

PACIFIC groundwater GROUP

BIRDS EYE FOODS TACOMA, WA 2011 REMEDIAL INVESTIGATION/ FEASIBILITY STUDY

December 16, 2011

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Prepared for:

**Pinnacle Foods Group LLC
399 Jefferson Road
Parsippany, NJ 07054
www.pinnaclefoods.com**

Prepared by:

**Pacific Groundwater Group
2377 Eastlake Avenue East, Suite 200
Seattle, Washington 98102
206.329.0141
www.pgwg.com**

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SIGNATURE

This report, and Pacific Groundwater Group's work contributing to this report, were reviewed by the undersigned and approved for release.



Janet N. Knox

Janet Knox

Principal Environmental Geochemist
Washington State Geologist No. 413



Inger R. Jackson

Inger Jackson

Senior Hydrogeologist
Washington State Hydrogeologist No. 1233

1.0 INTRODUCTION

This report presents the results of an independent 2011 Remedial Investigation and Feasibility Study (2011 RI/FS) performed on behalf of Birds Eye Foods LLC (Birds Eye) for their facility known as Birds Eye Foods, or Former Nalley's Fine Foods, in Tacoma, Washington. The 2011 RI/FS was developed under the Washington State Model Toxics Control Act (MTCA; Washington Administrative Code [WAC] Chapter 173-340) framework and written in accordance with WAC 173-340-350 to collect, develop, and evaluate sufficient information regarding petroleum contamination in the vicinity of the facility Boiler Room to select a cleanup remedy. The 2011 RI/FS updates information presented in the Phase II Remedial Investigation Report (PGG et al., 1992) and Nalley's Fine Foods Feasibility Study (RZA Agra, 1992a).

The Birds Eye Foods application to the Washington State Department of Ecology (Ecology) Voluntary Cleanup Program (VCP) was accepted on September 26, 2011.

1.1 GENERAL FACILITY INFORMATION

Site Name:	Birds Eye Foods
Site Address:	3303 S 35 th Street, Tacoma, Washington 98409
Parcel Numbers:	0320073062 (subject to this 2011 RI/FS) 0320077003 (adjacent parcel owned by Birds Eye Foods)
VCP Number:	SW1187
Current Owner:	Birds Eye Foods, LLC 399 Jefferson Road, Parsippany, NJ 07054
Owner's Representative Project Manager	Scott Fehseke, Pinnacle Foods Group LLC Project Manager
Current Operator:	Birds Eye Foods, LLC
Project Consultant:	Pacific Groundwater Group Janet Knox, Project Manager and Inger Jackson, Assistant Project Manager 2377 Eastlake Avenue East, Seattle WA 98102 206-329-0141

1.2 PURPOSE AND SCOPE

The purpose of the 2011 RI/FS is to evaluate the nature and extent of chemically-affected natural media at the Site (defined in Section 2.1), collect the data necessary to evaluate potential risks to human health and the environment, and develop and evaluate appropriate remedial alternatives, as necessary.

The scope of the RI/FS includes:

- Compilation of site historical information
- Characterization of the physical setting of the site and region

- Analysis of recent soil and long-term groundwater analytical data to evaluate the nature and extent of chemically-affected media
- Comparison of the recent groundwater data to historical analytical data to evaluate whether notable temporal changes have been observed
- Evaluation of the potential fate and transport of chemicals in the natural media, as they pertain to potential human or ecological risk
- Evaluation of the potential risk to onsite and offsite receptors
- Comparison of remedial alternatives
- Evaluation of remedial alternatives
- Selection of the preferred remedial alternative

1.3 REPORT ORGANIZATION

The 2011 RI and FS are presented together in a single document. The RI portions of this report (Section 2) present the site background information, environmental setting, nature and extent of contamination, and fate and transport analysis. The FS portions of the report (Section 3) describe remedial alternatives and a disproportionate cost analysis.

1.4 WARRANTY

This work was performed, our findings obtained, and this report prepared, using generally accepted hydrogeologic practices used at this time and in this vicinity, for exclusive application to this study, and for the exclusive use of Bird's Eye Foods. This is in lieu of other warranties, express or implied.

2.0 REMEDIAL INVESTIGATION

2.1 SITE DESCRIPTION

This section first describes the Birds Eye facility and then identifies and describes the Site within the facility. It is important to understand that the Site that is subject to this 2011 RI/FS occupies only a portion of the Birds Eye facility, which is over 22.5 acres in total area.

2.1.1 Birds Eye Foods Facility Description

The Birds Eye Foods facility is a former food processing facility located approximately 3 miles southwest of downtown Tacoma and the southernmost tip of Commencement Bay (Figure 1). Locally, the facility is also known as Nalley's Fine Foods, the original food processing company at this location. The facility address is 3303 South 35th Street, Tacoma, Washington; however, Birds Eye own two adjacent tax parcels with addresses registered with Pierce County as tabulated below.

Tax Parcel Number	Address	Acreage¹
0320073062	3410 S Lawrence St	20.3600
0320077003	3481 S 35 th St	2.1800

The Birds Eye Foods facility features are presented in Figure 2. The property is largely fenced. Truck loading docks on the east and south sides of the property are accessible from South Lawrence Street and South 35th Street respectively. The main facility vehicle corridor runs north-south through the property, immediately north of the intersection of South 35th Street and Windom Street (Figure 2). Access to the vehicle corridor is controlled through a security gate that crosses a driveway at the north end of the facility. A second security gate at the south end of the vehicle corridor permits vehicles to exit the facility; however, entrance to the facility through the south gate is only permitted to authorized facility personnel, municipal personnel, and Tacoma Rail.

Two railroad spurs owned by Birds Eye transect the site in a north-south direction. The western railroad spur runs through the vehicle corridor described above (Figure 2). The eastern railroad spur runs between the Lab/Warehouse/Office and Packaging buildings. It is not featured in Figure 2, but is visible in the aerial photo.

Buildings on tax parcel 0320073062 occupy approximately 318,000 square feet (7.3 acres) of the parcel; largely as a series of interconnected buildings that occupy approximately 300,000 square feet. Buildings on tax parcel 0320077003 occupy approximately 58,500 square feet (1.3 acres).

The property is paved or occupied by buildings with the exceptions of a gravel truck parking area in the northern portion of the property that is outside the facility fence, small landscaped areas along the northern and eastern perimeter of the site along public thoroughfares, and a gravel area between and adjacent to the tracks of the western railroad spur.

2.1.2 Former Boiler Room UST Site Description and Discovery

The subject of this 2011 RI/FS is a portion of the Birds Eye facility, referred to as the “Former Boiler Room UST Site” or “Boiler Room Site” (Figure 2). The Boiler Room Site is located in the south-western portion of the Birds Eye facility, specifically in parcel 0320073062. This is a mature Site and not the result of a recent or new release of hazardous materials to the subsurface.

As presented in Figures 2 and 3, the Boiler Room Site is located in the main internal vehicle corridor through the facility. A railroad spur and overhead power lines divide the vehicle corridor into west and east halves. Overhead and underground utilities through the Site are described in Section 2.3. Three buildings are located in the vicinity of the Boiler Room Site: the Potato Warehouse (currently vacant), the Boiler Room Building, and the former Pallet Room Building (currently vacant).

The Boiler Room Site is largely paved or covered with buildings. Crushed rock and gravel lies between the rails in the southern 350 feet of track and to approximately 2.5 feet

¹ As per Pierce County, Washington Public GIS website: <http://matterhorn3.co.pierce.wa.us/publicgis/>

on either side of the rails. There is also a gravel covered area approximately 1,200 square feet along the southern 100 feet of track.

An inventory of the Boiler Room Site former USTs and present AST is presented in Table 1. In 1990 as part of a property-wide program, two USTs were removed from an area immediately west of the Boiler Room (Figure 3) and petroleum-contaminated soil was identified:

- Tank B or North Tank: 10,000 gallon capacity, removed October 2-3, 1990; contents reported as Bunker C oil and some records report diesel².
- Tank A or South Tank: 20,000 gallon capacity, removed November 26-27, 1990; contents reported as residual oil and Bunker C oil³; installed in 1975 and used sporadically until 1982 when it was emptied (Reid, 1992).

Tank removals in 1990 were observed by Nowicki & Associates on behalf of Nalley's Fine Foods. Representatives of the Tacoma Pierce County Health Department (TPCHD) were periodically onsite during removal of Tank B (North Tank; Nowicki & Associates, 1990a); documentation of regulators onsite during removal of Tank A (South Tank) has not been identified. Observations made during tank removals and associated analytical results are described briefly in the following paragraphs.

Following removal of Tank B, no rust on the tank was evident and areas of tank rupture were not observed (Nowicki & Associates, 1990a). Soil surrounding Tank B was excavated to a depth of approximately 15 feet, in an area approximately 22 feet by 43 feet. "Petroleum product" was observed on the south, west, and east excavation walls. Soil samples for lab analyses were collected from each excavation sidewall and, at the request of TPCHD, from the excavation floor. Lab analysis confirmed the presence of total petroleum hydrocarbons ranging from 2,078 to 25,698 parts per million (ppm)⁴. The analytical results were communicated via telephone to TPCHD and Ecology representatives on October 4, 1990 (Nowicki & Associates, 1990a). Excavation of soil around the former Tank B was halted when structural risk to the railroad tracks and Boiler Room were identified. TPCHD and Ecology personnel were consulted prior to backfilling the excavation with clean fill (Nowicki & Associates, 1990a).

Tank A was removed on November 26 and 27, 1990. The tank was uniformly scaled to a one-quarter inch depth and two small holes, reportedly less than one-quarter inch, were observed. Soil surrounding Tank A was excavated to a depth of approximately 19 feet, in an area approximately 48 feet by 15 feet⁵ (Nowicki & Associates, 1990b). Soil under the storage tank was found to be uniformly contaminated with residual oil from 15 feet to at least 19 feet below ground (Nowicki & Associates, 1990b). Field observations indicated

² The North Tank contained heavy fuel oil throughout its history, except for a two month period in early 1989 during which the tank contained diesel (PGG, 1992). A site UST Generalized Closure Plan prepared for TPCHD identified the contents of both Tanks A and B as #2 Diesel fuel (Unknown Author, January 1990).

³ A site UST Generalized Closure Plan prepared for TPCHD identified the contents of both Tanks A and B as #2 Diesel fuel (Unknown Author, January 1990).

⁴ By EPA Method 418.1. This method is no longer considered a reliable method for analysis of TPH. It is known to result in false positives in the presence of natural organics and does not distinguish between different petroleum range organics.

⁵ Per saw-cut measurements provided in Nowicki & Associates, 1990b in SK-2

the north end of the excavation was more heavily impacted by petroleum product (Nowicki & Associates, 1990b). Lab analysis of soil samples collected from the north, west, and east sidewalls; and bottom of the excavation confirmed the presence of petroleum ranging from 15,370 to 61,600 ppm⁶ (Nowicki & Associates, 1990b). The lateral and vertical limits of contamination were not delineated. Excavation was halted at 19 feet due to limitations in the equipment and safety concerns regarding the stability of the sidewalls.

The location of the release is approximated as a point between the two former tanks, estimated to be at latitude 47 degrees, 13 minutes, 43.61 seconds north and longitude 122 degrees, 28 minutes, 52 seconds west.

2.2 PROPERTY HISTORY AND DEVELOPMENT

2.2.1 Historic Development

The following site history discussion summarizes information provided by facility personnel and presented in the Groundwater Remedial Investigation Report (PGG, 1992), Phase II RI (PGG et al., 1992), and Tacoma Public Library historical photos (Tacoma Public Library, 2011). This discussion is supported by Sanborn Fire Insurance maps (Sanborn maps) reproduced in Appendix B.

There is limited information about the property's use prior to development by Nalley's Fine Foods (Nalley's). In the 1912 Sanborn Fire Insurance map (Sanborn map, Appendix B), the northern portion of the current Birds Eye Foods property appears undeveloped, with the exception of a shed labeled "Bean St. Shaft" City Water Works Pumping Station. West of the Birds Eye property, in the area currently owned by the Tacoma School District (Figure 2), the J. L. Todd Lumber Company operated a planing mill in 1912. The existing railroad spur through the Boiler Room Site is depicted in the 1912 map, labeled as the Northern Pacific Rail Road Spur.

In the early 1940s, Nalley's Fine Foods (Nalley's) outgrew their original downtown Tacoma factory and moved their food production to the newly acquired property located between South Lawrence, South 35th, and Center Streets (Tacoma Public Library, 2011). The Nalley's facility expanded to become a major Tacoma-area industry and eventually the namesake of the "Nalley Valley," an industrial and warehouse district of Tacoma. The facility generally operated under the name Nalley's Fine Foods, although Curtice Burns Foods acquired Nalley's in the 1970s. Since that time, Nalley's has been a division of Curtice Burns Foods, who changed names to Agrilink Foods, Inc. in 1997 and to Birds Eye Foods in 2003.

In addition to the Nalley's operation, the 1950 Sanborn map depicts the Westwood Hardwood Company saw mill operation on the west side of Windom and South 35th Streets. Based on the Sanborn map, the saw mill was located in the vicinity of the Birds Eye Pallet Repair and Truck Maintenance buildings (Figure 2, Appendix B). The former J. L. Todd Lumber Company operation appears to have been replaced by the Pacific Match Company by 1950. The Match Company operation extended east to Windom

⁶ By EPA Method 418.1. See footnote 5.

Street and is interpreted to occupy a portion of the north-western property now owned by Birds Eye Foods.

In the early 1960s, General Plastic Mfg Co. operated a plastics manufacturing facility and compounding facility on tax parcel 0320077003 (Appendix B). By 1981, the city directory listed Nalley's Fine Foods as the property owner for this street address. Nalley's expanded pickle production into these buildings.

The Nalley's facility and main series of interconnected buildings expanded over the years. Many of the interconnected buildings were constructed during the 1950s and by 1969 the Nalley's facility had the same general configuration as present day, with the exception of the dressing plant and an eastern expansion of the maintenance shop at the north end of the main building.

Nalley's Fine Foods formerly owned and operated properties south of South 35th Street for staging of pickle tanks. The pickle tanks were dismantled and removed in approximately 2002 and the parcels were transferred to the City of Tacoma.

A railroad car unloading station, which included a boxcar height platform, was located south of the current Boiler Room. The platform had been removed and the surrounding area filled to ground level and covered with black-top prior to the 1991 RI activities (PGG, 1992).

Pickle processing, snack productions (potato and corn chips), salsa, canned foods, dressings, and peanut butter were produced at the facility throughout Nalley's Fine Foods history. The timing of the individual processes is largely unknown. Snack processing was discontinued in 1994 and pickle and salsa production were discontinued in 2002. Although the type of food produced at the Birds Eye facility changed over time, the facility on tax parcel 0320073062 has been used solely for food production since the saw mill and match company operations ceased between 1950 and 1969. Facilities on tax parcel 0320077003 have been used for food production and finished goods warehousing since the early 1980s.

2.2.2 Land Use

2.2.2.1 Current and Future Property Land Use

In June 2011, food production at the Birds Eye facility ceased. The facility is currently used for finished goods warehousing and distribution. It is anticipated that operations at the facility will cease before 2012.

Birds Eye currently holds the following permits for business operations:

Regulated Operation	Permit	Permit Dates
Industrial Wastewater Permit	#Tac-037-2008, Issued by City of Tacoma	Issue: 11/21/08 Expires: 11/21/13
Industrial Stormwater	General Permit, Issued by WA Dept. of Ecology	Issue: 10/21/09 Expires: 1/1/15
Handle/store hazardous substances (>200 lbs) or have infiltration systems that manage storm water	South Tacoma Groundwater Protection Agency Permit #PT0004360, Issued by City of Tacoma	Issue: Auto annual renewal Expires: 12/31/11
Retort Cooling Water Discharge	NPDES Stormwater Discharge Permit #WA003741-9	Issue: 09/10/09 Expires: 09/30/14
Air Pollution Control – Puget Sound Air	PSAPCA Vessel/Source Registration Permit/Fee #11583	Issue: Auto annual renewal Expires: 1/1/21

The Birds Eye property is currently for sale. Future land use is unknown, but will likely be industrial given the industrial and commercial zoning of the Nalley Valley and surrounding property use.

