MAUL FOSTER ALONGI

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March 20, 2013
Project No. 0779.02.01

Mark Urdahl, Executive Director
Port of Chelan County
285 Technology Center Way, Suite 102
Wenatchee, Washington 98801

Re: Site Characterization Report, Former Cashmere Mill Site, Cashmere, Washington

Dear Mr. Urdahl:

Maul Foster & Alongi, Inc. has prepared this letter report to summarize the results of environmental site characterization activities conducted at the former Cashmere Mill Site ("the site" or "the property") located along Mill Road and Sunset Highway in Cashmere, Washington (see Figure 1). On behalf of the Port of Chelan County (the Port), previous consultants have conducted multiple rounds of subsurface investigation at the site in order to evaluate geotechnical properties of the wood waste fill (sawdust, lumber ends, bark, and wood debris), evaluate hydraulic properties in support of construction dewatering activities, and characterize the nature and extent of wood waste and petroleum-contaminated soil (PCS) in support of a removal action that will take place before redevelopment of the site.

PCS was observed at the site during geotechnical exploration and site improvement activities conducted in 2009. Subsequently, soil samples were collected and analyzed from test pits completed in 2009, 2010, 2011, and 2012 to further characterize the nature and extent of chemical impacts. This letter report provides a summary of the physical and chemical data and an evaluation of chemical impacts within the context of the Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) guidance (Washington Administrative Code 173-340). The information provided herein is intended to inform a wood waste and PCS removal action, and associated confirmation testing, that the Port will initiate under an interagency agreement with Ecology. The removal action will be conducted in order to achieve a no further action (NFA) determination from Ecology and in support of redevelopment of the site.

SITE DESCRIPTION AND HISTORY

The site background information provided in this report was largely obtained from existing reports prepared by RH2 Engineering, Inc. (RH2).

Site Description

The site is located in the City of Cashmere, along Mill Road and Sunset Highway (Figure 1). The site is approximately 32.5 acres in size, bounded to the north by the Burlington Northern

Santa Fe railroad tracks; to the east, south, and partially to the west by Brender Creek; and to the west by residential and light industrial uses. The northern boundary of the site, along the railroad tracks, is less than 100 feet from the Wenatchee River.

The site is currently vacant. There are no buildings or structures and the ground surface is unpaved. The buildings shown in the aerial photograph (see Figure 2) were demolished and removed in 2011. Five areas of PCS have been identified at the site (see Figure 2), and wood waste fill material is present throughout most of the site (see Figure 3).

The Port intends to transfer the site to a prospective purchaser (Crunch Pak of Cashmere, Washington). Crunch Pak intends to redevelop the site for commercial use as a fruit storage warehouse and fruit bin storage site. As a condition of purchase, Crunch Pak requires removal of wood waste-related materials from areas of the site that are developable, removal of soil with petroleum contamination above cleanup levels, and backfilling of the site with structural import fill to regrade the site and improve drainage.

Site History

The site was used primarily for lumber milling from the 1940s until the late 1970s and for a variety of commercial and light industrial uses thereafter (see RH2, 2007, in Attachment A). The mill produced primarily thin lumber to construct fruit packing boxes. Reportedly, no wood-treatment chemicals or processes were documented to have been used at the site. The Cedarbrook Company, owned by Mr. John Lysaker, bought the property in 1990 from WI Forest Products, and sold the property to the Port in 2007. Based on anecdotal information, the property has never been used for agriculture (Attachment A: RH2, 2007).

An accidental fire in 1990 caused some damage to mill buildings. A larger arson fire in 2000 destroyed many of the mill buildings (see RH2, 2007, in Attachment A).

Mill operations produced wood wastes that were used to fill in low-lying areas at the site. Based on characterization efforts, wood waste at the site is primarily raw wood, lumber, sawdust, and is intermixed with granular fill. Wood waste was distributed by site grading that leveled or covered wood waste stockpiles after mill activities concluded. The former mill processed raw (untreated) timber into lumber; no wood treating is known to have taken place at the site (see Forsgren Associates, Inc., 1990, in Attachment A).

Interviews with several long-time City of Cashmere residents and the Port indicate that fill was also imported to the site for several decades (see Attachment B). There are three primary areas that received fill: (1) south of Mill Road in the former log storage area, (2) the former mill pond north of Mill Road; and (3) the area north of Sunset Highway. Fill materials in these areas have been observed to consist of wood waste; silt, sand and gravel-size granular fill; and concrete and asphalt. The portion of the site located north of Sunset Highway received fill from the City of Cashmere for a number of years. The material in this area consists primarily of silt, sand, gravel-size granular fill, and building materials, including concrete and asphalt (see Attachment A: RH2, 2007).

The Port has conducted a series of geotechnical investigations at the site since 2007 in order to characterize the nature and extent of wood waste. From 2009 to 2011, the Port also completed a series of site improvements, including the removal of asphalt-paved areas and concrete slabs and footings, primarily in the area between Mill Road and Sunset Highway. The concrete materials were crushed and stockpiled for use as fill. The asphalt pavement was sold for reuse and removed from the site. Asbestos-containing materials were removed from the two on-site buildings and then demolished. The demolition debris was reportedly disposed of off site (Attachment B).

During activities associated with the geotechnical investigations and site improvements, PCS was observed in five areas or concern at the site (see Figure 2). Focused environmental investigation work has been conducted at the site since 2009 to characterize the nature and extent of PCS in these areas. In addition, limited wood waste and soil removal actions were completed at the site in 2011 as part of a pilot wood waste interim removal action and during the reconstruction of Sunset Highway (RH2, 2013). The previous investigations and interim removal actions are discussed in the next section.

INVESTIGATIONS AND INTERIM ACTIONS

Geotechnical and environmental investigations and limited interim actions have been conducted at the site since as early as 1990. This section provides a brief summary of work completed, as well as confirmed or suspected environmental conditions identified as a result of this work. Available documentation and summaries of previous work activities and findings are provided as the following attachments to this report:

- Copies of reports summarizing previous work activities and findings, where available, are provided as Attachment A.
- The 2013 Removal Action Work Plan is included as Attachment B.
- Investigation locations are summarized in Table 1 and shown in Figure 2.
- A summary of samples collected and chemical analyses requested is included in Table 2.
- Depth to water measurements and petroleum hydrocarbon impacts observed during subsurface investigations (compiled from exploration logs) are summarized in Tables 3 and 4, respectively.

- Test pit, boring, and monitoring well completion logs are included as Attachment C.
- Laboratory analytical reports are provided as Attachment D.
- Receipts for soil that was disposed of off site as part of the interim actions are included as Attachment E.
- The 2012 Soil and Groundwater Characterization Work Plan is included as Attachment F.

Analytical data generated to date is being compiled and will be uploaded to Ecology's Environmental Information Management database in order to meet the requirements for a NFA.

1990 Phase I Environmental Assessment

In 1990, a Phase 1 environmental site assessment was performed by Forsgren and Associates, Inc., before the purchase of the property by Mr. Lysaker of the Cedarbrook Company (Forsgren, 1990, Attachment A). This assessment identified evidence of de minimis soil contamination from lubrication oils at several locations south of Mill Road, and concluded that the contamination likely existed only in shallow soil. Underground storage tanks (USTs) were observed, and a recommendation was made to remove them or upgrade them up to be compliant with the current code at that time (see Figure 2 for approximate former locations of the USTs). Asbestos (in existing building materials), electrical gear, and transformers were also identified as potential environmental conditions. No samples were collected in association with this work.

Mr. Lysaker communicated to RH2 that the items identified in the Forsgren environmental assessment were remedied before or immediately following his purchase of the property (see Attachment B). Mr. Lysaker states that, before he took ownership, WI Forest Products removed one diesel UST from the vicinity of the former mill office and one gasoline UST from the vicinity of the former truck shop (Attachment A: RH2, 2007). The volume of both of these tanks is unknown. He also states that WI Forest Products completed removal of electrical gear and transformers, from the site, before his purchase of the property and that asbestos removal was completed by WI Forest Products after he took ownership of the property. Reports documenting removal of USTs, electrical gear, and asbestos were not prepared or may have been destroyed in the 2000 mill fire.

2007 Feasibility Study

RH2 completed a feasibility study on behalf of the Port before the Port's purchase of the site. The feasibility report included a limited environmental assessment and a geologic assessment

(RH2, 2007, in Attachment A). Fourteen test pits were completed in association with the geologic assessment in order to characterize the wood waste composition and distribution (TP-1-2007 to TP-14-2007). The environmental assessment included a historical review and interviews with several community members. No evidence of petroleum-related contamination was recorded in the test pit logs and no soil or groundwater samples were collected for chemical analysis.

2008 Wood Waste Summary

In 2008, RH2 conducted a literature search and regulatory review to determine potential environmental impacts that may result from wood waste on the site and potential reuse options for excavated wood waste material. Their findings are summarized in a letter report (RH2, 2008, in Attachment A), in which they conclude that wood waste at the site may result in the following environmental impacts:

- The decomposition of wood waste may result in the production of unsafe levels of methane gas.
- If exposed, the wood waste may disperse in the air as fine particulates and present a breathing hazard.
- The decomposition of wood waste may result in the generation of leachate. Wood waste leachate may exhibit chemically reducing conditions (low dissolved oxygen [DO] and low hydrogen ion potential [pH]), which could potentially dissolve metals from the granular aquifer material, resulting in elevated metals concentrations in groundwater and/or surface water.

Additionally, petroleum hydrocarbons or wood-treating chemicals may also be present in the wood waste at the site. Wood waste samples collected in August 2012 were analyzed for petroleum hydrocarbons, metals, and chemicals potentially associated with wood-treating activities (phenols and polycyclic aromatic hydrocarbons [PAHs]), as discussed below. Water quality testing for field parameters, including pH and DO, and air quality testing have not been conducted at the site.

2009 and 2011 to 2012 Sunset Highway Improvements

On May 7, 2009, RH2 conducted a limited subsurface investigation along Sunset Highway in order to evaluate geotechnical conditions in support of the water main extension project. Petroleum impacts were observed in soil and groundwater in one test pit completed on the site (TP-2-052009); this area is identified as PCS "Area 1." No samples were collected for analytical testing; however, additional investigation work was conducted in September 2009 and August 2012 to further evaluate the extent of impacted soil.

In 2009, asphalt-paved areas and concrete slabs and footings were removed from the area between Mill Road and Sunset Highway in support of the water main extension. PCS was discovered underneath a former concrete slab in the area identified as PCS "Area 2." Follow-up investigation work was conducted in October 2009 and August 2012 to evaluate the extent of soil impacts.

In 2011 and 2012, the Port reconstructed a section of Sunset Highway and, during construction, PCS was removed from the road realignment in the vicinity of sample locations S-4-092009 and S-5-092009 (see Area 1 in Figure 2), and then disposed of off site (RH2, 2013). Samples were collected from the excavated material for characterization purposes and analyzed for metals by U.S. Environmental Protection Agency (USEPA) Methods SW846 6010 (arsenic, barium, cadmium, chromium [total], lead, selenium, and silver) and SW846 7471 (mercury); samples are associated with the "Area 1 Soil Removal Area" in Tables 1 and 2. Waste disposal tickets indicate that approximately 105 tons of PCS was removed from the site in three batches in January and April 2012 (see Attachment E); however, this quantity of material may also include PCS disposed of in association with the 2011 pilot wood waste interim removal action.

2009 Environmental Investigations

Following the discovery of petroleum impacts in soil in test pit TP-2-052009 and beneath a concrete slab formerly located between Mill Road and Sunset Highway (Areas 1 and 2, respectively), RH2 conducted follow-up environmental investigations in September and October 2009. In a 2009 letter from the Port, Ecology was notified of the discovery of PCS. The notification letter includes an attachment from RH2 detailing the discovery of PCS and a sampling and analysis plan for conducting follow-up investigation work (Attachment A: RH2, 2009).

Test pits were completed in the PCS areas in order to evaluate the extent of petroleum impacts (test pits S-1-092009 to S-8-092009 in Area 1 and TP-2-102009, TP-5-102009, and S-2-102009 to S-5-102009 in Area 2). Soil samples were collected from selected test pits, based on field observations, and analyzed for gasoline-range petroleum hydrocarbons by the Northwest Total Petroleum Hydrocarbon—Gasoline-Range Organics (NWTPH-Gx) Method and for benzene, toluene, ethylbenzene and xylenes (BTEX) by USEPA Method 8021B, modified. One sample (from test pit S-4-092009) was also analyzed for diesel-range petroleum hydrocarbons by the Northwest Total Petroleum Hydrocarbon—Diesel- and Heavy-Oil-Range Organics (NWTPH-Dx) Method. Analytical results and findings of this investigation work are discussed in the Investigation Results section of this report.

2010 Geotechnical Investigation

The Port contracted GeoEngineers, Inc. (GeoEngineers) in 2010 to perform a detailed geotechnical evaluation of the site in support of the Port's redevelopment plans (GeoEngineers, 2010, Attachment A). GeoEngineers drilled seven borings (B-1, B-1A, B-2, B-2A, and B-3 to B-5) and completed two borings as monitoring wells (B-1 and B-2). During the geotechnical investigation, hydrocarbon impacts were observed in boring B-1; this area is identified as PCS "Area 3." At the request of RH2, and on behalf of the Port, GeoEngineers drilled two additional borings (B-6 and B-7) and collected and analyzed soil samples for diesel-range hydrocarbons by NWTPH-Dx in order to evaluate the nature and extent of PCS in Area 3. No groundwater samples were collected from the borings or the monitoring wells. Analytical results and findings of this investigation work are discussed in the Investigation Results section of this report.

2011 Groundwater Table Investigation

In support of a wood waste removal action, RH2 performed a limited groundwater investigation in 2011 consisting of depth-to-groundwater measurements at several test pit locations (TPGW1 to TPGW12) (RH2, 2011, Attachment A). The depth to the water table ranged from 1.5 to 4.5 feet below ground surface (bgs) in the area south of Mill Road, and 2 to 5 feet bgs between Mill Road and Sunset Highway (see Table 3). RH2 produced a groundwater contour map as a result of this investigation (RH2, 2011, Attachment A).

During the investigation, petroleum impacts were observed in soil in test pit TPGW1; this area is identified as PCS "Area 4." A soil sample was collected from a second test pit completed in the same location (S-1-2011) on July 6, 2011, to be analyzed for petroleum hydrocarbons. The sample was analyzed for the presence of petroleum hydrocarbons by the Northwest Total Petroleum Hydrocarbon—Hydrocarbon Identification (NWTPH-HCID) Method. Based on the results, the sample was also analyzed for diesel-range organics by NWTPH-Dx. Analytical results from this sample are discussed in the Investigation Results section of this report.

2011 Pilot Wood Waste Interim Removal Action

The Port completed a limited wood waste interim removal pilot project in the southeast portion of the site in 2010 and 2011 (see "Pilot Wood Waste Removal Area" in Figure 2). The Port hired a contractor to remove surficial wood waste from this portion of the site. The contractor screened the wood waste, removed the larger rocks and wood pieces, and then sold the remaining material as landscape material. Crushed concrete that was previously stockpiled on site from slab removal was used to fill the excavated area. PCS was identified in the wood waste excavation area during the interim removal action; this area is identified as PCS "Area 5." The soil was stockpiled, a composite sample was collected from the stockpile, and the soil was disposed of off site (RH2, 2013); samples are associated with the "Pilot

Wood Waste Removal Area" in Tables 1 and 2. The samples were analyzed for the presence of petroleum hydrocarbons by NWTPH-HCID. Based on the results, one sample was also analyzed for diesel-range organics by NWTPH-Dx with silica gel cleanup. The quantity and extent of PCS removed are not known.

2012 Wood Waste, Soil, and Groundwater Investigation

RH2 performed an additional investigation in August 2012 to evaluate wood waste thickness and composition in unexplored areas, to evaluate hydraulic properties and groundwater quality, and to evaluate whether PCS remains in Area 1 surrounding the excavation limits. Work was conducted in accordance with the Wood Waste, Soil, and Groundwater Characterization Plan included as Attachment F. Wood waste samples were generally analyzed for the presence of petroleum hydrocarbons by NWTPH-HCID (one sample was also analyzed for diesel-range petroleum hydrocarbons by NWTPH-Dx with silica gel cleanup); for chemicals potentially associated with-wood treating activities, including total metals (arsenic, chromium [total], copper, and lead) by USEPA Method 6010C; and for PAHs and phenols by USEPA Method SW8270D. Soil samples were generally analyzed for the presence of petroleum hydrocarbons by NWTPH-HCID; for gasoline-range hydrocarbons by NWTPH-Gx; and for BTEX by USEPA Method 8021B modified. Selected samples were also analyzed for extractable and volatile petroleum hydrocarbons (EPH and VPH) by methods NWTPH-EPH and NWTPH-VPH, respectively. Analytical results from this investigation are discussed in the Investigation Results section of this report.

A dewatering test well was constructed to evaluate groundwater conditions, including aquifer characteristics, and dewatering requirements in support of the planned wood waste removal action (RH2, 2012, Attachment A). A groundwater sample was also collected from the dewatering well and analyzed for gasoline- and diesel-range petroleum hydrocarbons by NWTPH-Gx and NWTPH-Dx, respectively; for chemicals potentially associated with wood-treating activities, including metals (arsenic, chromium [total], copper, and lead) by USEPA Method 6010C; and for PAHs and phenols by USEPA Method SW8270D. Aquifer test results are discussed in the Geology and Hydrogeology section of this report; analytical results from the 2012 investigation are discussed in the Investigation Results section.

PHYSICAL SETTING

The physical characterization of the site, as described in this section, presents a compilation of information obtained from the multiple investigations discussed in the previous section. The following discussion was largely obtained from existing RH2 reports.

Hydrology

The site is mostly bounded by water features, including the Wenatchee River to the north, and Brender Creek to the west, south, and east. Brender Creek flowed directly to the Wenatchee River before construction of the railroad, but today flows in a long, curving channel about 100 feet north of the southern property line. Brender Creek's year-round flow around the site has raised the local groundwater table and created hydrologic conditions favorable for establishing wetlands. Brender Creek drains about 8 square miles and discharges to Mission Creek about 150 feet from the northeast corner of the property. Mission Creek lies east of the site, drains about 79 square miles, and discharges into the Wenatchee River approximately 800 feet east-northeast of the site.

An irrigation return ditch flows about 1,000 feet from west to east along the southern shoulder of Mill Road. The ditch is open near the western boundary of the site, where it forms a small pond. From there, the water flows in a culvert for approximately 600 feet. The ditch is open for about 180 feet along Mill Road near the former Cedarbrook shop. Near the eastern boundary of the property, water enters a culvert that crosses Mill Road and flows approximately 500 feet to discharge into Brender Creek. The ditch is open for about 6 feet before reentering a culvert beneath Sunset Highway.

In the mid-1990s, the property owner undertook a conservation effort in cooperation with the Washington Department of Fish and Wildlife and Chelan County Conservation District to enhance aquatic habitat in over 2,000 feet of Brender Creek. This effort required excavation of sediment in the stream channel, resulting in a large berm that parallels the creek. The berm is approximately 10 feet high, 60 feet wide, and 1,000 feet long.

Geology and Hydrogeology

The site is underlain by unconsolidated Quaternary glacial and alluvial sediments and sedimentary bedrock of the Chumstick Formation (Tabor et al., 1987). The site is located in a bend in the former channel of the Wenatchee River. The river bend was cut into a glacial outwash terrace, forming a cut bank approximately 20 feet high south of Brender Creek. Alluvium was deposited as the river channel incised the surrounding terraces. Brender Creek flows along the base of the river cut bank. Much of the site was formerly occupied by ponds and bogs along the river floodplain. These topographic depressions were filled at various times with wood debris from mill activities and other fill materials imported to the site. The three primary areas that received fill include the area north of Sunset Highway, the former mill pond area north of Mill Road, and the former log storage area south of Mill Road. In most places, fill was placed directly on top of Wenatchee River alluvium.

Fill material includes wood waste; granular fill (sand, silt, and gravel with organic material, including logs); and inert fill (concrete, asphalt, metal, lumber, and other building materials).

Most of the fill observed during fieldwork consists of slightly decomposed wood waste or granular fill containing wood waste.

The depth to groundwater observed in test pits and one monitoring well at the site ranged from 2 to 13 feet bgs (Table 4). According to RH2, groundwater elevations observed in May and June 2011 and August 2012 show a decreasing water table gradient from the southwest toward the northeast portion of the site (see Figure 4 and RH2's 2011 Groundwater Table Investigation Memorandum included in Attachment A). The observed water table gradient indicates that shallow groundwater at the site likely flows toward, and likely discharges to, the Wenatchee River to the northwest of the site. The groundwater table likely fluctuates seasonally in response to precipitation patterns and flow variations in Brender Creek and the Wenatchee River (GeoEngineers, 2010, Attachment A).

An aquifer transmissivity of 32,000 gallons per foot per day was estimated based on the results of the pumping and recovery test conducted in the dewatering well (location DW01 in Figure 2) in 2012.

INVESTIGATION RESULTS

This section provides a summary of the soil, wood waste, and groundwater chemical data collected during investigation activities conducted from 2009 to 2012. Petroleum hydrocarbon impacts observed during subsurface investigations (compiled from exploration logs) are summarized in Table 4. Soil and wood waste analytical results are summarized in Table 5. Groundwater analytical results are summarized in Table 6. Chemical concentrations in soil exceeding applicable cleanup levels are presented in Figure 5.

The analytical data were screened relative to MTCA cleanup levels in order to evaluate the potential for human health risks. Analytical results were compared to MTCA Method A, unrestricted land use, table values. The lower of the carcinogenic and non-carcinogenic MTCA Method B, standard formula values were used for chemicals with no available Method A cleanup level.

Soil and Wood Waste

Hydrocarbon impacts were observed in soil and wood waste in multiple locations of the site during subsurface investigation activities (see Table 4). Hydrocarbon impacts (e.g., odor, sheen) were observed in soil in the PCS areas during exploration activities and during the pilot wood waste interim removal action and water main extension activities. In addition to the five known PCS areas, hydrocarbon impacts were observed in soil and wood waste in test pit locations completed in August 2012 (see Table 4). Soil samples were collected and analyzed for petroleum hydrocarbons from the PCS areas and the August 2012 test pits with observed impacts, with the exception of test pits TP-13-2012, TP-16-2012, and TP-17-2012.

According to Ecology guidance, in the absence of hydrocarbon identification data (by NWTPH-HCID), the diesel- and motor-oil/heavy-oil-range hydrocarbon fractions should be summed for comparison with the MTCA Method A cleanup level (Ecology, 2004). In accordance with this guidance, the diesel- and motor-oil/heavy-oil-range hydrocarbon concentrations detected in samples that were not also analyzed for NWTPH-HCID were summed for comparison to the heavy oils cleanup level. Heavy-oil-range hydrocarbons were analyzed in soil samples from Areas 1 to 5, in stockpiled soil excavated from the Pilot Wood Waste Removal Area (Area 5), and in one wood waste sample (TP-24-2012). Heavy oils were detected in the wood waste sample and in the samples from Areas 2 to 5. Heavy oils concentrations above the MTCA Method A cleanup level were detected in Areas 2 and 3. Other chemical detections in soil and wood waste were below cleanup levels.

Gasoline-range petroleum hydrocarbons were analyzed in soil samples collected from Areas 1 and 2, but detected only in Area 1. Gasoline-range hydrocarbon concentrations in Area 1 soil exceeded the MTCA Method A cleanup level (see Figure 5).

Soil samples from Areas 1 and 2 were analyzed for BTEX. Ethylbenzene, toluene, and xylenes were detected in soil from Area 1. Concentrations were below applicable MTCA Method A cleanup levels.

Metals (arsenic chromium, copper, and lead) and PAHs and phenols (4-methylphenol and pentachlorophenol) were detected in wood waste samples collected from multiple locations at the site, but concentrations were below MTCA Method A cleanup levels. Metals were also analyzed in a sample collected from the stockpiled soil excavated from the Area 1 Soil Removal Area (Area 1) for disposal characterization. Concentrations were below MTCA Method A cleanup levels.

Groundwater

Petroleum impacts have been observed in groundwater at the site. A sheen on groundwater was observed in three subsurface explorations: test pit TP-2-052009 (Area 1), boring B-1 (Area 2), and boring B-6 (Area 2) (see Table 4); however, groundwater samples were not collected from these locations. Three wells have been completed at the site (monitoring wells B-1 and B-2 and dewatering well DW01); a groundwater sample was collected from the dewatering well only. According to RH2, the monitoring well at boring location B-2 was damaged or is not locatable. The condition of the monitoring wells is not known. It is likely the wells will be removed as part of a site removal action.

Petroleum hydrocarbons, BTEX, PAHs, and phenols were not detected in the groundwater sample from the dewatering well. Arsenic, copper, and lead were detected, but were below their respective MTCA Method A cleanup levels.

The dewatering well is screened in the native material below the fill and is presumed to be hydraulically upgradient of the known PCS areas. Additionally, the well was installed in the pilot wood waste interim removal area. Therefore, groundwater from this well likely is not representative of groundwater conditions affected by PCS or wood waste.

Summary

Groundwater quality in the vicinity of the dewatering well does not appear to be impacted by site-related sources. However, this sample likely is not representative of groundwater conditions affected by sources at the site. Chemical impacts due to site-related sources may be present in groundwater.

Chemical concentrations in wood waste were below applicable cleanup levels; however, these chemicals, where detected in wood waste and wood waste samples, were collected from limited areas of the site. Chemical concentrations may potentially be present in wood waste in areas of the site not sampled.

Heavy oils exceedances were observed in soil in Areas 2 to 3; however, the extent of soil with chemical exceedances is not well-delineated. Surrounding test locations either were not sampled, or the samples were not analyzed for diesel-range hydrocarbons. Gasoline-range hydrocarbon exceedances were detected in Area 1; however, gasoline-impacted soil was removed during the reconstruction of Sunset Highway and chemical concentrations in samples collected from test pits surrounding the excavation extent were below cleanup levels.

REMOVAL ACTION

In order to prepare the site for redevelopment and to obtain an NFA determination from Ecology, a wood waste and PCS removal action, followed by confirmational groundwater monitoring, will be conducted at the site. The details of the proposed action are outlined in the Removal Action Work Plan (Attachment B). The extent of wood waste that will be removed is shown in Figure 3. PCS will be removed concurrent with the wood waste removal.

Although chemical impacts to wood waste and soil at the site have not been fully delineated, the planned removal action is designed to identify and remove material with chemical concentrations above screening levels. Groundwater will be monitored for a period of time following the removal action.

Wood waste will be excavated to the underlying native alluvium in developable areas of the site (see Figure 3). Once exposed, the native alluvium will be field screened for petroleum impacts, and confirmation samples will be collected in a grid pattern and analyzed for petroleum hydrocarbons and wood-treating chemicals. Areas of the excavations exhibiting

MTCA Method A cleanup level exceedances, based on the grid sampling results, will be overexcavated until the remaining material meets cleanup levels.

Areas with confirmed petroleum hydrocarbon concentrations above MTCA Method A cleanup levels will be excavated. Additional areas where PCS is suspected, based on field observations made during the wood waste removal, will also be excavated. The excavation extents will be determined based on field screening and confirmation sampling. Areas of the excavations exhibiting MTCA Method A cleanup level exceedances, based on the confirmation sampling results, will be overexcavated until the remaining soil meets cleanup levels or to the extent practical given site conditions and dewatering activities.

A groundwater monitoring well network will be installed following the removal action. The network will be designed to monitor groundwater flow directions and groundwater. The objective of the groundwater monitoring is to confirm that chemical concentrations in groundwater (if any) are below applicable cleanup levels. Groundwater monitoring results will be used to inform ongoing monitoring and/or groundwater remedial actions that may be required in order to meet cleanup levels.

SUMMARY AND CONCLUSIONS

Petroleum hydrocarbons are present in soil in Areas 2 and 3 of site at concentrations above applicable cleanup levels. Chemical concentrations in wood waste were below applicable MTCA cleanup levels and were not detected in a groundwater sample collected from the dewatering well. However, the groundwater sample collected from the dewatering well is not considered representative of groundwater conditions and heavy oils exceedances in soil are not well-delineated.

The removal action is intended to remove wood waste and known PCS and identify and remove additional contaminated material above applicable cleanup levels. The proposed groundwater monitoring activities will provide additional characterization of groundwater contamination. The results of the soil confirmation and groundwater sampling that will be conducted as part of the removal action will provide the additional information needed by Ecology to make an NFA determination.

Sincerely,

Maul Foster & Alongi, Inc.

Heather Hirsch, LHG
Project Hydrogeologist

Justin Clary, PE
Principal Engineer

Attachments: Limitations
References
Tables
Figures
A—Previous Investigation Reports
B— Removal Action Work Plan
C—Test Pit, Boring, and Well Installation Logs
D—Laboratory Analytical Results
E—Soil Disposal Tickets
F—Soil and Groundwater Characterization Work Plan

cc: Mary Monahan, Washington State Department of Ecology

LIMITATIONS

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

Ecology. 2004. Memorandum (re: determining compliance with Method A cleanup levels for diesel and heavy oil) to interested parties from T. Nord, section manager, Washington State Department of Ecology. Implementation memorandum #4, 04-09-086. June.

RH2. 2013. A. Neff, RH2 Engineering, Inc., personal communication (re: site investigation activities and interim actions for the Cashmere Mill site) with H. Hirsch, Maul Foster & Alongi, Inc., Bellingham, Washington. March 13.

Tabor, R. W., V. A. Frizzell, Jr., J. T. Whetten, R. B. Waitt, D. A. Swanson, G. R. Byerly, D. B. Booth, M. J. Hetherington, and R. E. Zartman. 1987. Geological survey map I-1661. Geologic map of the Chelan 1:100,000 quadrangle, central Washington. U.S. Department of the Interior.

TABLES

Table 1
Summary of Investigation Locations
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

Location ID*	Original Location ID(s)*	PCS Area**	Location Type	Client	Completion Date	Total Depth (ft bgs)	Sample(s) Collected for Chemical Analysis	Purpose
TP-1-2007	TP-1	--	Test Pit	RH2	01/15/2007	12.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-2-2007	TP-2	--	Test Pit	RH2	01/15/2007	13.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-3-2007	TP-3	Area 1	Test Pit	RH2	01/15/2007	6.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-4-2007	TP-4	Area 2	Test Pit	RH2	01/15/2007	3.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-5-2007	TP-5	--	Test Pit	RH2	01/15/2007	5.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-6-2007	TP-6	--	Test Pit	RH2	01/15/2007	8.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-7-2007	TP-7	--	Test Pit	RH2	01/15/2007	4.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-8-2007	TP-8	--	Test Pit	RH2	01/15/2007	7.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-9-2007	TP-9	--	Test Pit	RH2	01/15/2007	8.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-10-2007	TP-10	--	Test Pit	RH2	01/15/2007	11.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-11-2007	TP-11	Area 5	Test Pit	RH2	01/15/2007	14.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-12-2007	TP-12	--	Test Pit	RH2	01/15/2007	9.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-13-2007	TP-13	--	Test Pit	RH2	01/15/2007	3.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-14-2007	TP-14	--	Test Pit	RH2	01/15/2007	5.0	--	Preliminary characterization of geologic, geotechnical, and hydrogeologic conditions.
TP-2-052009	TP-2	Area 1	Test Pit	RH2	05/07/2009	6.0	--	Geotechnical exploration for Sunset Highway water main extension.
S-1-092009	S-1	Area 1	Test Pit	RH2	09/16/2009	6.8	X	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
S-2-092009	S-2	Area 1	Test Pit	RH2	09/16/2009	7.2	X	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
S-3-092009	S-3	Area 1	Test Pit	RH2	09/16/2009	7.0	X	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
S-4-092009	S-4	--	Test Pit	RH2	09/16/2009	6.6	X	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
S-5-092009	S-5	Area 1	Test Pit	RH2	09/16/2009	9.0	X	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
S-6-092009	S-6	Area 1	Test Pit	RH2	09/16/2009	10.0	X	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
S-7-092009	S-7	Area 1	Test Pit	RH2	09/17/2009	7.0	X	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
S-8-092009	S-8	Area 1	Test Pit	RH2	09/17/2009	9.5	X	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
S-1-102009	S-1, TP-1, S-1b	Area 2	Test Pit	RH2	10/23/2009	5.5	X	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
TP-2-102009	TP-2, TP-2b	Area 2	Test Pit	RH2	10/23/2009	6.5	--	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
S-2-102009	S-2, S-2b, TP-3	Area 2	Test Pit	RH2	10/23/2009	6.5	X	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
S-3-102009	S-3, S-3b, TP-4	Area 2	Test Pit	RH2	10/23/2009	5.5	X	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
TP-5-102009	TP-5, TP-5b	Area 2	Test Pit	RH2	10/23/2009	5.0	--	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.

Table 1
Summary of Investigation Locations
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

Location ID*	Original Location ID(s)*	PCS Area**	Location Type	Client	Completion Date	Total Depth (ft bgs)	Sample(s) Collected for Chemical Analysis	Purpose
S-4-102009	S-4, S-4b, TP-6	Area 2	Test Pit	RH2	10/23/2009	6.0	X	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
S-5-102009	S-5, S-5b, TP-7	Area 2	Test Pit	RH2	10/23/2009	6.0	X	Evaluate extent of hydrocarbon impacts observed during geotechnical investigation for Sunset Highway water main extension.
A	A	Area 3	Test Pit	RH2	11/30/2009	8.0	--	Identify bottom depth of wood waste.
B	B	--	Test Pit	RH2	11/30/2009	8.5	--	Identify bottom depth of wood waste.
C	C	--	Test Pit	RH2	11/30/2009	7.0	--	Identify bottom depth of wood waste.
D	D	--	Test Pit	RH2	11/30/2009	7.0	--	Identify bottom depth of wood waste.
E	E	--	Test Pit	RH2	11/30/2009	6.0	--	Identify bottom depth of wood waste.
F	F	--	Test Pit	RH2	11/30/2009	5.0	--	Identify bottom depth of wood waste.
G	G	--	Test Pit	RH2	11/30/2009	5.5	--	Identify bottom depth of wood waste.
H	H	--	Test Pit	RH2	11/30/2009	5.0	--	Identify bottom depth of wood waste.
I	I	--	Test Pit	RH2	11/30/2009	4.0	--	Identify bottom depth of wood waste.
B-1	B-1, #1	Area 3	Monitoring Well	GeoEngineers	01/20/2010	17.5	X	Evaluate geotechnical properties and extent of wood waste and underlying native soils in the former log pond area.
B-1A	B-1A, #1A	--	Geotechnical Boring	GeoEngineers	01/21/2010	17.3	--	Evaluate geotechnical properties and extent of wood waste and underlying native soils in the former log pond area.
B-2	B-2, #2	--	Monitoring Well	GeoEngineers	01/21/2010	14.1	--	Evaluate geotechnical properties and extent of wood waste and underlying native soils in the former log storage area.
B-2A	B-2A, #2A	--	Geotechnical Boring	GeoEngineers	01/21/2010	12.7	--	Evaluate geotechnical properties and extent of wood waste and underlying native soils in the former log storage area.
B-3	B-3, #3	--	Geotechnical Boring	GeoEngineers	01/21/2010	12.7	--	Evaluate geotechnical properties and extent of wood waste and underlying native soils in the former log storage area.
B-4	B-4, #4	--	Geotechnical Boring	GeoEngineers	01/21/2010	12.5	--	Evaluate geotechnical properties and extent of wood waste and underlying native soils in the former log storage area.
B-5	B-5, #5	--	Geotechnical Boring	GeoEngineers	01/21/2010	5.8	--	Evaluate geotechnical properties and extent of wood waste and underlying native soils in the former log storage area.
B-6	B-6, #6	Area 3	Geotechnical Boring	GeoEngineers	01/21/2010	11.5	X	Evaluate extent of hydrocarbon impacts observed in boring B-1.
B-7	B-7, #7	Area 3	Geotechnical Boring	GeoEngineers	01/21/2010	11.5	--	Evaluate extent of hydrocarbon impacts observed in boring B-1.
Pilot Wood Waste Removal Area	--	Area 5	Stockpile	RH2	03/01/2011	Unknown	X	Hydrocarbon-impacted soil identified during the pilot wood waste removal action was stockpiled before sampling and disposal.
TPGW1	--	Area 4	Test Pit	RH2	May & June 2011	Unknown	--	Test pit explorations to observe and measure depth to groundwater.
TPGW2	--	--	Test Pit	RH2	May & June 2011	Unknown	--	Test pit explorations to observe and measure depth to groundwater.
TPGW3	--	Area 3	Test Pit	RH2	May & June 2011	Unknown	--	Test pit explorations to observe and measure depth to groundwater.
TPGW4	--	--	Test Pit	RH2	May & June 2011	Unknown	--	Test pit explorations to observe and measure depth to groundwater.
TPGW5	--	--	Test Pit	RH2	May & June 2011	Unknown	--	Test pit explorations to observe and measure depth to groundwater.
TPGW6	--	--	Test Pit	RH2	May & June 2011	Unknown	--	Test pit explorations to observe and measure depth to groundwater.
TPGW7	--	--	Test Pit	RH2	May & June 2011	Unknown	--	Test pit explorations to observe and measure depth to groundwater.
TPGW8	--	--	Test Pit	RH2	May & June 2011	Unknown	--	Test pit explorations to observe and measure depth to groundwater.
TPGW9	--	--	Test Pit	RH2	May & June 2011	Unknown	--	Test pit explorations to observe and measure depth to groundwater.
TPGW10	--	--	Test Pit	RH2	May & June 2011	Unknown	--	Test pit explorations to observe and measure depth to groundwater.

Table 1
Summary of Investigation Locations
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

Location ID*	Original Location ID(s)*	PCS Area**	Location Type	Client	Completion Date	Total Depth (ft bgs)	Sample(s) Collected for Chemical Analysis	Purpose
TPGW11	--	--	Test Pit	RH2	May & June 2011	Unknown	--	Test pit explorations to observe and measure depth to groundwater.
TPGW12	--	--	Test Pit	RH2	May & June 2011	Unknown	--	Test pit explorations to observe and measure depth to groundwater.
Area 1 Soil Removal Area	--	Area 1	Stockpile	RH2	07/27/2011	Unknown	X	Sample collected for disposal characterization from the PCS excavated from Area 1.
S-1-2011	TPGW1	Area 4	Test Pit	RH2	07/06/2011	5.5	X	Evaluate hydrocarbon impacts observed in test pit location TPGW1 during the May and June 2011 depth-to-groundwater investigation.
TP-1-2012	1	--	Test Pit	RH2	08/30/2012	6.0	--	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-2-2012	2	--	Test Pit	RH2	08/30/2012	6.0	--	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-3-2012	3	--	Test Pit	RH2	08/30/2012	5.5	--	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-4-2012	4	--	Test Pit	RH2	08/30/2012	7.0	X	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-5-2012	5	Area 1	Test Pit	RH2	08/30/2012	7.0	X	Collect confirmatnion samples surrounding the extent of PCS excavated from Area 1.
TP-6-2012	6	Area 1	Test Pit	RH2	08/30/2012	7.0	X	Collect confirmatnion samples surrounding the extent of PCS excavated from Area 1.
TP-7-2012	7	Area 1	Test Pit	RH2	08/30/2012	6.0	X	Collect confirmatnion samples surrounding the extent of PCS excavated from Area 1.
TP-8-2012	8	Area 1	Test Pit	RH2	08/30/2012	5.0	X	Collect confirmatnion samples surrounding the extent of PCS excavated from Area 1.
TP-9-2012	9	Area 2	Test Pit	RH2	08/30/2012	4.5	X	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-10-2012	10	--	Test Pit	RH2	08/30/2012	5.5	--	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-11-2012	11	Area 4	Test Pit	RH2	08/30/2012	4.0	X	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-12-2012	12	Area 4	Test Pit	RH2	08/30/2012	4.0	X	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-13-2012	13	--	Test Pit	RH2	08/30/2012	4.0	--	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-14-2012	14	--	Test Pit	RH2	08/30/2012	6.8	X	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-15-2012	15	--	Test Pit	RH2	08/30/2012	6.5	X	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-16-2012	16	--	Test Pit	RH2	08/30/2012	4.0	--	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-17-2012	17	--	Test Pit	RH2	08/30/2012	4.0	--	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-18-2012	18	--	Test Pit	RH2	08/30/2012	2.0	--	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-19-2012	19	--	Test Pit	RH2	08/30/2012	2.5	--	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-20-2012	20	--	Test Pit	RH2	08/30/2012	2.0	--	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-21-2012	21	--	Test Pit	RH2	08/30/2012	2.0	--	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-22-2012	22	--	Test Pit	RH2	08/30/2012	5.0	X	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-23-2012	23	--	Test Pit	RH2	08/30/2012	7.5	X	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-24-2012	24	--	Test Pit	RH2	08/30/2012	8.0	X	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-25-2012	25	--	Test Pit	RH2	08/30/2012	7.0	--	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-26-2012	26	--	Test Pit	RH2	08/30/2012	8.5	X	Characterize nature and extent of wood waste and hydrocarbon impacts.
TP-27-2012	27	--	Test Pit	RH2	08/30/2012	7.5	X	Characterize nature and extent of wood waste and hydrocarbon impacts.
DW01	Dewatering Well	--	Dewatering Well	RH2	09/18/2012	26.0	X	Evaluate hydraulic properties for construction dewatering.

NOTES:
-- = Indicates that no information is available or that a sample was not collected.
X = A sample was collected from this location.
ft bgs = feet below ground surface.
PCS = petroleum contaminated site
*Duplicate location IDs were originally assigned to more than one location, in some cases. New location IDs were assigned, as necessary, in order to differentiate between sampling points. More than one original location ID was identified on previous documents for some locations.
**Site areas are the areas of petroleum-contaminated soil as designated by RH2 Engineering, Inc. in their 2013 Removal Action Work Plan.

Table 2
Sample and Analysis Summary
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

Location	Location Type	Client	Sample Date	Sample Matrix	Sample Name	Sample Type	Collection Method	Laboratory	SDG	Sample Depth (ft bgs)	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx w/ SGC	NWTPH-VPH	NWTPH-EPH	Metals	Metals for Disposal	BTEX	PAHs	Phenols
S-1-092009	Test Pit	RH2	09/16/2009	Soil	S-1	Normal	Grab	Analytical Resources, Inc.	PP00	6.8		X							X		
					S-1b	Normal	Grab	Analytical Resources, Inc.	PP00	6.8	*Not Analyzed*										
S-2-092009	Test Pit	RH2	09/16/2009	Soil	S-2	Normal	Grab	Analytical Resources, Inc.	PP00	7.2		X							X		
					S-2b	Normal	Grab	Analytical Resources, Inc.	PP00	7.2	*Not Analyzed*										
S-3-092009	Test Pit	RH2	09/16/2009	Soil	S-3	Normal	Grab	Analytical Resources, Inc.	PP00	7		X							X		
S-4-092009	Test Pit	RH2	09/16/2009	Soil	S-4	Normal	Grab	Analytical Resources, Inc.	PP00	6.6		X							X		
					S-4b	Normal	Grab	Analytical Resources, Inc.	PP00	6.6	*Not Analyzed*										
					S-4c	Normal	Grab	Analytical Resources, Inc.	PP00	6.6			X								
S-5-092009	Test Pit	RH2	09/16/2009	Soil	S-5	Normal	Grab	Analytical Resources, Inc.	PP00	9		X							X		
					S-5b	Normal	Grab	Analytical Resources, Inc.	PP00	9	*Not Analyzed*										
S-6-092009	Test Pit	RH2	09/16/2009	Soil	S-6	Normal	Grab	Analytical Resources, Inc.	PP00	10		X							X		
					S-6b	Normal	Grab	Analytical Resources, Inc.	PP00	10	*Not Analyzed*										
					S-6c	Normal	Grab	Analytical Resources, Inc.	PP00	10	*Not Analyzed*										
S-7-092009	Test Pit	RH2	09/17/2009	Soil	S-7	Normal	Grab	Analytical Resources, Inc.	PP00	7		X							X		
					S-7b	Normal	Grab	Analytical Resources, Inc.	PP00	7	*Not Analyzed*										
S-8-092009	Test Pit	RH2	09/17/2009	Soil	S-8	Normal	Grab	Analytical Resources, Inc.	PP00	9.5		X							X		
					S-8b	Normal	Grab	Analytical Resources, Inc.	PP00	9.5	*Not Analyzed*										
S-1-102009	Test Pit	RH2	10/23/2009	Soil	S-1	Normal	Grab	Analytical Resources, Inc.	PU11	5		X	X						X		
S-2-102009	Test Pit	RH2	10/23/2009	Soil	S-2	Normal	Grab	Analytical Resources, Inc.	PU11	5		X							X		
S-3-102009	Test Pit	RH2	10/23/2009	Soil	S-3	Normal	Grab	Analytical Resources, Inc.	PU11	4		X							X		
S-4-102009	Test Pit	RH2	10/23/2009	Soil	S-4	Normal	Grab	Analytical Resources, Inc.	PU11	5..5		X							X		
S-5-102009	Test Pit	RH2	10/23/2009	Soil	S-5	Normal	Grab	Analytical Resources, Inc.	PU11	Unknown		X							X		
B-1	Monitoring Well	GeoEngineers	01/20/2010	Soil	B-1, S-6, 11.5'	Normal	Grab	OnSite Environmental, Inc.	1001-145	11.5			X								
B-6	Boring	GeoEngineers	01/21/2010	Soil	B-6, 11.5'	Normal	Grab	OnSite Environmental, Inc.	1001-145	11.5			X								
Pilot Wood Waste Removal Area	Stockpile	RH2	03/01/2011	Soil	S-1	Normal	Composite	Analytical Resources, Inc.	SL36 & SL69	Unknown	X			X							
					S-2	Normal	Composite	Analytical Resources, Inc.	SL36	Unknown	X										
S-1-2011	Test Pit	RH2	07/06/2011	Soil	S-1	Normal	Composite	Analytical Resources, Inc.	TD34	4-5.5	X		X								
Area 1 Soil Removal Area	Stockpile	RH2	07/27/2011	Soil	S-1-M	Normal	Composite	Cascade Analytical, Inc.	156333	Unknown								X			
					S-2-M	Normal	Composite	Cascade Analytical, Inc.	156333	Unknown	*Not Analyzed*										
					S-3-M	Normal	Composite	Cascade Analytical, Inc.	156333	Unknown	*Not Analyzed*										
TP-4-2012	Test Pit	RH2	08/30/2012	Soil	CMS-08302012-4	Normal	Grab	Analytical Resources, Inc.	VI35	3	X										
TP-5-2012	Test Pit	RH2	08/30/2012	Soil	CMS-08302012-5	Normal	Grab	Analytical Resources, Inc.	VI35	6		X							X		
TP-6-2012	Test Pit	RH2	08/30/2012	Soil	CMS-08302012-6	Normal	Grab	Analytical Resources, Inc.	VI35	6		X			X				X		
TP-7-2012	Test Pit	RH2	08/30/2012	Soil	CMS-08302012-7	Normal	Grab	Analytical Resources, Inc.	VI35	4		X							X		
TP-8-2012	Test Pit	RH2	08/30/2012	Soil	CMS-08302012-8	Normal	Grab	Analytical Resources, Inc.	VI35	4		X							X		
TP-9-2012	Test Pit	RH2	08/30/2012	Wood Waste	CMS-08302012-9	Normal	Grab	Analytical Resources, Inc.	VI35	3							X			X	X
TP-11-2012	Test Pit	RH2	08/30/2012	Unknown	CMS-08302012-11	Normal	Grab	Analytical Resources, Inc.	VI35	Unknown	*Not Analyzed*										

Table 2
Sample and Analysis Summary
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

Location	Location Type	Client	Sample Date	Sample Matrix	Sample Name	Sample Type	Collection Method	Laboratory	SDG	Sample Depth (ft bgs)	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx w/ SGC	NWTPH-VPH	NWTPH-EPH	Metals	Metals for Disposal	BTEX	PAHs	Phenols
TP-12-2012	Test Pit	RH2	08/30/2012	Soil	CMS-08302012-12	Normal	Grab	Analytical Resources, Inc.	VI35	3					X	X					
TP-14-2012	Test Pit	RH2	08/30/2012	Wood Waste	CMS-08302012-14	Normal	Grab	Analytical Resources, Inc.	VI35	6.5							X			X	X
TP-15-2012	Test Pit	RH2	08/30/2012	Unknown	CMS-08302012-15	Normal	Grab	Analytical Resources, Inc.	VI35	Unknown	*Not Analyzed*										
TP-22-2012	Test Pit	RH2	08/30/2012	Soil	CMS-08302012-22	Normal	Grab	Analytical Resources, Inc.	VI35	4	X										
TP-23-2012	Test Pit	RH2	08/30/2012	Wood Waste	CMS-08302012-23	Normal	Grab	Analytical Resources, Inc.	VI35	6	X						X			X	X
TP-24-2012	Test Pit	RH2	08/30/2012	Wood Waste	CMS-08302012-24	Normal	Grab	Analytical Resources, Inc.	VI35 & VI78	6	X			X			X			X	X
TP-26-2012	Test Pit	RH2	08/30/2012	Wood Waste	CMS-08302012-26	Normal	Grab	Analytical Resources, Inc.	VI35	7							X			X	X
TP-27-2012	Test Pit	RH2	08/30/2012	Unknown	CMS-08302012-27	Normal	Grab	Analytical Resources, Inc.	VI35	Unknown	*Not Analyzed*										
DW01	Dewatering Well	RH2	09/27/2012	Groundwater	CMS-20120927-1	Normal	Grab	Analytical Resources, Inc.	VL47	11.5		X	X				X		X	X	X

NOTES:

BTEX = benzene, toluene, ethylbenzene, and xylenes by USEPA Method 8021B modified.

ft bgs = feet below ground surface.

NWTPH-Dx = Northwest Total Petroleum Hydrocarbon—Diesel- and Heavy-Oil-Range Organics Method.

NWTPH-EPH = Northwest Total Petroleum Hydrocarbon—Extractable Petroleum Hydrocarbons.

NWTPH-Gx = Northwest Total Petroleum Hydrocarbon—Gasoline-Range Organics Method.

NWTPH-HCID = Northwest Total Petroleum Hydrocarbon —Hydrocarbon Identification Method.

NWTPH-VPH = Northwest Total Petroleum Hydrocarbon—Volatile Petroleum Hydrocarbons.

Metals = total metals (arsenic, chromium [total], copper, and lead) by USEPA Method 6010C.

Metals for Disposal = arsenic, barium, cadmium, chromium (total), lead, selenium, and silver by USEPA Method SW846 6010; mercury by USEPA Method SW846 7471.

PAHs = polycyclic aromatic hydrocarbons by USEPA Method SW8270D.

RH2 = RH2 Engineering, Inc.

Phenols = 2-methylphenol, 4-methylphenol, 2,4-dichlorophenol, pentachlorophenol, 2,4,6-trichlorophenol, and 2,4,5-trichlorophenol by USEPA Method SW8270D.

SDG = sample delivery group.

SGC = silica gel cleanup.

USEPA = U.S. Environmental Protection Agency.

Table 3
Depth to Water
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

Location	Location Type	Measurement Date	Depth to Water (ft bgs)
TP-1-2007	Test Pit	01/15/2007	11.0
TP-2-2007	Test Pit	01/15/2007	13.0
TP-3-2007	Test Pit	01/15/2007	6.0
TP-5-2007	Test Pit	01/15/2007	4.0
TP-8-2007	Test Pit	01/15/2007	7.0
TP-10-2007	Test Pit	01/15/2007	10.0
TP-12-2007	Test Pit	01/15/2007	8.0
TP-2-052009	Test Pit	05/07/2009	6.0
S-1-092009	Test Pit	09/16/2009	6.8
S-2-092009	Test Pit	09/16/2009	6.0
S-3-092009	Test Pit	09/16/2009	6.0
S-4-092009	Test Pit	09/16/2009	6.0
S-5-092009	Test Pit	09/16/2009	7.5
S-8-092009	Test Pit	09/17/2009	9.0
S-1-102009	Test Pit	10/23/2009	8.0
TP-2-102009	Test Pit	10/23/2009	6.0
S-3-102009	Test Pit	10/23/2009	6.0
S-4-102009	Test Pit	10/23/2009	4.0
S-5-102009	Test Pit	10/23/2009	4.5
A	Test Pit	11/30/2009	8.0
B	Test Pit	11/30/2009	8.5
C	Test Pit	11/30/2009	7.0
D	Test Pit	11/30/2009	7.0
G	Test Pit	11/30/2009	5.5
H	Test Pit	11/30/2009	5.0
B-1	Monitoring Well	01/22/2010	5.2
B-1A	Boring	01/21/2010	7.0
B-2	Monitoring Well	01/22/2010	6.7
B-2A	Boring	01/21/2010	7.0
B-3	Boring	01/21/2010	7.0
B-4	Boring	01/21/2010	8.0
B-5	Boring	01/21/2010	2.0
B-6	Boring	01/21/2010	6.0
B-7	Boring	01/21/2010	5.0
TPGW1	Test Pit	May and June 2011	2.1
TPGW2	Test Pit	May and June 2011	4.2
TPGW3	Test Pit	May and June 2011	4.33
TPGW4	Test Pit	May and June 2011	0
TPGW5	Test Pit	May and June 2011	2.5

Table 3
Depth to Water
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

Location	Location Type	Measurement Date	Depth to Water (ft bgs)
TPGW6	Test Pit	May and June 2011	4.4
TPGW7	Test Pit	May and June 2011	0
TPGW8	Test Pit	May and June 2011	2.25
TPGW9	Test Pit	May and June 2011	3.25
TPGW10	Test Pit	May and June 2011	4.2
TPGW11	Test Pit	May and June 2011	3.33
TPGW12	Test Pit	May and June 2011	0
TP-2-2012	Test Pit	08/30/2012	4.3
TP-3-2012	Test Pit	08/30/2012	5.1
TP-4-2012	Test Pit	08/30/2012	2.5
TP-5-2012	Test Pit	08/30/2012	6.0
TP-6-2012	Test Pit	08/30/2012	6.7
TP-9-2012	Test Pit	08/30/2012	3.5
TP-10-2012	Test Pit	08/30/2012	5.0
TP-11-2012	Test Pit	08/30/2012	3.2
TP-12-2012	Test Pit	08/30/2012	2.5
TP-13-2012	Test Pit	08/30/2012	2.8
TP-15-2012	Test Pit	08/30/2012	6.0
TP-16-2012	Test Pit	08/30/2012	4.0
TP-22-2012	Test Pit	08/30/2012	4.5
TP-24-2012	Test Pit	08/30/2012	7.5
TP-25-2012	Test Pit	08/30/2012	6.3
TP-26-2012	Test Pit	08/30/2012	8.0
DW01	Dewatering Well	09/18/2012	4.5

NOTES:

Water depths measured in test pits and borings are approximate.

ft bgs = feet below ground surface.

Table 4
Observed Petroleum Impacts
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

Location	PCS Area*	Location Type	Sample Date	Sample Matrix	Sample Depth (ft bgs)	Observations
TP-2-052009	Area 1	Test Pit	05/07/2009	Soil	6	strong gasoline-like odor and staining; iridescence on water
S-1-092009	Area 1	Test Pit	09/16/2009	Soil	4.5	sheen and hydrocarbon smell
S-5-092009	Area 1	Test Pit	09/16/2009	Soil	4.5	contamination observed
S-6-092009	Area 1	Test Pit	09/16/2009	Soil	10	possible weak contamination
S-1-102009	Area 2	Test Pit	10/23/2009	Soil	0-9	gas smell
TP-2-102009	Area 2	Test Pit	10/23/2009	Soil	2-5.5	gas smell
TP-5-102009	Area 2	Test Pit	10/23/2009	Soil	4-5	gas smell
B-1	Area 3	Monitoring Well	01/20/2010	Soil	11.5-13.5	hydrocarbon odor and heavy sheen
B-6	Area 3	Boring	01/21/2010	Soil	11.5	hydrocarbon odor and heavy sheen
TPGW1	Area 4	Test Pit	May and June 2011	Soil	4-5.5	hydrocarbon smell
TP-4-2012	--	Test Pit	08/30/2012	Soil	0-7	light petroleum odor
TP-6-2012	Area 1	Test Pit	08/30/2012	Soil	0-7	significant petroleum odor
TP-7-2012	Area 1	Test Pit	08/30/2012	Soil and Wood Waste	0-3	light petroleum odor
TP-11-2012	Area 4	Test Pit	08/30/2012	Soil	1-4	hydrocarbon smell
TP-12-2012	Area 4	Test Pit	08/30/2012	Soil	2-4	hydrocarbon smell
TP-13-2012	--	Test Pit	08/30/2012	Wood Waste and Debris	0-4	hydrocarbon smell
TP-16-2012	--	Test Pit	08/30/2012	Soil	0-4	slight hydrocarbon smell
TP-17-2012	--	Test Pit	08/30/2012	Soil and Debris	0-4	hydrocarbon smell
TP-22-2012	--	Test Pit	08/30/2012	Soil and Debris	1-4	hydrocarbon smell
TP-23-2012	--	Test Pit	08/30/2012	Soil and Wood Waste	4.5-7	hydrocarbon contamination
TP-24-2012	--	Test Pit	08/30/2012	Soil and Wood Waste	1.5-6.5	hydrocarbon contamination

NOTES:

Petroleum-impact observations are compiled from boring, test pit, and monitoring well completion logs.

-- = Sample location is not associated with a PCS area.

ft bgs = feet below ground surface.

PCS = petroleum contaminated site.

*Site areas are the areas of petroleum-contaminated soil as designated by RH2 Engineering, Inc. in their 2013 Removal Action Work Plan.

	Location	Soil CUL	Soil CUL Source	B-1	B-6	AREA 1 SOIL REMOVAL AREA	PILOT WOOD WASTE REMOVAL AREA		S-1-092009	S-1-102009	S-1-2011	S-2-092009	S-2-102009	S-3-092009
	Sample Name			B-1, S-6, 11.5'	B-6, 11.5'	S-1-M	S-1	S-2	S-1	S-1	S-1	S-2	S-2	S-3
	Sample Depth (ft bgs)			11.5	11.5	Unknown	Unknown	Unknown	6.8	5	Unknown	7.2	5	7
	Date Collected			01/20/2010	01/21/2010	07/27/2011	03/01/2011	03/01/2011	09/16/2009	10/23/2009	07/06/2011	09/16/2009	10/23/2009	09/16/2009
	Sample Matrix			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	PCS Area			AREA 3	AREA 3	AREA 1	AREA 5	AREA 5	AREA 1	AREA 2	AREA 4	AREA 1	AREA 2	AREA 1
Analyte Group	Analyte													
NWTPH-HCID	Gasoline						26 U	24 U			20 U			
	Diesel						**DETECT**	**DETECT**			**DETECT**			
	Motor Oil Range						**DETECT**	**DETECT**			**DETECT**			
NWTPH-Gx	Gasoline	30/100	MTCA A						**8.2**	7.9 U		6.3 U	7.3 U	4.7 U
NWTPH-Dx	Diesel	2000	MTCA A	**500**	**1100**		**350**[a]			**2500**	**27**			
	Motor Oil Range	2000	MTCA A	**820**	**1600**		**700**[a]			**4500**	**100**			
BTEX	Benzene	0.03	MTCA A						0.017 U	0.02 U		0.016 U	0.018 U	0.012 U
	Ethylbenzene	6	MTCA A						0.017 U	0.02 U		0.016 U	0.018 U	0.012 U
	m,p-Xylene	9	MTCA A						0.033 U	0.039 U		0.032 U	0.037 U	**0.029**
	o-Xylene	9	MTCA A						0.017 U	0.02 U		0.016 U	0.018 U	0.012 U
	Toluene	7	MTCA A						0.017 U	0.02 U		0.016 U	0.018 U	**0.02**
VPH	Aliphatic C5-C6													
	Aliphatic C6-C8													
	Aromatic C8-C10													
	Benzene	0.03	MTCA A											
	C10-C12 Aliphatic													
	C10-C12 Aromatic													
	C12-C13 Aromatic													
	C8-C10 Aliphatic													
	Ethylbenzene	6	MTCA A											
	m,p-Xylene	9	MTCA A											
	Methyl tert-butyl ether													
	n-Decane													
	n-Dodecane													
	n-Hexane													
	n-Octane													
	n-Pentane													
	o-Xylene	9	MTCA A											
	Toluene	7	MTCA A											

Table 5
Summary of Analytical Results in Soil (mg/kg)
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

	Location	Soil CUL	Soil CUL Source	B-1	B-6	AREA 1 SOIL REMOVAL AREA	PILOT WOOD WASTE REMOVAL AREA		S-1-092009	S-1-102009	S-1-2011	S-2-092009	S-2-102009	S-3-092009
	Sample Name			B-1, S-6, 11.5'	B-6, 11.5'	S-1-M	S-1	S-2	S-1	S-1	S-1	S-2	S-2	S-3
	Sample Depth (ft bgs)			11.5	11.5	Unknown	Unknown	Unknown	6.8	5	Unknown	7.2	5	7
	Date Collected			01/20/2010	01/21/2010	07/27/2011	03/01/2011	03/01/2011	09/16/2009	10/23/2009	07/06/2011	09/16/2009	10/23/2009	09/16/2009
	Sample Matrix			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	PCS Area			AREA 3	AREA 3	AREA 1	AREA 5	AREA 5	AREA 1	AREA 2	AREA 4	AREA 1	AREA 2	AREA 1
EPH	Aromatic C8-C10													
	C10-C12 Aliphatic													
	C10-C12 Aromatic													
	C12-C16 Aliphatic													
	C12-C16 Aromatic													
	C16-C21 Aliphatic													
	C16-C21 Aromatic													
	C21-C34 Aliphatic													
	C21-C34 Aromatic													
	C8-C10 Aliphatic[b]													
SVOCs	1-Methylnaphthalene	35	MTCA B CAR											
	2,4,5-Trichlorophenol	8000	MTCA B NCAR											
	2,4,6-Trichlorophenol	80	MTCA B NCAR											
	2,4-Dichlorophenol	240	MTCA B NCAR											
	2-Methylnaphthalene	320	MTCA B NCAR											
	2-Methylphenol													
	4-Methylphenol													
	Acenaphthene	4800	MTCA B NCAR											
	Acenaphthylene													
	Anthracene	24000	MTCA B NCAR											
	Benzo(a)anthracene	1.4	MTCA B CAR											
	Benzo(a)pyrene	0.1	MTCA A											
	Benzo(ghi)perylene													
	Bis(2-ethylhexyl)phthalate[b]	71	MTCA B CAR											
	Chrysene	140	MTCA B CAR											
	Dibenzo(a,h)anthracene	0.14	MTCA B CAR											
	Dibenzofuran	80	MTCA B NCAR											
	Fluoranthene	3200	MTCA B NCAR											
	Fluorene	3200	MTCA B NCAR											
	Indeno(1,2,3-cd)pyrene	1.4	MTCA B CAR											
	Naphthalene	5	MTCA A											
	Pentachlorophenol	2.5	MTCA B CAR											
	Phenanthrene													
	Pyrene	2400	MTCA B NCAR											
	Total Benzofluoranthenes	1.4	MTCA B CAR											

Table 5
Summary of Analytical Results in Soil (mg/kg)
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

	Location	Soil CUL	Soil CUL Source	B-1	B-6	AREA 1 SOIL REMOVAL AREA	PILOT WOOD WASTE REMOVAL AREA		S-1-092009	S-1-102009	S-1-2011	S-2-092009	S-2-102009	S-3-092009
	Sample Name			B-1, S-6, 11.5'	B-6, 11.5'	S-1-M	S-1	S-2	S-1	S-1	S-1	S-2	S-2	S-3
	Sample Depth (ft bgs)			11.5	11.5	Unknown	Unknown	Unknown	6.8	5	Unknown	7.2	5	7
	Date Collected			01/20/2010	01/21/2010	07/27/2011	03/01/2011	03/01/2011	09/16/2009	10/23/2009	07/06/2011	09/16/2009	10/23/2009	09/16/2009
	Sample Matrix			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	PCS Area			AREA 3	AREA 3	AREA 1	AREA 5	AREA 5	AREA 1	AREA 2	AREA 4	AREA 1	AREA 2	AREA 1
Metals	Arsenic	20	MTCA A			**4.052**								
Metals	Barium	16000	MTCA B NCAR			**81.2**								
Metals	Cadmium	2	MTCA A			**0.8**								
Metals	Chromium	2000	MTCA A			**33.8**								
Metals	Copper	3200	MTCA B NCAR											
Metals	Lead	250	MTCA A			**64.9**								
Metals	Mercury	2	MTCA A			**0.0395**								
Metals	Selenium	400	MTCA B NCAR			3.25 U								
Metals	Silver	400	MTCA B NCAR			0.32 U								
% Moisture	Percent Moisture					770000								
Calculated Values	cPAH TEQ	0.1	MTCA A											
Calculated Values	Heavy Oils	2000	MTCA A	**1320**	**2700**		**1050**[a]			**7000**	**127**			
Calculated Values	Xylenes	9	MTCA A						ND	ND		ND	ND	**0.035**

Table 5
Summary of Analytical Results in Soil (mg/kg)
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

	Location	Soil CUL	Soil CUL Source	S-3-102009	S-4-092009	S-4-092009	S-4-102009	S-5-092009	S-5-102009	S-6-092009	S-7-092009	S-8-092009	TP-4-2012
	Sample Name			S-3	S-4	S-4C	S-4	S-5	S-5	S-6	S-7	S-8	CMS-08302012-4
	Sample Depth (ft bgs)			4	6.6	6.6	5.5	9	Unknown	10	7	9.5	3
	Date Collected			10/23/2009	09/16/2009	09/16/2009	10/23/2009	09/16/2009	10/23/2009	09/16/2009	09/17/2009	09/17/2009	08/30/2012
	Sample Matrix			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	PCS Area			AREA 2	AREA 1	AREA 1	AREA 2	AREA 1	AREA 2	AREA 1	AREA 1	AREA 1	
Analyte Group	Analyte												
NWTPH-HCID	Gasoline												20 U
	Diesel												50 U
	Motor Oil Range												100 U
NWTPH-Gx	Gasoline	30/100	MTCA A	11 U	**1600**		8.1 U	**490**	7.7 U	7.4 U	6.1 U	6.2 U	
NWTPH-Dx	Diesel	2000	MTCA A			**910**							
	Motor Oil Range	2000	MTCA A			110 U							
BTEX	Benzene	0.03	MTCA A	0.027 U	0.12 U		0.02 U	0.014 U	0.019 U	0.018 U	0.015 U	0.015 U	
	Ethylbenzene	6	MTCA A	0.027 U	**1.6**		0.02 U	**0.37**	0.019 U	0.018 U	0.015 U	0.015 U	
	m,p-Xylene	9	MTCA A	0.054 U	0.23 U		0.041 U	0.028 U	0.039 U	0.037 U	0.03 U	0.031 U	
	o-Xylene	9	MTCA A	0.027 U	**0.7**		0.02 U	**0.21**	0.019 U	0.018 U	0.015 U	0.015 U	
	Toluene	7	MTCA A	0.027 U	**0.65**		0.02 U	**0.062**	0.019 U	0.018 U	0.015 U	0.015 U	
VPH	Aliphatic C5-C6												
	Aliphatic C6-C8												
	Aromatic C8-C10												
	Benzene	0.03	MTCA A										
	C10-C12 Aliphatic												
	C10-C12 Aromatic												
	C12-C13 Aromatic												
	C8-C10 Aliphatic												
	Ethylbenzene	6	MTCA A										
	m,p-Xylene	9	MTCA A										
	Methyl tert-butyl ether												
	n-Decane												
	n-Dodecane												
	n-Hexane												
	n-Octane												
	n-Pentane												
	o-Xylene	9	MTCA A										
	Toluene	7	MTCA A										

Table 5
Summary of Analytical Results in Soil (mg/kg)
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

	Location	Soil CUL	Soil CUL Source	S-3-102009	S-4-092009	S-4-092009	S-4-102009	S-5-092009	S-5-102009	S-6-092009	S-7-092009	S-8-092009	TP-4-2012
	Sample Name			S-3	S-4	S-4C	S-4	S-5	S-5	S-6	S-7	S-8	CMS-08302012-4
	Sample Depth (ft bgs)			4	6.6	6.6	5.5	9	Unknown	10	7	9.5	3
	Date Collected			10/23/2009	09/16/2009	09/16/2009	10/23/2009	09/16/2009	10/23/2009	09/16/2009	09/17/2009	09/17/2009	08/30/2012
	Sample Matrix			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	PCS Area			AREA 2	AREA 1	AREA 1	AREA 2	AREA 1	AREA 2	AREA 1	AREA 1	AREA 1	
EPH	Aromatic C8-C10												
	C10-C12 Aliphatic												
	C10-C12 Aromatic												
	C12-C16 Aliphatic												
	C12-C16 Aromatic												
	C16-C21 Aliphatic												
	C16-C21 Aromatic												
	C21-C34 Aliphatic												
	C21-C34 Aromatic												
	C8-C10 Aliphatic[b]												
SVOCs	1-Methylnaphthalene	35	MTCA B CAR										
	2,4,5-Trichlorophenol	8000	MTCA B NCAR										
	2,4,6-Trichlorophenol	80	MTCA B NCAR										
	2,4-Dichlorophenol	240	MTCA B NCAR										
	2-Methylnaphthalene	320	MTCA B NCAR										
	2-Methylphenol												
	4-Methylphenol												
	Acenaphthene	4800	MTCA B NCAR										
	Acenaphthylene												
	Anthracene	24000	MTCA B NCAR										
	Benzo(a)anthracene	1.4	MTCA B CAR										
	Benzo(a)pyrene	0.1	MTCA A										
	Benzo(ghi)perylene												
	Bis(2-ethylhexyl)phthalate[b]	71	MTCA B CAR										
	Chrysene	140	MTCA B CAR										
	Dibenzo(a,h)anthracene	0.14	MTCA B CAR										
	Dibenzofuran	80	MTCA B NCAR										
	Fluoranthene	3200	MTCA B NCAR										
	Fluorene	3200	MTCA B NCAR										
	Indeno(1,2,3-cd)pyrene	1.4	MTCA B CAR										
	Naphthalene	5	MTCA A										
	Pentachlorophenol	2.5	MTCA B CAR										
	Phenanthrene												
	Pyrene	2400	MTCA B NCAR										
	Total Benzofluoranthenes	1.4	MTCA B CAR										

Table 5
Summary of Analytical Results in Soil (mg/kg)
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

	Location	Soil CUL	Soil CUL Source	S-3-102009	S-4-092009	S-4-092009	S-4-102009	S-5-092009	S-5-102009	S-6-092009	S-7-092009	S-8-092009	TP-4-2012
	Sample Name			S-3	S-4	S-4C	S-4	S-5	S-5	S-6	S-7	S-8	CMS-08302012-4
	Sample Depth (ft bgs)			4	6.6	6.6	5.5	9	Unknown	10	7	9.5	3
	Date Collected			10/23/2009	09/16/2009	09/16/2009	10/23/2009	09/16/2009	10/23/2009	09/16/2009	09/17/2009	09/17/2009	08/30/2012
	Sample Matrix			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	PCS Area			AREA 2	AREA 1	AREA 1	AREA 2	AREA 1	AREA 2	AREA 1	AREA 1	AREA 1	
Metals	Arsenic	20	MTCA A										
	Barium	16000	MTCA B NCAR										
	Cadmium	2	MTCA A										
	Chromium	2000	MTCA A										
	Copper	3200	MTCA B NCAR										
	Lead	250	MTCA A										
	Mercury	2	MTCA A										
	Selenium	400	MTCA B NCAR										
	Silver	400	MTCA B NCAR										
% Moisture	Percent Moisture												
Calculated Values	cPAH TEQ	0.1	MTCA A										
	Heavy Oils	2000	MTCA A			**965**							
	Xylenes	9	MTCA A	ND	**0.815**		ND	**0.22**	ND	ND	ND	ND	

Table 5
Summary of Analytical Results in Soil (mg/kg)
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

	Location	Soil CUL	Soil CUL Source	TP-5-2012	TP-6-2012	TP-7-2012	TP-8-2012	TP-9-2012	TP-12-2012	TP-14-2012	TP-22-2012	TP-23-2012	TP-24-2012	TP-26-2012
	Sample Name			CMS-08302012-5	CMS-08302012-6	CMS-08302012-7	CMS-08302012-8	CMS-08302012-9	CMS-08302012-12	CMS-08302012-14	CMS-08302012-22	CMS-08302012-23	CMS-08302012-24	CMS-08302012-26
	Sample Depth (ft bgs)			6	6	4	4	3	3	6.5	4	6	6	7
	Date Collected			08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012
	Sample Matrix			SOIL	SOIL	SOIL	SOIL	WOOD WASTE	SOIL	WOOD WASTE	SOIL	WOOD WASTE	WOOD WASTE	WOOD WASTE
	PCS Area			AREA 1	AREA 1	AREA 1	AREA 1	AREA 2	AREA 4					
Analyte Group	Analyte													
NWTPH-HCID	Gasoline										20 U	20 U	20 U	
	Diesel										**DETECT**	**DETECT**	**DETECT**	
	Motor Oil Range										**DETECT**	**DETECT**	**DETECT**	
NWTPH-Gx	Gasoline	30/100	MTCA A	4.9 U	**73**	**74**	5.2 U							
NWTPH-Dx	Diesel	2000	MTCA A										**110[a]**	
	Motor Oil Range	2000	MTCA A										**290[a]**	
BTEX	Benzene	0.03	MTCA A	0.025 U	0.03 U	0.027 U	0.026 U							
	Ethylbenzene	6	MTCA A	0.025 U	0.03 U	0.027 U	0.026 U							
	m,p-Xylene	9	MTCA A	0.049 U	**0.071**	0.054 U	0.052 U							
	o-Xylene	9	MTCA A	0.025 U	**0.034**	0.027 U	0.026 U							
	Toluene	7	MTCA A	0.025 U	**0.082**	0.027 U	0.026 U							
VPH	Aliphatic C5-C6				11 U				11 U					
	Aliphatic C6-C8				11 U				11 U					
	Aromatic C8-C10				11 U				11 U					
	Benzene	0.03	MTCA A		1.1 U				1.1 U					
	C10-C12 Aliphatic				11 U				11 U					
	C10-C12 Aromatic				**10 J**				**11 J**					
	C12-C13 Aromatic				**8.7 J**				**11 J**					
	C8-C10 Aliphatic				**6.5 J**				11 U					
	Ethylbenzene	6	MTCA A		1.1 U				1.1 U					
	m,p-Xylene	9	MTCA A		2.2 U				2.2 U					
	Methyl tert-butyl ether				1.1 U				1.1 U					
	n-Decane				1.1 U				1.1 U					
	n-Dodecane				**0.57 J**				**0.77 J**					
	n-Hexane				1.1 U				1.1 U					
	n-Octane				1.1 U				1.1 U					
	n-Pentane				1.1 U				1.1 U					
	o-Xylene	9	MTCA A		1.1 U				1.1 U					
	Toluene	7	MTCA A		1.1 U				1.1 U					

Table 5
Summary of Analytical Results in Soil (mg/kg)
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

	Location	Soil CUL	Soil CUL Source	TP-5-2012	TP-6-2012	TP-7-2012	TP-8-2012	TP-9-2012	TP-12-2012	TP-14-2012	TP-22-2012	TP-23-2012	TP-24-2012	TP-26-2012
	Sample Name			CMS-08302012-5	CMS-08302012-6	CMS-08302012-7	CMS-08302012-8	CMS-08302012-9	CMS-08302012-12	CMS-08302012-14	CMS-08302012-22	CMS-08302012-23	CMS-08302012-24	CMS-08302012-26
	Sample Depth (ft bgs)			6	6	4	4	3	3	6.5	4	6	6	7
	Date Collected			08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012
	Sample Matrix			SOIL	SOIL	SOIL	SOIL	WOOD WASTE	SOIL	WOOD WASTE	SOIL	WOOD WASTE	WOOD WASTE	WOOD WASTE
	PCS Area			AREA 1	AREA 1	AREA 1	AREA 1	AREA 2	AREA 4					
EPH	Aromatic C8-C10								3.2					
	C10-C12 Aliphatic								2.2 U					
	C10-C12 Aromatic								2.2 U					
	C12-C16 Aliphatic								3.6					
	C12-C16 Aromatic								2.2 U					
	C16-C21 Aliphatic								2.9					
	C16-C21 Aromatic								2.2					
	C21-C34 Aliphatic								87					
	C21-C34 Aromatic								6.5					
	C8-C10 Aliphatic[b]								3.5 U					
SVOCs	1-Methylnaphthalene	35	MTCA B CAR					0.02 U		**0.037**		**0.0098 J**	**0.028**	0.02 U
	2,4,5-Trichlorophenol	8000	MTCA B NCAR					0.098 U		0.094 U		0.098 U	0.095 U	0.097 U
	2,4,6-Trichlorophenol	80	MTCA B NCAR					0.098 U		0.094 U		0.098 U	0.095 U	0.097 U
	2,4-Dichlorophenol	240	MTCA B NCAR					0.2 U		0.19 U		0.2 U	0.19 U	0.2 U
	2-Methylnaphthalene	320	MTCA B NCAR					0.02 U		**0.07**		**0.02**	**0.058**	**0.016 J**
	2-Methylphenol							0.02 U		0.019 U		0.02 U	0.019 U	0.02 U
	4-Methylphenol							0.039 U		**0.18**		**0.075**	**0.24**	**0.33**
	Acenaphthene	4800	MTCA B NCAR					0.02 U		**0.022**		0.02 U	0.019 U	0.02 U
	Acenaphthylene							0.02 U		**0.077**		0.02 U	0.019 U	0.02 U
	Anthracene	24000	MTCA B NCAR					0.02 U		**0.024**		0.02 U	0.019 U	0.02 U
	Benzo(a)anthracene	1.4	MTCA B CAR					0.02 U		**0.02**		**0.011 J**	**0.023**	0.02 U
	Benzo(a)pyrene	0.1	MTCA A					0.02 U		**0.025**		**0.013 J**	**0.018 J**	**0.016 J**
	Benzo(ghi)perylene							0.02 U		**0.057**		**0.035**	0.019 U	0.02 U
	Bis(2-ethylhexyl)phthalate[b]	71	MTCA B CAR					0.046 U		0.038 U		0.041 U	0.044 U	0.054 U
	Chrysene	140	MTCA B CAR					0.02 U		**0.037**		**0.028**	**0.043**	**0.018 J**
	Dibenzo(a,h)anthracene	0.14	MTCA B CAR					0.02 U		**0.01 J**		0.02 U	0.019 U	0.02 U
	Dibenzofuran	80	MTCA B NCAR					0.02 U		**0.035**		0.02 U	0.019 U	0.02 U
	Fluoranthene	3200	MTCA B NCAR					0.02 U		**0.075**		**0.014 J**	**0.046**	**0.018 J**
	Fluorene	3200	MTCA B NCAR					0.02 U		**0.015 J**		0.02 U	**0.0095 J**	0.02 U
	Indeno(1,2,3-cd)pyrene	1.4	MTCA B CAR					0.02 U		**0.036**		0.02 U	0.019 U	0.02 U
	Naphthalene	5	MTCA A					0.02 U		**0.38**		**0.027**	**0.12**	**0.025**
	Pentachlorophenol	2.5	MTCA B CAR					0.2 U		0.19 U		0.2 U	**0.17 J**	0.2 U
	Phenanthrene							0.02 U		**0.16**		**0.041**	**0.08**	**0.029**
	Pyrene	2400	MTCA B NCAR					0.02 U		**0.086**		**0.043**	**0.091**	**0.038**
	Total Benzofluoranthenes	1.4	MTCA B CAR					0.039 U		**0.05**		**0.016 J**	**0.05**	**0.02 J**

	Location	Soil CUL	Soil CUL Source	TP-5-2012	TP-6-2012	TP-7-2012	TP-8-2012	TP-9-2012	TP-12-2012	TP-14-2012	TP-22-2012	TP-23-2012	TP-24-2012	TP-26-2012
	Sample Name			CMS-08302012-5	CMS-08302012-6	CMS-08302012-7	CMS-08302012-8	CMS-08302012-9	CMS-08302012-12	CMS-08302012-14	CMS-08302012-22	CMS-08302012-23	CMS-08302012-24	CMS-08302012-26
	Sample Depth (ft bgs)			6	6	4	4	3	3	6.5	4	6	6	7
	Date Collected			08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012	08/30/2012
	Sample Matrix			SOIL	SOIL	SOIL	SOIL	WOOD WASTE	SOIL	WOOD WASTE	SOIL	WOOD WASTE	WOOD WASTE	WOOD WASTE
	PCS Area			AREA 1	AREA 1	AREA 1	AREA 1	AREA 2	AREA 4					
Metals	Arsenic	20	MTCA A					6 U		9 U		9 U	7 U	**10**
	Barium	16000	MTCA B NCAR											
	Cadmium	2	MTCA A											
	Chromium	2000	MTCA A					**91.7**		**29.1**		**41**	**38.9**	**89.6**
	Copper	3200	MTCA B NCAR					**15.8**		**15.8**		**15.1**	**27.1**	**17**
	Lead	250	MTCA A					**3**		**15**		**17**	**27**	**15**
	Mercury	2	MTCA A											
	Selenium	400	MTCA B NCAR											
	Silver	400	MTCA B NCAR											
% Moisture	Percent Moisture													
Calculated Values	cPAH TEQ	0.1	MTCA A					ND		**0.035**		**0.017**	**0.026**	**0.02**
	Heavy Oils	2000	MTCA A										**400**[a]	
	Xylenes	9	MTCA A	ND	**0.105**	ND	ND							

NOTES:

One-half the method reporting limit was used for non-detect results in the calculated values.

Soil CULs were used to screen chemical concentrations in wood waste.

BOLD = detections.

BTEX = benzene, toluene, ethylbenzene, xylenes by USEPA Method 8021B, modified.

cPAH TEQ = carcinogenic polycyclic aromatic hydrocarbon toxic equivalency quotient.

CUL = cleanup level.

EPH = extractable petroleum hydrocarbons by Northwest Total Petroleum Hydrocarbons-EPH.

ft bgs = feet below ground surface.

J = Result is estimated.

mg/kg = milligrams per kilogram.

MTCA A = Model Toxics Control Act, Method A, table value.

MTCA B CAR = Model Toxics Control Act, Method B, standard formula value, for carcinogenic compounds.

MTCA B NCAR = Model Toxics Control Act, Method B, standard formula value, for noncarcinogenic compounds.

ND = each individual compound result used in the calculated value is non-detect.

NWTPH-Dx = Northwest Total Petroleum Hydrocarbon—Diesel- and Heavy-Oil Range Organics.

NWTPH-Gx = Northwest Total Petroleum Hydrocarbon—Gasoline-Range Organics.

NWTPH-HCID = Northwest Total Petroleum Hydrocarbon—Hydrocarbon Identification Method.

PCS = petroleum-contaminated soil.

Shaded = exceeds the soil cleanup level.

SVOCs = semivolatile organic compounds by USEPA Method 8270D.

U = analyte not detected at posted method reporting limit.

USEPA = U.S. Environmental Protection Agency.

VPH = volatile petroleum hydrocarbons by Northwest Total Petroleum Hydrocarbons-VPH.

[a]Samples were analyzed by the NWTPH-Dx method with silica gel cleanup.

[b]Sample results for bis(2-ethylhexyl)phthalate and C8-C10 aliphatic hydrocarbons (EPH) have been qualified "U" as non-detect because of method blank contamination. Qualifications were made by MFA, as laboratory appropriately flagged results "B" for having associated method blank contamination.

Table 6
Summary of Analytical Results in Groundwater (µg/L)
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

	Location Sample Name Sample Depth (ft bgs) Date Collected Sample Matrix	Groundwater CUL (µg/L)	Groundwater CUL Source	DW01 CMS-20120927-1 11.5 09/27/2012 Groundwater
Analyte Group	Analyte			
NWTPH-Gx	Gasoline	800/1000	MTCA A	250 U
NWTPH-Dx	Diesel	500	MTCA A	100 U
	Motor-Oil Range	500	MTCA A	200 U
Metals	Arsenic	5	MTCA A	**2.0**
	Chromium	50	MTCA A	0.5 U
	Copper	640	MTCA B NCAR	**3.0**
	Lead	15	MTCA A	**1.4**
BTEX	Benzene	5	MTCA A	1.0 U
	Ethylbenzene	700	MTCA A	1.0 U
	m,p-Xylene	1000	MTCA A	2.0 U
	o-Xylene	1000	MTCA A	1.0 U
	Toluene	1000	MTCA A	1.0 U
SVOCs	1-Methylnaphthalene	1.5	MTCA B CAR	1.0 U
	2,4,5-Trichlorophenol	800	MTCA B NCAR	5.0 U
	2,4,6-Trichlorophenol	4	MTCA B CAR	3.0 U
	2,4-Dichlorophenol	24	MTCA B NCAR	3.0 U
	2-Methylnaphthalene	32	MTCA B NCAR	1.0 U
	2-Methylphenol			1.0 U
	4-Methylphenol			2.0 U
	Acenaphthene			1.0 U
	Acenaphthylene			1.0 U
	Anthracene	4800	MTCA B NCAR	1.0 U
	Benzo(a)anthracene	0.12	MTCA B CAR	1.0 U
	Benzo(a)pyrene	0.1	MTCA B CAR	1.0 U
	Benzo(ghi)perylene			1.0 U
	Bis(2-ethylhexyl)phthalate	6.3	MTCA B CAR	3.0 U
	Chrysene	12	MTCA B CAR	1.0 U
	Dibenzo(a,h)anthracene	0.012	MTCA B CAR	1.0 U
	Dibenzofuran	16	MTCA B NCAR	1.0 U
	Fluoranthene	640	MTCA B NCAR	1.0 U
	Fluorene	640	MTCA B NCAR	1.0 U
	Indeno(1,2,3-cd)pyrene	0.12	MTCA B CAR	1.0 U
	Naphthalene	160	MTCA A	1.0 U
	Pentachlorophenol	0.22	MTCA B CAR	10 U
	Phenanthrene			1.0 U
	Pyrene	480	MTCA B NCAR	1.0 U
	Total Benzofluoranthenes	1.2	MTCA B CAR	5.0 U
Calculated Values	cPAH TEQ	800/1000	MTCA A	ND
	Heavy Oils	500	MTCA A	ND
	Xylenes	500	MTCA A	ND

Table 6
Summary of Analytical Results in Groundwater (µg/L)
Cashmere Mill Site, Port of Chelan County
Cashmere, Washington

NOTES:

BOLD = detections.

BTEX = benzene, toluene, ethylbenzene, xylenes by USEPA Method 8021B, modified.

cPAH TEQ = carcinogenic polycyclic aromatic hydrocarbon toxic equivalency quotient.

CUL = cleanup level.

ft bgs = feet below ground surface.

MTCA A = Model Toxics Control Act, Method A, table value.

MTCA B CAR = Model Toxics Control Act, Method B, standard formula value, for carcinogenic compounds.

MTCA B NCAR = Model Toxics Control Act, Method B, standard formula value, for noncarcinogenic compounds.

µg/L = micrograms per liter.

ND = each individual compound result used in the calculated value is non-detect.

NWTPH-Dx = Northwest Total Petroleum Hydrocarbon—Diesel- and Heavy-Oil-Range Organics.

NWTPH-Gx = Northwest Total Petroleum Hydrocarbon—Gasoline-Range Organics.

Shaded = exceeds the groundwater cleanup level.

SVOCs = semivolatile organic compounds by USEPA Method 8270D.

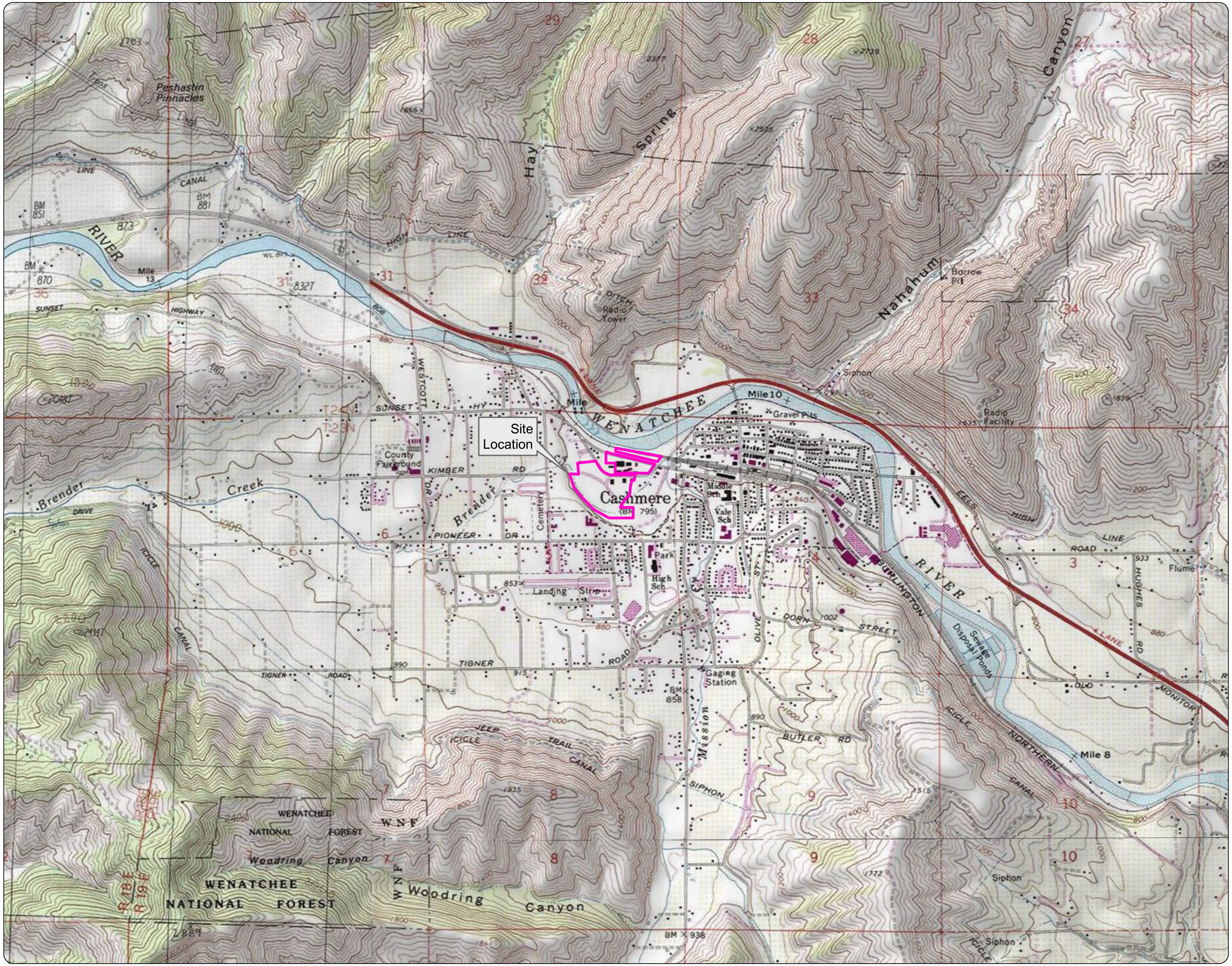
U = analyte not detected at posted method reporting limit.

USEPA = U.S. Environmental Protection Agency.

FIGURES

Figure 1
Vicinity Map

Port of Chelan County
Cashmere, WA



Legend

Site Boundary

Site Address: Sunset Highway, Cashmere, WA 98815
Section 5 of Township 23 North, Range 19 East

0 1,000 2,000
Feet

Source: Topo map acquired from ESRI, Inc., ArcGIS Online; site boundary obtained from RH2 Engineering, Inc.

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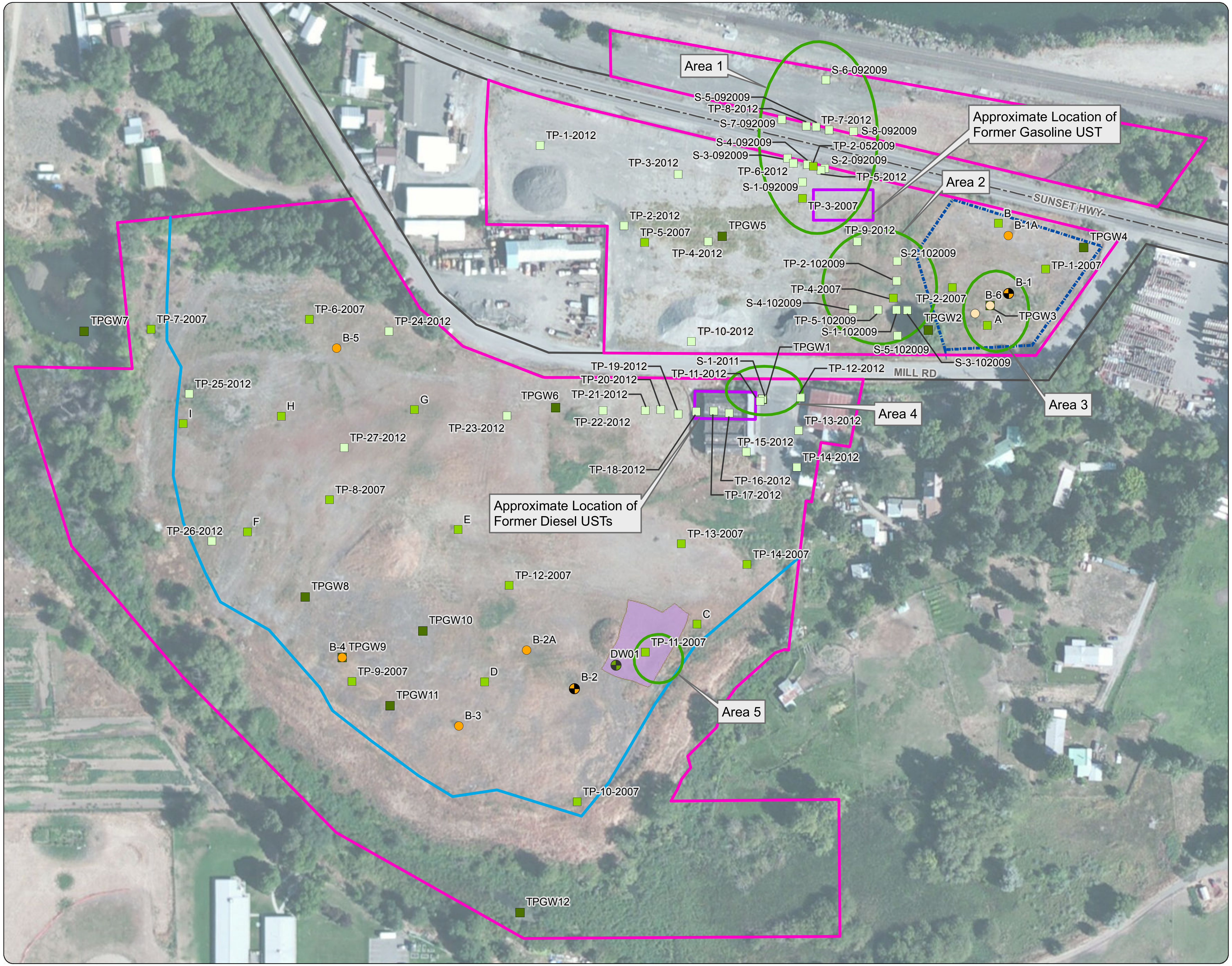
p. 971 544 2139 | www.maulfoster.com

Path: X:\0779.02 Port of Chelan County\Projects\Fig1_Vicinity Map.mxd
Print Date: 3/20/2013
Approved By: H. Hirsch
Produced By: apadilla
Project: 0779.01.02-01

Figure 2
Site Map

Port of Chelan County
Cashmere, WA



Legend

- Highway Centerline
- Road Extent
- 85' Riparian Buffer
- Approximate Location of Former Mill Pond
- Approximate UST Location
- Petroleum Contaminated Soil Area
- Pilot Wood Waste Removal Area
- Site Boundary

RH2 Locations

- Dewatering Well
- Groundwater Level Test Pit
- Geotechnical Test Pit
- Environmental Test Pit

GeoEngineers Locations

- Monitoring Well
- Geotechnical Boring
- Environmental Boring

Notes:
1. Petroleum contaminated soil areas are shown as defined by Removal Action Work Plan.

0 75 150
Feet

Source: Aerial photograph obtained from ESRI, Inc. ArcGIS Online; historical site features and surface elevation data obtained from RH2 Engineering, Inc.

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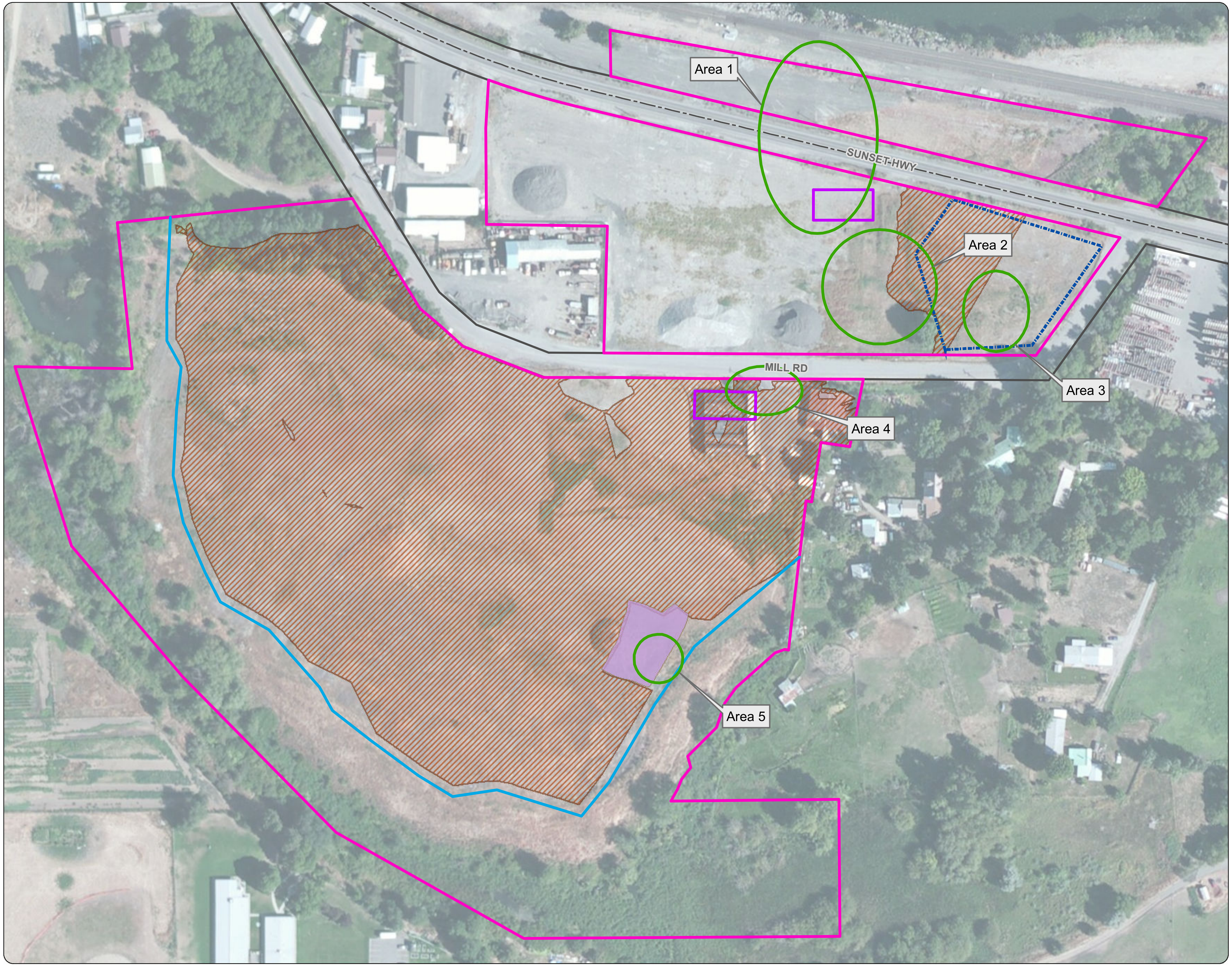
Path: X:\0779.02 Port of Chelan County\Projects\Fig2_Site Map.mxd
Print Date: 3/20/2013
Approved By: H. Hirsch
Produced By: apadilla
Project: 0779.01.02-01

Figure 3
Wood Waste Removal Area

Port of Chelan County
Cashmere, WA



Legend

- Highway Centerline
- Road Extent
- 85' Riparian Buffer
- Approximate Location of Former Mill Pond
- Approximate UST Location
- Wood Waste Removal Area
- Pilot Wood Waste Removal Area
- Petroleum Contaminated Soil Area
- Site Boundary

Notes:
1. Petroleum contaminated soil areas are shown as defined by Removal Action Work Plan.

0 75 150
Feet

Source: Aerial photograph obtained from ESRI, Inc. ArcGIS Online; historical site features obtained from RH2 Engineering, Inc.

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Path: X:\0779.02 Port of Chelan County\Projects\Fig3_Wood Waste Removal Area.mxd
Print Date: 3/20/2013
Approved By: H. Hirsch
Produced By: apadilla
Project: 0779.01.02-01

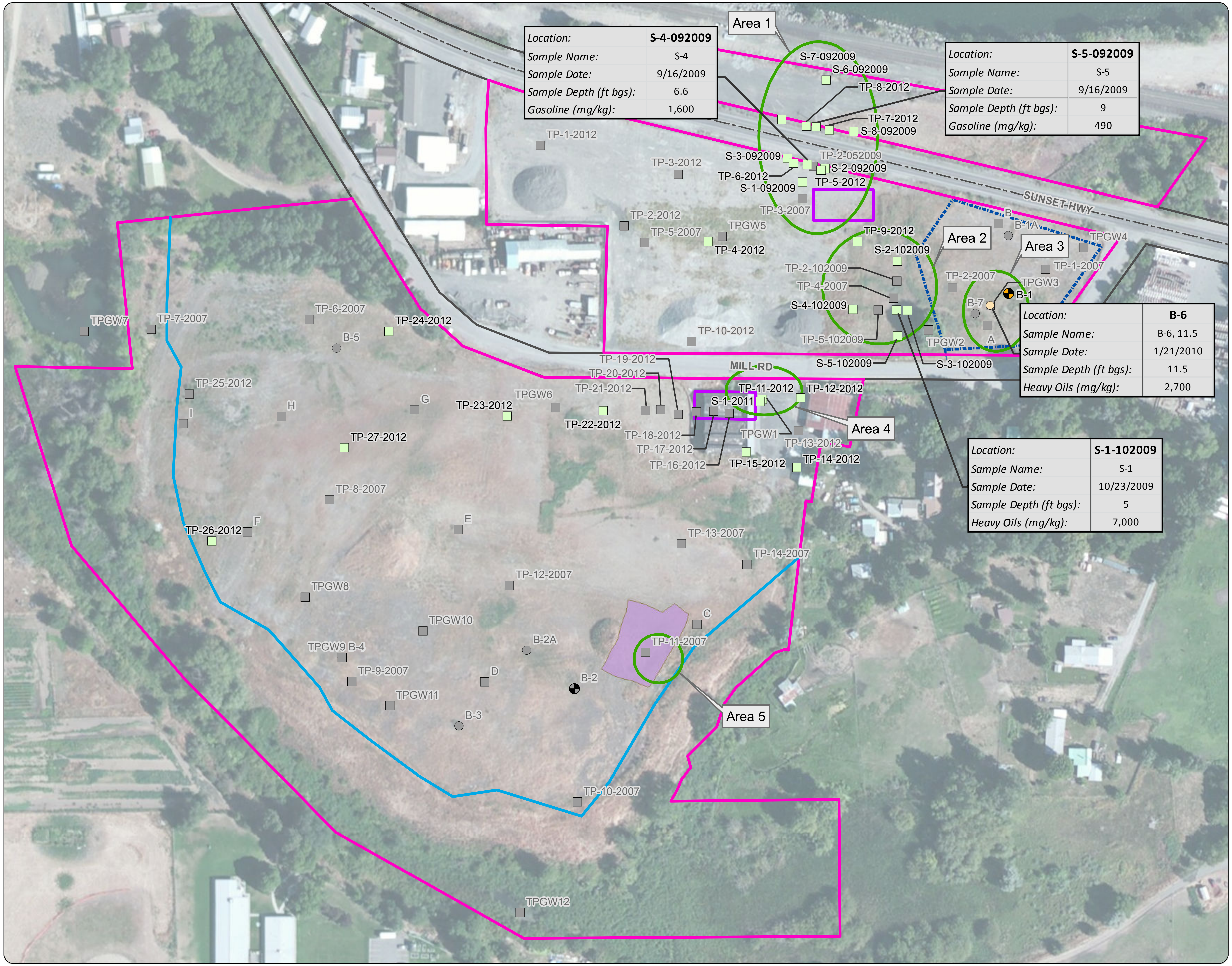

Figure 4
Soil Cleanup Level Exceedances

Port of Chelan County
Cashmere, WA

Legend

- Highway Centerline
- Road Extent
- 85' Riparian Buffer
- Approximate Location of Former Mill Pond
- Approximate UST Location
- Pilot Wood Waste Removal Area
- Petroleum Contaminated Soil Area
- Site Boundary

Sample Location

- Monitoring Well
- Environmental Boring
- Environmental Test Pit

Location Not Sampled

- Monitoring Well
- Boring
- Test Pit

Notes:
1. Petroleum contaminated soil areas are shown as defined by Removal Action Work Plan.
2. Soil with gasoline-range hydrocarbon exceedances in the vicinity of sample locations S-4-092009 and S-5-092009 was removed during the reconstruction of Sunset Highway.

0 75 150
Feet

Source: Aerial photograph obtained from ESRI, Inc. ArcGIS Online; historical site features obtained from RH2 Engineering, Inc.

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Path: X:\0779.02 Port of Chelan County\Projects\Fig4_Soil Cleanup Level Exceedances.mxd
Print Date: 3/20/2013
Approved By: H. Hirsch
Produced By: apadilla
Project: 0779.01.02-01

ATTACHMENT A

PREVIOUS INVESTIGATION REPORTS

890108

FORSGREN
ASSOCIATES / P.A.

August 24, 1990

MORRILL#3\LTR
LYSAKER.LTR

John H. Lysaker
Cedarbrook Lumber Company
21326 Highway #9
Woodinville, WA 98072

Dear John:

Forsgren Associates has completed a Phase 1, Hazardous Waste Assessment on the property located in Section 5, Township 23 North, Range 19 East, W.M., Chelan County, Washington. This property located in Cashmere, Washington, is currently the site of the old W.I. Forest Products Lumber Mill facility.

The purpose of this assessment is to identify as far as possible, what environmental concerns may exist on this property through searching state and local records, interviewing former employees and visiting the site to observe any signs of potential hazardous environmental practices. Areas of concern for a facility of this type would be identifying fuel facilities used for trucking operations, identifying areas of storage for fuel and lubrication oils, identifying storage for chemicals, identifying waste water systems and observing, as far as possible, the proper function of mechanical equipment at the site.

For all intents and purposes, this site will be evaluated for its operations at the lumber mill facility. Previous to that operation, the property is likely to have been used for agricultural means.

On Friday, August 17th, 1990, I visited the site for the purpose of observing areas for environmental concerns. Prior to my visit, buildings containing asbestos had been identified and had been dealt with by others. During my visit, I focused mainly on contaminated soils and operations at the mill which may have had an adverse environmental impact on the surrounding areas.

Visual observation of the area in general shows that except for the log lay-down area, the vast majority of the property is either covered by asphalt or concrete. Therefore, any substances that may have spilled or leaked onto the surface would not have made their way into the subsurface soils. An existing block building on the southwesterly portion of the property has been used as a repair shop. There is visual evidence that the surface soils surrounding this building have been contaminated with lubrication oils, probably from washing the concrete pads. Adjacent to this building is another smaller building where lubrication oils appear to have been stored. Soils near this facility have also been contaminated on the surface. The extent of the contamination is not expected to exceed six inches.

Throughout the physical facility wherever hydraulic equipment was used, there appears to be residue from hydraulic oil. As stated previously, because these facilities have concrete floors, where the hydraulic fluid has spilled over time, no contamination of the subsurface soils is expected.

Reconnaissance at the site and conversations with former employees show evidence of underground storage tanks which were used as part of a fueling facility on the westerly portion of the property. A specific age of this facility was unable to be determined, however considering the age of the existing building, it can be assumed to be a minimum of 20 years old. The current federal and state regulations regarding underground storage tanks dictate that the condition of the tanks be determined and brought within state and federal regulations and/or removed. As part of the fueling facility assessment, all soils that may have been impacted through the spillage or underground release of fuel oils must be removed and disposed of in an acceptable manner.

Electrical transformers and switch gears which may be present at the site, are the property of the mill owner. Conversations with Chelan County PUD indicate their responsibility ends with electrical equipment that lines Sunset Highway. This electrical equipment is expected to contain hazardous and toxic material. It is recommended that this equipment be disposed of in an acceptable manner.

From my observations, I was unable to determine what the onsite sewage septic system may have been. The location of a septic tank and drainfield were not identified and were assumed to have been used by the last inhabitants of the facility. State and local guidelines have changed since the construction of this plant. Depending on the anticipated use of the property, a new septic system and/or drainfield or sewering into the city facility may be required.

A review of the records kept by the Washington State Department of Ecology indicates that the State does not have record of complaints and/or spills at this location.

Generally speaking, the type of operations at the mill did not generate hazardous waste. It is my understanding that lumber was not treated at this site therefore chemical residue is not anticipated.

This Level 1, Hazardous Waste Assessment has been conducted and is based upon readily available documentation. Sampling of water and soil is beyond the scope of this assessment. No warranties are expressed or implied as part of this Hazardous Waste Assessment. Further investigation will be required to more fully identify what, if any, environmental concerns may exist at this property.

John Lysaker
August 24, 1990
Page 3

If you have any questions, please feel free to contact me.

Sincerely,

FORSGREN ASSOCIATES, p.a.

Scott K Morrill

Scott K. Morrill, P.E.
Project Manager

SKM:rc

RH2 ENGINEERING, INC

http://www.rh2.com

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KITSAP PENINSULA

600 Kitsap Street, Suite 101

Port Orchard, WA 98366

(tel) 360.876.7960

(fax) 360.876.7988

February 7, 2007

Mr. Mark Urdahl
Port of Chelan County
125 Easy Street
Wenatchee, WA 98801

Sent Via: *US Mail*

Subject: Cashmere Mill Site Feasibility Study-Letter Report

Dear Mr. Urdahl:

This report provides a feasibility study of the Cashmere Mill Site for the purposes of determining probable costs and other impacts related to development of the site into mixed commercial and light industrial uses. The costs addressed in this report are costs associated with bringing the condition of the site up to that of a virgin ground site, and do not include development costs, including roads and utilities required to serve the site. It also does not include any frontage improvements, such as curb and sidewalk that might be required as a condition of development.

Introduction and Background

The Mill Pond property consists of approximately 32.5 acres of land. The majority of the land lies south of Mill Road and is bordered on the west and south by Brender Creek. The property is identified by parcel no. 231905110150 and is currently owned by John Lysaker. Mr. Lysaker owns and operates a cedar sauna manufacturing operation on the site.

Geological Conditions

The Mill Site is located in a bend in the former channel of the Wenatchee River. The Wenatchee River was diverted to its current channel, north of the mill site, when the Great Northern Railroad was constructed in the early 1900s. Brender Creek, a perennial Wenatchee River tributary, discharges into the old river channel at the Mill Site.

Groundwater was encountered in test pits at depths ranging from 4 to 13 feet below ground surface. The shallow groundwater table is controlled by Brender Creek and the Wenatchee River and is subject to changes in river levels. This shallow groundwater table will likely affect the ability to construct basements or lower floors on the site.

Approximately 40 percent of the site lies within the 100-year floodplain, 50 percent within the 500-year floodplain, and about 10 percent of the site is not mapped as floodplain.

Local residents indicate much of the region south of Mill Road was formerly occupied by ponds and bogs. Mill operations since the early 1900s produced substantial amounts of wood waste that was used to fill in low-lying areas at the site. Additional fill was imported to the mill site for several decades. Most of the fill observed during geological field work consists of well-preserved wood waste resembling "hog fuel" or granular silt, sand and gravel fill containing wood waste. The region north of Sunset Highway, which was used by the City of Cashmere as a dump site, is reported to be mostly comprised of granular fill with concrete and some asphalt. A substantial amount of concrete is reported to have been dumped in piles above ground in the area south of Mill Road. Snow cover during site visits prevented us from delineating the extent of the concrete pile. Much of the site between Sunset Highway and Mill Road is paved. It is assumed that most of the concrete and paving will need to be removed or crushed and used for fill in order to develop the site. The costs associated with this are included in the attached cost estimates.

In the mid-1990s, sediment in much of the stream channel was excavated to form a large berm over 1,000 feet long that parallels the creek. According to the current property owner, the berm is mostly comprised of gravel. It may be possible to utilize portions of the berm as structural fill to replace the wood waste.

The attached Geological Report **(Appendix A)** provides more detailed information on the geological setting and history of the site, and provides detailed results of the field investigations.

Land Use Conditions

The property has three different zoning designations. The largest portion, south of Mill Road., is zoned Multi-Family Residential. The portion between Mill Road. and Sunset Highway is zoned Commercial/Industrial. The portion north of Sunset Highway is zoned Warehouse Industrial. The property is within the City of Cashmere Urban Growth Boundary and outside the City limits. The site contains wetlands associated with Brender Creek. The wetlands and wetland buffers incorporate approximately 15 acres of the property. These wetlands have not been delineated; their approximate locations are shown in the report prepared in May 2006 by Alliance Consulting. Development is restricted within the wetland buffer zones as follows

- Within the 200 foot buffer, no structures are allowed to be built, except the exemptions in 11.80.020.
- Within the 300 foot buffer, only low intensity land uses are allowed, which include "single family residential and related accessory structures and home occupational uses…"

The potential exists that the Multi-Family Residential zoning could be changed to Commercial/Industrial in the near future. This rezoning has been assumed for this report in determining future transportation and utility demands.

Environmental Issues

A limited Phase I environmental site assessment has been performed and is attached as **Appendix B**. This limited Phase I investigation did not observe indications of soil or ground water contamination at any inspected areas. However, known historical activities may have residual environmental impacts that could not be identified during this limited investigation.

Traffic and Impacts

Existing Conditions

The property is accessed from Sunset Highway and Mill Road. Sunset Highway is a two-lane, asphalt-paved, rural major collector. Mill Road serves the immediate vicinity of the property and is also a two-lane, asphalt-paved road. Neither road has been improved with sidewalks, curb and gutter, or street illumination. The roads are maintained by the City of Cashmere.

A traffic estimate was obtained from the Chelan County Department of Public Works. The most recent estimate from 2002 is that 1,000 average daily trips (ADT) occur on the portion of Sunset Highway from its end at Division Street to a point 1.36 miles west of Division Street. It is assumed that much of this traffic can be attributed to several businesses west of the property along Sunset Highway. At 1.36 miles west of the intersection with Division Street, the estimated ADT on Sunset Highway drops to 350.

The County has no level of service criteria or standards currently in place for Sunset Highway.

Traffic Generated

The type of development at the site will significantly impact the type and amount of traffic generated. Several land use options were mentioned above. For the purposes of this analysis, land use designations were kept very general and the total area of land to be developed was assumed to be approximately 17 acres, due to the wetland buffer restrictions. Traffic was estimated using the Institute of Transportation Engineers Trip Generation Reference, 5th Edition. Additional traffic was estimated at 900 trips per day for General Light Industrial use. It is assumed that 80 percent or more of the traffic (720 trips) will approach the site from the east, due to the population centers of both Cashmere and Wenatchee east of the property.

Traffic Improvements

The County requires that any land development project that will create more than 100 average daily trips include a transportation impact study. The transportation impact study will specifically identify all improvements needed for development. This report is not intended to serve as a transportation impact study; rather, it provides a general overview of potential impacts and potential improvements needed.

Access to the City of Cashmere from US 2/US 97 is provided by three bridges across the Wenatchee River. One of the bridges is west of the subject property and two are to the east. Potential congestion in accessing the site is mitigated by the ability to access the site from both directions. The intersection of Cottage Avenue and Division Street has the potential to become a bottleneck for traffic traveling over the Aplets Way bridge. Also, the addition of 720 trips through the downtown core is not desirable due to impacts on pedestrian safety and additional traffic noise. One alternative would be to use signage to direct traffic to use the Goodwin Road. bridge to avoid the downtown area. Additional options would be to install a traffic signal or channelize the intersections at one or both ends of Mill Road.

Based on the Manual on Uniform Traffic Control Devices (MUTCD), the combined existing and newly-generated vehicular volume do not exceed the minimum needed to warrant a traffic signal. Using the AASHTO Geometric Design of Highways and Streets criteria, the traffic volumes do not appear to warrant channelization where Mill Road. meets Sunset Highway.

Although this report does not anticipate any required roadway improvements, the type of development occurring on this property may have a significant impact on the access improvements required for the development of the site. Uses other than light industrial can create significantly higher traffic volumes than assumed for this report. Once more specific development plans have been developed, a transportation impact study, as well as additional traffic counts, may need to be completed to determine specific impacts. The transportation impact study may find the need for either a signal or for additional channelization to address traffic impacts. A very large retail-type development may require major road improvements off-site; however, it is assumed that these improvements would be required mitigation for that specific development.

Grading

The site has historically been used as a lumber mill. Significant amounts of wood waste from previous mill operations and other types of fill material covers much of the site at varying depths. The attached Geologic Report describes the various types of fill and their approximate locations in more detail. In order to better assess the feasibility of redevelopment of specific parts of the site, the site has been divided into a number of sub-areas based on location and depth of unsuitable materials. This information is provided in **Figure 1**.

The site is generally flat, and major grading and excavation operations required for construction of structures or parking areas would consist of:

1. Clearing and grubbing organic matter;
2. Removing unsuitable fill, including potentially large quantities of wood waste and replacing with structural fill. Also removing and disposing of waste concrete and asphalt. Concrete may be crushed and used for fill; and
3. Light grading to flatten existing irregularities.

Items No. 1 and No. 3 above would be typical for any site development, and specific costs for these items have not been included. For Item No. 2, approximately 60,000 cubic yards of material outside of the wetland buffers are considered unsuitable and would need to be removed and replaced with structural fill in order to support typical building footings. The cost of removal and replacement of this unsuitable material will be on the order of $17 to $20 per cubic yard. There is a potential for some of the wood waste to be processed and resold for landscaping uses as was done at the Peshastin Mill site, which may bring the cost down somewhat. The amounts of unsuitable material for each area are listed in the attached **Table 1**.

Stormwater Management

There are no stormwater improvements currently installed on-site. Stormwater runoff from Mill Road and Sunset Highway is contained by ditches and infiltrates at the shoulders of the roads. Stormwater from existing paved areas and other impervious surfaces on-site flows in sheet flow and infiltrates at the edges of the impervious surfaces. The site is subject to a high groundwater table (at depths between 4 and 13 feet below the surface). Stormwater from impervious surfaces such as roads and parking areas must be treated prior to discharge from the site. Stormwater from building roofs generally does not require treatment. All stormwater must be detained on-site to limit peak flow rates to pre-developed conditions. It is assumed that the County will allow stormwater treatment and detention within the wetland "low intensity" buffer area, provided disturbed areas are revegetated with native plant material.

Utility Availability

Domestic Water

Water Availability

The Mill Pond property lies outside both the City limits and the retail service area. However, it is within the Urban Growth Boundary. The property is currently connected to the City's water system, but development of the property would likely require new connection(s). According to Mark Botello, the City's public works director, the connection is considered an existing connection and the property will continue to be served by the City. The property has a 10 acre-foot water right associated with it, which is currently used to irrigate a portion of the property. The point of diversion is a surface water well of shallow depth. According to Mr. Lysaker, the irrigation system is not connected to the domestic water system.

Existing Water System Infrastructure

The property is currently served by the City's water system. The water main serving the property is old and in poor condition, according to the City. It has required several leak repairs. The existing main in Sunset Highway ends a few hundred feet west of the point where Brender Creek crosses Sunset Highway. A service line runs south across the property from the end of the existing main to the structure housing the sauna manufacturing operation. The service line continues south and serves approximately two residences southeast of the property.

Required Improvements

Development of the site would require replacement of the existing water main in Sunset Highway. The City's Comprehensive Water System Plan indicates the replacement of the existing water main as a planned capital improvement. The total length of the main to be installed is approximately 2,200 feet. The main would run from the intersection of Mill Road and Sunset Highway at the west end to River Street on the east end. The City has identified the size as 16-inch diameter pipe. The majority of the replacement main fronts the property. Replacement of the existing water system on the property would require restoration of the services to the residences currently served by the service line running across the property.

The City has indicated that the water main replacement would be the responsibility of the developer. According to the City's Comprehensive Water System Plan, the estimated cost of the 16-inch main is $394,000 (in 2003 dollars). Construction costs have risen significantly in recent years. It is reasonable to assume a 5 percent per year inflation in costs for water system work. In 2007 dollars, the estimated cost is approximately $479,000. The developer of the property is normally responsible for the portion of the improvements fronting the property. In this case, 1,700 feet of the 2,200 feet of proposed replacement main would be the developer's responsibility. The portion of the $479,000 covered by the developer would be $370,000.

Fire Flow Availability

No recent testing has been done to determine the available fire flow at the site. The most recent fire flow availability estimate is shown in the City's Comprehensive Water System Plan. Based on hydraulic modeling, approximately 1,765 gallons per minute are available at the intersection of Sunset Highway and Paton. Any proposed development will likely require testing or hydraulic modeling to determine the currently available fire flow, as well as the fire flow that will be available upon construction of the required improvements. If the 16-inch replacement main is installed as shown in the City's Comprehensive Water System Plan, the distribution system will be adequately sized to meet the City's maximum requirement of 3,500 gallons per minute. Most proposed developments will require less than 3,500 gallons per minute. Fire flow storage is provided by the 895 Zone and 1114 Zone Reservoirs. Pressure reducing valves allow water from the 1114 Zone to be used in the 895 Zone.

Sanitary Sewer

The City installed two force mains (6-inch and 2-inch diameter) in Mill Road in 2000. The 2-inch force main was installed to handle residential wastewater pumped from customers' individual pumps. The 6-inch force main was designed to handle larger flows from commercial or industrial customers. There are currently no restrictions on connections to the City's sewer system for ordinary residential and commercial wastewater. Industrial wastewater may require pretreatment prior to entering the City's system, depending on the composition of the waste stream. The City's sewer treatment plant may require an upgrade in the near future. However, the upgrade is not related to capacity deficiencies; therefore, the developer will not be expected to fund any portion of the upgrade costs.

Other Utilities

Power is provided by the City of Cashmere and is available at the site. Telephone service is also available at the site. Both services run along Mill Road on overhead poles. According to Mr. Lysaker, there are plans for providing fiber optic service to the area, but it is not yet available.

Costs for Site Rehabilitation

The costs addressed in this report are costs associated with bringing the condition of the site up to that of a virgin ground site, and do not include development costs, including roads and utilities required to serve the site. It also does not include any frontage improvements such as curb and sidewalk that might be required as a condition of development. A range of probable costs is provided. **Table 1** is the worst case cost where all of the unsuitable material would need to be hauled off-site for disposal and replaced with suitable fill from off-site and all of the water line costs are born by the developer. For this case, the rehabilitation cost is approximately $1,480,000, or approximately $89,000 per developable acre. **Table 2** is the best case cost where much of the unsuitable material could be excavated for landscaping uses or used as fill in the wetland buffers, on-site material could be used for fill, and the costs for the water line are deferred or shared. For this case, the rehabilitation costs are approximately $700,000, or approximately $43,000 per developable acre. It is most probable that the actual cost will fall between these extremes, and will probably not be less than $1,000,000 or around $60,000 per developable acre.

The Port may find that they may want to exclude certain sub-areas from development due to the high costs of rehabilitation of those specific sub-areas in relation to their market value. If the three highest cost areas are not considered developable, there are 10.8 acres remaining with rehabilitation costs between $20,000 and $40,000 per acre.

Summary and Recommendations

There are 32.5 acres in the parcel. Of these, 16.7 acres could be developed. The remainder is considered undevelopable due to wetland and wetland buffer constraints. The costs to rehabilitate the 16.7 acres are estimated to be approximately $60,000 per acre. These costs will vary across the site and are generally a function of the amount of wood waste and other unsuitable material that will need to be removed and replaced.

Should the Port decide to proceed with this project, it is recommended that the wetlands and wetland buffers be delineated so that the specific extent of developable land can be determined with more accuracy. We assume that the Port may also want to investigate the marketability of the land, and that may provide more information regarding probable development that could be incorporated into a traffic study. It is also recommended that the Port enter negotiations with the City on the construction of the water line. The Port should also begin to seek funding for the site rehabilitation, as well as the water line construction.

Please feel free to contact us to discuss this analysis and our conclusions and recommendations.
Thank you for the opportunity to be of assistance to the Port of Chelan County.

Sincerely,

RH2 ENGINEERING, INC.

Karen Kornher, P.E.
Project Manager

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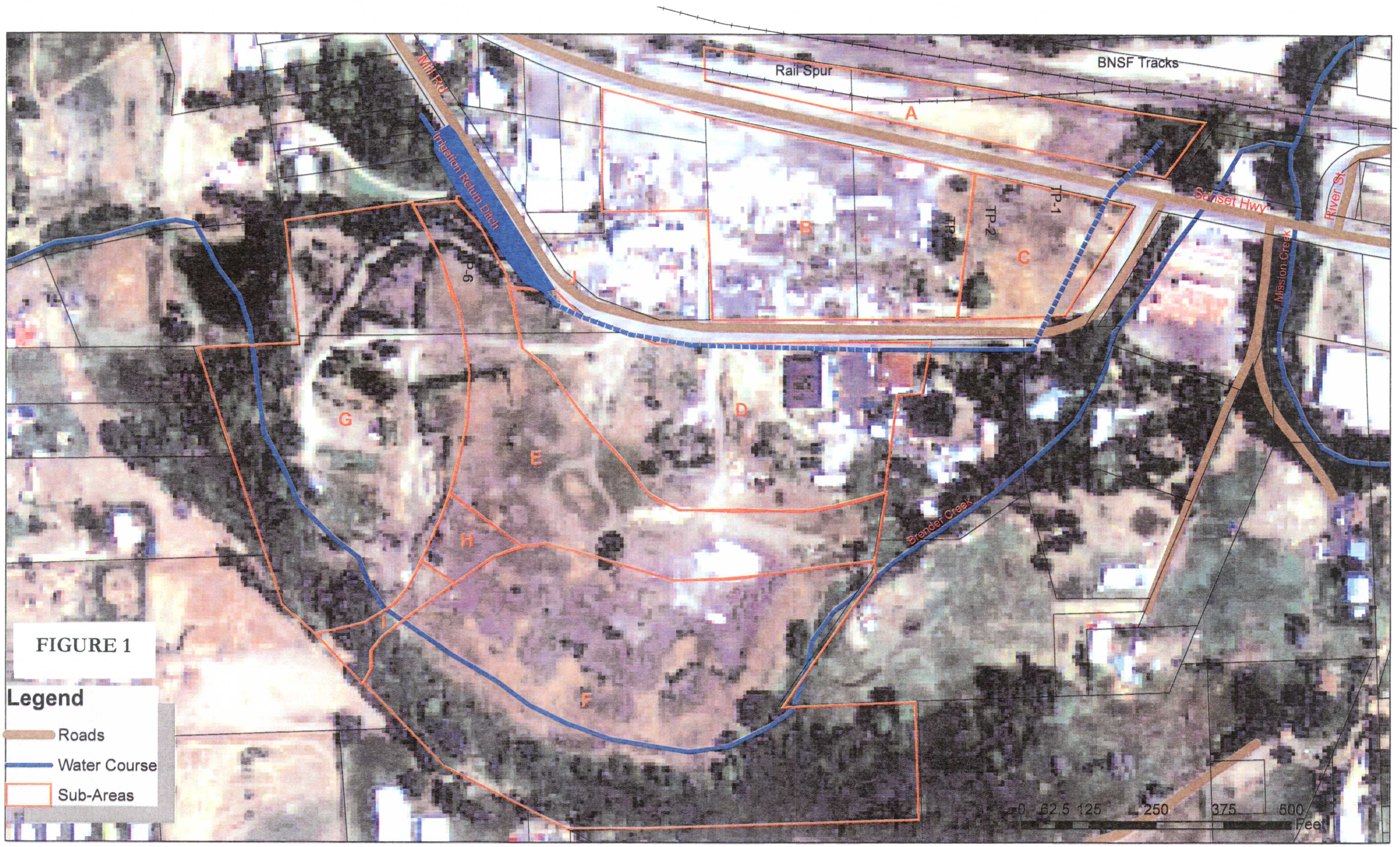
Enclosures: Figure 1 – Sub-Areas
Table 1 – Maximum Costs
Table 2 – Minimum Costs
Appendix A – Geological Report
Appendix B – Environmental Site Assessment



Rail Spur
BNSF Tracks
Mill Rd
Irrigation Return Ditch
A
B
C
D
E
F
G
H
I
J
TP-1
TP-2
TP-6
Sunset Hwy
River St
Mission Creek
Brender Creek
Legend
Roads
Water Course
Sub-Areas
0 62.5 125 250 375 500
Feet

FIGURE 1

TABLE 1
Cashmere Mill Site Sub-Areas Costs per SF
Worst Cast Costs

Sub-area		Export Fill ($10/CY)				Import Fill($7/CY)		Asphalt($10/CY)				Concrete($10/CY)				Water Line (a)		Total Cost	
	(acres)	area (acres)	depth (ft)	volume (yds^3)	cost	volume (yds^3)	cost	area (acres)	depth (ft)	volume (yds^3)	cost	area (acres)	depth (ft)	volume (yds^3)	cost	(acres)		Total Cost	Cost/SF
A	1.8	0	0	0	$0	5,000	$35,000	0	0.0	0	$0	0	0.0	0	$0	1.8	$40,000	$75,000	$0.96
B	4.5	0	0	0	$0	0	$0	4.5	0.2	1,234	$12,342	0.5	0.7	532	$5,324	4.5	$100,000	$117,666	$0.60
C	1.4	1.4	8	18,069	$180,693	18,069	$126,485	0	0.0	0	$0	0	0.0	0	$0	1.4	$31,111	$338,290	$5.55
D	4.5	0	0	0	$0	0	$0	0.5	0.2	137	$1,371	0.8	1.0	1,291	$12,907	4.5	$100,000	$114,278	$0.58
E	4.1	4.1	6	39,688	$396,880	39,688	$277,816	0	0.0	0	$0	0	0.0	0	$0	4.1	$91,111	$765,807	$4.29
F	9.1	0	0	0	$0	0	$0	0	0.0	0	$0	0	0.0	0	$0		$0	$0	$0.00
G	6.0	0	0	0	$0	0	$0	0	0.0	0	$0	0	0.0	0	$0		$0	$0	$0.00
H	0.4	0.4	6	3,872	$38,720	3,872	$27,104	0	0.0	0	$0	0	0.0	0	$0	0.4	$7,778	$73,602	$4.83
I	0.3	0	0	0	$0	0	$0	0	0.0	0	$0	0	0.0	0	$0		$0	$0	$0.00
J	0.4	0	0	0	$0	0	$0	0	0.0	0	$0	0	0.0	0	$0		$0	$0	$0.00
Total	**32.5**			**61,629**	**$616,293**	**66,629**	**$466,405**			**1,371**	**$13,713**			**1,823**	**$18,231**		**$370,000**	**$1,484,643**	**$2.05**
																		Per Acre	$89,168

16.7 Developable Acres

Notes

A Narrow parcel, fill imported from City, 500 feet of rail spur
B Concrete footing and slab for powerhouse, smoke stack, log haul building
C -
D Remove 2 buildings and one mobile home
E -
F 300-ft wetland buffer
G 300-ft wetland buffer
H Narrow
I Narrow and stream setback; considered not usable
J Currently a pond associated with irrigation return ditch - May be able to recover by piping.

(a) Cost of Water Main = $370,000 Divided to developable acres based on area

TABLE 2
Cashmere Mill Site Sub-Areas Costs per SF
Best Case Costs

This low-end estimate assumes that all wood waste and unsuitable fill is utilized in the wetland buffer areas or reused as landscape materials, the excavated berm along the river is used for all imported fill; that all waste concrete is reused for fill; and half of water service costs would be shared.

Sub-area		Export Fill ($4/CY)				Import Fill($4/CY)		Asphalt($10/CY)				Concrete($6/CY)				Water Service (a)		Cost	
	(acres)	area (acres)	depth (ft)	volume (yds^3)	cost	volume (yds^3)	cost	area (acres)	depth (ft)	volume (yds^3)	cost	area (acres)	depth (ft)	volume (yds^3)	cost	(acres)		Total Cost	cost/SF
A	1.8	0	0	0	$0	5,000	$20,000	0	0.0	0	$0	0	0.0	0	$0	1.8	$20,000	$40,000	$0.51
B	4.5	0	0	0	$0	0	$0	4.5	0.2	1,234	$12,342	0.5	0.7	532	$3,194	4.5	$50,000	$65,536	$0.33
C	1.4	1.4	8	18,069	$72,277	18,069	$72,277	0	0.0	0	$0	0	0.0	0	$0	1.4	$15,556	$160,110	$2.63
D	4.5	0	0	0	$0	0	$0	0.5	0.2	137	$1,371	0.8	1.0	1,291	$7,744	4.5	$50,000	$59,115	$0.30
E	4.1	4.1	6	39,688	$158,752	39,688	$158,752	0	0.0	0	$0	0	0.0	0	$0	4.1	$45,556	$363,060	$2.03
F	9.1	0	0	0	$0	0	$0	0	0.0	0	$0	0	0.0	0	$0		$0	$0	$0.00
G	6.0	0	0	0	$0	0	$0	0	0.0	0	$0	0	0.0	0	$0		$0	$0	$0.00
H	0.4	0.4	6	3,872	$15,488	3,872	$15,488	0	0.0	0	$0	0	0.0	0	$0	0.4	$3,889	$34,865	$2.29
I	0.3	0	0	0	$0	0	$0	0	0.0	0	$0	0	0.0	0	$0		$0	$0	$0.00
J	0.4	0	0	0	$0	0	$0	0	0.0	0	$0	0	0.0	0	$0		$0	$0	$0.00
Total	**32.5**			**61,629**	**$246,517**	**66,629**	**$266,517**			**1,371**	**$13,713**			**1,823**	**$10,938**		**$185,000**	**$722,686**	**$1.00**
																		Per Acre	$43,405

16.7 Developable Acres

Notes

A Narrow parcel, fill imported from City, 500 feet of rail spur
B Concrete footing and slab for powerhouse, smoke stack, log haul building
C -
D Remove 2 buildings and one mobile home
E -
F 300-ft wetland buffer
G 300-ft wetland buffer
H Narrow
I Narrow and stream setback; not usable
J Currently a pond associated with irrigation return ditch - May be able to recover by piping.

(a) Cost of Water Service = $185,000

APPENDIX A
GEOLOGY REPORT

INFORMATION ON SITE GEOLOGY, EXPLORATORY EXCAVATIONS AND GEOTECHNICAL ENGINEERING ISSUES

PORT OF CHELAN COUNTY

CASHMERE MILL SITE (CEDARBROOK) FEASIBILITY STUDY

Prepared by RH2 Engineering
for the Port of Chelan County
January 2007

This report is based on published studies and site visits, including exploratory excavations.

RH2 Project: 204068-01-156

RH2 ENGINEERS PLANNERS SCIENTISTS
Bothell
East Wenatchee
Port Orchard
Bellingham
Tacoma

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1.0 BACKGROUND

The Cashmere Mill site is located along Mill Road and Sunset Highway, immediately south of a railroad embankment west of the City of Cashmere (see Figure 1). The northern boundary of the property, along the railroad tracks, is less than 100 feet from the Wenatchee River. Construction of the Great Northern Railroad in the early 1900s resulted in a realignment of the Wenatchee River from a natural channel through the present property boundaries. Before 1900, the Wenatchee River flowed about 1,000 feet farther south through the mill site and the site was entirely within the river's channel migration zone. The river entered the mill property from the northwest, turned through a sharp bend (meander) within the site and left the site flowing to the northeast. Extensive filling and grading has created the present ground surface.

Brender Creek, which now flows within the mill property in a long curving channel about 100 feet north of the southern property line, flowed directly to the Wenatchee River prior to construction of the railroad. Brender Creek's year-round flow around the mill site has raised the local groundwater table and helped create hydrologic conditions favorable for establishing wetlands. Brender Creek drains about 8 square miles and discharges to Mission Creek about 150 feet from the northeast corner of the property. Mission Creek lies east of the site, drains 79 square miles and discharges into the Wenatchee River approximately 800 feet east-northeast of the northeast corner of the mill site.

An irrigation return ditch flows about 1,000 feet from west to east along the southern shoulder of Mill Road. The ditch is open near the western boundary of the mill site, where it forms a small pond. From there, the water flows in a culvert for approximately 600 feet. The ditch is open for about 180 feet along Mill Road near the current Cedarbrook shop. Near the eastern boundary of the property, water enters a culvert that crosses Mill Road and flows approximately 500 feet to discharge into Brender Creek. The ditch is open for about 6 feet before re-entering a culvert beneath Sunset Highway.

In the mid-1990s, the property owner undertook a conservation effort in cooperation with the Washington Department of Fish and Wildlife and Chelan County Conservation District to enhance aquatic habitat in over 2,000 feet of Brender Creek. This effort required sediment in the stream channel to be excavated, which resulted in a large berm that parallels the creek. The berm is approximately 10 feet high, 60 feet wide and 1,000 feet long. Most of it lies within the 300-foot buffer associated with two Class I National Wetlands Inventory listed wetlands. According to the current property owner, Mr. John Lysaker, the berm is mostly comprised of gravel.

Regional Geology

The geology of the Cashmere area has been mapped by Tabor et al. (1987)(**Figure 2**). Their work indicates that the main geologic units exposed in the vicinity of the mill are unconsolidated Quaternary glacial and alluvial sediments and sedimentary bedrock of the Chumstick Formation. The Eocene Chumstick Formation underlies most of the Cashmere area and uplifted and folded beds of its sediments are visible in the hills north and south of Cashmere. This bedrock is described as white to buff-grey sandstone, shale and conglomerate. The closest mapped outcrop from the mill site is across the Wenatchee River, where Highway 2 has been cut through exposed bedrock.

A northwest-trending high angle fault is located a few hundred yards north of Highway 2. This fault forms a contact between the Chumstick formation and late Cretaceous Swakane biotite gneiss that is present only on the north side of the Wenatchee River.

More than 40 times during the most recent glacial period (20,000 to 13,000 years ago), catastrophic glacial outburst floodss inundated most of the Columbia basin including the Columbia River valley. After many of these floods, flood waters were impounded by a massive gravel bar located downstream from Wenatchee, near the mouth of Moses Coulee Dam. This temporary dam created a large lake within the Columbia River valley that extended well into its tributary valleys, including the Wenatchee River. Pleistocene bedded silt deposits, described by Tabor et al. (1987) as ranging from very fine sand to clay with distinct interbeds and ice-rafted dropstones, were deposited in the relatively low-energy environment of the temporary glacial lake. Bedded silt deposits are mapped within 1 mile of the mill site.

Pleistocene terrace gravels, described as moderately sorted cobble to pebble gravel, form much of the relatively flat-lying land surface in the Cashmere area. The melting of alpine glaciers that advanced down the upper Wenatchee River valley during the last two glacial periods (between 150,000 and 130,000 years ago and also between 20,000 and 13,000 years ago), resulted in much larger flows in the Wenatchee River; the formation of braided outwash channels; and the transport of large volumes of sediment to the lower valley, partially filling the valley bottom with a broad plain of gravelly outwash. As the glaciers receded, the volume of sediment decreased and the Wenatchee River began to incise a channel into the outwash plain, leaving the gravel terraces perched 20 feet or more above the modern river channel. The Wenatchee River has meandered in this outwash plain, broadening its floodplain and depositing sediment. These Holocene and Pleistocene alluvial deposits of the Wenatchee River are described as moderately sorted cobble gravel. They grade into poorly sorted gravelly sands deposited in the alluvial fans of tributaries of the Wenatchee River like Mission Creek.

Products

This report documents the findings of the limited geologic evaluation and addresses all known issues for protecting life, health and property resulting from RH2's geologic assessment. This report is limited by the availability of published geologic information, site historical documents, the statements of persons currently and formerly associated with the subject property, and the observations made during a site inspection.

2.0 METHODS

A limited geologic evaluation was conducted to preliminarily characterize geologic, geotechnical and hydrogeologic conditions potentially affecting constructability at the mill site. Information was obtained from published geologic, soils, hydrologic and seismic reports, as well as anecdotal accounts from persons having local knowledge of the site. Based on the outcome of the limited geologic evaluation, RH2 conducted a targeted field investigation of the site including soil test pits to examine groundwater levels and the suitability of the earth for the construction and support of new structures.

Two site visits were conducted (December 19, 2006 and January 15, 2007). The first site visit was to interview the property owner while touring the site and to establish the ground truth of existing information. The purpose of the second visit was to excavate test pits to explore the subsurface environment. Approximately 12 inches of snow was on the ground during both site visits and temperatures ranged from 25 degrees during the first site visit to 10 degrees on the second site visit.

Fourteen test pits were excavated on January 15, 2007 using a Hitachi 22-ton excavator owned by Michael Irrigation of Cashmere (**Figure 1**). RH2 geologic staff determined the locations of test pits with assistance from a long-time City of Cashmere Public Works Department employee with a good familiarity with the site. The locations of test pits were selected to achieve an even spatial distribution throughout the site, taking into consideration that the region within 300 feet of listed wetlands will likely be regulated so that development is limited. A large portion of the ground surface between Mill Road and Sunset Highway is covered by asphalt and the concrete floor slabs and footings of the former mill buildings. To the extent possible, test pits in this part of the property were excavated where asphalt and concrete were absent. No test pits were attempted in the narrow lots north of Sunset Highway due to low-hanging power lines and limited access. No test pits were attempted in the portion of the site located south of Brender Creek. Test pits were excavated in the lots located south of Mill Road, and where asphalt, existing buildings, piles of dumped concrete and utilities were not present. These encumbrances were mostly located in the region immediately south of Mill Road.

Bill Sullivan of RH2 observed the excavations, described the materials encountered, recorded soil logs, collected samples (as necessary) and determined the required depth to complete each excavation. The excavations were not shored and were too deep for Bill to safely enter. Material was examined at the surface and photographs were taken. Below average air temperature caused steam to rise from the test pits that can be seen in many photographs. Most test pits were completed at depths where RH2 staff determined the excavations had reached undisturbed native sediments. Where test pits did not reach native material, excavation was stopped at a depth of about 12-to-13 feet, which was the limit of the excavator's reach.

The location of each test pit was marked in the field using an aerial photo of the site. Because no survey data were available, the land surface across the site was assumed to be flat. Although the site appears flat, this is a significant assumption and the test pit data may need to be tied to survey data to better support future site development plans. Each test pit was entered into ArcMap GIS and soil log data were used to assign a depth to native material at each test pit location. A triangular irregular network (TIN) was created using GIS to represent the surface of native material beneath the site. Linear contours were created from the TIN. A shaded relief map of the surface of the native material was also developed using ArcMap's inverse-distance weighted statistical techniques. These two interpretations (TIN contours and shaded relief) were displayed on a single map. The volume of wood waste fill and fill containing organic matter was estimated by examining the depth and area occupied by wood waste fill lying outside of the wetland buffer.

3.0 RESULTS

Test Pit Observations

A soil log was kept for each test pit (**Table 1**). The surface formed by the contact of native Wenatchee River alluvium and overlying material such as fill, will be referred to as the top of the alluvium. Locations of all test pits and a representation of the top of the alluvium are shown in **Figure 3**.

Test Pits 1 and 2 are located at the site of a former mill pond. Test Pits 1 and 2 reached depths of 12 and 13 feet, respectively and native alluvium was not encountered.

Test Pit 4 is located among concrete footings near the location of the former smokestack and the building used to retrieve logs from the mill pond. Test pit 4 was abandoned in fill at a depth of 3 feet when an unexpected pipe was encountered (the pipe was not damaged).

Test Pit 3 is located at the site of the former mill office and Test Pit 5 is located near the site of the former planer building. Test Pits 3 and 5 encountered native alluvium at depths of less than 1 foot to 3 feet, respectively.

Test Pits 6 through 14 are located south of Mill Road, in areas that were lightly used or used primarily for log storage. Test Pits 7, 12, 13 and 14 encountered native alluvium at depths of 4 feet or less. Test Pits 6, 8, 9, 10 and 11 encountered native alluvium at depths ranging from 6-to-13 feet. Fill in Test Pit 6 contained red bricks and an automobile wheel. In test Pits 6 and 12 the native alluvium contained thin (less than 1-foot thick) organic layers of roots or peat. Gravel with numerous small roots was found in Test Pit 9.

Silty fine sand was encountered in Test Pit 10 at a depth of 8 feet and grey silt clay was encountered at a depth of 13 feet in Test Pit 11. These sediments are finer grained than the native alluvium observed in other test pits. Coarse grained sediments underlying silty fine sand and silt clay in Test Pits 10 and 11 indicate these fine grained sediments could have been deposited onto the former Wenatchee River bed by Brender Creek and adjacent wetlands since the early 1900s. Regardless of their origin, test pit observations indicate lenses of relatively fine grained sediments are likely thin (1 to 3 feet thick) and not laterally extensive.

Site Geology

Pleistocene Deposits

The mill site is located in a bend in the former channel of the Wenatchee River. Geologic mapping (Tabor et al., 1987) indicates and test pits confirm that greater than 80 percent of the site is alluvium deposited by the Wenatchee River (**Figure 2**). The river bend was cut into an outwash terrace, forming a cut bank approximately 20 feet high south of Brender Creek. The outer edge of the river bend experienced the most energetic flows of the Wenatchee River and therefore, were scoured deeper than the inner regions of the bend. This was confirmed by test pit observations that indicate the alluvial surface is lower toward the outside of the bend (**Figure 4**). Geologic mapping (Tabor et al., 1987) indicates the terrace is comprised of glacial outwash gravels. These older gravels occupy less than 20 percent of the site (**Figure 2**). Because alluvium was deposited as the river channel incised the surrounding terraces, these outwash gravels might underlie alluvium in some places.

However, similarities in lithology between alluvium and terrace gravels make it difficult to differentiate these units in the field.

Modern Deposits

Brender Creek flows across the mill site on top of the former river bed. The creek flows along the base of the river cut bank probably because this is the deepest part of the former river bed. Local residents indicate much of the region south of Mill Road was formerly occupied by ponds and bogs. The presence of these water features was likely the result of water from Brender Creek and shallow groundwater filling the deeper areas of the outer bend in the former river channel. Fine grained sediments containing substantial organic material were observed overlying alluvium in several test pits. These deposits may be associated with creek, ponds and bogs that occupied the area since the early 1900s until they were filled at various times throughout the twentieth century.

Fill

Mill operations produced substantial amounts of wood wastes that were used to fill in low-lying areas at the site. Additionally, interviews with several long-time Cashmere residents and the current owner indicate that fill was imported to the mill site for several decades. There are three primary areas that received fill: 1) south of Mill Road in the log storage area, 2) the mill pond north of Mill Road; and 3) the area north of Sunset Highway. In most places, fill was dumped directly on top of Wenatchee River alluvium. However, sediments were deposited by Brender Creek and in associated ponds since the early 1900s along the southern boundary of the mill site. Fill in this region likely overlies thin layers of these modern sediments.

Field observations indicate that the composition of the fill falls into four broad categories: 1) wood waste (**Figure 5**); 2) granular fill (sand, silt and gravel) with organic material, including logs; 3) granular fill (**Figure 5**); and 4) fill containing concrete or other building materials. Most of the fill observed during field work consists of well-preserved wood waste resembling "hog fuel" or granular fill containing wood waste. In Test Pit 1, about 5 feet of granular fill was observed overlying wood waste (**Figure 5**).

Concrete and other building materials were not observed in test pits (expect some red bricks in Test Pit 6). However, conversations with the owner and locals, including a long-time City of Cashmere employee, indicate the region north of Sunset Highway, which was used by the City of Cashmere as a dump site, is mostly comprised of granular fill with concrete and some asphalt (Holstrum, personal communication, 2007). A substantial amount of concrete is reported to have been dumped in piles above-ground in the area to the southwest of the dry kiln building. Snow cover during site visits prevented a delineation of the extent of the concrete debris.

Excluding the region inside the 300-foot buffer for classified wetlands and the region north of Sunset Highway, the total area occupied by fill at the mill site is estimated to be 5.9 acres (**Figure 3**). Using the contoured surface of the top of the alluvium in **Figure 3**, the average thickness of fill was estimated to range between 6 and 8 feet. Using these parameters, the total volume of fill is estimated to be greater than 61,000 cubic yards.

Engineering Geology

The entire region south of Brender Creek lies within the 300-foot wetland buffer. The land in this area is either flat, low-lying wetland or part of the slope of the bank that was formed by the Wenatchee River. The slope of the cut bank is about 4H:1V. This slope is not considered to be a landslide hazard; however construction on such a slope would be more expensive than on flat ground.

Flood Hazards

The mill site is surrounded on nearly all sides by rivers, streams and ditches that will flood. Approximately 40 percent of the site lies within the 100-year floodplain, 50 percent within the 500-year floodplain and about 10 percent of the site is not mapped as floodplain. Most of the region not mapped as floodplain is located on the outwash terrace to the south of Brender Creek.

Accounts from a long-time local resident and former Chelan County Port Commissioner recall only one time, in 1948, when the mill site was flooded (Stoltenberg, personal communication, 2006). Water from the Wenatchee River backed up through culverts beneath the railroad and inundated the mill with about 1 foot of water. It should be noted that Wenatchee River flood stages higher than the 1948 event occurred on two to three occasions in the 1990s with no accounts of flooding at the mill site. Mr. Stoltenberg also stated that he is not aware of any flooding of the site by Brender or Mission creeks and no indication of flooding at the mill from either creek was revealed during this assessment. Brender Creek drains a relatively small area. A small sediment pond, located near the southwestern corner of the mill site, has an area of approximately 1 acre. The water level in this pond is close to the grade of the mill site. Two areas where Brender Creek could pose a flooding hazard are near the sediment pond and along the east end of Mill Road, especially if flow backed up due to flooding in Mission Creek or the Wenatchee River.

Mission Creek drains a relatively large area. The creek is not known for flooding, possibly because the north-facing slopes in the relatively large drainage are subject to slower snowmelt rates. Mission Creek reached a peak flow of 123 cubic feet per second on May 19, 1955.

The site is not listed by Chelan County Natural Resources Department as a Wenatchee River Channel Migration Zone.

Groundwater

Groundwater was encountered in 8 of 14 test pits at depths ranging from 3-to-13 feet below ground surface. The shallow groundwater table is controlled by the Wenatchee River and is subject to changes in river levels. The elevation of groundwater at the site is higher than the water level in the Wenatchee River, in part, because subsurface flow associated with Brender and Mission creeks is superimposed on or mounded upon the regional groundwater associated with the Wenatchee River. Groundwater levels will fluctuate seasonally. High flows in the Wenatchee River and the two creeks will result in elevated groundwater levels at the site. These conditions could result in localized "groundwater flooding" of low-lying areas and will decrease the soil's capacity to infiltrate stormwater. Groundwater flow directions were not established but are estimated to be generally sub-parallel or perpendicular to the existing Wenatchee River channel. Piezometers should be installed on site prior to any determination of the suitability of areas for alternative stormwater systems.

Seismic Hazards

The low-lying area north of Brender Creek is mapped as having high liquefaction susceptibility Washington Department of Natural Resources (WADNR, 2007), corresponds to the region of the geologic map shown as alluvium (**Figure 2**). The region on the geologic map shown as terrace gravels is shown on the seismic hazard map as having low liquefaction susceptibility. Liquefaction can be increased by the presence of fine grained materials such as silts and sands, especially when fine-grained sediments are saturated. However, liquefaction susceptibility is usually low in poorly sorted materials similar to the cobbly gravel that comprises most of the alluvium on-site. Therefore, most of the site likely has low-to-moderate liquefaction susceptibility, except where fine grained or organic materials are present. Thin lenses of fine grained material were observed along the southern boundary of the mill site in Test Pits 10 and 11, indicating that liquefaction susceptibility is likely higher in this portion of the site.

4.0 SUMMARY

Nearly all usable land lies north of Brender Creek. The area south of Mill Road contains substantial fill that thickens to the south. Fill is deepest where the mill pond was once located, on the east side of the property between Mill Road and Sunset Highway. Test pits indicate wood waste underlies granular fill at this location to depths exceeding 13 feet. Average fill thickness throughout the site is estimated at 8 feet for the region lying outside of the wetland buffer (5.9 acres)(**Figure 3**). The volume of fill is estimated to be greater than 61,000 cubic yards. Most of this fill is wood waste and granular fill containing wood waste. In most cases, neither of these materials are suitable for directly supporting building foundations. If the organic content is low, some granular fills can be compacted to make suitable material for foundation subgrades, but wider footings or a system of piles may be needed on these subgrades to achieve required bearing capacities.

Native alluvium underlies most of the mill site. This gravelly material is suitable for foundation subgrades. Locations that were occupied by mill buildings and asphalt generally correspond with areas where native alluvium lies near the surface. Native alluvium lies near the surface in most of the region north of Mill Road and in the region immediately south of Mill Road (region in blue in **Figure 3**). However, large quantities of asphalt and concrete are also present in these areas and these materials may need to be removed or pulverized. More than 5 acres are covered by asphalt, concrete and existing buildings.

Silty fine sand and silt clay were observed in two test pits near the southern portion of the site. These thin (1-to-3 feet thick) layers of organic-rich fine grained materials were likely deposited by Brender Creek and in associated wetlands since the early 1900s. Fluvial depositional environments are complex and localized lenses of fine grained sands, silts or clays could be present at any location beneath the mill site. However, fine grained lenses should be relatively thin and not laterally extensive.

The entire region north of Brender Creek has been mapped as having high liquefaction susceptibility (WADNR, 2007). This is not supported by field observations that establish that poorly sorted cobble gravel, which typically has low liquefaction susceptability, is the most common geologic material. Liquefaction susceptibility will be greater in areas underlain by saturated fine grained or orgnic sediments, for example, near Borehole 10 and 11.

The risk of flooding is significant because the site is located in a former river bed and surrounded on three sides by water courses. Nearly all of the land north of Brender Creek lies in the 500-year floodplain and almost half lies within the 100-year floodplain. Groundwater is located from 3-to 13-feet beneath ground surface. The shallow groundwater table will increase construction costs and liquefaction susceptibility in areas having fine grained soils.

There are no erosive soils and no landslide hazards associated with this site.

5.0 RECOMMENDATIONS

Given the geologic site conditions described in this report, the following are our recommendations.

- Any prospective development should include, as part of its design, a site-specific geotechnical investigation for each structure involving geotechnical drilling to confirm the depth of unsuitable fill and geotechnical testing to confirm the suitability of geologic materials and to provide design parameters.
- Plans to process or dispose of unsuitable fill should be capable of dealing with wood waste fill, as well as lesser amounts of building materials such as concrete and asphalt.
- Due to the shallow groundwater table, stormwater facilities should be designed to emphasize treatment storage rather than infiltration of runoff. Piezometers should be installed to provide groundwater level fluctuations for stormwater system and foundation designs.

6.0 REFERENCES

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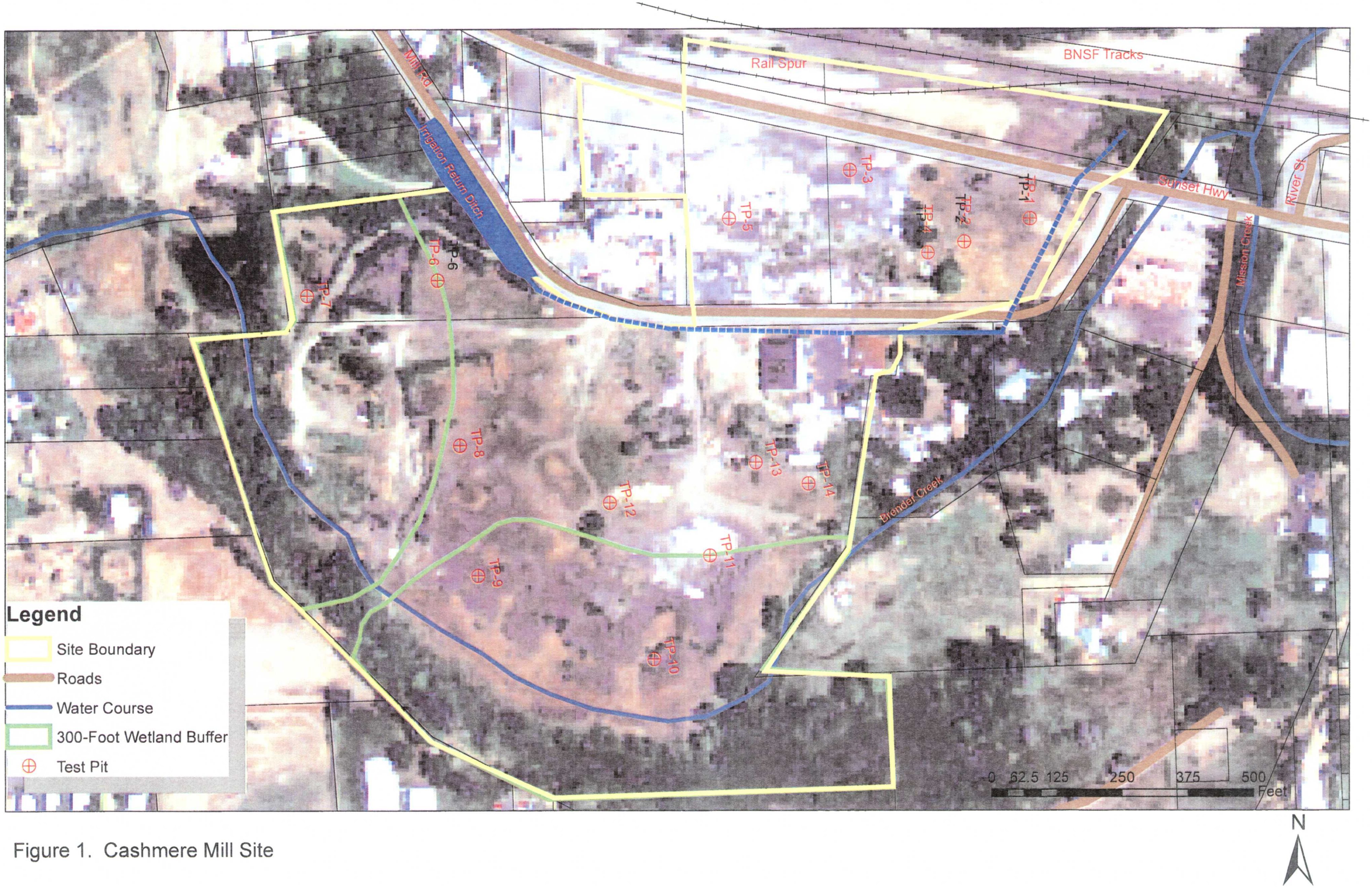

Figure 1. Cashmere Mill Site

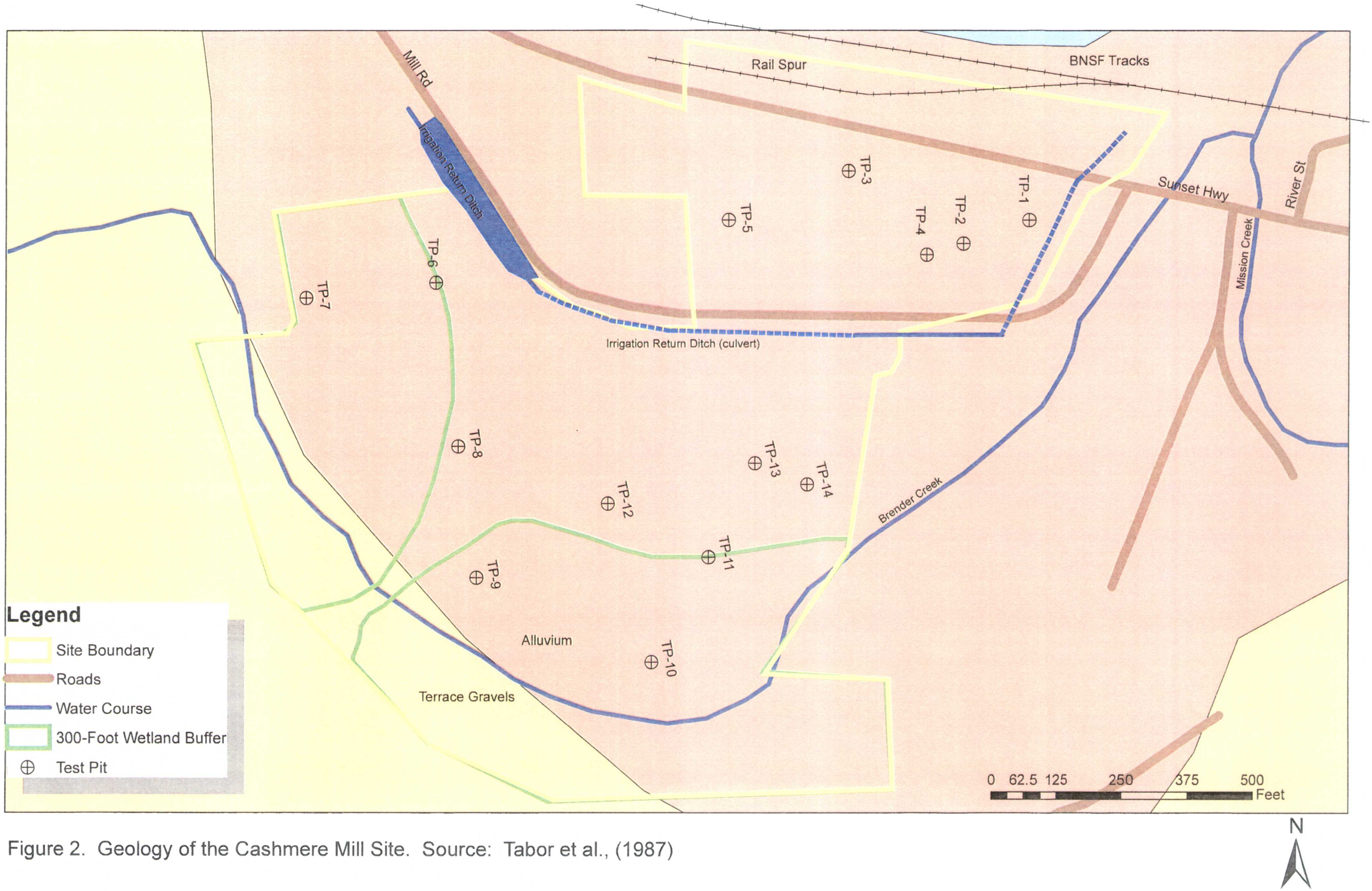

Figure 2. Geology of the Cashmere Mill Site. Source: Tabor et al., (1987)

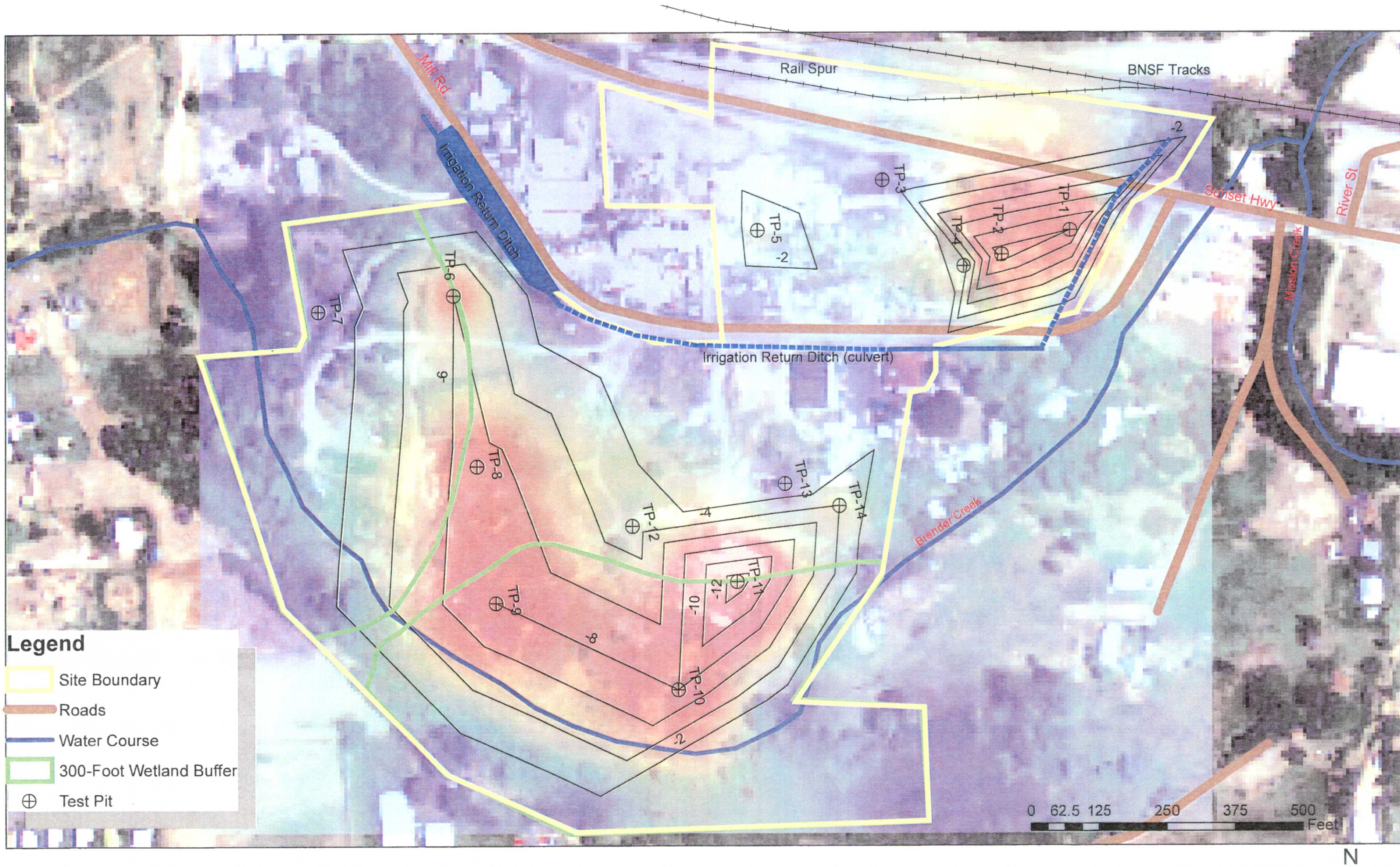

Figure 3. Thickness of Wood Waste Fill, Cashmere Mill Site, 2007.

