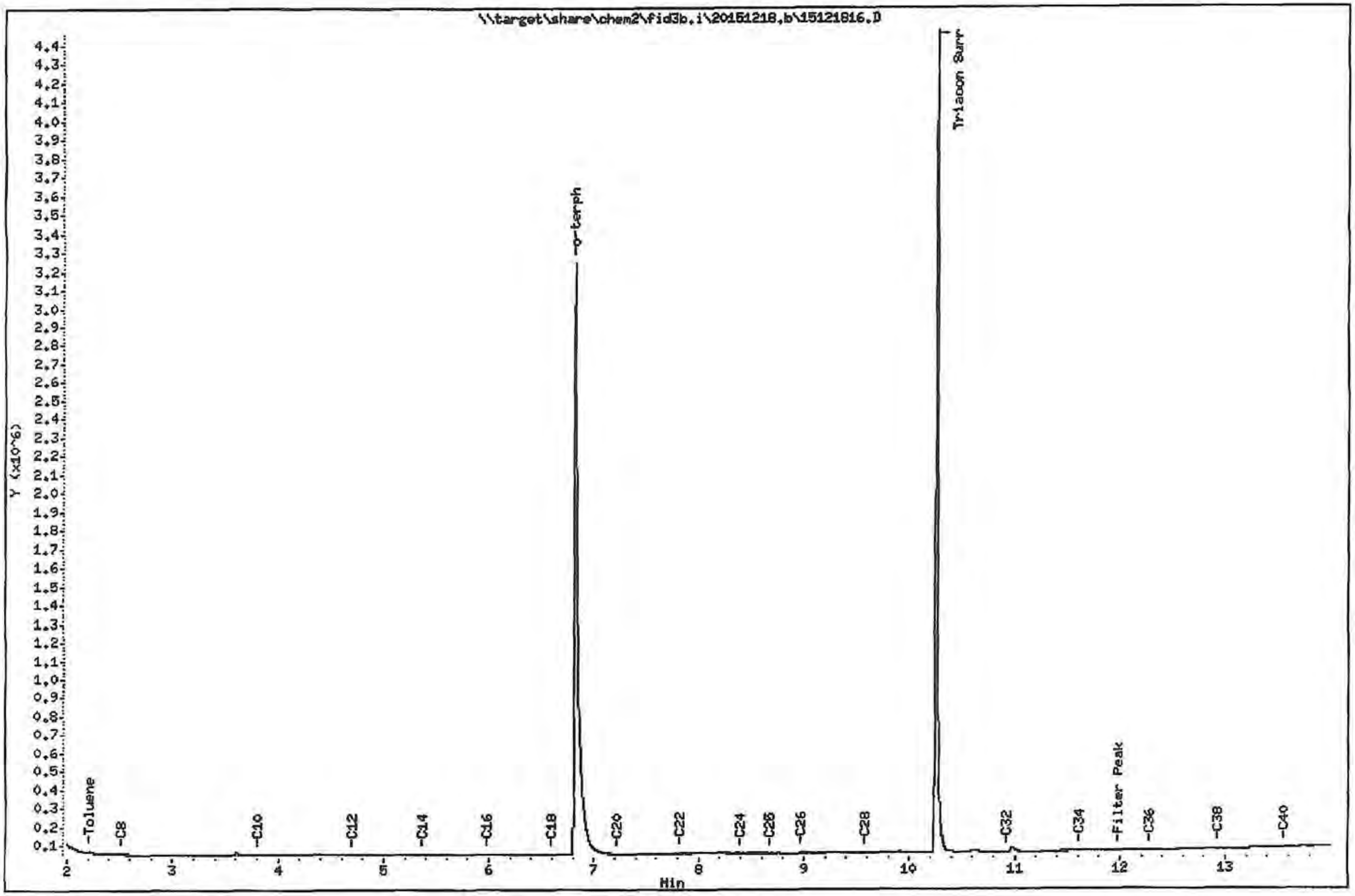
Instrument: fid3b.i

Sample Info: ASW9MBW1

Operator: ML

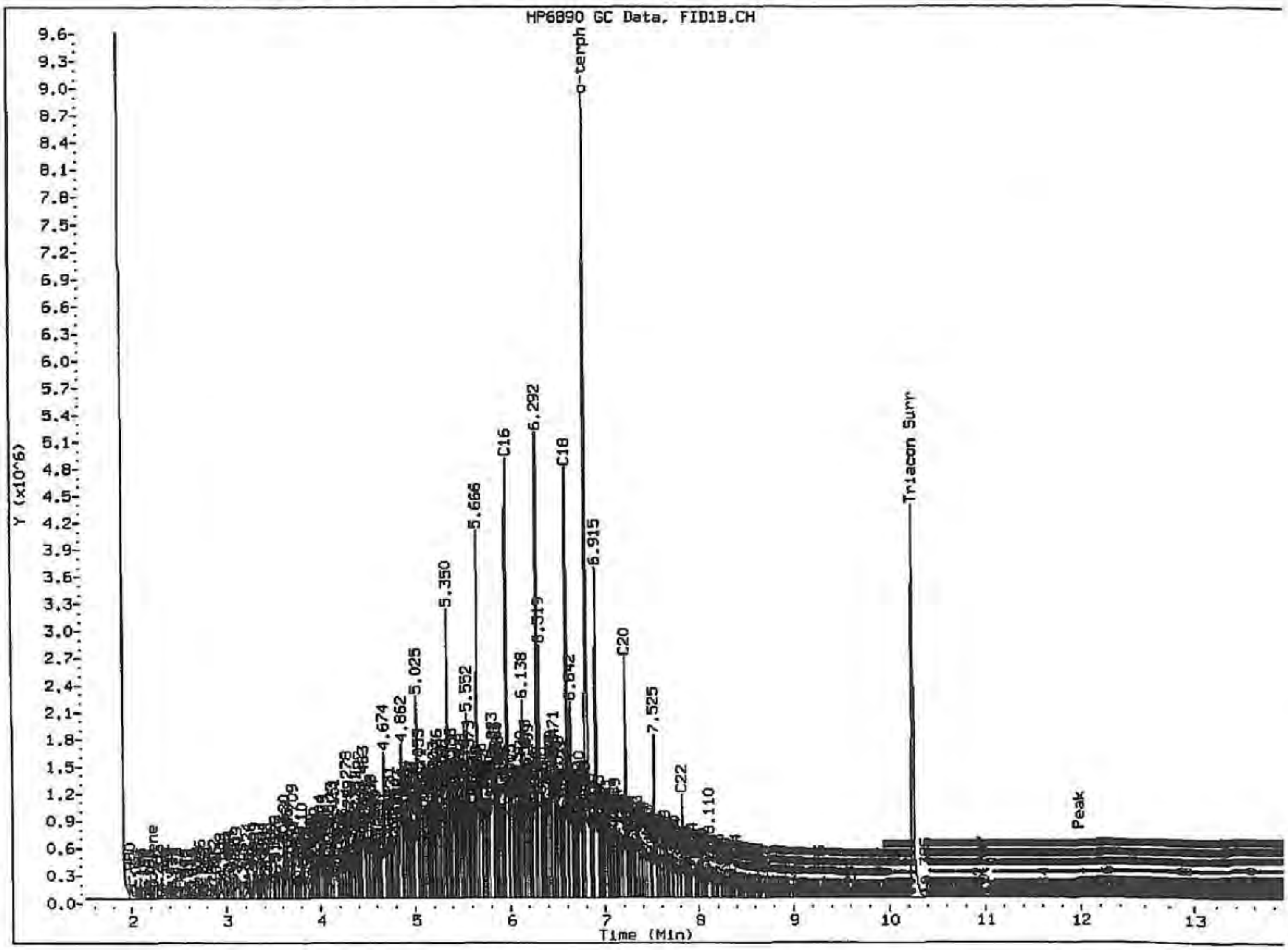
Column phase: RTX-1

Column diameter: 0.25



ASW9 : 00012

FID:3B-2C/RTX-1 ASW9LCSW1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: ML Date: 12/21/15