2.2.2.2 Surrounding Property Land Use

The Birds Eye facility is located in the Nalley Valley or South Tacoma Channel, which has a long history of industrial land use. In a 1999 National Report on Brownfields Redevelopment by the U.S. Conference of Mayors, the Nalley Valley district was reported as

one of the most concentrated and vital areas for industry and employment opportunities in the Tacoma region and is also one of the most polluted...The Nalley Valley District has historically provided traditional and heavy manufacturing jobs with a small resident population... With over 100 brownfields and three EPA Superfund operable units in the vicinity of the Nalley Valley, nearly all of the land is contaminated to some extent and relatively few of these sites have been cleaned up (US Conference of Mayors, 1999).

A map showing the Birds Eye Facility relative to Ecology's Confirmed and Suspected Contaminated Sites in the area and the EPA Superfund Sites is presented in Figure 4. The Superfund sites in the vicinity of the Nalley Valley include:

- Well 12A/Time Oil, located approximately 0.5 miles east of the Birds Eye facility
- South Tacoma Field Superfund Site, located approximately 0.2 to 1.5 miles south of the Birds Eye facility
- Tacoma Landfill, located approximately 0.7 miles west of the Birds Eye facility

Groundwater Extraction and Treatment Systems (GETS) were installed at the Well 12A/Time Oil and Tacoma Landfill sites to pump and treat contaminated groundwater and to limit migration of the sites' groundwater plumes. At the South Tacoma Field Site, monitored natural attenuation is the selected remedial option for groundwater contamination. Further discussion of offsite contamination relative to the Boiler Room Site is presented in Section 2.9 of this 2011 RI/FS.

The Birds Eye property is zoned by the City of Tacoma as Heavy Industrial (M2) with South Tacoma Groundwater Protection District and South Tacoma Manufacturing/Industrial Center overlays. The surrounding properties are zoned as heavy or light industrial with the same overlays as the Birds Eye facility.

The Birds Eye property and surrounding areas are located within the South Tacoma Ground Water Protection District (STGPD), which is a special zoning overlay district managed by the Tacoma Pierce County Health Department (TPCHD) and codified in the Tacoma Municipal Code. The Ground Water Protection District was created in 1988 in response to contamination in two of the City's South Tacoma Wellfield wells (Wells 9A and 12A, Figure 5) from improper waste handling. The program is focused on pollution prevention and protection of water quality in the shallow, unconfined aquifer that underlies an industrial portion of the City. Facilities in the STGPD are regulated based on use or handling of hazardous substances.

Immediately north of the Birds Eye facility, the valley wall slopes upwards. Center Street, a major arterial road, runs along a break in the valley wall north of the Birds Eye property (Figure 2). North of Center Street is a residential area that is topographically higher than the Birds Eye facility and the Nalley Valley.

Parcels west of the Birds Eye facility are occupied by the Tacoma School District Buildings & Grounds, Planning and Construction, and Food Services divisions; the Seafarers International Credit Union, and City of Tacoma Fire Station #17 (Figure 2).

South 35th Street borders the Birds Eye property to the south. The Tacoma Water Works office building, parking lot, and municipal supply wells 2B and 2C are located south of the Birds Eye property. A paved, vacant area owned by Tacoma City Light is also located south of the Birds Eye property.

To the east, the Birds Eye facility is bordered by South Lawrence Street. A number of commercial and industrial properties are located on the east side of South Lawrence Street, as presented in Figure 2.

2.2.3 Regulatory Status

Following discovery of contamination associated with the former Boiler Room USTs (Section 2.1.2), Nalley's Fine Foods continued to work with representatives of TPCHD and Ecology to assess the nature and extent of contamination under the MTCA framework. Representatives of TPCHD also attended Nalley's interviews with engineering firms to design a remediation system (Nowicki & Associates, 1992b).

The Birds Eye site is listed in Ecology's facility database:

Site Name:	Birds Eye Foods also listed as: Agrilink Foods Inc, Agrilink Foods Inc Nalleys Fine Fd, Birds Eye Foods, Birds Eye Foods Inc, Birds Eye Foods LLC Tacoma
Facility-Site ID:	1328
Cleanup Site ID:	5012
Rank:	2

In September 2011, Birds Eye entered Ecology's Voluntary Cleanup Program and was assigned VCP site number SW1187.

2.3 SITE RAIL AND UTILITY FEATURES

As described previously, the Boiler Room Site is located in a vehicle corridor oriented north-south. The vehicle corridor and the Boiler Room Site are divided into east and west halves by a railroad spur and adjacent overhead power lines. Based on the 1950 Sanborn map (Appendix B), Windom Street (Figure 2) formerly extended onto the current Birds Eye property, immediately to the west of the railroad spur that transects the Boiler Room Site. This is likely the reason for the large number of underground and overhead utilities located within the Boiler Room Site. The following description of utilities in the vicinity of the Boiler Room Site is based on information provided by Puget Sound Energy (PSE), private and City of Tacoma underground utility locators, and facility maps provided by Birds Eye Foods. Approximate locations of underground utilities are presented in Figure 3.

Tacoma Power has a transmission power line that transects the Boiler Room Site and Birds Eye facility parallel to the railroad spur. The transmission pole immediately outside the Boiler Room is host to overhead transformers. The transmission line continues beyond the Birds Eye facility into the residential areas north of Center Street, crosses State Route 16 (Figure 1), and continues north. South of the Birds Eye facility, the transmission line follows South 35th Street toward the east. Tacoma Power distribution poles are also present at the Birds Eye facility, approximately 370 feet north of the Boiler Room.

A 6-inch PSE high-pressure natural gas line runs north-south under the Birds Eye facility and Boiler Room Site to service the communities of Fircrest, located northwest of the Birds Eye facility. PSE report that their lines are typically 3 to 4 feet below ground surface. The 6-inch line pre-dates natural gas service to the Birds Eye facility, which began in 1956. A 4-inch, high pressure, service line supplies natural gas to the Birds Eye facility; it tees off the 6-inch line, then parallels the 6-inch line for approximately 50 feet before heading east to the meter. The depth of the 4-inch line is likely 3 to 4 feet below ground except where it crosses under the tracks, where it is approximately 10 feet below ground. The section under the tracks was replaced in the mid-2000s in response to a natural gas leak. PSE intends to replace the existing 4-inch line east and west of the tracks in winter 2011/12 and to tie the new line into the 6-inch line further to the north of the current tie-in. With this modification, the portion of the service line that parallels the 6-inch line will no longer be necessary. The service line under the tracks will not be replaced. (Potter, 2011a and 2011b).

A City of Tacoma gravity storm line also runs north-south through the Boiler Room Site on the west side of the rail tracks. According to the City's online map viewer (City of Tacoma, 2011), the storm line is 21 inches in diameter. Based on field observations at a manhole approximately 50 feet south of the Pickle Plant (Figure 2), the depth of the storm line is approximately 7 to 10 feet below ground. Storm water collected at the Birds Eye facility and adjacent Tacoma School District property (Figure 2) discharges to the City of Tacoma storm line.

Birds Eye facility storm water lines are 8 to 15 inches in diameter and tie into the City of Tacoma storm line approximately 50 feet north of the Boiler Room Site. The facility storm water lines parallel the City storm line to the west. Birds Eye facility maps also indicate that facility storm lines outside the Boiler Room Building cross under the tracks to tie into the north-south facility line. The depth measured from ground surface to the bottom of a facility storm sewer catch basin in the vicinity of the Boiler Room was approximately 2.5 feet.

In the 1992 Phase II RI (PGG et al., 1992), a sanitary sewer was depicted in the Site Plan in the approximate location of the City of Tacoma storm line; however, based on the facility maps and the City's online map viewer, the sanitary sewer lines are located in the vicinity of the Pickle Plant, northwest of the Boiler Room Site (Figure 3). It is therefore inferred that the sewer line depicted in the 1992 Phase II RI (PGG et al., 1992) was actually the City storm line.

Facility water lines oriented north-south also cross under the Boiler Room Site between the railroad spur and the Boiler Room and Potato Storage Warehouse. The lines run east into the warehouse and also extend south to South 35th Street. According to facility personnel, the lines are 6 or 8-inches in diameter. In the 1991 Groundwater RI, the water lines were identified as "fire lines." However, according to facility personnel, the fire protection lines are separate from the facility water lines and are located outside the Boiler Room Site (Fehseke, 2011).

2.4 NATURAL CONDITIONS

2.4.1 Physiographic Setting and Topography

The Tacoma area consists of an upland drift plain that is transected by glacial outwash channels and an alluvial valley east of the City that is part of the Puyallup River Valley. The Birds Eye facility is located in the South Tacoma glacial outwash channel, or South Tacoma Channel (Figures 4 and 5). The north end of the South Tacoma Channel is locally named the Nalley Valley after the Nalley's Fine Foods operation.

The South Tacoma Channel is a steep-sided glacial outwash depression oriented west-southwest from Commencement Bay to approximately the Birds Eye facility and then oriented toward the south. Further to the south, the channel widens and opens into a broad glacial outwash plain.

Ground surface elevations along the South Tacoma Channel range from sea level at Commencement Bay to about 245 to 255 feet above sea level at the Birds Eye facility. The channel floor at the Birds Eye facility is about 65 feet lower than the upland to the north. Topography at the Birds Eye facility is relatively flat with a minor downward slope to the southwest.

2.4.2 Geologic Setting

2.4.2.1 Regional Geology

The Tacoma area is located at the south end of the Puget Lowland, which has been glaciated several times, shaping the geology and hydrogeology of the area. The most recent was the Vashon Stage of the Frasier Glaciation that reached the central Puget Sound region about 15,000 years ago. The typical sequence of Vashon glacial deposits in order of decreasing age are advance deposits, till, and recessional deposits. As the glacier advanced south into the Puget Sound Lowland, rivers emanating from its front transported and deposited sediments that are identified as advance deposits. As the glacier overrode these advance deposits, compact mixtures of unsorted silt, sand, gravel, cobbles, and boulders were deposited in a tight matrix identified as glacial till. Subsequently, as the glacier retreated, rivers again deposited recessional sand and gravel on top of the glacial till. Interglacial periods came between each of the glacial incursions. The interglacial period immediately preceding Vashon time is called the Olympia interglacial period.

Glacial deposits in the South Tacoma Channel may not follow the typical sequence because of the dynamic and complex depositional regime in the area. During recession of the Vashon ice lobe, glacial lakes named Lake Puyallup and Lake Russell formed east and west, respectively, of the Tacoma Upland. As the ice front receded northward, successively lower outlets from the ice-dammed lakes were exposed. When the last (most northerly) Lake Puyallup outlet was exposed, the sudden opening resulted in a catastrophic flooding event with floodwaters flowing west from Lake Puyallup to Lake Russell, which was approximately 40 feet lower. This flood created the South Tacoma Channel by eroding through the previously deposited Vashon advance and till units and then depositing the recessional Steilacoom Gravel, which occurs near the surface of the valley or channel floor. The geologic map (Troost, In Review) indicates that the Birds Eye site is underlain by Steilacoom Gravel (Figure 5).

2.4.2.2 Site Geology

This discussion of Site geology is based on information presented in the 1992 RI (PGG, 1992) and 1992 Phase II RI (PGG et. al., 1992) reports, and the 2011 Soil Investigations (Appendix A2).

Numerous drilling tasks were performed at the Birds Eye facility for Boiler Room Site characterization in 1991, 1992, 1994, and 2011. During these investigations, three stratigraphic units were encountered in the vicinity of the Former Boiler Room Site:

- Fill
- Upper Sand
- Upper Gravel

For reference to larger-scale studies in the Tacoma area, the Upper Sand and Upper Gravel are mapped regionally as the Steilacoom Gravel geologic deposits as presented in Figure 5 (Troost, In Review). A regional cross section (Figure 6) through the Birds Eye facility is reproduced from the 1992 Phase II RI along the profile trace presented in Figure 2.

Fill

A layer of structural fill, approximately 4 to 12 feet thick and consisting of sand and gravel occurs at ground surface at the Boiler Room Site. The fill is approximately 15 to 19 feet thick where it was used to backfill the former UST excavations. The lateral extent of fill is unknown. The unit is not saturated with groundwater and field observations of the texture suggest this unit is relatively permeable.

Upper Sand

The Upper Sand is the shallowest naturally occurring unit at the Site. It is a 30 to 50 foot thick layer of fine to medium sand with minor gravel. At the Boiler Room Site the water table occurs in the Upper Sand Unit.

Upper Gravel

The Upper Gravel is a layer of approximately 50 to 100 feet of sandy gravel with significant interbeds of sand that range in thickness from 3 to 30 feet. The Upper Gravel may represent the Vashon advance outwash, a unit of interbedded coarse sand and gravel. The Upper Gravel is in direct contact with the overlying Upper Sand in the Birds Eye vicinity.

2.4.3 Hydrogeologic Setting and Groundwater System

2.4.3.1 Hydrogeologic Units

The aquifer system in South Tacoma is characterized by three primary aquifers separated by a series of low permeability, semi-confining units. The City of Tacoma and USGS have adopted different nomenclature for the aquifers:

City of Tacoma/ Tacoma Water	USGS	Encountered During Drilling at Birds Eye
Shallow Aquifer	AL Alluvial valley aquifer A1 Aquifer (Vashon Steilacoom Gravel and Recessional Outwash) A3 Aquifer (Vashon Advance Outwash)	Yes
Sea Level Aquifer	C Aquifer	No
Deep Aquifer	E or G Aquifer	No

A series of low permeability, semi-confining units (Layers B, D, and F) separate the aquifers. These semi-confining units are primarily comprised of fine-grained non-glacial sediments that limit flow between aquifer units. To date, drilling at the Birds Eye facility has not progressed deeper than the Shallow Aquifer; however, Tacoma Water Wells 2A, 2C, and TW 89.7 in the vicinity of the Site were drilled into deeper hydrogeologic units (Figures 2 and 6).

Shallow Aquifer/A1 Aquifer

The saturated portions of the Upper Sand and Upper Gravel units identified during drilling at the Birds Eye facility are part of the Shallow Aquifer, also known as the A1 Aquifer. Depth to groundwater in Boiler Room Site wells is typically 23 to 28 feet below ground; however the minimum and maximum measured at the site are about 18 and 30 feet, respectively (Figure 7).

The Shallow Aquifer is highly productive and has been developed by a number of City production wells. In particular, Well 2B, which is located approximately 300 feet southwest of the Boiler Room Building, is completed in this aquifer between 58 and 78 feet below ground. Other nearby City of Tacoma wells interpreted to be completed in the Shallow Aquifer include Wells 12A and 9A and are summarized in Table 2 and presented in Figure 5.

Silt/Clay Aquitard/A2 Confining Unit)

A regional silt/clay layer that is 8 to 28 feet thick occurs between the Shallow and Sea Level aquifers. Although the layer is widespread, it is not continuous in the Tacoma area (Ecology, 2005). However, the silt/clay layer was encountered during drilling at Wells 2A and 2C, approximately 300 feet south-west of the Boiler Room Building. At Well 2C, the layer was described as gray, soft clay. In the context of the South Tacoma Aquifer System, this layer is described as a highly variable aquitard composed of interbedded silt, silty sand, silty sandy gravel, and sandy gravel (Robinson, Noble & Saltbush, 2007).

Sea Level Aquifer/C Aquifer

Throughout the South Tacoma Aquifer System, the Sea Level Aquifer, or C Aquifer, generally occurs at elevations of 150 feet above to 50 feet below sea level (Robinson, Noble & Saltbush, 2007). A number of the City's production wells are completed in this aquifer. During drilling at Well 2C, Sea Level Aquifer materials were described as coarse sand with gravel and cobbles. The Sea Level Aquifer is a thick heterogeneous glacial sequence of stratified sand and gravel often referred to as the Salmon Springs Drift.