Figure 4. Alluvium consisting of poorly sorted sand, gravel and cobbles in Test Pit No. 3, located at the former site of the mill offices, approximately 50 feet south of Sunset Highway. Depth of test pit is 6 feet. Groundwater was encountered at a depth of 6 feet.

Figure 5. Imported soil overlying wood waste fill in Test Pit No. 1 located at the former site of the mill pond, near the intersection of Mill Road and Sunset Highway. Depth of test pit is 12 feet. Groundwater was encountered at a depth of 11 feet.

Table 1. Soil Log for Test Pits, (TP) Cashmere Mill Site

TP-1 15-Jan-07 — Corner of Mill Rd and Sunset

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown sand, gravel, cobbles, round	TP-1	0950
5.0	FILL	wood waste and sawdust		
7.0	FILL	dark silty sand, gravel, cobbles		
9.0	FILL	wood waste and sawdust		
11.0	FILL	water		
12.0	FILL	dark silty sand, gravel, cobbles with logs		

TP-2 15-Jan-07 — 50 ft N of "well"

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown organic material	TP-2	1020
3.0	FILL	grey silty sand, grave, cobbles w/ clay		
13.0	FILL	water		

TP-3 15-Jan-07 — Site of old office along Sunset

Depth (feet)	Material	Description	sample	time
0.0	ALLUVIUM	brown-grey sand, gravel, cobbles	NA	1040
6.0	ALLUVIUM	water		

Table 1. Continued

TP-4 Site of old smokestack
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	brown silty sandy gravelly fill	NA	1100
3.0	FILL	brown silty sandy gravelly fill-stop due to unexpected water line (likely abandoned)		

TP-5 Near western property line, N of Mill Rd
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	pavement, dark brown, sand, gravel, silt w/organics		1110
3.0	ALLUVIUM	brown sand, gravel, cobbles		
4.0	ALLUVIUM	water		
5.0	ALLUVIUM	brown sand, gravel, cobbles		

TP-6 Middle of open area in NW corner of lot S of Mill Rd
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown-black silty wood waste, bricks, car parts		1130
6.0	ALLUVIUM	grey sand, gravel, cobbles w/ roots, water		
8.0	ALLUVIUM	grey sand, gravel, cobbles		

Table 1. Continued

TP-7 NW corner of lot, along sediment basin pond on Brender Cr.
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	ALLUVIUM	brown sand, gravel, cobbles		1145
4.0	ALLUVIUM	brown sand, gravel, cobbles		

TP-8 E of trailer, S of hockey rink in NW corner of lot S of Mill Rd
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark silty sand, gravel, cobbles		1202
7.0	ALLUV/FILL	dark silty sand, gravel, cobbles, water		

TP-9 200 ft SW of Shangri-la, 100 ft N of Brender Cr.
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark wood waste		1209
8.0	ALLUVIUM	grey silty sand, gravel, cobbles w/ small organics (roots)	TP-9	

Table 1. Continued

TP-10 Southern most bend in Brender Cr, 50 ft N of berm
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	wood waste and sawdust	TP-10	1226
8.0	ALLUVIUM	grey silty fine sand w/ clay		
10.0	ALLUVIUM	water		
11.0	ALLUVIUM	grey silty fine sand w/ gravel		

TP-11 S edge of existing excavated pit, below 6-ft high cut face in wood waste, SW corner of property
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	wood waste	TP-11	1240
13.0	ALLUVIUM	grey clay		
14.0	ALLUVIUM	grey clay and gravel		

TP-12 100 ft S of water meter in lot S of Mill Rd
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark silty sand, gravel and wood waste	TP-12	1300
3.0	ALLUVIUM	grey silty sand and gravel w/ conglomerate and peat layers 0.5-1.0 ft thick		
8.0	ALLUVIUM	water		
9.0	ALLUVIUM	sand, gravel, cobbles		

Table 1. Continued

TP-13 100 ft W of single wide trailer
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	ALLUVIUM	brown sand, gravel, cobbles		1316
3.0	ALLUVIUM	brown sand, gravel, cobbles		

TP-14 50 ft S of single wide trailer
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown sand, gravel, cobbles w/organics		1320
4.0	ALLUVIUM	brown-orange sand, gravel, cobbles with foreset beds		
5.0	ALLUVIUM	brown-orange sand, gravel, cobbles with foreset beds		

APPENDIX B
LIMITED ENVIRONMENTAL ASSESSMENT
PORT OF CHELAN COUNTY

CASHMERE MILL SITE (CEDARBROOK) FEASIBILITY STUDY

Prepared by RH2 Engineering
for the Port of Chelan County
January 2007

RH2 Project: 204068-01-156

1.0 INTRODUCTION

RH2 Engineering, Inc. (RH2) conducted a limited environmental assessment to evaluate site conditions potentially affecting environmental liability at the Cashmere Mill Site currently owned by Mr. John Lysaker of the Cedarbrook Company. This report documents the findings of the limited environmental site assessment and is limited to the availability of site historical documents, the statements of persons currently and formerly associated with the subject property and the observations made during a site inspection.

The subject property is located immediately west of the Cashmere City Limits and Mission Creek and south of the BNSF Railroad tracks (**Figure 1**). RH2 completed the assessment at the request of the Port of Chelan County, which is considering purchase and redevelopment of the property. RH2 compiled site information from a previous site assessment report, Washington Department of Ecology (Ecology) public recoRoads, brief interviews with persons having local knowledge of the site and a limited field investigation. Based on our assessment, RH2 recommends a targeted field investigation of the site to confirm the presence or absence of potential contaminants possibly associated with the former mill pond, electrical transformers, underground storage tanks and small releases of petroleum products.

2.0 BACKGROUND

History

The mill site is located in a meander of the former channel of the Wenatchee River. The Wenatchee River was diverted to its current channel, north of the mill site, when the Great Northern Railroad was constructed in the early 1900s. The site operated as a saw mill beginning in about the mid-1940s, primarily to manufacture lumber for fruit boxes. It was first operated by the Schmitten Family (Stoltenberg, personal communication, 2006) until it was sold to the Pack-River Lumber Company in the 1950s or 1960s and later sold to W I Forest Products. The mill ceased operations in the 1970s and was sold to Mr. John Lysaker of the Cedarbrook Company in 1990. An accidental fire in 1990 caused some damage to mill buildings. A larger arson fire in 2000 destroyed many of the former mill buildings (Lysaker, personal communication, 2007).

Land Use

The general layout of the site is shown in **Figure 1**. The following historical narrative is based on interviews with four persons having local knowledge of the site (Mr. Dave Holstrum, long-time City of Cashmere Public Works Department employee; Mr. John Lysaker, property owner; Mr. John Michael of Michael Irrigation Company, which has previously performed numerous excavations on the site; and Mr. John Stoltenberg, long-time Cashmere resident and former Port of Chelan County Commissioner). The narrow portion of the site located north of Sunset Highway received fill from the City of Cashmere for a number of years. Most of the fill consists of silt, sand, gravel-size granular fill and building materials, including concrete and asphalt (Holstrum, personal communication, 2007; Lysaker, personal communication, 2007). The region north of Sunset Highway also contains several hundred feet of rail siding connected to current BNSF tracks. From conversations with the local persons listed above, the rail siding was not used to import or export any material to or from the site other than fresh, non-treated lumber products.

The mill reportedly burned wood waste to generate steam for its dry kiln operation and produce electricity that met all other mill power needs. No heating oil is known to have been used at the site (Lysaker, personal communication, 2007). A mill pond, located in the northeastern portion of the site, between Mill Road and Sunset Highway, was used for log storage and was ordered to be shut down by the State Department of Ecology in the 1950s; however, the reason is not clear (Stoltenberg, personal communication, 2006; Lysaker, personal communication, 2007). The wood waste-burning steam and electricity generating facility (power house) and a building used to haul logs from the mill pond occupied the region immediately west of the mill pond. Concrete footings from these facilities are visible at ground surface. To the west of these former building sites were the mill offices, planer and dry storage facilities. The mill offices fronted Sunset Highway. Two buildings, a former dry kiln and truck shop (Pacific Appraisal Associates, 2006), are located on the south side of Mill Road. These are the only two major mill buildings that remain. An aerial photograph from 1968 indicates the possibility that several other smaller buildings were present in the region south of Mill Road, but their purpose was not determined from any of the interviews with persons having local knowledge of the site. Forsgren (1990) stated that a "block building" used as a repair shop and a small building used for storage of petroleum-based lubricants were located in the southwest portion of the mill site. RH2 understands that the former "repair shop" described in Forsgren (1990) and the existing former "truck shop" described in Pacific Appraisal Associates (2006) are separate facilities; the former repair shop is associated with the former County Road Shop. Currently, the former dry kiln building is vacant except for several personal vehicles that are stored in bays that are open to the outside.

Much of the region south of Mill Road was used for log storage and has been extensively filled with wood waste. The former truck shop was used, in part, as a facility for mill employees and contained an employee restroom. This building has been used by the Cedarbrook Company since the early 1990s to manufacture and store components for saunas. No significant use or storage of resins, solvents, glues etc. is known to have occurred at this facility (Lysaker, personal communication, 2006). A Chelan County Road Maintenance Shop occupied a portion of the site south of Mill Road. The "repair shop" described in Forsgren (1990) may have been associated with the County Shop. The former shop was located at 5510 Mill Road, in the southwest portion of the mill site. For decades, fill material from various sources was reportedly used to level low-lying regions of the mill site. Fill material consisted of wood waste; silt, sand and gravel-size granular fill; and concrete and asphalt. Areas receiving the most fill were the former mill pond and the region between Mill Road and Brender Creek (Stoltenberg, personal communication, 2006; Holstrum, personal communication, 2007).

Hydrologic Features

Brender Creek, a year-round tributary to the Wenatchee River, flows across the property along its southern boundary and discharges into Mission Creek (also a perennial stream) just above its confluence with the Wenatchee (**Figure 1**). An irrigation return ditch flows about

1,000 feet from west to east along the southern shoulder of Mill Road. The ditch is open near the western boundary of the mill site, where it forms a small pond. From there, the water runs in a culvert for approximately 600 feet. The ditch is open again along Mill Road near the current Cedarbrook shop. Near the eastern boundary of the property, water enters a culvert that crosses Mill Road and runs approximately 500 feet to discharge into Brender Creek. The ditch is day-lighted for about 6 feet before flowing beneath Sunset Highway. In the mid-1990s, the property owner undertook a conservation effort in cooperation with the Washington Department of Fish and Wildlife and Chelan County Conservation District to enhance aquatic habitat in over 2,000 feet of Brender Creek. AccoRoading to Mr. Lysaker, much of the stream channel was deepened to remove sediment, which resulted in a large berm that parallels the creek. Mr. Lysaker indicated this berm is mostly comprised of sand and gravel sediment similar to Wenatchee River alluvium. It is not clear how much of the berm is comprised of fine-grained sediment. The berm is approximately 10-feet high, 60-feet wide and 1,000-feet long. Most of the berm lies within the Class I Wetland 300-foot buffer associated with two National Wetlands Inventory-listed wetlands. An excavated cistern, approximately 8-feet wide and 20-feet deep, is located just north of Mill Road on the eastern portion of the mill site. The cistern was reportedly used as a source of water for the production of steam at the power house.

Previous Environmental Evaluations

Prior to purchasing the mill site property in 1990, Mr. Lysaker obtained the services of Forsgren Associates (Forsgren) to conduct a Phase I Environmental Assessment for hazaRoadous waste. The report, dated August 24, 1990, focused on the potential for contaminated soils and mill operations that may have had adverse environmental impacts. In their report, Forsgren (1990) identified several conditions potentially affecting environmental liability at the mill site.

- Visual evidence of soil contamination surrounding the "repair shop" and a smaller shed that may have been used for the storage of petroleum-based lubricants. Forsgren concluded soil contamination likely did not exceed 6 inches depth and no samples were taken, nor was the extent of the contamination delineated.
- Various locations where hydraulic oil may have leaked from machinery. Forsgren concluded no contamination was associated with these operations.
- Underground storage tanks (USTs) used for fueling operations in the western portion of the property. Forsgren recommended removal of the tanks.
- Electrical transformers and switch gear associated with the former power house. Forsgren recommended removal of the electrical gear from the property.
- Forsgren was unable to determine the location of the former septic tank and drainfield.
- Forsgren determined Washington State Department of Ecology (Ecology) does not have record of complaints or spills at the mill site.

Mr. Lysaker indicated that most of the conditions identified by Forsgren (1990) were addressed prior to or shortly after taking ownership of the site as part of the Purchase and Sale Agreement with W I Forest Products (Exhibit 1). Prior to taking ownership, Mr. Lysaker states W I Forest Products removed a UST used to store diesel from the vicinity of the former mill office and one used to store gasoline from the vicinity of the former truck shop. The volume of both of these tanks is unknown. He also states W I Forest Products completed removal of electrical gear including transformers from the site, prior to his purchase of the property. Mr. Lysaker states removal of asbestos was completed by W I Forest Products after he took ownership of the property. Reports documenting removal of USTs, electrical gear and asbestos were either not prepared or were destroyed in the 2000 mill fire.

3.0 METHODS

The limited environmental assessment consisted of a review of available site assessment reports and Ecology recoRoads, discussions of site history with persons associated with the subject property, and a limited site inspection and environmental investigation.

RH2 reviewed the following Ecology documents and records.

- Confirmed and Suspected Contaminated Sites Report.
- Underground Storage Tank Listing.
- Leaking Underground Storage Tank Listing.
- No Further Action Site List.
- Catalog of Formal Oversight Decision Documents, ORoaders and Decrees.
- HazaRoadous Sites List.
- Site Register.
- HazaRoadous Waste Facilities Search.

Based on the outcome of the evaluation of Ecology's recoRoads and interviews with persons having knowledge of the site (Mr. Dave Holstrum, Mr. John Lysaker, Mr. John Michael and Mr. John Stoltenberg), RH2 conducted a field investigation of the site, including soil test pits to examine soil and groundwater conditions that could indicate site conditions potentially affecting environmental liability. On December 19, 2006, RH2 staff toured the site, reviewed existing information and interviewed the property owner. On January 15, 2007, RH2 conducted a surface and subsurface site inspection to assess environmental and construction-related conditions. Approximately 12 inches of snow covered the ground during both site-visits and temperatures ranged from 25 degrees during the first site-visit to 10 degrees on the second site-visit. These conditions limited the inspection of surface conditions in some areas.

A total of 14 soil test pits were excavated during the second site visit using a Hitachi 22-ton excavator operated by Michael Irrigation of Cashmere (**Figure 1**). RH2 staff determined the locations of test pits with assistance from Dave Holstrum. The test pits were evenly distributed throughout the site, except within 300 feet of listed wetlands which will likely receive light or limited use. A large portion of the lots located between Mill Road and Sunset Highway are covered by asphalt and concrete footings of the former mill buildings. To the extent possible, test pits in this part of the property were excavated where asphalt and concrete paving are absent. No test pits were attempted in the narrow lots north of Sunset

Highway due to low-hanging power lines and limited access. No test pits were attempted in the portion of the site located south of Brender Creek. Test pits were excavated in the lots located south of Mill Road, except immediately south of Mill Road where asphalt paving, existing buildings, piles of dumped concrete, and subsurface and overhead utilities limited access.

RH2 staff observed all excavations and documented any indications of environmental contamination such as staining, odors, discoloration and unusual fill or fluids. Excavated materials were examined at the surface and photographed. Cold air temperatures condensed soil moisture rising from the test pits, which is visible in site photographs. Most test pits were completed at depths where RH2 staff determined the excavations had reached native material, approximately 3 to greater than 13 feet.

Each test pit was located on site using an aerial photograph. Because there are no survey data available, the land surface across the site was assumed to be flat.

Mr. Lysaker submitted a statement addressing actions that were taken to eliminate potential environmental hazaRoads identified in Forsgren (1990) and to document the source of fill material (**Exhibit A**).

4.0 RESULTS

Ecology Records

Review of Ecology's recoRoads revealed two USTs were removed from the site of the former Chelan County Shop. These tanks were installed on December 31, 1964. No removal date or condition of the USTs or surrounding soil was reported. The USTs reportedly included a 100-gallon diesel tank and a 1,100-gallon unleaded gasoline tank. The property is not listed as a leaking underground storage tank site. The property was not listed in any of the other Ecology records that were reviewed. Two sites within 1/4 mile (Cashmere High School and Vale Elementary) are confirmed to have elevated levels of arsenic in soil. Arsenic contamination is likely associated with orchard operations.

Anecdotal Accounts from Locals

According to Mr. Lysaker, W I Forest Products spent approximately $100,000 to remove asbestos related to lagging of steam piping from the former power house and the dry kiln. Records of the asbestos removal were destroyed during the 2000 fire (Lysaker, personal communication, 2006). However, Forsgren (1990) stated that "Prior to my visit, buildings containing asbestos had been identified and had been dealt with by others." The power house was reportedly removed during the ownership transfer in 1990. The former dry kiln is currently standing. Mr. Lysaker also indicated that two USTs used for diesel near the former mill office and gasoline near the former truck shop were removed shortly before he took ownership in 1990. The location of the former septic tank and drainfield are also unknown. Mr. Lysaker indicated that he did find a small metal tank, approximately the size of a 55-gallon barrel, buried next to the truck shop with an outlet pipe that discharged into the unnamed irrigation return ditch. The mill site has never been used as an orchard (Stoltenberg, personal communication, 2006). Mr. Stoltenberg also indicated that a train collision, approximately 1/4 mile to the west of the site resulted in a large petroleum spill in the middle of the twentieth century (1940s or 1950s). Most fill consists of silt, sand and gravel-size granular fill and building materials, including concrete and asphalt. These materials originated from City of Cashmere projects consisting of roadbed repairs to Pioneer Avenue and removal of a berm at Riverside park (**Exhibit A**).

Site Observations

Field observations during the two site visits were partially obscured by snow cover. Field work indicated much of the site north of Mill Road and the region surrounding the current Cedarbrook operation and former dry kiln building is covered in asphalt. No current facilities or operations (fuel storage tanks or piping, hazardous materials or container stockpiles) were observed that would indicate the presence of environmental contamination. The former dry kiln building was not inspected for the presence of asbestos.

Test Pit Observations

RH2 prepared soil exploration logs for each test pit (see Geology Report, Table 1 in **Appendix A**). Fill consisted of wood waste and granular fill containing wood debris. One test pit (TP-6) also contained red bricks and an automobile wheel. Depth to groundwater ranged from 3 to 13 feet below ground surface. No indications of soil or groundwater contamination were observed in any of the test pits. No soil or groundwater samples were collected for laboratory analysis.

Table 1. Test Pits at the Cashmere Mill Site

Test Pit	Location	Total Depth (ft)	Dominant Material Encountered	Groundwater Depth (ft)
TP-1	Former Mill Pond	12	Fill (wood waste and granular)	11
TP-2	Former Mill Pond	13	Fill (wood waste and granular)	13
TP-3	Former Mill Office	6	Native Alluvium	6
TP-4	Former Powehouse	3	Fill (granular)	None
TP-5	Former Planer Bdlg	5	Native Alluvium	4
TP-6	Former County Shop	8	Fill (wood waste, bricks); Native Alluvium	None
TP-7	Log Storage	4	Native Alluvium	None
TP-8	Log Storage	7	Fill (granular); Native Alluvium	7
TP-9	Log Storage	8	Fill (wood waste); Native Alluvium	None
TP-10	Log Storage	11	Fill (wood waste); Native Alluvium	10
TP-11	Log Storage	14	Fill (wood waste); Native Alluvium	None
TP-12	Log Storage	9	Native Alluvium	8
TP-13	Log Storage	3	Native Alluvium	None
TP-14	Log Storage	5	Native Alluvium	None

5.0 SUMMARY

Review of Ecology's records, interviews with local persons having knowledge of the site and field observations, including 14 test pits, did not indicate the likely presence of contaminated soil or groundwater at the site. AccoRoading to Mr. Lysaker, the recommendations made by Forsgren (1990) during their Phase I Assessment have been resolved (**Exhibit A**) and in our limited environmental assessment, RH2 found nothing contradicting Mr. Lysaker's statements. Most of the fill consists of wood waste and silt, sand and gravel-size granular fill containing wood waste. Organic material in fill is generally well preserved. Mr. Lysaker indicated that some fill contains building materials such as concrete and asphalt; however, this material was not observed in the test pits and only one test pit (TP-6) contained bricks and metal debris. Greater than 5 acres are covered by asphalt, concrete and existing buildings, and there are several piles of asphalt and concrete. Elevated arsenic levels in soils reported at two nearby sites are likely due to their former use as orchards. The mill site has not been used as an orchard.

6.0 RECOMMENDATIONS

This limited Phase I investigation did not observe indications of soil or groundwater contamination at any inspected areas. However, known historical activities may have residual environmental impacts that are unresolved.

- Mill ponds at mill sites potentially may collect contaminated stormwater and sediment runoff from petroleum fuels and machine lubricants. Although no evidence of contamination was observed during the excavation of Test Pits 1 and 2, these test pits were limited by the excavator reach (12-to-13 feet) and did not encounter the bottom of the former mill pond. Additional assessment of the sediment at the bottom of the mill pond may be warranted to confirm the presence or absence of contaminants.
- Electric transformers may potentially contain polychlorinated biphenyl compounds (PCBs). No documentation of the removal of transformers was available, and the area of the former transformers was not available for inspection. Limited shallow surface inspection and soil sampling may be warranted to confirm the presence or absence of contaminants at the former transformer locations.
- Removal of four petroleum fuel USTs is undocumented. Limited soil assessment of the former USTs locations may be warranted to confirm the presence or absence of contaminants.
- Small releases of petroleum products may exist in soil at several areas of the site that were not accessible for inspection, including paved or covered areas near the dry kiln building, the maintenance shop, the power house, and the mill office and the former site of the Chelan County Shop. Additional assessment of these locations are unwarranted, as the size of the releases are likely minimal. If present, these small areas of soil contamination may be encountered during site development.

6.0 REFERENCES

Forsgren Associates, Phase 1 HazaRoadous Waste Assessment on the property located in Section 5, Township 23 North, Range 19 East W.M., August, 24, 1990.

Pacific Appraisal Associates, Appraisal of the Cedarbrook Property, Pacific Appraisal Associates, P.L.L.C., Cashmere, Washington, 2006

Holstrum, Dave, personal communication regarding history of the Cashmere Mill Site, January 15, 2007.

Lysaker, John, personal communication regarding the history of the Cashmere Mill Site, December 19, 2006 and January 29, 2007.

Stoltenberg, John, personal communication regarding history of the Cashmere Mill Site, November 2006.

Exhibit A

Statement
by
Mr. John Lysaker
Cashmere Mill Site (Cedarbrook)
Property Owner

2 pages

This message has been scanned for known viruses.

to From: bsullivan@RH2.com
From To: woodsaune@aol.com
Subject: Statement stuff
Date: Tue, 30 Jan 2007 2:10 PM

FAX

Hello Bill
Please find my two page
fax per our discussion

John,

This is for the Port of Chelan County Phase I Environmental Assessment of the Cedarbrook's Cashmere mill property. We need a statement from you to clarify several items regarding environmental conditions at the site. Based on our conversations, several statements are listed below. Please modify as required and sign that you know these statements to be true. Thanks.

Best Regards,

Bill

Thanks
[signature]
782 2447

This statement is submitted to RH2 Engineering for the Port of Chelan County Phase I Environmental Assessment of the Cedarbrook's Cashmere mill property.

1. Two underground storage tanks were removed by W I Forest products prior to my purchase of the property. One of these tanks, believed to be gasoline, was located near the former mill office. The other tank, believed to be diesel, was located near the former truck maintenance shop (current Cedarbrook manufacture building). I am not aware of any other above ground or underground storage tanks on the site.

2. Asbestos was removed from all facilities at the site including the former powerhouse (building was removed) and dry kiln buildings ~~prior~~ after (JW) to my purchase of the property.

3. Electrical equipment including transformers and switch gear were removed prior to my purchase of the property. I am not aware of any leaking from electrical equipment.

4. No septic tank and drain field were located. A primitive, small underground metal tank was found with a pipe discharging to the unnamed ditch along Mill Rd. It is suspected this was used in lieu of a septic system due to the shallow groundwater table.

5. Records and documentation of the removal of potential sources of environmental liability conducted by W I Forest Products were destroyed in the 2000 fire at the mill.

6. Composition of fill imported to the site: Road bed material from repave of Pioneer Avenue plus berm material (ie local topsoil) from Riverside Park

7. Sources of fill material (location and/or party)
City of Cashmere per our on going agreement that "material must be or meet compaction requirements"

 1/31/2007 1:37 PM

These statements are true to the best of my knowledge.

Signed _______________ 1/31/07
John H. Lysaker Date

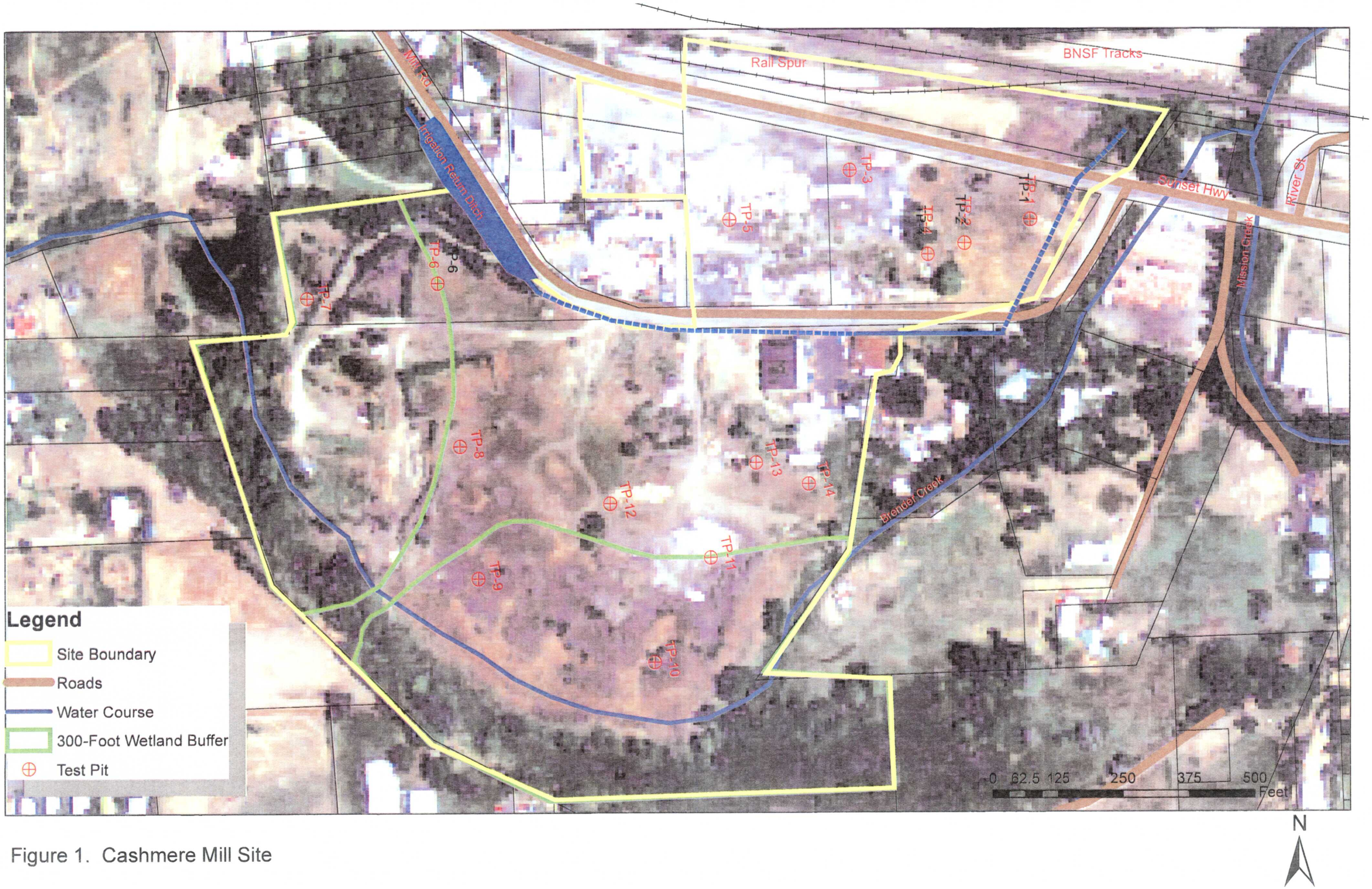

Figure 1. Cashmere Mill Site

Received 12/19/2011
F/S/L 20168
Chelan County
CASHMERE MILL SITE

RH2 ENGINEERS PLANNERS SCIENTISTS

DEPT OF ECOLOGY Received DEC 1 9 2011 CENTRAL REGION OFFICE

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October 24, 2008

Mr. Mark Urdahl
Executive Director
Port of Chelan County
238 Olds Station Road, Suite A
Wenatchee, WA 98801

Sent Via: *Email and US Mail*

Subject: Cashmere Mill Site Wood Waste Summary

Dear Mr. Urdahl:

Introduction

The Port of Chelan County (Port) is planning to redevelop its former Cashmere Mill Site (Site). RH2 Engineering (RH2) understands the Port will partially base redevelopment plans on economics, permitting and technical issues related to managing wood waste at the Site. This letter describes applicable regulatory agency requirements for removing or leaving wood waste at the site, and summarizes reuse and disposal options for excavated wood waste.

Previous assessments by RH2 have concluded that approximately 20,000-to-25,000 cubic yards of wood waste is present at the Site (out of a total of 60,000 cubic yards of fill that includes granular materials and construction debris). The wood waste is comprised of sawdust, chips, bark and logs that were placed in a topographic depression and covered. No wood treatment activities occurred at the site, limited releases of chemicals such as petroleum hydrocarbons are present, and methane gas occurs sporadically within and above wood waste.

Summary of Current Understanding of Environmental Issues of Wood Waste at the Site

1. Methane gas generated by the decomposition of wood waste is a potential hazard to human health if the occupancy at the Site is increased or structures are created that trap methane gas. Mitigation of the hazard would include removal of the wood waste, passive venting of the wood waste and overlying soil, active venting of the wood waste and soil, and engineering controls to prevent migration of methane into closed spaces associated with structures.
2. Direct contact with wood waste is not considered a human health hazard except where the wood waste may be exposed and allowed to disperse in the air as fine particulates. Mitigation of this hazard would include remove of wood waste from surface areas.
3. Infiltration of rainwater into wood waste and interaction of groundwater with wood waste may generate leachate from the waste that could migrate to nearby wetlands or surface water. In sufficient quantity, the wood waste leachate could create chemically reducing conditions (lower dissolved oxygen [DO]) in groundwater as wood waste decomposes. The lower pH could then potentially alter the geochemistry of

groundwater by dissolving metals from granular aquifer material, and these metals could migrate into surface water. However, the reduced groundwater is quickly oxidized and the acidic groundwater is neutralized when it combines with atmospheric oxygen and the metals precipitate at the point of discharge. The Site lies adjacent to the Wenatchee River, Mission Creek and Brender Creek. The Washington State Department of Ecology (Ecology) is studying the river for sources of contamination that reduce DO and affect pH, but has not attributed wood waste in floodplain areas as potential sources for these stream quality impairments. Note: The wood waste was placed in natural depressions of former channels of the Wenatchee River. These channels contained naturally occurring wood debris and organic-rich soil that would have similar effects on groundwater quality as wood waste. Any assessment of water quality impacts of wood waste would need to distinguish the effects of buried organic material from natural sources.

4. Much of the wood waste lies within a wetland buffer and/or floodplain; critical areas and zoning will affect the redevelopment plan and wood waste excavation.

Current Environmental Issues Related to Wood Waste in Chelan County and Washington State

Review of Ecology's environmental database and discussion with the Chelan-Douglas Health District (CDHD) concludes that no wood waste environmental assessment or cleanup projects are active in Ecology's Central Region. The former Boise Cascade Mill in Yakima was assessed for groundwater contamination related to wood waste. Ecology determined that no further action was required for the wood waste. Wood waste cleanup or assessment projects in Western Washington State are typically located along marine shorelines at the sites of former mills or log storage areas. Wood waste issues at these sites primarily pertain to sediment quality impaired by wood waste degradation in a marine environment or to mixtures of wood waste with other contaminants such as PCBs, treatment chemicals, arsenic-containing smelter slag, etc.

Recent Federal court rulings concluded that chemicals created by the decomposition of raw wood waste in the aquatic environment can create Comprehensive Environmental Response, Compensation and Liability Act of 1980 (Superfund) liability for the owner of the site where the wood waste is located. Wood waste was not considered, in and of itself, a hazardous substance. However, under certain aquatic conditions, the court ruled that decomposition of wood waste could result in a release of hazardous substances and provide a basis for liability under Superfund. These rulings and potential policies apply only to the marine environment where wood waste, marine water, sediments and biota are all interconnected. These conditions do not apply to the Site, where the wood waste is covered, only partially saturated by groundwater and isolated from freshwater shoreline environment.

The intensive approaches to managing Western Washington wood waste sites where significant degradation of environmental quality has occurred do not apply to the wood waste in upland/floodplain sites such as at the Site.

Discussions with Regulatory Agencies

Ecology – Conversations with Central Regional Office staff - Darlene Frye, Al Armstrong, Ryan Anderson, Canming Xiao, Gary Bleeker and Valerie Bound

Washington State solid waste regulation, Chapter 173-350 WAC, assigns regulatory responsibility of active solid waste facilities to the local health jurisdiction. Ecology Central Regional Office solid waste staff had few issues regarding wood waste and suggested directing further questions to the Toxics Cleanup staff in Ecology and to CDHD. Without indications of human health or environmental risk, Ecology defers to CDHD. However, Ecology's Toxics Cleanup Program has regulatory authority under Chapter 173-340

WAC for groundwater and surface water quality where contamination is discovered in association with former landfills and industrial sites. Ecology staff indicated that wood waste landfills that were discontinued before the permitting process could come under the jurisdiction of the Toxics Cleanup Program. Ecology staff indicated that the former Cashmere Mill Site may require environmental assessment if historical operations or current conditions indicate that contamination exists. The Site will require environmental assessment if contamination is discovered.

Evidence of contamination related to wood waste includes strong odors or staining in wood waste, soil, surface water and/or groundwater; red to yellow seepage of leachate from berms or slopes near wood waste; and strong odors or taste detected in groundwater from down-gradient wells. None of these conditions have been observed. However, some of the wood waste was encountered at or slightly below the water table at Test Pit 1 in the northeast corner of the site near the eastern intersection of Sunset Highway and Mill Road, and at Test Pit 11 in the southern area of the site. At these locations, where the wood waste may be seasonally saturated with groundwater, the potential for leachate generation is greater.

Previous environmental site assessment by Forsgren Associates in 1990 focused on the potential for contaminated soils and mill operations that may have had adverse environmental impacts. Forsgren Associates (1990) identified conditions related to minor releases of petroleum hydrocarbon fuels and lubricants potentially affecting environmental liability at the Site. RH2 conducted a second limited environmental assessment in 2006-2007 and did not observe indications of soil or groundwater contamination at any inspected areas. However, known historical activities related to the former mill pond, underground storage tanks (USTs) and transformers may have residual environmental impacts that remain unresolved.

An internal memorandum prepared by Ecology in June 2007 (**Appendix A**) estimated potential costs to conduct an environmental assessment of soil and groundwater conditions at the Site presuming that petroleum hydrocarbons, PCBs, metals, volatile organic compounds and dioxins were present. The cost estimate assumed that Ecology would conduct the assessment and reporting. The cost estimate significantly over estimates the time required for reporting and the requirements for analysis, and does not consider wood waste as a primary contaminant. However, the estimate does indicate the areas of concern that would need to be addressed should Ecology become involved in more detailed assessment of site conditions. The estimate indicates that the former use of petroleum hydrocarbons, electric transformers and wood treatment chemicals at the Site would be of greatest concern.

Ecology is directing a water quality total maximum daily load (TMDL) study on the Wenatchee River to evaluate causes and actions to improve low pH conditions and DO concentrations in the river. In its latest report issued in September 2008 (*Wenatchee River Watershed Dissolved Oxygen and pH Total Maximum Daily Load: Water Quality Improvement Report – DRAFT)*, Ecology did not identify wood waste as a potential source of water quality impairment (see www.ecy.wa.gov/biblio/0810062.html).

Chelan-Douglas Health District – Conversations with Suzen Hyde

The CDHD has jurisdiction over active landfills and joint jurisdiction with Ecology over landfills that pose risk to human health and the environment. The CDHD has developed a solid waste management plan that addresses solid waste facilities.

Discussion focused on issues related to the feasibility of redeveloping the Site and potential issues with wood waste where no obvious contamination issues exist.

The CDHD does not consider the wood waste deposits a landfill, but as a former mill site where wood debris was placed in one area. Because no conditions indicate that wood waste is generating contaminants, the CDHD is not concerned about leaving the waste in place and no closure activities are required. However, any redevelopment activities that expose the wood waste and potentially increase risks to human health and environment must be mitigated.

CDHD is aware that wood waste can potentially generate leachate that could affect water quality in adjacent wetlands and surface water, and they should be notified if any indications of contamination are discovered. CDHD suggested contacting the Chelan County Natural Resources Department and/or Ecology to see if any additional guidance is available.

Any wood waste that is removed must be managed as a non-dangerous solid waste unless indications of toxicity are discovered in the excavated waste. The waste can be transported to the Regional Landfill, or possibly to the Dryden composting facility if the wood material meets their criteria. The CDHD encouraged reuse or recycling options for excavated wood waste if possible.

The CDHD would not regulate methane gas generation unless human health or environmental issues exist. The methane gas should be managed according to Chelan County building codes.

The CDHD indicates that excavated wood waste may be stockpiled on site in a secure area (protected from runoff, access, etc.) for up to three months if it does not generate odors or up to three weeks if odors are present.

Permitting issues under the CDHD *Solid Waste Management Plan*, County code and Chapter 173-350 WAC will arise if the wood waste is managed and processed on site for new uses, such as a composting or recycling facility.

The CDHD is not aware of any environmental issues related to redevelopment of the Peshastin Mill site and is not aware of any other sites in Chelan or Douglas Counties that address former mills or wood waste.

Without indications of human health or environmental risk, the CDHD would not require any evaluation of the characteristics and fate of wood waste left in place.

<u>Cascadia Conservation District</u> – Conversations with Mike Rickel

The Cascadia Conservation District (CCD) oversees much of the water quality assessment of the Wenatchee River, monitors water quality in the Mission Creek watershed and was aware of the Cashmere Mill operations but did not have any concerns regarding the local surface water or groundwater quality other than as a potential source of phosphorous. Wood waste does not contain phosphorous, nor is it likely to cause phosphorous to leach out of aquifer materials in contact with wood waste. The CCD would appreciate notification and review of any activities at the site that could affect the flow or quality of water in Brender or Mission Creeks.

<u>Chelan County Public Works</u> – Conversations with Brenda Harn

Similar discussions were made with Chelan County Public Works (CCPW) staff. Because the Site is not an active landfill or recycling facility, the CCPW does not have regulatory authority.

Appropriate Regulatory Waste Designation for Excavated Wood Waste

CDHD and Ecology interpret wood waste as a non-dangerous solid waste that may be managed as such. Because the wood waste is not chemically inert, it cannot be replaced in quantity on the property once it has been removed without a limited purpose landfill permit issued by Ecology under Chapter 173-350 WAC, which triggers significant permitting and monitoring tasks. Small quantities of clean wood waste could be incorporated into other fill for landscaping, but not distributed wholesale throughout the site.

Potential Reuse Options for Excavated Wood Waste

Several options are available for managing excavated wood waste as a non-dangerous waste for disposal. These include a landfill, recycling into compost, or re-processing into landscape material or as a source of energy. The Port will need to determine the potential value of the wood waste before declaring it as surplus and for sale, similar to previous actions with the Peshastin Mill site wood waste. Several parties were interested in the potential reuse and recycling options for wood waste. Further consideration of these options would require an accurate estimate of the quantity and quality of the wood waste, and assurance through analytical testing that the wood waste has no contaminants. The following summarizes potential re-use options.

Off-site Composting Facility

The Dryden Landfill has a composting facility that would accept clean wood waste that meets size and moisture criteria. The facility has limited space and could not accept quantities much larger than a few hundred yards at a time. The facility would charge $10 per yard to accept the wood waste either as a component for composting or for disposal at the regional landfill. A similar facility may open up for the Town of Entiat, but likely will have similar space and quantity limitations. The City of Wenatchee could potentially incorporate some wood waste into its sludge drying beds.

Off-site Recycling Facility

Stemilt Growers is obtaining permits to process wood waste recycling and should be able to accept outside material soon. Stemilt Growers intends to compost wood waste from agricultural sources and reuse the compost for orchard operations and/or sell it as surplus. They are not yet prepared to provide costs for managing wood waste. (Contact: Robin Graham – robin.graham@stemilt.com or (509) 662-3613)

Bob's Apple Barrel in Wenatchee (Contact: Bob Spanjer – (509) 663-3833) has a long history of recycling organic and wood debris and is interested in the wood waste.

The following summarizes Bob's Apple Barrel operations.

- Currently purchasing a larger commercial (Trommel) screener (rated up to 200 cubic yards per hour).
- Considering purchasing another larger excavator.
- Estimates that it would take six months to excavate and screen up to 20,000 cubic yards.
- Sells approximately 20,000 cubic yards per year from its lot on Chelan Highway.
- Likely will need to maintain a stockpile at the Port site for up to three years if all of the material were to be removed. Note: Stockpiling would likely trigger permitting.
- Estimated that they may pay up to $1 per yard of recovered wood waste, but there may not be enough value in the wood waste for profit sharing with the Port. Up to half of the material may be screened out, which will have to be managed as waste and could not be placed back without a landfill permitting unless the material was demonstrated to be inert (clean granular soil). Grading and filling permits would still be required to replace screened granular fill.
- Large wood waste and rocks would increase the processing and disposal costs.

Pacific Topsoils operates several facilities in Western Washington and in the past has found it economical to haul large quantities of organic waste from Central Washington to its facilities in Western Washington for recycling (Source: Ecology).

Off-site Waste Generation Facility

Buckley Recycling Center (BRC) operates a recycling facility out of Auburn. BRC is very interested in the material for use as a source of hog fuel to generate energy. BRC would need to visit the site to observe wood waste quality before providing a price quote on removal and transport. BRC would like to be informed on any decisions of wood waste use or disposal, if possible, even if BRC is not contracted to manage the wood waste. (Contact: Ron Shear – (253) 223-8586)

Boise Cascade, LLC in Wallula may be interested in removing and transporting wood waste to its facility to burn as an energy source, but the transport fees may result in a net cost to the Port. Cost would be developed after a site inspection. The cost would likely be less than $10 per cubic yard. (Contact: Ray Lamb – (509) 545-3318)

On-site Recycling or Composting Operation

Establishing an on-site composting or recycling facility would require permitting under CDHD and Chapter 173-350 WAC (and a business plan to evaluate economics and markets for the recycled material). Fixed facilities in Central Washington have faced cost challenges that do not encourage wood waste recycling and reuse, which would be difficult to overcome in the current regulatory and commercial climate. Composting is not competitive with burning or stockpiling wood debris, and private landfills out-compete public recycling facilities (based on conversations with the CDHD and Ecology).

Off-site Disposal

The excavated waste, because it is not inert, may not be replaced on site without a landfill permit from the CDHD. The Wenatchee Regional Landfill would accept the wood waste for a tipping fee of approximately $25 per cubic yard. Kittitas County accepts yard waste materials only, but is considering expanding their operation to composting if demand rises. (Contact: Patti Johnson – (509) 962-7070)

Summary of Regulatory Status and Agency Requirements Related to Removing or Leaving Wood Waste

The CDHD considers the placement of wood waste as a former practice, and leaving the wood waste in place will not require any new environmental assessment. Redevelopment plans will need to address the potential for creating new human health or environmental risks due to new structures or utilities if the waste is disturbed or if contamination is discovered.

Ecology would regulate the site as a source of degraded groundwater and potentially surface water quality if indications of impacts to surface water or groundwater quality (leachate seeps, staining, odors, dead vegetation) were detected. Environmental assessment would consist of obtaining samples of background and down-gradient groundwater quality that could distinguish between the effects of the wood waste and natural sources of organic material on water quality. The cost for assessment would vary depending on whether the assessment also included those areas where petroleum hydrocarbons were used or stored on site and the extent or magnitude of the indications of impacted surface water or groundwater quality. The presence of methane in the wood waste and adjacent soil would require mitigation to eliminate the risk of methane migration into structures or entrapment beneath pavement. As the risk due to methane gas is considered low at the undeveloped site, and restricted to those areas where wood waste is present, methane mitigation could be conducted as part of site redevelopment.

The proximity of the site to Brender Creek, Mission Creek and the Wenatchee River raises the level of community awareness and heightens permitting review of redevelopment plans. Redevelopment will include SEPA review and could trigger EIS-related activities that may include environmental assessment of potential impacts of in-place wood waste or impacts of disturbing/removing/replacing the wood waste, particularly near these surface water bodies and within wetland buffers.

Please feel free to contact me if you have any questions.

Sincerely,

RH2 ENGINEERING, INC.

Steve Nelson, L.G., L.HG.
Hydrogeologist

State of Washington
Hydrogeologist
1402
Licensed Geologist
Steve Nelson

RANDY L. ASPLUND
STATE OF WASHINGTON
22780
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 3/19/10

SIGNED:
10/24/08

SN/jw/sp

Attachments: Appendix A – Department of Ecology Cashmere Mill Estimate

Site: Cashmere Mill

Estimate Prepared By: Bob Swackhamer 6/27/07

Work: RI/FS

Note: For almost all of this work the TCP Prime Contract could be used, but is not required to be used. For a small part of the work (the backhoe) it may be questionable whether it is appropriate to use the Prime Contract

Background:

The roughly circular site covers 32.5 acres. It spans both sides of Sunset Highway west of downtown Cashmere and includes about 15 acres of wetlands. It is bordered to the south by Brender Creek and to the north by the Wenatchee River.

Fred Schmitten built a sawmill on the property in 1918. The mill partially burned in 1930. The Schmitten family sold the mill in 1973 to Pack River Lumber, which later sold to WI Forest Products. WI Forest Products sold the property to John Lysaker in 1990, shortly after closing the mill. A June 2000 fire destroyed the historic mill, leveling 10 acres of weather-worn storage buildings. John Lysaker continues to operate a portion of his Cedarbrook Sauna and Steam Company, which builds and sells cedar saunas, from the logyard of the old mill. Chelan County Port District has an option through 7/30/07 to buy the property from John Lysaker for $ 1.5 million. (This paragraph and the previous one rely heavily on a Wenatchee World story posted electronically 6/14/07.)

Sawmills in general have the potential for dioxin contamination and petroleum contamination. Contamination can be caused by historical drips, leaks, spills and waste disposal and hazardous substance containment practices that might be considered poor when judged by today's standards. Dioxin contamination can come from treatment of wood using pentachlorophenol that contains dioxin. An example of a poor practice would be spraying the treatment chemical on the wood with the excess allowed to drip off onto the ground, causing soil and groundwater contamination. Petroleum contamination can come from fueling and maintenance associated with mobile and other equipment required to operate a sawmill. As with other industrial sites likely to have electrical transformers, PCB contamination also is a possibility.

(see back of page for cost estimate)

Cost Estimate:

Plan Preparation (Work Plan, SAP/QA/QC, HSP) 400 hours @ $ 110/hour $ 44,000
(Assumption: Public Participation work and document preparation will be done by Ecology in-house)

Field Work

Install and Develop 4 GW Monitoring Wells @ $ 5,000 per well $ 20,000
(Includes mob/demob, decontamination, plus containment, analysis and disposal of cuttings)

Soil Test Pits backhoe w/operator one day		$	1,000
Sampling and logging 40 hours @ $ 110/hour		$	4,400

Lab Analysis

Soil			
VOA	10 samples @ $ 200 per sample	$	2,000
PCBs	20 samples @ $ 100 per sample	$	2,000
TPH Diesel	20 samples @ $ 100 per sample	$	2,000
TPH Gasoline w/BTEX	20 samples @ $ 100 per sample	$	2,000
Priority Pollutant Metals	10 samples @ $ 200 per sample	$	2,000
Dioxin	10 samples @ $ 1,000 per sample	$	10,000
Water			
VOA	5 samples @ $ 200 per sample	$	1,000
PCBs	5 samples @ $ 100 per sample	$	500
TPH Diesel	5 samples @ $ 100 per sample	$	500
TPH Gasoline w/BTEX	5 samples @ 100 per sample	$	500
Priority Pollutant Metals	5 samples @ $ 200 per sample	$	1,000
Dioxin	5 samples @ $ 1,000 per sample	$	5,000
Travel & other direct costs		$	5,000
Prepare Report			
Prepare RI/FS Report	500 hours @ $ 110 per hour	$	55,000
	Total	$	157,900

port of chelan county
cultivating innovation

COMMISSIONERS:
Craig N. Larsen, District 1
JC Baldwin, District 2
Michael H. Mackey, District 3

RECEIVED
NOV 13 2009
DEPARTMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE

November 10, 2009

Mr. Don Abbot
Toxics Cleanup Program
Washington Department of Ecology
15 West Yakima Avenue, Suite 200
Yakima, WA 98902-3401

RE: Environmental Assessment, Cashmere Mill Site, Cashmere, WA

Dear Mr. Abbot:

The Port of Chelan County recently completed environmental assessment at two locations on the former Cashmere Mill site in Cashmere, Washington. The Port has attached a summary letter of the findings to inform Ecology of the nature and extent of soil contamination at these locations and to establish the timeline for remediation.

The Port encountered a small amount, less than 30 cubic yards of soil containing petroleum hydrocarbon concentrations that were near or exceeded the MTCA Method A Cleanup levels. The soil does not appear to present an immediate or significant risk to human health or the environment. The Port intends to redevelop the property and will include soil remediation tasks (excavation and off-site disposal) to address the soil at these two locations in summer 2010. The Port will collect confirmation samples after completing the remediation and report the findings to Ecology.

If you have any questions or need for additional information, please call our engineer, Karen Kornher, at RH2 Engineering at (509) 886-6764.

Very truly,

Dayle S. Rushing

Dayle S. Rushing, Director
Properties and Risk Management
Attachment: RH2 letter, Nov 10, 2009

cc: Karen Kornher
Mark Urdahl

November 11, 2009

Ms. Dayle Rushing
Port of Chelan County
238 Olds Station Road, Suite A
Wenatchee, WA 98801

Sent Via: *US Mail*

Subject: **Contamination Assessment Letter**
Cashmere Mill Site, Cashmere, Washington

Dear Ms. Rushing:

This letter summarizes the findings of two limited soil assessments completed by RH2 Engineering (RH2) at the Port of Chelan County's (Port) former mill site in Cashmere, Washington. The assessments included shallow soil exploration at and near two locations of previous discoveries of apparently contaminated soil (**Figure 1**). This letter describes the field investigations and laboratory analyses to support the evaluation of the extent of contamination at the discovery sites and recommends actions to remediate soil containing residual petroleum hydrocarbon concentrations that exceed Washington State Department of Ecology (Ecology) cleanup levels. RH2 understands the Port is planning a major redevelopment of the former mill site and recommends remediation of petroleum hydrocarbons in soil at the two sites at the time of redevelopment.

Summary of Discoveries

Site 1 – Sunset Highway

On May 7, 2009, RH2 conducted a geotechnical investigation to evaluate soil and groundwater conditions along a proposed water main replacement alignment. During the investigation at one location--Test Pit 2 (TP-2), on the attached **Figure 1**), RH2 encountered soil apparently contaminated by a historical release of petroleum hydrocarbons. The absence of free petroleum products and the 5.5-foot depth of the contaminated soil indicated that the release was not a significant threat to human health or the environment. The potential contamination was not attributable to a known or suspected underground storage tank.

The soil exploration at TP-2 encountered light gray soil at a depth of 5.5 feet. The soil exhibited an odor characteristic of gasoline-range hydrocarbons. The water-saturated soil at the water table depth of 6.0 feet exhibited a faint sheen, as did the groundwater at the water table. No evidence of a measureable thickness of petroleum product was apparent at the water table. No other evidence in the surface indicates a potential source for the release. No indications of petroleum hydrocarbon seepage were observed on the Wenatchee River bank (the nearest body of surface water), which is 250 feet from the discovery site.

Site 2 – Mill Road
In October 2009, the Port encountered apparently contaminated soil while conducting site demolition at Site 2 -- Sample Location 1 (S-1) on **Figure 1**. The soil exhibited an odor characteristic of gasoline-range hydrocarbons. The Port contacted RH2 to assess the nature and extent of contamination at the second discovery site.

Environmental Assessment

The extent of the contamination was assessed by excavating exploration pits at Site 1 on September 16, 2009, and Site 2 on October 23, 2009, with a small backhoe to the depth of the water table, approximately 4 to 8 feet below grade. The field inspector obtained samples either directly from the excavation sidewall or from a representative sample retrieved by the contractor from the excavation sidewall. The soil was observed for lithology and evidence of contamination, including visible staining and obvious odors. Soil consisted of sand and gravel, with variable amounts of silt. No evidence of pure-phase petroleum products were observed in the soil or the water table at any location. The field inspector qualitatively documented the degree of any apparent contamination. After samples were collected, soil was replaced in the excavation at the depth of its removal, covered by shallow soil initially removed from the excavation and compacted in 1-foot lifts. The surface was restored to the condition of the surrounding area. Samples were submitted to Analytical Resources, Inc. in Tukwila, Washington. The laboratory reports are attached.

Site 1 – Sunset Highway
Three test pits (S-1, S-2, S-3) were excavated approximately 10 to 30 feet from TP-2, the original discovery location at Site 1. No apparent contamination (an odor characteristic of petroleum hydrocarbons) was present in the soil at these locations. Test pit S-4 was excavated near TP-2 to confirm the type and concentrations of petroleum hydrocarbons in soil at the original discovery location. Test pit S-5 was excavated across Sunset Highway from TP-2, and observations indicated the presence of hydrocarbons in soil. Three additional test pits (S-6, S-7, S-8) were excavated to assess the extent of soil contamination near S-5, and did not encounter evidence of soil contamination. (**Figure 1**).

Soil samples were retrieved from each excavation sidewall at a depth of approximately 5 to 7 feet and submitted for analysis of gasoline-range hydrocarbons by the US Environmental Protection Agency (EPA) Method 5035A/Ecology Method NWTPH-Gx. Sample S-4 was analyzed for diesel-range hydrocarbons by Ecology Method NWTPH-Dx to confirm the presence or absence of diesel fuel contamination at Site 1.

Site 2 – Mill Road
Four test pits (TP-2, TP-5, S-3, and S-5) were excavated approximately 10 to 30 feet from S-1 at the original discovery location at Site 2. Apparent contamination was present in the soil at TP-2 and TP-5. Test pit S-1 was completed to obtain representative soil from the original discovery location at Site 2. No apparent contamination was present in the soil at S-3 and S-5. Two additional excavations at S-2 and S-4 were excavated to assess the extent of contamination near TP-2 and TP-5, respectively. No apparent contamination was present in the soil at these locations. Soil samples were retrieved from excavation sidewall at a depth of approximately 4 to 6.5 feet and submitted for analysis of gasoline-range

hydrocarbons by EPA Method 5035A/Ecology Method NWTPH-Gx. The sample from S-1 was also analyzed for diesel-range hydrocarbons by Ecology Method NWTPH-Dx to confirm the presence or absence of diesel fuel contamination at Site 2.

Findings

Site 1 – Sunset Highway

Odors characteristic of gasoline were detected at S-4 and S-5, and possibly at S-6. **Table 1** summarizes the laboratory analyses of the soil samples. Petroleum hydrocarbons were detected in soil from the two locations where characteristic odors were most obvious (S-4, S-5), and trace concentrations of petroleum hydrocarbons were detected at S-1 and S-3. No petroleum hydrocarbons were detected in the soil where weak characteristic odors were noted at S-6.

The Ecology Model Toxics Control Act (MTCA) Method A Cleanup Levels for Soil, Unrestricted Land Use were compared to detected concentrations of petroleum hydrocarbons in the soil (**Table 1**). Concentrations of Total Petroleum Hydrocarbons (TPH) as gasoline at Site 1 at S-4 and S-5 exceeded Method A Cleanup Levels in Soil for both Unrestricted and Industrial Land Uses.

Table 1. Summary of Laboratory Results

	Sample Location – Site 1 – Sunset Highway								MTCA Method A Cleanup Level[1]	Units[2]
Compound	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8		
Benzene	<17[3]	<16	<12	<120	<14	<18	<15	<15	30	µg/kg
Toluene	<17	<16	20	650	62	<18	<15	<15	7,000	µg/kg
Ethylbenzene	<17	<16	<12	1,600	370	<18	<15	<15	6,000	µg/kg
Xylenes (total)	<17	<16	29	700	210	<18	<15	<15	9,000	µg/kg
TPH as gasoline	8.2	<6.3	<4.7	**1,600**	**490**	<7.4	<6.1	<6.2	100	mg/kg
TPH as diesel fuel[4]	*[5]	*	*	910	*	*	*	*	2,000	mg/kg
TPH as heavy oil	*	*	*	<110	*	*	*	*	2,000	mg/kg

Site 2 – Mill Road

Odors characteristic of gasoline were detected at S-1, TP-2 and TP-5. **Table 2** summarizes the laboratory analyses of the soil samples. Diesel and oil-range petroleum hydrocarbons were detected in the soil at Site 2 from sample S-1 at concentrations that were below Method A Cleanup Levels in Soil for both Unrestricted and Industrial Land Uses.

Table 2. Summary of Laboratory Results

Compound	Sample Location – Site 2 – Mill Road					MTCA Method A Cleanup Level[1]	Units[2]
	S-1	S-2	S-3	S-4	S-5		
Benzene	<20[3]	<18	<27	<20	<19	30	µg/kg
Toluene	<20	<18	<27	<20	<19	7,000	µg/kg
Ethylbenzene	<20	<18	<27	<20	<19	6,000	µg/kg
Xylenes (total)	<39	<37	<54	<41	<39	9,000	µg/kg
TPH as gasoline	<7.9	<7.3	<11	<8.1	<7.7	100	mg/kg
TPH as diesel fuel[4]	260	*	*	*	*	2,000	mg/kg
TPH as heavy oil	520	*	*	*	*	2,000	mg/kg

Notes:

1. Ecology's MTCA Method A Cleanup Level, Unrestricted Land Use and Industrial Land Use.
2. µg/kg equivalent to parts per million (ppm); mg/kg equivalent to ppm.
3. < = less than method report limit.
4. Chromatogram is characteristic of weathered gasoline and not diesel fuel.
5. * = not analyzed.

Conclusions and Recommendations

Site 1 – Sunset Highway

Soil containing weathered, gasoline-range petroleum hydrocarbons at concentrations exceeding the Method A cleanup levels exists at three locations next to the Sunset Highway at the former Cashmere Mill Site (TP-2, S-4 and S-5). The source of contamination is unknown. The contaminated soil is limited in extent and concentration, and represents little or no immediate threat to human health or the environment. It is possible that some contaminated soil underlies the highway. The lack of benzene and the characteristic patterns in the laboratory chromatograms suggest that the petroleum hydrocarbons in the soil are relatively old, have degraded over time, have likely stabilized in the soil and are not mobile. The small quantity (approximately 15 cubic yards) of soil containing petroleum hydrocarbon concentrations that exceed cleanup levels will be remediated by excavation and off-site disposal during utility decommissioning and replacement, which is scheduled for the summer of 2010. Soil samples should be collected and submitted for analysis, and findings should be submitted to Ecology to confirm the remedial action.

Site 2 – Mill Road

Soil containing petroleum hydrocarbons exists at three locations near Mill Road. The concentrations of TPH as diesel at S-1 are below MTCA cleanup levels. The TPH concentrations at TP-2 and TP-5 are unknown, but similar to the concentrations detected at S-1, based on field evidence (odors, color). The source of contamination is unknown. The contaminated soil is limited in extent and concentration, and represents little or no immediate threat to human health or the environment. The small quantity (approximately 15 to 30 cubic yards) of soil containing petroleum hydrocarbon concentrations that may exceed cleanup levels should be remediated by excavation and off-site disposal during site redevelopment, which is scheduled for the summer of 2010. Soil samples should be collected and submitted for analysis, and findings should be submitted to Ecology to confirm the remedial action.

If you have any questions or need additional information, please call either myself or Karen Kornher.

Sincerely,

RH2 ENGINEERING. INC.

Steve Nelson, L.G., L.HG.
Senior Hydrogeologist

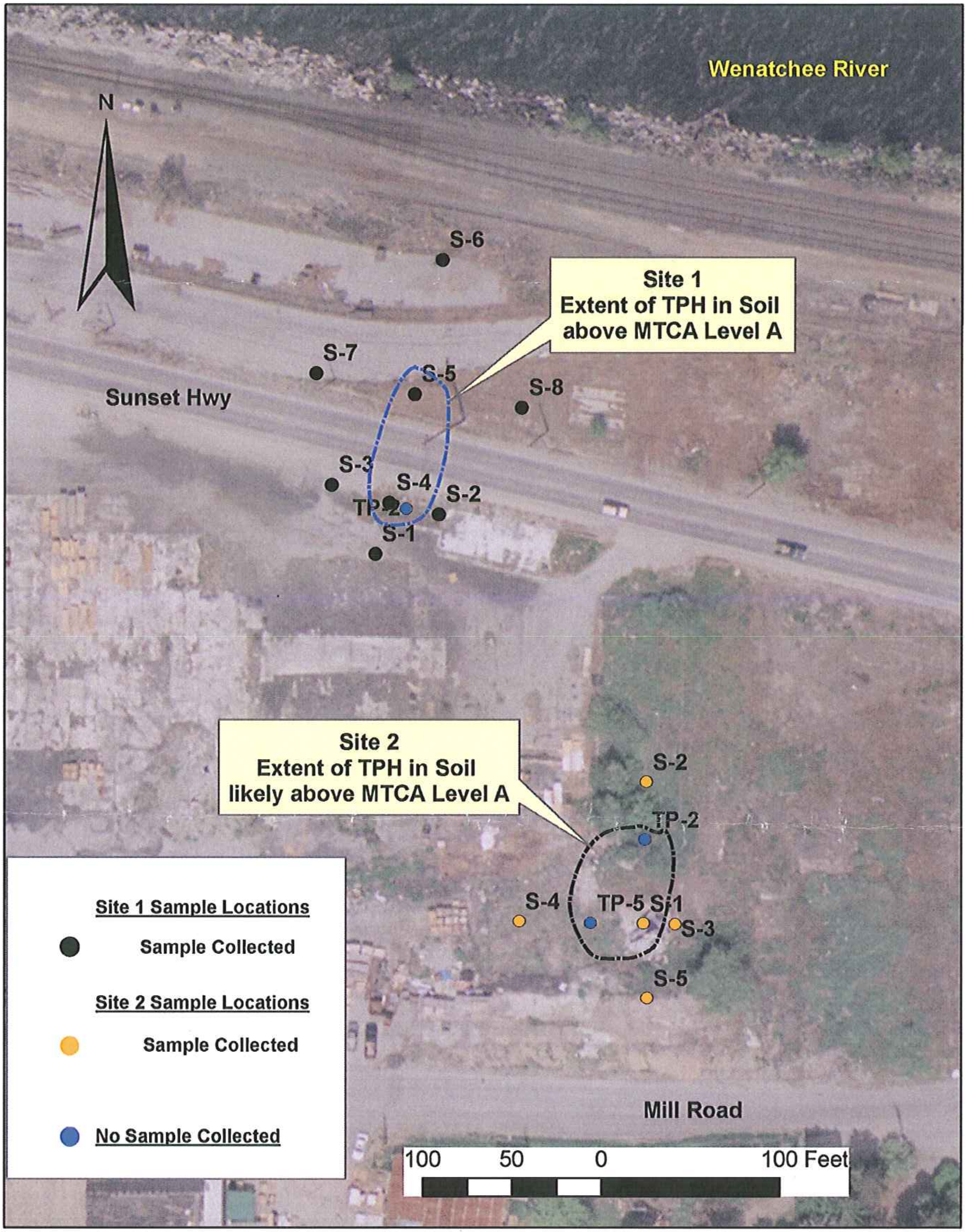
State of Washington
Hydrogeologist
1402
Licensed Geologist
Steve Nelson

RANDY L. ASPLUND
STATE OF WASHINGTON
22780
REGISTERED
PROFESSIONAL ENGINEER

SN/jw/sp

Attachments: Figure 1 Site Map
Laboratory Reports for Sites 1 and 2

Figure 1
Port of Cashmere Soil Assessment



RH2 Engineering

July 23, 2009

Mr. Don Abbot
Toxics Cleanup Program
Washington Department of Ecology
15 West Yakima Avenue, Suite 200
Yakima, WA 98902-3401

Sent Via: *US Mail*

Subject: Site Discovery Release Letter, Cashmere Mill Site, Cashmere, WA

Dear Mr. Abbot:

On May 7, 2009, the Port of Chelan County (Port) conducted a geotechnical investigation on Port property to evaluate soil and groundwater conditions along a proposed water main replacement in Cashmere, WA. During the investigation at one location (TP-2), indications were observed that soil, and potentially groundwater, were possibly contaminated by a historical release of petroleum hydrocarbons. The soil and groundwater conditions indicate that the release does not unlikely pose a threat to human health or the environment. The potential contamination at this time is not attributable to a known or suspected underground storage tank. The discovery location is at 5276 Sunset Highway, in Cashmere, Washington

The Port has attached a letter summarizing the details of the discovery. The Port initially intended to conduct a limited investigation soon after discovery, but concluded that the presence of both active and unknown underground water supply lines and other utilities posed a great risk of breakage and potentially causing a dispersion of any potential contamination in the subsurface. The Port is planning a major redevelopment of the former Mill Site, which will include decommissioning underground utilities in the area of the discovery site in October 2009. At that time, the Port intends to further assess the extent and characteristics of the petroleum hydrocarbons in soil and groundwater.

If you have any questions or need for additional information, please call either myself or Karen Kornher at RH2 Engineering.

Sincerely,

Attachment: RH2 letter, July 23, 2009

July 23, 2009

Ms. Dayle Rushing
Port of Chelan County
238 Olds Station Rd., Ste. A
Wenatchee, WA 98801

Sent Via: *US Mail*

Subject: Site Discovery Release Letter, Cashmere Mill Site, Cashmere, WA

Dear Ms. Rushing:

On May 7, 2009, RH2 Engineering (RH2) conducted a geotechnical investigation on behalf of Port of Chelan County (Port) property to evaluate soil and groundwater conditions along a proposed water main replacement in Cashmere, WA. During the investigation at one location (TP-2), RH2 encountered indications that soil, and potentially groundwater, were possibly contaminated by a historical release of petroleum hydrocarbons. The soil and groundwater conditions indicate that the release does not unlikely pose a threat to human health or the environment. The potential contamination at this time is not attributable to a known or suspected underground storage tank. **Figure 1** shows the general area of the former Mill Site and the discovery location. The discovery location is at 5276 Sunset Highway, in Cashmere, Washington, at latitude 47°31'17.69"N, longitude 120°28'44.96"W.

Summary of Discovery

A soil exploration using a backhoe encountered light-gray soil at a depth of 5.5 feet. The soil exhibited an odor characteristic of petroleum hydrocarbons, possibly gasoline-range hydrocarbons. The water-saturated soil at the water table at a depth of 6.0 feet exhibited a faint sheen, and the groundwater at the water table exhibited a faint sheen. No evidence of a measureable thickness of petroleum product was apparent at the water table. No other evidences in the surface indicate a potential source for the release. No indications of seepage of petroleum hydrocarbons were observed on the bank of the Wenatchee River (the nearest body of surface water), which is 250 feet from the discovery site.

Photo 1 – Test Pit at Discovery Site (Depth = 6 ft); Photo 2 - Soil at Discovery Site

No historical information presented in two previous Phase 1 environmental site assessment reports (Forsgren, 1990; RH2, January 2007) indicated the potential source of a release of petroleum hydrocarbons at the Mill Site in general, or specifically at the site of discovery of the release. The Phase 1 reports indicated that a gasoline and diesel UST were present and removed from the site between 1964 and 1990, and the location of the former diesel UST was approximately 50 feet from the site of discovery. A test pit (TP-3) completed in January 2007 near the former diesel UST location (**Figure 1**) to a depth of 6 feet did not encounter any evidence of petroleum hydrocarbons in soil or groundwater. At this time, RH2 considers the release as a minor spill of petroleum fuel from an unknown source near the discovery location.

Further investigation and potential remediation

RH2 understands the Port initially intended to conduct a limited investigation soon after discovery, but concluded that the presence of both active and unknown underground water supply lines and other utilities posed a great risk of breakage and potentially causing a dispersion of any potential contamination in the subsurface. RH2 understands the Port is planning a major redevelopment of the former Mill Site, which will include decommissioning underground utilities in the area of the discovery site. At that time, the Port intends to further assess the extent and characteristics of the petroleum hydrocarbons in soil and groundwater. RH2 has developed an investigation plan which includes pothole exploration around the release area and contingency to step-out further if evidence of contamination is observed (**Figure 1**). Soil remediation is expected to be conducted soon after an evaluation of the findings of the exploration. RH2 understands the Port intends to conduct a limited geotechnical boring program for site redevelopment, and may include installing one or two groundwater monitoring wells in the downgradient (northerly) direction from the discovery site.

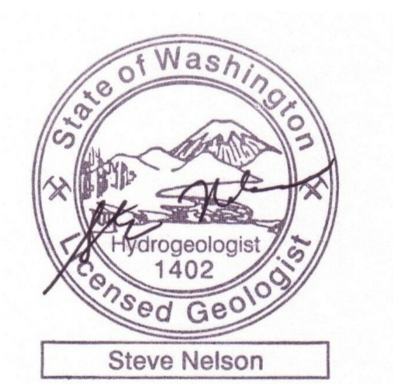
RH2 concludes that the potential contamination is limited in extent and concentration, and represents little or no immediate threat to human health or the environment. The release likely occurred during former mill operations which ceased in the 1970s, and the petroleum hydrocarbons have likely stabilized and undergone degradation since the date of release. It is expected that only a small quantity of soil containing petroleum hydrocarbon concentrations that exceed cleanup levels exists at the discovery site and would be readily remediated during the redevelopment phase of work that includes utility decommissioning and replacement. This work is scheduled for October 2009.

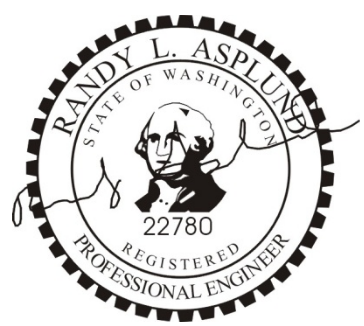
RH2 understands that Ecology may conduct an initial investigation in accordance with WAC 173-340-310 to determine whether a release or threatened release of a hazardous substance may have occurred that warrants further action. If so, access to the site of discovery is unrestricted.

If you have any questions or need for additional information, please call either myself or Karen Kornher at RH2 Engineering.

Sincerely,

RH2 ENGINEERING, INC.



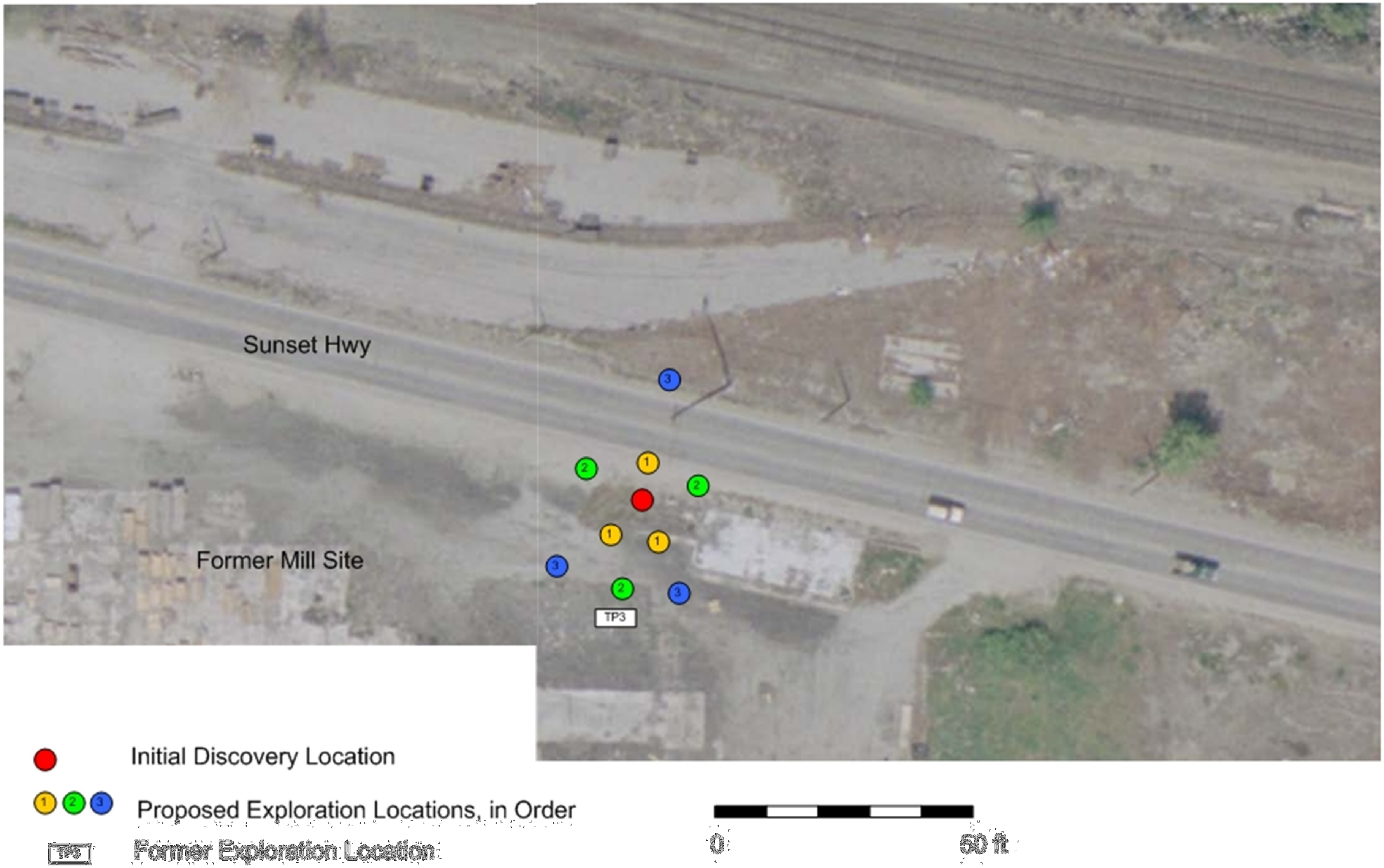


Steve Nelson, L.G., L.HG.
Senior Hydrogeologist

SN/sp/kj

Attachment: Figure 1 Site Map

Figure 1
Site Map - Contamination Assessment
Port of Chelan County Mill Pond Site



RH2 Engineering

June 16, 2009

Ms. Dayle Rushing
Port of Chelan County
238 Olds Station Rd., Ste. A
Wenatchee, WA 98801

Sent Via: *US Mail*

Subject: Cashmere Mill Site Environmental Contamination
Sampling and Analysis Plan

Dear Ms. Rushing:

This letter provides the Sampling and Analysis Plan (SAP) for the assessment of contamination discovered on May 7, 2009 during the engineering geology investigation for the Mill Pond Site Water Main Extension. The SAP is the first task of our authorization for contamination assessment issued on May 27, 2009.

This focused Sampling and Analysis Plan describes the initial exploration area, criteria for field identification of contamination by potholing and visual inspection, laboratory testing parameters, contaminated soil management, and excavation backfill.

Task 1 - Project Mobilization

RH2 will coordinate the scope and schedule with the Port and the excavation contractor that will conduct the exploration. RH2 will mark the proposed exploration areas on the ground at site and then notify public utility locator to clear exploration areas in the public right of way. The Port may or may not elect to clear utilities on Port property and rely on current as-built drawings available to RH2.

We assume the work will be completed in one working day, and all equipment will be mobilized on and off the site in one day. The Contractor will be responsible for excavating and backfilling the excavations. After completing the work, the Contractor will clean the excavation equipment at the site and place any rinse water in a shallow basin and allowed to evaporate on site.

Figure 1 shows the proposed initial and alternate sampling locations intended to delineate the boundaries of potential contamination. It is assumed that contamination may extend beneath the road, and that subsurface utilities and/or surface features may prevent exploration in certain areas.

RH2 will coordinate with the lab to obtain sufficient sampling containers and equipment to conduct the investigation and to schedule the arrival of samples, sample analysis and holding times, and expected delivery of results.

Task 2 – Site Characterization

RH2 will conduct a brief site safety meeting with the Contractor to discuss potential hazardous issues related to working on Port property and working with petroleum hydrocarbon-contaminated soil and groundwater.

The extent of contamination will be assessed by excavating small potholes with a small backhoe to the depth of the water table, approximately 6 to 8 feet below grade. The soil will be observed for lithology and evidence of contamination including visible staining and obvious odors. The field inspector will qualitatively document the degree of any apparent contamination. Each test pit will be measured for depth, and the sidewall photographed.

If no contamination is apparent in the excavation, a sample of the excavation sidewall at a depth of approximately 18 inches above the water table will be collected and submitted for analysis of gasoline-range hydrocarbons to verify that no contamination exists at that location. If contamination is present, a sample will be collected and stored in a separate cooler and submitted to the lab for archival storage. It is unlikely that the archived sample would be analyzed, but should initial testing results warrant additional characterization of the concentration or type of contaminants to optimize site cleanup, the archived samples would be available for the additional analysis. One sample of obviously contaminated soil will be submitted for analysis of both gasoline- and diesel-range hydrocarbons to confirm the type of contamination at the site.

Any apparently contaminated soil will be replaced back in the excavation at the depth of its removal, and covered by shallow soil initially removed from the excavation which will be compacted in one-foot lifts. The surface will be restored to the condition of the surrounding area; asphalt will be replaced, if necessary, with cold patch.

The results of this assessment may be useful to document non-contaminated conditions and therefore, sampling and analysis will comply with Ecology environmental site assessment guidance. Samples will be retrieved with clean sampling tools to support analysis of volatile petroleum hydrocarbons using EPA Method 5035A to determine concentrations of gasoline-range hydrocarbons and BTEX components. One sample of contaminated soil will be analyzed by Method NWTPH-Gx and by Method NWTPH-DX for diesel range hydrocarbons to characterize the type of contamination. These methods will provide sufficient data quality for Ecology to make determinations of the extent of contamination at the site.

The field inspector will obtain the samples directly from the excavation sidewall, or direct the

Contractor to retrieve a representative sample from the excavation sidewall if the sample depth is below 4 feet. The inspector will immediately obtain the sample from the backhoe bucket.

If no apparent contamination is present in soil or in groundwater at the water table, the exploration location will be considered "clean" and no further exploration in the vicinity will be conducted. If apparent contamination is present in soil or in groundwater at the water table, a step-out location will be explored at a distance of approximately 10 to 30 feet radially outward from the direction of exploration. Figure 1 shows the initial sample locations and subsequent sample locations if additional areas of contamination are discovered.

Task 3 – Laboratory Analysis

Samples will be labeled in the field and secured in an iced cooler using appropriate chain of custody management. Samples will be uniquely labeled by location, depth, and date: for example, X1-4.5-062509. The field inspector will ensure that the samples are submitted to the laboratory for analysis within the holding time, and samples will be submitted with a request for standard turnaround time, approximately 10 working days, and within the holding time should additional analysis be warranted for archived samples. Up to six samples will be analyzed for gasoline-range hydrocarbons and one sample will be analyzed for diesel-range hydrocarbons. The laboratory will be required to provide data quality sufficient to meet Ecology standards for site assessment. The laboratory results will be reviewed for data quality and assurance and tabulated for reporting. RH2 has identified two cost-competitive accredited labs (ARI Laboratories in Seattle or TestAmerica in Bothell) and will select the laboratory contractor based on laboratory capacity at the time of the project.

Task 4 – Evaluation and Reporting

All field activities including field reports and photographs will be documented and summarized in a report. Documentation of laboratory analysis will include the chain of custody, data quality review and tabulation of results. RH2 will make conclusions regarding the nature and extent of contamination at the site with recommendations to either proceed directly with soil cleanup or develop a remediation plan to address contaminated soil and groundwater. The plan will identify the most efficient method for contaminated soil management and excavation backfill.

If you have any questions or comments regarding the proposed SAP, please do not hestitate to call.

Sincerely,

RH2 ENGINEERING, INC.

Steve Nelson, L.G., L.HG.
Senior Hydrogeologist

SN/sp/kj

Attachment: Figure 1 Site Map

Preliminary Geotechnical Engineering Services

Redevelopment of Cashmere Mill Site
Mill Road and Sunset Highway
Cashmere, Washington

for
Port of Chelan County

March 5, 2010

GeoEngineers
Earth Science + Technology

Preliminary Geotechnical Engineering Services

Redevelopment of Cashmere Mill Site
Mill Road and Sunset Highway
Cashmere, Washington

for
Port of Chelan County

March 5, 2010

GeoEngineers

8410 154th Avenue NE
Redmond, Washington 98052
425.861.6000

GeoEngineers

8410 154th Avenue NE
Redmond, Washington 98052
425.861.6000

March 5, 2010

RH2 Engineering, Inc.
300 Simon Street SE, Suite 5
East Wenatchee, Washington 98802

Attention: Karen Kornher

We are pleased to submit four copies of our report, "Preliminary Geotechnical Engineering Services, Redevelopment of Cashmere Mill Site, Mill Road and Sunset Highway, Cashmere, Washington". A draft version of this report was submitted to RH2 Engineering, Inc. on February 17, 2010 for review and comment. We have incorporated the review comments in this final version of the report.

Our services were completed in general accordance with Exhibit A of a Subconsultant Agreement between GeoEngineers, Inc. and RH2 Engineering, Inc. executed December 8, 2009. Exhibit A includes our proposal dated April 8, 2009.

We have enjoyed serving you on this interesting project. Please call if you have any questions, or if you require additional information. We look forward to assisting you during the final design and construction phases of this project.

Sincerely,
GeoEngineers, Inc.

Herbert R. Pschunder, PE
Senior Geotechnical Engineer

Bo McFadden, PE, LEG
Principal

HRP:JJM:nlu
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cc: Steve Nelson, LHG, LG
RH2 Engineering, Inc.
12100 NE 195th Street, Suite 100
Bothell, WA 98011

Preliminary Geotechnical Engineering Services
Redevelopment of Cashmere Mill Site
Mill Road and Sunset Highway
Cashmere, Washington

File No. 18593-001-00

March 5, 2010

Prepared for:

RH2 Engineering, Inc.
300 Simon Street SE, Suite 5
East Wenatchee, Washington 98802

Attention: Karen Kornher

Prepared by:

GeoEngineers, Inc.
8410 154th Avenue NE
Redmond, Washington 98052
425.861.6000

Herbert R. Pschunder, PE
Senior Geotechnical Engineer

HERBERT R. PSCHUNDER
STATE OF WASHINGTON
21158
REGISTERED
PROFESSIONAL ENGINEER

3/5/10

Bo McFadden, PE, LEG
Principal

HRP:JJM:nlu
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GEOENGINEERS

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LIST OF FIGURES

APPENDICES

INTRODUCTION

This report presents the results of our preliminary geotechnical engineering services related to the proposed redevelopment of the former Cashmere Mill site in Cashmere, Washington. The approximately 32.5-acre site is located in the general vicinity of Mill Road and Sunset Highway and is currently owned by the Port of Chelan County.

A vicinity map showing the general location of the project site is shown in Figure 1. Figure 2, Site Plan, shows the project site in relation to existing features.

PROJECT DESCRIPTION

The site is generally bounded on the north by BNSF railroad tracks and the Wenatchee River; on the west, south and east by Brender Creek; and on the northwest by other commercial and light industrial properties. Sunset Highway crosses west to east through the northern portion of the site. South of Sunset Highway, Mill Road crosses the north-central portion of the site and intersects with Sunset Highway near the northeast corner of the site.

We understand that the Port plans to redevelop the former mill site with a mix of commercial and light industrial buildings, with the commercial development to be clustered along Sunset Highway. You provided a drawing titled "Cashmere Mill Site Proposed Master Use Plan" prepared by PKJB Architecture and Engineering dated December 9, 2009 that indicates the site will be subdivided into ten parcels. A new loop access road extending south of Mill Road will be constructed within the southern portion of the site.

The number, location and types of proposed buildings have not yet been determined. We anticipate that buildings will be located near the interior of the parcels and that the exterior portions of the parcels will consist of paved parking areas and access driveways.

Portions of the site are underlain by known areas of wood waste fill. We understand wood waste fill was placed in a former log pond in the northeastern portion of the site, and in a former river channel generally located in the southern portion of the site. Site development will be impacted by the presence of the wood waste fill.

AVAILABLE SUBSURFACE INFORMATION

RH2 Engineering, Inc. has previously obtained subsurface information within the site and has also completed various environmental evaluations of the site, including, but not limited to, a summary of environmental issues related to the wood waste fill. We reviewed the previous information developed by RH2 Engineering that pertains to geotechnical site conditions, which is summarized in the following documents:

- "Appendix A, Geology Report, Port of Chelan County, Cashmere Mill Site (Cedarbrook) Feasibility Study" dated January 2007. This report includes logs of test pit explorations completed in January 2007.
- "Cashmere Mill Site Wood Waste Summary" dated October 24, 2008.

We also reviewed the logs and photographs of additional test pit explorations completed by RH2 Engineering on November 30, 2009. Our Site Plan, Figure 2 indicates the approximate locations of previous explorations completed by RH2 Engineering within the site, as well as the approximate locations of explorations completed by GeoEngineers as part of the current study.

SCOPE OF SERVICES

The purpose of this phase of our services is to complete a series of relatively shallow explorations within the northeastern and southern portions of the site to further evaluate the presence, extent and characteristics of the wood waste and other fill materials in these portions of the site. The information from these explorations will be used in preliminary planning of site development for commercial and industrial uses, and in developing options for foundation support of future buildings. Additional explorations and geotechnical input may be needed during final design of individual buildings and other aspects of site development.

Our specific scope of services for this phase included the following tasks:

1. Review available subsurface information and previous reports prepared by RH2 Engineering and others for this site.
2. Arrange for RH2 Engineering personnel to identify suitable exploration locations in relation to existing underground utilities and structures, and in relation to previous explorations completed at the site.
3. Explore subsurface conditions at the site by drilling nine borings to depths ranging from approximately 6 to 17.5 feet below the existing ground surface. Seven of the borings (B-1, B-1A, B-2, B-2A and B-3 through B-5) were intended to identify the thickness, extent and character of the wood waste fill in previously unexplored areas within the northeastern and southern portions of the site. These borings also provide information on the nature of the underlying alluvial soils. The remaining two borings (B-6 and B-7) were drilled at the request of RH2 Engineering in the northeastern portion of the site to evaluate the extent of suspected hydrocarbon contamination first encountered in Boring B-1.
4. Install 2-inch diameter groundwater monitoring wells in two of the borings (B-1 and B-2) to allow for groundwater level measurements following drilling. The wells could also be used for future groundwater sampling, if necessary.
5. Complete a limited geotechnical laboratory testing program on selected soil samples obtained from the borings, including moisture content, dry density, organic content, percent fines (particles passing the No. 200 sieve), and sieve analysis (gradation tests).
6. At the request of RH2 Engineering, arrange for chemical analytical testing of two jar samples of soil suspected to be contaminated with petroleum hydrocarbons.
7. Evaluate the extent, thickness and character of the wood waste fill based on the results of the borings and the previous RH2 Engineering test pits, and comment on suitable end uses of the wood waste fill if it will be removed from building areas and other portions of the site.
8. Develop options for foundation support of the future buildings to be located near and within identified wood waste fill areas, including shallow foundations with removal and replacement

of the wood waste, and deep foundations and ground improvement such as Geopiers to allow the wood waste to remain in place.

9. Comment on issues related to leaving the wood waste fill in place, such as settlements in foundation, floor slab, pavement and utility areas, and the potential for methane gas generation.
10. Comment on site seismic issues and liquefaction potential for the site soils.
11. Prepare a report including our evaluation, conclusions and recommendations related to the wood waste fill and foundation support options, along with our supporting field and laboratory test data.

Our scope did not include design phase or construction observation services. It also did not include environmental services, other than the specific drilling, sampling and testing activities requested by RH2 Engineering and mentioned above.

SITE DESCRIPTION

Surface Conditions

The Cashmere Mill site is located approximately ½ mile west of downtown Cashmere, Washington, and is approximately 32.5 acres in size. The site is bounded on the north by BNSF railroad tracks and the Wenatchee River; on the west, south and east by Brender Creek; and on the northwest by other commercial and light industrial properties. Sunset Highway crosses west to east through the northern portion of the site. Mill Road extends west to east across the central portion of the site and intersects with Sunset Highway near the northeast corner of the site.

Figure 1, Vicinity Map, shows the site in relation to regional features. The site is shown in relation to existing features in Figure 2, Site Plan.The project site is within part of an alluvial valley formed and altered by historic meanders of the Wenatchee River and its interaction with Brender and Mission Creeks. The confluence of the creeks with each other and with the Wenatchee River is located near the northeast corner of the site. As a result of the complex erosional and depositional environment, the composition and thickness of the native alluvial deposits varies beneath the site. The site was subsequently modified by filling and grading since the early 1900s during construction of the railroad and the former mill.

Wood waste from milling operations and granular fill containing various amounts of wood waste were used to fill low lying areas in the southern portion of the site. This was done to create a storage area for logs. A former log pond located between Sunset Highway and Mill Road near the northeast corner of the site was also filled with wood waste and granular soil.

We understand the mill was closed by 1990. Most of the mill buildings have either been removed or burned down. Two buildings remain in the eastern portion of the site just south of Mill Road. The mill facilities are likely to have included process buildings, maintenance buildings, kilns, a boiler house, lumber storage facilities, office buildings, shops and various ancillary structures and storage areas. We understand a smokestack also existed in the northeast portion of the site adjacent to the log pond.

During our field exploration program, we observed a circular concrete feature embedded in the ground and enclosed within a 50-foot square fenced area in the northeast portion of the site. This feature is located approximately 50 feet south of RH2 Engineering test pit TP-2. We observed ponded water within this feature. The fenced area also includes a large deciduous tree.

In the summer of 2009, asphalt and concrete pavement covering portions of the site were removed, and some regrading of the site took place. Also, stockpiles consisting of pulverized asphalt and concrete were created, along with stockpiles of imported silty gravel soils. Three stockpiles are located north of Mill Road, and vary from 10 to 20 feet in height, 60 to 100 feet in width, and 75 to 150 feet in length. Two stockpiles are located south of Mill Road, both having a height of about 15 feet, a width of about 75 feet, and a length of about 100 feet.

Other than the stockpiles, the site is relatively level, except along the west and south sides of Brender Creek channel where there are steeper slopes extending up to a glacial outwash terrace. The terrace is about 20 feet above the general level of the site and extends beyond the south site boundary. Also, a low berm about 5 feet high extends along the north side of the Brender Creek channel in the southern portion of the site.

Wetlands exist along Brender Creek, and wetland buffers have been delineated by others at various distances (100 and 300 feet) from the creek. Various ponds associated with the wetlands exist within the southern portion of the site. There is an irrigation return ditch that extends from the west edge of the site along the south side of Mill Road to a corrugated metal culvert in the central portion of the site. The culvert eventually crosses Mill Road and extends through the northeastern portion of the site to a discharge point near the confluence of Brender Creek and nearby Mission Creek.

Vegetation at the site was largely obscured by snow cover during the time we completed our field exploration program (January 2010). Scattered deciduous trees and brush were observed within the site.

Subsurface Conditions

General

We evaluated shallow subsurface conditions within the northeastern and southern portions of the site by drilling nine borings (B-1, B-1A, B-2, B-2A and B-3 through B-7) at the approximate locations shown in Figure 2. Appendix A presents the details of our field testing program, together with the logs of our borings. Two of our borings (B-1 and B-2) were completed as monitoring wells.

Appendix A also presents the details of our geotechnical laboratory testing program. Laboratory test data is included on the boring logs and also in Appendix A. A summary of the laboratory tests we completed is presented below:

- Moisture content tests on nine samples in general accordance with American Society of Testing and Materials (ASTM) Test Method D 2216. Samples from borings B-1A, B-2, B-2A and B-3 through B-5 were tested.
- Dry density tests on eleven ring samples obtained using a heavy-duty split barrel sampler. Samples from borings B-1, B-1A, B-2, B-2A and B-4 were tested.

- Organic content tests on six samples in general accordance with ASTM D 2974. Samples from borings B-1, B-1A, B-2, B-2A, B-3 and B-4 were tested.
- Percent fines (particles passing the No. 200 sieve) tests on one sample from boring B-4 in general accordance with ASTM D 1140.
- Gradation tests (sieve analysis) for two samples, one each from borings B-1 and B-1A, completed in general accordance with ASTM D 6913.

We also reviewed the logs and photographs of previous test pit explorations that RH2 Engineering completed in 2007 and 2009 within the site. Figure 2 also shows the approximate locations of those explorations. Appendix B presents the logs of those explorations.

Two soil samples, one from boring B-1 and one from boring B-6, were submitted for chemical analytical testing. The laboratory report summarizing the chemical analytical testing is presented in Appendix C.

Shallow subsurface conditions encountered in our borings are similar to those encountered in the previous RH2 Engineering test pits, and generally consist of interlayered or mixed wood waste and soil fill overlying native granular alluvial deposits. The wood waste fill and soil fill are generally in a soft or loose condition and are highly compressible.

On our borings logs, wood waste fill material containing roughly equal parts (based on visual observation) of wood waste and soils are generally described as "wood waste mixed with silty sand, gravel and cobbles (OL/SM)". Wood waste fill material with a greater percentage of wood waste than soil are generally described as "wood waste with silty sand, gravel and cobbles (OL)". Granular fill materials with a low percentage of wood waste are generally described with "…and a trace of wood waste."

Figure 2 shows the approximate limits of fill areas containing wood waste within the northeastern and southern portions of the site. Also indicated in Figure 2 are the approximate areas where the bottom of the wood waste fill was encountered at or below a depth of 8 feet. Test pit TP-12 is included within the latter category since the log indicates that layers of peat were encountered within the alluvial soils down to a depth of 8 feet.

The granular alluvial deposits generally consist of medium dense silty sand and dense to very dense silty sand, sand and gravel with cobbles, and have low compressibility.

Subsurface soil and groundwater conditions for 1) the northeastern portion of the site and 2) the southern portion of the site are discussed separately below.

Northeastern Portion of Site (Former Log Pond)

As indicated in Figure 2, our borings B-1, B-1A, B-6 and B-7 were completed in the northeastern portion of the site. Borings B-1 and B-1A were intended to evaluate the thickness, extent and character of the wood waste fill within the former log pond area, as well as to evaluate the depth and character of the underlying native granular alluvial soils. Borings B-6 and B-7 were added at the request of RH2 Engineering to evaluate the possible presence and extent of hydrocarbon contamination as a result of encountering suspected similar contamination in boring B-1.

Previous test pits completed by RH2 Engineering in this portion of the site include test pits TP-1, -2 and -4 excavated in January 2007, and test pits TP-A and -B excavated in late November 2009.

Shallow subsurface conditions encountered in our borings within this portion of the site are similar to those encountered in the previous test pits by RH2 Engineering. The explorations encountered wood waste fill materials consisting of variable percentages of wood waste and soil. The wood waste fill materials are generally about 12 to 13 feet thick in these explorations. Test pit TP-2 encountered 3 feet of fill described as "dark brown organic material," which could be wood waste. Silty sand with gravel, cobbles and clay fill was encountered below 3 feet and extended to the bottom of this test pit. Two of the explorations, borings B-1 and B-1A, penetrated the fill and encountered native alluvial deposits at a depth of about 13 feet.

Various attempts were made to drill boring B-1A. The boring was successfully completed about 40 feet northeast of its originally staked location. The previous attempts made at the staked location, and then successively 2.5 feet, 5 feet, 10 feet northwest, 15 feet east of the staked location, and 25 feet northeast of the staked location, all encountered a concrete obstruction at a depth of about 2.5 feet.

Test pit TP-4 encountered a water line at a depth of 3 feet and was not excavated deeper.

The wood waste fill materials generally consist of a mixture of wood waste and silty sand with gravel and cobbles in a soft and loose condition. Some layers of silty sand with gravel fill containing lower percentages of wood waste were encountered in the explorations. The wood waste typically includes sawdust, bark fragments and chips with lengths up to 3 inches. Larger pieces of wood debris, although not directly sampled in our borings, are likely to exist within the fill, based on photographs of the test pits provided by RH2 Engineering.

We noted a hydrocarbon odor and heavy sheen in the upper portion of a Shelby tube sample obtained starting at a depth of 11.5 feet in our boring B-1. As mentioned above, borings B-6 and B-7 were drilled at the request of RH2 Engineering to evaluate the extent of potential contamination indicated by the sample in B-1. We also noted hydrocarbon odor and sheen from a sample of silty sand with wood waste taken at a depth of about 10 feet in B-6 (drilled about 30 feet south-southwest of B-1). No hydrocarbon odor and sheen were noted from samples taken in B-7, which was drilled approximately 60 feet south-southwest of boring B-1.

Native soil encountered beneath the wood waste and soil fill in B-1, B-1A and TP- 2 consists of dense to very dense gravel with silt, sand and cobbles. This native soil represents alluvium deposited by the Wenatchee River.

Groundwater seepage was observed at depths ranging from 5 to 13 feet during the time the explorations were being completed. The depth at which groundwater is observed during drilling and test pit excavation may be several feet lower than the true groundwater level that is typically measured in monitoring wells. Groundwater was measured in the B-1 monitoring well at a depth of 5.2 feet below the existing ground surface on January 22, 2010, two days after drilling.

We expect that groundwater levels within this and other portions of the site will fluctuate by several feet due to seasonal variations in precipitation and to changes in the level of Brender Creek and the Wenatchee River.

Southern Portion of Site (Former Log Storage Yard South of Mill Road)

The explorations completed in this portion of the site include our borings B-2, B-2A and B-3 through B-5, test pits TP-6 through -14 excavated in January 2007 by RH2 Engineering, and test pits TP-C through -I excavated in late November 2009 by RH2 Engineering. These explorations were intended to evaluate the thickness, extent and character of the wood waste fill within the former log storage area, as well as to evaluate the depth and character of the underlying native granular alluvial soils.

The majority of these explorations encountered various fill materials consisting of wood waste fill typically mixed with or interlayered with granular fill soils. The granular fill soils generally consist of silty sand with varying amounts of gravel and cobbles. The wood waste fill is typically in a soft condition, while the granular fill soils are loose. Debris consisting of bricks and car parts was noted in the fill on the log for test pit TP-6. The wood waste, where encountered, typically includes sawdust, bark fragments and chips with lengths up to 3 inches. Larger pieces of wood debris, although not directly sampled in our borings, are likely to exist within the fill, based on photographs of the test pits provided by RH2 Engineering.

A layer of orange brown wood waste (sawdust and fine shavings) with a low percentage of sand and gravel was encountered between depths of 1.5 and 4.5 feet in boring B-3. A similar layer was apparently encountered in test pit TP-F between depths of 1 and 3.5 feet.

The wood waste and granular fill soils, where encountered, extend to depths of 2 to 13 feet below the existing ground surface. Fill materials (either wood waste or granular soils) were apparently not encountered in test pits TP-7, -8, -13, -14, -E, or –H.

Native soil encountered beneath the wood waste and soil fill in the explorations consists of medium dense silty sand and dense to very dense gravel with silt, sand and cobbles. This native soil represents alluvium deposited by the Wenatchee River. The presence of some organic matter, roots and peat layers was noted in the upper few feet of the alluvium on the logs for test pits TP-6, -9 and -12.

Groundwater seepage was observed at depths ranging from 2 to 12 feet in some of the explorations as they were being completed. Groundwater seepage depths were not indicated on the logs for test pits TP-7, -9, -13, -14, -E, –F or -I. Groundwater was measured in the B-2 monitoring well at a depth of 6.7 feet below the existing ground surface on January 22, 2010, one day after drilling.

We expect that groundwater levels within this portion of the site will fluctuate by several feet due to seasonal variations in precipitation and to changes in the level of Brender Creek and the Wenatchee River.

CONCLUSIONS AND RECOMMENDATIONS

General

Based on the results of our explorations, geotechnical laboratory testing and analyses, as well as review of the test pit logs and photographs provided by RH2 Engineering, we conclude that shallow foundation and on-grade floor slab support can be used for most, if not all, of the buildings for the proposed redevelopment of the Cashmere Mill site.

Buildings located outside of identified wood waste fill and mixed wood waste/granular fill areas can be supported on shallow foundations bearing on native alluvial soils or on existing or new granular fill soils that directly overlie the alluvial soils.

Options for foundation support of buildings located within identified wood waste fill areas include:

1. Shallow foundations combined with complete removal of the wood waste fill and replacement with compacted structural fill. This option is expected to be most cost effective where the depth to the bottom of the wood waste fill is less than about 8 feet, and is expected to result in satisfactory settlement performance..
2. Deep foundation systems including pile foundation support or ground improvement, assuming that all of the wood waste fill will be left in place.
3. Shallow foundations combined with partial removal of wood waste fill down to a depth of 8 feet in areas where the wood waste extends deeper than about 8 feet. This option is least desirable, since the long-term decay and compression of the wood waste below a depth of 8 feet may result in excessive long-term settlements that could affect building performance.

Complete removal and replacement of wood waste fill should also be done in soil-supported floor slab areas (Option 1 above), where feasible. Alternatively, the floor slabs could be supported on piles or grade beams connected to foundation piles, or on improved ground in the case where no wood waste fill is removed.

If part, or all, of the wood waste fill is left (Option 3 above) in place beneath on-grade floor slab areas, some slab settlements should be expected. The magnitude of the settlements would depend on floor slab loading, the change in finished floor grade relative to existing grade, and the thickness of remaining wood waste fill.

Complete removal of wood waste fill will mitigate the potential for methane gas generation beneath building areas.

Roadways and parking areas can be supported on alluvial soils or on existing, or new granular fill soils that directly overlie the alluvial soils. Pavement areas underlain by wood waste fill may undergo long-term settlement, depending on the thickness of new fill placed in these areas. We expect it will not be cost-effective to remove and replace a significant thickness of wood waste fill in pavement areas,

In our opinion, material excavated from within identified wood waste fill areas is best suited for composting and landscaping due to the generally high percentage of granular soil included within the wood waste. . Localized layers of “pure” waste fill (that is, containing little to no granular soil) do occur within the site, but it will likely not be practical to segregate this wood waste from the rest of the fill materials while they are being excavated.

Site Preparation

The fill materials that mantle much of the site are highly moisture sensitive. Also, groundwater levels within the site are likely to be within a few feet of the ground surface. It will be difficult to properly compact or operate construction equipment on these materials when they are wet. Accordingly, we recommend that site preparation, grading and foundation installation activities be planned for the normally drier late summer to early fall months so that difficulties and costs associated with these activities can be reduced. Dewatering efforts for deeper excavations may also be reduced.

If site preparation must take place during wet weather, no attempt should be made to compact or proof roll the existing surficial soils or wood waste fill. These activities would cause softening or disturbance that could require extensive removal of unsuitable soil. General construction traffic during wet weather should be limited to access roads and layout areas. Access roads should be constructed using a layer of free-draining sand and gravel, crushed rock such as quarry spalls, or recycled concrete. A layer up to 2 feet thick may be needed in heavy traffic areas underlain by wood waste fill.

Vegetation including trees and brush should be removed from within building and pavement areas. Sod and topsoil, where present, should be stripped from building and pavement areas. We did not encounter sod or topsoil in our borings; however, based on photographs of some of the test pits excavated by RH 2 Engineering, we expect that the depth of stripping will generally be a few inches. Stripped materials should be wasted off-site or used for landscaping.

In general, exposed subgrade soils within building and pavement areas should be proofrolled with heavily loaded, rubber-tired construction equipment if site preparation is done during extended dry weather conditions. Proof rolling should immediately follow stripping. Soft, loose or otherwise unsuitable areas revealed during proof rolling should be excavated to firm soil and replaced with structural fill.

If site preparation is done during wet weather or if groundwater levels are within a few feet of the surface, the exposed subgrade should not be proofrolled because this could cause excessive disturbance of the subgrade. In wet weather, the sod/topsoil zone and unsuitable soils should be stripped with lightweight equipment and construction traffic kept off the exposed surface. A representative of our firm should evaluate the subgrade by probing to identify localized areas of unsuitable soils that need to be removed and replaced. These soils should be excavated to the depth recommended by our representative.

Dewatering

We recommend that excavations for removing fill containing wood waste as well as for underground utilities and other below-grade structures be planned for the normally dry season of the year. Groundwater control and handling would generally be less expensive then and require less effort.

We expect that significant groundwater seepage quantities will generally be encountered for excavations greater than about 5 feet in depth. Dewatering with well points or wells adjacent to the excavation, or pumping from large sumps in other portions of the excavation may be necessary.

The contractor should plan the method of dewatering within any excavation and related safety precautions. The quantities of water to be handled will depend on the season of construction, as well as the permeability of the soils through which the excavation is made and the depth, width and length of the excavation. The contractor should be prepared to handle highly variable quantities of groundwater and must be prepared to remove sediment from the collected water prior to discharging it. GeoEngineers should review the contractor's proposed dewatering plan. Surface water should be diverted away from the perimeter of excavations to reduce the quantity of water to be removed.

We recommend that groundwater level measurements be made again in the monitoring wells just prior to bidding and also at the start of excavation so that the contractor can further evaluate groundwater handling needs and costs.

Earthwork

Excavations

As discussed in the section "Foundation Support", we recommend a portion or all of the fill containing wood waste be removed from building areas and replaced with structural fill. Depths of excavation will vary significantly across the site, and the lower portions of some excavations may extend below the groundwater level.

Foundation elements from former mill structures, such as the concrete slab encountered at the several locations attempted for the drilling of boring B-1A in the vicinity of the former log pond area, may underlie future building areas, including areas of the site not previously explored. Buried concrete might also be encountered in trenches for future utilities and other deep excavations. We recommend that these buried concrete elements be removed from new building areas and from within utility trenches or other deep excavations for new facilities. Existing concrete elements may be left in place in paved areas, provided they do not interfere with utility construction.

Excavations into which personnel must enter should be sloped back in accordance with the following recommendations. We recommend that temporary cut slopes in the fill and native soils have an inclination of 1.5H:1V (horizontal to vertical) or flatter for excavations that exceed 4 feet in depth. Shallower excavations in these soils may be sloped to near vertical where significant groundwater inflow does not occur. Cut slopes may need to be made flatter locally where seepage and caving are encountered. We recommend that the inclination for slopes where seepage or caving are encountered be 2.5H:1V or flatter.

Where open cuts are not feasible or practical, trench boxes or shoring should be used in trenches with near vertical sides. On a preliminary basis, a uniform lateral soil pressure equal to 35H pounds per square foot (psf) may be used for design of internally braced shoring, assuming effective dewatering and no surcharge loads.

We recommend that site safety and shoring be made the responsibility of the contractor who is present at the site continuously and is able to observe changes in groundwater seepage and soil conditions and monitor the performance of excavations. The contractor should follow all safety requirements of federal, state and other agencies when excavating cut slopes and trenches, including the use of trench boxes and shoring. In addition, the contractor should be responsible for maintaining adequate support of adjacent facilities such as roadways during trenching operations so that they are not damaged. Temporary cut slopes should be protected with plastic sheeting during periods of wet weather to reduce the potential for erosion.

Reuse of Excavated Materials

The wood waste fill encountered in our borings and in the previous test pit explorations by RH2 Engineering is typically mixed with or interlayered with granular soil consisting of silty sand, gravel and cobbles. Localized layers of "pure" waste fill (that is, containing little to no granular soil) do occur within the site, but it will likely not be practical to segregate this wood waste from the rest of the fill materials while they are being excavated. In our opinion, suitable end uses for the excavated wood waste/soil mixture include compost and landscaping material, either for use on site or for export to other sites.

Structural Fill Criteria

Structural fill for support of foundations, floor slabs, pavements, and other settlement-sensitive elements of the redevelopment project should be free of organic matter, debris, man-made contaminants and other deleterious materials, with no individual particles larger than 6 inches in greatest dimension. Particles larger than 3 inches should be excluded from the top 1 foot of fill that will underlie floor slabs or pavements. The fill should generally consist of well-graded, free-draining pit run sand and gravel for placement above the groundwater level. Below the groundwater level, structural fill should generally consist of crushed rock or quarry spalls with particles sizes in the range of 1 to 4 inches.

As the amount of fines (particles passing the No. 200 sieve) increases, soil becomes increasingly more sensitive to small changes in moisture content and adequate compaction becomes more difficult to achieve, particularly during wet weather. Generally, soils containing more than about 5 percent fines cannot be properly compacted when the moisture content is more than a few percent above optimum. If fill placement is done during wet weather, the fines content of fill soils should be limited to less than 5 percent by weight relative to the fraction passing the ¾-inch sieve.

For earthwork during extended dry weather conditions, the fines content may be somewhat higher, provided the exposed subgrade is moist, not wet, and generally firm. Up to about 30 percent fines is usually acceptable for dry weather earthwork, provided that the fines are well distributed throughout the soil and are not present as lumps or balls, and the soil is within a few percent of the optimum moisture content.

Based on our observations, the materials in the recently placed stockpiles have a fines content significantly above 5 percent and will not be suitable for use during wet weather or on wet surfaces. However, they may be used for structural fill during extended dry weather, provided that the exposed surface is not wet and that the soils are within a few percent of the optimum moisture content.

We recommend that the suitability of structural fill soil from proposed borrow sources be evaluated by a representative of our firm before the earthwork contractor begins transporting the soil to the site.

Fill Placement and Compaction

We recommend that the following general requirements be applied to structural fill and trench backfill placement.

1. All structural fill and trench backfill must be placed in thin lifts so that uniform compaction can be achieved throughout the entire lift thickness. In general, granular soils with less than 5 percent fines can be placed in lifts of about 12 inches or less in loose thickness. Thinner lifts will be required for soils with a greater percentage of fines. Each lift must be compacted prior to placing the subsequent lift. The initial lift may need to be somewhat thicker in order to reduce the potential for pumping of wet subgrade soils and to provide uniform support for construction traffic in heavily used areas.
2. Structural fill within building areas should be compacted to at least 95 percent of the maximum dry density (MDD) determined in accordance with the ASTM D 1557 test method.
3. Crushed rock or quarry spalls placed below the groundwater level should be compacted in layers not exceeding 1 foot in thickness to a firm, nonyielding condition.
4. Structural fill and trench backfill placed within 2 feet of finished grades in pavement areas and for the entire height of permanent fill slopes should be compacted to at least 95 percent of MDD (ASTM D 1557). Below a depth of 2 feet, the fill should be compacted to at least 90 percent of MDD.
5. Fill not supporting structural elements or roadways should be compacted to at least 88 percent of the MDD (ASTM D 1557).
6. Prior to compaction, the structural fill material should be moisture conditioned to within approximately 3 percent of optimum moisture content, otherwise adequate compaction may be difficult to achieve.
7. Compaction must be achieved by mechanical means. No jetting, ponding or flooding should be used for compaction.
8. The initial lift of fill over utility pipes should be thick enough to reduce the potential for damage during compaction but generally should not be greater than about 18 inches.
9. During fill placement, a suitable number of in-place density tests should be performed by a representative of our firm or other qualified geotechnical engineer concurrently with the filling to evaluate whether or not the required degree of compaction is being achieved.

Foundation Support

General

Foundation support conditions vary significantly across the site due to the presence of the wood waste fill. In the northwestern portion of the site and in other areas of the site not underlain by wood waste, conventional shallow foundation support in native granular alluvial soils or on competent existing granular fill soils is feasible.

In the areas underlain by the compressible wood waste fill and wood waste/soil mixtures, several options could be considered for foundation support, including:

1. Shallow foundations combined with complete removal and replacement of the wood waste fill.
2. Deep foundation support consisting of piles or improved ground supporting shallow foundations, assuming no removal of wood waste fill.
3. Shallow foundations combined with partial removal and replacement of the wood waste fill down to a depth of about 8 feet.

Partial removal and replacement in foundation areas is the least desirable option, as this would likely result in greater long term settlements and some potential for building distress. .

The following sections present our preliminary recommendations for the various foundation support options. We anticipate that some modifications to these recommendations will be necessary during final design of the individual buildings.

Shallow Foundation Support

GENERAL

We recommend that buildings outside of identified wood waste fill areas be supported on conventional shallow foundations bearing on the medium dense to very dense granular alluvial soils, or on compacted structural fill extending down to these soils. Some existing loose granular fill soils may be encountered at footing subgrade elevations. If this is the case, we recommend that the existing loose fill soils be removed to a depth of 2 feet below the footing subgrade level, and replaced with structural fill placed and compacted as recommended in the "Earthwork" section of this report.

We recommend that the wood waste fill be completely removed, if possible, from beneath buildings located within wood waste fill areas. Generally, removal and replacement to depths of up to 8 feet is considered cost effective, unless groundwater is encountered at shallower depths. Leaving the lower portion of the wood waste fill in place will likely result in greater post construction settlements due to compression and ongoing decay of the wood materials.

The excavation should extend laterally outward from the edges of the footing (and the building footprint) a distance equal to the depth of the excavation. In some cases, excavations for individual footings may be deep enough so as to overlap, resulting in a general excavation over the entire building area.

As mentioned above in the "Dewatering" and "Earthwork" sections, footing excavations may extend below the groundwater level. Dewatering of the excavations and the use of crushed rock fill below the groundwater level will likely be necessary.

ALLOWABLE BEARING CAPACITY

On a preliminary basis, footings supported directly on native granular alluvial soils or on compacted structural fill used to partially or completely replace wood waste fill may be designed using an allowable bearing capacity of 2,500 psf. Exterior footings should be founded at least 24 inches below the lowest adjacent finished grade. Interior footings should be embedded at least 12 inches below the lowest adjacent grade. Isolated spread footings should have a minimum width of 24 inches, and continuous strip footings should be at least 18 inches wide.

This allowable bearing pressure applies to the total of dead and long-term live loads exclusive of the weight of the footing and any overlying backfill. This value may be increased by one-third when considering design loads of short duration such as wind or seismic forces.

SETTLEMENT

If the wood waste fill is absent or is completely removed from beneath building foundations, we expect that post-construction footing settlements will be on the order of ½ to 1 inch for comparably loaded footings supporting loads typical of one- to two-story buildings. The buildings should be designed to accommodate at least ½ inch of differential settlement between adjacent column footings. We expect that most of these footing settlements will occur as loads are applied.

If wood waste fill is left in place below a depth of 8 feet, post construction total and differential settlements of footings will be larger, and will depend on the thickness of remaining wood waste fill, footing loads, position of the groundwater level, and other factors. These larger settlements might need to be accommodated in structural design of the footings, columns and wall connections. These settlements will be more long-term in nature due to the high compressibility and ongoing decay of the wood materials. These potential settlements should be evaluated for each building where some wood waste fill will remain in order to establish an acceptable level of building performance.

LATERAL RESISTANCE

Resistance to lateral loads may be developed through friction on the base of footings and passive resistance on the sides of footings. For footings founded on native granular alluvial soils or on compacted structural fill, the allowable friction resistance may be computed using a coefficient of friction of 0.4. The allowable passive resistance on the sides of footings may be computed using an equivalent fluid density of 250 pounds per cubic foot (pcf), assuming the footings are backfilled with structural fill compacted to at least 95 percent of the MDD. The above values include a factor of safety of around 1.5.

Pile Foundation Support

GENERAL

In our opinion, either driven piles or augercast piles could be used for foundation support of buildings in areas where the wood waste fill is not removed, particularly in areas where the bottom of the wood waste is 8 feet or more below existing grades. The piles would derive their downward capacity from end bearing in the dense granular alluvial soils. In general, we recommend that the piles extend at least 5 feet into the supporting soils.

AXIAL CAPACITY

We assume that the building loads will be relatively light. For preliminary planning purposes, allowable capacities in the range of 20 to 30 tons may be used for axial downward loading for 8-inch tip diameter timber piles, assuming that the piles are new and are treated. Allowable downward capacities in the range of 30 to 40 tons could be used for 12-inch diameter pipe piles. Twelve inch-diameter augercast concrete piles with allowable capacities in the range of 30 to

40 tons could also be used. Higher capacities could be achieved, if necessary, by increasing pile embedment lengths into the supporting soils or by using larger diameter piles.

These preliminary capacities are applicable to the total of dead and long-term live loads and may be increased by one-third when considering design loads of short duration such as wind or seismic loads. These preliminary allowable capacities are based on the strength of the supporting soils for the indicated penetration and include a factor of safety of about 2.5 for end bearing and side friction.

The capacities apply to single piles. If piles within groups are spaced at least there pile diameters on-center, no reduction for group action need be made.

Allowable uplift capacities for the piles will be limited to a few tons with assumed penetration into the supporting soils of about 5 feet. Higher uplift capacities could be achieved by increasing the embedment length.

The structural characteristics of pile materials and structural connections could impose limitations on pile capacities and should be evaluated by your structural engineer. Full length reinforcing steel will be needed if augercast piles will be subjected to uplift loads. We recommend that a single reinforcing bar be installed for the entire length of augercast piles to develop the allowable uplift capacity.

SETTLEMENT

On a preliminary basis, we estimate the settlement of pile foundations designed as recommended above will be on the order of ½ inch or less. Most of this settlement will occur as building loads are applied. Post construction differential settlements between pile-supported foundation elements are expected to be negligible.

PILE DOWNDRAG

Pile downdrag forces develop when surrounding compressible soil settles relative to a pile, thus interacting with and adding load to the pile. If new fill will be placed in building areas underlain by the compressible wood waste fill, the resulting settlement could impose a small downdrag load on the piles. The downdrag loads could be on the order of 2 to 4 tons.

LATERAL CAPACITY

On a preliminary basis, the allowable load capacities for the pile types listed above may be taken as 2 tons per pile for timber piles and 4 tons per pile for the other pile types. These lateral capacities assume a center-to-center pile spacing of at least three pile diameters perpendicular to the applied load and eight pile diameters parallel to the applied load, adequate steel reinforcing for the imposed bending moments, and pile head fixity against rotation. The capacities are also based on a maximum pile head deflections of about ½ inch.

Resistance to lateral loads can also be developed by passive pressure on the face of pile caps and other below-grade elements. Passive pressures may be computed using an equivalent fluid density of 250 pcf in a triangular distribution assuming that the pile caps will be backfilled with structural fill compacted to at least 95 percent of the MDD. This passive pressure value includes a factor of safety of about 1.5.

INSTALLATION CRITERIA

Both driven piles and drilled augercast concrete piles may encounter cobbles, boulders and other obstructions as they penetrate the wood waste fill and also in the native granular alluvial soils. Some piles might encounter refusal on cobbles and boulders at penetrations shallower than recommended above. Refusal might also be encountered on obstructions within the existing wood waste and granular fill soils. We recommend that provisions be made in the project plans and specifications to address the obstructions, and to evaluate the capacity of piles that encounter refusal on obstructions, cobbles or boulders. Installation of replacement piles may be appropriate.

Driven piles should be installed with a pile driving hammer having a minimum rated energy appropriate for the pile type, length and design load. To develop the preliminary estimated downward capacities, the piles should be driven to the penetration indicated, or to refusal, whichever occurs first. Refusal criteria are dependent on the driving equipment characteristics, pile type, required capacity, group action and other parameters. When identified, we can evaluate these parameters to develop appropriate refusal criteria.

Augercast concrete piles should be installed to the recommended tip elevation (or as adjusted in the field) using a continuous-flight, hollow-stem auger. As is common practice, the pile grout is pumped under pressure through the hollow stem as the auger is withdrawn to prevent caving of the sides of the drilled hole. Reinforcing steel for bending and uplift is placed in the fresh grout column immediately after withdrawal of the auger.

We recommend that the augercast piles be installed by a contractor experienced in their placement and using suitable equipment. Grout pumps should be fitted with a volume-measuring device (for example, stroke counter with related volume calibration information) and pressure gauge so that the volume of grout placed in each pile and the pressure head can easily be determined. During grouting, the rate of auger withdrawal should be uniform and controlled such that the volume of grout pumped is equivalent to at least 115 percent of the theoretical hole volume. A grout line pressure of at least 100 pounds per square inch (psi) should be maintained during grouting. A grout head (the depth of auger in the ground when grout return is observed) of at least 10 feet should also be maintained.

We recommend that there be a waiting period of at least eight hours between installation of piles spaced closer than about 10 feet center-to-center in order to avoid disturbance of concrete undergoing curing in a previously cast pile.

There may be unexpected variations in the depth to and characteristics of the supporting soils across the site. In addition, no direct information regarding the capacity of augercast piles (such as driving resistance data for the driven piles) is obtained while this type of pile is being installed. Accordingly, we strongly recommend that we be retained to observe drilling operations, record indicated penetrations into supporting soils, observe grout injection procedures, record the volume of grout placed in each pile relative to the calculated volume of the hole, and evaluate the adequacy of each pile installation. We should also observe the installation of driven piles.

Ground Improvement

An alternative to pile foundations is to improve the support capability of the wood waste fill and mixed fill soils so that shallow spread foundations could be used without removing the wood waste fill. One such method is the Geopier system, a proprietary system that consists of 24- to 36-inch-diameter drilled holes filled with densely compacted crushed rock. The holes can also be created by driving a mandrel down to suitable bearing soils. The crushed rock is placed in the hole in lifts of about 12 inches in thickness and compacted using a high-energy hydraulic ram. Grout could be added to the portion of the crushed rock column extending through the wood waste fill in order to provide higher lateral stiffness and therefore a higher vertical load capacity or smaller foundation settlements.

If drilling is used to install the piers, casing might be required because of the high groundwater level and the potential for caving of the near-surface soils. Casing would not be required if the holes are created by driving a mandrel.

The piers would be installed in a grid pattern beneath footings and also at regular intervals beneath ground floor slab areas, if needed to control slab settlements. The piers would extend through the existing fill soils and terminate at the upper surface of the native granular alluvial soils. We anticipate that the base of the piers would range up to about 13 to 14 feet below the existing ground surface. For preliminary planning purposes, an allowable footing bearing pressure of at least 2,500 psf under dead and long-term live loads would be possible with this system. The pier system should be designed so that abrupt differential settlements do not occur.

We can provide more input for this system during final design, if desired. In addition, we recommend that the design team interact with a representative of the Geopier Foundation Company to develop design and cost information.

We recommend that we be retained to observe Geopier installation, including drilling or driving operations, rock placement, and rock compaction.

Floor Slab Support

The floor slabs for buildings outside of wood waste fill areas can be supported on-grade. We recommend that the exposed subgrade soils within these slab-on-grade areas be prepared by proofrolling with heavily loaded, rubber-tired construction equipment if site preparation is done during extended dry weather conditions and if groundwater levels are sufficiently low. Proofrolling should immediately follow excavation. Soft, loose or otherwise unsuitable areas revealed during proofrolling should be excavated to firm soil or to 2 feet, whichever is less, and replaced with structural fill.

If site preparation is done during wet weather or if groundwater levels are within a few feet of the surface, the exposed subgrade should not be proofrolled because this could cause excessive disturbance of the subgrade. In wet weather or on wet surfaces, the final few inches of excavation to subgrade level should be done with lightweight equipment and construction traffic kept off the exposed surface. A representative of our firm should be allowed to evaluate the subgrade by probing. Our representative will evaluate whether there are localized areas of unsuitable soils that need to be removed or replaced. These soils should be excavated to the depth recommended by our representative.

We recommend that a capillary break zone consisting of at least 6 inches of crushed rock containing negligible sand and silt be installed directly beneath the slab. The crushed rock should have a maximum particle size of ¾ inch. We recommend that a vapor retarder be placed in floor slab areas where moisture in the slab cannot be tolerated, such as areas that will have vinyl, tile or carpeted finishes. The vapor retarder should consist of a layer of plastic sheeting intended for this application with a thickness sufficient to withstand foot traffic during placement of reinforcement and slab concrete.

We estimate that the settlements of the floor slabs in areas that are supported as recommended above, not underlain by wood waste fill, and subjected to uniform areal loads of 100 psf will be about ½ inch or less. Abrupt differential settlements are not likely to occur unless highly variable floor loads are placed. On a preliminary basis, a modulus of subgrade reaction of 100 kips per cubic foot (kcf) may be used for design of slabs supported as recommended above.

We recommend that consideration be given to removing and replacing all wood waste fill from beneath floor slab areas, if feasible, because of the potential for long-term settlements caused by both floor loads and decay of the wood material. If this cannot be done, we recommend that partial removal and replacement with structural fill be done for at least the upper 8 feet of wood waste fill.

For on-grade floor slabs where wood waste fill will remain in place below a depth of 8 feet, we estimate that post-construction floor slab settlements could range from 1 to several inches. Differential settlements could significantly exceed ½ inch in the deeper wood waste fill areas.

Some cracking of floor slabs underlain by wood waste fill may be expected where differential settlements are relatively large. Measures to increase the tolerance of the slabs to settlements should be implemented, such as use of bars rather than wire mesh to reinforce the slab. In addition, distress may be caused by differential settlement between spread footing and floor slab areas. Consideration should be given to structurally isolating the slabs from the footings or pile caps. Differential settlements along building walls may be large enough to require periodic recaulking of joints.

Alternatives to on-grade support of slabs in wood waste fill areas include supporting the slabs on grade beams and piles, or on Geopiers.

Methane Mitigation

If possible, all wood waste fill beneath enclosed building floor slab areas should removed and replaced with new structural fill so that the potential for generation of methane gas can be essentially eliminated.

Provision should be made in enclosed floor slab areas that are underlain by any wood waste fill to vent potential accumulations of methane gas generated by ongoing decomposition of the wood. Venting could be done by placing a system of perforated pipes beneath the floor slab in a grid pattern with a spacing of about 25 feet. The pipes should be vented outside the building, either at ground or at roof level. Methane vapor mitigation should also include placing a PVC liner or a sprayed liner beneath the floor slab.

Utility Construction

Underground utilities within areas underlain by wood waste fill might experience some post construction settlement. Such utility lines that tie to buildings should have flexible connections and be designed to accommodate differential settlement without damage.

Trenching for underground utilities will encounter existing wood waste and granular fill soils, and native granular alluvial soils. Buried elements (such as concrete) related to former mill structures might also be encountered in the trenches. Shallow groundwater levels should be expected in the trenches, particularly during the normally wet portions of the year. We expect that trench boxes will be necessary for construction of deeper utilities. Recommendations for trench excavation, shoring and dewatering are provided in previous sections of this report.

Bedding soil at least 6 to 12 inches thick may be required for pipe, manhole and other utility structure support in the existing wood waste and granular fill soils. The bedding soil should generally consist of imported sand or fine gravel. The bedding soil should be compacted to a firm, stable condition. This may be difficult to attain if the trench has some water in it. Bedding should also be placed around and 6 inches above the top of the pipe. Care should be taken by the contractor to avoid damaging the pipes during placement and compaction of bedding and backfill.

Backfill above the bedding soil should consist of structural fill placed and compacted as recommended above in the "Earthwork" section of this report. It is important to pavement, sidewalk and floor slab performance that utility trench backfill be compacted in accordance with our recommendations.

Pavements

Pavement subgrade areas should be prepared and filled as recommended in the "Site Preparation," and "Earthwork" sections of this report.

New fill that will be placed in pavement areas underlain by wood waste fill may result in significant long-term settlements. The amount of settlement will depend on the thickness of new fill and the decay of the wood materials. If possible, placement of the final paving layer should be delayed as long as possible after filling. It may be necessary to periodically repair distressed pavement areas during the life of the pavement.

On a preliminary basis, we recommend that the pavement section in areas used primarily for automobile parking consist of 2 inches of hot mix asphalt concrete (Class ½ inch, PG 58), 4 inches of crushed surfacing base course, and 6 inches of free-draining sand and gravel subbase fill. In areas directly underlain by wood waste fill, we recommend that the subbase fill thickness be at least 12 inches. Greater depths may be needed in localized areas identified during proofrolling or probing. In driveways and in truck parking and loading areas, we recommend increasing the thickness of asphalt concrete to 4 inches.

If pavement subgrade preparation work will take place during wet weather, it might be necessary to increase the thickness of subbase fill. Generally, a 12-inch thickness is adequate for protection except for heavy traffic areas, where 18 inches may be needed. It might also be appropriate to place asphalt-treated base (ATB) as a temporary wearing surface for construction traffic during prolonged wet weather. The ATB should be at least 3 inches thick and may be used as a direct substitute for the crushed surfacing base course.

Crushed surfacing base course should conform to Washington State Department of Transportation Standard Specifications for Road, Bridge and Municipal Construction, Section 9-03.9(3), Crushed Surfacing Base Course. Subbase fill should generally conform to Section 9-03.14, Gravel Borrow, except the percent passing the U.S. No. 200 sieve should not exceed 5 percent. Both the crushed surfacing base course and the subbase fill should be compacted to at least 95 percent of the MDD estimated in accordance with ASTM D 1557. It is important to pavement performance that backfill in utility trenches also be properly compacted.

Surface Drainage

We recommend that the ground surface adjacent to the buildings be sloped so that surface runoff flows away from the structures. Roof drains should be connected via tightlines to appropriate discharge points.

Seismic Considerations

General

Potential seismic hazards at this site from earthquakes include surface fault rupture, ground shaking, liquefaction, lateral spreading and landslides. We evaluated the likelihood of each of these hazards at the site.

Surface Fault **Rupture**

The north central Washington area has experienced some seismic activity in the past, as evidenced by a large earthquake that occurred in the Chelan area on December 14, 1872. This earthquake is the subject of an on-going study related to the safety evaluation of several dams along the Columbia River.

We reviewed published geologic maps by the United States Geological Survey (USGS) on known recent (Quaternary) faults in the Cashmere vicinity. The closest mapped recent faults are located 25 miles to the south and 35 miles to the west. No other known active faults are mapped that extend through the project site or vicinity. An apparently inactive high angle fault trending northwest to southwest is mapped about ½ mile northeast of the site.

Based on the available information, it is our opinion that the potential for surface fault rupture at the site is low.

Ground Shaking – 2006 IBC Information

For this site we recommend the IBC parameters for Site Class, short period spectral response acceleration (S_S), 1-second period spectral response acceleration (S_1), and Seismic Coefficients F_A and F_V presented in the following table:

2006 IBC Parameter	Recommended Value
Soil Profile Type	D/E (see below)
Short Period Spectral Response Acceleration, S_S (percent g)	54.4
1-Second Period Spectral Response Acceleration, S_1 (percent g)	18.4
Seismic Coefficient, F_A	1.37/1.61
Seismic Coefficient, F_V	2.06/3.25

The portions of the site in which the buildings will be supported directly on the native granular alluvial soils or on compacted structural fill extending down to these soils may be classified as Soil Profile Type D. The portions of the site underlain by wood waste fill (if not removed) should be classified as Soil Profile Type E.

Liquefaction

Liquefaction is a condition where soils experience a rapid loss of internal strength as a result of strong ground shaking. Ground settlement, lateral spreading and sand boils may result from soil liquefaction. Structures supported on large zones of liquefied soils could undergo potentially damaging differential settlements or lateral movement. Conditions favorable for liquefaction include loose to medium dense sand that has a low percentage of silt and that is below the groundwater table.

Medium dense silty sand layers were encountered in the upper portion of the alluvial deposits in a few of the explorations. Based on our preliminary evaluation, these layers have a low potential for liquefaction during an earthquake associated with the parameters listed above. We estimate that the total ground subsidence resulting from liquefaction of these granular soils could range from 1 to 2 inches. Differential movement may be about one-half of the total subsidence over a distance of 100 feet. Somewhat greater amounts of subsidence could result in areas where the wood waste fill and loose granular fill remains in place. The dense to very dense granular alluvial soils are not considered susceptible to liquefaction.

Actual settlement patterns will vary widely based on variations in silt content, thicknesses of loose soil and wood waste fill zones and the particular characteristics of the earthquake such as horizontal and vertical accelerations, duration and attenuation behavior. The pile-supported elements or improved ground areas of buildings are not likely to experience significant liquefaction-induced settlements.

Lateral Spreading

Lateral spreading involves lateral displacements of large volumes of liquefied soils during a large earthquake. Lateral spreading can occur on near-level ground as blocks of surface soils displace relative to adjacent blocks. Lateral spreading also occurs as blocks of surface soils are displaced toward a nearby slope (free face). Some limited lateral spreading along the banks of Brender Creek may occur at this site during a very large earthquake; however, we consider it unlikely that the lateral spreading would occur far enough into the interior of the site to affect structures or other site improvements.

Landslides

Some slope instability may occur along the banks of Brender Creek during a large earthquake. These landslides, if they occur, are likely to be relatively shallow in nature and are unlikely to affect site improvements.

LIMITATIONS

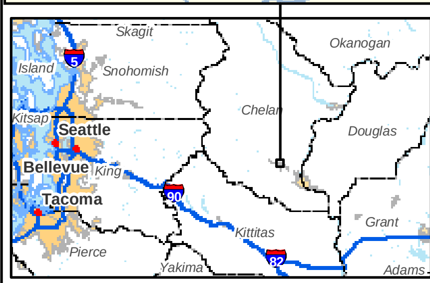
We have prepared this report for the exclusive use by RH2 Engineering, Inc., the Port of Chelan County and their authorized agents in the preliminary design of the geotechnical elements of the proposed redevelopment of the Cashmere Mill site. The data and report should be provided to prospective contractors for their bidding or estimating purposes, but our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix D titled “Report Limitations and Guidelines for Use” for additional information pertaining to use of this report.

FIGURES



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Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

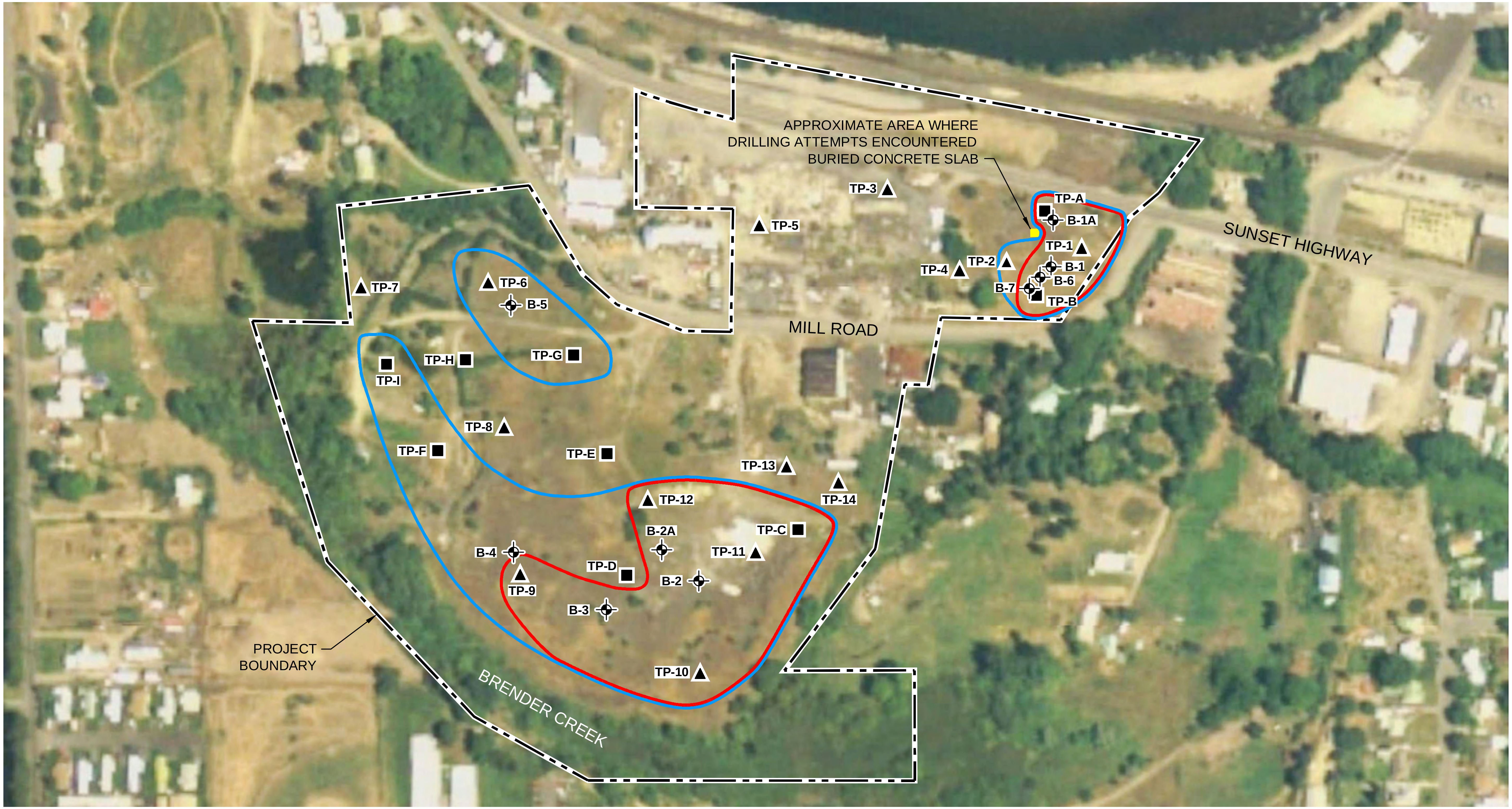
Vicinity Map

Redevelopment of Cashmere Mill Site
Cashmere, Washington

GeoEngineers

Figure 1

Office: Redmond Path: W:\Redmond\Projects\18\18593001\GIS\1859300100_F1.mxd Map Revised: February 04, 2010 EL



Notes

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Reference: Base Aerial from IR3 Imagery.

Legend

B-1 — Boring by GeoEngineers, Inc. (January 2010)

TP-A — Previous Test Pit by RH2 Engineering, Inc. (November 2009)

TP-1 — Previous Test Pit by RH2 Engineering, Inc. (January 2007)

Approximate Limits of Wood Waste Fill

Approximate Areas where Bottom of Wood Waste Fill was Encountered at or Below Depth of 8 Feet

Site Plan

Redevelopment of Cashmere Mill Site
Cashmere, Washington

GEOENGINEERS

Figure 2

W:\Redmond\Projects\18\1859300100\CAD\185930010 Fig 2.dwg\TAB:Landscape modified by tmichaud on Mar 04, 2010 - 11:47

APPENDICES

GeoEngineers

APPENDIX A
Field Explorations and Laboratory Testing

APPENDIX A
FIELD EXPLORATIONS, ENVIRONEMTNAL SAMPLING AND FIELD SCREENING, AND LABORATORY TESTING

Field Explorations

We explored shallow subsurface conditions within the project site by drilling nine borings (B-1, B-1A, B-2, B-2A and B-3 through B-5) at the approximate locations shown in Figure 2. Figure 2 also shows the approximate locations of previous test pit explorations completed by RH2 Engineering, Inc. in 2007 and 2009 within the site.

A representative of RH2 Engineering staked the boring locations prior to our mobilizing to the site, then subsequently measured the actual boring locations by obtaining GPS coordinates. The boring locations should be considered accurate only to the degree implied by the method used. Elevations at the exploration locations were not determined, as a topographic site plan or site benchmarks with known elevations were not identified at the time we completed the explorations. We understand that RH2 Engineering will survey the ground surface elevations at the boring locations later in 2010.

Our drilling activities occurred on January 20 and 21, 2010. Several inches of snow covered the ground surface during the time of our field explorations. We drilled our borings to depths ranging from approximately 6 to 17.5 feet below the existing ground surface using subcontracted track-mounted, hollow-stem auger drilling equipment.

A member of our geotechnical engineering staff classified the soils encountered in the borings, observed and recorded groundwater seepage conditions, obtained representative samples of the soils using various sampling techniques, and prepared a detailed field log of each boring. Our representative also assisted in the installation of monitoring wells at two of our boring locations, and conducted environmental sampling and field screening at two boring locations (as described below).

We classified the subsurface materials in general accordance with the system described in Figure A-1. Figure A-1 also includes a key to the boring log symbols. Figures A-2 through A-10 present the logs of our borings. The logs reflect our interpretation of the field conditions and the results of geotechnical laboratory evaluation and testing of soil and wood waste samples. They also indicate the depths at which the soil types or their characteristics change, although the change might actually be gradual. If the change occurred between samples, it was interpreted.

Samples of the subsurface materials were obtained in the borings by driving two types of split barrel samplers. Samples of wood waste and other fill materials were obtained by driving a 2.4-inch inside diameter thick-walled split barrel sampler using a 140-pound hammer falling approximately 30 inches. Samples of the underlying native alluvial soils were obtained by driving a 1.4-inch inside diameter Standard Penetration test (SPT) split barrel sampler using a 140-pound hammer falling approximately 30 inches. The number of blows required to drive each type of sampler the final 12 inches or other specified distance is recorded on the boring logs. A thin wall (Shelby tube) sample was obtained during the drilling of boring B-1. Also, we obtained bag samples of soil cuttings from the auger used to advance the borings.

We made observations of groundwater conditions as the borings were completed. Two-inch diameter monitoring wells were installed in borings B-1 and B-2 to allow measurement of groundwater levels after drilling. We measured groundwater levels in the monitoring wells on January 22, 2010. The measurements are noted on the respective boring logs.

Environmental Sampling and Field Screening

We noted hydrocarbon odor and sheen from the top of the Shelby tube sample obtained from 11.5 to 13.5 feet in boring B-1. The soil sampling equipment or the drilling equipment had not been decontaminated prior to obtaining the Shelby tube sample. A portion of the soil sample was collected from the top of the Shelby tube using a stainless steel knife and gloves, and was placed in a laboratory prepared sample jar for potential chemical analysis. The sample container was completely filled to minimize headspace. A small amount of the sample was used for field screening.

We also noted hydrocarbon odor and sheen from a split barrel sample obtained from a depth of about 11.5 feet in boring B-6, drilled about 30 feet southwest of boring B-1. Similar sampling procedures as above were used to obtain a jar sample for potential chemical analytical testing, with the exception that the split barrel sampler had been decontaminated with a soap solution and distilled water prior to the sampling attempt. Equipment to steam clean the drilling equipment was not available.

Samples submitted for chemical analysis are denoted by "CA" on the logs. The soil samples were placed in a cooler with snow and subsequently refrigerated prior to transport to the chemical analytical laboratory. Standard chain of custody procedures were followed in transporting and submitting the soil samples to the laboratory. RH2 Engineering requested that the samples be sent to On-Site Environmental Inc. in Redmond, Washington to be tested for diesel-range hydrocarbons. Appendix C includes the report of the analytical test results.

We conducted limited field screening on the two samples described above. Field screening results can be used as a general guideline to delineate areas of possible petroleum- or solvent-related contamination in soils. In addition, screening results are often used as a basis for selecting soil samples for chemical analysis.

The screening methods employed included noting odor from the sample and water sheen testing.

Water sheen testing involves placing soil in water and observing the water surface for signs of sheen. The results of water sheen testing on soil samples from the borings are presented on the boring logs. Sheens are classified as follows:

No Sheen (NS)	No visible sheen on water surface.
Slight Sheen (SS)	Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly.
Moderate Sheen (MS)	Light to heavy sheen, may have some color/iridescence; spread is irregular to flowing; few remaining areas of no sheen on water surface.
Heavy Sheen (HS)	Heavy sheen with color/iridescence; spread is rapid; entire water surface may be covered with sheen.

Field screening results are site- and boring-specific. The results may vary with temperature, moisture content, soil lithology, organic content and type of contaminant.

Geotechnical Laboratory Testing

We brought the soil and wood waste samples obtained from our borings to our Redmond geotechnical laboratory for further evaluation and testing. Selected samples were tested for various engineering properties including moisture content, dry density, organic content, percent fines and gradation.

We conducted moisture content determinations on several samples in general accordance with American Society of Testing and Materials (ASTM) Test Method D 2216. These determinations were used for sample correlation. We also conducted dry density tests on ring samples obtained with the heavy-duty split barrel sampler. The boring logs include the results of the moisture content and dry density tests.

Organic content tests were completed in general accordance with ASTM D 2974 on six samples of wood waste or wood waste/soil mixtures. These tests were used to evaluate the character of the wood waste and mixtures encountered in the borings. Percent fines (particles passing the No. 200 sieve) tests were conducted on several soil samples in general accordance with ASTM D 1140. The organic content and percent fines test results are also indicated on the boring logs.

Gradation test (sieve analysis) results for two samples of the native alluvial soils are presented in Figure A-11. These tests were completed in general accordance with ASTM D 6913.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod

Measured groundwater level in exploration, well, or piezometer

Groundwater observed at time of exploration

Perched water observed at time of exploration

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Material Description Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
NT	Not Tested

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS

GEOENGINEERS

FIGURE A-1

Drilled	Start 1/20/2010	End 1/20/2010	Total Depth (ft)	17.5	Logged By NCS / Checked By HRP	Driller	Holocene Drilling	Drilling Method	Hollow-stem Auger/SPT/D&M

Hammer Data	Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50	A 2 (in) well was installed on 1/20/2010 to a depth of 17.5 (ft). Well was developed on 1/22/2010.
Surface Elevation (ft) Vertical Datum	Undetermined	Top of Casing Elevation (ft)		
Latitude Longitude		Horizontal Datum	N/A	

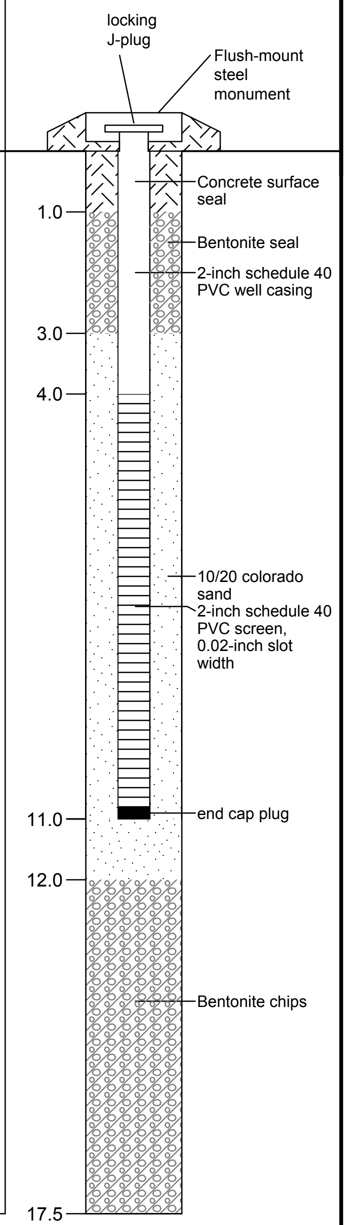
Groundwater

Date Measured	Depth to Water (ft)	Elevation (ft)
1/22/2010	5.2	

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.; Shelby Tube 3 inches I.D.

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)
	0		6			1			OL	Dark brown wood waste with silty sand, gravel and cobbles (soft, moist) (fill)	30	
										(wood waste includes chips and bark fragments to 2 inches long) organic content = 26%		
			14	9		2				Grades to dark brown and medium stiff	49	31
										(wood waste includes chips up to 3 inches long)		
						2a						
	5		12	5		3	▼			Grades with increasing silty sand content	69	36
										(wood waste includes sawdust, bark and chips to 1 inch long)		
						3a	▽					
			12	8		4			SM/OL	Gray and brown silty fine to coarse sand with wood waste, gravel and cobbles (very loose, wet) (fill)	20	57
						4a				(wood waste includes sawdust and chips from ½ to 2½ inches long)		
										(wood waste includes roots and sticks to ¼-inch-diameter)		
	10		12	3		5					52	55
						5a			OL	Dark brown decomposed wood waste with silty fine sand (very soft, wet) (fill)		
			24			6				(hydrocarbon odor and sheen at top of sample; sample submitted for chemical analysis)		
									GP	Gray fine to coarse gravel with sand and cobbles (dense, wet) (alluvium)		
	15		18	40		7					10	
			5	50/5"		8						

WELL LOG



Note: See Figure A-1 for explanation of symbols.

Log of Monitoring Well B-1

GeoEngineers

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-2
Sheet 1 of 1

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	1/21/2010	1/21/2010	17.3	NCS	HRP	Holocene Drilling	Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	Automatic 140 (lbs) / 30 (in) Drop
Drilling Equipment	Diedrich D-50	Latitude Longitude	
System Datum	N/A		

Groundwater: Date Measured	Depth to Water (ft)	Elevation (ft)
1/21/2010	7.0	

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0					1			SM	Brown silty fine to coarse sand with gravel, cobbles, and trace wood waste (medium dense, moist) (fill)	19		Wood waste includes bark fragments to 1-inch
			0	59		2							Sampler driven on gravel or cobble
									OL	Dark brown wood waste with silty sand, gravel and cobbles (very stiff, moist) (fill)			Softer drilling Wood waste includes sawdust and chips to 1 inch long
	5		15	30		3					31		
						3a	∇						
			18	6		4			SM	Dark brown silty fine to coarse sand with gravel and trace of wood waste (very loose, wet) (fill)	26	75	Wood waste includes sawdust and chips to ½ inch long
						4a				Organic content = 4%	25		
	10		0	6		5							No recovery
				53		6					33	66	Wood waste includes sawdust and small decomposing chips
						6a 6b			GP	Gray fine to coarse gravel with cobbles (very dense, wet) (alluvium)			Rough drilling
	15												
			15	50/4"		7					13		

Boring was completed about 40 feet NE of intended location. Various attempts to drill at the intended location, and at 2.5, 5, 10 NW and 15 feet E, and 25 feet NE of intended location encountered a concrete obstruction at a depth of 2.5 feet.

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-1A

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-3
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 14.1	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Hammer Data	Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	Undetermined	Top of Casing Elevation (ft)	
Latitude Longitude		Horizontal Datum	N/A

A 2 (in) well was installed on 1/22/2010 to a depth of 13.5 (ft).
Well was developed on 1/22/2010.

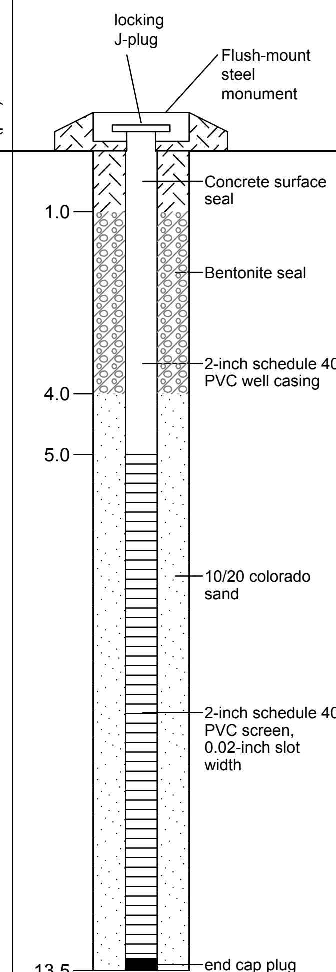
Groundwater

Date Measured	Depth to Water (ft)	Elevation (ft)
1/22/2010	6.7	

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Elevation (feet)	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)
	0							OL/SM	Dark brown wood waste mixed with silty sand, gravel, and cobbles (soft/loose, moist) (fill)		
		6			1					40	
									(wood waste includes chips, bark and lumber fragments to 3 inches long) Organic content = 29%		
		6	47		2				(sampler driven on gravel or cobble)		
	5	12	12		3					47	48
					3a	▼			Grades to medium stiff (wood waste includes sawdust and wood chips to 2 inches long)		
		15	27		4				Grades to stiff (wood waste includes sawdust and wood chips to 2 inches long)	39	56
					4a						
	10	18	16		5				Grades to medium stiff (wood waste includes sawdust and wood chips to ½ inch long)		
					5a	∇		SM	Gray silty fine to medium sand with gravel and wood waste (medium dense, moist) (fill)	58	
		5	50/2"		6			GM	Gray silty fine to coarse gravel with sand and cobbles (very dense, wet) (alluvium) (Harder drilling)		
		0	50/1"		7				Refusal on boulder/cobbles		

WELL LOG



Note: See Figure A-1 for explanation of symbols.

Log of Monitoring Well B-2

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-4
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft)	12.7	Logged By NCS / Checked By HRP	Driller	Holocene Drilling	Drilling Method	Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) / Vertical Datum	Undetermined	Hammer Data	Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Latitude / Longitude		System Datum	N/A	Groundwater	

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
1/21/2010	7.0	

FIELD DATA

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0								OL	Dark brown wood waste with silty sand, gravel and cobbles (soft, moist) (fill)			
						1					71		Wood waste includes sawdust, bark and chips to 3 inches long
						2					23		Large wood chunks in sampler Organic content = 13%
													Rough drilling
	5		0	18		3							No recovery
							∇		OL/ML	Dark brown fine-grained wood waste mixed with sand, gravel and cobbles (soft/loose, wet) (fill mixed)			
						4							Change in drilling
									GP-GM	Gray sandy fine to coarse gravel with silt and cobbles (dense, wet) (alluvium)			Rough drilling
	10		6	42		5							
			1	50/2"		6							Sampler driven on gravel or cobble

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-2A

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-5
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 12.7	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	Automatic 140 (lbs) / 30 (in) Drop
Drilling Equipment	Diedrich D-50		
Latitude Longitude		System Datum	N/A

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
1/21/2010	7.0	

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0								OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (soft/loose, moist) (fill)			
						1					39		Wood waste includes sawdust, bark fragments and chips from ¾ inch to 3 inches long
									OL	Orange brown wood waste (stiff, moist) (fill)			
			6	22		2					93		Wood waste includes fine shavings and sawdust Organic content = 63%
									OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (medium stiff/medium dense, moist) (fill)			
	5		6	50/6"		3					65		Wood waste includes sawdust and chips to ½ inch long Sampler driven on gravel or cobble
							∇						
			10	63		4							
									SM	Gray silty fine to coarse gravel with sand and cobbles (very dense, wet) (alluvium)			Rough drilling
	10												Rough drilling
			2	50/2"		5							

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-3

GeoEngineers

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Drilled: Start 1/21/2010, End 1/21/2010	Total Depth (ft): 12.5	Logged By NCS; Checked By HRP	Driller: Holocene Drilling	Drilling Method: Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) / Vertical Datum: Undetermined	Hammer Data: Automatic, 140 (lbs) / 30 (in) Drop	Drilling Equipment: Diedrich D-50
Latitude / Longitude	System / Datum: N/A	Groundwater: Date Measured 1/21/2010; Depth to Water (ft) 8.0; Elevation (ft)

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Depth (feet)	Recovered (in)	Blows/foot	Sample Name / Testing	Water Level	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
0			1		OL/SM	Brown wood waste mixed with with silty sand, gravel and cobbles (soft/loose, moist) (fill)	46		Wood waste includes bark and chips to 2 inches long
	16	22	2		OL	Dark brown wood waste with silty sand, gravel and cobbles (stiff, moist) (fill)	39	46	Large wood chunks in sampler Wood waste also includes chips and bark to 3 inches long
			2a				96		Organic content = 57%
5	18	24	3				49	40	Large wood chunks in sampler
			3a						
	10	32	4						
					SM	Gray silty fine sand with organic matter (medium dense, moist) (fill)			Hard drilling
	12	23	5	∇	SM	Gray silty fine to medium sand with gravel and cobbles (medium dense, wet) (alluvium)	31		Rough drilling %F=20
10									
	18	50/6"	6						
					GP	Gray fine to coarse gravel with sand, gravel and cobbles (very dense, wet) (alluvium)			

Note: See Figure A-1 for explanation of symbols.

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Log of Boring B-4

GeoEngineers

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-7
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 5.8	Logged By NCS / Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) / Vertical Datum	Undetermined	Hammer Data	Automatic 140 (lbs) / 30 (in) Drop
Drilling Equipment	Diedrich D-50		
Latitude / Longitude		System / Datum	N/A

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Groundwater: Date Measured	Depth to Water (ft)	Elevation (ft)
1/21/2010	2.0	

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0			5		1			OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (soft/loose, moist) (fill)	28		Wood waste includes bark and chips to 1 inch long
							▽ (2.0)						
			6	20		2			SM	Dark brown silty fine to medium sand with organic matter, gravel and cobbles (loose, wet) (fill)			
									GM	Gray silty fine to coarse gravel with sand and cobbles (very dense, wet) (alluvium)			Rough drilling
	5		1	50/4"		3							Sampler driven on gravel or cobble

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-5

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-8
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 11.5	Logged By NCS / Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) / Vertical Datum: Undetermined	Hammer Data: Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment: Diedrich D-50	
Latitude / Longitude	System Datum: N/A	Groundwater	
Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.		Date Measured: 1/21/2010	Depth to Water (ft): 6.0; Elevation (ft):

FIELD DATA

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0								OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (soft/loose, moist) (fill)			Wood waste includes chips and bark to 1 inch long
									SM	Brown silty fine to coarse sand with gravel, cobbles and trace wood waste (loose, wet) (fill)			Wood waste includes sawdust and chips to ½-inch
	5		14	11		1							No sheen, no odor
							▽ (6.0)						
													Wood waste includes bark and lumber fragments to 1 inch
	10		18	26		2							Heavy sheen and hydrocarbon odor from sample; sample submitted for chemical analysis

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-6

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-9
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 11.5	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	Automatic 140 (lbs) / 30 (in) Drop
Drilling Equipment	Diedrich D-50		
Latitude Longitude		System Datum	N/A

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
1/21/2010	5.0	

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0								OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (soft to medium stiff/loose, moist to wet) (fill)			Wood waste includes shavings and chips to 2 inches long
	5		18	16		1	∇						No sheen, no odor
									SM	Brown silty fine to coarse sand with gravel, cobbles and wood waste (loose, wet) (fill)			Wood waste includes shavings and chips to 2 inches long
	10		18	19		2							No sheen, no odor

Note: See Figure A-1 for explanation of symbols.