Data File: \\target\share\chem2\fid3b.i\20151218.b\15121817.D

Date : 18-DEC-2015 16:19

Client ID: ASW9LCSW1

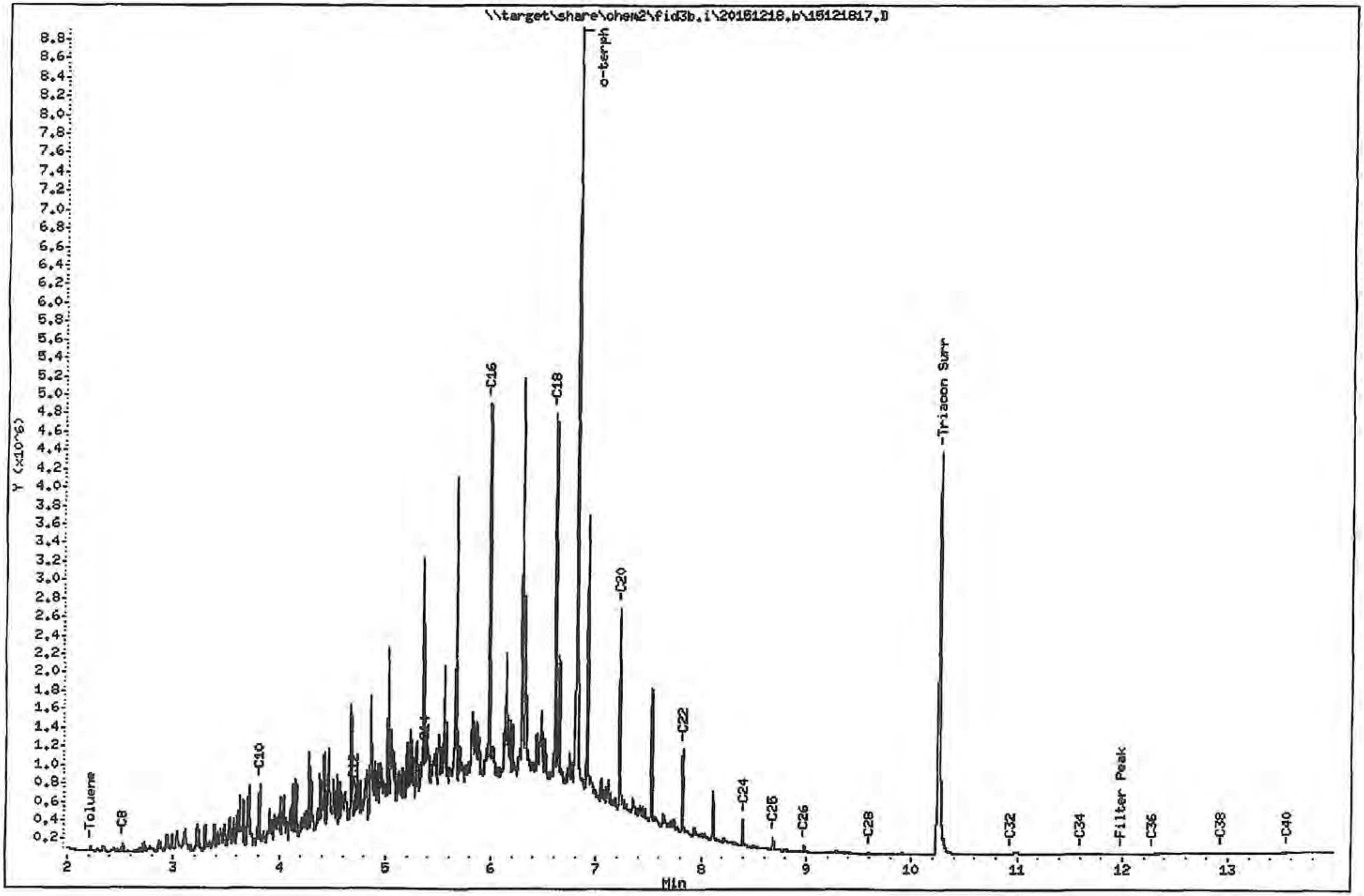
Instrument: fid3b.i

Sample Info: ASW9LCSW1

Operator: ML

Column phase: RTX-1

Column diameter: 0.25



Date : 18-DEC-2015 16:41

Client ID: MW-6

Sample Info: ASW9A

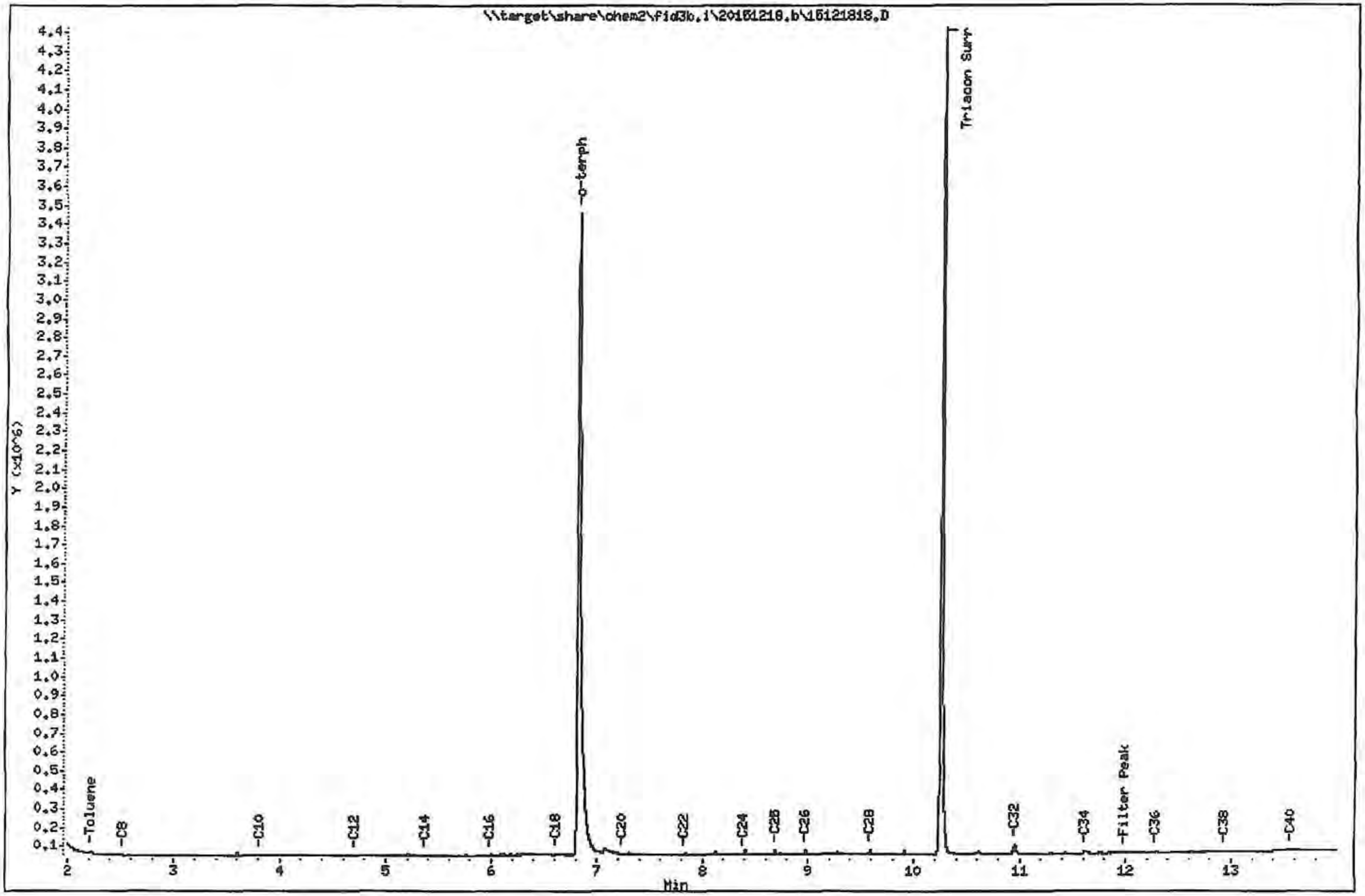
Column phase: RTX-1

Instrument: fid3b.i

Operator: ML

Column diameter: 0.25

\\target\share\chem2\fid3b.i\20151218.b\15121818.D



Data File: \\target\share\chem2\fid3b.i\20151218.b\15121819.D

Date : 18-DEC-2015 17:02

Client ID: MW-5

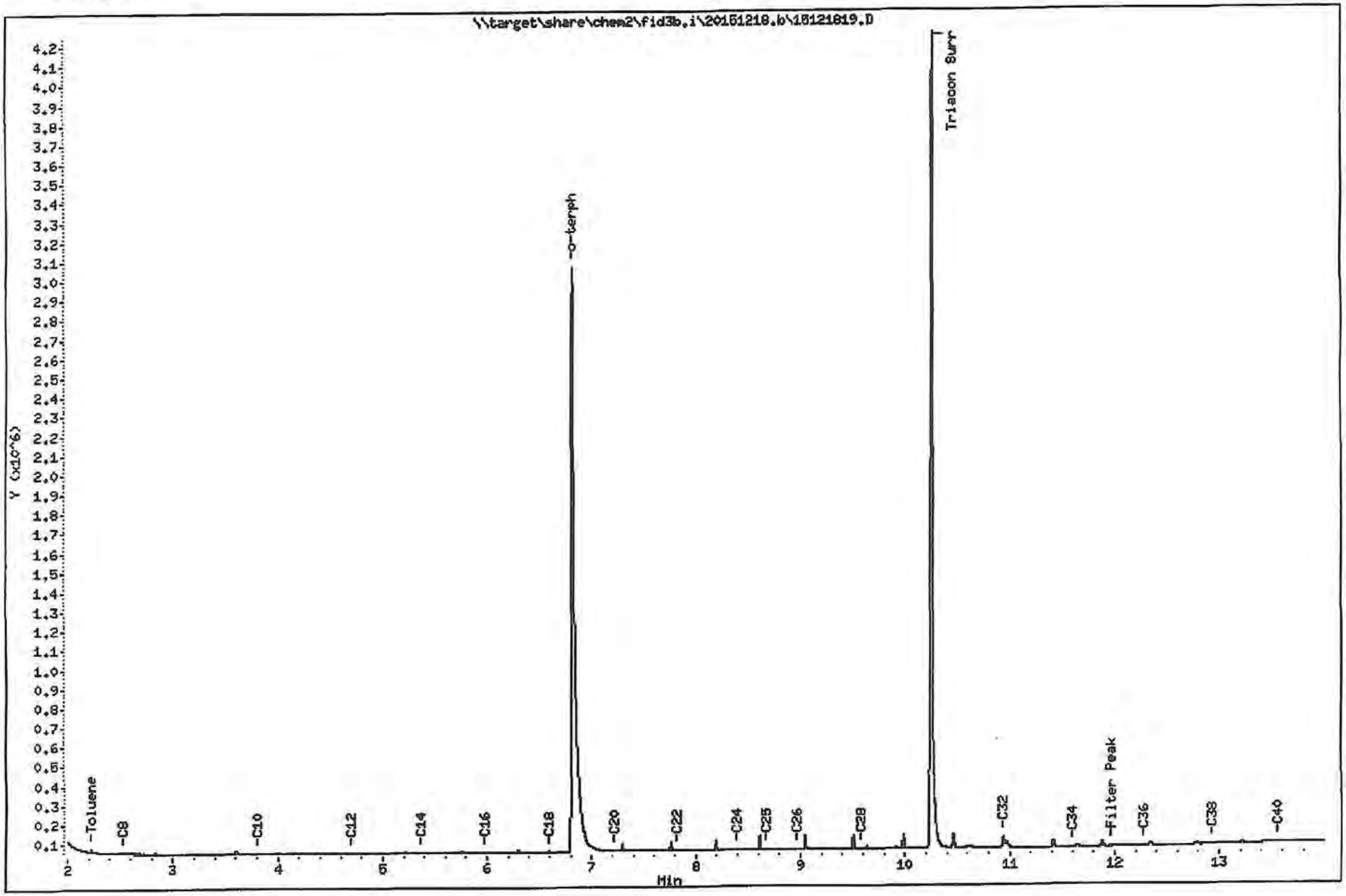
Sample Info: ASW9B

Column phase: RTX-1

Instrument: fid3b.i

Operator: ML

Column diameter: 0.25

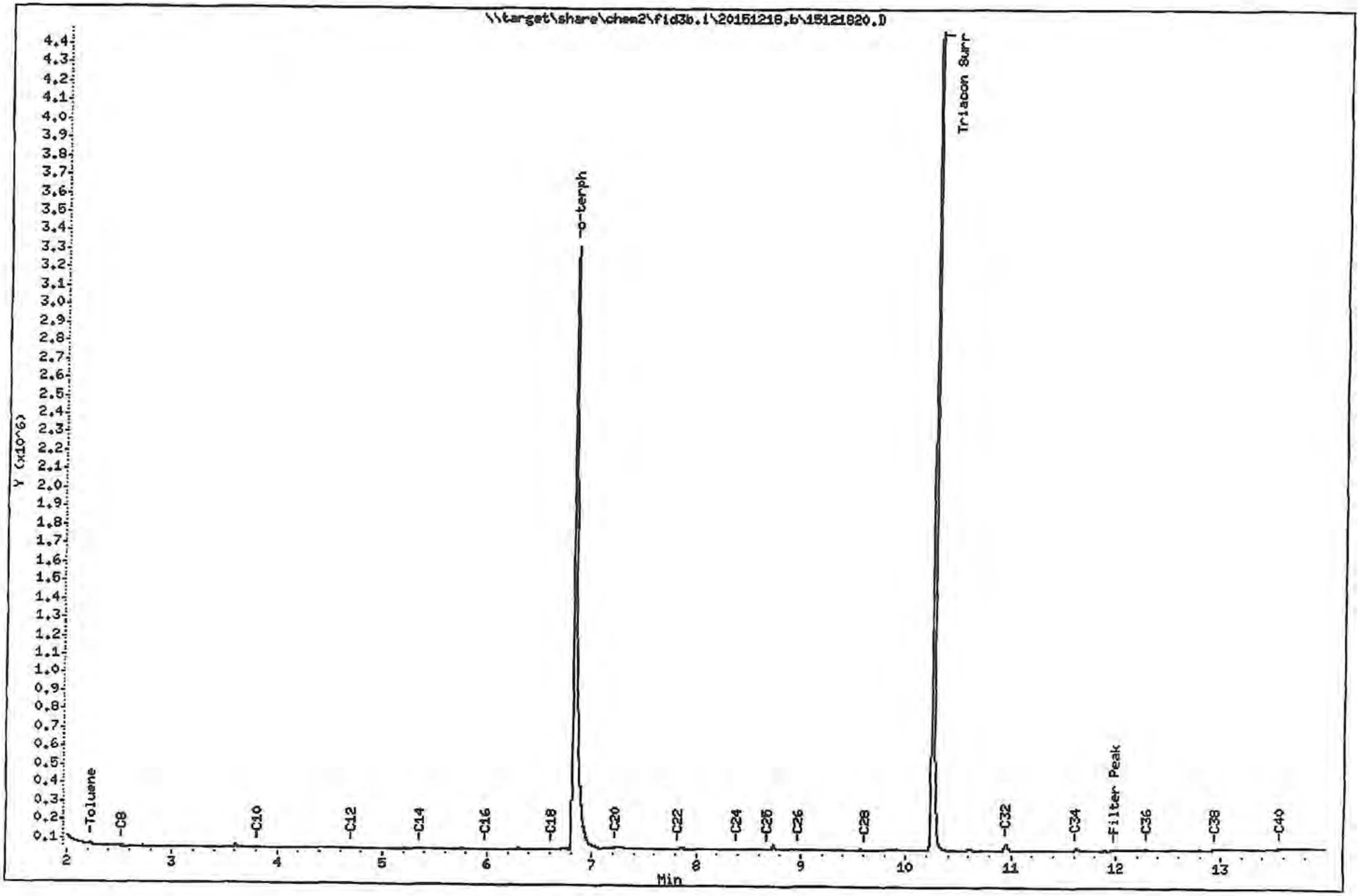


Data File: \\target\share\chem2\fid3b.i\20151218.b\15121820.D
Date : 18-DEC-2015 17:23
Client ID: MW-4
Sample Info: ASW9C

Column phase: RTX-1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25

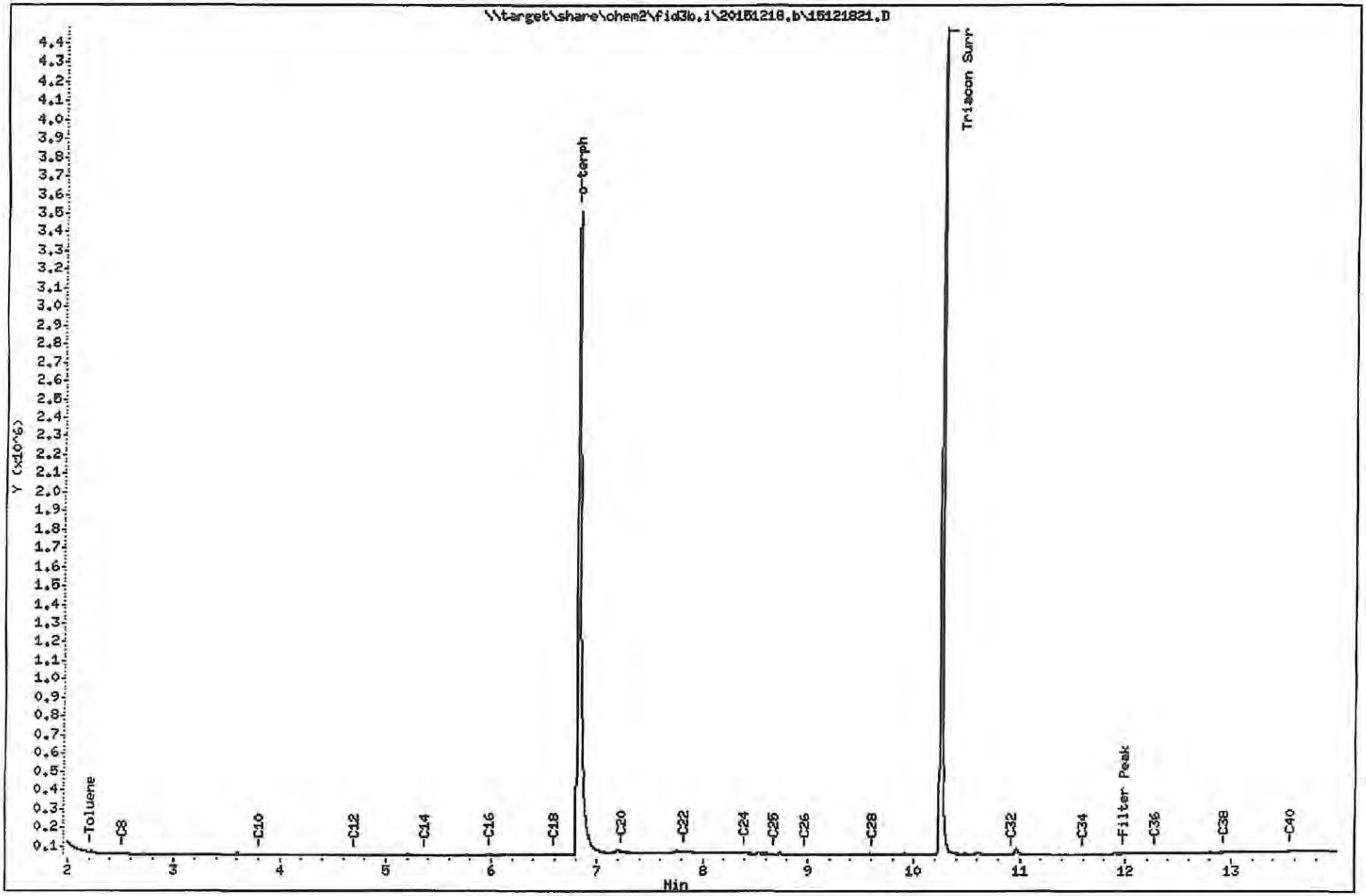


Data File: \\target\share\chem2\fid3b.i\20151218.b\15121821.D
Date : 18-DEC-2015 17:45
Client ID: MW-1
Sample Info: ASW9D