Silty Aquitard/D Confining Unit)

A thick silty aquitard with occasional sand and gravel layers occurs between the Sea Level and Deep Aquifers (Robinson, Noble, & Saltbush, 2007). At Well 2C, approximately 115 feet of clay was penetrated between the aquifers.

Deep Aquifer/E and G Aquifers, and Deeper Aquifer Zones

The City of Tacoma identifies a third, "Deep Aquifer" that correlates to the USGS E, G, and deeper aquifers. The Deep Aquifer is generally 800 to 1,300 feet deep and occurs between 600 and 1,000 feet below sea level (Robinson, Noble, & Saltbush). Tacoma Water Well 2C is completed in this aquifer and screened from 1,110 to 1,115 feet and 1,135 to 1,295 feet below ground. The aquifer materials encountered at Well 2C are described as gravel with wood and sand layers.

2.4.3.2 South Tacoma Wellfield

Previous studies in the South Tacoma Channel and for the Birds Eye Facility have described the influence of production well pumping on shallow groundwater flow in the area. Therefore, a brief discussion of nearby production wells is included in this section.

Tacoma Water provides water service to residences, businesses, and industries located in the cities of Tacoma, University Place and Ruston; as well as portions of other cities, portions of Pierce County, and the southern portion of King County. Tacoma Water's primary source of water supply is the Green River. The surface water source can be replaced with water from wells located on the North Fork of the Green River when water in the river is turbid or cloudy (City of Tacoma, 2008). The North Fork Wellfield was developed in 1975.

In addition to sources in the Green River Watershed, Tacoma Water has several different groups of wells and springs in their service area which can supply approximately 15-percent of total annual water requirements. The wells are primarily used for peaking needs and for offsetting Green River supplies during periods of high demand or high turbidity (City of Tacoma, 2008). Multiple wells in the South Tacoma Wellfield are in the vicinity of the Birds Eye Facility. Wells closest to the Birds Eye facility are summarized in Table 2 and presented in Figure 5. The remaining South Tacoma Wellfield wells are located approximately 0.5 to 2.5 miles south of the Birds Eye Facility.

2.4.3.3 Groundwater Flow

Groundwater recharge originates as precipitation in the Tacoma upland with shallow groundwater flow east toward the Puyallup River and west toward Puget Sound. Previous studies (Griffin et al., 1962; Brown and Caldwell, 1985) have mapped a natural groundwater divide in the Shallow Aquifer in the vicinity of the South Tacoma Channel and the Birds Eye facility (Figure 5). The axis of the divide is generally oriented north-south and groundwater flows away from the divide both east toward the Puyallup River and west toward Puget Sound. The axis of the divide can shift to the east or west under the influence of production well pumping. Therefore, groundwater flow directions in the vicinity of the axis can vary by nearly 180-degrees.

Water table contour maps from previous Birds Eye reports are reproduced in Appendix C. The maps represent data collected between 1991 and 1999. The contour maps reflect the transient nature of groundwater flow in the Shallow Aquifer near the Birds Eye facility. Groundwater flow directions rotate from west to north to southeast or east. With very low horizontal gradients across the site, a minor change in groundwater level could suggest a shift in groundwater flow direction. Site-wide water level measurements were discontinued following 1999 when the frequency of water quality monitoring was reduced to annual.

The local groundwater flow system is very dynamic and responds to local stresses like pumping. The influence of the South Tacoma Wellfield on water levels at the Birds Eye site was evaluated in the summer of 1992 (RZA Agra, 1992b). During the summer of 1992, Well 2B was pumped for two days in early September and Wells 11A and 12A (Figure 5) were pumped continuously from mid-August through the end of September 1992. The main findings of the water level study were:

- It is likely that pumping Well 2B can cause a reversal in the hydraulic gradient (RZA Agra, 1992b). Note that the non-pumping groundwater flow direction was interpreted to be toward the northeast.
- The combined pumping of Wells 11A and 12A caused a decline in groundwater levels at the Birds Eye facility of approximately 2 feet relative to earlier summer water levels (RZA Agra, 1992b). The groundwater contour map for September 1992 (Appendix C) suggests a steeper hydraulic gradient in the eastern portion of the facility toward Well 12A than July and August 1992 contour maps. The October 1992 groundwater contour map (Appendix C) after Wells 11A and 12A ceased pumping suggests that flow in the vicinity of the former USTs was south east toward Well 12A and the gradient east of the Birds Eye facility was flatter.
- Pumping Shallow Aquifer wells farther away than Well 11A (approximately 4,000 feet southwest of the Birds Eye site) were not found to affect Site groundwater levels (RZA Agra, 1992b).

The water table at the Birds Eye facility is relatively flat. Among the 56 groundwater contour figures reproduced in Appendix C, the differences between high and low groundwater elevations in a single contour map range from 0.18 to 1.36 feet, with an average of 0.47 feet. This is graphically presented in Figure 8, which demonstrates that the difference in groundwater elevations was 0.8 feet or less for 91-percent of contour figures generated from 1991-1999 data. Contour patterns for four of the maps with groundwater elevation differences greater than 1 foot suggest the influence of Well 12A pumping (September 1992, August 1994, August 1996, and August 1997).

The average horizontal groundwater gradient estimated in the 1992 Groundwater RI was approximately 0.0005 ft/ft toward the northeast (RZA Agra, Inc., 1992b). A gradient of 0.001 to the east was estimated from water level data collected in October 1992 and considered representative of conditions imposed by summer pumping of TPU Wells 12A and 9A (RZA Agra, 1992b).

Groundwater gradients can be divided into vertical and horizontal components. The vertical component is quantified using water-level elevations from two adjacent wells completed at different depths. Birds Eye well pairs MW-4S/D and MW-9S/D each had one well completed in the Upper Sand and one well in the Upper Gravel units. Historic water levels measured in the well pairs were used to estimate vertical gradients (Table 3). MW-4S/D consistently show a downward gradient and the historic average is 0.014 ft/ft⁷. The downward gradient at MW-9S/D is not as strong, averaging 0.006 ft/ft. Among the MW-9S/D water level measurements, 3 out of 42 measurements demonstrate an upward groundwater gradient. Relatively strong downward gradients have also been reported at other sites in the South Tacoma Channel, including the EPA Superfund Time Oil/Well 12A site (CDM, 2009), located approximately 0.5 miles east of Birds Eye. Downward gradients suggest that the Birds Eye facility is located in a groundwater recharge zone.

⁷ Note that the vertical gradient presented in the 1992 Groundwater RI/FS was calculated from an incorrect difference between the screen midpoints. A difference of 27.5 feet was used in the 1992 calculations; however, well construction information indicates a difference of 42 feet is more accurate.

2.4.3.4 Aquifer Properties

Aquifer properties were estimated in previous reports based on slug tests performed in select Boiler Room Site monitoring wells (PGG, 1992a) and a 25-hour pumping test performed in pilot extraction well⁸ drilled at the Site (RZA Agra Inc., 1992b). Aquifer properties are summarized in Table 4. Water level response curves are available in the original reports and are not reproduced in this 2011 RI/FS.

Pumping tests have a larger radius of influence and therefore stress a larger aquifer volume than slug tests, which stress aquifer materials immediately surrounding the well. Therefore, aquifer properties estimated from pumping tests are typically more representative of bulk aquifer materials than those estimated from slug tests. The average transmissivity of the Upper Sand portion of the Shallow Aquifer was estimated to be 92,000 gallons per day per foot (gpd/ft) based on the pilot extraction well pumping test. Given the duration of the pumping test, this estimate likely reflects a combined transmissivity of the Upper Sand and Upper Gravel portions of the Shallow Aquifer.

2.4.3.5 Status of Well 2B

In the 2002 Tacoma Wellhead Protection Program Report (TPCHD, 2002), Well 2B is identified as an emergency supply well⁹ due to taste and odor considerations. Metering data received by Ecology from Tacoma Water indicate that Well 2B was only pumped during one month between November 2008 and January 2010. A monthly total of 0.0457 acre-feet (14,891 gallons) was pumped from Well 2B during August 2008. Assuming the pumping rate of 1,500 gallons per minute (gpm; PGG et al., 1992), the duration of pumping was approximately 10 minutes.

In late 2010, PGG made repeated attempts to contact the Tacoma Public Water Supply Manager to inquire about the utility's plans to use Well 2B as a water supply source. Unfortunately, our efforts were unsuccessful. We spoke with the TPU Water Quality Manager, Chris McMeen, who had participated in a meeting with Birds Eye and PGG representatives regarding Well 2B in 2005. Mr. McMeen receives annual groundwater monitoring reports for the former Nalley's site.

There are three wells at the 2B site: Well 2A, Well 2B, and Well 2C. Mr. McMeen reported that there had been no production from any of the 2A/2B/2C wells for the 3 or 4 years prior to 2010, possibly longer (McMeen, 2010). Mr. McMeen reported that Well 2B has not been used due to poor water quality; referring in particular to high chloride and impacts from Nalley's previous pickle production. Well 2C (Deep Aquifer well) has elevated ammonia concentrations. According to Mr. McMeen, if Tacoma Water wanted to use one of these three wells for water supply, it would be Well 2C. In that event, they would treat the water to meet acceptable ammonia concentrations.

⁸ Pilot extraction well was 6-inches in diameter and completed with a 5-foot screen from 40 to 45 feet below ground surface in the Upper Sand unit.

⁹ Not routinely used supply source; emergency supply sources are typically used as needed to meet high demands.

2.4.4 Surface Water and Sediment

There are no surface water bodies on the Birds Eye property. The nearest surface water body is Snake Lake, located approximately one-half mile to the northwest.

Storm water from roofs and paved areas in the western part of the property is collected in catch basins and routed to the Flett Creek Waterway; whereas storm water from roofs and paved areas in the remaining portions of the site is collected in catch basins and routed to the Thea Foss Waterway, which drains to Commencement Bay.

2.4.5 Vegetation

The Birds Eye property is largely paved and there is no vegetation with the exception of small landscaped areas along the northern and eastern perimeter of the site along public thoroughfares. The landscaped areas are approximately 0.1 to 0.2 miles northeast and north of the former Boiler Room USTs.

2.4.6 Climate

The climate of the Puget Sound area is characterized as marine west coast or “Pacific Maritime.” The prevailing winds move moist air inland from the Pacific Ocean, moderating both winter and summer temperatures. According to the Western Regional Climate Center (WRCC, 2011) climatic average data from 1982 to 2005 for Tacoma weather station (458278), the annual average precipitation is 38.8 inches. Three-quarters of the precipitation is distributed throughout the rainy season from October to March. On average, the driest months are July and August.

Average high temperatures are below 60 degrees Fahrenheit from November through March with average lows in the high 30s to low 40s. December through March are typically the coldest months and July and August are the warmest (Western Regional Climate Center, 2011).

2.4.7 Natural Resources and Ecological Receptors

The Terrestrial Ecological Evaluations (TEE) in MTCA provides a process for evaluating potential impacts from contaminated soil to plants and wildlife. Sites that do not qualify for one of the primary exclusions may be evaluated using a simplified ecological evaluation or a site-specific evaluation. The Birds Eye Boiler Room Site qualifies for a simplified evaluation based on MTCA’s four primary concerns in relation to terrestrial ecological receptors (Appendix D).

The Boiler Room Site is largely paved and there is less than 0.25 acres of undeveloped land¹⁰ within 500 feet of the Site. Based on the Simplified Terrestrial Ecological Evaluation-Exposure Analysis (Appendix D), land use at the site and the surrounding area make substantial wildlife exposure unlikely and no further evaluation is required.

¹⁰ Land that is not covered by buildings, roads, paved areas, or other barriers that would prevent wildlife from feeding on plants, earthworms, insects, or other food in or on the soil (WAC 173-340-7491(1)(c)(iii))

2.5 ENVIRONMENTAL INVESTIGATIONS, INTERIM ACTIONS, AND REMEDIATION SYSTEM DESIGN

Multiple environmental investigations and interim actions have been conducted at the Former Boiler Room UST Site on the Birds Eye property. The investigations and interim actions are briefly summarized in the following sections; more detail is provided in Appendix A1 (investigations prior to 2011) and Appendix A2 (2011 investigations). The investigation references are summarized in Table 5 and a timeline of investigations and interim actions is presented in Figure 9.

2.5.1 Remedial Investigations

Major phases of environmental investigation were completed in 1991, 1992, and 2011 in the vicinity of the Boiler Room Site. These investigations were completed following site discovery in 1990 and the initial soil samples collected during site discovery (Section 2.1.2). The focus of the investigations has been soil and groundwater quality. Analytical results and supporting figures for previous investigations are presented in Appendices A1 and A2.

2.5.1.1 May 1991 Monitoring Well Installation with Soil and Groundwater Quality Evaluation

A series of monitoring wells (MW-1 through MW-6) were installed surrounding the former Boiler Room UST excavations as directed by Nowicki & Associates with input from TPCHD (Nowicki & Associates, 1991). Soil samples collected from boreholes between and within the former UST excavations showed concentrations of diesel/heavy oil and xylenes above Ecology screening limits at the time, as reported in the summary report (Nowicki & Associates, 1991). The lab reports appended to the Monitoring Well Installation Summary Report indicate elevated concentrations of ethylbenzene, toluene, and xylenes in soil from MW-5 and MW-6; however, these detections were not discussed relative to Ecology screening limits in the summary report.

In addition, groundwater samples collected from wells between and within the former UST excavations showed concentrations of total petroleum hydrocarbons, diesel/heavy oil, 2-methylnaphthalene, and anthracene above Ecology screening limits at the time, as reported in the summary report (Nowicki & Associates, 1991). Summary tables of analytical results from the 1991 Monitoring Well Installation are presented in Appendix A1 (Tables A1-1 through A1-5).

2.5.1.2 1991 Soil and Groundwater Remedial Investigations

As directed by TPCHD, field work associated with remedial investigations of soil and groundwater were performed in 1991. The RIs were issued under separate covers. Nalley's Fine Foods Remedial Investigation Report (Nowicki & Associates, 1992a) documents the soil investigation and the Groundwater Remedial Investigation Report (PGG, 1992) documents the groundwater investigation.

The major findings of the two 1992 RI reports were:

- The extent of petroleum-contaminated soil was delineated as any detectable presence of petroleum compounds. This resulted in a lateral footprint of approximately 11,000 square feet on both the east and west sides of the railroad spur. The depths of soil contamination ranged from approximately 14 to 29 feet below ground in the vicinity of the former tanks. However, the vertical extent of soil contamination was not defined¹¹. Soil data presented in lab reports in the soil remedial investigation report (Nowicki, 1992) are summarized in Tables A1-1 and A1-3.
- Groundwater at the time of drilling was at approximately 27 feet below ground. The local groundwater flow direction under non-pumping conditions was toward the northeast. However, when nearby shallow Tacoma Public Utility (TPU) production wells were pumped, groundwater flow direction could be reversed (PGG et al., 1992).
- Groundwater seepage velocity was estimated to be between 0.02 to 0.3 feet per day in ambient conditions (PGG, 1992).
- Free product (mixture of diesel and heavy oil) was found in two monitoring wells – one installed between the two tanks and one installed in the footprint of the former South Tank.
- A round of groundwater samples was collected. Groundwater concentrations of total petroleum, diesel, and benzene in monitoring wells in the vicinity of the former tanks and to the north of the former tanks were elevated above state cleanup levels established at the time. Data are summarized in Tables A1-6 and A1-7.
- Additionally, November 1991 groundwater concentrations of chloride and sodium in virtually all site monitoring wells were elevated above Washington State groundwater contaminant levels¹². Data are summarized in Tables A1-6 and A1-7.