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Log of Boring B-7

GeoEngineers

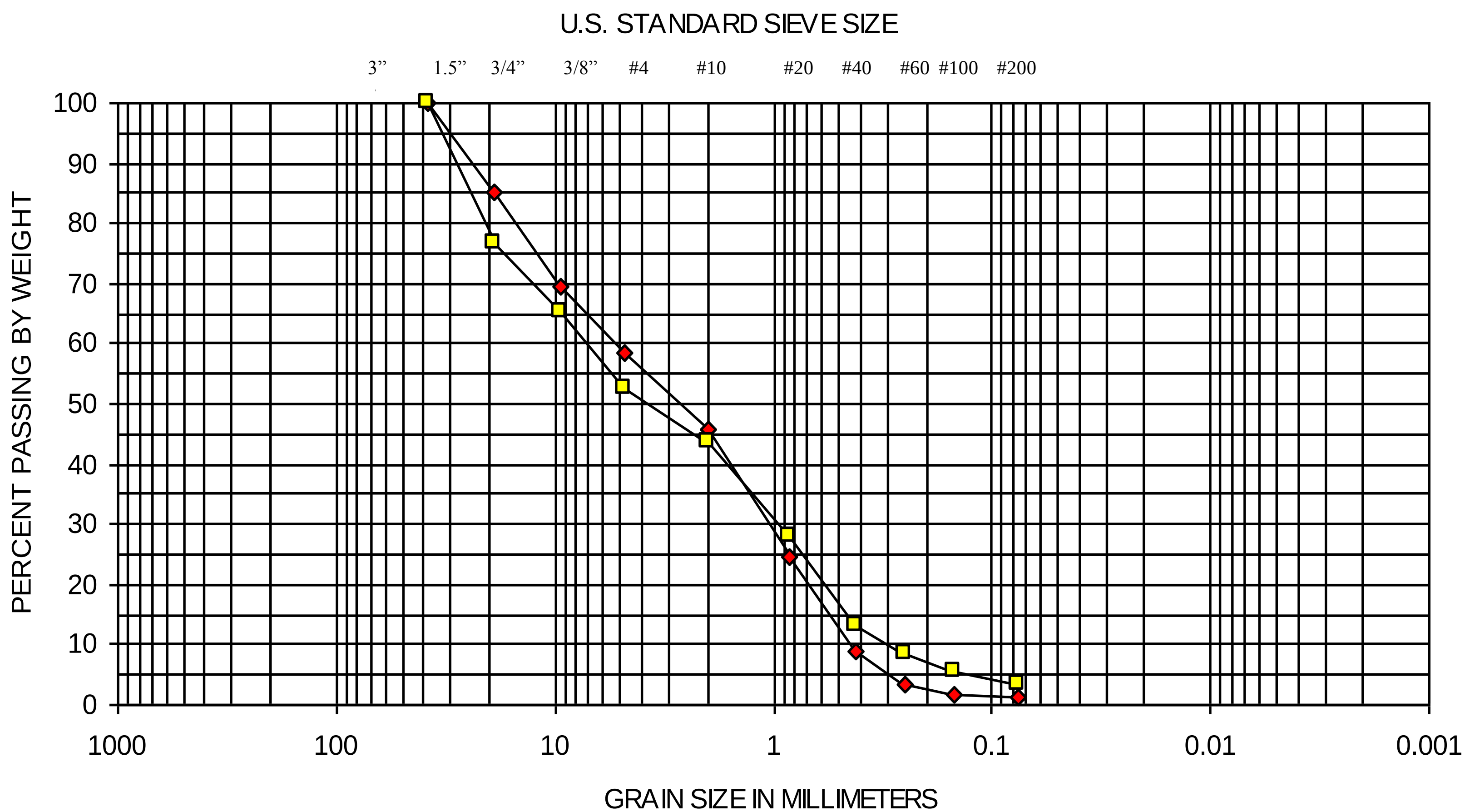
Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-10
Sheet 1 of 1

GEOENGINEERS

FIGURE A-11

SIEVE ANALYSIS RESULTS



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SYMBOL	EXPLORATION NUMBER	DEPTH (ft)	SOIL CLASSIFICATION
■ (yellow square)	B-1	15 – 16.5	Fine to medium sand with gravel (SP)
◆ (red diamond)	B-1A	16 – 17.5	Fine to coarse sand with gravel (SP)

APPENDIX B
Logs of Test Pit Explorations Completed Previously by RH2 Engineering, Inc.

Date: 11/30/09
No Samples Taken

Test Pit	Time	Depth From Surface
A	9:15	0 to 2.5
		2.5 to 8
		8
B	9:30	0 to 3
		3 to 8.5
		8.5
C	9:50	0 to 2
		2 to 5
		5 to 7
		7
D	10:06	0 to 4.5
		4.5 to 7
		7
E	11:46	0 to 3
		3 to 3.5
		3.5 to 6
F	10:25	0 to 1
		1 to 3.5
		3.5 to 5
G	11:24	0 to 2
		2 to 4
		4 to 5.5
		5.5
H	11:10	0 to 2
		2 to 3.5
		3.5 to 5
		5
I	10:56	0 to 3
		3 to 4
		4 to 6

Description
Brown Silty Sand
Gray Wood Waste with Silty Sand and Gravel
Water Table

Brown Wood Waste with Silty Sand
Gray Wood Waste with Silty Sand and Gravel
Water Table

Brown Wood Waste
Brown Silty Sand with Cobbles
Gray Silty Sand
Water Table

Brown Wood Waste
Gray Silty Sand - Free of Organics
Water Table

Brown Silty Sand with Gravel
Brown Silty Sand with Cobles
Gray Silty Sand

Brown Silty Sand
Bright Orange/Brown Wood Waste
Gray Silty Sand with Cobles

Brown Silty Sand
Gray Silty Sand with Cobles
Dark Black/Brown Wood Waste - Bark Chips
Water Table

Brown Silty Sand
Gray Silty Sand with Cobles
Gray Silty Sand
Water Table

Brown Silty Wood waste
Gray Wood Waste with Silty Sand and Cobles
Gray Silty Sand

TP-1 Corner of Mill Rd and Sunset
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown sand, gravel, cobbles, round	TP-1	950
5.0	FILL	wood waste and sawdust		
7.0	FILL	dark silty sand, gravel, cobbles		
9.0	FILL	wood waste and sawdust		
11.0	FILL	water		
12.0	FILL	dark silty sand, gravel, cobbles with logs		

TP-2 50 ft N of "well"
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown organic material	TP-2	1020
3.0	FILL	grey silty sand, grave, cobbles w/ clay		
13.0	FILL	water		

TP-3 Site of old office along Sunset
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	ALLUVIUM	brown-grey sand, gravel, cobbles	NA	1040
6.0	ALLUVIUM	water		

TP-4 Site of old smokestack
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	brown silty sandy gravelly fill	NA	1100
3.0	FILL	brown silty sandy gravelly fill-stop due to unexpected water line (likely abandoned)		

stopped due to pipe

TP-5 Near western property line, N of Mill Rd

15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	pavement, dark brown, sand, gravel, silt w/organics		1110
3.0	ALLUVIUM	brown sand, gravel, cobbles		
4.0	ALLUVIUM	water		
5.0	ALLUVIUM	brown sand, gravel, cobbles		

TP-6 Middle of open area in NW corner of lot S of Mill Rd

15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown-black silty wood waste, bricks, car parts		1130
6.0	ALLUVIUM	grey sand, gravel, cobbles w/ roots, water		
8.0	ALLUVIUM	grey sand, gravel, cobbles		

TP-7 NW corner of lot, along sediment basin pond on Brender Cr.

15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	ALLUVIUM	brown sand, gravel, cobbles		1145
4.0	ALLUVIUM	brown sand, gravel, cobbles		

TP-8 E of trailer, S of hockey rink in NW corner of lot S of Mill Rd

15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark silty sand, gravel, cobbles		1202
7.0	ALLUV/FILL	dark silty sand, gravel, cobbles, water		

root layer 1 ft thick

TP-9 200 ft SW of Shangri-la, 100 ft N of Brender Cr.
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark wood waste		1209
8.0	ALLUVIUM	grey silty sand, gravel, cobbles w/ small organics (roots)	TP-9	

TP-10 Southern most bend in Brender Cr, 50 ft N of berm
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	wood waste and sawdust	TP-10	1226
8.0	ALLUVIUM	grey silty fine sand w/ clay		
10.0	ALLUVIUM	water		
11.0	ALLUVIUM	grey silty fine sand w/ gravel		

TP-11 S edge of existing excavated pit, below 6-ft high cut face in wood waste, SW corner of property
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	wood waste	TP-11	1240
13.0	ALLUVIUM	grey clay		
14.0	ALLUVIUM	grey clay and gravel		

TP-12 100 ft S of water meter in lot S of Mill Rd
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark silty sand, gravel and wood waste	TP-12	1300
3.0	ALLUVIUM	grey silty sand and gravel w/ conglomerate and peat layers 0.5-1.0 ft thick		
8.0	ALLUVIUM	water		
9.0	ALLUVIUM	sand, gravel, cobbles		

cut 6 ft above top of test pit all wood waste
pit started at 6 ft

TP-13 100 ft W of single wide trailer

15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	ALLUVIUM	brown sand, gravel, cobbles		1316
3.0	ALLUVIUM	brown sand, gravel, cobbles		

TP-14 50 ft S of single wide trailer

15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown sand, gravel, cobbles w/organics		1320
4.0	ALLUVIUM	brown-orange sand, gravel, cobbles with foreset beds		
5.0	ALLUVIUM	brown-orange sand, gravel, cobbles with foreset beds		

APPENDIX C
Chemical Analytical Report

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

January 29, 2010

Bert Pschunder
GeoEngineers, Inc.
8410 154th Avenue NE
Redmond, WA 98052

Re: Analytical Data for Project 18593-001-00
Laboratory Reference No. 1001-145

Dear Bert:

Enclosed are the analytical results and associated quality control data for samples submitted on January 25, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

Case Narrative

Samples were collected on January 20 and 21, 2010 and received by the laboratory on January 25, 2010. They were maintained at the laboratory at a temperature of 2°C to 6°C. Please see Sample/Cooler Receipt form at the end of the report.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
B-1, 5-6, 11-5'	01-145-0	Soil	1-20-10	1-25-10	
B-6, 11-5'	01-145-0	Soil	1-21-10	1-25-10	

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

NWTPH-Dx

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Date Prepared	Date Analyzed	Flags
Lab ID:	01-145-01				
Client ID:	**B-1,S-6,11.5'**				
Diesel Range Organics	**500**	37	1-27-10	1-27-10	Y
Lube Oil	**820**	74	1-27-10	1-27-10	Y
Surrogate: o-terphenyl	95%	50-150			
Lab ID:	01-145-02				
Client ID:	**B-6,11.5'**				
Diesel Range Organics	**1100**	47	1-27-10	1-27-10	Y
Lube Oil	**1600**	93	1-27-10	1-27-10	Y
Surrogate: o-terphenyl	111%	50-150			

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	1-27-10
Date Analyzed:	1-27-10
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB0127S1
Diesel Range:	**ND**
PQL:	25
Identification:	---
Lube Oil Range:	**ND**
PQL:	50
Identification:	---
Surrogate Recovery	
o-Terphenyl:	97%
Flags:	Y

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted:	1-27-10
Date Analyzed:	1-27-10
Matrix:	Soil
Units:	mg/kg (ppm)

Lab ID:	MB0127S1
Diesel Range:	**ND**
PQL:	25
Identification:	---
Lube Oil Range:	**ND**
PQL:	50
Identification:	---
Surrogate Recovery	
o-Terphenyl:	97%
Flags:	Y

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

NWTPH-Dx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Contol Limits
DF2CCV0127F-V1	100	94.4	6	+/-15%
DF2CCV0127F-V2	100	96.0	4	+/-15%
DF2CCV0127F-V3	100	98.2	2	+/-15%
DF2CCV0127R-V1	100	92.7	7	+/-15%
DF2CCV0127R-V2	100	96.6	3	+/-15%
DF2CCV0127R-V3	100	99.1	1	+/-15%

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

% MOISTURE

Date Analyzed: 1-27-10

Client ID	Lab ID	% Moisture
B-1, 5-6, 11-5'	01-145-01	32
B-6, 11-5'	01-145-02	46

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Company: GeoEngineers
Project Number: 18593-001-00
Project Name: Cashmere MiLL
Project Manager: Bert Pschunder
Sampled by: Nick Szot

Turnaround Request (in working days)
(Check One)
- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ________ (other)

Laboratory Number: 01-145

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
1	B-1, S-6, 11.5'	1/20/10	1500	Soil	1			X																	X
2	B-6, 11.5'	1/21/10	1715	Soil	1			X																	✓

	Signature	Company	Date	Time
Relinquished by	N Szot	GeoEngineers	1/25/10	1107
Received by	[signature]	[illegible]	1/25/10	1107
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:
Sample contains wood waste: use Any cleanup steps necessary in analysis.

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Client Copy

Sample/Cooler Receipt and Acceptance Checklist

Client: GE

Client Project Name/Number: ____________

OnSite Project Number: 01-145

Initiated by: [signature]

Date Initiated: 1/25/10

1.0 Cooler Verification

1.1 Were there custody seals on the outside of the cooler?	Yes	No	N/A	1 2 3 4
1.2 Were the custody seals intact?	Yes	No	N/A	1 2 3 4
1.3 Were the custody seals signed and dated by last custodian?	Yes	No	N/A	1 2 3 4
1.4 Were the samples delivered on ice or blue ice?	Yes	No		1 2 3 4
1.5 Were samples received between 0-6 degrees Celsius?	Yes	No	Temperature: 15	
1.6 Have shipping bills (if any) been attached to the back of this form?	Yes	N/A		
1.7 How were the samples delivered?	Client	Courier	UPS/FedEx	OSE Pickup Other

2.0 Chain of Custody Verification

2.1 Was a Chain of Custody submitted with the samples?	Yes	No	1 2 3 4
2.2 Was the COC legible and written in permanent ink?	Yes	No	1 2 3 4
2.3 Have samples been relinquished and accepted by each custodian?	Yes	No	1 2 3 4
2.4 Did the sample labels (ID, date, time, preservative) agree with COC?	Yes	No	1 2 3 4
2.5 Were all of the samples listed on the COC submitted?	Yes	No	1 2 3 4
2.6 Were any of the samples submitted omitted from the COC?	Yes	No	1 2 3 4

3.0 Sample Verification

3.1 Were any sample containers broken or compromised?	Yes	No		1 2 3 4
3.2 Were any sample labels missing or illegible?	Yes	No		1 2 3 4
3.3 Have the correct containers been used for each analysis requested?	Yes	No		1 2 3 4
3.4 Have the samples been correctly preserved?	Yes	No	N/A	1 2 3 4
3.5 Are volatiles samples free from headspace and air bubbles?	Yes	No	N/A	1 2 3 4
3.6 Is there sufficient sample submitted to perform requested analyses?	Yes	No		1 2 3 4
3.7 Have any holding times already expired or will expire in 24 hours?	Yes	No		1 2 3 4
3.8 Was method 5035A used?	Yes	No	N/A	1 2 3 4
3.9 If 5035A was used, which sampling option was used (#1, 2, or 3).	#		N/A	1 2 3 4

Explain any discrepancies:

1 - Discuss issue in Case Narrative

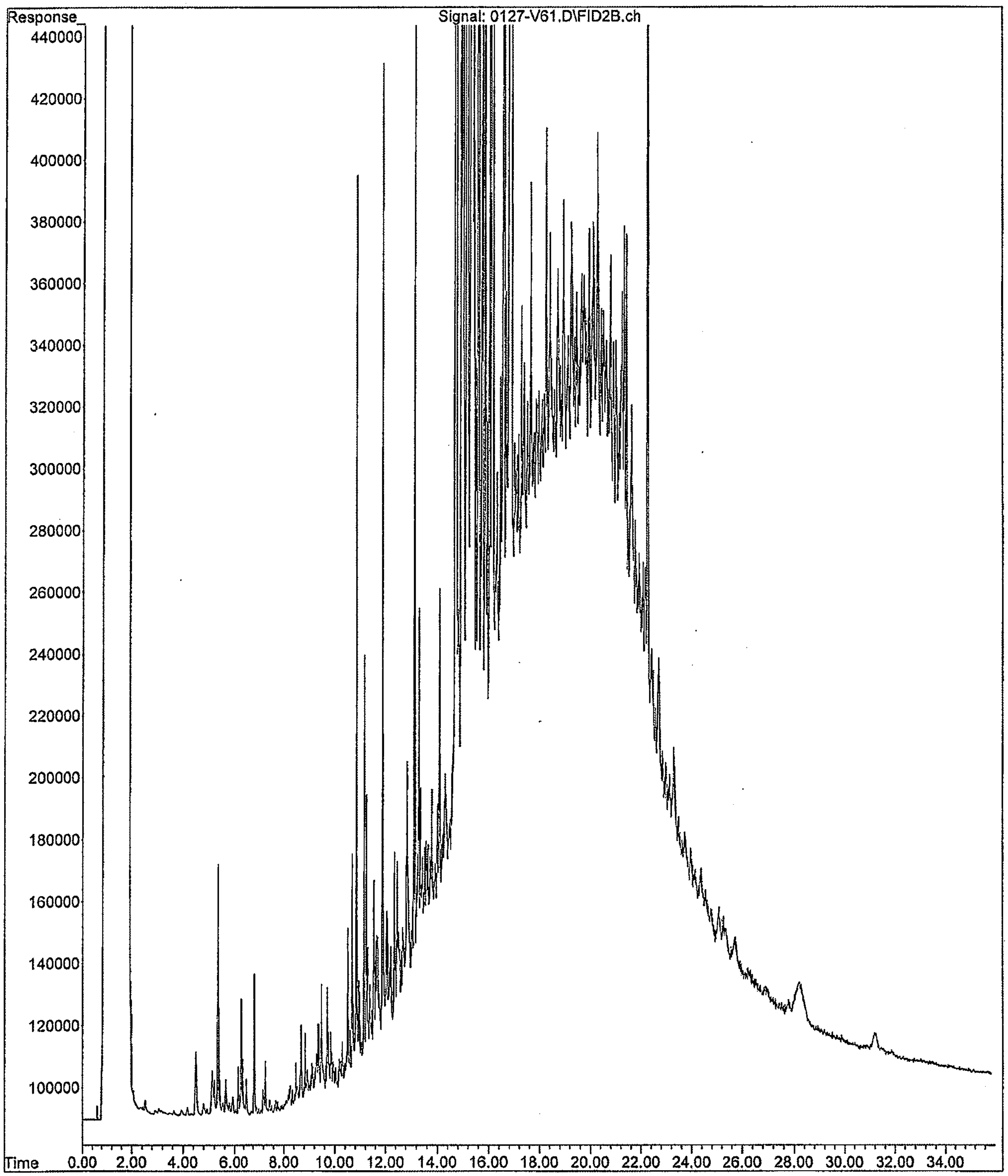
2 - Process Sample As-is

3 - Client contacted to discuss problem

4 - Sample cannot be analyzed or client does not wish to proceed

//SERVER\OSE\Administration\forms\cooler_checklist.xls

File   :X:\DIESELS\VIGO\DATA\V100127.SEC\0127-V61.D
Operator   : ZT
Acquired   : 27 Jan 10   4121 p   using AcqMethod V091125F.M
Instrument :   Vigo
Sample Name: 01-145-01
Misc Info   :
Vial Number: 61