Column phase: RTX-1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25



Data File: \\target\share\chem2\fid3b.i\20151218.b\15121822.D

Date : 18-DEC-2015 18:06

Client ID: MW-3

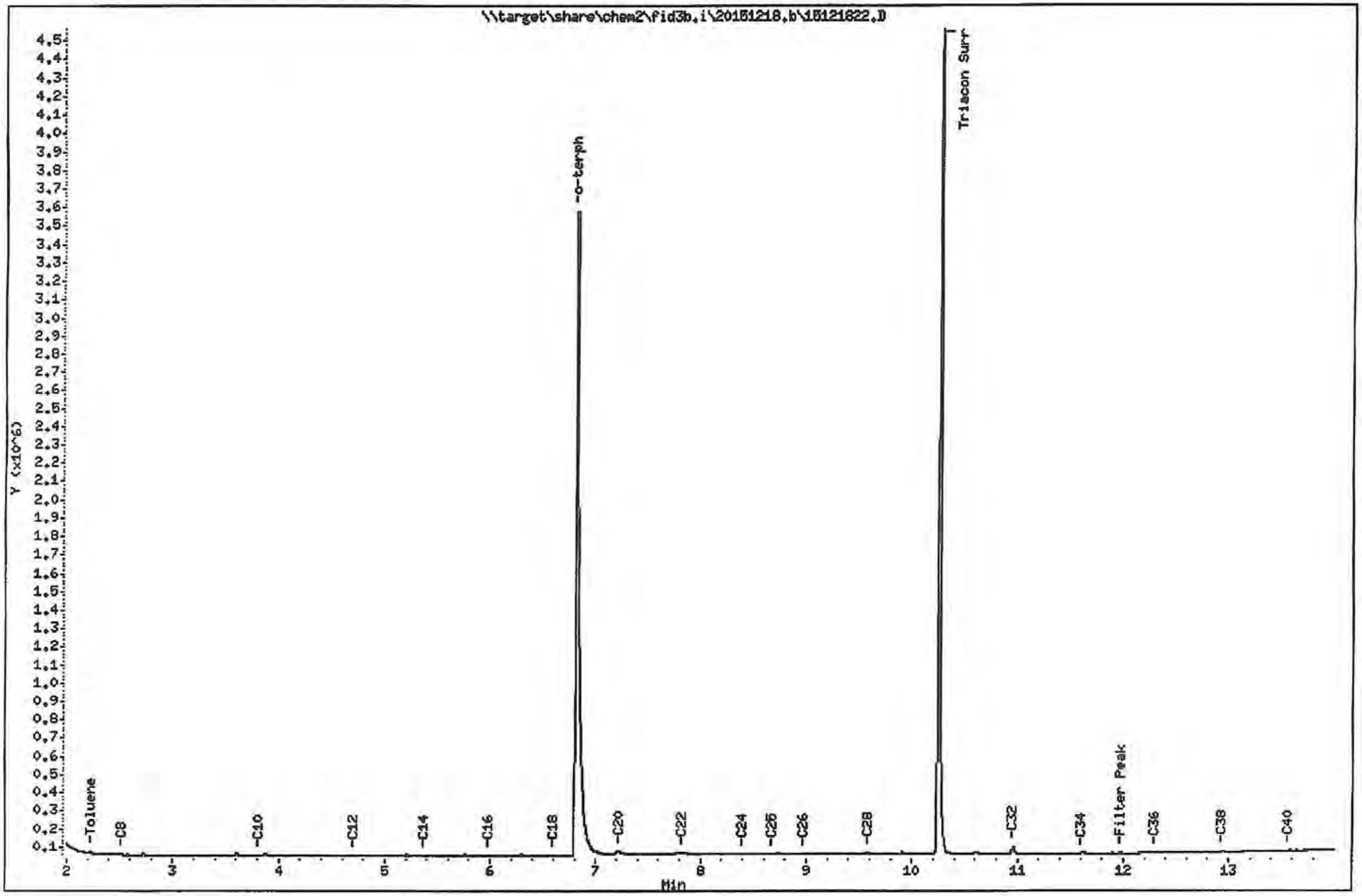
Instrument: fid3b.i

Sample Info: ASW9E

Operator: ML

Column phase: RTX-1

Column diameter: 0.25



Data File: \\target\share\chem2\fid3b.i\20151218.b\15121823.D

Date : 18-DEC-2015 18:27

Client ID: DUP-GW

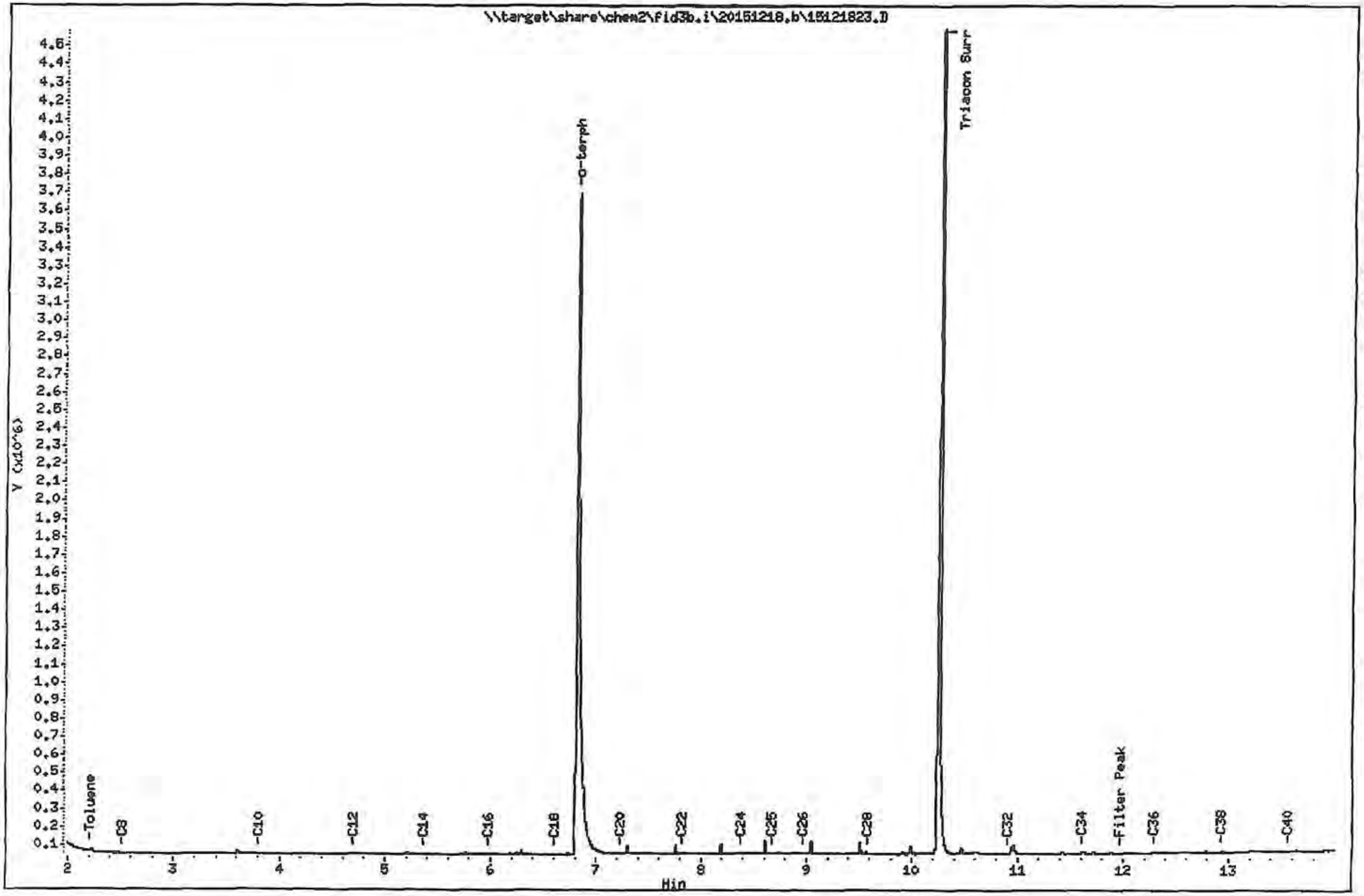
Sample Info: ASW9F

Column phase: RTX-1

Instrument: fid3b.i

Operator: ML

Column diameter: 0.25



ASW9 : 00020

EDD-EIM Data Spreadsheet - KTA Sampling at PacifiCorp, Chehalis WA
Data from 3rd Quarterly Sampling Event
December 16th, 2015

Field_Collection_Start_Date	Field_Collection_Start_Time	Sample_ID	Sample_Matrix	Sample_Preparation_Method	Result_Parameter_Name	Result_Value	Result_Value_Units	Result_Reporting_Limit	Result_Detection_Limit	Result_Detection_Limit_Type	Result_Data_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

**Duplicate sample collected at MW-5

APPENDIX H

GROUNDWATER MONITORING REPORT 4TH QUARTERLY EVENT

MARCH 2016

CLEAR WATER SERVICES

Groundwater Monitoring Report
4th 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

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

April 2016

Groundwater Monitoring Report
4th 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

Prepared for	KTA Associates, Inc.
Document Name	Groundwater Monitoring Report 4th Quarterly Event – March 2016
File Reference	Document 4_FINAL
Job Reference	15KTA1.008
Document Date	22 April 2016

Contact Information

Clear Water Services
2525 West Casino Road
Suite 7AB
Everett, WA 98204

Telephone: 425-412-5700
Facsimile: 425-775-1524

Project Manager; Dave Metallo, LHG

Document Control

Version	Date	Author	Author Initials	Reviewer	Reviewer Initials
001	04/08/2016	Dave Metallo	DCM	L. Westbrook (KTA)	4/21/2016

Table of Contents

Appendices

Tables

Figures

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)

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

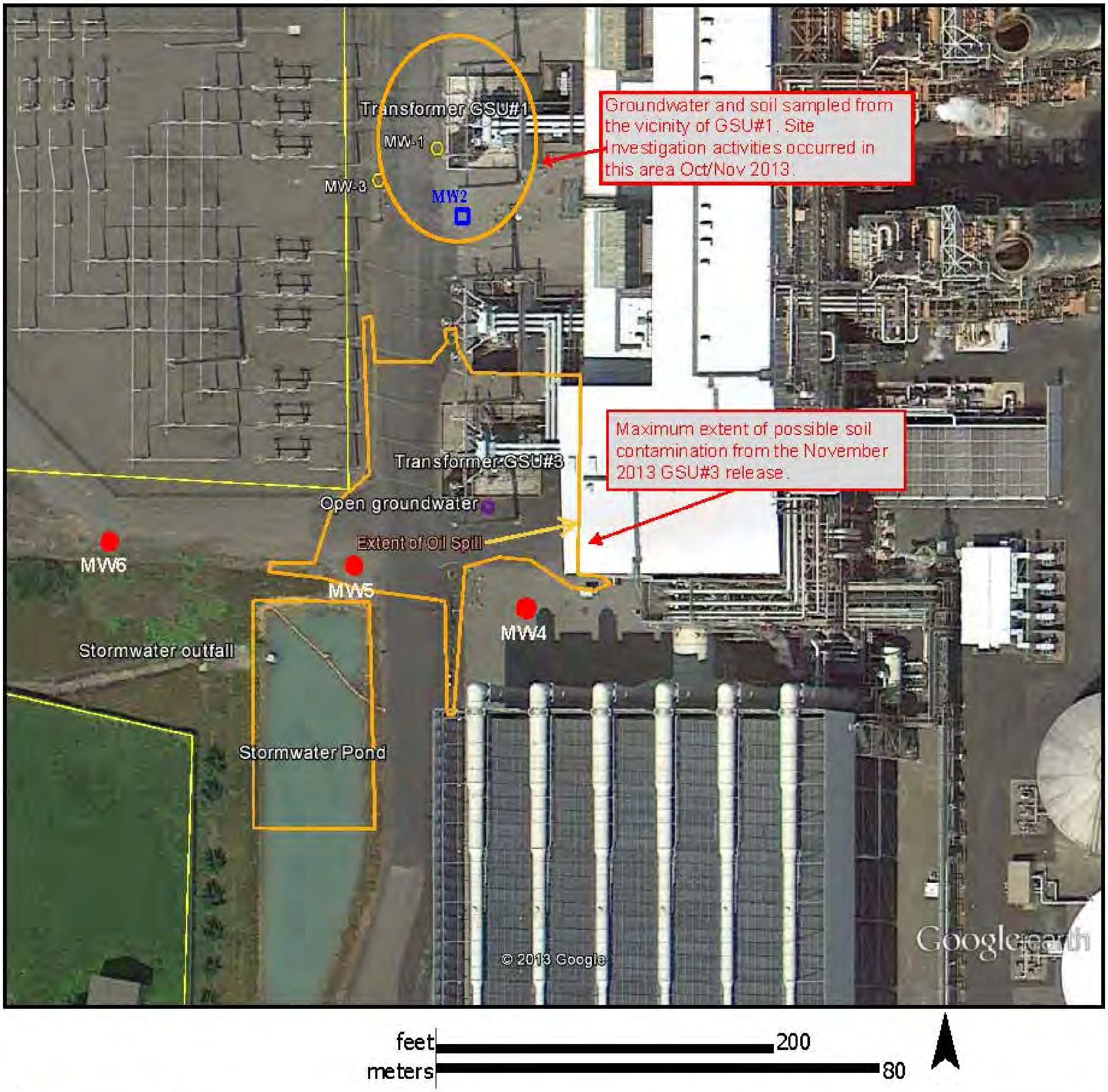
> Section 2.0 Site Background

> 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.



4th Quarterly Groundwater Sampling Event Results Summary – March 22, 2016

- MW-1 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-3 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-4 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-5 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-6 – TPH (including DRO / Mineral Oil and RRO) in Groundwater = Non-Detect
- MW-2; this location was not developed as a permanent well, sampled only once in 2013

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 Geology

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 Hydrogeology

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 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 23rd through May 25th, 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 µg/L, which are below the MTCA Method A Groundwater Cleanup Level of **500 µg/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.

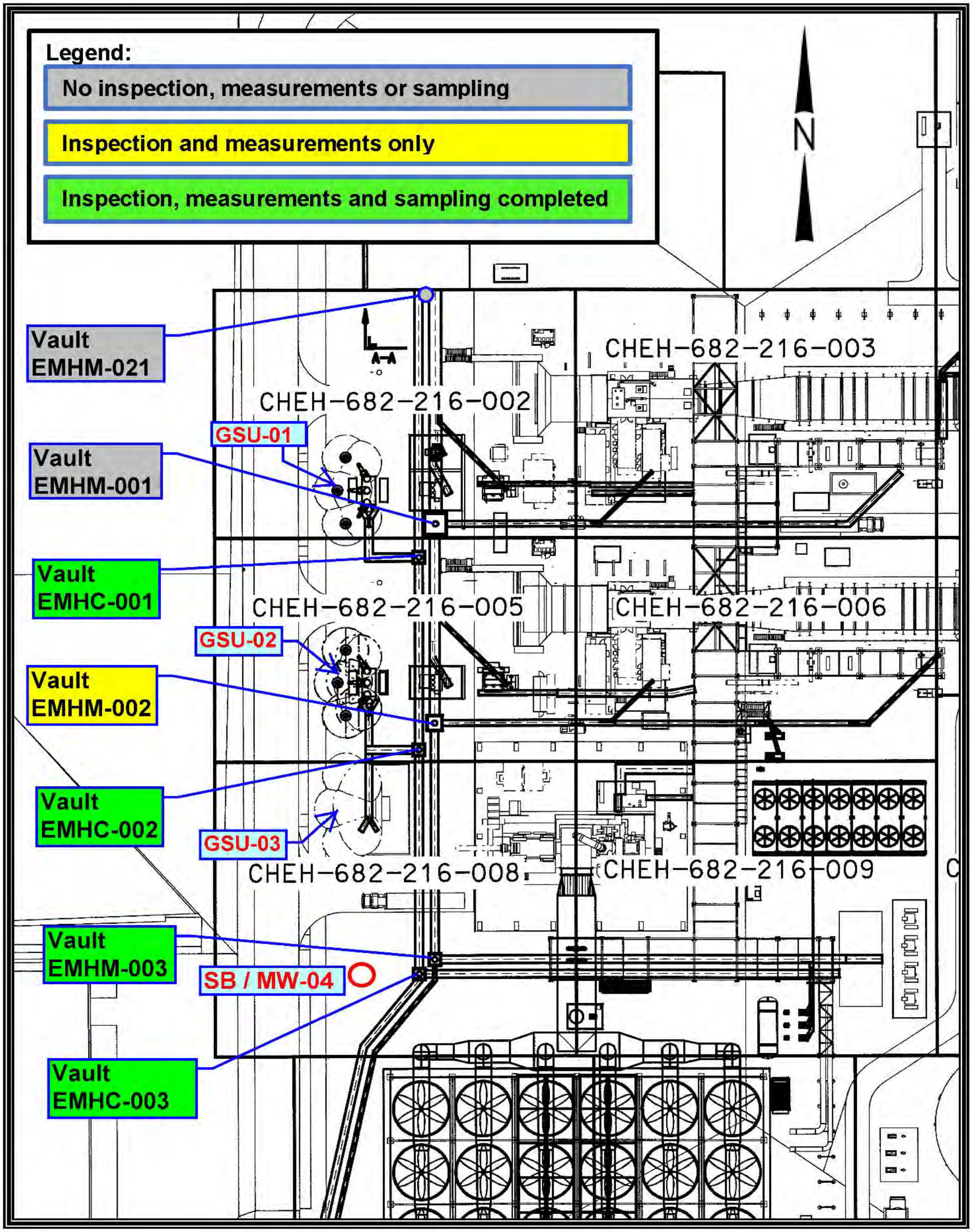


Figure 2. Electrical Vault / In-Flow Water Sampling Locations

3 Field Efforts

Section 3 details the field efforts that were employed during the 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 Health and Safety

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.