2.5.1.3 1992 Phase II Groundwater Remedial Investigation

A second groundwater remedial investigation was performed in the spring of 1992 to address comments made by TPCHD and Ecology following review of the initial RI reports. The results were presented in a Phase II Remediation Investigation Report (PGG et. al., 1992) and Nalley's Fine Foods Feasibility Study (RZA Agra, 1992a). The analytical results for the groundwater samples are summarized in Table A1-8. The major investigation findings were:

- The hydraulic gradient under ambient (non-pumping) conditions was found to be very low, on the order of 0.0005 feet/foot.
- A numerical groundwater model assessed that under the influence of continuous Well 2B pumping, groundwater at the Birds Eye facility in the vicinity of the former USTs would take over 11 months to travel to Well 2B (PGG et. al., 1992). However, this assumed no groundwater flow from the Upper Sand to the Upper Gravel units.

¹¹ Soil samples were not collected deeper than petroleum-contaminated soil in multiple borings.

¹² Chloride concentrations in site groundwater samples ranged from 42 to 925 mg/L; relative to the Washington State maximum contaminant level (MCL, WAC 173-200) of 250 mg/L. Sodium concentrations in site groundwater samples ranged from 47.4 to 590 mg/L; relative to the EPA-recommended maximum level of 20 mg/L for those on sodium-restricted diets. There are no MTCA Method A, B, or C cleanup levels for chloride or sodium in groundwater.

- Dissolved heavy petroleum concentrations in groundwater samples collected in February and May 1992 near the former tanks exceeded state cleanup levels established at the time for MTCA Method A.
- Chloride concentrations in groundwater samples collected in February and May 1992 were elevated above Washington State groundwater contaminant levels¹³ and appeared to be higher in the southern portion of the site than the north (PGG et. al., 1992).
- Quarterly groundwater monitoring began.

2.5.1.4 1992 Feasibility Study

A feasibility study was performed in 1992 to develop and evaluate a range of remedial action alternatives for the Boiler Room Site (RZA Agra, 1992a):

- Steam injection and groundwater injection/extraction was identified as the preferred remedial option.
- An evaluation of water collected from the Boiler Room Site indicated the presence of many small to medium sized rod shaped bacteria characteristic of the family Pseudomonaceae; many of which are known to degrade petroleum hydrocarbons. The need for additional study to evaluate the effectiveness of the bacteria to degrade site chemicals of concern was acknowledged.

2.5.1.5 2011 Soil Remedial Investigation

In 2011, investigations were performed to evaluate the current status of petroleum-contamination in soil at the Boiler Room Site. Two phases of borehole drilling and soil sampling were performed in January/February 2011 and July 2011. Soil samples collected during drilling were analyzed for:

- Diesel and residual (heavy) oil range organics by NWTPH-Dx
- Gasoline range organics by NWTPH-G and SW8021F
- BTEX by SW8021B, SW8021F, and SW8260C

In addition, select soil samples collected in January/February 2011 were analyzed for PAHs and Volatile Petroleum Hydrocarbons and Extractable Petroleum Hydrocarbons.

The 2011 Soil Remedial Investigations are documented in Appendix A2-1 and A2-2. The analytical data is assessed in the Nature and Extent of Contamination in Section 2.8 of this report. The major findings of the 2011 Soil Remedial Investigation were:

- Soil concentrations of petroleum hydrocarbons at the Boiler Room Site exceeded MTCA screening levels ranging from 9 to approximately 40 feet below ground.

¹³ Chloride concentrations in site groundwater samples ranged from 3.7 to 1200 mg/L; relative to the Washington State MCL of 250 mg/L. Sodium concentrations in site groundwater samples ranged from 14 to 679 mg/L; relative to the EPA-recommended maximum level of 20 mg/L for those on sodium-restricted diets. There are no MTCA Method A, B, or C cleanup levels for chloride or sodium in groundwater.

- Non-aqueous phase liquid (NAPL) was observed in soil above the water table (vadose zone) and below the water table (smear and/or saturated zones).
- The lateral extent of soil-contamination (concentrations above MTCA screening levels) is comparable to that delineated for the 1992 Soil RI.

2.5.2 Interim Actions

Interim cleanup actions performed at the former Boiler Room Site include initial soil excavation associated with tank removal and two phases of product recovery.

2.5.2.1 Soil Source Removal

As described in Section 2.1.2, soil immediately surrounding the former Boiler Room USTs was excavated to the extent possible when the tanks were removed. Soil surrounding the North Tank was excavated to a depth of approximately 15 feet, in an area approximately 22 feet by 43 feet. The excavation was backfilled by approximately 525 cubic yards of clean fill. The North Tank had a 10,000 gallon capacity, or 50 cubic yards approximately. Therefore, approximately 475 cubic yards of soil was excavated from the vicinity of the North Tank. The relative percentage of contaminated soil excavated was not quantified in documents reviewed for this 2011 RI/FS.

The lateral dimensions of the excavation around the South Tank were not documented in reports reviewed for this 2011 RI/FS. Based on the saw-cut measurements, the excavation surrounding the South Tank was approximately 19 feet deep in an area approximately 48 feet by 15 feet¹⁴. Based on a tank volume of 20,000 gallons, or 100 cubic yards, approximately 400 cubic yards of soil was excavated from the vicinity of the South Tank. Field observations indicated uniform contamination in soil below 15 feet, so approximately 105 cubic yards of contaminated soil were removed.

In a 1997 memo summarizing the discovery of the former Boiler Room Site and describing Site status, it was estimated that approximately 370 tons of contaminated soil was removed from the site and disposed of in an approved manner (Reid, October 1996). The RI/FS states that approximately 600 tons of petroleum-contaminated soil was removed from the site in June 1992, including soil from the former Boiler Room UST excavations.

2.5.2.2 Product Recovery

There were two main stages of product recovery that effectively removed over 750 gallons of product as summarized below.

During the initial Remedial Investigation, a skimmer pump was installed in MW-5 and captured approximately **80 gallons** of free product between September 10, 1991 and December 15, 1991. The skimmer pump was removed from the site in January 1992 (Nowicki & Associates, 1992a).

Another product recovery effort was initiated during a “lull in construction” of the remediation system, likely between 1994/95 or 1995/96. For approximately one year, a skimming pump system was used to recover product from one of the site wells. Approx-

¹⁴ Saw-cut measurements provided in Nowicki & Associates, December 20, 1990, SK-2

imately **600 gallons** of oil product was removed over the year until the thickness of product on the water surface was insufficient to recover. Oil-specific absorbent “socks” were then used to capture an additional **80 gallons** of oil product (Nowicki & Associates, 1997).

2.5.3 Remediation System Design

Following completion of the 1992 Phase II RI (PGG et. al, 1992) and 1992 FS (RZA Agra, 1992b), Nalley’s Fine Foods retained RZA Agra to design the steam-injection remediation system. The design report was submitted for Ecology’s review in January 1993; however, it was not approved (Schenck, 1993). In November and December 1993, 28 groundwater extraction wells, groundwater injection wells, steam injection wells, product recovery wells, and performance monitoring wells were drilled at the site for the remediation system (Table 6). Construction bids for the remediation system were solicited from multiple firms in early 1994; however, Nalley’s Fine Foods rejected the bids because they exceeded the Engineer’s cost estimate (Nowicki & Associates, 1994).

With the exception of the remediation well installations, the steam-injection system was not constructed at the site because groundwater monitoring data collected subsequent to site discovery indicated that concentrations of petroleum compounds were declining. According to the PGG project manager at that time, the regulating agencies agreed that Nalley’s was not required to initiate the remediation system because petroleum concentrations in groundwater were declining (Prior, 2010). In 2003, the remediation wells were decommissioned (Section 2.5.4).

2.5.4 Long-Term Groundwater Monitoring

Groundwater quality at the Birds Eye facility has been monitored since the 1992 Groundwater RI. The highly variable nature of groundwater flow directions presented a challenge to designing the monitoring well network. Following the 1992 Phase II RI (PGG et al., 1992), groundwater samples were collected from a network of monitoring wells located throughout the southern portion of the Birds Eye facility (Figure 10). The frequency of monitoring was well-specific and varied from quarterly to annually.

Groundwater levels were contoured for each sampling event and the flat hydraulic gradient was acknowledged. Over time, concentrations of the dissolved plume declined and the plume did not appear to be migrating significantly. This was attributed to natural attenuation and the flat horizontal hydraulic gradient. Nalley’s consultants petitioned TPCHD to reduce the monitoring network and to focus on wells closer to the former UST excavations and on potential plume migration toward Well 2B. Modifications to the monitoring program were made in 1995 and 2001 (Table 6). Both modifications were made with TPCHD’s approval (Ruggiero, 1995; Nowicki & Associates, 2001).

Groundwater quality has been monitored in six Site wells on an annual basis since 2000. The annual monitoring wells were primarily selected to monitor hydrocarbon concentrations in groundwater that could be migrating offsite toward Well 2B under pumping conditions and to monitor hydrocarbon concentrations in groundwater within the area of soil contamination. The annual groundwater monitoring network is presented in Figure 10. Groundwater-monitoring summary reports are submitted to TPCHD and Ecology. Begin-

ning in 2005, monitoring reports are also submitted to TPU Water Division. The most recent sampling event was performed in December 2010.

Groundwater samples are analyzed for:

- Gasoline-range, Diesel-range, and Heavy-Oil range hydrocarbons
- Benzene, Ethylbenzene, Toluene, and Xylenes (BETX)
- Polynuclear Aromatic Hydrocarbons (PAHs)

In 2003, all site monitoring wells and piezometers other than the annual monitoring network were decommissioned by Gregory Drilling in accordance with WAC 173-160-460 on behalf of Birds Eye Foods. The wells and piezometers had not been used in approximately four years and there were no intentions at that time to expand the monitoring network.

The objectives of the original monitoring network were to assess the nature and extent of groundwater contamination at the water table resulting from the former Boiler Room USTs. The vertical component of groundwater flow was acknowledged and two deep monitoring wells were installed (MW-4d and MW-9d). However, vertical migration of the dissolved plume was not considered to be a complete pathway under the presumed remedy of groundwater extraction which would create upward gradients in the vicinity of the wells and discourage vertical contaminant migration (PGG, 1993).

2.6 POTENTIAL SOURCES OF CONTAMINATION

The 1991 Soil RI concluded that the heavy heating oil stored in the former USTs was the source of a portion of the Boiler Room Site contamination. However, the diesel contamination was not attributed to the former USTs, and potential diesel sources were identified, including:

- An unknown UST in the area (Nowicki and Associates, 1992).
- Diesel migration through the storm drain or backfill (Nowicki and Associates, 1992).
- The former saw mill located on the property, which may have used a hog fueled boiler system to dry wood and provide power and was potentially fueled with diesel. However, no storage tanks were found when Nalley's Fine Foods acquired that portion of the property (Nowicki and Associates, 1990a).
- Spills associated with the original boiler installed in 1947. The original building had no floor until the boiler was replaced in 1977 and a concrete floor was poured (Reid, 1992).
- Former Union Pacific Railroad storage of locomotives on the railroad spur in the 1940s and 1950s (Reid, 1992).
- Barrel storage during World War II just west of the contaminated area by a firm serving the military (Reid, 1992).
- Saw mill equipment located in the area that had diesel engines supplying power and light (Reid, 1992).

Geophysical surveys performed in the Boiler Room Site in 1992 did not identify USTs in the area (PGG et al., 1992). Fecal coliform analysis of groundwater samples in 1992 indicated that a sanitary sewer thought to be in the area was not contributing significant recharge and was therefore not considered to be contributing diesel contamination (PGG, 1992b). Further evaluation to the source of diesel contamination in soil and groundwater at the Boiler Room Site was not performed.

Bunker C or No. 6 fuel oil is dense, viscous oil produced by blending heavy residual oils with lighter, middle distillates to meet specifications for viscosity and pour point (NOAA, 2006). Because of the different composition of the residuals and lighter blending oils, the actual compounds found in heavy oils and their percent by weight is highly variable. Therefore, it is possible that the source of diesel-range organics in the subsurface at the Boiler Room Site were middle distillates blended with Bunker C.

There is an above ground, 2,000 gallon diesel tank immediately north of the Boiler Room that could have been a potential source. The tank is surrounded by secondary containment; however, there is underground transfer piping for the boiler backup diesel fuel that is not double-walled. Staining was not noted during an inspection of the diesel AST by a consultant previously retained by the facility.

As described in Section 2.1.2, the Boiler Room Site is located in a major truck and former rail traffic corridor with a number of underground utilities. Surface spills of hydrocarbons could have migrated to the subsurface and potentially migrated along preferential utility corridors. Hydrocarbon spills in the Boiler Room Area have not been documented prior to the Site discovery in 1990.

2.7 REGULATORY REQUIREMENTS

Federal and state laws applicable to the investigation and cleanup of the former Boiler Room UST site at the Birds Eye facility are:

Federal:

- Resource Conservation and Recovery Act (RCRA) Subtitle I

State and Local:

- Model Toxics Control Act (MTCA)
- State Environmental Policy Act (SEPA); applies if remedy is pursued that involves excavation of more than 500 cubic yards of soil
- Washington Water Pollution Control Act; applies if remedy is pursued that involves injecting compounds to the subsurface that will affect groundwater chemistry (oxidants, etc.)
- TPCHD Environmental Health Code Chapter 4 Underground Storage Tanks

2.7.1 Point Of Compliance

MTCA regulations specify points of compliance (POCs) for various media that may become contaminated. The POC applies to soil, groundwater, indoor air, or surface water at or adjacent to any location where releases of hazardous substances have occurred or that has been impacted by releases from the location.

MTCA also defines conditional POCs. These typically apply to a specific location as near as possible to the source of the release. However, under some site-specific circumstances a conditional POC may be established beyond the property if approved by Ecology. The regulatory requirements for indoor air, soil, groundwater, and surface water are discussed below.

2.7.1.1 Soil POC

The requirements for soil POCs are provided by the MTCA regulations WAC 173-340-740(6). The soil POC requirements depend on the relevant exposure pathway. The requirements specified by MTCA are as follows:

- For soil direct human exposure via ingestion, inhalation, or dermal absorption, the POC includes soil throughout the site to a depth of 15 feet below ground surface (bgs).
- For soil to indoor air inhalation (vapor intrusion) the POC are the soils throughout the site from the ground surface to the uppermost water table.
- For soil leaching to groundwater/surface water the POC is in soils throughout the site to the water table.

2.7.1.2 Groundwater POC

The requirements for groundwater POCs are provided by the MTCA regulations WAC 173-340-720(8). For groundwater, the standard POC is throughout the site from the uppermost level of the saturated zone extending vertically to the lowest-most depth which could potentially be affected by the site.

2.7.1.3 Indoor Air POC

The POC for indoor air is the air inside of a building.

Direct quantification of volatile organic compounds (VOCs) in indoor air is not necessary in Ecology Draft Vapor Intrusion Guidance (Ecology, 2009). As an alternative, the Guidance allows for estimates of indoor air VOC concentrations based on subsurface VOC concentrations. The appropriate subsurface media (groundwater, soil, soil gas, etc.) is based on the source zone of the contamination.

2.7.1.4 Surface Water POC

The POC for surface water cleanup levels as provided by MTCA regulations are the point or points at which hazardous substances are released to surface waters of the state unless a mixing zone is authorized by Ecology. The ultimate discharge point for groundwater in

the South Tacoma Channel is Puget Sound or Commencement Bay, which is part of the Commencement Bay, Nearshore / Tideflats Superfund Site that includes nearly 500 identified point and non-point sources of contamination. Given the industrial history of the Nalley Valley, both up- and downgradient of the Birds Eye facility, the contribution of petroleum contamination originating on an individual site in the valley would not likely be defensible. Therefore, impacts to surface water are not evaluated in this RI/FS.

2.7.2 Identification of Applicable Screening Concentrations

Site zoning, adjacent property information, and characteristics of the affected media were considered in the selection of applicable screening concentrations. Screening concentrations were obtained from the Cleanup Levels and Risk Calculations (CLARC) on-line database developed and maintained by Ecology. The CLARC database provides screening concentrations as described in MTCA.

2.7.2.1 Soil

Standard MTCA Method A Industrial Land Use screening concentrations for direct contact with soil are applicable at this site.