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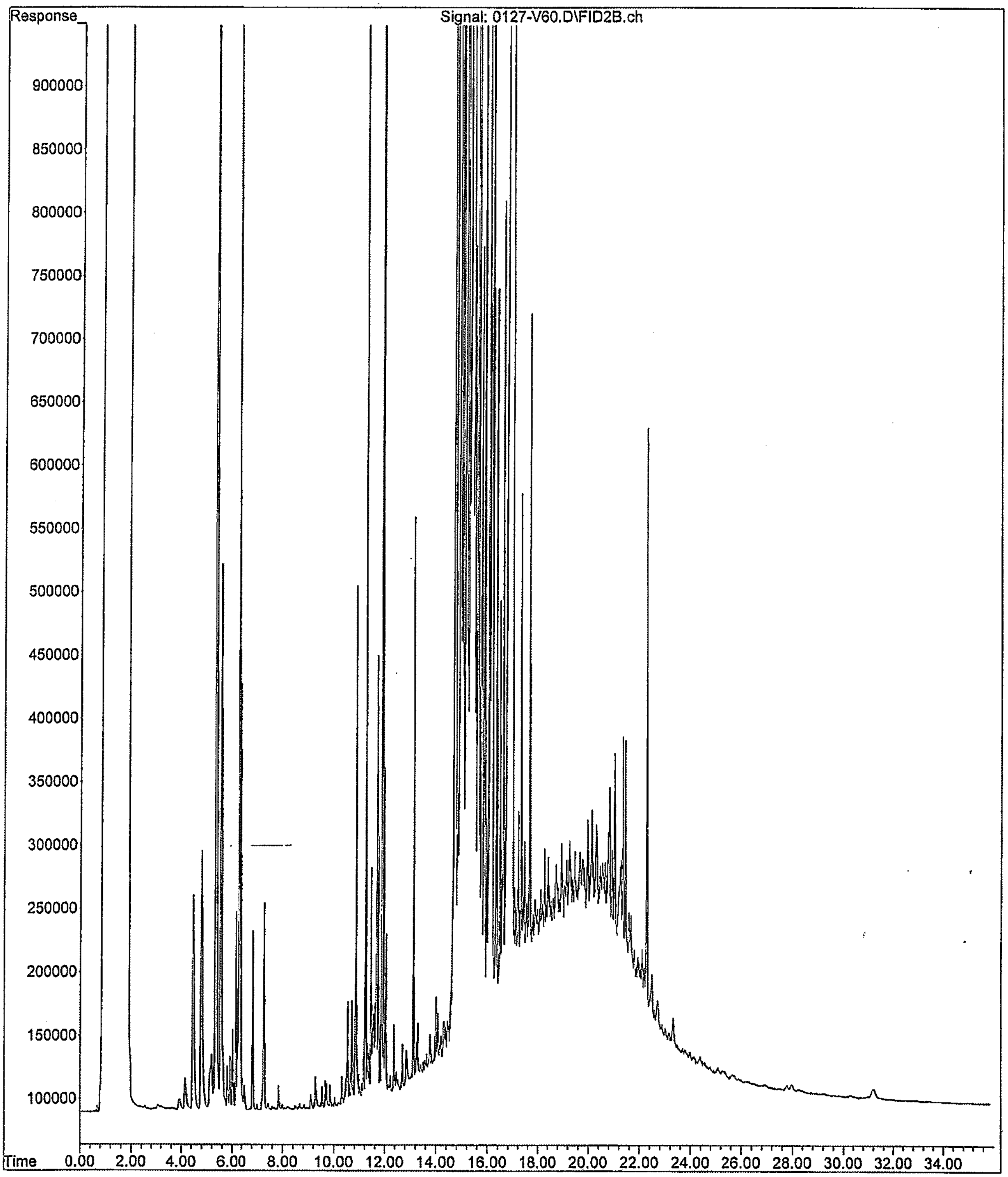
File         :X:\DIESELS\VIGO\DATA\V100127.SEC\0127-V60.D
Operator     : ZT
Acquired     : 27 Jan 10   3121 p      using AcqMethod V091125F.M
Instrument :    Vigo
Sample Name: 01-145-02
Misc Info  :
Vial Number: 60
```



APPENDIX D
Report Limitations and Guidelines for Use

APPENDIX D
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Geotechnical Services Are Performed for Specific Purposes, Persons and Projects

This report has been prepared for the exclusive use of RH2 Engineering, Inc., the Port of Chelan County, and their authorized agents. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, a geotechnical or geologic study conducted for a civil engineer or architect may not fulfill the needs of a construction contractor or even another civil engineer or architect that are involved in the same project. Because each geotechnical or geologic study is unique, each geotechnical engineering or geologic report is unique, prepared solely for the specific client and project site. Our report is prepared for the exclusive use of our Client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and generally accepted geotechnical practices in this area at the time this report was prepared. This report should not be applied for any purpose or project except the one originally contemplated.

A Geotechnical Engineering or Geologic Report is Based on a Unique Set of Project-Specific Factors

This report has been prepared for the preliminary design of the redevelopment of the Cashmere Mill site in Cashmere, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed structure;
- elevation, configuration, location, orientation or weight of the proposed structure;
- composition of the design team; or
- project ownership.

[1] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org .

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying a report to determine if it remains applicable.

Most Geotechnical and Geologic Findings Are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

Geotechnical Engineering Report Recommendations Are Not Final

Do not over-rely on the preliminary construction recommendations included in this report. These recommendations are not final, because they were developed principally from GeoEngineers' professional judgment and opinion. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for this report's recommendations if we do not perform construction observation.

Sufficient monitoring, testing and consultation by GeoEngineers should be provided during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether or not earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective method of managing the risks associated with unanticipated conditions.

A Geotechnical Engineering or Geologic Report Could be Subject to Misinterpretation

Misinterpretation of this report by other design team members can result in costly problems. You could lower that risk by having GeoEngineers confer with appropriate members of the design team after submitting the report. Also retain GeoEngineers to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering or geologic report. Reduce that risk by having GeoEngineers participate in pre-bid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

Give Contractors a Complete Report and Guidance

Some owners and design professionals believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering or geologic report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer. A pre-bid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might an owner be in a position to give contractors the best information available, while requiring them to at least share the financial responsibilities stemming from unanticipated conditions. Further, a contingency for unanticipated conditions should be included in your project budget and schedule.

Contractors Are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and to adjacent properties.

Read These Provisions Closely

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering or geology) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

Geotechnical, Geologic and Environmental Reports Should Not be Interchanged

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants and no conclusions or inferences should be drawn regarding Biological Pollutants, as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

If Client desires these specialized services, they should be obtained from a consultant who offers services in this specialized field.

Have we delivered World Class Client Service?

Please let us know by visiting **www. geoengineers.com/feedback**.

GeoEngineers

RH2 TECHNICAL

Memorandum

Client: Port of Chelan County

Project: Cashmere Mill Site

Project File: PCC 208.020.01.126 **Project Manager:** Karen Kornher., P.E.

Composed by: Adam Neff

Reviewed by: Karen Kornher, P.E.

Subject: Groundwater table investigation

Date: 6/27/11

Summary

RH2 Engineering Inc., (RH2) performed a groundwater investigation during May and June 2011 to better characterize the groundwater conditions at the Cashmere Millsite property to support planning for future development. The investigation measured groundwater elevation fluctuations during the study period to anticipate seasonal trends and ranges in the depth to groundwater at the property.

Groundwater elevations were measured at one monitoring well, installed previously by Geo Engineers on January 20, 2010, and were measured in four excavations (constructed during the wood waste removal project) that encountered the groundwater table from the current. The depth to water in the well and excavations were measured during May 10, 1011 to June 1, 2011. During the sampling period the site recieved several large rain events. Following these events the observed groundwater elevation with the open excavations increased by 2-4.5” while groundwater elevations within the monitoring well slight decreased. The increase is likely due to the precipitation while variation in increase is likely due to the influence of surface water runoff into the excavations. It is assumed that these excavations still provide value in determining the groundwater table elevation, albeit a less precise measurement than the monitoring well.

During the sampling period the groundwater table within the monitoring well fluctuated between 4.75’ and 4.92’ below the ground surface. Using these values and the value from the well install during January 2010, 5.2’ below ground surface, the site can expect to see of groundwater fluctuation of at least 0.45’ if not more during a year.

Groundwater elevations from this investigation are published in the figure “*Cashmere Mill Site Groundwater Elevations*”. Based on these elevations, depth to the expected groundwater table can be determined when used in conjuction with ground surface elevation data.

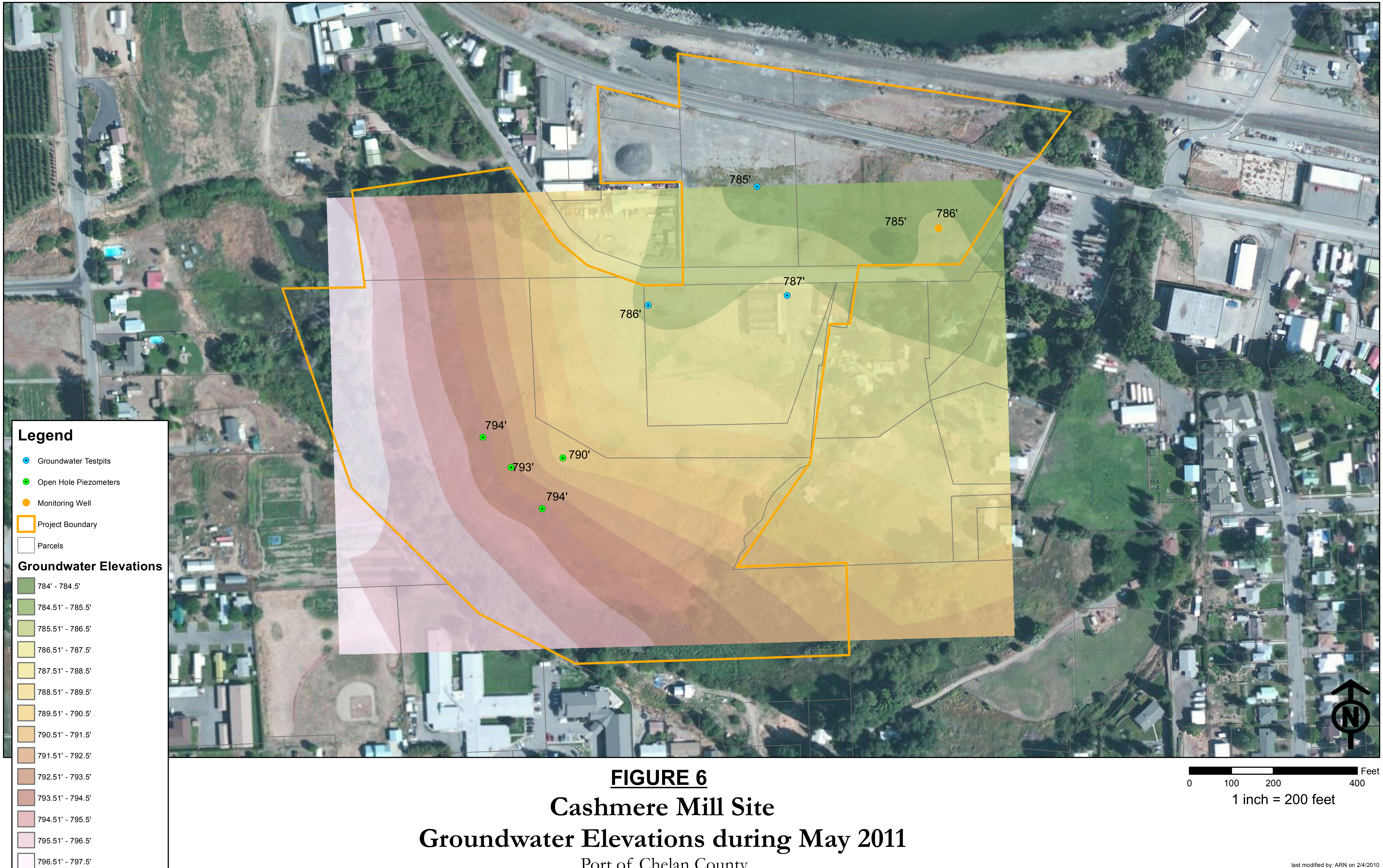


FIGURE 6

Cashmere Mill Site
Groundwater Elevations during May 2011

Port of Chelan County

last modified by: ARN on 2/4/2010
map located at: J:\data\PCC\208-020\01 Port\126 Site Grading\GIS\map.mxd

RH2 TECHNICAL

Memorandum

Client: Port of Chelan County

Project: Former Cashmere Mill

Project File: PCC 208020.01.127 **Project Manager:** Karen Kornher, P.E.

Composed by: Steve Nelson, L.G., L.HG, L.E.G

Reviewed by: Randy Asplund, P.E.

Subject: Construction Dewatering at the Former Cashmere Mill Site

Date: November 7, 2012

State of Washington Licensed Geologist Hydrogeologist 1402 Steve Nelson 11/7/2012

Randy L. Asplund State of Washington 22780 Registered Professional Engineer 11/7/2012

Introduction

This technical memorandum summarizes the soil, wood waste, and groundwater conditions at the Port of Chelan County (Port) former Cashmere Mill (the Site) to support the design and implementation of construction dewatering for the upcoming Site remediation project. The Site was formerly used as a lumber mill during the early- to mid-1900s. Wood waste from milling activities and log storage was deposited on the Site at and below existing grade to depths up to 15 feet. Some woodwaste was likely placed in natural topographic depressions that were former stream channels or ponds at the confluence of Wenatchee River and Brender Creek. Portions of the wood waste were placed below the current depth of the water table at the Site (approximately 4 to 6 feet). The Port intends to remove portions of wood waste from the Site and replace the wood waste with compacted granular fill to recover developable land. Removal and replacement of wood waste below the water table will require some form of construction dewatering to maintain excavation stability and minimize excavation of wet wood waste and soil.

Summary of Investigations

Between 2007 and 2012, the Port conducted several investigations to document the composition and properties of soil and wood waste and to identify groundwater conditions at the Site. The investigations included test pit exploration to depths ranging from 4 to 15 feet, soil borings and monitoring wells completed at depths of 15 feet, and a dewatering test well to a depth of 26 feet. **Figure 1** identifies test pit and boring locations. Representative samples of soil, wood waste, and groundwater were collected and analyzed for chemical composition. A bibliography of the investigations is included as a reference list attached to this memorandum (**Attachment 1**). Site boring logs and test pit exploration findings are included in **Attachment 2**.

A dewatering test well was constructed to evaluate the effect of groundwater pumping on water levels and estimate aquifer properties of the native soil below the wood waste. The 5-inch-diameter well was completed within native soil below the base of wood waste using a 10-foot-long, wire-wrapped, stainless steel screen installed from 12 to 22 feet below grade. Static water level in the well was 4 feet below ground surface. The dewatering well was pumped at a rate of 92 gallons per minute (gpm) for several hours. The water level in the well drew down 6.2 feet to slightly above the base of the wood waste and then stabilized. After pumping, the groundwater level recovered to the static level in about 60 minutes. **Figure 2** shows the results of the dewatering pumping and recovery test. The specific capacity of the well was 14.8 gpm per foot of drawdown (**Attachment 3**). The analysis of the pumping and recovery tests indicates an aquifer transmissivity value of approximately 32,000 gallons per foot per day, or 3 feet squared per minute (ft^2/min).

Summary of Findings

<u>Soil and Wood Waste</u>

The wood waste is a mixture of variable amounts of sawdust, scrap lumber, and woody debris (bark, limbs, and roots). The wood waste also contains variable amounts of sand to cobble-size granular fill and locally contains minor amounts of concrete and metal construction debris. The wood waste thickness ranges from a few inches at the surface to up to 15 feet.

Native soil underlying the wood waste consists of layers of sand, gravelly sand, and silty sand deposited by the Wenatchee River and Brender Creek.

<u>Groundwater</u>

The local groundwater table exists below the Site at depths ranging from 4 to 6 feet. Groundwater elevations fluctuate approximately 1 foot during the year, and surface water elevations of the Wenatchee River and Brender Creek fluctuate by several feet during the year. Groundwater elevations do not appear to fluctuate with surface water levels.

Excavations into the wood waste a few feet below the water table typically encounter minor seepage from the wood waste at rates of less than 10 gpm into the open excavations. Seepage rates increase from progressively deeper excavations. Over several hours, the water level in the open excavations in wood waste typically rises to the elevation of the local water table. Excavations into native soil below the water table experience much higher seepage rates from the native soil, and water levels in open excavations quickly rise to the local water table elevation.

Dewatering Objectives

The observations of groundwater levels during shallow excavation, soil and monitoring well construction, and dewatering well testing indicates that the native soil has a much higher transmissivity value than wood waste. Excavation into the shallow wood waste a few feet below the water table level will encounter seepage that likely can be controlled with local sumping. Deeper excavations will encounter higher rates of seepage that may not be controlled with local sumping and could create unstable excavations (for example, quick conditions, piping, and sand boils) if groundwater pressures in the native soil beneath the wood waste are not reduced.

The dewatering test well indicates that the native soil exhibits a permeability that would support construction dewatering consisting of dewatering wells or well points. Either of these two methods could be used to depressurize the native soil below the wood waste before excavation. However, the large area that likely will require construction dewatering and permeability of the native soil indicates that dewatering wells would likely be selected as the preferred method for dewatering.

Construction dewatering could generate 50 gpm during shallow excavation into soil that would likely be managed through sumping. Excavation into deeper wood waste below depths of 8 to 10 feet likely will require construction dewatering that will likely generate groundwater discharge rates ranging from 300 to 500 gpm. The range of groundwater discharge will depend on the permeability of the native soil and wood waste at the excavated area, the depth of the excavation, and the method used for groundwater control.

The native soil exhibits a relatively high transmissivity value that groundwater withdrawal could affect groundwater levels at a distance of 50 to 200 feet from the well. It is possible that groundwater withdrawal could capture a portion of Brender Creek streamflow, depending on the degree of hydraulic continuity between the creek and the adjacent saturated wood waste and native soil. Based on the predicted groundwater withdrawal rates, the change in flow will not likely be measurable. However, even this insignificant effect may be mitigated by infiltrating groundwater discharging from the dewatering system back into the ground next to Brender Creek in order to recharge the groundwater and augment flow in the creek.

Using the Theis method and cumulative drawdown analysis (Cashman and Preene, 2001), RH2 estimated the total groundwater withdrawal rate from a wellfield surrounding the deepest area of excavation measuring approximately 350 feet by 300 feet. A calibrated spreadsheet model was used to calculate the drawdown at eight individual pumping wells surrounding the excavation area and an observation well at the center of the area. Using the estimate of transmissivity (3 ft^2/min) from the dewatering test, a network of eight well pumping at a combined rate of 400 gpm would theoretically induce a groundwater drawdown of approximately 12 to 13 feet at the edge of the excavation and 11.6 feet at the center of the excavation (**Attachment 3**). This theoretical estimate may be used to guide contractors to prepare bid estimates. Successful groundwater control will require establishing background water level data in the excavation area before construction and confirming the progress and performance of groundwater control during construction. Groundwater monitoring wells and dewatering wells should be constructed so that well screens fully penetrate the native soil aquifer and are fully developed prior to use.

Water Quality and Discharge

Groundwater withdrawn during pumping should be routed into a settling tank and then passed through a granular activated carbon filter to remove any dissolved organic compounds and trace metals. The treated water should be periodically monitored for turbidity and organic compounds and discharged to one or more infiltration areas identified on the Site as suitable for groundwater recharge and capable of recharging the native soil and augmenting Brender Creek.

Bibliography

Cashman, P.M. and Preene, M. (2001) *Groundwater Lowering in Construction: A Practical Guide.* Spon, London

Figures:

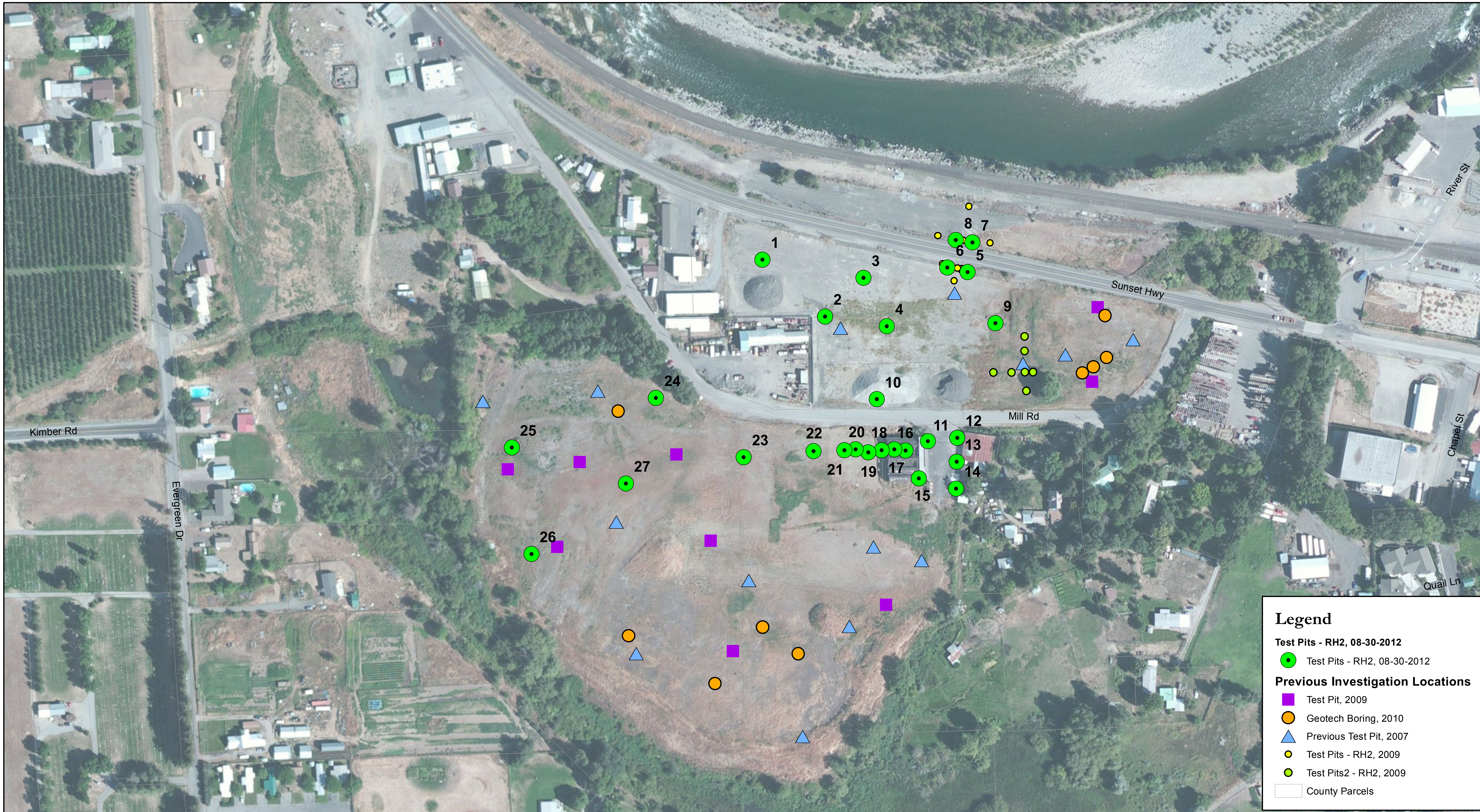
- Figure 1 – Test Pit and Soil Boring Locations
- Figure 2 – Dewatering Drawdown and Recovery Test Results

Attachments:

- Attachment 1 – Bibliography of Site Investigations
- Attachment 2 – Site Boring Logs and Test Pit Logs
- Attachment 3 – Dewatering Evaluation Summary

Figures

Figure 1
Test Pit and Soil Boring Locations



Cashmere Mill Site

Test Pit and Soil Boring Locations

Figure 1

last modified by: ARN on 6/13/2012 J:\data\PCC\208-020\01 Port\127 Site Clean-up\GIS\dewateringfig1.mxd

Figure 2
Dewatering Drawdown and Recovery Test Results

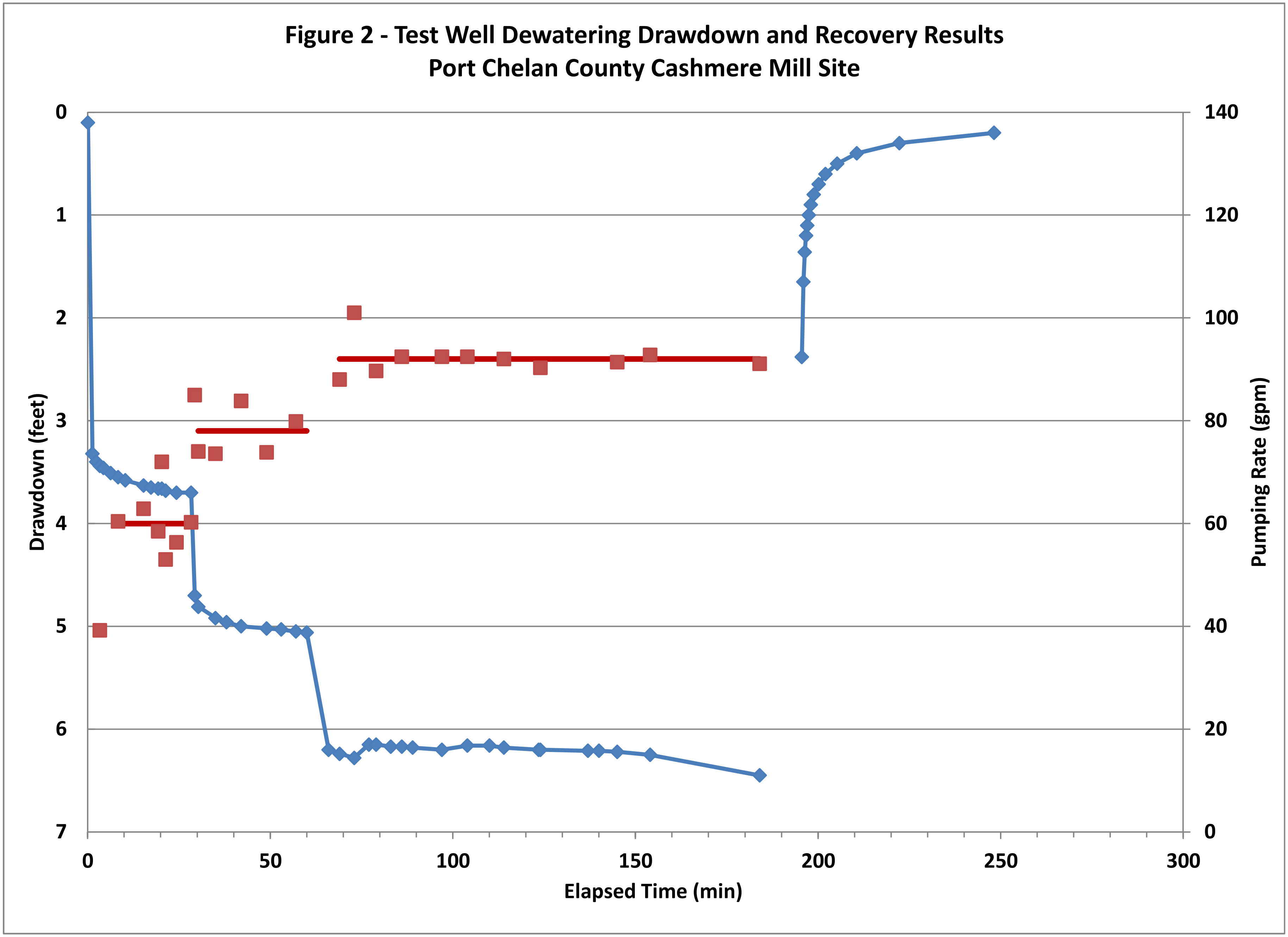


Figure 2 - Test Well Dewatering Drawdown and Recovery Results
Port Chelan County Cashmere Mill Site
Drawdown (feet)
Pumping Rate (gpm)
Elapsed Time (min)
0
1
2
3
4
5
6
7
140
120
100
80
60
40
20
0
0
50
100
150
200
250
300

ATTACHMENTS

ATTACHMENT 1
Bibliography of Site Investigations

Cashmere Mill Site Geological Investigation Bibliography

- 1990. *Phase 1 Environmental Site Assessment*, Forsgren and Associates, Inc.
    - No subsurface explorations.

- 2007. *Feasibility Report* and *Geologic Report*. RH2 Engineering, Inc.
    - Fourteen (14) test pits excavated with a backhoe; characterized subsurface conditions.

- 2009. *Cashmere Mill Site Improvements, Phase 1 – Surface Cleanup*. RH2 Engineering, Inc.
    - Nine (9) test pits excavated with a backhoe; data used for support of design project.

- 2010. *Redevelopment of Cashmere Mill Site, Mill Road, and Sunset Highway, Cashmere Washington*. GeoEngineers, Inc.
    - Nine (9) borings or attempted borings characterizing subsurface conditions.

- 2012. *Cashmere Mill Site Remediation*. RH2 Engineering, Inc.
    - Twenty-six (26) test pits excavated with a backhoe; data used for support of design project.

Attachment 2
Site Boring Logs and Test Logs

2007 Investigation

Table 1. Soil Log for Test Pits, (TP) Cashmere Mill Site

TP-1 Corner of Mill Rd and Sunset
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown sand, gravel, cobbles, round	TP-1	0950
5.0	FILL	wood waste and sawdust		
7.0	FILL	dark silty sand, gravel, cobbles		
9.0	FILL	wood waste and sawdust		
11.0	FILL	water		
12.0	FILL	dark silty sand, gravel, cobbles with logs		

TP-2 50 ft N of "well"
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown organic material	TP-2	1020
3.0	FILL	grey silty sand, grave, cobbles w/ clay		
13.0	FILL	water		

TP-3 Site of old office along Sunset
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	ALLUVIUM	brown-grey sand, gravel, cobbles	NA	1040
6.0	ALLUVIUM	water		

Table 1. Continued

TP-4 Site of old smokestack
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	brown silty sandy gravelly fill	NA	1100
3.0	FILL	brown silty sandy gravelly fill-stop due to unexpected water line (likely abandoned)		

TP-5 Near western property line, N of Mill Rd
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	pavement, dark brown, sand, gravel, silt w/organics		1110
3.0	ALLUVIUM	brown sand, gravel, cobbles		
4.0	ALLUVIUM	water		
5.0	ALLUVIUM	brown sand, gravel, cobbles		

TP-6 Middle of open area in NW corner of lot S of Mill Rd
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown-black silty wood waste, bricks, car parts		1130
6.0	ALLUVIUM	grey sand, gravel, cobbles w/ roots, water		
8.0	ALLUVIUM	grey sand, gravel, cobbles		

Table 1. Continued

TP-7 NW corner of lot, along sediment basin pond on Brender Cr.
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	ALLUVIUM	brown sand, gravel, cobbles		1145
4.0	ALLUVIUM	brown sand, gravel, cobbles		

TP-8 E of trailer, S of hockey rink in NW corner of lot S of Mill Rd
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark silty sand, gravel, cobbles		1202
7.0	ALLUV/FILL	dark silty sand, gravel, cobbles, water		

TP-9 200 ft SW of Shangri-la, 100 ft N of Brender Cr.
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark wood waste		1209
8.0	ALLUVIUM	grey silty sand, gravel, cobbles w/ small organics (roots)	TP-9	

Table 1. Continued

TP-10 Southern most bend in Brender Cr, 50 ft N of berm
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	wood waste and sawdust	TP-10	1226
8.0	ALLUVIUM	grey silty fine sand w/ clay		
10.0	ALLUVIUM	water		
11.0	ALLUVIUM	grey silty fine sand w/ gravel		

TP-11 S edge of existing excavated pit, below 6-ft high cut face in wood waste, SW corner of property
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	wood waste	TP-11	1240
13.0	ALLUVIUM	grey clay		
14.0	ALLUVIUM	grey clay and gravel		

TP-12 100 ft S of water meter in lot S of Mill Rd
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark silty sand, gravel and wood waste	TP-12	1300
3.0	ALLUVIUM	grey silty sand and gravel w/ conglomerate and peat layers 0.5-1.0 ft thick		
8.0	ALLUVIUM	water		
9.0	ALLUVIUM	sand, gravel, cobbles		

Table 1. Continued

TP-13 100 ft W of single wide trailer
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	ALLUVIUM	brown sand, gravel, cobbles		1316
3.0	ALLUVIUM	brown sand, gravel, cobbles		

TP-14 50 ft S of single wide trailer
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown sand, gravel, cobbles w/organics		1320
4.0	ALLUVIUM	brown-orange sand, gravel, cobbles with foreset beds		
5.0	ALLUVIUM	brown-orange sand, gravel, cobbles with foreset beds		

Figure 4. Alluvium consisting of poorly sorted sand, gravel and cobbles in Test Pit No. 3, located at the former site of the mill offices, approximately 50 feet south of Sunset Highway. Depth of test pit is 6 feet. Groundwater was encountered at a depth of 6 feet.

Figure 5. Imported soil overlying wood waste fill in Test Pit No. 1 located at the former site of the mill pond, near the intersection of Mill Road and Sunset Highway. Depth of test pit is 12 feet. Groundwater was encountered at a depth of 11 feet.

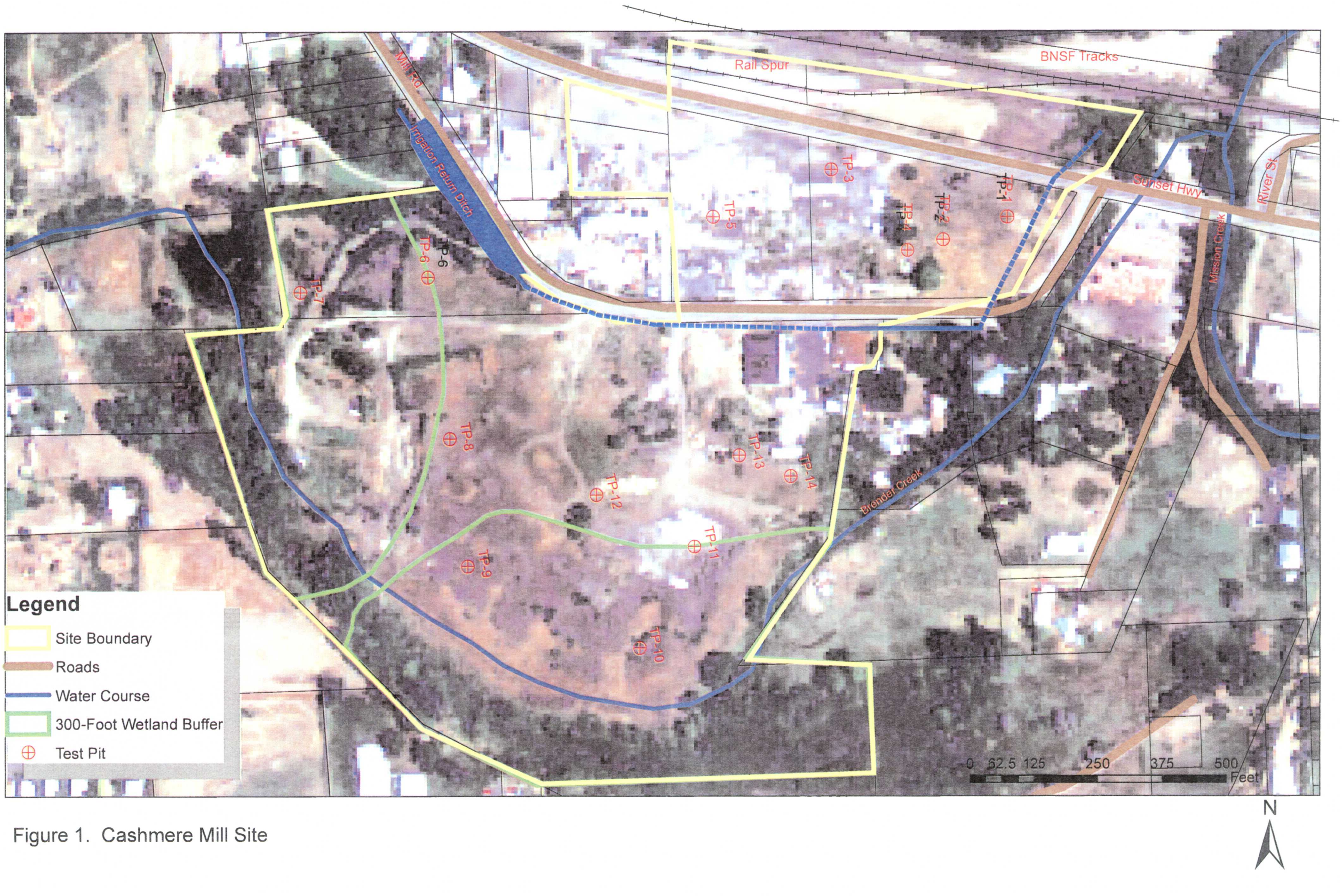


Figure 1. Cashmere Mill Site

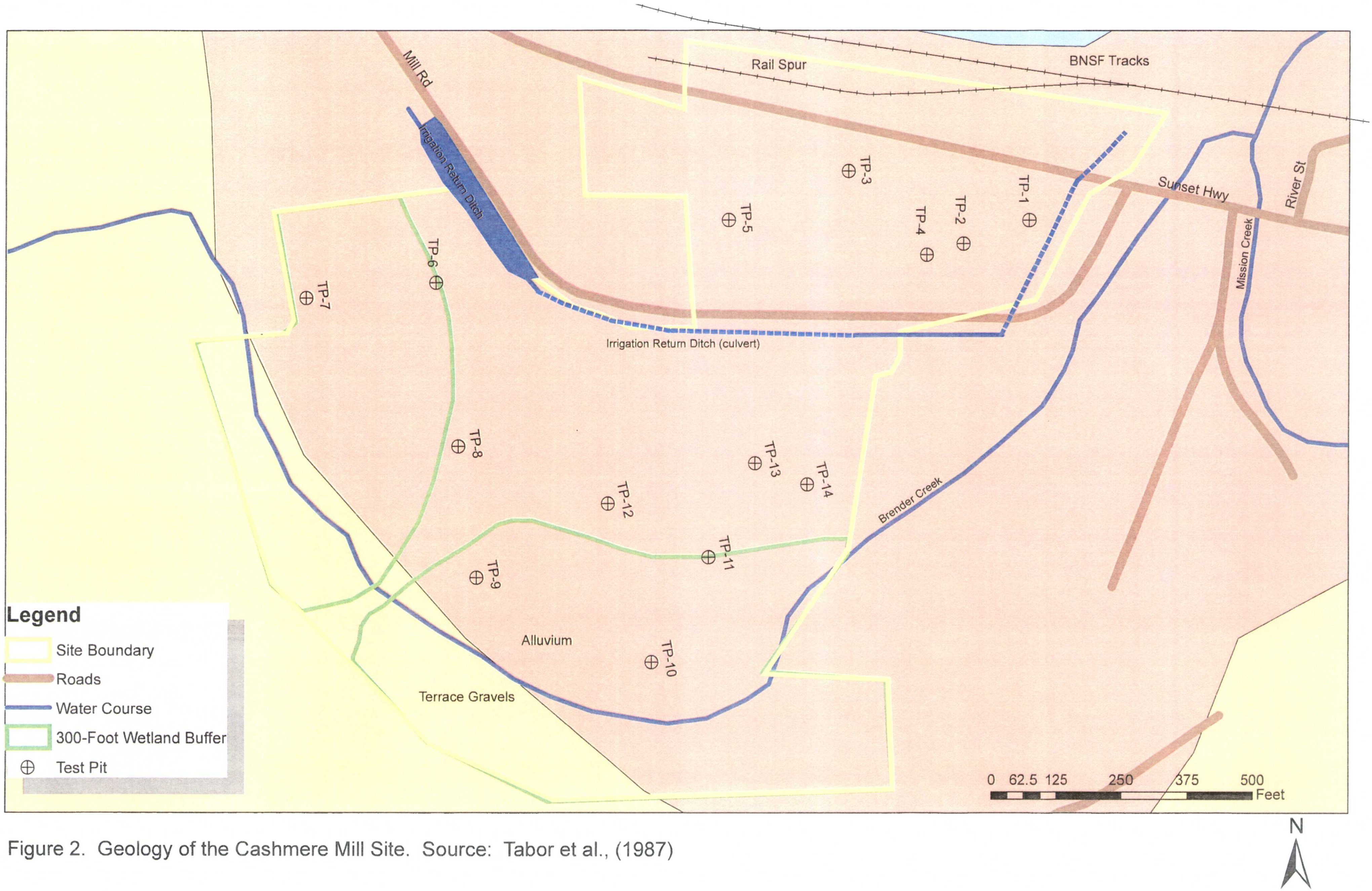
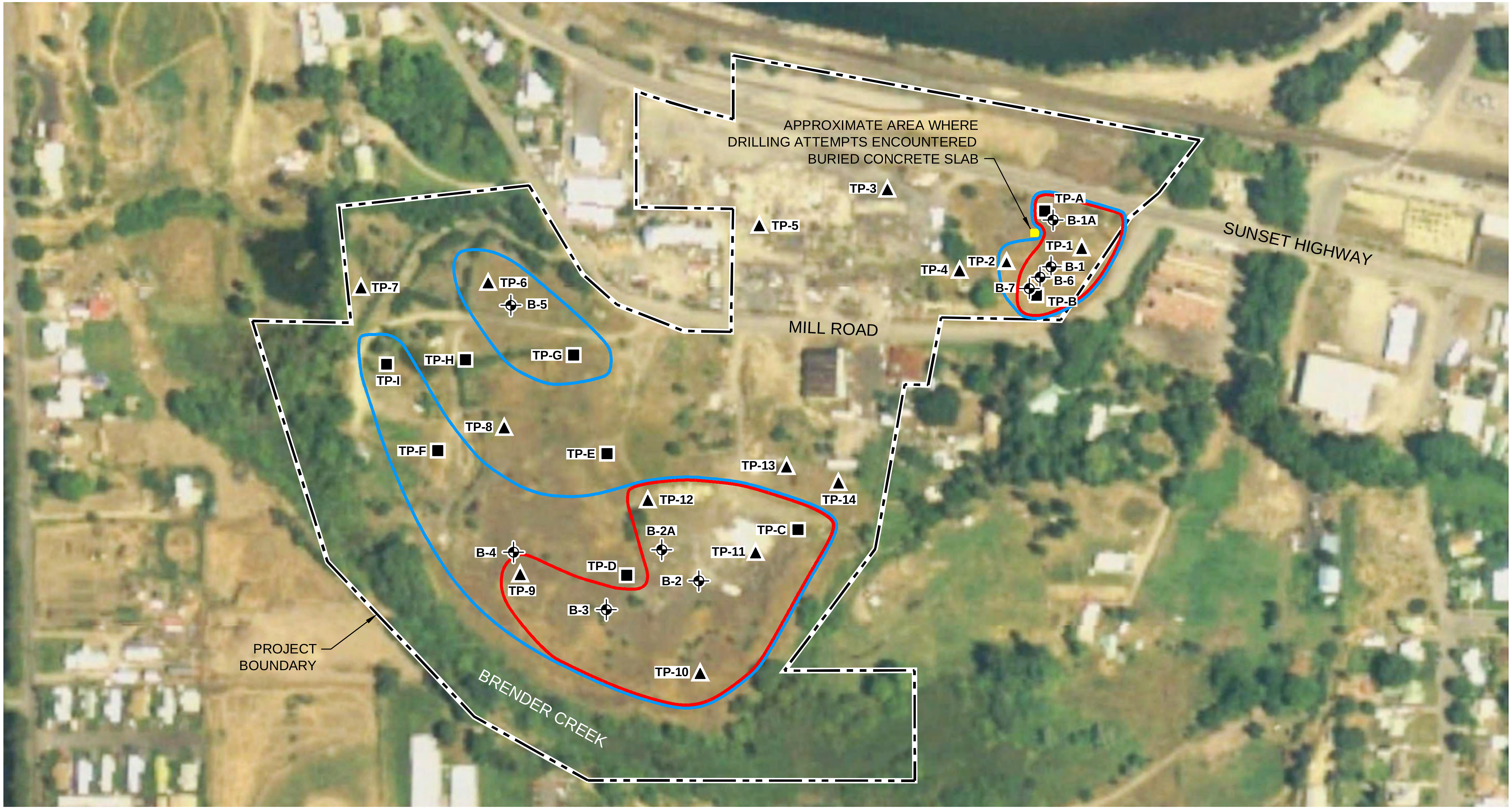


Figure 2. Geology of the Cashmere Mill Site. Source: Tabor et al., (1987)

2009 Investigation



Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base Aerial from IR3 Imagery.

Legend

B-1	Boring by GeoEngineers, Inc. (January 2010)
TP-A	Previous Test Pit by RH2 Engineering, Inc. (November 2009)
TP-1	Previous Test Pit by RH2 Engineering, Inc. (January 2007)
	Approximate Limits of Wood Waste Fill
	Approximate Areas where Bottom of Wood Waste Fill was Encountered at or Below Depth of 8 Feet

N W E S

200 0 200
FEET

Site Plan

Redevelopment of Cashmere Mill Site
Cashmere, Washington

GeoEngineers

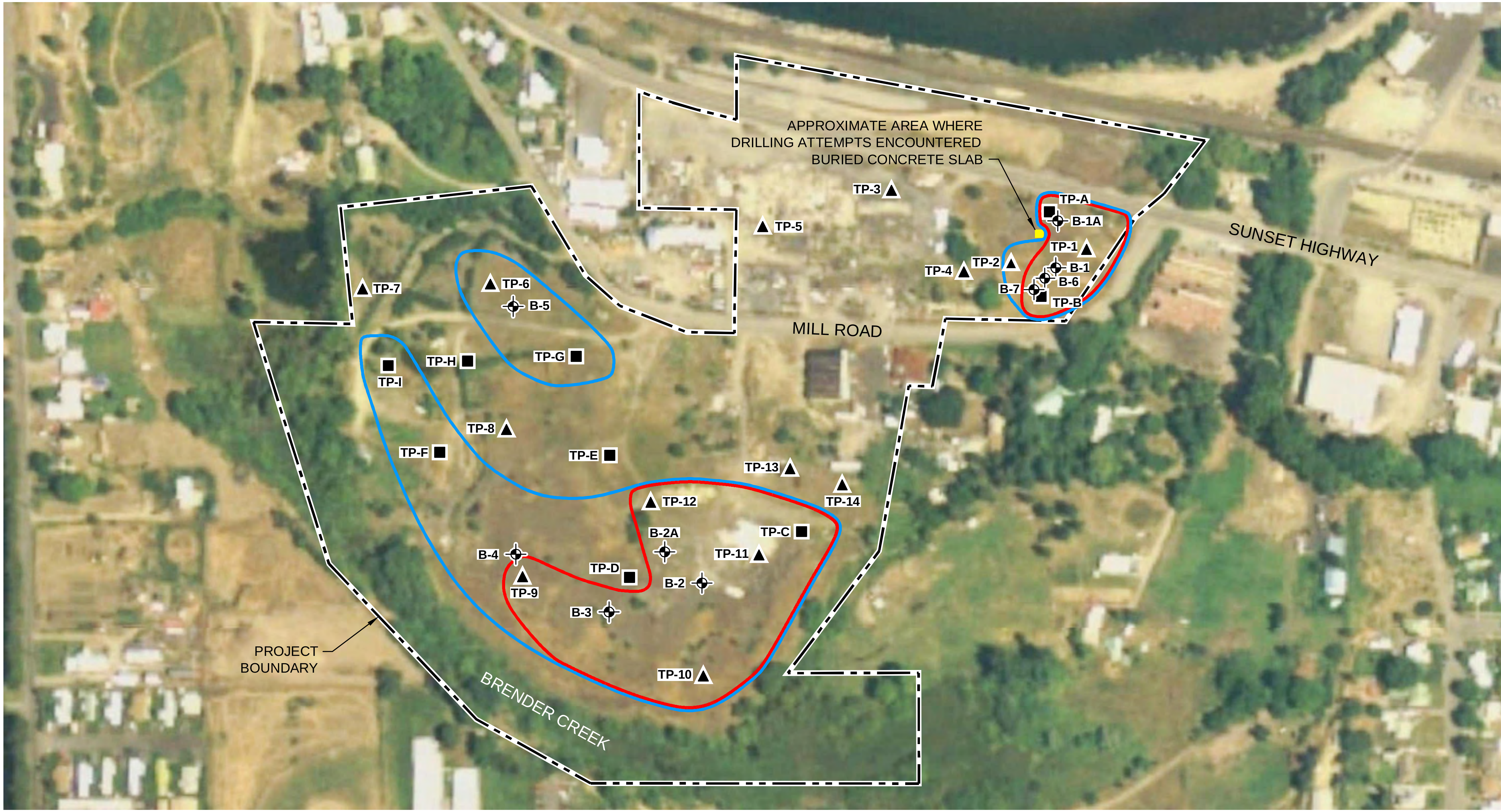
Figure 2

W:\Redmond\Projects\18\1859300100\CAD\185930010 0 Fig 2.dwg\TAB:Landscape modified by tmichaud on Mar 04, 2010 - 11:47

Date: 11/30/09
No Samples Taken

Test Pit	Time	Depth From Surface	Description
A	9:15	0 to 2.5	Brown Silty Sand
		2.5 to 8	Gray Wood Waste with Silty Sand and Gravel
		8	Water Table
B	9:30	0 to 3	Brown Wood Waste with Silty Sand
		3 to 8.5	Gray Wood Waste with Silty Sand and Gravel
		8.5	Water Table
C	9:50	0 to 2	Brown Wood Waste
		2 to 5	Brown Silty Sand with Cobbles
		5 to 7	Gray Silty Sand
		7	Water Table
D	10:06	0 to 4.5	Brown Wood Waste
		4.5 to 7	Gray Silty Sand - Free of Organics
		7	Water Table
E	11:46	0 to 3	Brown Silty Sand with Gravel
		3 to 3.5	Brown Silty Sand with Cobles
		3.5 to 6	Gray Silty Sand
F	10:25	0 to 1	Brown Silty Sand
		1 to 3.5	Bright Orange/Brown Wood Waste
		3.5 to 5	Gray Silty Sand with Cobles
G	11:24	0 to 2	Brown Silty Sand
		2 to 4	Gray Silty Sand with Cobles
		4 to 5.5	Dark Black/Brown Wood Waste - Bark Chips
		5.5	Water Table
H	11:10	0 to 2	Brown Silty Sand
		2 to 3.5	Gray Silty Sand with Cobles
		3.5 to 5	Gray Silty Sand
		5	Water Table
I	10:56	0 to 3	Brown Silty Wood waste
		3 to 4	Gray Wood Waste with Silty Sand and Cobles
		4 to 6	Gray Silty Sand

2010 Investigaton



Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base Aerial from IR3 Imagery.

Legend

B-1 Boring by GeoEngineers, Inc. (January 2010)

TP-A Previous Test Pit by RH2 Engineering, Inc. (November 2009)

TP-1 Previous Test Pit by RH2 Engineering, Inc. (January 2007)

Approximate Limits of Wood Waste Fill

Approximate Areas where Bottom of Wood Waste Fill was Encountered at or Below Depth of 8 Feet

N W E S

200 0 200

FEET

Site Plan

Redevelopment of Cashmere Mill Site
Cashmere, Washington

GEOENGINEERS

Figure 2

W:\REDMOND\PROJECTS\18\1859300100\CAD\1859300100 Fig 2.dwg\TAB:LANDSCAPE modified by tmichaud on Mar 04, 2010 - 11:47

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod

Measured groundwater level in exploration, well, or piezometer

Groundwater observed at time of exploration

Perched water observed at time of exploration

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Material Description Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
NT	Not Tested

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS

GeoEngineers

FIGURE A-1

Drilled	Start 1/20/2010	End 1/20/2010	Total Depth (ft)	17.5	Logged By NCS Checked By HRP	Driller	Holocene Drilling	Drilling Method	Hollow-stem Auger/SPT/D&M

Hammer Data	Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50	A 2 (in) well was installed on 1/20/2010 to a depth of 17.5 (ft). Well was developed on 1/22/2010.	
Surface Elevation (ft) Vertical Datum	Undetermined	Top of Casing Elevation (ft)			
Latitude Longitude		Horizontal Datum	N/A		

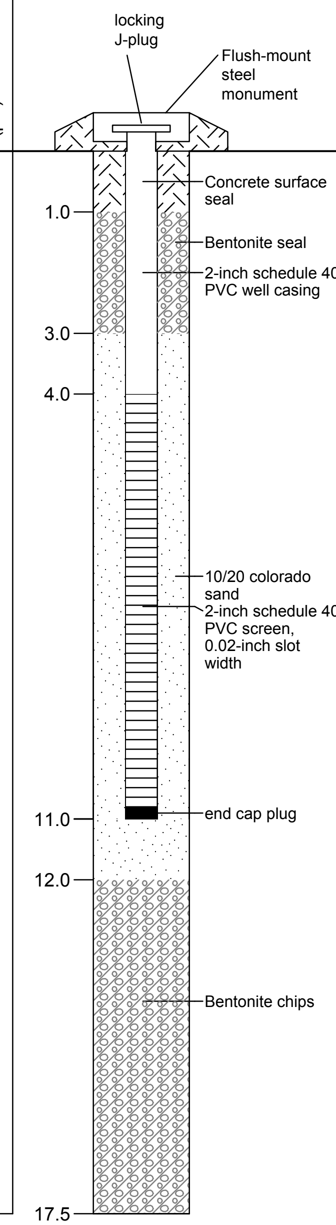
Groundwater

Date Measured	Depth to Water (ft)	Elevation (ft)
1/22/2010	5.2	

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.; Shelby Tube 3 inches I.D.

Elevation (feet)	Depth (feet)	Recovered (in)	Blows/foot	Sample Name	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)
	0				OL	Dark brown wood waste with silty sand, gravel and cobbles (soft, moist) (fill)		
		6		1			30	
						(wood waste includes chips and bark fragments to 2 inches long) organic content = 26%		
		14	9	2		Grades to dark brown and medium stiff	49	31
						(wood waste includes chips up to 3 inches long)		
				2a				
	5	12	5	3		Grades with increasing silty sand content	69	36
						(wood waste includes sawdust, bark and chips to 1 inch long)		
				3a				
					SM/OL	Gray and brown silty fine to coarse sand with wood waste, gravel and cobbles (very loose, wet) (fill)		
		12	8	4			20	57
				4a		(wood waste includes sawdust and chips from ½ to 2½ inches long)		
						(wood waste includes roots and sticks to ¼-inch-diameter)		
	10	12	3	5			52	55
					OL	Dark brown decomposed wood waste with silty fine sand (very soft, wet) (fill)		
		24		5a 6				
						(hydrocarbon odor and sheen at top of sample; sample submitted for chemical analysis)		
					GP	Gray fine to coarse gravel with sand and cobbles (dense, wet) (alluvium)		
	15	18	40	7			10	
		5	50/5"	8				

WELL LOG



Note: See Figure A-1 for explanation of symbols.

Log of Monitoring Well B-1

GeoEngineers

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-2
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 17.3	Logged By NCS / Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) / Vertical Datum: Undetermined	Hammer Data: Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment: Diedrich D-50
Latitude / Longitude	System / Datum: N/A	Groundwater

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
1/21/2010	7.0	

FIELD DATA

Elevation (feet)	Depth (feet)	Recovered (in)	Blows/foot	Sample Name / Testing	Water Level	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0			1		SM	Brown silty fine to coarse sand with gravel, cobbles, and trace wood waste (medium dense, moist) (fill)	19		Wood waste includes bark fragments to 1-inch
		0	59	2						Sampler driven on gravel or cobble
						OL	Dark brown wood waste with silty sand, gravel and cobbles (very stiff, moist) (fill)			Softer drilling Wood waste includes sawdust and chips to 1 inch long
	5	15	30	3				31		
				3a	∇					
		18	6	4		SM	Dark brown silty fine to coarse sand with gravel and trace of wood waste (very loose, wet) (fill)	26	75	Wood waste includes sawdust and chips to ½ inch long
				4a			Organic content = 4%	25		
	10	0	6	5						No recovery
			53	6				33	66	Wood waste includes sawdust and small decomposing chips
				6a 6b		GP	Gray fine to coarse gravel with cobbles (very dense, wet) (alluvium)			Rough drilling
	15									
		15	50/4"	7				13		

Boring was completed about 40 feet NE of intended location. Various attempts to drill at the intended location, and at 2.5, 5, 10 NW and 15 feet E, and 25 feet NE of intended location encountered a concrete obstruction at a depth of 2.5 feet.

Note: See Figure A-1 for explanation of symbols.

Redmond: Date:3/5/10 Path:W:\REDMOND\PROJECTS\18\1859300100\GINT\1859300100.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_STANDARD

Log of Boring B-1A

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-3
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 14.1	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Hammer Data	Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50	A 2 (in) well was installed on 1/22/2010 to a depth of 13.5 (ft). Well was developed on 1/22/2010.
Surface Elevation (ft) Vertical Datum	Undetermined	Top of Casing Elevation (ft)		
Latitude Longitude		Horizontal Datum	N/A	

Groundwater

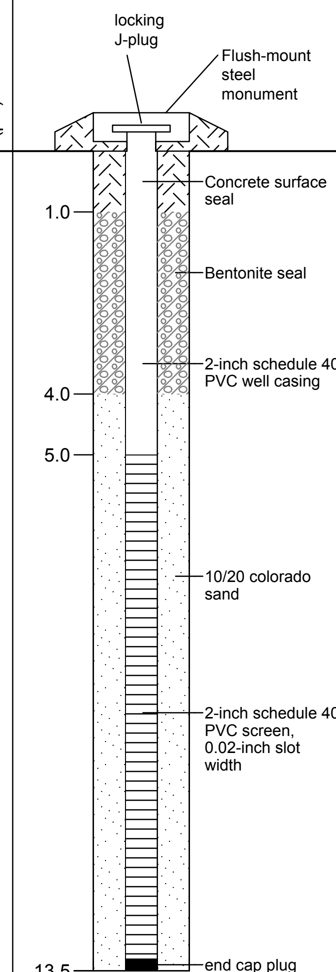
Date Measured	Depth to Water (ft)	Elevation (ft)
1/22/2010	6.7	

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

FIELD DATA

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)
	0		6			1			OL/SM	Dark brown wood waste mixed with silty sand, gravel, and cobbles (soft/loose, moist) (fill)	40	
			6	47		2				(wood waste includes chips, bark and lumber fragments to 3 inches long) Organic content = 29% (sampler driven on gravel or cobble)		
	5		12	12		3					47	48
						3a	▼			Grades to medium stiff (wood waste includes sawdust and wood chips to 2 inches long)		
			15	27		4				Grades to stiff (wood waste includes sawdust and wood chips to 2 inches long)	39	56
						4a						
	10		18	16		5				Grades to medium stiff (wood waste includes sawdust and wood chips to ½ inch long)		
						5a	▽		SM	Gray silty fine to medium sand with gravel and wood waste (medium dense, moist) (fill)	58	
			5	50/2"		6			GM	Gray silty fine to coarse gravel with sand and cobbles (very dense, wet) (alluvium) (Harder drilling)		
			0	50/1"		7				Refusal on boulder/cobbles		

WELL LOG



Note: See Figure A-1 for explanation of symbols.

Log of Monitoring Well B-2

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-4
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 12.7	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M
Surface Elevation (ft) Vertical Datum	Undetermined		Hammer Data	Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Latitude Longitude			System Datum	N/A	Groundwater	

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
1/21/2010	7.0	

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0					1			OL	Dark brown wood waste with silty sand, gravel and cobbles (soft, moist) (fill)	71		Wood waste includes sawdust, bark and chips to 3 inches long
						2					23		Large wood chunks in sampler Organic content = 13%
													Rough drilling
	5		0	18		3							No recovery
							▽		OL/ML	Dark brown fine-grained wood waste mixed with sand, gravel and cobbles (soft/loose, wet) (fill mixed)			
						4							Change in drilling
									GP-GM	Gray sandy fine to coarse gravel with silt and cobbles (dense, wet) (alluvium)			Rough drilling
	10		6	42		5							
			1	50/2"		6							Sampler driven on gravel or cobble

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-2A

GeoEngineers

Project: Redevelopment of Cashmere Mill Site

Project Location: Cashmere, Washington

Project Number: 18593-001-00

Figure A-5
Sheet 1 of 1

Drilled — Start 1/21/2010; End 1/21/2010	Total Depth (ft) 12.7	Logged By NCS; Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M
Surface Elevation (ft) / Vertical Datum: Undetermined		Hammer Data: Automatic 140 (lbs) / 30 (in) Drop		Drilling Equipment: Diedrich D-50
Latitude / Longitude		System Datum: N/A		Groundwater — Date Measured: 1/21/2010; Depth to Water (ft): 7.0; Elevation (ft):
Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.				

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0					1			OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (soft/loose, moist) (fill)	39		Wood waste includes sawdust, bark fragments and chips from ¾ inch to 3 inches long
			6	22		2			OL	Orange brown wood waste (stiff, moist) (fill)	93		Wood waste includes fine shavings and sawdust Organic content = 63%
	5		6	50/6"		3			OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (medium stiff/medium dense, moist) (fill)	65		Wood waste includes sawdust and chips to ½ inch long Sampler driven on gravel or cobble
							∇						
			10	63		4			SM	Gray silty fine to coarse gravel with sand and cobbles (very dense, wet) (alluvium)			Rough drilling
	10												Rough drilling
			2	50/2"		5							

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-3

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-6
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 12.5	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) Vertical Datum: Undetermined	Hammer Data: Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment: Diedrich D-50	
Latitude Longitude	System Datum: N/A	Groundwater	
Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.		Date Measured: 1/21/2010	Depth to Water (ft): 8.0 · Elevation (ft):

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0					1			OL/SM	Brown wood waste mixed with with silty sand, gravel and cobbles (soft/loose, moist) (fill)	46		Wood waste includes bark and chips to 2 inches long
			16	22		2			OL	Dark brown wood waste with silty sand, gravel and cobbles (stiff, moist) (fill)	39	46	Large wood chunks in sampler Wood waste also includes chips and bark to 3 inches long
						2a					96		Organic content = 57%
	5		18	24		3					49	40	Large wood chunks in sampler
						3a							
			10	32		4							
									SM	Gray silty fine sand with organic matter (medium dense, moist) (fill)			Hard drilling
			12	23		5	▽		SM	Gray silty fine to medium sand with gravel and cobbles (medium dense, wet) (alluvium)	31		Rough drilling %F=20
	10												
			18	50/6"		6							
									GP	Gray fine to coarse gravel with sand, gravel and cobbles (very dense, wet) (alluvium)			

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-4

GeoEngineers

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Drilled Start 1/21/2010 End 1/21/2010	Total Depth (ft) 5.8	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M
Surface Elevation (ft) Vertical Datum: Undetermined		Hammer Data: Automatic 140 (lbs) / 30 (in) Drop		Drilling Equipment: Diedrich D-50
Latitude Longitude		System Datum: N/A		Groundwater — Date Measured: 1/21/2010; Depth to Water (ft): 2.0; Elevation (ft):
Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.				

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0			5		1			OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (soft/loose, moist) (fill)	28		Wood waste includes bark and chips to 1 inch long
			6	20		2			SM	Dark brown silty fine to medium sand with organic matter, gravel and cobbles (loose, wet) (fill)			
									GM	Gray silty fine to coarse gravel with sand and cobbles (very dense, wet) (alluvium)			Rough drilling
	5		1	50/4"		3							Sampler driven on gravel or cobble

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-5

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 11.5	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) Vertical Datum: Undetermined	Hammer Data: Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment: Diedrich D-50
Latitude Longitude	System Datum: N/A	Groundwater: Date Measured 1/21/2010; Depth to Water (ft) 6.0; Elevation (ft)
Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.		

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0								OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (soft/loose, moist) (fill)			Wood waste includes chips and bark to 1 inch long
									SM	Brown silty fine to coarse sand with gravel, cobbles and trace wood waste (loose, wet) (fill)			Wood waste includes sawdust and chips to ½-inch
	5		14	11		1							No sheen, no odor
							▽						
													Wood waste includes bark and lumber fragments to 1 inch
	10		18	26		2							Heavy sheen and hydrocarbon odor from sample; sample submitted for chemical analysis

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-6

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-9
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 11.5	Logged By NCS / Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) / Vertical Datum: Undetermined	Hammer Data: Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment: Diedrich D-50	
Latitude / Longitude	System Datum: N/A	Groundwater	

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
1/21/2010	5.0	

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0								OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (soft to medium stiff/loose, moist to wet) (fill)			Wood waste includes shavings and chips to 2 inches long
	5		18	16		1	∇						No sheen, no odor
									SM	Brown silty fine to coarse sand with gravel, cobbles and wood waste (loose, wet) (fill)			Wood waste includes shavings and chips to 2 inches long
	10		18	19		2							No sheen, no odor

Note: See Figure A-1 for explanation of symbols.

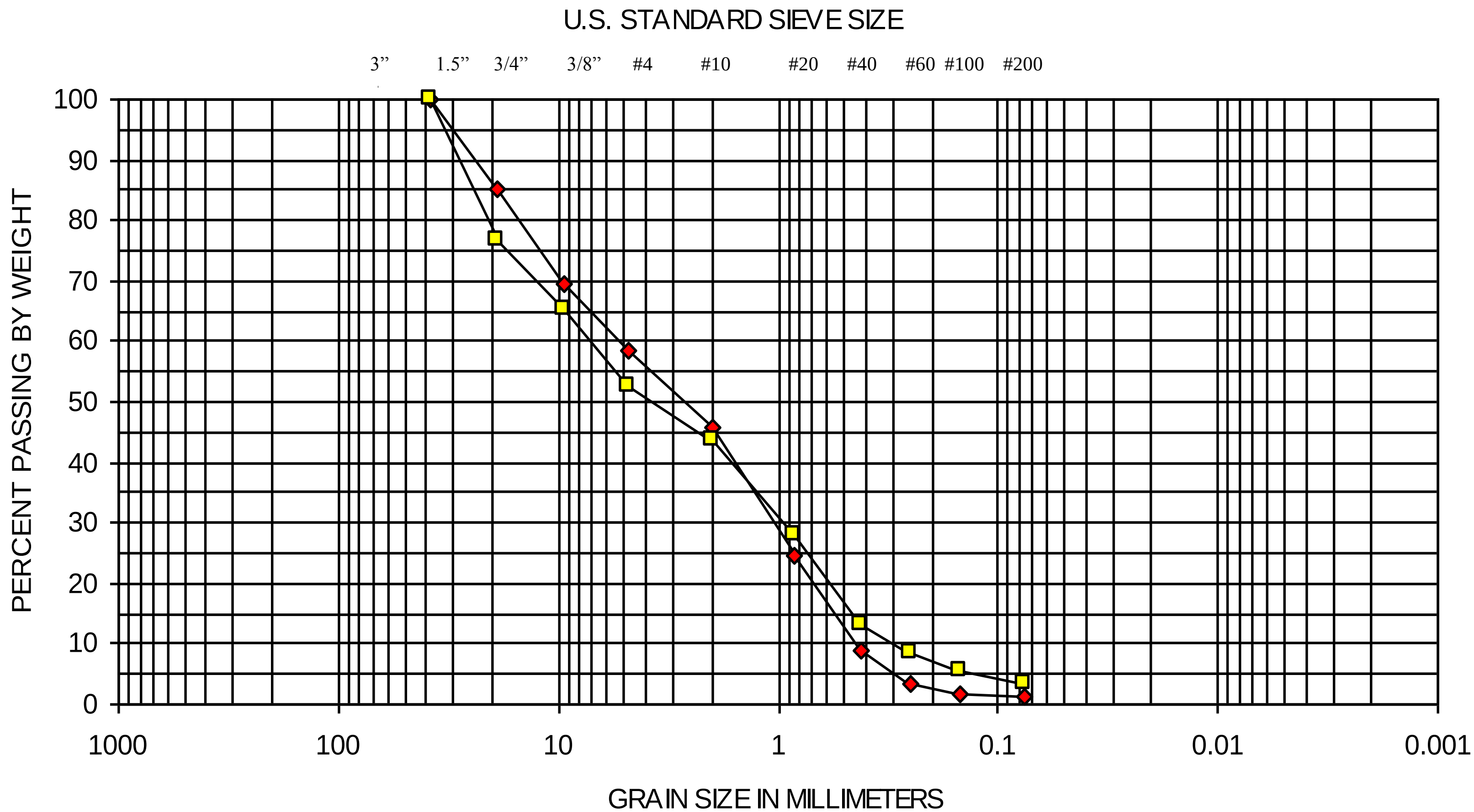
Redmond: Date:2/10/10 Path:W:\REDMOND\PROJECTS\18\1859300100\GINT\1859300100.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_STANDARD

Log of Boring B-7

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-10
Sheet 1 of 1



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SYMBOL	EXPLORATION NUMBER	DEPTH (ft)	SOIL CLASSIFICATION
■ (yellow square)	B-1	15 – 16.5	Fine to medium sand with gravel (SP)
◆ (red diamond)	B-1A	16 – 17.5	Fine to coarse sand with gravel (SP)

GEOENGINEERS

SIEVE ANALYSIS RESULTS

FIGURE A-11

2012 Investigation

Feet
0 75 150 300
1 inch = 150 feet

Cashmere Mill Site

Sampling Locations

last modified by: ARN on 6/13/2012 J:\data\PCC\208-020\01 Port\127 Site Clean-up\GIS\Characterization Plan Fig1.mxd

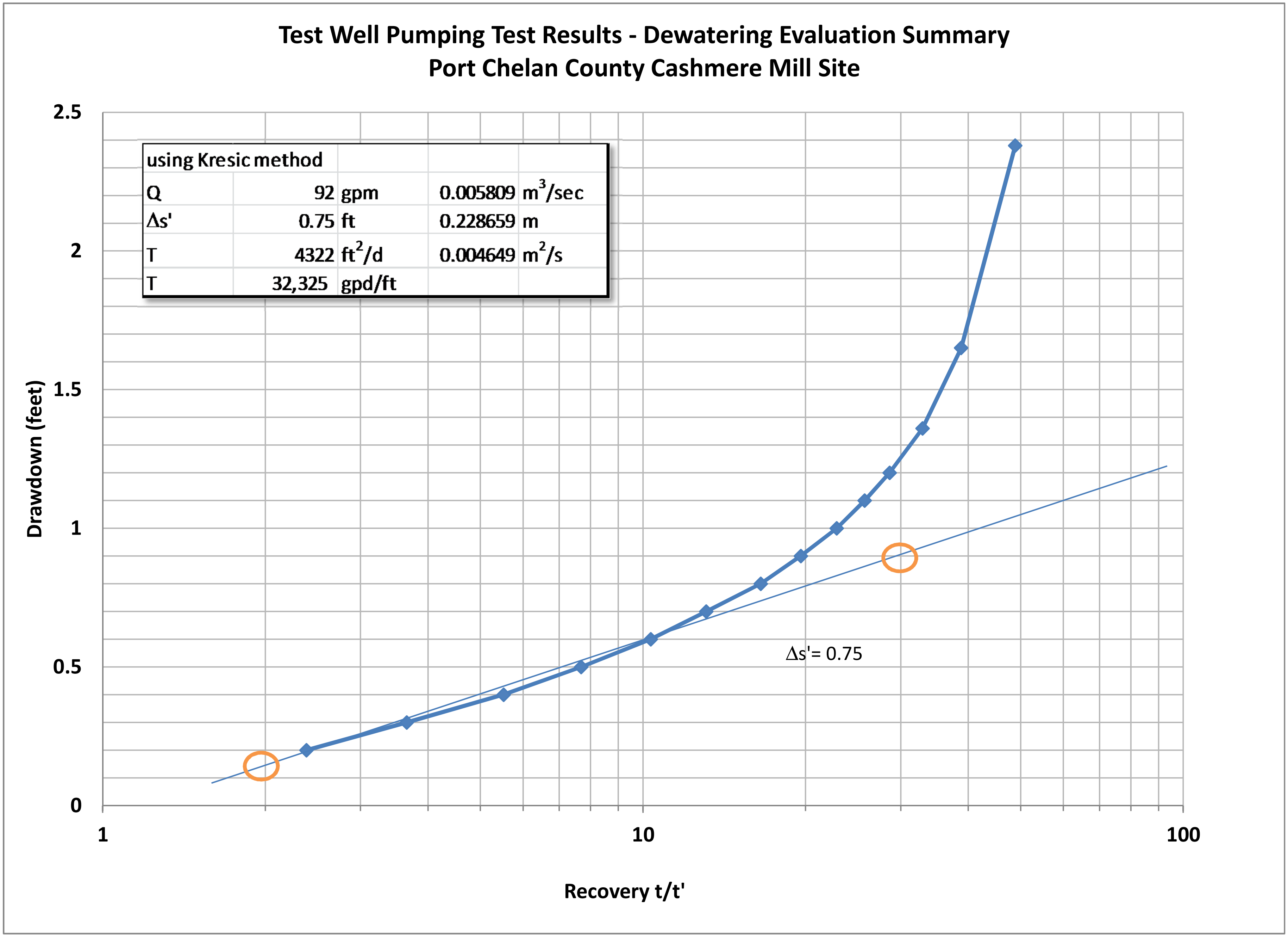
Cashmere Mill Site Test Pit Summary – August 30, 2012

Project & Owner	Port of Chelan County	Project Number	208.020.01.127
Dates	August 30, 2012	Location	Cashmere Mill Site
Field Rep	Adam Neff	Photos	J:\data\PCC\208-020\01 Port\127 Site Clean-up\GEO\photos

Boring	Total Depth	Samples Collected	Depth and Description
CMS-08302012-1	6	N	Sandy COBBLE with gravel (GP). No petroleum odor, no wood waste.
CMS-08302012-2	6	N	Sandy COBBLE with gravel (GP). No petroleum odor, no wood waste. Water level: 4.3’
CMS-08302012-3	5.5	N	Cobbly SAND with gravel (SP). No petroleum odor, no wood waste. Water level: 5.1’
CMS-08302012-4	7	Y	SAND with gravel and cobbles (SP). Light petroleum odor, no wood waste. Water level: 2.5’
CMS-08302012-5	7	Y	Cobbly SAND with gravel (SP). No petroleum odor, no wood waste. Water level: 6’
CMS-08302012-6	7	Y	SAND with gravel and cobbles and construction debris (SP). Significant petroleum odor, no wood waste. Water level: 6.7’
CMS-08302012-7	6	Y	0-3 Mix of wood waste, sand, and gravel. Light petroleum odor. 3-6 SAND with gravel and cobbles (SP).
CMS-08302012-8	5	Y	0-2.5 Mix of wood waste, sand, and gravel. 2.5-5 Coarse SAND with gravel and cobbles (SP). No petroleum odor.
CMS-08302012-9	4.5	Y	0-3 wood waste 3-4.5 grey coarse cobbly SAND with gravel (SP). Water level: 3.5’. No odor.
CMS-08302012-10	5.5	N	0 - 2.2 Crushed concrete 2.2 - 2.5 FILL sand with gravel and organics 2.5 – 5.5 Coarse sand w/gravel and cobbles. Water level 5’
CMS-08302012-11	4	Y	0 – 1 sand with gravel and wood waste 1 – 4 gray coarse sand with gravel and cobble. Hydrocarbon smell. Water level at 3.2’
CMS-08302012-12	4	Y	0 – 2 mix, sand with silt, gravel, cobbles and wood waste 2 – 4 Cobbly sand w/gravel. Hydrocarbon smell in all material. Water level at 2.5 ft.
CMS-08302012-13	4	N	0 – 4 fill with wood waste and construction debris. Hydrocarbon smell. Water level 2.8’

CMS-08302012-14	6.8	Y	0 – 2.8 Silt, sand, cobbles and some wood waste 2.8 – 6.5 Wood waste 6.5 – 6.8 medium sand (clean, native). No odor.
CMS-08302012-15	6.5	Y	0 – 3.5 mixed fill with some construction debris, Sand w/gravel and cobbles 3.5 – 6.5 clean wood waste. Water level at 6.0'. No odor.
CMS-08302012-16	4	N	0 – 4 sand with gravel and cobbles. Slight hydrocarbon smell. Water level at 4'
CMS-08302012-17	4	N	0 – 4 fill with construction debris, sandy cobble w/gravel. Hydrocarbon smell.
CMS-08302012-18	2	N	0 – 2 crushed concrete. 2' refusal on slab of concrete (railroad rail on concrete)
CMS-08302012-19	2.5	N	0 – 2.5 crushed concrete. 2' refusal on slab of concrete (railroad rail on concrete)
CMS-08302012-20	2	N	0 – 2 crushed concrete. 2' refusal on slab of concrete (railroad rail on concrete)
CMS-08302012-21	2	N	0 – 2 crushed concrete. 2' refusal on slab of concrete
CMS-08302012-22	5	Y	0 – 1 crushed concrete 1 – 4 mixed sand with gravel, some cobbles and construction debris. Hydrocarbon smell 4 – 5 gravelly sand with cobbles (native). Water level at 4.5 ft.
CMS-08302012-23	7.5	Y	0 - 4.5 Sand with gravel and cobbles, some construction debris. Very dense 4.5 – 7 Wood waste with sand and cobble. Hydrocarbon contamination 7 - 7.5 fine sand with organics (native)
CMS-08302012-24	8	Y	0 - 1.5 Top soil with organics 1.5 – 6.5 Wood waste with sand and cobble. Hydrocarbon smell 6.5 – 8 medium sand (native). Water level at 7.5'
CMS-08302012-25	7	N	0 – 6 fine sand with silt, gravel and organics. (very little wood waste, mostly roots) 6 – 7 grey medium sand with gravel (native). Water level at 6.3'
CMS-08302012-26	8.5	Y	0 – 8.3 Wood waste w/sand and silt 8.3 - 8.5 grey sand with gravel and cobbles. Water level at 8'
CMS-08302012-27	7.5	Y	0 - 0.5 top soil w/organics 0.5 – 2 sand w/gravel, some cobbles 2 – 3 wood waste 3 – 5 cobbly sand w/gravel 5 – 6.5 medium sand (native) 6.5 – 7.5 sandy cobble w/gravel (native)

Attachment 3
Dewatering Evaluation Summary


Test Well Pumping Test Results - Dewatering Evaluation Summary
Port Chelan County Cashmere Mill Site
using Kresic method
Q 92 gpm 0.005809 m3/sec
Δs' 0.75 ft 0.228659 m
T 4322 ft2/d 0.004649 m2/s
T 32,325 gpd/ft
Δs'= 0.75
Drawdown (feet)
2.5
2
1.5
1
0.5
0
1
10
100
Recovery t/t'

ATTACHMENT B

REMOVAL ACTION WORK PLAN

Port of Chelan County

Former Cashmere Mill Site
Removal Action Work Plan

February 2013

Prepared by RH2 Engineering, Inc.

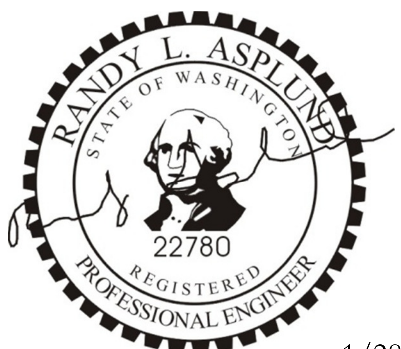
Port of Chelan County

Former Cashmere Mill Site
Removal Action Work Plan
February 2013

Prepared by RH2 Engineering, Inc.

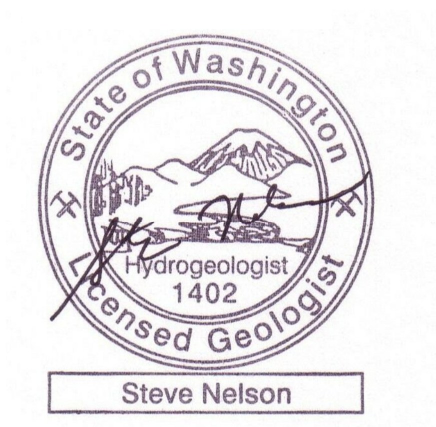
Prepared for Port of Chelan County.

Note: This Removal Action Work Plan was completed under the direct supervision of the following Licensed Professional Engineers and Licensed Geologist registered in the State of Washington.



1/28/13

1/28/13



1/28/13

Port of Chelan County
Former Cashmere Mill Site Removal Action Work Plan
February 2013
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Appendices

1. Introduction

This removal action work plan (Plan) was prepared by RH2 Engineering, Inc., (RH2) with support of Maul Foster & Alongi, Inc., (MFA) on behalf of the Port of Chelan County (Port). The Port owns the former Cashmere Mill properties (site) (**Figure 1**) and intends to transfer the site to a prospective purchaser (Crunch Pak, of Cashmere, Washington) that intends to redevelop the site for commercial use as a fruit storage warehouse and fruit bin storage site. As a condition of purchase, Crunch Pak requires removal of all wood waste-related materials resulting from former mill activities from the developable areas of the site, removal of known, and any discovered, petroleum hydrocarbon-contaminated soil (PCS), and backfilling the excavated areas and filling other areas of the site with structural import fill to regrade the site and to improve drainage. The Port intends to conduct wood waste and PCS removal actions and place structural import fill (the removal action) in 2013.

The Washington State Department of Ecology (Ecology) is providing funding through an Interagency Agreement to support the removal action, which outlines the basic objectives of the removal action and requirements to achieve a determination of no-further-action (NFA) for the site. The NFA determination for soil will be based on confirmation that all PCS and wood waste containing contaminant concentrations exceeding associated cleanup levels have been removed from the site. The Port will also conduct groundwater characterization as part of this removal action after wood waste and PCS removal activities are complete. The objective of the groundwater characterization efforts is to confirm that no contaminants of concern remain in groundwater beneath the Site at concentrations exceeding associated cleanup levels. Initial groundwater characterization will be completed to determine the nature and extent of groundwater contaminants and will guide the development of a groundwater monitoring program, if determined necessary based on initial sampling results, to assess the fate of any residual contaminants in groundwater and what form of groundwater remediation, if any, would be required to achieve an NFA for groundwater at the site.

This work plan describes removal action activities to meet the project objectives. The work plan summarizes background information, defines field activities and specifications, and identifies applicable regulatory requirements necessary to complete the removal action. Key personnel, organizations, individual roles, and responsibilities associated with implementation of the removal action are described in Section 7.

Implementation of this work plan following plan approval will include procurement of materials and services, completion of required activities, and restoration of the site. Soil confirmation sampling after wood waste and PCS removal will provide data necessary for obtaining NFA determination for soil at the site. Documentation of all activities completed, including the achievement of the removal action objectives, will be presented in a removal action report.

2. Site Summary

The Port has conducted environmental site assessments at the site since 2007. Reports describing the activities and findings of the assessments pertaining to the nature and extent of wood waste and PCS at the site are summarized in the References section. This section compiles a summary of site conditions and history from these reports.

2.1. Location

The site is located within the City of Cashmere, along Mill Road and Sunset Highway (**Figure 1**). The site is approximately 32.5 acres in size, bounded to the north by the Burlington Northern Santa Fe (BNSF) railroad tracks; to the east, south, and partially to the west by Brender Creek; with the remaining westerly portion bounded by residential and light industrial uses. The northern boundary of the site, along the railroad tracks, is less than 100 feet from the Wenatchee River.

2.2. History

Construction of the Great Northern Railroad in the early 1900s required realignment of the Wenatchee River to the north of the site. Historically, the river occupied a meander extending south and east of the site. Brender Creek now flows along this former meander (RH2, 2007a).

The site was used primarily for lumber milling from the 1940s until the late 1970s (RH2, 2007b) and for a variety of commercial and light industrial uses thereafter. The mill primarily produced thin lumber to construct fruit packing boxes. No wood treatment chemicals or processes were documented to have been used at the site. The Cedarbrook Company, owned by Mr. John Lysaker, bought the property in 1990 from WI Forest Products, and sold the property to the Port in 2007. Based on anecdotal information, this property has never been used for agriculture (RH2, 2007b).

From 2009 to 2011, the Port completed a series of projects to improve the site. The projects included removing existing asphalt-paved areas, and concrete slabs and footings found throughout the site, primarily in the area between Mill Road and Sunset Highway. These pavement materials were crushed and stockpiled for use as fill (the asphalt piles were sold and disposed offsite). The two remaining buildings on site were treated for asbestos materials, and then demolished and the materials disposed offsite.

The Port also completed a limited wood waste removal project in the southeast portion of the site in 2010 and 2011. The Port hired a contractor to remove all surficial wood waste from a portion of the site. The contractor screened the wood waste, removed the larger rocks and wood pieces, and then sold the remaining material as landscape material. Crushed concrete stockpiled onsite was used to fill the excavated area.

2.3. Previous Site Investigations

In 1990, a Phase 1 Environmental Site Assessment was performed by Forsgren and Associates, Inc. prior to the purchase of the property by Mr. Lysaker of the Cedarbrook Company (Forsgren and Associates, Inc., 1990; RH2, 2007b). This assessment identified evidence of *de minimis* soil contamination from lubrication oils at several locations south of Mill Road, and concluded that the contamination likely existed only in the upper 6 inches of soil. The area between Sunset Highway and Mill Road was reportedly almost completely paved with either asphalt or cement/concrete and therefore, any minor spills that occurred in the area would not likely have led to contamination of the underlying soil. Underground storage tanks (USTs) were observed and a recommendation was made to remove them or bring them up to code. Communications with Mr. Lysaker indicated that all the items identified in the Forsgren Environmental Assessment were remedied prior to or immediately following his purchase of the property, including removal of the USTs. The locations of the USTs were not documented, but based on personal communication with Mr. Lysaker, were likely located in the specified areas shown on **Figure 1**. Documentation of these actions was either not prepared or was lost in a large fire that occurred on the site in 2000 and, therefore, could not be verified for this Plan.

RH2 (2007c) completed a feasibility report prior to the Port's purchase of the site. The feasibility report included a limited environmental assessment (RH2, 2007b) and a geologic report (RH2, 2007a). The geologic report helped to characterize the wood waste composition and distribution, and is summarized later in this Plan. The environmental assessment, completed through a detailed historical review including interviews with several knowledgeable community members and a limited subsurface exploration south of mill road, was able to establish the existence of several mill related structures and the former uses and purposes, but was unable to identify any evidence of existing contamination.

In 2009 and 2010, RH2 conducted limited field assessment of PCS discovered during site-development activities. The field assessment included test pit exploration and sampling and analysis of soil for concentrations of total petroleum hydrocarbons (TPH). Assessment locations are shown in **Figure 2** and the findings are described in Section 2.5

In 2010, GeoEngineers, Inc., (GeoEngineers) performed a detailed geotechnical evaluation of the site as part of the Port's redevelopment plans. GeoEngineers drilled nine borings and completed two of the borings as groundwater monitoring wells (B-1, B-2; **Figure 2**) (GeoEngineers, 2010). At two locations (B-1, B-6; **Figure 2**), soil containing petroleum hydrocarbon-like odors was encountered at a depth of 11.5 feet below ground surface (bgs), which is below the depth of the local water table. Samples from the borings contained TPH as diesel and oil concentrations below Ecology Model Toxics Control Act (MTCA) Method A Cleanup Levels. No groundwater samples were collected from the wells as part of the investigation.

RH2 performed a limited groundwater investigation in 2011 consisting of measuring groundwater elevations at one existing monitoring well (B-5) and in four open test pits excavated to the water table during May and June 2011 (RH2, 2011). The depth to the water table ranged from 1.5 to 4.5 feet bgs in the area south of Mill Road, and 2 to 5 feet bgs between Mill Road and Sunset Highway. The groundwater level measured in May and June 2011 at the monitoring well were approximately 0.5 feet higher than the groundwater water level measured in January, 2010, indicating that minor (less than 1 foot) of seasonal groundwater fluctuation may occur at the site.

RH2 performed additional wood waste, soil, and groundwater investigation activities in August 2012 to better delineate wood waste thickness and composition in unexplored areas, to characterize existing conditions of PCS in areas of known contamination, and to determine if groundwater conditions would allow for site dewatering during future wood waste removal. Wood waste samples were analyzed for chemicals typically used during wood treating processes, including petroleum hydrocarbons; metals (arsenic, chromium, copper, lead); and semi-volatile organic compounds (SVOCs). Soil collected from test pits at known PCS sites was tested for TPH as gasoline and TPH as diesel. A dewatering test well was constructed to evaluate groundwater conditions including aquifer characteristics and dewatering requirements. A sample of water from the test well was also analyzed for wood treatment chemicals. The results of the test are included in **Appendix A.**

2.4. Site Characteristics

The site is underlain by unconsolidated Quaternary glacial and alluvial sediments and sedimentary bedrock of the Chumstick Formation (Tabor et al.; 1987). The site is located in a bend in the former channel of the Wenatchee River. The river bend was cut into a glacial outwash terrace, forming a cut bank approximately 20 feet high south of Brender Creek (**Figure 1**). Alluvium was deposited as the river channel incised the surrounding terraces. Brender Creek flows along the base of the river cut bank. Much of the site was formerly occupied by ponds and bogs along the river floodplain. These topographic depressions were filled at various times with wood debris from mill activities. Interviews with several long-time Cashmere residents and the former owner indicate that granular fill was imported to the site. Three primary areas received fill: Area 1 – north of Sunset Highway; Area 2 – the mill pond north of Mill Road; and Area 3 – south of Mill Road in the log storage area (**Figure 1**). In most places, fill was placed directly on top of Wenatchee River alluvium.

Fill includes wood waste (sawdust, lumber ends, bark, and wood debris); granular fill (sand, silt, and gravel with organic material, including logs); and inert fill consisting (concrete, asphalt, metal, lumber, and other building materials). Most of the fill observed during field work consists of slightly decomposed wood waste or granular fill containing wood waste.

Wood waste at the site is a mixture of raw wood, lumber, sawdust, and granular fill. Wood waste was redistributed by site grading that leveled or covered wood waste stockpiles after mill activities concluded. Site history indicates that the former mill only prepared raw timber into lumber, and no wood treatment operations were conducted. No historical activities, documented through interviews with persons familiar with the site history, reportedly included intentional or accidental releases of petroleum hydrocarbons on the site or import of contaminated materials on to the site (Forsgren, 1990; RH2, 2007a).

2.4.1. Hydrology

The site is almost entirely bounded by water features including the Wenatchee River to the north, and Brender Creek to the west, south, and east. Brender Creek flows in a long curving channel about 100 feet north of the southern property line and discharges into the Wenatchee River northeast of the site. Wetlands exist along the Brender Creek shoreline. Year-round flow in Brender Creek likely affects the groundwater level at the site.

An irrigation return ditch (No-Name Creek) flows about 1,000 feet from west to east along the southern shoulder of Mill Road. The ditch is open near the western boundary of the site, where it forms a small pond. From there, the water flows in a culvert for approximately 600 feet. The ditch is open for about 180 feet along Mill Road near the current Cedarbrook shop. Near the eastern boundary of the property, water enters a culvert that crosses Mill Road and flows approximately 500 feet to discharge into Brender Creek. The ditch is open for about 6 feet before re-entering a culvert beneath Sunset Highway.

In the mid-1990s, the property owner undertook a conservation effort in cooperation with the Washington Department of Fish and Wildlife (WDFW) and Chelan County Conservation District to enhance aquatic habitat in over 2,000 feet of Brender Creek. This effort included excavating sediment from the stream channel placing the excavated sediment in a large berm that parallels the creek. The berm is approximately 10 feet high, 60 feet wide, and 1,000 feet long (**Figure 1**).

Groundwater elevations vary across the site, ranging in depth from 1.5 feet to 5.5 feet bgs. The groundwater table likely fluctuates a few feet during the course of a year due to seasonal precipitation patterns and the changes in flows in Brender Creek and the Wenatchee River (GeoEngineers, 2010).

2.5. Description of Areas Considered Under Removal Action

2.5.1. Wood Waste

The site is divided into three general areas corresponding to the areas of historical waste placement. Area 1 is the northern most area located between Sunset Highway and the BNSF railroad tracks. No wood waste was encountered in Area 1 and no removal actions will be conducted in Area 1.

Area 2 is located south of Area 1, between Sunset Highway and Mill Road, and includes the former mill pond (**Figure 1** and **Figure 2**). Wood waste thickness in the former mill pond ranges from 3 to 13 feet (GeoEngineers, 2010) and tapers to less than 3 feet west of the former pond and to a thickness of 10 feet at the eastern property boundary at Area 2. Wood waste in the center of the former mill pond will not be removed in order to maintain the integrity of the culvert that contains No-Name Creek, which is considered by WDFW as a fish-bearing year-round stream. The wood waste east of the former mill pond in Area 2 (**Figure 1**) has a maximum depth of 10 feet and will be removed as part of the removal action.

Area 3 is the largest area and is located south of Mill Road. This area was predominantly used as a storage area for logs and processed lumber when the mill was operational. Wood waste in Area 3 includes wood waste typically mixed with or interlayered with granular fill soils consisting of silty sand with varying amounts of gravel and cobbles. Native alluvium underlying wood waste and granular fill consists of medium dense silty sand and dense to very dense gravel with silt, sand, and cobbles (RH2, 2007a; GeoEngineers, 2010).

In August 2012, RH2 conducted additional characterization activities in Areas 2 and 3 to estimate wood waste thickness in previously unexplored areas. RH2 collected representative samples of wood waste from the five locations where a significant thickness (greater than 1 foot) of wood waste was encountered. Wood waste samples were analyzed for TPH, SVOCs, and metals. Wood waste did not contain detectable concentrations of TPH as gasoline. Wood waste at one location contained TPH as diesel and oil at concentrations of less than 50 milligrams per kilogram (mg/kg) and less than 100 mg/kg, respectively, based on testing using the HCID method without silica gel cleanup step. Woodwaste at a second location contained TPH as diesel and oil at concentrations of 110 mg/kg and 290 mg/kg, respectively, based on testing using the HCID method with the silica gel cleanup step. Most samples contained detectable concentrations of arsenic, chromium, copper, and lead at concentrations similar to natural background; two samples contained chromium concentrations that were twice the value of the natural statewide background concentration of 38 mg/kg, but below the MTCA Method A cleanup level of 100 mg/kg (*Natural Background Soil Metals Concentrations in Washington State*, Ecology Publication No. 94-115). Note that arsenic and lead were also used historically as components of pesticides for applications at orchards in the region, and detection of these metals may be partially attributed to area-wide contamination common to agricultural areas in central Washington (*Area Wide Soil Contamination Task Force Report*, Ross and Associates, et al, 2003).

All samples contained detectable concentrations of SVOCs, primarily phenols and polynuclear aromatic hydrocarbons (PAHs), generally in the range of 20 to 100 micrograms per kilogram (μg/kg) which is near the method detection limit for these compounds. Results of the wood waste chemical analysis are summarized in **Table 1**. Pentachlorophenol was detected in one sample at an estimated concentration below the method detection limit; the same sample also contained several other phenol compounds. The broad range in types of detected compounds in wood waste is characteristic of creosote, which is a mixture of more than 100 separate chemicals including polynuclear aromatic hydrocarbons and phenols (http://www.epa.gov/opp00001/factsheets/chemicals/creosote_main.htm). The proximity of the historic railroad and its use of treated railroad ties for rail operation is a potential source of these trace concentrations of SVOCs detected in wood waste at the site.

Table 1. Wood Waste Analytical Results

	Sample Number				
Analyte	9	14	23	24	26
SVOCs by EPA Method 8270 (ug/kg)					
Benzo (a) pyrene	<20	25	13 J	18 J	16 J
Benzo (a) anthracene	<20	20	11 J	23	16
Total Benzo fluoranthenes	<39	50	16 J	50	20 J
Chrysene	<20	37	28	43	18 J
Dibenz (a, h) anthracene	<20	10 J	<20	<19	<20
Indeno (1, 2, 3-cd) pyrene	<20	36	<20	<19	<20
Fluorene	<20	15	<20	9.5 J	<20
Acenaphthylene	<20	77	<20	<19	<20
Acenaphthene	<20	22	<20	<19	<20
Phenanthrene	<20	160	41	80	29
Anthracene	<20	24	<20	<19	<20
Fluoranthene	<20	75	14 J	46	18 J
Dibenzofuran	<20	35	<20	<19	<20
Fluorene	<20	15 J	<20	<19	<20
Pyrene	<20	86	43	91	38
Benzo (g, h, i) perylene	<20	57	35	<19	<19
Naphthalene	<20	380	27	120	25
1-Methylnapthalene	<20	37	9.8 J	28	<20
2-Methylnapthalene	<20	70	20	58	16 J
bis (2-Ethylhexyl) phthalate	46 B	38 B	41 B	44 B	54 B
2, 4-Dichlorophenol	<200	<190	<200	<190	<200
2-Methylphenol	<20	<19	<20	<19	<20
4-Methylphenol	<39	180	75	240	330
Pentachlorophenol	<200	<190	<200	170 J	<200
2, 4, 6-Trichlorophenol	<98	<94	<98	<95	<97
2, 4, 5-Trichlorophenol	<98	<94	<98	<95	<97
Metals by EPA Method 6010C (mg/kg)					
Arsenic	6	9	9	7	10
Chromium	91.7	29.1	41	38.9	89.6
Copper	15.8	15.8	15.1	27.1	17
Lead	3	15	17	27	15
Total Petroleum Hydrocarbons by NWTPH-HCID (mg/kg)					
HCID-TPH gasoline	-	-	<20	<20	-
HCID – TPH diesel	-	-	>50	110*	-
HCID-TPH oil	-	-	>100	290*	-

Samples collected on 8/30/2012. See **Figure 2** for sample locations.

- Not analyzed
- B – detected in laboratory method blank.
- J – lab estimate below detection limit.

* – Analysis included silica gel cleanup step.

2.5.2. Groundwater below Wood Waste

Based on the mapped depths of wood waste and groundwater elevations, as well as previous visual observations at the site, dewatering will likely be necessary to achieve complete wood waste removal at Area 3.

A dewatering test well was constructed in August 2012 to evaluate the effect of groundwater pumping on site water levels and estimate aquifer properties of the native soil below the wood waste. The results of dewatering testing and water quality analysis and an analysis of dewatering system requirements are summarized in **Appendix A**.

A 5-inch-diameter test well was completed within native soil below the base of wood waste using a 10-foot-long, wire-wrapped, stainless steel screen installed from 12 to 22 feet bgs. Static water level in the well was 4 feet bgs. The dewatering well was pumped at a rate of 92 gallons per minute (gpm) for several hours. The water level in the well drew down 6.2 feet to slightly above the base of the wood waste and then stabilized. After pumping, the groundwater level recovered to the static level in about 60 minutes. A sample of groundwater collected at the end of the pumping test was submitted for analysis of TPH as gasoline and diesel; benzene, ethylbenzene, toluene, and total xylenes (BTEX); total metals (copper, lead, arsenic, chromium); and SVOCs. The groundwater sample did not contain detectable concentrations of TPH, BTEX, or SVOCs. The groundwater sample contained trace levels of metals at concentrations close to their respective laboratory detection limits.

Construction dewatering could generate 50 gpm during shallow excavation into soil that would likely be managed through sumping. Excavation into deeper wood waste below depths of 8 to 10 feet likely will require construction dewatering that will likely generate groundwater discharge rates initially at 50 to 100 gpm and up to 300 to 500 gpm. The rate of groundwater discharge will depend on the permeability of the native soil and wood waste at the excavated area, the depth of the excavation, and the method used for groundwater control.

Dewatering discharge will be evaluated and managed as described in Section 4.

2.5.3. Petroleum Contaminated Sites

Previous investigations encountered PCS at five separate locations. Characterization of the nature and extent of the PCS is summarized in this section. The five PCS sites are shown on **Figures 1, 2,** and **3**.

2.5.3.1. Site 1

On May 7, 2009, RH2 conducted a geologic investigation to evaluate soil and groundwater conditions along a proposed water main replacement alignment. At location TP-2 (**Figure 2**), alluvial soil exhibiting an odor characteristic of gasoline-range hydrocarbons was encountered at a depth of 5.5 feet bgs. The water-saturated soil at the water table depth of 6.0 feet exhibited a faint sheen, as did the groundwater at the water table. No evidence of a measureable thickness of petroleum product was apparent at the water table. No other evidence in surface soil indicated a potential source for the release. No indications of petroleum hydrocarbon seepage were observed or have been observed on the Wenatchee River bank (the nearest body of surface water), which is approximately 250 feet from TP-2.

On September 9, 2009, RH2 explored Site 1 using test pits. Three test pits (S-1, S-2, S-3) were excavated approximately 10 to 30 feet from TP-2 (**Figure 2**). No apparent contamination (an odor characteristic of petroleum hydrocarbons) was present in the soil at these locations. Test pit S-4 was excavated near TP-2 to confirm the type and concentrations of petroleum hydrocarbons in soil at the original discovery location. Test pit S-5 was excavated across Sunset Highway from TP-2, and observations indicated the presence of hydrocarbons in soil. Three additional test pits (S-6, S-7, and S-8) were excavated to assess the extent of soil contamination near S-5, and did not encounter evidence of soil contamination (**Figure 2**). Odors characteristic of gasoline-range hydrocarbons were detected at S-4 and S-5, and possibly at S-6.

Soil samples were retrieved from each excavation sidewall at a depth of approximately 5 to 7 feet bgs and submitted for analysis of gasoline-range hydrocarbons by the U.S. Environmental Protection Agency (EPA) Method 5035A/Ecology Method NWTPH-Gx. Sample S-4 was analyzed for diesel-range hydrocarbons by Ecology Method NWTPH-Dx to confirm the presence or absence of diesel fuel contamination at Site 1.

Table 2a summarizes the laboratory analyses of the initial soil samples from Site 1.

Table 2a. Initial Investigation Results – Site 1

Sample Number	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	
BTEX (µg/kg)									**MTCA Method A Cleanup Level (µg/kg)**
Benzene	<17	<16	<12	<12	<14	<18	<15	<15	30
Toluene	<17	<16	20	650	62	<18	<15	<15	7,000
Ethylbenzene	<17	<16	<12	1,600	370	<18	<15	<15	6,000
Xylenes (total)	<17	<16	29	700	210	<18	<15	<15	9,000
NWPTH-Gx (mg/kg)									**MTCA Method A Cleanup Level (mg/kg)**
TPH as gasoline	8.2	<6.3	<4.7	**1,600**	**490**	<7.4	<6.1	<6.2	30
NWPTH-Dx (mg/kg)									**MTCA Method A Cleanup Level (mg/kg)**
TPH as diesel fuel	-	-	-	910	-	-	-	-	2,000
TPH at heavy oil	-	-	-	<110	-	-	-	-	2,000

Concentrations of TPH as gasoline at Site 1 at S-4 and S-5 exceeded MTCA Method A Cleanup Levels in Soil for Unrestricted Land Use.

In 2011 and 2012, during reconstruction of Sunset Highway, PCS in the road alignment at sample locations S-4 and S-5 was remediated by excavation and off-site disposal at the Waste Management municipal waste landfill in East Wenatchee, Washington.

In August 2012, RH2 collected four soil samples for laboratory analysis of TPH as gasoline and BTEX from test pits installed on each side of the extent of the prior remedial action excavation to confirm the remedial action removed contaminants exceeding applicable cleanup levels (**Figure 2**). One sample was analyzed to characterize the TPH composition using Ecology Methods Volatile Petroleum Hydrocarbons/Extractable Petroleum Hydrocarbons (VPH/EPH). Results are summarized in **Table 2b**. Concentrations of TPH as gasoline range from less than 5 mg/kg to

74 mg/kg; toluene and total xylenes were detected in one sample at concentrations of 82 and 105 µg/kg, respectively. Therefore, the representative confirmation samples indicate that no residual PCS containing TPH and BTEX concentrations exceeding MTCA Method A cleanup levels remains at Site 1 and no additional soil remedial action is warranted. Groundwater characterization of Site 1 using monitoring wells will occur after wood waste removal.

Table 2b. Confirmation Sampling Results – Site 1

Sample Number	5	6	7	8	
BTEX (µg/kg)					**MTCA Method A Cleanup Level (µg/kg)**
Benzene	<25	<30	<27	<25	30
Toluene	<25	82	<27	<25	7,000
Ethylbenzene	<25	<30	<27	<25	6,000
Xylenes (total)	<25	105	<27	<25	9,000
NWTPH-Gx (mg/kg)					**MTCA Method A Cleanup Level (□g/kg)**
TPH as gasoline	<4.9	73	74	<5.2	100
Ecology Method VPH (µg/kg)					**MTCA Method A Cleanup Level (µg/kg)**
C8-C10 Aromatics	<11,000	-	-	-	na
C10-C12 Aromatics	10,000	-	-	-	na
C12-C13 Aromatics	8,700	-	-	-	na
C5-C6 Aliphatics	<11,000	-	-	-	na
C6-C8 Aliphatics	<11,000	-	-	-	na
C8-C10 Aliphatics	6,500	-	-	-	na
C10-C12 Aliphatics	<11,000	-	-	-	na

- Not analyzed

na - Not available

2.5.3.2. Site 2

Site 2 was identified in October 2009 during removal of existing asphalt pavement and concrete footings from the project site by the Port's contractor. Soil exhibiting an odor characteristic of petroleum hydrocarbons was observed under and adjacent to several large concrete footings (**Figure 2**).

As part of the October 2009 field efforts, RH2 investigated Site 2 via installation of exploration test pits. A representative soil sample (S-1) was collected from test pit S-1b located at the original discovery location. Analytical results of the soil sample S-1 contained diesel-range hydrocarbons at concentrations above MTCA Method A cleanup levels. Soil exhibiting odors characteristic of petroleum hydrocarbons was also observed at test pits TP-2b and TP-5b. Step-out exploration pits S-2b and S-4b) were dug to the north and east, respectively (**Figure 2**). No odors in soil were detected in samples from step out test pits and samples (S-2 and S-4) from the step-out test pits contained no detectable concentrations of TPH as gasoline. At two additional excavations (S-3b and S-5b), no gasoline-range hydrocarbons were detected in soil samples collected from excavation sidewall at a depth of approximately 4 to 6.5 feet bgs. Samples were collected approximately 6 to 12 inches above the water table at the time of excavation. **Table 3** summarizes the laboratory analyses of the soil samples collected associated with Site 2.

Table 3. Investigation Results – Site 2

Sample Number	**S-1**	**S-2**	**S-3**	**S-4**	**S-5**	
BTEX (µg/kg)						**MTCA Method A Cleanup Level (µg/kg)**
Benzene	<20	<18	<27	<20	<19	30
Toluene	<20	<18	<27	<20	<19	7,000
Ethylbenzene	<20	<18	<27	<20	<19	6,000
Xylenes (total)	<39	<37	<54	<41	<39	9,000
NWTPH-Gx (mg/kg)						**MTCA Method A Cleanup Level (mg/kg)**
TPH as gasoline	<7.9	<7.3	<11	<8.1	<7.7	100
HCID (mg/kg)						**MTCA Method A Cleanup Level (mg/kg)**
HCID – TPH diesel	**2,500**	-	-	-	-	2,000
HCID-TPH oil	**4,500**	-	-	-	-	2,000

- Not analyzed

Soil containing TPH as diesel/oil exceeding MTCA Method A cleanup levels exists at Site 2 at S-1b, and likely exists at TP-2b and TP-5b where petroleum hydrocarbon-odors were detected similar to those at S1-b. PCS may also underlie concrete foundations at Site 2. Additional soil characterization of this site will take place during the wood waste removal action. Groundwater characterization of Site 2 using monitoring wells will occur after wood waste removal. In addition, any catch basins, drywells, and sumps that are encountered during the wood waste removal will be characterized for petroleum hydrocarbons.

2.5.3.3. Site 3

Petroleum contaminated Site 3 was discovered in 2010 by GeoEngineers during drilling of geotechnical soil borings. Soil boring B-1 was drilled to a depth of 17.5 feet, encountered groundwater at 6 feet, and encountered soil at a depth of 11.5 feet exhibiting odors resembling petroleum hydrocarbons. Soil boring B-6 was drilled to a depth of 11 feet, encountered groundwater at 5.5 feet, and encountered soil containing petroleum hydrocarbon-like odors at a depth of 11.5 feet (**Figure 2**). Soil samples from the two borings were analyzed for diesel-range petroleum hydrocarbons and contained detectable diesel and lube oil-range hydrocarbons concentrations below MTCA Method A cleanup levels (**Table 4**).

Table 4. Investigation Results – Site 3, Mill Pond

Sample Number and depth (feet)	B-1; 11.5 ft	B-6; 11.5 ft	MTCA Method A Cleanup Level (mg/kg)
NWTPH as diesel (mg/kg)	500	1,100	2,000
NWTPH as heavy oil (mg/kg)	820	1,600	2,000

No residual PCS is apparent at Site 3 at concentrations exceeding MTCA Method A cleanup levels. No removal action is planned for Site 3. Groundwater monitoring at Site 3 will be conducted after site-wide removal action is completed (Section 4.4).

2.5.3.4. Site 4

Site Location 4 was discovered in July 2011 as part of the field investigations during test pit exploration to observe the depth of the water table at the site. A multi-point composite soil sample collected from one test pit (S-1) exhibited a strong petroleum hydrocarbon odor and was submitted for analysis of diesel range hydrocarbons. Analytical results indicated the presence of TPH as diesel at concentrations below MTCA Method A cleanup levels (**Table 5**). The result was used as a screening tool to indicate the need for additional characterization, as composite sampling is not appropriate for this type of investigation

Table 5. Initial Investigation Results – Site 4 and Site 5

Sample Number and Depth	Site 4 S-1; 4 ft	Site 5 S-1; 4 ft	Site 5 S-2; 5 ft	MTCA Method A Cleanup Level (mg/kg)
NWTPH as diesel (mg/kg)	-	350	-	2,000
NWTPH as heavy oil (mg/kg)	-	700	-	2,000
HCID-gasoline (mg/kg)	<20	<26	<24	100
HCID-diesel (mg/kg)	6.7	>65	>60	2,000
HCID-oil (mg/kg)	100	>130	>120	2,000

- not analyzed

In August 2012, RH2 further investigated Site 4 with 12 test pits to better characterize the extent and composition of TPH in PCS. Petroleum hydrocarbon-like odors were detected in soil at most sampling locations. The sample with the strongest apparent hydrocarbon odor (S-12) was analyzed to characterize the TPH composition using Ecology Methods VPH and EPH, and for potential use to calculate Method B Cleanup Levels. The VPH/EPH results indicate a concentration of TPH as gasoline of approximately 22 mg/kg and TPH as diesel/oil of approximately 100 mg/kg, which are below Method A Cleanup Levels; use of the Method B Cleanup Level calculation was not warranted based on these results. One sample (S-22) was analyzed for TPH as gasoline and TPH as diesel using Ecology method NWTPH-HCID to identify the types of TPH at the potential western limit of PCS at Site 4. The sample did not contain TPH as gasoline concentrations greater than 20 mg/kg and did contain concentrations of TPH as diesel and oil of greater than 50 and greater than 100 mg/kg, respectively. Results are summarized in **Table 6**.

The August 2012 investigation was for screening purposes to assess the extent of PCS that may be encountered during removal action. PCS containing concentrations of TPH exceeding MTCA Method A cleanup levels will be removed during removal actions at Site 4 as described in Section 4.

Table 6. Additional Investigation Results – Site 4

	Sample Number and depth (feet)		MTCA Method A Cleanup Level (mg/kg)
HCID (mg/kg)	S-12; 3 ft	S-22; 4 ft	
HCID - TPH as gasoline	-	<20	100
HCID - TPH as diesel	-	>50	2,000
HCID - TPH as heavy oil	-	>100	2,000
Ecology Method VPH/EPH (mg/kg)			
C8-C10 Aromatics	3.2	-	na
C10-C12 Aromatics	11 J	-	na
C12-C16 Aromatics	<2.2	-	na
C16-C21 Aromatics	2.2	-	na
C21-C34 Aromatics	6.5	-	na
C5-C6 Aliphatics	<11	-	na
C6-C8 Aliphatics	<11	-	na
C8-C10 Aliphatics	¤ 3.5B	-	na
C10-C12 Aliphatics	<2.2	-	na
C12-C16 Aliphatics	3.6	-	na
C16-C21 Aliphatics	2.9	-	na
C21-C34 Aliphatics	87.0	-	na

\- Not analyzed
na - Not available

2.5.3.5. Site 5

Site 5 was discovered during the initial wood waste removal project in 2011. Soil at Site 5 exhibited a faint petroleum hydrocarbon-like odor. A soil sample from Site 5 analyzed for TPH using Ecology method NWTPH-HCID did not contain detectable concentrations of gasoline and diesel-range hydrocarbons (**Table 5**). The stockpiled soil from the Site 5 was disposed offsite.

No residual PCS is apparent at Site 5 at concentrations exceeding Method A cleanup levels. No removal action is warranted for Site 5.

3. Removal Action Objectives

The overall removal action objective is to gain an NFA determination from Ecology for the project site through conducting the necessary field activities to confirm the removal of wood waste and soil containing contaminants exceeding associated cleanup levels, and through adequately characterizing the underlying groundwater to demonstrate that the groundwater has not been impacted and that no adverse impact to groundwater remains at the site. To meet this objective, the planned removal action consists of removing all wood waste in developable areas of the site, removing all known PCS exceeding associated cleanup levels, disposal of all PCS and any petroleum-contaminated wood waste identified during wood waste removal at an appropriate facility, backfilling of all excavated areas with clean fill, and conducting groundwater monitoring to confirm that groundwater at locations identified to have been impacted by petroleum hydrocarbons do not contain contaminant levels that exceed cleanup goals.

4. Removal Action Strategy

4.1. Wood Waste

4.1.1. Wood Waste Removal and Disposal

Wood waste will be entirely removed from developable areas of the site (i.e., areas outside of any critical areas or critical area buffers) by excavation, and transported offsite for reuse or disposal. The excavated areas will be backfilled as soon as possible after wood waste removal using clean import fill or clean native soil from the site.

Wood waste will be removed using large bulldozers and excavators to place excavated wood waste directly into trucks for transport off-site. During wood waste removal, on-site inspectors will screen the wood waste for physical evidence of contaminants using visual indications and a photoionization detector (PID) as described in **Appendix B**, Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP). If contamination is suspected, the wood waste will be stockpiled on site and assessed for the type and concentrations of contaminants and the wood waste will be disposed of based upon the characterization results. When native alluvium is exposed, the native soil will be screened and grid-sampled for analysis of petroleum hydrocarbons and wood treatment chemicals. Laboratory results will be returned 24 hours after receipt of the sample. Upon receipt of soil testing results confirming that no contaminants remain at concentrations above associated cleanup levels, the excavated area will be backfilled with imported structural fill and compacted. Field screening methods and soil confirmation sampling and analysis methods are described in **Appendix B**. Health and safety procedures are described in **Appendix C,** the Health and Safety Plan**.**

Thinnest areas of wood waste in the west and northern portions of the project site Area 3 will be excavated first. The thickest areas of wood waste that are below the water table in the southern portions of Area 3 and eastern portions of Area 2 will be removed last, in late summer 2013, to minimize the requirements for construction dewatering.

4.1.2. Dewatering Effluent Characterization, Treatment, and Disposal

Construction dewatering is estimated to generate 50 to 100 gpm during initial shallow wood waste excavation activities that would likely be managed through sumping. Excavation into deeper wood waste (below depths of 8 to 10 feet) likely will require construction dewatering that may generate groundwater discharge rates ranging from 300 to 500 gpm.

Groundwater withdrawn during pumping will be routed into a settling tank to reduce total suspended solids (TSS). The Port will establish an agreement with the City of Cashmere (City) to accept the discharge water for treatment at the City's wastewater treatment plant (WWTP). The agreement will require periodic water quality monitoring for TPH and wood treatment chemical concentrations and daily inspections of discharge water in the settling tanks to be conducted by the Contractor to confirm that no sheens or odors are present in the discharge. At the start of operation, sampling will occur daily for the first week, and then be adjusted, if warranted, based on analytical results. The discharge will be routed to a connection point (6" PVC pipe stub) to the City of Cashmere's low pressure sewer system. This connection point is located just off the mill site entrance from Sunset Highway (**Figure 4**), discharge will require pumping, a system curve will be provided in the bid documents.

Should the WWTP become unavailable to accept dewatering effluent during the removal action, the Contractor will use an on-site water treatment system to remove organic compounds from dewatering discharge and route the treated discharge to an on-site infiltration basin constructed in the shallow areas of wood waste. The treatment system will be sized to adequately receive the anticipated dewatering rates and will likely include granular activated carbon filters to remove any dissolved organic compounds and trace metals.

4.1.3. Potentially Contaminated Wood Waste Characterization and Disposal

Wood waste may locally contain inert solid waste including concrete and metal. Anecdotal evidence also suggests the possibility that buried vehicles exist in the wood waste, and that abandoned subsurface utilities may exist, including dry wells. All areas of unusual wastes or abandoned utilities will be observed for indications of contamination and field screened. Field screening results will determine whether wood waste contains contaminants warranting additional characterization and appropriate disposal. Any contaminated wood waste will be removed, stockpiled separately on site for waste characterization, and disposed off-site at an applicable facility permitted to receive the contaminated wood waste. Soil underlying contaminated wood waste will be field-screened and confirmation samples collected. Field screening methods and soil confirmation sampling and analysis methods are described in the SAP/QAPP (**Appendix B**).

4.2. Petroleum Contaminated Sites

4.2.1. Site 2

PCS at confirmed locations containing TPH as diesel exceeding MTCA Method A Cleanup Levels at petroleum contaminated Site 2 will be removed and the limits of PCS removal will be determined by field screening. Excavated PCS will be removed for off disposal at a facility permitted to receive and dispose of the PCS. Confirmation sampling will assess the effectiveness of PCS removal, and the excavation will be backfilled with clean imported soil following confirmation that no contamination exceeding cleanup levels remains. Field screening methods and soil confirmation sampling and analysis methods are described in the SAP/QAPP (**Appendix B**).

4.2.2. Site 4

Concrete foundations will be removed at petroleum contaminated Site 4 during removal actions. PCS at confirmed locations containing TPH as diesel exceeding MTCA Method A Cleanup Levels at Site 4 will be removed and the limits of PCS removal will be determined by field screening. Excavated PCS will be removed for disposal at a permitted facility. Confirmation sampling will assess the effectiveness of PCS removal, and the excavation will be backfilled with clean imported soil following confirmation that no contamination exceeding cleanup levels remains. Field screening methods and soil confirmation sampling and analysis methods are described in the SAP/QAPP (**Appendix B**).

4.2.3. Discovered potentially contaminated soil sites

If field screening during wood waste removal encounters evidence of potentially contaminated soil (e.g., odors, sheens, stains, detections of volatile organic vapors using a PID, etc.), any apparent potentially contaminated soil will be removed and the limits of potentially contaminated soil removal will be determined by field screening. Excavated soil will be removed for on-site stockpiling, characterization, and disposal at a permitted facility. Confirmation sampling will assess the effectiveness of soil removal, and the excavation will be backfilled with clean imported soil following confirmation that no contamination exceeding cleanup levels remains. Field screening methods and soil confirmation sampling and analysis methods are described in the SAP/QAPP (**Appendix B**).

4.3. Excavated PCS and Contaminated Wood Waste Stockpiling

Excavated PCS and contaminated wood waste (CWW) will be stockpiled separately at predefined locations at the project site. Excavated PCS and CWW will be stockpiled separately in a manner that will allow for characterization sampling (composite samples) of the material. Characterization sampling will be conducted per methods described in the SAP/QAPP (**Appendix B**). Characterization of PCS and CWW will demonstrate compliance with acceptance criteria of the designated disposal facility.

The stockpile areas will be constructed to include an impermeable plastic liner placed on compacted gravel, an impermeable plastic cover, and sufficient stormwater controls to isolate the stockpiles from precipitation and surface water prevent stormwater run-on into or runoff from the stockpile area.

4.4. Groundwater Monitoring

Groundwater monitoring will be conducted after removal actions. Groundwater monitoring will characterize groundwater conditions at upgradient/background locations and downgradient of areas of known and discovered PCS and CWW. Groundwater monitoring wells will be installed following Washington Administrative Code (WAC) 173-160 at locations based on the findings of field exploration and observations during wood waste and PCS removal, and to establish the groundwater gradient and flow direction at the site. Proposed locations for groundwater monitoring wells are shown on **Figure 1**. Additional groundwater monitoring wells may be installed downgradient of locations of where PCS or contaminated wood waste is discovered and removed. Groundwater samples will be collected in accordance with the SAP/QAPP (**Appendix B**) from each monitoring well after the wells have been developed in accordance with Ecology standards. Groundwater samples will be analyzed for TPH as gasoline, TPH as diesel/oil, and BTEX. If gasoline is detected in groundwater, samples will also be analyzed for lead, methyl tertiary-butyl ether (MTBE), ethylene dibromide (EDB) and ethylene dichloride (EDC). If WTC is detected in wood waste, groundwater samples will also be analyzed for WTC.

5. Removal Action Implementation

5.1. Wood Waste Removal

Wood waste will be progressively removed from shallow to deeper wood waste layers. Wood waste in Area 2 will be removed up to within approximately 10 feet of the eastern boundary of the parcel and down to native alluvial soil (**Figure 4**); wood waste in Area 3 will be removed up to the critical area buffer zone and parcel boundaries, as applicable, and down to native alluvial soil (**Figure 4**). Non-contaminated wood waste will be placed directly into trucks and transported offsite. Construction dewatering is anticipated only to be required during Area 3 excavation activities and will be implemented at shallower excavations using sumps. When sumping is not able to maintain the integrity of the excavation, dewatering wells will be installed to drain the soil of groundwater and reduce underlying groundwater pressure. Dewater discharge will be managed as described in Section 5.6.3. Wood waste identified as potentially contaminated by field staff during excavation will be stockpiled on site for further characterization.

Wood waste removal will include continuous field observation to evaluate the quality of the wood waste and to screen wood waste and underlying soil exhibiting signs of potential contamination, including odors and stains. If field screening results indicate potential contamination, the wood waste will be removed and stockpiled on site. Confirmation sampling will be conducted of both wood waste and underlying soil.

5.2. Petroleum Contaminated Soil Removal

PCS will be removed from the locations of known cleanup level exceedances at petroleum contaminated Sites 2 and 4, and field screening will guide the extent of initial soil removal. PCS will be removed at areas discovered during wood waste removal and confirmed through field screening. Any apparently contaminated soil exhibiting sheen, staining, odors will be removed below the water table to a maximum depth of 2 feet. Excavated soil in areas of known TPH contamination will be placed into a separate PCS stockpile for characterization and subsequent transport offsite for disposal. Excavated PCS in areas of discovered TPH will also be placed in the on-site PCS stockpile for characterization sampling. Additional PCS removal followed by additional screening and confirmation sampling will be conducted in areas where TPH concentrations are confirmed to exceed MTCA Method A cleanup levels.