Table 1. Water Level Measurements and Groundwater Elevations

Location	Top PVC Well Casing (ft amsl)	Depth to Product (ft)	Static Water Level Measurements (ft)	Groundwater Elevation (ft amsl)
SW corner GSU-1 containment wall	100.00[1]	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

[1]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 15th, (2) July 8th, and (3) December 16th, 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 / re-developed 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.

Table 2 Summary of Water Quality Measurements

**Well ID	Date / Sample Time	Average Purge Rate (ml/min)	Total Purge Volume (gal)	Temp. (C°)	pH	Sp. Cond (µS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)
MW-1	3/22/16 (1130)	100	2	12.2	6.69	158.7	2.7	1.82
[a]DUP-GW	3/22/16 (1600)	100	2	12.2	6.69	158.7	2.7	1.82
MW-3	3/22/16 (1250)	100	1.5	11.3	6.23	115.7	8.30	2.50
MW-4	3/22/16 (1010)	100	1.5	10.3	6.63	89.6	10.9	0.51
MW-5	3/22/16 (1445)	100	1	12.0	6.51	128.9	3.9	0.95
MW-6	3/22/16 (1400)	100	1.5	13.4	6.31	139.6	17.1	2.27

**All wells are 2-inch diameter Sch40 PVC [a]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.

Table 3. Groundwater Sample Collection Information

Sample Type	Analytical Parameter	Sample Matrix	Analytical Method	No. of Samples	No. of Duplicates
Quarterly Groundwater 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.

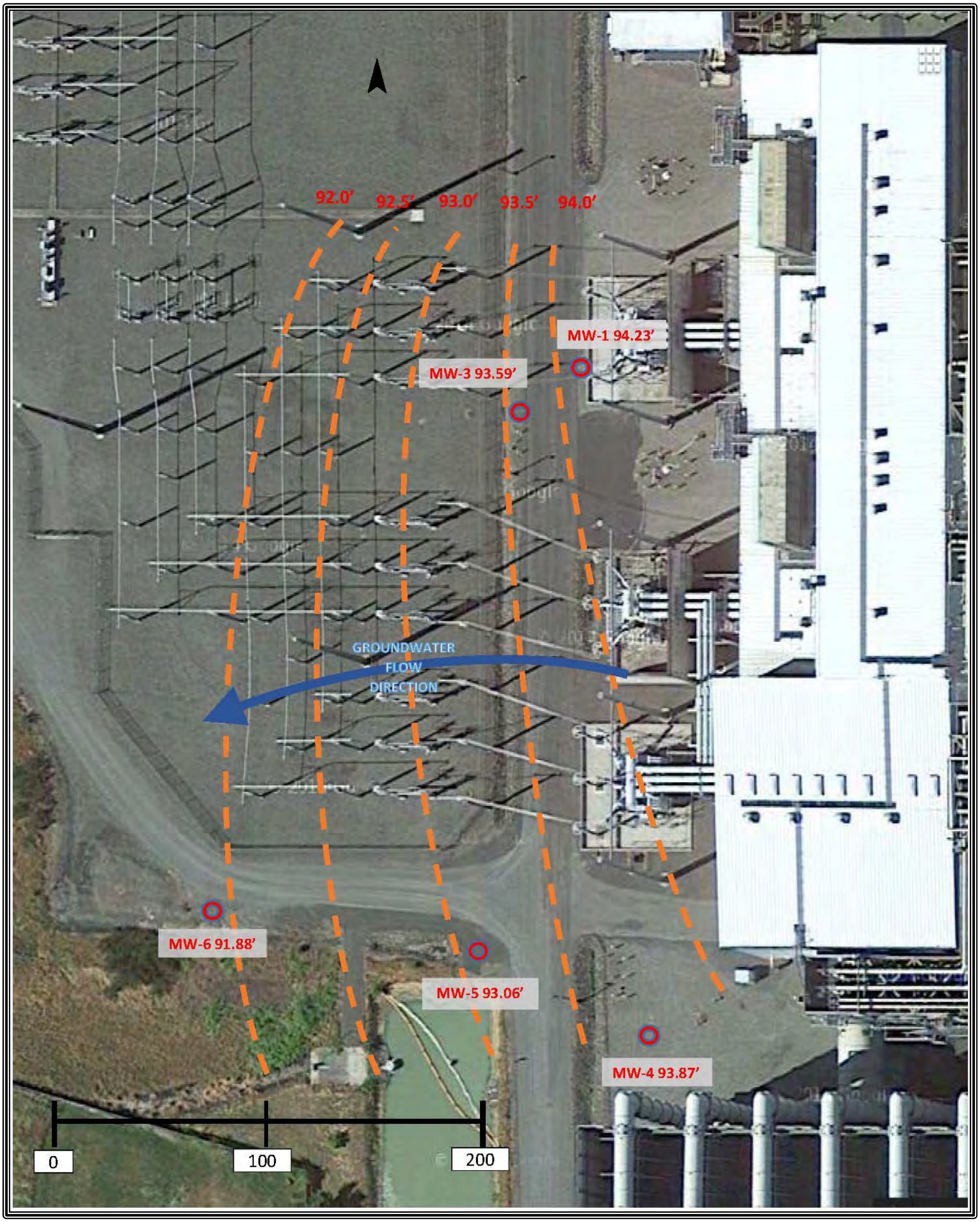


Figure 3. Groundwater Elevations and Flow Direction

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 22nd, 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.

Table 4. Groundwater Sampling Results

Sample ID	Parameter	Detection Limit µg/L	Reporting Limit µg/L	Result Value µg/L	Data 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

U = non-detect   Duplicate collected at MW-1

5 References

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Appendices

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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 breeze

Personnel In Attendance :

Dave Metallo (CWS) Brad Kwasnowski (Cardno)

Meeting Minutes (Brief description of topics, special concerns and sites discussed):

- Checked/signed in w/ front office staff, speak w/our plant contact Jeremy Smith - receive lastest update re: plant & ~~curren~~ current work tasks, etc. at the site - all good
- Hypothermia, windy, cold conditions
- Slip-trips-falls
- PPE (required)
- Electrical hazards/overhead lines
- Lifting, proper techniques
- Gw sampling work tasks
- Emerg. rally point (front gate area)
- Haz-Comm/Plant Radio comm monitoring

Signature of Attendees' :

D Metallo

[signature]

"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

Project Name: PacifiCorp Quarterly GW Investigation

Site Name: Chehalis Plant GSU's

Sample Location ID: MW-1

Sampler(s): D. Metallo, B. Kwasnowski

Parameters: NWTPH-Dx / Mineral Oil

QC Sample: Y N Type: Duplicate

Date: 3·22·2016

LNAPL: Y N DNAPL: Y N Depth to Product (ft btoc): NA

Product Thickness (ft): 0.00 Depth to Water (ft btoc) 3.53

Well Screen Interval: 17-4.5 Mid Screen Depth (ft btoc): 10.75

Pump Intake (ft btoc): 10.5 Total Depth (ft btoc): 16.75

Purge Style: Peristaltic / Bladder / Submersible /Other:

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1037			[1] 3.53						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
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	6.70	159.4	3.0 DM	1.86	
1120	100	500	5.89	12.2	6.69	158.7	2.7	1.82	
[1] Water Level Measurements in these boxes must match !									
1130		~2 gal	[1] 3.53	12.2	6.69	158.7	2.7	1.82	MW-1
(DUP) 1600		—							DUP-GW

Additional Comments:

CLEAR WATER SERVICES **LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM** PAGE 1 OF 1

Project Name: PacifiCorp Quarterly GW Investigation

Site Name: Chehalis Plant GSU's

Sample Location ID: MW-3

Sampler(s): D. Metallo, B. Kwasnowski

Parameters: NWTPH-Dx / Mineral Oil

QC Sample: Y / N Type: NA

Date: 3.22.2016

LNAPL: Y N DNAPL: Y N Depth to Product (ft btoc): NA

Product Thickness (ft): 0.00 Depth to Water (ft btoc) 3.98

Well Screen Interval: 19-4' Mid Screen Depth (ft btoc): 11.5'

Pump Intake (ft btoc): 11.5 Total Depth (ft btoc): 19.22

Purge Style: Peristaltic / Bladder / Submersible /Other:

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1215			[1] 3.98						Initial water level, pre-pumping
1220	100	500ml	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	7.70	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	115.7	8.30	2.50	
[1]Water Level Measurements in these boxes must match !									
1250		~1.5gal	[1] 3.98	11.3	6.23	115.7	8.30	2.50	MW-3
(DUP) —		—							—

Additional Comments:

CLEAR WATER SERVICES

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Project Name: PacifiCorp Quarterly GW Investigation
Date: 3·22·16
Site Name: Chehalis Plant GSU's
LNAPL: Y (N) DNAPL: Y (N) Depth to Product (ft btoc): NA
Sample Location ID: MW-4
Product Thickness (ft): 0.00 Depth to Water (ft btoc) 3.77'
Sampler(s): D. Metallo, B. Kwasnowski
Well Screen Interval: 25-5 Mid Screen Depth (ft btoc): 14.80'
Parameters: NWTPH-Dx / Mineral Oil
Pump Intake (ft btoc): 15' Total Depth (ft btoc): 24.80'
QC Sample: Y / (N) Type: NA
Purge Style: (Peristaltic) / Bladder / Submersible /Other:

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
		Stabilization Requirements		(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
0930			[1] 3.77						Initial water level, pre-pumping
0940	100	500 mL	3.88	10.0	6.69	91.3	11.1	2.56	Pump 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	6.64	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	
[1]Water Level Measurements in these boxes must match !									
1010		~1.5g	[1] 3.77	10.3	6.63	89.6	10.9	0.51	MW-4
(DUP) —		—							—

Additional Comments:

CLEAR WATER

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Project Name: PacifiCorp Quarterly GW Investigation
Site Name: Chehalis Plant GSU's
Sample Location ID: MW-5
Sampler(s): D. Metallo, B. Kwasnowski
Parameters: NWTPH-Dx / Mineral Oil
QC Sample: Y / N Type:

Date: 3.22.2016
LNAPL: Y N DNAPL: Y N Depth to Product (ft btoc): NA
Product Thickness (ft): 0.00 Depth to Water (ft btoc) 4.02
Well Screen Interval: 25-5 Mid Screen Depth (ft btoc): 15.3'
Pump Intake (ft btoc): 15' Total Depth (ft btoc): 25.29'
Purge Style: Peristaltic / Bladder / Submersible /Other:

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1414			[1] 4.02						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 12.6	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	12.0	6.51	128.9	3.9	0.95	
[1] Water Level Measurements in these boxes must match !									
1445		1 gal	[1] 4.02	12.0	6.51	128.9	3.9	0.95	MW-5
(DUP) —									—

Additional Comments:

CLEAR WATER SERVICES

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Project Name: PacifiCorp Quarterly GW Investigation

Site Name: Chehalis Plant GSU's

Sample Location ID: MW-6

Sampler(s): D. Metallo, B. Kwasnowski

Parameters: NWTPH-Dx / Mineral Oil

QC Sample: Y / N Type: NA

Date: 3-22-2016

LNAPL: Y N DNAPL: Y N Depth to Product (ft btoc): NA

Product Thickness (ft): 0.00 Depth to Water (ft btoc) 4.30'

Well Screen Interval: 25-5' Mid Screen Depth (ft btoc): 15

Pump Intake (ft btoc): 15' Total Depth (ft btoc): 25.10

Purge Style: Peristaltic / Bladder / Submersible /Other:

Time	Purge Rate (ml/min)	Total Purge (gal)	Depth to Water (ft btoc)	Temp. °C	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	DO (mg/L)	Comments
Stabilization Requirements				(± 10%)	(± 0.2)	(± 10%)	(± 10 %)	(± 10%)	
1320			[1] 4.30						Initial water level, pre-pumping
1330	100	500 ml	4.49	12.0	6.31	139.5	11.9	2.45	Pump Speed = 0.5
1335	100	500	4.50	12.8	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	
[1]Water Level Measurements in these boxes must match !									
1400		1.5	[1] 4.30	13.4	6.31	139.6	17.1	2.27	MW-6
(DUP) NA		—							—

Additional Comments:

APPENDIX C
FIELD LOGBOOK ENTRIES

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- Dave Metallo w/ Clear Water Services
- Brad Kwasnowski w/ Cardno

- Weather: Partly Cloudy w/ Sun breaks, 43° at 0830 arrival, strong westerly breeze

- Left Cardno shop at ~0650, mobilize down to ARI Labs in Tukwila, WA to pickup analytical bottles, COC's, etc.

- Mob south to PacifiCorp site in Chehalis, WA - Arrived ~~~0830~~ DCM 0900
  - Signed in at front desk
  - Spoke w/ Jeremy Smith - Env Mng.
  - Received plant update / safety briefing from Jeremy
  - Signed out Plant Radio #9
  - Mob back around west side of plant to set up on Monitoring wells near GSU's 1 & 3

- Conduct on-site Tailgate Health & Safety Meeting b/w Metallo & Kwasnowski
  * See Tailgate H&S form for details

~ DCM ~

Rite in the Rain

— Multimeter Water Quality measurement instrument is a YSI Pro DDS unit
Sonde = 14L103125 626909-10
handset = 14M101509 Geotech # 5011
• rental from Geotech in Kirkland, WA

— Readied Sampling gear, meters, paperwork, bottles, supplies, etc.