The property meets the criteria for an industrial property: it is zoned as industrial and there are no immediately adjacent residential properties on any side of the Birds Eye facility. Also, due to its proximity to other industrial properties and its value as industrial property, it is not likely that zoning will change in the future and there is no intent to change it. Finally, there is currently no direct public access to the Boiler Room Site. Regarding the site as ecological habitat, the property does not provide a suitable habitat for wildlife.

The site is zoned Heavy Industrial (M2) and surrounding properties are zoned Heavy or Light Industrial according to the City of Tacoma govME mapping tool (City of Tacoma website).

The lab analyst for diesel- and heavy-oil range hydrocarbons in the January/February Boiler Room Site soil samples made an observation that affects site screening levels for soil. Based on the sample chromatograms, the lab analyst noted evidence of two distinct signals in the diesel-range and heavy-oil ranges, as opposed to a single signal that spanned both ranges. Under MTCA, if there is clear evidence in the chromatogram that petroleum at a site consists of a mixture of diesel and heavy oil, the Method A Industrial cleanup level is 2,000 mg/kg for diesel-range organics and 2,000 mg/kg for heavy-oil range organics (Ecology, 2011). This is consistent with the chromatograms of the January/February Boiler Room Site soil samples. If there is not clear evidence in the chromatogram of two distinct signals or peaks, the combined Method A Industrial soil cleanup level for diesel- plus heavy-oil range hydrocarbons is 2,000 mg/kg (total).

2.7.2.2 Groundwater

Under MTCA, groundwater cleanup levels must be based on the highest beneficial use of groundwater. The highest beneficial use would be drinking water unless the criteria outlined in the MTCA definition are not met as detailed in WAC 173-340-720-2. Because

shallow groundwater is hydraulically connected to the potable aquifer that supplies the South Tacoma Wellfield, the drinking water criteria are met.

Standard MTCA Method A Unrestricted Land Use screening concentrations are applicable to the Boiler Room Site to evaluate the relative chemical effects from the site on groundwater. MTCA Method A meets the criteria of WAC 173-340-704(1) because there are few hazardous substances at the Site and numerical Method A standards have been established.

2.7.2.3 Indoor Air

MTCA Industrial air cleanup levels would be appropriate for buildings at the Boiler Room Site based on current land use and the expectation that future land use will remain industrial (Ecology, 2009). Industrial air cleanup levels are established under MTCA Method C (Ecology, 2009).

Ecology's Draft Vapor Intrusion Guidance (Ecology, 2009) has a tiered approach to evaluate if concentrations of volatile substances are high enough to pose a potentially unacceptable threat to indoor air quality with current or future site area buildings depending on the subsurface source:

- Shallow Groundwater Source (only): use measured groundwater concentrations or soil gas concentrations
- Vadose Zone Soil Source (only): use measured soil gas concentrations
- Shallow Groundwater and Vadose Zone Soil Sources: use measured soil gas concentrations
- LNAPL Source (on top of the water table): use measured soil gas concentrations

Based on observations of NAPL at the Boiler Room Site, the appropriate media to evaluate potential vapor intrusion would be soil gas. The appropriate screening levels would be sub-slab or deep soil gas screening levels established in the Draft Guidance that are protective of an industrial air cleanup levels. Benzene is the only petroleum-related VOC detected in soil and/or groundwater at the Boiler Room Site and would be the driver for vapor intrusion.

2.7.2.4 Surface Water

There are no surface water bodies on or adjacent to the Birds Eye facility; therefore surface water is not considered in this 2011 RI/FS.

2.7.3 Constituents of Concern

During the pre-RI investigations (Nowicki & Associates, 1991) and RI investigations (PGG 1992a, 1992b), soil and groundwater samples were analyzed for a broad range of contaminants including VOCs, SVOCs, petroleum hydrocarbons, and PAHs (Appendix A1). Groundwater samples were also analyzed for sodium, chloride, nitrate+nitrite, ammonia/ammonium, and coliform (Appendix A1).

The constituent list for long-term **groundwater** monitoring was narrowed to the following Constituents of Concern (COCs):

- Total Petroleum Hydrocarbons (TPH) including gasoline-, diesel-, and motor oil-range hydrocarbons
- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)
- Polycyclic Aromatic Hydrocarbons (PAHs)

Documentation of the rationale for discontinuing VOC and SVOC groundwater monitoring has not been identified or reviewed in preparation of this 2011 RI/FS. However, they were likely discontinued because the only VOC/SVOC parameters detected in soil and groundwater samples were 2-methylnaphthalene, BTEX compounds, and anthracene (a non-carcinogenic PAH compound).

Coliform monitoring was performed to assess potential aquifer recharge from sanitary and storm lines and was discontinued following the Phase II RI.

Inorganic groundwater monitoring performed as part of initial site characterization but was discontinued for long-term monitoring. Groundwater cleanup or screening levels are not established for these inorganic parameters under the MTCA framework

2.8 NATURE AND EXTENT OF CONTAMINATION

This section describes the type of contaminants at the Boiler Room Site (nature) and the distribution of these contaminants vertically and horizontally across the site (extent). The nature of soil contamination was assessed based on 1991 fingerprinting by gas chromatography and results of the 2011 soil investigations. The extent of soil contamination was assessed based on results of the 2011 soil investigations and the nature and extent of groundwater contamination is based on long-term monitoring data.

2.8.1 Soil

Select soil samples collected in 1991 for the RI were submitted to a lab for fingerprint characterization by gas chromatography. The lab identified the presence of medium boiling compounds such as those found in diesel fuel and medium boiling compounds such as those found in Bunker C or crude oil. In both cases, the material appeared to be unweathered. Regarding a 1991 soil sample collected adjacent to the former north UST, the lab commented that:

This would be a fairly expensive Bunker C because it contains the more valuable diesel portion. The gasoline portion has been removed and the presence of alkanes all the way through C34 implies a less refined crude oil (Nowicki and Associates, 1992).

The analytical results of soil samples collected during the 1990s are summarized in Appendix A1 tables. The remainder of the discussion of nature and extent of soil contamination is based on the results of soil investigations performed at the Boiler Room Site in 2011 (Appendix A2).

To assess the current status of soil, samples were collected from locations throughout the Boiler Room Site in 2011 and analyzed for diesel- and oil-range hydrocarbons by NWTPH-Dx. Select samples were also analyzed for gasoline-range hydrocarbons and BTEX compounds. Additionally, five soil samples were analyzed for PAH and VPH/EPH. Soil samples were collected at depths ranging from 9 to 55 feet below ground surface.

The NWTPH-Dx method reports petroleum hydrocarbons as diesel-range (C9 to C20) and oil-range (C20 to C32). Diesel fuel generally includes hydrocarbon ranges C9 to C20 whereas Bunker C is a fuel mixture that generally contains both diesel-range and oil-range hydrocarbons (C9 to C32). Therefore, the diesel-range analysis provides the concentration of diesel fuel and/or the lighter hydrocarbons in Bunker C within a sample, whereas the oil-range analysis provides the concentrations of the heavier hydrocarbons present in Bunker C.

The lab analyst made two significant observations from the January/February 2011 soil sample chromatograms (samples collected from boreholes B11-01 through B11-17) regarding the nature of contamination:

- The chromatogram peaks in the gasoline-range did not match the pattern of an identifiable gasoline chromatogram for any January/February 2011 Boiler Room Site soil sample with a detectable concentration of gasoline-range hydrocarbons.
- There were two distinct chromatogram signals or peaks in the diesel-range and oil-range—not a single peak that spans both ranges.

Borehole locations for the 2011 Soil Investigations are presented in Figure 3. Because of access limitations, boreholes were not drilled inside the Boiler Room. Boreholes B11-01 through B11-17 were drilled in January/February 2011; boreholes B11-18 through B11-23 were drilled in July 2011. The analytical results are presented in Tables 7 through 10. Soil concentrations of diesel-, heavy oil-, and gasoline-range hydrocarbons; and benzene relative to Method A Industrial cleanup levels are graphically presented in Figures 11 through 14.

Soil samples collected in 2011 in the vicinity of the Boiler Room Site exceeded MTCA Method A Industrial cleanup levels for:

- Diesel-range organics (Table 7 and Figure 11)
- Oil-range organics—samples from 3 boreholes only (Table 7 and Figure 12)
- Gasoline-range organics (Table 7 and Figure 13)
- Benzene (Table 8 and Figure 14)
- Benzo(a)pyrene and toxic equivalent of carcinogenic PAHs—5 samples analyzed for PAHs, 1 sample exceedance (Tables 9 and 10)
- Naphthalene—5 samples analyzed for PAHs, 1 sample exceedance (Table 9)

One of the main findings of the 2011 Soil Investigations was that the lateral extent of soil contamination is comparable to that delineated during the 1992 RI (Figure 10). Observations in the field and analytical results indicated that soil contamination could be

represented by three areas based on depth: the “Main Area,” “North Shallow Area,” and “West Shallow Area.” The areas are delineated on Figures 10 and 15 and discussed below. The vertical extents of select parameters are presented on cross sections in Figures 16 through 23. Please refer to Figure 15 for cross section traces.

2.8.1.1 Main Area

The “Main Area” of soil contamination is located both east and west of the railroad spur and extends under portions of the Boiler Room and Potato Warehouse (Figure 15). The Main Area is distinguished from the Shallow Areas because field screening techniques and/or analytical results generally did not indicate petroleum-related contamination was present in the upper 14 feet of soil¹⁵.

Chemicals of concern that exceeded Method A Industrial cleanup levels for soil in the Main Area are TPH (as diesel, oil, and gasoline-ranges), benzene, benzo(a)pyrene, and naphthalene (Tables 7 through 10). Diesel- and gasoline-range hydrocarbons are laterally the most extensive chemicals of concern in the Main Area (Figures 16-19) based on the data available.

Site chemicals of concern in the Main Area exceeded screening levels from approximately 14 to 40 feet below ground, in both unsaturated (vadose zone) and saturated portions of the Upper Sand unit. Non-aqueous phase liquid, or NAPL, was observed in the Main Area soil, both above and below the water table (see NAPL description in Section 2.8.2).

Generally, the top of petroleum-contaminated soil in the Main Area is shallower in the southern portion of the area near B11-08 and the concentrations of diesel-range and heavy-oil range organics in soil are greater in the southern portion of the Main Area (Figures 16-19). Soil with concentrations of diesel-range organics greater than the MTCA Method A Industrial cleanup level were encountered in the Fill Unit at approximately 15- and 14-feet below ground in boreholes B11-08 and B11-09 respectively; concentrations of diesel-, heavy oil-, and gasoline-range organics and benzene were also elevated above MTCA Method A Industrial cleanup levels in soil samples collected from B11-08 and B11-09 in the Upper Sand unit. Analytical results of soil samples collected in B11-08 reflect an increasing trend with depth for petroleum and benzene concentrations; however, this trend was not reflected in B11-09 samples. Petroleum-contaminated soil in the southern portion of the Main Area does not extend vertically to 38-feet below ground based on analytical results for a soil sample collected at B11-22, drilled less than 3 feet from B11-08. Based on figures presented in previous reports, boreholes B11-08, B11-09, and B11-22 are located within or adjacent to the excavation of the South Tank where soil-contamination was encountered from 15- to 19 feet below ground during site discovery.

The depth to petroleum-contaminated soil is shallower (closer to ground surface) in the southern portion of the Main Area near B11-08 and B11-09 than in the northern portion of the Main Area near B11-01 and B11-02 (Figures 15-19). As described above, petroleum-impacted soil in the Main Area was encountered in the vicinity of B11-08 at 14 feet below ground surface in the Fill Unit. Boreholes B11-01 and B11-02 are located in the northern portion of the Main Area. Petroleum-impacted soil was encountered deeper in

¹⁵ The 9-foot deep soil sample collected at B11-14 had elevated concentrations of diesel; however, the “Shallow Areas” described subsequently may overlap the Main Area in the vicinity of B11-14.

B11-01 and B11-02 (30 and 23.5 feet respectively) than in B11-08 and B11-09. Field screening methods of soils collected from the Fill Unit in B11-01 and B11-02 did not suggest elevated petroleum concentrations. Soil samples collected at 30-feet below ground from the Upper Sand unit at B11-01 had concentrations of gasoline-range and diesel-range hydrocarbons above MTCA Method A Industrial screening levels. In B11-02, soil samples collected from the Upper Sand unit at 23.5 and 30 feet below ground had concentrations of diesel-range hydrocarbons above MTCA Method A Industrial screening levels. Samples for gasoline-range hydrocarbon analyses were not collected from B11-02. Petroleum-contaminated soil in the northern portion of the Main Area does not extend vertically to 45-feet below ground based on analytical results for soil samples collected at B11-19.

The Main Area of petroleum-contaminated soil in the Upper Sand unit is estimated to extend west of the tracks based on concentrations of diesel-range organics elevated above Method A Industrial in soil samples collected from B11-14 at 20- and 30-feet below ground. The diesel-range organics concentration in the Fill Unit at 9-feet below ground in B11-14 was also elevated above the cleanup level and suggests that B11-14 may be located in an area where the Main Area underlies the North Shallow Area. Petroleum-contaminated soil in the western portion of the Main Area does not extend vertically to 40-feet below ground based on analytical results for soil samples collected at B11-18.

Four soil samples collected in the Main Area were analyzed for PAHs and EPH/VPH fractions (Table 9). The concentrations of benzo(a)pyrene and the toxic equivalent of carcinogenic PAHs as benzo(a)pyrene exceeded MTCA Method A Industrial cleanup level in the sample collected from B11-06 at 25 feet below ground (Table 10). Additionally, the naphthalene concentration exceeded the Method A Industrial cleanup level in the sample collected from B11-14 at 30 feet below ground (Table 9).

2.8.1.2 Shallow Areas

There are two additional areas of soil contamination that can be distinguished from the Main Area based on the depths of contamination.

North Shallow Area

The North Shallow Area is approximately 25 feet deep in an area approximately 750 square feet in the vicinity of boreholes B11-12 and B11-17 (Figure 15). Soil samples collected at 10 feet below ground from these boreholes exceeded the Method A Industrial cleanup levels for diesel- and gasoline-range hydrocarbons. NAPL was observed in the 10-foot sample collected from B11-12, but not B11-17. This is consistent with the relative diesel-range concentrations for these samples (7,100 mg/kg in the 10 foot sample from B11-12 and 2,500 mg/kg in the 10 foot sample from B11-17). Unlike boreholes in the Main Area, deeper soil samples collected from B11-12 and B11-17 did not exceed the Method A Industrial cleanup level for diesel-range organics (Figure 20). However, traces of NAPL were observed in the 30 foot sample collected at B11-17.

The soil sample collected from B11-17 at approximately 20 feet below ground also exceeded the Method A Industrial cleanup level for gasoline-range organics (Table 7, Figure 22). Soil samples collected deeper than 20 feet from B11-17 were not analyzed for gasoline-range organics. Following review of the analytical data, the lab was queried as

to whether existing data could be evaluated regarding the presence of gasoline-range organics from the analyses performed on the 30 foot sample collected at B11-17, named B11-17-30 (NWTPH-Dx, EPH/VPH). The lab review is provided in Appendix E. While the lab cannot report actual concentrations for gasoline-range organics from the existing data, they do state that:

Pertinent comparison ranges from the gasoline standard and the VPH sample results are Aromatic ranges – reported as C8-C10, C10-C12, and C12-C13¹⁶.

The VPH analysis of this sample had no detections for any C ranges or individual constituents down to 12 mg/kg. This information is being provided to the client for their assessment and inference only.

In addition, the analyst who performed the EPH and VPH analyses of sample B11-17-30 noted that the chromatograms did not have the appearance of gasoline.

This analytical review suggests that gasoline-range organics were likely not present in the B11-17-30 sample above the MTCA Method A Industrial cleanup level of 30 mg/kg. This information is noted and used in the interpretation of gasoline-range concentrations in soil at B11-17-30 in Figure 22.