5.3. Pollution and Erosion Control Measures

The removal actions at the site will include management of potential pollutants introduced to the site by contractor equipment and to prevent off-site discharge of pollutants by runoff and erosion of excavated materials or by discharges from contractor equipment. The details of pollution and erosion control measures are described in the construction bid documents for the removal action.

5.4. Stormwater Collection and Management

Stormwater management is an important consideration during implementation of the removal action. Stormwater is defined as any precipitation (e.g., rain, snow, and hail) or surface water that accumulates on or flows across the ground surface. Control measures will be incorporated that mitigate stormwater run-on into, as well as runoff from, the excavation. All stormwater shall be removed from the excavation and treated as dewatering water. Temporary alternate drainage pathways, temporary diversion structures, or other measures will be utilized to minimize the amount of stormwater to be managed during the field activities. Stormwater management activities are described in the contract specifications for the removal action.

After the start of excavation and prior to confirmation sampling, water that accumulates in the excavation will be pumped with sump pumps into the construction dewatering system and managed with dewatering discharge.

5.5. Establishment of Work Zones

Work zones for the removal action will include the active excavation area, stockpile areas, and construction dewatering system. These zones will likely shift as excavation proceeds depending on excavation progress. **Figure 4** shows the initial work zones, which will be identified on the site using signage and fencing, where appropriate.

5.6. Removal Action Construction Activities

5.6.1. Dewatering Well and Monitoring Well Network Installation

The removal action contractor will install construction dewatering wells following WAC 173-160. The wells will be installed using either a large diameter auger or air rotary methods to complete the dewatering well borings to a depth of approximately 30 feet, and installing 4- to 6-inch-diameter slotted-screen PVC wells. The boring annular space will be backfilled with pea gravel for the full length of the boring. The wells will be positioned by the contractor around the deepest part of wood waste removal area in locations that would achieve effective groundwater control to facilitate excavation and removal of wood waste below the water table.

The removal action contractor will install temporary monitoring wells at the center and along the perimeter of deep excavations to support operation of the dewatering system and to confirm effective dewatering performance. The monitoring wells will be installed following WAC 173-160 using either an auger or air rotary rig to complete the piezometer borings to a depth of approximately 30 feet, and installing 2-inch-diameter slotted-screen PVC well screen. The boring annular space will be backfilled with pea gravel for the full length of the boring. Monitoring well installation will be observed by, or under the direction of, a Washington State licensed hydrogeologist.

Two monitoring wells constructed in 2010 (B-1, B-2) (**Figure 3**) will be used to support groundwater elevation monitoring of construction dewatering performance.

All dewatering wells and monitoring wells (including the two existing monitoring wells) (GeoEngineers, 2009) will be decommissioned at the end of the construction dewatering activities following WAC 173-160.

5.6.2. Site Clearing and Grubbing

Much of the project site is already cleared of structures and debris. Concrete foundations near petroleum contaminated Site 4 will be removed initially before wood waste removal actions. Areas of the project site covered will granular fill over wood waste will be stripped and the fill removed for off-site disposal.

5.6.3. Dewatering Activities

Areas of shallow fill that lie below the water table will be excavated with the support of groundwater sumps to remove water from the excavation. Sumps will be used as long as the integrity of the excavation is maintained with sumping. Deeper excavations will require dewatering wells to reduce groundwater pressure underlying the wood waste and to allow excavation to proceed below the water table to the base of the wood waste. Electric submersible pumps will be placed in each dewatering well and a discharge line will be routed to a manifold that collects all discharge water. Each well will have independent flow control valves.

Water from sumps and from dewatering wells will be routed from the manifold to a series of 20,000-gallon settling tanks. The water will then be routed to a manhole for discharge to the Cashmere WWTP. If the WWTP discharge option is not available, the water will be treated for organic compounds using granular activated carbon filters and the water will be discharged under permit to an infiltration basin constructed on site (**Figure 4**). **Appendix A** contains calculations of anticipated dewatering discharge rates.

5.6.4. Wood Waste Excavation

5.6.4.1. Potentially Contaminated Wood Waste or Fill Material

Field inspectors will continuously monitor wood waste removal to observe indications of contamination in wood waste and in native soil underlying wood waste. If visible or olfactory indications of contamination are observed (stains, sheens, odors, etc.), then field screening will be conducted by the field inspector to assess the potential for TPH in wood waste and in soil underlying the wood waste. If field screening indicates the presence of TPH, wood waste will be excavated and stockpiled in the CWW stockpile area for disposal characterization. Excavation and stockpiling of CWW will proceed until confirmation sampling indicates that the CWW has been removed and wood waste removal actions will proceed.

5.6.4.2. Unanticipated Anomalies

Unexpected materials in the wood waste may include inert waste, or equipment from former mill activities. Inert solid waste such as construction debris (concrete, metal, plastic) will be segregated from wood waste and placed in a separate inert solid waste stockpile and subsequently disposed off-site at a permitted facility. Equipment that may have included petroleum hydrocarbons, heavy metals, and polychlorinated biphenyls (PCBs) (vehicles, oil drums, motors, electrical transformers, etc.) will be removed from the wood waste and stockpiled separately from other wastes on site for characterization and subsequent off-site disposal at a permitted facility. The wood waste, fill, and underlying soil will be field screened for the type of potential contaminants, and any contaminated wood waste, fill, and underlying soil will be excavated and stockpiled on site for disposal characterization. Confirmation sampling will assess the effectiveness of the removal action and will test compounds pertinent to the type of waste or materials encountered.

5.6.5. Site 2 Excavation, Stockpiling and Characterization

Petroleum contaminated Site 2 removal actions will be conducted independently of wood waste removal actions. The PCS at the known area of contamination at Site 2 will be removed and placed into the PCS stockpile for subsequent off-site disposal. Field screening will be used to identify the limits of PCS removal. Confirmation sampling will confirm the effectiveness of PCS removal action. The excavated area will be backfilled with import structural fill following receipt of analytical results confirming that no contaminants exceeding applicable cleanup levels remain on site.

5.6.6. Site 4 Excavation, Stockpiling and Characterization

Petroleum contaminated Site 4 removal actions will be conducted independently of wood waste removal actions. The concrete foundations at Site 4 will be removed before removal actions at Site

4. The PCS at the known area of contamination at Site 4 will be removed and placed into the PCS stockpile for subsequent off-site disposal. Field screening will be used to identify the limits of PCS removal. Confirmation sampling will confirm the effectiveness of PCS removal action. The excavated area will be backfilled with import structural fill following receipt of analytical results confirming that no contaminants exceeding applicable cleanup levels remain on site.

5.6.7. Excavated Material Transport

Wood waste will be loaded directly from the excavation and into trucks for transport off-site. All trucks containing wood waste will be covered with plastic tarps to prevent loss of wood waste from the truck during transport in a manner which meets any applicable local, state or federal requirements.

PCS and CWW will be loaded directly from PCS stockpiles into trucks for transport off-site to a permitted disposal facility. All trucks containing PCS and CWW will be lined and covered with plastic tarps to prevent loss of PCS and CWW from the truck during transport. The trucks will be weighed upon entering and leaving the project site to determine the amount of PCS and CWW exported from the site. Manifests of PCS and CWW transported from the site will be maintained and will be used to determine contractor payment.

All inert solid waste will be loaded directly from the inert solid waste stockpile and into trucks for transport offsite to a permitted disposal facility.

5.6.8. Wood Waste Area Confirmation Soil Sampling and Analysis

Once wood waste has been excavated to native soil, confirmation soil samples in areas where PCS has not been observed through field screening will be collected from the excavation base and analyzed for petroleum hydrocarbons and wood treatment chemicals. A sample grid will be created by dividing the excavated surface area into individual 200-foot by 200-foot grids in areas where PCS has not been detected during previous investigations, and into 100-foot by 100-foot grids where PCS has been previously detected. The grid system will extend only within the boundaries of the wood waste excavation. **Figure 5** illustrates the proposed grid sample spacing.

One sample will be collected from the center of each grid. Based on the anticipated excavation dimensions, a total of 36 soil samples (33 from the base and 3 field duplicates) will be collected.

If confirmation grid samples indicate MTCA Method A cleanup level exceedance for TPH or MTCA Method B cleanup level exceedance for WTC, additional soil will be removed from the grid. Field screening will be used to identify the limits of soil removal. Confirmation sampling will confirm the effectiveness of soil removal action. The excavated area will be backfilled with import structural fill. Field screening and confirmation sampling methods will follow the SAP/QAPP (**Appendix B**).

If confirmation sample analytical results indicate an exceedance of an associated cleanup level, then four additional soil samples (referred to as "stepped out" samples) will be collected from the base of the excavation. The stepped out samples should generally be spaced evenly and located approximately 20 to 40 feet from the original confirmation sample location based on field conditions. These four stepped out soil samples will only be analyzed for the constituent(s) that indicated a cleanup level exceedance. If the analytical results from the stepped out samples indicate compliance with associated cleanup levels, then the area within the boundaries of the stepped out samples will be excavated and a confirmation sample will be collected from the new excavation. This confirmation sample will be analyzed for the constituent(s) that indicated a cleanup level exceedance. If the analytical results of the samples indicate an exceedance of the associated cleanup level, then consider continuing the process of stepping out or excavate the remaining area of the grid being sampled. This process could continue until confirmation samples indicate compliance with associated cleanup levels as site conditions allow.

5.6.9. Material Import and Backfilling

The wood waste and PCS removal actions will create large excavated areas. The removal action objective includes replacing all excavated material with import structural fill up to the elevation of the Wenatchee River floodplain and compacting the imported fill to support redevelopment of the site. The imported fill will be obtained from a verified and tested clean source of off-site fill, loaded into trucks, and placed directly into the excavated areas. The inspector shall observe the import fill source to confirm whether it is native or fill. If the source is a native material (undisturbed) then three (3) composite samples will be collected, if the material is determined to be fill (previously disturbed material) then 10 composite samples shall be collected. Each sample shall be tested for TPH as gasoline/BTEX and TPH as diesel. The imported fill will be placed in 1-foot-thick lifts and compacted to meet redevelopment objectives, which will be verified as filling proceeds using field inspection and nuclear gauge instrumentation. The details of import material specifications, placement, and compaction will be described in the removal action construction bid documents.

5.6.10. Groundwater Monitoring Well Installation

5.6.10.1. Well Construction

Groundwater monitoring wells to characterize groundwater at the site will be installed after wood waste and PCS removal actions. A well drilling contractor will install groundwater monitoring wells following WAC 173-160. The wells will be installed using either an auger or air rotary rig to complete the monitoring well borings to a depth of approximately 20 to 30 feet, and installing 2-inch-diameter slotted-screen PVC wells. The screen length will be 10 feet. The slot size will be based on the grain-size distribution of the native alluvium encountered at the monitoring well location. The boring annular space will be backfilled with graded silica-sand filter pack size appropriately for the screen up to at least 1 foot above the top of the screen slots. The remaining portion of the annular space will be filled with granular bentonite up to within 2 feet of ground surface. The remaining annular space will be filled with crushed gravel or clean sand to provide a firm base for a flush-mount locking well monument that will be placed over the top of the well and secured in place with concrete. Well drilling and construction will be observed by or under the direction of a Washington State licensed hydrogeologist.

5.6.10.2. Well Location Methodology

At least one well will be located upgradient from any potentially contaminated sites. At least two monitoring wells will be located downgradient of areas of known PCS at Sites 1, 2, and 4. Additional groundwater monitoring wells may be required at locations within and downgradient of areas of PCS or CWW discovered during removal actions. Groundwater gradient at the project site is undefined, but presumed to be oriented subparallel to the Wenatchee River. Two background monitoring wells will be located in areas likely upgradient of the downgradient wells. The proposed monitoring well locations are shown on **Figure 1**. The top of well casing will be surveyed by a licensed surveyor to determine horizontal location and vertical elevation. The surveyor will tie the well locations and elevations to a Site survey benchmark, referenced to NAVD 88.

5.6.10.3. Well Development

The monitoring wells will be developed using surging and pumping techniques until the water from the well flows free and clear of sediment and turbidity has stabilized. Well development procedures are fully described in the SAP/QAPP in **Appendix B**. Once wells have been developed, they will not be sampled for at least 24 hours, preferably 48 hours.

5.6.10.4. Sampling Program

The monitoring wells will be sampled to characterize the groundwater conditions at the site including the presence of TPH in groundwater downgradient of PCS sites, in areas background to the PCS removal sites, and to establish groundwater elevations and flow direction at the PCS removal sites. The monitoring wells will be initially sampled four times, approximately every 3 months, to establish the groundwater conditions and groundwater flow direction. If groundwater concentrations of TPH are detected in any samples from at least one monitoring well downgradient of a PCS site, an additional year of quarterly monitoring will be conducted in all of the wells at the site. Groundwater sampling, monitoring, and reporting procedures are fully described in the SAP/QAPP in **Appendix B**.

6. Removal Action Schedule

The removal action will be conducted during 2013. Contract bid documents will be submitted for public bidding in January 2013. The contractor will be selected in February 2013 and will mobilize to the project site shortly thereafter. Removal action field activities will begin with establishment of work areas, and removal of concrete foundations and surficial granular fill. PCS removal actions at petroleum contaminated Sites 2 and 4 will proceed independently of wood waste removal, likely during early summer 2013. Wood waste removal will start in March 2013, and proceed through August or September 2013. Backfilling of the wood waste excavation will proceed as soon as soil confirmation grid sampling demonstrates the particular grid area is compliant with cleanup levels.

A proposed schedule for removal actions is provided in the removal action Construction Bid documents.

7. Removal Action Organization

The Port, and its consultants at RH2 and Ecology, are guiding and implementing this removal action. An accredited analytical laboratory that will be identified at a later date will provide laboratory services. RH2 environmental staff is responsible for checking, downloading, and calibrating the field instruments, collecting and transporting samples under chain of custody to the laboratory representatives. RH2 will evaluate all water quality and quantity data, using methods approved by Ecology.

Key personnel involved in this project and their responsibilities are as follows.

Laura Jaecks, Port of Chelan County, is the owner's representative. The Port is responsible for development of documents and implementation field activities necessary to meet the removal action objective, and for interacting with interested public and stakeholders. Phone: (509) 661-3118. Email: laura@ccpd.com.

Karen Kornher, *P.E.,* RH2, Engineering, Inc., is the project manager and agent between the sampling staff at RH2 and the Port. Phone: (509) 886-6764. Email: kkornher@rh2.com.

Steve Nelson, L.G., L.HG., L.E.G., RH2, Engineering, Inc., is the project lead for the development of this work plan and analysis of data for the final project report. Phone: (425) 951-5406. Email: snelson@rh2.com.

Mary Monahan, Central Regional Office, Department of Ecology Toxics Program, is responsible for Ecology's review and approval of the work plan and construction-related documents, and will advise on sampling requirements, quality assurance, and quality control issues during project implementation and assessment. Phone: (509) 454-7840. Email: mmon461@ecy.wa.gov

The primary contact for laboratory coordination for sample management and data quality will be determined upon selection of the contract laboratory.

8. References

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R. W. Tabor, R. B. Waitt, Jr., V. A. Frizzell, Jr., D. A. Swanson, G. R. Byerly, and R. D. Bentley. (1982). Geologic Map of the Wenatchee 1:100,000 Quadrangle, Central Washington. Geological Survey Miscellaneous Investigations Map I-1311.

Figures

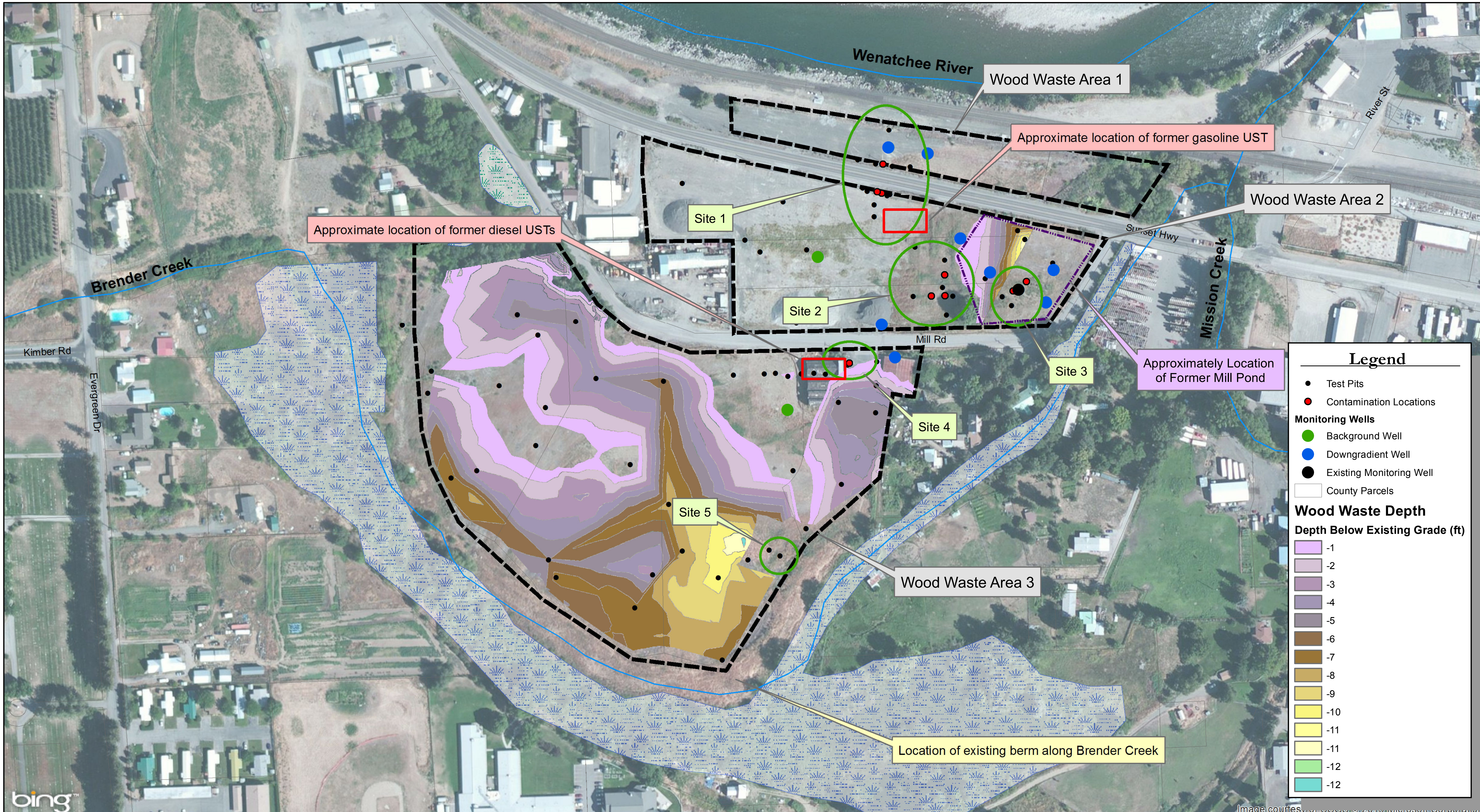

Figure 1
Cashmere Mill Site
Characterization
Site Map

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General Legend

1. Triangles represent test pits where soil samples where taken and sent to a lab for analysis.
2. Circles represent test pits excavated for lithologic purposes. Samples may have been

Figure 2
Cashmere Mill Site
Site Characterization
Wood Waste Areas 1 and 2

0 75 150 Feet

1 inch = 75 feet

RH2

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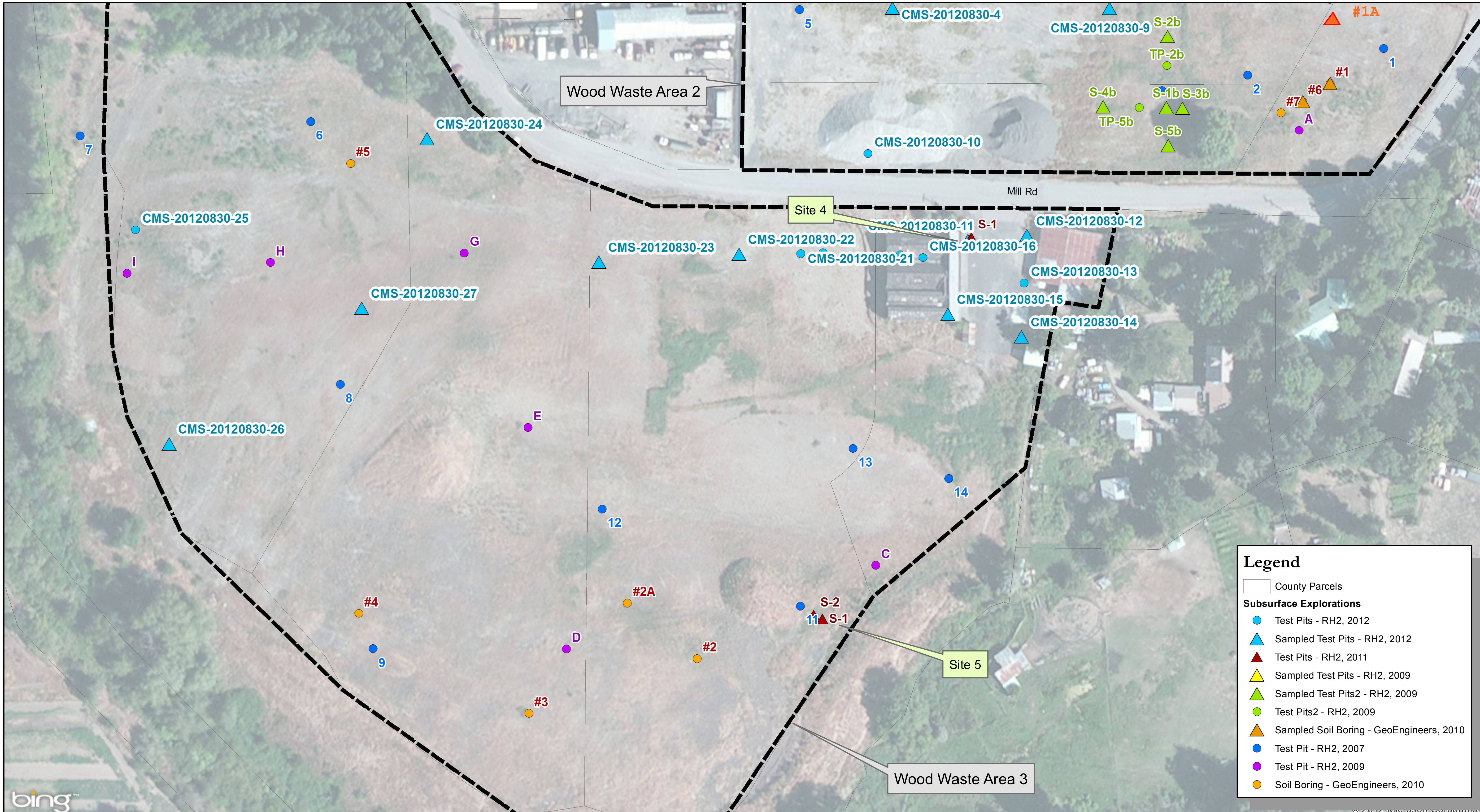

General Legend

1. Triangles represent test pits where soil samples where taken and sent to a lab for analysis.
2. Circles represent test pits excavated for lithologic purposes. Samples may have been

Figure 3
Cashmere Mill Site
Site Characterization
Wood Waste Area 3

0 100 200 Feet

1 inch = 100 feet

RH2 ENGINEERS PLANNERS SCIENTISTS

N

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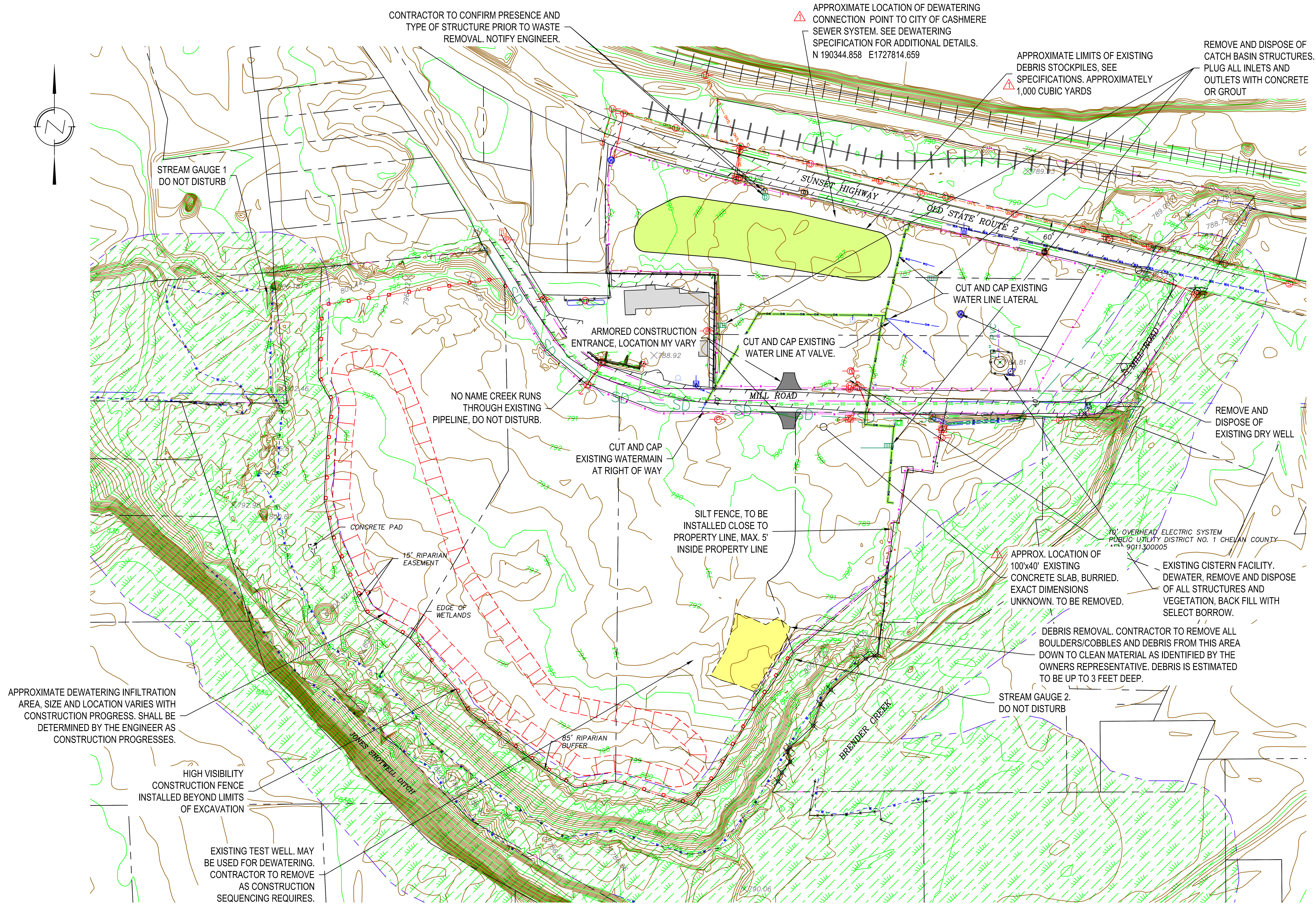
LEGEND

- RIGHT OF WAY
- EDGE OF WATER BOUNDARY
- CENTER LINE OF STREAM
- 85' RIPARIAN SETBACK
- WETLAND HABITAT AREA
- CULVERT
- EDGE OF PAVEMENT
- EDGE OF GRAVEL / DIRT
- EDGE OF SHOULDER
- BOTTOM OF DITCH
- GUARDRAIL / RAILING
- ECOLOGY BLOCK WALL
- RAILROAD TRACK
- FENCE LINE
- EDGE OF CONCRETE
- IRRIGATION LINE
- WATER LINE - CITY OF CASHMERE
- WATER LINE - PRIVATE
- SEWER LINE - CITY OF CASHMERE
- OVERHEAD TELEPHONE / UTILITY LINE
- OVERHEAD POWER LINE
- WETLAND INCLUDING BUFFER
- FOUND ALUMINUM OR BRASS IN MONUMENT CASE [AS NOTED]
- FOUND IRON PIPE [AS NOTED]
- FOUND REBAR OR REBAR & CAP [AS NOTED]
- FOUND REBAR & CAP IN MONUMENT CASE [AS NOTED]
- FOUND RAILROAD SPIKE [AS NOTED]
- CALCULATED POINT NOT SET OR FOUND
- POLE ANCHOR
- UTILITY POLE
- POWER POLE
- POWER POLE WITH TRANSFORMER AND SWEEP
- POWER POLE WITH TRANSFORMER
- POWER POLE WITH SWEEP
- ELECTRIC METER
- POWER BREAKER BOX
- TELEPHONE PEDESTAL
- CATCH BASIN
- SEWER MANHOLE
- WATER METER
- WATER VALVE
- WELL - DOMESTIC / IRRIGATION
- FIRE HYDRANT
- IRRIGATION VALVE
- PUMP
- BOLLARD
- CARSONITE POST
- SIGN
- METAL POST

	HIGH VISIBILITY FENCE
	SILT FENCE
	APPROXIMATE DEWATERING INFILTRATION AREA
	ARMORED CONSTRUCTION ENTRANCE
	EXISTING FILL PILES
	DEBRIS REMOVAL AREA



ALL SCHEDULES - EXISTING SITE AND TESC PLAN

1" = 100'

NOTES

- CONTRACTOR SHALL INSTALL HIGH VISIBILITY CONSTRUCTION FENCING AND SILT FENCE PRIOR TO ANY EXCAVATION ACTIVITIES.
- CONTRACTOR TO MAINTAIN ONE WAY TRAFFIC ON MILL ROAD AT ALL TIMES. SUBMIT A TRAFFIC CONTROL PLAN TO THE CITY FOR REVIEW PRIOR TO IMPEDING TRAFFIC.
- DEPTH TO BOTTOM OF WOOD WASTE AND WOOD WASTE VOLUMES ARE ESTIMATED.
- THE DEPTH TO BOTTOM OF WOOD WASTE SHOWN WITHIN THE PLANS IS FOR GENERAL UNDERSTANDING ONLY. ACTUAL WOOD WASTE REMOVAL VOLUME SHALL BE DETERMINED IN THE FIELD BY THE OWNERS REPRESENTATIVE.
- ALL DEWATERING ACTIVITIES SHALL CONFORM TO THE DEWATERING SPECIFICATIONS.
- EXISTING DOMESTIC WATER SYSTEMS ARE ALL CONSIDERED LIVE. PROTECT DURING CONSTRUCTION.
- CONNECTION TO LOW PRESSURE SEWER SYSTEM WILL BE THROUGH EXISTING 6" PVC, LOCATED APPROXIMATELY 4 FEET BELOW THE GROUND SURFACE. PIPE IS CAPPED. CONTRACTOR TO REMOVE CAP AS NECESSARY FOR CONTRACTOR DESIGNED CONNECTION. CONNECTION DESIGN TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION. SEE DEWATERING SPECIFICATIONS FOR SYSTEM CURVE.
- CONTRACTOR TO DESIGN MILL ROAD CROSSING AS NECESSARY TO CONVEY DEWATERING DISCHARGE TO SEWER CONNECTION POINT. DESIGN SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO CONSTRUCTION.

Figure 4
Proposed Removal Action Activities

NO.	REVISION	BY	REVIEW	DATE
2	REVISED PER ADDENDUM 2	ARN	KLK	2/07/13

RANDY L. ASPLUND, STATE OF WASHINGTON, 22780, REGISTERED PROFESSIONAL ENGINEER

KAREN KORNHER, STATE OF WASHINGTON, 29675, REGISTERED PROFESSIONAL ENGINEER

port of chelan county
cultivating innovation

PORT OF CHELAN COUNTY
CASHMERE MILL SITE REMEDIATION

EXISTING SITE AND TESC PLAN

RH2 ENGINEERS PLANNERS SCIENTISTS

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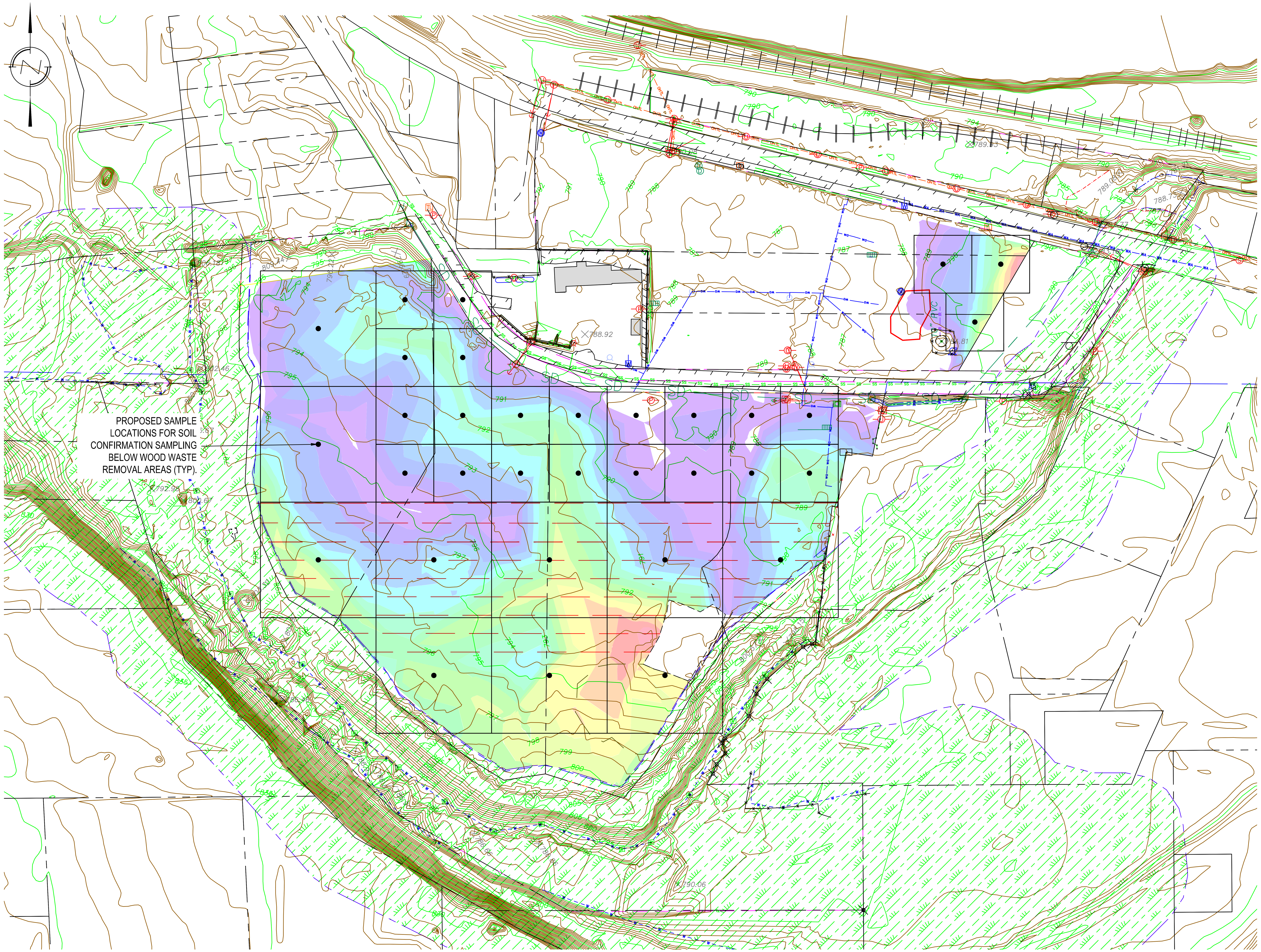
114 Columbia Point Drive, Suite C
SILVERDALE 360.876.7960
2021 NW Myhre Rd, Suite 107
TACOMA 253.272.3059
621 Pacific Avenue Suite 104

SCALE: SHOWN
0 1" 2"
DRAWING IS NOT TO SCALE IF BAR IS NOT 2" LONG

PLOT: 1
DWG NO. C01
ENGINEER: ARN
REVIEWED: RCP
DATE: Feb 11, 2013
SHEET NO. 1 of 5
CLIENT: PCC
JOB NO: 208-020
FILENAME: MSITE-P-SITE.DWG



PROPOSED SAMPLE LOCATIONS BELOW WOOD WASTE

1" = 100'

RANDY L. ASPLUND, STATE OF WASHINGTON, 22780, REGISTERED PROFESSIONAL ENGINEER

SIGNED: 01/28/13

KAREN KORNHER, STATE OF WASHINGTON, 29675, REGISTERED PROFESSIONAL ENGINEER

SIGNED: 01/28/13

port of chelan county
cultivating innovation

PORT OF CHELAN COUNTY CASHMERE MILL SITE REMEDIATION

FIGURE 5 SAMPLING GRID

RH2
ENGINEERS
PLANNERS
SCIENTISTS

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SCALE: SHOWN
0 1" 2"
DRAWING IS NOT TO SCALE IF BAR IS NOT 2" LONG

PLOT:	1
ENGINEER:	ARN
REVIEWED:	RCP
DATE:	Feb 11, 2013
CLIENT:	PCC
JOB NO.:	208-020
FILENAME:	MSITE-P-SITE.DWG
DWG NO.	C06
SHEET NO.	6 of 6

Appendices

Appendix A – Dewatering Test Well Evaluation

Appendix B – Sampling and Analysis Plan/Quality Assurance Project Plan

Port of Chelan County

Former Cashmere Mill Site Removal Action Sampling and Analysis Plan/Quality Assurance Project Plan

February 2013

Prepared by RH2 Engineering, Inc.

1. Introduction and Objectives

This combined Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) was prepared by RH2 Engineering, Inc., (RH2) with the support of Maul Foster & Alongi, Inc., (MFA) on behalf of the Port of Chelan County (Port). This SAP/QAPP describes procedures for wood waste and soil field screening, wood waste and soil sampling, and groundwater sampling that will be conducted during implementation of the wood waste and petroleum contaminated soil (PCS) removal action at the Port's former mill site in Cashmere, Washington. This SAP/QAPP provides guidance for field and laboratory analysis activities and quality assurance objectives to be performed and tracked for the project. This SAP/QAPP is an appendix to the Cashmere Mill Site Removal Action Work Plan (Work Plan), prepared by RH2 Engineering in January 2013. The Work Plan describes removal action activities to meet the project objectives, summarizes background information, defines field activities and specifications, and identifies applicable regulatory requirements necessary to complete the removal action.

1.1. Background

The Port owns the former Cashmere Mill properties (**Figure 1**), and intends to transfer the site to a prospective purchaser (Crunch Pak, of Cashmere, Washington) that intends to redevelop the site for commercial use as fruit storage warehouse and fruit bin storage site. As a condition of purchase, Crunch Pak requires removal of all wood waste-related materials resulting from former mill activities from the developable areas of the site, removal of known PCS exceeding associated cleanup levels, and backfilling the site with structural import fill to regrade the site and to improve drainage. The Port intends to conduct wood waste and PCS removal actions and backfill the excavated areas (the removal action) in 2013.

The Port has conducted environmental site assessments at the site since 2007. Reports describing the activities and findings of the assessments pertaining to the nature and extent of wood waste and PCS at the site are summarized and referenced in the Work Plan.

1.2. Project Description

The field screening and confirmation sampling procedures and frequencies presented in this SAP/QAPP will provide characterization and confirmation data to support verification of removal action objectives at the site, which include removal of all of the wood waste at the developable areas of the site, as well as removal of all PCS at two or more sites containing total petroleum hydrocarbons (TPH) concentrations exceeding Model Toxics Control Act (MTCA) Method A Cleanup Levels. Non-contaminated wood waste and fill will be transported off site for reuse or disposal. Any soil or wood waste containing contaminants that exceed MTCA Cleanup Levels and discovered during removal actions will be removed, and soil confirmation samples from all excavated areas will be collected to confirm removal action objectives. Wood waste and soil stockpile sampling will support demonstration of compliance with acceptability criteria at the designated off-site disposal facility for any contaminated wood waste (CWW) and PCS excavated during the removal action. Following acceptance of characterization data at the disposal facility, the stockpiled PCS and CWW will be transported directly to the disposal facility. Upon verification of obtaining removal action objectives, the excavations will be backfilled with structural import fill to support site redevelopment.

Characterization sampling will also support the appropriate disposal of groundwater generated during construction dewatering that will facilitate excavation and removal of wood waste below the groundwater table. Characterization will demonstrate compliance with acceptability criteria of the permitted water treatment facility or for permitted on-site disposal. Any stormwater that collects into the excavation during the removal action will be discharged with dewatering discharge. Groundwater monitoring wells will be constructed and sampled to characterize groundwater conditions after removal actions are complete in order to characterize groundwater conditions upgradient (or background) and downgradient of known and discovered PCS and CWW areas at the site.

This SAP/QAPP includes procedures for field screening and collection of the confirmation and characterization samples, sampling methods, documentation of field activities, and laboratory analysis to ensure data quality objectives.

1.3. Project Objectives

The objectives of the removal actions include excavating and removing all wood waste at developable areas of the site, excavating and removing all PCS at the site exceeding MTCA Method A Cleanup Levels, excavating and removing all CWW at the site exceeding MTCA Method B Cleanup Levels, and backfilling the excavation with verified clean structural import fill.

The objectives of the removal actions also include characterizing groundwater conditions after removal actions to obtain sufficient information to establish natural upgradient/background conditions as well as groundwater conditions downgradient of known and discovered PCS and CWW, evaluate potential manmade effects on natural background conditions, and compare on-site groundwater water quality conditions to groundwater quality criteria. Characterization will be sufficient to determine whether the site groundwater meets MTCA Method A and/or B Cleanup Levels or if additional monitoring or groundwater remediation is warranted.

2. Removal Action Organization and Schedule

The Port, and its consultants at RH2 and the Washington State Department of Ecology (Ecology), are guiding and implementing this removal action. An Ecology-accredited laboratory will provide laboratory services. RH2 environmental staff is responsible for checking, downloading, and calibrating the field instruments, and collecting and transporting samples under chain of custody to the laboratory representatives. RH2 will evaluate all water quality and quantity data, using methods approved by Ecology.

2.1. Organization

Key personnel involved in this project and their responsibilities are listed below.

Laura Jaecks, Port of Chelan County, is the owner's representative. The Port is responsible for development of documents and implementation of field activities necessary to meet the removal action objective, and for interacting with interested public and stakeholders. Phone: (509) 661-3118. Email: laura@ccpd.com.

Karen Kornher, *P.E.,* RH2, Engineering, Inc., is the project manager and agent between the sampling staff at RH2 and the Port of Chelan County. Phone: (509) 886-6764. Email: kkornher@rh2.com.

Steve Nelson, L.G., L.HG., L.E.G., RH2, Engineering, Inc., is the project lead for the development of this work plan and analysis of data for the final project report. Phone: (425) 951-5406. Email: snelson@rh2.com.

Mary Monahan, Central Regional Office, Department of Ecology Toxics Program, is responsible for Ecology's review and approval of the work plan and construction-related documents, and will advise on sampling requirements, quality assurance, and quality control issues during project implementation and assessment. Phone: (509) 454-7840. Email: mmon461@ecy.wa.gov.

The primary contact for laboratory coordination for sample management and data quality will be determined upon selection of the contract lab.

2.2. Project Schedule

The wood waste and PCS removal action will begin in March 2013 and is expected to conclude in October 2013. Field and laboratory work will proceed concurrently with the removal action. Groundwater characterization will begin after the removal actions are complete, or as the site become finalized, with the installation of monitoring wells and will proceed through at least 1 year or 4 quarters of sampling and laboratory analysis. A final wood waste and PCS removal action report will be completed in November 2013. Quarterly groundwater monitoring summaries will begin in July 2013 and a final groundwater monitoring report will be completed in July 2014.

3. Quality Objectives

Procedures in this SAP/QAPP are used to collect representative samples and field measurements of the highest possible quality. Usability of the data will be based on both quantitative (precision, accuracy/bias, and completeness) and qualitative (representativeness and comparability) quality assurance objectives.

Measurement quality objectives (MQOs) specify how good the data must be in order to meet the objectives of the project. MQOs are the performance or acceptance thresholds or goals for the project data, based primarily on the data quality indicators precision. In practice, these are often the precision, bias, and accuracy guidelines against which laboratory indicators and field quality control results are compared. To confirm that project MQOs for precision and accuracy are achieved, analytical results for field and laboratory quality control samples will be evaluated. Quality control results that do not meet target values will be qualified during data validation, and their limitations will be noted in the data quality and usability report for the project. To ensure comparability and representativeness of the laboratory data, standard instrumentation will be used for the analyses and the instruments will be properly calibrated and maintained.

Precision is a measure of the variability in the results of replicate measurements due to random error. Random errors are always present because of normal variability in the many factors that affect measurement results. Precision can also be affected by the variations of the actual concentrations in the media being sampled. The closer the measured values are to each other, the more precise the measurement process. Precision error may affect data usefulness. Good precision is indicative of relative consistency and comparability between different samples. Precision will be expressed as percent relative standard deviation (% RSD) between sets of duplicate field samples. Project MQOs for laboratory analyses are contained in **Table 1**. Analytical sample bias will be largely investigated at the laboratory where samples will be analyzed, following a laboratory quality assurance process.

Table 1. Project Measurement Quality Objectives for Laboratory Analyses

Parameter	Check Standards/Lab Control Standards (% Recovery Limits)	Precision for Duplicate Samples (RPDs)	Matrix Spike Recoveries
Gasoline-Range Organics	80-120%	±50%	80-120%
Diesel and Oil-Range Organics	80-120%	±50%	80-120%
BTEX, EDB, EDC	75-125%	±25%	75-125%
Chlorophenols, PAHs, cresols, phenols	Varies - 15-150%	±40%	Varies - 15-150%
Metals:	80-120%	±20%	75-125%

Arsenic, Chromium, Copper, Lead			
Volatile Hydrocarbons (VPH)	80-120%	±50%	80-120%
Extractable Hydrocarbons (EPH)	Varies: 21-100% to 45-137%	±50%	Varies: 21-100% to 45-137%

RPD – Relative Percent Difference
BTEX – Benzene, Toluene, Ethylbenzene, Total Xylenes
EDB – Ethylene Dibromide
EDC – Ethylene Dichloride

4. Field Activities

4.1. Soil and Wood Waste Field Screening

Concurrent with the inspection of wood waste removal activities, the composition of the wood waste and the quality of the native soil underlying excavated wood waste will be inspected for evidence of stains, sheens, solid waste, and odor. Areas of exposed wood waste and soil exhibiting potential contamination during inspection will be field screened.

The extent of PCS removal in the areas identified for PCS removal (Site 2 and Site 4; Figures 1, 2, and 3 in Work Plan) and in areas where PCS or CCW has been discovered during wood waste removal actions will be guided by field screening of exposed soil and wood waste during removal.

Field screening will consist of observing exposed soil and wood waste for evidence of stains or sheens, or unusual color, detection of any odors, and collecting representative samples of the upper 6 to 12 inches of soil or a representative sample of potentially contaminated wood waste using clean stainless steel spoons for organic vapor analysis using a Photoionization Detector (PID). A portion of the sample will be placed in an airtight bag for a minimum of 3 minutes, warmed, and then the air in the bag will evaluated for volatile organic compounds (VOCs) using a PID following manufacturers procedures. Field screening locations for which a PID reading exceeding 10 parts per million (ppm) above background observations will be located using a portable GPS unit, and the sampling observations, details and results of field screening will be recorded in a field notebook. All sample locations shall be located in this manner.

Wood waste or soil samples indicating the potential presence of VOC concentrations of greater than 10 parts per million (ppm) in air in samples tested with the PID or containing visible stains, sheens from a sheen test, or moderate to strong odors will be considered contaminated. PCS and CWW will be excavated and stockpiled on site for characterization and off-site disposal.

4.2. Soil Confirmation Sampling Rationale

Collection and analysis of confirmation soil samples from native soil exposed during wood waste removal will provide verification of the presence/absence of soil containing TPH and wood treatment chemical concentrations exceeding cleanup levels below wood waste. Wood treatment chemicals (WTCs) include polynuclear aromatic hydrocarbons (PAHs), methylphenols (cresols), chlorophenols, metals (arsenic, chromium, copper, lead), and TPH as gasoline and diesel/oil.

Collection and analysis of confirmation soil samples from native soil exposed during PCS and CWW removal actions will provide verification of the presence/absence of soil containing TPH and WTCs concentrations exceeding cleanup levels below these areas.

4.3. Soil Confirmation Sampling at Grid Locations

Concurrent with the inspection of wood waste removal activities, the native soil underlying excavated wood waste will be exposed and accessible for grid sampling (Figure 4 of the Work Plan). Representative samples of the upper 6 to 12 inches soil will be collected using clean stainless steel spoons and placed into laboratory-provided containers for semi-volatile organic compounds (SVOCs) and metals analysis. Representative samples of the upper 6 to 12 inches soil will be collected using the U.S. Environmental Protection Agency (EPA) Method 5035 for VOC analysis (see Ecology Fact Sheet 04-09-087). Samples will be analyzed for TPH as gasoline, TPH as diesel/oil, BTEX, and for WTCs. If TPH as gasoline is detected, the sample will also be analyzed for EDB/EDC, MTBE and total lead. The samples will be analyzed on a 24-hour turnaround schedule. **Table 2** in Section 4.6 summarizes sample management details and Section 5 summarizes laboratory methods for soil confirmation sampling. If laboratory results indicate that TPH or WTC concentrations in soil exceeds cleanup levels, soil removal actions and subsequent confirmation sampling will be conducted at the grid location. If laboratory results are below cleanup levels, the excavated area will be backfilled with clean imported structural fill or clean native soil.

If confirmation sample analytical results indicate an exceedance of an associated cleanup level, then four additional soil samples (referred to as "stepped out" samples) will be collected from the base of the excavation. The stepped out samples should generally be spaced evenly and located approximately 20 to 40 feet from the original confirmation sample location based on field conditions. These four stepped out soil samples will only be analyzed for the constituent(s) that indicated a cleanup level exceedance. If the analytical results from the stepped out samples indicate compliance with associated cleanup levels, then the area within the boundaries of the stepped out samples will be excavated and a confirmation sample will be collected from the new excavation. This confirmation sample will be analyzed for the constituent(s) that indicated a cleanup level exceedance. If the analytical results of the samples indicate an exceedance of the associated cleanup level, then consider continuing the process of stepping out or excavate the remaining area of the grid being sampled. This process could continue until confirmation samples indicate compliance with associated cleanup levels as site conditions allow.

4.4. Soil Confirmation Sampling for Known and Discovered PCS and CWW

PCS removal at Site 2, Site 4, and any discovered PCS or CWW sites will be guided by field screening results to establish the limits of probable contamination. Representative soil samples shall be collected up 6 to 12 inches below the excavation base and at the vertical center of each excavation sidewall using clean stainless steel spoons for SVOCs and metals analysis and using EPA Method 5035 for VOC analysis and placed into laboratory-provided containers. One sample will be collected for every 100 square feet of excavation floor and every 10 linear feet of excavation sidewall. For side walls greater than 20 feet in length samples shall be collected every 20 linear feet. Samples at locations where PCS has been removed at Site 2 and Site 4 will be collected and analyzed for TPH as diesel/oil and BTEX. Samples of soil at locations where PCS has been discovered will be collected and analyzed for TPH as gasoline, TPH as diesel/oil, BTEX (and EDC/EDB, MTBE and total lead if gasoline is detected). Samples of soil at locations where CWW has been removed will be collected from the excavation base and analyzed for TPH as gasoline, TPH as diesel/oil, BTEX and WTC (and total lead, EDC/EDB and MTBE if gasoline is detected).

If former sumps, drywells, or catch basins are encountered during removal actions, the structure will be removed and underlying soil will be field screened for evidence of stains, sheens, unusual color, or odors. If no contamination evidence is apparent, a representative of soil from below the structure will be collected and analyzed for TPH as gasoline, TPH as diesel/oil, BTEX (and EDC/EDB, MTBE, and total lead if gasoline is detected). If contamination evidence is apparent, the location will be remediated and confirmation sampling will be conducted similarly to a discovered PCS site as described in the previous section.

Samples of soil at locations where PCS has been discovered will be collected and analyzed for TPH as gasoline, TPH as diesel/oil, BTEX (and EDC/EDB, MTBE and total lead if gasoline is detected).

All soil confirmation sampling locations will be located using a portable GPS unit and the sampling observations and details will be recorded in a field book.

If laboratory results indicate that TPH/BTEX concentrations in soil exceeds MTCA Method A Cleanup Levels or WTC concentrations exceed Method B Cleanup Levels, additional soil removal actions, as defined in the Work Plan, and subsequent confirmation sampling will be conducted at the removal location.

If PCS cannot be removed due to risk to existing structures, encroachment into adjacent properties or wetland and stream buffers, analysis of representative soil samples on the excavation sidewall and floor will also include analysis of TPH composition by Ecology Methods VPH/EPH for subsequent risk analysis using MTCA Method B.

If confirmation samples indicate no exceedance of TPH and WTC cleanup levels, the excavation will be backfilled with clean fill and compacted. If confirmation samples contain TPH or WTC concentrations above cleanup levels, additional soil will be removed and additional confirmation samples will be collected. If the second confirmation samples contain TPH or WTC concentrations below cleanup levels, the excavation will be backfilled with clean fill. If the second confirmation samples contain TPH and/or WTC concentrations above cleanup levels, Ecology will be notified and an approach for addressing residual contamination at the location will be established.

4.5. Stockpiled Soil Characterization Sampling

Upon completion of excavation of PCS and CWW discovered during wood waste removal activities that generate stockpiles, soil and wood waste samples will be collected from the stockpiles for characterization purposes. Stockpiled PCS samples collected for characterization purposes for off-site disposal will be analyzed for TPH as diesel, BTEX, total lead (and gasoline/BTEX if present in discovered PCS). Stockpiled CWW samples collected for characterization purposes for off-site disposal will be analyzed for TPH and WTCs. Samples of unusual solid wastes discovered during wood waste removal actions and stockpiled will be analyzed for offsite disposal characterization. Appropriate analytical methods for samples of unusual solid wastes will be determined at the time of stockpiling and based on the types of waste materials identified.

Collection and analysis of composite soil samples from different locations of the stockpile will provide analytical data representative of the excavated soil. The analytical data will allow for demonstration of compliance with the acceptability criteria of the off-site disposal facility.

Stockpile soil sampling will consist of preparing one composite soil sample to represent each 500 cubic yards (yd^3) of stockpiled PCS or CWW. Composite samples shall consist of equal portions of discrete samples taken at a frequency of one sample for every 50 yd^3 of material.

4.6. Soil Sample Management

Upon collection, soil and wood waste samples will be individually labeled and immediately placed on ice in a cooler for delivery to the laboratory. All samples will either be delivered by field staff or via courier to the lab with chain of custody protocols to meet holding times. A Chain of Custody form provided by the lab will be submitted for each sampling event. Sample containers and analysis holding times are summarized in **Table 2**.

Table 2. Soil and CWW Sample Containers, Preservation, and Holding Time Requirements

Parameter	Container	Preservative	Holding Time
Gasoline-range TPH/BTEX (using EPA Method 5035), EDB/EDC, MTBE, VPH	4 x 40 mL glass vials	Na_2SO_4 (2 vials) Methanol (2 vials)	7 days
Diesel and Oil-range TPH, EPH	8 oz. glass	none	14 days
chlorophenols, PAHs, phenols, cresols	8 oz. glass	none	14 days
Metals (arsenic, chromium, copper, lead)	8 oz. glass	none	6 months

4.7. Decontamination and Investigation Derived Wastes

Decontamination of sampling equipment will be completed after collection of each sample. Spoons used for collecting soil samples for SVOC and metals analysis will be cleaned using detergent and multiple rinses of potable water. One rinsate sample will be collected for every 20 soil samples collected with non-disposable sampling equipment. Reusable personal safety gear will be decontaminated at the end of each day using detergent and multiple rinses of potable water. Disposable safety gear, such as gloves and ear protection, will be managed as investigation derived wastes (IDW). All investigation derived wastes (IDW) will be collected in a separate container at the site and disposed at a permitted waste facility. All wastewater generated from equipment decontamination will be collected into a separate container and disposed at the City of Cashmere (Cashmere) wastewater treatment plant (WWTP).

Dewatering discharge will be collected in a settling tank before discharge to the Cashmere WWTP. Samples of discharge water will be collected daily to comply with testing conditions established between the Port and Cashmere. Compliance testing may be adjusted depending on flow rates, time of year, and the location of the dewatering area. Representative samples of discharge water will be collected directly from a sampling port in the storage tank and placed into laboratory provided containers and analyzed for TPH/BTEX and any other water quality parameters (to be determined by Cashmere at the time of discharge) on a 24-hour turnaround.

4.8. Sample Chain of Custody/Documentation

Sampling details and field observations will be documentation in field logbooks. Soil and wood waste samples will be identified using sample labels placed on laboratory containers and the sample numbers will be recorded on field sampling data sheets, and laboratory-provided chain-of-custody forms. The sample numbering system for analytical samples collected will be dependent on the type of sample collected. Soil confirmation samples from grid locations will be identified starting with "S-G-###". Soil confirmation samples from PCS Sites 2 and 4 will be identified starting with "S-C-2-###" or "S-C-4-###", respectively. Soil confirmation samples from additionally discovered PCS sites will be identified starting with "S-C-#-###", where the first discovered PCS site will start with the number "6" and proceed sequentially for each subsequently discovered PCS site. Wood waste confirmation samples from CWW sites will be identified starting with "WW-C-#-###", where the first discovered CWW site will start with the number "1" and proceed sequentially for each subsequently discovered CWW site. Characterization samples from stockpiles of PCS and CWW will be identified starting with the identification "S-SP-###" and "WW-SP-###", respectively. Discharge water characterization samples will be identified with "W-###".

For field duplicates, the sample identification number will be XX-###-MMDDYY, where "MMDDYY" stands for month, date, and year of the sample collection. For example, for a field duplicate collected on June 15, 2013, the identification would be XX-###-061513. A sample time of 1700 will be recorded on the sample labels and Chain-of-Custody record for all field duplicates. In addition, it is imperative that the field duplicate number be referenced on the sample collection field sheet.

4.9. Groundwater Sampling

4.9.1. Dewatering Discharge Sample Collection and Analysis

Samples of groundwater will be collected during construction dewatering to characterize dewatering discharge. Water samples will be collected directly from the dewatering system storage containers and placed into laboratory-provided containers for laboratory analysis of TPH as gasoline, TPH as diesel and oil, and BTEX (Section 5).

4.9.2. Groundwater Monitoring Well Sampling

Samples of groundwater will be collected from existing monitoring wells before removal action begins, and from existing and new monitoring wells after removal action is complete. Water samples will be collected from the monitoring wells and placed into laboratory-provided containers for laboratory analysis of TPH as gasoline, TPH as diesel and oil, and BTEX. If gasoline is detected, samples will be analyzed for EDB/EDC, MTBE, and total lead. If CCW was present and removed upgradient of the monitoring well, groundwater samples will also be tested for WTC (Section 5). The Port will notify Ecology by telephone or email as early as possible prior to groundwater monitoring well sampling events. Duplicate samples will be collected at a rate of at least 1 per sampling event, or 1 per 10 samples collected.

Groundwater Monitoring Well sampling frequency will occur as follows:

1. Groundwater Monitoring wells (GMW) where no detection of contamination occurs will be sampled two (2) times. Sample events shall be three (3) to six (6) months apart.

2. Groundwater Monitoring wells (GMW) where contamination is detected but at levels below cleanup levels will be sampled four (4) times. Sample events shall be three (3) to six (6) months apart or quarterly.
3. Groundwater Monitoring wells (GMW) where contamination is detected at levels exceeding cleanup levels will be sampled at least eight (8) times. Sample events shall be three (3) to six (6) months apart or quarterly.

4.9.2.1. Field Meter Calibration Procedures

Field meters will be used to measure depth to water and water quality parameters prior to groundwater sample collection. The following field instruments will be used:

- Electrical well probe – Water level meter, marked every 0.01 foot. When the sensor at the tip of the probe contacts water, the circuit is completed, activating a steady tone and light on the reel.
- Water quality multimeters – Used to measure the following water quality parameters prior to sample collection: pH, dissolved oxygen (DO), turbidity, specific conductance, and temperature. Purge water will be continuously monitored, and parameters recorded to verify stability of groundwater conditions prior to collecting samples for lab analysis.

The meters will be calibrated and operated according to the manufacturer's specifications prior to sampling (once at the start of each day sampling will occur). Field meter calibration will be checked prior to use and at the conclusion of each sampling day. The calibration check will be recorded in the field logbook or on the Sample Collection Log. Results for field measurements will be recorded on the Sample Collection Log.

4.9.2.2. Groundwater Level Measurement

The depth to groundwater will be measured in each well before purging begins. Water level will be measured directly using an electric well probe. Results will be recorded to the nearest 0.01 foot in the field log book. The top of well casing will be surveyed to the nearest 0.01 feet and referenced to NAVD 88.

4.9.2.3. Purging

The wells will be purged using a peristaltic pump and dedicated Teflon-coated tubing that will remain in the well between sampling events. The pump and tubing will be installed and handled for each event while wearing clean disposable gloves. The tubing intake will be positioned at a depth of 2 to 3 feet below the static water level. The well will be purged at a rate of 0.5 to 1 liter per minute. Field parameters to be measured include temperature, pH, turbidity, specific conductance, and dissolved oxygen prior to the water being exposed to the atmosphere. Purging will continue until these parameters have stabilized, with measurements taken at five minute intervals. Purging will be considered complete when two consecutive sets of parameter readings show changes less than the criteria listed in **Table 3**. Well drawdown will be monitored using a well probe during purging and recorded in the field notes.

Table 3. Field Parameter Stability Criteria

Field Parameter	Criteria

pH	± 0.1 Standard Unit (SU)
Temperature	± 0.3°C
Turbidity	± 1 Nephelometric Turbidity Unit (NTU)
Specific Conductance	± 5 microSiemens per centimeter (mS/cm)
Dissolved Oxygen	± 0.3 mg/L

Purge water will be collected and disposed at the Cashmere WWTP.

4.9.2.4. Field Measurement Procedures

Measurements made in the field will include direct measurement of water level at the start of purging; and direct measurement of pH, temperature, specific conductivity, DO, and turbidity during purging. Field instruments will be calibrated according to manufacturer's specifications within 4 hours before purging. The field instrumentation and respective ranges of results and accuracies are summarized in **Table 4**.

Table 4. Summary of Field Measurement Analytical Reporting Limits for Groundwater Quality and Level Monitoring

Parameter	Measurement Method	Accuracy	Expected Range of Results
Temperature (C)	YSI 556 MPS	0.01C	10 to 13 degrees
pH	YSI 556 MPS	0.01 pH units	6.5 to 7.5 pH units
Specific Conductance (mS/cm)	YSI 556 MPS	1 µs/cm	100 to 200 µmhos/cm
Turbidity (NTU)*	HF Scientific MicroTPW	0.01 NTU	5 to 50 NTU
Dissolved Oxygen (DO)	YSI 556 MPS	0.01 mg/L	0.5 to 5 mg/L
Water level (feet)	Solinst Well Probe	0.01 feet	3 to 15 feet

NTU - Nephelometric
TDS – Total Dissolved Solids

4.9.2.5. Groundwater Sample Collection

Groundwater samples will be collected directly from the discharge tubing immediately after purging; samples will be collected while the pump is running at less than 0.5 liters per minute. Sample containers will be filled in the following sequence.

1. Unpreserved samples.
2. Preserved samples.

Samples shall be labeled in the format of [well number]-[date] (date to be in DDMMYY format). Every individual sample container shall be labeled with the date and time of sampling, location, sampler's initials, and preservatives. Replicates will be collected and handled in the same manner.

4.9.3. Groundwater Sample Management

Upon collection, water samples will be individually labeled and immediately placed on ice in a cooler for delivery to the laboratory. All samples will either be delivered by field staff or via courier (i.e. Fed Ex) to the lab with chain of custody protocols to meet holding times. A Chain of Custody form provided by the lab will be submitted for each sampling event. Sample containers and analysis holding times are summarized in **Table 5**.

Table 5. Groundwater Sample Containers, Preservation, and Holding Time Requirements

Parameter	Container	Preservative	Holding Time
Gasoline-range hydrocarbons/BTEX, EDB/EDC, MTBE	3 x 40 mL vial	HCl	14 days
Diesel-range hydrocarbons	2 x 500 ml amber glass	None	30 days
chlorophenols, phenols, cresols, PAHs	2 x 500 ml amber glass	None	7 days
Metals: Arsenic, Chromium, Copper, Lead	500 mL – polyethylene	HNO_3	6 months

The date and time of sample collection, sampler name, purging volumes, field water quality measurements, water levels, time of instrument calibration, and environmental conditions shall be recorded at the time of sampling on a field sampling data sheet. Any deviation from the sampling protocol will be noted.

4.10. Field Logbooks

Field logbooks will provide the means of recording data-collecting activities performed at the site. Entries will be described in as much detail as possible so that persons going to the site can reconstruct a particular situation without reliance on memory.

Field logbooks will be bound and assigned to field personnel, but will be stored in the project file when not in use. Each logbook will be identified by the project name and, if applicable a project number.

The title page of each logbook will contain the following:

- Logbook Number (if applicable)
- Project Name
- Log Entry Start Date and End Date

The following information will be recorded in the logbook at the beginning of each daily entry:

- Date, start time, weather conditions.
- Names of sampling personnel present.

- A summary of sample activities including sample location, sample time, sample description, depth at which the sample was collected, sample volume, the number of containers for the sample and any field notes relating to the well or sample.
- The names of any visitors along with a description of the purpose of the visit.
- Decontamination procedures.
- Field quality control samples including identification numbers used.
- Signature of the person recording any entries into the logbook.

5. Laboratory Analysis Methods

An Ecology-accredited analytical laboratory will conduct analysis for the project. Laboratory standard operating procedures will be on file with the laboratory.

Table 6 summarizes laboratory analysis methods for PCS and MTCA Method A Cleanup Levels, and **Table 7** summarizes laboratory analysis methods for confirmation soil below wood waste and for CWW and MTCA Method A Cleanup Levels.

Table 6. Analytical Summary for PCS at Site 2 and 4

Parameter	Analytical Method	Method Detection Limit (mg/kg)	MTCA Method A Cleanup Level[b] (mg/kg)
Diesel-Range Hydrocarbons	Ecology NWTPH-Dx + Acid/Silica Gel Cleanup	5.0 – 10.0	2,000 – Diesel 2,000 – Heavy Oil 4,000 – Mineral Oil
BETX	EPA 8021	0.01255	0.3 – benzene 6 – ethylbenzene 7 – toluene 9 – total xylenes
EPH[a]	Ecology EPH	5.0 – 10.0	na

[a] If Method B Cleanup Level is used.
[b] From Table 740-1 in WAC 173-340-900.
na = not available

Table 7. Analytical Summary for Confirmation Soil Samples and Contaminated Wood Waste

Parameter	Analytical Method	Detection Limit (mg/kg)	MTCA Method A Cleanup Level[b] (mg/kg)
Gasoline-Range Hydrocarbons	Ecology NWTPH-Gx/5035	5.0	30 (100 if benzene - ND, TEX < 1 %)
BETX	EPA 8021	0.01255	0.3 - benzene 6 - ethylbenzene 7 - toluene 9 – total xylenes
Ethylene dibromide (EDB)[a] Ethylene dichloride (EDC)[a] MTBE[a]	EPA 8260	0.001	0.005 – EDB EDC – Method B 0.1 - MTBE MTBE
Diesel-Range Hydrocarbons	Ecology NWTPH-Dx + Acid/Silica Gel Cleanup	5 – Diesel 10 – Heavy, Mineral	2,000 – Diesel 2,000 – Heavy Oil 4,000 – Mineral Oil
Chlorophenols	EPA SW8041	0.00625	Method B
PAHs	EPA SW8270-SIM	0.005	0.1
Phenols, Cresols	EPA SW8270	0.2 to 0.0201	Method B
Arsenic	EPA 6010C	5	20
Chromium III	EPA 6010C	0.5	2,000
Copper	EPA 6010C	0.2	Method B
Lead[a]	EPA 6010C	0.2	250

[a] If gasoline is detected in the soil or wood waste.
[b] From Table 740-1 in WAC 173-340-900.

Table 8 summarizes laboratory analysis methods for groundwater and MTCA Method A Cleanup Levels.

Table 8. Analytical Summary for Groundwater

Parameter	Analytical Method	Detection Limit (mg/L)	MTCA Method A Cleanup Level[b] (mg/L)
Gasoline-Range Hydrocarbons	NWTPH-Gx	0.25	800 (1,000 if benzene - ND)
BETX	EPA 8021	1 – BTE 2 - Xylenes	5 – Benzene 700 – Ethylbenzene 1,000 – Toluene 1,000 – Xylenes
EDB, EDC[a] MTBE[a]	EPA 8260	0.2 0.00036	0.01 – EDB 5 – EDC 20 – MTBE
Diesel-Range Hydrocarbons	NWTPH-Dx with Acid/Silica Gel Cleanup	0.05 – Diesel 0.1 – Heavy, Mineral	500
Chlorophenols[cc]	EPA SW8041	0.25	Method B
PAHs[c]	EPA SW8270-SIM	0.0001	0.1
Phenols, Cresols[c]	EPA SW8270	0.001 to 0.02	Method B
Arsenic[c]	EPA 200.7	0.5	5
Chromium (total)[c]	EPA 200.7	0.5	50
Copper[c]	EPA 200.7	0.5	Method B
Lead[a,c]	EPA 200.7	0.1	15

[a] If gasoline is detected in groundwater.
[b] From Table 720-1 in WAC 173-340-900.
[c] If CWW was present and removed upgradient of the monitoring well.

6. Quality Control Procedures

6.1. Field

Field quality control will consist of collecting field duplicates, rinsate blanks, and field blanks (groundwater only). Field duplicates consist of two or more samples collected at the same time and place. Field duplicates will be collected at a rate of 1 duplicate sample per 20 field samples. In the case of a quarterly groundwater monitoring event, one duplicate groundwater sample will be collected per monitoring event.

Rinsate blanks are samples obtained by running distilled/deionized water over non-disposable decontaminated sampling equipment used to collect soil samples for SVOCs and metals analysis. The blank water is collected in sample containers for handling, shipment, and analysis. These samples are treated identically to the other samples collected that day. A rinsate blank is used to assess cross contamination brought about by improper decontamination procedures. Rinsate blanks will be collected at a rate of 1 sample per 20 collected samples that are collected using non-disposable sampling equipment.

Field blanks are prepared in the field by filling the appropriate sample container with distilled/deionized water and are then submitted to the laboratory for analysis. A field blank is primarily used to evaluate contamination errors associated with field operations and shipping but may also be used to evaluate contamination errors associated with laboratory procedures. Field blanks will be collected at a rate of one per day per sampling event.

Water quality control measures for dissolved oxygen, temperature, specific conductance, turbidity, and pH, will be measured. Measurement will consist of allowing the water quality multimeter to continuously monitor field parameters until they have stabilized, at which point sampling may occur. All field measurements will be recorded in the field log. Field water quality control requirements are contained in **Table 9**.

Table 9. Field Quality Control Measurements

Parameter	Replicate Samples	Field Calibration Check Standards	Calibration Drift End Check
DO	RPD ≤ 20%	NA	±4%
Temperature	± 0.3°C	NA	N/A
Specific Conductance	± 5 mS/cm	± 5 mS/cm	± 5 mS/cm
Turbidity	± 2 NTU	± 2 NTU	± 2 NTU
pH	± 0.2 pH units	± 0.2 pH units	± 0.2 pH units

6.2. Laboratory

Sample precision will be assessed by collecting replicates at the rate of 1 per batch of 10, or 1 per batch if less than 10 samples are included in a batch of samples. Samples will undergo laboratory standard analytical techniques with standard laboratory quality control procedures.

6.3. Data Management Procedures

All field observations and monitoring results will be recorded on individual well sampling sheets that will be maintained throughout the length of the project and included in all draft and final reports. Field observations and all data will be checked for legibility and completeness before leaving the site locations. Field data will be entered into tables or spreadsheet and included with the laboratory data in all draft and final reports.

Analytical data from the laboratory will be entered in electronic format. After the data are verified, they will be summarized in case narratives and provided in all draft and final reports.

After completing the sampling, staff will compile and evaluate all field and laboratory analytical data against the project MQOs.

6.4. Audits and Reports

Ecology's Laboratory Accreditation Program establishes whether the laboratory has the capability to provide accurate and defensible data. The accreditation involves an evaluation of the laboratory's quality system, staff, facilities, equipment, test methods, records, and reports.

The final report will include a quality assurance section describing data quality. These reports will undergo scientific peer review by staff who have appropriate expertise and who are not directly connected with this project.

6.5. Data Verification and Validation

Data verification is a quality assurance review process to determine the quality and the completeness of the field and analytical data. This is done by determining that all quality control samples meet the acceptance criteria as specified in the standard operating procedure for that method.

Analytical laboratory staff will review all laboratory analysis for the project to verify that the methods and protocols specified in the SAP/QAPP were followed; that all instrument calibrations, quality control checks, and intermediate calculations were performed appropriately; and that the final reported data are consistent, correct, and complete with no omissions or errors. Evaluation criteria will include the acceptability of instrument calibrations, procedural blanks, spike sample analysis, precision data, laboratory control sample analysis, and the appropriateness of assigned data qualifiers. The laboratory staff will prepare a written case narrative describing the results of their data review.

Precision will be estimated by calculating the relative percent difference (RPD) for field duplicate results. Analytical bias will be assumed to be within acceptable limits if laboratory quality control limits are achieved for blanks, matrix spikes, matrix spike duplicates and check standards. Sampling bias will be assessed by verifying that the correct sampling and handling procedures were used. Goals for completeness will be evaluated and, if needed, replacement samples will be obtained and adjustments in subsequent sampling events will be made.

Field quality control procedures include reviewing field notes for completeness, errors, and consistency. Duplicate measurements and documentation of conditions in field notes will support verification of analytical measurements and field measurements.

The project lead will review the data package and case narrative to determine if the results meet the MQOs for accuracy, precision, and bias for that sampling episode. Field duplicate results will be evaluated and compared to the MQOs shown in **Table 1**. Based on these assessments, the data will be accepted, accepted with appropriate qualifications, or rejected.

After the laboratory and field data have been reviewed and verified by the project manager, data submittals will be independently reviewed for errors by another staff person before finalizing.

Appendix C – Site Safety and Health Plan

ATTACHMENT C

TEST PIT, BORING, AND WELL INSTALLATION LOGS

Table 1. Soil Log for Test Pits, (TP) Cashmere Mill Site

TP-1 Corner of Mill Rd and Sunset
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown sand, gravel, cobbles, round	TP-1	0950
5.0	FILL	wood waste and sawdust		
7.0	FILL	dark silty sand, gravel, cobbles		
9.0	FILL	wood waste and sawdust		
11.0	FILL	water		
12.0	FILL	dark silty sand, gravel, cobbles with logs		

TP-2 50 ft N of "well"
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown organic material	TP-2	1020
3.0	FILL	grey silty sand, grave, cobbles w/ clay		
13.0	FILL	water		

TP-3 Site of old office along Sunset
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	ALLUVIUM	brown-grey sand, gravel, cobbles	NA	1040
6.0	ALLUVIUM	water		

Table 1. Continued

TP-4 Site of old smokestack
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	brown silty sandy gravelly fill	NA	1100
3.0	FILL	brown silty sandy gravelly fill-stop due to unexpected water line (likely abandoned)		

TP-5 Near western property line, N of Mill Rd
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	pavement, dark brown, sand, gravel, silt w/organics		1110
3.0	ALLUVIUM	brown sand, gravel, cobbles		
4.0	ALLUVIUM	water		
5.0	ALLUVIUM	brown sand, gravel, cobbles		

TP-6 Middle of open area in NW corner of lot S of Mill Rd
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown-black silty wood waste, bricks, car parts		1130
6.0	ALLUVIUM	grey sand, gravel, cobbles w/ roots, water		
8.0	ALLUVIUM	grey sand, gravel, cobbles		

Table 1. Continued

TP-7 NW corner of lot, along sediment basin pond on Brender Cr.
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	ALLUVIUM	brown sand, gravel, cobbles		1145
4.0	ALLUVIUM	brown sand, gravel, cobbles		

TP-8 E of trailer, S of hockey rink in NW corner of lot S of Mill Rd
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark silty sand, gravel, cobbles		1202
7.0	ALLUV/FILL	dark silty sand, gravel, cobbles, water		

TP-9 200 ft SW of Shangri-la, 100 ft N of Brender Cr.
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark wood waste		1209
8.0	ALLUVIUM	grey silty sand, gravel, cobbles w/ small organics (roots)	TP-9	

Table 1. Continued

TP-10	Southern most bend in Brender Cr, 50 ft N of berm			
15-Jan-07				
Depth (feet)	Material	Description	sample	time
0.0	FILL	wood waste and sawdust	TP-10	1226
8.0	ALLUVIUM	grey silty fine sand w/ clay		
10.0	ALLUVIUM	water		
11.0	ALLUVIUM	grey silty fine sand w/ gravel		

TP-11	S edge of existing excavated pit, below 6-ft high cut face in wood waste, SW corner of property			
15-Jan-07				
Depth (feet)	Material	Description	sample	time
0.0	FILL	wood waste	TP-11	1240
13.0	ALLUVIUM	grey clay		
14.0	ALLUVIUM	grey clay and gravel		

TP-12	100 ft S of water meter in lot S of Mill Rd			
15-Jan-07				
Depth (feet)	Material	Description	sample	time
0.0	FILL	dark silty sand, gravel and wood waste	TP-12	1300
3.0	ALLUVIUM	grey silty sand and gravel w/ conglomerate and peat layers 0.5-1.0 ft thick		
8.0	ALLUVIUM	water		
9.0	ALLUVIUM	sand, gravel, cobbles		

Table 1. Continued

TP-13 100 ft W of single wide trailer
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	ALLUVIUM	brown sand, gravel, cobbles		1316
3.0	ALLUVIUM	brown sand, gravel, cobbles		

TP-14 50 ft S of single wide trailer
15-Jan-07

Depth (feet)	Material	Description	sample	time
0.0	FILL	dark brown sand, gravel, cobbles w/organics		1320
4.0	ALLUVIUM	brown-orange sand, gravel, cobbles with foreset beds		
5.0	ALLUVIUM	brown-orange sand, gravel, cobbles with foreset beds		

RH2 ENGINEERS PLANNERS SCIENTISTS	**Test Pit/Exploration Log** **PCCMP TP1** Exploration Name	**Geo Exploration Millpond Site Watermain Extension** Project	**West end of project** **Cashmere, WA** Location
Adam Neff Inspected by:	**May 7, 2009** Date	**PCC 20802001108** Project #	**Komatsu PC75 track mounted backhoe – 1 ft bucket** **D. Baker Construction and Excavation** Backhoe and Operator

Depth	Description	Sketch/Photo
0 to 1.5 feet	Sandy SILT (ML), light brown to slightly light gray, little clay, some coarse gravel and cobbles to 6 inches; dry, compact, sustains vertical cuts (fill)	
1.5 to 6.0 feet	Gravelly SAND (SW); brown, coarse subrounded gravel and cobbles, with boulders to 12 inches, moist to wet below 6 feet; compact to loose; stratified (alluvium). Groundwater seepage (water table) of several gpm at 6 feet. Sidewall collapse, unstable below 3 feet; soil suitable for use as backfill.	

Exploration discontinued at water table
Excavation backfilled with excavated material.

RH2 ENGINEERS PLANNERS SCIENTISTS	**Test Pit/Exploration Log** **PCCMP TP2** Exploration Name	**Geo Exploration Millpond Site Watermain Extension** Project	**Next to large concrete pad** **Cashmere, WA** Location
Adam Neff Inspected by:	**May 7, 2009** Date	**PCC 20802001108** Project #	**Komatsu PC75 track mounted backhoe – 1 ft bucket** **D. Baker Construction and Excavation** Backhoe and Operator

Depth	**Description**	**Sketch/Photo**
0 to 6.0 feet	Silty SAND with Gravel (SM) olive brown, fine to coarse, non-plastic fines, fine to coarse subround gravel, scattered fragments of concrete, compact, moist to wet at 5.5 feet (fill) At 6 feet, soil exhibited strong of gasoline-like odor and staining; some iridescence on water in excavation. Soil unsuitable for use as backfill. Groundwater seepage (water table) at 6 feet. Soil in excavation sidewall remained vertical.	
Exploration discontinued at water table at 6 feet. Excavation backfilled with excavated soil.		

RH2 ENGINEERS PLANNERS SCIENTISTS	**Test Pit/Exploration Log** **PCCMP TP3** Exploration Name	**Geo Exploration Millpond Site Watermain Extension** Project	**Next to unnamed ditch** **Cashmere, WA** Location
Adam Neff Inspected by:	**May 7, 2009** Date	**PCC 20802001108** Project #	**Komatsu PC75 track mounted backhoe – 1 ft bucket** **D. Baker Construction and Excavation** Backhoe and Operator

Depth	Description
0 to 7.0 feet	Silty SAND (SM) brown, fine to medium, trace fine to medium subrounded gravel, dry to moist, compact, many roots. (alluvium). Soil suitable for use as backfill.
7.0 to 8.7 feet	Silty SAND (SM); gray; fine, trace fine to medium subrounded gravel; moist to wet; compact (alluvium) Groundwater seepage at 1-1.5 gpm at 6 to 8 feet. Vertical sidewall stable in open excavation; suitable for use as backfill at optimum moisture.

Exploration discontinued at water table at 7 feet.
Excavation backfilled with excavated soil.

Sketch/Photo

RH2 ENGINEERS PLANNERS SCIENTISTS	**Test Pit/Exploration Log** **PCCMP TP4** Exploration Name	**Geo Exploration Millpond Site Watermain Extension** Project	**Next to and west of Mission Creek** **Cashmere, WA** Location
Adam Neff Inspected by:	**May 7, 2009** Date	**PCC 20802001108** Project #	**Komatsu PC75 track mounted backhoe – 1 ft bucket** **D. Baker Construction and Excavation** Backhoe and Operator

Depth	**Description**	**Sketch/Photo**
0 to 9.0 feet	Silty SAND (SM); brown, fine to medium, trace coarse gravel to boulders to 10 inches; layers of loose, lighter colored grayish sand and cobbles at 4.5 feet; fining with depth to trace below 7.5 feet; compact, dry to moist (alluvium). Suitable for use as backfill.	
9 to 9.5 feet	Silty SAND to Sandy SILT (SM/ML); gray; fine; moist to wet at 9+ feet; compact; (alluvium). Groundwater seepage of several gpm at 9+ feet. Stable sidewall; suitable for use as backfill at optimum moisture content and if fines < 50% #200 sieve.	
Exploration discontinued at water table at 9 feet. Excavation backfilled with excavated soil.		

RH2 ENGINEERS PLANNERS SCIENTISTS	**Test Pit/Exploration Log** **PCCMP TP5** Exploration Name	**Geo Exploration Millpond Site Watermain Extension** Project	**Next to and east of Mission Creek** **Cashmere, WA** Location
Adam Neff Inspected by:	**May 7, 2009** Date	**PCC 20802001108** Project #	**Komatsu PC75 track mounted backhoe – 1 ft bucket** **D. Baker Construction and Excavation** Backhoe and Operator

Depth	**Description**	**Sketch/Photo**
0 to 2.5 feet	Sandy SILT (ML) brown, non-plastic, fine to medium sand, some gravel and cobbles to 5 inches, dry to moist; compact (fill)	NO PHOTO AVAILABLE
2.5 to 4.0 feet	Gravelly SAND (SW); brown; fine to medium, fine to coarse subrounded gravel and cobbles to 6 inches; moist; compact to loose, (alluvium/fill?).	
4.0 to 7.5 feet	SAND (SP) gray, fine to medium; moist; compact (fill?)	
7.5 to 8.5 feet	Sandy SILT (ML); gray, non-plastic; fine to medium; moist to wet; compact (alluvium). Groundwater seepage of 1 to 3 gpm at 8 feet. Stable sidewall; not suitable for use as backfill.	
Test pit completed at 8.5 at water table. Excavation backfilled with excavated material.		

<table>
<tr><td>RH2 ENGINEERS PLANNERS SCIENTISTS</td><td>Test Pit/Exploration Log
PCCMP TP6
Exploration Name</td><td>Geo Exploration Millpond Site Watermain Extension
Project</td><td>West of Chapel Street
Cashmere, WA
Location</td></tr>
<tr><td>Adam Neff
Inspected by:</td><td>May 7, 2009
Date</td><td>PCC 20802001108
Project #</td><td>Komatsu PC75 track mounted backhoe – 1 ft bucket
D. Baker Construction and Excavation
Backhoe and Operator</td></tr>
<tr><td>Depth</td><td colspan="2">Description</td><td>Sketch/Photo</td></tr>
<tr><td>0 to 0.5 feet</td><td colspan="2">Gravel and sand (fill); Compact.</td><td rowspan="4"></td></tr>
<tr><td>0.5 to 5.0 feet</td><td colspan="2">Silty SAND with Gravel (SM); brown; fine to medium, fine to coarse subrounded gravel, non-plastic fines; some solid waste (metal, concrete) dry to moist; compact (fill).
No groundwater seepage.
No sidewall failure; suitable for backfill if solid waste removed.</td></tr>
<tr><td>5.0 to 10 feet</td><td colspan="2">Silty SAND with Gravel (SM); brown; fine to coarse, trace fine to coarse subrounded gravel; moist; compact, (alluvium).
No groundwater seepage.
No sidewall failure; suitable for use as backfill.</td></tr>
<tr><td colspan="3">Excavation backfilled with excavated material.</td></tr>
</table>

Date: 11/30/09
No Samples Taken

Test Pit	Time	Depth From Surface	Description
A	9:15	0 to 2.5	Brown Silty Sand
		2.5 to 8	Gray Wood Waste with Silty Sand and Gravel
		8	Water Table
B	9:30	0 to 3	Brown Wood Waste with Silty Sand
		3 to 8.5	Gray Wood Waste with Silty Sand and Gravel
		8.5	Water Table
C	9:50	0 to 2	Brown Wood Waste
		2 to 5	Brown Silty Sand with Cobbles
		5 to 7	Gray Silty Sand
		7	Water Table
D	10:06	0 to 4.5	Brown Wood Waste
		4.5 to 7	Gray Silty Sand - Free of Organics
		7	Water Table
E	11:46	0 to 3	Brown Silty Sand with Gravel
		3 to 3.5	Brown Silty Sand with Cobles
		3.5 to 6	Gray Silty Sand
F	10:25	0 to 1	Brown Silty Sand
		1 to 3.5	Bright Orange/Brown Wood Waste
		3.5 to 5	Gray Silty Sand with Cobles
G	11:24	0 to 2	Brown Silty Sand
		2 to 4	Gray Silty Sand with Cobles
		4 to 5.5	Dark Black/Brown Wood Waste - Bark Chips
		5.5	Water Table
H	11:10	0 to 2	Brown Silty Sand
		2 to 3.5	Gray Silty Sand with Cobles
		3.5 to 5	Gray Silty Sand
		5	Water Table
I	10:56	0 to 3	Brown Silty Wood waste
		3 to 4	Gray Wood Waste with Silty Sand and Cobles
		4 to 6	Gray Silty Sand

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod

Measured groundwater level in exploration, well, or piezometer

Groundwater observed at time of exploration

Perched water observed at time of exploration

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Material Description Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

Laboratory / Field Tests

%F	**Percent fines**
AL	**Atterberg limits**
CA	**Chemical analysis**
CP	**Laboratory compaction test**
CS	**Consolidation test**
DS	**Direct shear**
HA	**Hydrometer analysis**
MC	**Moisture content**
MD	**Moisture content and dry density**
OC	**Organic content**
PM	**Permeability or hydraulic conductivity**
PP	**Pocket penetrometer**
SA	**Sieve analysis**
TX	**Triaxial compression**
UC	**Unconfined compression**
VS	**Vane shear**

Sheen Classification

NS	**No Visible Sheen**
SS	**Slight Sheen**
MS	**Moderate Sheen**
HS	**Heavy Sheen**
NT	**Not Tested**

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS

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FIGURE A-1

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	1/20/2010	1/20/2010	17.5	NCS	HRP	Holocene Drilling	Hollow-stem Auger/SPT/D&M

Hammer Data	Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	Undetermined	Top of Casing Elevation (ft)	
Latitude Longitude		Horizontal Datum	N/A

A 2 (in) well was installed on 1/20/2010 to a depth of 17.5 (ft).
Well was developed on 1/22/2010.

Groundwater

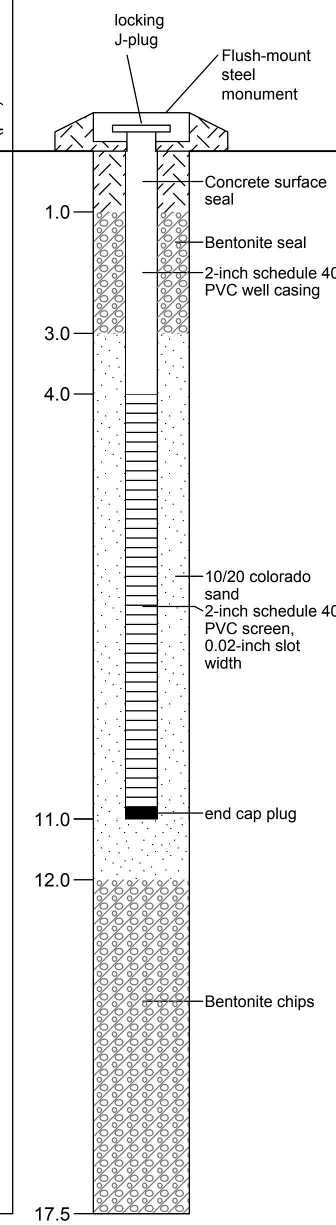
Date Measured	Depth to Water (ft)	Elevation (ft)
1/22/2010	5.2	

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.; Shelby Tube 3 inches I.D.

FIELD DATA

Elevation (feet)	Depth (feet)	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)
	0	6			1		OL	Dark brown wood waste with silty sand, gravel and cobbles (soft, moist) (fill)	30	
								(wood waste includes chips and bark fragments to 2 inches long) organic content = 26%		
		14	9		2			Grades to dark brown and medium stiff	49	31
								(wood waste includes chips up to 3 inches long)		
					2a					
	5	12	5		3	▼		Grades with increasing silty sand content	69	36
								(wood waste includes sawdust, bark and chips to 1 inch long)		
					3a	▽				
		12	8		4		SM/OL	Gray and brown silty fine to coarse sand with wood waste, gravel and cobbles (very loose, wet) (fill)	20	57
					4a			(wood waste includes sawdust and chips from ½ to 2½ inches long)		
								(wood waste includes roots and sticks to ¼-inch-diameter)		
	10	12	3		5				52	55
					5a		OL	Dark brown decomposed wood waste with silty fine sand (very soft, wet) (fill)		
		24			6			(hydrocarbon odor and sheen at top of sample; sample submitted for chemical analysis)		
							GP	Gray fine to coarse gravel with sand and cobbles (dense, wet) (alluvium)		
	15	18	40		7				10	
		5	50/5"		8					

WELL LOG



Note: See Figure A-1 for explanation of symbols.

Log of Monitoring Well B-1

GeoEngineers

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-2
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 17.3	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M
Surface Elevation (ft) Vertical Datum	Undetermined		Hammer Data	Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment Diedrich D-50
Latitude Longitude			System Datum	N/A	Groundwater: Date Measured 1/21/2010; Depth to Water (ft) 7.0; Elevation (ft)

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0					1			SM	Brown silty fine to coarse sand with gravel, cobbles, and trace wood waste (medium dense, moist) (fill)	19		Wood waste includes bark fragments to 1-inch
			0	59		2							Sampler driven on gravel or cobble
									OL	Dark brown wood waste with silty sand, gravel and cobbles (very stiff, moist) (fill)			Softer drilling Wood waste includes sawdust and chips to 1 inch long
	5		15	30		3					31		
						3a	∇						
			18	6		4			SM	Dark brown silty fine to coarse sand with gravel and trace of wood waste (very loose, wet) (fill)	26	75	Wood waste includes sawdust and chips to ½ inch long
						4a				Organic content = 4%	25		
	10		0	6		5							No recovery
				53		6					33	66	Wood waste includes sawdust and small decomposing chips
						6a 6b			GP	Gray fine to coarse gravel with cobbles (very dense, wet) (alluvium)			Rough drilling
	15												
			15	50/4"		7					13		

Boring was completed about 40 feet NE of intended location. Various attempts to drill at the intended location, and at 2.5, 5, 10 NW and 15 feet E, and 25 feet NE of intended location encountered a concrete obstruction at a depth of 2.5 feet.

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-1A

GeoEngineers

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-3
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 14.1	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Hammer Data	Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	Undetermined	Top of Casing Elevation (ft)	
Latitude Longitude		Horizontal Datum	N/A

A 2 (in) well was installed on 1/22/2010 to a depth of 13.5 (ft).
Well was developed on 1/22/2010.

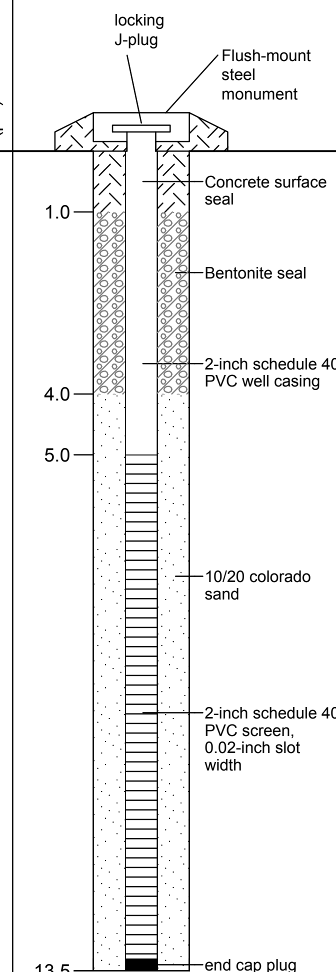
Groundwater

Date Measured	Depth to Water (ft)	Elevation (ft)
1/22/2010	6.7	

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	FIELD DATA: Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name	FIELD DATA: Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)
	0		6			1			OL/SM	Dark brown wood waste mixed with silty sand, gravel, and cobbles (soft/loose, moist) (fill)	40	
			6	47		2				(wood waste includes chips, bark and lumber fragments to 3 inches long) Organic content = 29% (sampler driven on gravel or cobble)		
	5		12	12		3					47	48
						3a	▼			Grades to medium stiff (wood waste includes sawdust and wood chips to 2 inches long)		
			15	27		4				Grades to stiff (wood waste includes sawdust and wood chips to 2 inches long)	39	56
						4a						
	10		18	16		5				Grades to medium stiff (wood waste includes sawdust and wood chips to ½ inch long)		
						5a	▽		SM	Gray silty fine to medium sand with gravel and wood waste (medium dense, moist) (fill)	58	
			5	50/2"		6			GM	Gray silty fine to coarse gravel with sand and cobbles (very dense, wet) (alluvium) (Harder drilling)		
			0	50/1"		7				Refusal on boulder/cobbles		

WELL LOG



Note: See Figure A-1 for explanation of symbols.

Log of Monitoring Well B-2

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 12.7	Logged By NCS / Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) / Vertical Datum: Undetermined	Hammer Data: Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment: Diedrich D-50	
Latitude / Longitude	System Datum: N/A	Groundwater — Date Measured: 1/21/2010	Depth to Water (ft): 7.0; Elevation (ft):
Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.			

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0								OL	Dark brown wood waste with silty sand, gravel and cobbles (soft, moist) (fill)			
						1					71		Wood waste includes sawdust, bark and chips to 3 inches long
						2					23		Large wood chunks in sampler Organic content = 13%
													Rough drilling
	5		0	18		3							No recovery
							▽		OL/ML	Dark brown fine-grained wood waste mixed with sand, gravel and cobbles (soft/loose, wet) (fill mixed)			
						4							Change in drilling
									GP-GM	Gray sandy fine to coarse gravel with silt and cobbles (dense, wet) (alluvium)			Rough drilling
	10		6	42		5							
			1	50/2"		6							Sampler driven on gravel or cobble

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-2A

GeoEngineers

Project: Redevelopment of Cashmere Mill Site

Project Location: Cashmere, Washington

Project Number: 18593-001-00

Figure A-5
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 12.7	Logged By NCS / Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) / Vertical Datum	Undetermined	Hammer Data	Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Latitude / Longitude		System Datum	N/A	Groundwater: Date Measured 1/21/2010	Depth to Water (ft) 7.0; Elevation (ft)

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0					1			OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (soft/loose, moist) (fill)	39		Wood waste includes sawdust, bark fragments and chips from ¾ inch to 3 inches long
			6	22		2			OL	Orange brown wood waste (stiff, moist) (fill)	93		Wood waste includes fine shavings and sawdust Organic content = 63%
	5		6	50/6"		3			OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (medium stiff/medium dense, moist) (fill)	65		Wood waste includes sawdust and chips to ½ inch long Sampler driven on gravel or cobble
			10	63		4	∇		SM	Gray silty fine to coarse gravel with sand and cobbles (very dense, wet) (alluvium)			Rough drilling
	10												Rough drilling
			2	50/2"		5							

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-3

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-6
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 12.5	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	Automatic 140 (lbs) / 30 (in) Drop
Drilling Equipment	Diedrich D-50		
Latitude Longitude		System Datum	N/A

Groundwater

Date Measured	Depth to Water (ft)	Elevation (ft)
1/21/2010	8.0	

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Elevation (feet)	Depth (feet)	Recovered (in)	Blows/foot	Sample Name / Testing	Water Level	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0			1		OL/SM	Brown wood waste mixed with with silty sand, gravel and cobbles (soft/loose, moist) (fill)	46		Wood waste includes bark and chips to 2 inches long
		16	22	2		OL	Dark brown wood waste with silty sand, gravel and cobbles (stiff, moist) (fill)	39	46	Large wood chunks in sampler Wood waste also includes chips and bark to 3 inches long
				2a				96		Organic content = 57%
	5	18	24	3				49	40	Large wood chunks in sampler
				3a						
		10	32	4						
						SM	Gray silty fine sand with organic matter (medium dense, moist) (fill)			Hard drilling Rough drilling %F=20
		12	23	5	∇	SM	Gray silty fine to medium sand with gravel and cobbles (medium dense, wet) (alluvium)	31		
	10									
		18	50/6"	6						
						GP	Gray fine to coarse gravel with sand, gravel and cobbles (very dense, wet) (alluvium)			

Note: See Figure A-1 for explanation of symbols.

Redmond: Date:2/10/10 Path:W:\REDMOND\PROJECTS\18\1859300100\GINT\1859300100.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_STANDARD

Log of Boring B-4

GeoEngineers

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-7
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 5.8	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) Vertical Datum: Undetermined	Hammer Data: Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment: Diedrich D-50	
Latitude Longitude	System Datum: N/A	Groundwater Date Measured: 1/21/2010	Depth to Water (ft): 2.0; Elevation (ft):
Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.			

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0			5		1	▽ (2.0)		OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (soft/loose, moist) (fill)	28		Wood waste includes bark and chips to 1 inch long
			6	20		2			SM	Dark brown silty fine to medium sand with organic matter, gravel and cobbles (loose, wet) (fill)			
									GM	Gray silty fine to coarse gravel with sand and cobbles (very dense, wet) (alluvium)			Rough drilling