— * Purge Water ; common 55-gal drum (used since Qt evnt #1) has been place on South side of GSU #3 near corregated open well (sitting on pallet)

— MW-4 (0930)
• Dpth to Prod. = NA Thickness = 0.00'
• Dpth to Water = 3.77' TD = 24.80'
• Smpl. Intake Dpth = 15'
• Peri-pump rate = 100 ml/min
• Total Purge Vol. = 1.5 gals
• Final WQ Readings:

Time	Temp	pH	SP. Cond µS/cm	Turb NTU	DO mg/L
1010	10.3	6.63	89.6	10.9	0.51

• Smpl ID = MW-4 Time = (1010)

— Clean up around site, load gear, move to next well

— MW-1 (1035)
• Dpth to Prod. = NA Thickness = 0.00'
• Dpth to Wtr = 3.53' TD = 16.75'
• Smpl Intake Dpth = 10.5'
• Peri-pump Rate = 100 ml/min
• Total Purge Vol. = ~2 gal
- Final WQ Readings

Time	Temp	pH	Sp Cond	Turb	DO
1130	12.2	6.69	158.7	2.7	1.82

• Smpl ID = MW-1 (1130)
* Duplicate Smpl. = DUP-GW (1600)

— Clean up around well head, load gear move to next well

— Jeremy and Lenora Westbrook are on site to inspector today's event. Discussed current situation w/ the group.

DCM

— MW-3 (1215)

- Dpth to Prdt = NA Thickness = 0.00
- Dpth to Wtr = 3.98 TD = 19.22
- Smpl Intake Dpth = 11.5
- Peri-pump Rate = 100 ml/min
- Tot. Purge Vol. = 1.5 gal
- Final WQ Readings:

Time	Temp	pH	Sp. Cond	Turb	DO
1250	11.3	6.23	115.7	8.30	2.50

Smpl ID = MW-3 Smpl Time = (1250)

— Clean up around site, mob to next site

— MW-6 (1318)

- Dpth to Prod = NA Prod. Thickness = 0.00'
- Dpth to Wtr = 4.30' TD = 25.10'
- Smpl Intake Dpth = 15'
- Peri-pump Rate = 100 ml/min
- Total Purge Vol. = 1.5 gals
- Final WQ Readings:

Time	Temp	pH	Sp. Cond.	Turb	DO
1400	13.4	6.31	139.6	17.1	2.27

Smpl. ID = MW-6 Smpl. Time (1400)

— clean up around well, mob to next location. DCM

— MW-5 (1409)

- Dpth to Prod. = NA Prod. Thickness = 0.00
- Dpth to Wtr = 4.02 TD = 25.29'
- Smpl. Intake Depth = 15'
- Peri-pump Rate = 100 ml/min
- Total Purge Vol. = ~1 gal
- Final WQ Readings:

Time	Temp	pH	Sp Cond.	Turb	DO
1445	12.0	6.51	128.9	3.9	0.95

Smpl ID = MW-5 Smpl. Time (1445)

— Clean up around the site, powered off multi-meter - clean meter and place it back in its case. Clean/decon IFP (cleaned b/w wells and prior to use today).

— Packaged samples for transport, checked labels, place into insulated Coolers. Will take Samples to ARI Labs in Tukwila, WA.

— Emptied remaining Purge/decon water into staged 55-gal drum.

DCM

- Today's event generated ~9.5/10 gallons of process water. This brings the total drum contents from (4) GW sampling events to ~34 gals. The Collection Drum was re-sealed w/ its lid, gasket and steel bolted band.

- Note: Conducted visual inspection of open observation well at the south side of GSU#3, several times today. No visual sheen and/or oil/oily droplets were noted/observed. Water in the well was clear and the bottom was visible.

- Mob'ed around to Admin Office after packing gear into van and readying contents for travel. Returned plant radio to control room. Touched base w/ Jeremy Smith, conducted an event debrief. Signed out in Visitor Log (~1515)

- Leave site and head to convenience store to purchase additional ice for samples

DCM

- thoroughly iced samples, added water to provide an ice-bath. Added cushioning material to provide additional safety for transport to ARI Labs. Seal Cooler

- Completed & QC'ed C.O.C. form

- Mob back to Lab., arrived ~(1700)
  - Reviewed CoC w/ Sample Rec'ing Staff
  - Signed custody over to ARI (1704)
  - Cooler/Sample Temp. = 4.6°C

- Mob'ed to Cardno-GS Shop to drop off gear and clean out van.
  - Notified Lenora Westbrook that the Samples had been submitted to the lab.

4th Qter'ly GW Sampling Completed

DCM

APPENDIX D

ANALYTICAL REPORT (D-1)

And

ELECTRONIC DATA DELIVERABLE SUMMARY (D-2)

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

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.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number: 16C0025	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: KTA, Inc.	Phone: 360-250-7694	Date: 3-22-16	Ice Present? Yes
Client Contact: Lenora Westbrook		No. of Coolers: 1	Cooler Temps: 4.6
Client Project Name: PacifiCorp GW Investigation			
Client Project #:	Samplers: D. Metallo B. Kwasnowski		

Sample ID	Date	Time	Matrix	No Containers	NWTPH-Dx /Mineral Oil								Notes/Comments
MW-4	3.22.16	1010	W	2	X								
MW-1	3.22.16	1130	W	2	X								
MW-3	3.22.16	1250	W	2	X								
MW-6	3.22.16	1400	W	2	X								
MW-5	3.22.16	1445	W	2	X								
DUP-GW	3.22.16	1600	W	2	X								
DCM													

Comments/Special Instructions	Relinquished by	Received by	Relinquished by	Received by
	(Signature) D. Metallo	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Dave Metallo	Printed Name: Justin Meyer	Printed Name	Printed Name
	Company: Clear Water Services	Company: ARI	Company	Company
	Date & Time: 3.22.16 (1704)	Date & Time: 3-22-16 (1705)	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

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: KTA INC

Project Name: PacifiCorp GW Investigation

COC No(s): NA

Delivered by: Fed-Ex UPS Courier **Hand Delivered** Other:

Assigned ARI Job No: 16C0025

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?	**YES**	NO
Were custody papers properly filled out (ink, signed, etc.)	**YES**	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.6
Time:

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D0052776

Cooler Accepted by: JM Date: 3-22-16 Time: 1705

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:

	NA	YES	NO
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)?		**YES**	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?		**YES**	NO
Date VOC Trip Blank was made at ARI	**NA**		

Was Sample Split by ARI : **NA** YES Date/Time: Equipment: Split by:

Samples Logged by: TR Date: 3-23-16 Time: 0924

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

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

ANALYTICAL REPORT FOR SAMPLES

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

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: **(206) 695-6200** • Fax: **(206) 695-6201**

These analyses proceeded without incident of note.

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-4

16C0025-01 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx
Instrument: FID4 — Analyzed: 29-Mar-2016 13:27

Sample Preparation: Preparation Method: EPA 3510C Separatory Funnel
Preparation Batch: BEC0042 — Sample Size: 500 mL
Prepared: 25-Mar-2016 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting 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 %*	*87.6*	*%*	

Data File: \\target\share\chem2\fid4a.i\20160329.b\16032908.D

Date : 29-MAR-2016 13:27

Client ID: MW-4

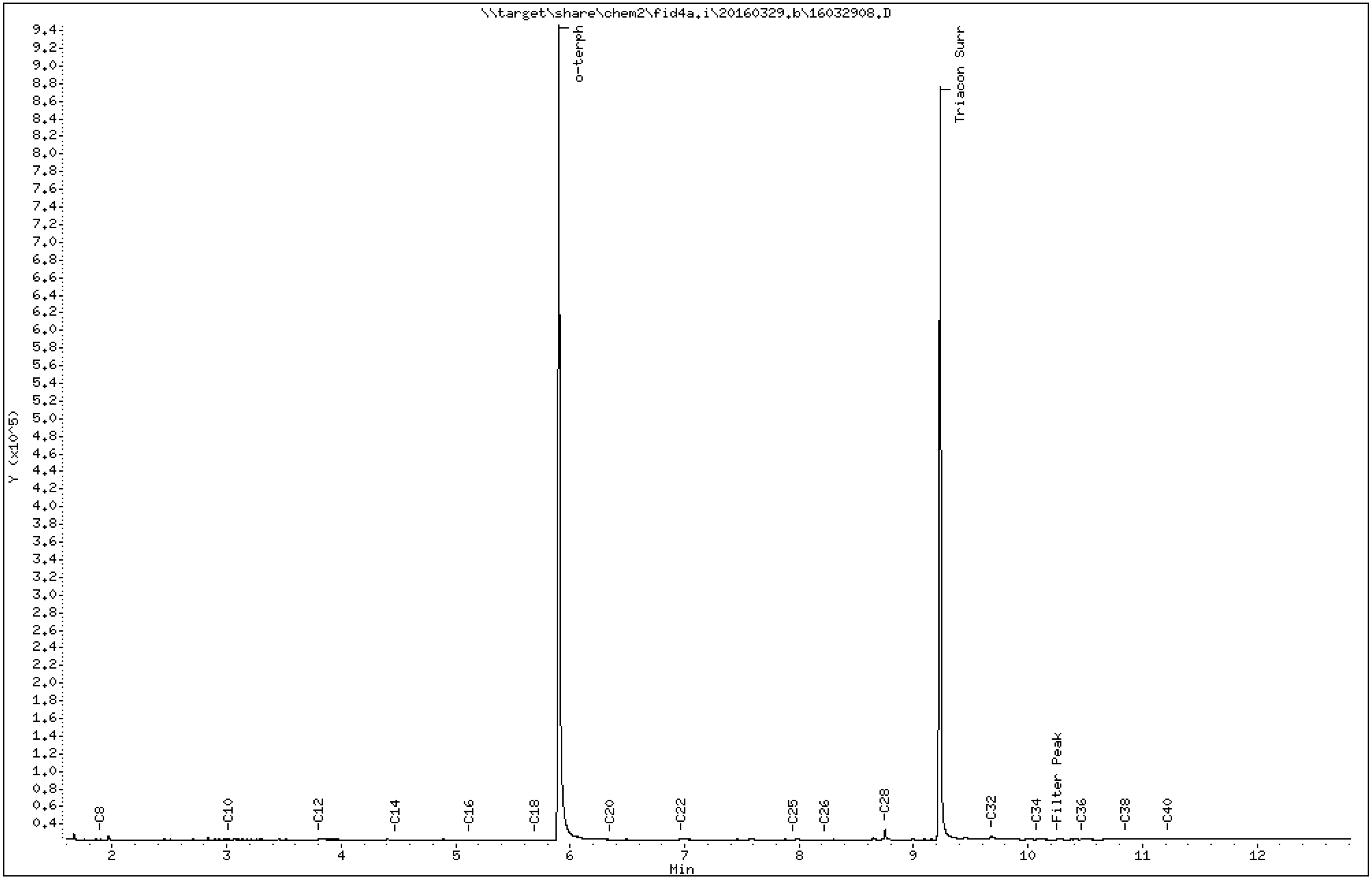
Instrument: fid4a.i

Sample Info: 16C0025-01

Operator: ML

Column phase: RTX-1

Column diameter: 0.25



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20160329.b/16032908.D
Method: 20160329.b\FID4TPH.m
Instrument: fid4a.i, ML
Report Date: 03/30/2016
Macro: 15-MAR-2016
Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

ARI ID: 16C0025-01
Client ID: MW-4
Injection: 29-MAR-2016 13:27
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.664	0.003	7267	5905	WATPHG	(Tol-C12)	84347	3.47
C8	1.902	-0.009	803	1201	WATPHD	(C12-C24)	116133	5.60
C10	3.018	0.000	1043	1290	WATPHM	(C24-C38)	156832	9.63
C12	3.815	-0.015	1018	4344	AK102	(C10-C25)	159652	6.46
C14	4.484	-0.021	562	1955				
C16	5.121	0.017	560	2658	OR.DIES	(C10-C28)	210272	8.46
C18	5.702	-0.019	552	2664				
C20	6.355	-0.017	760	1383				
C22	6.971	-0.044	1162	8268	MIN.OIL	(C16-C28)	297636	12.13
C24	----							
C25	7.953	0.024	614	1109				
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				
C38	10.854	0.009	1226	4335				
C40	11.234	0.016	1195	10262				
o-terph	5.902	-0.003	924371	1097633				
Triacon Surr	9.236	-0.002	854941	927624	NAS DIES	(C10-C24)	155511	6.30

Range Times: NW Diesel(3.830 - 7.634) AK102(3.02 - 7.93) Jet A(3.02 - 5.72)
NW M.Oil(7.63 - 10.85) AK103(7.93 - 10.47) OR Diesel(3.02 - 8.75)

Surrogate	Area	Amount	%Rec
o-Terphenyl	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

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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-1

16C0025-02 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx
Instrument: FID4 Analyzed: 29-Mar-2016 13:50

Sample Preparation: Preparation Method: EPA 3510C Separatory Funnel
Preparation Batch: BEC0042 Sample Size: 500 mL
Prepared: 25-Mar-2016 Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting 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 %*	*90.9*	*%*	