The North Shallow Area may extend to B11-14 as discussed above and presented in Figure 22.

West Shallow Area

A second shallow area of soil contamination, the West Shallow Area, is approximately 15 feet deep in an area approximately 600 square feet in the vicinity of B11-16 (Figure 15). The concentration of gasoline-range organics in the sample collected from B11-16 at approximately 12 feet below ground exceeded the Method A Industrial cleanup level. While deeper samples from this borehole were not analyzed for gasoline-range organics, sheen tests performed on soil deeper than 12 feet were negative and PID readings were 0 parts per million (ppm). Based on these field screening tests, gasoline-range organics likely do not exceed cleanup levels at depths greater than approximately 12 feet below ground. Diesel- and heavy-oil range organics were not detected in soil samples collected at B11-16, and NAPL was not observed.

2.8.2 NAPL in Soil

Two samples of free product were collected in 1991 during the RI for chromatogram fingerprinting. One sample was collected from a skimmer installed in MW-5 (located between the former USTs) and the second was collected from the recovery storage tank. The free product samples were not analyzed for specific gravity or viscosity. The major analytical findings were (Nowicki & Associates, 1992a):

- The gas chromatogram indicated the presence of medium to high boiling compounds, typical of diesel, and a higher boiling biogenic material.

¹⁶ The analytical method for gasoline-range hydrocarbons (NWTPH-Gx), measures hydrocarbons in the C7 (toluene) – C12 range. Note that sample B11-17-30 was non-detect for toluene with a reporting limit of 1.2 mg/kg (Table 8)

- The medium boiling material appeared to be relatively fresh or unweathered. The higher boiling material appeared to be highly weathered due to biodegradation and was believed to be highly degraded residue of heating oil.
- Low levels of volatile chlorinated solvents were present in the product samples.
- The lab interpretation was that no PCBs were indicated in the free product chromatograms.

Another product sample was collected from the skimmer installed in MW-5 in 1992. The analytical findings were similar to the previous samples (PGG et al., 1992):

- The gas chromatogram indicated the presence of medium and high boiling compounds, such as those found in diesel mixed with a higher boiling material.
- The material appeared to be weathered.
- The diesel-like material may be a Bunker C; the high boiling material may be due to motor oil or sewage sludge.

NAPL has not been collected for analytical characterization more recently than 1992.

The current extent of NAPL is based on field observations made during the 2011 Soil Investigations. NAPL was observed in soil samples during drilling at B11-01 (30 feet), B11-02 (23 and 30 feet), B11-06 (20 to 30 feet), B11-08 (20 to 30 feet), B11-09 (14 to 23.5 feet), B11-12 (10 feet), B11-14 (23 to 30 feet), B11-17 (28 feet), B11-18 (25 to 30 feet), B11-19 (30 to 35 feet), and B11-22 (30 feet).

Note that there is a strong correlation to the observations of NAPL in soil and exceedances of diesel-, and/or oil-range hydrocarbon Method A Industrial cleanup levels in the 2011 soil samples. With the exceptions of B11-08-15, B11-14-09, and B11-14-20, soil samples that did not have visible NAPL did not exceed Method A Industrial cleanup levels for diesel- and oil-range hydrocarbons.

Visual observations made during drilling indicate that the composition of the NAPL is not uniform throughout the site. The NAPL encountered at B11-08, B11-09, and B11-22 in the southern portion of the Main Area was black, very sticky, and more viscous than elsewhere at the site. The NAPL encountered by the hollow stem auger rig during drilling at B11-22 was difficult to clean off auger flights and sampling equipment—pressure washing the equipment did not effectively remove the product and repeated steam cleaning and pressure washing with an environmental degreaser was required. Elsewhere at the Boiler Room Site, the NAPL was golden-brown and less viscous. These visual observations are supported by higher concentrations of oil-range hydrocarbons in soil samples collected from B11-08 and B11-09.

2.8.3 NAPL Accumulation on Groundwater

NAPL thickness was most recently gauged in the following site monitoring wells in March 1997 using oil and gas finding paste: PW-2, PW-3, PW-6, PW-7, MW-4s, MW-9s, MW-7, and MW-8. There was not a measureable thickness of NAPL in the wells measured during that event.

Annual monitoring well PW-4 is located within the Main Area of contamination and approximately 15 feet from B11-08, where soil samples with the greatest concentrations of diesel- and heavy oil-range hydrocarbons were collected. During groundwater sampling at PW-4, field observations have not indicated the presence of NAPL on the water table since annual monitoring began in 2001 (there was no staining or coating on water level sounder, pumps, discharge lines, etc.). Similarly, field observations made during sampling of the remaining wells have not suggested that NAPL has accumulated in the wells. Field notes prior to 2001 have not been reviewed to assess field observations.

2.8.4 Groundwater

Groundwater samples have been collected at the Boiler Room Site since 1991. The monitoring network has been modified over time as described in Section 2.5.4; six monitoring wells are currently sampled annually. The monitoring wells are screened in:

- Saturated portions of the Upper Sand unit (5 wells)
- Top of the Upper Gravel unit (1 well)

The results of annual groundwater monitoring are presented as time-series plots in Figures 24-32. Groundwater samples collected prior to 1998 were analyzed for TPH using an older method (EPA Method 418.1). This method is no longer considered a reliable method for analysis of TPH. It is known to result in false positives in the presence of natural organics and does not distinguish between different petroleum range organics. Therefore, results from Method 418.1 were not considered in the following groundwater discussion.

The time-series plots indicate that petroleum concentrations have declined over time and have not exceeded MTCA Method A cleanup levels since the 2007 annual sampling event. In the last 5 years of monitoring (2006-2010 events):

- Diesel-range hydrocarbons exceeded Method A cleanup levels in PW-4 and PW-6 in 2/5 events; diesel was not detected or did not exceed the Method A cleanup level in PW-2, MW-9s, MW-9d, and MW-10 samples
- Heavy oil range hydrocarbons exceeded Method A cleanup levels in PW-4 and PW-6 in 1/5 events each; heavy oil was not detected or did not exceed Method A cleanup levels in PW-2, MW-9s, MW-9d, and MW-10 samples
- Benzene exceeded Method A cleanup levels in PW-6 in 1/5 events; benzene was not detected or did not exceed Method A cleanup levels in PW-2, PW-4, MW-9s, MW-9d, and MW-10 samples.
- Gasoline-range hydrocarbons, ethylbenzene, toluene, total xylenes, naphthalene, and the toxic equivalents of carcinogenic PAHs to benzo(a)pyrene have not exceeded MTCA Method A cleanup levels in any annual monitoring well.

Statistical analysis of the groundwater dataset is challenging because of the high number of non-detect results. Typically with environmental data sets, trend analyses of a given constituent per well are not valid with fewer than 50-percent detections. Applying this approach to annual monitoring data for constituents that have exceeded cleanup levels, the annual monitoring well data sets available for trend analyses are diesel-range organics in PW-4 and PW-6.

The Mann-Kendall test is a non-parametric statistical test routinely used to assess trends in groundwater analytical data. Ecology has developed spreadsheet models that apply the Mann-Kendall test to evaluate plume stability. Up to 16 data points can be input into the model. Analyzing the PW-4 and PW-6 diesel-range results, Ecology's spreadsheet model indicates that the groundwater plume is shrinking with a 99- to 99.2-percent confidence level (Appendix F).

Again, trend analysis on individual wells was not valid because of the limited number of detections. Therefore, site-wide trends were evaluated by considering analytical data for an entire sampling event, disregarding the sampling point (well). Constituents were grouped into the following parameter groups: NWTPH (diesel-, heavy oil-, and gasoline-range hydrocarbons), BTEX, and PAHs. Data collected from February 1992 through December 2010 were considered¹⁷. The time-trends are presented in Figure 33. Visually, the trend plots suggest that groundwater concentrations of NWTPH, BTEX, and PAHs have decreased with time.

The Mann-Kendall Test¹⁸ was used to assess if site-wide concentrations of the parameter groups are significantly increasing or decreasing with time. The test results provide a tau value and a p-level. The tau indicates the trend direction (+) upward or (-) downward. The p-level indicates the confidence level. If the p-level was less than 0.05, the null hypothesis of no trend is rejected, indicating a significant trend. The Mann-Kendall test indicates there are significant decreasing trends in site-wide groundwater concentrations of NWTPH, BTEX, and PAH parameter groups (Table 11).

2.8.5 Air/Soil Vapor

Volatile hazardous substances can partition to soil gas and potentially migrate from the subsurface to indoor air. Vapor intrusion is a potential exposure pathway where volatile hazardous substances are present in the subsurface and occupied buildings are in the vicinity of the contamination.

Benzene is identified as a volatile hazardous substance in Ecology's Draft Vapor Intrusion Guidance (Ecology, 2009). Because NAPL is present in the subsurface at the Boiler Room Site, soil gas data is the Ecology-recognized method for assessing potential vapor intrusion, as opposed to assessing vapor intrusion based on shallow groundwater concentrations.

To date, soil gas sampling and evaluation has not been performed at the Boiler Room Site.

2.9 BOILER ROOM SITE RELATIVE TO SOUTH TACOMA CHANNEL AREA CONFIRMED AND SUSPECTED CONTAMINATED SITES

As described in Section 2.2.2.2 of this RI/FS, the Birds Eye Facility and the Boiler Room Site are located in an area of Tacoma with significant contamination from a long history

¹⁷ Data set in the project groundwater database.

¹⁸ The Mann-Kendall Test for trend analysis is routinely used by the U.S. Environmental Protection Agency and U.S. Geological Survey for trend analysis of nonparametric data sets.

of industrial land use. The primary contaminants of concern at other sites in the South Tacoma Channel area include volatile and semi-volatile organic compounds (VOCs and SVOCs), as well as petroleum hydrocarbons and metals. However, the available groundwater data for the Boiler Room Site indicate that the site has not been impacted by these off-site sources.

Groundwater samples were collected from six Boiler Room Site monitoring wells in May 1991 for the Pre-Remedial Investigation and were analyzed for VOCs by EPA Method 8240 (Appendix A1). The two monitoring wells located within and between the former Boiler Room Site UST excavations had detectable concentrations of the VOCs benzene, toluene, and xylenes, all natural components of crude oil. No other VOCs were detected in the 1991 Boiler Room Site groundwater samples. Samples collected in 1991 from the two monitoring wells located within and between the former UST excavations were also analyzed for SVOCs by EPA Method 8270. In those samples, only anthracene and 2-methylnaphthalene were detected (Appendix A1). Both compounds are natural components of crude oil. No other SVOCs were detected in the 1991 Boiler Room Site groundwater samples.

Therefore, the only VOCs and SVOCs detected in the 1991 Boiler Room Site groundwater samples are related to petroleum hydrocarbons, the primary chemicals of concern at the Boiler Room Site. More recent groundwater monitoring has indicated decreasing concentrations of the Site chemicals of concern. Thus, the existing data indicates the Boiler Room Site is not impacted by off-site sources.

2.10 CONTAMINANT FATE AND TRANSPORT MECHANISMS

The subsurface can be divided into different zones based on saturation:

- **Vadose Zone.** The vadose zone is the unsaturated zone above the water table. Void spaces between soil particles in the vadose zone are occupied by a mixture of air and water.
- **Smear Zone.** The smear zone is the range of depths within which groundwater fluctuates seasonally or under the influence of pumping. Therefore, this zone may be saturated or unsaturated. Historic water levels measured in 1991, 1994-1999, and 2000-2010 were used to assess the depth of the smear zone (Figure 7). Wells PW-4, MW-3, and PW-6 (Figure 10) were considered representative of the Main Area of soil contamination. Based on the data set, the smear zone is approximately 20 to 29 feet below ground in the Main Area.
- **Saturated Zone.** In contrast to the Smear Zone, the saturated zone is defined as the depths where groundwater is always present regardless of groundwater fluctuations. The top of the saturated zone is considered the base of the smear zone.

Bunker C fuel oil and possibly diesel were historically stored in the former USTs. Bunker C or No. 6 fuel oil is dense, viscous oil produced by blending heavy residual oils with lighter, middle distillates to meet specifications for viscosity and pour point (NOAA, 2006). Because of the different composition of the residuals and lighter blending oils, the actual compounds found in heavy oils and their percent by weight is highly variable.

The specific gravity of a particular Bunker C fuel oil can vary from 0.95 to greater than 1.03 (NOAA, 2006). This range suggests that Bunker C oil released to surface water or groundwater may float, suspend in the water column, or sink (specific gravity of water is 1). The greater the density of NAPL compared to water, the greater its tendency to drive deeper into the subsurface. The lower the viscosity, the more mobile it tends to be in the subsurface.

NAPL is an acronym for non-aqueous phase liquid. MTCA defines NAPL as a “hazardous substance that is present in the soil, bedrock, groundwater or surface water as a liquid not dissolved in water” (WAC 173-340-200). NAPL derived from petroleum fuels are complex mixtures of organic (carbon-based) molecules with slight solubility in water. NAPL can describe both free (mobile) and residual product. It can be sub-divided into light NAPL (LNAPL) and dense NAPL (DNAPL) depending on the density relative to water.

Although, Bunker C fuel oil may be slightly denser than water, DNAPLs with densities close to that of water may not experience as large a driving force for vertical migration (NRC, 2005). Therefore, NAPL discussions for the Birds Eye Boiler Room Site focus on LNAPL with minor references to DNAPL.

As discussed above, pore spaces in subsurface soil are occupied by air and water or water. NAPL may also occupy pore spaces at a petroleum-contaminated site. For NAPL to migrate, it must displace air from soil pores in the vadose zone or displace water from soil pores in the saturated zone. NAPL migrates more easily through the vadose zone than saturated zone because less force is required to displace air than water.

NAPL migration through the vadose zone is generally downwards and is driven primarily by gravity. Volatile components, where present, separate into soil gas and can form vapor plumes. The migrating NAPL leaves residual product in its path wherever NAPL has been in contact with soil. The residual NAPL is effectively trapped by capillary forces and does not flow under the influence of gravity.

If sufficient NAPL is present, it can migrate through the vadose zone and reach the water table. At the water table, the fate of the NAPL is a function of solubility, capillary pressures, and density. The soluble fractions of the petroleum NAPL will dissolve in groundwater and be transported as a groundwater plume.

It is important to consider the transport of NAPL in the saturated zone at both the pore-scale and the site-scale. If NAPL reaches the saturated zone, NAPL and water can co-exist in a soil pore. Water has a greater tendency to spread on or adhere to soil particles than NAPL (i.e. water is the wetting fluid in a NAPL-water system). Therefore, NAPL within a pore is surrounded by a continuous phase of water covering the soil particles. Water is able to enter new pore spaces easily, but NAPL must overcome capillary forces to migrate (NRC, 2005). Pressure is therefore required for NAPL to move between pores. The critical pressure differential that must be achieved for NAPL to displace water from a pore is known as the displacement entry pressure (head). In that regard, water acts as a capillary barrier against NAPL spreading from pore to pore (Barkau et. al., 2011). The displacement entry pressure or head is related to the thickness of LNAPL in the formation. Below the minimum thickness, no LNAPL movement into water-wet pores occurs.

NAPL saturation is the percentage of a pore occupied by NAPL. Previously held conceptual models were that LNAPL saturation approached 100-percent in the subsurface; however, recent studies have found that LNAPL saturation is typically much lower. Over 300 samples collected from the most heavily LNAPL impacted portions of 11 British Petroleum sites (refineries, chemical plants, bulk fuel terminal, pipeline) had an average LNAPL saturation of 5.6-percent and maximum of 56.6-percent (Adamski, 2011). On a site-scale, LNAPL saturation is greater in the core of the LNAPL body than at the lateral margins of the body.

Relative permeability is the ability of fluid to flow in porous media when other phases are present. It is directly proportionate to a fluid's degree of saturation. Below residual saturation for a given fluid, flow decreases exponentially. Therefore, at the lateral margins of a LNAPL body where saturation is minimal, there may be little to no LNAPL migration. Potential LNAPL mobility within the core of the plume does not necessarily equate to spreading of LNAPL or an expanding LNAPL footprint (Barkau et. al., 2011).