	5		1	50/4"		3							Sampler driven on gravel or cobble

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-5

GeoEngineers

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 11.5	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) Vertical Datum: Undetermined	Hammer Data: Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment: Diedrich D-50
Latitude Longitude	System Datum: N/A	Groundwater — Date Measured: 1/21/2010; Depth to Water (ft): 6.0; Elevation (ft):

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0								OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (soft/loose, moist) (fill)			Wood waste includes chips and bark to 1 inch long
									SM	Brown silty fine to coarse sand with gravel, cobbles and trace wood waste (loose, wet) (fill)			Wood waste includes sawdust and chips to ½-inch
	5		14	11		1							No sheen, no odor
							∇						
													Wood waste includes bark and lumber fragments to 1 inch
	10		18	26		2							Heavy sheen and hydrocarbon odor from sample; sample submitted for chemical analysis

Note: See Figure A-1 for explanation of symbols.

Redmond: Date:2/10/10 Path:W:\REDMOND\PROJECTS\18\1859300100\GINT\1859300100.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_STANDARD

Log of Boring B-6

GeoEngineers

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-9
Sheet 1 of 1

Drilled	Start 1/21/2010	End 1/21/2010	Total Depth (ft) 11.5	Logged By NCS Checked By HRP	Driller Holocene Drilling	Drilling Method Hollow-stem Auger/SPT/D&M

Surface Elevation (ft) Vertical Datum: Undetermined	Hammer Data: Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment: Diedrich D-50	
Latitude Longitude	System Datum: N/A	Groundwater Date Measured: 1/21/2010	Depth to Water (ft): 5.0; Elevation (ft):

Notes: Auger Data: 5 inches I.D; 9.5 inches O.D.

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	0								OL/SM	Dark brown wood waste mixed with silty sand, gravel and cobbles (soft to medium stiff/loose, moist to wet) (fill)			Wood waste includes shavings and chips to 2 inches long
	5		18	16		1	∇						No sheen, no odor
									SM	Brown silty fine to coarse sand with gravel, cobbles and wood waste (loose, wet) (fill)			Wood waste includes shavings and chips to 2 inches long
	10		18	19		2							No sheen, no odor

Note: See Figure A-1 for explanation of symbols.

Redmond: Date:2/10/10 Path:W:\REDMOND\PROJECTS\18\1859300100\GINT\1859300100.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_STANDARD

Log of Boring B-7

GEOENGINEERS

Project: Redevelopment of Cashmere Mill Site
Project Location: Cashmere, Washington
Project Number: 18593-001-00

Figure A-10
Sheet 1 of 1

Cashmere Mill Site Test Pit Summary – August 30, 2012

Project & Owner	Port of Chelan County	Project Number	208.020.01.127
Dates	August 30, 2012	Location	Cashmere Mill Site
Field Rep	Adam Neff	Photos	J:\data\PCC\208-020\01 Port\127 Site Clean-up\GEO\photos

Boring	Total Depth	Samples Collected	Depth and Description
CMS-08302012-1	6	N	Sandy COBBLE with gravel (GP). No petroleum odor, no wood waste.
CMS-08302012-2	6	N	Sandy COBBLE with gravel (GP). No petroleum odor, no wood waste. Water level: 4.3’
CMS-08302012-3	5.5	N	Cobbly SAND with gravel (SP). No petroleum odor, no wood waste. Water level: 5.1’
CMS-08302012-4	7	Y	SAND with gravel and cobbles (SP). Light petroleum odor, no wood waste. Water level: 2.5’
CMS-08302012-5	7	Y	Cobbly SAND with gravel (SP). No petroleum odor, no wood waste. Water level: 6’
CMS-08302012-6	7	Y	SAND with gravel and cobbles and construction debris (SP). Significant petroleum odor, no wood waste. Water level: 6.7’
CMS-08302012-7	6	Y	0-3 Mix of wood waste, sand, and gravel. Light petroleum odor. 3-6 SAND with gravel and cobbles (SP).
CMS-08302012-8	5	Y	0-2.5 Mix of wood waste, sand, and gravel. 2.5-5 Coarse SAND with gravel and cobbles (SP). No petroleum odor.
CMS-08302012-9	4.5	Y	0-3 wood waste 3-4.5 grey coarse cobbly SAND with gravel (SP). Water level: 3.5’. No odor.
CMS-08302012-10	5.5	N	0 - 2.2 Crushed concrete 2.2 - 2.5 FILL sand with gravel and organics 2.5 – 5.5 Coarse sand w/gravel and cobbles. Water level 5’
CMS-08302012-11	4	Y	0 – 1 sand with gravel and wood waste 1 – 4 gray coarse sand with gravel and cobble. Hydrocarbon smell. Water level at 3.2’
CMS-08302012-12	4	Y	0 – 2 mix, sand with silt, gravel, cobbles and wood waste 2 – 4 Cobbly sand w/gravel. Hydrocarbon smell in all material. Water level at 2.5 ft.
CMS-08302012-13	4	N	0 – 4 fill with wood waste and construction debris. Hydrocarbon smell. Water level 2.8’

CMS-08302012-14	6.8	Y	0 – 2.8 Silt, sand, cobbles and some wood waste 2.8 – 6.5 Wood waste 6.5 – 6.8 medium sand (clean, native). No odor.
CMS-08302012-15	6.5	Y	0 – 3.5 mixed fill with some construction debris, Sand w/gravel and cobbles 3.5 – 6.5 clean wood waste. Water level at 6.0'. No odor.
CMS-08302012-16	4	N	0 – 4 sand with gravel and cobbles. Slight hydrocarbon smell. Water level at 4'
CMS-08302012-17	4	N	0 – 4 fill with construction debris, sandy cobble w/gravel. Hydrocarbon smell.
CMS-08302012-18	2	N	0 – 2 crushed concrete. 2' refusal on slab of concrete (railroad rail on concrete)
CMS-08302012-19	2.5	N	0 – 2.5 crushed concrete. 2' refusal on slab of concrete (railroad rail on concrete)
CMS-08302012-20	2	N	0 – 2 crushed concrete. 2' refusal on slab of concrete (railroad rail on concrete)
CMS-08302012-21	2	N	0 – 2 crushed concrete. 2' refusal on slab of concrete
CMS-08302012-22	5	Y	0 – 1 crushed concrete 1 – 4 mixed sand with gravel, some cobbles and construction debris. Hydrocarbon smell 4 – 5 gravelly sand with cobbles (native). Water level at 4.5 ft.
CMS-08302012-23	7.5	Y	0 - 4.5 Sand with gravel and cobbles, some construction debris. Very dense 4.5 – 7 Wood waste with sand and cobble. Hydrocarbon contamination 7 - 7.5 fine sand with organics (native)
CMS-08302012-24	8	Y	0 - 1.5 Top soil with organics 1.5 – 6.5 Wood waste with sand and cobble. Hydrocarbon smell 6.5 – 8 medium sand (native). Water level at 7.5'
CMS-08302012-25	7	N	0 – 6 fine sand with silt, gravel and organics. (very little wood waste, mostly roots) 6 – 7 grey medium sand with gravel (native). Water level at 6.3'
CMS-08302012-26	8.5	Y	0 – 8.3 Wood waste w/sand and silt 8.3 - 8.5 grey sand with gravel and cobbles. Water level at 8'
CMS-08302012-27	7.5	Y	0 - 0.5 top soil w/organics 0.5 – 2 sand w/gravel, some cobbles 2 – 3 wood waste 3 – 5 cobbly sand w/gravel 5 – 6.5 medium sand (native) 6.5 – 7.5 sandy cobble w/gravel (native)

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

DEPARTMENT OF ECOLOGY State of Washington

Construction/Decommission *("x" in circle)*

☒ Construction

☐ Decommission *ORIGINAL INSTALLATION*

Notice of Intent Number ____________

PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☒ DeWater ☐ Irrigation ☐ Test Well ☐ Other ______

TYPE OF WORK: Owner's number of well (if more than one) ______

☒ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Deepened ☐ Cable ☒ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 26 ft.
Depth of completed well 22 ft.

CONSTRUCTION DETAILS

Casing Installed: ☒ Welded 6" Diam. from +1 1/2 ft. to 12 1/2 ft.
☐ Liner installed ____" Diam. from ____ ft. to ____ ft.
☐ Threaded ____" Diam. From ____ ft. to ____ ft.

Perforations: ☐ Yes ☒ No

Type of perforator used ______

SIZE of perfs ____ in. by ____ in. and no. of perfs ____ from ____ ft. to ____ ft.

Screens: ☒ Yes ☐ No ☒ K-Pac Location 11-12'

Manufacturer's Name Alloy Machine

Type Sainless Model No. ______

Diam. 5" Slot size .60 from 12 ft. to 22 ft.

Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel/Filter packed: ☐ Yes ☒ No Size of gravel/sand ____

Materials placed from ____ ft. to ____ ft.

Surface Seal: ☒ Yes ☐ No To what depth? 10+ ft.

Material used in seal Bentonite

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? ______ Depth of strata ______

Method of sealing strata off ______

PUMP: Manufacturer's Name ______

Type: ______ H.P. ______

WATER LEVELS: Land-surface elevation above mean sea level 739 ft.

Static level 4 1/2 ft. below top of well Date 09-18-12

Artesian pressure ____ lbs. per square inch Date ______

Artesian water is controlled by ______ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom? ______

Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ______

Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.

Airtest 30+ gal./min. with stem set at 10 ft. for 2 hrs.

Artesian flow ____ g.p.m. Date 09-18-12

Temperature of water ____ Was a chemical analysis made? ☐ Yes ☒ No

CURRENT

Notice of Intent No. DE 01197

Unique Ecology Well ID Tag No. BCF 944

Water Right Permit No. ______

Property Owner Name Port of Chelan County

Well Street Address Mill Rd. (Cashmere Mill Site Dewatering well)

City Cashmere County Chelan

Location SE 1/4-1/4 NE 1/4 Sec 05 Twn 23 R 19 EWM ☒ Or WWM ☐

(s, t, r Still REQUIRED)

Lat/Long Lat Deg N 47 Lat Min/Sec 31.159
Long Deg W 120 Long Min/Sec 28.838

Tax Parcel No. (Required) 231905110150

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Logs, wood chips, rocks, black silt, gravels WB @ 5	0	12
Gray cemented cobbles, sand, gravel	12	16
Brownish med. sand, gravels WB	16	22
Dk. gray cemented fine - coarse sand, gravels	22	26
Constructed per WAC # 173-160-271-3,a,ii & iii		

Start Date 09-17-12 Completed Date 09-18-12

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.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) Brett Phythian

Driller/Engineer/Trainee Signature

Driller or trainee License No. 1249

IF TRAINEE: Driller's License No:

Driller's Signature: Brett

Drilling Company Tumwater Drilling & Pump Inc.

Address P.O.Box 777 9290 Hwy 2

City, State, Zip Leavenworth, WA, 98826

Contractor's Registration No. TUWADP011LZ Date 09-19-2012

ECY 050-1-20 (Rev 02/10) *If you need this document in an alternate format, please call the Water Resources Program at 360-407-6872. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.*

ATTACHMENT D

LABORATORY ANALYTICAL RESULTS

September 29, 2009

Adam Neff
RH2 Engineering, Inc.
300 Simon Street SE
Suite #5
East Wenatchee, WA 98802-7720

Client Project: Cashmere Mill Site
ARI ID: PP00

Dear Adam:

Please find enclosed the original Chain of Custody, sample receipt documentation, and the final results for the project referenced above. Analytical Resources, Inc. (ARI) accepted nine soil samples on September 18, 2009. For further details regarding sample receipt, please refer to the enclosed Cooler Receipt Form.

The samples were analyzed for NWTPH-G/BTEX and NWTPH-Dx, as requested on the Chain of Custody.

All analyses were completed routinely.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please feel free to contact me at your convenience.

Respectfully,

Bob Congleton

Bob Congleton
Project Manager
ANALYTICAL RESOURCES, INC.
(206) 695-6232
bob@arilabs.com
www.arilabs.com

Enclosures

cc: eFile PP00

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)

ARI Assigned Number: PPOO	Turn-around Requested:	Page: 1	of 2
ARI Client Company: RH2	Phone: 509-886-2900	Date: 9-17	Ice Present? Yes
Client Contact: Adam Neff		No. of Coolers: 1	Cooler Temps:
Client Project Name: Cashmere millsite			
Client Project #:	Samplers: Adam Neff		

Sample ID	Date	Time	Matrix	No. Containers	Total solids	VOA/BETX/ ~~TPH~~	NWTPH Dx						Notes/Comments
S-1	9-16	8:30		1	X								
S-1b	9-16	8:35		2		X							
S-2	9-16	8:45		1	X								
S-2b	9-16	8:48		2		X							
S-3	9-16	9:00		1	X								
S-3b	9-16	9:03		2		X							
S-4	9-16	9:18		1	X								
S-4b	9-16	9:22		2		X							
S-5	9-16	9:30		1	X								
S-5b	9-16	9:35		2		X							

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) Adam Neff	(Signature)	(Signature)	(Signature)
	Printed Name: Adam Neff	Printed Name: A. Volgardsen	Printed Name:	Printed Name:
	Company: RH2	Company: ARI	Company:	Company:
	Date & Time: 9-17 3:30 pm	Date & Time: 9/18/09 11:08	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.

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)

ARI Assigned Number:	Turn-around Requested:	Page: 2 of 2	
ARI Client Company: RH 2	Phone: 509-886-2900	Date: 9-17	Ice Present? Yes
Client Contact: [redacted] Neff		No. of Coolers: 1	Cooler Temps:
Client Project Name: [redacted]llsite			
Client Project #:	Samplers: [redacted]		

Sample ID	Date	Time	Matrix	No. Containers	Total [redacted]	VOA/[redacted]	NWTPH Dx						Notes/Comments
S-6	[redacted]	[redacted]		1	X								
S-6b	[redacted]	[redacted]		2		X							
S-7	[redacted]	[redacted]		1	X								
S-7b	[redacted]	[redacted]		2		X							
S-8	9-17	10:10		1	X								
S-8b	9-17	10:15		2		X							
S-4C	9-16	9:20		1			X						
S-6C	9-16	9:55		1			X						

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Adam Neff	Printed Name: A. Volgardsen	Printed Name:	Printed Name:
	Company: RH2	Company: ARI	Company:	Company:
	Date & Time: 9-17 3:30 pm	Date & Time: 9/18/09 11:08	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: RH2

COC No(s): ______ NA

Assigned ARI Job No: PPOO

Project Name: Cashmere Millsite

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: ______

Tracking No: K0967786718 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) 11.4

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 487405

Cooler Accepted by: AV Date: 9/18/09 Time: 1108

Complete custody forms and attach all shipping documents

Log-In Phase:

	NA	YES	NO
Was a temperature blank included in the cooler?		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 *

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: ______

Samples Logged by: AV Date: 9/18/09 Time: 1224

***** 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:

* 1 container for S-1b + S-4b arrived broken (40ml vials)
S-6c the entire jar arrived broken

*limited volume on samples w/ broken jars

All Samples out of temp compliance

By: AV Date: 9/18/09

Small Air Bubbles ~2mm	Peabubbles' 2-4 mm	LARGE Air Bubbles > 4 mm

Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

Data Reporting Qualifiers

Effective 7/10/2009

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

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

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.

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

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
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: S-1
SAMPLE

Lab Sample ID: PP00A
LIMS ID: 09-21744
Matrix: Soil
Data Release Authorized:
Reported: 09/29/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 09/16/09
Date Received: 09/18/09

Date Analyzed: 09/24/09 13:50
Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL
Sample Amount: 75 mg-dry-wt
Percent Moisture: 13.5%

CAS Number	Analyte	RL	Result	
71-43-2	Benzene	17	< 17 U	
108-88-3	Toluene	17	< 17 U	
100-41-4	Ethylbenzene	17	< 17 U	
179601-23-1	m,p-Xylene	33	< 33 U	
95-47-6	o-Xylene	17	< 17 U	
				GAS ID
	Gasoline Range Hydrocarbons	**6.6**	**8.2**	**GRO**

BETX Surrogate Recovery

Trifluorotoluene	97.0%
Bromobenzene	102%

Gasoline Surrogate Recovery

Trifluorotoluene	95.0%
Bromobenzene	101%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

MH
9/29/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090924-2.b/0924a017.d
Data file 2: /chem3/pid3.i/20090924-1.b/0924a017.d
Method: /chem3/pid3.i/20090924-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: PP00A
Client ID: S-1
Injection Date: 24-SEP-2009 13:50
Matrix: SOIL
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.429	0.033	7091	82867	95.0	TFT(Surr)
14.914	0.023	4370	36420	100.8	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	88443	0.128
8015B 2MP-TMB	(4.89 to 15.58)	72128	0.052
AKGas nC6-nC10	(5.38 to 14.54)	67378	0.061
NWGas Tol-Nap	(10.17 to 18.19)	90047	0.123

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.428	0.033	23018	97.0	TFT(Surr)
14.912	0.023	49290	101.7	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20090924-2.b/0924a017.d

Date : 24-SEP-2009 13:50

Client ID: S-1

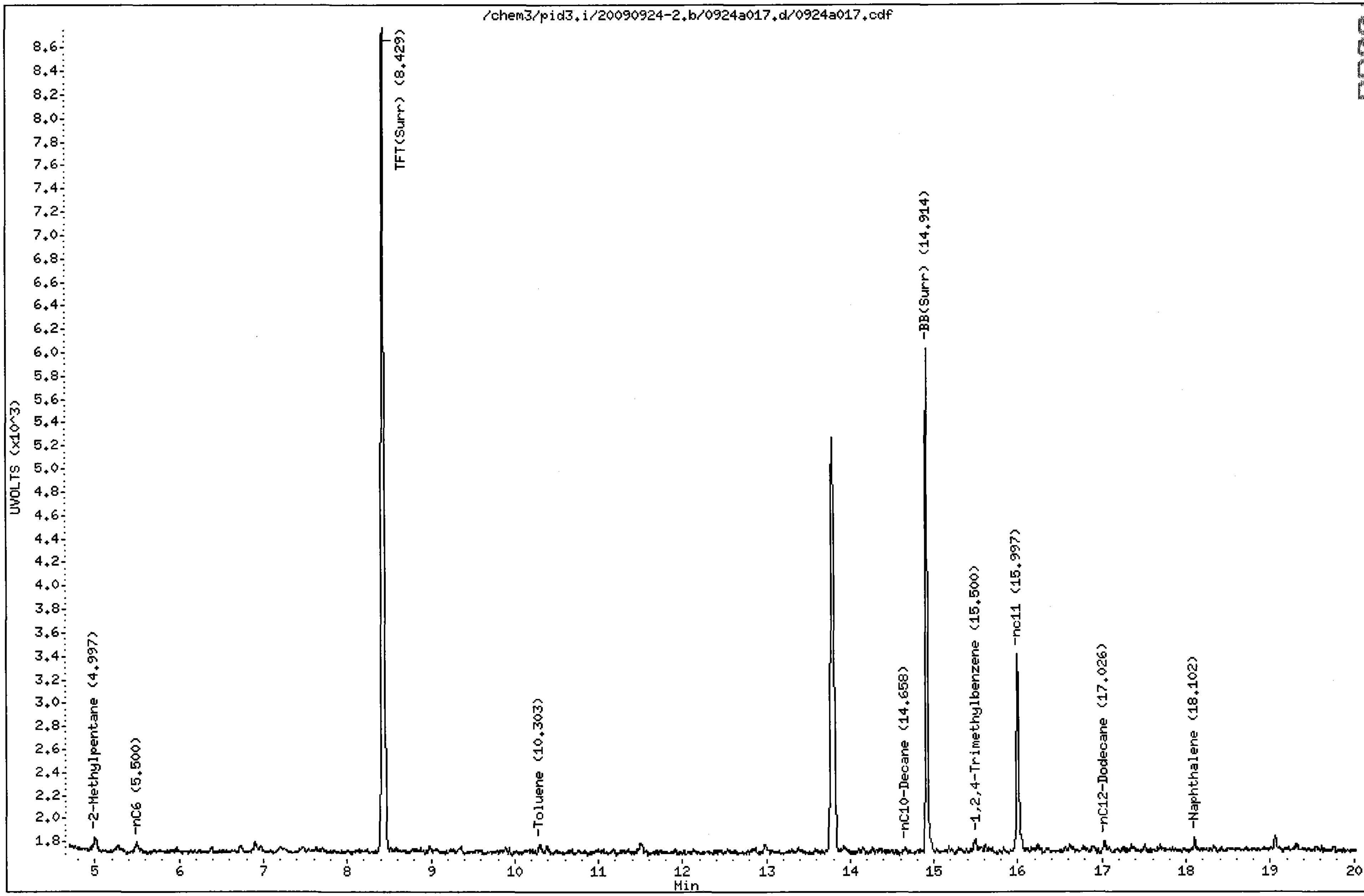
Instrument: pid3.i

Sample Info: PP00A

Operator: MH

Column phase: RTX 502-2 FID

Column diameter: 0.18



PP00 00005

Data File: /chem3/pid3.i/20090924-1.b/0924a017.d

Date : 24-SEP-2009 13:50

Client ID: S-1

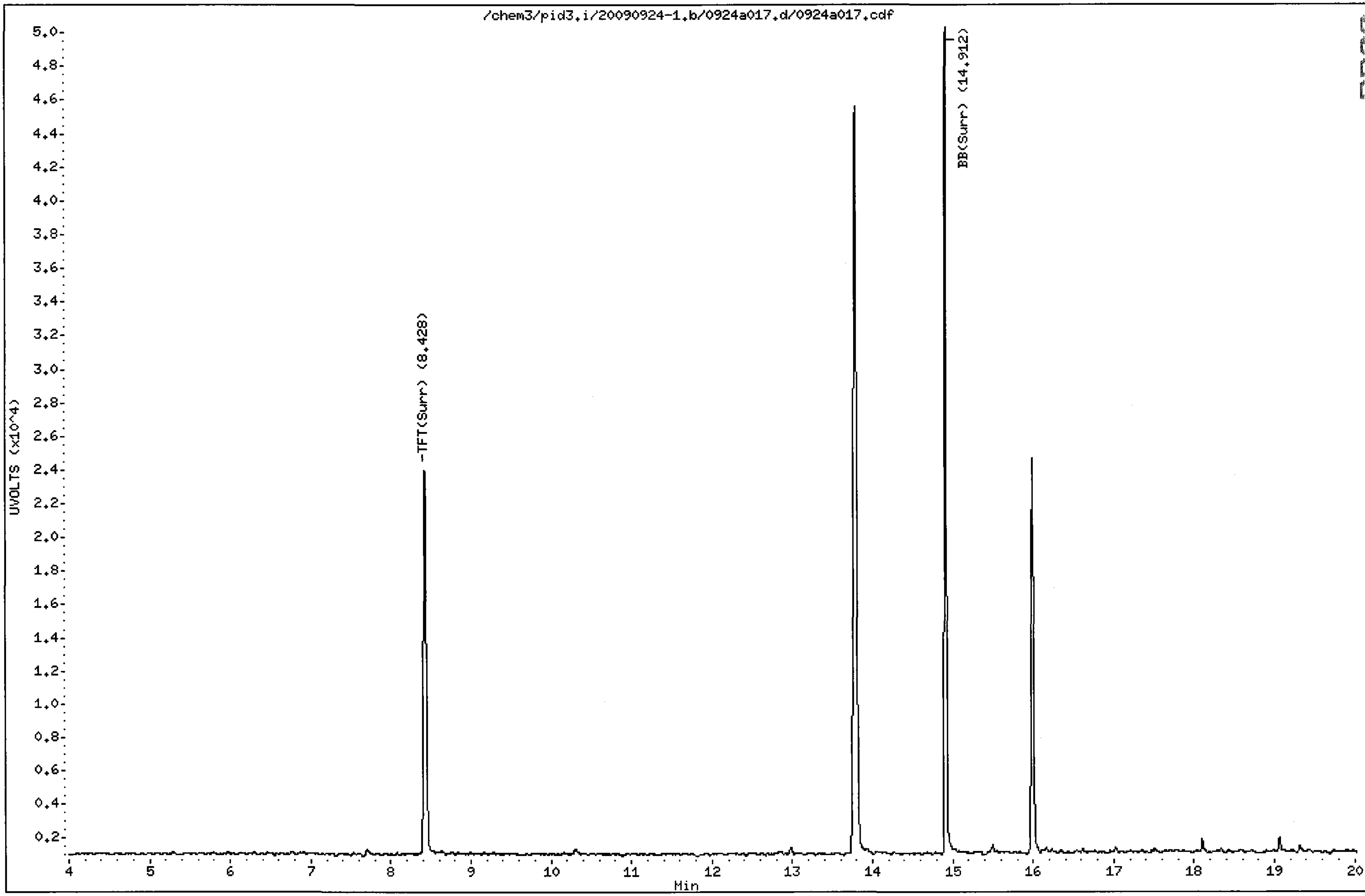
Sample Info: PP00A

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: MH

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG

Sample ID: S-2
SAMPLE

Lab Sample ID: PP00B
LIMS ID: 09-21745
Matrix: Soil
Data Release Authorized:
Reported: 09/29/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 09/16/09
Date Received: 09/18/09

Date Analyzed: 09/24/09 14:39
Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL
Sample Amount: 79 mg-dry-wt
Percent Moisture: 11.6%

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	16	< 16 U	
108-88-3	Toluene	16	< 16 U	
100-41-4	Ethylbenzene	16	< 16 U	
179601-23-1	m,p-Xylene	32	< 32 U	
95-47-6	o-Xylene	16	< 16 U	
	Gasoline Range Hydrocarbons	6.3	< 6.3 U	---

BETX Surrogate Recovery

Trifluorotoluene	95.5%
Bromobenzene	102%

Gasoline Surrogate Recovery

Trifluorotoluene	94.7%
Bromobenzene	101%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

MH 9/29/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090924-2.b/0924a019.d
Data file 2: /chem3/pid3.i/20090924-1.b/0924a019.d
Method: /chem3/pid3.i/20090924-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: PP00B
Client ID: S-2
Injection Date: 24-SEP-2009 14:39
Matrix: SOIL
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.427	0.030	7064	82734	94.7	TFT(Surr)
14.914	0.023	4375	37119	101.0	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	26267	0.038
8015B 2MP-TMB	(4.89 to 15.58)	22037	0.016
AKGas nC6-nC10	(5.38 to 14.54)	17256	0.016
NWGas Tol-Nap	(10.17 to 18.19)	34007	0.047

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.425	0.030	22664	95.5	TFT(Surr)
14.912	0.023	49344	101.8	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20090924-2.b/0924a019.d

Date : 24-SEP-2009 14:39

Client ID: S-2

Sample Info: PP00B

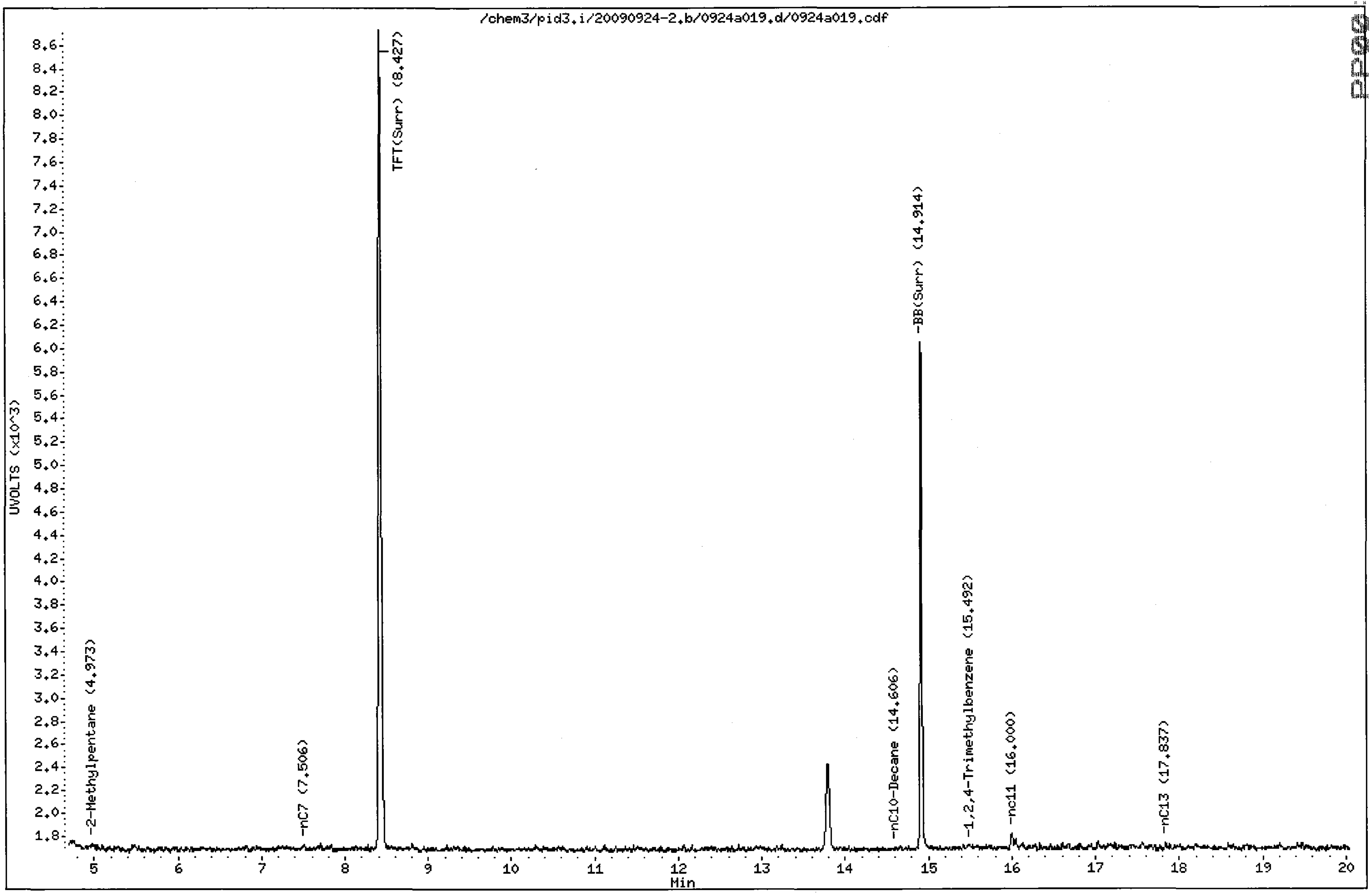
Column phase: RTX 502-2 FID

Page 1

Instrument: pid3.i

Operator: MH

Column diameter: 0.18

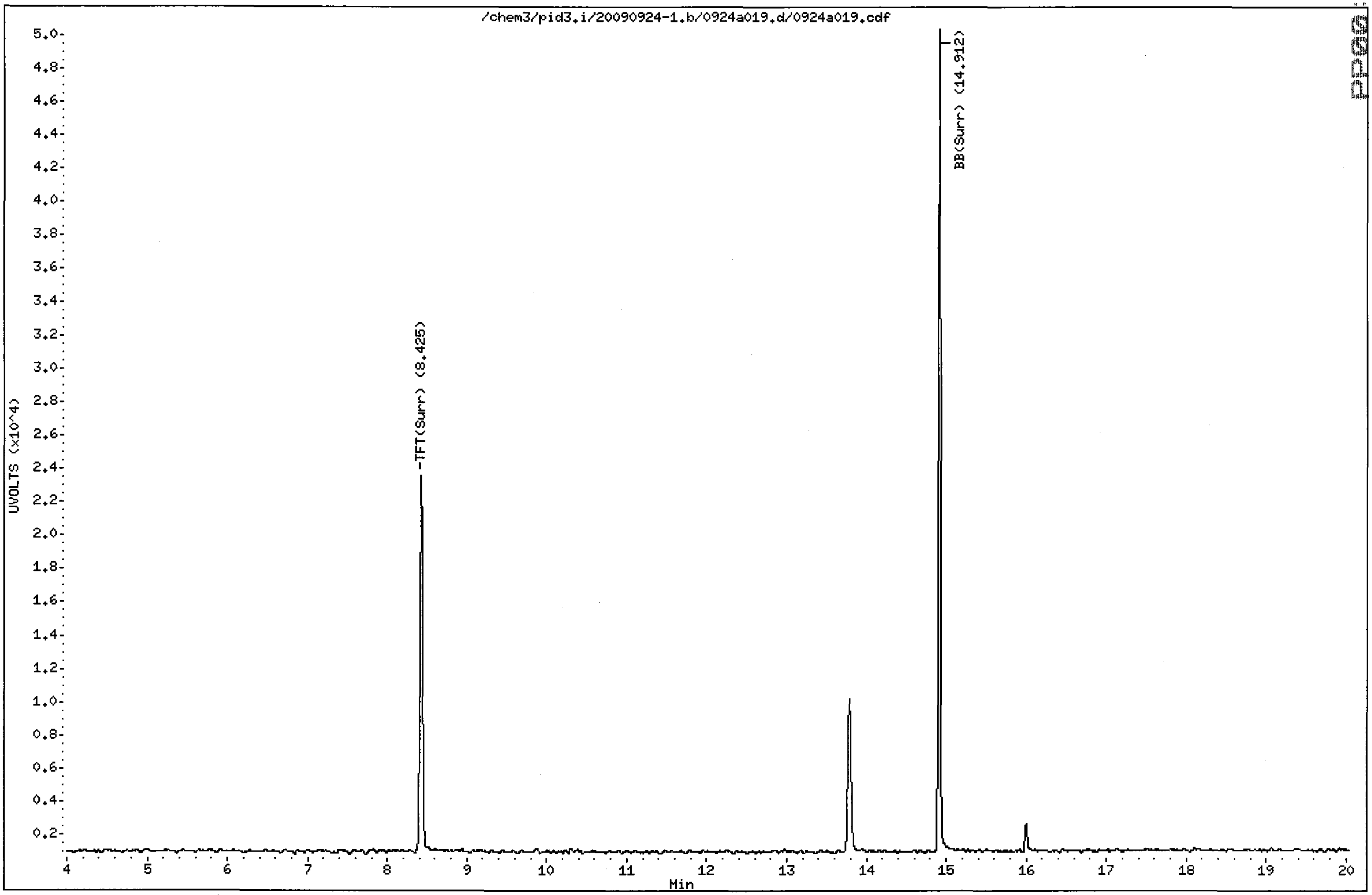


Data File: /chem3/pid3.i/20090924-1.b/0924a019.d
Date : 24-SEP-2009 14:39
Client ID: S-2
Sample Info: PP00B

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: MH
Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG

Sample ID: S-3
SAMPLE

Lab Sample ID: PP00C
LIMS ID: 09-21746
Matrix: Soil
Data Release Authorized:
Reported: 09/29/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 09/16/09
Date Received: 09/18/09

Date Analyzed: 09/24/09 15:03
Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL
Sample Amount: 100 mg-dry-wt
Percent Moisture: 10.5%

CAS Number	Analyte	RL	Result	
71-43-2	Benzene	12	< 12 U	
108-88-3	**Toluene**	**12**	**20**	
100-41-4	Ethylbenzene	12	< 12 U	
179601-23-1	**m,p-Xylene**	**24**	**29**	
95-47-6	o-Xylene	12	< 12 U	
				GAS ID
	Gasoline Range Hydrocarbons	4.7	< 4.7 U	---

BETX Surrogate Recovery

Trifluorotoluene	98.0%
Bromobenzene	104%

Gasoline Surrogate Recovery

Trifluorotoluene	97.7%
Bromobenzene	104%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

MH
9/29/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090924-2.b/0924a020.d
Data file 2: /chem3/pid3.i/20090924-1.b/0924a020.d
Method: /chem3/pid3.i/20090924-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: PP00C
Client ID: S-3
Injection Date: 24-SEP-2009 15:03
Matrix: SOIL
Dilution Factor: 1.000

===

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.426	0.030	7290	85924	97.7	TFT(Surr)
14.913	0.022	4507	36985	104.0	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	12887	0.019
8015B 2MP-TMB	(4.89 to 15.58)	13863	0.010
AKGas nC6-nC10	(5.38 to 14.54)	13862	0.013
NWGas Tol-Nap	(10.17 to 18.19)	15053	0.021

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

===

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.425	0.030	23253	98.0	TFT(Surr)
14.911	0.022	50652	104.5	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
10.299	0.034	589	0.42	Toluene
ND	---	---	---	Ethylbenzene
12.977	0.035	861	0.61	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

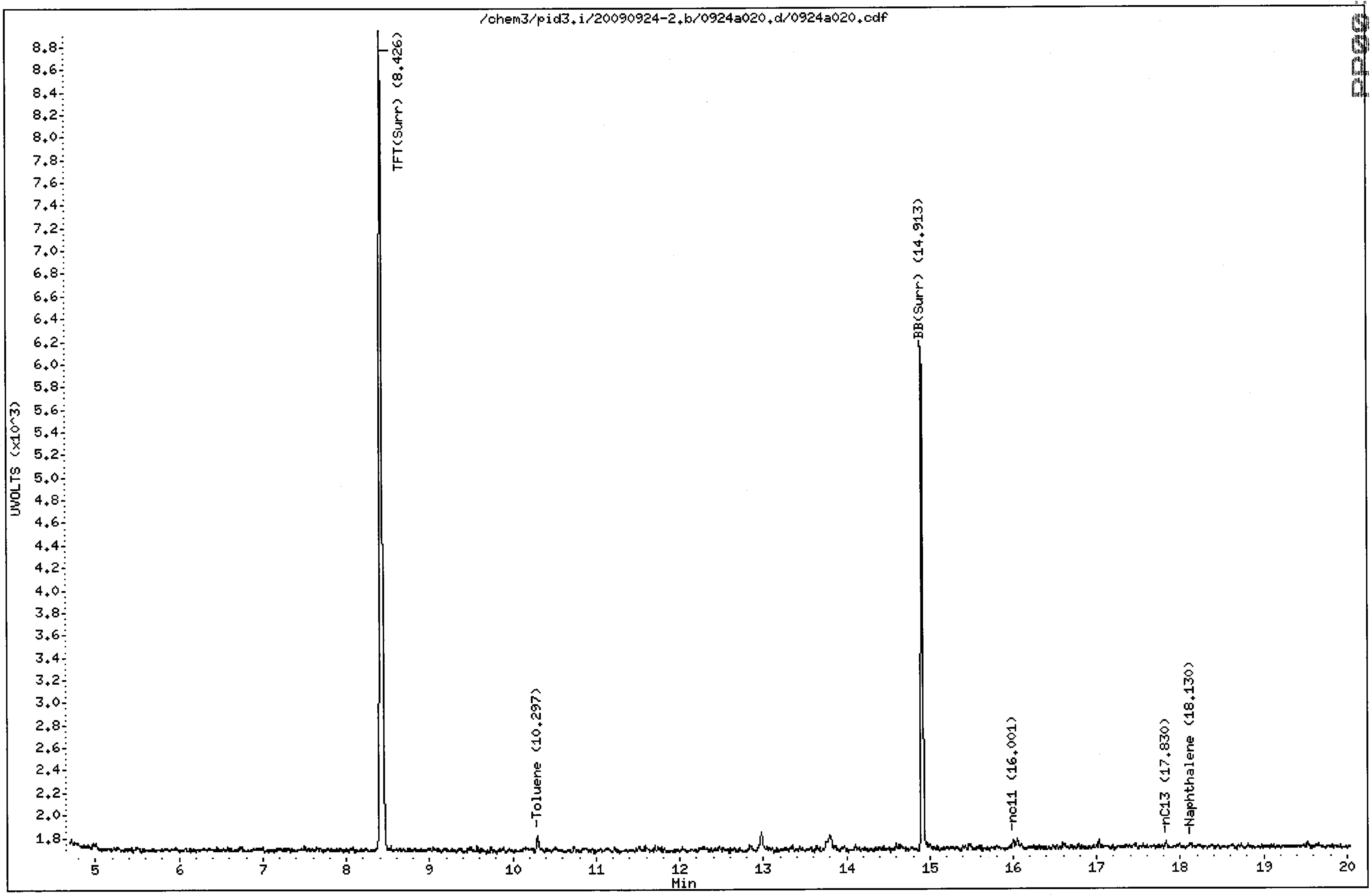
A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20090924-2.b/0924a020.d
Date : 24-SEP-2009 15:03
Client ID: S-3
Sample Info: PP00C

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: MH
Column diameter: 0.18

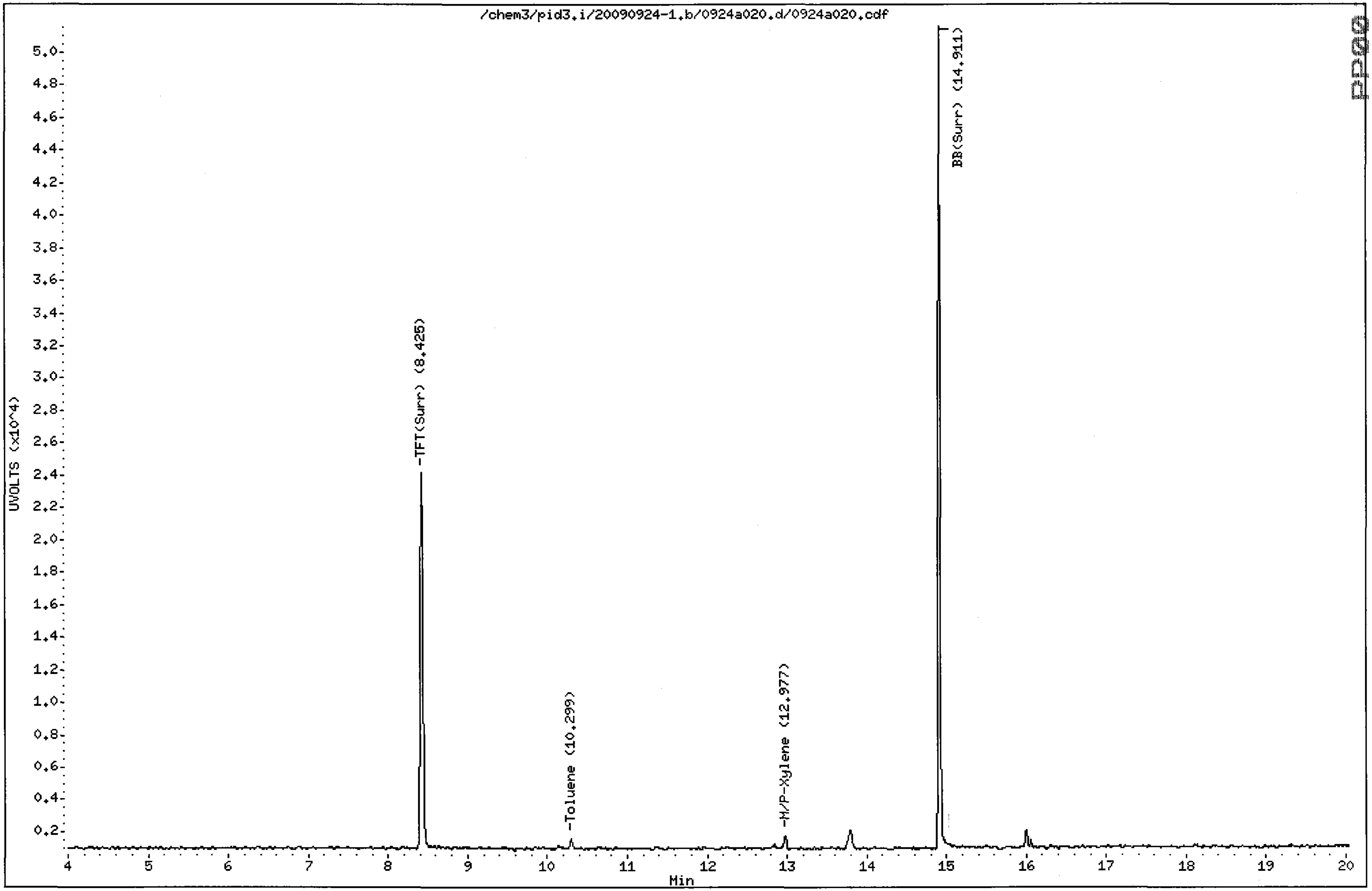


Data File: /chem3/pid3.i/20090924-1.b/0924a020.d
Date : 24-SEP-2009 15:03
Client ID: S-3
Sample Info: PP00C

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: MH
Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: S-4
SAMPLE

Lab Sample ID: PP00D
LIMS ID: 09-21747
Matrix: Soil
Data Release Authorized:
Reported: 09/29/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 09/16/09
Date Received: 09/18/09

Date Analyzed: 09/25/09 09:28
Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL
Sample Amount: 11 mg-dry-wt
Percent Moisture: 12.0%

CAS Number	Analyte	RL	Result	
71-43-2	Benzene	120	< 120 U	
108-88-3	**Toluene**	**120**	**650**	
100-41-4	**Ethylbenzene**	**120**	**1,600**	
179601-23-1	m,p-Xylene	230	< 230 U	
95-47-6	**o-Xylene**	**120**	**700**	
				GAS ID
	Gasoline Range Hydrocarbons	**46**	**1,600**	**GRO**

BETX Surrogate Recovery

Trifluorotoluene	104%
Bromobenzene	108%

Gasoline Surrogate Recovery

Trifluorotoluene	103%
Bromobenzene	118%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

MH 9/29/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090925-2.b/0925a009.d
Data file 2: /chem3/pid3.i/20090925-1.b/0925a009.d
Method: /chem3/pid3.i/20090925-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: PP00D
Client ID: S-4
Injection Date: 25-SEP-2009 09:28
Matrix: SOIL
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.422	0.027	7715	90710	103.4	TFT(Surr)
14.911	0.022	5132	60945	118.4	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.16 to 17.11)	2186459	3.156
8015B 2MP-TMB	(4.89 to 15.58)	2381923	1.720
AKGas nC6-nC10	(5.38 to 14.53)	1988296	1.798
NWGas Tol-Nap	(10.16 to 18.19)	2584146	3.540

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.421	0.027	24654	103.9	TFT(Surr)
14.909	0.021	52419	108.2	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
10.286	0.023	1994	1.41	Toluene
12.818	0.014	4545	3.54	Ethylbenzene
ND	---	---	---	M/P-Xylene
13.707	-0.018	2080	1.52	O-Xylene
ND	---	---	---	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20090925-2.b/0925a009.d

Date : 25-SEP-2009 09:28

Client ID:

Sample Info: PPOOD

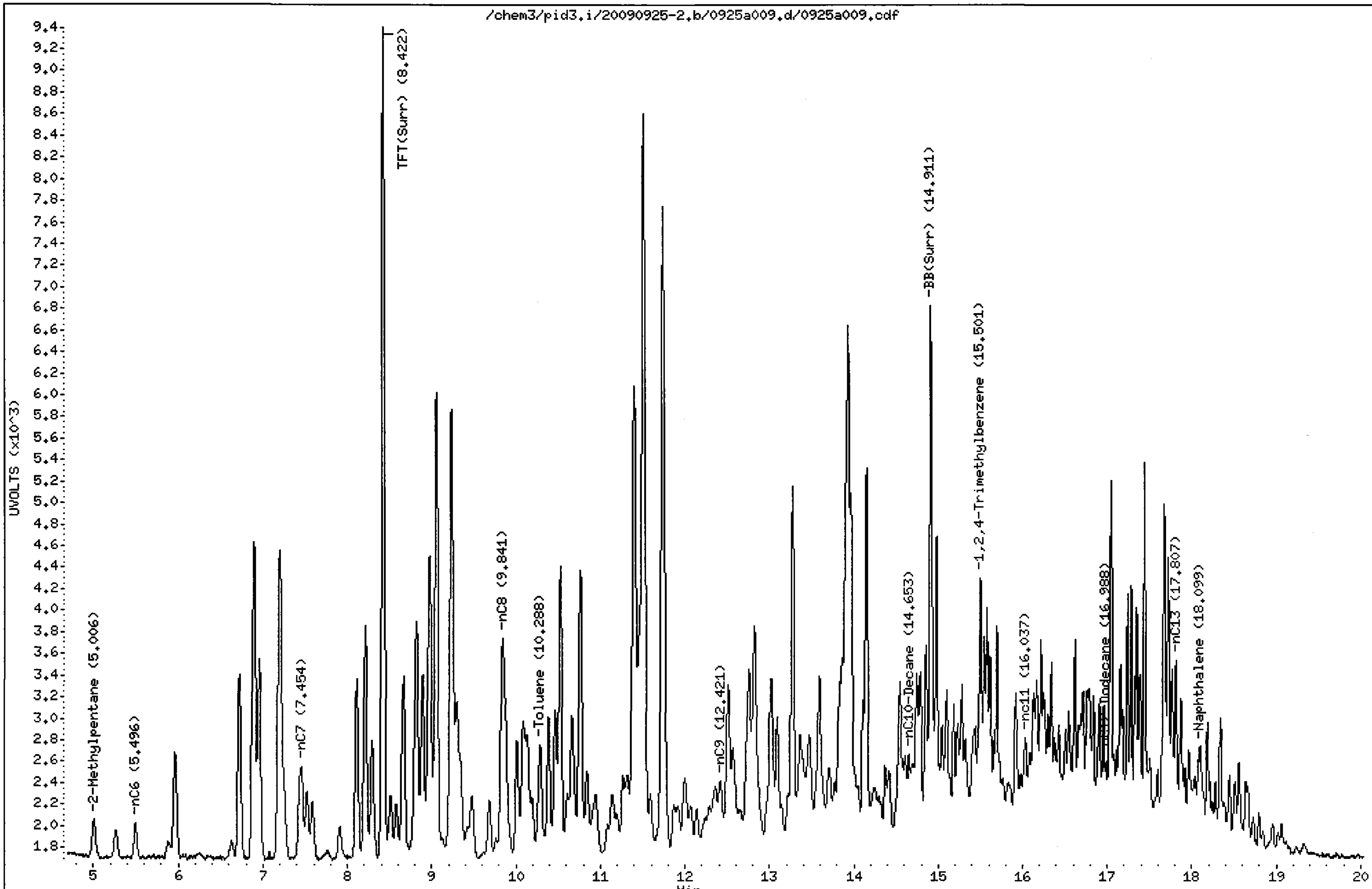
Column phase: RTX 502-2 FID

Page 1

Instrument: pid3.i

Operator: MH

Column diameter: 0.18



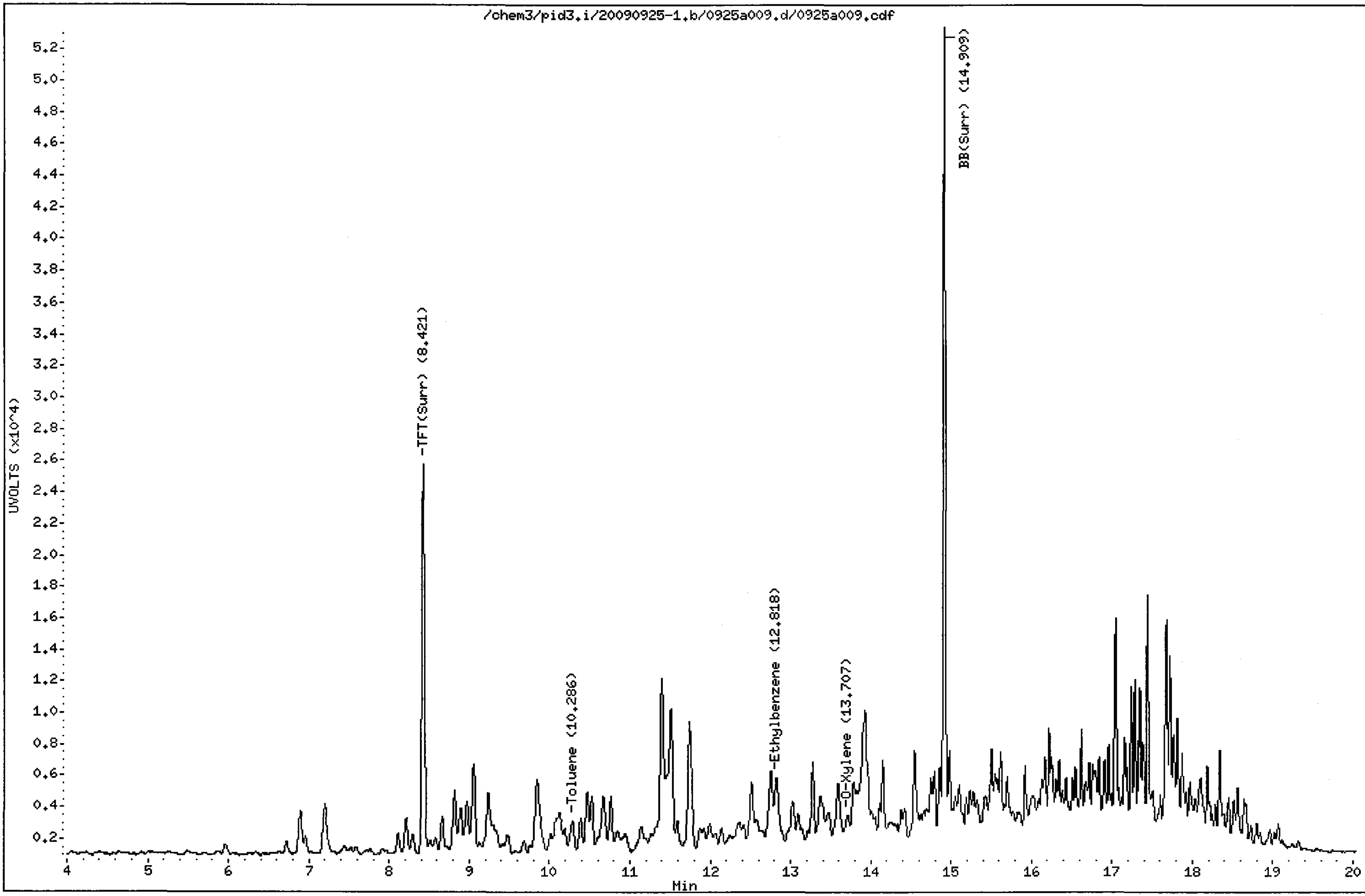
PP00 00021

Data File: /chem3/pid3.i/20090925-1.b/0925a009.d
Date : 25-SEP-2009 09:28
Client ID: S-4
Sample Info: PP00D

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: MH
Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: S-5
SAMPLE

Lab Sample ID: PP00E
LIMS ID: 09-21748
Matrix: Soil
Data Release Authorized:
Reported: 09/29/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 09/16/09
Date Received: 09/18/09

Date Analyzed: 09/24/09 15:52
Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL
Sample Amount: 90 mg-dry-wt
Percent Moisture: 15.0%

CAS Number	Analyte	RL	Result	
71-43-2	Benzene	14	< 14 U	
108-88-3	**Toluene**	**14**	**62**	
100-41-4	**Ethylbenzene**	**14**	**370**	
179601-23-1	m,p-Xylene	28	< 28 U	
95-47-6	**o-Xylene**	**14**	**210**	
				GAS ID
	Gasoline Range Hydrocarbons	**5.6**	**490**	**GRO**

BETX Surrogate Recovery	
Trifluorotoluene	94.3%
Bromobenzene	119%

Gasoline Surrogate Recovery	
Trifluorotoluene	91.6%
Bromobenzene	91.2%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

MH 9/29/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090924-2.b/0924a022.d
Data file 2: /chem3/pid3.i/20090924-1.b/0924a022.d
Method: /chem3/pid3.i/20090924-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: PP00E
Client ID: S-5
Injection Date: 24-SEP-2009 15:52
Matrix: SOIL
Dilution Factor: 1.000

===

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.426	0.030	6835	79884	91.6	TFT(Surr)
14.913	0.022	3954	32411	91.2	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	5904888	8.525
8015B 2MP-TMB	(4.89 to 15.58)	3999706	2.889
AKGas nC6-nC10	(5.38 to 14.54)	2556096	2.311
NWGas Tol-Nap	(10.17 to 18.19)	6382622	8.743

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

===

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.425	0.030	22396	94.3	TFT(Surr)
14.913	0.023	57753	119.2	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
10.294	0.028	1567	1.11	Toluene
12.831	0.026	8564	6.68	Ethylbenzene
ND	---	---	---	M/P-Xylene
13.713	-0.014	5068	3.71	O-Xylene
ND	---	---	---	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

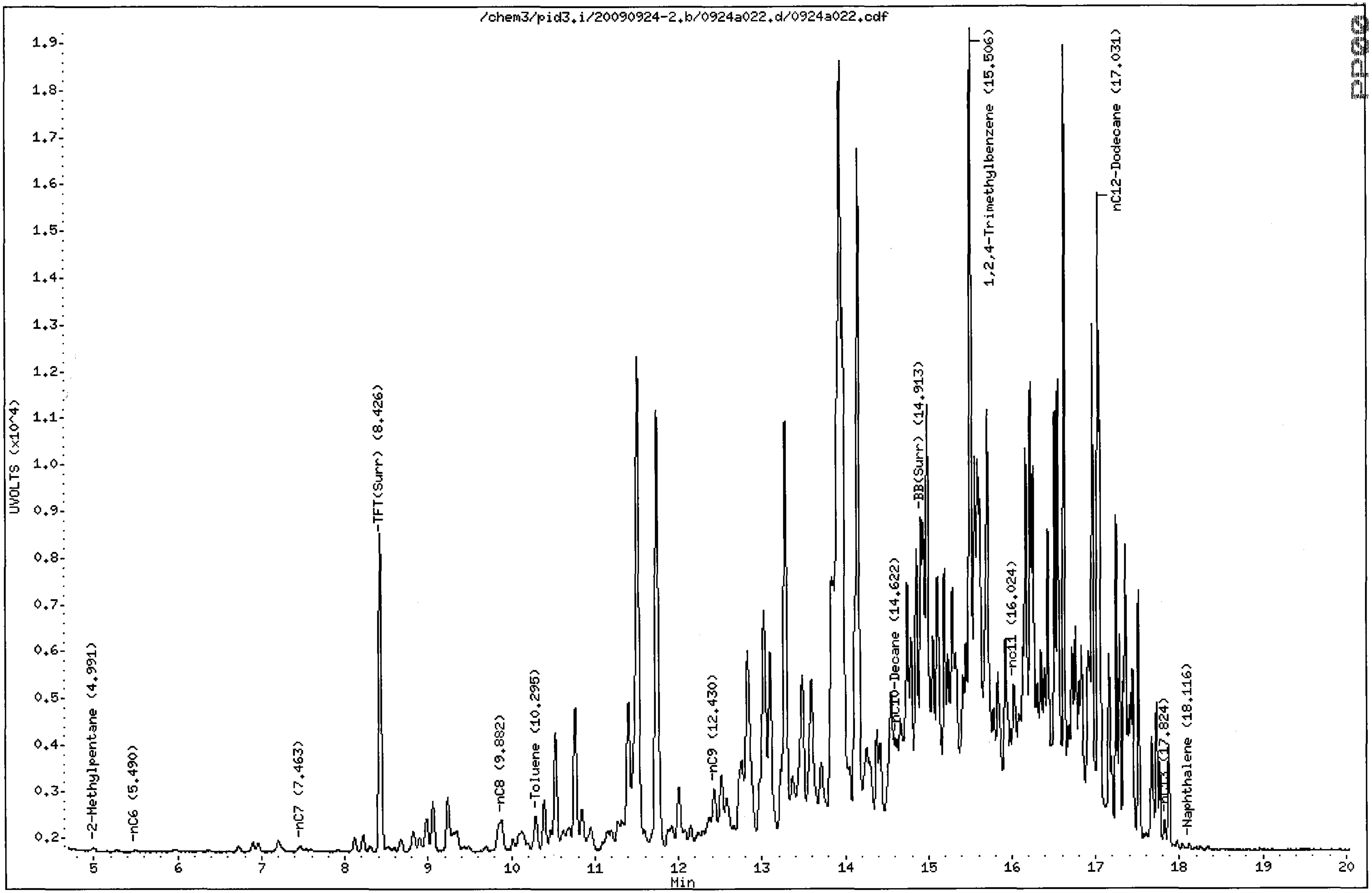
Data File: /chem3/pid3.i/20090924-2.b/0924a022.d
Date : 24-SEP-2009 15:52
Client ID: S-5
Sample Info: PP00E

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: MH

Column diameter: 0.18



Data File: /chem3/pid3.i/20090924-1.b/0924a022.d

Date : 24-SEP-2009 15:52

Client ID: S-5

Sample Info: PP00E

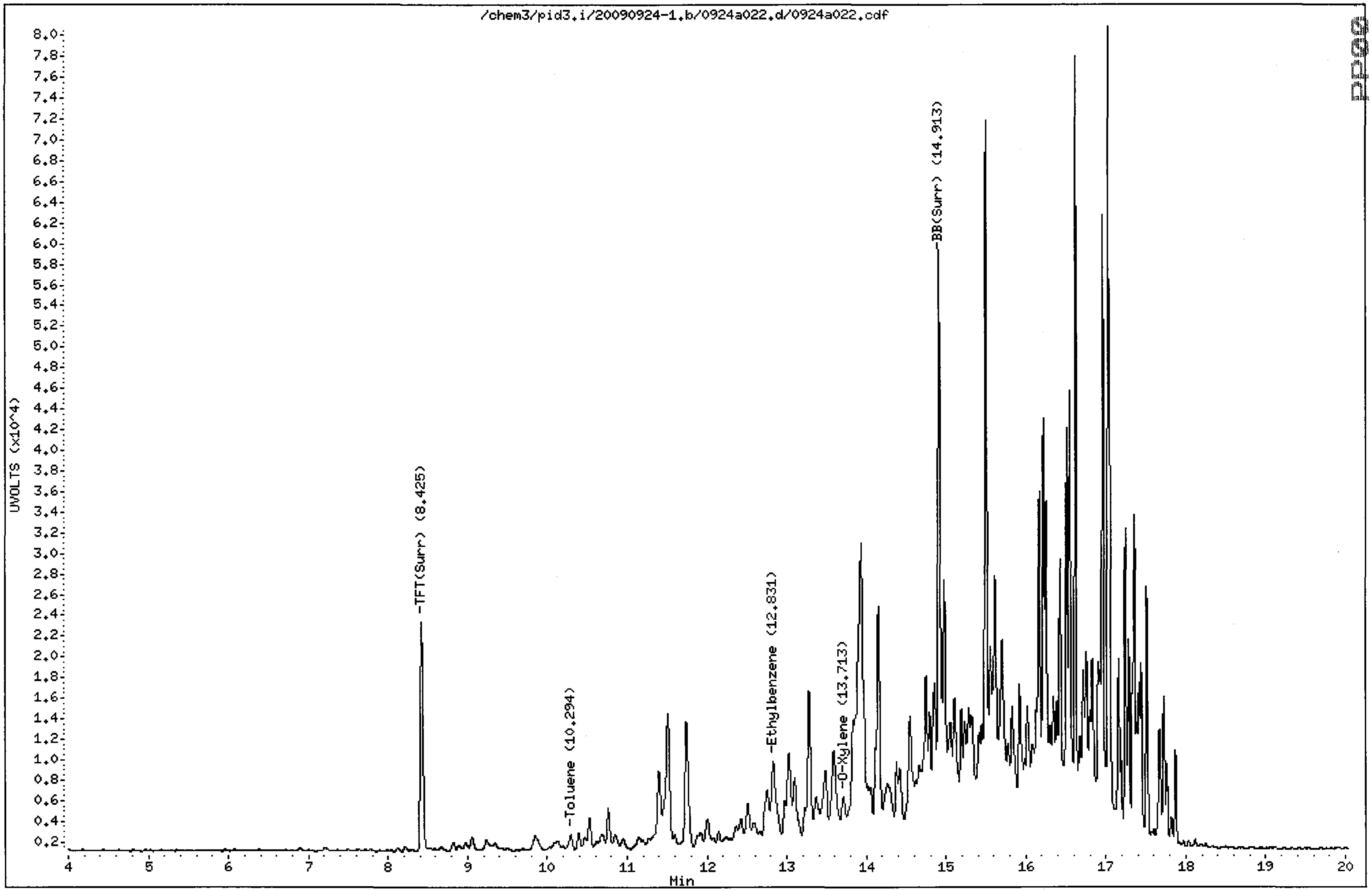
Column phase: RTX 502-2 PID

Page 1

Instrument: pid3.i

Operator: MH

Column diameter: 0.18



PP00 00026

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: S-6
SAMPLE

Lab Sample ID: PP00F
LIMS ID: 09-21749
Matrix: Soil
Data Release Authorized:
Reported: 09/29/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 09/16/09
Date Received: 09/18/09

Date Analyzed: 09/25/09 08:39
Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL
Sample Amount: 68 mg-dry-wt
Percent Moisture: 12.7%

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	18	< 18 U	
108-88-3	Toluene	18	< 18 U	
100-41-4	Ethylbenzene	18	< 18 U	
179601-23-1	m,p-Xylene	37	< 37 U	
95-47-6	o-Xylene	18	< 18 U	
	Gasoline Range Hydrocarbons	7.4	< 7.4 U	---

BETX Surrogate Recovery

Trifluorotoluene	114%
Bromobenzene	110%

Gasoline Surrogate Recovery

Trifluorotoluene	112%
Bromobenzene	109%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

MH
9/29/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090925-2.b/0925a007.d
Data file 2: /chem3/pid3.i/20090925-1.b/0925a007.d
Method: /chem3/pid3.i/20090925-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: PP00F
Client ID: S-6
Injection Date: 25-SEP-2009 08:39
Matrix: SOIL
Dilution Factor: 1.000

==

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.382	-0.013	8333	97413	111.7	TFT(Surr)
14.892	0.002	4718	38805	108.9	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.16 to 17.11)	16278	0.023
8015B 2MP-TMB	(4.89 to 15.58)	10207	0.007
AKGas nC6-nC10	(5.38 to 14.53)	9125	0.008
NWGas Tol-Nap	(10.16 to 18.19)	23784	0.033

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

==

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.381	-0.013	27053	114.0	TFT(Surr)
14.890	0.002	53174	109.7	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20090925-2.b/0925a007.d

Date : 25-SEP-2009 08:39

Client ID:

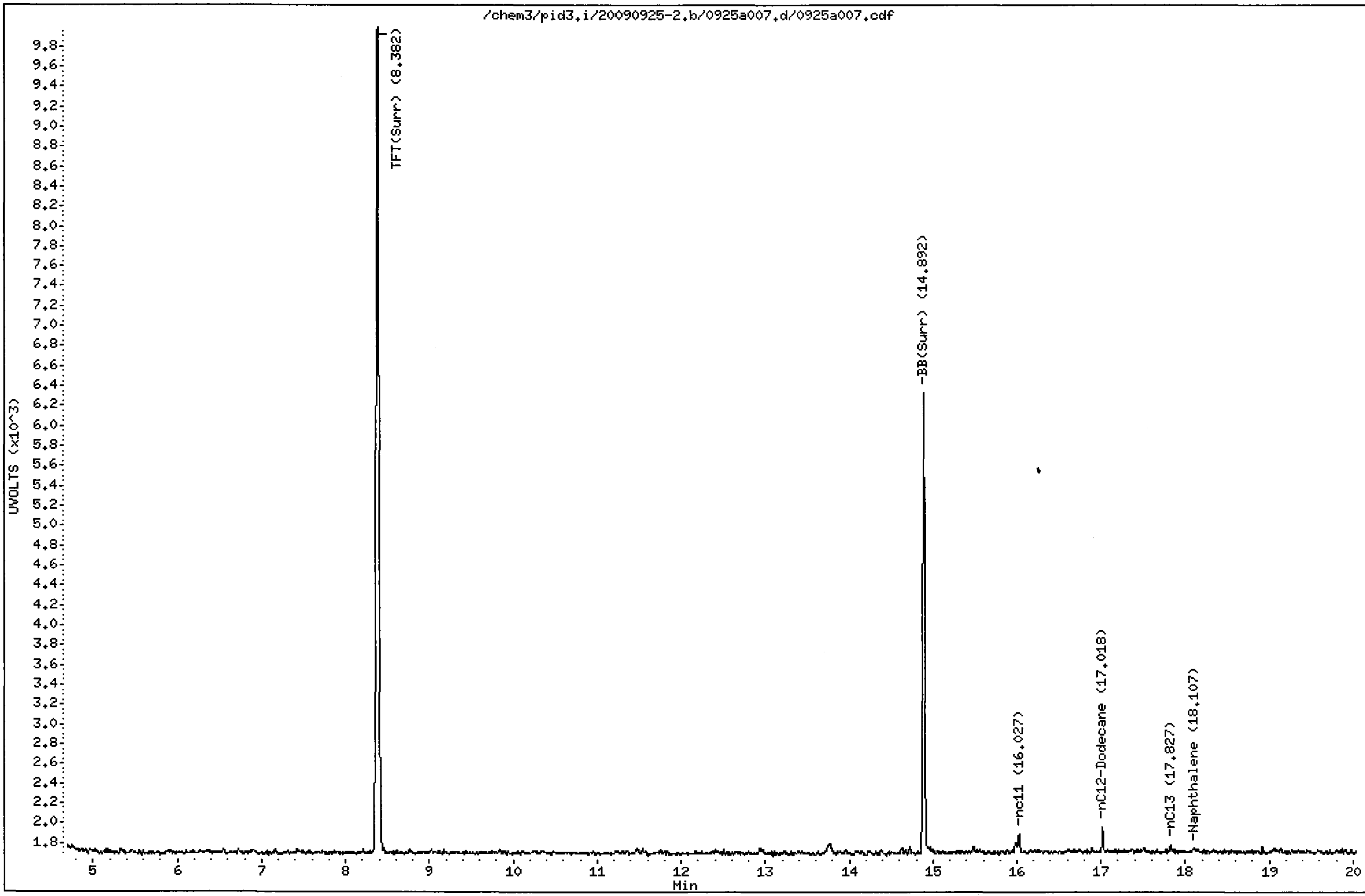
Sample Info: PP00F

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: MH

Column diameter: 0.18



Data File: /chem3/pid3.i/20090925-1.b/0925a007.d

Date : 25-SEP-2009 08:39

Client ID: S-6

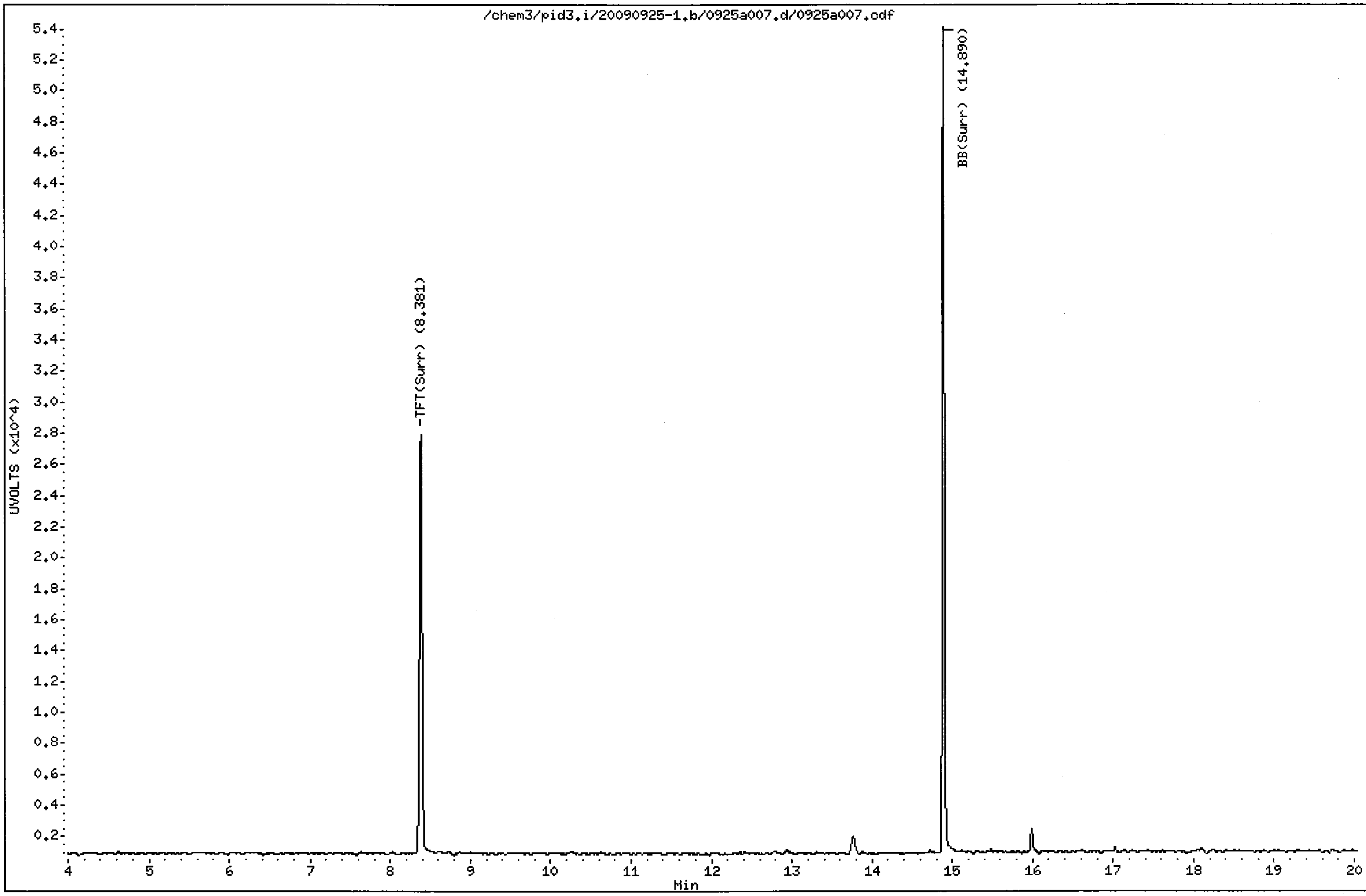
Sample Info: PP00F

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: MH

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: S-7
SAMPLE

Lab Sample ID: PP00G
LIMS ID: 09-21750
Matrix: Soil
Data Release Authorized:
Reported: 09/29/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 09/17/09
Date Received: 09/18/09

Date Analyzed: 09/24/09 16:42
Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL
Sample Amount: 82 mg-dry-wt
Percent Moisture: 9.1%

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	15	< 15 U	
108-88-3	Toluene	15	< 15 U	
100-41-4	Ethylbenzene	15	< 15 U	
179601-23-1	m,p-Xylene	30	< 30 U	
95-47-6	o-Xylene	15	< 15 U	
	Gasoline Range Hydrocarbons	6.1	< 6.1 U	---

BETX Surrogate Recovery

Trifluorotoluene	97.0%
Bromobenzene	107%

Gasoline Surrogate Recovery

Trifluorotoluene	95.7%
Bromobenzene	106%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

MH
9/29/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090924-2.b/0924a024.d
Data file 2: /chem3/pid3.i/20090924-1.b/0924a024.d
Method: /chem3/pid3.i/20090924-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: PP00G
Client ID: S-7
Injection Date: 24-SEP-2009 16:42
Matrix: SOIL
Dilution Factor: 1.000

==

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.427	0.030	7139	83132	95.7	TFT(Surr)
14.913	0.022	4608	37638	106.3	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	34454	0.050
8015B 2MP-TMB	(4.89 to 15.58)	19483	0.014
AKGas nC6-nC10	(5.38 to 14.54)	9438	0.009
NWGas Tol-Nap	(10.17 to 18.19)	54101	0.074

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

==

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.426	0.031	23032	97.0	TFT(Surr)
14.912	0.022	51686	106.6	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

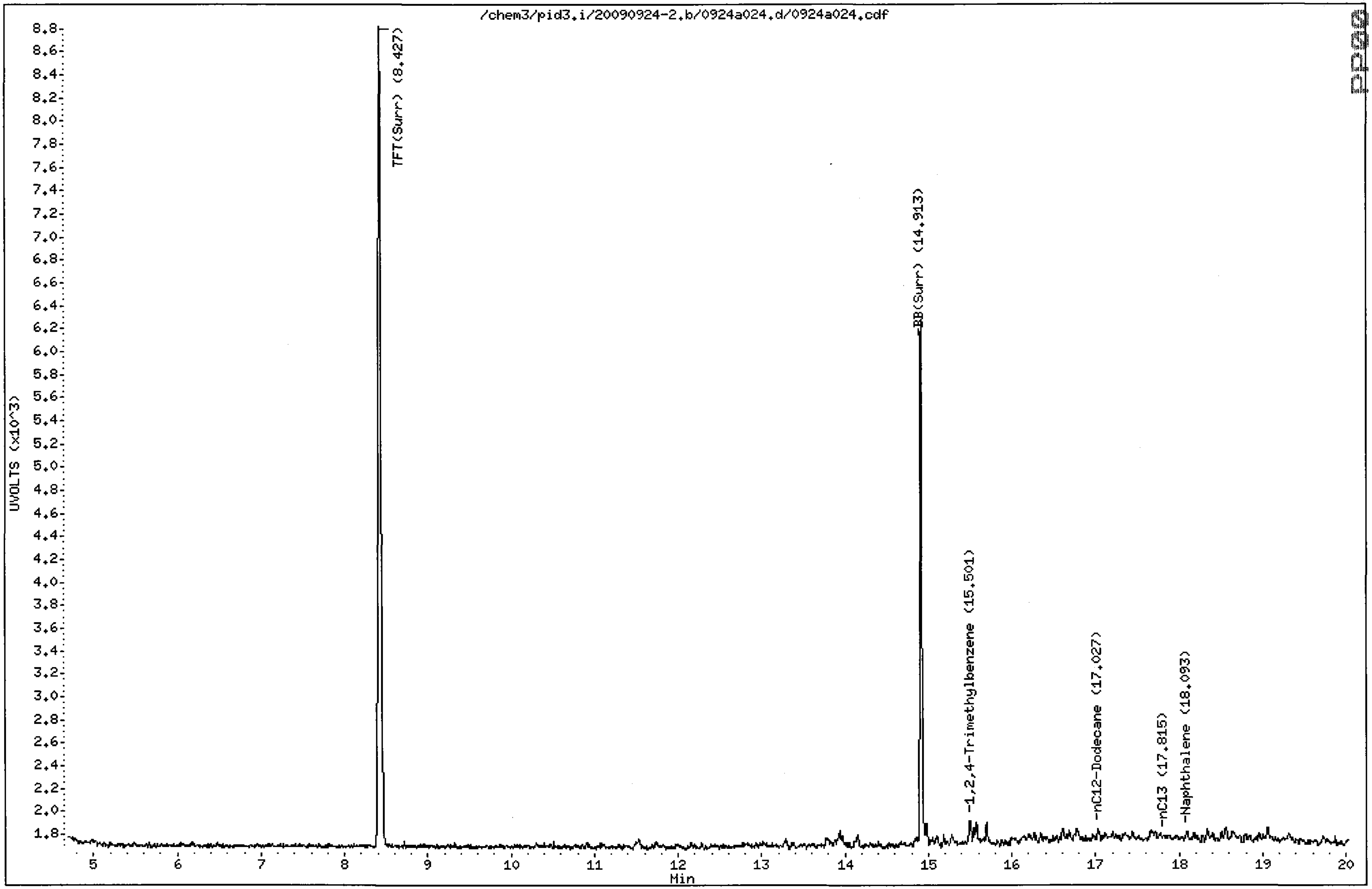
A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20090924-2.b/0924a024.d
Date : 24-SEP-2009 16:42
Client ID: S-7
Sample Info: PP00G

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: MH
Column diameter: 0.18



Data File: /chem3/pid3.i/20090924-1.b/0924a024.d

Date : 24-SEP-2009 16:42

Client ID: S-7

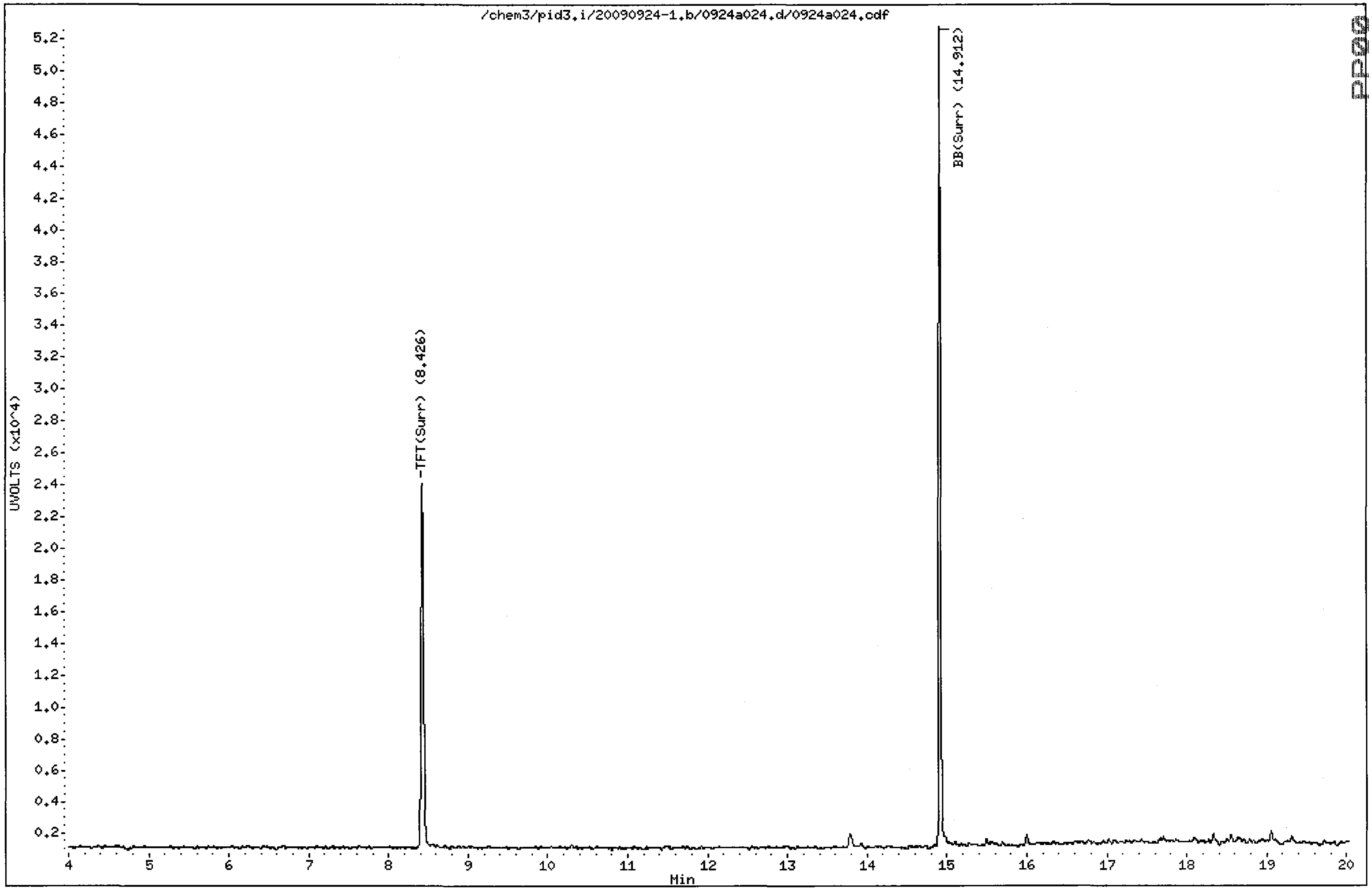
Sample Info: PP00G

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: MH

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG

Sample ID: S-8
SAMPLE

Lab Sample ID: PP00H
LIMS ID: 09-21751
Matrix: Soil
Data Release Authorized: B
Reported: 09/29/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 09/17/09
Date Received: 09/18/09

Date Analyzed: 09/24/09 17:06
Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL
Sample Amount: 81 mg-dry-wt
Percent Moisture: 13.5%

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	15	< 15 U	
108-88-3	Toluene	15	< 15 U	
100-41-4	Ethylbenzene	15	< 15 U	
179601-23-1	m,p-Xylene	31	< 31 U	
95-47-6	o-Xylene	15	< 15 U	
	Gasoline Range Hydrocarbons	6.2	< 6.2 U	---

BETX Surrogate Recovery

Trifluorotoluene	93.3%
Bromobenzene	102%

Gasoline Surrogate Recovery

Trifluorotoluene	92.0%
Bromobenzene	100%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

MH
9/29/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090924-2.b/0924a025.d
Data file 2: /chem3/pid3.i/20090924-1.b/0924a025.d
Method: /chem3/pid3.i/20090924-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: PP00H
Client ID: S-8
Injection Date: 24-SEP-2009 17:06
Matrix: SOIL
Dilution Factor: 1.000

===

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.425	0.029	6862	81489	92.0	TFT(Surr)
14.913	0.022	4346	34947	100.3	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	15315	0.022
8015B 2MP-TMB	(4.89 to 15.58)	15556	0.011
AKGas nC6-nC10	(5.38 to 14.54)	11948	0.011
NWGas Tol-Nap	(10.17 to 18.19)	19099	0.026

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

===

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.424	0.029	22145	93.3	TFT(Surr)
14.911	0.022	49356	101.8	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20090924-2.b/0924a025.d

Date : 24-SEP-2009 17:06

Client ID: S-8

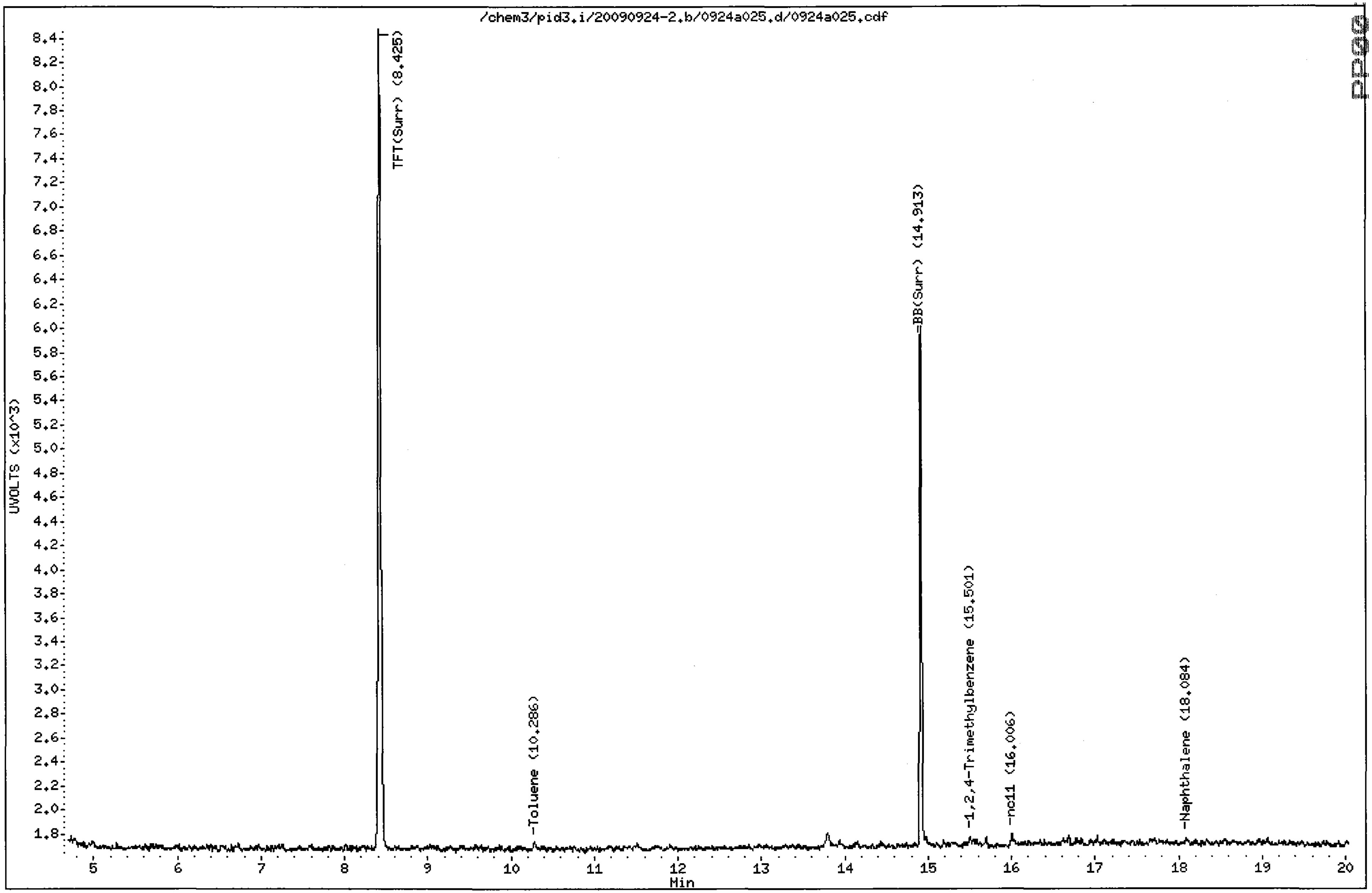
Sample Info: PP00H

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: MH

Column diameter: 0.18



Data File: /chem3/pid3.i/20090924-1.b/0924a025.d

Date : 24-SEP-2009 17:06

Client ID: S-8

Sample Info: PPOOH

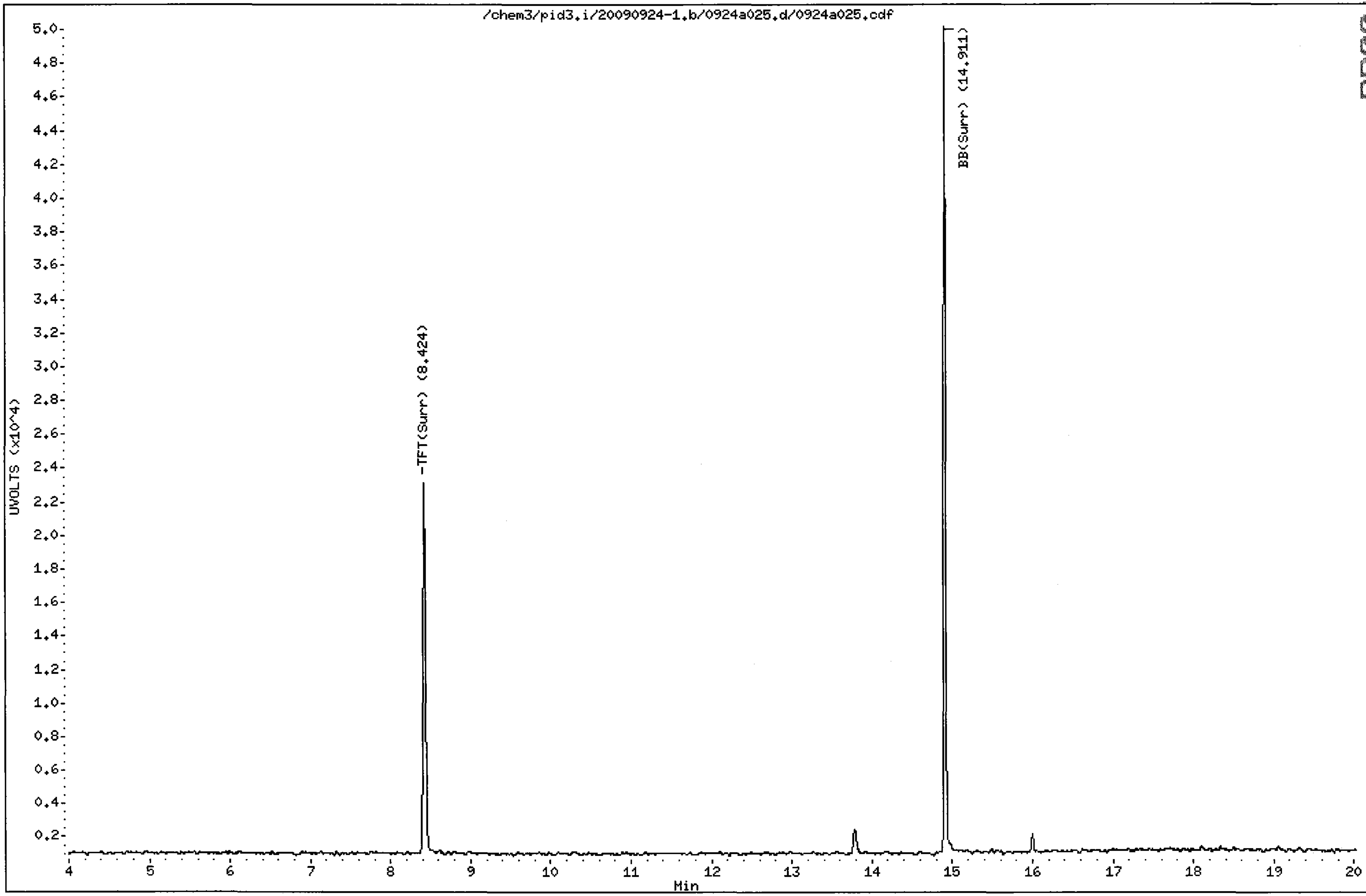
Column phase: RTX 502-2 PID

Page 1

Instrument: pid3.i

Operator: MH

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

TPHG SOIL SURROGATE RECOVERY SUMMARY

ARI Job: PP00
Matrix: Soil

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA

Client ID	BFB	TFT	BBZ	TOT OUT
MB-092409	NA	94.1%	101%	0
LCS-092409	NA	97.4%	102%	0
LCSD-092409	NA	97.4%	102%	0
S-1	NA	95.0%	101%	0
S-2	NA	94.7%	101%	0
S-3	NA	97.7%	104%	0
MB-092509	NA	99.3%	100%	0
LCS-092509	NA	102%	100%	0
LCSD-092509	NA	97.3%	98.1%	0
S-4	NA	103%	118%	0
S-5	NA	91.6%	91.2%	0
S-6	NA	112%	109%	0
S-7	NA	95.7%	106%	0
S-8	NA	92.0%	100%	0

	LCS/MB LIMITS	QC LIMITS
(BFB) = Bromofluorobenzene	(70-130)	(70-130)
(TFT) = Trifluorotoluene	(80-120)	(66-123)
(BBZ) = Bromobenzene	(80-120)	(62-130)

Log Number Range: 09-21744 to 09-21751

ANALYTICAL RESOURCES INCORPORATED

BETX SOIL SURROGATE RECOVERY SUMMARY

ARI Job: PP00
Matrix: Soil

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA

Client ID	TFT	BBZ	TOT OUT
MB-092409	94.9%	99.1%	0
LCS-092409	98.9%	103%	0
LCSD-092409	98.7%	104%	0
S-1	97.0%	102%	0
S-2	95.5%	102%	0
S-3	98.0%	104%	0
MB-092509	100%	100%	0
LCS-092509	104%	102%	0
LCSD-092509	99.5%	100%	0
S-4	104%	108%	0
S-5	94.3%	119%	0
S-6	114%	110%	0
S-7	97.0%	107%	0
S-8	93.3%	102%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(68-124)
(BBZ) = Bromobenzene	(77-120)	(62-134)

Log Number Range: 09-21744 to 09-21751

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: LCS-092409
LAB CONTROL SAMPLE

Lab Sample ID: LCS-092409
LIMS ID: 09-21744
Matrix: Soil
Data Release Authorized:
Reported: 09/29/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 09/24/09 08:11
LCSD: 09/24/09 08:36
Instrument/Analyst LCS: PID3/MH
LCSD: PID3/MH

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	55.2	50.0	110%	52.2	50.0	104%	5.6%

Reported in mg/kg (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	97.4%	97.4%
Bromobenzene	102%	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
Page 1 of 1

Sample ID: LCS-092409
LAB CONTROL SAMPLE

Lab Sample ID: LCS-092409
LIMS ID: 09-21744
Matrix: Soil
Data Release Authorized:
Reported: 09/29/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 09/24/09 08:11
LCSD: 09/24/09 08:36
Instrument/Analyst LCS: PID3/MH
LCSD: PID3/MH

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	248	265	93.6%	250	265	94.3%	0.8%
Toluene	1960	2060	95.1%	1950	2060	94.7%	0.5%
Ethylbenzene	474	500	94.8%	463	500	92.6%	2.3%
m,p-Xylene	1980	2120	93.4%	1980	2120	93.4%	0.0%
o-Xylene	709	745	95.2%	710	745	95.3%	0.1%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	98.9%	98.7%
Bromobenzene	103%	104%

MH 9/29/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090924-2.b/0924a004.d
Data file 2: /chem3/pid3.i/20090924-1.b/0924a004.d
Method: /chem3/pid3.i/20090924-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: LCS0924
Client ID:
Injection Date: 24-SEP-2009 08:11
Matrix: WATER
Dilution Factor: 1.000

==

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.421	0.025	7269	85678	97.4	TFT(Surr)
14.909	0.018	4401	36013	101.6	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	753486	1.088
8015B 2MP-TMB	(4.89 to 15.58)	1507615	1.089
AKGas nC6-nC10	(5.38 to 14.54)	1186568	1.073
NWGas Tol-Nap	(10.17 to 18.19)	806526	1.105

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

==

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.420	0.025	23470	98.9	TFT(Surr)
14.908	0.018	49789	102.7	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
7.692	0.022	7211	4.96	Benzene
10.292	0.027	55259	39.11	Toluene
12.834	0.028	12138	9.47	Ethylbenzene
12.973	0.030	55958	39.67	M/P-Xylene
13.752	0.025	19344	14.18	O-Xylene
5.263	0.003	2052	5.15	MTBE

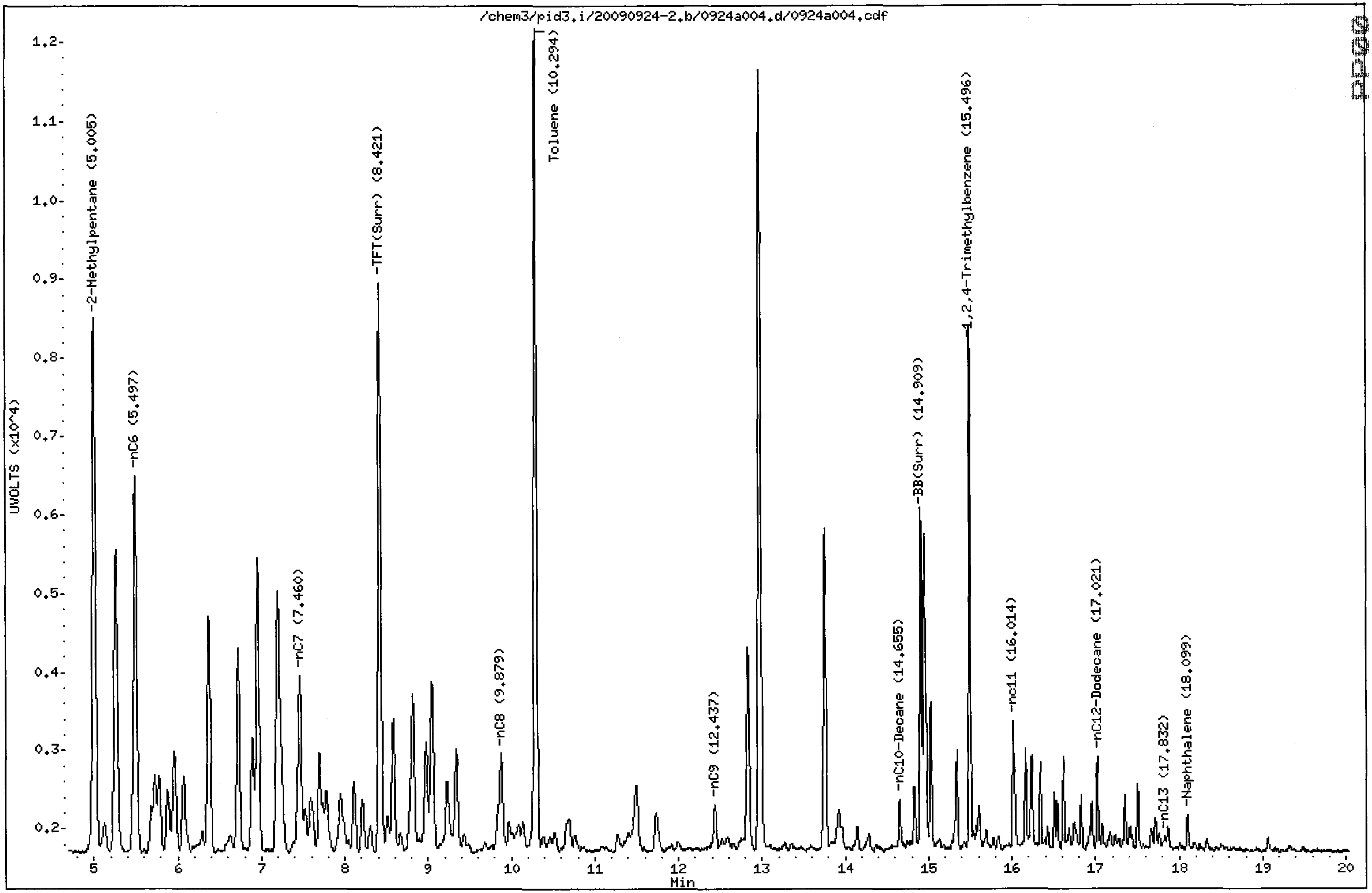
A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20090924-2.b/0924a004.d
Date : 24-SEP-2009 08:11
Client ID:
Sample Info: LCS0924

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: MH
Column diameter: 0.18



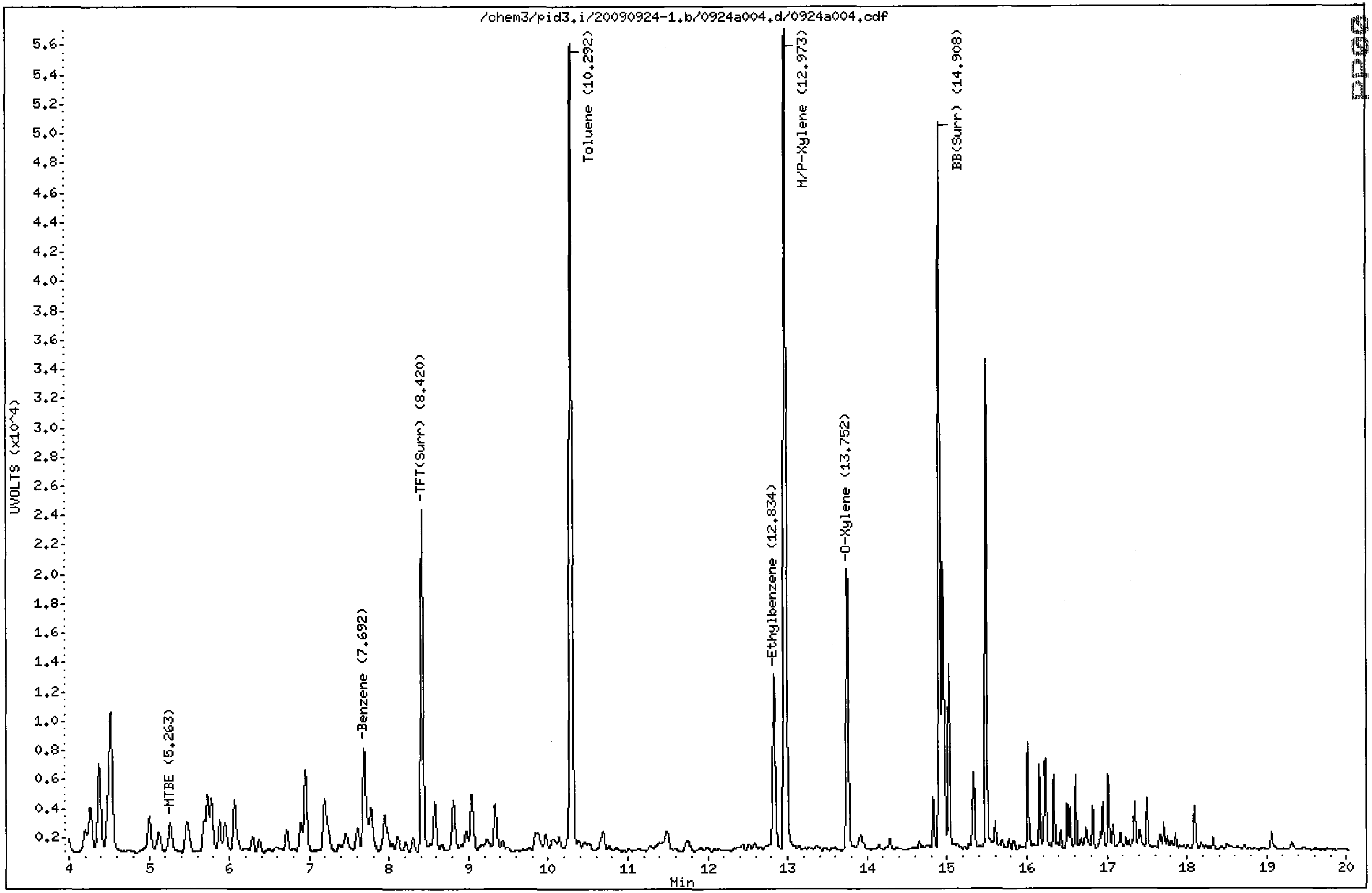
PP00 000044

Data File: /chem3/pid3.i/20090924-1.b/0924a004.d
Date : 24-SEP-2009 08:11
Client ID:
Sample Info: LCS0924

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: MH
Column diameter: 0.18



MH
9/29/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090924-2.b/0924a005.d
Data file 2: /chem3/pid3.i/20090924-1.b/0924a005.d
Method: /chem3/pid3.i/20090924-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: LCSD0924
Client ID:
Injection Date: 24-SEP-2009 08:36
Matrix: WATER
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.425	0.029	7270	85788	97.4	TFT(Surr)
14.912	0.021	4433	36308	102.3	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	712492	1.029
8015B 2MP-TMB	(4.89 to 15.58)	1459827	1.054
AKGas nC6-nC10	(5.38 to 14.54)	1153228	1.043
NWGas Tol-Nap	(10.17 to 18.19)	761168	1.043

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.424	0.029	23424	98.7	TFT(Surr)
14.910	0.021	50514	104.2	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
7.695	0.026	7258	4.99	Benzene
10.296	0.030	55206	39.07	Toluene
12.837	0.031	11870	9.26	Ethylbenzene
12.977	0.034	55765	39.54	M/P-Xylene
13.755	0.028	19382	14.21	O-Xylene
5.265	0.005	2022	5.08	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20090924-2.b/0924a005.d

Page 1

Date : 24-SEP-2009 08:36

Client ID:

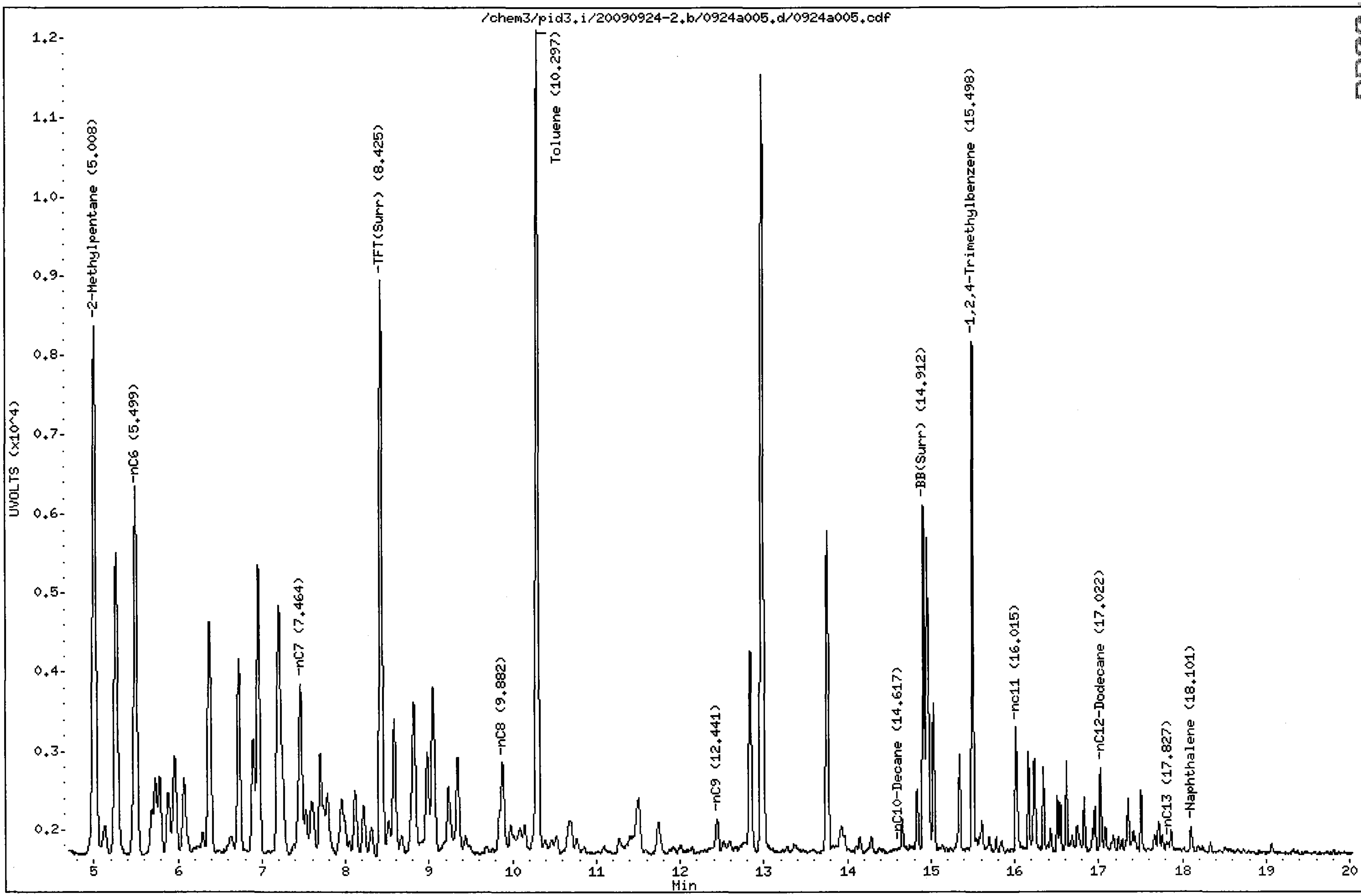
Instrument: pid3.i

Sample Info: LCSD0924

Operator: MH

Column phase: RTX 502-2 FID

Column diameter: 0.18



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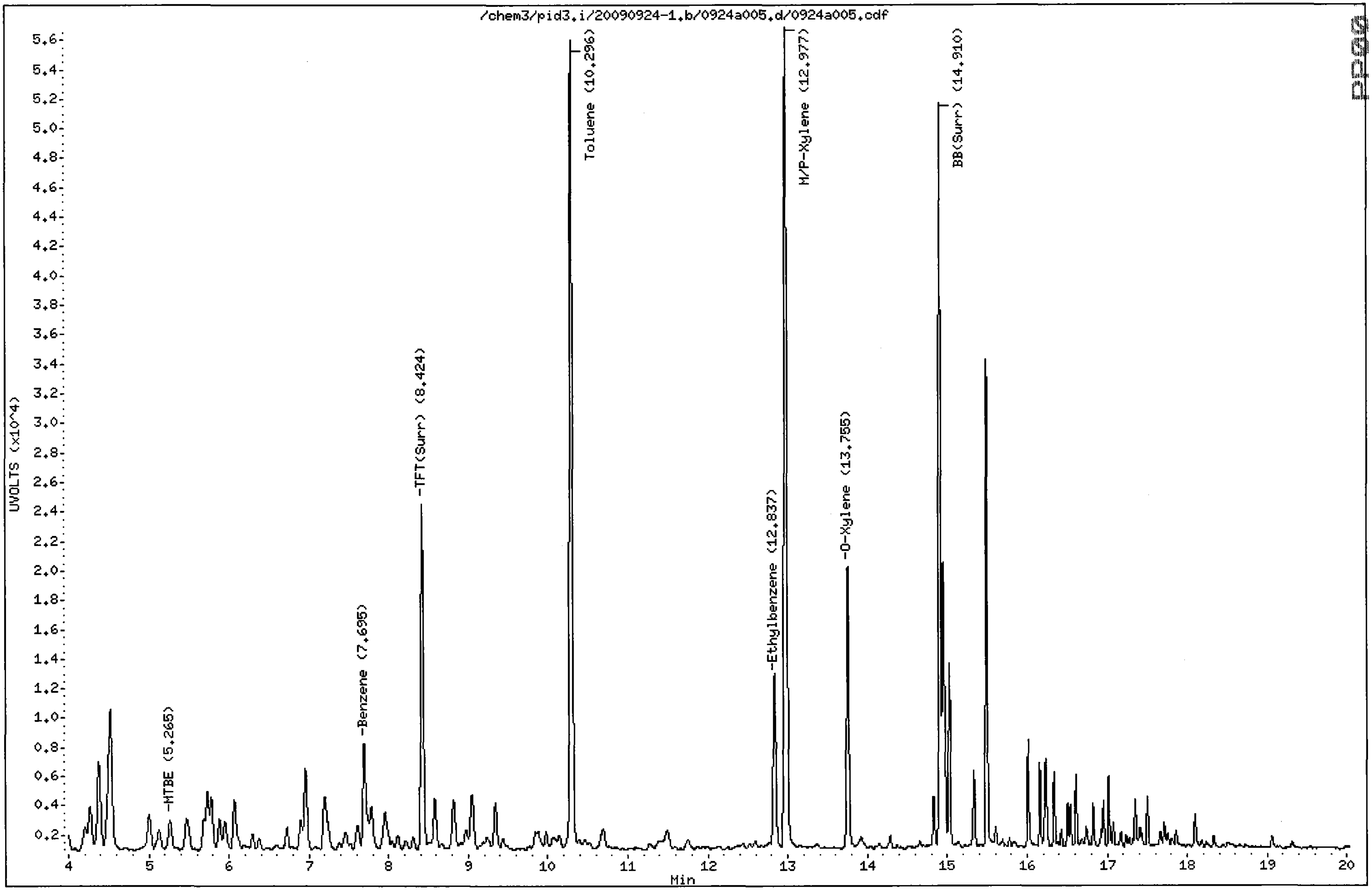
Date : 24-SEP-2009 08:36
Client ID:
Sample Info: LCSD0924

Instrument: pid3.i
Operator: MH

Column phase: RTX 502-2 PID
Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG

Sample ID: MB-092409
METHOD BLANK

Lab Sample ID: MB-092409
LIMS ID: 09-21744
Matrix: Soil
Data Release Authorized:
Reported: 09/29/09

Date Analyzed: 09/24/09 09:00
Instrument/Analyst: PID3/MH

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: NA
Date Received: NA

Purge Volume: 5.0 mL
Sample Amount: 100 mg-dry-wt

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	12	< 12 U	
108-88-3	Toluene	12	< 12 U	
100-41-4	Ethylbenzene	12	< 12 U	
179601-23-1	m,p-Xylene	25	< 25 U	
95-47-6	o-Xylene	12	< 12 U	
	Gasoline Range Hydrocarbons	5.0	< 5.0 U	---

BETX Surrogate Recovery

Trifluorotoluene	94.9%
Bromobenzene	99.1%

Gasoline Surrogate Recovery

Trifluorotoluene	94.1%
Bromobenzene	101%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

MH 9/29/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090924-2.b/0924a006.d
Data file 2: /chem3/pid3.i/20090924-1.b/0924a006.d
Method: /chem3/pid3.i/20090924-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: MB0924
Client ID:
Injection Date: 24-SEP-2009 09:00
Matrix: WATER
Dilution Factor: 1.000

==

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.425	0.029	7019	81751	94.1	TFT(Surr)
14.913	0.022	4360	35199	100.6	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	1171	0.002
8015B 2MP-TMB	(4.89 to 15.58)	2246	0.002
AKGas nC6-nC10	(5.38 to 14.54)	2245	0.002
NWGas Tol-Nap	(10.17 to 18.19)	2658	0.004

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

==

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.424	0.029	22524	94.9	TFT(Surr)
14.911	0.022	48011	99.1	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

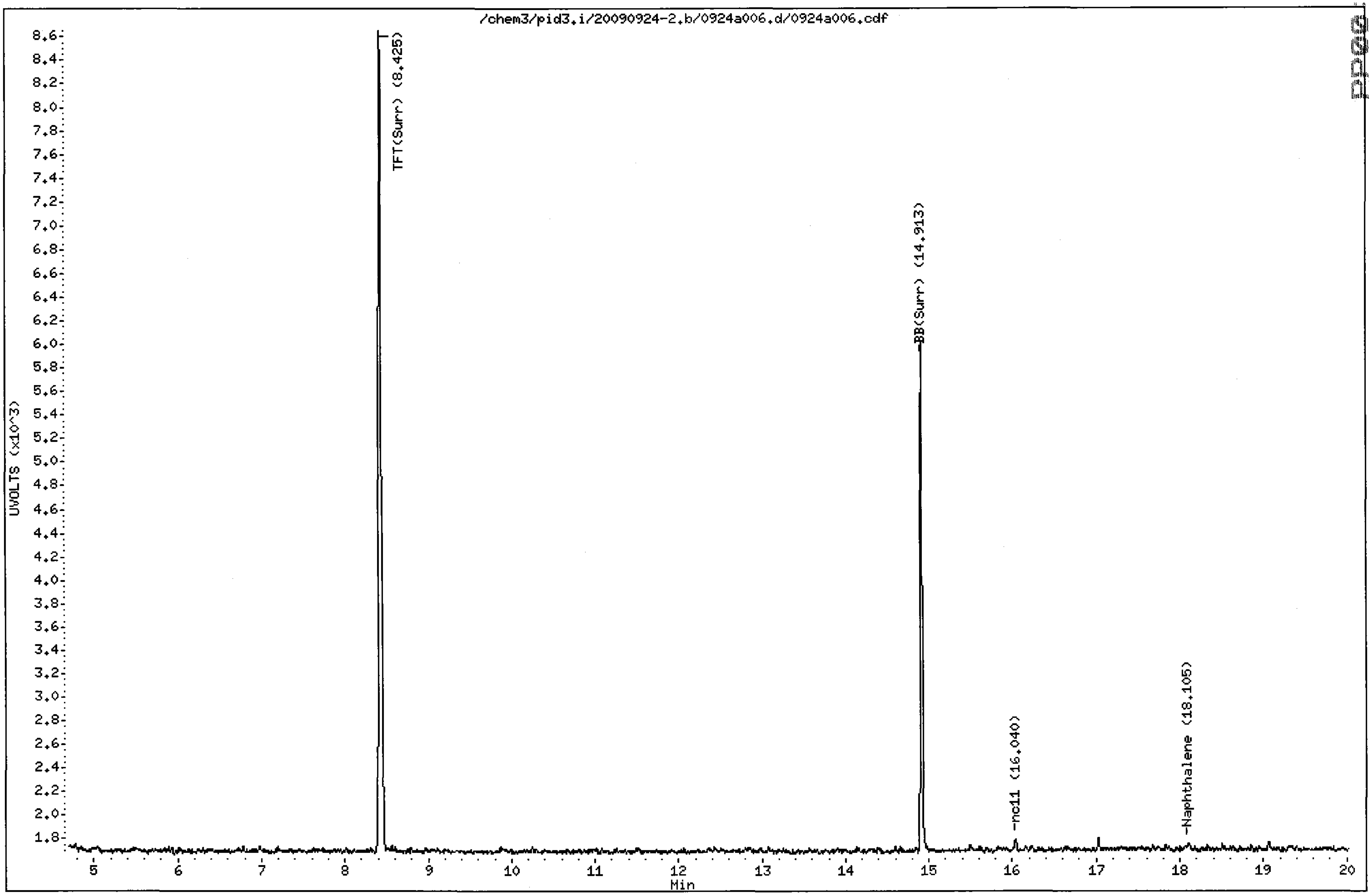
A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20090924-2.b/0924a006.d
Date : 24-SEP-2009 09:00
Client ID:
Sample Info: MB0924

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: MH
Column diameter: 0.18



Data File: /chem3/pid3.i/20090924-1.b/0924a006.d

Date : 24-SEP-2009 09:00

Client ID:

Sample Info: MB0924

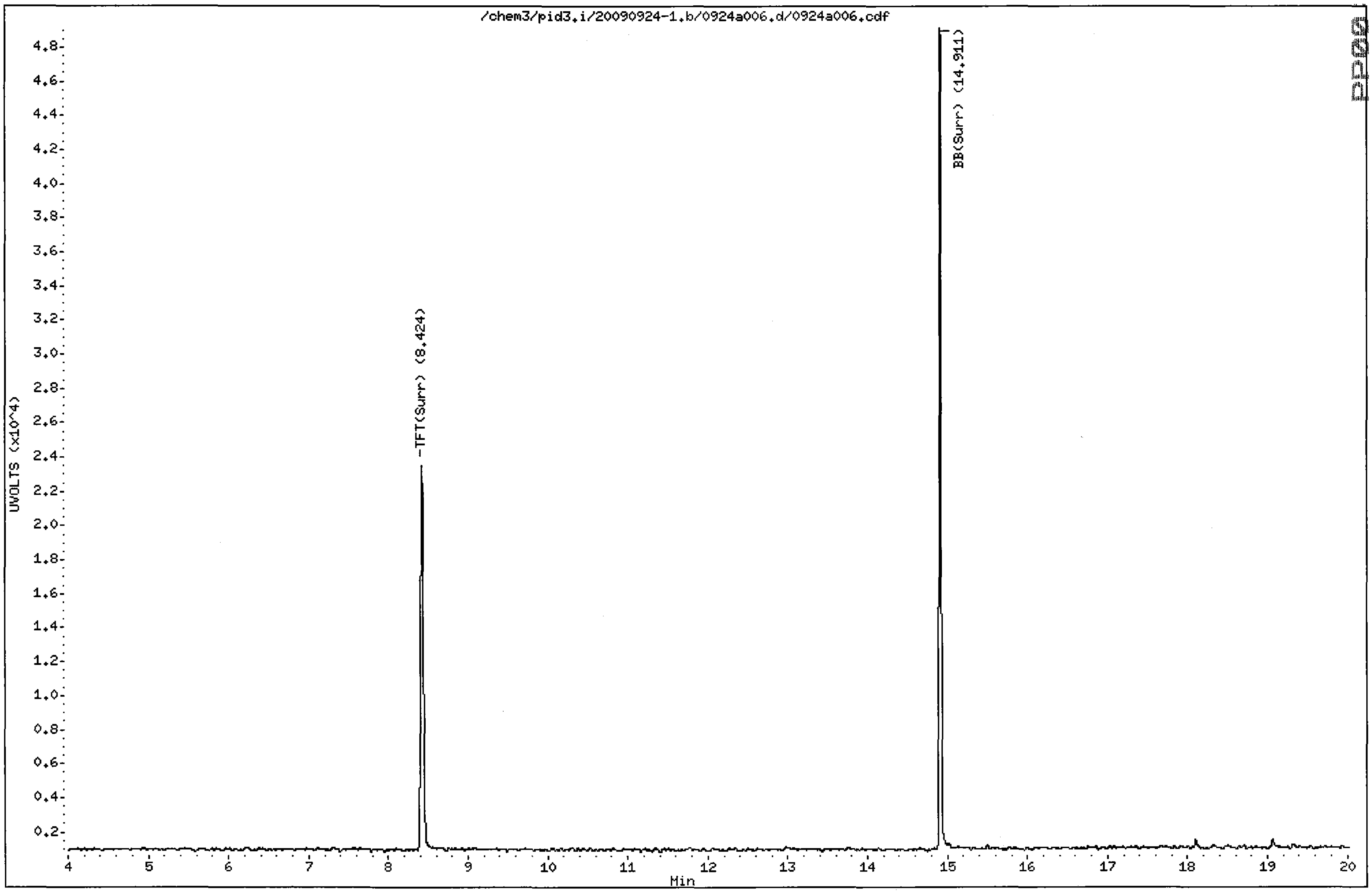
Column phase: RTX 502-2 PID

Page 1

Instrument: pid3.i

Operator: MH

Column diameter: 0.18



PP00 00052

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: LCS-092509
LAB CONTROL SAMPLE

Lab Sample ID: LCS-092509
LIMS ID: 09-21747
Matrix: Soil
Data Release Authorized:
Reported: 09/29/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 09/25/09 07:13
LCSD: 09/25/09 07:37
Instrument/Analyst LCS: PID3/MH
LCSD: PID3/MH

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	**LCS**	**Spike Added-LCS**	**LCS Recovery**	**LCSD**	**Spike Added-LCSD**	**LCSD Recovery**	**RPD**
Gasoline Range Hydrocarbons	53.6	50.0	107%	51.2	50.0	102%	4.6%

Reported in mg/kg (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	**LCSD**
Trifluorotoluene	102%	97.3%
Bromobenzene	100%	98.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
Page 1 of 1

Sample ID: LCS-092509
LAB CONTROL SAMPLE

Lab Sample ID: LCS-092509
LIMS ID: 09-21747
Matrix: Soil
Data Release Authorized:
Reported: 09/29/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 09/25/09 07:13
LCSD: 09/25/09 07:37
Instrument/Analyst LCS: PID3/MH
LCSD: PID3/MH

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	240	265	90.6%	242	265	91.3%	0.8%
Toluene	1870	2060	90.8%	1860	2060	90.3%	0.5%
Ethylbenzene	451	500	90.2%	451	500	90.2%	0.0%
m,p-Xylene	1910	2120	90.1%	1910	2120	90.1%	0.0%
o-Xylene	674	745	90.5%	689	745	92.5%	2.2%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	104%	99.5%
Bromobenzene	102%	100%

MH 9/29/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090925-2.b/0925a004.d
Data file 2: /chem3/pid3.i/20090925-1.b/0925a004.d
Method: /chem3/pid3.i/20090925-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: LCS0925
Client ID:
Injection Date: 25-SEP-2009 07:13
Matrix: WATER
Dilution Factor: 1.000

==

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.421	0.026	7613	89826	102.0	TFT(Surr)
14.909	0.020	4355	35462	100.5	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.16 to 17.11)	729232	1.053
8015B 2MP-TMB	(4.89 to 15.58)	1468086	1.060
AKGas nC6-nC10	(5.38 to 14.53)	1157948	1.047
NWGas Tol-Nap	(10.16 to 18.19)	781833	1.071

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

==

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.420	0.026	24708	104.1	TFT(Surr)
14.908	0.020	49574	102.3	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
7.691	0.023	6966	4.79	Benzene
10.292	0.029	52776	37.35	Toluene
12.833	0.030	11570	9.02	Ethylbenzene
12.973	0.032	53870	38.19	M/P-Xylene
13.751	0.026	18386	13.48	O-Xylene
5.264	0.004	2051	5.15	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20090925-2.b/0925a004.d

Date : 25-SEP-2009 07:13

Client ID:

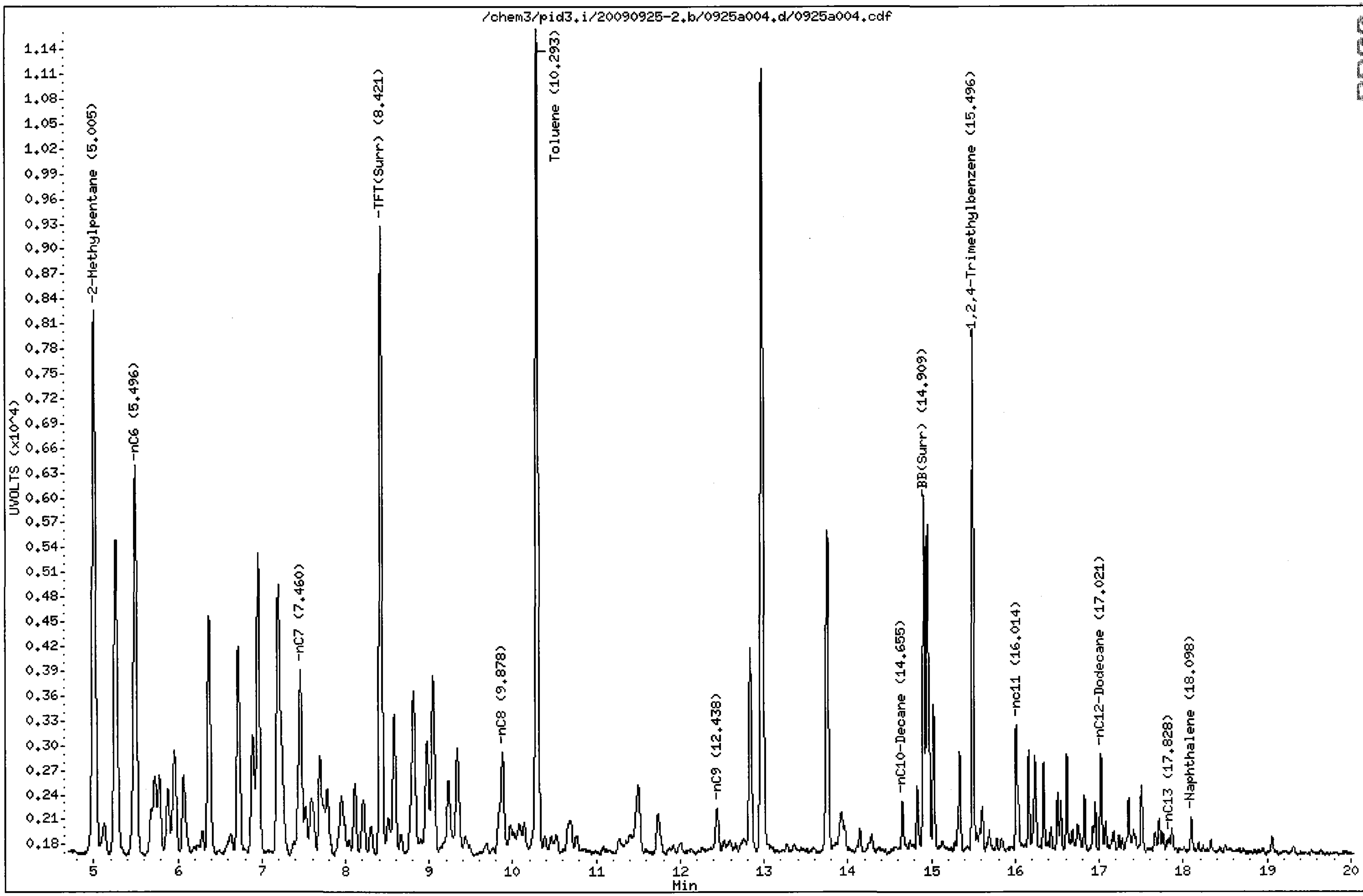
Sample Info: LCS0925

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: MH

Column diameter: 0.18

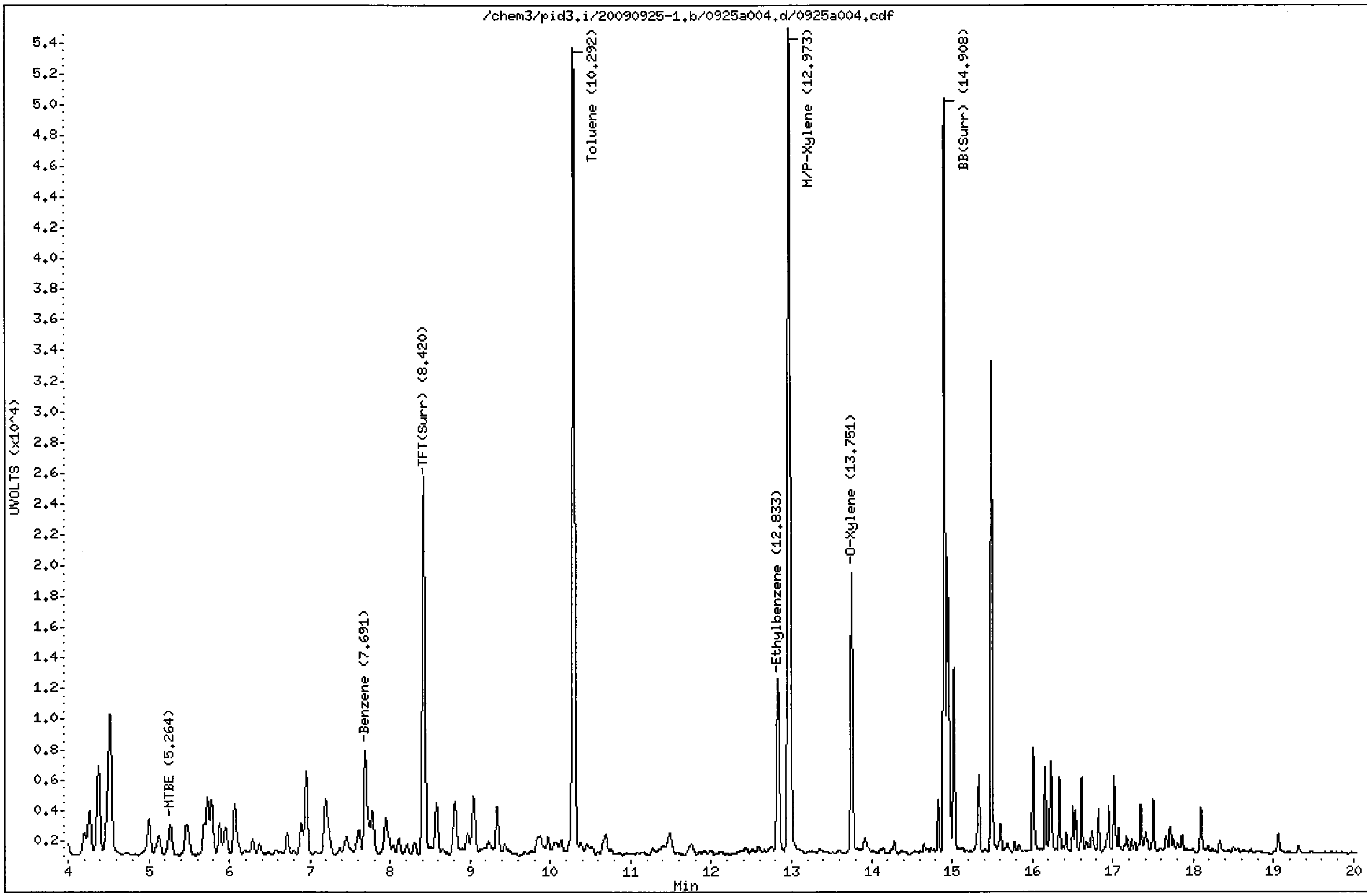


Data File: /chem3/pid3.i/20090925-1.b/0925a004.d
Date : 25-SEP-2009 07:13
Client ID:
Sample Info: LCS0925

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: MH
Column diameter: 0.18



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9/29/0

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090925-2.b/0925a005.d
Data file 2: /chem3/pid3.i/20090925-1.b/0925a005.d
Method: /chem3/pid3.i/20090925-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: LCSD0925
Client ID:
Injection Date: 25-SEP-2009 07:37
Matrix: WATER
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.424	0.029	7260	85880	97.3	TFT(Surr)
14.911	0.022	4251	35240	98.1	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.16 to 17.11)	699256	1.009
8015B 2MP-TMB	(4.89 to 15.58)	1407011	1.016
AKGas nC6-nC10	(5.38 to 14.53)	1109554	1.003
NWGas Tol-Nap	(10.16 to 18.19)	746524	1.023

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.423	0.029	23612	99.5	TFT(Surr)
14.909	0.022	48446	100.0	BB(Surr)

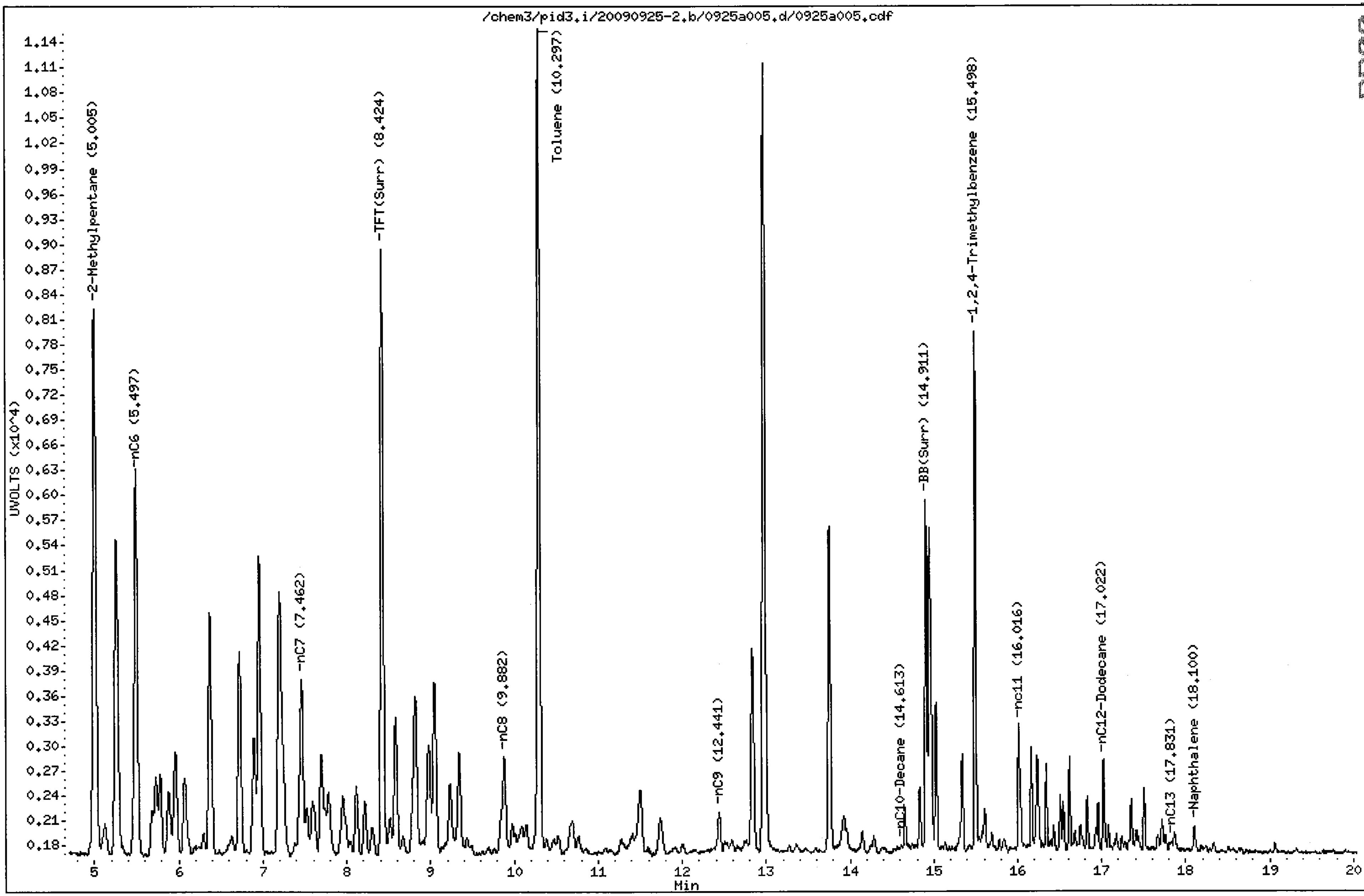
AROMATICS (PID)

RT	Shift	Response	Amount	Compound
7.694	0.025	7052	4.85	Benzene
10.295	0.032	52636	37.25	Toluene
12.837	0.033	11566	9.02	Ethylbenzene
12.977	0.036	53885	38.20	M/P-Xylene
13.755	0.029	18799	13.78	O-Xylene
5.263	0.003	2146	5.39	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20090925-2.b/0925a005.d
Date : 25-SEP-2009 07:37
Client ID:
Sample Info: LCSD0925
Column phase: RTX 502-2 FID

Instrument: pid3.i
Operator: MH
Column diameter: 0.18



Data File: /chem3/pid3.i/20090925-1.b/0925a005.d

Page 1

Date : 25-SEP-2009 07:37

Client ID:

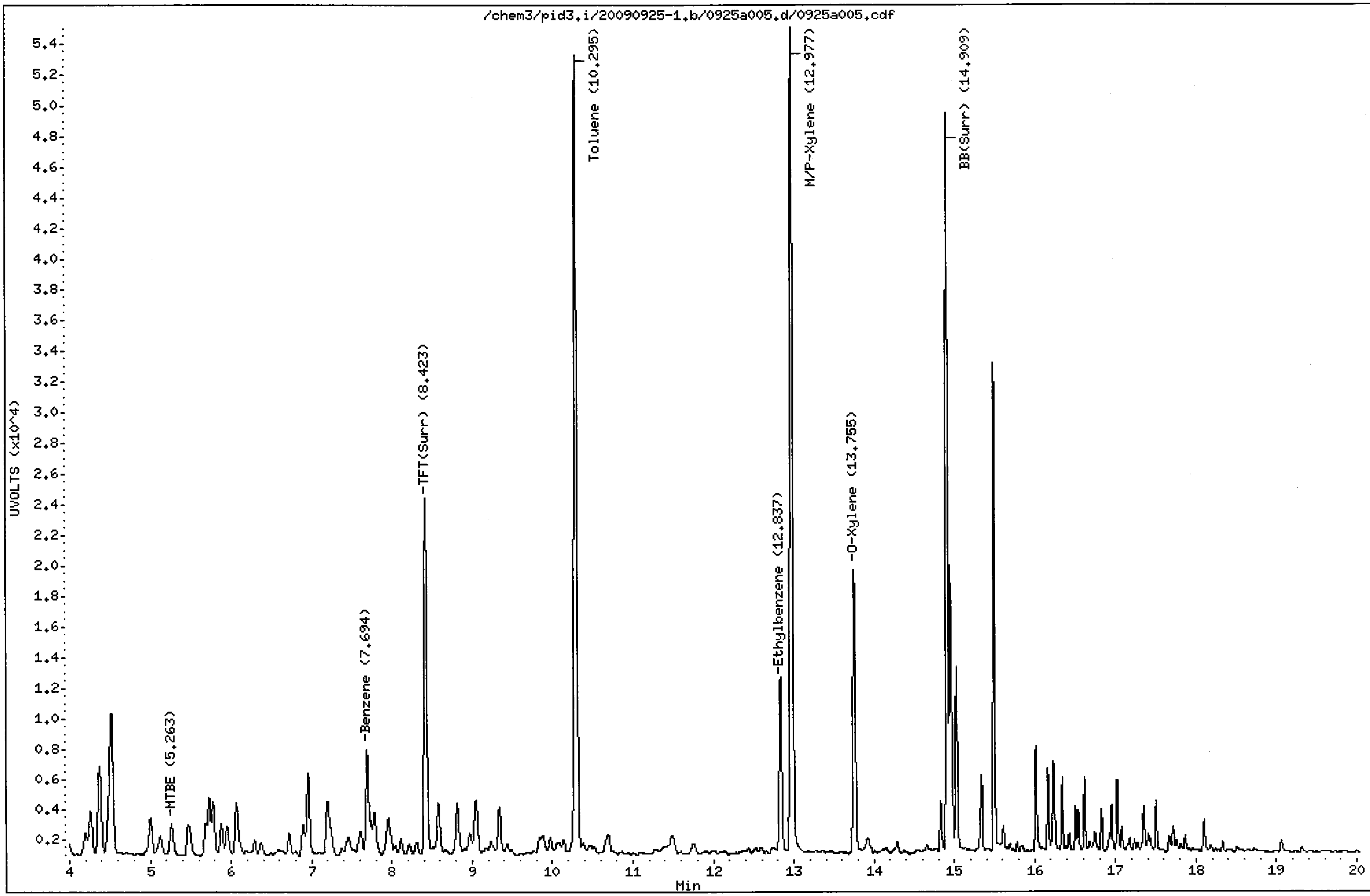
Instrument: pid3.i

Sample Info: LCSD0925

Operator: MH

Column phase: RTX 502-2 PID

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG

Sample ID: MB-092509
METHOD BLANK

Lab Sample ID: MB-092509
LIMS ID: 09-21747
Matrix: Soil
Data Release Authorized:
Reported: 09/29/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed: 09/25/09 08:02
Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL
Sample Amount: 100 mg-dry-wt

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	12	< 12 U	
108-88-3	Toluene	12	< 12 U	
100-41-4	Ethylbenzene	12	< 12 U	
179601-23-1	m,p-Xylene	25	< 25 U	
95-47-6	o-Xylene	12	< 12 U	
	Gasoline Range Hydrocarbons	5.0	< 5.0 U	---

BETX Surrogate Recovery

Trifluorotoluene	100%
Bromobenzene	100%

Gasoline Surrogate Recovery

Trifluorotoluene	99.3%
Bromobenzene	100%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

MH
9/29/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20090925-2.b/0925a006.d
Data file 2: /chem3/pid3.i/20090925-1.b/0925a006.d
Method: /chem3/pid3.i/20090925-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 07-SEP-2009

ARI ID: MB0925
Client ID:
Injection Date: 25-SEP-2009 08:02
Matrix: WATER
Dilution Factor: 1.000

==

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.426	0.031	7407	86312	99.3	TFT(Surr)
14.912	0.023	4332	35614	100.0	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.16 to 17.11)	8356	0.012
8015B 2MP-TMB	(4.89 to 15.58)	5554	0.004
AKGas nC6-nC10	(5.38 to 14.53)	5553	0.005
NWGas Tol-Nap	(10.16 to 18.19)	10846	0.015

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

==

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.424	0.031	23842	100.4	TFT(Surr)
14.911	0.023	48545	100.2	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

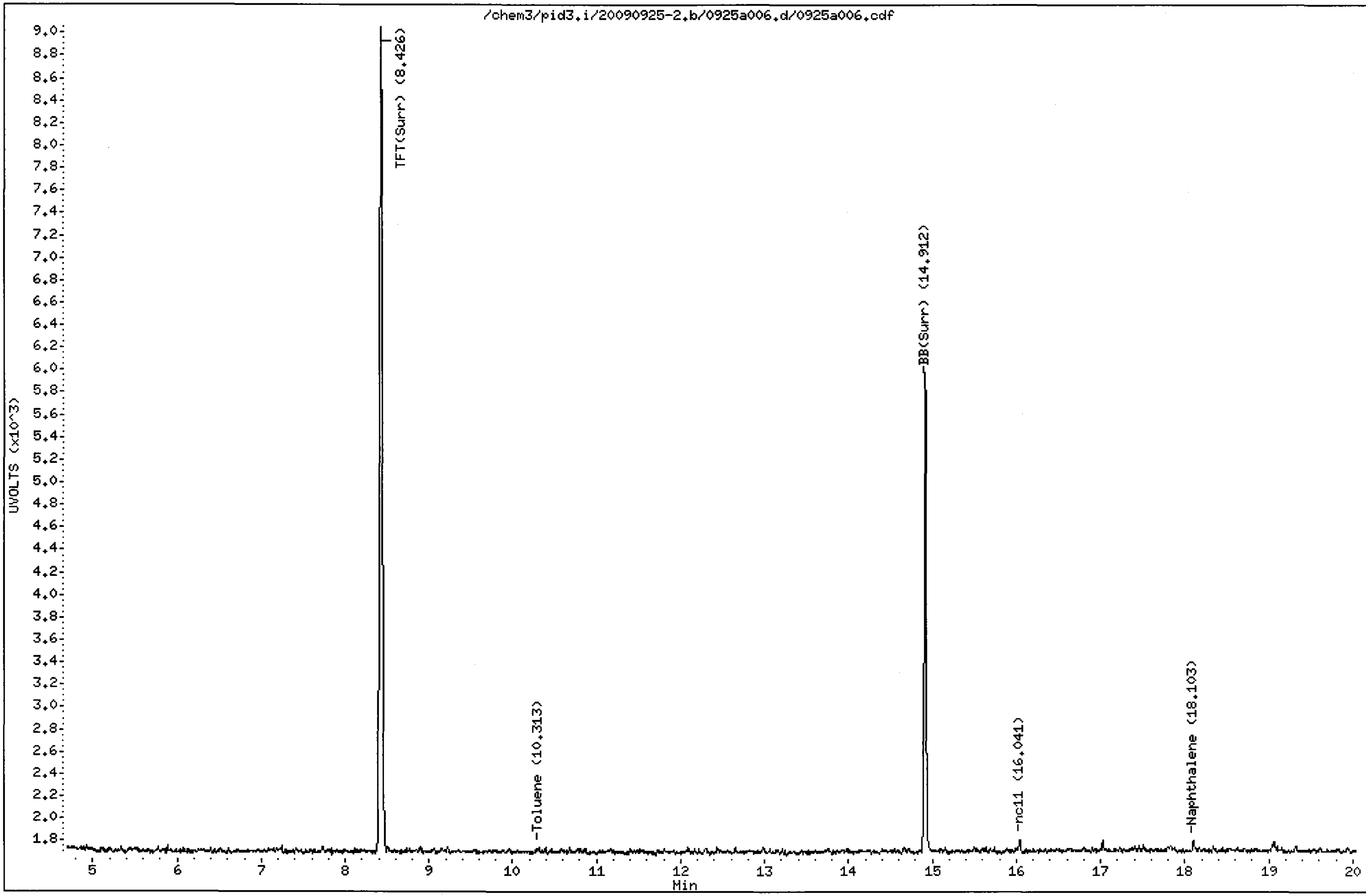
A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20090925-2.b/0925a006.d
Date : 25-SEP-2009 08:02
Client ID:
Sample Info: MB0925

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: MH
Column diameter: 0.18



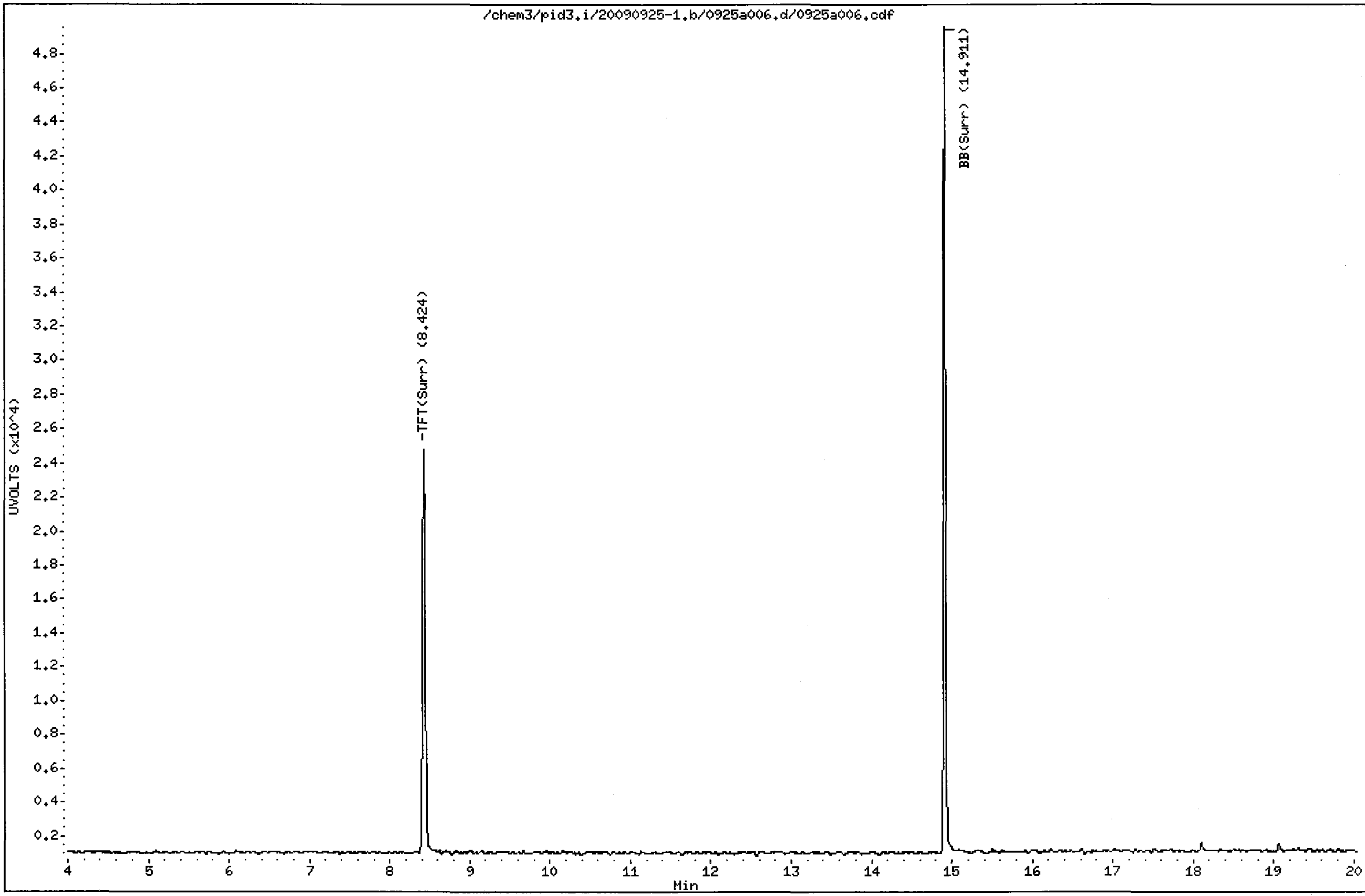
Data File: /chem3/pid3.i/20090925-1.b/0925a006.d
Date : 25-SEP-2009 08:02
Client ID:
Sample Info: MB0925

Column phase: RTX 502-2 PID

Page 1

Instrument: pid3.i

Operator: MH
Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Page 1 of 1
Matrix: Soil

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite

Date Received: 09/18/09

Data Release Authorized:
Reported: 09/23/09

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
MB-091809	Method Blank	09/18/09	09/21/09	1.00	Diesel	5.0	< 5.0 U
09-21752	HC ID: ---		FID3A	1.0	Motor Oil	10	< 10 U
					o-Terphenyl		94.7%
PP00I	S-4C	09/18/09	09/22/09	1.00	**Diesel**	**55**	**910**
09-21752	HC ID: **DIESEL**		FID3A	10	Motor Oil	110	< 110 U
					o-Terphenyl		88.2%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel quantitation on total peaks in the range from C12 to C24.
Motor Oil 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.

MS 9/23/09

Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem3/fid3a.i/20090922.b/0922a006.d
Method: /chem3/fid3a.i/20090922.b/ftphfid3a.m
Instrument: fid3a.i
Operator: ms
Report Date: 09/23/2009
Macro: FID:3A091709

ARI ID: PP00I
Client ID:
Injection: 22-SEP-2009 13:27
Dilution Factor: 10

FID:3A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	0.957	-0.026	40070	217876	GAS (Tol-C12)	11730107	67
C8	1.237	-0.007	11946	1193	DIESEL (C12-C24)	17770115	827
C10	3.002	-0.014	87524	199281	M.OIL (C24-C38)	411824	35
C12	3.769	0.002	213929	247440	AK-102 (C10-C25)	25475445	955
C14	4.314	-0.013	258330	397658	AK-103 (C25-C36)	378137	42
C16	4.800	-0.012	184394	302964	OR.DIES (C10-C28)	25673664	1217
C18	5.245	0.000	159240	145169	OR.MOIL (C28-C40)	214330	19
C20	5.637	0.000	103726	121751	JET-A (C10-C18)	21609868	1364
C22	5.989	-0.003	32548	17332			
C24	6.300	0.001	12017	4279	STODDARD (C8-C12)	11424049	413
C25	6.441	0.001	9271	5413			
C26	6.574	0.002	6491	3962			
C28	6.819	-0.003	6549	1538			
C32	7.269	0.003	3326	1873			
C34	7.474	0.002	1128	90			
Filter Peak	9.123	-0.001	66	6			
C36	7.671	0.000	766	91	CREOSOT (C8-C22)	28893312	4517
C38	7.864	0.000	1423	336			
C40	8.063	0.001	1922	153	BUNKERC (C10-C38)	25865907	2993

Range Times: NW Diesel(3.817 - 6.349) NW Gas(0.933 - 3.817) NW M.Oil(6.349 - 7.914)
AK102(2.966 - 6.390) AK103(6.390 - 7.721) Jet A(2.966 - 5.295)

Surrogate	Area	Amount	%Rec
o-Terphenyl	104527	4.0	88.3
Triacontane	55303	3.2	71.5

Analyte	RF	Curve Date
o-Terph Surr	26299.8	01-SEP-2009
Triacon Surr	17199.0	01-SEP-2009
Gas	174500.4	15-SEP-2009
Diesel	21481.1	01-SEPT-2009
Motor Oil	11926.9	01-SEPT-2009
AK102	26685.8	01-SEPT-2009
AK103	8932.5	01-SEPT-2009
JetA	15848.0	27-JAN-2009
OR Diesel	21090.0	
OR M.Oil	11274.0	
Bunker C	8643.2	15-SEP-2009
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3a.i/20090922.b/0922a006.d

Date : 22-SEP-2009 13:27

Client ID:

Sample Info: PP00I,10

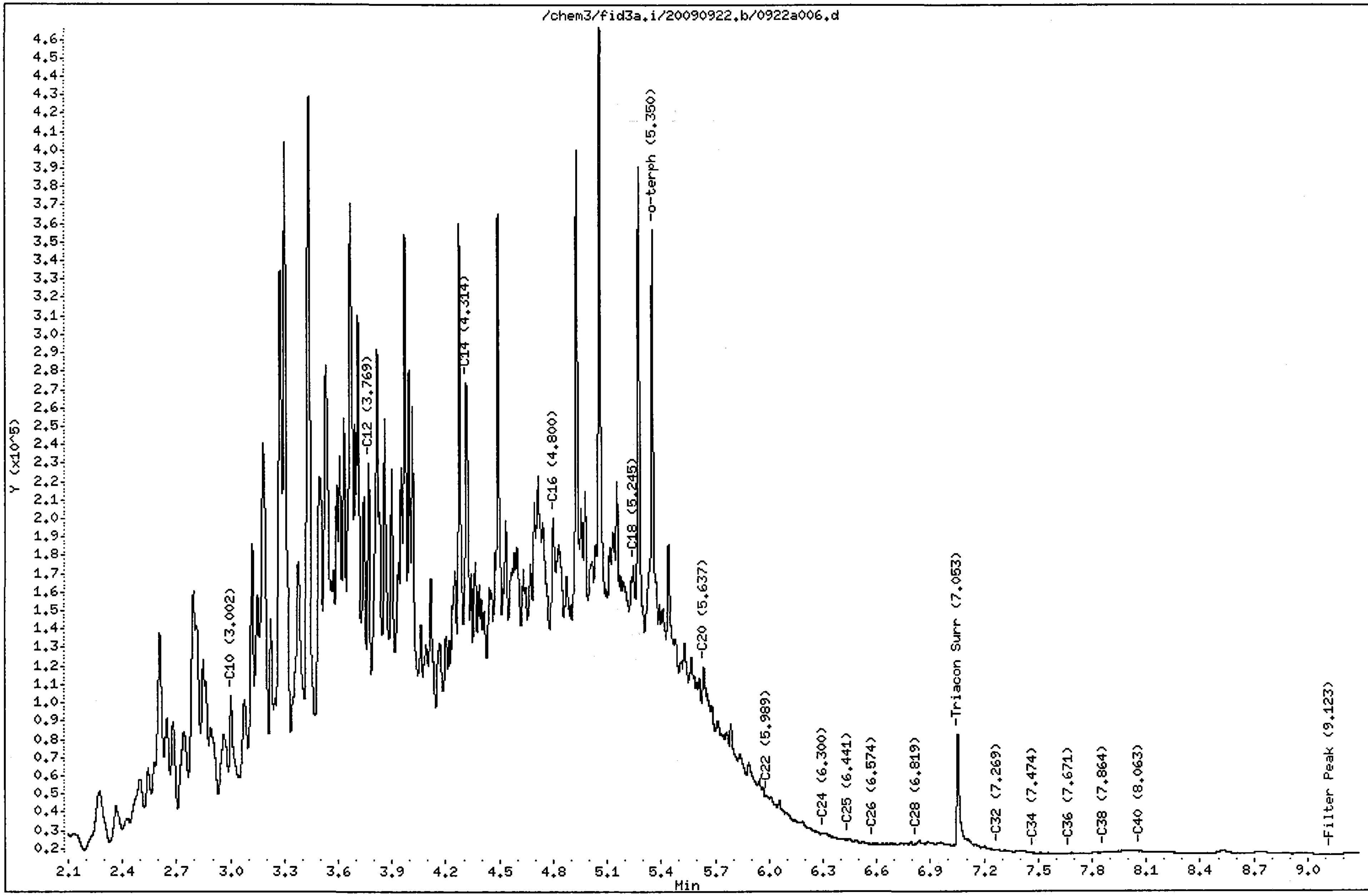
Column phase: ZB1-HT

Page 1

Instrument: fid3a.i

Operator: ms

Column diameter: 0.25



ms 9/23/09

Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem3/fid3a.i/20090921.b/0921a022.d
Method: /chem3/fid3a.i/20090921.b/ftphfid3a.m
Instrument: fid3a.i
Operator: ms
Report Date: 09/23/2009
Macro: FID:3A091709

ARI ID: PPOOMBS1
Client ID:
Injection: 21-SEP-2009 19:58
Dilution Factor: 1

FID:3A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	0.978	0.012	13350	18865	GAS (Tol-C12)	639128	4
C8	1.230	-0.002	6666	1856	DIESEL (C12-C24)	447853	21
C10	3.014	-0.002	3892	1008	M.OIL (C24-C38)	121336	10
C12	3.767	-0.001	6799	1220	AK-102 (C10-C25)	727243	27
C14	4.328	0.000	5531	1433	AK-103 (C25-C36)	80570	9
C16	4.810	-0.001	3597	643	OR.DIES (C10-C28)	729847	35
C18	5.246	0.000	2032	363	OR.MOIL (C28-C40)	159791	14
C20	5.639	0.000	1731	411	JET-A (C10-C18)	671773	42
C22	5.993	0.002	666	132			
C24	6.298	0.000	274	36	STODDARD (C8-C12)	552487	20
C25	6.438	0.000	129	21			
C26	6.572	0.000	68	9			
C28	6.821	0.000	303	129			
C32	7.266	-0.003	3619	5398			
C34	7.477	-0.001	2217	221			
Filter Peak	9.125	0.001	5319	531			
C36	7.675	-0.004	3272	3037	CREOSOT (C8-C22)	994177	155
C38	7.875	0.000	3277	523			
C40	8.075	-0.001	3907	625	BUNKERC (C10-C38)	848226	98

Range Times: NW Diesel(3.818 - 6.348) NW Gas(0.916 - 3.818) NW M.Oil(6.348 - 7.924) AK102(2.965 - 6.388) AK103(6.388 - 7.729) Jet A(2.965 - 5.295)

Surrogate	Area	Amount	%Rec
o-Terphenyl	1120872	42.6	94.7
Triacontane	654660	38.1	84.6

Analyte	RF	Curve Date
o-Terph Surr	26299.8	01-SEP-2009
Triacon Surr	17199.0	01-SEP-2009
Gas	174500.4	15-SEP-2009
Diesel	21481.1	01-SEPT-2009
Motor Oil	11926.9	01-SEPT-2009
AK102	26685.8	01-SEPT-2009
AK103	8932.5	01-SEPT-2009
JetA	15848.0	27-JAN-2009
OR Diesel	21090.0	
OR M.Oil	11274.0	
Bunker C	8643.2	15-SEP-2009
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3a.i/20090921.b/0921a022.d

Date : 21-SEP-2009 19:58

Client ID:

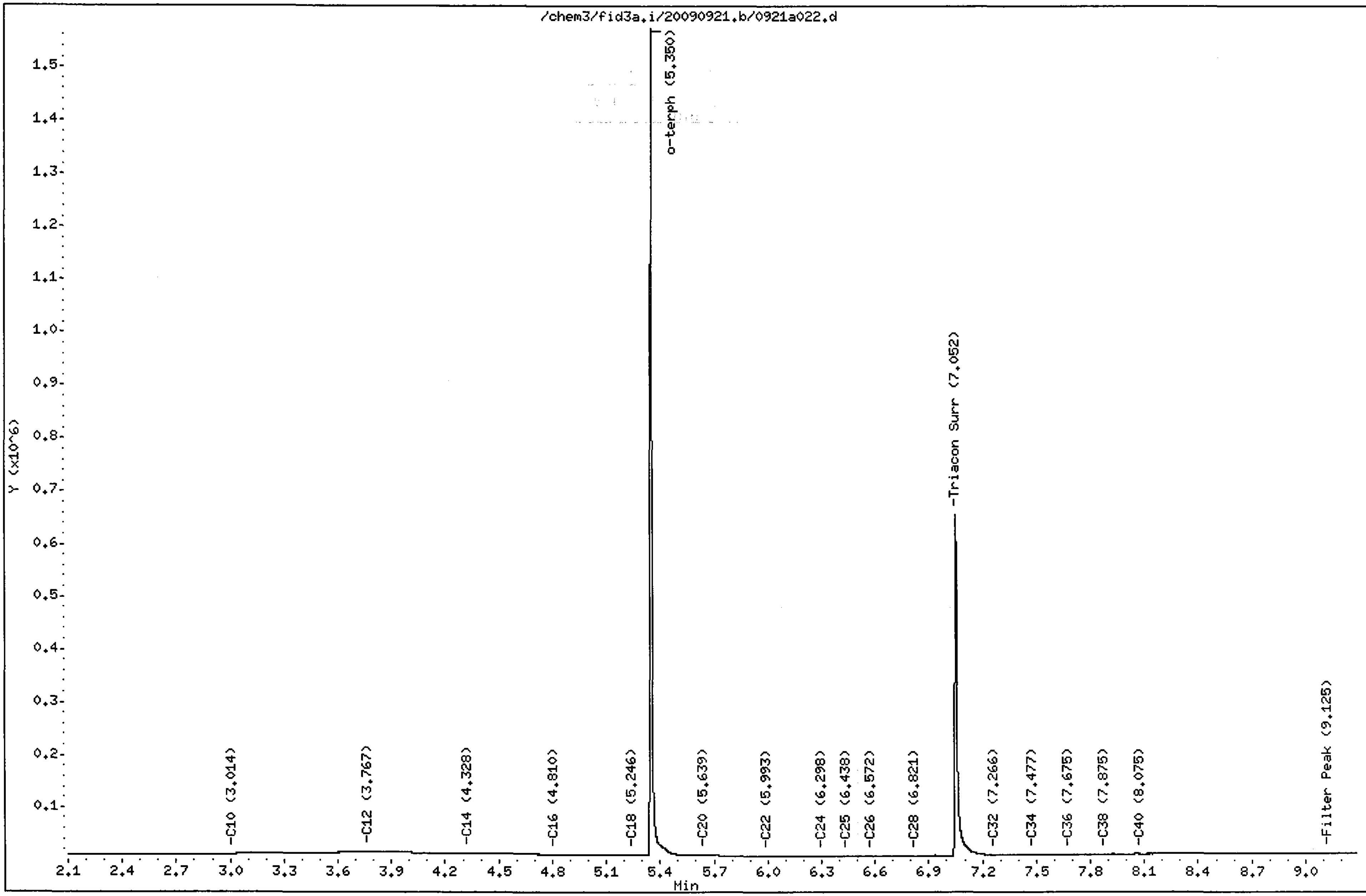
Sample Info: PPOOMBS1

Column phase: ZB1-HT

Instrument: fid3a.i

Operator: ms

Column diameter: 0.25



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-091809
LAB CONTROL

Lab Sample ID: LCS-091809
LIMS ID: 09-21752
Matrix: Soil
Data Release Authorized:
Reported: 09/23/09

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite

Date Sampled: NA
Date Received: NA

Date Extracted: 09/18/09
Date Analyzed: 09/21/09 20:16
Instrument/Analyst: FID3A/MS

Sample Amount: 10.0 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	**Lab Control**	**Spike Added**	**Recovery**
Diesel	133	150	88.7%

TPHD Surrogate Recovery	
o-Terphenyl	99.8%

Results reported in mg/kg

ms 9/23/08

Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem3/fid3a.i/20090921.b/0921a023.d
Method: /chem3/fid3a.i/20090921.b/ftphfid3a.m
Instrument: fid3a.i
Operator: ms
Report Date: 09/23/2009
Macro: FID:3A091709

ARI ID: PP00LCSS1
Client ID:
Injection: 21-SEP-2009 20:16
Dilution Factor: 1

FID:3A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	0.917	-0.049	23631	142995	GAS (Tol-C12)	6081908	35
C8	1.227	-0.005	7296	3308	DIESEL (C12-C24)	28564441	1330
C10	3.021	0.006	46953	42167	M.OIL (C24-C38)	424867	36
C12	3.768	0.000	562655	479948	AK-102 (C10-C25)	33489781	1255
C14	4.329	0.001	760536	1122253	AK-103 (C25-C36)	361661	40
C16	4.813	0.002	822132	1254297	OR.DIES (C10-C28)	33803454	1603
C18	5.247	0.002	693512	730863	OR.MOIL (C28-C40)	76034	7
C20	5.639	0.001	459854	724298	JET-A (C10-C18)	25761093	1626
C22	5.991	0.000	171632	219216			
C24	6.298	0.000	64961	118599	STODDARD (C8-C12)	5882034	213
C25	6.439	0.000	37821	74995			
C26	6.572	0.001	20271	33389			
C28	6.819	-0.002	5051	4274			
C32	7.264	-0.004	2928	1948			
C34	7.476	-0.001	678	120			
Filter Peak	9.123	-0.001	2075	329			
C36	7.685	0.007	695	135	CREOSOT (C8-C22)	33565692	5248
C38	7.875	0.001	1122	111			
C40	8.075	-0.001	1397	139	BUNKERC (C10-C38)	33862737	3918

Range Times: NW Diesel(3.818 - 6.348) NW Gas(0.916 - 3.818) NW M.Oil(6.348 - 7.924)
AK102(2.965 - 6.388) AK103(6.388 - 7.729) Jet A(2.965 - 5.295)

Surrogate	Area	Amount	%Rec
o-Terphenyl	1181010	44.9	99.8
Triacontane	681183	39.6	88.0

Analyte	RF	Curve Date
o-Terph Surr	26299.8	01-SEP-2009
Triacon Surr	17199.0	01-SEP-2009
Gas	174500.4	15-SEP-2009
Diesel	21481.1	01-SEPT-2009
Motor Oil	11926.9	01-SEPT-2009
AK102	26685.8	01-SEPT-2009
AK103	8932.5	01-SEPT-2009
JetA	15848.0	27-JAN-2009
OR Diesel	21090.0	
OR M.Oil	11274.0	
Bunker C	8643.2	15-SEP-2009
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3a.i/20090921.b/0921a023.d

Date : 21-SEP-2009 20:16

Client ID:

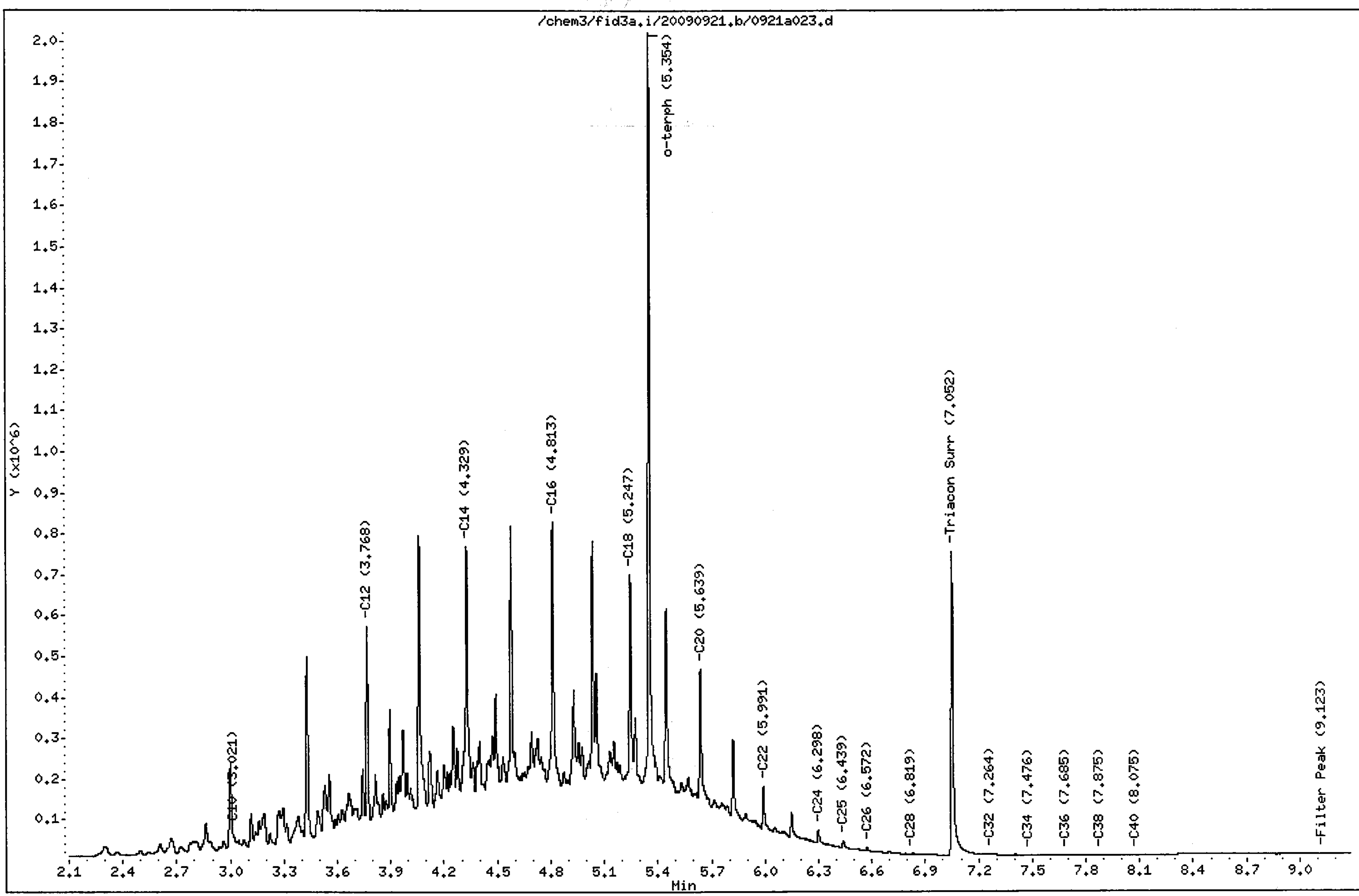
Sample Info: PP00LCSS1

Column phase: ZB1-HT

Instrument: fid3a.i

Operator: ms

Column diameter: 0.25



ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: PP00-RH2 Engineering
Project: Cashmere Millsite

Client ID	OTER	TOT OUT
091809MBS	94.7%	0
091809LCS	99.8%	0
S-4C	88.2%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(58-121)	(53-118)

Prep Method: SW3546
Log Number Range: 09-21752 to 09-21752

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Soil
Date Received: 09/18/09

ARI Job: PP00
Project: Cashmere Millsite

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
09-21752-091809MB1	Method Blank	10.0 g	1.00 mL	-	09/18/09
09-21752-091809LCS1	Lab Control	10.0 g	1.00 mL	-	09/18/09
09-21752-PP00I	S-4C	9.05 g	1.00 mL	D	09/18/09

Basis: D=Dry Weight W=As Received

Analytical Resources, Incorporated
Analytical Chemists and Consultants

October 30, 2009

Adam Neff
RH2 Engineering, Inc.
300 Simon Street SE
Suite #5
East Wenatchee, WA 98802-7720

Client Project: Cashmere Mill Site
ARI ID: PU11

Dear Adam:

Please find enclosed the original Chain of Custody, sample receipt documentation, and the final results for the project referenced above. Analytical Resources, Inc. (ARI) accepted five soil samples and one trip blank on October 26, 2009. For further details regarding sample receipt, please refer to the enclosed Cooler Receipt Form.

The samples were analyzed for NWTPH-G/BTEX and NWTPH-Dx, as requested on the Chain of Custody.

All analyses were completed routinely.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please feel free to contact me at your convenience.

Respectfully,

Bob Congleton

Bob Congleton
Project Manager
ANALYTICAL RESOURCES, INC.
(206) 695-6232
bob@arilabs.com
www.arilabs.com

Enclosures

cc: eFile PU11

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)

ARI Assigned Number:	Turn-around Requested:
ARI Client Company: RH2	Phone: 425-951-5406
Client Contact: Steve Nelson	
Client Project Name: Cashmere Millsite	
Client Project #:	Samplers: ARN

Page: 1	of 1		
Date: 10/23	Ice Present? NO		
No. of Coolers: 1	Cooler Temps: 11.3		

Sample ID	Date	Time	Matrix	No. Containers	NWTPH Gas/BTEX	Total Solids	NWTPH-DX Diesel Range						Notes/Comments
S-1	10/23		Fill	4	X	X	X						
S-2	10/23		Fill	3	X	X							
S-3	10/23		Fill	3	X	X							
S-4	10/23		Fill	3	X	X							
S-5	10/23		Fill	3	X	X							

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
Please exuse the Faint labels, it was raining like crazy and I couldn't get anything to write well	(Signature) [signature]	(Signature) J. Peterson	(Signature)	(Signature)
	Printed Name: Adam Neff	Printed Name: J. Peterson	Printed Name:	Printed Name:
	Company: RH2 Engineering	Company: ARI	Company:	Company:
	Date & Time: 10/23 3:00 pm	Date & Time: 10/24/07 1100	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.

PU11:00002

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: RHZ

COC No(s): ______ NA

Assigned ARI Job No: PU11

Project Name: Cashmere Millsite

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: ______

Tracking No: K0967780745 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)........ 11.3

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90877952

Cooler Accepted by: JP Date: 10/26/09 Time: 1100

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

Samples Logged by: MW Date: 10/26/09 Time: 1210

***** 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:

2 Trip blank vials found in cooler, not included on COC. 2 of 2 trip blank vials had pb.

By: MW Date: 10/26/09

Small Air Bubbles ~2 mm	Peabubbles' 2-4 mm	LARGE Air Bubbles > 4 mm

Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Page 1 of 1
Matrix: Soil

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite

Date Received: 10/26/09

Data Release Authorized:
Reported: 10/29/09

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
MB-102609	Method Blank	10/26/09	10/27/09	1.00	Diesel	5.0	< 5.0 U
09-25006	HC ID: ---		FID4B	1.0	Motor Oil	10	< 10 U
					o-Terphenyl		83.2%
PU11A	S-1	10/26/09	10/27/09	1.00	**Diesel**	**260**	**2,500**
09-25006	HC ID: **DRO/MOTOR OIL**		FID4B	40	**Motor Oil**	**520**	**4,500**
					o-Terphenyl		85.3%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel quantitation on total peaks in the range from C12 to C24.
Motor Oil 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 Inc.
TPH Quantitation Report

MS 10/28/09

Data file: /chem3/fid4b.i/20091027.b/1027b010.d
Method: /chem3/fid4b.i/20091027.b/ftphfid4b.m
Instrument: fid4b.i
Operator: MS
Report Date: 10/28/2009
Macro: 21-OCT-2009

ARI ID: PU11MBS1
Client ID: PU11MBS1
Injection: 27-OCT-2009 18:05

Dilution Factor: 1

FID:4B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	2.075	-0.012	556	1175	GAS (Tol-C12)	52229	5
C8	2.522	-0.004	352	261	DIESEL (C12-C24)	17796	1
C10	3.807	-0.015	265	349	M.OIL (C24-C38)	115761	10
C12	4.741	0.005	97	101	AK-102 (C10-C25)	31479	2
C14	5.491	-0.001	112	142	AK-103 (C25-C36)	87700	11
C16	6.182	0.015	37	38	OR.DIES (C10-C28)	45001	3
C18	6.811	0.001	38	17	OR.MOIL (C28-C40)	138744	16
C20	7.418	-0.007	86	104			
C22	8.003	0.005	93	59			
C24	8.531	0.002	148	140			
C25	8.785	-0.002	146	231			
C26	9.059	0.009	122	83			
C28	9.594	0.001	304	454			
C32	10.703	0.011	3762	6759			
C34	11.231	0.003	475	448	CREOSOT (C12-C22)	13388	3
Filter Peak	9.125	0.004	2826	3131			
C36	11.733	-0.013	642	423			
C38	12.247	0.004	933	790			
C40	12.736	0.016	3125	9044			
o-terph	6.998	0.002	832230	605218	JET-A (C10-C18)	17448	1
Triacon Surr	10.152	0.000	631648	680655			

Range Times: NW Diesel(4.736 - 8.530) AK102(3.82 - 8.79) Jet A(3.82 - 6.81)
NW M.Oil(8.53 - 12.24) AK103(8.79 - 11.75) OR Diesel(3.82 - 9.59)

Surrogate	Area	Amount	%Rec
o-Terphenyl	605218	37.4	83.2
Triacontane	680655	36.3	80.6

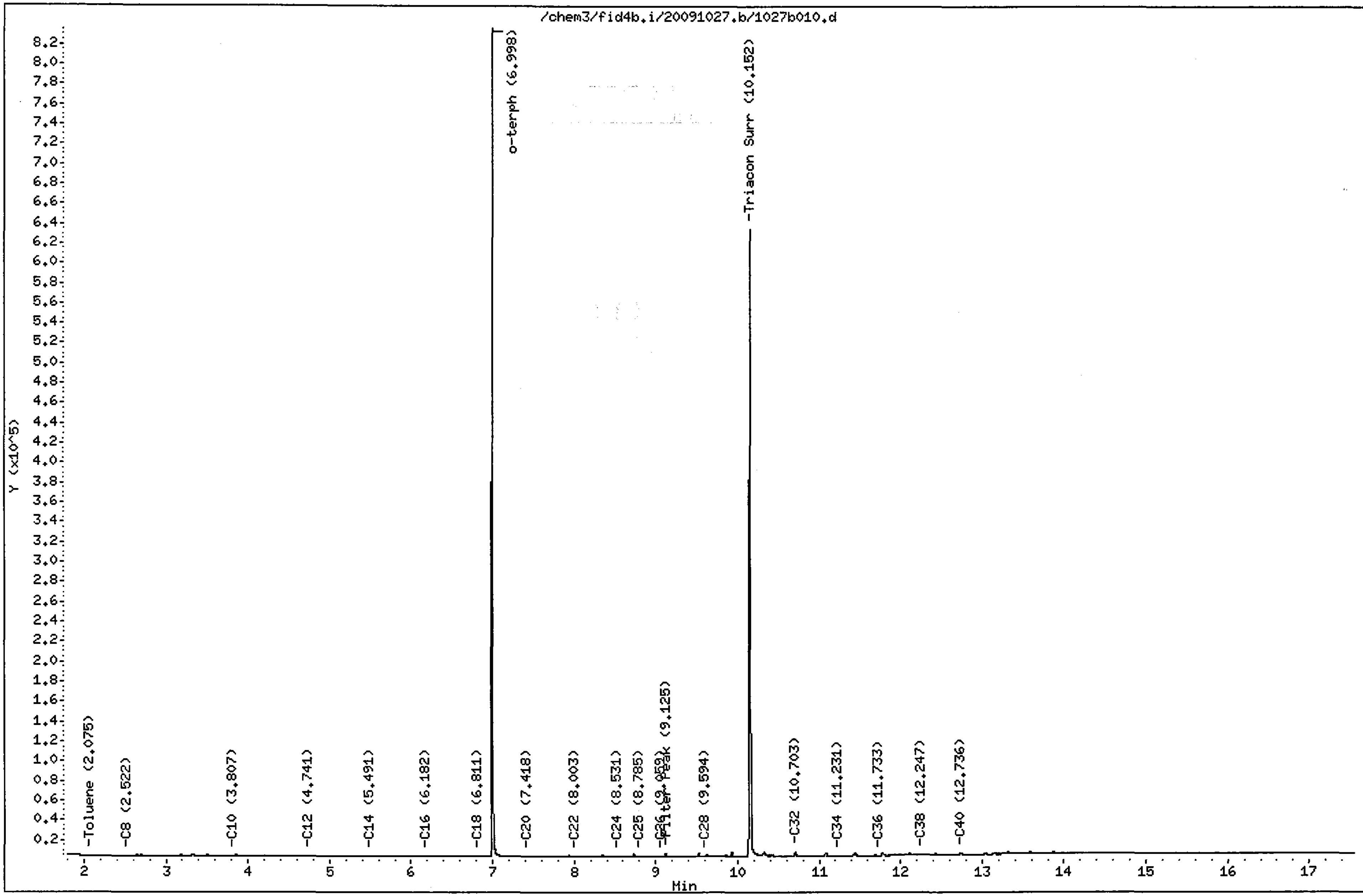
Analyte	RF	Curve Date
o-Terph Surr	16164.3	21-OCT-2009
Triacon Surr	18775.2	03-SEP-2009
Gas	10306.6	01-OCT-2009
Diesel	12095.5	21-OCT-2009
Motor Oil	11031.9	03-SEP-2009
AK102	14148.6	21-OCT-2009
AK103	7888.6	08-SEP-2009
JetA	15409.6	22-AUG-2009
OR Diesel	13552.0	
OR M.Oil	8574.0	
Bunker C	8358.3	04-MAR-2009
Creosote	4779.1	13-AUG-2009

Data File: /chem3/fid4b.i/20091027.b/1027b010.d
Date : 27-OCT-2009 18:05
Client ID: PU11MBS1
Sample Info: PU11MBS1

Column phase: RTX-1

Instrument: fid4b.i

Operator: MS
Column diameter: 0.25



MS 10/28/09

Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem3/fid4b.i/20091027.b/1027b008.d
Method: /chem3/fid4b.i/20091027.b/ftphfid4b.m
Instrument: fid4b.i
Operator: MS
Report Date: 10/28/2009
Macro: 21-OCT-2009

ARI ID: PU11A
Client ID: S-1
Injection: 27-OCT-2009 17:16

Dilution Factor: 40

FID:4B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	2.088	0.001	259	445	GAS (Tol-C12)	33530	3
C8	2.525	-0.001	203	104	DIESEL (C12-C24)	5946686	492
C10	3.824	0.001	142	102	M.OIL (C24-C38)	9567188	867
C12	4.731	-0.005	26	29	AK-102 (C10-C25)	6943512	491
C14	5.490	-0.002	211	83	AK-103 (C25-C36)	8364107	1060
C16	6.168	0.000	1028	1565	OR.DIES (C10-C28)	11363440	839
C18	6.812	0.001	5300	4864	OR.MOIL (C28-C40)	4313948	503
C20	7.429	0.004	34301	48287			
C22	7.998	0.000	78342	85903			
C24	8.522	-0.007	103576	131335			
C25	8.785	-0.003	102838	28607			
C26	9.052	0.002	91667	36281			
C28	9.591	-0.002	73177	24412			
C32	10.694	0.002	31696	22017			
C34	11.225	-0.004	19814	10106	CREOSOT (C12-C22)	2799995	586
Filter Peak	9.118	-0.003	93537	133208			
C36	11.757	0.012	9465	7054			
C38	12.248	0.005	6200	7272			
C40	12.706	-0.014	4768	2815			
o-terph	6.994	-0.002	25222	15466	JET-A (C10-C18)	157958	10
Triacon Surr	10.144	-0.008	19314	17973			

Range Times: NW Diesel(4.736 - 8.530) AK102(3.82 - 8.79) Jet A(3.82 - 6.81)
NW M.Oil(8.53 - 12.24) AK103(8.79 - 11.75) OR Diesel(3.82 - 9.59)

Surrogate	Area	Amount	%Rec
o-Terphenyl	15466	1.0	85.0
Triacontane	17973	1.0	85.1

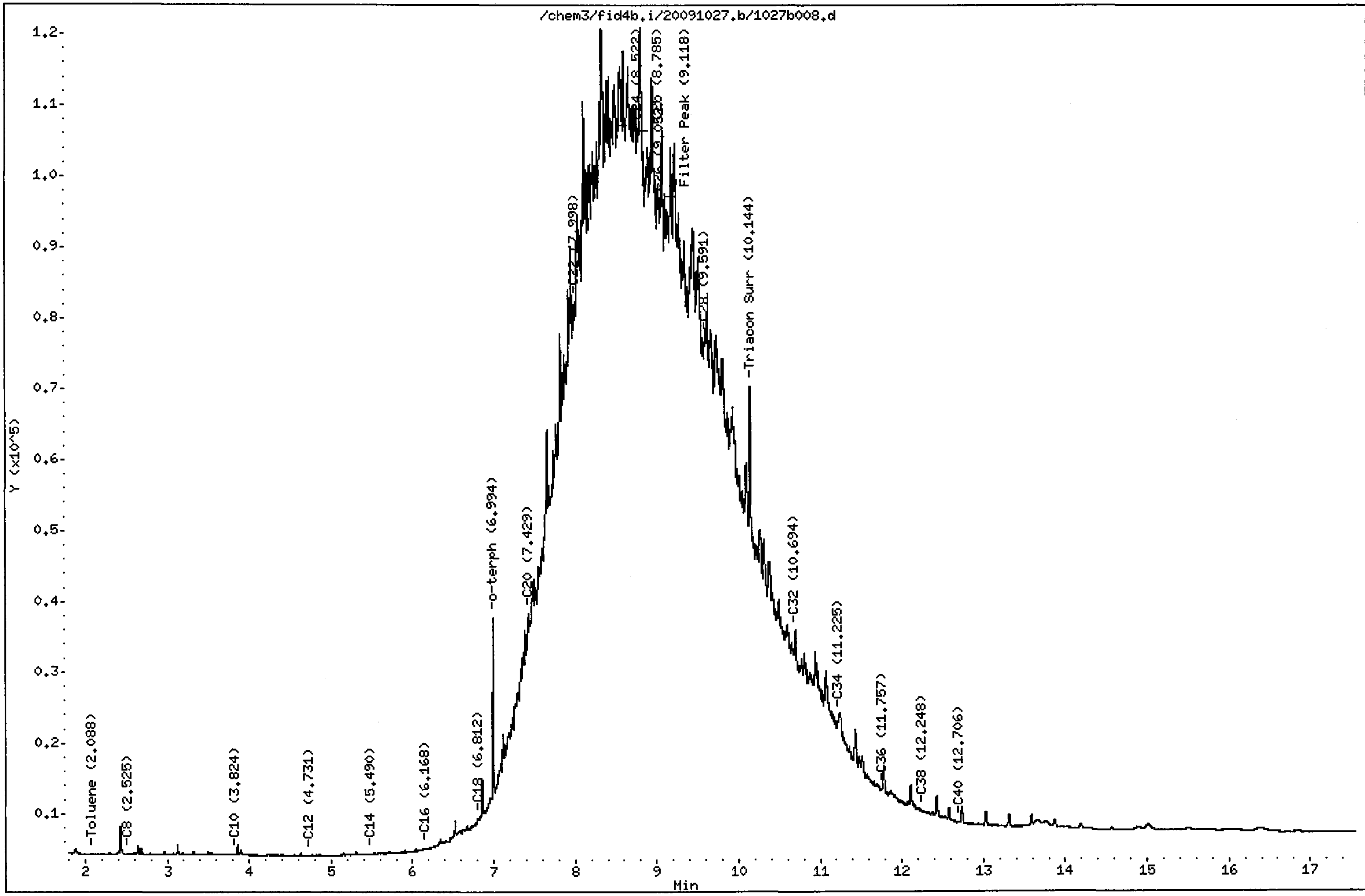
Analyte	RF	Curve Date
o-Terph Surr	16164.3	21-OCT-2009
Triacon Surr	18775.2	03-SEP-2009
Gas	10306.6	01-OCT-2009
Diesel	12095.5	21-OCT-2009
Motor Oil	11031.9	03-SEP-2009
AK102	14148.6	21-OCT-2009
AK103	7888.6	08-SEP-2009
JetA	15409.6	22-AUG-2009
OR Diesel	13552.0	
OR M.Oil	8574.0	
Bunker C	8358.3	04-MAR-2009
Creosote	4779.1	13-AUG-2009

Data File: /chem3/fid4b.i/20091027.b/1027b008.d
Date : 27-OCT-2009 17:16
Client ID: S-1
Sample Info: PU11A,40

Column phase: RTX-1

Instrument: fid4b.i

Operator: MS
Column diameter: 0.25



ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: PU11
Matrix: Soil
Project: Cashmere Millsite
Date Received: 10/26/09

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
09-25006-102609MB1	Method Blank	10.0 g	1.00 mL	-	10/26/09
09-25006-102609LCS1	Lab Control	10.0 g	1.00 mL	-	10/26/09
09-25006-PU11A	S-1	7.76 g	1.00 mL	D	10/26/09

Basis: D=Dry Weight W=As Received

ANALYTICAL
RESOURCES
INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite

Client ID	OTER	TOT OUT
102609MBS	83.2%	0
102609LCS	96.9%	0
S-1	85.3%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(58-121)	(53-118)

Prep Method: SW3546
Log Number Range: 09-25006 to 09-25006

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID

Sample ID: LCS-102609
LAB CONTROL

Lab Sample ID: LCS-102609
LIMS ID: 09-25006
Matrix: Soil
Data Release Authorized:
Reported: 10/29/09

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite

Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/09
Date Analyzed: 10/27/09 17:41
Instrument/Analyst: FID4B/MS

Sample Amount: 10.0 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	143	150	95.3%

TPHD Surrogate Recovery	
o-Terphenyl	96.9%

Results reported in mg/kg

ms 10/28/09

Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem3/fid4b.i/20091027.b/1027b009.d
Method: /chem3/fid4b.i/20091027.b/ftphfid4b.m
Instrument: fid4b.i
Operator: MS
Report Date: 10/28/2009
Macro: 21-OCT-2009

ARI ID: PU11LCSS1
Client ID: PU11LCSS1
Injection: 27-OCT-2009 17:41

Dilution Factor: 1

FID:4B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	2.119	0.032	3932	6510	GAS (Tol-C12)	2261505	219
C8	2.516	-0.010	87	78	DIESEL (C12-C24)	17275110	1428
C10	3.817	-0.006	76046	48859	M.OIL (C24-C38)	290017	26
C12	4.734	-0.002	184661	199011	AK-102 (C10-C25)	19068724	1348
C14	5.492	0.000	364054	234735	AK-103 (C25-C36)	191037	24
C16	6.170	0.003	630414	571607	OR.DIES (C10-C28)	19200623	1417
C18	6.818	0.007	540721	487872	OR.MOIL (C28-C40)	103681	12
C20	7.428	0.003	334001	358740			
C22	7.998	0.000	156253	160845			
C24	8.530	0.000	47845	48933			
C25	8.787	0.000	19529	35688			
C26	9.050	0.000	7513	13283			
C28	9.592	-0.001	1307	1977			
C32	10.703	0.011	2937	4947			
C34	11.223	-0.005	281	389	CREOSOT (C12-C22)	16603007	3474
Filter Peak	9.124	0.003	4482	10016			
C36	11.737	-0.008	430	373			
C38	12.245	0.002	705	773			
C40	12.734	0.014	2289	6566			
o-terph	7.002	0.006	998882	704810	JET-A (C10-C18)	13672389	887
Triacon Surr	10.153	0.001	707336	761870			

Range Times: NW Diesel(4.736 - 8.530) AK102(3.82 - 8.79) Jet A(3.82 - 6.81)
NW M.Oil(8.53 - 12.24) AK103(8.79 - 11.75) OR Diesel(3.82 - 9.59)

Surrogate	Area	Amount	%Rec
o-Terphenyl	704810	43.6	96.9
Triacontane	761870	40.6	90.2

Analyte	RF	Curve Date
o-Terph Surr	16164.3	21-OCT-2009
Triacon Surr	18775.2	03-SEP-2009
Gas	10306.6	01-OCT-2009
Diesel	12095.5	21-OCT-2009
Motor Oil	11031.9	03-SEP-2009
AK102	14148.6	21-OCT-2009
AK103	7888.6	08-SEP-2009
JetA	15409.6	22-AUG-2009
OR Diesel	13552.0	
OR M.Oil	8574.0	
Bunker C	8358.3	04-MAR-2009
Creosote	4779.1	13-AUG-2009

Data File: /chem3/fid4b.i/20091027.b/1027b009.d

Date : 27-OCT-2009 17:41

Client ID: PU11LCSS1

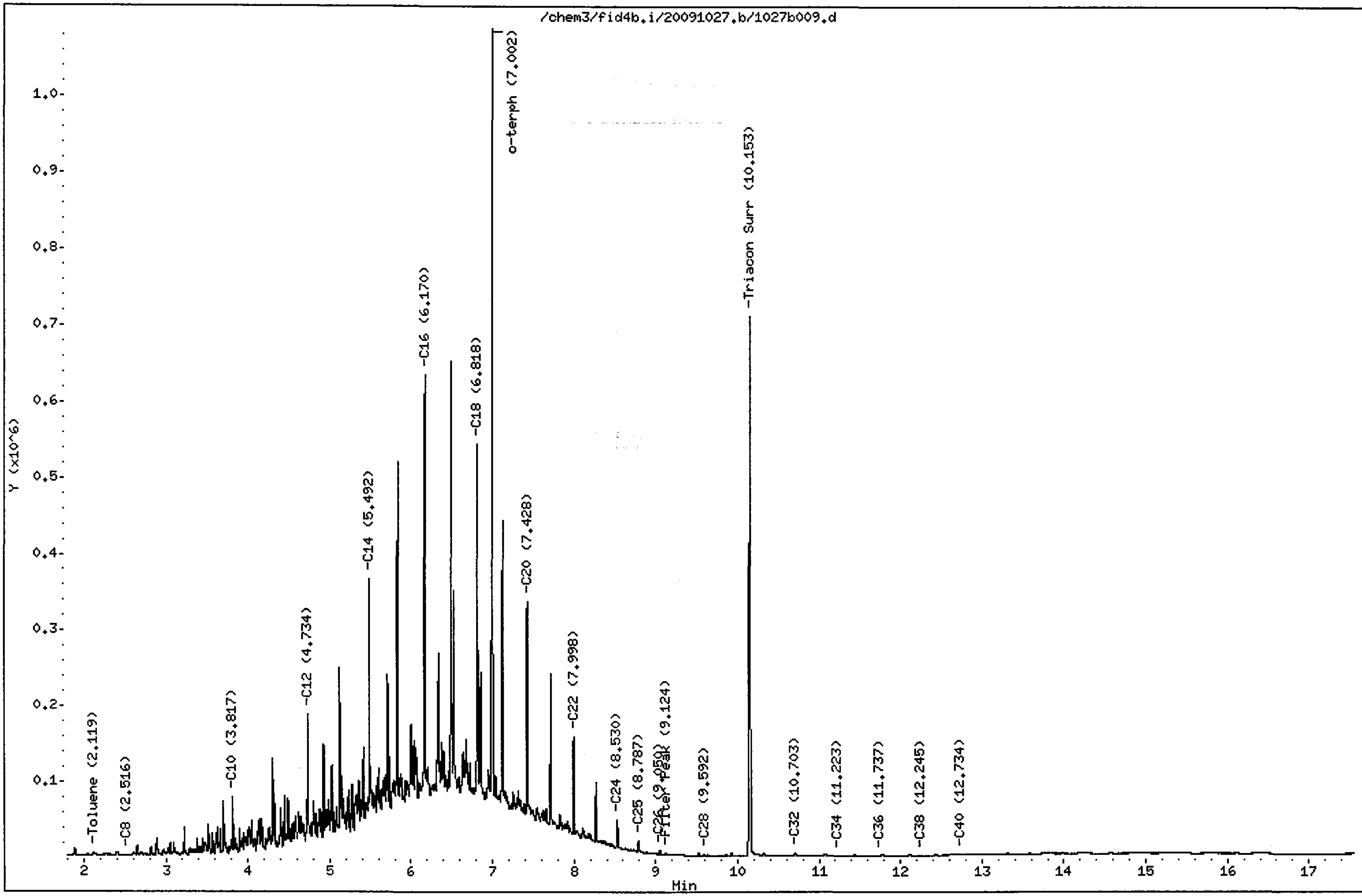
Sample Info: PU11LCSS1

Column phase: RTX-1

Instrument: fid4b.i

Operator: MS

Column diameter: 0.25



PU11 00013

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: S-1
SAMPLE

Lab Sample ID: PU11A
LIMS ID: 09-25006
Matrix: Soil
Data Release Authorized:
Reported: 10/29/09

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 10/23/09
Date Received: 10/26/09

Date Analyzed: 10/27/09 17:39
Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL
Sample Amount: 64 mg-dry-wt
Percent Moisture: 22.1%

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	20	< 20 U	
108-88-3	Toluene	20	< 20 U	
100-41-4	Ethylbenzene	20	< 20 U	
179601-23-1	m,p-Xylene	39	< 39 U	
95-47-6	o-Xylene	20	< 20 U	
	Gasoline Range Hydrocarbons	7.9	< 7.9 U	---

BETX Surrogate Recovery

Trifluorotoluene	106%
Bromobenzene	102%

Gasoline Surrogate Recovery

Trifluorotoluene	101%
Bromobenzene	99.0%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

PC 10/28/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20091027-2.b/1027a008.d
Data file 2: /chem3/pid3.i/20091027-1.b/1027a008.d
Method: /chem3/pid3.i/20091027-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 19-OCT-2009

ARI ID: PU11A
Client ID: S-1
Injection Date: 27-OCT-2009 17:39
Matrix: SOIL
Dilution Factor: 1.000

==

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.428	0.024	6442	75409	101.0	TFT(Surr)
14.908	0.018	3831	31500	99.0	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	17319	0.025
8015B 2MP-TMB	(4.90 to 15.58)	14631	0.011
AKGas nC6-nC10	(5.39 to 14.53)	12421	0.011
NWGas Tol-Nap	(10.17 to 18.19)	17319	0.024

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

==

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.426	0.030	20863	105.9	TFT(Surr)
14.907	0.022	43220	101.9	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20091027-2.b/1027a008.d

Date : 27-OCT-2009 17:39

Client ID: S-1

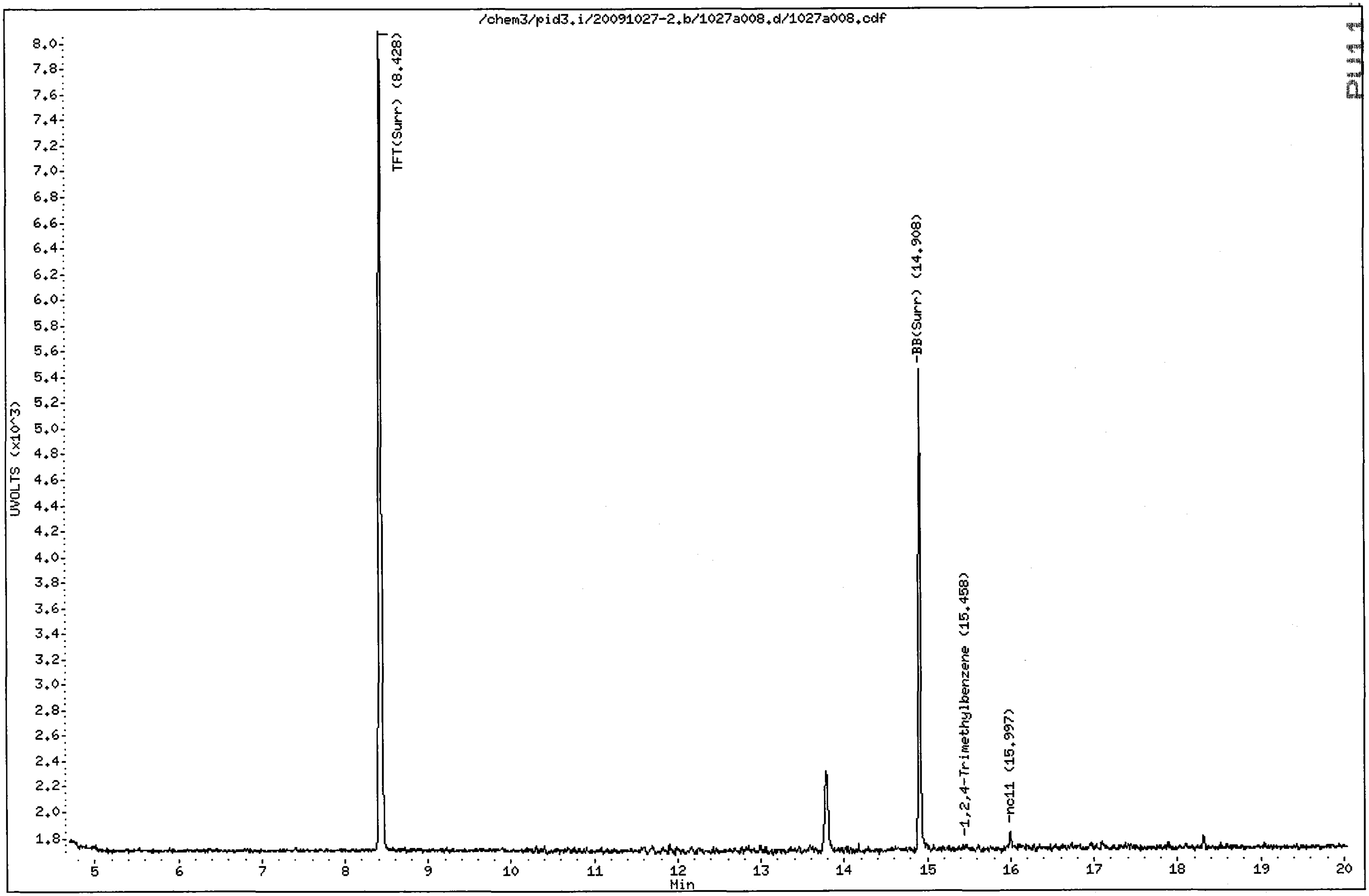
Sample Info: PU11A

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: PC

Column diameter: 0.18



Data File: /chem3/pid3.i/20091027-1.b/1027a008.d

Date : 27-OCT-2009 17:39

Client ID: S-1

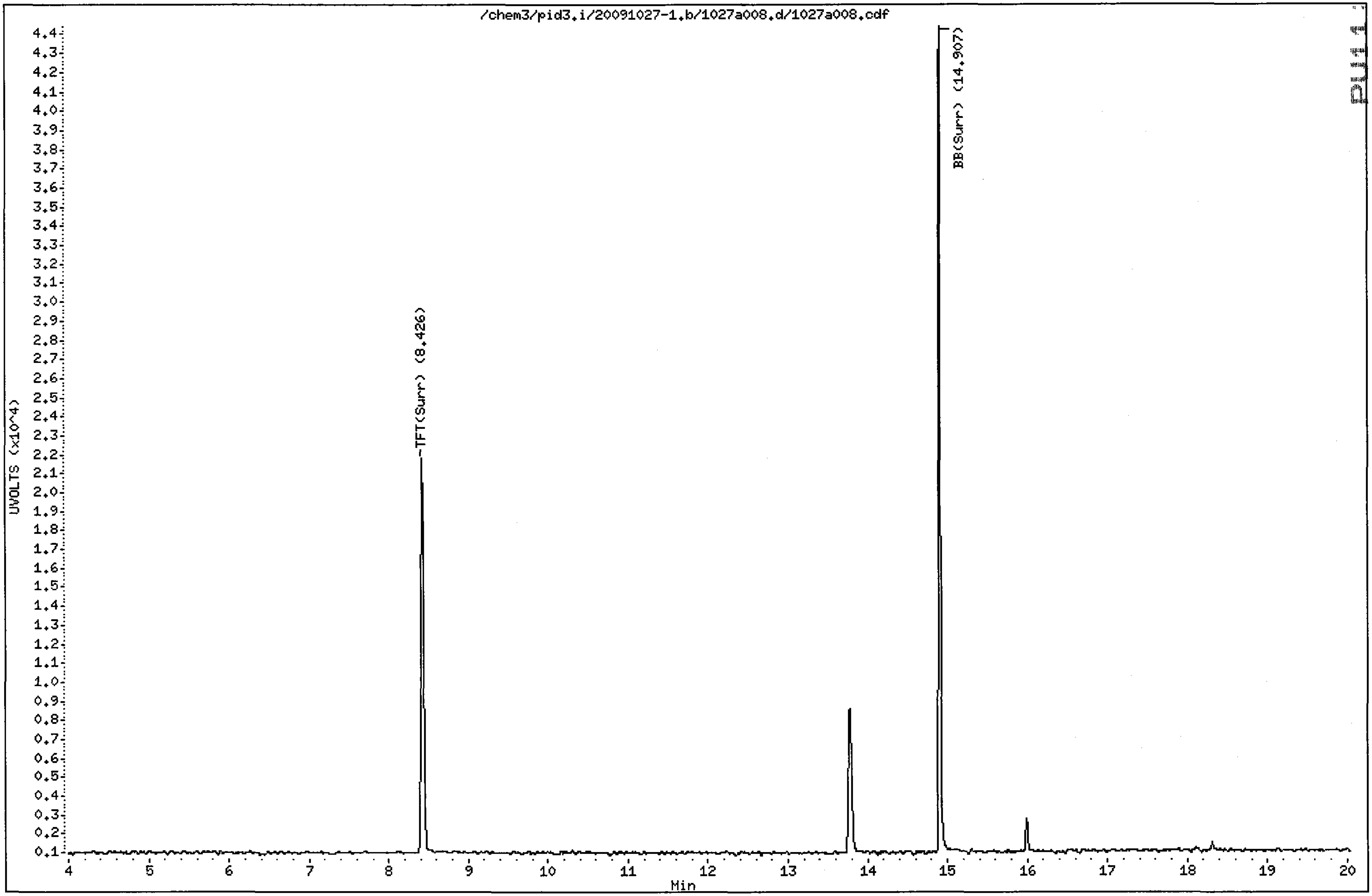
Sample Info: PU11A

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: PC

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: S-2
SAMPLE

Lab Sample ID: PU11B
LIMS ID: 09-25007
Matrix: Soil
Data Release Authorized:
Reported: 10/29/09

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 10/23/09
Date Received: 10/26/09

Date Analyzed: 10/27/09 18:04
Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL
Sample Amount: 68 mg-dry-wt
Percent Moisture: 15.6%

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	18	< 18 U	
108-88-3	Toluene	18	< 18 U	
100-41-4	Ethylbenzene	18	< 18 U	
179601-23-1	m,p-Xylene	37	< 37 U	
95-47-6	o-Xylene	18	< 18 U	
	Gasoline Range Hydrocarbons	7.3	< 7.3 U	---

BETX Surrogate Recovery

Trifluorotoluene	106%
Bromobenzene	101%

Gasoline Surrogate Recovery

Trifluorotoluene	101%
Bromobenzene	98.8%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

RC 10/28/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20091027-2.b/1027a009.d
Data file 2: /chem3/pid3.i/20091027-1.b/1027a009.d
Method: /chem3/pid3.i/20091027-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 19-OCT-2009

ARI ID: PU11B
Client ID: S-2
Injection Date: 27-OCT-2009 18:04
Matrix: SOIL
Dilution Factor: 1.000

===

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.430	0.027	6451	75641	101.2	TFT(Surr)
14.909	0.019	3823	30789	98.8	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	11670	0.017
8015B 2MP-TMB	(4.90 to 15.58)	8715	0.006
AKGas nC6-nC10	(5.39 to 14.53)	8714	0.008
NWGas Tol-Nap	(10.17 to 18.19)	11670	0.016

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

===

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.428	0.031	20827	105.7	TFT(Surr)
14.907	0.022	42775	100.8	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

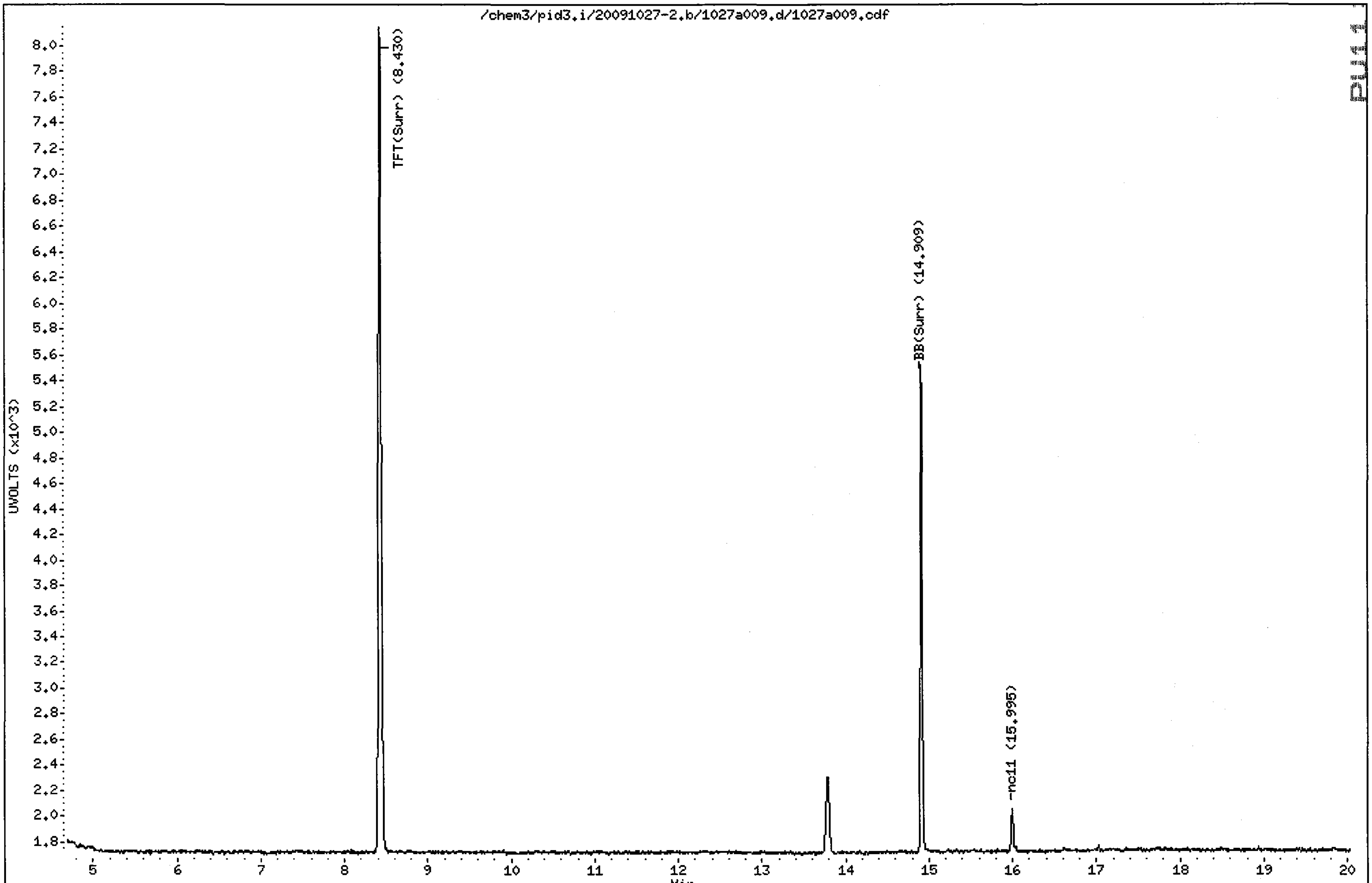
A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20091027-2.b/1027a009.d
Date : 27-OCT-2009 18:04
Client ID: S-2
Sample Info: PU11B

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: PC
Column diameter: 0.18



PU11 00020

Data File: /chem3/pid3.i/20091027-1.b/1027a009.d

Date : 27-OCT-2009 18:04

Client ID: S-2

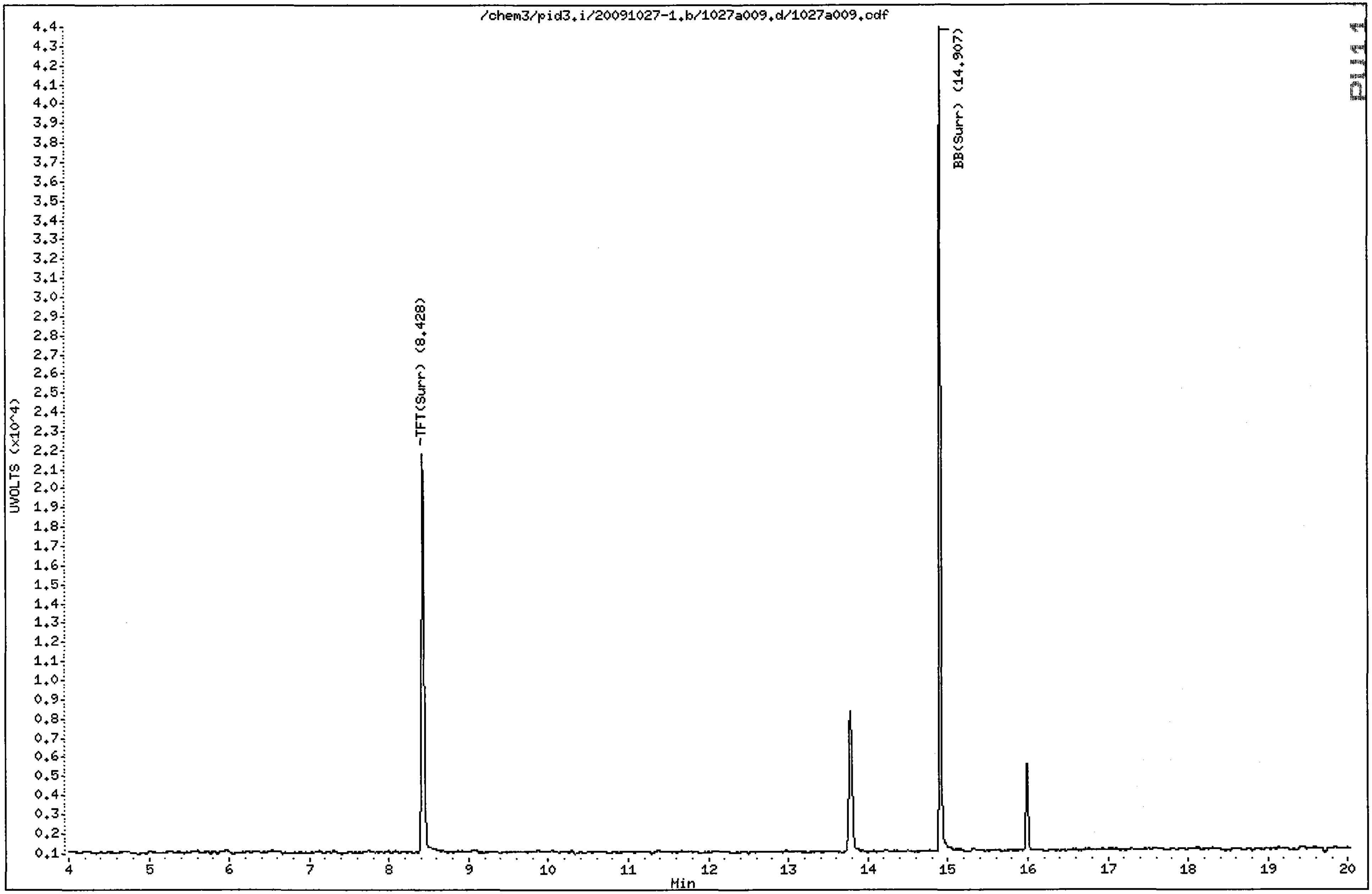
Sample Info: PU11B

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: PC

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: S-3
SAMPLE

Lab Sample ID: PU11C
LIMS ID: 09-25008
Matrix: Soil
Data Release Authorized:
Reported: 10/29/09

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 10/23/09
Date Received: 10/26/09

Date Analyzed: 10/27/09 18:29
Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL
Sample Amount: 46 mg-dry-wt
Percent Moisture: 18.0%

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	27	< 27 U	
108-88-3	Toluene	27	< 27 U	
100-41-4	Ethylbenzene	27	< 27 U	
179601-23-1	m,p-Xylene	54	< 54 U	
95-47-6	o-Xylene	27	< 27 U	
	Gasoline Range Hydrocarbons	11	< 11 U	---

BETX Surrogate Recovery

Trifluorotoluene	101%
Bromobenzene	98.3%

Gasoline Surrogate Recovery

Trifluorotoluene	98.5%
Bromobenzene	95.8%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

RC 12/18/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20091027-2.b/1027a010.d
Data file 2: /chem3/pid3.i/20091027-1.b/1027a010.d
Method: /chem3/pid3.i/20091027-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 19-OCT-2009

ARI ID: PU11C
Client ID: S-3
Injection Date: 27-OCT-2009 18:29
Matrix: SOIL
Dilution Factor: 1.000

==

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.428	0.025	6282	73061	98.5	TFT(Surr)
14.909	0.019	3708	29757	95.8	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	47151	0.068
8015B 2MP-TMB	(4.90 to 15.58)	38989	0.028
AKGas nC6-nC10	(5.39 to 14.53)	38989	0.035
NWGas Tol-Nap	(10.17 to 18.19)	48308	0.066

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

==

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.427	0.030	19960	101.3	TFT(Surr)
14.908	0.023	41700	98.3	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20091027-2.b/1027a010.d

Date : 27-OCT-2009 18:29

Client ID: S-3

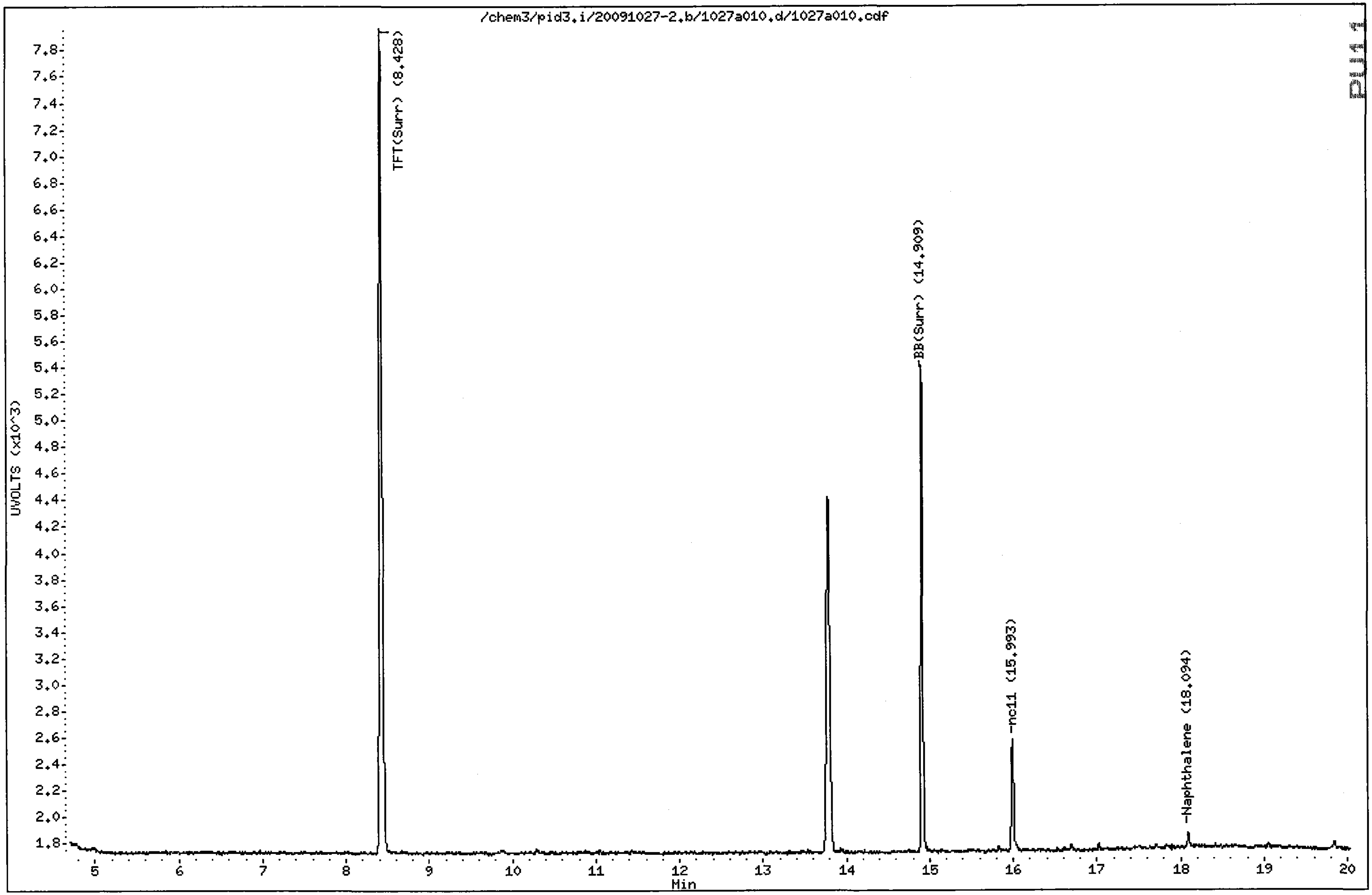
Sample Info: PU11C

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: PC

Column diameter: 0.18



Data File: /chem3/pid3.i/20091027-1.b/1027a010.d

Date : 27-OCT-2009 18:29

Client ID: S-3

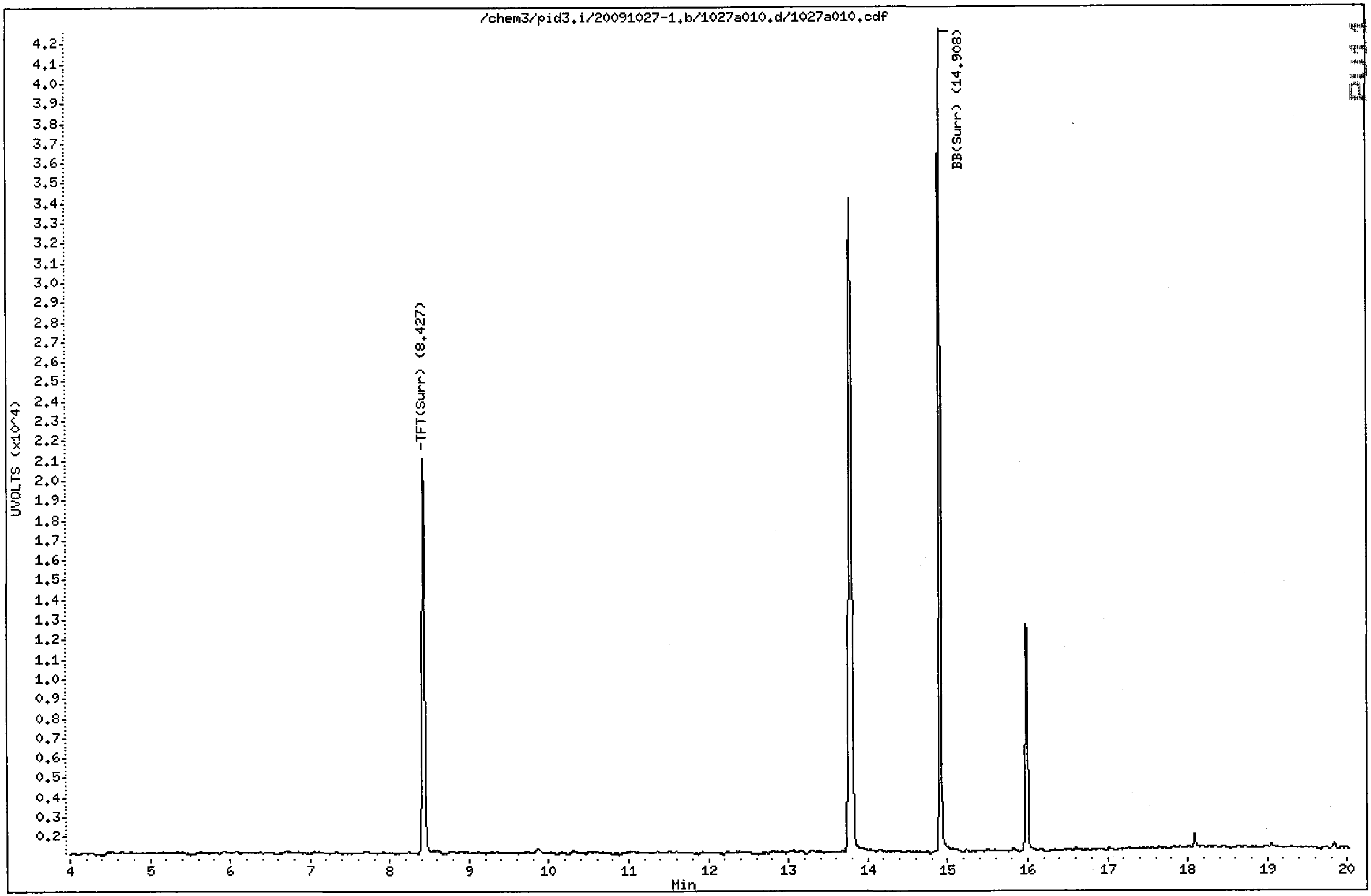
Sample Info: PU11C

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: PC

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: S-4
SAMPLE

Lab Sample ID: PU11D
LIMS ID: 09-25009
Matrix: Soil
Data Release Authorized:
Reported: 10/29/09

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 10/23/09
Date Received: 10/26/09

Date Analyzed: 10/27/09 18:53
Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL
Sample Amount: 61 mg-dry-wt
Percent Moisture: 23.9%

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	20	< 20 U	
108-88-3	Toluene	20	< 20 U	
100-41-4	Ethylbenzene	20	< 20 U	
179601-23-1	m,p-Xylene	41	< 41 U	
95-47-6	o-Xylene	20	< 20 U	
	Gasoline Range Hydrocarbons	8.1	< 8.1 U	---

BETX Surrogate Recovery

Trifluorotoluene	76.4%
Bromobenzene	76.2%

Gasoline Surrogate Recovery

Trifluorotoluene	75.1%
Bromobenzene	75.6%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

RC 12/28/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20091027-2.b/1027a011.d
Data file 2: /chem3/pid3.i/20091027-1.b/1027a011.d
Method: /chem3/pid3.i/20091027-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 19-OCT-2009

ARI ID: PU11D
Client ID: S-4
Injection Date: 27-OCT-2009 18:53
Matrix: SOIL
Dilution Factor: 1.000

==

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.434	0.030	4788	55288	75.1	TFT(Surr)
14.911	0.020	2924	23070	75.6	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	2186	0.003
8015B 2MP-TMB	(4.90 to 15.58)	1010	0.001
AKGas nC6-nC10	(5.39 to 14.53)	1009	0.001
NWGas Tol-Nap	(10.17 to 18.19)	2186	0.003

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

==

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.432	0.036	15066	76.4	TFT(Surr)
14.909	0.024	32350	76.2	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20091027-2.b/1027a011.d

Date : 27-OCT-2009 18:53

Client ID: S-4

Sample Info: PU11D

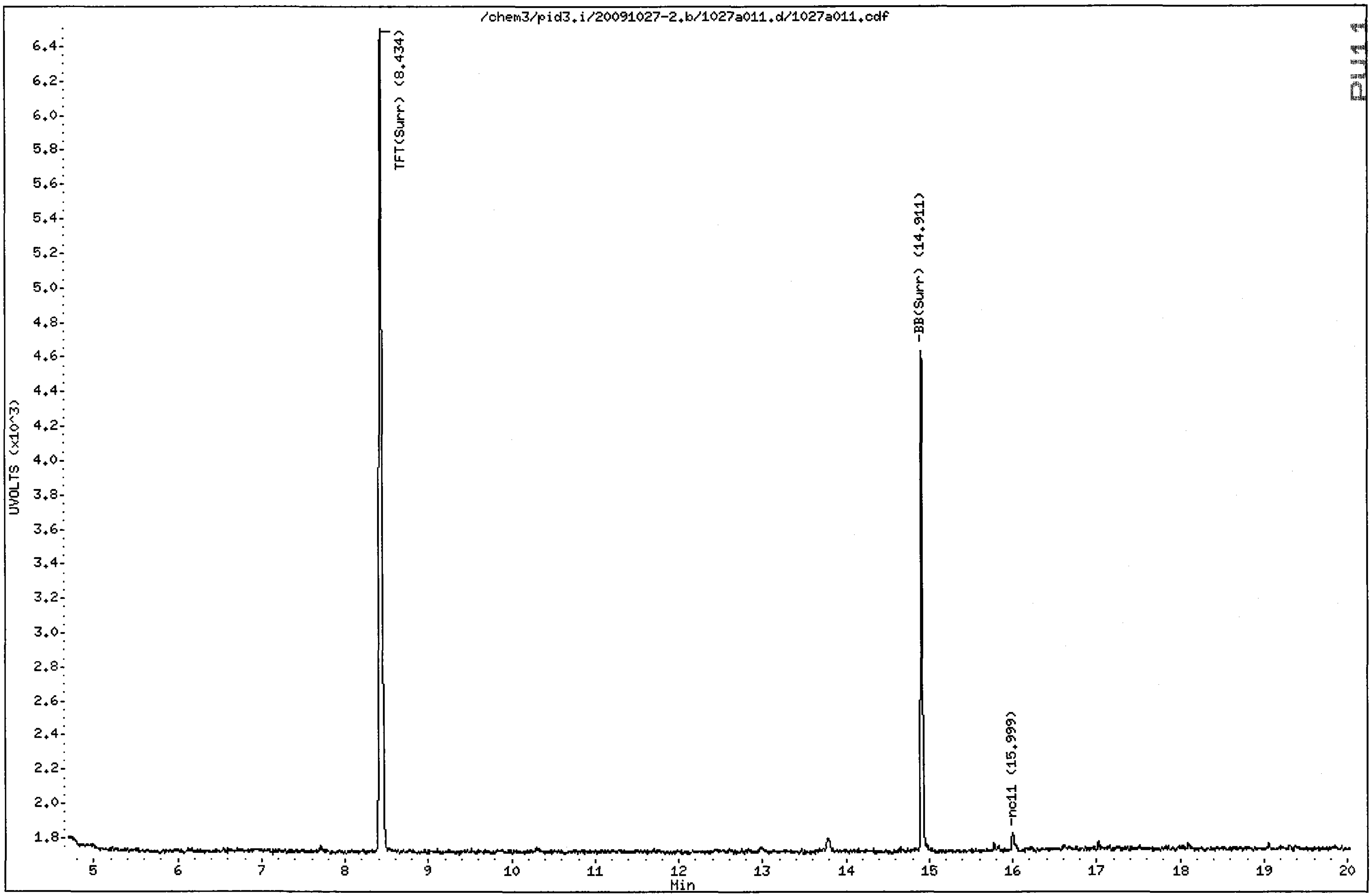
Column phase: RTX 502-2 FID

Page 1

Instrument: pid3.i

Operator: PC

Column diameter: 0.18



PU11 00028

Data File: /chem3/pid3.i/20091027-1.b/1027a011.d

Date : 27-OCT-2009 18:53

Client ID: S-4

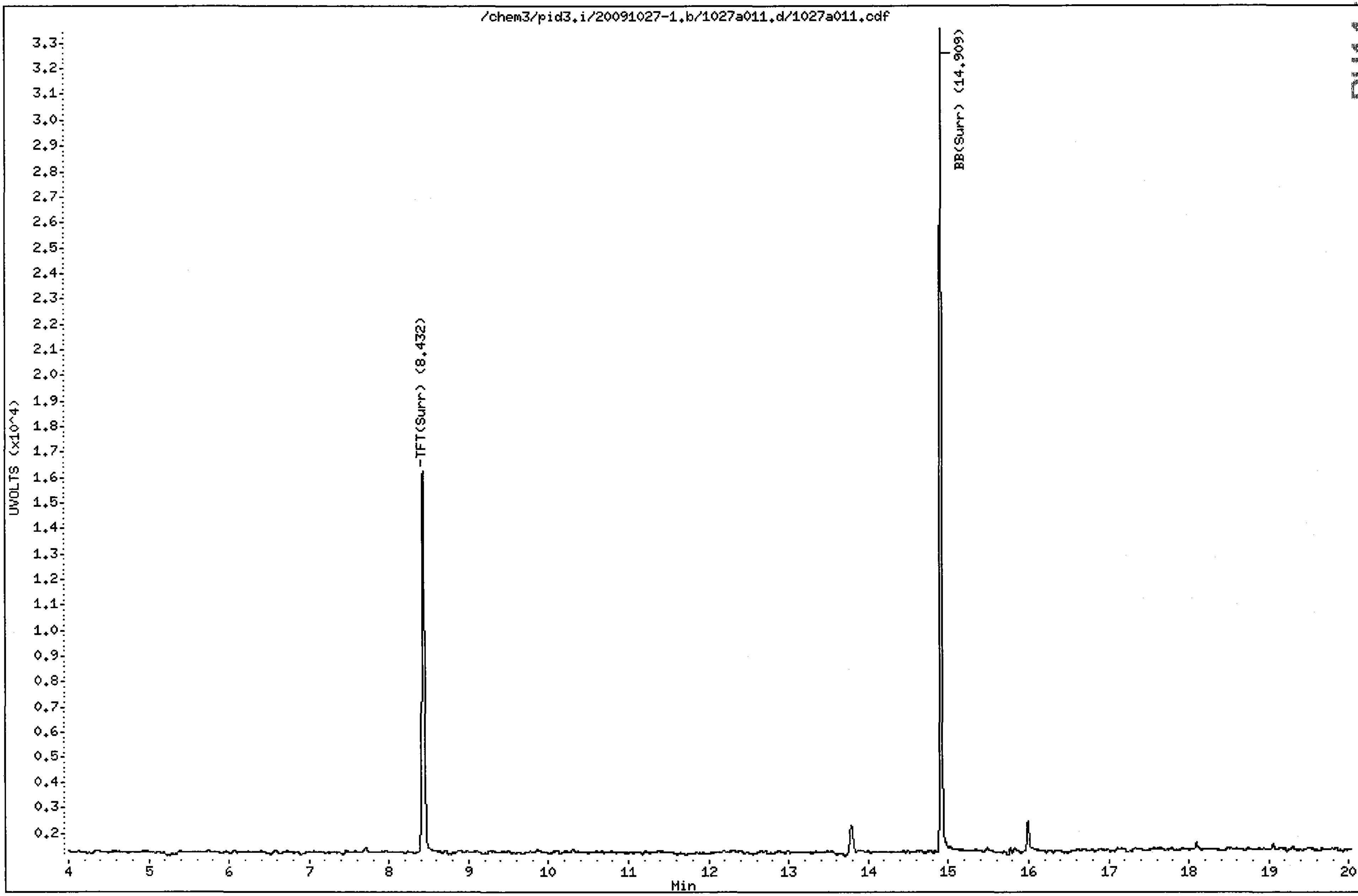
Sample Info: PU11D

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: PC

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: S-5
SAMPLE

Lab Sample ID: PU11E
LIMS ID: 09-25010
Matrix: Soil
Data Release Authorized:
Reported: 10/29/09

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 10/23/09
Date Received: 10/26/09

Date Analyzed: 10/27/09 19:18
Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL
Sample Amount: 65 mg-dry-wt
Percent Moisture: 20.7%

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	19	< 19 U	
108-88-3	Toluene	19	< 19 U	
100-41-4	Ethylbenzene	19	< 19 U	
179601-23-1	m,p-Xylene	39	< 39 U	
95-47-6	o-Xylene	19	< 19 U	
	Gasoline Range Hydrocarbons	7.7	< 7.7 U	---

BETX Surrogate Recovery

Trifluorotoluene	113%
Bromobenzene	109%

Gasoline Surrogate Recovery

Trifluorotoluene	110%
Bromobenzene	107%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

PC
10/28/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20091027-2.b/1027a012.d
Data file 2: /chem3/pid3.i/20091027-1.b/1027a012.d
Method: /chem3/pid3.i/20091027-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 19-OCT-2009

ARI ID: PU11E
Client ID: S-5
Injection Date: 27-OCT-2009 19:18
Matrix: SOIL
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.431	0.027	7025	81329	110.2	TFT(Surr)
14.911	0.020	4140	32955	107.0	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	1148	0.002
8015B 2MP-TMB	(4.90 to 15.58)	1149	0.001
AKGas nC6-nC10	(5.39 to 14.53)	1148	0.001
NWGas Tol-Nap	(10.17 to 18.19)	1148	0.002

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.430	0.033	22292	113.1	TFT(Surr)
14.909	0.024	46073	108.6	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20091027-2.b/1027a012.d

Date : 27-OCT-2009 19:18

Client ID: S-5

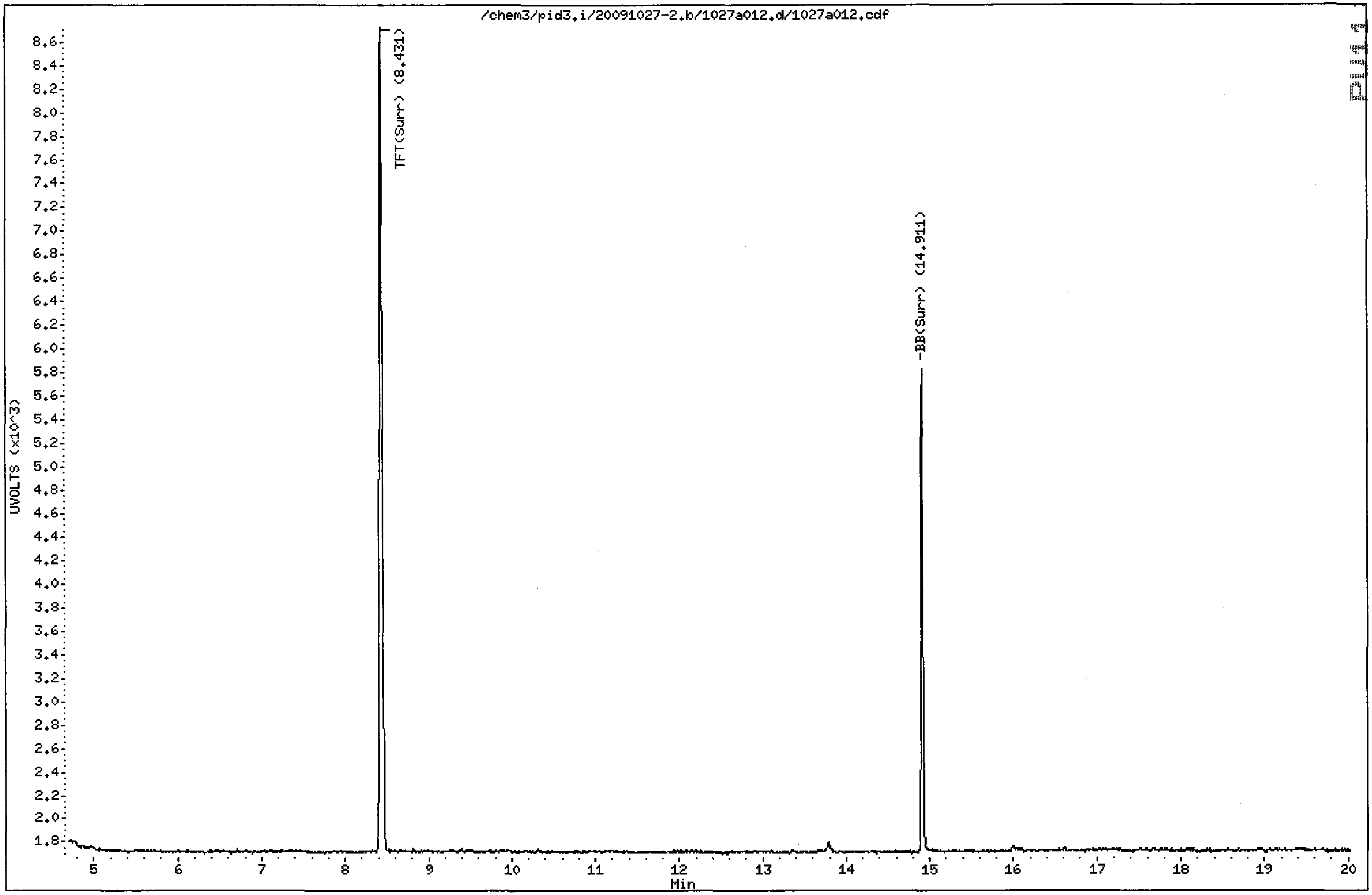
Sample Info: PU11E

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: PC

Column diameter: 0.18



Data File: /chem3/pid3.i/20091027-1.b/1027a012.d

Page 1

Date : 27-OCT-2009 19:18

Client ID: S-5

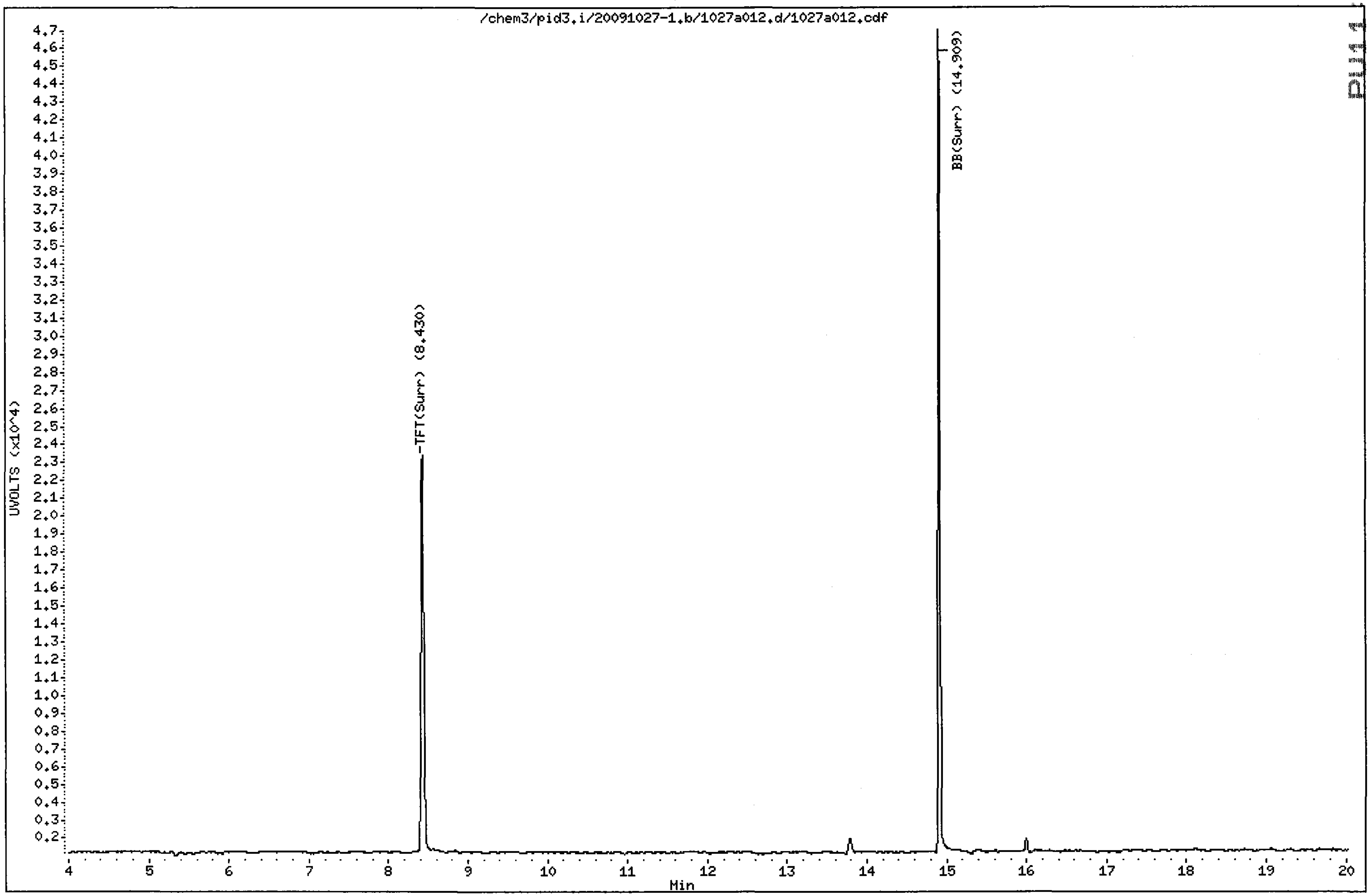
Instrument: pid3.i

Sample Info: PU11E

Operator: PC

Column phase: RTX 502-2 PID

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

TPHG SOIL SURROGATE RECOVERY SUMMARY

ARI Job: PU11
Matrix: Soil

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite
Event: NA

Client ID	BFB	TFT	BBZ	TOT OUT
MB-102709	NA	106%	104%	0
LCS-102709	NA	106%	101%	0
LCSD-102709	NA	106%	100%	0
S-1	NA	101%	99.0%	0
S-2	NA	101%	98.8%	0
S-3	NA	98.5%	95.8%	0
S-4	NA	75.1%	75.6%	0
S-5	NA	110%	107%	0

	LCS/MB LIMITS	QC LIMITS
(BFB) = Bromofluorobenzene	(70-130)	(70-130)
(TFT) = Trifluorotoluene	(80-120)	(66-123)
(BBZ) = Bromobenzene	(80-120)	(62-130)

Log Number Range: 09-25006 to 09-25010

ANALYTICAL RESOURCES INCORPORATED

BETX SOIL SURROGATE RECOVERY SUMMARY

ARI Job: PU11
Matrix: Soil

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite
Event: NA

Client ID	TFT	BBZ	TOT OUT
MB-102709	113%	108%	0
LCS-102709	113%	107%	0
LCSD-102709	111%	107%	0
S-1	106%	102%	0
S-2	106%	101%	0
S-3	101%	98.3%	0
S-4	76.4%	76.2%	0
S-5	113%	109%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(68-124)
(BBZ) = Bromobenzene	(77-120)	(62-134)

Log Number Range: 09-25006 to 09-25010

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG

Sample ID: TRIP BLANK SAMPLE

Lab Sample ID: PU11F
LIMS ID: 09-25011
Matrix: Water
Data Release Authorized:
Reported: 10/29/09

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: 10/23/09
Date Received: 10/26/09

Date Analyzed: 10/27/09 17:15
Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	0.25	< 0.25 U	
108-88-3	Toluene	0.25	< 0.25 U	
100-41-4	Ethylbenzene	0.25	< 0.25 U	
179601-23-1	m,p-Xylene	0.50	< 0.50 U	
95-47-6	o-Xylene	0.25	< 0.25 U	
	Gasoline Range Hydrocarbons	0.10	< 0.10 U	---

BETX Surrogate Recovery

Trifluorotoluene	112%
Bromobenzene	109%

Gasoline Surrogate Recovery

Trifluorotoluene	107%
Bromobenzene	106%

BETX values reported in $\mu g/L$ (ppb)
Gasoline values reported in mg/L (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

RC 10/28/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20091027-2.b/1027a007.d
Data file 2: /chem3/pid3.i/20091027-1.b/1027a007.d
Method: /chem3/pid3.i/20091027-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 19-OCT-2009

ARI ID: PU11F
Client ID: TRIP BLANK
Injection Date: 27-OCT-2009 17:15
Matrix: WATER
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.427	0.024	6844	79277	107.3	TFT(Surr)
14.908	0.018	4092	33934	105.8	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	2119	0.003
8015B 2MP-TMB	(4.90 to 15.58)	1043	0.001
AKGas nC6-nC10	(5.39 to 14.53)	1042	0.001
NWGas Tol-Nap	(10.17 to 18.19)	2119	0.003

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.426	0.029	22182	112.5	TFT(Surr)
14.907	0.022	46131	108.7	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

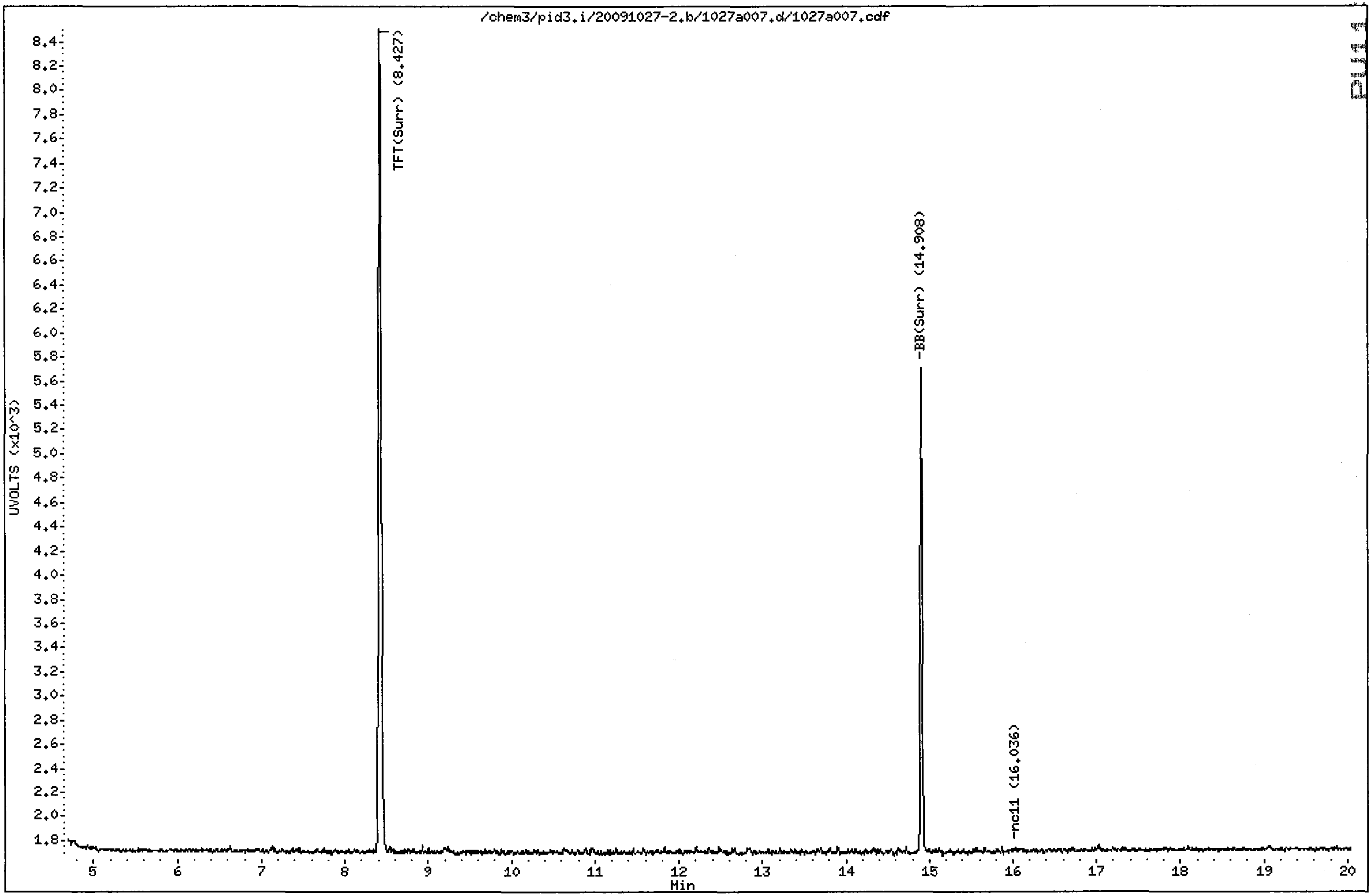
A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20091027-2.b/1027a007.d
Date : 27-OCT-2009 17:15
Client ID: TRIP BLANK
Sample Info: PU11F

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: PC
Column diameter: 0.18



Data File: /chem3/pid3.i/20091027-1.b/1027a007.d

Date : 27-OCT-2009 17:15

Client ID: TRIP BLANK

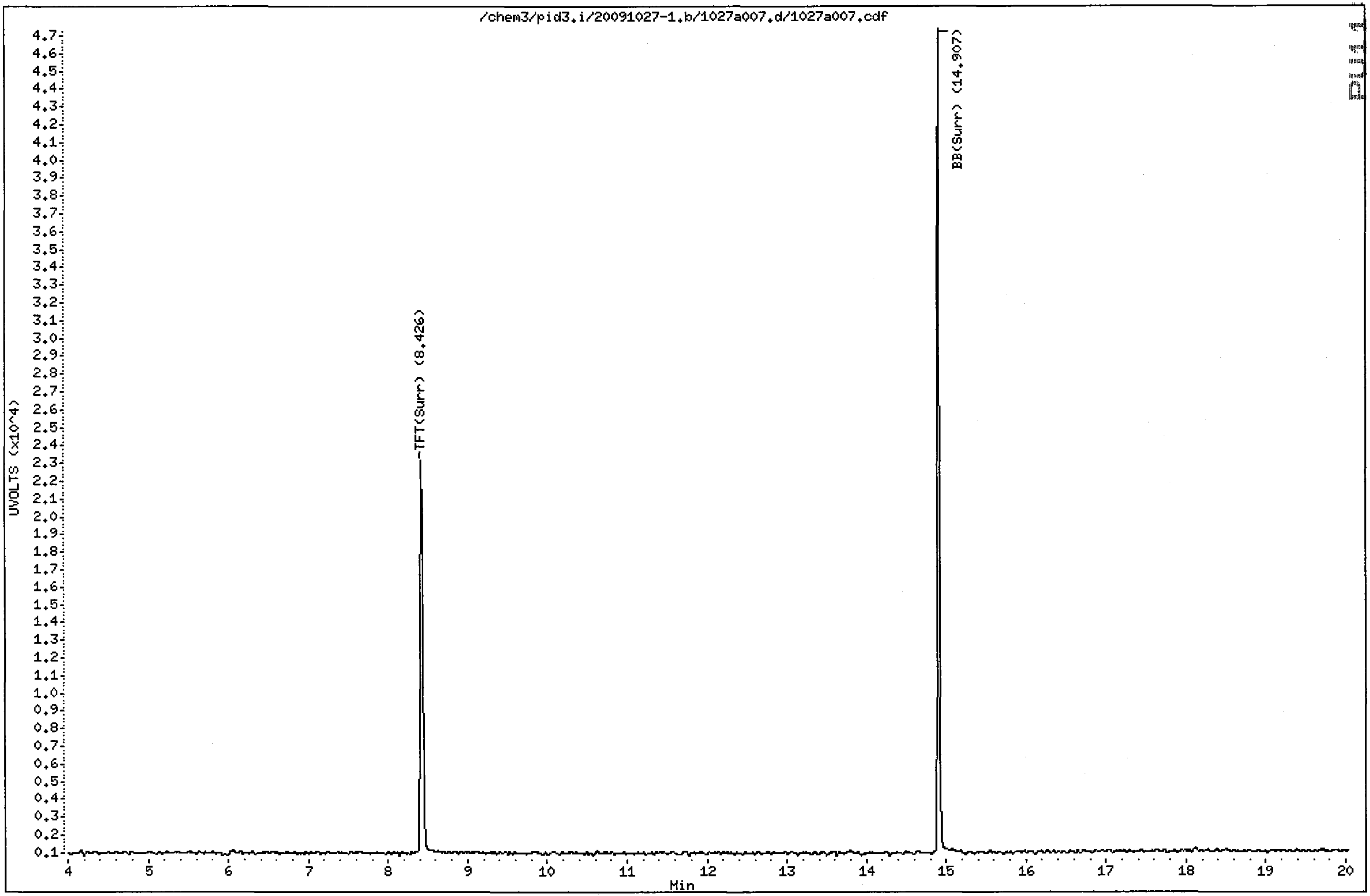
Sample Info: PU11F

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: PC

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

TPHG WATER SURROGATE RECOVERY SUMMARY

ARI Job: PU11
Matrix: Water

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite
Event: NA

Client ID	TFT	BBZ	TOT OUT
TRIP BLANK	107%	106%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(80-120)
(BBZ) = Bromobenzene	(80-120)	(80-120)

Log Number Range: 09-25011 to 09-25011

ANALYTICAL RESOURCES INCORPORATED

BETX WATER SURROGATE RECOVERY SUMMARY

ARI Job: PU11
Matrix: Water

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite
Event: NA

Client ID	TFT	BBZ	TOT OUT
TRIP BLANK	112%	109%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(79-120)	(80-120)
(BBZ) = Bromobenzene	(79-120)	(80-120)

Log Number Range: 09-25011 to 09-25011

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: LCS-102709
LAB CONTROL SAMPLE

Lab Sample ID: LCS-102709
LIMS ID: 09-25006
Matrix: Soil
Data Release Authorized:
Reported: 10/29/09

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 10/27/09 16:01
LCSD: 10/27/09 16:25
Instrument/Analyst LCS: PID3/PKC
LCSD: PID3/PKC

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	48.6	50.0	97.2%	45.4	50.0	90.8%	6.8%

Reported in mg/kg (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	106%	106%
Bromobenzene	101%	100%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod

Sample ID: LCS-102709
LAB CONTROL SAMPLE

Lab Sample ID: LCS-102709
LIMS ID: 09-25006
Matrix: Soil
Data Release Authorized:
Reported: 10/29/09

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 10/27/09 16:01
LCSD: 10/27/09 16:25
Instrument/Analyst LCS: PID3/PKC
LCSD: PID3/PKC

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	270	265	102%	248	265	93.6%	8.5%
Toluene	2090	2060	101%	1950	2060	94.7%	6.9%
Ethylbenzene	490	500	98.0%	456	500	91.2%	7.2%
m,p-Xylene	2170	2120	102%	2000	2120	94.3%	8.2%
o-Xylene	754	745	101%	694	745	93.2%	8.3%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	113%	111%
Bromobenzene	107%	107%

PC
12/28/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20091027-2.b/1027a004.d
Data file 2: /chem3/pid3.i/20091027-1.b/1027a004.d
Method: /chem3/pid3.i/20091027-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 19-OCT-2009

ARI ID: LCS102709
Client ID:
Injection Date: 27-OCT-2009 16:01
Matrix: WATER
Dilution Factor: 1.000

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FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.370	-0.033	6744	79348	105.8	TFT(Surr)
14.880	-0.010	3915	32830	101.2	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	661238	0.955
8015B 2MP-TMB	(4.90 to 15.58)	1341812	0.969
AKGas nC6-nC10	(5.39 to 14.53)	1065750	0.964
NWGas Tol-Nap	(10.17 to 18.19)	709755	0.972

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

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PID Surrogates

RT	Shift	Response	%Rec	Compound
8.368	-0.029	22233	112.8	TFT(Surr)
14.877	-0.008	45269	106.7	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
7.646	-0.027	6526	5.39	Benzene
10.241	-0.024	49416	41.86	Toluene
12.784	-0.017	10795	9.81	Ethylbenzene
12.924	-0.015	50670	43.39	M/P-Xylene
13.709	-0.013	17487	15.07	O-Xylene
5.234	-0.031	1754	5.58	MTBE

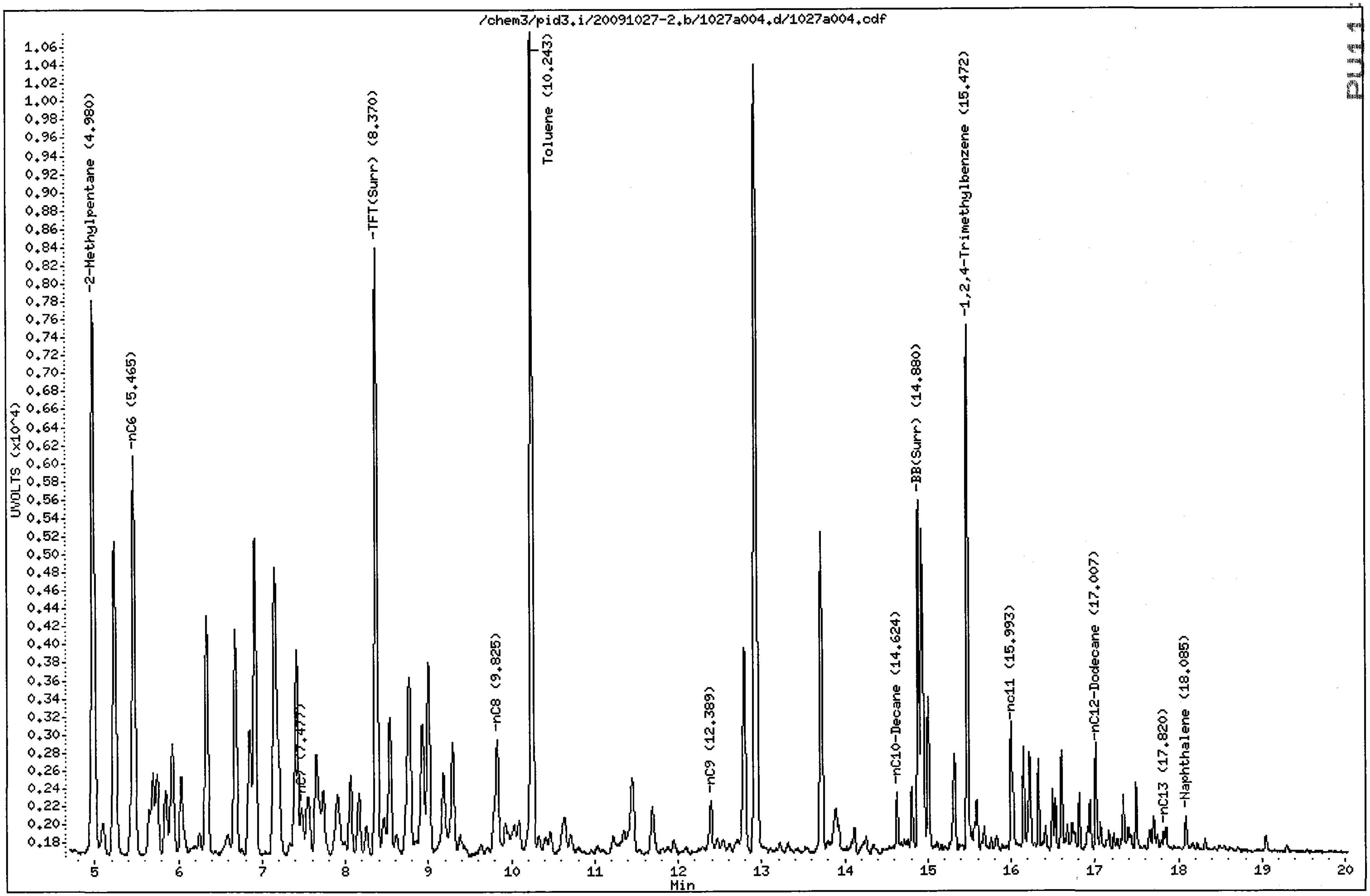
A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20091027-2.b/1027a004.d
Date : 27-OCT-2009 16:01
Client ID:
Sample Info: LCS102709

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: PC
Column diameter: 0.18



Data File: /chem3/pid3.i/20091027-1.b/1027a004.d

Date : 27-OCT-2009 16:01

Client ID:

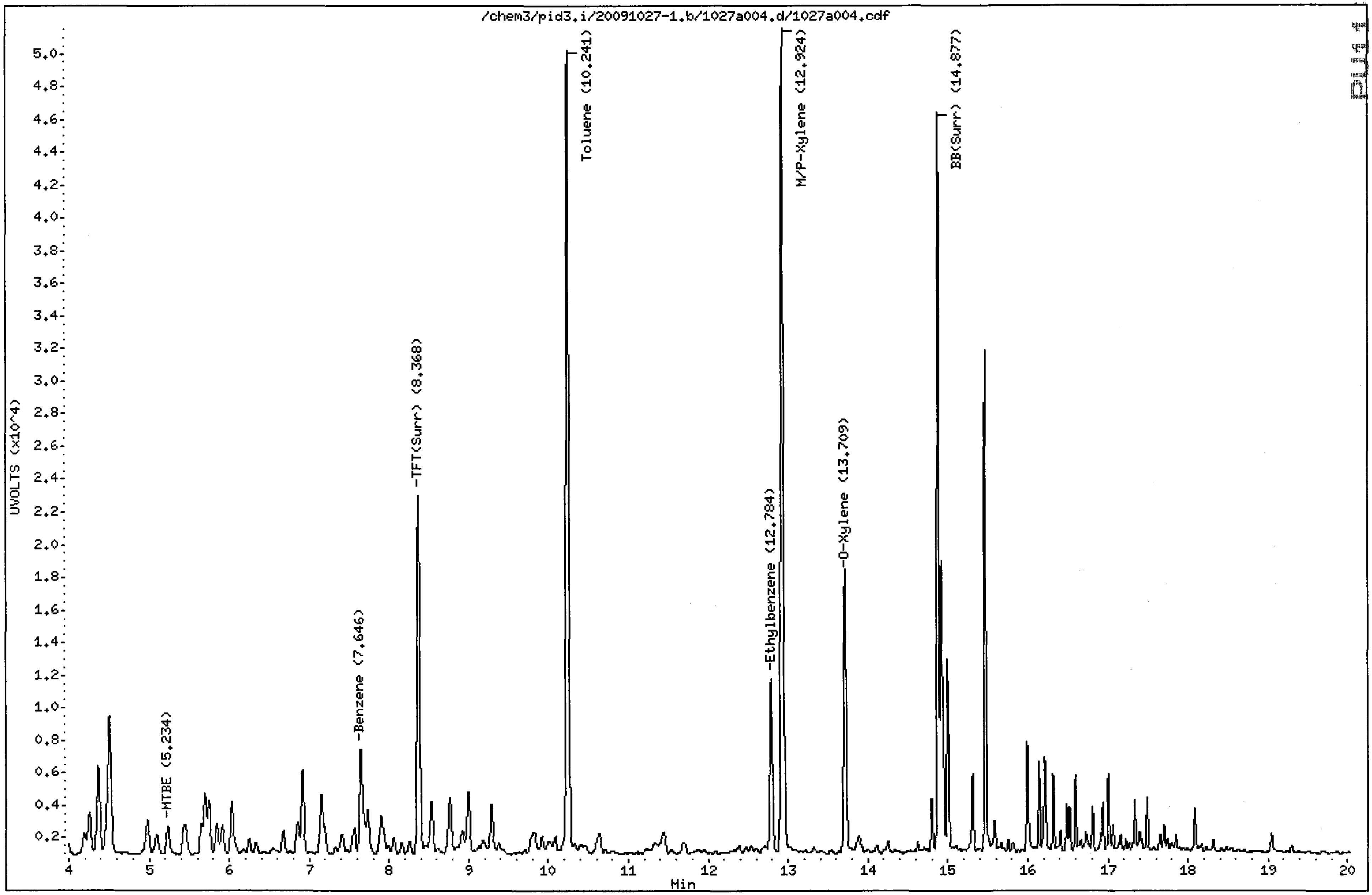
Sample Info: LCS102709

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: PC

Column diameter: 0.18



KC
10/28/09

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20091027-2.b/1027a005.d
Data file 2: /chem3/pid3.i/20091027-1.b/1027a005.d
Method: /chem3/pid3.i/20091027-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 19-OCT-2009

ARI ID: LCSD102709
Client ID:
Injection Date: 27-OCT-2009 16:25
Matrix: WATER
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.414	0.010	6735	79271	105.6	TFT(Surr)
14.898	0.008	3888	32185	100.5	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	619474	0.894
8015B 2MP-TMB	(4.90 to 15.58)	1241377	0.897
AKGas nC6-nC10	(5.39 to 14.53)	986351	0.892
NWGas Tol-Nap	(10.17 to 18.19)	663588	0.909

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.412	0.015	21927	111.2	TFT(Surr)
14.897	0.011	45281	106.7	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
7.687	0.014	6001	4.96	Benzene
10.282	0.017	46068	39.03	Toluene
12.819	0.018	10034	9.12	Ethylbenzene
12.959	0.020	46743	40.02	M/P-Xylene
13.738	0.016	16095	13.87	O-Xylene
5.264	-0.001	1522	4.84	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20091027-2.b/1027a005.d

Date : 27-OCT-2009 16:25

Client ID:

Sample Info: LCSD102709

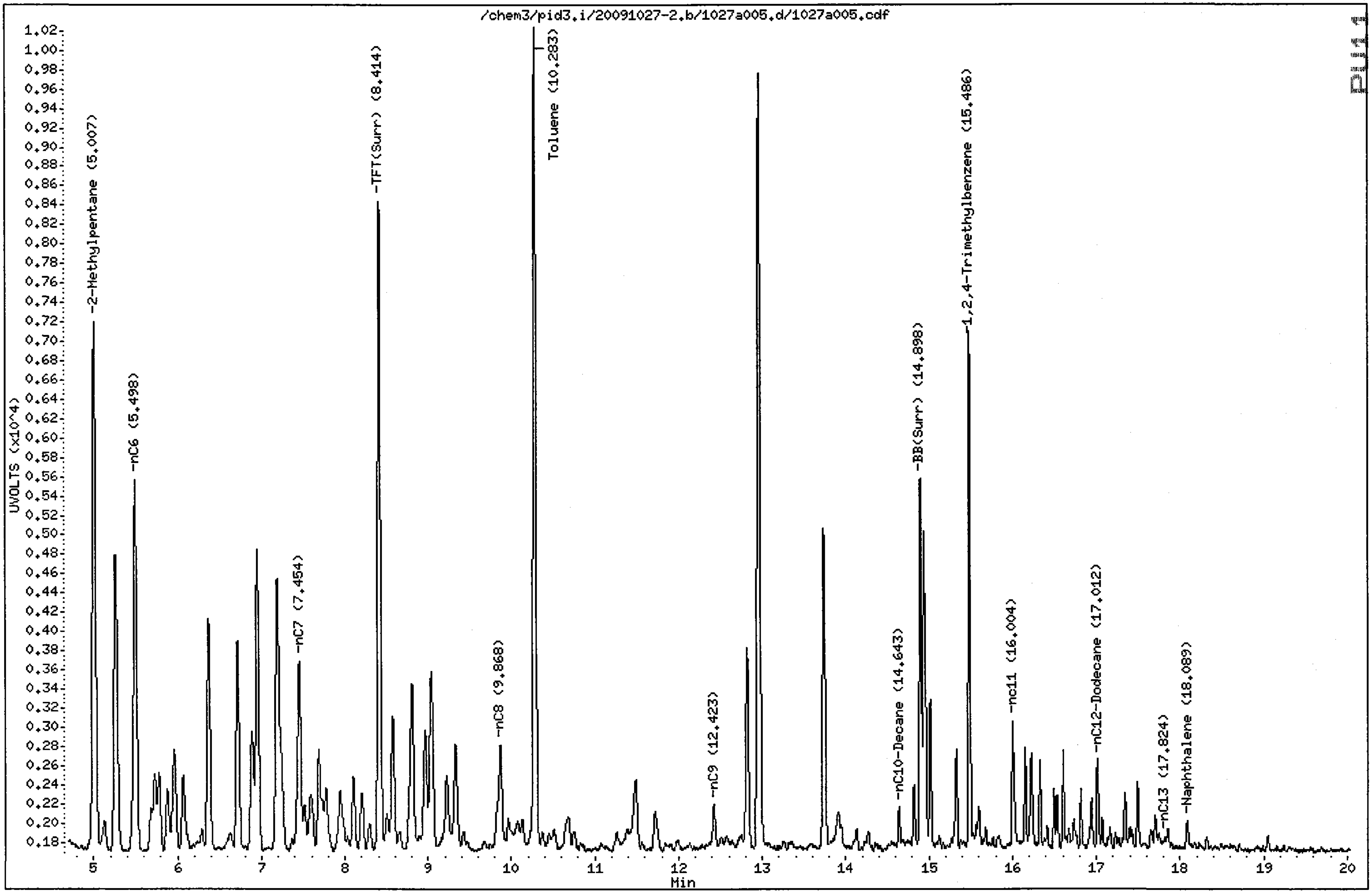
Column phase: RTX 502-2 FID

Page 1

Instrument: pid3.i

Operator: PC

Column diameter: 0.18



Data File: /chem3/pid3.i/20091027-1.b/1027a005.d

Date : 27-OCT-2009 16:25

Client ID:

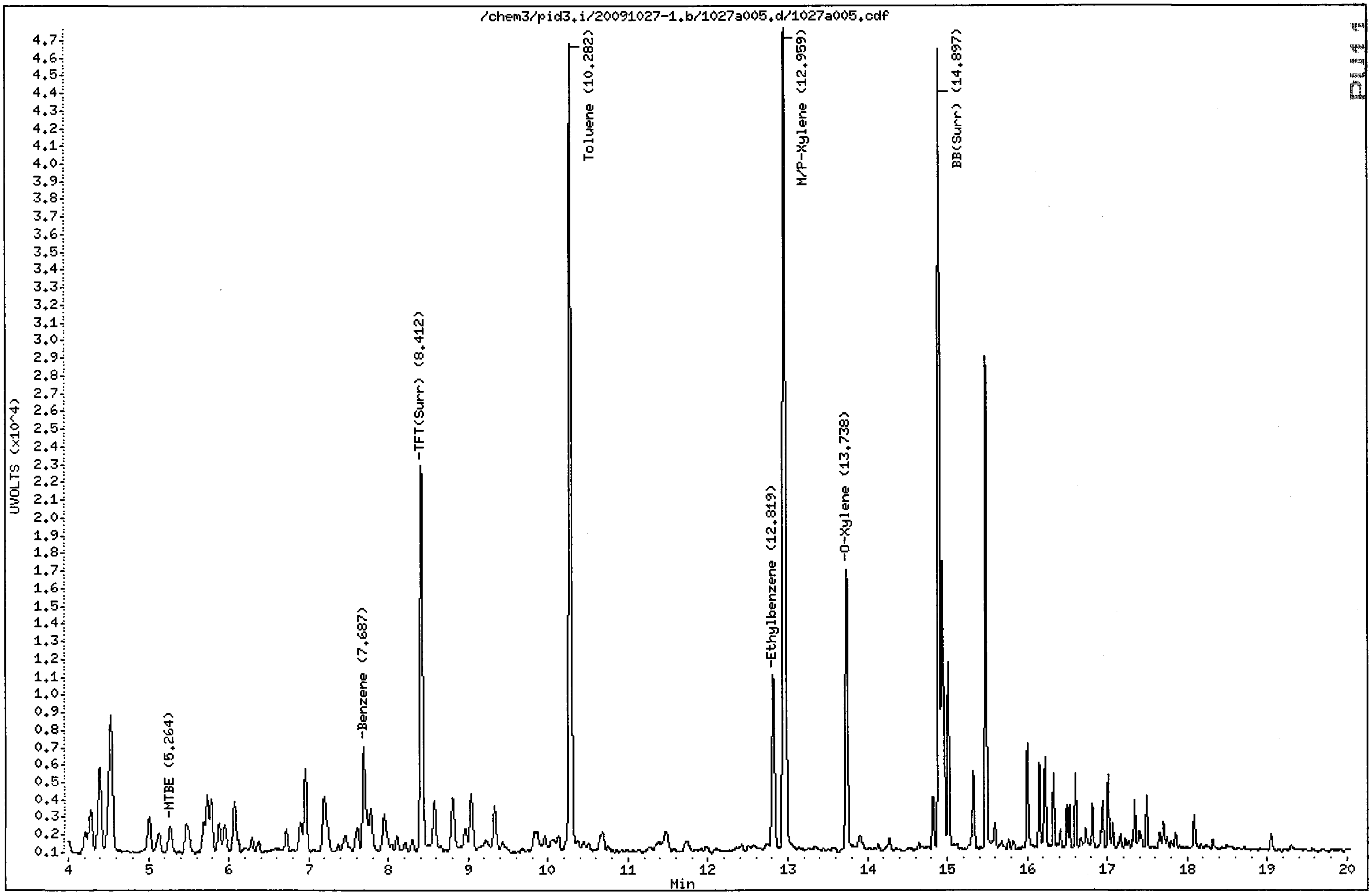
Instrument: pid3.i

Sample Info: LCSD102709

Operator: PC

Column phase: RTX 502-2 PID

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: MB-102709
METHOD BLANK

Lab Sample ID: MB-102709
LIMS ID: 09-25006
Matrix: Soil
Data Release Authorized:
Reported: 10/29/09

QC Report No: PU11-RH2 Engineering
Project: Cashmere Millsite
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed: 10/27/09 16:50
Instrument/Analyst: PID3/PKC

Purge Volume: 5.0 mL
Sample Amount: 100 mg-dry-wt

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	12	< 12 U	
108-88-3	Toluene	12	< 12 U	
100-41-4	Ethylbenzene	12	< 12 U	
179601-23-1	m,p-Xylene	25	< 25 U	
95-47-6	o-Xylene	12	< 12 U	
	Gasoline Range Hydrocarbons	5.0	< 5.0 U	---

BETX Surrogate Recovery	
Trifluorotoluene	113%
Bromobenzene	108%

Gasoline Surrogate Recovery	
Trifluorotoluene	106%
Bromobenzene	104%

BETX values reported in $\mu g/kg$ (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

RC
12/28K9

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20091027-2.b/1027a006.d
Data file 2: /chem3/pid3.i/20091027-1.b/1027a006.d
Method: /chem3/pid3.i/20091027-1.b/PIDB.m
Instrument: pid3.i
Gas Ical Date: 22-JUN-2009
BETX Ical Date: 19-OCT-2009

ARI ID: MB102709
Client ID:
Injection Date: 27-OCT-2009 16:50
Matrix: WATER
Dilution Factor: 1.000

==

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.422	0.019	6785	79659	106.4	TFT(Surr)
14.905	0.014	4013	32446	103.7	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range		Total Area*	Amount
WAGas Tol-C12	(10.17 to 17.11)	1	0.000
8015B 2MP-TMB	(4.90 to 15.58)	3366	0.002
AKGas nC6-nC10	(5.39 to 14.53)	3366	0.003
NWGas Tol-Nap	(10.17 to 18.19)	1	0.000

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

==

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.421	0.024	22201	112.6	TFT(Surr)
14.903	0.018	45978	108.4	BB(Surr)

AROMATICS (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20091027-2.b/1027a006.d

Date : 27-OCT-2009 16:50

Client ID:

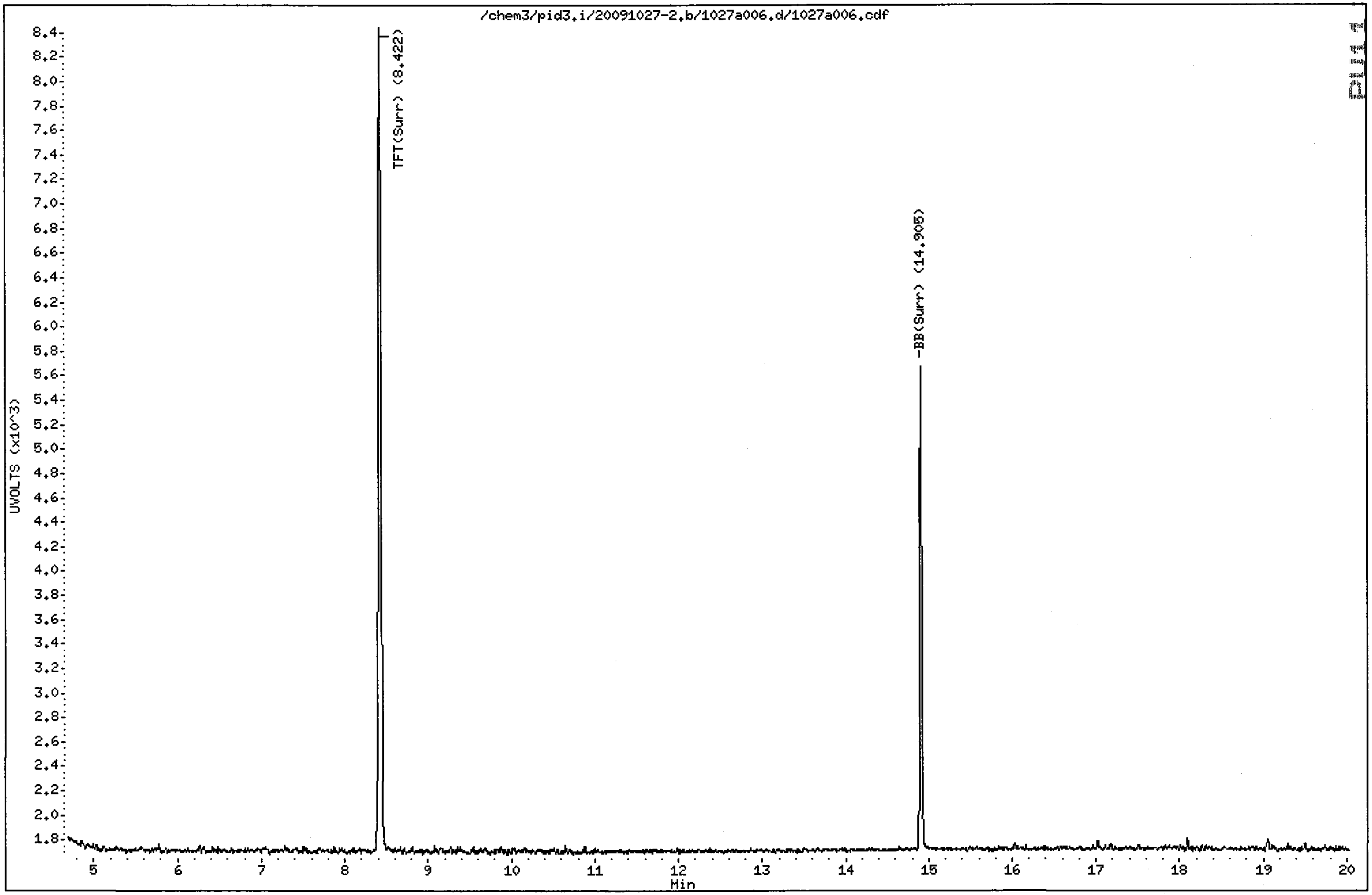
Sample Info: MB102709

Column phase: RTX 502-2 FID

Instrument: pid3.i

Operator: PC

Column diameter: 0.18



Data File: /chem3/pid3.i/20091027-1.b/1027a006.d

Date : 27-OCT-2009 16:50

Client ID:

Sample Info: MB102709

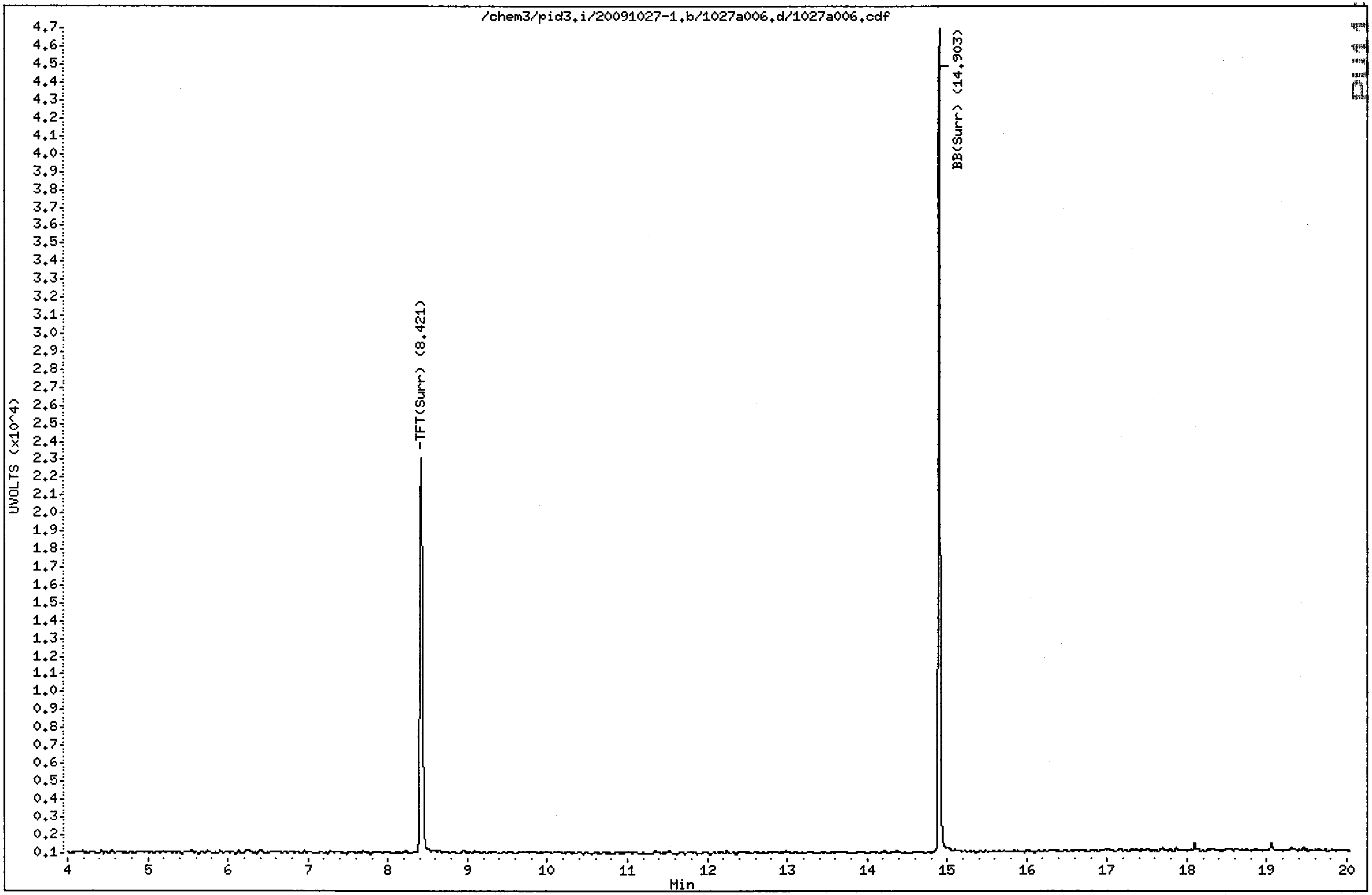
Column phase: RTX 502-2 PID

Page 1

Instrument: pid3.i

Operator: PC

Column diameter: 0.18



OnSite
Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

January 29, 2010

Bert Pschunder
GeoEngineers, Inc.
8410 154th Avenue NE
Redmond, WA 98052

Re: Analytical Data for Project 18593-001-00
Laboratory Reference No. 1001-145

Dear Bert:

Enclosed are the analytical results and associated quality control data for samples submitted on January 25, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

Case Narrative

Samples were collected on January 20 and 21, 2010 and received by the laboratory on January 25, 2010. They were maintained at the laboratory at a temperature of 2°C to 6°C. Please see Sample/Cooler Receipt form at the end of the report.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
B-1, 5-6, 11-5'	01-145-0	Soil	1-20-10	1-25-10	
B-6, 11-5'	01-145-0	Soil	1-21-10	1-25-10	

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

NWTPH-Dx

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Date Prepared	Date Analyzed	Flags
Lab ID:	01-145-01				
Client ID:	**B-1,S-6,11.5'**				
Diesel Range Organics	**500**	37	1-27-10	1-27-10	Y
Lube Oil	**820**	74	1-27-10	1-27-10	Y
Surrogate: o-terphenyl	95%	50-150			
Lab ID:	01-145-02				
Client ID:	**B-6,11.5'**				
Diesel Range Organics	**1100**	47	1-27-10	1-27-10	Y
Lube Oil	**1600**	93	1-27-10	1-27-10	Y
Surrogate: o-terphenyl	111%	50-150			

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	1-27-10
Date Analyzed:	1-27-10
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB0127S1
Diesel Range:	**ND**
PQL:	25
Identification:	---
Lube Oil Range:	**ND**
PQL:	50
Identification:	---
Surrogate Recovery	
o-Terphenyl:	97%
Flags:	Y

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted:	1-27-10
Date Analyzed:	1-27-10
Matrix:	Soil
Units:	mg/kg (ppm)

Lab ID:	MB0127S1
Diesel Range:	**ND**
PQL:	25
Identification:	---
Lube Oil Range:	**ND**
PQL:	50
Identification:	---
Surrogate Recovery	
o-Terphenyl:	97%
Flags:	Y

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

NWTPH-Dx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Contol Limits
DF2CCV0127F-V1	100	94.4	6	+/-15%
DF2CCV0127F-V2	100	96.0	4	+/-15%
DF2CCV0127F-V3	100	98.2	2	+/-15%
DF2CCV0127R-V1	100	92.7	7	+/-15%
DF2CCV0127R-V2	100	96.6	3	+/-15%
DF2CCV0127R-V3	100	99.1	1	+/-15%

Date of Report: January 29, 2010
Samples Submitted: January 25, 2010
Laboratory Reference: 1001-145
Project: 18593-001-00

% MOISTURE

Date Analyzed: 1-27-10

Client ID	Lab ID	% Moisture
B-1, 5-6, 11-5'	01-145-01	32
B-6, 11-5'	01-145-02	46

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Laboratory Number: 01-145

Company: GeoEngineers

Project Number: 18593-001-00

Project Name: Cashmere MiLL

Project Manager: Bert Pschunder

Sampled by: Nick Szot

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
1	B-1, S-6, 11.5'	1/20/10	1500	Soil	1			X																	X
2	B-6, 11.5'	1/21/10	1715	Soil	1			X																	✓

	Signature	Company	Date	Time
Relinquished by	N Szot	GeoEngineers	1/25/10	1107
Received by	[illegible]	OSE	1/25/10	1107
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:
Sample contains wood waste: Use Any cleanup steps necessary in analysis.

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Client Copy

Sample/Cooler Receipt and Acceptance Checklist

Client: GE

Client Project Name/Number: ____________

OnSite Project Number: 01-145

Initiated by: [signature]

Date Initiated: 1/25/10

1.0 Cooler Verification

1.1 Were there custody seals on the outside of the cooler?	Yes	No	N/A	1 2 3 4
1.2 Were the custody seals intact?	Yes	No	N/A	1 2 3 4
1.3 Were the custody seals signed and dated by last custodian?	Yes	No	N/A	1 2 3 4
1.4 Were the samples delivered on ice or blue ice?	Yes	No		1 2 3 4
1.5 Were samples received between 0-6 degrees Celsius?	Yes	No	Temperature: 15	
1.6 Have shipping bills (if any) been attached to the back of this form?	Yes	N/A		
1.7 How were the samples delivered?	Client	Courier	UPS/FedEx	OSE Pickup Other

2.0 Chain of Custody Verification

2.1 Was a Chain of Custody submitted with the samples?	Yes	No	1 2 3 4
2.2 Was the COC legible and written in permanent ink?	Yes	No	1 2 3 4
2.3 Have samples been relinquished and accepted by each custodian?	Yes	No	1 2 3 4
2.4 Did the sample labels (ID, date, time, preservative) agree with COC?	Yes	No	1 2 3 4
2.5 Were all of the samples listed on the COC submitted?	Yes	No	1 2 3 4
2.6 Were any of the samples submitted omitted from the COC?	Yes	No	1 2 3 4

3.0 Sample Verification

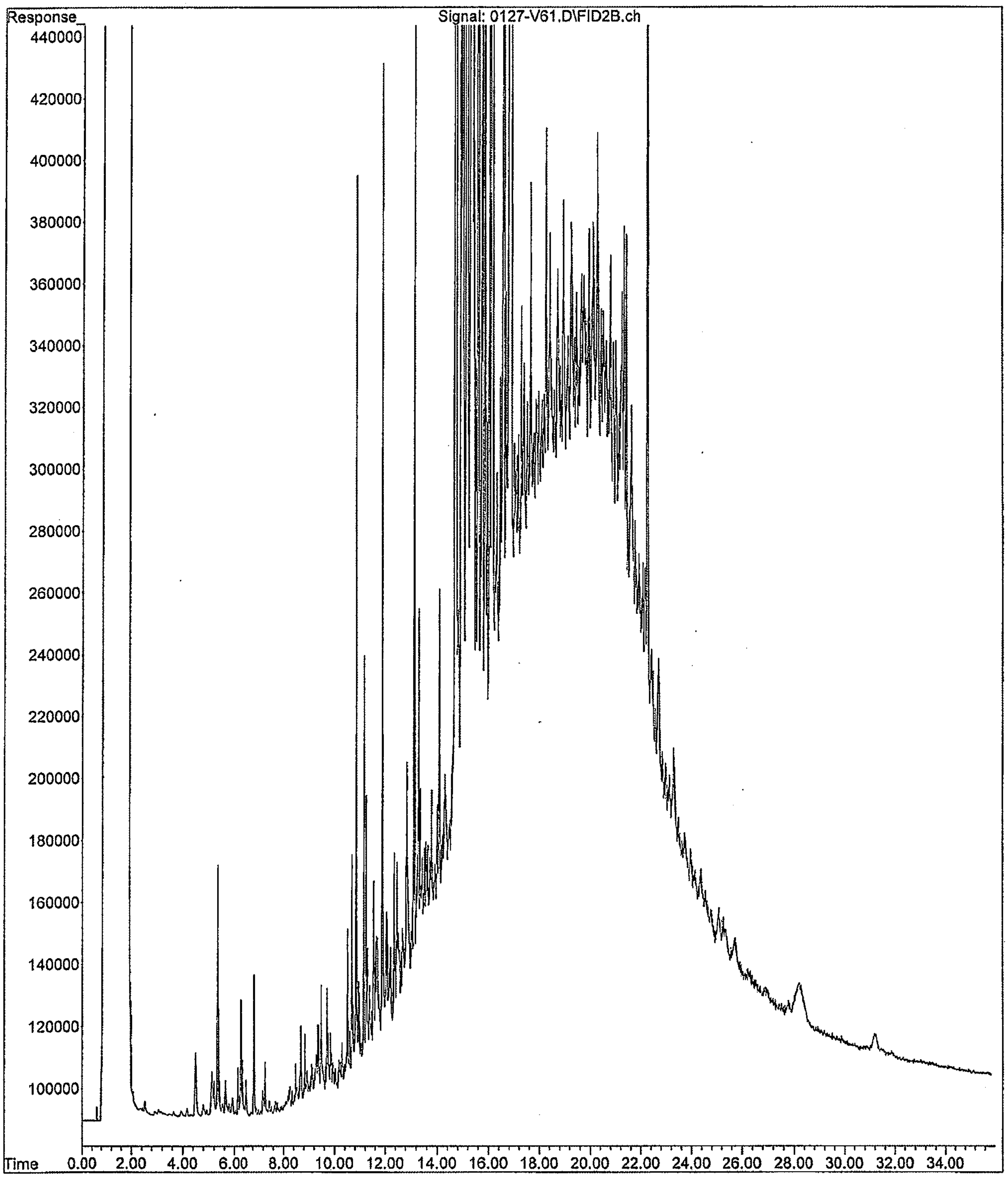
3.1 Were any sample containers broken or compromised?	Yes	No		1 2 3 4
3.2 Were any sample labels missing or illegible?	Yes	No		1 2 3 4
3.3 Have the correct containers been used for each analysis requested?	Yes	No		1 2 3 4
3.4 Have the samples been correctly preserved?	Yes	No	N/A	1 2 3 4
3.5 Are volatiles samples free from headspace and air bubbles?	Yes	No	N/A	1 2 3 4
3.6 Is there sufficient sample submitted to perform requested analyses?	Yes	No		1 2 3 4
3.7 Have any holding times already expired or will expire in 24 hours?	Yes	No		1 2 3 4
3.8 Was method 5035A used?	Yes	No	N/A	1 2 3 4
3.9 If 5035A was used, which sampling option was used (#1, 2, or 3).	#		N/A	1 2 3 4

Explain any discrepancies:

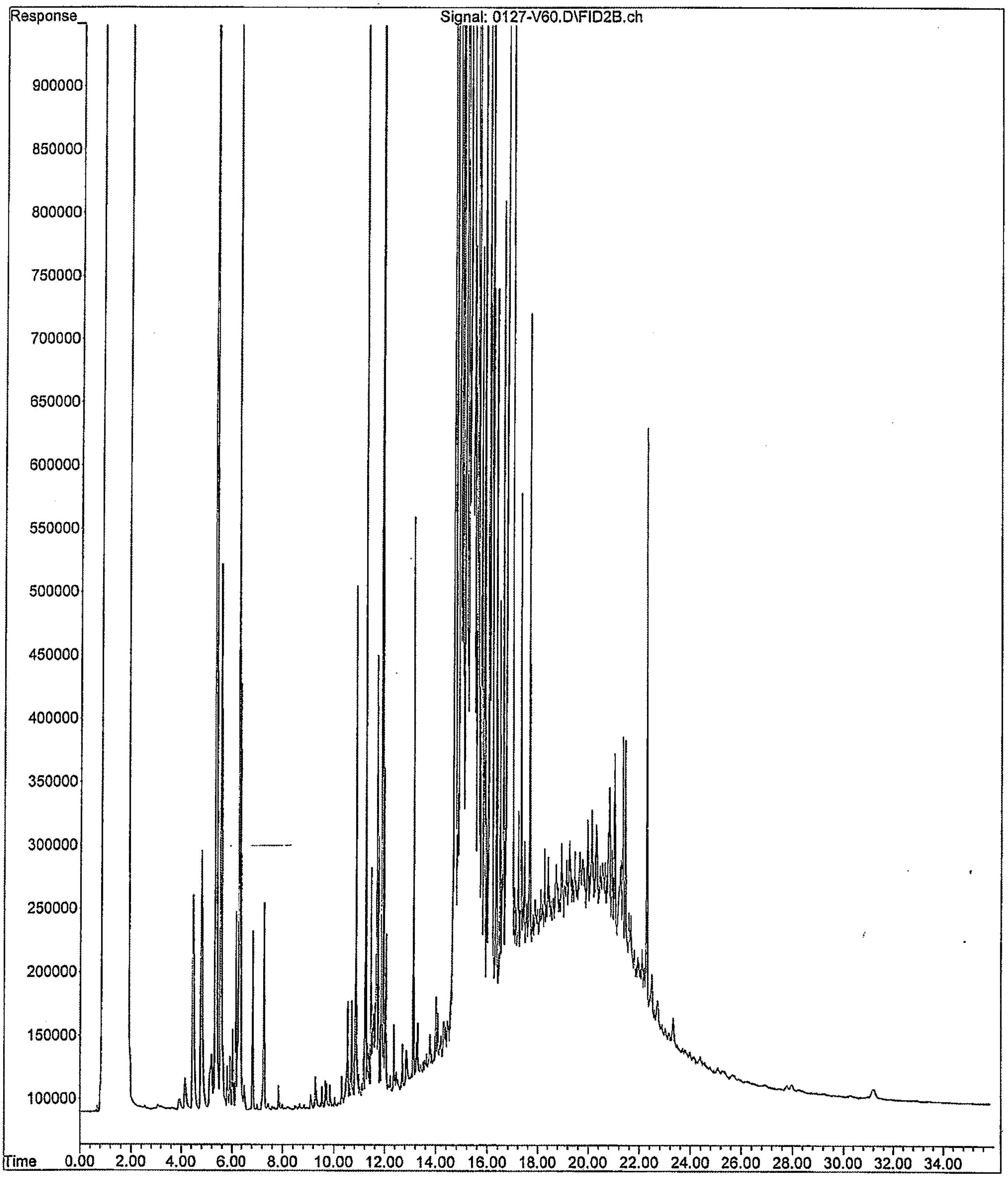
1 - Discuss issue in Case Narrative
2 - Process Sample As-is
3 - Client contacted to discuss problem
4 - Sample cannot be analyzed or client does not wish to proceed

//SERVER\OSE\Administration\forms\cooler_checklist.xls