Data File: \\target\share\chem2\fid4a.i\20160329.b\16032909.D

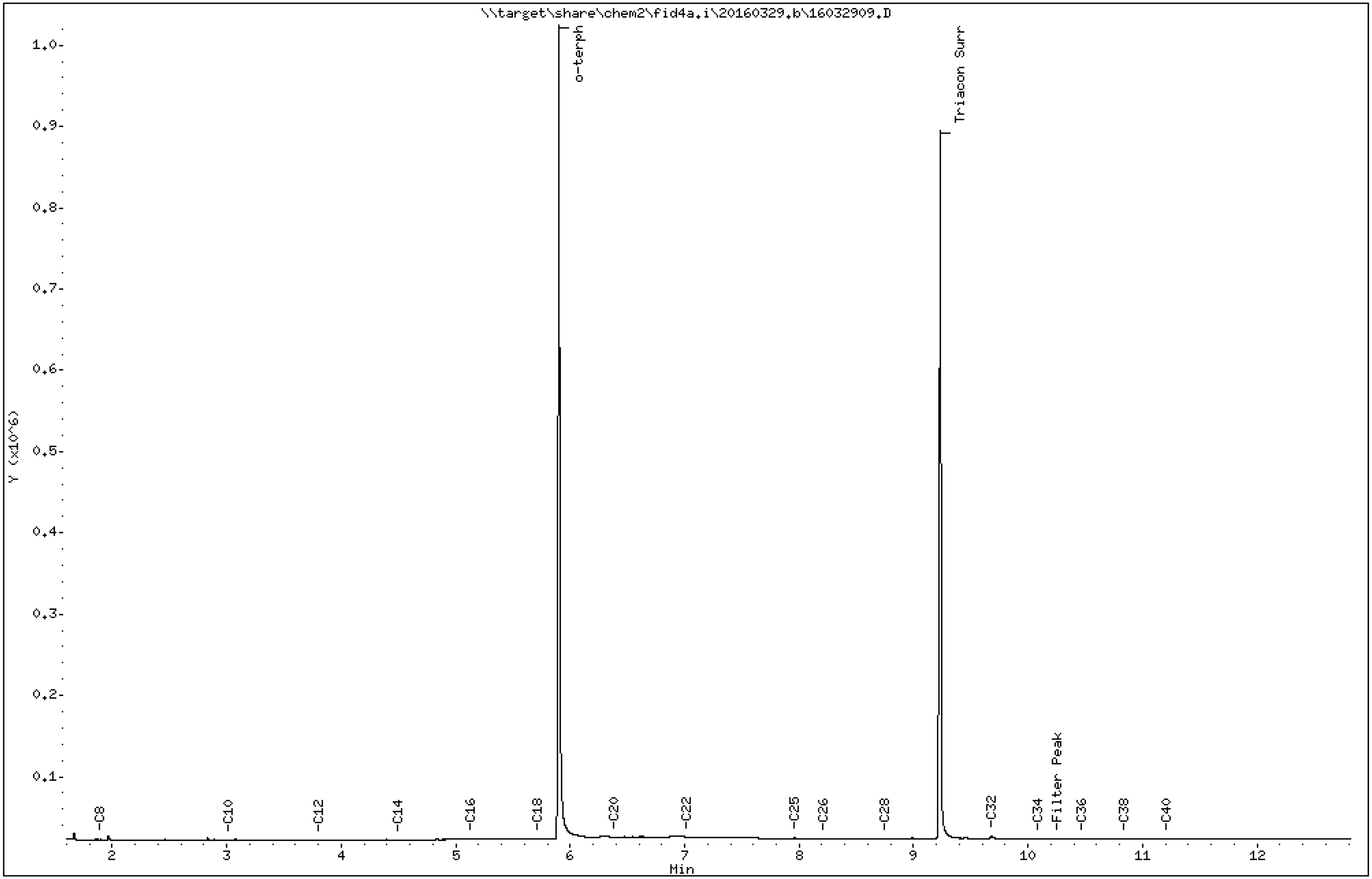
Date : 29-MAR-2016 13:50

Client ID: MW-1 | Instrument: fid4a.i

Sample Info: 16C0025-02

Operator: ML

Column phase: RTX-1 | Column diameter: 0.25



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20160329.b/16032909.D
Method: 20160329.b\FID4TPH.m
Instrument: fid4a.i, ML
Report Date: 03/30/2016
Macro: 15-MAR-2016
Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

ARI ID: 16C0025-02
Client ID: MW-1
Injection: 29-MAR-2016 13:50
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.665	0.004	8768	6693	WATPHG	(Tol-C12)	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				
C16	5.141	0.037	1087	3612	OR.DIES	(C10-C28)	519769	20.91
C18	5.716	-0.004	1853	2371				
C20	6.385	0.013	4140	5949				
C22	7.018	0.003	4163	19544	MIN.OIL	(C16-C28)	634836	25.86
C24	----							
C25	7.963	0.033	2781	21651				
C26	8.220	0.001	1542	7759	CA ORO	(C23-C32)	2746261	211.69
C28	8.750	-0.001	1780	2394				
C32	9.682	0.016	4626	26216				
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				
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: NW Diesel(3.830 - 7.634) AK102(3.02 - 7.93) Jet A(3.02 - 5.72)
NW M.Oil(7.63 - 10.85) AK103(7.93 - 10.47) OR Diesel(3.02 - 8.75)

Surrogate	Area	Amount	%Rec
o-Terphenyl	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 Separatory Funnel

Preparation Batch: BEC0042 Sample Size: 500 mL

Prepared: 25-Mar-2016 Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting 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 %*	*91.1*	*%*	

Data File: \\target\share\chem2\fid4a.i\20160329.b\16032910.D

Date : 29-MAR-2016 14:13

Client ID: MW-3

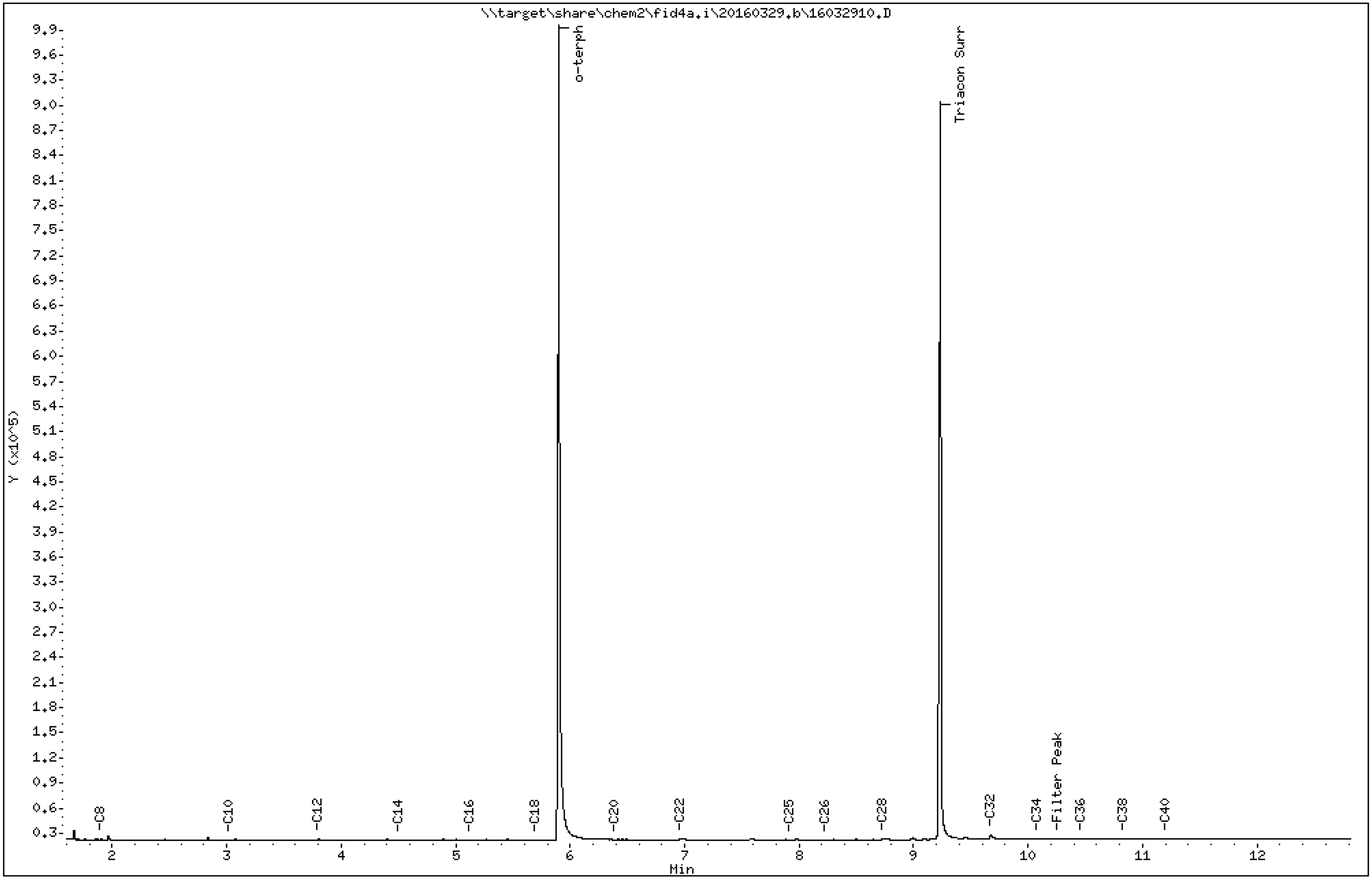
Instrument: fid4a.i

Sample Info: 16C0025-03

Operator: ML

Column phase: RTX-1

Column diameter: 0.25



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20160329.b/16032910.D
Method: 20160329.b\FID4TPH.m
Instrument: fid4a.i, ML
Report Date: 03/30/2016
Macro: 15-MAR-2016
Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

ARI ID: 16C0025-03
Client ID: MW-3
Injection: 29-MAR-2016 14:13
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.667	0.006	12254	9058	WATPHG	(Tol-C12)	58301	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				
C20	6.390	0.018	812	1123				
C22	6.970	-0.045	1202	9182	MIN.OIL	(C16-C28)	315655	12.86
C24	----							
C25	7.918	-0.012	634	621				
C26	8.235	0.016	699	2323	CA ORO	(C23-C32)	2416687	186.29
C28	8.730	-0.021	1638	5340				
C32	9.677	0.011	5930	26004				
C34	10.080	0.006	1851	9955				
Filter Peak	10.258	-0.005	1307	1669	CREOSOT	(C12-C22)	96796	4.80
C36	10.465	-0.002	1728	5228				
C38	10.836	-0.009	1660	9216				
C40	11.205	-0.014	1698	9508				
o-terph	5.901	-0.004	974171	1142530				
Triacon Surr	9.235	-0.003	882672	962502	NAS DIES	(C10-C24)	136135	5.52

Range Times: NW Diesel(3.830 - 7.634) AK102(3.02 - 7.93) Jet A(3.02 - 5.72)
NW M.Oil(7.63 - 10.85) AK103(7.93 - 10.47) OR Diesel(3.02 - 8.75)

Surrogate	Area	Amount	%Rec
o-Terphenyl	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

MW-6

16C0025-04 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Instrument: FID4

Analyzed: 29-Mar-2016 14:36

Sample Preparation: Preparation Method: EPA 3510C Separatory Funnel

Preparation Batch: BEC0042 Sample Size: 500 mL

Prepared: 25-Mar-2016 Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting 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 %*	*79.3*	*%*	

Data File: \\target\share\chem2\fid4a.i\20160329.b\16032911.D

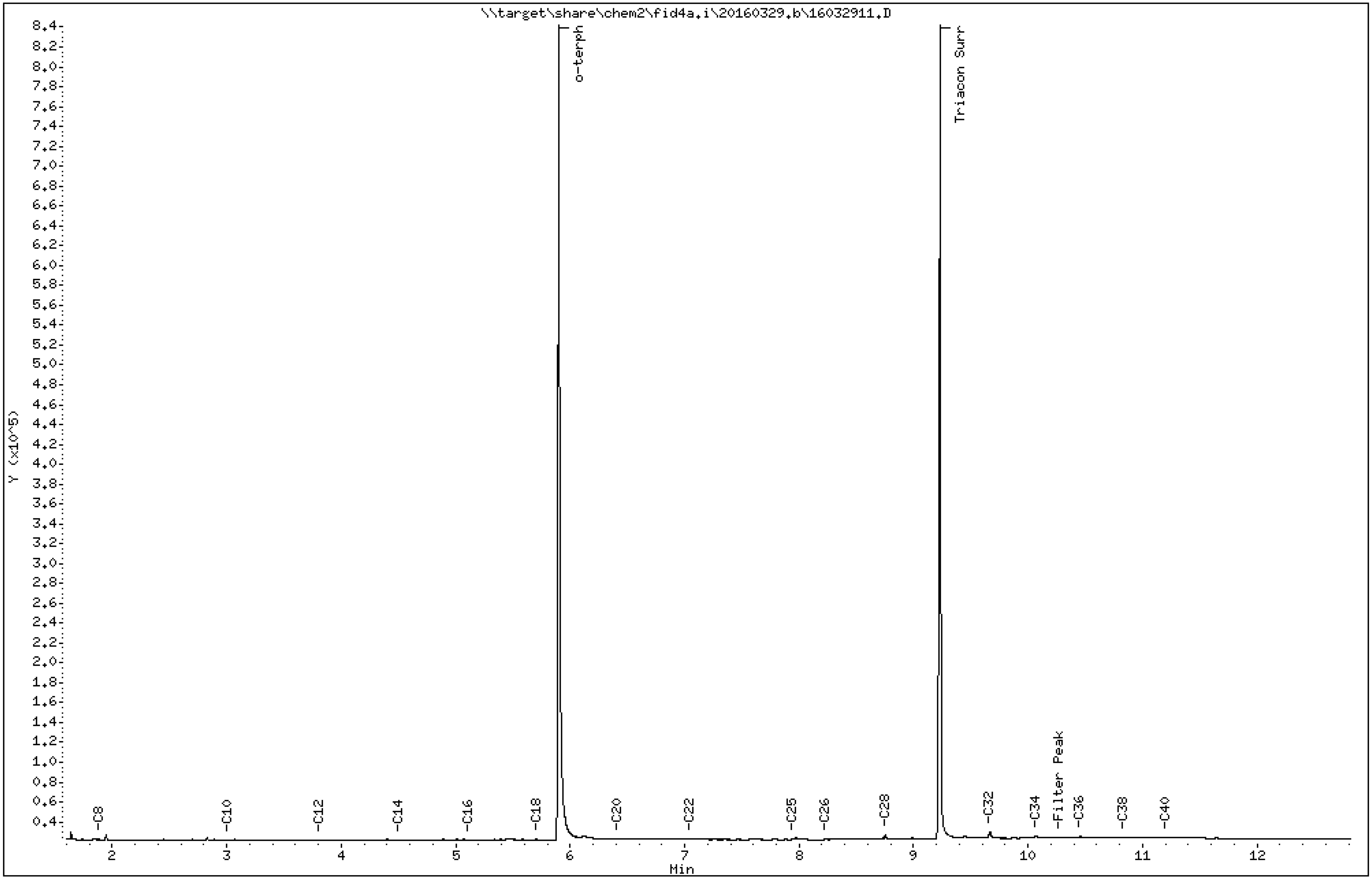
Date : 29-MAR-2016 14:36

Client ID: MW-6 Instrument: fid4a.i

Sample Info: 16C0025-04

Operator: ML

Column phase: RTX-1 Column diameter: 0.25



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20160329.b/16032911.D
Method: 20160329.b\FID4TPH.m
Instrument: fid4a.i, ML
Report Date: 03/30/2016
Macro: 15-MAR-2016
Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

ARI ID: 16C0025-04
Client ID: MW-6
Injection: 29-MAR-2016 14:36
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.638	-0.024	8108	8176	WATPHG	(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				
C16	5.108	0.004	552	409	OR.DIES	(C10-C28)	209828	8.44
C18	5.705	-0.015	727	4226				
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				
Filter Peak	10.270	0.007	2666	9940	CREOSOT	(C12-C22)	117970	5.85
C36	10.456	-0.011	3708	10854				
C38	10.831	-0.014	3393	13178				
C40	11.206	-0.012	2916	12950				
o-terph	5.901	-0.004	820470	993409				
Triacon Surr	9.234	-0.004	820152	865390	NAS DIES	(C10-C24)	152153	6.17