At the site-scale, an earlier conceptual model of LNAPL migration was that LNAPL would spread out and float on the water table like a pancake of uniform saturation. This model is no longer considered to represent LNAPL in the subsurface. Instead, LNAPL is distributed at and below the water table at saturations that vary vertically (Barkau et. al., 2011). LNAPL can penetrate up to 15 feet below the water table due to pressure head developed by LNAPL in the pore network in the vadose zone (Adamski, 2011).

If a release is sufficient to migrate through the vadose zone and reach the water table, during early periods after the release LNAPL will mound at the water table beneath the release point. This creates a LNAPL gradient or head and at this stage, the LNAPL body can expand horizontally and vertically. Mounding of LNAPL and radial spreading can cause LNAPL to migrate in directions opposite to groundwater flow direction.

If the release is stopped, the LNAPL gradient dissipates over time until there is no longer sufficient head for the LNAPL to overcome displacement entry pressures. LNAPL bodies tend to come to stable configurations in relatively short time periods (Barkau et. al., 2011). At this period, LNAPL may still be present in monitoring wells, but the LNAPL body is no longer migrating, even though LNAPL in the soil near the former release may be at high saturations. A LNAPL plume or body may be stable even if there is redistribution within the LNAPL core and varying thickness of LNAPL observed in wells. Removal of LNAPL at this point will shorten the life of the dissolved and vapor plumes.

As sites mature, they can reach a point where there is no longer LNAPL present in monitoring wells. The fraction of pore space occupied by LNAPL decreases over time as the volume of LNAPL is depleted by dissolution, volatilization, and biodegradation. With depletion, free product flow paths become smaller and more tortuous. This reduces the ease with which free product can move. Ultimately, the free product breaks into isolated globules or ganglia that are discontinuous and immobile as a separate residual liquid phase. The residual product is held in soil pores by capillary pressures and will not flow under the influence of gravity or groundwater. The trapped NAPL is frequently referred to as residual saturation, "the volumetric ratio of entrapped organic phase to the total pore volume." (NRC, 2005).

MTCA defines residual saturation in WAC 173-340-747(10)(b) as the

concentration of hazardous substances in the soil at equilibrium conditions. At concentrations above residual saturation, the NAPL will continue to migrate due to gravimetric and capillary forces and may eventually reach the groundwater, provided a sufficient volume of NAPL is released.

This implies that residual saturation is applicable to the vadose zone only. However, seminars hosted by the US EPA and literature sources apply “residual saturation” to saturated zones and define it as the fraction of pore space occupied by LNAPL that cannot be mobilized under an applied gradient. (Barkau et. al, 2011).

Residual product is immobile and not “free product” but may remain a source of dissolved contaminants in groundwater. Soluble fractions of petroleum are dissolved and mobilized from the residual product until an insoluble residue remains.

The descriptions of entry pressure and water acting as a capillary barrier are also applicable to DNAPL (NRC, 2005). Vertical migration of DNAPL will continue below the water table until a less permeable stratum is reached, the volume of DNAPL is depleted and entry pressure can no longer be overcome, or a sufficient upward hydraulic gradient is encountered (NRC, 2005). Because the density of Bunker C fuels is typically close to that of water, they may not experience as large a driving force for vertical migration as other DNAPLs.

2.11 CONCEPTUAL MODEL

There are no active, operating sources of hazardous substances at the Boiler Room Site with the exception of a 2,000 gallon diesel AST immediately north of the Boiler Room. As described in Section 2.6, the tank is surrounded by secondary containment and staining was not noted during an inspection of the AST. Existing contamination in the Main Area (Section 2.8.1.1) derives from historical releases that occurred before the Boiler Room concrete floor was poured in 1977 and before the USTs were removed in 1990. Potential secondary sources of contamination are areas containing NAPL.

Leaks from the former USTs and possibly spills in the original Boiler Room released petroleum-related NAPL to the subsurface. NAPL at the Boiler Room Site is derived from releases of petroleum fuels (primarily diesel and Bunker C) used in the facility boiler. NAPL migrated vertically downward into the vadose zone under the influence of gravity. As it migrated vertically, portions of NAPL accumulated in soil pores in the vadose zone. Soil concentrations of petroleum compounds in the vadose zone of the Main Area exceeded site screening levels in boreholes B11-08 and B11-09 and B11-06¹⁹; supporting the conceptual model that these boreholes are located at former release points.

The volume of NAPL released was sufficient to migrate to the water table. When groundwater monitoring began at the Boiler Room Site, the depth to groundwater was approximately 24 feet in the spring (May 1991) and 28 feet in the late fall (September and November 1991). This variation likely represents seasonal changes and pumping from the nearby South Tacoma Wellfield. The 1991 water levels indicate that the top of

¹⁹Field notes do not include water saturation observations during drilling B11-06 at 20 feet below ground, interpreted to be above the water table based on observations at nearby boreholes.

the saturated zone during NAPL release at the Boiler Room Site may have been as much as 28 feet below ground surface.

The NAPL likely mounded at the water table under the release points and spread out laterally and vertically until the releases were stopped. While Bunker C fuel oil is typically viscous, the 2011 analytical soil data and 1991/92 free product analyses suggests it was mixed with diesel-fractions, which would have increased mobility. The Bunker C mobility may also have been improved by high temperatures in the area from the boiler. Typical groundwater temperatures are about 55 degrees Fahrenheit. Groundwater temperatures measured in May 1992 ranged from 60 to 80.5 degrees in the Main Area of soil contamination.

NAPL was observed during 2011 Soil Investigations to at least 35 or 40 feet below ground, suggesting the thickness of the NAPL body and/or density was sufficient for NAPL to penetrate through the smear zone into the saturated zone. The vertical distribution of NAPL at the Boiler Room Site is consistent with currently-held concepts for LNAPL mobility, but may also be a function of DNAPL mobility.

The 2011 Soil Investigation data indicate that concentrations of heavy-oil range hydrocarbons are elevated above screening levels in a small portion of the Boiler Room Site, specifically in the vicinity of B11-06, B11-08, and B11-09. Again, these boreholes are interpreted to be located at the former UST release points. The current, limited extent of soil with detected heavy-oil range hydrocarbons suggests that the viscosity of the Bunker C fuel oil was sufficient to keep heavy-oil contamination in soil to the vicinity of the source area. While Bunker C fuel oil may be denser than water, the density was not sufficient to penetrate the full depths of the Upper Sand into the underlying gravel unit.

The LNAPL compounds (diesel-range and lighter) of the release spread laterally at the water table and based on current knowledge of LNAPL behavior, penetrated beneath the water table. After the releases stopped, the LNAPL mound or gradient at the water table diminished until it was insufficient to result in further migration of the LNAPL body. At this point the geometry of the LNAPL body was functionally stable. Based on the strong correlation between NAPL observation and elevated petroleum concentrations in 2011 soil samples, and similarities in the 1992 and 2011 delineations of soil contamination, it is likely that the geometry of the LNAPL body was stable prior to 1992.

Based on observations of product in site monitoring wells, LNAPL accumulated on the water table and would have fluctuated seasonally in the smear zone. Free product was only documented in monitoring wells located in the UST source area. The historic groundwater data indicates that a dissolved-petroleum plume developed. Skimming activities reduced the amount of free (mobile) LNAPL at the Boiler Room Site, which likely shortened the life of the dissolved groundwater plume.

Horizontally, groundwater flow directions can rotate over 180 degrees at the site. Coupled with low horizontal gradients, this minimized the horizontal migration of the dissolved plume. The pre-1999 groundwater monitoring network (Table 6, Figure 10) indicated the dissolved plume had not reached the Birds Eye property boundaries. As described in the Section 2.4.3, there is a vertical component of groundwater flow at the site. Groundwater quality data in the Upper Gravel unit is limited to MW-4d and MW-9d and was discontinued in MW-4d in 1999. However, between 1991 and 1999, concentrations

of petroleum compounds in MW-4d did not exceed site screening levels indicating the dissolved plume had not migrated to this deeper monitoring well. In addition, concentrations of petroleum compounds in samples collected from MW-9d have not exceeded cleanup levels in over 10 years.

Monitoring wells PW-4 and PW-6 are located within the Main Area of soil contamination and screened at depths comparable to soil contamination. Concentrations of petroleum-related compounds in groundwater samples collected from these wells have not exceeded site screening levels since 2007. The few number of COC detections limit the statistical evaluation for trends; however, where data are sufficient, Ecology's spreadsheet for plume stability indicates the dissolved plume is shrinking. In addition, statistical evaluation of site-wide groundwater concentrations indicate significant decreasing trends. This suggests that the soil-leaching to groundwater pathway is no longer complete at the Boiler Room Site.

Two Shallow Areas of soil contamination are described in Section 2.8.1.2 based on analytical data collected during the 2011 Investigations; specifically gasoline-range and diesel-range hydrocarbon concentrations in excess of site screening levels in samples collected from 10 feet below ground. These samples were collected from the vadose zone where contaminant pathways are primarily downward and at shallower depths than contamination noted in the Main Area. Conceptually, it is not likely that contamination migrated to these Shallow Areas from the former USTs. Potential sources include fueling spills associated with the railroad spur or vehicle use of the transit corridor that bisects the Boiler Room Site. Both Shallow Areas are paved with asphalt.

The Boiler Room Site is a mature site. Significant degradation has likely occurred and sufficient physical or chemical changes are unlikely that would cause a dissolved plume to migrate to receptors.

2.11.1 Soil-NAPL Body Migration

NAPL accumulated on groundwater has not been observed at the site since the mid 1990s.

A NAPL body in soil was observed during the 2011 Soil Investigations. Based on the strong correlation between NAPL observation and elevated petroleum concentrations in 2011 soil samples, and similarities in the 1992 and 2011 delineations of soil contamination, it is likely that the NAPL body configuration was stable prior to 1992. This refers to a state or condition where additional movement of the NAPL body is relatively minor and should not impact ongoing management objectives. The low (below cleanup levels) dissolved groundwater plume concentrations and low frequency of detections also indicate the NAPL body in soil is stable.

2.11.2 Soil-NAPL Body to Groundwater Pathway

Natural source zone depletion (NSZD) is a combination of processes that reduce the mass of NAPL in the subsurface. The processes include dissolution of NAPL into groundwater, volatilization to soil gas, and biodegradation of dissolved or volatilized NAPL (ITRC, 2009). Mass from the NAPL body is lost as the dissolved-phase constituents are transported from the body by groundwater. Groundwater quality monitoring data collected at

the Boiler Room Site support that NSZD was occurring via dissolution. However, recent data suggest that dissolution is no longer occurring and the dissolved mass flux is essentially zero. This suggests that the NAPL body present in soil at the Boiler Room Site is an insoluble residue.

2.11.3 Soil-NAPL Body to Vapor Pathway

The vapor pathway has not been quantified at the Boiler Room Site. However, the age of the site, effective stability of the NAPL body in soil, and mass flux to groundwater suggest that the source is mature and NSZD is no longer occurring.

Buildings within 100 feet of the Boiler Room are not residential structures and it is not likely that residential structures will be constructed in the future based on zoning and the industrial history of the Nalley Valley.

Buildings within 100 feet of the soil-NAPL body area include the Boiler Room, Potato Warehouse, and Pallet Room. All have large bay doors and are not insulated. The buildings were used for industrial and warehouse purposes and did not house office workers. The Boiler Room houses two industrial boilers and associated equipment; the Potato Warehouse is a drafty building that stored plywood totes; and the Pallet Room was used to re-build wooden pallets. The current construction and condition of the buildings likely preclude them for use as office space. Therefore, the current buildings do not require further assessment for vapor intrusion. Should future site use change significantly (e.g., construction of permanent offices), additional vapor intrusion risk assessment may be required.

2.11.4 Soil-NAPL Body Direct Contact Pathway

In the Main Area of soil contamination and NAPL, depths to impacted soil are 15 feet or greater, except at B11-08 in the south portion of the area and at B11-14 west of the railroad spur. The Main Area is largely paved with asphalt. Workers at the site would typically not be exposed to contaminated soil and NAPL in this area unless significant site redevelopment activities were to occur.

In the Shallow Areas of soil contamination, depth to impacted soil or NAPL is less than 15 feet. Workers at the site would typically not be exposed to contaminated soil and NAPL in this area; however, Ecology considers 15 feet to be the reasonable estimate of the depth of soil that could be excavated as a result of site development (WAC 173-340-740). The Shallow Areas of soil contamination are paved with asphalt.

3.0 FOCUSED FEASIBILITY STUDY

3.1 CLEANUP OBJECTIVES

This focused feasibility study (FS), evaluates and develops cleanup alternatives for the Boiler Room Site. The FS builds on the characterization of LNAPL and petroleum-related COCs in soil and groundwater as described previously in the remedial investigation, which divided the Boiler Room Site into a Main Area and two Shallow Areas of soil contamination. For this LNAPL Site, the cleanup objectives include protecting human health and the environment by reducing LNAPL and reducing the potential for downgradient dissolved phase migration impacts.

The FS performs an initial screening of appropriate cleanup components and documents the non-cleanup components specific to this site. Then, the FS describes and evaluates remedial alternatives using the cleanup components, which could be applied to remove, treat, contain, and/or immobilize the LNAPL in soil currently at the Site. The report details how each alternative meets the regulatory cleanup requirements and describes likely construction techniques, schedule, uncertainties, and estimated costs for each alternative. The preferred alternative is selected on the basis of this detailed evaluation.

3.2 INITIAL SCREENING OF CLEANUP COMPONENTS

At LNAPL sites, cleanup components can be divided into three categories (ITRC, 2009):

- mass-recovery
- mass-control
- phase-change

Within each category, there are a number of available remedial technologies. Technologies are screened on the basis of applicability to this site, cleanup objectives, and geologic factors (ITRC, 2009).

3.2.1 Mass-Recovery

Mass-recovery of LNAPL involves physical removal of LNAPL by excavation or hydraulic recovery (e.g. skimming). At this site, excavation with dewatering could potentially meet cleanup objectives. Much of the LNAPL at the Boiler Room Site is highly viscous at or within the range of residual saturation, which makes conventional hydraulic recovery impractical. However, hot water, steam, surfactants, or solvents can be injected to mobilize LNAPL and permit some recovery (see further discussion under Phase-Change section). For viscous LNAPL, steam injection is most likely to meet cleanup objectives. Hydraulic recovery enhancements would likely require a bench or pilot scale test prior to full implementation. Of these technologies, steam enhanced extraction is considered because the time frame to completion is generally shorter than other hydraulic recovery remedies, but the order of magnitude costs are similar.

3.2.2 Mass-Control

Mass-control of LNAPL involves stabilization of mobile or migrating LNAPL by physical barriers or mixing with stabilizing agents. The remedial investigation concludes that the LNAPL is functionally stable or not migrating, so physical barriers are not appropriate. Accordingly, no mass-control components are appropriate for this Site.

3.2.3 Phase-Change

Phase-change of LNAPL involves the transformation of LNAPL into vapor or dissolved phase constituents, which are captured and removed from the soil and/or groundwater. The LNAPL body's composition changes as the treatment preferentially removes some constituents. Possible phase-change components include in-situ chemical oxidation, in-situ thermal desorption, surfactants, solvents, and natural source zone depletion (NSZD).

In-situ chemical oxidation, in-situ thermal desorption, surfactant and solvent technologies all require injection, hydraulic controls, and generation and capture of by-products. Of these technologies in-situ thermal desorption is considered because the time frame to completion is generally shorter than other phase-change remedies, but the order of magnitude costs are likely similar²⁰.

3.3 NON-REMEDIAL COMPONENTS

3.3.1 Railroad Spur

A railroad spur runs in a north-south direction from S 35th Street through the Site (Figure 2). The railroad spur is owned by Birds Eye Foods and was formerly used to supply ingredients to the Dressing Plant. Approximately 200 feet of track would be affected by remedial actions. The cost of removal and replacement would have to be included in excavation and injection/recovery remedies in the affected portion of the Boiler Room Site.