```
File          :X:\DIESELS\VIGO\DATA\V100127.SEC\0127-V61.D
Operator      : ZT
Acquired      : 27 Jan 10   4121 p     using AcqMethod V091125F.M
Instrument :    Vigo
Sample Name: 01-145-01
Misc Info    :
Vial Number: 61
```



```
File         :X:\DIESELS\VIGO\DATA\V100127.SEC\0127-V60.D
Operator     : ZT
Acquired     : 27 Jan 10   3121 p     using AcqMethod V091125F.M
Instrument :    Vigo
Sample Name: 01-145-02
Misc Info  :
Vial Number: 60
```



Analytical Resources, Incorporated
Analytical Chemists and Consultants

March 9, 2011

Steve Nelson
RH2 Engineering, Inc.
12100 NE 195th Street
Suite #100
Bothell, WA 98011

Client Project: PCC Cashmere, PCC 208.020.01.122
ARI ID: SL36, SL69

Dear Steve:

Please find enclosed the original Chain of Custody (COC), sample receipt documentation, and the final results for the project referenced above. Analytical Resources, Inc. (ARI) accepted two soil samples on March 3, 2011. For further details regarding sample receipt, please refer to the Cooler Receipt Form. The samples were analyzed for NWTPH-HCID under ARI job number SL36. As per client instruction on March 4, 2011, sample **S-1** was re-analyzed for NWTPH-Dx with Acid/Silica clean-up under job number SL69.

The percent recover for the surrogate, O-terphenyl, was high following the initial analysis of the method blank associated with the HCID analysis. The recoveries for this surrogate for both samples were within compliance. No corrective action was required.

There were no other anomalies associated with these analyses.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please feel free to contact me at your convenience.

Respectfully,

Bob Congleton

Bob Congleton
Project Manager
ANALYTICAL RESOURCES, INC.
(206) 695-6232
bob@arilabs.com
www.arilabs.com

Enclosures

cc: eFile SL36_SL69

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

SL36

CASCADE ANALYTICAL, INC.

AGRICULTURAL&
ENVIRONMENTAL ANALYSIS

3019 G.S. Center Rd.
Wenatchee, WA 98801

(509) 662-1888
Fax: (509) 662-8183
1-800-545-4206

SPECIAL SERVICE ORDER FORM

SAMPLE #	1	2	3	4
SEND RESULTS TO 1)Client 2)Billing 3)Both				
SAMPLE REPRESENTS 1)Food 2)Water 3)Soil 4)Plant Tissue 5)Other				
SAMPLE BY 1)Client 2)Field Rep 3)Quality Control 4)Cascade 5)Other				
SAMPLER'S NAME				

CLIENT NAME/ADDRESS	BILLING NAME/ADDRESS
Steve Nelson	Steve Nelson, RH2 Engineering
RH2 Engineering	300 Simon St. SE, Suite 5
300 Simon St ~~SE~~, Suite 5, East Wenatchee,	East Wenatchee, WA 98802
PHONE NO. 206-794-6613 WA 98802	PHONE NO. 206-794-6613
EMAIL snelson@rh2.com	EMAIL snelson@rh2.com

FORM MUST BE COMPLETED BEFORE ANALYSIS WILL BE PERFORMED.

RELINQUISHED BY (Signature) 1	DATE	RELINQUISHED BY. (Signature) 2	DATE	RELINQUISHED BY (Signature) 3	DATE
[signature]	3-2-11				
(Printed) Adam Neff	TIME	(Printed)	TIME	(Printed)	TIME
RECEIVED BY (Signature) [signature]	DATE 945 3/3/11	RECEIVED BY: (Signature) A.	DATE	RECEIVED BY (Signature)	DATE
(Printed) A. Volgardsen	TIME 945	(Printed)	TIME	(Printed)	TIME

#		Sample Date	Sample Time
1	SAMPLE I D S-1a	3-1-11	530 pm
	ANALYSIS REQUESTED HCID - Diesel + gasoline range hydrocarbons		
	COMMENT		
2	SAMPLE I D S-1b	3-1-11	530 pm
	ANALYSIS REQUESTED HCID - Diesel + gasoline range hydrocarbons		
	COMMENT		
3	SAMPLE I D S-2a	3-1-11	530 pm
	ANALYSIS REQUESTED HCID - Diesel + gasoline range hydrocarbons		
	COMMENT		
4	SAMPLE I D S-2b	3-1-11	530 pm
	ANALYSIS REQUESTED HCID - Diesel + gasoline range hydrocarbons		
	COMMENT		

Sample container received by client was sealed **Yes** _____ **No** _____
Sample container received by laboratory was sealed **Yes** _____ **No** _____

Customer Signature [signature] Date 3-1-11

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: PHA

COC No(s): (NA)

Assigned ARI Job No: SL36

Project Name: PCC Cashmere

Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

Tracking No: 12F64W2122 1000380 9 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)........ 4.7

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90941619

Cooler Accepted by: AV Date: 3/3/11 Time: 945

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: AV Date: 3/3/11 Time: 1032

***** 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:

placed 1 1/2 oz jars on hold, made four samples into two.

By: AV Date: 3/3/11

Small Air Bubbles ~2mm	Peabubbles' 2-4 mm	LARGE Air Bubbles > 4 mm

Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

SL36

Cooler#: 1 Temperature(°C): 10.7

Sample ID	Bottle Count	Bottle Type
All samples out of temp compliance.		

Cooler#: Temperature(°C):

Sample ID	Bottle Count	Bottle Type

Cooler#: Temperature(°C):

Sample ID	Bottle Count	Bottle Type

Cooler#: Temperature(°C):

Sample ID	Bottle Count	Bottle Type

Completed by: AV Date: 3/3/11 Time: 1115

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: SL36
Client: RH2
Project Event: PCC 208.020.01.122
Project Name: PCC Cashmere

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	S-1	SL36A	11-4446	Soil	03/01/11 17:30	03/03/11 09:45
2.	S-2	SL36B	11-4447	Soil	03/01/11 17:30	03/03/11 09:45

Printed 03/03/11

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 2/14/2011

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

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

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
NWTPH-HCID Method by GC/FID
Page 1 of 1
Matrix: Soil

QC Report No: SL36-RH2
Project: PCC Cashmere
PCC 208.020.01.122

Data Release Authorized:
Reported: 03/04/11

ARI ID	Sample ID	Extraction Date	Analysis Date	DL	Range	Result
MB-030311	Method Blank	03/03/11	03/04/11	1.0	Gas	< 20 U
11-4446					Diesel	< 50 U
					Oil	< 100 U
					o-Terphenyl	127%
SL36A	S-1	03/03/11	03/04/11	1.0	Gas	< 26 U
11-4446	HC ID: **DRO/MOTOR OIL**				**Diesel**	**> 65**
					Oil	**> 130**
					o-Terphenyl	110%
SL36B	S-2	03/03/11	03/04/11	1.0	Gas	< 24 U
11-4447	HC ID: **DRO/MOTOR OIL**				**Diesel**	**> 60**
					Oil	**> 120**
					o-Terphenyl	115%

Reported in mg/kg (ppm)

Gas value based on total peaks in the range from Toluene to C12.
Diesel value based on the total peaks in the range from C12 to C24.
Oil value based on the total peaks in the range from C24 to C38.

FORM I

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110303.b/0303a033.d
Method: /chem3/fid4a.i/20110303.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 03/04/2011
Macro: 11-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SL36MBS1
Client ID: SL36MBS1
Injection: 04-MAR-2011 08:51
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.545	0.005	933	1668	GAS (Tol-C12)	42318	2.14
C8	1.909	0.005	412	679	DIESEL (C12-C24)	53947	2.88
C10	3.526	-0.001	463	528	M.OIL (C24-C38)	80250	7.07
C12	4.519	0.000	83	80	AK-102 (C10-C25)	68152	3.24
C14	5.291	-0.002	89	74	AK-103 (C25-C36)	66068	9.57
C16	5.973	0.004	6657	1305			
C18	6.603	-0.003	315	437	CRUDE (Tol-C40)	189647	25.11
C20	7.210	-0.002	463	525	MIN.OIL (C24-C38)	80250	5.99
C22	7.796	0.009	358	315			
C24	8.317	-0.008	377	680			
C25	8.577	-0.005	321	136			
C26	8.827	-0.006	306	220			
C28	9.341	-0.007	613	861			
C32	10.391	-0.018	2534	5489			
C34	10.939	0.004	3569	1029	BUNKERC (C10-C38)	144573	19.53
Filter Peak	12.863	-0.004	519	385			
C36	11.455	0.005	2351	3845			
C38	11.939	-0.007	319	91			
C40	12.417	-0.007	1444	2749			
o-terph	6.769	-0.001	1053894	884848	JET-A (C10-C18)	25148	1.96
Triacon Surr	9.890	-0.001	759463	880668			

M Indicates manual integration within range.
Range Times: NW Diesel(4.519 - 8.325) AK102(3.53 - 8.58) Jet A(3.53 - 6.61)
NW M.Oil(8.32 - 11.95) AK103(8.58 - 11.45) OR Diesel(3.53 - 9.35)

Surrogate	Area	Amount	%Rec
o-Terphenyl	884848	57.0	126.6
Triacontane	880668	54.3	120.8

Analyte	RF	Curve Date
o-Terph Surr	15531.5	07-FEB-2011
Triacon Surr	16206.2	20-JAN-2011
Gas	19792.1	17-DEC-2010
Diesel	18711.8	07-FEB-2011
Motor Oil	11353.0	20-JAN-2011
AK102	21028.1	07-FEB-2011
AK103	6902.1	10-DEC-2009
JetA	12809.9	11-FEB-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

M 3/4/11

Page 1

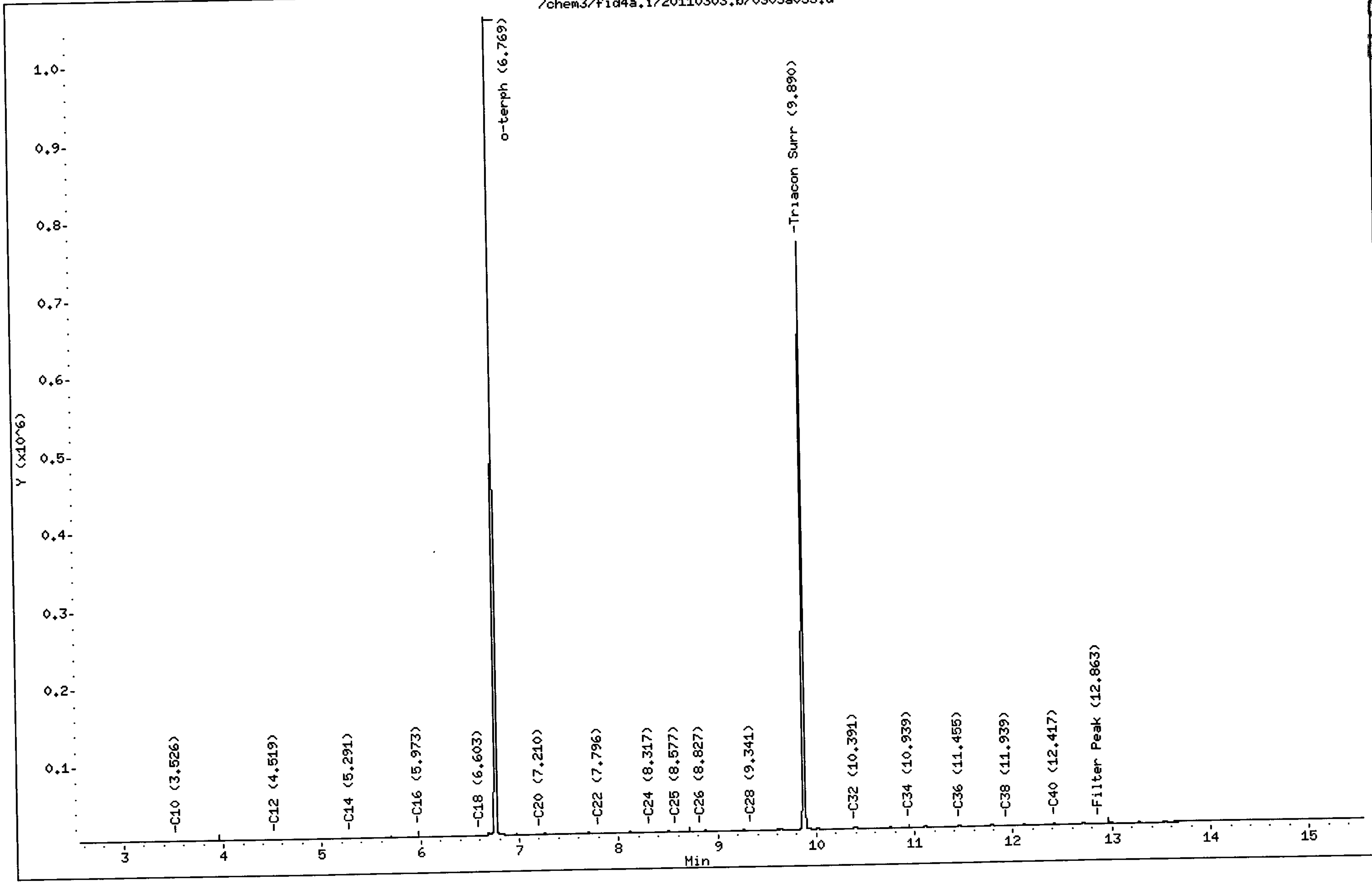
Data File: /chem3/fid4a.i/20110303.b/0303a033.d
Date : 04-MAR-2011 08:51
Client ID: SL36MBS1
Sample Info: SL36MBS1

Column phase: RTX-1

Instrument: fid4a.i

Operator: MS
Column diameter: 0.25

/chem3/fid4a.i/20110303.b/0303a033.d



SL36 : 00011

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110303.b/0303a034.d
Method: /chem3/fid4a.i/20110303.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 03/04/2011
Macro: 11-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SL36A
Client ID: S-1
Injection: 04-MAR-2011 09:15

Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area
Toluene	1.547	0.006	3273	3888
C8	1.913	0.010	478	1183
C10	3.525	-0.003	2600	1654
C12	4.518	-0.001	2337	3930
C14	5.286	-0.007	33010	26341
C16	5.966	-0.003	9347	12831
C18	6.604	-0.003	22988	28890
C20	7.218	0.006	107322	101838
C22	7.783	-0.004	60804	44188
C24	8.340	0.015	664856	1392098
C25	8.578	-0.004	89334	135243
C26	8.835	0.002	81121	25787
C28	9.338	-0.010	104132	143631
C32	10.417	0.007	63840	73552
C34	10.921	-0.015	78688	201428
Filter Peak	12.891	0.024	5167	16295
C36	11.447	-0.003	24318	13916
C38	11.958	0.011	13175	14641
C40	12.407	-0.017	17511	49978
o-terph	6.770	0.000	959414	846872
Triacon Surr	9.896	0.005	817113	1124595

Range	Total Area	Conc
GAS (Tol-C12)	192872	9.74
DIESEL (C12-C24)	15781412	843.39
M.OIL (C24-C38)	12699257	1118.58
AK-102 (C10-C25)	16517099	785.48
AK-103 (C25-C36)	11513114	1668.06
CRUDE (Tol-C40)	28960153	3834.38
MIN.OIL (C24-C38)	12699257	947.29
BUNKERC (C10-C38)	28582480	3861.68
JET-A (C10-C18)	977735	76.33

M Indicates manual integration within range.
Range Times: NW Diesel(4.519 - 8.325) AK102(3.53 - 8.58) Jet A(3.53 - 6.61)
NW M.Oil(8.32 - 11.95) AK103(8.58 - 11.45) OR Diesel(3.53 - 9.35)

Surrogate	Area	Amount	%Rec
o-Terphenyl	846872	54.5	121.2
Triacontane	1124595	69.4	154.2

Analyte	RF	Curve Date
o-Terph Surr	15531.5	07-FEB-2011
Triacon Surr	16206.2	20-JAN-2011
Gas	19792.1	17-DEC-2010
Diesel	18711.8	07-FEB-2011
Motor Oil	11353.0	20-JAN-2011
AK102	21028.1	07-FEB-2011
AK103	6902.1	10-DEC-2009
JetA	12809.9	11-FEB-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

M3/4/11

Data File: /chem3/fid4a.i/20110303.b/0303a034.d
Date : 04-MAR-2011 09:15
Client ID: S-1
Sample Info: SL36A

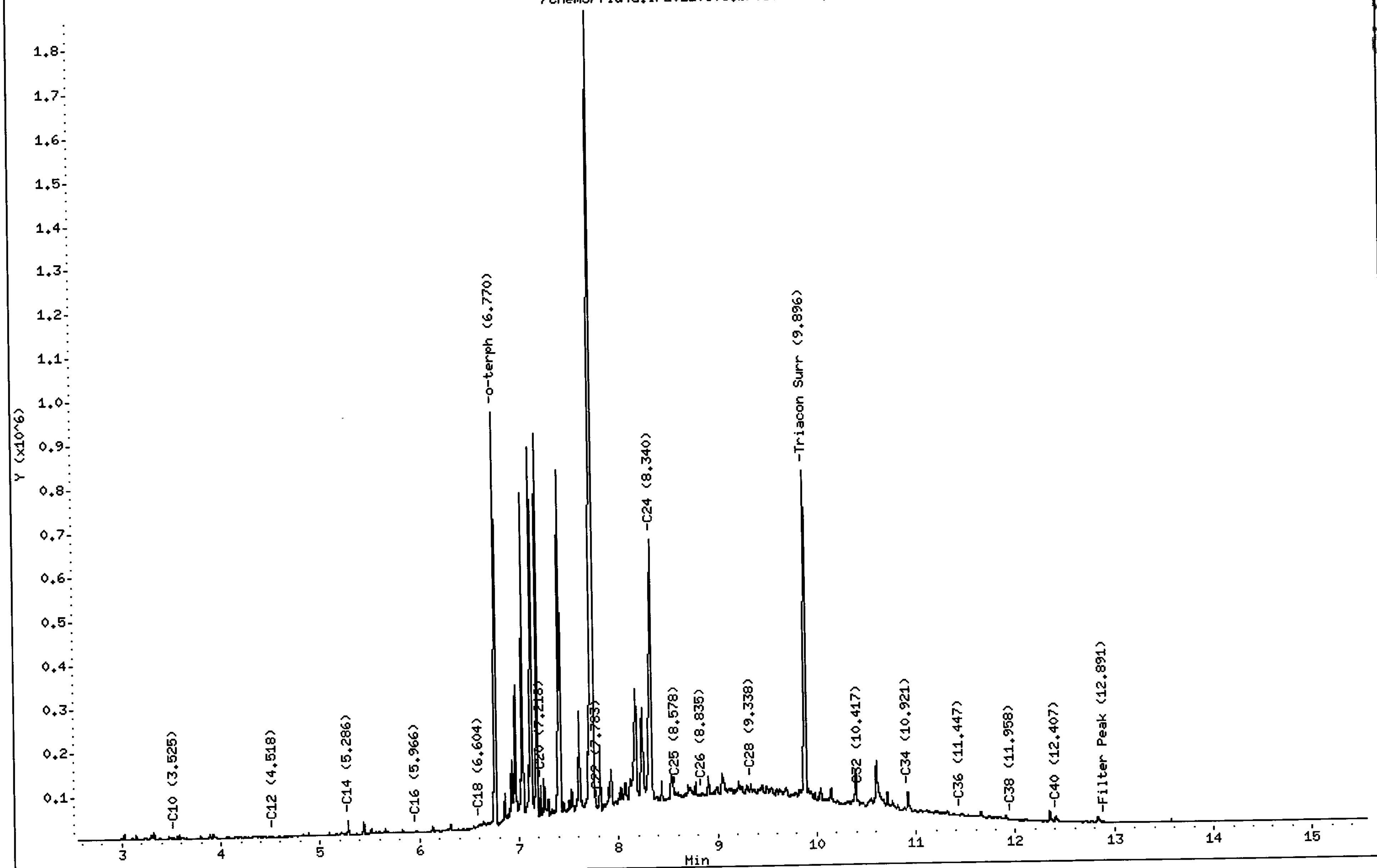
Column phase: RTX-1

Page 1

Instrument: fid4a.i

Operator: MS
Column diameter: 0.25

/chem3/fid4a.i/20110303.b/0303a034.d



Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110303.b/0303a034.d
Method: /chem3/fid4a.i/20110303.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 03/04/2011
Macro: 11-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SL36A
Client ID: S-1
Injection: 04-MAR-2011 09:15
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.547	0.006	3273	3888	GAS (Tol-C12)	192872	9.74
C8	1.913	0.010	478	1183	DIESEL (C12-C24)	15858705	847.53
C10	3.525	-0.003	2600	1654	M.OIL (C24-C38)	12979296	1143.24
C12	4.518	-0.001	2337	3930	AK-102 (C10-C25)	16594393	789.15 M
C14	5.286	-0.007	33010	26341	AK-103 (C25-C36)	11793154	1708.64 M
C16	5.966	-0.003	9347	12831			
C18	6.604	-0.003	22988	28890	CRUDE (Tol-C40)	29317486	3881.69 M
C20	7.218	0.006	107322	101838	MIN.OIL (C24-C38)	12979296	968.18 M
C22	7.783	-0.004	60804	44188			
C24	8.340	0.015	664856	1392098			
C25	8.578	-0.004	89334	135243			
C26	8.835	0.002	81121	25787			
C28	9.338	-0.010	104132	143631			
C32	10.417	0.007	63840	73552			
C34	10.921	-0.015	78688	201428	BUNKERC (C10-C38)	28939814	3909.95 M
Filter Peak	12.891	0.024	5167	16295			
C36	11.447	-0.003	24318	13916			
C38	11.958	0.011	13175	14641			
C40	12.407	-0.017	17511	49978			
o-terph	6.770	0.000	932800	770715	JET-A (C10-C18)	977735	76.33
Triacon Surr	9.896	0.005	733874	846198			

M Indicates manual integration within range.
Range Times: NW Diesel(4.519 - 8.325) AK102(3.53 - 8.58) Jet A(3.53 - 6.61)
NW M.Oil(8.32 - 11.95) AK103(8.58 - 11.45) OR Diesel(3.53 - 9.35)

Surrogate	Area	Amount	%Rec
o-Terphenyl	770715	49.6	110.3
Triacontane	846198	52.2	116.0

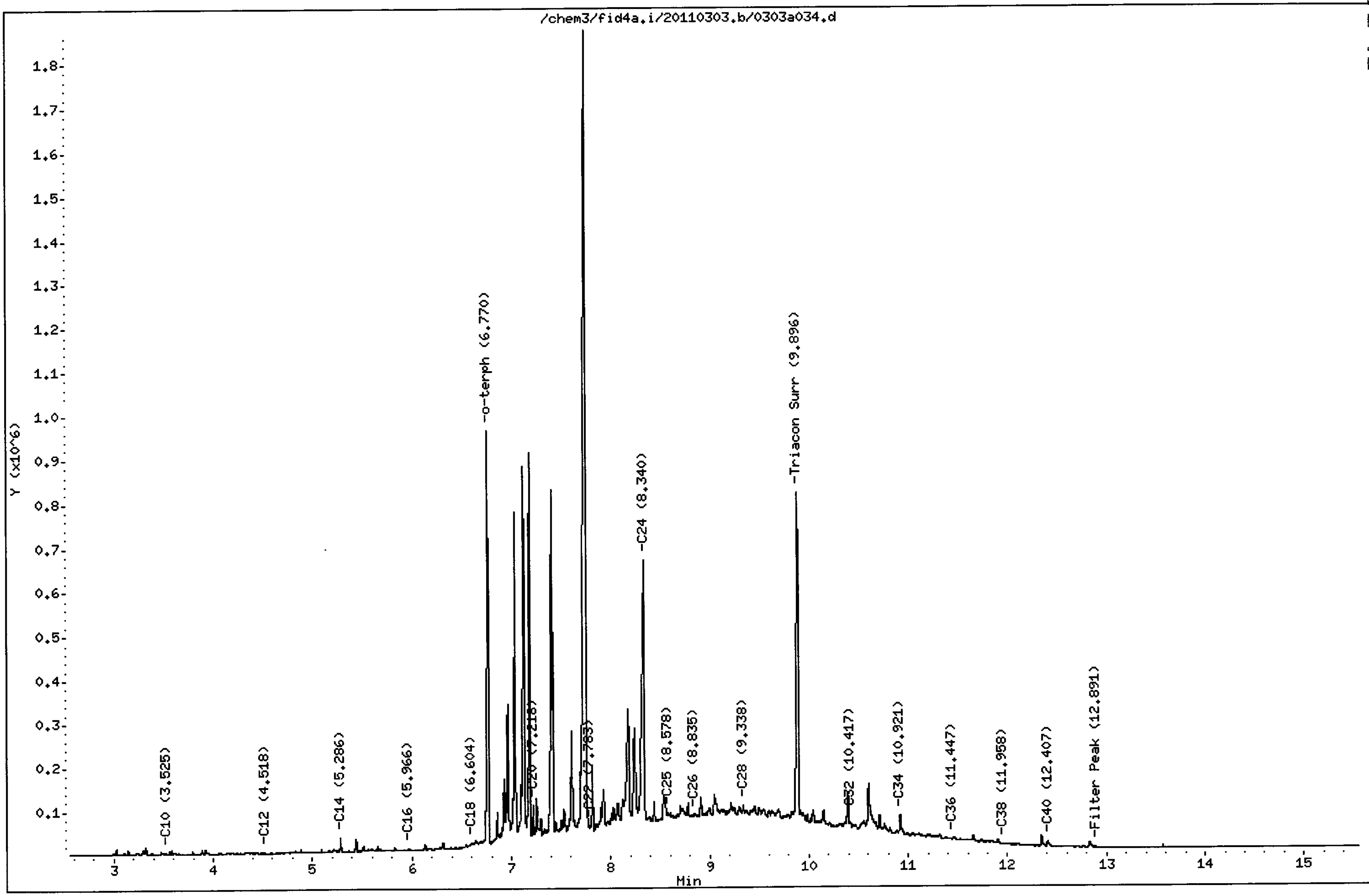
Analyte	RF	Curve Date
o-Terph Surr	15531.5	07-FEB-2011
Triacon Surr	16206.2	20-JAN-2011
Gas	19792.1	17-DEC-2010
Diesel	18711.8	07-FEB-2011
Motor Oil	11353.0	20-JAN-2011
AK102	21028.1	07-FEB-2011
AK103	6902.1	10-DEC-2009
JetA	12809.9	11-FEB-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

Data File: /chem3/fid4a.i/20110303.b/0303a034.d
Date : 04-MAR-2011 09:15
Client ID: S-1
Sample Info: SL36A

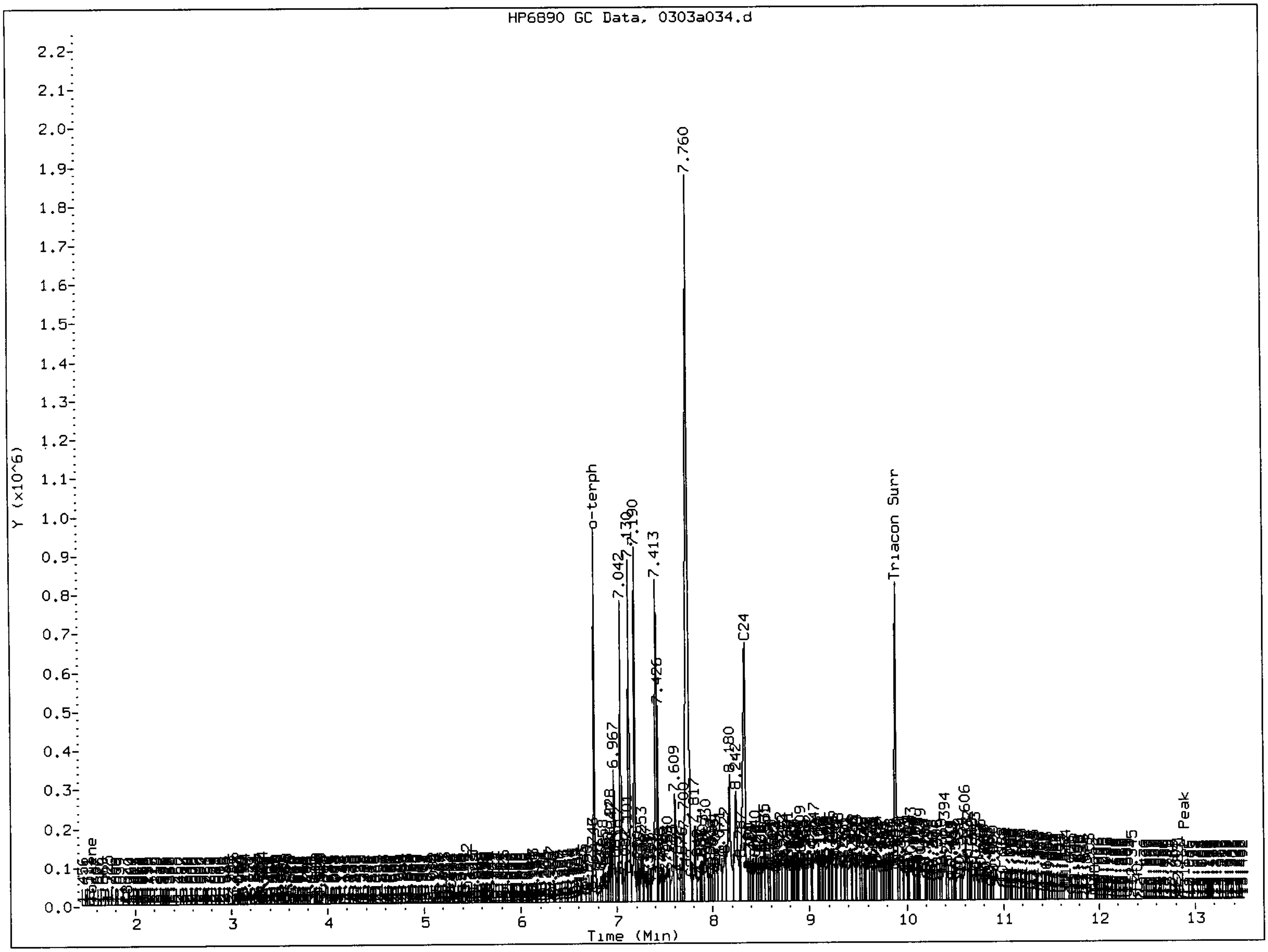
Column phase: RTX-1

Instrument: fid4a.i

Operator: MS
Column diameter: 0.25



FID:4A-2C/RTX-1 SL36A   FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other ____________

Analyst: [signature]   Date: 3/4/11

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110303.b/0303a035.d
Method: /chem3/fid4a.i/20110303.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 03/04/2011
Macro: 11-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SL36B
Client ID: S-2
Injection: 04-MAR-2011 09:38

Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.544	0.004	2754	3375	GAS (Tol-C12)	156586	7.91
C8	1.908	0.005	427	769	DIESEL (C12-C24)	9195628	491.44
C10	3.523	-0.004	3871	2296	M.OIL (C24-C38)	10164123	895.28
C12	4.516	-0.002	2225	3378	AK-102 (C10-C25)	9989804	475.07
C14	5.285	-0.008	24618	19340	AK-103 (C25-C36)	9023086	1307.30
C16	5.965	-0.004	8776	12586			
C18	6.602	-0.004	20050	37709	CRUDE (Tol-C40)	19733423	2612.75
C20	7.214	0.002	34803	49590	MIN.OIL (C24-C38)	10164123	758.18
C22	7.777	-0.009	43825	49894			
C24	8.330	0.006	52984	47268			
C25	8.586	0.003	76449	163139			
C26	8.821	-0.011	68786	88216			
C28	9.359	0.011	72383	134260			
C32	10.393	-0.016	130643	280764			
C34	10.920	-0.015	61479	160719	BUNKERC (C10-C38)	19441475	2626.67
Filter Peak	12.888	0.021	3926	9653			
C36	11.459	0.009	21796	62665			
C38	11.942	-0.005	10329	5525			
C40	12.407	-0.017	9042	32674			
o-terph	6.767	-0.002	972793	891327	JET-A (C10-C18)	856855	66.89
Triacon Surr	9.894	0.004	788952	1066874			

M Indicates manual integration within range.
Range Times: NW Diesel(4.519 - 8.325) AK102(3.53 - 8.58) Jet A(3.53 - 6.61)
NW M.Oil(8.32 - 11.95) AK103(8.58 - 11.45) OR Diesel(3.53 - 9.35)

Surrogate	Area	Amount	%Rec
o-Terphenyl	891327	57.4	127.5
Triacontane	1066874	65.8	146.3

Analyte	RF	Curve Date
o-Terph Surr	15531.5	07-FEB-2011
Triacon Surr	16206.2	20-JAN-2011
Gas	19792.1	17-DEC-2010
Diesel	18711.8	07-FEB-2011
Motor Oil	11353.0	20-JAN-2011
AK102	21028.1	07-FEB-2011
AK103	6902.1	10-DEC-2009
JetA	12809.9	11-FEB-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

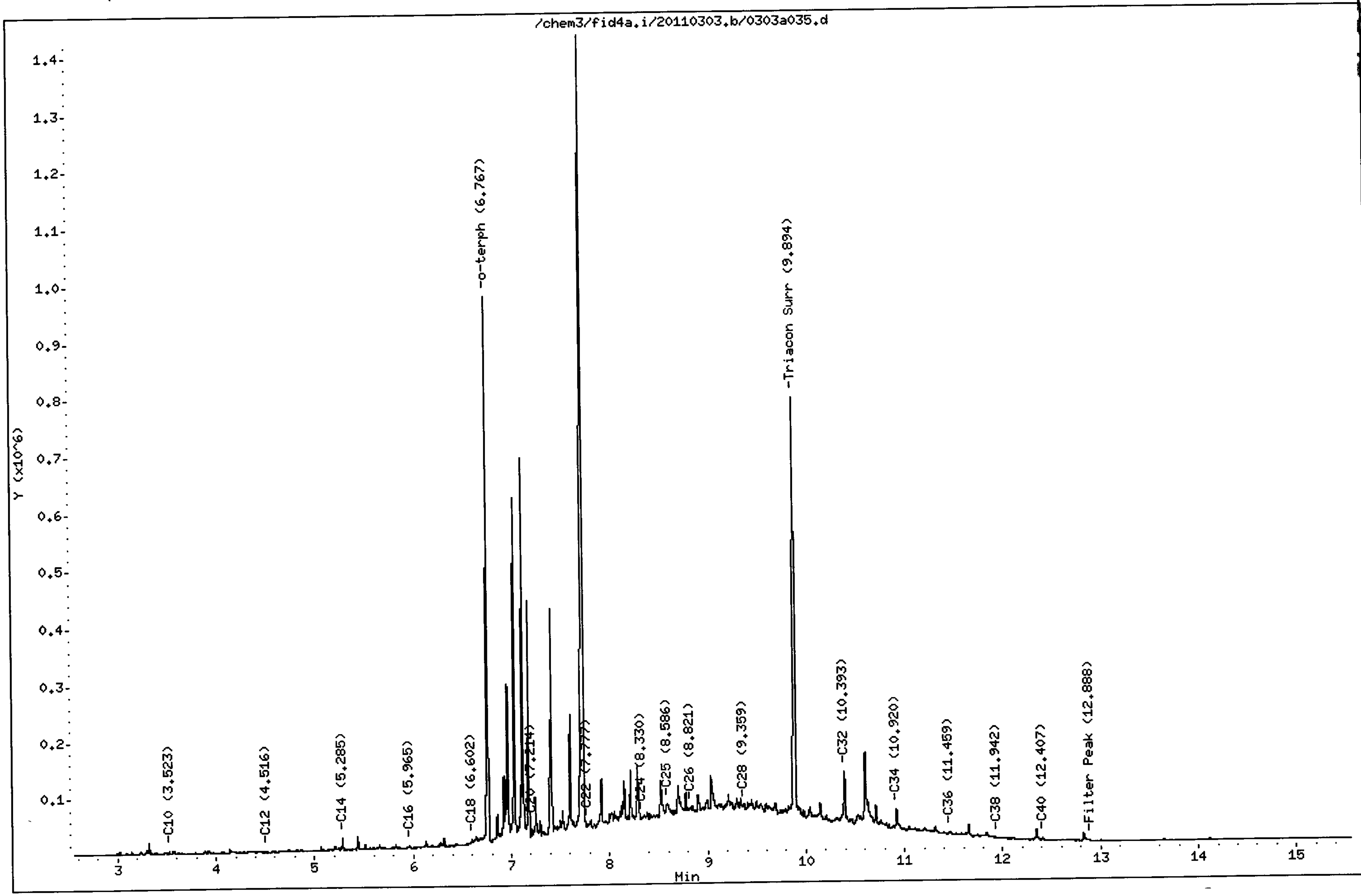
3/4/11

Data File: /chem3/fid4a.i/20110303.b/0303a035.d
Date : 04-MAR-2011 09:38
Client ID: S-2
Sample Info: SL36B

Column phase: RTX-1

Instrument: fid4a.i

Operator: MS
Column diameter: 0.25



Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110303.b/0303a035.d
Method: /chem3/fid4a.i/20110303.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 03/04/2011
Macro: 11-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SL36B
Client ID: S-2
Injection: 04-MAR-2011 09:38
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.544	0.004	2754	3375	GAS (Tol-C12)	156586	7.91
C8	1.908	0.005	427	769	DIESEL (C12-C24)	9284380	496.18
C10	3.523	-0.004	3871	2296	M.OIL (C24-C38)	10388132	915.01
C12	4.516	-0.002	2225	3378	AK-102 (C10-C25)	10078556	479.29 M
C14	5.285	-0.008	24618	19340	AK-103 (C25-C36)	9247095	1339.75 M
C16	5.965	-0.004	8776	12586			
C18	6.602	-0.004	20050	37709	CRUDE (Tol-C40)	20046184	2654.16 M
C20	7.214	0.002	34803	49590	MIN.OIL (C24-C38)	10388132	774.89 M
C22	7.777	-0.009	43825	49894			
C24	8.330	0.006	52984	47268			
C25	8.586	0.003	76449	163139			
C26	8.821	-0.011	68786	88216			
C28	9.359	0.011	72383	134260			
C32	10.393	-0.016	130643	280764			
C34	10.920	-0.015	61479	160719	BUNKERC (C10-C38)	19754236	2668.92 M
Filter Peak	12.888	0.021	3926	9653			
C36	11.459	0.009	21796	62665			
C38	11.942	-0.005	10329	5525			
C40	12.407	-0.017	9042	32674			
o-terph	6.767	-0.002	950619	802953	JET-A (C10-C18)	856855	66.89
Triacon Surr	9.894	0.004	723791	844171			

M Indicates manual integration within range.
Range Times: NW Diesel(4.519 - 8.325) AK102(3.53 - 8.58) Jet A(3.53 - 6.61)
NW M.Oil(8.32 - 11.95) AK103(8.58 - 11.45) OR Diesel(3.53 - 9.35)

Surrogate	Area	Amount	%Rec
o-Terphenyl	802953	51.7	114.9
Triacontane	844171	52.1	115.8

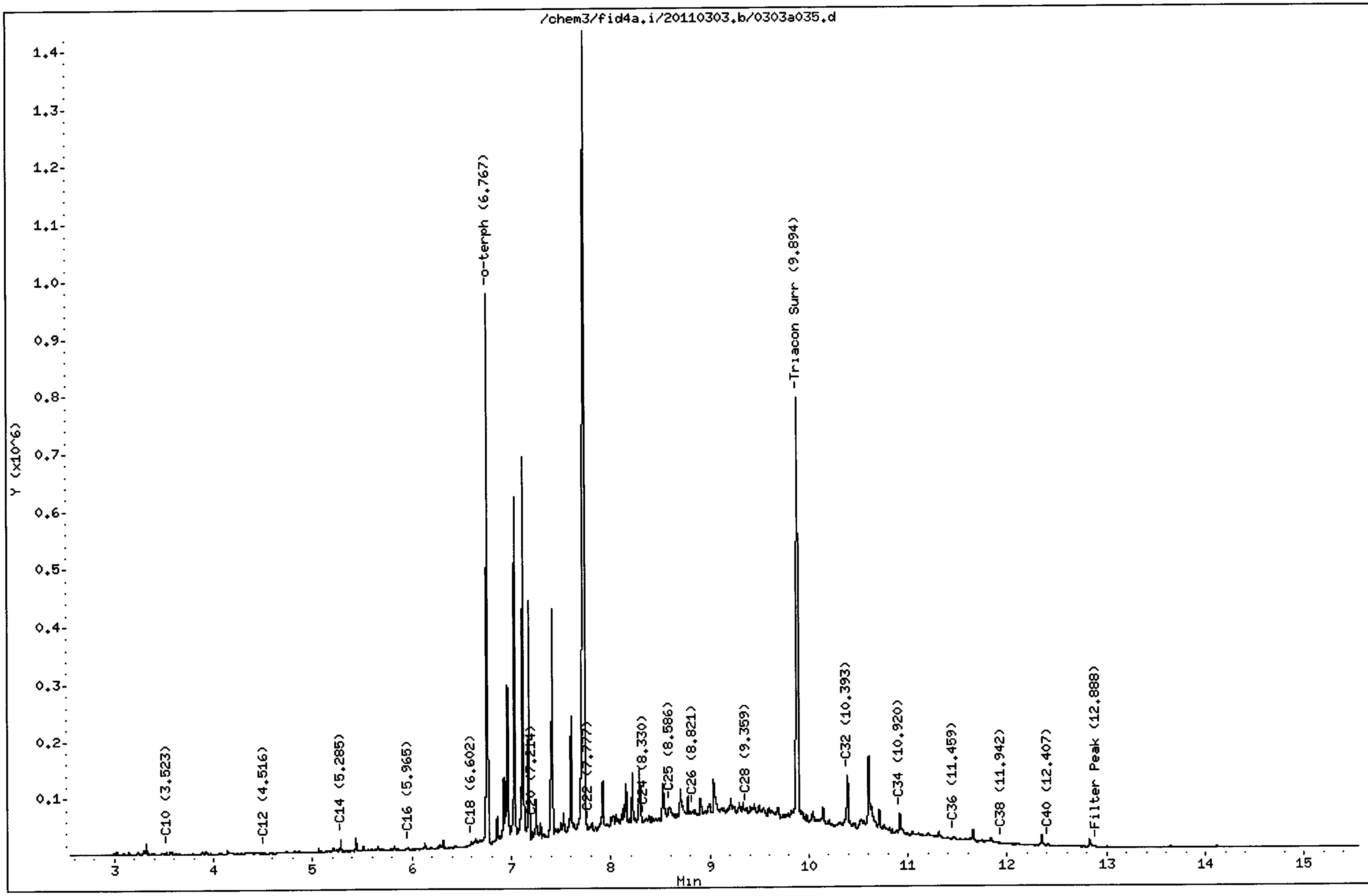
Analyte	RF	Curve Date
o-Terph Surr	15531.5	07-FEB-2011
Triacon Surr	16206.2	20-JAN-2011
Gas	19792.1	17-DEC-2010
Diesel	18711.8	07-FEB-2011
Motor Oil	11353.0	20-JAN-2011
AK102	21028.1	07-FEB-2011
AK103	6902.1	10-DEC-2009
JetA	12809.9	11-FEB-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

Data File: /chem3/fid4a.i/20110303.b/0303a035.d
Date : 04-MAR-2011 09:38
Client ID: S-2
Sample Info: SL36B

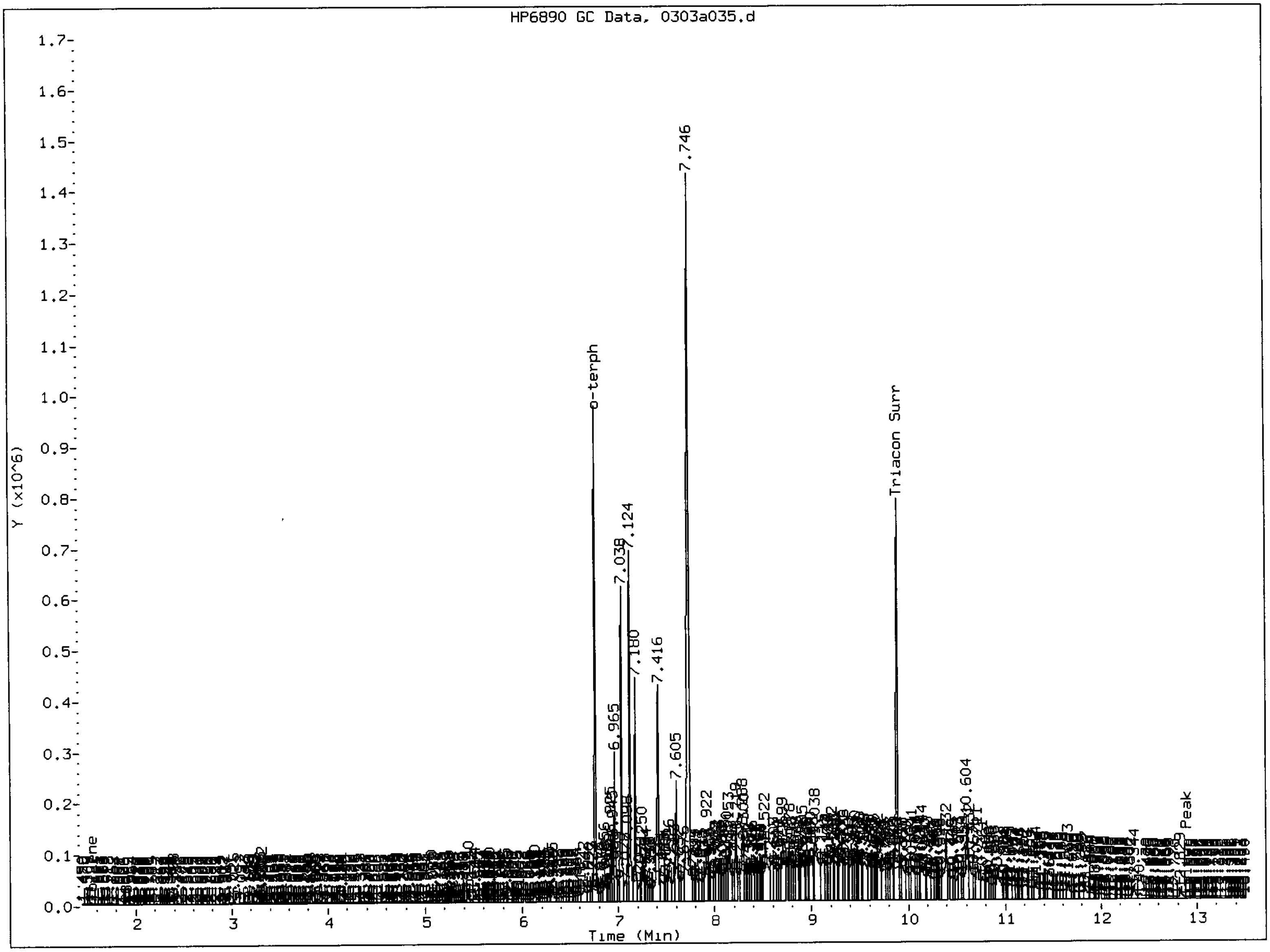
Column phase: RTX-1

Instrument: fid4a.i

Operator: MS
Column diameter: 0.25



FID:4A-2C/RTX-1 SL36B FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other ______________________

Analyst: Jm Date: 3/4/6

HCID SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SL36-RH2
Project: PCC Cashmere
PCC 208.020.01.122

Client ID	O-TER	TOT OUT
030311MB	127%*	1
S-1	110%	0
S-2	115%	0

	LCS/MB LIMITS	QC LIMITS
(O-TER) = o-Terphenyl	(68-122)	(50-150)

Prep Method: SW3550B
Log Number Range: 11-4446 to 11-4447

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID-Silica and Acid Cleaned
Page 1 of 1
Matrix: Soil

QC Report No: SL69-RH2
Project: PCC Cashmere
PCC 208.020.01.122

Data Release Authorized:
Reported: 03/08/11

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
MB-030711	Method Blank	03/07/11	03/07/11	1.00	Diesel	5.0	< 5.0 U
11-4585	HC ID: ---		FID9	1.0	Motor Oil	10	< 10 U
					o-Terphenyl		75.9%
SL69A	S-1	03/07/11	03/07/11	1.00	**Diesel**	**13**	**350**
11-4585	HC ID: **DIESEL/MOTOR OIL**		FID9	1.0	**Motor Oil**	**26**	**700**
					o-Terphenyl		70.9%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel quantitation on total peaks in the range from C12 to C24.
Motor Oil quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicate results of organics or additional hydrocarbons in ranges are not identifiable.

Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110307.b/0307A008.D
Method: /chem2/fid9.i/20110307.b/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 03/08/2011

ARI ID: SL69MBS1
Client ID: SL69MBS1
Injection: 07-MAR-2011 22:05
Dilution Factor: 1
Macro: 15-FEB-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.530	-0.006	4077	3537	GAS (Tol-C12)	64508	3.07
C8	1.336	0.054	4909	3577	DIESEL (C12-C24)	170629	7.53
C10	1.977	-0.003	764	342	M.OIL (C24-C38)	23435	1.77
C12	2.610	-0.011	321	336	AK-102 (C10-C25)	199718	7.82
C14	3.158	0.001	822	881	AK-103 (C25-C36)	19261	2.27
C16	3.617	-0.007	2436	2587			
C18	4.042	-0.001	2892	1668			
C20	4.435	0.005	2076	1459			
C22	4.825	0.005	1175	1358			
C24	5.328	0.012	1310	1777			
C25	5.542	0.003	442	636			
C26	5.741	0.000	440	344			
C28	6.094	-0.001	1011	699			
C32	6.695	0.003	964	1384	JP-4 (Tol-C14)	104027	6.34
C34	6.962	0.003	285	312	BUNKERC (C10-C38)	222568	29.90
Filter Peak	----						
C36	7.210	-0.003	273	231			
C38	7.451	-0.004	358	327			
C40	7.731	0.004	363	156			
o-terph	4.157	-0.004	1250895	731476	JET-A (C10-C18)	135848	9.83
Triacon Surr	6.413	-0.004	987186	662546	JP8 (Tol-C16)	138676	7.88

M Indicates manual integration within range.
Range Times: NW Diesel(2.621 - 5.316) AK102(1.98 - 5.54) Jet A(1.98 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.98 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	731476	34.2	75.9
Triacontane	662546	37.6	83.5

Analyte	RF	Curve Date
o-Terph Surr	21417.1	20-JAN-2011
Triacon Surr	17626.4	20-JAN-2011
Gas	21009.8	15-JUN-2010
Diesel	22653.1	20-JAN-2011
Motor Oil	13263.6	20-JAN-2011
AK102	25525.9	20-JAN-2011
AK103	8498.1	07-SEP-2010
JP4	16396.5	09-JUN-2010
JetA	13819.1	11-JUN-2010
Bunker C	7444.4	15-FEB-2011
JP-8	17594.0	25-MAY-2010

3/8/11

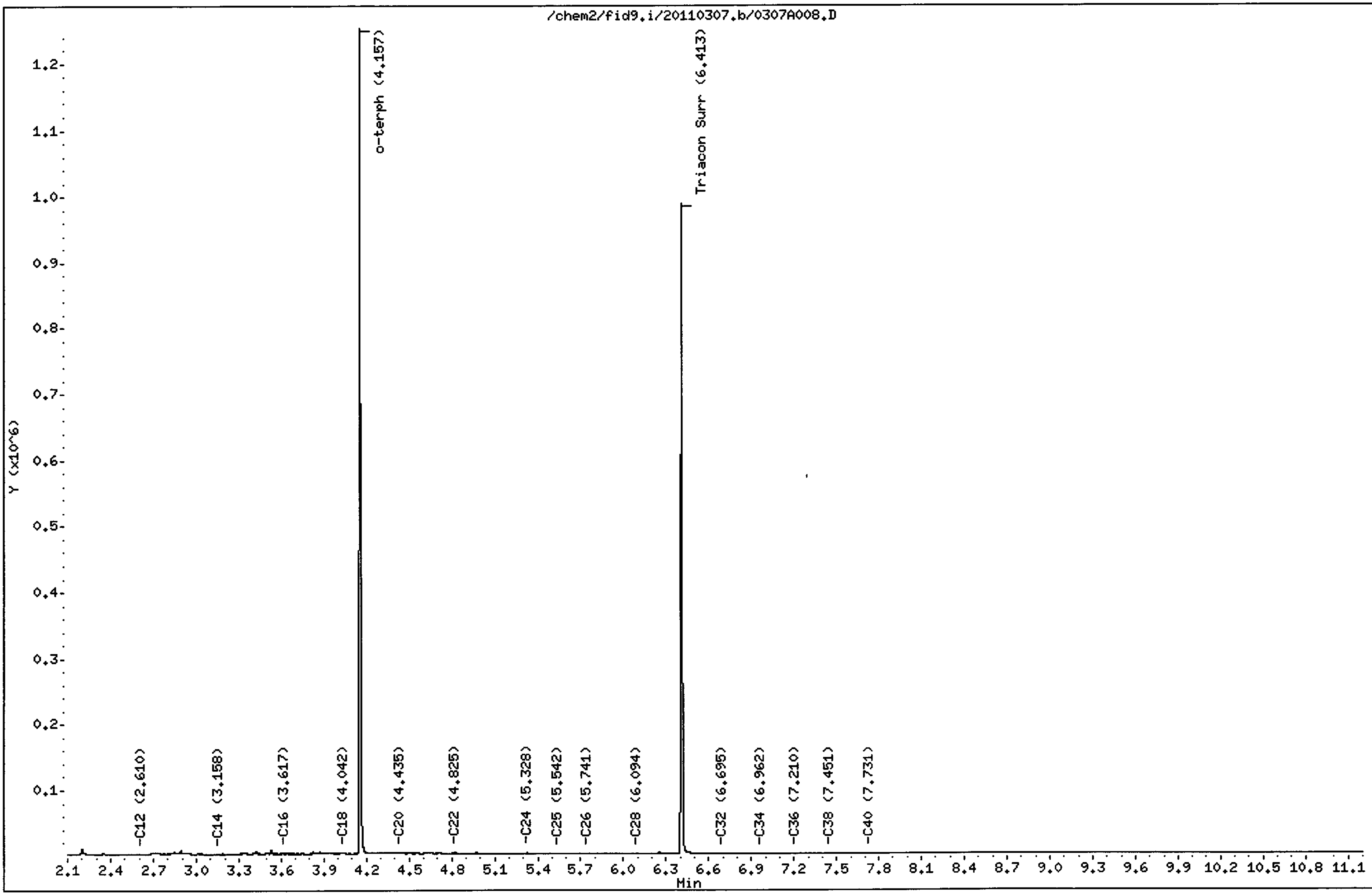
Data File: /chem2/fid9.i/20110307.b/0307A008.D
Date : 07-MAR-2011 22:05
Client ID: SL69MBS1
Sample Info: SL69MBS1

Column phase: RTX-1

Page 1

Instrument: fid9.i

Operator: MS
Column diameter: 0.25



SL36 : 00025

Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110307.b/0307A010.D
Method: /chem2/fid9.i/20110307.b/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 03/08/2011

ARI ID: SL69A
Client ID: S-1
Injection: 07-MAR-2011 22:48
Dilution Factor: 1
Macro: 15-FEB-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range		Total Area	Conc
Toluene	1.529	-0.007	2962	2322	GAS	(Tol-C12)	211221	10.05
C8	1.367	0.084	10443	9898	DIESEL	(C12-C24)	30737048	1356.86
C10	1.983	0.003	5020	3100	M.OIL	(C24-C38)	36617588	2760.76
C12	2.624	0.002	5015	5619	AK-102	(C10-C25)	32284692	1264.78
C14	3.156	-0.001	14114	16012	AK-103	(C25-C36)	34135534	4016.82
C16	3.621	-0.003	33576	22932				
C18	4.042	0.000	61992	67207				
C20	4.435	0.005	1399744	980490				
C22	4.818	-0.002	1743703	1871186				
C24	5.315	0.000	194903	121365				
C25	5.541	0.002	265077	134221				
C26	5.741	0.000	335734	104282				
C28	6.101	0.005	479696	101762				
C32	6.690	-0.002	274639	118544	JP-4	(Tol-C14)	366511	22.35
C34	6.957	-0.002	191232	55875	BUNKERC	(C10-C38)	67452563	9060.85
Filter Peak	----							
C36	7.215	0.002	115106	92374				
C38	7.456	0.001	59311	43495				
C40	7.725	-0.002	22410	12350				
o-terph	4.159	-0.001	1290301	890743	JET-A	(C10-C18)	1729756	125.17
Triacon Surr	6.417	0.000	490866	121039	JP8	(Tol-C16)	839640	47.72

M Indicates manual integration within range.
Range Times: NW Diesel(2.621 - 5.316) AK102(1.98 - 5.54) Jet A(1.98 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.98 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	890743	41.6	92.4
Triacontane	121039	6.9	15.3

Analyte	RF	Curve Date
o-Terph Surr	21417.1	20-JAN-2011
Triacon Surr	17626.4	20-JAN-2011
Gas	21009.8	15-JUN-2010
Diesel	22653.1	20-JAN-2011
Motor Oil	13263.6	20-JAN-2011
AK102	25525.9	20-JAN-2011
AK103	8498.1	07-SEP-2010
JP4	16396.5	09-JUN-2010
JetA	13819.1	11-JUN-2010
Bunker C	7444.4	15-FEB-2011
JP-8	17594.0	25-MAY-2010

3/8/11

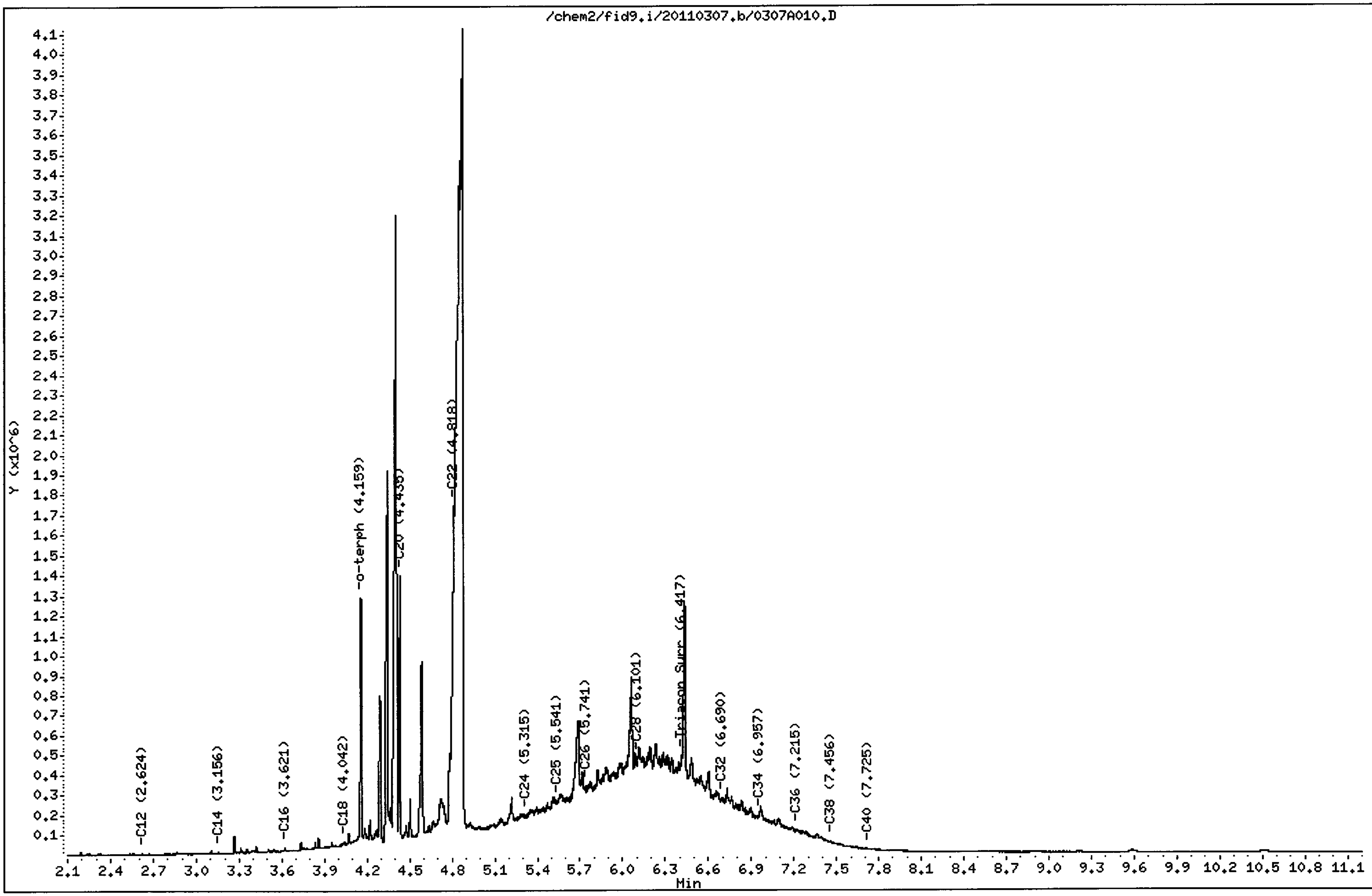
Data File: /chem2/fid9.i/20110307.b/0307A010.D
Date : 07-MAR-2011 22:48
Client ID: S-1
Sample Info: SL69A

Column phase: RTX-1

Page 1

Instrument: fid9.i

Operator: MS
Column diameter: 0.25



SL36 : 00027

Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110307.b/0307A010.D
Method: /chem2/fid9.i/20110307.b/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 03/08/2011

ARI ID: SL69A
Client ID: S-1
Injection: 07-MAR-2011 22:48
Dilution Factor: 1
Macro: 15-FEB-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.529	-0.007	2962	2322	GAS (Tol-C12)	211221	10.05
C8	1.367	0.084	10443	9898	DIESEL (C12-C24)	30946452	1366.10
C10	1.983	0.003	5020	3100	M.OIL (C24-C38)	36141148	2724.83
C12	2.624	0.002	5015	5619	AK-102 (C10-C25)	32494095	1272.98 M
C14	3.156	-0.001	14114	16012	AK-103 (C25-C36)	33659094	3960.76 M
C16	3.621	-0.003	33576	22932			
C18	4.042	0.000	61992	67207			
C20	4.435	0.005	1399744	980490			
C22	4.818	-0.002	1743703	1871186			
C24	5.315	0.000	194903	121365			
C25	5.541	0.002	265077	134221			
C26	5.741	0.000	335734	104282			
C28	6.101	0.005	479696	101762			
C32	6.690	-0.002	274639	118544	JP-4 (Tol-C14)	366511	22.35
C34	6.957	-0.002	191232	55875	BUNKERC (C10-C38)	67185525	9024.98 M
Filter Peak	----						
C36	7.215	0.002	115106	92374			
C38	7.456	0.001	59311	43495			
C40	7.725	-0.002	22410	12350			
o-terph	4.159	-0.001	1202411	682918	JET-A (C10-C18)	1729756	125.17
Triacon Surr	6.436	0.019	825166	605934	JP8 (Tol-C16)	839640	47.72

M Indicates manual integration within range.
Range Times: NW Diesel(2.621 - 5.316) AK102(1.98 - 5.54) Jet A(1.98 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.98 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	682918	31.9	70.9
Triacontane	605934	34.4	76.4

Analyte	RF	Curve Date
o-Terph Surr	21417.1	20-JAN-2011
Triacon Surr	17626.4	20-JAN-2011
Gas	21009.8	15-JUN-2010
Diesel	22653.1	20-JAN-2011
Motor Oil	13263.6	20-JAN-2011
AK102	25525.9	20-JAN-2011
AK103	8498.1	07-SEP-2010
JP4	16396.5	09-JUN-2010
JetA	13819.1	11-JUN-2010
Bunker C	7444.4	15-FEB-2011
JP-8	17594.0	25-MAY-2010

Data File: /chem2/fid9.i/20110307.b/0307A010.D

Page 1

Date : 07-MAR-2011 22:48

Client ID: S-1

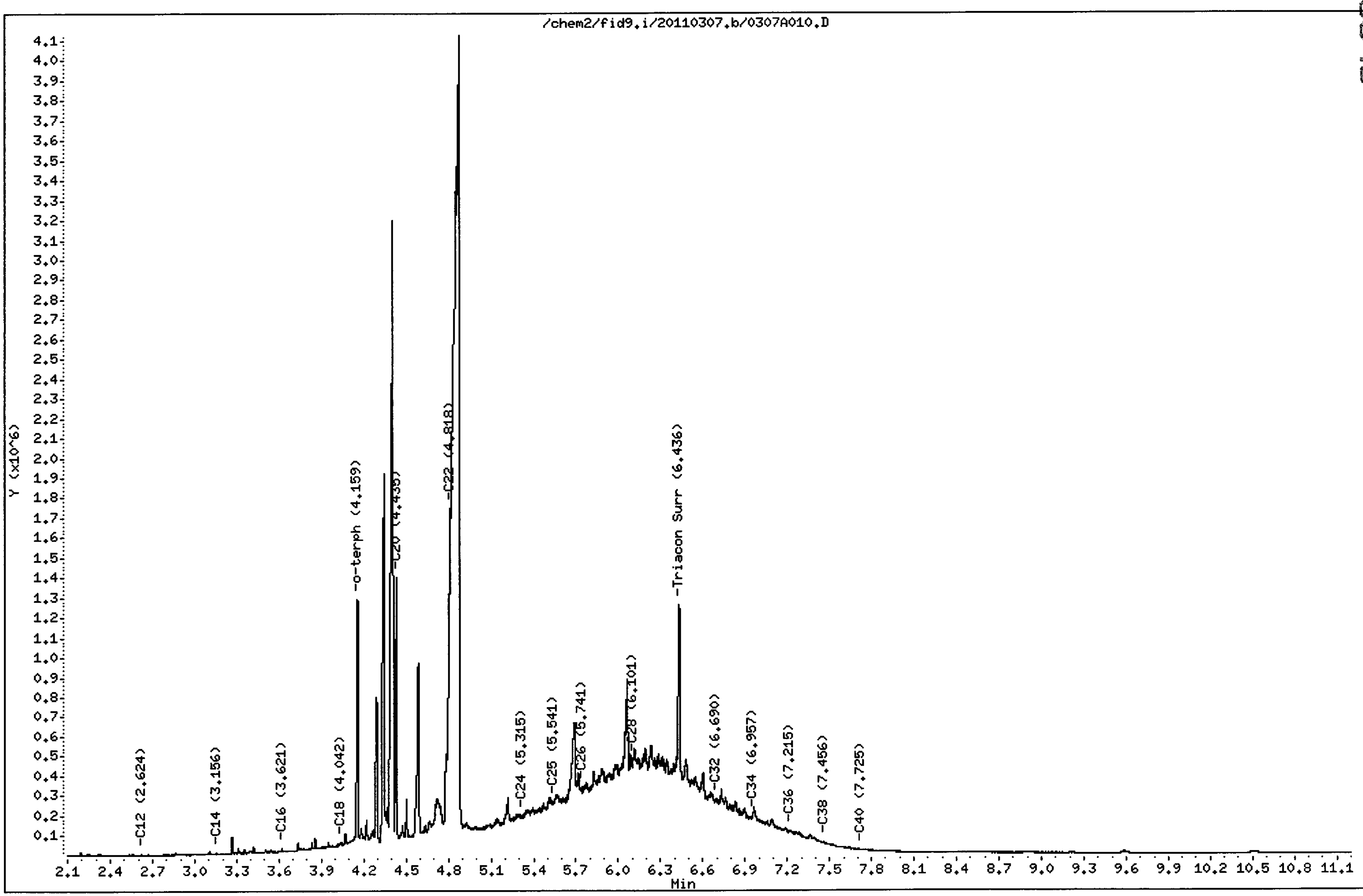
Instrument: fid9.i

Sample Info: SL69A

Operator: MS

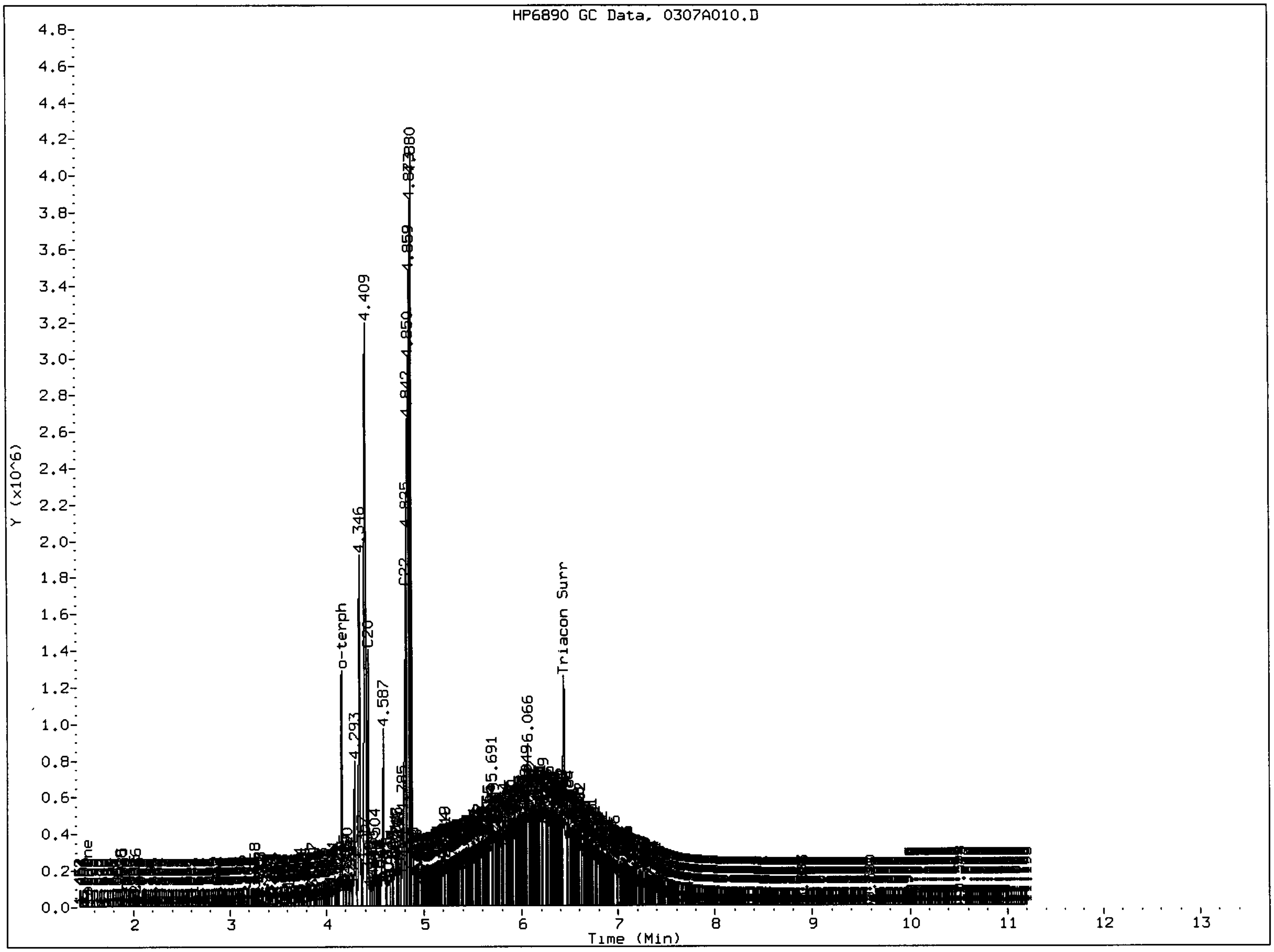
Column phase: RTX-1

Column diameter: 0.25



FID:9A-2C/RTX-1 SL69A

FID:9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other ______________________

Analyst: [signature] Date: 3/8/11

CLEANED TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SL69-RH2
Project: PCC Cashmere
PCC 208.020.01.122

Client ID	OTER	TOT OUT
MB-030711	75.9%	0
LCS-030711	83.5%	0
S-1	70.9%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(59-134)	(43-137)

Prep Method: SW3546
Log Number Range: 11-4585 to 11-4585

FORM-II TPHD

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned
Page 1 of 1

Sample ID: LCS-030711
LAB CONTROL

Lab Sample ID: LCS-030711
LIMS ID: 11-4585
Matrix: Soil
Data Release Authorized:
Reported: 03/08/11

QC Report No: SL69-RH2
Project: PCC Cashmere
PCC 208.020.01.122
Date Sampled: 03/01/11
Date Received: 03/04/11

Date Extracted: 03/07/11
Date Analyzed: 03/07/11 22:27
Instrument/Analyst: FID/MS

Sample Amount: 10.0 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.0

Range	**Lab Control**	**Spike Added**	**Recovery**
Diesel	113	150	75.3%

TPHD Surrogate Recovery	
o-Terphenyl	83.5%

Results reported in mg/kg

Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110307.b/0307A009.D
Method: /chem2/fid9.i/20110307.b/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 03/08/2011

ARI ID: SL69LCSS1
Client ID: SL69LCSS1
Injection: 07-MAR-2011 22:27
Dilution Factor: 1
Macro: 15-FEB-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.534	-0.002	15498	17215	GAS (Tol-C12)	3181515	151.43
C8	1.331	0.048	5080	3679	DIESEL (C12-C24)	25137409	1109.67
C10	1.983	0.003	128504	96788	M.OIL (C24-C38)	320693	24.18
C12	2.616	-0.005	328760	228922	AK-102 (C10-C25)	27795376	1088.91
C14	3.151	-0.007	626471	453655	AK-103 (C25-C36)	231932	27.29
C16	3.623	-0.002	1157185	896462			
C18	4.048	0.005	959642	737914			
C20	4.430	0.000	700488	524201			
C22	4.818	-0.003	280193	226857			
C24	5.311	-0.005	88377	68062			
C25	5.533	-0.006	38932	36164			
C26	5.737	-0.004	16155	13930			
C28	6.093	-0.003	3907	3135			
C32	6.695	0.003	1391	1853	JP-4 (Tol-C14)	7304252	445.48
C34	6.950	-0.008	159	41	BUNKERC (C10-C38)	28028819	3765.09
Filter Peak	----						
C36	7.214	0.001	188	158			
C38	7.459	0.004	208	121			
C40	7.728	0.001	238	95			
o-terph	4.162	0.002	1711988	1267044	JET-A (C10-C18)	20287032	1468.05
Triacon Surr	6.415	-0.002	1128136	709565	JP8 (Tol-C16)	13727727	780.25

M Indicates manual integration within range.
Range Times: NW Diesel(2.621 - 5.316) AK102(1.98 - 5.54) Jet A(1.98 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.98 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	1267044	59.2	131.5
Triacontane	709565	40.3	89.5

Analyte	RF	Curve Date
o-Terph Surr	21417.1	20-JAN-2011
Triacon Surr	17626.4	20-JAN-2011
Gas	21009.8	15-JUN-2010
Diesel	22653.1	20-JAN-2011
Motor Oil	13263.6	20-JAN-2011
AK102	25525.9	20-JAN-2011
AK103	8498.1	07-SEP-2010
JP4	16396.5	09-JUN-2010
JetA	13819.1	11-JUN-2010
Bunker C	7444.4	15-FEB-2011
JP-8	17594.0	25-MAY-2010

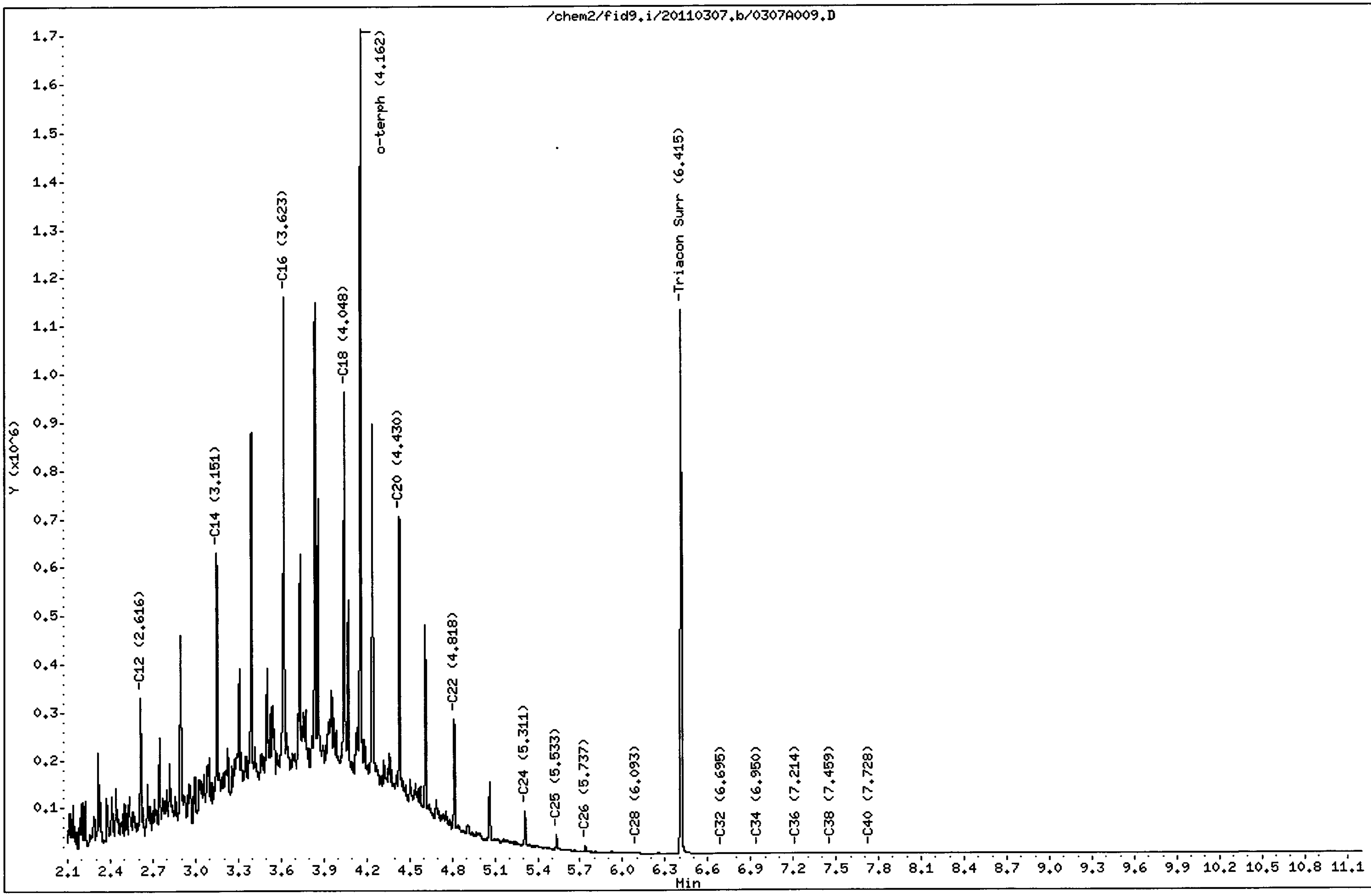
Ju 3/8/11

Data File: /chem2/fid9.i/20110307.b/0307A009.D
Date : 07-MAR-2011 22:27
Client ID: SL69LCSS1
Sample Info: SL69LCSS1

Column phase: RTX-1

Instrument: fid9.i

Operator: MS
Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110307.b/0307A009.D
Method: /chem2/fid9.i/20110307.b/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 03/08/2011

ARI ID: SL69LCSS1
Client ID: SL69LCSS1
Injection: 07-MAR-2011 22:27
Dilution Factor: 1
Macro: 15-FEB-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.534	-0.002	15498	17215	GAS (Tol-C12)	3181515	151.43
C8	1.331	0.048	5080	3679	DIESEL (C12-C24)	25603780	1130.26
C10	1.983	0.003	128504	96788	M.OIL (C24-C38)	320693	24.18
C12	2.616	-0.005	328760	228922	AK-102 (C10-C25)	28261747	1107.18 M
C14	3.151	-0.007	626471	453655	AK-103 (C25-C36)	231932	27.29
C16	3.623	-0.002	1157185	896462			
C18	4.048	0.005	959642	737914			
C20	4.430	0.000	700488	524201			
C22	4.818	-0.003	280193	226857			
C24	5.311	-0.005	88377	68062			
C25	5.533	-0.006	38932	36164			
C26	5.737	-0.004	16155	13930			
C28	6.093	-0.003	3907	3135			
C32	6.695	0.003	1391	1853	JP-4 (Tol-C14)	7304252	445.48
C34	6.950	-0.008	159	41	BUNKERC (C10-C38)	28495190	3827.74 M
Filter Peak	----						
C36	7.214	0.001	188	158			
C38	7.459	0.004	208	121			
C40	7.728	0.001	238	95			
o-terph	4.162	0.002	1480374	804728	JET-A (C10-C18)	20287032	1468.05
Triacon Surr	6.415	-0.002	1128136	709565	JP8 (Tol-C16)	13727727	780.25

M Indicates manual integration within range.
Range Times: NW Diesel(2.621 - 5.316) AK102(1.98 - 5.54) Jet A(1.98 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.98 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	804728	37.6	83.5
Triacontane	709565	40.3	89.5

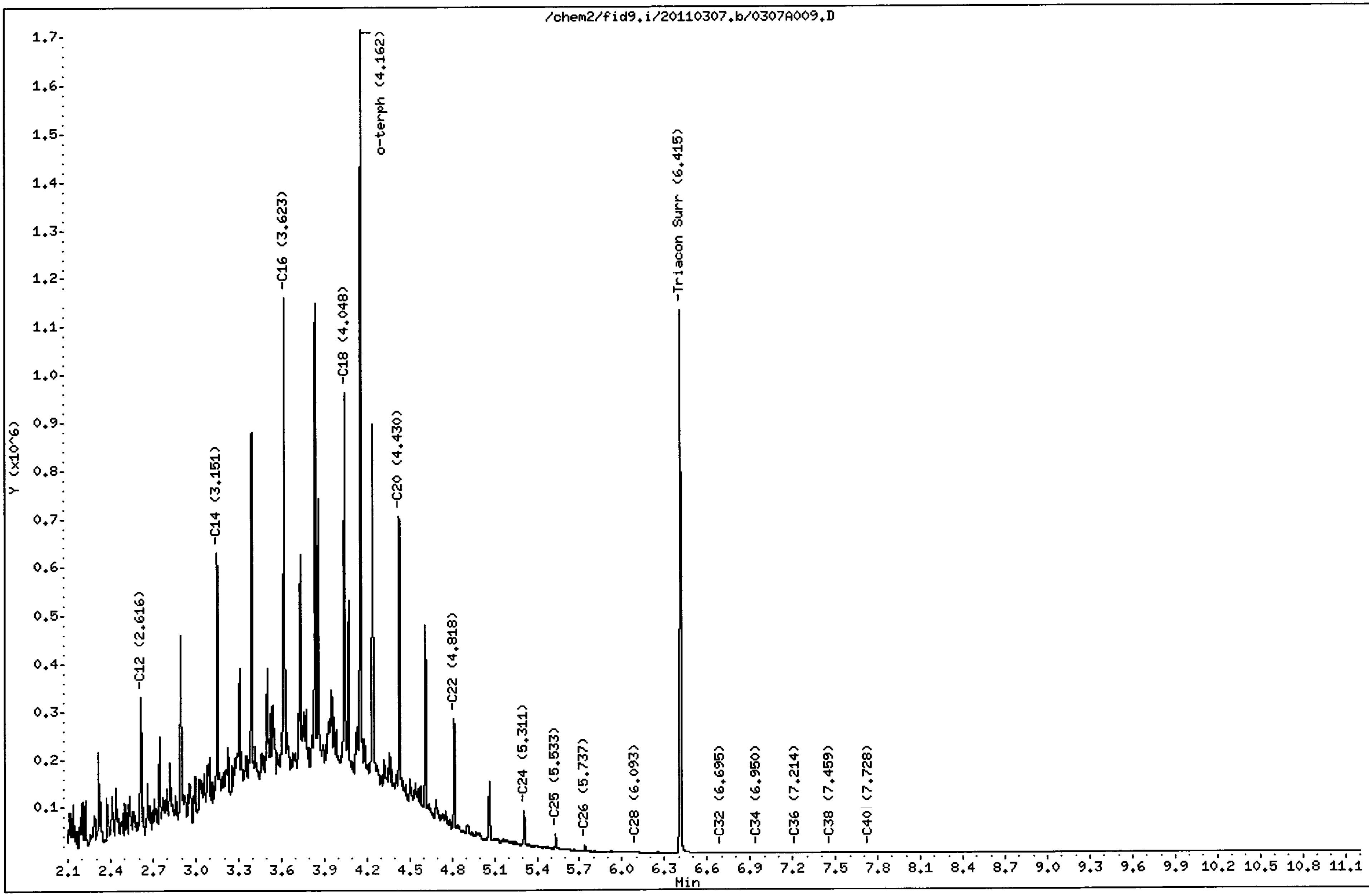
Analyte	RF	Curve Date
o-Terph Surr	21417.1	20-JAN-2011
Triacon Surr	17626.4	20-JAN-2011
Gas	21009.8	15-JUN-2010
Diesel	22653.1	20-JAN-2011
Motor Oil	13263.6	20-JAN-2011
AK102	25525.9	20-JAN-2011
AK103	8498.1	07-SEP-2010
JP4	16396.5	09-JUN-2010
JetA	13819.1	11-JUN-2010
Bunker C	7444.4	15-FEB-2011
JP-8	17594.0	25-MAY-2010

Data File: /chem2/fid9.i/20110307.b/0307A009.D
Date : 07-MAR-2011 22:27
Client ID: SL69LCSS1
Sample Info: SL69LCSS1

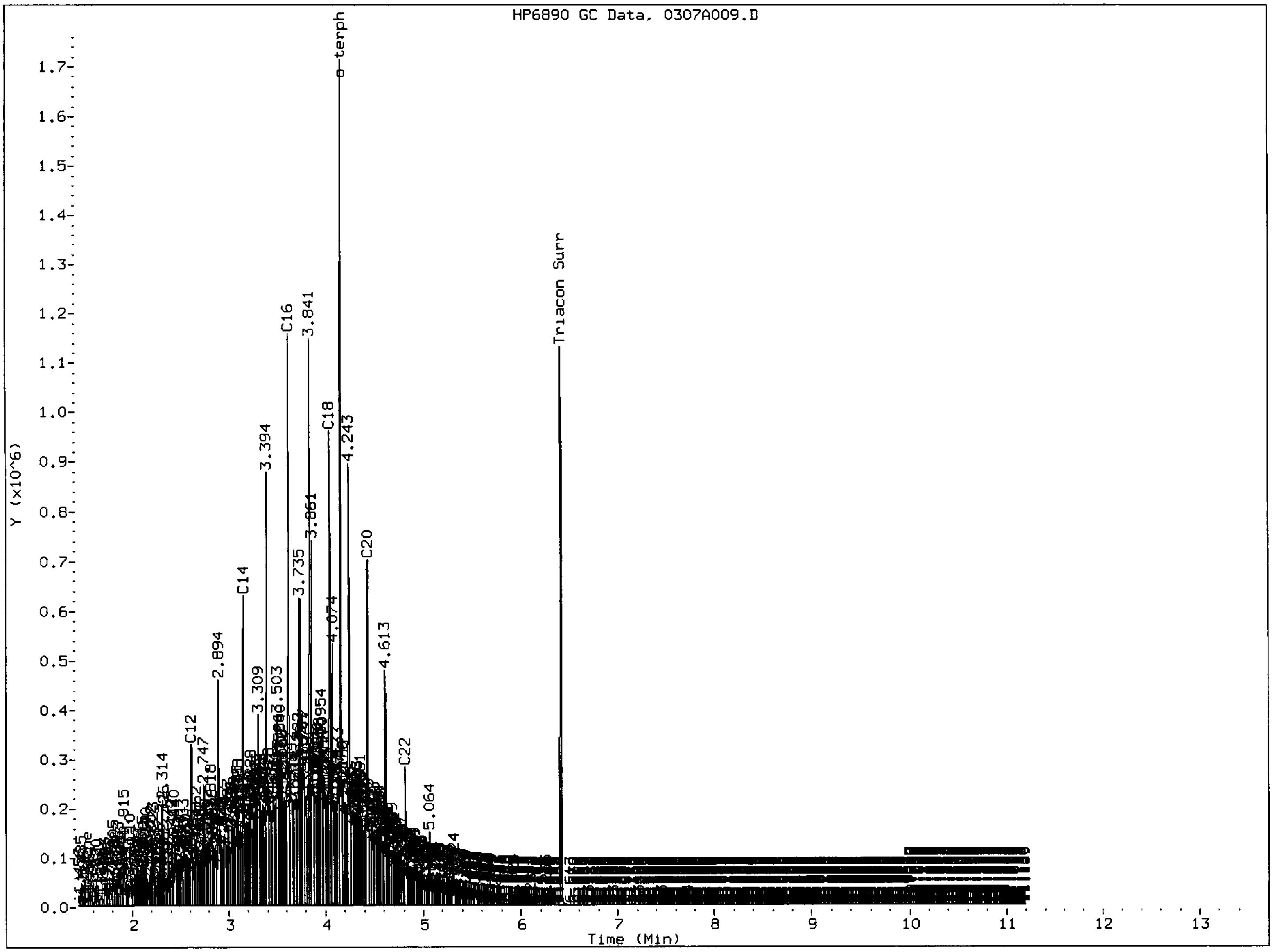
Column phase: RTX-1

Instrument: fid9.i

Operator: MS
Column diameter: 0.25



FID:9A-2C/RTX-1 SL69LCSS1 FID:9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other

Analyst: [signature]   Date: 3/8/11

Analytical Resources, Incorporated
Analytical Chemists and Consultants

July 14, 2011

Adam Neff
RH2 Engineering, Inc.
300 Simon Street SE
Suite #5
East Wenatchee, WA 98802-7720

RECEIVED E. WENATCHEE
RH2 ENGINEERING INC.
JOB NO:
JUL 18 2011
ROUTE TO:
FILE:

Client Project: Cashmere Mill Site
ARI ID: TD34

Dear Adam:

Please find enclosed the original Chain of Custody, sample receipt documentation, and the final results for the project referenced above. Analytical Resources, Inc. (ARI) accepted one soil sample on July 7, 2011. For further details regarding sample receipt, please refer to the enclosed Cooler Receipt Form.

The sample was analyzed for HCID, as requested on the COC. Based on the HCID results, the sample was subsequently analyzed for NWTPH-Dx.

All analyses were completed routinely.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please feel free to contact me at your convenience.

Respectfully,

Bob Congleton

Bob Congleton
Project Manager
ANALYTICAL RESOURCES, INC.
(206) 695-6232
bob@arilabs.com
www.arilabs.com

Enclosures

cc: eFile TD34

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)

ARI Assigned Number: TD34	Turn-around Requested: 1-2 weeks
ARI Client Company: RH2 Engineering	Phone: 425-951-5302
Client Contact: Adam Neff	
Client Project Name: Cashmere Millsite	
Client Project #:	Samplers: ARN

Page: 1 of 1	
Date: 7-6-11	Ice Present?
No. of Coolers:	Cooler Temps:

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested								Notes/Comments
S-1	7-6-11	918		4	HCID								*additional analysis possible

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Adam Neff	Printed Name: A. Volgardsen	Printed Name:	Printed Name:
	Company: RH2 Engineering	Company: ARI	Company:	Company:
	Date & Time: 7-6-11 11:30 am	Date & Time: 7/7/11 1115	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: RH2

COC No(s): ______ NA

Assigned ARI Job No: TD34

Project Name: Cashmere Millsite

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: ______

Tracking No: K0967793423 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)........ 5.9

If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: 90941619

Cooler Accepted by: AV Date: 7/7/11 Time: 1115

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~~ JM
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: JM Date: 7/7/11 Time: 1135

***** 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"
			Peabubbles → "pb"
			Large → "lg"
			Headspace → "hs"

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: TD34
Client: RH2 Engineering
Project Event: N/A
Project Name: Cashmere Millsite

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	S-1	TD34A	11-14653	Soil	07/06/11 09:18	07/07/11 11:15

Printed 07/08/11

Data Reporting Qualifiers

Effective 2/14/2011

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
M2	The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.
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-Silica and Acid Cleaned
Page 1 of 1
Matrix: Soil

QC Report No: TD34-RH2 Engineering
Project: Cashmere Millsite

Data Release Authorized: VB
Reported: 07/12/11

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
MB-071111	Method Blank	07/11/11	07/11/11	1.00	Diesel	5.0	< 5.0 U
11-14653	HC ID: ---		FID4A	1.0	Motor Oil	10	< 10 U
					o-Terphenyl		98.9%
TD34A	S-1	07/11/11	07/11/11	1.00	**Diesel**	**6.7**	**27**
11-14653	HC ID: **DRO/MOTOR OIL**		FID4A	1.0	**Motor Oil**	**14**	**100**
					o-Terphenyl		68.6%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel quantitation on total peaks in the range from C12 to C24.
Motor Oil quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicate results of organics or additional hydrocarbons in ranges are not identifiable.

FORM I

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110711.b/0711a009.d ARI ID: TD34MBS1
Method: /chem3/fid4a.i/20110711.b/ftphfid4a.m Client ID: TD34MBS1
Instrument: fid4a.i Injection: 11-JUL-2011 16:02
Operator: MS
Report Date: 07/11/2011 Dilution Factor: 1
Macro: 14-JUNE-2011
Calibration Dates: Gas:30-APR-2010 Diesel:13-MAY-2011 M.Oil:21-MAR-2011

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.506	0.005	1193	1244	GAS (Tol-C12)	82685	6.19
C8	1.867	0.013	298	617	DIESEL (C12-C24)	344824	26.57
C10	3.510	0.005	236	135	M.OIL (C24-C38)	201238	17.66
C12	4.488	-0.012	509	1136	AK-102 (C10-C25)	389375	25.48
C14	5.308	0.033	1408	3833	AK-103 (C25-C36)	165769	24.02
C16	5.964	0.013	9364	22685			
C18	6.585	-0.003	44497	29943			
C20	7.201	0.008	10543	20026			
C22	7.788	0.023	7302	20828	MSPIRIT (Tol-C12)	82685	4.50
C24	8.323	0.020	4526	14128			
C25	8.533	-0.027	608	236			
C26	8.787	-0.022	637	362			
C28	9.335	0.012	4907	6535			
C32	10.367	-0.016	4105	5958			
C34	10.894	-0.016	830	1693	BUNKERC (C10-C38)	583223	77.78
Filter Peak	12.935	0.005	1303	1850			
C36	11.432	0.007	3647	6913			
C38	11.923	0.004	845	1050			
C40	12.396	-0.001	2828	6519			
o-terph	6.748	0.001	967188	757358	JET-A (C10-C18)	250473	16.88
Triacon Surr	9.861	-0.003	650929	752353			

M Indicates manual integration within range.
Range Times: NW Diesel(4.500 - 8.303) AK102(3.51 - 8.56) Jet A(3.51 - 6.59)
NW M.Oil(8.30 - 11.92) AK103(8.56 - 11.42) OR Diesel(3.51 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	757358	44.5	98.9
Triacontane	752353	44.3	98.4

Analyte	RF	Curve Date
o-Terph Surr	17021.2	13-MAY-2011
Triacon Surr	16986.4	21-MAR-2011
Gas	13367.0	30-APR-2010
Diesel	12976.7	13-MAY-2011
Motor Oil	11395.0	21-MAR-2011
AK102	15282.5	13-MAY-2011
AK103	6902.1	10-DEC-2009
JetA	14842.0	13-APR-2011
Min Spirit	18373.2	30-MAR-2011
Bunker C	7498.8	14-JUN-2011

Mx 7/11/11

Data File: /chem3/fid4a.i/20110711.b/0711a009.d

Date : 11-JUL-2011 16:02

Client ID: TD34MBS1

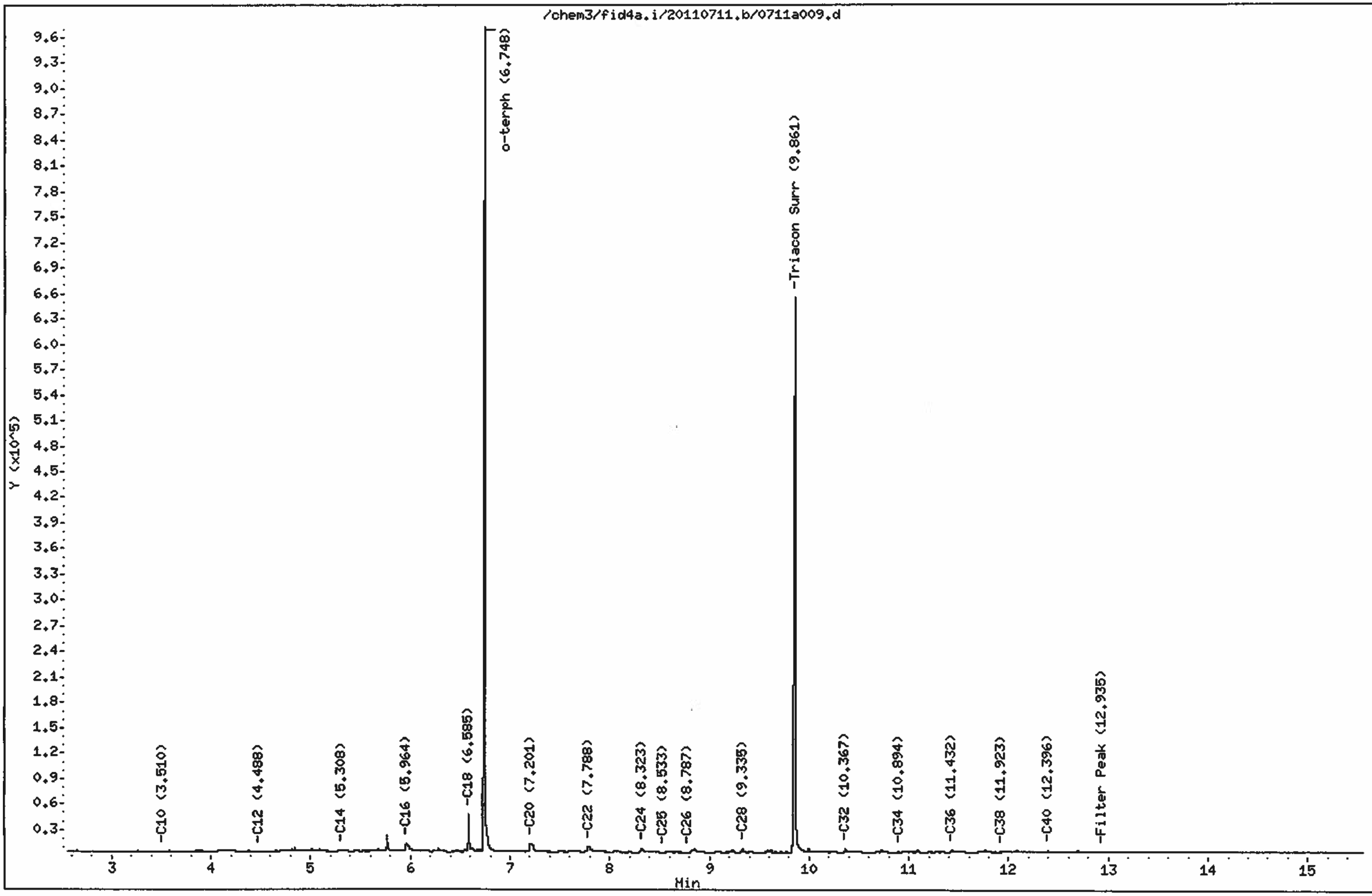
Sample Info: TD34MBS1

Column phase: RTX-1

Instrument: fid4a.i

Operator: MS

Column diameter: 0.25



Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110711.b/0711a006.d   ARI ID: TD34A
Method: /chem3/fid4a.i/20110711.b/ftphfid4a.m   Client ID: S-1
Instrument: fid4a.i   Injection: 11-JUL-2011 14:51
Operator: MS
Report Date: 07/11/2011   Dilution Factor: 1
Macro: 14-JUNE-2011
Calibration Dates: Gas:30-APR-2010 Diesel:13-MAY-2011 M.Oil:21-MAR-2011

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.505	0.003	1276	1579	GAS (Tol-C12)	286984	21.47
C8	1.858	0.004	402	315	DIESEL (C12-C24)	2525343	194.61
C10	3.500	-0.005	1129	1176	M.OIL (C24-C38)	8691500	762.75
C12	4.505	0.005	1810	2322	AK-102 (C10-C25)	2995009	195.98
C14	5.266	-0.009	3045	3064	AK-103 (C25-C36)	7746243	1122.31
C16	5.951	0.000	21919	38071			
C18	6.584	-0.004	53496	46884			
C20	7.191	-0.002	46088	50117			
C22	7.764	-0.002	42540	75803	MSPIRIT (Tol-C12)	286984	15.62
C24	8.299	-0.004	44560	94226			
C25	8.563	0.003	42244	46160			
C26	8.806	-0.004	50875	90372			
C28	9.305	-0.018	74853	168458			
C32	10.376	-0.008	50608	68552			
C34	10.912	0.002	57607	184758	BUNKERC (C10-C38)	11346506	1513.11
Filter Peak	12.931	0.002	5250	3298			
C36	11.432	0.008	32962	88688			
C38	11.917	-0.003	18856	25060			
C40	12.396	-0.002	13308	34048			
o-terph	6.744	-0.003	756516	579606	JET-A (C10-C18)	737557	49.69
Triacon Surr	9.863	-0.002	580519	715804			

M Indicates manual integration within range.
Range Times: NW Diesel(4.500 - 8.303) AK102(3.51 - 8.56) Jet A(3.51 - 6.59)
NW M.Oil(8.30 - 11.92) AK103(8.56 - 11.42) OR Diesel(3.51 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	579606	34.1	75.7
Triacontane	715804	42.1	93.6

Analyte	RF	Curve Date
o-Terph Surr	17021.2	13-MAY-2011
Triacon Surr	16986.4	21-MAR-2011
Gas	13367.0	30-APR-2010
Diesel	12976.7	13-MAY-2011
Motor Oil	11395.0	21-MAR-2011
AK102	15282.5	13-MAY-2011
AK103	6902.1	10-DEC-2009
JetA	14842.0	13-APR-2011
Min Spirit	18373.2	30-MAR-2011
Bunker C	7498.8	14-JUN-2011

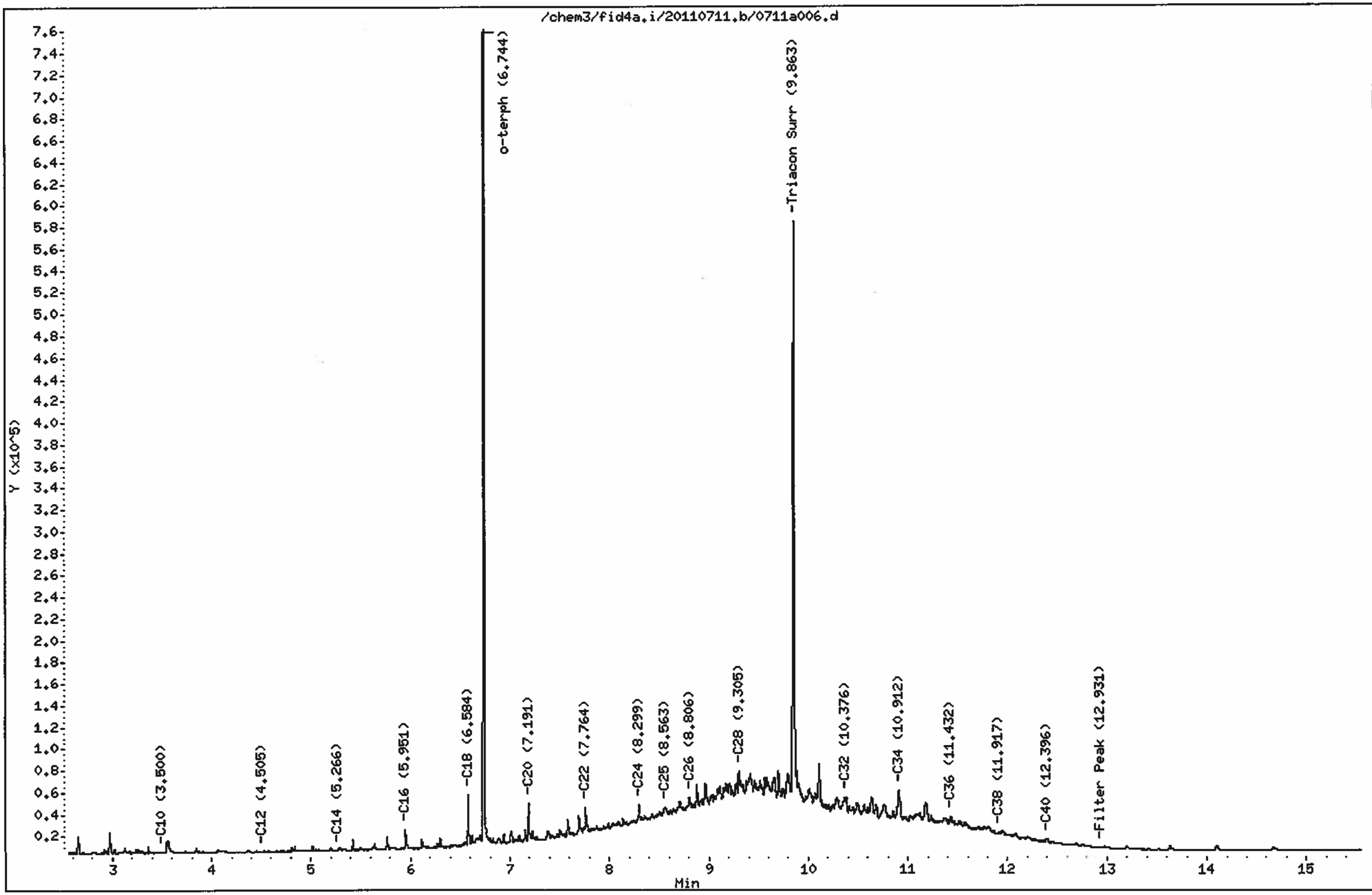
ru 7/11/11

Data File: /chem3/fid4a.i/20110711.b/0711a006.d
Date : 11-JUL-2011 14:51
Client ID: S-1
Sample Info: TD34A

Column phase: RTX-1

Instrument: fid4a.i

Operator: MS
Column diameter: 0.25



Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110711.b/0711a006.d
Method: /chem3/fid4a.i/20110711.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 07/11/2011
Macro: 14-JUNE-2011
Calibration Dates: Gas:30-APR-2010 Diesel:13-MAY-2011 M.Oil:21-MAR-2011

ARI ID: TD34A
Client ID: S-1
Injection: 11-JUL-2011 14:51
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.505	0.003	1276	1579	GAS (Tol-C12)	286984	21.47
C8	1.858	0.004	402	315	DIESEL (C12-C24)	2579734	198.80
C10	3.500	-0.005	1129	1176	M.OIL (C24-C38)	8883497	779.60
C12	4.505	0.005	1810	2322	AK-102 (C10-C25)	3049401	199.54 M
C14	5.266	-0.009	3045	3064	AK-103 (C25-C36)	7938241	1150.12 M
C16	5.951	0.000	21919	38071			
C18	6.584	-0.004	53496	46884			
C20	7.191	-0.002	46088	50117			
C22	7.764	-0.002	42540	75803	MSPIRIT (Tol-C12)	286984	15.62
C24	8.299	-0.004	44560	94226			
C25	8.563	0.003	42244	46160			
C26	8.806	-0.004	50875	90372			
C28	9.305	-0.018	74853	168458			
C32	10.376	-0.008	50608	68552			
C34	10.912	0.002	57607	184758	BUNKERC (C10-C38)	11592895	1545.96 M
Filter Peak	12.931	0.002	5250	3298			
C36	11.432	0.008	32962	88688			
C38	11.917	-0.003	18856	25060			
C40	12.396	-0.002	13308	34048			
o-terph	6.744	-0.003	744517	525453	JET-A (C10-C18)	737557	49.69
Triacon Surr	9.863	-0.002	514072	525057			

M Indicates manual integration within range.
Range Times: NW Diesel(4.500 - 8.303) AK102(3.51 - 8.56) Jet A(3.51 - 6.59)
NW M.Oil(8.30 - 11.92) AK103(8.56 - 11.42) OR Diesel(3.51 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	525453	30.9	68.6
Triacontane	525057	30.9	68.7

Analyte	RF	Curve Date
o-Terph Surr	17021.2	13-MAY-2011
Triacon Surr	16986.4	21-MAR-2011
Gas	13367.0	30-APR-2010
Diesel	12976.7	13-MAY-2011
Motor Oil	11395.0	21-MAR-2011
AK102	15282.5	13-MAY-2011
AK103	6902.1	10-DEC-2009
JetA	14842.0	13-APR-2011
Min Spirit	18373.2	30-MAR-2011
Bunker C	7498.8	14-JUN-2011

Data File: /chem3/fid4a.i/20110711.b/0711a006.d

Date : 11-JUL-2011 14:51

Client ID: S-1

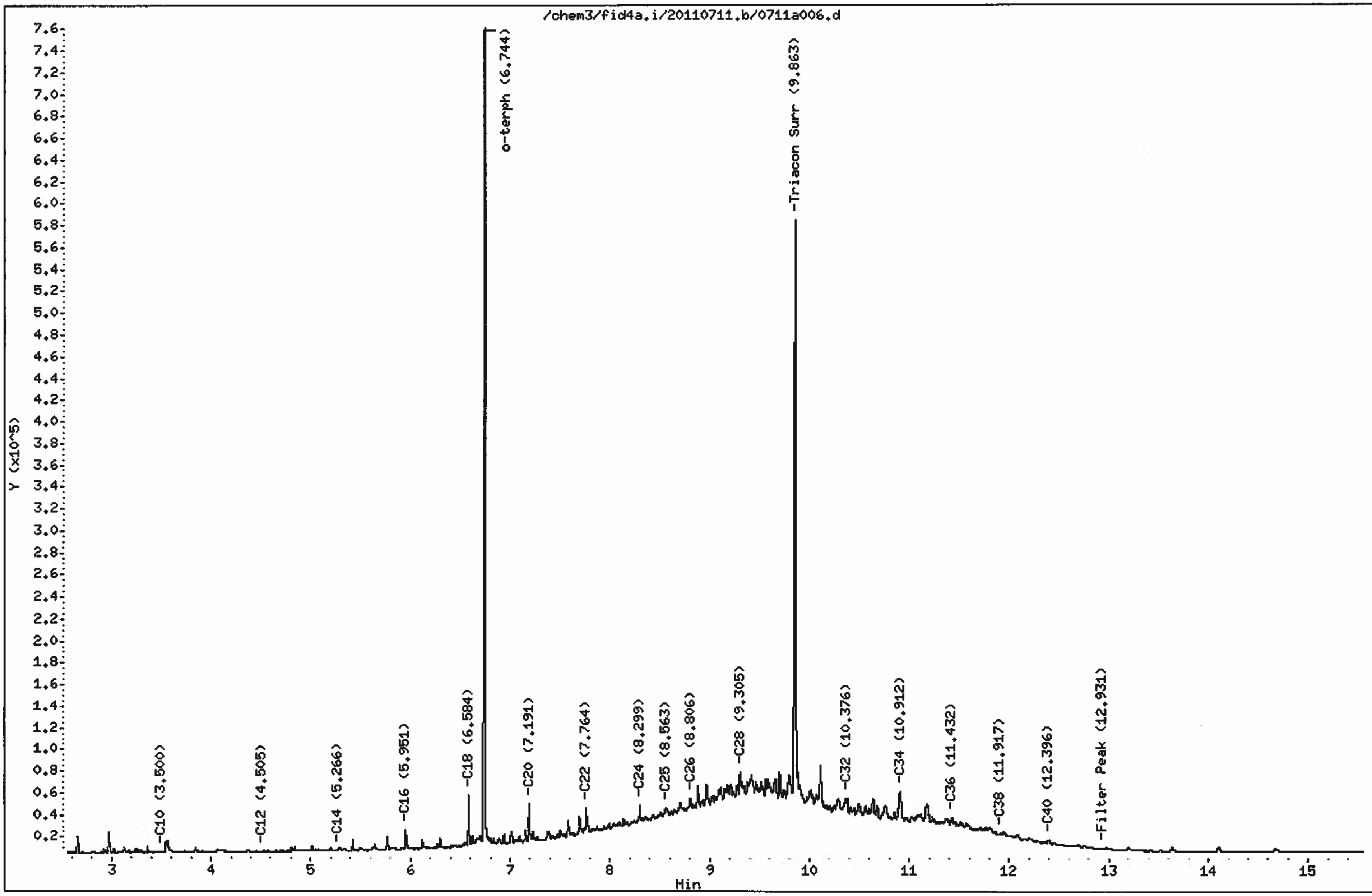
Sample Info: TD34A

Column phase: RTX-1

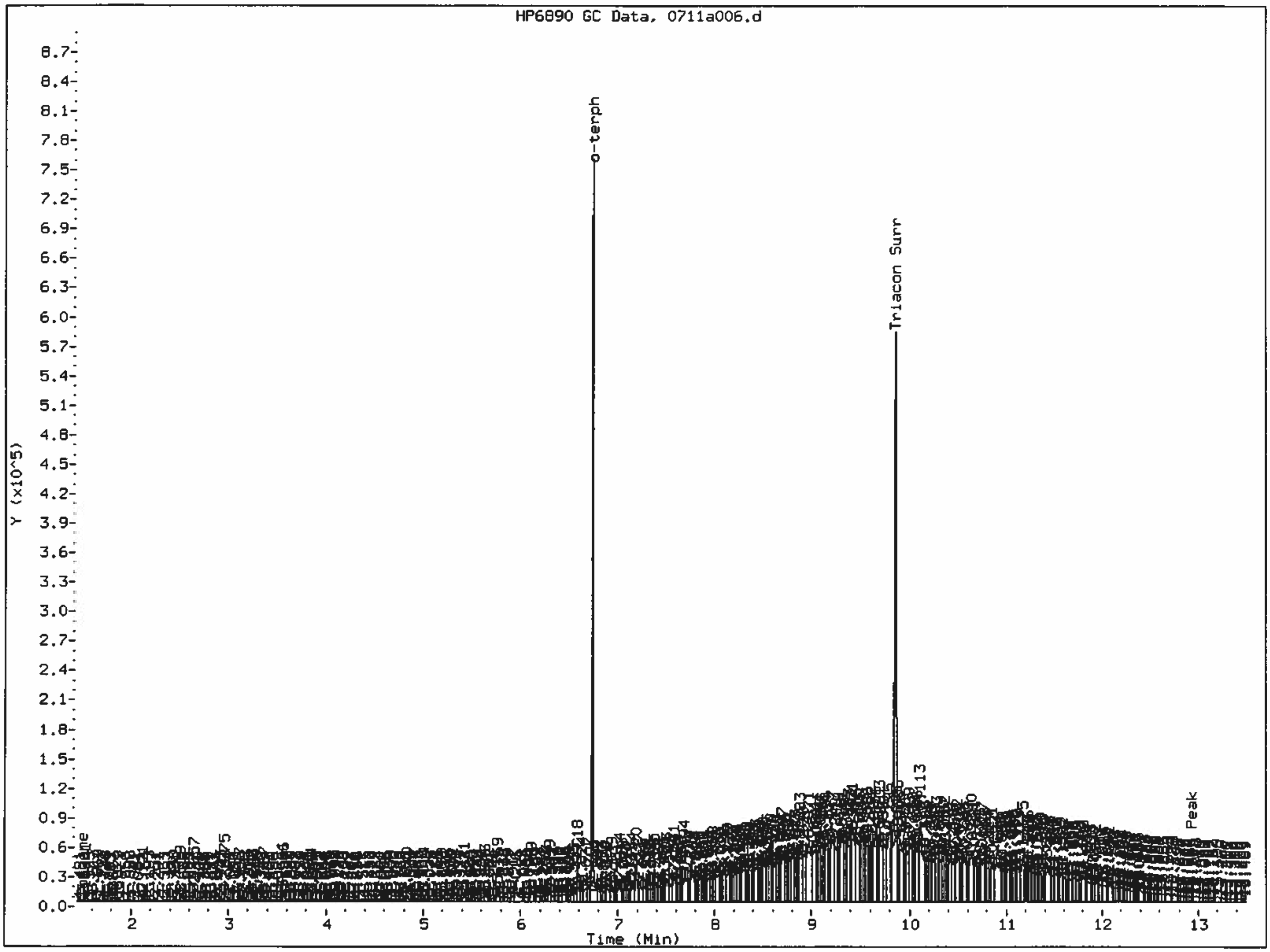
Instrument: fid4a.i

Operator: MS

Column diameter: 0.25



FID:4A-2C/RTX-1 TD34A FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other ______________________

Analyst: ________ Date: 7/4/9

ANALYTICAL RESOURCES INCORPORATED

CLEANED TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: TD34-RH2 Engineering
Project: Cashmere Millsite

Client ID	OTER	TOT OUT
MB-071111	98.9%	0
LCS-071111	97.7%	0
S-1	68.6%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 11-14653 to 11-14653

FORM-II TPHD

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned

Sample ID: LCS-071111
LAB CONTROL

Lab Sample ID: LCS-071111
LIMS ID: 11-14653
Matrix: Soil
Data Release Authorized: VT
Reported: 07/12/11

QC Report No: TD34-RH2 Engineering
Project: Cashmere Millsite

Date Sampled: 07/06/11
Date Received: 07/07/11

Date Extracted: 07/11/11
Date Analyzed: 07/11/11 15:15
Instrument/Analyst: FID/MS

Sample Amount: 10.0 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.0

Range	Lab Control	Spike Added	Recovery
Diesel	134	150	89.3%

TPHD Surrogate Recovery	
o-Terphenyl	97.7%

Results reported in mg/kg

FORM III

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110711.b/0711a007.d   ARI ID: TD34LCSS1
Method: /chem3/fid4a.i/20110711.b/ftphfid4a.m   Client ID: TD34LCSS1
Instrument: fid4a.i   Injection: 11-JUL-2011 15:15
Operator: MS
Report Date: 07/11/2011   Dilution Factor: 1
Macro: 14-JUNE-2011
Calibration Dates: Gas:30-APR-2010 Diesel:13-MAY-2011 M.Oil:21-MAR-2011

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.504	0.002	1420	1226	GAS (Tol-C12)	4008846	299.91
C8	1.877	0.023	5111	4165	DIESEL (C12-C24)	17066002	1315.13
C10	3.509	0.004	109950	71122	M.OIL (C24-C38)	420814	36.93
C12	4.502	0.002	191786	185573	AK-102 (C10-C25)	19957159	1305.89
C14	5.277	0.002	290572	371885	AK-103 (C25-C36)	323641	46.89
C16	5.954	0.003	482770	553913			
C18	6.592	0.004	425438	506110			
C20	7.195	0.002	328366	343914			
C22	7.766	0.000	178478	177985	MSPIRIT (Tol-C12)	4008846	218.19
C24	8.301	-0.001	51108	69803			
C25	8.560	0.000	13951	34491			
C26	8.814	0.005	10872	19724			
C28	9.333	0.010	7298	12706			
C32	10.368	-0.015	9059	12292			
C34	10.897	-0.013	909	1389	BUNKERC (C10-C38)	20310072	2708.44
Filter Peak	12.932	0.002	1224	338			
C36	11.435	0.010	8187	15065			
C38	11.909	-0.011	846	948			
C40	12.395	-0.002	3705	7279			
o-terph	6.751	0.004	1031891	1026314	JET-A (C10-C18)	14903529	1004.15
Triacon Surr	9.863	-0.002	669088	773265			

M Indicates manual integration within range.
Range Times: NW Diesel(4.500 - 8.303) AK102(3.51 - 8.56) Jet A(3.51 - 6.59)
NW M.Oil(8.30 - 11.92) AK103(8.56 - 11.42) OR Diesel(3.51 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	1026314	60.3	134.0
Triacontane	773265	45.5	101.2

Analyte	RF	Curve Date
o-Terph Surr	17021.2	13-MAY-2011
Triacon Surr	16986.4	21-MAR-2011
Gas	13367.0	30-APR-2010
Diesel	12976.7	13-MAY-2011
Motor Oil	11395.0	21-MAR-2011
AK102	15282.5	13-MAY-2011
AK103	6902.1	10-DEC-2009
JetA	14842.0	13-APR-2011
Min Spirit	18373.2	30-MAR-2011
Bunker C	7498.8	14-JUN-2011

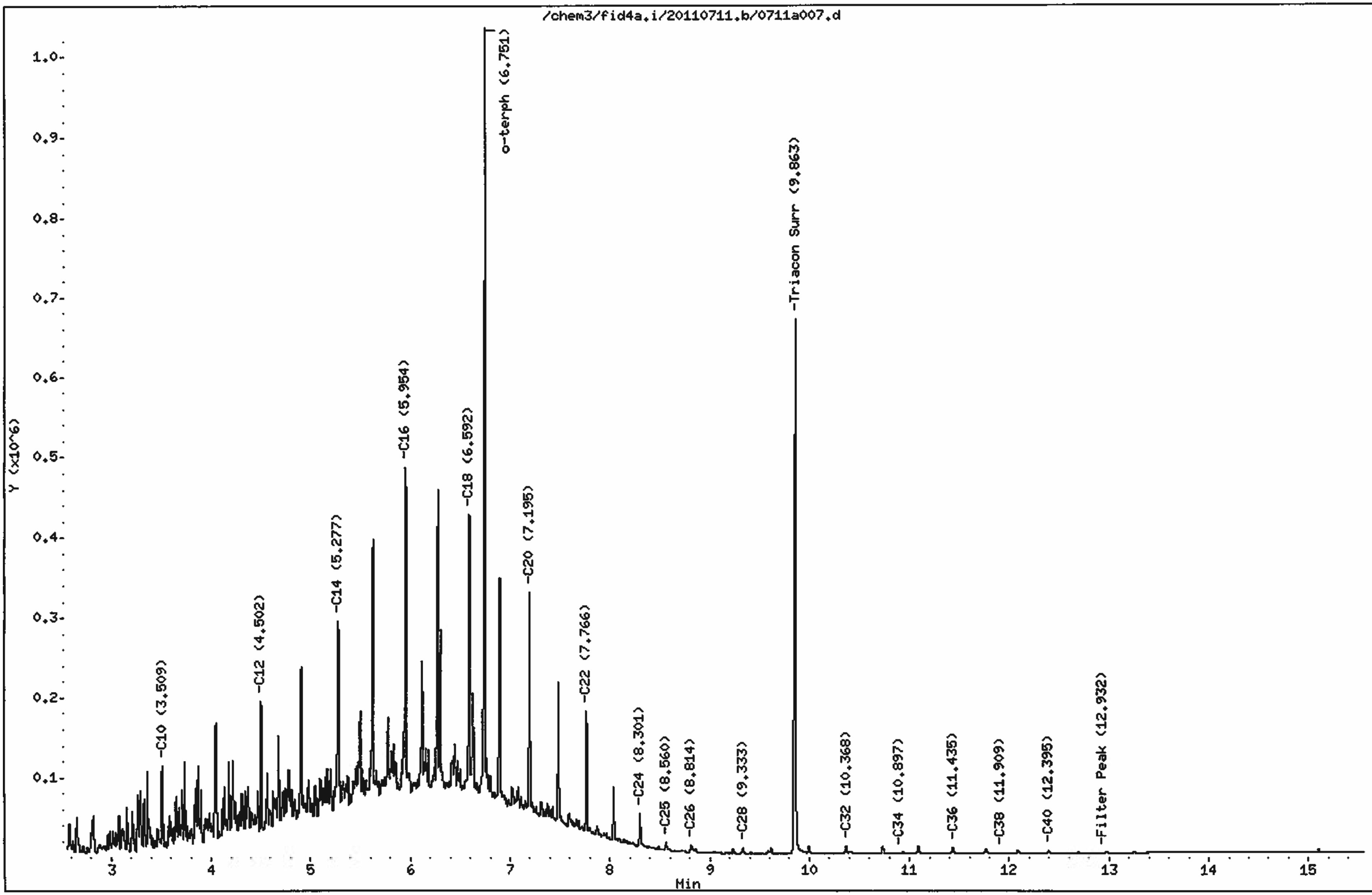
7/11/11

Data File: /chem3/fid4a.i/20110711.b/0711a007.d
Date : 11-JUL-2011 15:15
Client ID: TD34LCSS1
Sample Info: TD34LCSS1

Column phase: RTX-1

Instrument: fid4a.i

Operator: MS
Column diameter: 0.25



Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110711.b/0711a007.d ARI ID: TD34LCSS1
Method: /chem3/fid4a.i/20110711.b/ftphfid4a.m Client ID: TD34LCSS1
Instrument: fid4a.i Injection: 11-JUL-2011 15:15
Operator: MS
Report Date: 07/11/2011 Dilution Factor: 1
Macro: 14-JUNE-2011
Calibration Dates: Gas:30-APR-2010 Diesel:13-MAY-2011 M.Oil:21-MAR-2011

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.504	0.002	1420	1226	GAS (Tol-C12)	4008846	299.91
C8	1.877	0.023	5111	4165	DIESEL (C12-C24)	17346014	1336.71
C10	3.509	0.004	109950	71122	M.OIL (C24-C38)	420814	36.93
C12	4.502	0.002	191786	185573	AK-102 (C10-C25)	20237172	1324.21 M
C14	5.277	0.002	290572	371885	AK-103 (C25-C36)	323641	46.89
C16	5.954	0.003	482770	553913			
C18	6.592	0.004	425438	506110			
C20	7.195	0.002	328366	343914			
C22	7.766	0.000	178478	177985	MSPIRIT (Tol-C12)	4008846	218.19
C24	8.301	-0.001	51108	69803			
C25	8.560	0.000	13951	34491			
C26	8.814	0.005	10872	19724			
C28	9.333	0.010	7298	12706			
C32	10.368	-0.015	9059	12292			
C34	10.897	-0.013	909	1389	BUNKERC (C10-C38)	20590085	2745.78 M
Filter Peak	12.932	0.002	1224	338			
C36	11.435	0.010	8187	15065			
C38	11.909	-0.011	846	948			
C40	12.395	-0.002	3705	7279			
o-terph	6.751	0.004	932262	748191	JET-A (C10-C18)	14903529	1004.15
Triacon Surr	9.863	-0.002	669088	773265			

M Indicates manual integration within range.
Range Times: NW Diesel(4.500 - 8.303) AK102(3.51 - 8.56) Jet A(3.51 - 6.59)
NW M.Oil(8.30 - 11.92) AK103(8.56 - 11.42) OR Diesel(3.51 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	748191	44.0	97.7
Triacontane	773265	45.5	101.2

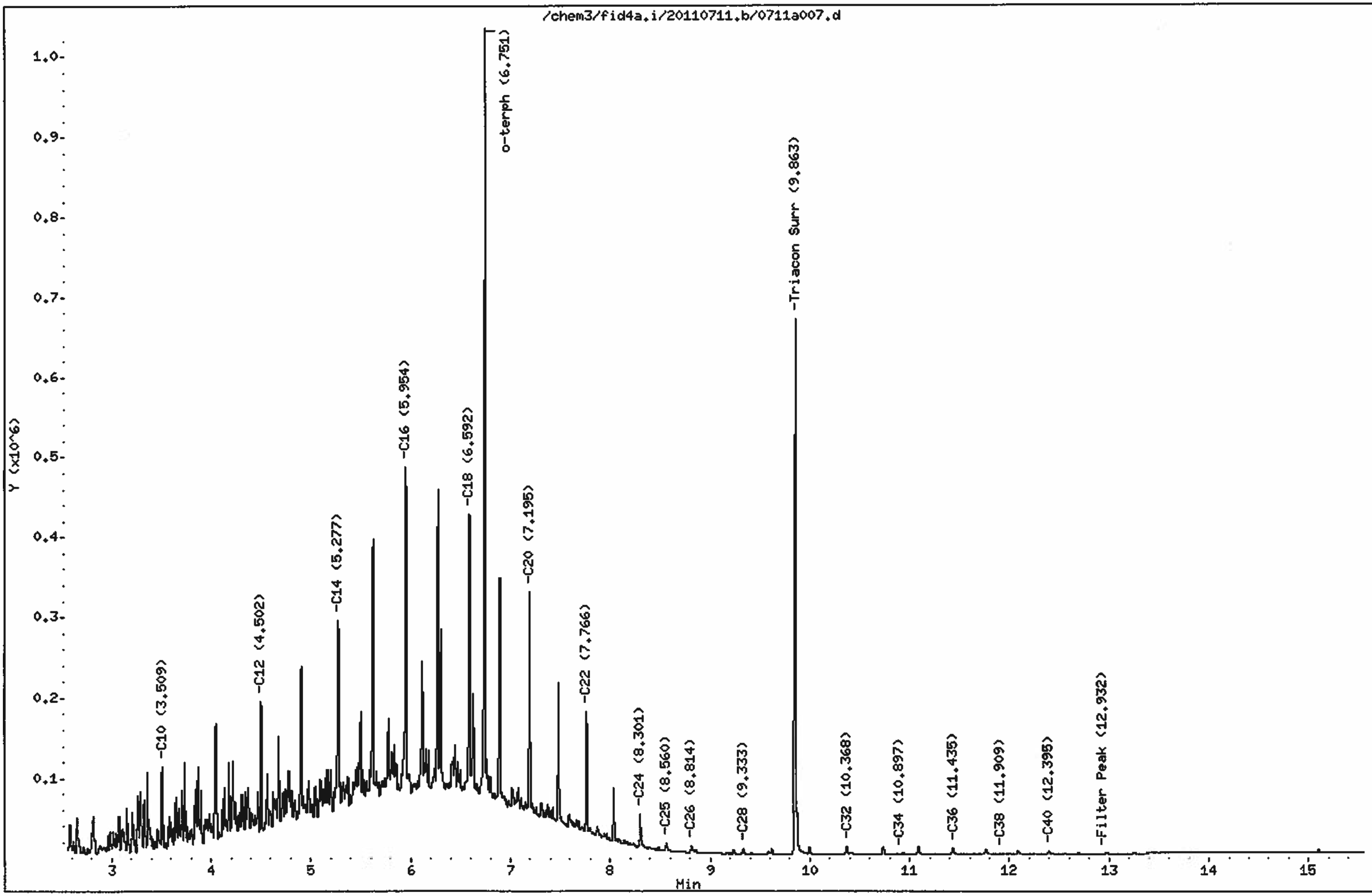
Analyte	RF	Curve Date
o-Terph Surr	17021.2	13-MAY-2011
Triacon Surr	16986.4	21-MAR-2011
Gas	13367.0	30-APR-2010
Diesel	12976.7	13-MAY-2011
Motor Oil	11395.0	21-MAR-2011
AK102	15282.5	13-MAY-2011
AK103	6902.1	10-DEC-2009
JetA	14842.0	13-APR-2011
Min Spirit	18373.2	30-MAR-2011
Bunker C	7498.8	14-JUN-2011

Data File: /chem3/fid4a.i/20110711.b/0711a007.d
Date : 11-JUL-2011 15:15
Client ID: TD34LCSS1
Sample Info: TD34LCSS1

Column phase: RTX-1

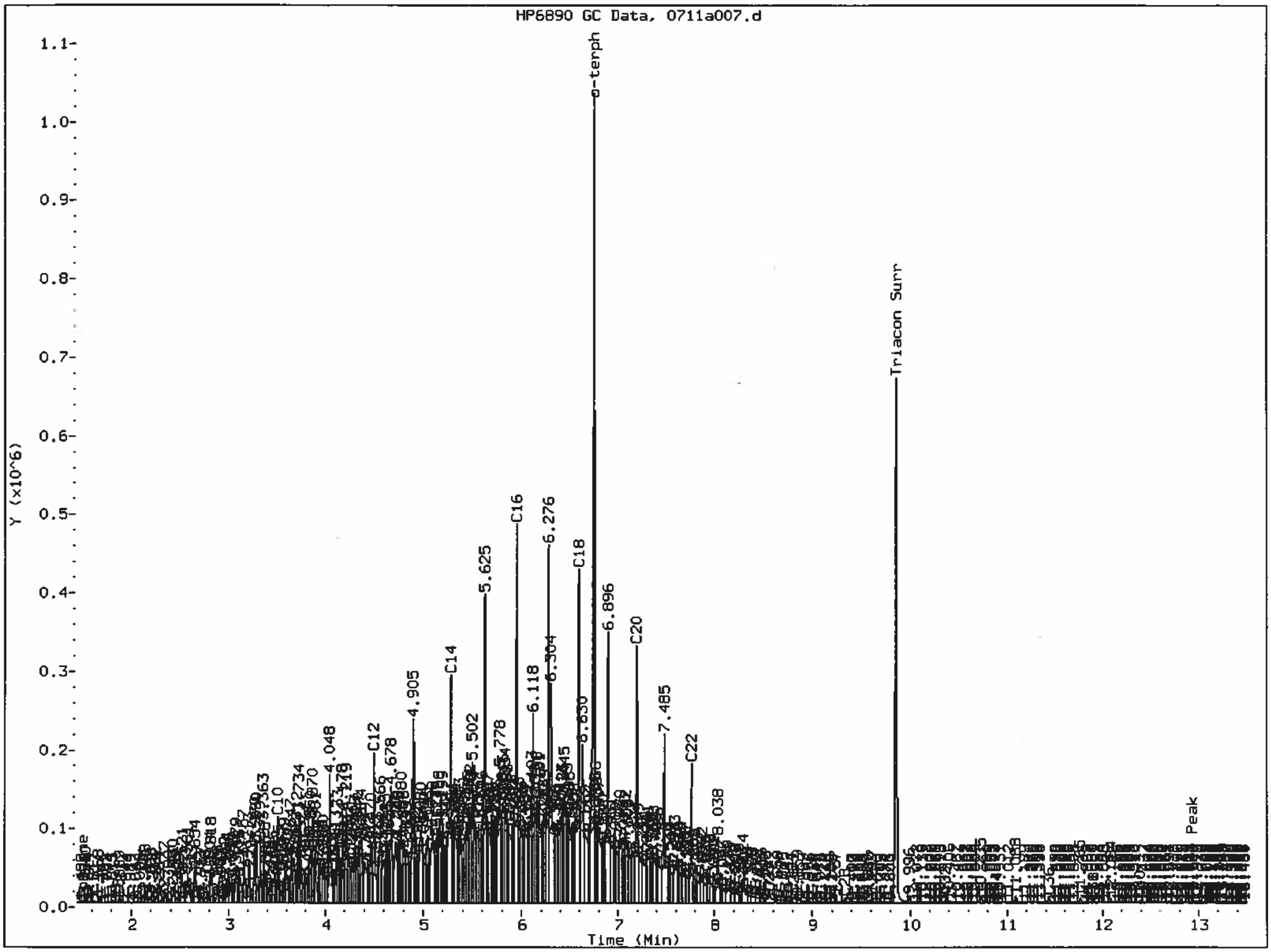
Instrument: fid4a.i

Operator: MS
Column diameter: 0.25



TD34 · 00021

FID:4A-2C/RTX-1 TD34LCSS1 FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other ______________

Analyst: [signature] Date: 7/11/6

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Soil
Date Received: 07/07/11

ARI Job: TD34
Project: Cashmere Millsite

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
11-14653-071111MB1	Method Blank	10.0 g	1.00 mL	-	07/11/11
11-14653-071111LCS1	Lab Control	10.0 g	1.00 mL	-	07/11/11
11-14653-TD34A	S-1	7.42 g	1.00 mL	D	07/11/11

Basis: D=Dry Weight W=As Received

Diesel Extraction Report

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPH-HCID Method by GC/FID
Page 1 of 1
Matrix: Soil

QC Report No: TD34-RH2 Engineering
Project: Cashmere Millsite

Data Release Authorized:
Reported: 07/08/11

ARI ID	Sample ID	Extraction Date	Analysis Date	DL	Range	Result
MB-070711	Method Blank	07/07/11	07/08/11	1.0	Gas	< 20 U
11-14653					Diesel	< 50 U
					Oil	< 100 U
					o-Terphenyl	105%
TD34A	S-1	07/07/11	07/08/11	1.0	Gas	< 20 U
11-14653	HC ID: **DRO/MOTOR OIL**				**Diesel**	**> 50**
					Oil	**> 100**
					o-Terphenyl	103%

Reported in mg/kg (ppm)

Gas value based on total peaks in the range from Toluene to C12.
Diesel value based on the total peaks in the range from C12 to C24.
Oil value based on the total peaks in the range from C24 to C38.

HCID SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: TD34-RH2 Engineering
Project: Cashmere Millsite

Client ID	O-TER	TOT OUT
070711MB	105%	0
S-1	103%	0

	LCS/MB LIMITS	QC LIMITS
(O-TER) = o-Terphenyl	(68-122)	(50-150)

Prep Method: SW3550B
Log Number Range: 11-14653 to 11-14653

ANALYTICAL RESOURCES INCORPORATED

TOTAL HCID RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Soil
Date Received: 07/07/11

ARI Job: TD34
Project: Cashmere Millsite

ARI ID	Client ID	Sample Amt	Final Vol	Basis	Prep Date
11-14653-070711MB	Method Blank	10.0 g	5.00 mL	-	07/07/11
11-14653-TD34A	S-1	7.53 g	5.00 mL	D	07/07/11

Basis: D=Dry Weight W=As Received

HCID Extraction Report

CASCADE ANALYTICAL, INC.

AGRICULTURAL& ENVIRONMENTAL ANALYSIS

3019 G.S. Center Rd.
Wenatchee, WA 98801

(509) 662-1888
Fax: (509) 662-8183
1-800-545-4206

SPECIAL SERVICE ORDER FORM

SAMPLE #	1	2	3	4
SEND RESULTS TO 1)Client 2)Billing 3)Both				
SAMPLE REPRESENTS 1)Food 2)Water 3)Soil 4)Plant Tissue 5)Other				
SAMPLE BY 1)Client 2)Field Rep. 3)Quality Control 4)Cascade 5)Other				
SAMPLER'S NAME				

CLIENT NAME/ADDRESS	BILLING NAME/ADDRESS
Adam Neff	same
RH2 Engineering	
300 SE Simon St., Suite 5	
PHONE NO. 509-699-8427	PHONE NO.
EMAIL aneff@rh2.com	EMAIL

FORM MUST BE COMPLETED BEFORE ANALYSIS WILL BE PERFORMED.

RELINQUISHED BY: (Signature) 1	DATE	RELINQUISHED BY: (Signature) 2	DATE	RELINQUISHED BY: (Signature) 3	DATE
[signature]	7/27				
(Printed)	TIME	(Printed)	TIME	(Printed)	TIME
RECEIVED BY: (Signature)	DATE	RECEIVED BY: (Signature) [signature] 1633	DATE	RECEIVED BY: (Signature) [signature]	DATE 7/28/11
(Printed)	TIME	(Printed)	TIME	(Printed)	TIME

11E WB

#			Sample Date	Sample Time
1	SAMPLE I.D.	S-1-M	7-27	3:45 pm
	ANALYSIS REQUESTED	RCRA 8 metals		
	COMMENT			
2	SAMPLE I.D.	S-2-M	7-27	~~3:~~ 4:?? pm
	ANALYSIS REQUESTED			
	COMMENT	hold		
3	SAMPLE I.D.	S-3-M	7-27	4:39
	ANALYSIS REQUESTED			
	COMMENT	hold		
4	SAMPLE I.D.			
	ANALYSIS REQUESTED			
	COMMENT			

Sample container received by client was sealed **Yes _____ No _____**
Sample container received by laboratory was sealed **Yes _____ No _____**

Disclaimer:
Cascade Analytical, Inc., makes no warranty of any kind, expressed or implied, and customer assumes all risk and liability from use of Cascade Analytical test results. Cascade neither assumes not authorizes any person to assume for Cascade any other liability in connection with the testing done by Cascade Analytical, Inc., and there are not other oral agreements or warranties collateral to or affecting this agreement.
Cascade Analytical, Inc.'s liability to customer as a result of customers use of Cascade's tests results shall be limited to a sum equal to the fees paid by customer to Cascade Analytical, Inc. for the testing work.

Customer Signature [signature] Date 7-27-11

Q-4
Item 130

CASCADE ANALYTICAL, INC.
1-800-545-4206

(509) 662-1888
Fax: (509) 662-8183
3019 G.S. Center Road
Wenatchee, WA 98801

(509) 452-7707
Fax: (509) 452-7773
1008 W. Ahtanum Rd.
Union Gap, WA 98903

Batch: 156333
Client: RH2 Engineering/E Wenatchee
Account: 04789
Sampler: Adam Neff
PO Number:

--- Analytical Services Report ---

Report Date: 8/ 5/11

RH2 Engineering/E Wenatchee
Adam Neff
300 Simon St SE
E Wenatchee, WA 98802

Laboratory Number: 11-E014438
Sample Identification: S-1-M

Date Received: 7/28/11
Date Sampled: 7/27/11

Test Requested	Results	Units	RL	Method	Date Analyzed	Flags
Arsenic Solid	4.052	mg/Kg	3.247	SW846 6010	8/ 1/11	
Barium Solid	81.2	mg/Kg	0.26	SW846 6010	8/ 1/11	
Cadmium Solid	0.80	mg/Kg	0.39	SW846 6010	8/ 1/11	
Chromium Total Solid	33.8	mg/Kg	0.29	SW846 6010	8/ 1/11	
Lead Solid	64.9	mg/Kg	3.2	SW846 6010	8/ 1/11	
Mercury Solid	0.0395	mg/Kg	0.0195	SW846 7471	8/ 5/11	
Selenium Solid	< 3.25	mg/Kg	3.25	SW846 6010	8/ 1/11	
Silver Solid	< 0.32	mg/Kg	0.32	SW846 6010	8/ 2/11	
Total Percent Solids	77.0	%	0.01 %	SM 2540-B	7/29/11	
Total Metals Digest Solid	Metals Digest			SW846 3050	8/ 2/11	

RECEIVED E. WENATCHEE
RH2 ENGINEERING INC.
JOB NO:
AUG 08 2011
ROUTE TO:
FILE:

Approved By:

Analytical Resources, Incorporated
Analytical Chemists and Consultants

September 20, 2012

Adam Neff
RH2 Engineering, Inc.
300 Simon Street SE
Suite #5
East Wenatchee, WA 98802-7720

RE: Client Project: Cashmere Mill Site
ARI Job No.: VI35 & VI78

Dear Adam:
Please find enclosed the original Chain of Custody records (COCs), sample receipt documentation, and the final results for the project referenced above. Analytical Resources, Inc. (ARI) accepted fifteen soil samples on September 5, 2012 under ARI job VI03. All samples were archived upon receipt. For further details regarding sample receipt, please refer to the enclosed Cooler Receipt Form.

Twelve samples were removed from archive on September 6, 2012 and logged under ARI job VI35. The samples were analyzed for Semivolatiles, NWTPH-HCID, NWTPH-Gx/BETX, EPH, VPH, and metals, as requested. Based on HCID results, one sample was analyzed for NWTPH-Dx under ARI job VI78

Only one methanol preserved vial was provided for sample **CMS-083020102-6**. Both NWTPH-Gx/BETX and VPH analyses were analyzed from the same vial.

Bis(2-Ethylhexyl)phthalate was present in **MB-091112** at a level that was greater than the reporting limit. All detected results for this compound have been flagged with a "B" qualifier. No further corrective action was taken.

C8-C10 Aliphatics were present in **MB-091112** at a level greater than the reporting limit. Detected results have been flagged with a "B" qualifier. No further corrective action was taken.

The matrix spike percent recovery of chromium fell outside the control limits low for sample **CMS-08302012-9**. The chromium result has been flagged with an "N" qualifier on the Form V. No further corrective action was taken.

The duplicate RPD of chromium was outside the 20% control limit for sample **CMS-08302012-9**. The chromium result has been flagged with a "*" qualifier on the Form VI. No further corrective action was taken.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please feel free to contact me at your convenience.

Respectfully,
ANALYTICAL RESOURCES, INC.

Cheronne Oreiro
Project Manager
(206) 695-6214
cheronneo@arilabs.com
www.arilabs.com

cc: eFile VI35_VI78

Enclosures

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)

ARI Assigned Number: VI03	Turn-around Requested:
ARI Client Company: RH2 Engineering	Phone: 509-886-6774
Client Contact: Adam Neff	
Client Project Name: Cashmere Mill Site	
Client Project #:	Samplers: Adam Neff

Page:	of
Date: 8-31-12	Ice Present?
No. of Coolers: 1	Cooler Temps: 11.1°C

Sample ID	Date	Time	Matrix	No Containers	Analysis Requested								Notes/Comments
													Hold all Samples
CMS-08302012-4	8/30	8:30	Soil	3									
CMS-08302012-5	8/30	9:15	Soil	3									
CMS-08302012-6	8/30	9:30	Soil	3									
CMS-08302012-7	8/30	10:00	Soil	3									
CMS-08302012-8	8/30	10:15	Soil	3									
CMS-08302012-9	8/30	10:40	Soil	3									
CMS-08302012-11	8/30	11:25	Soil	3									
CMS-08302012-12	8/30	12:42	Soil	3									
CMS-08302012-14	8/30	13:05	Soil	3									
CMS-08302012-15	8/30	13:35	Soil	3									

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by	Received by:
	(Signature) Adam Neff	(Signature) Joshua Rains	(Signature)	(Signature)
	Printed Name: Adam Neff	Printed Name: Joshua Rains	Printed Name:	Printed Name
	Company: RH2	Company: ARI	Company.	Company
	Date & Time: 8/31	Date & Time: 09/05/12 6:40	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.

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)

ARI Assigned Number: VI03	Turn-around Requested:
ARI Client Company: RH2 Engineering	Phone: 509 886 6777
Client Contact: Adam Neff	
Client Project Name: Cashmere Mill site	
Client Project #:	Samplers: Adam Neff

Page:	of
Date: 8-31-12	Ice Present?
No. of Coolers: 1	Cooler Temps: 11.1

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested								Notes/Comments
													Hold all samples
CMS-08302012-22	8/30	14:50	Soil	3									
CMS-08302012-23	8/30	15:22	Soil	3									
CMS-08302012-24	8/30	15:32	Soil	3									
CMS-08302012-26	8/30	16:30	Soil	3									
CMS-08302012-27	8/30	16:40	Soil	3									

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Adam Neff	Printed Name: Jennifer Millsap	Printed Name:	Printed Name:
	Company: RH2	Company: ARI	Company:	Company:
	Date & Time: 8/31	Date & Time: 9/5/12 640	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.

Cooler Receipt Form

ARI Client: RH2 Engineering
COC No(s): ____ NA
Assigned ARI Job No: VI03

Project Name: Cashmere Mill Site
Delivered by: Fed-Ex UPS Courier Hand Delivered Other ____
Tracking No: 8735 8129 8400 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) 11.1

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90877952

Cooler Accepted by: JM (for JR) Date: 9/5/12 Time: 640

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: JM Date: 9/5/12 Time: 927

*** 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:

Weights on MEOH vials were covered by labels.

By: JM Date: 9/5/12

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm

Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

Incorporated
Analytical Chemists and
Consultants

Cooler Temperature Compliance Form

VI03

Cooler#: 1 Temperature(°C): 11.1

Sample ID	Bottle Count	Bottle Type
All samples associated		
with this job were		
received at a temp		
greater than 6°C.		

Cooler#: ______ Temperature(°C): ______

Sample ID	Bottle Count	Bottle Type

Cooler#: ______ Temperature(°C): ______

Sample ID	Bottle Count	Bottle Type

Cooler#: ______ Temperature(°C): ______

Sample ID	Bottle Count	Bottle Type

Completed by: JM Date: 9/5/12 Time: 927

RH2 Engineering

Cashmere Mill Site

Analytical Request

Sample ID	**Analysis Requested**	**Notes**
CMS-08302012-4	HCID	
CMS-08302012-5	Gx, BTEX	
CMS-08302012-6	Gx, BTEX, VPH	
CMS-08302012-7	Gx, BTEX	
CMS-08302012-8	Gx, BTEX	
CMS-08302012-9	Metals, SW8270	Need to make sure RL are smaller than the most stringent Method A cleanup levels
CMS-08302012-12	EPH, VPH	
CMS-08302012-14	Metals, SW8270	Need to make sure RL are smaller than the most stringent Method A cleanup levels
CMS-08302012-22	HCID	
CMS-08302012-23	Metals, SW8270, HCID	Need to make sure RL are smaller than the most stringent Method A cleanup levels
CMS-08302012-24	Metals, SW8270, HCID	Need to make sure RL are smaller than the most stringent Method A cleanup levels
CMS-08302012-26	Metals, SW8270	Need to make sure RL are smaller than the most stringent Method A cleanup levels

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: VI35
Client: RH2 Engineering
Project Event: N/A
Project Name: Cashmere Mill Site

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CMS-08302012-4	VI35A	12-16910	Soil	08/30/12 08:30	09/05/12 06:40
2.	CMS-08302012-5	VI35B	12-16911	Soil	08/30/12 09:15	09/05/12 06:40
3.	CMS-08302012-6	VI35C	12-16912	Soil	08/30/12 09:30	09/05/12 06:40
4.	CMS-08302012-7	VI35D	12-16913	Soil	08/30/12 10:00	09/05/12 06:40
5.	CMS-08302012-8	VI35E	12-16914	Soil	08/30/12 10:15	09/05/12 06:40
6.	CMS-08302012-9	VI35F	12-16915	Soil	08/30/12 10:40	09/05/12 06:40
7.	CMS-08302012-12	VI35G	12-16916	Soil	08/30/12 12:42	09/05/12 06:40
8.	CMS-08302012-14	VI35H	12-16917	Soil	08/30/12 13:05	09/05/12 06:40
9.	CMS-08302012-22	VI35I	12-16918	Soil	08/30/12 14:50	09/05/12 06:40
10.	CMS-08302012-23	VI35J	12-16919	Soil	08/30/12 15:22	09/05/12 06:40
11.	CMS-08302012-24	VI35K	12-16920	Soil	08/30/12 15:52	09/05/12 06:40
12.	CMS-08302012-26	VI35L	12-16921	Soil	08/30/12 16:30	09/05/12 06:40
13.	CMS-08302012-6	VI35M	12-16922	Soil	08/30/12 09:30	09/05/12 06:40

ARI Client: RH2 Engineering
COC No(s): NA
Assigned ARI Job No: VI03

Project Name: Cashmere Mill Site
Delivered by: Fed-Ex UPS Courier Hand Delivered Other ____
Tracking No: 8735 8129 8410 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): 11.1

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90877952

Cooler Accepted by: JM (for JR) Date: 9/5/12 Time: 640

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: JM Date: 9/5/12 Time: 927

*** 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:

Weights on MEOH vials were covered by labels.

By: JM Date: 9/5/12

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm	
			Small → "sm"
			Peabubbles → "pb"
			Large → "lg"
			Headspace → "hs"

Analytical Chemists and
Consultants

Compliance Form

VI03

Cooler#: 1 **Temperature(°C):** 11.1

Sample ID	Bottle Count	Bottle Type
All samples associated		
with this job were		
received at a temp		
greater than 6°C.		

Cooler#: ______ **Temperature(°C):** ______

Sample ID	Bottle Count	Bottle Type

Cooler#: ______ **Temperature(°C):** ______

Sample ID	Bottle Count	Bottle Type

Cooler#: ______ **Temperature(°C):** ______

Sample ID	Bottle Count	Bottle Type

Completed by JM Date 9/5/12 Time 927

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: VI78
Client: RH2 Engineering
Project Event: N/A
Project Name: Cashmere Mill Site

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CMS-08302012-24	VI78A	12-17193	Soil	08/30/12 15:52	09/05/12 06:40

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 2/14/2011

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

M2 — The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

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
PSDDA Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: CMS-08302012-9
SAMPLE

Lab Sample ID: VI35F
LIMS ID: 12-16915
Matrix: Soil
Data Release Authorized:
Reported: 09/20/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
NA
Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted: 09/11/12
Date Analyzed: 09/17/12 18:34
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.22 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 16.4%

CAS Number	Analyte	RL	Result
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	39	< 39 U
120-83-2	2,4-Dichlorophenol	200	< 200 U
91-20-3	Naphthalene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
88-06-2	2,4,6-Trichlorophenol	98	< 98 U
95-95-4	2,4,5-Trichlorophenol	98	< 98 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
86-73-7	Fluorene	20	< 20 U
87-86-5	Pentachlorophenol	200	< 200 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**24**	**46 B**
218-01-9	Chrysene	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	39	< 39 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	63.6%	2-Fluorobiphenyl	65.4%
d14-p-Terphenyl	81.2%	d4-1,2-Dichlorobenzene	63.2%
d5-Phenol	61.2%	2-Fluorophenol	60.9%
2,4,6-Tribromophenol	69.9%	d4-2-Chlorophenol	68.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: CMS-08302012-14
SAMPLE

Lab Sample ID: VI35H
LIMS ID: 12-16917
Matrix: Soil
Data Release Authorized:
Reported: 09/20/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
NA
Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted: 09/11/12
Date Analyzed: 09/17/12 20:20
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.66 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 42.4%

CAS Number	Analyte	RL	Result
95-48-7	2-Methylphenol	19	< 19 U
106-44-5	**4-Methylphenol**	**38**	**180**
120-83-2	2,4-Dichlorophenol	190	< 190 U
91-20-3	**Naphthalene**	**19**	**380**
91-57-6	**2-Methylnaphthalene**	**19**	**70**
88-06-2	2,4,6-Trichlorophenol	94	< 94 U
95-95-4	2,4,5-Trichlorophenol	94	< 94 U
208-96-8	**Acenaphthylene**	**19**	**77**
83-32-9	**Acenaphthene**	**19**	**22**
132-64-9	**Dibenzofuran**	**19**	**35**
86-73-7	**Fluorene**	**19**	**15 J**
87-86-5	Pentachlorophenol	190	< 190 U
85-01-8	**Phenanthrene**	**19**	**160**
120-12-7	**Anthracene**	**19**	**24**
206-44-0	**Fluoranthene**	**19**	**75**
129-00-0	**Pyrene**	**19**	**86**
56-55-3	**Benzo(a)anthracene**	**19**	**20**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**24**	**38 B**
218-01-9	**Chrysene**	**19**	**37**
50-32-8	**Benzo(a)pyrene**	**19**	**25**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**19**	**36**
53-70-3	**Dibenz(a,h)anthracene**	**19**	**10 J**
191-24-2	**Benzo(g,h,i)perylene**	**19**	**57**
90-12-0	**1-Methylnaphthalene**	**19**	**37**
TOTBFA	**Total Benzofluoranthenes**	**38**	**50**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	60.8%	2-Fluorobiphenyl	68.8%
d14-p-Terphenyl	76.6%	d4-1,2-Dichlorobenzene	62.0%
d5-Phenol	60.8%	2-Fluorophenol	61.5%
2,4,6-Tribromophenol	74.4%	d4-2-Chlorophenol	67.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CMS-08302012-23
SAMPLE

Lab Sample ID: VI35J
LIMS ID: 12-16919
Matrix: Soil
Data Release Authorized:
Reported: 09/20/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
NA
Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted: 09/11/12
Date Analyzed: 09/17/12 20:55
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.23 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 47.0%

CAS Number	Analyte	RL	Result
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	**4-Methylphenol**	**39**	**75**
120-83-2	2,4-Dichlorophenol	200	< 200 U
91-20-3	**Naphthalene**	**20**	**27**
91-57-6	**2-Methylnaphthalene**	**20**	**20**
88-06-2	2,4,6-Trichlorophenol	98	< 98 U
95-95-4	2,4,5-Trichlorophenol	98	< 98 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
86-73-7	Fluorene	20	< 20 U
87-86-5	Pentachlorophenol	200	< 200 U
85-01-8	**Phenanthrene**	**20**	**41**
120-12-7	Anthracene	20	< 20 U
206-44-0	**Fluoranthene**	**20**	**14 J**
129-00-0	**Pyrene**	**20**	**43**
56-55-3	**Benzo(a)anthracene**	**20**	**11 J**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**24**	**41 B**
218-01-9	**Chrysene**	**20**	**28**
50-32-8	**Benzo(a)pyrene**	**20**	**13 J**
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	**Benzo(g,h,i)perylene**	**20**	**35**
90-12-0	**1-Methylnaphthalene**	**20**	**9.8 J**
TOTBFA	**Total Benzofluoranthenes**	**39**	**16 J**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.8%	2-Fluorobiphenyl	70.0%
d14-p-Terphenyl	75.2%	d4-1,2-Dichlorobenzene	61.8%
d5-Phenol	61.7%	2-Fluorophenol	59.7%
2,4,6-Tribromophenol	75.3%	d4-2-Chlorophenol	68.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: CMS-08302012-24
SAMPLE

Lab Sample ID: VI35K
LIMS ID: 12-16920
Matrix: Soil
Data Release Authorized:
Reported: 09/20/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
NA
Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted: 09/11/12
Date Analyzed: 09/17/12 21:30
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.49 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 30.6%

CAS Number	Analyte	RL	Result
95-48-7	2-Methylphenol	19	< 19 U
106-44-5	**4-Methylphenol**	**38**	**240**
120-83-2	2,4-Dichlorophenol	190	< 190 U
91-20-3	**Naphthalene**	**19**	**120**
91-57-6	**2-Methylnaphthalene**	**19**	**58**
88-06-2	2,4,6-Trichlorophenol	95	< 95 U
95-95-4	2,4,5-Trichlorophenol	95	< 95 U
208-96-8	Acenaphthylene	19	< 19 U
83-32-9	Acenaphthene	19	< 19 U
132-64-9	Dibenzofuran	19	< 19 U
86-73-7	**Fluorene**	**19**	**9.5 J**
87-86-5	**Pentachlorophenol**	**190**	**170 J**
85-01-8	**Phenanthrene**	**19**	**80**
120-12-7	Anthracene	19	< 19 U
206-44-0	**Fluoranthene**	**19**	**46**
129-00-0	**Pyrene**	**19**	**91**
56-55-3	**Benzo(a)anthracene**	**19**	**23**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**24**	**44 B**
218-01-9	**Chrysene**	**19**	**43**
50-32-8	**Benzo(a)pyrene**	**19**	**18 J**
193-39-5	Indeno(1,2,3-cd)pyrene	19	< 19 U
53-70-3	Dibenz(a,h)anthracene	19	< 19 U
191-24-2	Benzo(g,h,i)perylene	19	< 19 U
90-12-0	**1-Methylnaphthalene**	**19**	**28**
TOTBFA	**Total Benzofluoranthenes**	**38**	**50**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	58.8%	2-Fluorobiphenyl	68.8%
d14-p-Terphenyl	69.6%	d4-1,2-Dichlorobenzene	60.6%
d5-Phenol	61.1%	2-Fluorophenol	57.9%
2,4,6-Tribromophenol	73.1%	d4-2-Chlorophenol	65.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CMS-08302012-26
SAMPLE

Lab Sample ID: VI35L
LIMS ID: 12-16921
Matrix: Soil
Data Release Authorized:
Reported: 09/20/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
NA
Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted: 09/11/12
Date Analyzed: 09/17/12 22:05
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.28 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 39.0%

CAS Number	Analyte	RL	Result
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	**4-Methylphenol**	**39**	**330**
120-83-2	2,4-Dichlorophenol	200	< 200 U
91-20-3	**Naphthalene**	**20**	**25**
91-57-6	**2-Methylnaphthalene**	**20**	**16 J**
88-06-2	2,4,6-Trichlorophenol	97	< 97 U
95-95-4	2,4,5-Trichlorophenol	97	< 97 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
86-73-7	Fluorene	20	< 20 U
87-86-5	Pentachlorophenol	200	< 200 U
85-01-8	**Phenanthrene**	**20**	**29**
120-12-7	Anthracene	20	< 20 U
206-44-0	**Fluoranthene**	**20**	**18 J**
129-00-0	**Pyrene**	**20**	**38**
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**24**	**54 B**
218-01-9	**Chrysene**	**20**	**18 J**
50-32-8	**Benzo(a)pyrene**	**20**	**16 J**
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	**Total Benzofluoranthenes**	**39**	**20 J**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	64.8%	2-Fluorobiphenyl	75.0%
d14-p-Terphenyl	74.8%	d4-1,2-Dichlorobenzene	66.2%
d5-Phenol	64.3%	2-Fluorophenol	63.5%
2,4,6-Tribromophenol	77.7%	d4-2-Chlorophenol	78.7%

FORM I

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-091112	64.4%	67.4%	87.2%	66.0%	62.9%	61.9%	62.1%	70.0%	0
LCS-091112	63.8%	66.8%	84.8%	66.6%	64.4%	65.1%	66.7%	69.7%	0
LCSD-091112	67.2%	71.6%	87.4%	67.8%	68.1%	66.8%	67.2%	72.1%	0
CMS-08302012-9	63.6%	65.4%	81.2%	63.2%	61.2%	60.9%	69.9%	68.1%	0
CMS-08302012-9 MS	61.4%	66.0%	79.2%	62.6%	63.1%	63.6%	70.1%	66.9%	0
CMS-08302012-9 MSD	62.6%	66.4%	78.4%	64.0%	64.1%	63.5%	70.1%	69.6%	0
CMS-08302012-14	60.8%	68.8%	76.6%	62.0%	60.8%	61.5%	74.4%	67.2%	0
CMS-08302012-23	61.8%	70.0%	75.2%	61.8%	61.7%	59.7%	75.3%	68.4%	0
CMS-08302012-24	58.8%	68.8%	69.6%	60.6%	61.1%	57.9%	73.1%	65.2%	0
CMS-08302012-26	64.8%	75.0%	74.8%	66.2%	64.3%	63.5%	77.7%	78.7%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(30-160)	(30-160)
(FBP) = 2-Fluorobiphenyl	(30-160)	(30-160)
(TPH) = d14-p-Terphenyl	(30-160)	(30-160)
(DCB) = d4-1,2-Dichlorobenzene	(30-160)	(30-160)
(PHL) = d5-Phenol	(30-160)	(30-160)
(2FP) = 2-Fluorophenol	(30-160)	(30-160)
(TBP) = 2,4,6-Tribromophenol	(30-160)	(30-160)
(2CP) = d4-2-Chlorophenol	(30-160)	(30-160)

Prep Method: SW3546
Log Number Range: 12-16915 to 12-16921

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS

Sample ID: CMS-08302012-9
MS/MSD

Lab Sample ID: VI35F
LIMS ID: 12-16915
Matrix: Soil
Data Release Authorized:
Reported: 09/20/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted MS/MSD: 09/11/12

Date Analyzed MS: 09/17/12 19:09
MSD: 09/17/12 19:45
Instrument/Analyst MS: NT10/YZ
MSD: NT10/YZ
GPC Cleanup: Yes

Sample Amount MS: 10.35 g-dry-wt
MSD: 10.33 g-dry-wt
Final Extract Volume MS: 1.0 mL
MSD: 1.0 mL
Dilution Factor MS: 1.00
MSD: 1.00
Percent Moisture: 16.4 %

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
2-Methylphenol	< 19.6 U	263	483	54.5%	258	484	53.3%	1.9%
4-Methylphenol	< 39.1 U	531	966	55.0%	534	968	55.2%	0.6%
2,4-Dichlorophenol	< 196 U	870	1450	60.0%	893	1450	61.6%	2.6%
Naphthalene	< 19.6 U	332	483	68.7%	340	484	70.2%	2.4%
2-Methylnaphthalene	< 19.6 U	336	483	69.6%	344	484	71.1%	2.4%
2,4,6-Trichlorophenol	< 97.8 U	1070	1450	73.8%	1060	1450	73.1%	0.9%
2,4,5-Trichlorophenol	< 97.8 U	1060	1450	73.1%	1080	1450	74.5%	1.9%
Acenaphthylene	< 19.6 U	355	483	73.5%	355	484	73.3%	0.0%
Acenaphthene	< 19.6 U	374	483	77.4%	369	484	76.2%	1.3%
Dibenzofuran	< 19.6 U	349	483	72.3%	344	484	71.1%	1.4%
Fluorene	< 19.6 U	374	483	77.4%	374	484	77.3%	0.0%
Pentachlorophenol	< 196 U	1170	1450	80.7%	1170	1450	80.7%	0.0%
Phenanthrene	< 19.6 U	425	483	88.0%	424	484	87.6%	0.2%
Anthracene	< 19.6 U	383	483	79.3%	383	484	79.1%	0.0%
Fluoranthene	< 19.6 U	411	483	85.1%	420	484	86.8%	2.2%
Pyrene	< 19.6 U	419	483	86.7%	429	484	88.6%	2.4%
Benzo(a)anthracene	< 19.6 U	387	483	80.1%	391	484	80.8%	1.0%
bis(2-Ethylhexyl)phthalate	46.0 B	447 B	483	83.0%	437 B	484	80.8%	2.3%
Chrysene	< 19.6 U	362	483	74.9%	358	484	74.0%	1.1%
Benzo(a)pyrene	< 19.6 U	359	483	74.3%	360	484	74.4%	0.3%
Indeno(1,2,3-cd)pyrene	< 19.6 U	349	483	72.3%	353	484	72.9%	1.1%
Dibenz(a,h)anthracene	< 19.6 U	276	483	57.1%	288	484	59.5%	4.3%
Benzo(g,h,i)perylene	< 19.6 U	336	483	69.6%	342	484	70.7%	1.8%
1-Methylnaphthalene	< 19.6 U	318	483	65.8%	332	484	68.6%	4.3%
Total Benzofluoranthenes	< 39.1 U	754	966	78.1%	758	968	78.3%	0.5%

Reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CMS-08302012-9
MATRIX SPIKE

Lab Sample ID: VI35F
LIMS ID: 12-16915
Matrix: Soil
Data Release Authorized:
Reported: 09/20/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
NA
Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted: 09/11/12
Date Analyzed: 09/17/12 19:09
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.35 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 16.4%

CAS Number	Analyte	RL	Result
95-48-7	2-Methylphenol	19	---
106-44-5	4-Methylphenol	39	---
120-83-2	2,4-Dichlorophenol	190	---
91-20-3	Naphthalene	19	---
91-57-6	2-Methylnaphthalene	19	---
88-06-2	2,4,6-Trichlorophenol	97	---
95-95-4	2,4,5-Trichlorophenol	97	---
208-96-8	Acenaphthylene	19	---
83-32-9	Acenaphthene	19	---
132-64-9	Dibenzofuran	19	---
86-73-7	Fluorene	19	---
87-86-5	Pentachlorophenol	190	---
85-01-8	Phenanthrene	19	---
120-12-7	Anthracene	19	---
206-44-0	Fluoranthene	19	---
129-00-0	Pyrene	19	---
56-55-3	Benzo(a)anthracene	19	---
117-81-7	bis(2-Ethylhexyl)phthalate	24	---
218-01-9	Chrysene	19	---
50-32-8	Benzo(a)pyrene	19	---
193-39-5	Indeno(1,2,3-cd)pyrene	19	---
53-70-3	Dibenz(a,h)anthracene	19	---
191-24-2	Benzo(g,h,i)perylene	19	---
90-12-0	1-Methylnaphthalene	19	---
TOTBFA	Total Benzofluoranthenes	39	---

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.4%	2-Fluorobiphenyl	66.0%
d14-p-Terphenyl	79.2%	d4-1,2-Dichlorobenzene	62.6%
d5-Phenol	63.1%	2-Fluorophenol	63.6%
2,4,6-Tribromophenol	70.1%	d4-2-Chlorophenol	66.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CMS-08302012-9
MATRIX SPIKE DUPLICATE

Lab Sample ID: VI35F
LIMS ID: 12-16915
Matrix: Soil
Data Release Authorized:
Reported: 09/20/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
NA
Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted: 09/11/12
Date Analyzed: 09/17/12 19:45
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.33 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 16.4%

CAS Number	Analyte	RL	Result
95-48-7	2-Methylphenol	19	---
106-44-5	4-Methylphenol	39	---
120-83-2	2,4-Dichlorophenol	190	---
91-20-3	Naphthalene	19	---
91-57-6	2-Methylnaphthalene	19	---
88-06-2	2,4,6-Trichlorophenol	97	---
95-95-4	2,4,5-Trichlorophenol	97	---
208-96-8	Acenaphthylene	19	---
83-32-9	Acenaphthene	19	---
132-64-9	Dibenzofuran	19	---
86-73-7	Fluorene	19	---
87-86-5	Pentachlorophenol	190	---
85-01-8	Phenanthrene	19	---
120-12-7	Anthracene	19	---
206-44-0	Fluoranthene	19	---
129-00-0	Pyrene	19	---
56-55-3	Benzo(a)anthracene	19	---
117-81-7	bis(2-Ethylhexyl)phthalate	24	---
218-01-9	Chrysene	19	---
50-32-8	Benzo(a)pyrene	19	---
193-39-5	Indeno(1,2,3-cd)pyrene	19	---
53-70-3	Dibenz(a,h)anthracene	19	---
191-24-2	Benzo(g,h,i)perylene	19	---
90-12-0	1-Methylnaphthalene	19	---
TOTBFA	Total Benzofluoranthenes	39	---

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	62.6%	2-Fluorobiphenyl	66.4%
d14-p-Terphenyl	78.4%	d4-1,2-Dichlorobenzene	64.0%
d5-Phenol	64.1%	2-Fluorophenol	63.5%
2,4,6-Tribromophenol	70.1%	d4-2-Chlorophenol	69.6%

FORM I

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS
Page 1 of 1

Sample ID: LCS-091112
LCS/LCSD

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: LCS-091112
LIMS ID: 12-16915
Matrix: Soil
Data Release Authorized:
Reported: 09/20/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted LCS/LCSD: 09/11/12

Date Analyzed LCS: 09/17/12 16:48
LCSD: 09/17/12 17:23
Instrument/Analyst LCS: NT10/YZ
LCSD: NT10/YZ
GPC Cleanup: Yes

Sample Amount LCS: 10.00 g
LCSD: 10.00 g
Final Extract Volume LCS: 1.0 mL
LCSD: 1.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Percent Moisture: NA

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
2-Methylphenol	263	500	52.6%	272	500	54.4%	3.4%
4-Methylphenol	546	1000	54.6%	562	1000	56.2%	2.9%
2,4-Dichlorophenol	932	1500	62.1%	1050	1500	70.0%	11.9%
Naphthalene	357	500	71.4%	368	500	73.6%	3.0%
2-Methylnaphthalene	352	500	70.4%	361	500	72.2%	2.5%
2,4,6-Trichlorophenol	1060	1500	70.7%	1120	1500	74.7%	5.5%
2,4,5-Trichlorophenol	1080	1500	72.0%	1110	1500	74.0%	2.7%
Acenaphthylene	358	500	71.6%	380	500	76.0%	6.0%
Acenaphthene	373	500	74.6%	395	500	79.0%	5.7%
Dibenzofuran	348	500	69.6%	367	500	73.4%	5.3%
Fluorene	366	500	73.2%	388	500	77.6%	5.8%
Pentachlorophenol	1070	1500	71.3%	1110	1500	74.0%	3.7%
Phenanthrene	398	500	79.6%	423	500	84.6%	6.1%
Anthracene	370	500	74.0%	393	500	78.6%	6.0%
Fluoranthene	421	500	84.2%	435	500	87.0%	3.3%
Pyrene	449	500	89.8%	463	500	92.6%	3.1%
Benzo(a)anthracene	413	500	82.6%	431	500	86.2%	4.3%
bis(2-Ethylhexyl)phthalate	449 B	500	89.8%	478 B	500	95.6%	6.3%
Chrysene	371	500	74.2%	388	500	77.6%	4.5%
Benzo(a)pyrene	377	500	75.4%	402	500	80.4%	6.4%
Indeno(1,2,3-cd)pyrene	387	500	77.4%	414	500	82.8%	6.7%
Dibenz(a,h)anthracene	325	500	65.0%	355	500	71.0%	8.8%
Benzo(g,h,i)perylene	364	500	72.8%	384	500	76.8%	5.3%
1-Methylnaphthalene	335	500	67.0%	347	500	69.4%	3.5%
Total Benzofluoranthenes	797	1000	79.7%	848	1000	84.8%	6.2%

Semivolatile Surrogate Recovery

	LCS	LCSD
d5-Nitrobenzene	63.8%	67.2%
2-Fluorobiphenyl	66.8%	71.6%
d14-p-Terphenyl	84.8%	87.4%
d4-1,2-Dichlorobenzene	66.6%	67.8%
d5-Phenol	64.4%	68.1%
2-Fluorophenol	65.1%	66.8%
2,4,6-Tribromophenol	66.7%	67.2%
d4-2-Chlorophenol	69.7%	72.1%

Reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: MB-091112
METHOD BLANK

Lab Sample ID: MB-091112
LIMS ID: 12-16915
Matrix: Soil
Data Release Authorized:
Reported: 09/20/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 09/11/12
Date Analyzed: 09/17/12 16:13
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	RL	Result
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	40	< 40 U
120-83-2	2,4-Dichlorophenol	200	< 200 U
91-20-3	Naphthalene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
88-06-2	2,4,6-Trichlorophenol	100	< 100 U
95-95-4	2,4,5-Trichlorophenol	100	< 100 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
86-73-7	Fluorene	20	< 20 U
87-86-5	Pentachlorophenol	200	< 200 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**25**	**38**
218-01-9	Chrysene	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	64.4%	2-Fluorobiphenyl	67.4%
d14-p-Terphenyl	87.2%	d4-1,2-Dichlorobenzene	66.0%
d5-Phenol	62.9%	2-Fluorophenol	61.9%
2,4,6-Tribromophenol	62.1%	d4-2-Chlorophenol	70.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPH-HCID Method by GC/FID
Extraction Method: SW3580A
Page 1 of 1

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Matrix: Soil

Data Release Authorized: MW
Reported: 09/10/12

ARI ID	Sample ID	Extraction Date	Analysis Date	DL	Range	Result
MB-090712 12-16910	Method Blank	09/07/12	09/07/12	1.0	Gas Diesel Oil o-Terphenyl	< 20 U < 50 U < 100 U 119%
VI35A 12-16910	CMS-08302012-4 HC ID: ---	09/07/12	09/07/12	1.0	Gas Diesel Oil o-Terphenyl	< 20 U < 50 U < 100 U 118%
VI35I 12-16918	CMS-08302012-22 HC ID: **DRO/MOTOR OIL**	09/07/12	09/07/12	1.0	Gas **Diesel** **Oil** o-Terphenyl	< 20 U **> 50** **> 100** 118%
VI35J 12-16919	CMS-08302012-23 HC ID: **DRO/MOTOR OIL**	09/07/12	09/07/12	1.0	Gas **Diesel** **Oil** o-Terphenyl	< 20 U **> 50** **> 100** 118%
VI35K 12-16920	CMS-08302012-24 HC ID: **DRO/MOTOR OIL**	09/07/12	09/07/12	1.0	Gas **Diesel** **Oil** o-Terphenyl	< 20 U **> 50** **> 100** 120%

Reported in mg/kg (ppm)

Gas value based on total peaks in the range from Toluene to C12.
Diesel value based on the total peaks in the range from C12 to C24.
Oil value based on the total peaks in the range from C24 to C38.

Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem3/fid3b.i/20120907.b/0907b030.d
Method: /chem3/fid3b.i/20120907.b/ftphfid3b.m
Instrument: fid3b.i
Operator: AR
Report Date: 09/10/2012
Macro: FID:3B083112

ARI ID: VI35MBS1
Client ID:
Injection: 07-SEP-2012 18:43
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.048	0.007	28159	30892	WATPHG	(Tol-C12)	758608	16.15
C8	1.249	-0.006	13639	17499	WATPHD	(C12-C24)	47014	~~4.22~~
C10	2.894	0.000	4438	2853	WATPHM	(C24-C38)	85022	~~9.74~~
C12	3.729	-0.004	1197	782	AK102	(C10-C25)	178530	~~12.01~~
C14	4.332	-0.001	543	363	AK103	(C25-C36)	52995	6.31
C16	4.846	-0.001	401	338	OR.DIES	(C10-C28)	183947	10.29
C18	5.300	-0.001	417	375				
C20	5.695	-0.001	408	261				
C22	6.050	0.000	147	109				
C24	6.371	-0.003	161	134				
C25	6.528	0.002	367	274				
C26	6.670	-0.002	190	127				
C28	6.950	0.000	752	649	FUEL OIL	(C10-C24)	178252	12.23
C32	7.453	0.000	2322	2669				
C34	7.687	0.003	1138	995				
Filter Peak	7.923	0.000	2191	3456				
C36	7.905	0.002	1771	458	BUNKERC	(C10-C38)	263331	57.13
o-terph	5.392	0.001	1197922	761092	JET-A	(C10-C18)	169129	11.75
Triacon Surr	7.218	0.004	1098612	687537				

Range Times: NW Diesel(3.782 - 6.424) NW Gas(0.991 - 3.782) NW M.Oil(6.424 - 8.165)
AK102(2.844 - 6.476) AK103(6.476 - 7.953) Jet A(2.844 - 5.351)

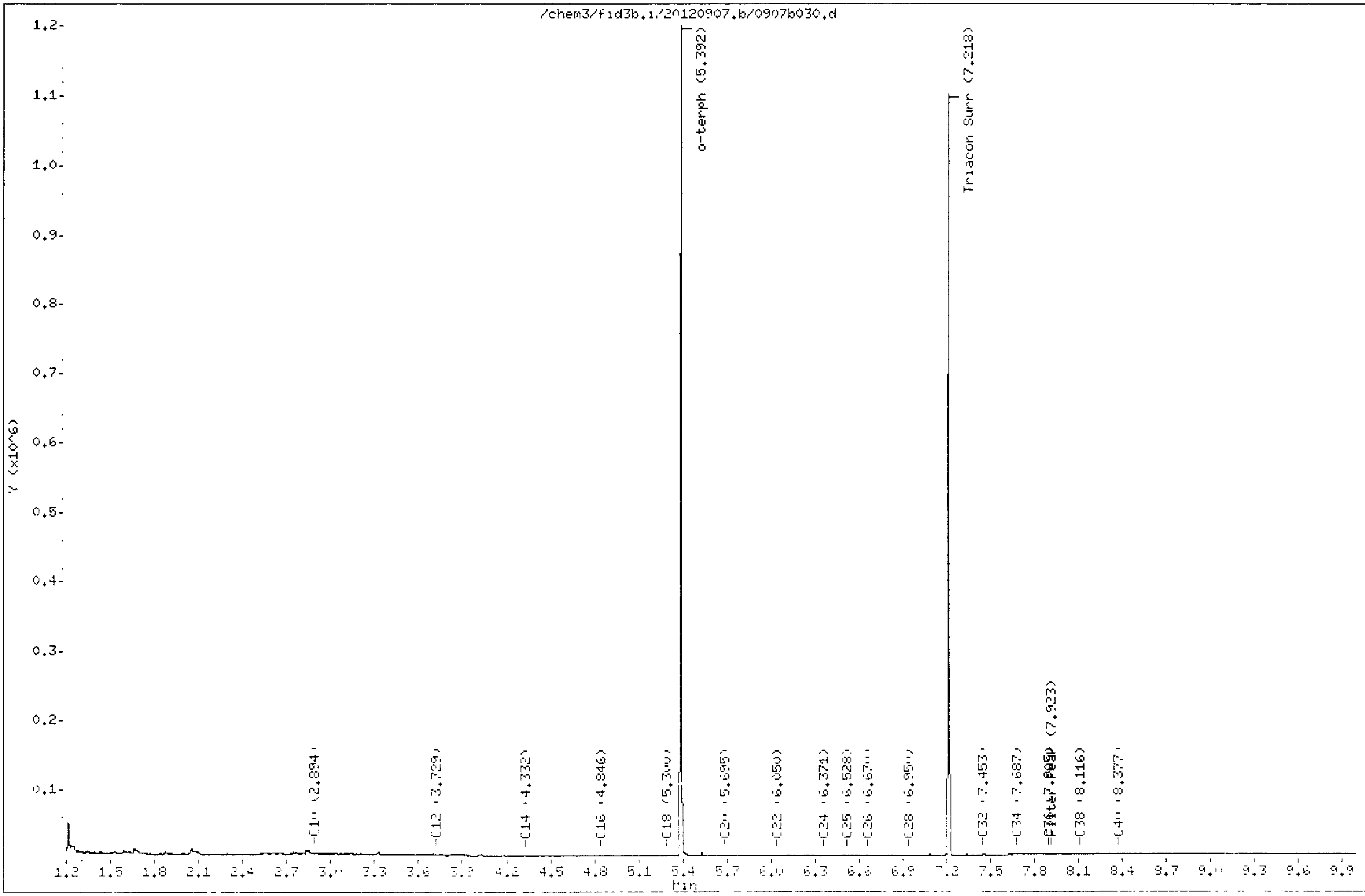
Surrogate	Area	Amount	%Rec
o-Terphenyl	761092	53.6	119.2
Triacontane	687537	57.2	127.2

Analyte	RF	Curve Date
o-Terph Surr	14186.7	31-AUG-2012
Triacon Surr	12016.0	31-AUG-2012
Gas	46960.0	15-AUG-2012
Diesel	11138.6	31-AUG-2012
Motor Oil	8727.6	31-AUG-2012
AK102	14870.4	31-AUG-2012
AK103	8399.4	11-AUG-2012
JetA	14399.0	16-FEB-2012
OR Diesel	17876.0	
Bunker C	4609.0	25-AUG-2012
Fuel Oil	14574.0	16-JUN-2012

R 09/10/12

Data File: /chem3/fid3b.i/20120907.b/0907b030.d
Date : 07-SEP-2012 18:43
Client ID:
Sample Info: VI35HBS1
Column phase: RTX-1

Instrument: fid3b.i
Operator: AR
Column diameter: 0.25



Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem3/fid3b.i/20120907.b/0907b032.d
Method: /chem3/fid3b.i/20120907.b/ftphfid3b.m
Instrument: fid3b.i
Operator: AR
Report Date: 09/10/2012
Macro: FID:3B083112

ARI ID: VI35I
Client ID:
Injection: 07-SEP-2012 19:20
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.046	0.006	28954	22478	WATPHG	(Tol-C12)	570211	12.14 DRO
C8	1.248	-0.008	12896	16459	WATPHD	(C12-C24)	1286034	115.46
C10	2.890	-0.004	3035	1575	WATPHM	(C24-C38)	1618564	185.45 MO
C12	3.734	0.001	541	359	AK102	(C10-C25)	1389703	93.45 M
C14	4.334	0.001	3607	2128	AK103	(C25-C36)	1457352	173.51 M
C16	4.842	-0.005	7586	7473	OR.DIES	(C10-C28)	1941204	108.59 M
C18	5.302	0.001	12303	11029				
C20	5.696	0.000	14898	14750				
C22	6.051	0.000	15852	12415				
C24	6.378	0.003	14218	3856				
C25	6.525	-0.001	15694	2458				
C26	6.672	0.000	16169	10243				
C28	6.951	0.002	20554	6457	FUEL OIL	(C10-C24)	1356170	93.05
C32	7.453	-0.001	18613	14099				
C34	7.687	0.002	16073	9500				
Filter Peak	7.921	-0.001	12013	3321				
C36	7.901	-0.002	12640	5466	BUNKERC	(C10-C38)	2974734	645.42
o terph	5.394	0.003	1220051	753518	JET-A	(C10-C18)	551051	38.27
Triacon Surr	7.217	0.003	1081115	701052				

Range Times: NW Diesel(3.782 - 6.424) NW Gas(0.991 - 3.782) NW M.Oil(6.424 - 8.165)
AK102(2.844 - 6.476) AK103(6.476 - 7.953) Jet A(2.844 - 5.351)

Surrogate	Area	Amount	%Rec
o-Terphenyl	753518	53.1	118.0
Triacontane	701052	58.3	129.7

AR 09/10/12

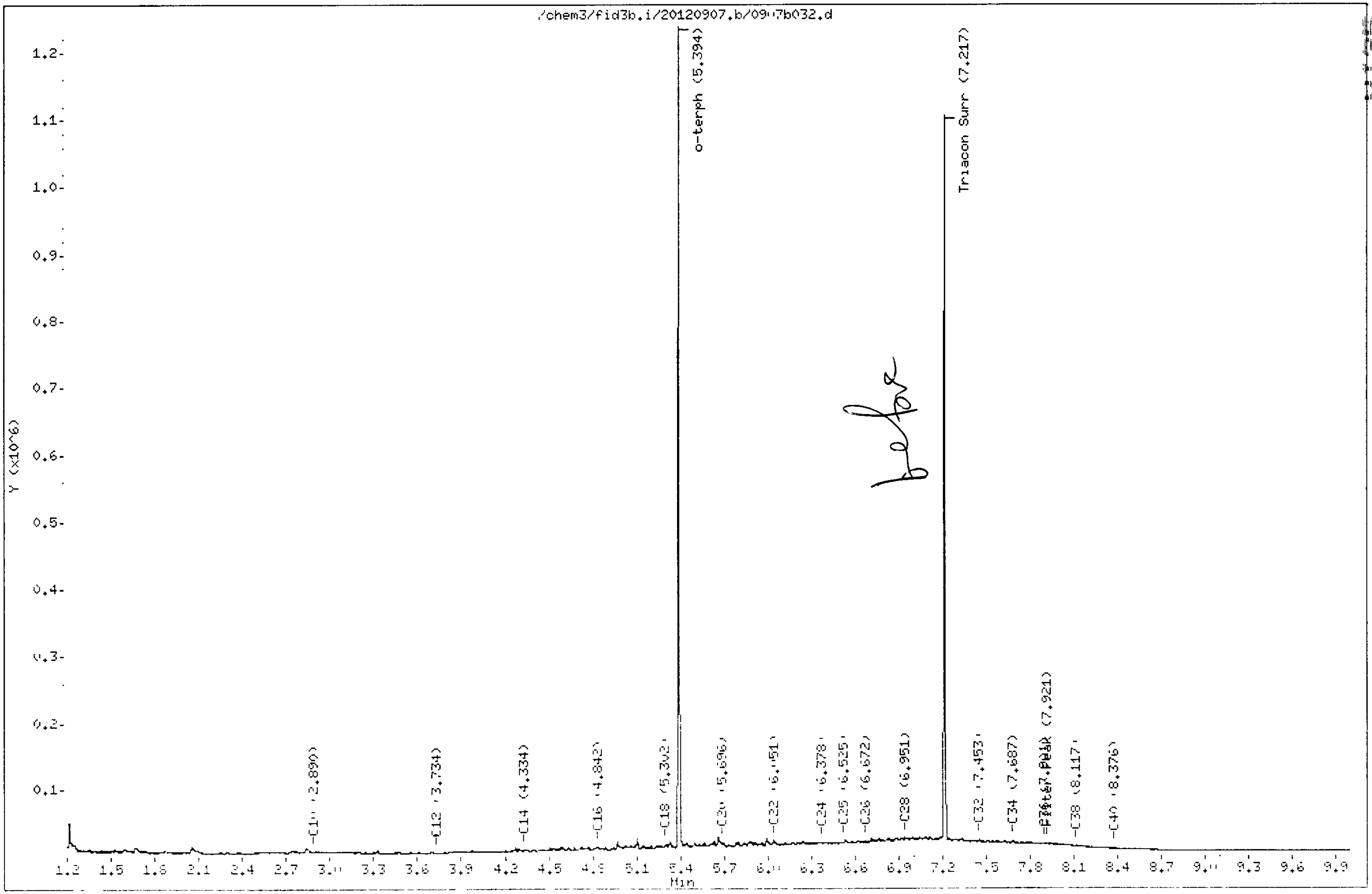
Analyte	RF	Curve Date
o-Terph Surr	14186.7	31-AUG-2012
Triacon Surr	12016.0	31-AUG-2012
Gas	46960.0	15-AUG-2012
Diesel	11138.6	31-AUG-2012
Motor Oil	8727.6	31-AUG-2012
AK102	14870.4	31-AUG-2012
AK103	8399.4	11-AUG-2012
JetA	14399.0	16-FEB-2012
OR Diesel	17876.0	
Bunker C	4609.0	25-AUG-2012
Fuel Oil	14574.0	16-JUN-2012

Data File: /chem3/fid3b.i/20120907.b/0907b032.d
Date : 07-SEP-2012 19:20
Client ID:
Sample Info: VI35I

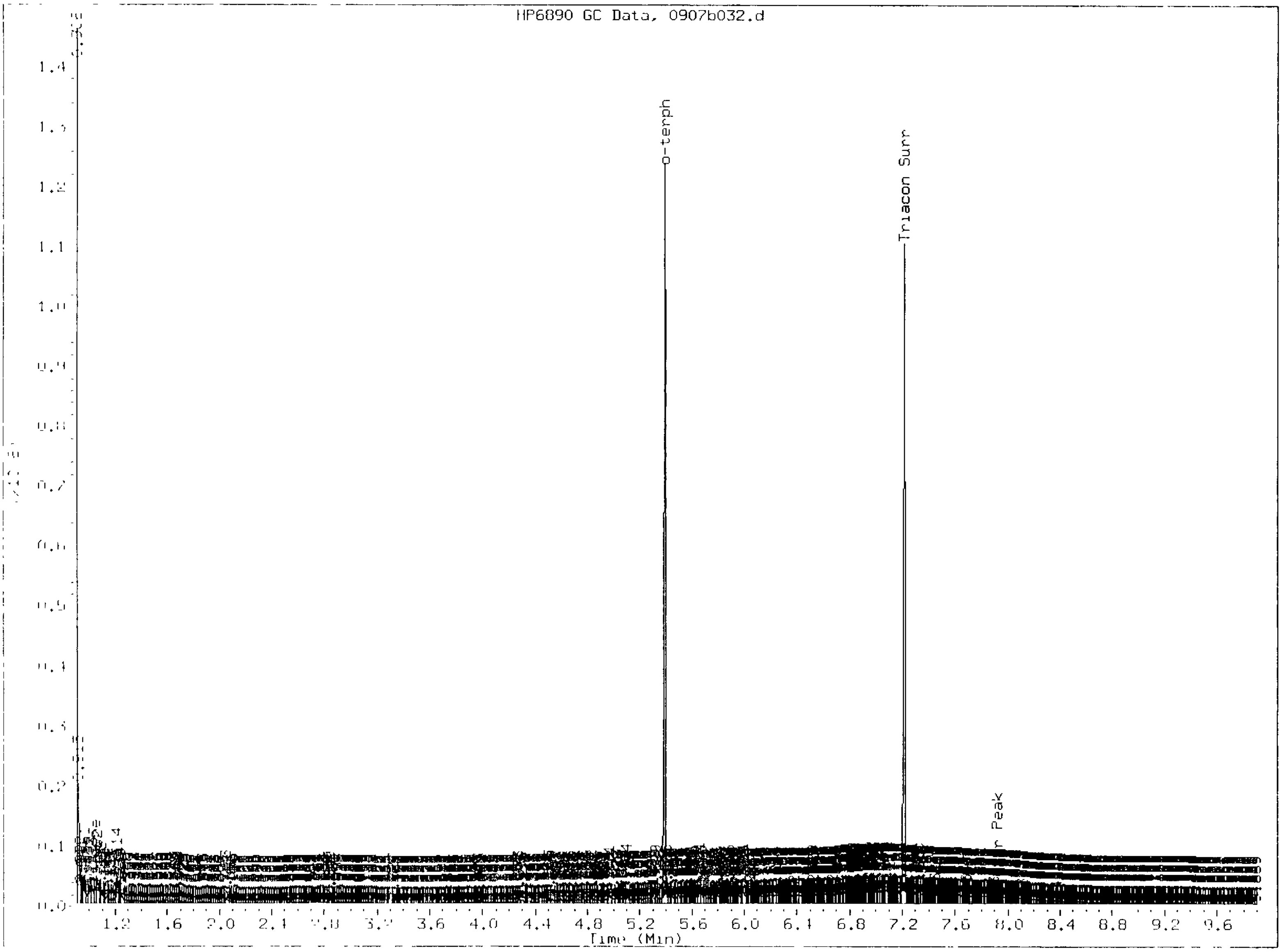
Column phase: RTX-1

Instrument: fid3b.i

Operator: AR
Column diameter: 0.25



FID:3B-2C/RTX-1 VI35I FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: _____ Date: 09/10/12

Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem3/fid3b.i/20120907.b/0907b033.d
Method: /chem3/fid3b.i/20120907.b/ftphfid3b.m
Instrument: fid3b.i
Operator: AR
Report Date: 09/10/2012
Macro: FID:3B083112

ARI ID: VI35J
Client ID:
Injection: 07-SEP-2012 19:38
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.046	0.005	30123	30429	WATPHG	(Tol-C12)	698851	~~14.88~~
C8	1.257	0.002	12368	9467	WATPHD	(C12-C24)	813635	73.05
C10	2.895	0.001	4355	3482	WATPHM	(C24-C38)	1269856	~~145.50~~
C12	3.735	0.003	636	417	AK102	(C10-C25)	944351	63.51 M
C14	4.334	0.002	605	510	AK103	(C25-C36)	1174850	139.87 M
C16	4.847	0.000	1628	1257	OR.DIES	(C10-C28)	1479697	82.78 M
C18	5.301	0.000	4538	4309				
C20	5.694	-0.002	8815	6500				
C22	6.048	-0.002	11745	10718				
C24	6.370	-0.004	12709	8422				
C25	6.527	0.002	19108	11635				
C26	6.672	0.001	15553	7956				
C28	6.948	-0.002	16305	7986	FUEL OIL	(C10-C24)	919630	63.10
C32	7.454	0.001	13197	13218				
C34	7.680	-0.005	11231	12437				
Filter Peak	7.925	0.002	6765	5000				
C36	7.901	-0.002	6794	5081	BUNKERC	(C10-C38)	2189486	475.05
o terph	5.394	0.002	1247034	754820	JET-A	(C10-C18)	189360	13.15
Triacon Surr	7.219	0.005	1038404	696958				

ORO
mb

Range Times: NW Diesel(3.782 - 6.424) NW Gas(0.991 - 3.782) NW M.Oil(6.424 - 8.165)
AK102(2.844 - 6.476) AK103(6.476 - 7.953) Jet A(2.844 - 5.351)

Surrogate	Area	Amount	%Rec
o-Terphenyl	754820	53.2	118.2
Triacontane	696958	58.0	128.9

m09/10/12

Analyte	RF	Curve Date
o-Terph Surr	14186.7	31-AUG-2012
Triacon Surr	12016.0	31-AUG-2012
Gas	46960.0	15-AUG-2012
Diesel	11138.6	31-AUG-2012
Motor Oil	8727.6	31-AUG-2012
AK102	14870.4	31-AUG-2012
AK103	8399.4	11-AUG-2012
JetA	14399.0	16-FEB-2012
OR Diesel	17876.0	
Bunker C	4609.0	25-AUG-2012
Fuel Oil	14574.0	16-JUN-2012

Data File: /chem3/fid3b.i/20120907.b/0907b033.d

Page 1

Date : 07-SEP-2012 19:38

Client ID:

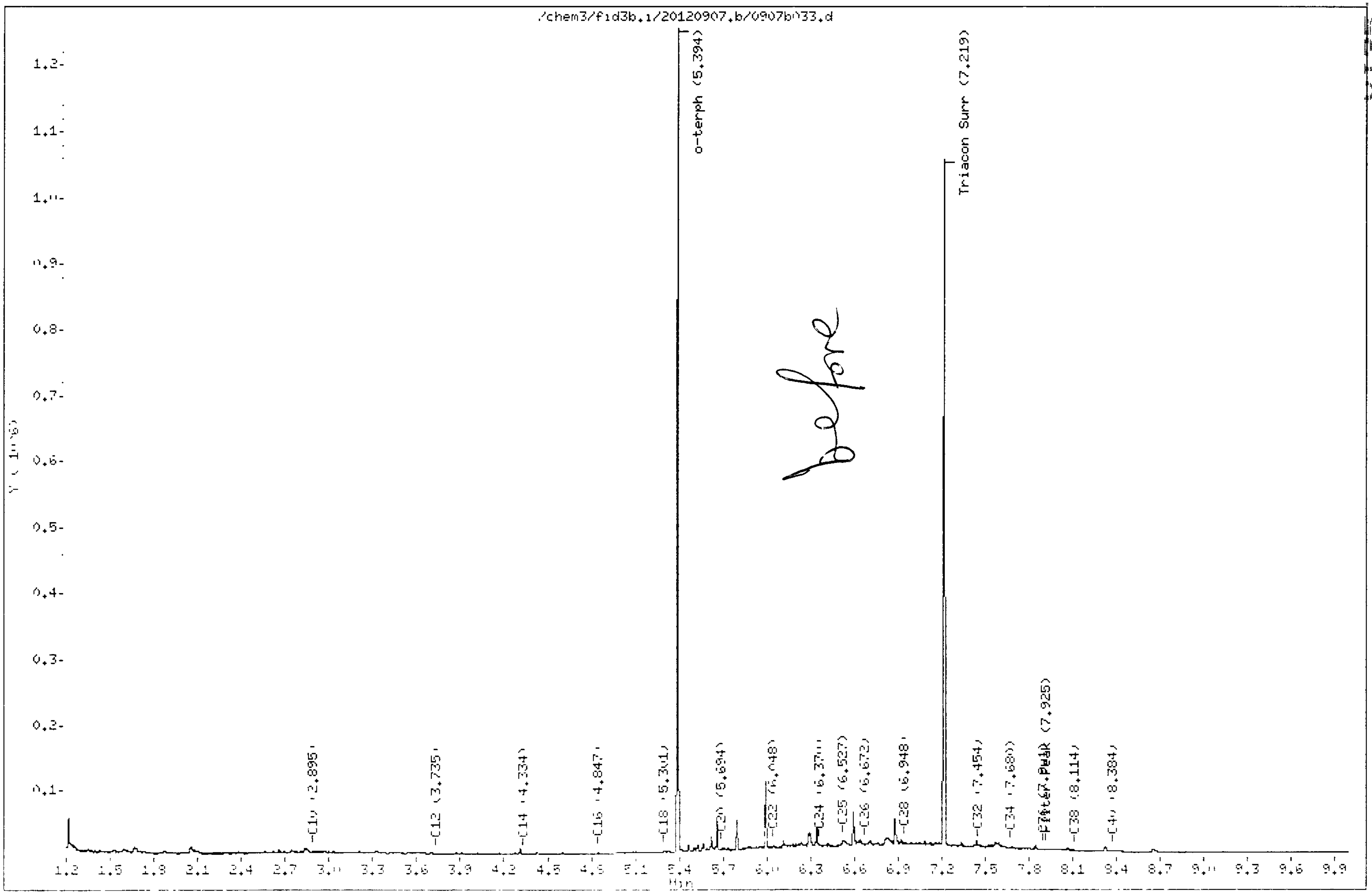
Instrument: fid3b.i

Sample Info: VI35J

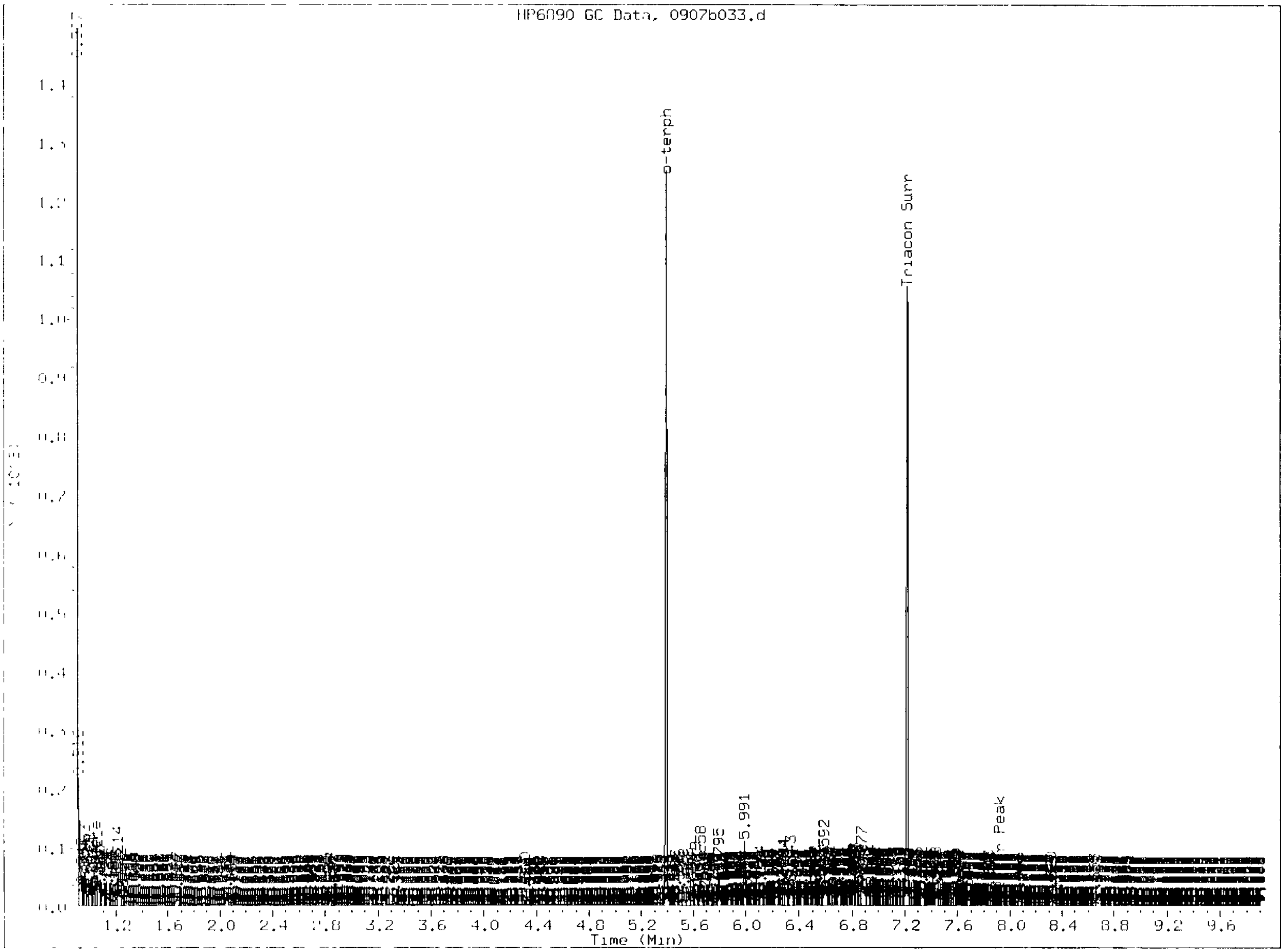
Operator: HP

Column phase: RTX-1

Column diameter: 0.25



FID:3B-2C/RTX-1 VI35J FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: J Date: 09/10/12

Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem3/fid3b.i/20120907.b/0907b034.d
Method: /chem3/fid3b.i/20120907.b/ftphfid3b.m
Instrument: fid3b.i
Operator: AR
Report Date: 09/10/2012
Macro: FID:3B083112

ARI ID: VI35K
Client ID:
Injection: 07-SEP-2012 19:57
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.047	0.006	27866	25777	WATPHG	(Tol-C12)	740253	15.76
C8	1.257	0.002	11256	7999	WATPHD	(C12-C24)	3056633	274.42
C10	2.889	-0.005	3790	2236	WATPHM	(C24-C38)	3688823	422.66
C12	3.733	0.001	1058	846	AK102	(C10-C25)	3269320	219.85 M
C14	4.334	0.001	1471	1106	AK103	(C25-C36)	3271161	389.45 M
C16	4.847	0.000	1772	948	OR.DIES	(C10-C28)	4616207	258.23 M
C18	5.298	-0.003	5365	5186				
C20	5.695	-0.002	18254	6940				
C22	6.049	-0.002	51173	47520				
C24	6.389	0.014	50002	75366				
C25	6.534	0.008	39758	25483				
C26	6.671	-0.001	33199	6534				
C28	6.950	0.000	34033	4687	FUEL OIL	(C10-C24)	3213351	220.49
C32	7.446	-0.008	61680	58643				
C34	7.680	-0.005	58642	60153				
Filter Peak	7.925	0.002	23680	3768				
C36	7.905	0.002	26062	12670	BUNKERC	(C10-C38)	6902174	1497.55
o-terph	5.395	0.003	1206386	767052	JET-A	(C10-C18)	348285	24.19
Triacon Surr	7.218	0.003	1044248	707313				

Range Times: NW Diesel(3.782 - 6.424) NW Gas(0.991 - 3.782) NW M.Oil(6.424 - 8.165)
AK102(2.844 - 6.476) AK103(6.476 - 7.953) Jet A(2.844 - 5.351)

Surrogate	Area	Amount	%Rec
o-Terphenyl	767052	54.1	120.2
Triacontane	707313	58.9	130.8

Analyte	RF	Curve Date
o-Terph Surr	14186.7	31-AUG-2012
Triacon Surr	12016.0	31-AUG-2012
Gas	46960.0	15-AUG-2012
Diesel	11138.6	31-AUG-2012
Motor Oil	8727.6	31-AUG-2012
AK102	14870.4	31-AUG-2012
AK103	8399.4	11-AUG-2012
JetA	14399.0	16-FEB-2012
OR Diesel	17876.0	
Bunker C	4609.0	25-AUG-2012
Fuel Oil	14574.0	16-JUN-2012

JL 09/10/12

Data File: /chem3/fid3b.i/20120907.b/0907b034.d

Date : 07-SEP-2012 19:57

Client ID:

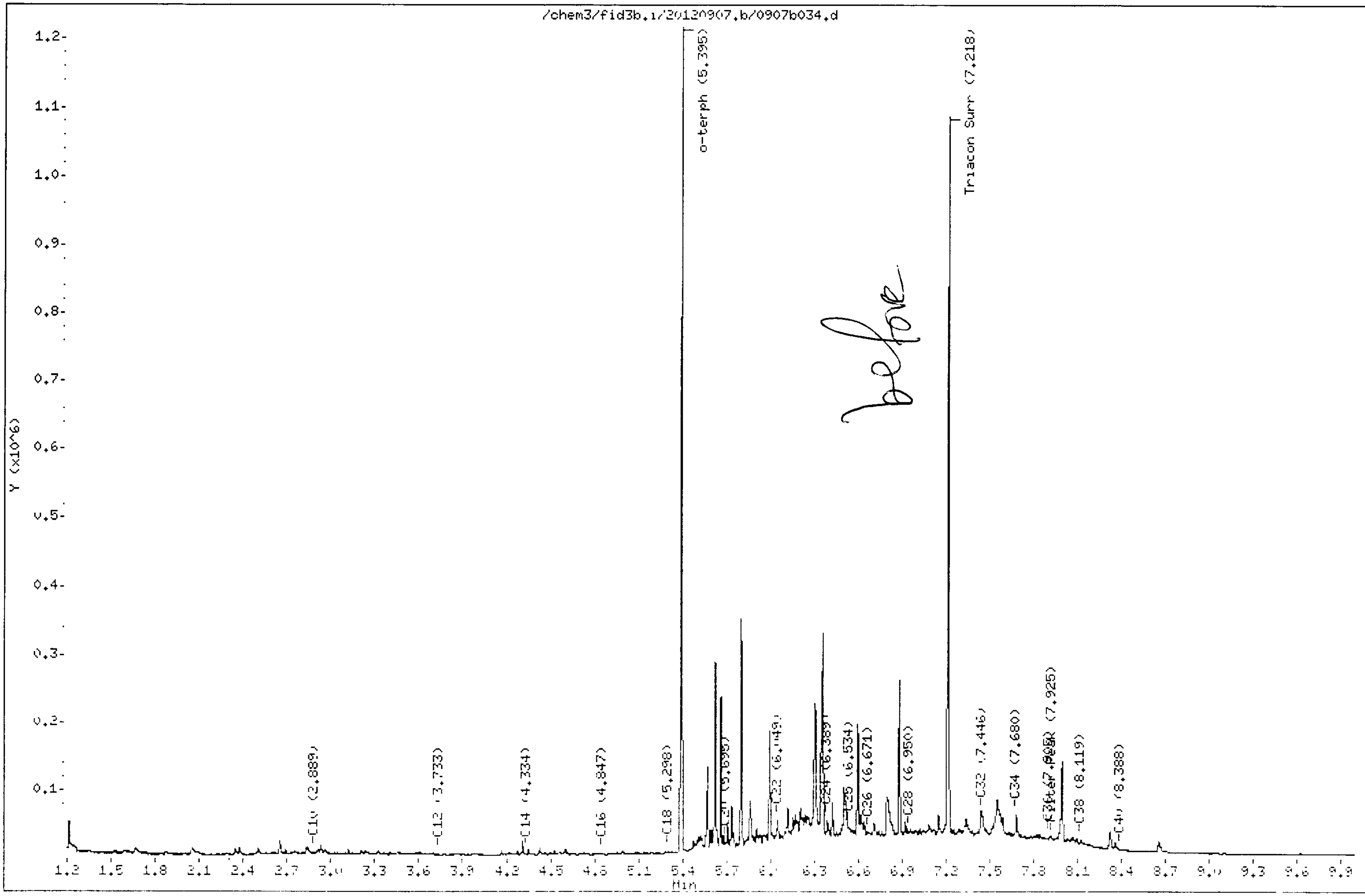
Sample Info: VI35K

Column phase: RTX-1

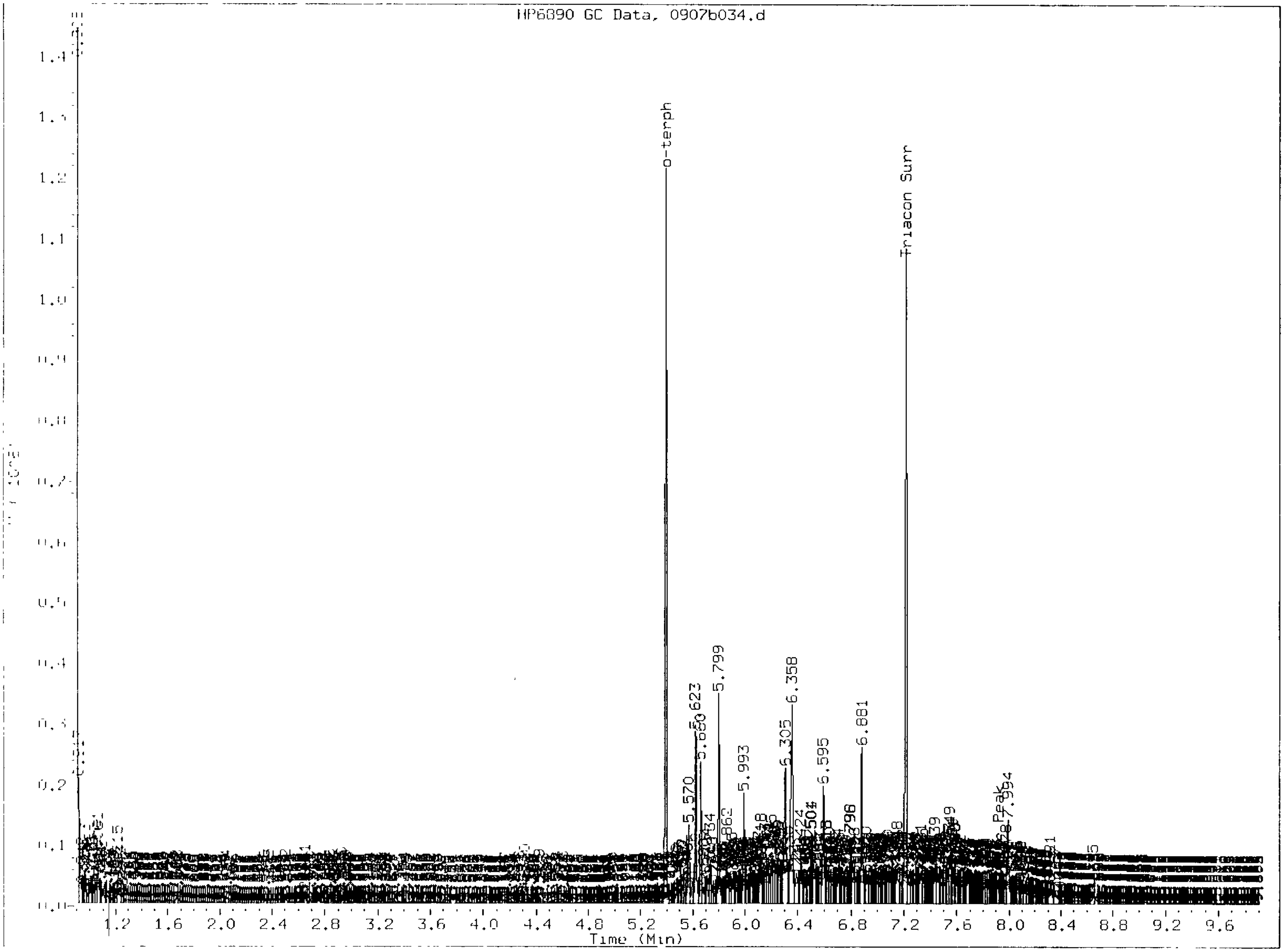
Instrument: fid3b.i

Operator: AR

Column diameter: 0.25



FID:3B-2C/RTX-1 VI35K FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: ____ Date: 09/10/12

ANALYTICAL RESOURCES INCORPORATED

HCID SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Client ID	O-TER	TOT OUT
090712MB	119%	0
CMS-08302012-4	118%	0
CMS-08302012-22	118%	0
CMS-08302012-23	118%	0
CMS-08302012-24	120%	0

	LCS/MB LIMITS	QC LIMITS
(O-TER) = o-Terphenyl	(68-122)	(50-150)

Prep Method: SW3550B
Log Number Range: 12-16910 to 12-16920

ANALYTICAL RESOURCES INCORPORATED

TOTAL HCID RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Soil
Date Received: 09/05/12

ARI Job: VI35
Project: Cashmere Mill Site

ARI ID	Client ID	Sample Amt	Final Vol	Basis	Prep Date
12-16910-090712MB	Method Blank	10.0 g	5.00 mL	-	09/07/12
12-16910-VI35A	CMS-08302012-4	8.02 g	5.00 mL	D	09/07/12
12-16918-VI35I	CMS-08302012-22	8.67 g	5.00 mL	D	09/07/12
12-16919-VI35J	CMS-08302012-23	5.33 g	5.00 mL	D	09/07/12
12-16920-VI35K	CMS-08302012-24	6.96 g	5.00 mL	D	09/07/12

Basis: D=Dry Weight W=As Received

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID-Silica and Acid Cleaned
Extraction Method:
Page 1 of 1

QC Report No: VI78-RH2 Engineering
Project: Cashmere Mill Site

Matrix: Soil
Data Release Authorized:
Reported: 09/13/12

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	RL	Result
MB-091112	Method Blank	09/11/12	09/11/12	1.00	Diesel Range	5.0	< 5.0 U
12-17193	HC ID: ---		FID3B	1.0	Motor Oil Range	10	< 10 U
					o-Terphenyl		108%
VI78A	CMS-08302012-24	09/11/12	09/11/12	1.00	**Diesel Range**	**7.3**	**110**
12-17193	HC ID: **DRO/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**14**	**290**
					o-Terphenyl		93.8%

Reported in mg/kg (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.
HC ID: DRO/RRO indicate results of organics or additional hydrocarbons in ranges are not identifiable.

Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem3/fid3b.i/20120911.b/0911b042.d
Method: /chem3/fid3b.i/20120911.b/ftphfid3b.m
Instrument: fid3b.i
Operator: JR
Report Date: 09/13/2012
Macro: FID:3B083112

ARI ID: VI78MBS1
Client ID:
Injection: 11-SEP-2012 19:39
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.037	-0.007	23259	18514	WATPHG	(Tol-C12)	433612	9.23
C8	1.256	-0.003	9420	6660	WATPHD	(C12-C24)	145844	~~13.09~~
C10	2.891	-0.001	970	224	WATPHM	(C24-C38)	74504	8.54
C12	3.735	0.003	6594	6489	AK102	(C10-C25)	212075	~~14.26~~
C14	4.338	0.006	1825	1963	AK103	(C25-C36)	53559	6.38
C16	4.849	0.001	2595	2427	OR.DIES	(C10-C28)	225936	12.64
C18	5.301	0.000	2265	2009				
C20	5.698	0.001	1736	1882				
C22	6.051	0.000	1536	1590				
C24	6.374	0.000	1047	778				
C25	6.527	0.003	3189	2215				
C26	6.670	-0.001	926	678				
C28	6.949	0.002	1361	1287	FUEL OIL	(C10-C24)	211016	14.48
C32	7.453	0.002	2303	2335				
C34	7.681	-0.001	814	1131				
Filter Peak	7.924	0.005	1447	2001				
C36	7.895	-0.005	1267	667	BUNKERC	(C10-C38)	285520	61.95
o-terph	5.393	0.002	1143859	690223	JET-A	(C10-C18)	173518	12.05
Triacon Surr	7.218	0.006	908959	618021				

Range Times: NW Diesel(3.782 - 6.423) NW Gas(0.994 - 3.782) NW M.Oil(6.423 - 8.163)
AK102(2.843 - 6.475) AK103(6.475 - 7.950) Jet A(2.843 - 5.351)

Surrogate	Area	Amount	%Rec
o-Terphenyl	690223	48.7	108.1
Triacontane	618021	51.4	114.3

Analyte	RF	Curve Date
o-Terph Surr	14186.7	31-AUG-2012
Triacon Surr	12016.0	31-AUG-2012
Gas	46960.0	15-AUG-2012
Diesel	11138.6	31-AUG-2012
Motor Oil	8727.6	31-AUG-2012
AK102	14870.4	31-AUG-2012
AK103	8399.4	11-AUG-2012
JetA	14399.0	16-FEB-2012
OR Diesel	17876.0	
Bunker C	4609.0	25-AUG-2012
Fuel Oil	14574.0	16-JUN-2012

JR 09/13/12

Data File: /chem3/fid3b.i/20120911.b/0911b042.d

Page 1

Date : 11-SEP-2012 19:39

Client ID:

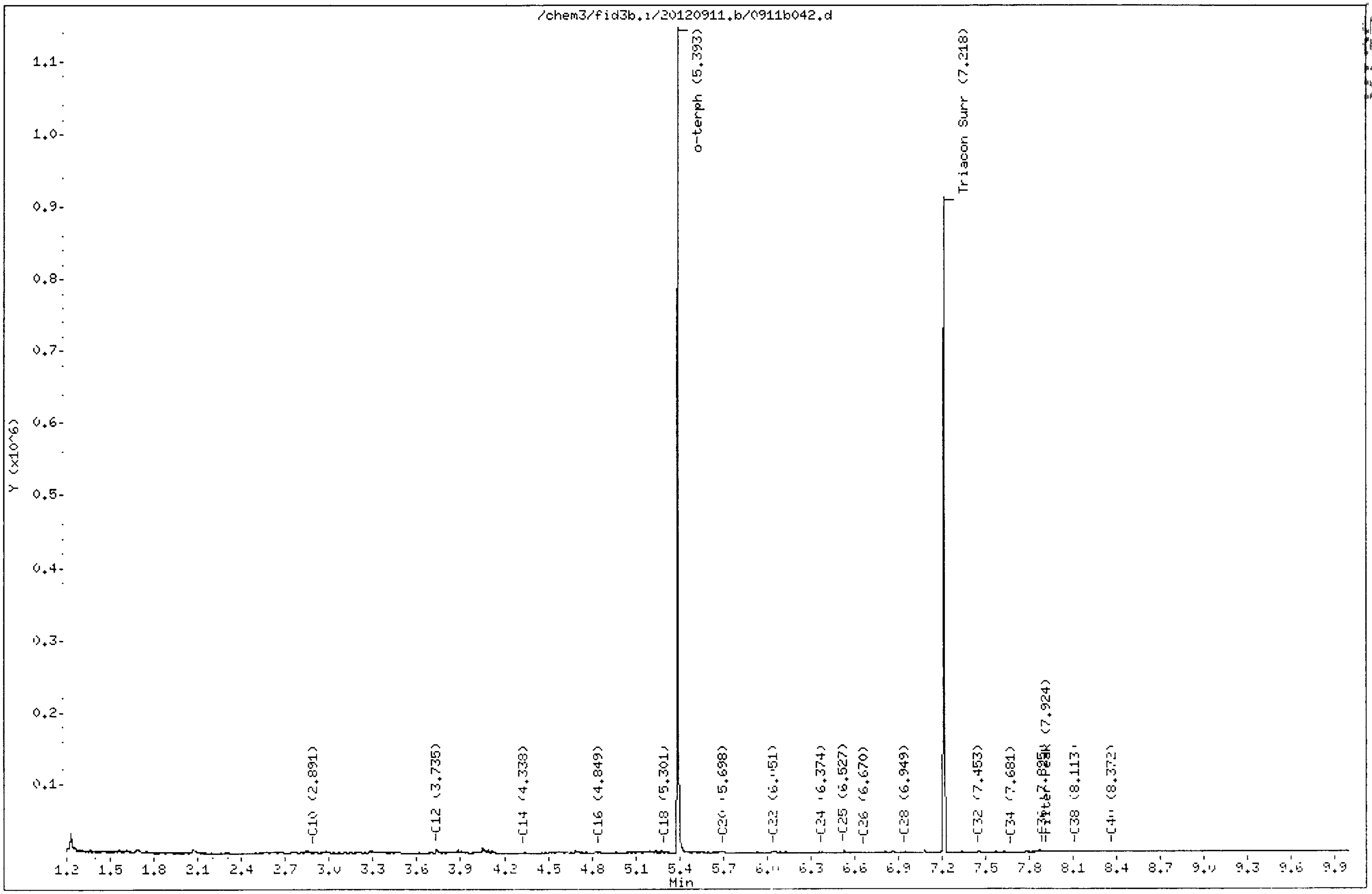
Instrument: fid3b.i

Sample Info: VI78MBS1

Operator: JR

Column phase: RTX-1

Column diameter: 0.25



Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem3/fid3b.i/20120911.b/0911b045.d
Method: /chem3/fid3b.i/20120911.b/ftphfid3b.m
Instrument: fid3b.i
Operator: JR
Report Date: 09/13/2012
Macro: FID:3B083112

ARI ID: VI78A
Client ID:
Injection: 11-SEP-2012 20:36
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.034	-0.010	26576	20680	WATPHG	(Tol-C12)	1717613	36.58
C8	1.254	-0.006	11209	8625	WATPHD	(C12-C24)	8121337	729.12 DRO
C10	2.900	0.007	9263	9113	WATPHM	(C24-C38)	17427323	1996.80
C12	3.735	0.003	12118	11172	AK102	(C10-C25)	9171718	~~616.78~~ M
C14	4.334	0.002	9599	7137	AK103	(C25-C36)	15959277	1900.06 M moil
C16	4.848	0.000	16452	15026	OR.DIES	(C10-C28)	14918125	834.53 M
C18	5.304	0.003	45759	41312				
C20	5.697	0.001	57923	25332				
C22	6.051	0.000	119376	119511				
C24	6.370	-0.004	116919	95516				
C25	6.521	-0.004	136252	24027				
C26	6.673	0.003	159982	75324				
C28	6.945	-0.002	287753	288496	FUEL OIL	(C10-C24)	8830648	605.92
C32	7.447	-0.004	267888	280513				
C34	7.681	-0.001	155510	27539				
Filter Peak	7.917	-0.003	121154	62303				
C36	7.901	0.000	130750	25190	BUNKERC	(C10-C38)	26257972	5697.14
o-terph	5.394	0.002	1014652	599111	JET-A	(C10-C18)	1597763	110.96
Triacon Surr	7.223	0.011	817541	487907				

Range Times: NW Diesel(3.782 - 6.423) NW Gas(0.994 - 3.782) NW M.Oil(6.423 - 8.163)
AK102(2.843 - 6.475) AK103(6.475 - 7.950) Jet A(2.843 - 5.351)

Surrogate	Area	Amount	%Rec
o-Terphenyl	599111	42.2	93.8
Triacontane	487907	40.6	90.2

Analyte	RF	Curve Date
o-Terph Surr	14186.7	31-AUG-2012
Triacon Surr	12016.0	31-AUG-2012
Gas	46960.0	15-AUG-2012
Diesel	11138.6	31-AUG-2012
Motor Oil	8727.6	31-AUG-2012
AK102	14870.4	31-AUG-2012
AK103	8399.4	11-AUG-2012
JetA	14399.0	16-FEB-2012
OR Diesel	17876.0	
Bunker C	4609.0	25-AUG-2012
Fuel Oil	14574.0	16-JUN-2012

JR 09/13/12

Data File: /chem3/fid3b.i/20120911.b/0911b045.d

Page 1

Date : 11-SEP-2012 20:36

Client ID:

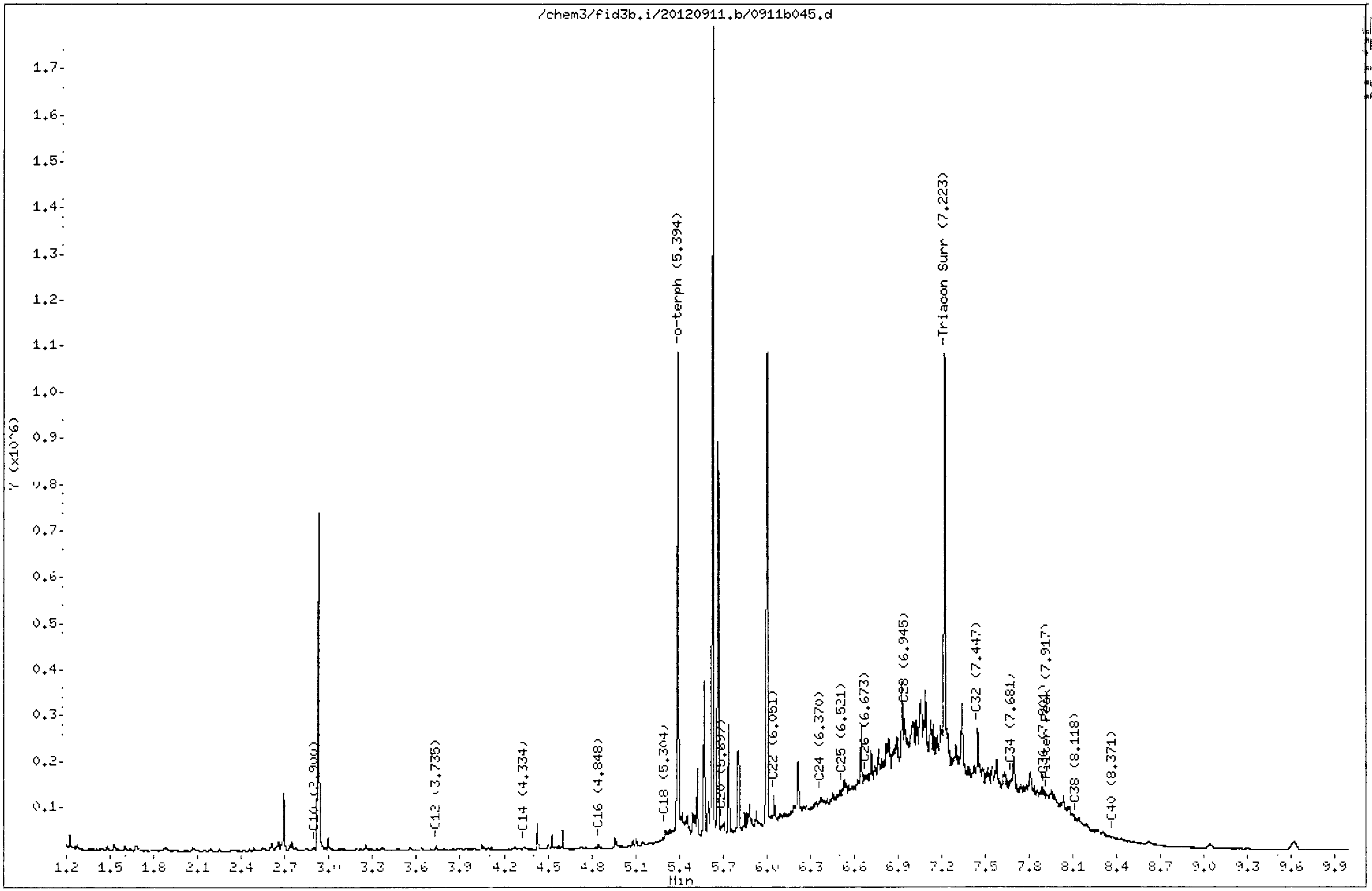
Instrument: fid3b.i

Sample Info: VI78A

Operator: JR

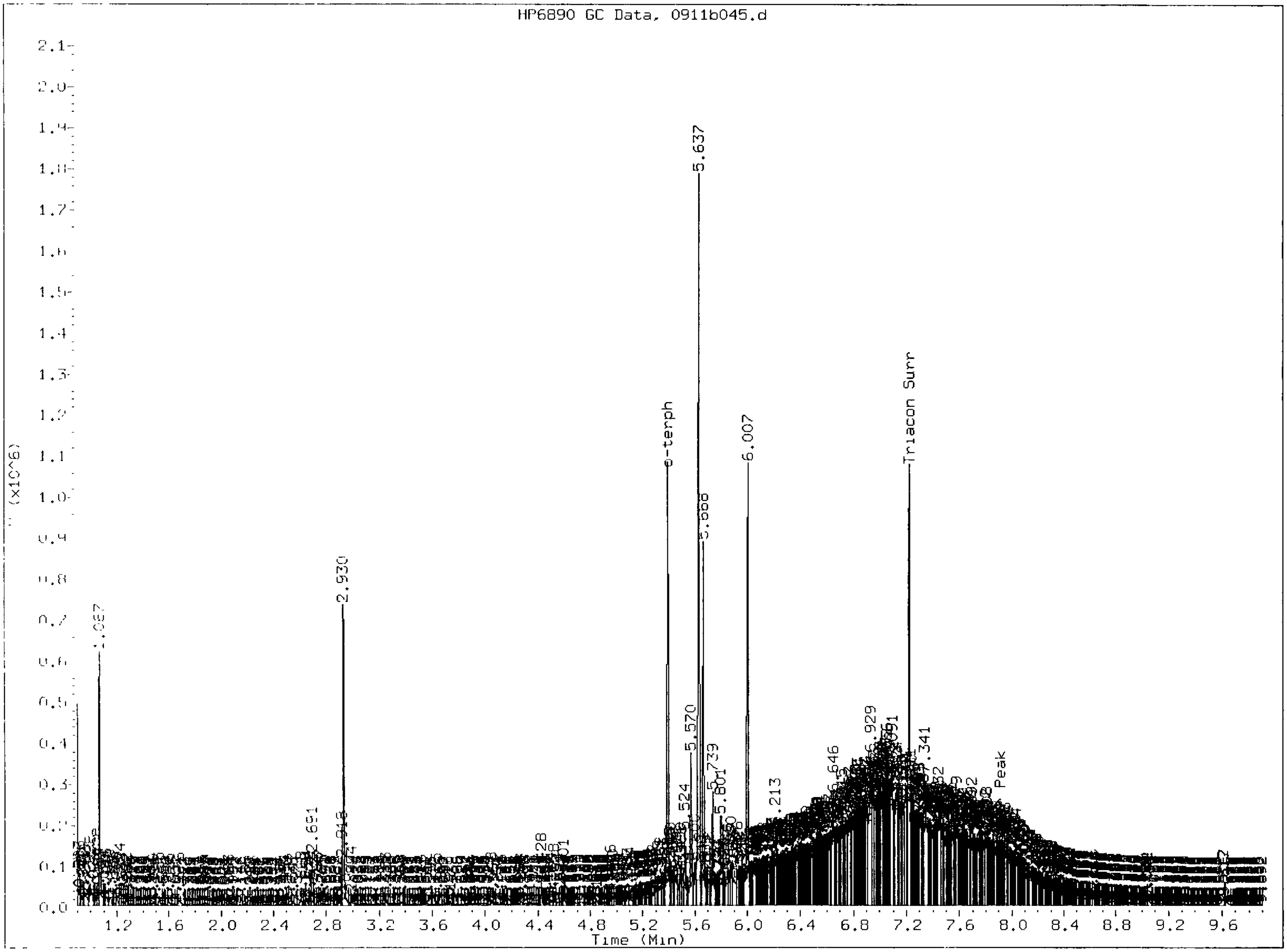
Column phase: RTX-1

Column diameter: 0.25



VI35.00043

FID:3B-2C/RTX-1 VI78A FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: [signature]   Date: 09/13/12

ANALYTICAL RESOURCES INCORPORATED

CLEANED TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: VI78-RH2 Engineering
Project: Cashmere Mill Site

Client ID	OTER	TOT OUT
MB-091112	108%	0
LCS-091112	115%	0
LCSD-091112	117%	0
CMS-08302012-24	93.8%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3580A
Log Number Range: 12-17193 to 12-17193

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned

Sample ID: LCS-091112
LCS/LCSD

Lab Sample ID: LCS-091112
LIMS ID: 12-17193
Matrix: Soil
Data Release Authorized:
Reported: 09/13/12

QC Report No: VI78-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted LCS/LCSD: 09/11/12

Date Analyzed LCS: 09/11/12 19:58
LCSD: 09/11/12 20:17
Instrument/Analyst LCS: FID/JGR
LCSD: FID/JGR

Sample Amount LCS: 10.0 g
LCSD: 10.0 g
Final Extract Volume LCS: 1.0 mL
LCSD: 1.0 mL
Dilution Factor LCS: 1.0
LCSD: 1.0

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	133	150	88.7%	138	150	92.0%	3.7%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	115%	117%

Results reported in mg/kg
RPD calculated using sample concentrations per SW846.

FORM III

Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem3/fid3b.i/20120911.b/0911b043.d
Method: /chem3/fid3b.i/20120911.b/ftphfid3b.m
Instrument: fid3b.i
Operator: JR
Report Date: 09/13/2012
Macro: FID:3B083112

ARI ID: VI78LCSS1
Client ID:
Injection: 11-SEP-2012 19:58
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.033	-0.011	24837	25668	WATPHG	(Tol-C12)	4175567	88.92
C8	1.254	-0.005	10494	7991	WATPHD	(C12-C24)	14793591	1328.14
C10	2.900	0.007	106264	84427	WATPHM	(C24-C38)	393032	45.03
C12	3.735	0.003	208564	161783	AK102	(C10-C25)	17565894	1181.27 M
C14	4.336	0.004	356159	310138	AK103	(C25-C36)	351704	41.87
C16	4.852	0.004	569135	397428	OR.DIES	(C10-C28)	17662468	988.05 M
C18	5.306	0.005	473616	378147				
C20	5.699	0.003	352076	291332				
C22	6.052	0.002	188131	135272				
C24	6.372	-0.001	50599	41006				
C25	6.524	-0.001	23230	22883				
C26	6.670	-0.001	9349	9633				
C28	6.946	-0.001	2433	2063	FUEL OIL	(C10-C24)	17535431	1203.20
C32	7.451	0.000	7816	5490				
C34	7.683	0.001	10590	5118				
Filter Peak	7.923	0.004	859	1123				
C36	7.903	0.003	516	240	BUNKERC	(C10-C38)	17928463	3889.90
o-terph	5.396	0.005	1175075	731604	JET-A	(C10-C18)	13260865	920.96
Triacon Surr	7.214	0.002	956046	622637				

Range Times: NW Diesel(3.782 - 6.423) NW Gas(0.994 - 3.782) NW M.Oil(6.423 - 8.163)
AK102(2.843 - 6.475) AK103(6.475 - 7.950) Jet A(2.843 - 5.351)

Surrogate	Area	Amount	%Rec
o-Terphenyl	731604	51.6	114.6
Triacontane	622637	51.8	115.1

Analyte	RF	Curve Date
o-Terph Surr	14186.7	31-AUG-2012
Triacon Surr	12016.0	31-AUG-2012
Gas	46960.0	15-AUG-2012
Diesel	11138.6	31-AUG-2012
Motor Oil	8727.6	31-AUG-2012
AK102	14870.4	31-AUG-2012
AK103	8399.4	11-AUG-2012
JetA	14399.0	16-FEB-2012
OR Diesel	17876.0	
Bunker C	4609.0	25-AUG-2012
Fuel Oil	14574.0	16-JUN-2012

JR 09/13/12

Data File: /chem3/fid3b.i/20120911.b/0911b043.d

Page 1

Date : 11-SEP-2012 19:58

Client ID:

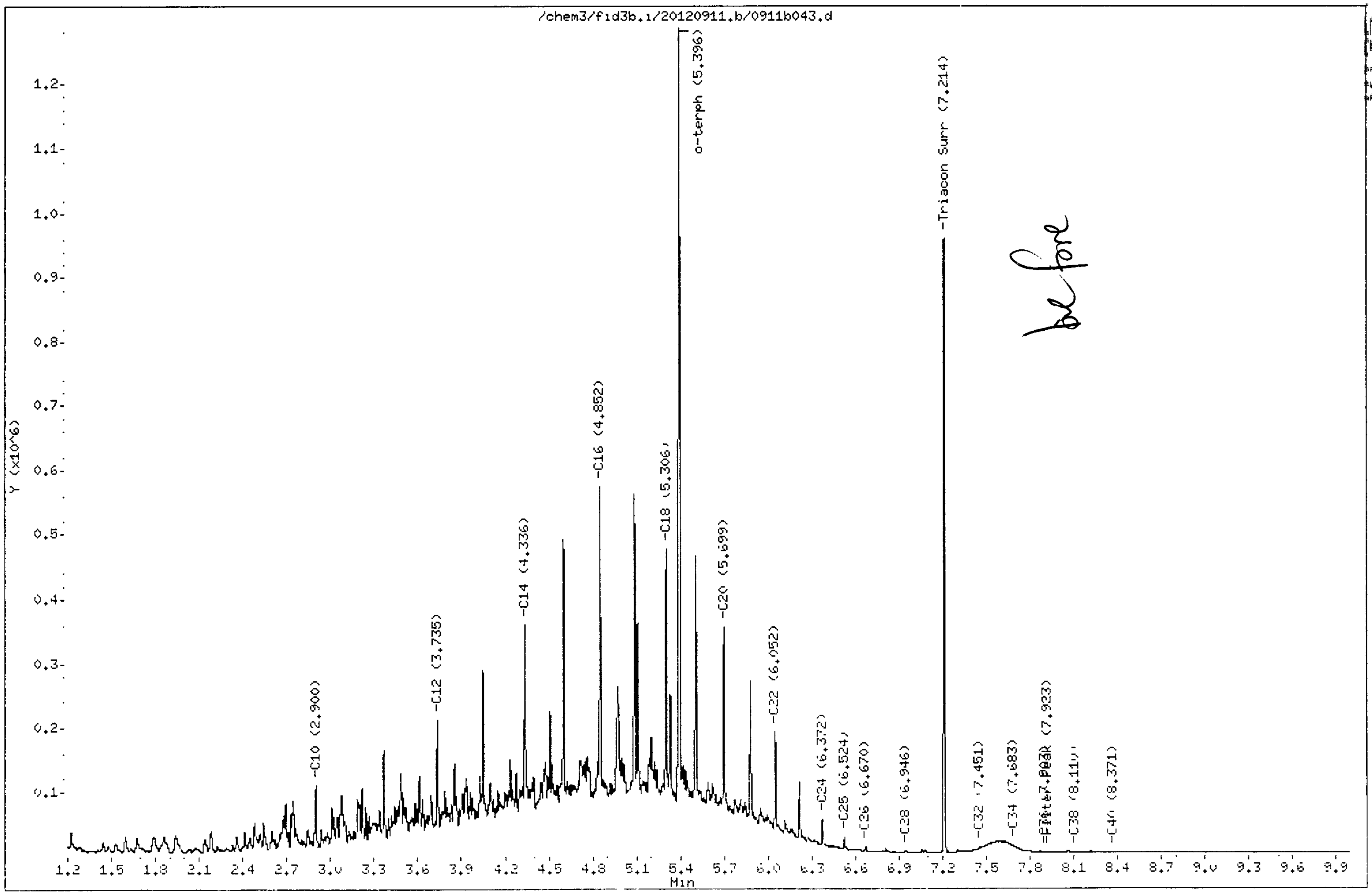
Instrument: fid3b.i

Sample Info: VI78LCSS1

Operator: JR

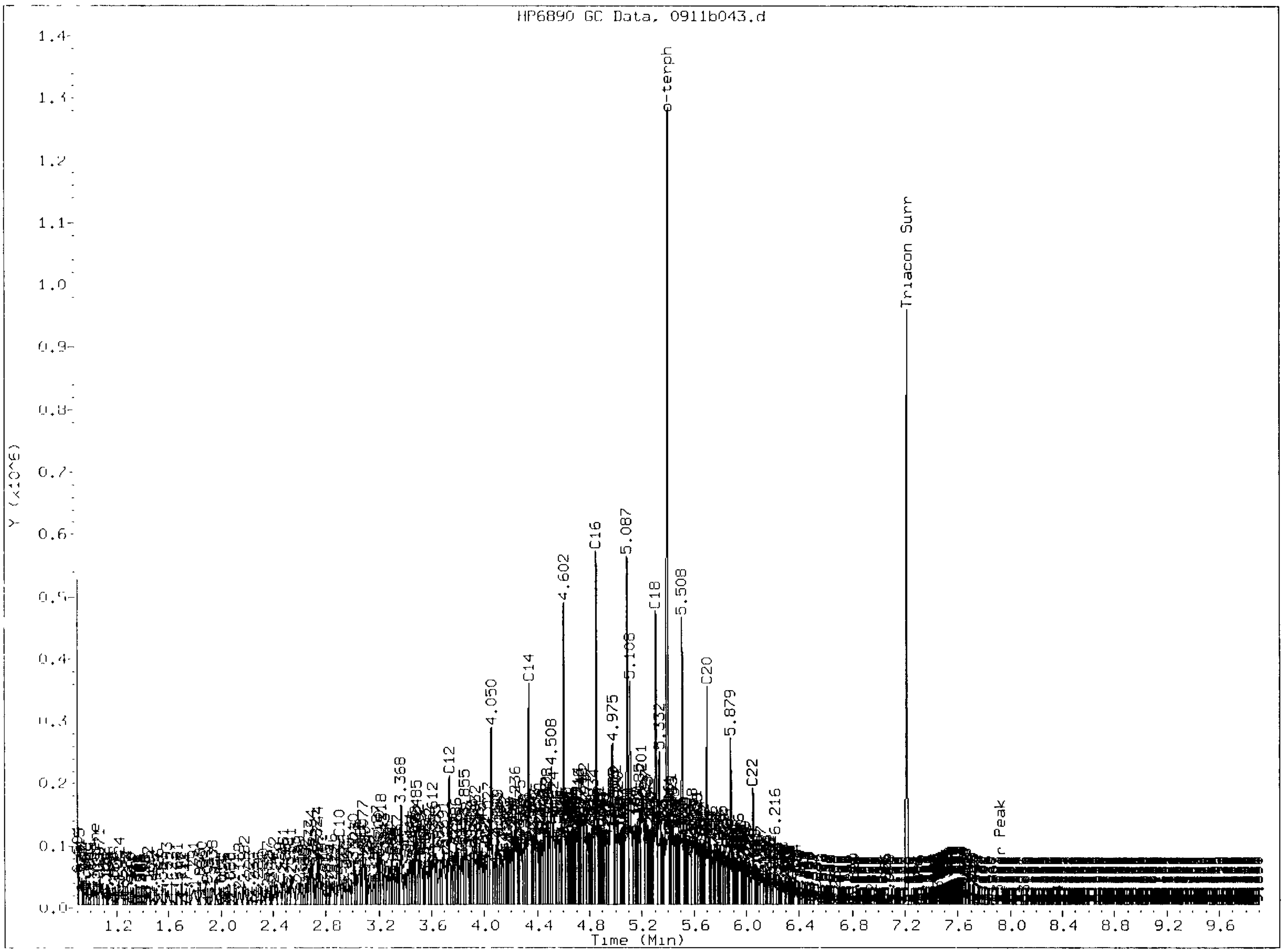
Column phase: RTX-1

Column diameter: 0.25



VI35:00046

FID:3B-2C/RTX-1 VI78LCSS1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: JR Date: 09/13/12

Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem3/fid3b.i/20120911.b/0911b044.d
Method: /chem3/fid3b.i/20120911.b/ftphfid3b.m
Instrument: fid3b.i
Operator: JR
Report Date: 09/13/2012
Macro: FID:3B083112

ARI ID: VI78LCSDS1
Client ID:
Injection: 11-SEP-2012 20:17
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc
Toluene	1.055	0.011	21239	16582	WATPHG	(Tol-C12)	4515282	96.15
C8	1.255	-0.004	10530	7632	WATPHD	(C12-C24)	15373562	1380.20
C10	2.890	-0.003	35723	13780	WATPHM	(C24-C38)	175349	20.09
C12	3.736	0.004	224455	170219	AK102	(C10-C25)	18406637	1237.80 M
C14	4.336	0.004	361937	262061	AK103	(C25-C36)	130545	15.54
C16	4.853	0.005	555645	435761	OR.DIES	(C10-C28)	18509750	1035.45 M
C18	5.307	0.006	484844	398954				
C20	5.699	0.003	364654	309460				
C22	6.051	0.000	197192	135704				
C24	6.372	-0.001	51604	40488				
C25	6.524	-0.001	23756	20784				
C26	6.670	-0.001	9847	10111				
C28	6.948	0.001	2352	1927	FUEL OIL	(C10-C24)	18373735	1260.72
C32	7.452	0.001	2114	1801				
C34	7.682	0.000	557	429				
Filter Peak	7.922	0.003	987	1328				
C36	7.901	0.001	676	426	BUNKERC	(C10-C38)	18549084	4024.56
o-terph	5.398	0.006	1173794	748201	JET-A	(C10-C18)	13954117	969.11
Triacon Surr	7.216	0.004	932756	633456				

Range Times: NW Diesel(3.782 - 6.423) NW Gas(0.994 - 3.782) NW M.Oil(6.423 - 8.163)
AK102(2.843 - 6.475) AK103(6.475 - 7.950) Jet A(2.843 - 5.351)

Surrogate	Area	Amount	%Rec
o-Terphenyl	748201	52.7	117.2
Triacontane	633456	52.7	117.2

JR 09/13/12

Analyte	RF	Curve Date
o-Terph Surr	14186.7	31-AUG-2012
Triacon Surr	12016.0	31-AUG-2012
Gas	46960.0	15-AUG-2012
Diesel	11138.6	31-AUG-2012
Motor Oil	8727.6	31-AUG-2012
AK102	14870.4	31-AUG-2012
AK103	8399.4	11-AUG-2012
JetA	14399.0	16-FEB-2012
OR Diesel	17876.0	
Bunker C	4609.0	25-AUG-2012
Fuel Oil	14574.0	16-JUN-2012

Data File: /chem3/fid3b.i/20120911.b/0911b044.d

Date : 11-SEP-2012 20:17

Client ID:

Sample Info: VI78LCSDS1

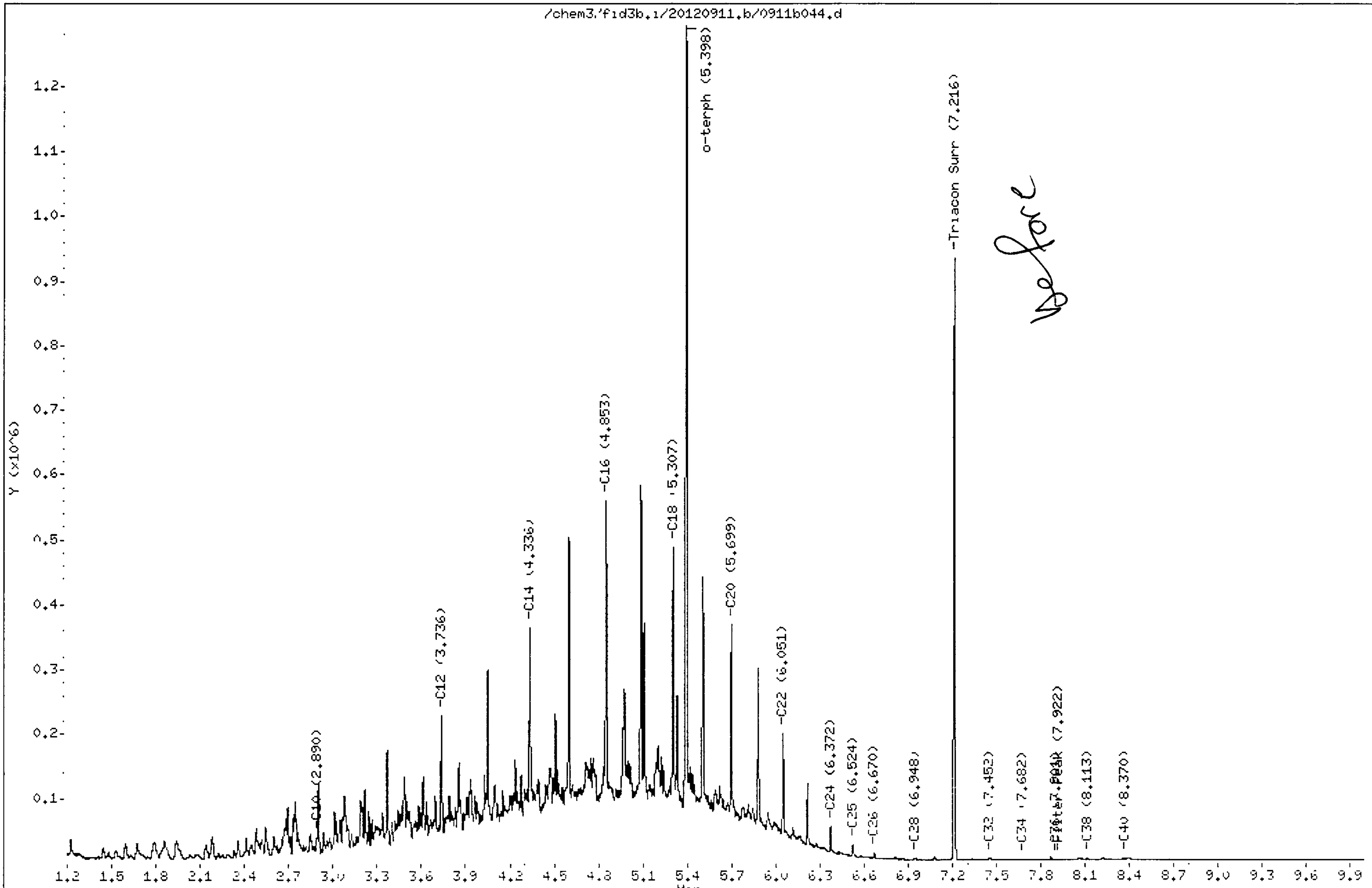
Column phase: RTX-1

Page 1

Instrument: fid3b.i

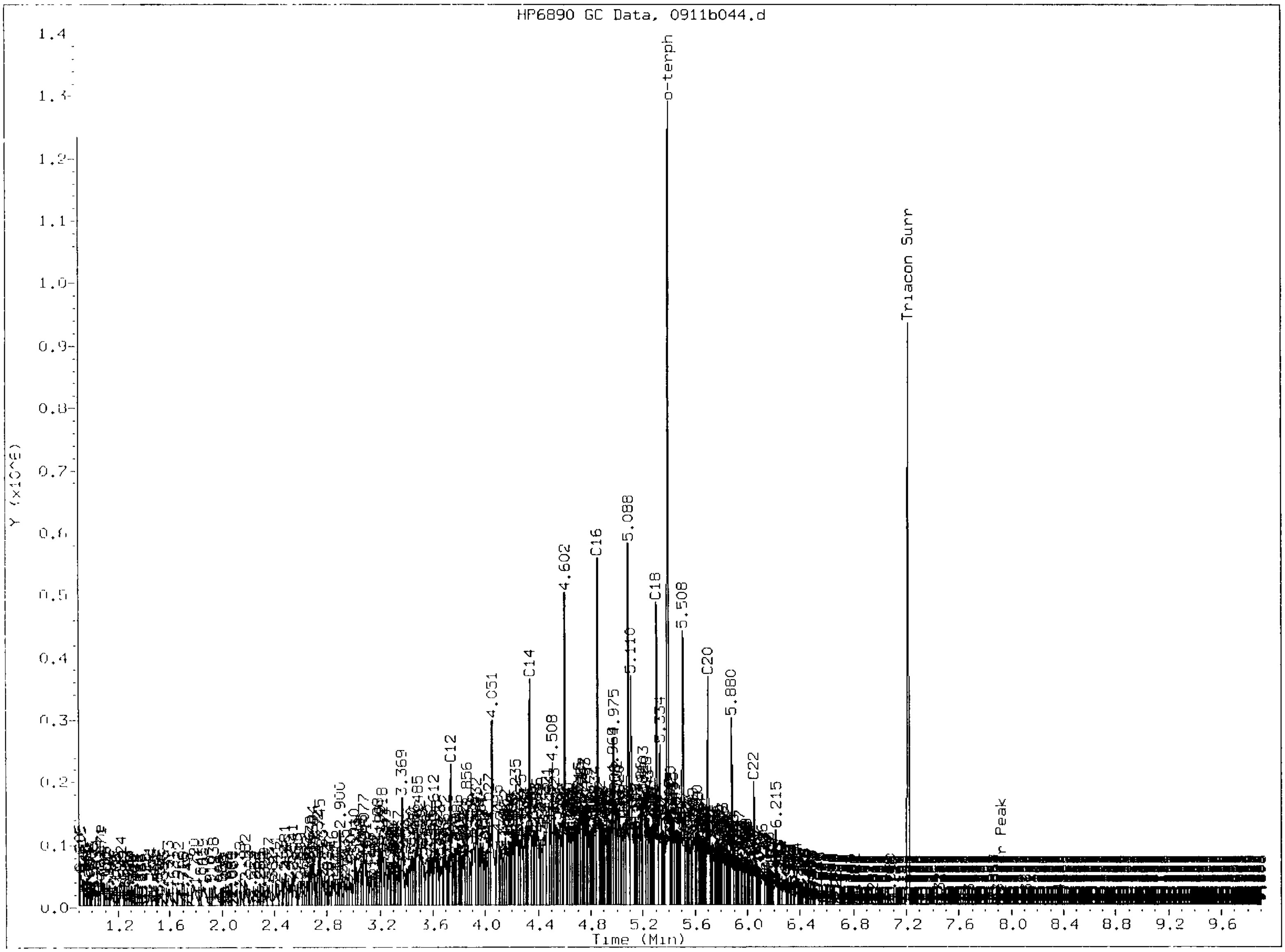
Operator: JR

Column diameter: 0.25



VI35:00051

FID:3B-2C/RTX-1 VI78LCSDS1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: JL Date: 09/13/12

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: VI78
Matrix: Soil
Project: Cashmere Mill Site
Date Received: 09/05/12

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
12-17193-091112MB1	Method Blank	10.0 g	1.00 mL	-	09/11/12
12-17193-091112LCS1	Lab Control	10.0 g	1.00 mL	-	09/11/12
12-17193-091112LCSD1	Lab Control Dup	10.0 g	1.00 mL	-	09/11/12
12-17193-VI78A	CMS-08302012-24	6.88 g	1.00 mL	D	09/11/12

Basis: D=Dry Weight W=As Received

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG

Sample ID: CMS-08302012-5
SAMPLE

Lab Sample ID: VI35B
LIMS ID: 12-16911
Matrix: Soil
Data Release Authorized:
Reported: 09/13/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
Event: NA
Date Sampled: 08/30/12
Date Received: 09/05/12

Date Analyzed: 09/11/12 12:43
Instrument/Analyst: PID2/JLW

Purge Volume: 5.0 mL
Sample Amount: 100 mg-dry-wt
Percent Moisture: 9.6%

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	25	< 25 U	
108-88-3	Toluene	25	< 25 U	
100-41-4	Ethylbenzene	25	< 25 U	
179601-23-1	m,p-Xylene	49	< 49 U	
95-47-6	o-Xylene	25	< 25 U	
	Gasoline Range Hydrocarbons	4.9	< 4.9 U	---

BETX Surrogate Recovery

Trifluorotoluene	100%
Bromobenzene	96.8%

Gasoline Surrogate Recovery

Trifluorotoluene	105%
Bromobenzene	106%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG

Sample ID: CMS-08302012-6
SAMPLE

Lab Sample ID: VI35C
LIMS ID: 12-16912
Matrix: Soil
Data Release Authorized:
Reported: 09/13/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
Event: NA
Date Sampled: 08/30/12
Date Received: 09/05/12

Date Analyzed: 09/11/12 13:11
Instrument/Analyst: PID2/JLW

Purge Volume: 5.0 mL
Sample Amount: 83 mg-dry-wt
Percent Moisture: 17.1%

CAS Number	Analyte	RL	Result	
71-43-2	Benzene	30	< 30 U	
108-88-3	**Toluene**	**30**	**82**	
100-41-4	Ethylbenzene	30	< 30 U	
179601-23-1	**m,p-Xylene**	**60**	**71**	
95-47-6	**o-Xylene**	**30**	**34**	
				GAS ID
	Gasoline Range Hydrocarbons	**6.0**	**73**	**GAS/GRO**

BETX Surrogate Recovery

Trifluorotoluene	98.4%
Bromobenzene	101%

Gasoline Surrogate Recovery

Trifluorotoluene	103%
Bromobenzene	110%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/091112-1.b/0911a008.d
Data file 2: /chem3/pid2.i/091112-2.b/0911a008.d
Method: /chem3/pid2.i/091112-2.b/PIDB.m
Instrument: pid2.i
Gas Ical Date: 26-JULY-2012
BETX Ical Date: 26-JUL-2012

ARI ID: VI35C
Client ID: CMS-08302012-6
Injection Date: 11-SEP-2012 13:11
Matrix: SOIL
Dilution Factor: 1.000

==

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
7.296	-0.015	6119	94486	103.4	TFT(Surr)
14.805	-0.012	4010	51150	110.3	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Method	Range		RF	Total Area*	Amount
WATPHG	Tol-C12	(9.14 to 17.57)	691452	720272	1.042 M
8015C	2MP-TMB	(4.00 to 15.74)	1522325	588128	0.386 M
AK101	nC6-nC10	(4.42 to 14.48)	1210379	451610	0.373 M
NWTPHG	Tol-Nap	(9.14 to 18.58)	705433	855264	1.212 M

M Indicates manual integration within range

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

==

PID Surrogates

RT	Shift	Response	%Rec	Compound
7.323	-0.017	27343	98.4	TFT(Surr)
14.823	-0.013	42937	100.6	BB(Surr)

SW8021B (PID)

RT	Shift	Response	Amount	Compound
6.576	-0.018	398	0.21	Benzene
9.242	-0.018	1750	1.35	Toluene
12.050	-0.012	467	0.40	Ethylbenzene
12.201	-0.021	1190	1.17	M/P-Xylene
13.094	-0.024	500	0.57	O-Xylene
ND	---	---	---	MTBE

JW 9/12/12

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak was manually integrated

Data File: /chem3/pid2.i/091112-1.b/0911a008.d

Date : 11-SEP-2012 13:11

Client ID: CMS-08302012-6

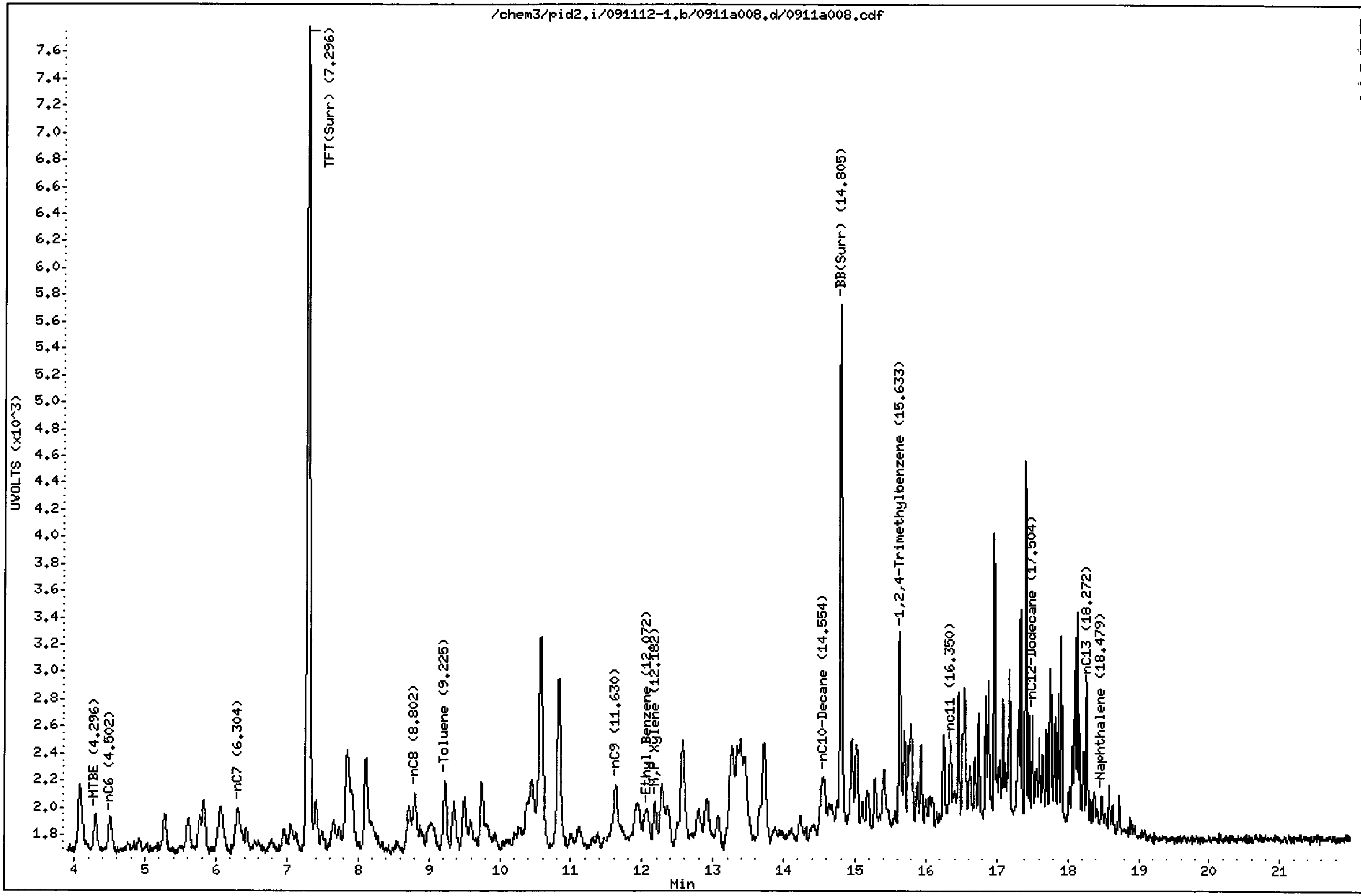
Sample Info: VI35C

Column phase: RTX 502-2 FID

Instrument: pid2.i

Operator: JW

Column diameter: 0.18



VI35 0005

Data File: /chem3/pid2.i/091112-2.b/0911a008.d

Date : 11-SEP-2012 13:11

Client ID: CMS-08302012-6

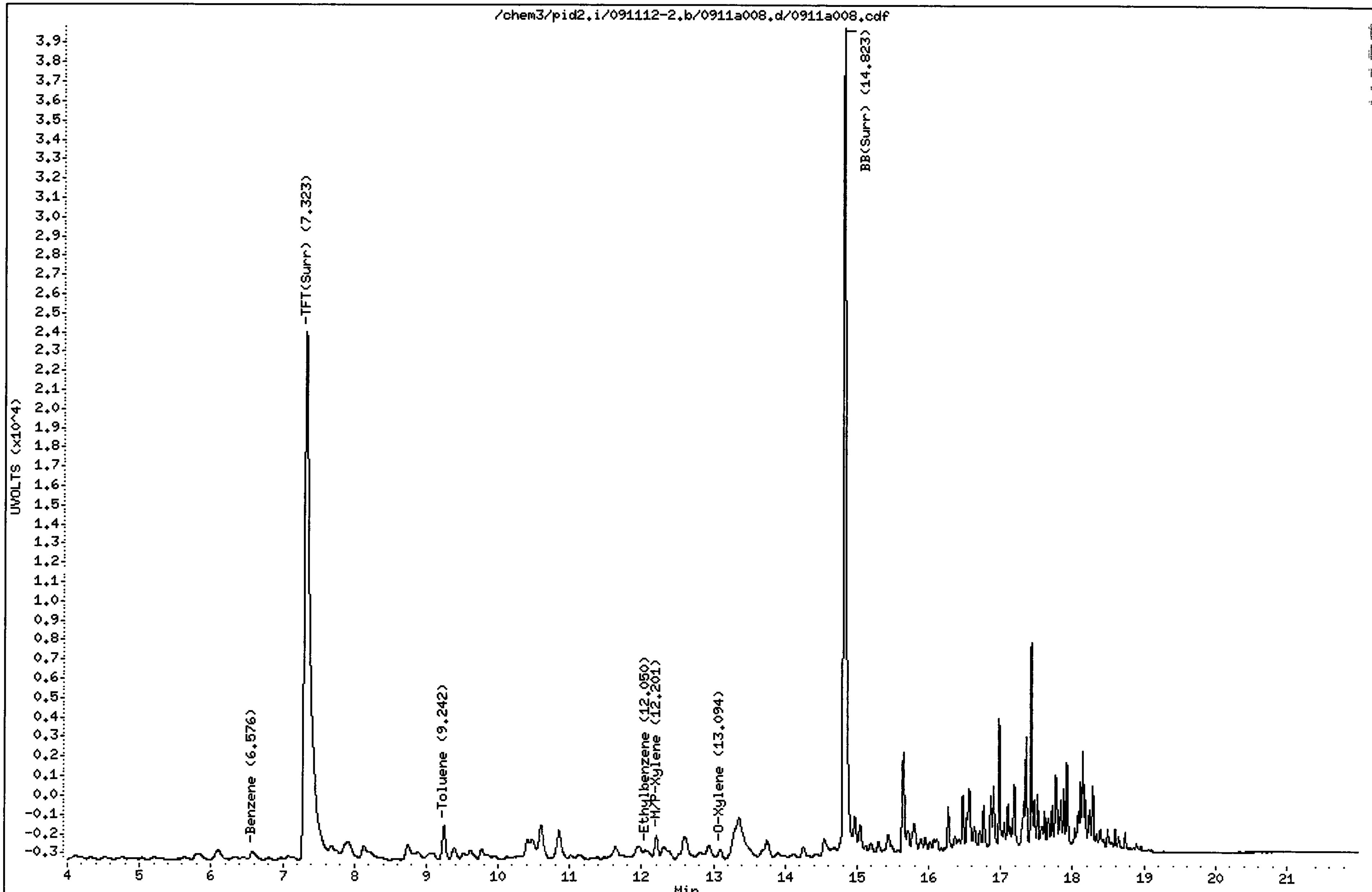
Sample Info: VI35C

Column phase: RTX 502-2 PID

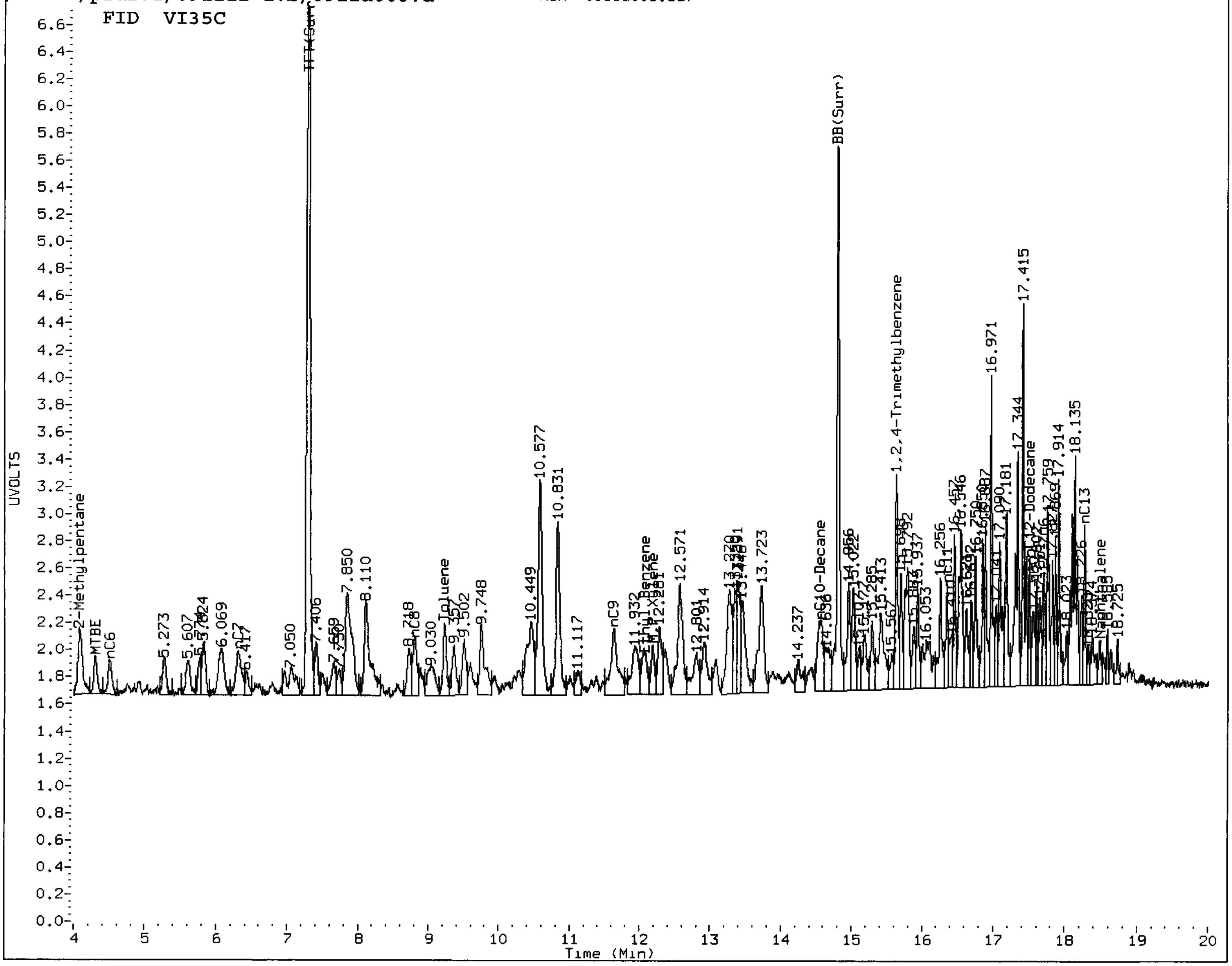
Instrument: pid2.i

Operator: JW

Column diameter: 0.18



/chem3/pid2.i/091112-1.b/0911a008.d AIA 0911a008.cdf



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other ____________________

Analyst: JW Date: 9/12/12

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: CMS-08302012-7
SAMPLE

Lab Sample ID: VI35D
LIMS ID: 12-16913
Matrix: Soil
Data Release Authorized:
Reported: 09/13/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
Event: NA
Date Sampled: 08/30/12
Date Received: 09/05/12

Date Analyzed: 09/11/12 13:39
Instrument/Analyst: PID2/JLW

Purge Volume: 5.0 mL
Sample Amount: 92 mg-dry-wt
Percent Moisture: 6.9%

CAS Number	Analyte	RL	Result	
71-43-2	Benzene	27	< 27 U	
108-88-3	Toluene	27	< 27 U	
100-41-4	Ethylbenzene	27	< 27 U	
179601-23-1	m,p-Xylene	54	< 54 U	
95-47-6	o-Xylene	27	< 27 U	
				GAS ID
	Gasoline Range Hydrocarbons	**5.4**	**74**	**GRO**

BETX Surrogate Recovery

Trifluorotoluene	99.7%
Bromobenzene	102%

Gasoline Surrogate Recovery

Trifluorotoluene	104%
Bromobenzene	112%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/091112-1.b/0911a009.d
Data file 2: /chem3/pid2.i/091112-2.b/0911a009.d
Method: /chem3/pid2.i/091112-2.b/PIDB.m
Instrument: pid2.i
Gas Ical Date: 26-JULY-2012
BETX Ical Date: 26-JUL-2012

ARI ID: VI35D
Client ID: CMS-08302012-7
Injection Date: 11-SEP-2012 13:39
Matrix: SOIL
Dilution Factor: 1.000

==

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
7.293	-0.018	6173	92371	104.3	TFT(Surr)
14.804	-0.013	4054	55916	111.5	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Method	Range		RF	Total Area*	Amount
WATPHG	Tol-C12	(9.14 to 17.57)	691452	798688	1.155 M
8015C	2MP-TMB	(4.00 to 15.74)	1522325	351058	0.231 M
AK101	nC6-nC10	(4.42 to 14.48)	1210379	196228	0.162 M
NWTPHG	Tol-Nap	(9.14 to 18.58)	705433	959489	1.360 M

M Indicates manual integration within range

* Surrogate areas are subtracted from Total Area
  Range marker RT's are set by daily RT standard

==

PID Surrogates

RT	Shift	Response	%Rec	Compound
7.321	-0.018	27708	99.7	TFT(Surr)
14.823	-0.013	43385	101.7	BB(Surr)

SW8021B (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
9.240	-0.020	513	0.40	Toluene
12.096	0.034	450	0.39	Ethylbenzene
12.203	-0.018	320	0.31	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

JW 9/12/12

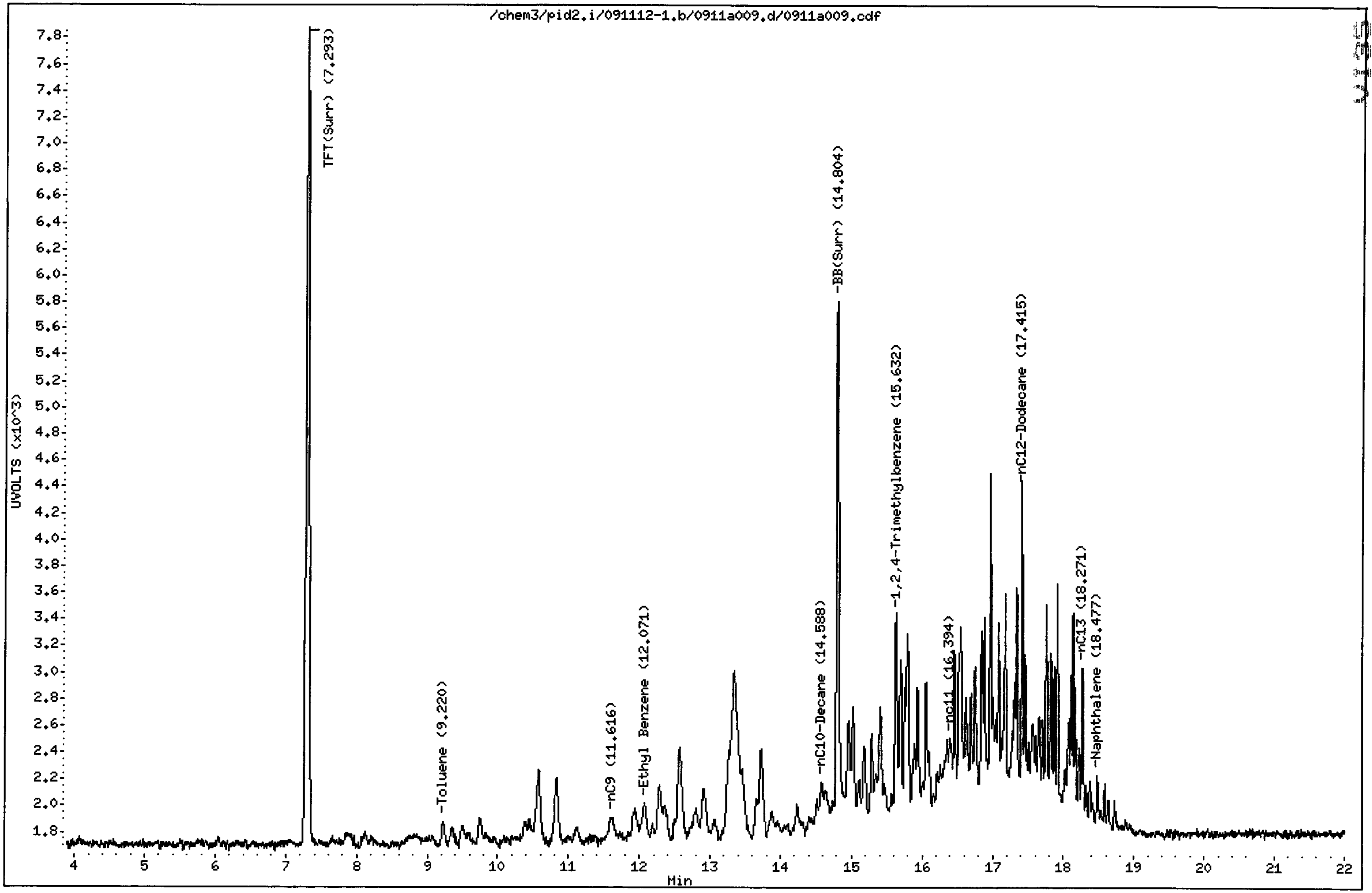
A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak was manually integrated

Data File: /chem3/pid2.i/091112-1.b/0911a009.d
Date : 11-SEP-2012 13:39
Client ID: CMS-08302012-7
Sample Info: VI35D

Column phase: RTX 502-2 FID

Instrument: pid2.i

Operator: JW
Column diameter: 0.18



Data File: /chem3/pid2.i/091112-2.b/0911a009.d

Date : 11-SEP-2012 13:39

Client ID: CMS-08302012-7

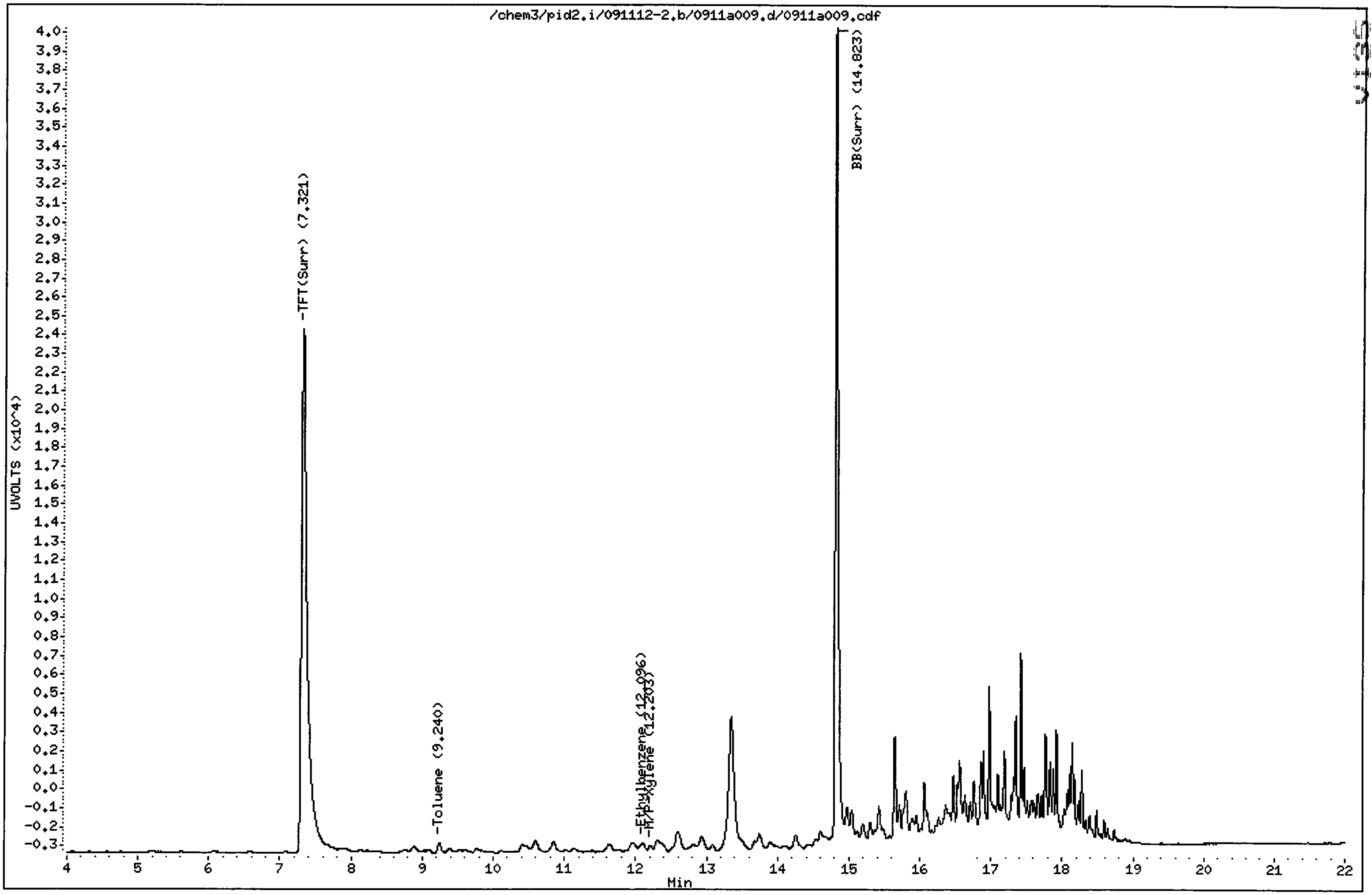
Sample Info: VI35D

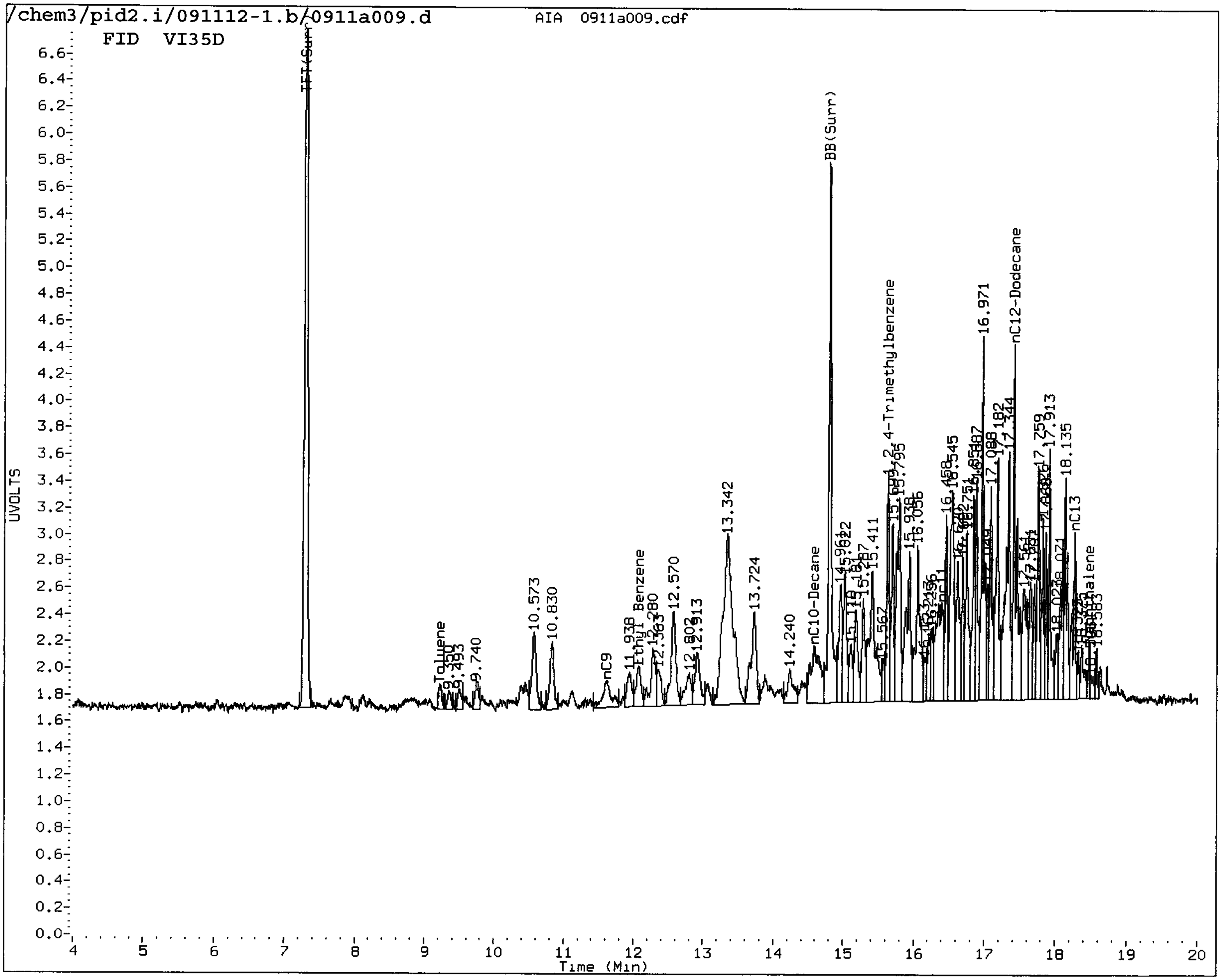
Column phase: RTX 502-2 PID

Instrument: pid2.i

Operator: JW

Column diameter: 0.18





MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other ______________________

Analyst: JW   Date: 9/12/12

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: CMS-08302012-8
SAMPLE

Lab Sample ID: VI35E
LIMS ID: 12-16914
Matrix: Soil
Data Release Authorized:
Reported: 09/13/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
Event: NA
Date Sampled: 08/30/12
Date Received: 09/05/12

Date Analyzed: 09/11/12 14:07
Instrument/Analyst: PID2/JLW

Purge Volume: 5.0 mL
Sample Amount: 96 mg-dry-wt
Percent Moisture: 3.8%

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	26	< 26 U	
108-88-3	Toluene	26	< 26 U	
100-41-4	Ethylbenzene	26	< 26 U	
179601-23-1	m,p-Xylene	52	< 52 U	
95-47-6	o-Xylene	26	< 26 U	
	Gasoline Range Hydrocarbons	5.2	< 5.2 U	---

BETX Surrogate Recovery

Trifluorotoluene	96.8%
Bromobenzene	92.2%

Gasoline Surrogate Recovery

Trifluorotoluene	102%
Bromobenzene	100%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

BETX SOIL SURROGATE RECOVERY SUMMARY

ARI Job: VI35
Matrix: Soil

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
Event: NA

Client ID	TFT	BBZ	TOT OUT
MB-091112	95.0%	96.5%	0
LCS-091112	104%	102%	0
LCSD-091112	101%	101%	0
CMS-08302012-5	100%	96.8%	0
CMS-08302012-6	98.4%	101%	0
CMS-08302012-7	99.7%	102%	0
CMS-08302012-8	96.8%	92.2%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(69-126)
(BBZ) = Bromobenzene	(80-120)	(49-143)

Log Number Range: 12-16911 to 12-16914

ANALYTICAL RESOURCES INCORPORATED

TPHG SOIL SURROGATE RECOVERY SUMMARY

ARI Job: VI35
Matrix: Soil

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
Event: NA

Client ID	BFB	TFT	BBZ	TOT OUT
MB-091112	NA	99.4%	105%	0
LCS-091112	NA	106%	110%	0
LCSD-091112	NA	103%	108%	0
CMS-08302012-5	NA	105%	106%	0
CMS-08302012-6	NA	103%	110%	0
CMS-08302012-7	NA	104%	112%	0
CMS-08302012-8	NA	102%	100%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(65-128)
(BBZ) = Bromobenzene	(80-120)	(52-149)

Log Number Range: 12-16911 to 12-16914

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod

Sample ID: LCS-091112
LAB CONTROL SAMPLE

Lab Sample ID: LCS-091112
LIMS ID: 12-16911
Matrix: Soil
Data Release Authorized:
Reported: 09/13/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 09/11/12 11:17
LCSD: 09/11/12 11:45
Instrument/Analyst LCS: PID2/JLW
LCSD: PID2/JLW

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	183	185	98.9%	184	185	99.5%	0.5%
Toluene	2010	1980	102%	2000	1980	101%	0.5%
Ethylbenzene	490	580	84.5%	486	580	83.8%	0.8%