Range Times: NW Diesel(3.830 - 7.634) AK102(3.02 - 7.93) Jet A(3.02 - 5.72)
NW M.Oil(7.63 - 10.85) AK103(7.93 - 10.47) OR Diesel(3.02 - 8.75)

Surrogate	Area	Amount	%Rec
o-Terphenyl	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

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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-5

16C0025-05 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx
Instrument: FID4
Analyzed: 29-Mar-2016 14:59

Sample Preparation: Preparation Method: EPA 3510C Separatory Funnel
Preparation Batch: BEC0042 Sample Size: 500 mL
Prepared: 25-Mar-2016 Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting 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*	*%*	

Data File: \\target\share\chem2\fid4a.i\20160329.b\16032912.D

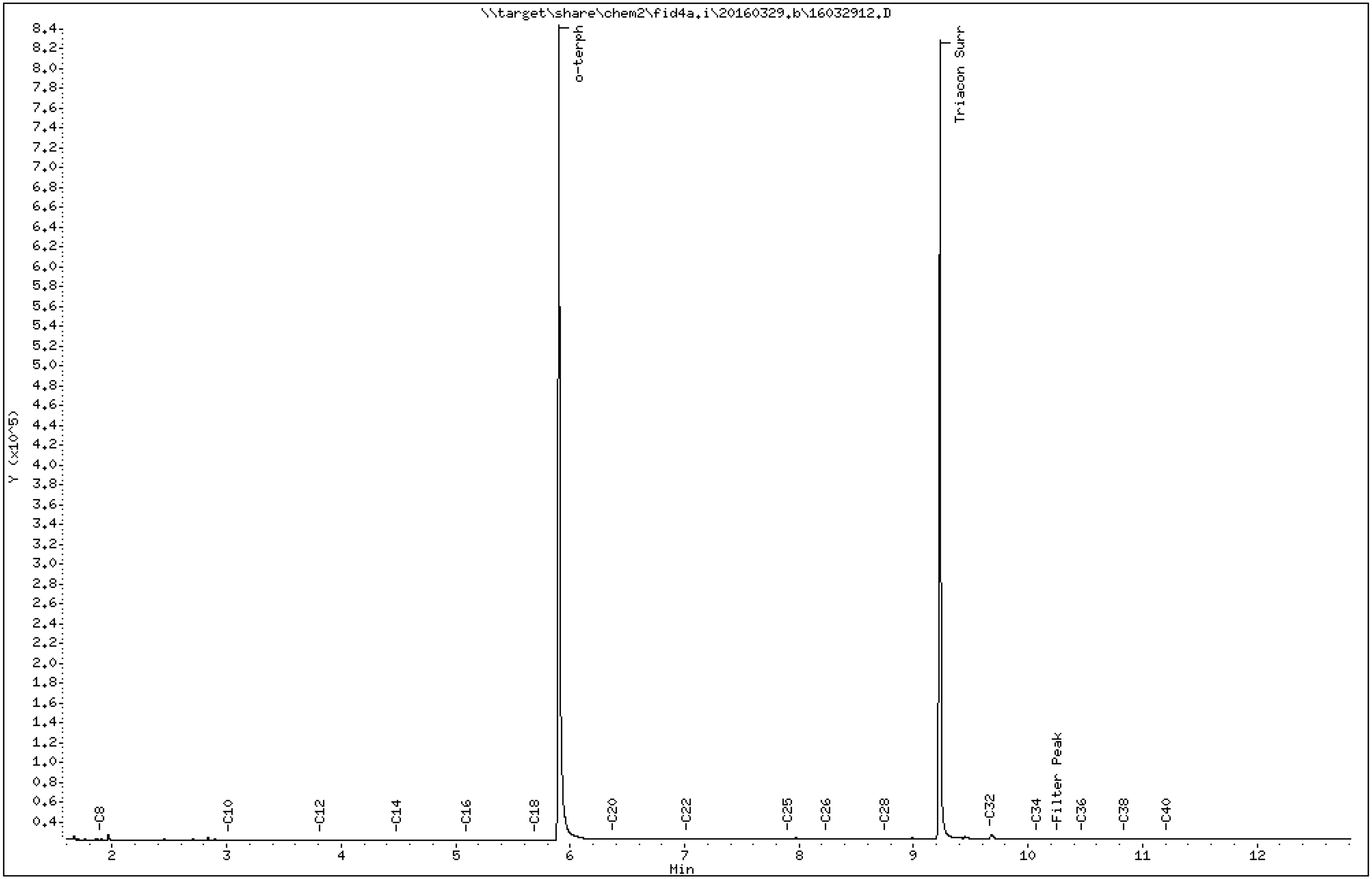
Date : 29-MAR-2016 14:59

Client ID: MW-5 Instrument: fid4a.i

Sample Info: 16C0025-05

Operator: ML

Column phase: RTX-1 Column diameter: 0.25



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20160329.b/16032912.D
Method: 20160329.b\FID4TPH.m
Instrument: fid4a.i, ML
Report Date: 03/30/2016
Macro: 15-MAR-2016
Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

ARI ID: 16C0025-05
Client ID: MW-5
Injection: 29-MAR-2016 14:59
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	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				
C16	5.096	-0.008	277	226	OR.DIES	(C10-C28)	185989	7.48
C18	5.703	-0.018	512	1260				
C20	6.374	0.002	1128	4491				
C22	7.029	0.014	1207	3614	MIN.OIL	(C16-C28)	323247	13.17
C24	----							
C25	7.911	-0.019	899	1496				
C26	8.241	0.021	856	4526	CA ORO	(C23-C32)	2190857	168.88
C28	8.751	-0.000	1603	1754				
C32	9.679	0.013	5052	26173				
C34	10.081	0.006	1731	10114				
Filter Peak	10.259	-0.004	1373	3296	CREOSOT	(C12-C22)	81804	4.05
C36	10.471	0.003	1627	5089				
C38	10.843	-0.003	1652	9755				
C40	11.221	0.002	1691	7838				
o-terph	5.902	-0.003	822241	1023545				
Triacon Surr	9.234	-0.004	806877	865432	NAS DIES	(C10-C24)	127847	5.18

Range Times: NW Diesel(3.830 - 7.634) AK102(3.02 - 7.93) Jet A(3.02 - 5.72)
NW M.Oil(7.63 - 10.85) AK103(7.93 - 10.47) OR Diesel(3.02 - 8.75)

Surrogate	Area	Amount	%Rec
o-Terphenyl	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

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

DUP-GW

16C0025-06 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Instrument: FID4

Analyzed: 29-Mar-2016 15:22

Sample Preparation: Preparation Method: EPA 3510C Separatory Funnel

Preparation Batch: BEC0042 Sample Size: 500 mL

Prepared: 25-Mar-2016 Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting 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 %*	*78.9*	*%*	

Data File: \\target\share\chem2\fid4a.i\20160329.b\16032913.D

Date : 29-MAR-2016 15:22

Client ID: DUP-GW

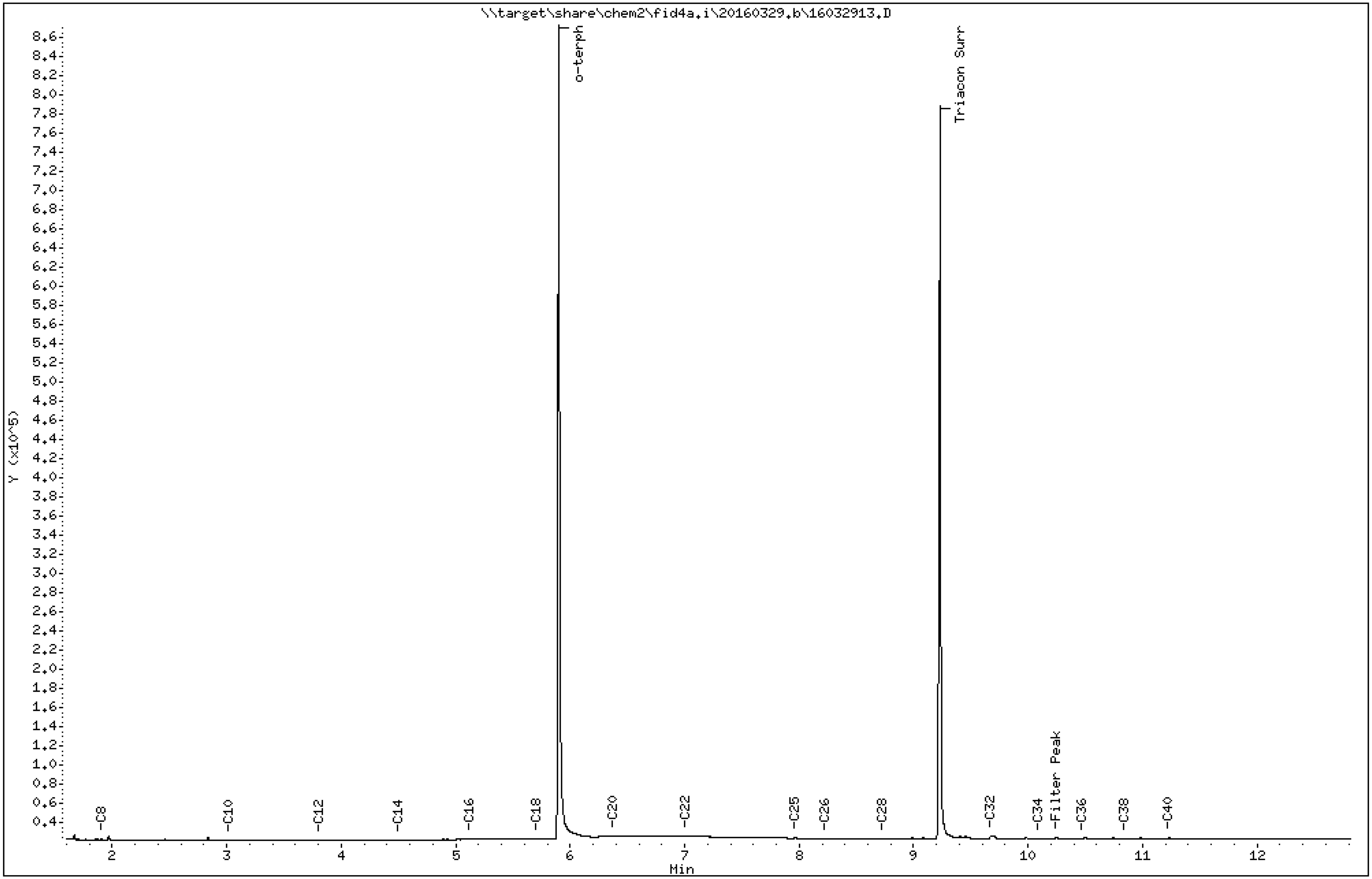
Instrument: fid4a.i

Sample Info: 16C0025-06

Operator: ML

Column phase: RTX-1

Column diameter: 0.25



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20160329.b/16032913.D
Method: 20160329.b\FID4TPH.m
Instrument: fid4a.i, ML
Report Date: 03/30/2016
Macro: 15-MAR-2016
Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

ARI ID: 16C0025-06
Client ID: DUP-GW
Injection: 29-MAR-2016 15:22
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.668	0.006	5110	5928	WATPHG	(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				
C16	5.126	0.022	830	735	OR.DIES	(C10-C28)	492131	19.80
C18	5.704	-0.016	1796	9709				
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: NW Diesel(3.830 - 7.634) AK102(3.02 - 7.93) Jet A(3.02 - 5.72)
NW M.Oil(7.63 - 10.85) AK103(7.93 - 10.47) OR Diesel(3.02 - 8.75)

Surrogate	Area	Amount	%Rec
o-Terphenyl	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	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

Petroleum Hydrocarbons - Quality Control

Batch BEC0042 - EPA 3510C Separatory Funnel

Instrument: FID4

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BEC0042-BLK1)					Prepared: 25-Mar-2016 Analyzed: 29-Mar-2016 12:42						
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*			

Data File: \\target\share\chem2\fid4a.i\20160329.b\16032906.D

Date : 29-MAR-2016 12:42

Client ID: Blank

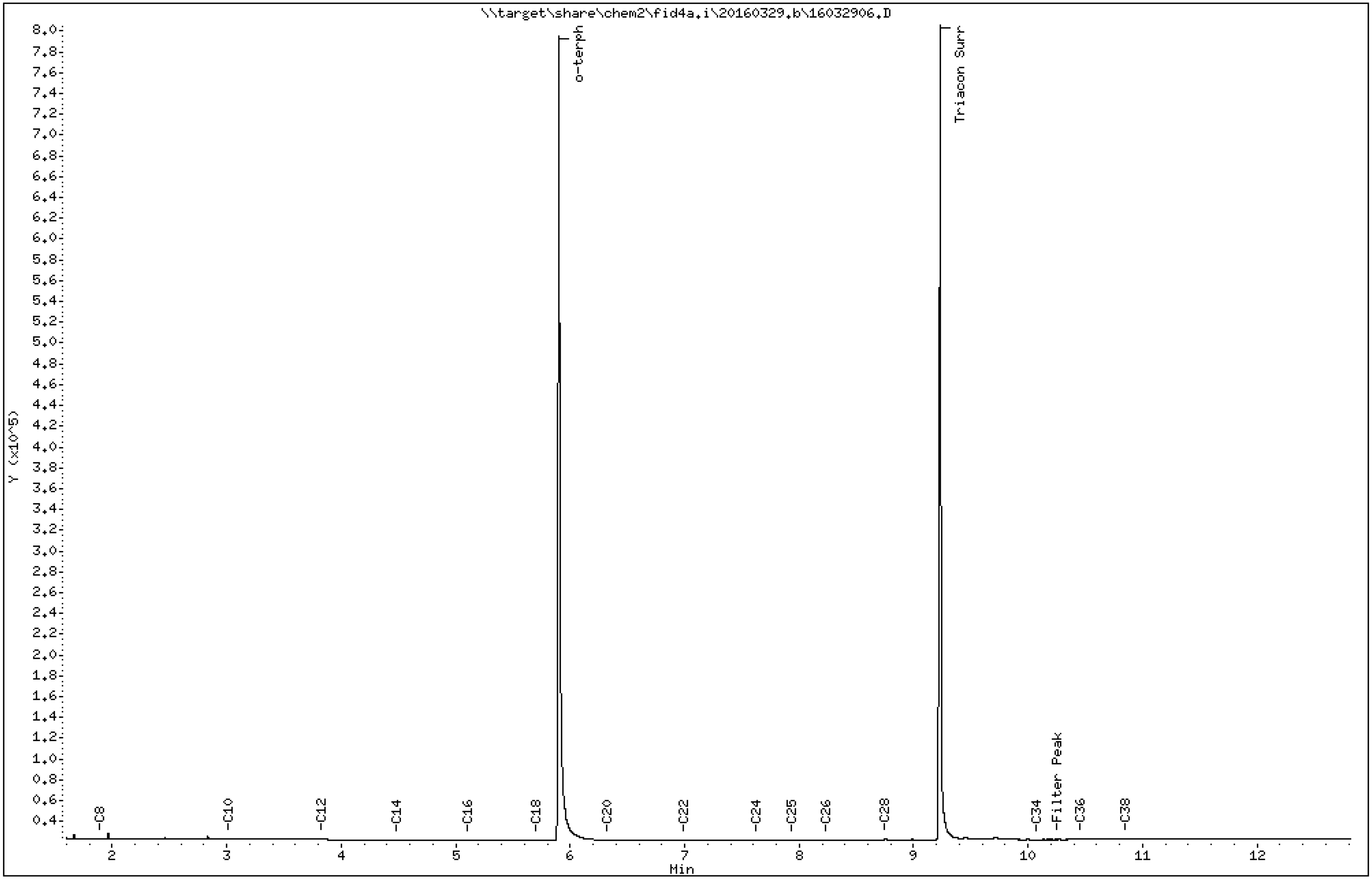
Instrument: fid4a.i

Sample Info: BEC0042-BLK1

Operator: ML

Column phase: RTX-1

Column diameter: 0.25



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20160329.b/16032906.D
Method: 20160329.b\FID4TPH.m
Instrument: fid4a.i, ML
Report Date: 03/30/2016
Macro: 15-MAR-2016
Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

ARI ID: BEC0042-BLK1
Client ID: Blank
Injection: 29-MAR-2016 12:42
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	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				
C32	----							
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	(C10-C24)	85784	3.48

Range Times: NW Diesel(3.830 - 7.634) AK102(3.02 - 7.93) Jet A(3.02 - 5.72)
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	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

Petroleum Hydrocarbons - Quality Control

Batch BEC0042 - EPA 3510C Separatory Funnel

Instrument: FID4

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BEC0042-BS1)					Prepared: 25-Mar-2016 Analyzed: 29-Mar-2016 13:04						
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*			

Data File: \\target\share\chem2\fid4a.i\20160329.b\16032907.D

Date : 29-MAR-2016 13:04

Client ID: LCS

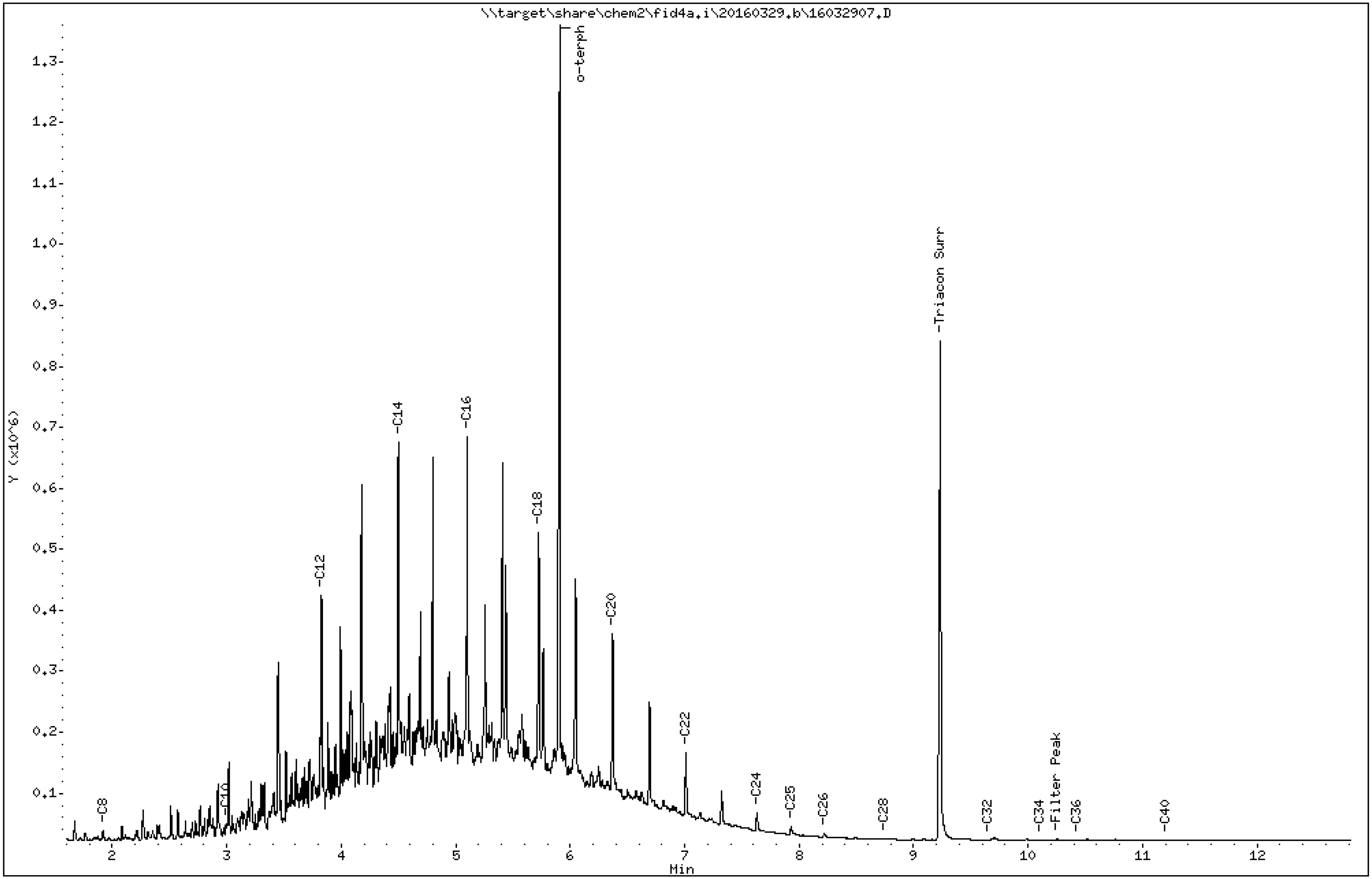
Instrument: fid4a.i

Sample Info: BEC0042-BS1

Operator: ML

Column phase: RTX-1

Column diameter: 0.25



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20160329.b/16032907.D
Method: 20160329.b\FID4TPH.m
Instrument: fid4a.i, ML
Report Date: 03/30/2016
Macro: 15-MAR-2016
Calibration Dates: Gas:24-FEB-2016 Diesel:15-MAR-2016 M.Oil:15-MAR-2016

ARI ID: BEC0042-BS1
Client ID: LCS
Injection: 29-MAR-2016 13:04
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.670	0.009	31065	22206	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				
C16	5.100	-0.004	660912	847698	OR.DIES	(C10-C28)	30952460	1245.17
C18	5.725	0.005	504665	715179				
C20	6.371	-0.001	339823	626563				
C22	7.011	-0.004	143310	307962	MIN.OIL	(C16-C28)	15310114	623.71
C24	7.631	-0.003	44655	166963				
C25	7.929	-0.001	22660	71103				
C26	8.219	-0.000	10774	30691	CA ORO	(C23-C32)	33779391	2603.82
C28	8.749	-0.002	3077	7462				
C32	9.649	-0.016	570	630				
C34	10.111	0.036	166	515				
Filter Peak	10.254	-0.009	1837	3208	CREOSOT	(C12-C22)	26172644	1297.22
C36	10.423	-0.045	146	533				
C38	----							
C40	11.209	-0.009	290	294				
o-terph	5.909	0.004	1211204	1070652				
Triacon Surr	9.234	-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)
NW M.Oil(7.63 - 10.85) AK103(7.93 - 10.47) OR Diesel(3.02 - 8.75)

Surrogate	Area	Amount	%Rec
o-Terphenyl	1070652	38.4	85.4 M
Triacontane	902783	36.8	81.9

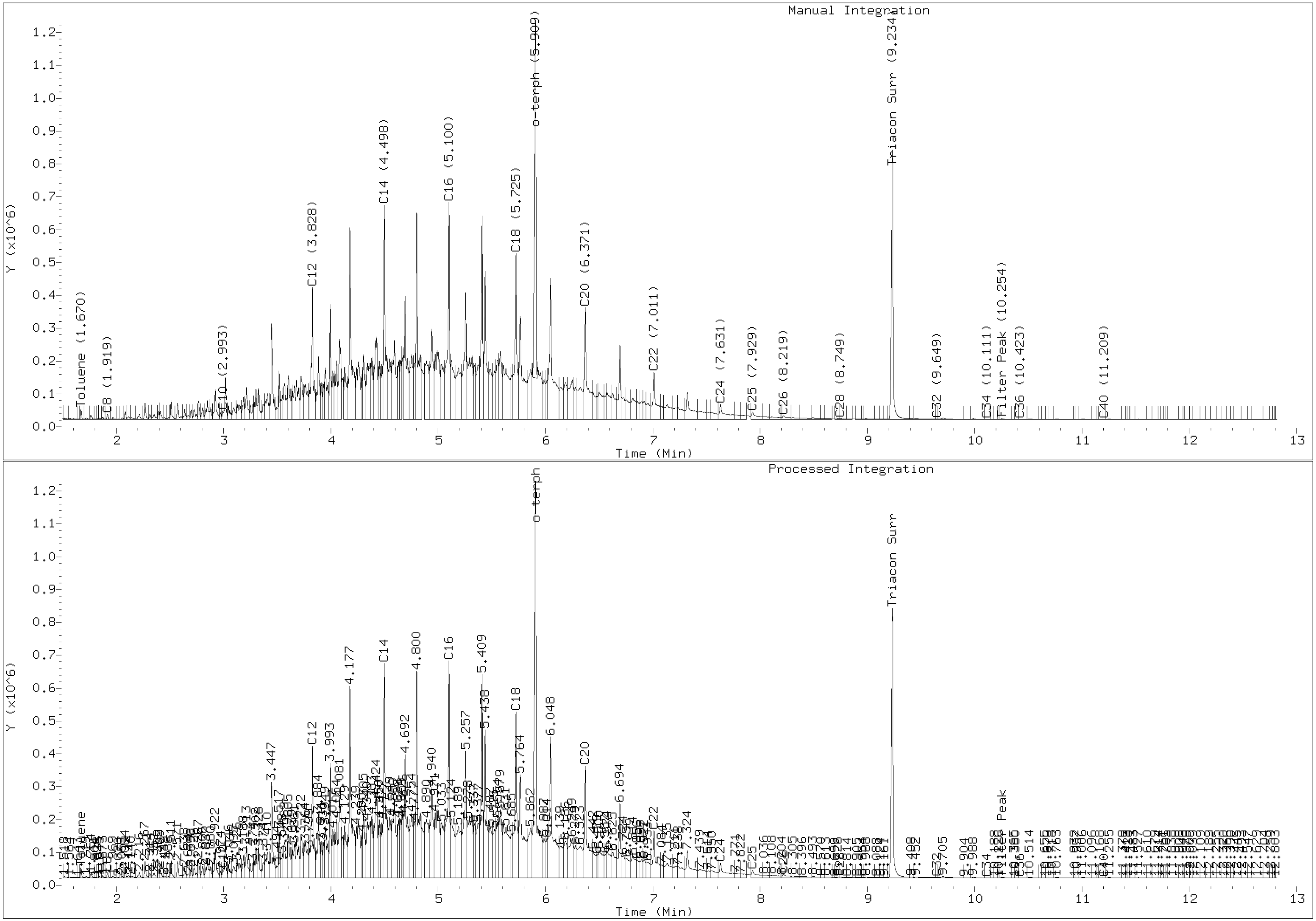
M Indicates the peak was manually integrated

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

TPH Manual Integrations Report

Datafile: FID4A, 20160329.b/16032907.D Injection: 29-MAR-2016 13:04

Lab ID:BEC0042-BS1



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

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	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

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

Notes and Definitions

U	This analyte is not detected above the applicable reporting or detection limit.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

Items for Project Manager Review

	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

Items for Project Manager Review

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

Items for Project Manager Review

LabNumber	Analysis	Analyte	Exception
SEC0055-CCV2	TPH NW (Extractables)	Motor Oil Range Organics (C24-C40)	Exceeds lower control limit

Items for Project Manager Review

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_Start_Date	Field_Collection_Start_Time	Sample_Matrix	Sample_Preparation_Method	Result_Parameter_Name	Result_Value	Result_Value_Units	Result_Reporting_Limit	Result_Detection_Limit	Result_Detection_Limit_Type	Result_Method	Result_Data_Qualifier	Result_Additional_Comment
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	U : This analyte is not detected above the applicable reporting or detection limit.
MW-1	03/22/2016	11:30:00	Water	SW3510C	Mineral Oil	0.20	mg/l	0.20	0.10	MDL	NWTPH-Dx	U	U : This analyte is not detected above the applicable reporting or detection limit.
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	U : This analyte is not detected above the applicable reporting or detection limit.
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	U : This analyte is not detected above the applicable reporting or detection limit.
MW-3	03/22/2016	12:50:00	Water	SW3510C	Mineral Oil	0.20	mg/l	0.20	0.10	MDL	NWTPH-Dx	U	U : This analyte is not detected above the applicable reporting or detection limit.
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	U : This analyte is not detected above the applicable reporting or detection limit.
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	U : This analyte is not detected above the applicable reporting or detection limit.
MW-4	03/22/2016	10:10:00	Water	SW3510C	Mineral Oil	0.20	mg/l	0.20	0.10	MDL	NWTPH-Dx	U	U : This analyte is not detected above the applicable reporting or detection limit.
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	U : This analyte is not detected above the applicable reporting or detection limit.
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	U : This analyte is not detected above the applicable reporting or detection limit.
MW-5	03/22/2016	14:45:00	Water	SW3510C	Mineral Oil	0.20	mg/l	0.20	0.10	MDL	NWTPH-Dx	U	U : This analyte is not detected above the applicable reporting or detection limit.
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	U : This analyte is not detected above the applicable reporting or detection limit.
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	U : This analyte is not detected above the applicable reporting or detection limit.
MW-6	03/22/2016	14:00:00	Water	SW3510C	Mineral Oil	0.20	mg/l	0.20	0.10	MDL	NWTPH-Dx	U	U : This analyte is not detected above the applicable reporting or detection limit.
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	U : This analyte is not detected above the applicable reporting or detection limit.
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	U : This analyte is not detected above the applicable reporting or detection limit.
DUP-GW	03/22/2016	16:00:00	Water	SW3510C	Mineral Oil	0.20	mg/l	0.20	0.10	MDL	NWTPH-Dx	U	U : This analyte is not detected above the applicable reporting or detection limit.
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	U : This analyte is not detected above the applicable reporting or detection limit.

**Duplicate sample collected at MW-1