m,p-Xylene	2140	2120	101%	2120	2120	100%	0.9%
o-Xylene	954	960	99.4%	940	960	97.9%	1.5%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	104%	101%
Bromobenzene	102%	101%

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG

ANALYTICAL RESOURCES INCORPORATED

Sample ID: LCS-091112
LAB CONTROL SAMPLE

Lab Sample ID: LCS-091112
LIMS ID: 12-16911
Matrix: Soil
Data Release Authorized:
Reported: 09/13/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 09/11/12 11:17
LCSD: 09/11/12 11:45
Instrument/Analyst LCS: PID2/JLW
LCSD: PID2/JLW

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	56.0	50.0	112%	55.4	50.0	111%	1.1%

Reported in mg/kg (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	106%	103%
Bromobenzene	110%	108%

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/091112-1.b/0911a004.d
Data file 2: /chem3/pid2.i/091112-2.b/0911a004.d
Method: /chem3/pid2.i/091112-2.b/PIDB.m
Instrument: pid2.i
Gas Ical Date: 26-JULY-2012
BETX Ical Date: 26-JUL-2012

ARI ID: LCS0911
Client ID:
Injection Date: 11-SEP-2012 11:17
Matrix: WATER
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
7.301	-0.010	6251	109361	105.6	TFT(Surr)
14.810	-0.007	3988	42491	109.7	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Method	Range		RF	Total Area*	Amount
WATPHG	Tol-C12	(9.14 to 17.57)	691452	773922	1.119
8015C	2MP-TMB	(4.00 to 15.74)	1522325	1718968	1.129
AK101	nC6-nC10	(4.42 to 14.48)	1210379	1390811	1.149
NWTPHG	Tol-Nap	(9.14 to 18.58)	705433	790348	1.120

M Indicates manual integration within range

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

PID Surrogates

RT	Shift	Response	%Rec	Compound
7.327	-0.012	28990	104.3	TFT(Surr)
14.830	-0.006	43386	101.7	BB(Surr)

SW8021B (PID)

RT	Shift	Response	Amount	Compound
6.580	-0.014	7092	3.66	Benzene
9.252	-0.008	52086	40.27	Toluene
12.051	-0.011	11386	9.81	Ethylbenzene
12.214	-0.008	43807	42.89	M/P-Xylene
13.108	-0.010	16661	19.08	O-Xylene
ND	---	---	---	MTBE

JW
9/11/12

Indicates Peak Area was used for quantitation instead of Height
Indicates peak was manually integrated

Data File: /chem3/pid2.i/091112-1.b/0911a004.d

Date : 11-SEP-2012 11:17

Client ID:

Sample Info: LCS0911

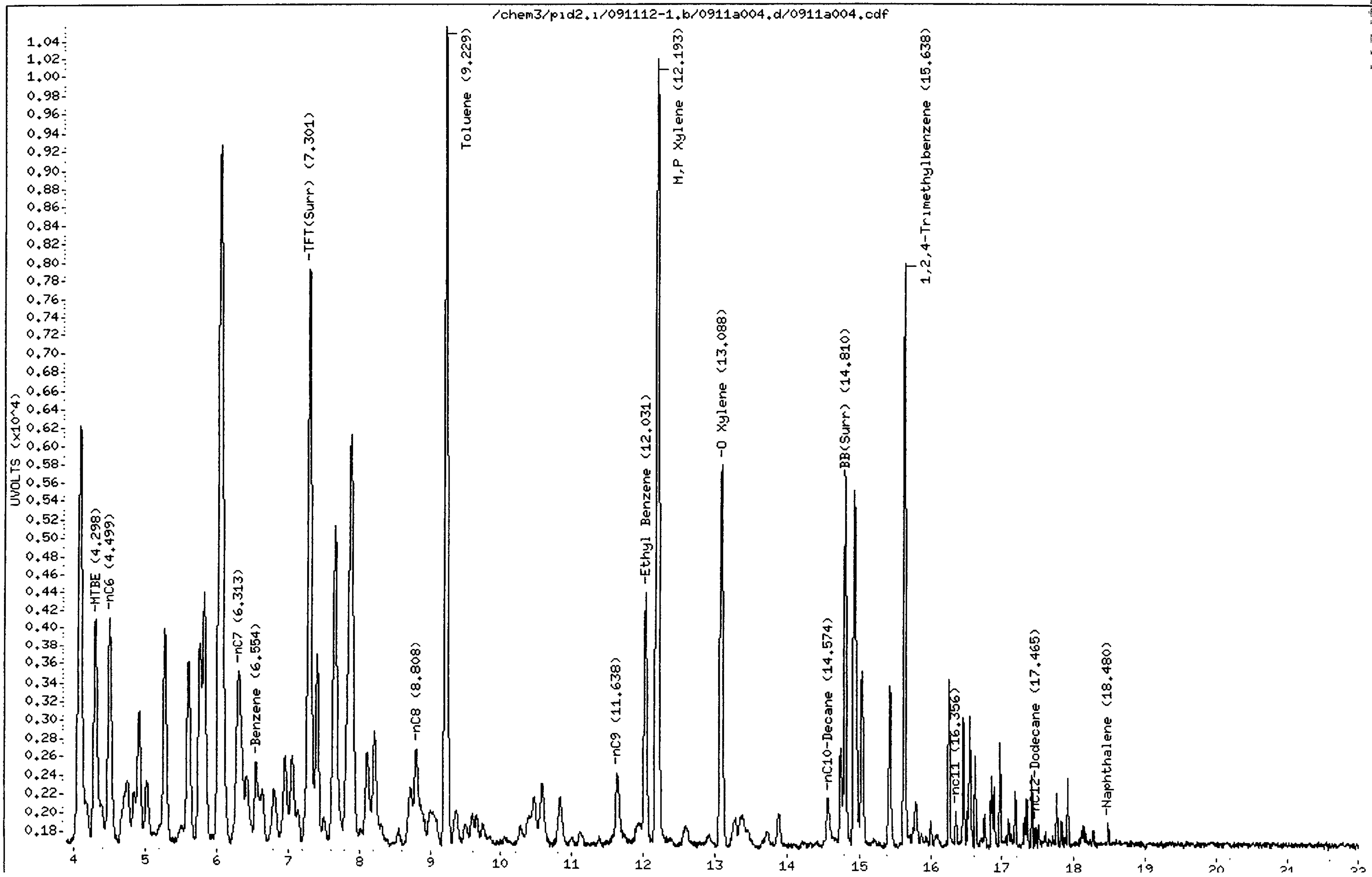
Column phase: RTX 502-2 FID

Page 1

Instrument: pid2.i

Operator: JW

Column diameter: 0.18

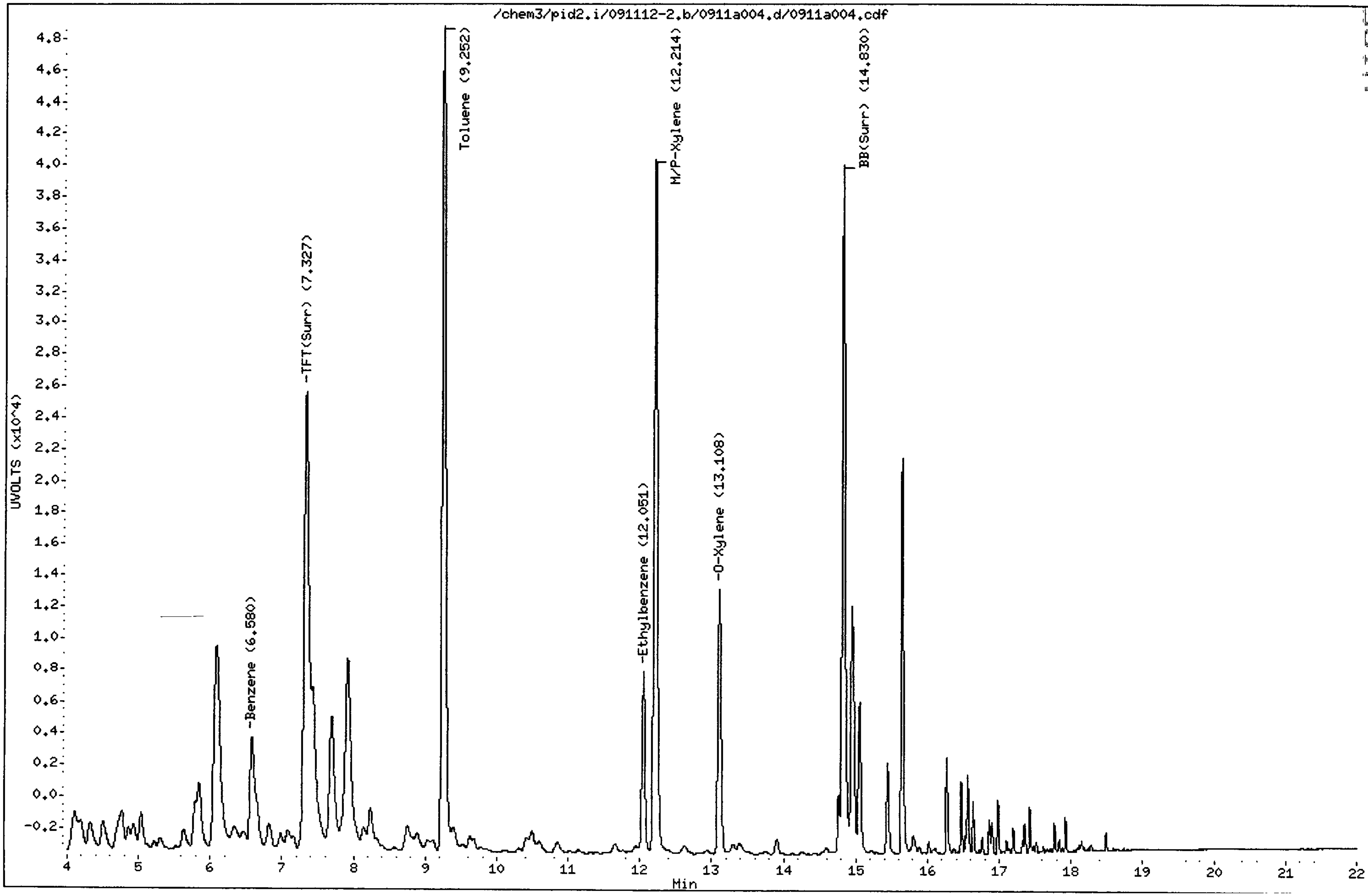


Data File: /chem3/pid2.i/091112-2.b/0911a004.d
Date : 11-SEP-2012 11:17
Client ID:
Sample Info: LCS0911

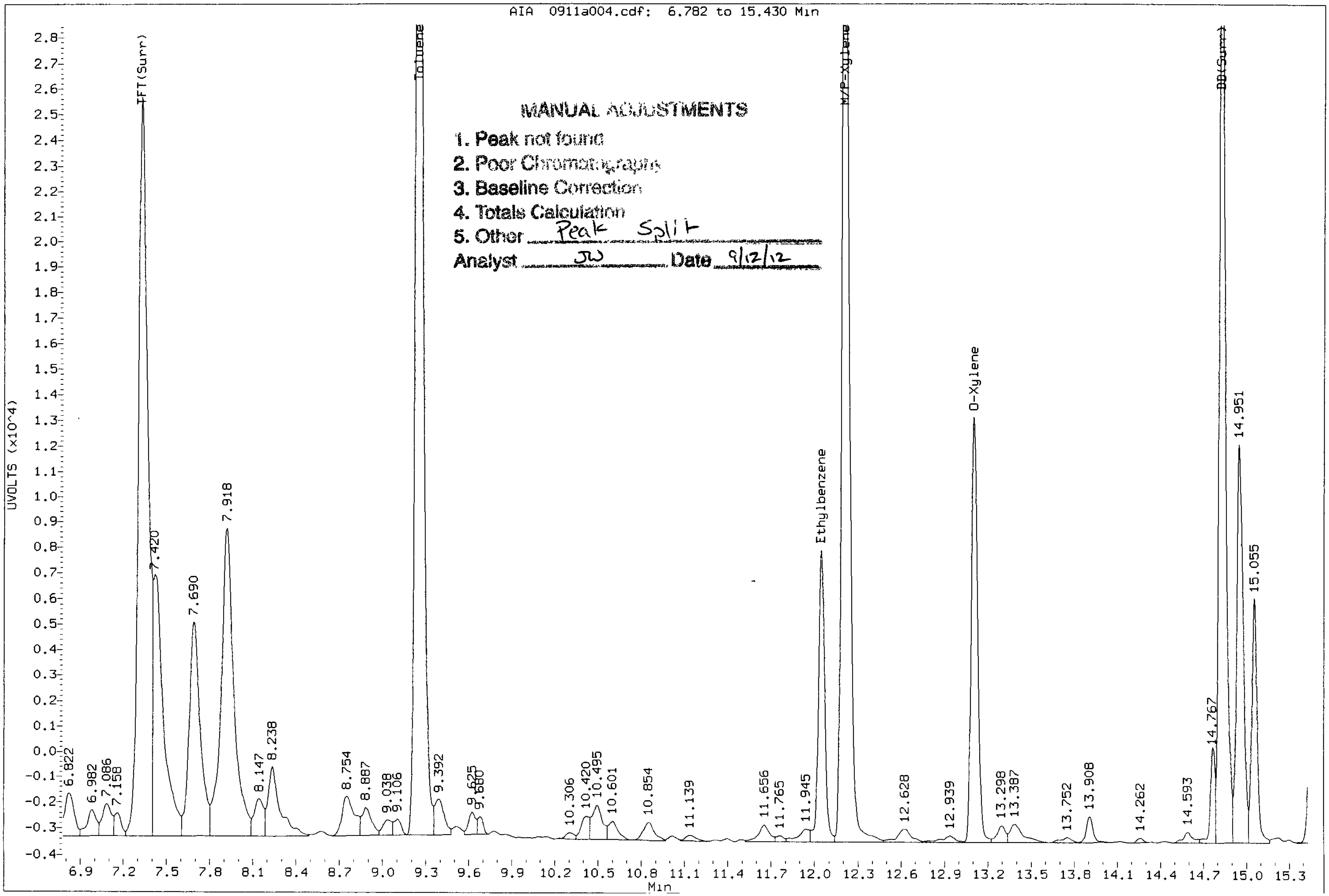
Column phase: RTX 502-2 PID

Instrument: pid2.i

Operator: JW
Column diameter: 0.18



Data File: /chem3/pid2.i/091112-2.b/0911a004.d/0911a004.cdf
Injection Date: 11-SEP-2012 11:17
Instrument: pid2.i
Client Sample ID:



MANUAL ADJUSTMENTS
1. Peak not found
2. Poor Chromatography
3. Baseline Correction
4. Totals Calculation
5. Other Peak Split
Analyst JW Date 9/12/12

VI35:00073

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/091112-1.b/0911a005.d
Data file 2: /chem3/pid2.i/091112-2.b/0911a005.d
Method: /chem3/pid2.i/091112-2.b/PIDB.m
Instrument: pid2.i
Gas Ical Date: 26-JULY-2012
BETX Ical Date: 26-JUL-2012

ARI ID: LCSD0911
Client ID:
Injection Date: 11-SEP-2012 11:45
Matrix: WATER
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
7.299	-0.012	6105	108018	103.1	TFT(Surr)
14.808	-0.009	3911	42455	107.6	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Method	Range		RF	Total Area*	Amount
WATPHG	Tol-C12	(9.14 to 17.57)	691452	762547	1.103
8015C	2MP-TMB	(4.00 to 15.74)	1522325	1694088	1.113
AK101	nC6-nC10	(4.42 to 14.48)	1210379	1360673	1.124
NWTPHG	Tol-Nap	(9.14 to 18.58)	705433	780755	1.107

M Indicates manual integration within range

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

PID Surrogates

RT	Shift	Response	%Rec	Compound
7.327	-0.012	28198	101.4	TFT(Surr)
14.827	-0.009	43269	101.4	BB(Surr)

SW8021B (PID)

RT	Shift	Response	Amount	Compound
6.582	-0.011	7153	3.69	Benzene
9.250	-0.010	51841	40.08	Toluene
12.050	-0.012	11277	9.72N	Ethylbenzene
12.213	-0.009	43377	42.47	M/P-Xylene
13.107	-0.011	16411	18.80	O-Xylene
ND	---	---	---	MTBE

JW 9/11/12

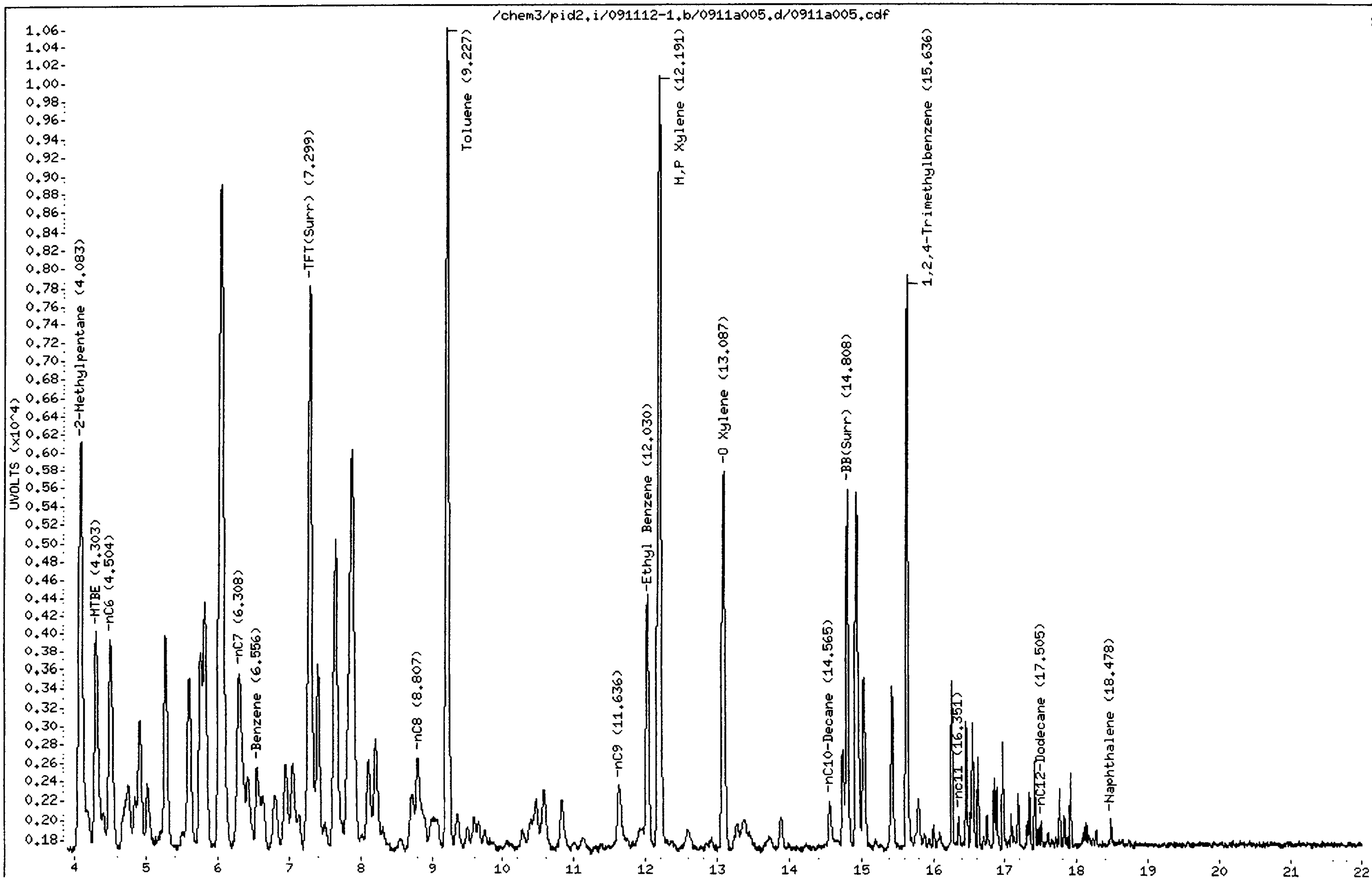
Indicates Peak Area was used for quantitation instead of Height
Indicates peak was manually integrated

Data File: /chem3/pid2.i/091112-1.b/0911a005.d
Date : 11-SEP-2012 11:45
Client ID:
Sample Info: LCSD0911

Column phase: RTX 502-2 FID

Instrument: pid2.i

Operator: JW
Column diameter: 0.18

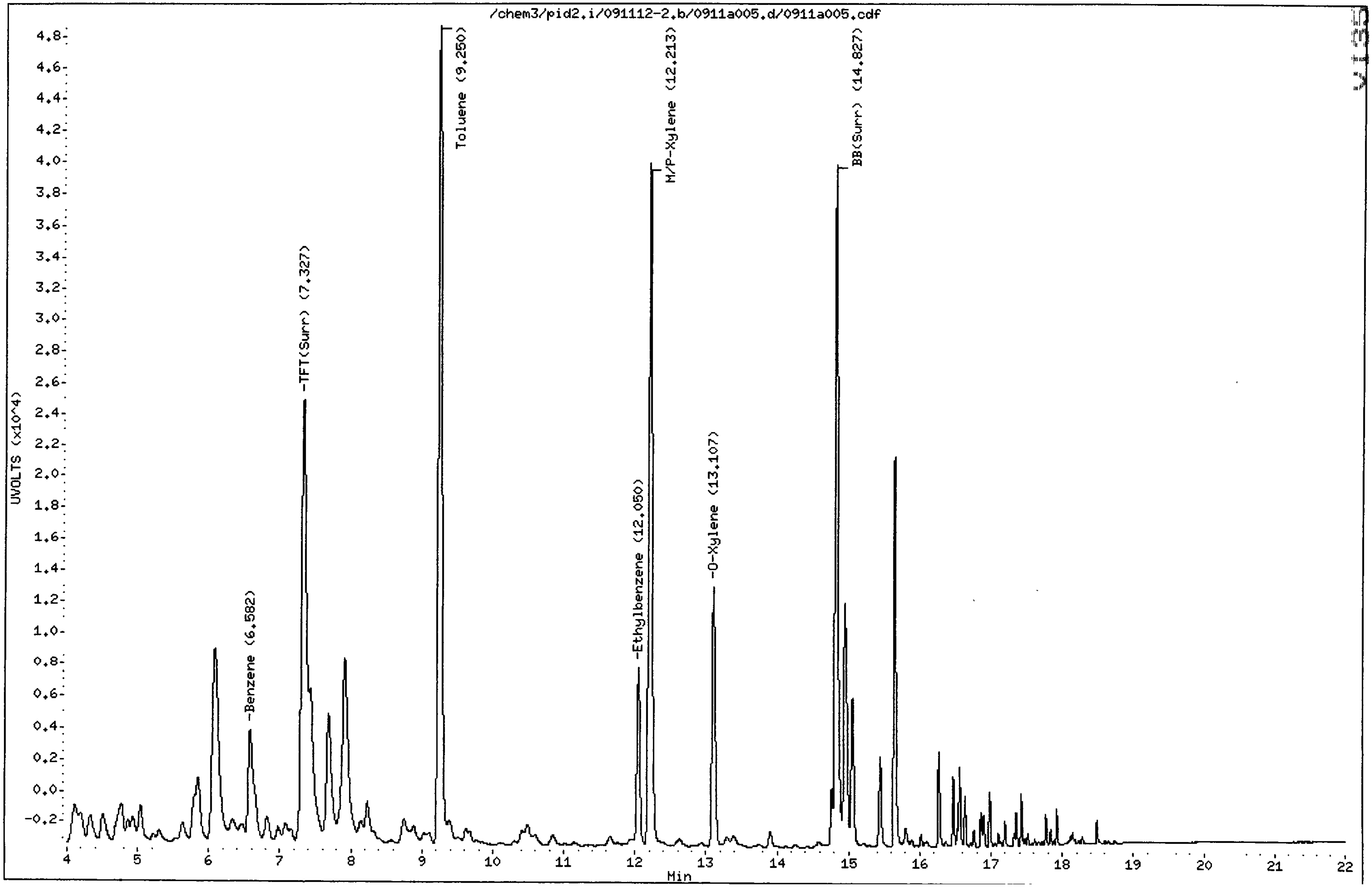


Data File: /chem3/pid2.i/091112-2.b/0911a005.d
Date : 11-SEP-2012 11:45
Client ID:
Sample Info: LCSD0911

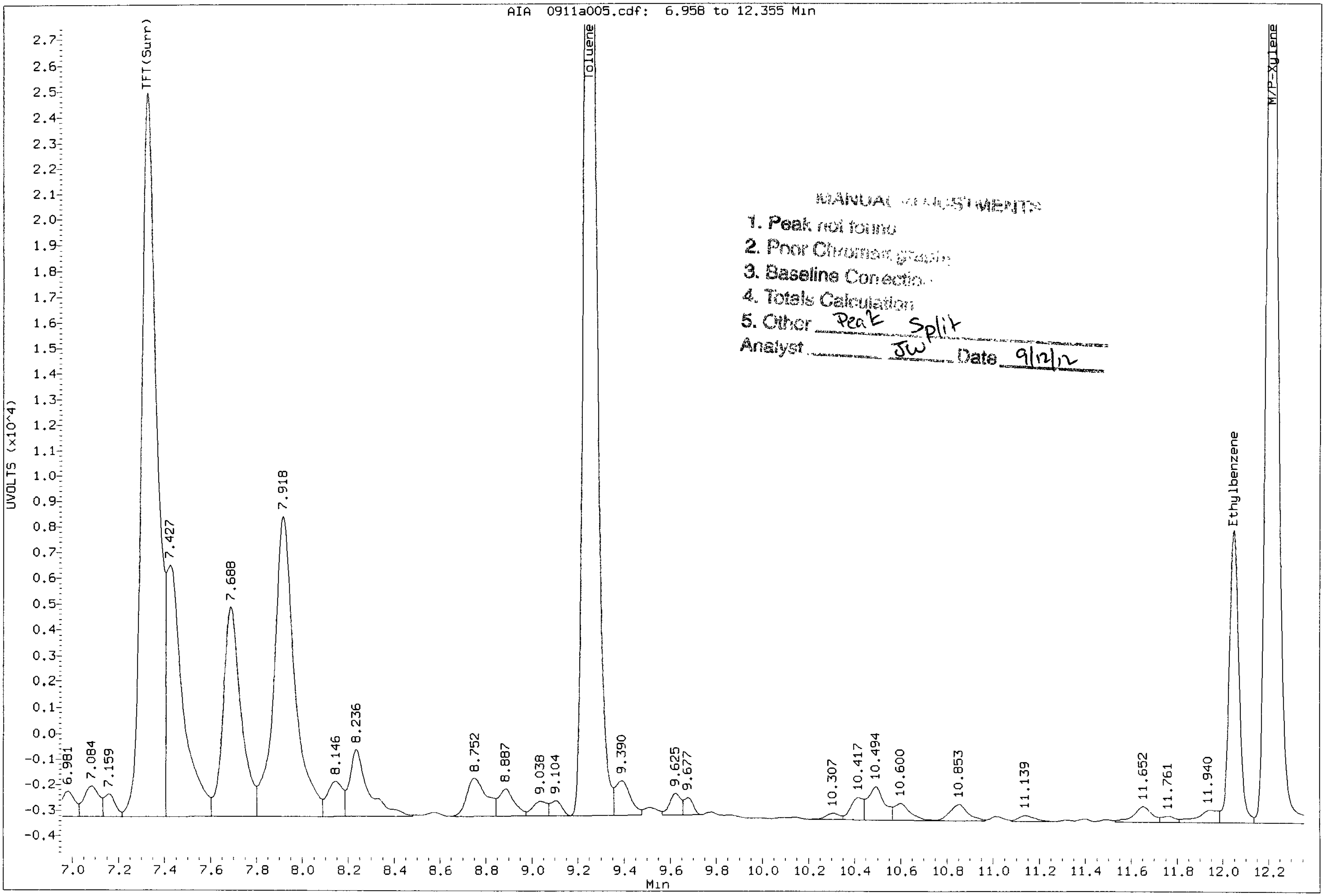
Column phase: RTX 502-2 PID

Instrument: pid2.i

Operator: JW
Column diameter: 0.18



Data File: /chem3/pid2.i/091112-2.b/0911a005.d/0911a005.cdf
Injection Date: 11-SEP-2012 11:45
Instrument: pid2.i
Client Sample ID:



MANUAL ADJUSTMENTS
1. Peak not found
2. Poor Chromatography
3. Baseline Correction
4. Totals Calculation
5. Other Peak Split
Analyst JW Date 9/12/12

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG

Sample ID: MB-091112
METHOD BLANK

Lab Sample ID: MB-091112
LIMS ID: 12-16911
Matrix: Soil
Data Release Authorized:
Reported: 09/13/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed: 09/11/12 12:13
Instrument/Analyst: PID2/JLW

Purge Volume: 5.0 mL
Sample Amount: 100 mg-dry-wt

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	25	< 25 U	
108-88-3	Toluene	25	< 25 U	
100-41-4	Ethylbenzene	25	< 25 U	
179601-23-1	m,p-Xylene	50	< 50 U	
95-47-6	o-Xylene	25	< 25 U	
	Gasoline Range Hydrocarbons	5.0	< 5.0 U	---

BETX Surrogate Recovery

Trifluorotoluene	95.0%
Bromobenzene	96.5%

Gasoline Surrogate Recovery

Trifluorotoluene	99.4%
Bromobenzene	105%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

FORM I

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/091112-1.b/0911a006.d
Data file 2: /chem3/pid2.i/091112-2.b/0911a006.d
Method: /chem3/pid2.i/091112-2.b/PIDB.m
Instrument: pid2.i
Gas Ical Date: 26-JULY-2012
BETX Ical Date: 26-JUL-2012

ARI ID: MB0911
Client ID:
Injection Date: 11-SEP-2012 12:13
Matrix: WATER
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
7.299	-0.012	5887	92220	99.4	TFT(Surr)
14.809	-0.008	3831	41318	105.4	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Method	Range		RF	Total Area*	Amount
WATPHG	Tol-C12	(9.14 to 17.57)	691452	0	0.000
8015C	2MP-TMB	(4.00 to 15.74)	1522325	1	0.000
AK101	nC6-nC10	(4.42 to 14.48)	1210379	0	0.000
NWTPHG	Tol-Nap	(9.14 to 18.58)	705433	0	0.000

M Indicates manual integration within range

* Surrogate areas are subtracted from Total Area
Range marker RT's are set by daily RT standard

JW 9/11/12

PID Surrogates

RT	Shift	Response	%Rec	Compound
7.327	-0.013	26399	95.0	TFT(Surr)
14.827	-0.009	41194	96.5	BB(Surr)

SW8021B (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

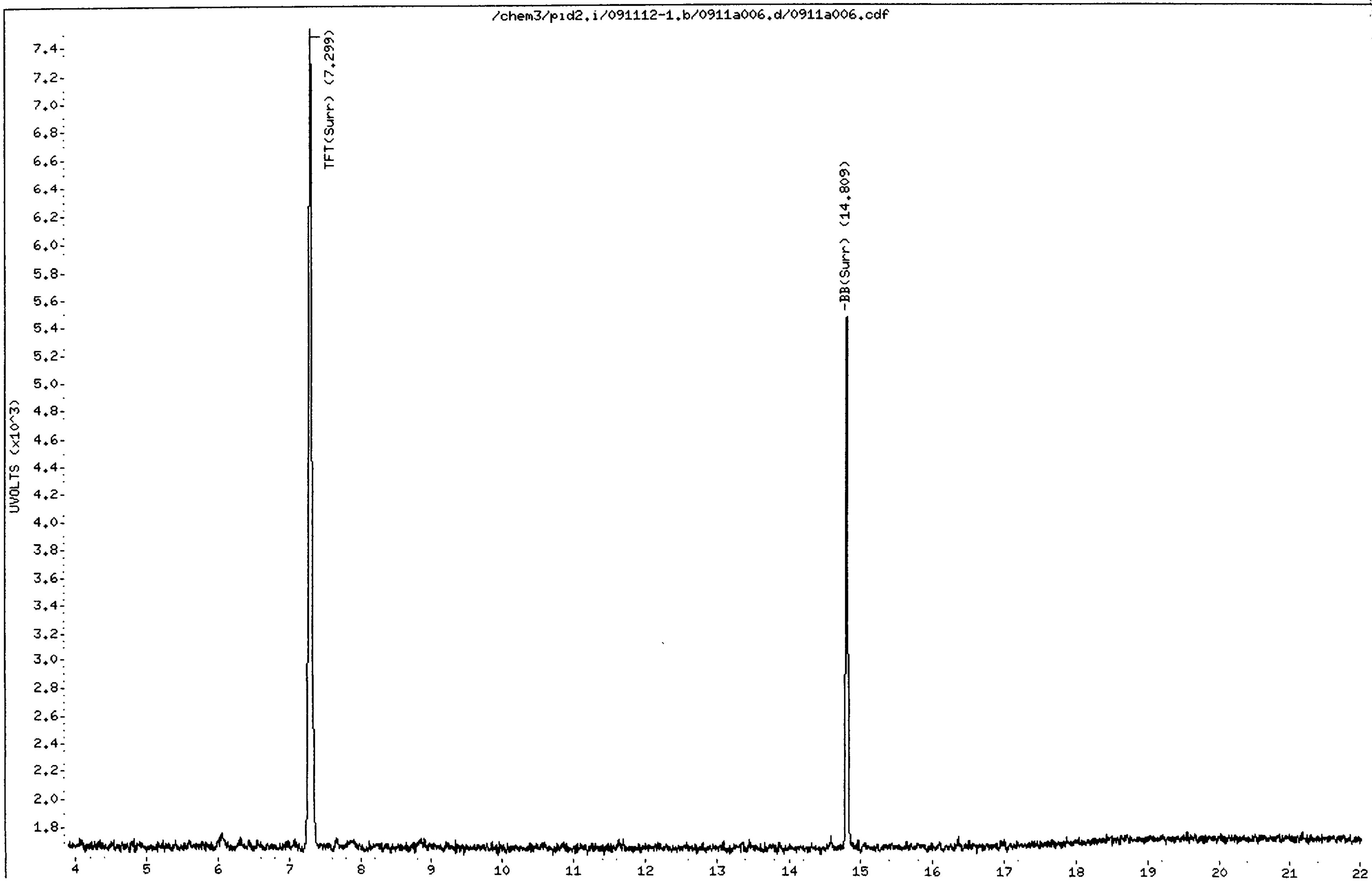
Indicates Peak Area was used for quantitation instead of Height
Indicates peak was manually integrated

Data File: /chem3/pid2.i/091112-1.b/0911a006.d
Date : 11-SEP-2012 12:13
Client ID:
Sample Info: MB0911

Column phase: RTX 502-2 FID

Instrument: pid2.i

Operator: JW
Column diameter: 0.18



Data File: /chem3/pid2.i/091112-2.b/0911a006.d

Date : 11-SEP-2012 12:13

Client ID:

Sample Info: MB0911

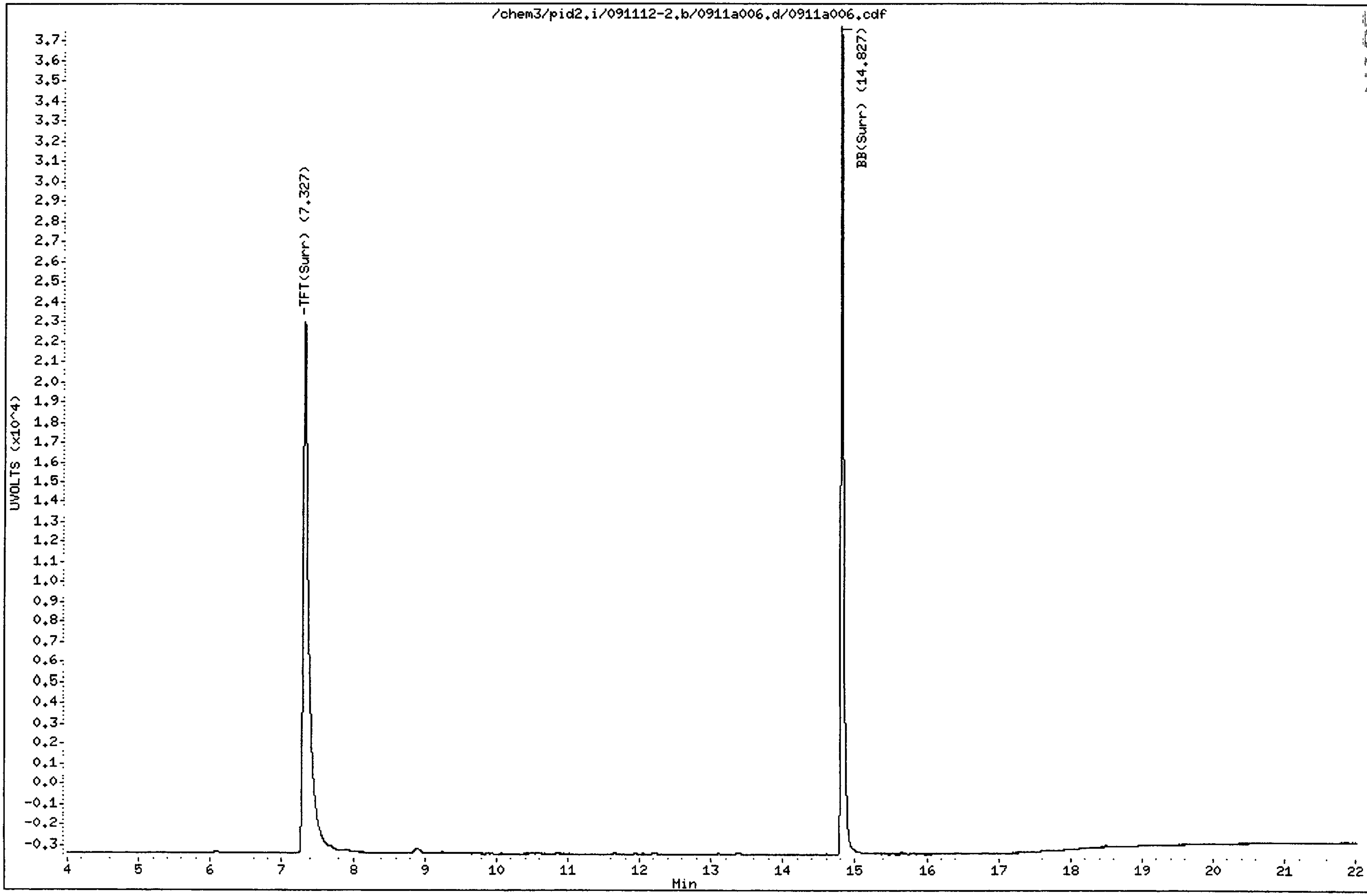
Column phase: RTX 502-2 PID

Instrument: pid2.i

Operator: JW

Column diameter: 0.18

/chem3/pid2.i/091112-2.b/0911a006.d/0911a006.cdf



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Aliphatic/Aromatic GC-EPH
Extraction Method: SW3550C
Page 1 of 1

Sample ID: CMS-08302012-12
SAMPLE

Lab Sample ID: VI35G
LIMS ID: 12-16916
Matrix: Soil
Data Release Authorized:
Reported: 09/19/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted: 09/11/12
Percent Moisture: 15.8%

Sample Amount: 9.07 g-dry-wt
Final Extract Volume: 1.0 mL

Aliphatic
Date Analyzed: 09/17/12 23:49
Instrument/Analyst: FID8/AAR
Dilution Factor: 1.00

Aromatic
Date Analyzed: 09/17/12 20:05
Instrument/Analyst: FID8/AAR
Dilution Factor: 1.00

Range	RL	Result
C8-C10 Aliphatics	**2,200**	**3,500 B**
C10-C12 Aliphatics	2,200	< 2,200 U
C12-C16 Aliphatics	**2,200**	**3,600**
C16-C21 Aliphatics	**2,200**	**2,900**
C21-C34 Aliphatics	**2,200**	**87,000**
C8-C10 Aromatics	**2,200**	**3,200**
C10-C12 Aromatics	2,200	< 2,200 U
C12-C16 Aromatics	2,200	< 2,200 U
C16-C21 Aromatics	**2,200**	**2,200**
C21-C34 Aromatics	**2,200**	**6,500**

Reported in µg/kg (ppb)

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	71.1%
Aromatic	o-Terphenyl	66.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ALEPH SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Client ID	COD	TOT OUT
MB-091112	77.0%	0
LCS-091112	68.7%	0
CMS-08302012-12	71.1%	0
CMS-08302012-12 MS	67.2%	0
CMS-08302012-12 MSD	67.8%	0

	LCS/MB LIMITS	QC LIMITS
(COD) = 1-Chlorooctadecane	(27-128)	(39-131)

Prep Method: SW3550C
Log Number Range: 12-16916 to 12-16916

ANALYTICAL RESOURCES INCORPORATED

AREPH SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Client ID	OTER	TOT OUT
MB-091112	70.1%	0
LCS-091112	66.3%	0
CMS-08302012-12	66.6%	0
CMS-08302012-12 MS	66.5%	0
CMS-08302012-12 MSD	69.4%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(34-133)	(10-143)

Prep Method: SW3550C
Log Number Range: 12-16916 to 12-16916

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Aliphatic/Aromatic GC-EPH

Sample ID: CMS-08302012-12
MS/MSD

Lab Sample ID: VI35G
LIMS ID: 12-16916
Matrix: Soil
Data Release Authorized:
Reported: 09/19/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted MS/MSD: 09/11/12

Sample Amount MS: 8.42 g-dry-wt
MSD: 9.07 g-dry-wt
Final Extract Volume MS: 1.0 mL
MSD: 1.0 mL

Aliphatic
Date Analyzed MS: 09/18/12 00:14
MSD: 09/18/12 00:39
Instrument/Analyst MS: FID8/AAR
MSD: FID8/AAR

Dilution Factor MS: 1.00
MSD: 1.00

Aromatic
Date Analyzed MS: 09/17/12 20:29
MSD: 09/17/12 20:54
Instrument/Analyst MS: FID8/AAR
MSD: FID8/AAR

Dilution Factor MS: 1.00
MSD: 1.00

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
C8-C10 Aliphatics	3530 B	12200 B	17800	48.7%	12200 B	16500	52.4%	0.0%
C10-C12 Aliphatics	< 2210 U	13300	17800	74.7%	14100	16500	85.3%	5.8%
C12-C16 Aliphatics	3640	16700	17800	73.3%	17400	16500	83.2%	4.1%
C16-C21 Aliphatics	2870	15700	17800	72.0%	15000	16500	73.3%	4.6%
C10-C12 Aromatics	< 2210 U	10500	17800	58.9%	8820	16500	53.3%	17.4%
C12-C16 Aromatics	< 2210 U	11900	17800	66.8%	11400	16500	68.9%	4.3%
C16-C21 Aromatics	2210	27600	35600	71.3%	27800	33100	77.4%	0.7%
C21-C34 Aromatics	6500	41800	35600	99.1%	39000	33100	98.3%	6.9%

Results reported in µg/kg
RPD calculated using sample concentrations per SW846.

FORM III

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Aliphatic/Aromatic GC-EPH
Extraction Method: SW3550C

Sample ID: CMS-08302012-12
MATRIX SPIKE

Lab Sample ID: VI35G
LIMS ID: 12-16916
Matrix: Soil
Data Release Authorized:
Reported: 09/19/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted: 09/11/12
Percent Moisture: 15.8%

Sample Amount: 8.42 g-dry-wt
Final Extract Volume: 1.0 mL

Aliphatic
Date Analyzed: 09/18/12 00:14
Instrument/Analyst: FID8/AAR
Dilution Factor: 1.00

Aromatic
Date Analyzed: 09/17/12 20:29
Instrument/Analyst: FID8/AAR
Dilution Factor: 1.00

Range	RL	Result
C8-C10 Aliphatics	2,400	---
C10-C12 Aliphatics	2,400	---
C12-C16 Aliphatics	2,400	---
C16-C21 Aliphatics	2,400	---
C8-C10 Aromatics	2,400	< 2,400 U
C10-C12 Aromatics	2,400	---
C12-C16 Aromatics	2,400	---
C16-C21 Aromatics	2,400	---
C21-C34 Aromatics	2,400	---

Reported in µg/kg (ppb)

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	67.2%
Aromatic	o-Terphenyl	66.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Aliphatic/Aromatic GC-EPH
Extraction Method: SW3550C
Page 1 of 1

Sample ID: CMS-08302012-12
MATRIX SPIKE DUP

Lab Sample ID: VI35G
LIMS ID: 12-16916
Matrix: Soil
Data Release Authorized:
Reported: 09/19/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Date Extracted: 09/11/12
Percent Moisture: 15.8%

Sample Amount: 9.07 g-dry-wt
Final Extract Volume: 1.0 mL

Aliphatic
Date Analyzed: 09/18/12 00:39
Instrument/Analyst: FID8/AAR
Dilution Factor: 1.00

Aromatic
Date Analyzed: 09/17/12 20:54
Instrument/Analyst: FID8/AAR
Dilution Factor: 1.00

Range	RL	Result
C8-C10 Aliphatics	2,200	---
C10-C12 Aliphatics	2,200	---
C12-C16 Aliphatics	2,200	---
C16-C21 Aliphatics	2,200	---
C8-C10 Aromatics	2,200	< 2,200 U
C10-C12 Aromatics	2,200	---
C12-C16 Aromatics	2,200	---
C16-C21 Aromatics	2,200	---
C21-C34 Aromatics	2,200	---

Reported in µg/kg (ppb)

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	67.8%
Aromatic	o-Terphenyl	69.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Aliphatic/Aromatic GC-EPH

Sample ID: LCS-091112
LAB CONTROL

Lab Sample ID: LCS-091112
LIMS ID: 12-16916
Matrix: Soil
Data Release Authorized:
Reported: 09/19/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: NA
Date Received: NA

Date Extracted: 09/11/12

Sample Amount: 10.0 g-as-rec
Final Extract Volume: 1.0 mL

Aliphatic
Date Analyzed: 09/17/12 22:59
Instrument/Analyst: FID8/AAR
Dilution Factor: 1.00

Aromatic
Date Analyzed: 09/17/12 19:15
Instrument/Analyst: FID8/AAR
Dilution Factor: 1.00

Range	**Lab Control**	**Spike Added**	**Recovery**
C8-C10 Aliphatics	13000 B	15000	86.7%
C10-C12 Aliphatics	9500	15000	63.3%
C12-C16 Aliphatics	12000	15000	80.0%
C16-C21 Aliphatics	12000	15000	80.0%
C10-C12 Aromatics	8200	15000	54.7%
C12-C16 Aromatics	9100	15000	60.7%
C16-C21 Aromatics	19800	30000	66.0%
C21-C34 Aromatics	22700	30000	75.7%

Results reported in µg/kg

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	68.7%
Aromatic	o-Terphenyl	66.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Aliphatic/Aromatic GC-EPH
Extraction Method: SW3550C
Page 1 of 1

Sample ID: MB-091112
METHOD BLANK

Lab Sample ID: MB-091112
LIMS ID: 12-16916
Matrix: Soil
Data Release Authorized:
Reported: 09/19/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: NA
Date Received: NA

Date Extracted: 09/11/12
Percent Moisture: NA

Sample Amount: 10.0 g-as-rec
Final Extract Volume: 1.0 mL

Aliphatic
Date Analyzed: 09/17/12 22:34
Instrument/Analyst: FID8/AAR

Dilution Factor: 1.00

Aromatic
Date Analyzed: 09/17/12 18:50
Instrument/Analyst: FID8/AAR

Dilution Factor: 1.00

Range	RL	Result
C8-C10 Aliphatics	**2,000**	**2,200**
C10-C12 Aliphatics	2,000	< 2,000 U
C12-C16 Aliphatics	2,000	< 2,000 U
C16-C21 Aliphatics	2,000	< 2,000 U
C21-C34 Aliphatics	2,000	< 2,000 U
C8-C10 Aromatics	2,000	< 2,000 U
C10-C12 Aromatics	2,000	< 2,000 U
C12-C16 Aromatics	2,000	< 2,000 U
C16-C21 Aromatics	2,000	< 2,000 U
C21-C34 Aromatics	2,000	< 2,000 U

Reported in µg/kg (ppb)

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	77.0%
Aromatic	o-Terphenyl	70.1%

ORGANICS ANALYSIS DATA SHEET
VPH by Method WA VPH

ANALYTICAL RESOURCES INCORPORATED

Sample ID: CMS-08302012-12
SAMPLE

Lab Sample ID: VI35G
LIMS ID: 12-16916
Matrix: Soil
Data Release Authorized:
Reported: 09/14/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Date Analyzed: 09/07/12 11:52
Instrument/Analyst: PID1/JLW

Purge Volume: 10 mL
Sample Amount: 44.7 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1100	< 1,100 U
108-88-3	Toluene	1100	< 1,100 U
100-41-4	Ethylbenzene	1100	< 1,100 U
179601-23-1	m,p-Xylene	2200	< 2,200 U
95-47-6	o-Xylene	1100	< 1,100 U
1634-04-4	Methyl tert-Butyl Ether	1100	< 1,100 U
109-66-0	n-Pentane	1100	< 1,100 U
110-54-3	n-Hexane	1100	< 1,100 U
111-65-9	n-Octane	1100	< 1,100 U
124-18-5	n-Decane	1100	< 1,100 U
112-40-3	**n-Dodecane**	**1100**	**770 J**

Range	RL	Result	
C8-C10 Aromatics	11,000	< 11,000	U
C10-C12 Aromatics	**11,000**	**11,000**	**J**
C12-C13 Aromatics	**11,000**	**11,000**	**J**
C5-C6 Aliphatics	11,000	< 11,000	U
C6-C8 Aliphatics	11,000	< 11,000	U
C8-C10 Aliphatics	11,000	< 11,000	U
C10-C12 Aliphatics	11,000	< 11,000	U

Values reported in µg/kg (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	122%
FID: 2,5-Dibromotoluene	116%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
VPH by Method WA VPH
Page 1 of 1

Sample ID: CMS-08302012-6
SAMPLE

Lab Sample ID: VI35M
LIMS ID: 12-16922
Matrix: Soil
Data Release Authorized:
Reported: 09/14/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Date Analyzed: 09/07/12 12:20
Instrument/Analyst: PID1/JLW

Purge Volume: 10 mL
Sample Amount: 45.9 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1100	< 1,100 U
108-88-3	Toluene	1100	< 1,100 U
100-41-4	Ethylbenzene	1100	< 1,100 U
179601-23-1	m,p-Xylene	2200	< 2,200 U
95-47-6	o-Xylene	1100	< 1,100 U
1634-04-4	Methyl tert-Butyl Ether	1100	< 1,100 U
109-66-0	n-Pentane	1100	< 1,100 U
110-54-3	n-Hexane	1100	< 1,100 U
111-65-9	n-Octane	1100	< 1,100 U
124-18-5	n-Decane	1100	< 1,100 U
112-40-3	**n-Dodecane**	**1100**	**570 J**

Range	RL	Result	
C8-C10 Aromatics	11,000	< 11,000	U
C10-C12 Aromatics	**11,000**	**10,000**	**J**
C12-C13 Aromatics	**11,000**	**8,700**	**J**
C5-C6 Aliphatics	11,000	< 11,000	U
C6-C8 Aliphatics	11,000	< 11,000	U
C8-C10 Aliphatics	**11,000**	**6,500**	**J**
C10-C12 Aliphatics	11,000	< 11,000	U

Values reported in µg/kg (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	117%
FID: 2,5-Dibromotoluene	111%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

ANALYTICAL RESOURCES INCORPORATED

VPH SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Client ID	PDBT	FDBT	TOT OUT
MB-090712	114%	99.6%	0
LCS-090712	106%	97.4%	0
LCSD-090712	103%	95.8%	0
CMS-08302012-12	122%	116%	0
CMS-08302012-6	117%	111%	0

	LCS/MB LIMITS	QC LIMITS
(PDBT) = 2,5-Dibromotoluene	(60-140)	(60-140)
(FDBT) = 2,5-Dibromotoluene	(60-140)	(60-140)

Prep Method: METHOD
Log Number Range: 12-16916 to 12-16922

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
VPH by Method WA VPH
Page 1 of 1

Sample ID: LCS-090712
LCS/LCSD

Lab Sample ID: LCS-090712
LIMS ID: 12-16916
Matrix: Soil
Data Release Authorized: MW
Reported: 09/14/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 09/07/12 10:16
Date Analyzed LCSD: 09/07/12 10:45
Instrument/Analyst: PID1/JLW

Purge Volume: 10 mL
Sample Amount: 111 mg-dry-wt

Analyte/Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	1840	1800	102%	1760	1800	97.8%	4.4%
Toluene	1870	1800	104%	1760	1800	97.8%	6.1%
Ethylbenzene	1930	1800	107%	1820	1800	101%	5.9%
m,p-Xylene	3820	3600	106%	3580	3600	99.4%	6.5%
o-Xylene	1900	1800	106%	1770	1800	98.3%	7.1%
Methyl tert-Butyl Ether	1760	1800	97.8%	1690	1800	93.9%	4.1%
Naphthalene	1800	1800	100%	1680	1800	93.3%	6.9%
1,2,3-Trimethylbenzene	1980	1800	110%	1840	1800	102%	7.3%
1-Methylnaphthalene	2320	1800	129%	2330	1800	129%	0.4%
n-Pentane	2130	1800	118%	2040	1800	113%	4.3%
n-Hexane	1910	1800	106%	1830	1800	102%	4.3%
n-Octane	1790	1800	99.4%	1670	1800	92.8%	6.9%
n-Decane	1660	1800	92.2%	1590	1800	88.3%	4.3%
n-Dodecane	1940	1800	108%	1890	1800	105%	2.6%

Values reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.

VPH Surrogate Recovery

	LCS	LCSD
PID: 2,5-Dibromotoluene	106%	103%
FID: 2,5-Dibromotoluene	97.4%	95.8%

FORM III

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
VPH by Method WA VPH
Page 1 of 1

Sample ID: MB-090712
METHOD BLANK

Lab Sample ID: MB-090712
LIMS ID: 12-16916
Matrix: Soil
Data Release Authorized: Mw
Reported: 09/14/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: NA
Date Received: NA

Date Analyzed: 09/07/12 11:15
Instrument/Analyst: PID1/JLW

Purge Volume: 10 mL
Sample Amount: 111 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	450	< 450 U
108-88-3	Toluene	450	< 450 U
100-41-4	Ethylbenzene	450	< 450 U
179601-23-1	m,p-Xylene	900	< 900 U
95-47-6	o-Xylene	450	< 450 U
1634-04-4	Methyl tert-Butyl Ether	450	< 450 U
109-66-0	n-Pentane	450	< 450 U
110-54-3	n-Hexane	450	< 450 U
111-65-9	n-Octane	450	< 450 U
124-18-5	n-Decane	450	< 450 U
112-40-3	n-Dodecane	450	< 450 U

Range	RL	Result
C8-C10 Aromatics	4,500	< 4,500 U
C10-C12 Aromatics	4,500	< 4,500 U
C12-C13 Aromatics	4,500	< 4,500 U
C5-C6 Aliphatics	4,500	< 4,500 U
C6-C8 Aliphatics	4,500	< 4,500 U
C8-C10 Aliphatics	4,500	< 4,500 U
C10-C12 Aliphatics	4,500	< 4,500 U

Values reported in µg/kg (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	114%
FID: 2,5-Dibromotoluene	99.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CMS-08302012-9
SAMPLE

Lab Sample ID: VI35F
LIMS ID: 12-16915
Matrix: Soil
Data Release Authorized:
Reported: 09/11/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Percent Total Solids: 81.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	09/07/12	6010C	09/10/12	7440-38-2	Arsenic	6	6	U
3050B	09/07/12	6010C	09/10/12	**7440-47-3**	**Chromium**	0.6	**91.7**	
3050B	09/07/12	6010C	09/10/12	**7440-50-8**	**Copper**	0.2	**15.8**	
3050B	09/07/12	6010C	09/10/12	**7439-92-1**	**Lead**	2	**3**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

FORM-I

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CMS-08302012-14
SAMPLE

Lab Sample ID: VI35H
LIMS ID: 12-16917
Matrix: Soil
Data Release Authorized
Reported: 09/11/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Percent Total Solids: 54.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	09/07/12	6010C	09/10/12	7440-38-2	Arsenic	9	9	U
3050B	09/07/12	6010C	09/10/12	**7440-47-3**	**Chromium**	0.9	**29.1**	
3050B	09/07/12	6010C	09/10/12	**7440-50-8**	**Copper**	0.4	**15.8**	
3050B	09/07/12	6010C	09/10/12	**7439-92-1**	**Lead**	4	**15**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

FORM-I

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CMS-08302012-23
SAMPLE

Lab Sample ID: VI35J
LIMS ID: 12-16919
Matrix: Soil
Data Release Authorized:
Reported: 09/11/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Percent Total Solids: 56.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	09/07/12	6010C	09/10/12	7440-38-2	Arsenic	9	9	U
3050B	09/07/12	6010C	09/10/12	**7440-47-3**	**Chromium**	0.9	**41.0**	
3050B	09/07/12	6010C	09/10/12	**7440-50-8**	**Copper**	0.3	**15.1**	
3050B	09/07/12	6010C	09/10/12	**7439-92-1**	**Lead**	3	**17**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CMS-08302012-24
SAMPLE

Lab Sample ID: VI35K
LIMS ID: 12-16920
Matrix: Soil
Data Release Authorized:
Reported: 09/11/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Percent Total Solids: 65.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	09/07/12	6010C	09/10/12	7440-38-2	Arsenic	7	7	U
3050B	09/07/12	6010C	09/10/12	**7440-47-3**	**Chromium**	0.7	**38.9**	
3050B	09/07/12	6010C	09/10/12	**7440-50-8**	**Copper**	0.3	**27.1**	
3050B	09/07/12	6010C	09/10/12	**7439-92-1**	**Lead**	3	**27**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CMS-08302012-26
SAMPLE

Lab Sample ID: VI35L
LIMS ID: 12-16921
Matrix: Soil
Data Release Authorized:
Reported: 09/11/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

Percent Total Solids: 59.5%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	09/07/12	6010C	09/10/12	**7440-38-2**	**Arsenic**	8	**10**	
3050B	09/07/12	6010C	09/10/12	**7440-47-3**	**Chromium**	0.8	**89.6**	
3050B	09/07/12	6010C	09/10/12	**7440-50-8**	**Copper**	0.3	**17.0**	
3050B	09/07/12	6010C	09/10/12	**7439-92-1**	**Lead**	3	**15**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

FORM-I

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CMS-08302012-9
MATRIX SPIKE

Lab Sample ID: VI35F
LIMS ID: 12-16915
Matrix: Soil
Data Release Authorized:
Reported: 09/11/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010C	6 U	237	242	97.9%	
Chromium	6010C	91.7	96.3	60.5	7.6%	N
Copper	6010C	15.8	81.6	60.5	109%	
Lead	6010C	3	229	242	93.4%	

Reported in mg/kg-dry

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CMS-08302012-9
DUPLICATE

Lab Sample ID: VI35F
LIMS ID: 12-16915
Matrix: Soil
Data Release Authorized:
Reported: 09/11/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 08/30/12
Date Received: 09/05/12

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	**Analysis Method**	**Sample**	**Duplicate**	**RPD**	**Control Limit**	**Q**
Arsenic	6010C	6 U	6 U	0.0%	+/- 6	L
Chromium	6010C	91.7	42.7	72.9%	+/- 20%	*
Copper	6010C	15.8	15.2	3.9%	+/- 20%	
Lead	6010C	3	4	28.6%	+/- 2	L

Reported in mg/kg-dry

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: VI35LCS
LIMS ID: 12-16917
Matrix: Soil
Data Release Authorized:
Reported: 09/11/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	201	200	100%	
Chromium	6010C	48.8	50.0	97.6%	
Copper	6010C	48.6	50.0	97.2%	
Lead	6010C	195	200	97.5%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: METHOD BLANK

Lab Sample ID: VI35MB
LIMS ID: 12-16917
Matrix: Soil
Data Release Authorized:
Reported: 09/11/12

QC Report No: VI35-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	09/07/12	6010C	09/10/12	7440-38-2	Arsenic	5	5	U
3050B	09/07/12	6010C	09/10/12	7440-47-3	Chromium	0.5	0.5	U
3050B	09/07/12	6010C	09/10/12	7440-50-8	Copper	0.2	0.2	U
3050B	09/07/12	6010C	09/10/12	7439-92-1	Lead	2	2	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

Analytical Resources, Incorporated
Analytical Chemists and Consultants

October 15, 2012

Adam Neff
RH2 Engineering, Inc.
300 Simon Street SE
Suite #5
East Wenatchee, WA 98802-7720

RE: Client Project: Cashmere Mill Site
ARI Job No.: VL47

Dear Adam:

Please find enclosed the original Chain of Custody record (COC), sample receipt documentation, and the final results for the project referenced above. Analytical Resources, Inc. (ARI) accepted one water sample and a trip blank on September 28, 2012 under ARI job VL47. For further details regarding sample receipt, please refer to the enclosed Cooler Receipt Form.

The sample was analyzed for Semivolatiles, NWTPH-Dx, NWTPH-Gx/BETX, and Total Metals, as requested.

There were no anomalies associated with the analyses of this sample.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please feel free to contact me at your convenience.

Respectfully,
ANALYTICAL RESOURCES, INC.

Cheronne Oreiro
Project Manager
(206) 695-6214
cheronneo@arilabs.com
www.arilabs.com

cc: eFile VL47

Enclosures

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: ~~VL25~~ VL47	Turn-around Requested: 2-week
ARI Client Company: RH2 Engineering	Phone: 509-886-6774
Client Contact: Adam Neff	
Client Project Name: Cashmere Mill site	
Client Project #:	Samplers: AN

Page: 1	of 1	
Date: 9-27-12	Ice Present? y	
No. of Coolers: 1	Cooler Temps: 0.6	

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: NWTPH-Gx/BTX	NWTPh-Dx	Metals						Notes/Comments
CMS-20120927-1	9-27-12	1pm	water	8	X	X	X						retain samples don't dispose

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Adam Neff	Printed Name: Jennifer Millsap	Printed Name:	Printed Name:
	Company: RH2	Company: ARI	Company:	Company:
	Date & Time: 9-27-12 14:00	Date & Time: 9/28/12 945	Date & Time:	Date & Time:

VL47 : 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: RHZ Engineering
COC No(s): ______ NA
Assigned ARI Job No: VL47

Project Name: Cashmere Mill Site
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: ______
Tracking No: 8735 8129 7518 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)........ 0.6
If cooler temperature is out of compliance fill out form 00070F
Temp Gun ID#: 90877952
Cooler Accepted by: JM Date: 9/28/12 Time: 945

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 9/13/12
Was Sample Split by ARI: NA YES Date/Time: ______ Equipment: ______ Split by: ______

Samples Logged by: JM Date: 10/1/12 Time: 1215

***** 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:

CMS-20120927-1 = sm in 3 of 4
Trip Blank = sm in 1 of 2

By: JM Date: 10/1/12

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm	
			Small → "sm"
			Peabubbles → "pb"
			Large → "lg"
			Headspace → "hs"

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: VL47
Client: RH2 Engineering
Project Event: N/A
Project Name: Cashmere Mill Site

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CMS-20120927-1	VL47A	12-18899	Water	09/27/12 13:00	09/28/12 09:45
2.	Trip Blank	VL47B	12-18900	Water	09/27/12	09/28/12 09:45

PRESERVATION VERIFICATION 10/01/12

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **VL47**

Inquiry Number: NONE
Analysis Requested: 10/01/12
Contact: Neff, Adam
Client: RH2 Engineering
Logged by: JM
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Cheronne
VTSR: 09/28/12

Project #:
Project: Cashmere Mill Site
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
12-18899 **VL47A**	CMS-20120927-1						TOT pass															

Checked By JM Date 10/1/12

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C

Sample ID: CMS-20120927-1
SAMPLE

Lab Sample ID: VL47A
LIMS ID: 12-18899
Matrix: Water
Data Release Authorized:
Reported: 10/11/12

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site
NA
Date Sampled: 09/27/12
Date Received: 09/28/12

Date Extracted: 10/03/12
Date Analyzed: 10/10/12 23:11
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
95-48-7	2-Methylphenol	1.0	< 1.0 U
106-44-5	4-Methylphenol	2.0	< 2.0 U
120-83-2	2,4-Dichlorophenol	3.0	< 3.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
88-06-2	2,4,6-Trichlorophenol	3.0	< 3.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	3.0	< 3.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	5.0	< 5.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	75.6%	2-Fluorobiphenyl	69.6%
d14-p-Terphenyl	71.2%	d4-1,2-Dichlorobenzene	60.8%
d5-Phenol	72.8%	2-Fluorophenol	79.7%
2,4,6-Tribromophenol	91.7%	d4-2-Chlorophenol	72.5%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-100312	79.6%	73.2%	81.2%	63.2%	76.3%	81.9%	86.7%	76.5%	0
LCS-100312	73.6%	69.6%	75.2%	58.8%	67.7%	73.9%	85.3%	73.3%	0
LCSD-100312	72.4%	69.6%	74.4%	57.2%	68.8%	71.5%	88.3%	70.4%	0
CMS-20120927-1	75.6%	69.6%	71.2%	60.8%	72.8%	79.7%	91.7%	72.5%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(50-100)	(34-101)
(FBP) = 2-Fluorobiphenyl	(51-100)	(38-100)
(TPH) = d14-p-Terphenyl	(54-117)	(27-122)
(DCB) = d4-1,2-Dichlorobenzene	(40-100)	(27-100)
(PHL) = d5-Phenol	(15-121)	(16-106)
(2FP) = 2-Fluorophenol	(33-100)	(23-100)
(TBP) = 2,4,6-Tribromophenol	(46-125)	(31-128)
(2CP) = d4-2-Chlorophenol	(46-102)	(33-100)

Prep Method: SW3520C
Log Number Range: 12-18899 to 12-18899

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: LCS-100312
LCS/LCSD

Lab Sample ID: LCS-100312
LIMS ID: 12-18899
Matrix: Water
Data Release Authorized:
Reported: 10/11/12

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 09/27/12
Date Received: 09/28/12

Date Extracted LCS/LCSD: 10/03/12

Sample Amount LCS: 500 mL
LCSD: 500 mL

Date Analyzed LCS: 10/10/12 21:29
LCSD: 10/10/12 22:03
Instrument/Analyst LCS: NT6/JZ
LCSD: NT6/JZ
GPC Cleanup: NO

Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
2-Methylphenol	15.2	25.0	60.8%	16.5	25.0	66.0%	8.2%
4-Methylphenol	33.0	50.0	66.0%	35.4	50.0	70.8%	7.0%
2,4-Dichlorophenol	57.4	75.0	76.5%	60.2	75.0	80.3%	4.8%
Naphthalene	15.6	25.0	62.4%	16.2	25.0	64.8%	3.8%
2-Methylnaphthalene	13.1	25.0	52.4%	13.8	25.0	55.2%	5.2%
2,4,6-Trichlorophenol	59.5	75.0	79.3%	64.6	75.0	86.1%	8.2%
2,4,5-Trichlorophenol	64.8	75.0	86.4%	68.6	75.0	91.5%	5.7%
Acenaphthylene	16.5	25.0	66.0%	17.8	25.0	71.2%	7.6%
Acenaphthene	16.0	25.0	64.0%	17.0	25.0	68.0%	6.1%
Dibenzofuran	14.5	25.0	58.0%	15.6	25.0	62.4%	7.3%
Fluorene	16.3	25.0	65.2%	17.5	25.0	70.0%	7.1%
Pentachlorophenol	64.8	75.0	86.4%	70.7	75.0	94.3%	8.7%
Phenanthrene	17.6	25.0	70.4%	18.7	25.0	74.8%	6.1%
Anthracene	15.8	25.0	63.2%	17.3	25.0	69.2%	9.1%
Fluoranthene	17.5	25.0	70.0%	19.3	25.0	77.2%	9.8%
Pyrene	18.4	25.0	73.6%	18.7	25.0	74.8%	1.6%
Benzo(a)anthracene	17.1	25.0	68.4%	18.6	25.0	74.4%	8.4%
bis(2-Ethylhexyl)phthalate	18.8	25.0	75.2%	20.4	25.0	81.6%	8.2%
Chrysene	16.9	25.0	67.6%	18.2	25.0	72.8%	7.4%
Benzo(a)pyrene	14.7	25.0	58.8%	16.6	25.0	66.4%	12.1%
Indeno(1,2,3-cd)pyrene	18.2	25.0	72.8%	19.3	25.0	77.2%	5.9%
Dibenz(a,h)anthracene	14.9	25.0	59.6%	16.2	25.0	64.8%	8.4%
Benzo(g,h,i)perylene	18.4	25.0	73.6%	19.2	25.0	76.8%	4.3%
1-Methylnaphthalene	18.7	25.0	74.8%	20.1	25.0	80.4%	7.2%
Total Benzofluoranthenes	33.6	50.0	67.2%	36.5	50.0	73.0%	8.3%

Semivolatile Surrogate Recovery

	LCS	LCSD
d5-Nitrobenzene	73.6%	72.4%
2-Fluorobiphenyl	69.6%	69.6%
d14-p-Terphenyl	75.2%	74.4%
d4-1,2-Dichlorobenzene	58.8%	57.2%
d5-Phenol	67.7%	68.8%
2-Fluorophenol	73.9%	71.5%
2,4,6-Tribromophenol	85.3%	88.3%
d4-2-Chlorophenol	73.3%	70.4%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MB-100312
METHOD BLANK

Lab Sample ID: MB-100312
LIMS ID: 12-18899
Matrix: Water
Data Release Authorized:
Reported: 10/11/12

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 10/03/12
Date Analyzed: 10/10/12 20:54
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
95-48-7	2-Methylphenol	1.0	< 1.0 U
106-44-5	4-Methylphenol	2.0	< 2.0 U
120-83-2	2,4-Dichlorophenol	3.0	< 3.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
88-06-2	2,4,6-Trichlorophenol	3.0	< 3.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	3.0	< 3.0 U
218-01-9	Chrysene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	5.0	< 5.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	79.6%	2-Fluorobiphenyl	73.2%
d14-p-Terphenyl	81.2%	d4-1,2-Dichlorobenzene	63.2%
d5-Phenol	76.3%	2-Fluorophenol	81.9%
2,4,6-Tribromophenol	86.7%	d4-2-Chlorophenol	76.5%

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: VL47-RH2 Engineering
Project: Cashmere Mill Site

Matrix: Water

Date Received: 09/28/12

Data Release Authorized: MW
Reported: 10/05/12

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	RL	Result
MB-100312 12-18899	Method Blank HC ID: ---	10/03/12	10/04/12 FID4A	1.00 1.0	Diesel Range Motor Oil Range o-Terphenyl	0.10 0.20	< 0.10 U < 0.20 U 85.8%
VL47A 12-18899	CMS-20120927-1 HC ID: ---	10/03/12	10/04/12 FID4A	1.00 1.0	Diesel Range Motor Oil Range o-Terphenyl	0.10 0.20	< 0.10 U < 0.20 U 84.0%

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.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site

Client ID	OTER	TOT OUT
MB-100312	85.8%	0
LCS-100312	92.9%	0
LCSD-100312	86.5%	0
CMS-20120927-1	84.0%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 12-18899 to 12-18899

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID

Sample ID: LCS-100312
LCS/LCSD

Lab Sample ID: LCS-100312
LIMS ID: 12-18899
Matrix: Water
Data Release Authorized: Mw
Reported: 10/05/12

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 10/03/12

Sample Amount LCS: 500 mL
LCSD: 500 mL

Date Analyzed LCS: 10/04/12 12:58
LCSD: 10/04/12 13:20
Instrument/Analyst LCS: FID4A/VTS
LCSD: FID4A/VTS

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	2.52	3.00	84.0%	2.63	3.00	87.7%	4.3%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	92.9%	86.5%

Results reported in mg/L
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: VL47
Matrix: Water
Project: Cashmere Mill Site
Date Received: 09/28/12

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
12-18899-100312MB1	Method Blank	500 mL	1.00 mL	10/03/12
12-18899-100312LCS1	Lab Control	500 mL	1.00 mL	10/03/12
12-18899-100312LCSD1	Lab Control Dup	500 mL	1.00 mL	10/03/12
12-18899-VL47A	CMS-20120927-1	500 mL	1.00 mL	10/03/12

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG

Sample ID: CMS-20120927-1
SAMPLE

Lab Sample ID: VL47A
LIMS ID: 12-18899
Matrix: Water
Data Release Authorized:
Reported: 10/08/12

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site
Event: NA
Date Sampled: 09/27/12
Date Received: 09/28/12

Date Analyzed: 10/01/12 15:30
Instrument/Analyst: PID2/JLW

Purge Volume: 5.0 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	1.0	< 1.0 U	
108-88-3	Toluene	1.0	< 1.0 U	
100-41-4	Ethylbenzene	1.0	< 1.0 U	
179601-23-1	m,p-Xylene	2.0	< 2.0 U	
95-47-6	o-Xylene	1.0	< 1.0 U	
	Gasoline Range Hydrocarbons	0.25	< 0.25 U	---

BETX Surrogate Recovery	
Trifluorotoluene	112%
Bromobenzene	110%

Gasoline Surrogate Recovery	
Trifluorotoluene	110%
Bromobenzene	100%

BETX values reported in µg/L (ppb)
Gasoline values reported in mg/L (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: Trip Blank
SAMPLE

Lab Sample ID: VL47B
LIMS ID: 12-18900
Matrix: Water
Data Release Authorized:
Reported: 10/08/12

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site
Event: NA
Date Sampled: 09/27/12
Date Received: 09/28/12

Date Analyzed: 10/01/12 14:33
Instrument/Analyst: PID2/JLW

Purge Volume: 5.0 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	1.0	< 1.0 U	
108-88-3	Toluene	1.0	< 1.0 U	
100-41-4	Ethylbenzene	1.0	< 1.0 U	
179601-23-1	m,p-Xylene	2.0	< 2.0 U	
95-47-6	o-Xylene	1.0	< 1.0 U	
	Gasoline Range Hydrocarbons	0.25	< 0.25 U	---

BETX Surrogate Recovery

Trifluorotoluene	110%
Bromobenzene	106%

Gasoline Surrogate Recovery

Trifluorotoluene	106%
Bromobenzene	99.6%

BETX values reported in µg/L (ppb)
Gasoline values reported in mg/L (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

ANALYTICAL RESOURCES INCORPORATED

TPHG WATER SURROGATE RECOVERY SUMMARY

ARI Job: VL47
Matrix: Water

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site
Event: NA

Client ID	TFT	BBZ	TOT OUT
MB-100112	101%	98.4%	0
LCS-100112	104%	98.8%	0
LCSD-100112	103%	98.5%	0
CMS-20120927-1	110%	100%	0
Trip Blank	106%	99.6%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(80-120)
(BBZ) = Bromobenzene	(80-120)	(80-120)

Log Number Range: 12-18899 to 12-18900

ANALYTICAL RESOURCES INCORPORATED

BETX WATER SURROGATE RECOVERY SUMMARY

ARI Job: VL47
Matrix: Water

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site
Event: NA

Client ID	TFT	BBZ	TOT OUT
MB-100112	105%	109%	0
LCS-100112	114%	111%	0
LCSD-100112	109%	110%	0
CMS-20120927-1	112%	110%	0
Trip Blank	110%	106%	0

		LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(5 mL PV)	(80-120)	(80-120)
(TFT) = Trifluorotoluene	(15 mL PV)	(79-120)	(80-120)
(BBZ) = Bromobenzene	(5 mL PV)	(80-120)	(77-120)
(BBZ) = Bromobenzene	(15 mL PV)	(79-120)	(80-120)

Log Number Range: 12-18899 to 12-18900

FORM II BETX

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod

Sample ID: LCS-100112
LAB CONTROL SAMPLE

Lab Sample ID: LCS-100112
LIMS ID: 12-18899
Matrix: Water
Data Release Authorized:
Reported: 10/08/12

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 10/01/12 12:50
LCSD: 10/01/12 13:19
Instrument/Analyst LCS: PID2/JLW
LCSD: PID2/JLW

Purge Volume: 5.0 mL

Dilution Factor LCS: 1.0
LCSD: 1.0

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	4.19	3.70	113%	3.22	3.70	87.0%	26.2%
Toluene	46.8	39.6	118%	45.3	39.6	114%	3.3%
Ethylbenzene	12.5	11.6	108%	11.1	11.6	95.7%	11.9%
m,p-Xylene	47.4	42.5	112%	44.2	42.5	104%	7.0%
o-Xylene	22.0	19.2	115%	20.2	19.2	105%	8.5%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	114%	109%
Bromobenzene	111%	110%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: LCS-100112
LAB CONTROL SAMPLE

Lab Sample ID: LCS-100112
LIMS ID: 12-18899
Matrix: Water
Data Release Authorized:
Reported: 10/08/12

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 10/01/12 12:50
LCSD: 10/01/12 13:19
Instrument/Analyst LCS: PID2/JLW
LCSD: PID2/JLW

Purge Volume: 5.0 mL

Dilution Factor LCS: 1.0
LCSD: 1.0

Analyte	**LCS**	**Spike Added-LCS**	**LCS Recovery**	**LCSD**	**Spike Added-LCSD**	**LCSD Recovery**	**RPD**
Gasoline Range Hydrocarbons	1.14	1.00	114%	1.11	1.00	111%	2.7%

Reported in mg/L (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	**LCSD**
Trifluorotoluene	104%	103%
Bromobenzene	98.8%	98.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: MB-100112
METHOD BLANK

Lab Sample ID: MB-100112
LIMS ID: 12-18899
Matrix: Water
Data Release Authorized:
Reported: 10/08/12

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site
Event: NA
Date Sampled: NA
Date Received: NA

Date Analyzed: 10/01/12 13:47
Instrument/Analyst: PID2/JLW

Purge Volume: 5.0 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result	GAS ID
71-43-2	Benzene	1.0	< 1.0 U	
108-88-3	Toluene	1.0	< 1.0 U	
100-41-4	Ethylbenzene	1.0	< 1.0 U	
179601-23-1	m,p-Xylene	2.0	< 2.0 U	
95-47-6	o-Xylene	1.0	< 1.0 U	
	Gasoline Range Hydrocarbons	0.25	< 0.25 U	---

BETX Surrogate Recovery

Trifluorotoluene	105%
Bromobenzene	109%

Gasoline Surrogate Recovery

Trifluorotoluene	101%
Bromobenzene	98.4%

BETX values reported in µg/L (ppb)
Gasoline values reported in mg/L (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CMS-20120927-1
SAMPLE

Lab Sample ID: VL47A
LIMS ID: 12-18899
Matrix: Water
Data Release Authorized:
Reported: 10/11/12

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: 09/27/12
Date Received: 09/28/12

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	10/02/12	200.8	10/09/12	**7440-38-2**	**Arsenic**	0.2	**2.0**	
200.8	10/02/12	200.8	10/10/12	7440-47-3	Chromium	0.5	0.5	U
200.8	10/02/12	200.8	10/09/12	**7440-50-8**	**Copper**	0.5	**3.0**	
200.8	10/02/12	200.8	10/09/12	**7439-92-1**	**Lead**	0.1	**1.4**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: VL47LCS
LIMS ID: 12-18899
Matrix: Water
Data Release Authorized:
Reported: 10/11/12

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	200.8	27.1	25.0	108%	
Chromium	200.8	23.3	25.0	93.2%	
Copper	200.8	25.6	25.0	102%	
Lead	200.8	27.1	25.0	108%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: VL47MB
LIMS ID: 12-18899
Matrix: Water
Data Release Authorized:
Reported: 10/11/12

QC Report No: VL47-RH2 Engineering
Project: Cashmere Mill Site

Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	10/02/12	200.8	10/09/12	7440-38-2	Arsenic	0.2	0.2	U
200.8	10/02/12	200.8	10/10/12	7440-47-3	Chromium	0.5	0.5	U
200.8	10/02/12	200.8	10/09/12	7440-50-8	Copper	0.5	0.5	U
200.8	10/02/12	200.8	10/09/12	7439-92-1	Lead	0.1	0.1	U

U-Analyte undetected at given RL
RL-Reporting Limit

ATTACHMENT E

SOIL DISPOSAL TICKETS

WASTE MANAGEMENT

Greater Wenatchee Regional Landfill
191 Webb Road
Wenatchee, WA, 98802
Ph: (509) 884-2802

Original
Ticket# 658953

Customer Name SELLAND CONSTRUCTION SELLAND
Ticket Date 04/26/2012
Payment Type Credit Account
Manual Ticket#
Route
Hauling Ticket#
Destination
PO# 1109-81130

Carrier SELLAND SELLAND
Vehicle# 0
Container
Driver
Check#
Billing# 0227322
Grid

Volume

	Time	Scale	Operator	Inbound
In	04/26/2012 12:29:07	Inbound	cmorris	
Out	04/26/2012 12:54:18	Outbound	cmorris	

Gross	98420 lb
Tare	39720 lb
Net	58700 lb
Tons	29.35

Comments

I acknowledge I have no hazardous materials.

Product		LD%	Qty	UOM	Rate	Tax	Amount	Origin
1	Cont Soil Pet-RGC-Tons-C	100	29.35	Tons	56.00	59.17	$1643.60	CHELAN
2	ENVFEE$7.28-Env Fee $7.2	100	29.35	Tons	7.28		$213.67	CHELAN

PCS

Total Tax $59.17
Total Ticket $1916.44

Driver's Signature

203 WM

WASTE MANAGEMENT

Greater Wenatchee Regional Landfill
191 Webb Road
Wenatchee, WA, 98802 Ph: (509) 884-2802

Original
Ticket# 653978

Customer Name SELLAND CONSTRUCTION SELLAND
Ticket Date 01/16/2012
Payment Type Credit Account
Manual Ticket#
Route
Hauling Ticket#
Destination
PO# 1109-81130

Carrier SELLAND SELLAND
Vehicle# 0
Container
Driver
Check#
Billing# 0227322
Grid

Volume

	Time	Scale	Operator	Inbound
In	01/16/2012 14:13:17	Scale2	cmorris	
Out	01/16/2012 14:28:16	Scale2	cmorris	

Gross	119780 lb
Tare	39080 lb
Net	80700 lb
Tons	40.35

Comments

I acknowledge I have no hazardous materials.

	Product	LD%	Qty	UOM	Rate	Tax	Amount	Origin
1	Cont Soil Pet-RGC-Tons-C	100	40.35	Tons	56.00	81.35	$2259.60	CHELAN
2	ENVFEE$7.28-Env Fee $7.2	100	40.35	Tons	7.28		$293.75	CHELAN

PCS

Total Tax $81.35
Total Ticket $2634.70

Driver's Signature

203 WM

WASTE MANAGEMENT

Greater Wenatchee Regional Landfill
191 Webb Road
Wenatchee, WA, 98802

Ph: (509) 884-2802

Original
Ticket# 652966

Customer Name SELLAND CONSTRUCTION SELLAND
Ticket Date 01/16/2012
Payment Type Credit Account
Manual Ticket#
Route
Hauling Ticket#
Destination
PO# 1109-B1130

Carrier SELLAND SELLAND
Vehicle# 0
Container
Driver
Check#
Billing# 0227322
Grid

Volume

	Time	Scale	Operator
In	01/16/2012 12:07:34	Scale2	cmorris
Out	01/16/2012 12:20:23	Scale2	cmorris

Inbound

Gross	108980 lb
Tare	39280 lb
Net	69700 lb
Tons	34.85

1109

Comments

I acknowledge I have no hazardous materials.

	Product	LD%	Qty	UOM	Rate	Tax	Amount	Origin
1	Cont Soil Pet-RGC-Tons-C	100	34.85	Tons	56.00	70.26	$1951.60	CHELAN
2	ENVFEE$7.28-Env Fee $7.2	100	34.85	Tons	7.28		$253.71	CHELAN

PCS

Total Tax $70.26
Total Ticket $2275.57

Driver's Signature

203 WM

ATTACHMENT F

SOIL AND GROUNDWATER CHARACTERIZATION WORK PLAN

Port of Chelan County Former Mill Site

Wood Waste, Soil and Groundwater Characterization Plan

Prepared for Port of Chelan County

RH2 Engineering, Inc.
September 2012

Port of Chelan County
Former Mill Site
Wood Waste, Soil and Groundwater
Characterization Plan

The information contained in this plan was prepared by and under the direct supervision of the undersigned.

Signed: 8/21/2012	Signed: 8/21/2012	Signed: 8/21/2012
Randy L. Asplund, P.E. Principal	Karen Kornher, P.E. Project Manager	Steve Nelson Licensed Hydrogeolgist

RH2 Engineering, Inc.
September 2012

Creative Ideas
Innovative Solutions
Quality Service

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Goals and Objectives

This Wood Waste, Soil, and Groundwater Characterization Plan (Plan) will be conducted by the Port of Chelan County (Port) to evaluate the wood waste, soil, and groundwater quality at the Port's former mill site (Site) in Cashmere, Washington. This Plan meets the requirements of Chapter 173-340 WAC and follows the discussions between the Port and the Washington State Department of Ecology (Ecology). This Plan evaluates the characteristics of wood waste in areas previously unexplored at the Site, the extent of total petroleum hydrocarbons (TPH) in soil in areas where TPH has been previously detected and the groundwater quality in the uppermost aquifer below the Site in areas where TPH has been previously detected.

The results of the investigations and data analyses to be performed (outlined in this Plan) will support any necessary remedial actions necessary to obtain a determination of no further action for soil and groundwater at the Site from Ecology through the Voluntary Cleanup Program (VCP). Wood waste and soil will be characterized through shallow test pit exploration, and groundwater quality will be evaluated using existing and new groundwater monitoring wells constructed at the Site. The duration of periodic groundwater monitoring will depend on the soil evaluation results and initial groundwater characterization results.

Data Quality Objectives

The wood waste, soil, and groundwater quality data generated from implementing this Plan will be used to establish the nature and extent of any residual TPH in wood waste, soil, and/or groundwater, and screen in-situ wood waste for the presence of typical wood treatment chemicals. If necessary, Groundwater characterization will include obtaining sufficient information to establish natural background conditions for potential contaminants of concern, evaluate potential manmade effects on natural background conditions and compare on-site groundwater water quality conditions to groundwater quality criteria. Obtaining valid wood waste and soil data that will meet these objectives will depend on achieving consistent and accurate results that reflect the variable distribution of wood waste placement at the site and the apparently localized distribution of TPH in soil from historical spills. Obtaining valid groundwater data that will meet these objectives will depend on achieving consistent and accurate results that reflect the seasonally variable natural conditions while minimizing errors from sampling and analysis. Sampling methods, documentation of field activities and laboratory analysis to ensure data quality objectives are described in the Sampling Analysis Project Plan/Quality Assurance Project Plan (SAPP/QAPP) in **Appendix A** of this Plan.

Study Area Location and Description

The Site is located within the City of Cashmere, along Mill Road and Sunset Highway (see **Figure 1**). The Site is approximately 32.5 acres in size, bounded to the north by the Burlington Northern Santa Fe (BNSF) railroad tracks, to the east, south, and partially to the west by Brender Creek, and partially to the west by residential and light industrial uses. The northern boundary of the property, along the railroad tracks, is less than 100 feet from the Wenatchee River.

Site History and Operation

The Site was used for a variety of functions most notably lumber milling from the 1940s until late 1970s (Environmental Assessment, RH2, 2007). Construction of the Great Northern Railroad in the early 1900s resulted in a realignment of the Wenatchee River to the north of the site. The river had historically occupied a meander extending south and east of the site. Brender Creek now flows along this old meander (Geological Report, RH2, 2007).

The site has had several owners since the mill on the site stopped operations in the 1970's. The Cedarbrook Company, owned by Mr. John Lysaker, bought the property in 1990 from WI Forest Products, and sold the property to the Port in 2007.

Based on anecdotal information, this property has never been used for agriculture (Environmental Assessment, RH2, 2007).

Previous Reports and Studies

In 1990, a Phase 1 Environmental Site Assessment was performed by Forsgren and Associates, Inc., prior to the purchase of the property by Mr. John Lysaker of the Cedarbrook Company (Letter, Forsgren and Associates, Inc., 1990; Environmental Assessment, RH2, 2007). This assessment discovered evidence of *de minimis* soil contamination from lubrication oils at several locations south of Mill Road, and concluded that the contamination was likely only in the upper 6 inches of soil. The area between Sunset Highway and Mill Road was reportedly almost completely paved with either asphalt or cement/concrete and therefore, any minor spills that occurred in the area would not likely have led to contamination of the underlying soil. Underground storage tanks were observed and a recommendation was made to remove them or bring them up to code. Communications with Mr. Lysaker indicates all the items identified in the Forsgren Environmental Assessment were remedied prior to or immediately following his purchase of the property. Documentation of these actions was either not prepared or was lost in a large fire that occurred on the Site in 2000 and therefore, could not be verified for this Plan.

In 2007, the Port purchased the Site from the Cedarbrook Company. A feasibility report was completed by RH2 prior to the purchase. The feasibility report included a limited environmental assessment and a geologic report (RH2, 2007). The geologic report helped to characterize the wood waste composition and distribution, and is summarized later in this Plan. The environmental assessment, through a detailed historical review, including interviews with several knowledgeable community members and a limited subsurface exploration south of mill road, was able to establish the existence of several mill related structures and the former uses and purposes but was unable to identify any evidence of existing contamination.

From 2009 to 2011, the Port completed a series of projects to improve the Site. The projects included removing existing asphalt paved areas, and concrete slabs and footings found throughout the site, primarily in the area between Mill Road and Sunset Highway. These pavement materials were crushed and stockpiled for use as fill (the asphalt piles were sold and hauled off site). The two remaining buildings on site were treated for asbestos materials, and then demolished and hauled off the Site.

The Port also completed a limited wood waste removal project in the southeast portion of the site in 2010 and 2011. The Port hired a contractor to remove all surficial wood waste from an area approximately equal in volume to the crushed concrete piles. The contractor screened the wood waste, removing the larger rocks and wood pieces, then sold the remaining material as landscape material. The crushed concrete was used as fill to replace the removed wood waste.

The Port contracted GeoEngineers, Inc., in 2010 to perform a detailed geotechnical evaluation of the Site as part of the Port's redevelopment plans. GeoEngineers drilled nine borings and completed two borings as monitoring wells. The results are summarized in the following section.

RH2 performed a limited groundwater investigation in 2011 consisting of groundwater elevation measurements at several locations (Groundwater table investigation, Tech Memo, RH2, 2011). The depth to the water table ranged from 1.5 to 4.5 feet below the ground surface in the area south of Mill Rd and 2 to 5 feet below the ground surface between Mill Rd and Sunset Hwy. A groundwater contour map was produced as a result of this investigation.

Geologic Setting

In 2007, RH2 prepared a geologic report for the mill site as part of the initial feasibility study. This report characterized both the local and regional geologic setting through a literature review, personal communication, and field explorations. The following is an excerpt RH2's 2007 Geologic Report.

Regional Geology

The geology of the Cashmere area has been mapped by Tabor et al. (1987)(Figure 2). Their work indicates that the main geologic units exposed in the vicinity of the mill are unconsolidated Quaternary glacial and alluvial sediments and sedimentary bedrock of the Chumstick Formation. The Eocene Chumstick Formation underlies most of the Cashmere area and uplifted and folded beds of its sediments are visible in the hills north and south of Cashmere. This bedrock is described as white to buff-grey sandstone, shale and conglomerate. The closest mapped outcrop from the mill site is across the Wenatchee River, where Highway 2 has been cut through exposed bedrock.

A northwest-trending high angle fault is located a few hundred yards north of Highway 2. This fault forms a contact between the Chumstick formation and late Cretaceous Swakane biotite gneiss that is present only on the north side of the Wenatchee River.

More than 40 times during the most recent glacial period (20,000 to 13,000 years ago), catastrophic glacial outburst floods inundated most of the Columbia basin including the Columbia River valley. After many of these floods, flood waters were impounded by a massive gravel bar located downstream from Wenatchee, near the mouth of Moses Coulee Dam. This temporary dam created a large lake within the Columbia River valley that extended well into its tributary valleys, including the Wenatchee River. Pleistocene bedded silt deposits, described by Tabor et al. (1987) as ranging from very fine sand to clay with distinct interbeds and ice-rafted dropstones, were deposited in the relatively low-energy environment of the temporary glacial lake. Bedded silt deposits are mapped within 1 mile of the mill site.

Pleistocene terrace gravels, described as moderately sorted cobble to pebble gravel, form much of the relatively flat-lying land surface in the Cashmere area. The melting of alpine glaciers that advanced down the upper Wenatchee River valley during the last two glacial periods (between 150,000 and 130,000 years ago and also between 20,000 and 13,000 years ago), resulted in much larger flows in the Wenatchee River; the formation of braided outwash channels; and the transport of large volumes of sediment to the lower valley, partially filling the valley bottom with a broad plain of gravelly outwash. As the glaciers receded, the volume of sediment decreased and the Wenatchee River began to incise a channel into the outwash plain, leaving the gravel terraces perched 20 feet or more above the modern river channel. The Wenatchee River has meandered in this outwash plain, broadening its floodplain and depositing sediment. These Holocene and Pleistocene alluvial deposits of the Wenatchee River are described as moderately sorted cobble gravel. They grade into poorly sorted gravelly sands deposited in the alluvial fans of tributaries of the Wenatchee River like Mission Creek.

Site Geology

Pleistocene Deposits

The mill site is located in a bend in the former channel of the Wenatchee River. Geologic mapping (Tabor et al., 1987) indicates and test pits confirm that greater than 80 percent of the site is alluvium deposited by the Wenatchee River (Figure 2). The river bend was cut into an outwash terrace, forming a cut bank approximately 20 feet high south of Brender Creek. The outer edge of the river bend experienced the most energetic flows of the Wenatchee River and therefore, were scoured deeper than the inner regions of the bend. This was confirmed by test pit observations that indicate the alluvial surface is lower toward the outside of the bend (Figure 4). Geologic mapping (Tabor et al., 1987) indicates the terrace is comprised of glacial outwash gravels. These older gravels occupy less than 20 percent of the site (Figure 2). Because alluvium was deposited as the river channel incised the surrounding terraces, these outwash gravels might underlie alluvium in some places. However, similarities in lithology between alluvium and terrace gravels make it difficult to differentiate these units in the field.

Modern Deposits

Brender Creek flows across the mill site on top of the former river bed. The creek flows along the base of the river cut bank probably because this is the deepest part of the former river bed. Local residents indicate much of the region south of Mill Road was formerly occupied by ponds and bogs. The presence of these water features was likely the result of water from Brender Creek and shallow groundwater filling the deeper areas of the outer bend in the former river channel. Fine grained sediments containing substantial organic material were observed overlying alluvium in several test pits. These deposits may be associated with creek, ponds and bogs that occupied the area since the early 1900s until they were filled at various times throughout the twentieth century.

Fill

Mill operations produced substantial amounts of wood wastes that were used to fill in low-lying areas at the site. Additionally, interviews with several long-time Cashmere residents and the current owner indicate that fill was imported to the mill site for several decades. There are three primary areas that received fill: 1) south of Mill Road in the log storage area, 2) the mill pond north of Mill Road; and 3) the area north of Sunset Highway. In most places, fill was dumped directly on top of Wenatchee River alluvium. However, sediments were deposited by Brender Creek and in associated ponds since the early 1900s along the southern boundary of the mill site. Fill in this region likely overlies thin layers of these modern sediments.

Field observations indicate that the composition of the fill falls into four broad categories: 1) wood waste (Figure 5); 2) granular fill (sand, silt and gravel) with organic material, including logs; 3) granular fill (Figure 5); and 4) fill containing concrete or other building materials. Most of the fill observed during field work consists of well-preserved wood waste resembling "hog fuel" or granular fill containing wood waste. In Test Pit 1, about 5 feet of granular fill was observed overlying wood waste (Figure 5).

For a complete summary of the site geology, or for referencing the above mentioned figures refer to the RH2 Geologic Report (2007).

Hydrologic Setting

The Site is almost entirely bounded by water features including, the Wenatchee River to the north, and Brender Creek to the west, south, and east. The following excerpt is from the Geologic Report by RH2 in 2007:

> *Brender Creek, which now flows within the mill property in a long curving channel about 100 feet north of the southern property line, flowed directly to the Wenatchee River prior to construction of the railroad. Brender Creek's year-round flow around the mill site has raised the local groundwater table and helped create hydrologic conditions favorable for establishing wetlands. Brender Creek drains about 8 square miles and discharges to Mission Creek about 150 feet from the northeast corner of the property. Mission Creek lies east of the site, drains 79 square miles and discharges into the Wenatchee River approximately 800 feet east-northeast of the northeast corner of the mill site.*
>
> *An irrigation return ditch flows about 1,000 feet from west to east along the southern shoulder of Mill Road. The ditch is open near the western boundary of the mill site, where it forms a small pond. From there, the water flows in a culvert for approximately 600 feet. The ditch is open for about 180 feet along Mill Road near the current Cedarbrook shop. Near the eastern boundary of the property, water enters a culvert that crosses Mill Road and flows approximately 500 feet to discharge into Brender Creek. The ditch is open for about 6 feet before re-entering a culvert beneath Sunset Highway.*
>
> *In the mid-1990s, the property owner undertook a conservation effort in cooperation with the Washington Department of Fish and Wildlife and Chelan County Conservation District to enhance aquatic habitat in over 2,000 feet of Brender Creek. This effort required sediment in the stream channel to be excavated, which resulted in a large berm that parallels the creek. The berm is approximately 10 feet high, 60 feet wide and 1,000 feet long.*

Groundwater elevations, vary across the Site, ranging in depth from 1.5 feet to 5.5 feet below the existing ground surface. The groundwater table likely fluctuates up to several feet during the course of a year due the changes in flows in Brender Creek and the Wenatchee River (GeoEngineers, 2010).

Wetlands

Wetlands have been identified on or adjacent to the Site through two separate delineations performed by Alliance Consulting Group (ACG) in 2008 and again in 2010. The 2008 delineation established the boundary and rating for the wetland associated with Brender Creek from the western edge of the Site where Brender Creek enters the Site to the east edge of the Site (south of Mill Rd) where Brender Creek leaves the property. The second delineation characterized and mapped the wetland associated with both Brender Creek from the end of the previous delineation north to the railroad track crossing, and delineated the wetland associated with No-Name Creek from Sunset Highway north to its confluence with Brender Creek. The first delineation rated the wetland as Class I, approximately 13 acres in size (ACG, 2008). The second delineation rated the wetland associated with both Brender Creek and No-Name Creek as Class III (ACG, 2010).

In June, 2012, RH2 completed a wetland reconnaissance of the northwest portion of the Mill Property located south of Mill Road along the property boundary with Mr. Richard R. Dueman. Potential wetland vegetation was noted along the property boundary (e.g., cottonwood and horsetails), indicating there may be undelineated wetland habitat in this area. Additionally, there is visual evidence of wetland habitat (standing vegetation, wetland vegetation, and sulfuric odor) along Mill Road on Mr. Dueman's property. Results of the reconnaissance confirmed the presence of a depressional wetland on Mr. Dueman's property adjacent to Mill Road. This depressional wetland drains southeast across Mr. Dueman's driveway and joins with a drainage swale that follows the northwestern property boundary of the Mill Property. With the hydrologic connection of these two wetlands, they were characterized as one unit and rated as a Category III wetland. The reconnaissance did not demarcate the wetland edge, but rather identified a potential boundary from which to base a wetland buffer. The City's wetland buffer for a Category III wetland is 40-feet. The actual buffer location and extent onto the Mill Property would require formal wetland delineation. It is likely that a portion of this wetland buffer will extend partially onto the Mill Property in the northwest corner. Because the location of the wood waste is beyond any probable wetland buffer, no further action has been taken to delineate the wetland.

Wood Waste Location and Extent

The site is divided into three general areas. Area 1 is the northern most area located between Sunset Highway and the BNSF railroad tracks. No actions have been taken to identify wood waste in this area due to its limited development potential. Area 2 is located south of Area 1, between Sunset Highway and Mill Road, and includes the former mill pond. Wood waste thickness in the former mill pond ranges from 3 to 13 feet (GeoEngineers, 2010) and tapers to less than 3 feet west of the former pond.

No wood waste removal is planned for the mill pond area due to the following Site conditions. The No-Name Creek runs in an 18 or 24-inch steel pipe/culvert (exact size unknown) from the south side of Mill Rd, across the Port property through the mill pond area. In 2010, RH2 evaluated the possibility of relocating the culvert so that the wood waste could be removed. The project was discussed with the Washington Department of Fish and Wildlife (WDFW), Ecology, and United States Army Corps of Engineers (Corps). No-Name Creek is a fish-bearing year-round stream.

The WDFW concluded they would not permit the removal and replacement of the pipe, and instead recommended "day-lighting" this reach (RH2 meeting minutes, May 26, 2010). After further discussion, alternatives were developed and discussed between the Port, WDFW, Ecology, and the Corps, and adjacent property owners, but were not resolved, and the Port decided to leave wood waste in place at the former mill pond.

The remaining wood waste not associated with the former mill pond in Area 2 has a maximum depth of 3 feet and an extrapolated area (based on ArcGIS interpolate tool) of 0.5 acres (Geotechnical Report, RH2, 2007).

Area 3 is the largest area and is located south of Mill Road. This area was predominantly used as a storage area for logs and processed lumber when the mill was operational. GeoEngineers (2010) provides a complete summary of the wood waste conditions in this area. Below is an excerpt from GeoEngineers' 2010 Geotechnical Report.

Southern Portion of Site (Former Log Storage Yard South of Mill Road)

The explorations completed in this portion of the site include our borings B-2, B-2A and B-3 through B-5, test pits TP-6 through -14 excavated in January 2007 by RH2 Engineering, and test pits TP-C through -I excavated in late November 2009 by RH2 Engineering. These explorations were intended to evaluate the thickness, extent and character of the wood waste fill within the former log storage area, as well as to evaluate the depth and character of the underlying native granular alluvial soils.

The majority of these explorations encountered various fill materials consisting of wood waste fill typically mixed with or interlayered with granular fill soils. The granular fill soils generally consist of silty sand with *varying amounts of gravel and cobbles. The wood waste fill is typically in a soft condition, while the granular fill soils are loose. Debris consisting of bricks and car parts was noted in the fill on the log for test pit TP-6. The wood waste, where encountered, typically includes sawdust, bark fragments and chips with lengths up to 3 inches. Larger pieces of wood debris, although not directly sampled in our borings, are likely to exist within the fill, based on photographs of the test pits provided by RH2 Engineering.*

A layer of orange brown wood waste (sawdust and fine shavings) with a low percentage of sand and gravel was encountered between depths of 1.5 and 4.5 feet in boring B-3. A similar layer was apparently encountered in test pit TP-F between depths of 1 and 3.5 feet. The wood waste and granular fill soils, where encountered, extend to depths of 2 to 13 feet below the existing ground surface. Fill materials (either wood waste or granular soils) were apparently not encountered in test pits TP-7, -8, -13, -14, -E, or –H.

Native soil encountered beneath the wood waste and soil fill in the explorations consists of medium dense silty sand and dense to very dense gravel with silt, sand and cobbles. This native soil represents alluvium deposited by the Wenatchee River. The presence of some organic matter, roots and peat layers was noted in the upper few feet of the alluvium on the logs for test pits TP-6, -9 and -12.

Wood Waste as a Potential Contaminant

In 2008, RH2 developed a letter report summarizing the potential environmental impacts of the wood waste at the Site. The following is an excerpt from RH2's 2008 Cashmere Mill Site Wood Waste Summary Letter Report.

Summary of Current Understanding of Environmental Issues of Wood Waste at the Site

1. *Methane gas generated by the decomposition of wood waste is a potential hazard to human health if the occupancy at the Site is increased or structures are created that trap methane gas. Mitigation of the hazard would include removal of the wood waste, passive venting of the wood waste and overlying soil, active venting of the wood waste and soil, and engineering controls to prevent migration of methane into closed spaces associated with structures.*
2. *Direct contact with wood waste is not considered a human health hazard except where the wood waste may be exposed and allowed to disperse in the air as fine particulates. Mitigation of this hazard would include remove of wood waste from surface areas.*
3. *Infiltration of rainwater into wood waste and interaction of groundwater with wood waste may generate leachate from the waste that could migrate to nearby wetlands or surface water. In sufficient quantity, the wood waste leachate could create chemically reducing conditions (lower dissolved oxygen [DO]) in groundwater as wood waste decomposes. The lower pH could then potentially alter the geochemistry of groundwater by dissolving metals from granular aquifer material, and these metals could migrate into surface water. However, the reduced groundwater is quickly oxidized and the acidic groundwater is neutralized when it combines with atmospheric oxygen and the metals precipitate at the point of discharge. The Site lies adjacent to the Wenatchee River, Mission Creek, and Brender Creek. Ecology is studying the river for sources of contamination that reduce DO and affect pH, but has not attributed wood waste in floodplain areas as potential sources for these stream quality impairments. Note: The wood waste was placed in natural depressions of former channels of the Wenatchee River. These channels contained naturally occurring wood debris and organic-rich soil that would have similar effects on groundwater quality as wood waste. Any assessment of water quality impacts of wood waste would need to distinguish the effects of buried organic material from natural sources.*

Wood Waste Removal Alternatives

GeoEngineers (2010) provided three alternatives for managing wood waste. Option 1 included removing all of the wood waste. Option 2 would leave wood waste in-place and constructing deep foundation support (concrete piling, etc.) and appropriate mitigation for potential methane gas generation under structures. Option 3 included removing wood waste to a depth of 8 feet, backfilling with structural fill and designing structures that could accommodate long-term settlement. GeoEngineers supported Option 1 wherever feasible (GeoEngineers, 2010).

GeoEngineers recommended replacing wood waste with granular structural fill not to exceed 6 inches in size, with a percent of fines between 5 percent and 30 percent, depending on moisture conditions at the time of placement. The following is an excerpt from the 2010 GeoEngineers report on the allowable bearing capacity at the site:

> ***Allowable Bearing Capacity***
> *On a preliminary basis, footings supported directly on native granular alluvial soils or on compacted structural fill used to partially or completely replace wood waste fill may be designed using an allowable bearing capacity of 2,500 psf. Exterior footings should be founded at least 24 inches below the lowest adjacent finished grade. Interior footings should be embedded at least 12 inches below the lowest adjacent grade. Isolated spread footings should have a minimum width of 24 inches, and continuous strip footings should be at least 18 inches wide.*
>
> *This allowable bearing pressure applies to the total of dead and long-term live loads exclusive of the weight of the footing and any overlying backfill. This value may be increased by one-third when considering design loads of short duration such as wind or seismic forces.*

"Complete removal" is herein defined as removal of all material containing visible woody material or milling remnants to a depth consistent with the anticipated base of wood waste based on previously compiled maps where a distinct compositional charge is observed and native alluvium is encountered. During construction an inspector would be on site at all times to verify and document complete wood waste removal.

RH2 concurs that structural fill should replace the wood waste. Structural fill should contain between 2 percent and 10 percent fines, depending on moisture conditions, to promote acceptable compaction performance.

Dewatering

Based on the mapped depths of wood waste and the mapped groundwater elevations as well as previous visual observations at the site, dewatering will likely be necessary to achieve complete wood waste removal at Area 3. A dewatering test well will be installed and tested to provide aquifer characteristics to support the design of a dewatering system.

Utility Impacts

The only known utilities located within the areas identified as containing wood waste, excluding the mill pond area, are the City of Cashmere water mains. One of the mains crosses Area 2 (the area located between Mill Road and Sunset Highway) approximately 550 feet west of Brender Creek The exact location of these mains is unknown.

According Cashmere's City Engineer, if the wood waste excavation extends into the approximate area of the water main, then the main should be replaced with a new 8-inch ductile iron pipe. The cost for this work, as a stand-alone project, is estimated at $100,000. However, significant cost savings may be possible if combined with the wood waste removal, thus eliminating a portion of the excavation and backfill costs. If the installation of a new pipe is not feasible, or the wood waste excavation does not uncover the pipe, then RH2 recommends to avoiding any form of vibratory compaction methods within 15 feet of the pipe or its assumed location.

Maps and survey data of the area show another water main crossing Mill Road and extending south into the southern portion of the property to serve two adjacent properties. The water main does not impact the area where a majority of the wood waste excavation will take place (same map as above).

Hydrocarbon Contamination

Soil containing petroleum hydrocarbons has been found at five locations at the Site (**Figure 1**). Each discovery has been tested for specific range of hydrocarbons based on characteristic odors in the soil. Testing results for Locations 1 and 2 are summarized in Tables 1 and 2, respectively. All of the discoveries occurred either during construction related to an improvement or during various investigations and studies undertaken on the property; no explicit attempt to define the nature and extent of petroleum hydrocarbons on the Site has been conducted.

The Port notified Ecology of the first discovery on July 23, 2009. Since that initial notification, four additional locations were encountered, which were reported to Ecology with the statement that additional characterization and appropriate remediation would occur at the time of Site redevelopment. The Port has not yet entered into the VCP program and has not requested an opinion regarding the Site.

Hydrocarbon Contaminant Site 1 was discovered during the sub-surface exploration for a new water main in Sunset Highway. The following is an excerpt from the 2010 letter report by RH2 to the Port characterizing the observations, investigation, findings, and conclusions for this discovery:

> *Summary of Discoveries*
>
> *On May 7, 2009, RH2 conducted a geotechnical investigation to evaluate soil and groundwater conditions along a proposed water main replacement alignment. During the investigation at one location-- Test Pit 2 (TP-2), on the attached Figure 1), RH2 encountered soil apparently contaminated by a historical release of petroleum hydrocarbons. The potential contamination was not attributable to a known or suspected underground storage tank.*
>
> *The soil exploration at TP-2 encountered light gray soil at a depth of 5.5 feet. The soil exhibited an odor characteristic of gasoline-range hydrocarbons. The water-saturated soil at the water table depth of 6.0 feet exhibited a faint sheen, as did the groundwater at the water table. No evidence of a measureable thickness of petroleum product was apparent at the water table. No other evidence in the surface indicates a potential source for the release. No indications of petroleum hydrocarbon seepage were observed on the Wenatchee River bank (the nearest body of surface water), which is 250 feet from the discovery site.*
>
> *Environmental Assessment*

Three test pits (S-1, S-2, S-3) were excavated approximately 10 to 30 feet from TP-2, the original discovery location at Site 1. No apparent contamination (an odor characteristic of petroleum hydrocarbons) was present in the soil at these locations. Test pit S-4 was excavated near TP-2 to confirm the type and concentrations of petroleum hydrocarbons in soil at the original discovery location. Test pit S-5 was excavated across Sunset Highway from TP-2, and observations indicated the presence of hydrocarbons in soil. Three additional test pits (S-6, S-7, S-8) were excavated to assess the extent of soil contamination near S-5, and did not encounter evidence of soil contamination. (Figure 1). Soil samples were retrieved from each excavation sidewall at a depth of approximately 5 to 7 feet and submitted for analysis of gasoline-range hydrocarbons by the US Environmental Protection Agency (EPA) Method 5035A/Ecology Method NWTPH-Gx. Sample S-4 was analyzed for diesel-range hydrocarbons by Ecology Method NWTPH-Dx to confirm the presence or absence of diesel fuel contamination at Site 1.

Findings

Odors characteristic of gasoline-range hydrocarbons were detected at S-4 and S-5, and possibly at S-6. Table 1 summarizes the laboratory analyses of the soil samples. Petroleum hydrocarbons were detected in soil from the two locations where characteristic odors were most obvious (S-4, S-5), and trace concentrations of petroleum hydrocarbons were detected at S-1 and S-3. No petroleum hydrocarbons were detected in the soil where weak characteristic odors were noted at S-6.

The Ecology Model Toxics Control Act (MTCA) Method A Cleanup Levels for Soil, Unrestricted Land Use were compared to detected concentrations of petroleum hydrocarbons in the soil (Table 1). Concentrations of Total Petroleum Hydrocarbons (TPH) as gasoline at Site 1 at S-4 and S-5 exceeded Method A Cleanup Levels in Soil for both Unrestricted and Industrial Land Uses.

Table 1. Summary of Laboratory Results – Site 1, Sunset Highway

	Sample Number								
Compound	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	MTCA Method A Cleanup Level
Benzene (µg/kg)	<17	<16	<12	<12	<14	<18	<15	<15	30
Toluene (µg/kg)	<17	<16	20	650	62	<18	<15	<15	7,000
Ethylbenzene (µg/kg)	<17	<16	<12	1,600	370	<18	<15	<15	6,000
Xylenes (total) (µg/kg)	<17	<16	29	700	210	<18	<15	<15	9,000
TPH as gasoline (mg/kg)	8.2	<6.3	<4.7	1,600	490	<7.4	<6.1	<6.2	100
TPH as diesel fuel4 (mg/kg)	*5	*	*	910	*	*	*	*	2,000
TPH as heavy oil (mg/kg)	*	*	*	<110	*	*	*	*	2,000

Conclusions and Recommendations

Soil containing weathered, gasoline-range petroleum hydrocarbons at concentrations exceeding the Method A cleanup levels exists at three locations next to the Sunset Highway at the former Cashmere Mill Site (TP-2, S-4 and S-5). The source of contamination is unknown. It is possible that some contaminated soil underlies the highway. The lack of benzene and the characteristic patterns in the laboratory chromatograms suggest that the petroleum hydrocarbons in the soil are relatively old, have degraded over time, have likely stabilized in the soil and are not mobile. The small quantity (approximately 15 cubic yards) of soil containing petroleum hydrocarbon concentrations that exceed cleanup levels [RH2 note: the soil was remediated by excavation and off-site disposal in 2011 and 2012]. Soil samples for confirmation sampling should be collected and submitted for analysis, and findings should be submitted to Ecology to confirm the remedial action. Groundwater characterization using monitoring wells will occur after soil remedial actions].

Site 2 was discovered in 2009 as part of the improvement project to remove the existing asphalt pavement and concrete footings from the Site. The soil at Location 2 was under and adjacent to several large concrete footings. The following is an excerpt from the 2010 RH2 letter report to the Port characterizing the observations, investigation, and results at this location.

> *<u>Summary of Discoveries</u>*
>
> *In October 2009, the Port encountered apparently contaminated soil while conducting building demolition at Site 2 -- Sample Location 1 (S-1) on Figure 1. The soil exhibited an odor characteristic of gasoline-range hydrocarbons. The Port contacted RH2 to assess the nature and extent of contamination at the second discovery site.*
>
> *<u>Environmental Assessment</u>*
>
> *Four test pits (TP-2, TP-5, S-3, and S-5) were excavated approximately 10 to 30 feet from S-1 at the original discovery location at Site 2, and Test pit S-1 was completed to obtain representative soil from the original discovery location at Site 2. Petroleum hydrocarbons were present in soil at TP-2 and TP-5. Soil at S-1 contained diesel-range hydrocarbons at concentrations below MTCA Method A cleanup levels. No detectable hydrocarbons were present in the soil at S-3 and S-5. At two additional excavations (S-2 and S-4) near TP-2 and TP-5, respectively, gasoline-range hydrocarbons were not detected in soil samples retrieved from excavation sidewall at a depth of approximately 4 to 6.5 feet. Table 2 summarizes the laboratory analyses of the soil samples.*

Table 2. Summary of Laboratory Results – Site 2, Mill Road

	Sample Number					MTCA Method A Cleanup Level
Compound	S-1	S-2	S-3	S-4	S-5	
Benzene (μg/kg)	<20	<18	<27	<20	<19	30
Toluene (μg/kg)	<20	<18	<27	<20	<19	7,000
Ethylbenzene (μg/kg)	<20	<18	<27	<20	<19	6,000
Xylenes (total) (μg/kg)	<39	<37	<54	<41	<39	9,000
TPH as gasoline (mg/kg)	<7.9	<7.3	<11	<8.1	<7.7	100
TPH as diesel fuel4 (mg/kg)	260	*	*	*	*	2,000
TPH as heavy oil (mg/kg)	520	*	*	*	*	2,000

Conclusions and Recommendations

Soil containing petroleum hydrocarbons exists at three locations near Mill Road. The concentrations of TPH as diesel at S-1 are below MTCA cleanup levels. The TPH concentrations at TP-2 and TP-5 are unknown, but were similar to the concentrations detected at S-1, based on field evidence (odors, color). The source of contamination is unknown. The contaminated soil is limited in extent and concentration

Site 3 was discovered in 2010 by GeoEngineers during the soil boring activity associated with their geotechnical evaluation. Both of the two borings located in the mill pond area (B-1 and B-6) contained evidence of hydrocarbon contamination. Soil boring B-1 was drilled to a depth of 17.5 feet, encountered groundwater at 6 feet, and encountered soil containing petroleum hydrocarbon-like odors at a depth of 11.5 feet. Soil boring B-6 was drilled to a depth of 11 feet, encountered groundwater at 5.5 feet, and encountered soil containing petroleum hydrocarbon-like odors at a depth of 11.5 feet at B-6. Soil samples contained both diesel and lube oil-range hydrocarbon concentrations below MTCA Method A cleanup levels (See **Table 3**).

Table 3. Summary of Laboratory Results – Site 3, Mill Pond

	Sample Number		MTCA Method A Cleanup Level
Compound	B-1, 11.5'	B-6, 11.5'	
TPH as diesel (mg/kg)	500	1,100	2,000
TPH as heavy oil (mg/kg)	820	1,600	2,000

Site Location 4 was discovered in 2011 as part of the field investigations associated with RH2's Groundwater Table Investigation Technical Memorandum. This site exhibited a strong diesel odor but the lab results indicated contaminant levels below cleanup standards (See **Table 4**). It is possible the sample taken to the lab was not representative of the maximum concentration at this location.

Table 4. Summary of Laboratory Results – Site 4, WW area; Site 5, WW area

	Sample Number			MTCA Method A Cleanup Level
Compound	Site 4 S-1, 2'	Site 5 S-1, 4'	Site 5 S-2, 5'	
TPH as diesel (mg/kg)	6.7	350	NA	2,000
TPH as heavy oil (mg/kg)	100	700	NA	2,000
HCID-gasoline (mg/kg)	NA	<26	<24	-
HCID-diesel (mg/kg)	NA	>65	>60	-
HCID-oil (mg/kg)	NA	>130	>120	-

NA = not analyzed

Site Location 5 was discovered 2011 as part of the initial wood waste removal project. The material exhibited at faint odor and no sheen. Soil contained concentrations of gasoline and diesel-range hydrocarbons below Method A cleanup levels (See **Table 4**). Soil from Location 5 was excavated and disposed off site.

Rationale for Wood Waste, Soil, and Groundwater Characterization Plan

The following assumptions will guide the scope of this work.

1. Wood waste at the Site is a mixture of raw wood, lumber, sawdust, and granular fill. Wood waste was placed in topographic depressions and stockpiles at the Site during former mill activities. Wood Waste was redistributed by site grading that leveled or covered wood waste stockpiles after mill activities concluded. Site history indicates that the former mill only prepared raw timber into lumber, and no wood treatment operations were conducted. Any residual TPH in wood waste is considered incidental, as no historical activities apparently intentionally combined wood waste and petroleum hydrocarbons. Removal of wood waste below the water table likely will require groundwater dewatering to facilitate the excavation.
2. Soil at the Site is a mixture of granular fill and native sand and gravel alluvium deposited by the Wenatchee River and its tributaries. Releases of petroleum hydrocarbons into soil were the result of incidental spills from former mill activities, most likely related to petroleum fuel and lubricants.
3. Groundwater at the Site exists with the saturated zone of native alluvium and wood waste, and is affected by variable recharge and discharge patterns from precipitation, irrigation, and surface water stage. Groundwater flow is therefore likely to vary seasonally in direction and rate. No groundwater monitoring wells at the Site are positioned in an "upgradient location" from known locations of residual TPH in soil. No groundwater data exists for locations confirmed downgradient of known locations of residual TPH in soil.

Tasks

Implementing the Plan includes the following tasks.

Improve the Understanding of Site and Extent of Wood Waste

Excavate seven test pits to confirm the depth and composition of wood waste at unexplored locations (**Figure 1**). Test pit observations will include inspection and documentation of any visible evidence or odors indicating the potential presence of petroleum hydrocarbons in soil and/or wood waste. Representative samples of wood waste will be collected at each test pit location for analysis of wood treatment chemicals; if no wood waste exists at the test pit location, no sample will be collected for laboratory analysis. (See **Appendix A** for analytes and methods).

Construct and Test a Groundwater Dewatering Test Well

Drill one soil boring (**Figure 1**) to 10 feet below wood waste in the deepest known portion of the wood waste. The boring will be completed as a dewatering test well consisting of a 10-foot-length of 4-inch-diameter PVC screen at the bottom of the boring with a sand filter backfill around the screen, and bentonite seal per Chapter 173-160 WAC. The well will be tested at pumping rates of 25 to 50 gallons per minute (gpm) for up to 4 hours, or until steady state is achieved for 1 hour. The groundwater level in the well will be measured and recorded during pumping and recovery. The pumping test discharge will be directed on site and allowed to infiltrate into a shallow pit excavated at former test pit location E (**Figure 1**).

Evaluate Groundwater Quality at the Dewatering Test Well

The flow rate and water quality parameters (e.g., pH, temperature, specific conductivity, etc.) of discharge water will be measured during testing. At the end of testing, a sample of groundwater will be collected for analysis of petroleum hydrocarbons and wood treatment chemicals (see **Appendix A** for analytes and methods).

Characterize Soil and Groundwater Conditions at Site 1 and Site 3.

Excavate four (4) test pits to the water table at Site 1 and four (4) test pits to the water table at Site 3 (**Figure 1**). Collect representative samples of soil for analysis petroleum hydrocarbons. Groundwater will be characterized downgradient of Site 1 and 3 either through the use of temporary well points or groundwater monitoring wells. The selected method will depend on soil and groundwater conditions encountered during test pit exploration.

Groundwater Monitoring Well Installation

Groundwater monitoring wells will be installed following WAC 173-160 after removing wood waste and remediating soil containing residual petroleum hydrocarbons. The wells will be located based on the findings of field exploration and observations during wood waste removal and soil remediation, which will improve the understanding of the character of the uppermost aquifer and the water table elevation. A sufficient number of groundwater monitoring wells will be installed in locations to confirm the nature and extent of petroleum hydrocarbons in groundwater downgradient of former or residual petroleum hydrocarbons in soil, and to establish the groundwater gradient and flow direction. Groundwater samples will be collected from the wells after the wells have been developed.

Periodic Groundwater Monitoring

Groundwater quality samples will be collected at new and existing monitoring wells on a quarterly basis using dedicated sampling equipment and managed following methods described in **Appendix A**. The duration of periodic monitoring will depend on the findings of the initial four monitoring events.

Data Management, Interpretation, and Reporting

Upon receipt from the laboratory, wood waste, soil, and groundwater monitoring results will be reviewed for data quality and compiled into an electronic database for use and for upload to Ecology's Environmental Information Management system.

The results of the data analysis will be interpreted to guide any necessary remedial actions and/or monitoring to result in a no further action determination for soil and groundwater at the Site.

Monitoring reports will include copies of field investigation results and field sampling data sheets for the groundwater monitoring events, a tabulated summary of data, and graphical representation of groundwater monitoring results. Data collected will be summarized, reported, and submitted to Ecology as part of the summary report.

The summary report will summarize field and any interim remedial activities, results of laboratory analysis, interpretation of results with comparison to applicable cleanup levels, and recommendations for final remedial actions and compliance monitoring. All reports and records will be retained by the Port for a minimum of 3 years.

Records include calibration methods and dates, maintenance records, and original recording of all directly measured field data, including dates, locations, methods, timing, and personnel that performed the monitoring and/or analysis. Informal audits will be conducted throughout the study to ensure the project continues to follow the SAPP/QAPP.

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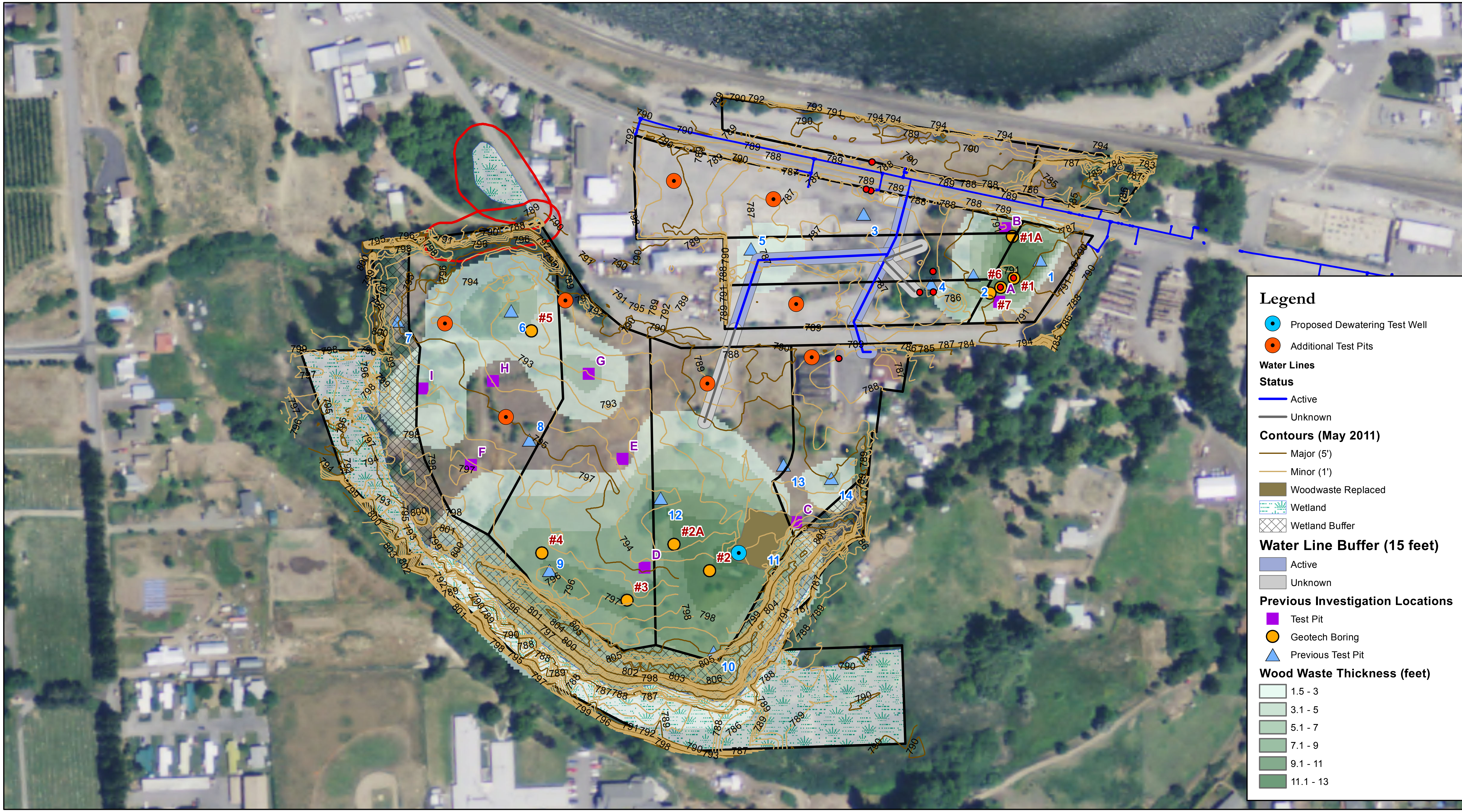

Feet
0 100 200 400
1 inch = 200 feet

Cashmere Mill Site

Subsurface Investigation Locations and Modeled Wood Waste Thickness

RH2 ENGINEERS PLANNERS SCIENTISTS

last modified by: ARN on 6/13/2012 J:\data\PCC\208-020\01 Port\127 Site Clean-up\GIS\Map_surfaceanalysis.mxd

Appendix A
Sampling Analysis Project Plan/ Quality Assurance Project Plan

Appendix A

Sampling Analysis Project Plan/Quality Assurance Project Plan

SAMPLING PROCEDURES

Wood Waste and Soil Characterization

Wood waste and soil characterization will include excavating shallow test pits using a rubber tired backhoe or tracked excavator to excavate test pits to at least the water table, and deeper if wood waste has not been fully penetrated. The wood waste and soil will be visually inspected for composition, odor, color, etc. Representative samples of wood waste and soil will be retrieved directly from the backhoe bucket and placed in laboratory-prepared containers (**Table 1**) and stored in chilled coolers pending delivery to the laboratory. If any visual or other evidence of petroleum hydrocarbons or other chemicals are detected in the excavation, additional excavation may be warranted at the time of the investigation or may be deferred to a later time pending consultation with the Port of Chelan County (Port) and the Washington State Department of Ecology (Ecology). The dimensions and location of the excavations will be measured, photographed, and then backfilled and compacted with excavated materials.

Wood Waste and Soil Sample Management

Upon collection, soil samples will be individually labeled and immediately placed on ice in a cooler for delivery to the laboratory. All samples will either be delivered by RH2 staff or via courier to the lab with chain of custody protocols to meet holding times. A Chain of Custody form provided by the lab will be submitted for each sampling event. Sample containers and analysis holding times are summarized in **Table 1**.

Table 1. Sample Containers, Preservation, and Holding Time Requirements for Study Parameters

Parameter	Container	Holding Time
Gasoline-range hydrocarbons/BETX (using EPA Method 5035)	8 oz. glass	7 days
Diesel-range hydrocarbons	16 oz. glass	14 days
Volatile/Extractable Hydrocarbons	8/16 oz. glass	7/14 days
Chlorophenols	1-liter amber	14 days
Arsenic, Chromium, Copper, Lead	500 mL - polyethylene	28 days
PAHs	8 oz. glass	14 days

Groundwater Monitoring Well Installation

Groundwater monitoring wells will be installed at a minimum of one upgradient and two downgradient positions relative to residual or former petroleum hydrocarbons in soil at the Site. The wells will be installed to a depth of approximately 20 feet, and completed with 10 feet of machine-slotted 2-inch diameter Schedule 40 PVC well screen and protected with flush-mount locking well monuments set slightly above grade with concrete pads sloping away from the well. The well screens will intersect the water table during the period of monitoring and will be positioned so that the screen is never fully submerged, nor completely dry. The wells will be developed by surging and bailing after installation. Well locations will be determined after soil remedial actions are complete.

Groundwater Sampling

Notification
The Port will notify Ecology by telephone or e-mail as early as possible prior to sampling events and allow Ecology upon request to obtain split samples.

Groundwater Level Measurement
The depth to groundwater will be measured in each well before purging begins. Water level will be measured directly using an electric well probe. The top of well casing will be surveyed to the nearest 0.01 feet and referenced to NAVD 88.

Purging
The wells will be purged using a dedicated battery-powered electric submersible pump and dedicated high-density polyethylene (HDPE) tubing. Each pump and tubing system will be used solely for one well and not used elsewhere. The pump and tubing will be stored on a single-hose reel and stored off site in a clean facility. The pump and tubing will be installed and retrieved for each event while wearing clean disposable gloves. The pump intake will be positioned at a depth of 2 to 5 feet below the static water level. The well will be purged at a rate of 0.5 to 1 liter per minute until consecutive measurements of field water quality parameters have reached stability (without an increasing or decreasing trend) as follows.

- pH ± 0.2 pH units
- Specific conductance, temperature, turbidity ±10%

Sampling
Groundwater samples will be collected directly from the discharge tubing after purging; samples will be collected while the pump is running at less than 0.5 liters per minute. Sample containers will be filled in the following sequence.

1. Unpreserved samples.
2. Preserved samples.

Sample shall be labeled in the format of [location]-[date] (date to be in DDMMYY format). Every individual sample container shall be labeled with the date and time of sampling, location, sampler's initials, and preservatives.

Field instruments will be calibrated according to manufacturer's specifications within 4 hours before purging.

Groundwater Sample Management

Upon collection, water samples will be individually labeled and immediately placed on ice in a cooler for delivery to the laboratory. All samples will either be delivered by RH2 staff or via courier to the lab with chain of custody protocols to meet holding times. A Chain of Custody form provided by the lab will be submitted for each sampling event. Sample containers and analysis holding times are summarized in **Table 2**.**Table 2. Sample Containers, Preservation, and Holding Time Requirements for Study Parameters**

Parameter	Container	Preservative	Holding Time
Gasoline-range hydrocarbons/BETX	40 mL vial	H_2SO_4	14 days
Diesel-range hydrocarbons	1-liter amber glass	None	30 days
Chlorophenols	1-liter amber glass	None	14 days
Arsenic, Chromium, Copper, Lead	500-mL HDPE	HNO_3	6 months
CPAHs	1-liter amber glass	None	30 days

The date and time of sample collection, sampler name, purging volumes, field water quality measurements, water levels, time of instrument calibration, and environmental conditions shall be recorded at the time of sampling on a field sampling data sheet. Any deviation from the sampling protocol will be noted.

MEASUREMENT PROCEDURES

Measurements made in the field will include continuous water level and temperature monitoring using In-Situ pressure transducers; direct measurement of water level at the start of purging; direct measurement of pH, temperature, specific conductivity and turbidity during purging; and direct measurement of dissolved oxygen at the end of purging. The field instrumentation and respective ranges of results and accuracies are summarized in **Table 3**.

Table 3. Summary of Field Sampling for Groundwater Quality and Level Monitoring

	Measurement Method	Accuracy	WA State Groundwater Quality Standard	Expected Range of Results
Temperature (C)	Hach 44600 Conductance/TDS meter	0.1C	NA	10 to 13 degrees
pH	Hach SensIon1; pH probe	0.01pH units	6.5-8.5 pH units	6.5 to 7.5 pH units
Specific Conductance (µS/cm)	Hach 44600 Conductance/TDS meter	1µmhos/cm	700 µS/cm	100 to 200 µmhos/cm
Turbidity (NTU)*	Hach 2100P Turbidimeter	0.1 NTU	NA	5 to 50 NTU
Water level (feet)	Solinst Well Probe	0.01 feet	NA	50 to 75 feet

*NTU = Nephelometric Turbidity Units

LABORATORY ANALYSIS

Analytical Resources, Inc., (ARI) in Tukwila, Washington, will provide Ecology-accredited analytical laboratory analysis for the project. ARI standard operating procedures are on file with ARI.

Table 4 summarizes laboratory analysis methods for wood waste and soil.

TABLE 4: ANALYTICAL SUMMARY FOR WOOD WASTE AND SOIL		
Parameter	**Analytical Method**	**Detection Limit[a] (mg/kg)**
Gasoline-Range Hydrocarbons	NWTPH-HCID / NWTPH-Gx/5035	1.5
Diesel-Range Hydrocarbons	NWTPH-HCID / NWTPH-Dx	1.5
BETX	8021	0.027
Chlorophenols	SW8041	.00625
PAHs	SW8270-SIM	0.0005
Phenols	SW8270	0.0005
Arsenic	EPA 200.7	0.383
Chromium	EPA 200.7	0.210
Copper	EPA 200.7	0.013
Lead	EPA 200.7	0.163

Notes:
a. Detection Limits based on those established by ARI.

Table 5 summarizes laboratory analysis methods for groundwater.

TABLE 5: ANALYTICAL SUMMARY FOR GROUNDWATER		
Parameter	**Analytical Method**	**Detection Limit[a] (mg/L)**
Field Parameters		
Groundwater level	NA	0.01 ft
Turbidity	SM 2130B	0.1 NTU
Temperature	SM 2550B	0.1°C
pH	SM 4500-H	0.1 units
Specific Conductance	SM 2510B	1 µmhos/cm
Analytes		
Gasoline-Range Hydrocarbons	NWTPH-Gx	0.08
Diesel-Range Hydrocarbons	NWTPH-Dx	0.08
BETX	8021	0.0001
Chlorophenols	SW8041	0.00025
PAHs	SW8270-SIM	0.0001
Phenols	SW8270	0.0005
Arsenic	EPA 200.7	0.0001
Chromium	EPA 200.7	0.00025
Copper	EPA 200.7	0.00025
Lead	EPA 200.7	0.00005

Notes:
Detection Limits based on those established by ARI

QUALITY CONTROL PROCEDURES

Field Quality Control

In addition to the procedures described in the Sampling and Measurement Procedures, a variety of steps will be employed to maintain a high level of quality control during groundwater monitoring, including the following.

1. A site log book will be maintained with accurate field notes that record daily field conditions, general times for field activities and any variation from the planned procedures.
2. Field sampling data sheets will be prepared for each site visit to record field measurements, times and rates during monitoring.
3. Water level measurement devices will decontaminated with potable water before use at each well.
4. Field meters, if used, will be calibrated in accordance with the manufacturer's instructions on the day of sampling, before purging.
5. Dedicated field equipment for each well will be used for sampling to prevent cross-contamination.
6. The type of individual sample container will be compatible with the parameters of interest to prevent bias in sample results.
7. Sources of extraneous contamination will be avoided during sampling. Sampling personnel will employ disposable sampling gloves for each sample.
8. Chain of custody procedures for all samples will be followed throughout the period between sample collection and delivery to the laboratory.
9. The type of container, pump, tubing, and fitting material, if used, will be compatible with the parameters of interest to prevent bias in sample results.

Laboratory Quality Control

ARI performs routine laboratory quality control procedures and sample handling procedures. ARI's quality control procedures are discussed in detail in their Quality Assurance Plan, which is updated daily, automatically, from its document management system.

DATA VERIFICATION, VALIDATION AND MANAGEMENT

Data Records and Management

Field data will be recorded at the time of measurement or sampling on field sampling data sheets. Data to be entered include dates and times of measurement or sampling, names of field personnel, sampling location, appropriate field measurement values and units of measure, laboratory sample numbers, and field comments on any deviations from described procedures. Field data will be compared to previous results to identify any significant deviations from historical trends. Field data will be entered into spreadsheets within 48 hours of collection.

Field data will be compared to previous results to identify any significant deviations from historical trends. Field data will be entered into an Excel spreadsheet or similar data management program within 48 hours of collection.

Continuously collected data from the monitoring well transducers will be downloaded each month and data will be entered into spreadsheets.

Data Review

Prior to distribution to the project lead, all laboratory data will undergo a quality assurance review by the laboratory staff itself to verify that quality control samplers met acceptance criteria as specified in the standard operating procedure for that method. Appropriate qualifiers will be attached to results that did not meet requirements. An explanation for the data qualification will be described in a quality assurance memorandum (case narrative) attached with the data package. Any significant deviation from historical trends will be immediately communicated to Ecology via telephone or email for discussion of potential actions, which may include repeat sampling.

Data Validation

Upon receipt of the verified data from the laboratory, the project lead will determine if the results have met the measurement quality objectives for precision and accuracy for the sampling episode.

Precision will be estimated by calculating the relative percent standard deviation between results for duplicate pairs of groundwater samples. One duplicate sample will be collected for approximately 5 percent of groundwater samples (at least one duplicate sample if 10 or more samples are collected). These values provide an indication of the degree of random variability introduced by sampling and analytical procedures. These values will be compared to the mean duplicate concentration (over the entire concentration range reported during the project) to assess the ability of the data to meet the project measurement objectives. The percent standard deviation for duplication pairs at or near the reporting limit are typically higher than the allowed error described by the measurement quality objectives, but are small in absolute terms and will not automatically disqualify data from use. If the relative percent difference for sample pairs exceeds 15 percent, a repeat sampling event will be conducted.

After evaluation of the analytical data against the project data quality objectives and historical trends, the reported results will be entered into either the same spreadsheet as the field collected data or a similar spreadsheet within 48 hours of obtaining the lab results.

ORGANIZATION AND SCHEDULE

The Port, its consultants at RH2 Engineering, Inc., (RH2) and Ecology are guiding and implementing this study. Analytical Resources, Inc., (ARI) will provide laboratory services. RH2 environmental staff is responsible for checking, downloading, and calibrating the field instruments, collecting and transporting samples under chain of custody to ARI representatives. RH2 will evaluate all water quality and quantity data, using methods approved by Ecology.

Key personnel involved in this project and their responsibilities are listed below.

Laura Jaecks, Port of Chelan County, is the Owner's Representative. The Port is responsible for reviewing and approving the Quality Assurance Project Plan (QAPP) and final report and interacting with interested public and stakeholders. Phone: (509) 661-3118. Email: laura@ccpd.com.

Karen Kornher, *P.E.,* RH2, Engineering, Inc., is the project manager and agent between the sampling staff at RH2 and the Port of Chelan County. Phone: (509) 886-6764. Email: kkornher@rh2.com.

Steve Nelson, L.G., L.HG., RH2, Engineering, Inc., is the project lead for the development of this study and analysis of data for the final project report. Phone: (425) 951-5406. Email: snelson@rh2.com.

Mary Monahan, Central Regional Office, Department of Ecology Toxics Program, is responsible for review and approval of the QAPP and will advise on sampling requirements, quality assurance, and quality control issues during project implementation and assessment.

Bob Congleton, is the primary contact for laboratory coordination for sample management and data quality. Phone: (206) 695-6232. Email: bob@arilabs.com.