3.3.2 High Pressure Gas Line

A 6-inch Puget Sound Energy (PSE) high pressure, natural gas line runs north-south through the Boiler Room Site. Also, a 4-inch service line supplies high pressure natural gas to the Birds Eye facility. The 4-inch service line tees off the 6-inch line, then parallels the 6-inch line for approximately 50 feet before heading east to the meter. PSE report that their lines are typically 3 to 4 feet below ground surface, and the 4-inch line is approximately 10 feet below ground under the railroad tracks. PSE intends to replace the existing 4-inch line east and west of the tracks in winter 2011/12 and to tie the new line into the 6-inch further to the north of the current tie-in, so the portion of the service line that parallels the 6-inch will no longer be necessary. The service line under the tracks will not be replaced (Potter, 2011).

PSE recommends drilling and excavation encroach no closer than 10 feet from the 6-inch gas line. It is likely that any remedy that involves excavation or injection/recovery would

²⁰ In-Situ Bioremediation is often cost-effective for lighter petroleum hydrocarbons (gas and diesel sites) but would likely require a long restoration time frame, long-term monitoring and numerous injections that may not be able to fully degrade the stickiest and viscous-tightly held LNAPL.

not be possible within at least 10 feet of the gas line or require a temporary relocation of the gas line. It is estimated that 160 feet of 6-inch line would need to be relocated for excavation or injection/recovery remedies.

3.3.3 21-inch Storm Sewer Line

A City of Tacoma gravity storm line also runs north-south through the Boiler Room Site west of the rail tracks at approximately 7 to 10 feet below ground. Birds Eye facility storm water lines are 8 to 15-inches in diameter and tie into the City of Tacoma storm line.

For remedies involving excavation or injection/recovery, a temporary bypass of the storm sewer would be required. For cost estimates, it is assumed that bypass with a flexible surface line and inexpensive pump will be sufficient.

3.3.4 Electrical Transmission Line

An electrical transmission line operated by the City of Tacoma runs in a north-south direction from S 35th Street through the site and off the property to serve Fircrest. These lines parallel the railroad spur, running above the tracks, with electrical poles on the west side of the track. For a full excavation remedy of the Main Area, the electrical line would need temporary relocation and replacement.

3.3.5 Water Line Replacement

A water line from the City of Tacoma runs in a north-south direction from S 35th Street through the site. The water line is downstream of the meter, so it can be modified by the property owner during a remedial action. Temporary water line bypass and replacement would be necessary for excavation remedies and may be necessary for injection/recovery remedies.

3.3.6 Asphalt Reconstruction (Site Restoration)

The cost of asphalt reconstruction, which may involve removal and off-site disposal, would be included in the cost of any remedy that involves excavation or injection/recovery.

3.3.7 Boiler Room and Potato Warehouse Buildings

The Boiler Room and Potato Warehouse buildings are located at the eastern margin of the site. Although the construction specifications of the buildings are not fully known, full excavation work would likely require demolition and reconstruction of the buildings, which is more cost-effective than shoring options for slab-on-grade masonry construction.

3.4 SELECTION AND DESCRIPTION OF ALTERNATIVES

Alternatives were selected from cleanup components described above. Alternatives were selected that protect human health and the environment by eliminating, reducing, or oth-

erwise controlling risks. The standard point of compliance (POC) for soil protective of groundwater is in soil throughout the site. The standard POC for groundwater is in groundwater throughout the Site. Four pairs of shallow/deep monitoring wells will be used for compliance monitoring for the proposed remedial alternatives.

For the remedies where residual LNAPL remains onsite, the groundwater POC would also serve as an empirical demonstration of soil and LNAPL protective of groundwater. Remedies where cleanup levels are not met in soil include restrictive covenants.

3.4.1 Alternative 1: Soil Containment and Natural Source Zone Depletion (NSZD) Remedy

The soil containment and natural source zone depletion (NSZD) remedy is a type of phase-change remedy that reduces LNAPL mass as constituents are naturally depleted from the LNAPL body over time. Soil containment is achieved with a restrictive covenant that would include maintenance of asphalt and a protocol for performing site work (e.g., utility trenches).

The Interstate Technology and Regulatory Council (ITRC) is a coalition of state environmental regulators working with federal partners, industry, and stakeholders to advance innovative environmental decision making. The ITRC has developed a detailed guidance for evaluating NSZD which involve qualitative and quantitative assessment, and a long-term evaluation (ITRC, 2009b). The qualitative assessment involves gathering evidence to support the hypothesis that NSZD is occurring. Quantitative assessment is used to estimate mass flux rates from the LNAPL source area. The long-term evaluation is used to evaluate progress, monitor for changes in risk, and predict progress.

Over the last 21 years since UST removal and 15 or 16 years since cessation of skimming operations, the Boiler Room Site has been undergoing cleanup by NSZD. The findings of the 2011 Remedial Investigation clearly indicate that dissolved phase concentrations in Site monitoring wells have decreased over time, consistent with a qualitative assessment of NSZD. Monitoring well samples have not exceeded MTCA Method A cleanup levels for the last 3 years. The absence of groundwater dissolved phase hydrocarbon exceedances indicates that the mass flux from the Boiler Room Site is effectively zero. Therefore, further quantitative assessments are not necessary, in that the LNAPL body is sufficiently depleted that the rate at which constituents dissolve into groundwater is matched by the rate of biodegradation.

Alternative Components

This alternative involves the following components:

- Installation of 3 monitoring wells pairs: 3 shallow and 3 deep monitoring wells
- 4 quarters of groundwater monitoring at 8 monitoring wells (4 well pairs) and reporting
- Long-term groundwater monitoring at 8 monitoring wells every 18 months from year 2 to 10, a total of 5 monitoring events with reporting
- Restrictive Environmental Covenant

The restrictive covenant would include a surveyed description of the Boiler Room Site, specific information about maintenance of asphalt, protections of Site utility/trench workers, and provisions for vapor intrusion risk assessment should future Site use change significantly (e.g. permanent offices). The long-term monitoring well network would include a total of 8 wells (4 shallow/deep well pairs) that surround the Site; 6 wells (3 well pairs) would be added for comprehensive long-term monitoring.

Schedule

Portions of this remedy have already been implemented with satisfactory results. It is anticipated that the restrictive environmental covenant would take no more than 6 months to complete, well installation and 4 quarters of monitoring would take no more than 18 months, and long-term monitoring is anticipated to occur for a period of 10 years. Long-term monitoring would be reduced upon satisfactory completion of the 5 and 10-year reviews conducted by Ecology.

Cost

The overall cost for this alternative is estimated to range from \$207,809 to \$304,017. These are conceptual level costs, where the lower cost does not assume any contingencies and the higher cost includes contingencies (Table 12).

3.4.2 Alternative 2: Excavation

This alternative includes full removal of all impacted soil above MTCA Method A Industrial cleanup levels. The area of soil to be excavated is the extent shown on Figure 15. This includes the Main Area excavation to about 40 feet bgs and the Shallow Areas to around 15 and 25 feet bgs (West and North Shallow Areas respectively). Crete Engineering provided an engineer's estimate of the full excavation alternative with consideration of non-remedial components. Crete evaluated a number of excavation strategies and shoring options to arrive at this excavation approach. See Appendix G for Crete's memorandum discussing excavation options and solutions. Approximately 15,000 cubic yards of soil would be excavated, of which 9,000 cubic yards of impacted soil would be disposed of off-site and 6,000 cubic yards reused as backfill.

Alternative Components

This alternative involves the following excavation components:

- Mobilization/Demobilization of equipment to the Site
- Construction surveying
- Site Preparation
- Dewatering and water disposal
- Excavate, stockpile clean overburden
- Excavate and dispose off-site of impacted soils
- Import and place backfill
- Confirmation Sampling
- Shoring
- Site restoration

The Site Preparation and Restoration tasks involve a number of non-remedial components including: Potato Warehouse and Boiler Room building demolition and replacement, natural gas line relocation, removal and replacement of railroad tracks, and bypass and replacement of local storm drains, water service, and 21-inch storm line.

Schedule

This excavation could be completed within 1 year, with site restoration complete within an additional 1 year. It is assumed that post-excavation groundwater monitoring will not be required because soil cleanup levels will be met, assisted by dewatering.

Cost

Crete provided an engineer's cost estimate of excavation components with the exception of dewatering, which was provided by Designed Groundwater Services. The overall cost for this alternative is estimated to range from \$4.4 to \$6.2 million. These are conceptual level costs, where the lower cost does not include any contingencies and the higher cost includes contingencies (Table 13). These costs equate to \$484 to \$682 per cubic yard of contaminated soil; Crete notes that a typical petroleum excavation and disposal remedy without the complexities of the Boiler Room Site would cost about \$150 per cubic yard.

3.4.3 Alternative 3: Soil Containment, NSZD, and Partial Excavation with Off-Site Disposal

This alternative includes removal of Shallow Area impacted soil above MTCA Method A Industrial cleanup levels within 15-feet of ground surface, and a containment remedy for the Main Area. This includes Shallow Area excavation and off-site disposal of 2,100 cubic yards of impacted soil to around 15 feet bgs. Crete Engineering provided an engineer's estimate for the partial excavation portion. Crete evaluated a number of partial excavation strategies that would address the Main Area, but the deep shoring and site preparations would not have provided significantly reduced costs relative to the reduced benefit of full excavation. Accordingly, Crete developed a cost estimate for partial excavation (Appendix G). PGG added costs for the soil containment portion.

Alternative Components

This alternative includes the following soil containment and NSZD components, which are the same as Alternative 1:

- Installation of 3 monitoring well pairs, 3 shallow and 3 deep monitoring wells
- 4 quarters of groundwater monitoring at 8 monitoring wells (4 well pairs) and reporting
- Long-term groundwater monitoring at 8 monitoring wells every 18 months from year 2 to 10, a total of 5 monitoring events with reporting
- Restrictive Environmental Covenant

This alternative involves the following excavation components:

- Mobilization/Demobilization of equipment to the Site
- Construction surveying
- Site Preparation
- Excavate and off-site disposal of impacted soils
- Import and place backfill
- Confirmation Sampling
- Shoring
- Site restoration

The Site Preparation and Restoration tasks involve a number of non-remedial components including: natural gas line relocation, and bypass and replacement of local storm drains, water service, and the 21-inch storm line.

Schedule

Implementing this remedy would take 1 year to complete the excavation, restore the site, and complete the restrictive covenant. Long-term monitoring is anticipated to occur for a period of 10 years, and would be reduced upon a satisfactory completion of the 5 and 10-year review conducted by the Department of Ecology.

Cost

The overall cost for this alternative is estimated to range from \$0.76 to \$1.1 million. These are conceptual level costs, where the lower cost does not include any contingencies and the higher cost includes contingencies (Table 14). The itemized partial excavation cost is \$0.55 to \$0.75 million and equates to \$292 to \$397 per cubic yard of contaminated soil; Crete notes that a typical petroleum excavation and disposal remedy without the complexities of the Boiler Room Site would cost about \$150 per cubic yard.

3.4.4 Alternative 4: In-Situ Steam Enhanced Extraction and Bioremediation

This alternative includes full site cleanup of soil to MTCA Method A Industrial cleanup levels by mass-recovery using in-situ steam enhanced extraction (IS-SEE) and bioremediation (Table 15). TerraTherm provided an estimate for the major IS-SEE components, which would remove LNAPL (Appendix H). TerraTherm indicates that the IS-SEE remediation would likely need to be followed by biopolishing to achieve soil cleanup levels. Due to poorly constrained level-of-effort requirements after IS-SEE is complete to achieve soil cleanup levels, PGG provides a gross cost estimate for in-situ bioremediation by injection of an oxygen releasing compound to promote aerobic biodegradation and achieve complete soil cleanup.

Alternative Components

This alternative includes the following IS-SEE remedial components:

- Design and Procurement
- Site Preparation
- Construction and Operation
- Utilities

- Disposal of waste stream
- Permits
- Well Decommissioning
- Site Restoration
- Reporting

The Site Preparation and Restoration tasks involve a number of non-remedial components including: natural gas line relocation, and possible bypass and replacement of local storm drains, water service, and the 21-inch storm line.

And the following biopolishing components:

- Characterize residual petroleum hydrocarbons
- In-situ bioremediation
- Soil confirmation sampling
- 8 quarters of groundwater monitoring
- Reporting

Schedule

TerraTherm estimates that the IS-SEE phase would be completed in 186 days of operation, or within a year from design to IS-SEE termination, and PGG estimates that biopolishing may take at least 1 year, with soil confirmation sampling to be completed within 6 months, and an additional 1 year of groundwater compliance monitoring.

Cost

The overall cost for this alternative is estimated to range from \$3.6 to \$5.3 million. These are conceptual level costs, where the lower cost does not include any contingencies and the higher cost includes contingencies (Table 15).

3.4.5 Alternative 5: In-Situ Thermal Desorption

This alternative includes full site cleanup of soil to MTCA Method A Industrial cleanup levels by mass-recovery using in-situ thermal desorption (IS-TD) (Table 16). TerraTherm provided an estimate for the major IS-TD components, which would remove all petroleum hydrocarbons to achieve soil cleanup levels (Appendix H).

Alternative Components

This alternative includes the following IS-TD remedial components:

- Design and Procurement
- Site Preparation
- Construction and Operation
- Utilities
- Disposal of waste stream
- Permits

- Well Decommissioning
- Site Restoration
- Reporting

The Site Preparation and Restoration tasks involve a number of non-remedial components including: natural gas line relocation, and possible bypass and replacement of local storm drains, water service, and the 21-inch storm line.

Schedule

TerraTherm estimates that the IS-TD phase would be completed in 173 days of operation, or within a year from design to IS-TD termination, with soil confirmation sampling to be completed within 6 months and 4 quarters of groundwater compliance monitoring for a total of about 1.5 years.

Cost

The overall cost for this alternative is estimated to range from \$6.5 to \$9.6 million. These are conceptual level costs, where the lower cost does not include any contingencies and the higher cost includes contingencies (Table 16).

3.5 EVALUATION OF ALTERNATIVES

The 5 cleanup alternatives are evaluated based on the following regulatory requirements:

- Threshold Criteria (WAC 173-340-360(4)(a))
- Permanent Solutions to the Maximum Extent Practicable (PMEP) Criterion (WAC 173-340-360 (3)(e)(i))
- Comparison with “Reasonable Restoration Time Frame” Criterion (WAC 173-340-360(4))

3.5.1 Threshold Requirements

The proposed alternatives are compared to the threshold requirement criteria. Only alternatives that meet these threshold requirements were proposed. The threshold requirements are that the remedy protects human health and the environment, complies with cleanup standards, complies with applicable state and federal laws, provides for compliance monitoring, uses permanent solutions to the maximum extent practicable, provides for a reasonable restoration time frame, and considers public concerns.

3.5.2 Permanent Solutions to the Maximum Extent Practicable (PMEP) Criterion

The proposed alternatives are semi-quantitatively analyzed using a disproportionate cost analysis (DCA) to determine the most practicable permanent solution. The DCA is a test to evaluate if incremental costs of a given alternative over a lower-cost option exceed the incremental degree of benefit achieved by the higher cost alternative.

The MTCA criteria for evaluating the benefits of each alternative in a DCA are:

- Protectiveness
- Permanence
- Effectiveness over the long term
- Management of short-term risks
- Technical and administrative implementability
- Consideration of public concerns

The remedial Alternatives are assigned points from 1 to 5 for each benefit criteria listed above, with 5 representing the greatest benefit (Table 17). Additionally, the benefit criteria are weighted by the following multiplier based on the protection of human health and the environment appropriate for this VCP Site:

- 6) Protectiveness
- 5) Permanence
- 4) Effectiveness over the long term
- 3) Technical and administrative implementability
- 2) Consideration of public concerns
- 1) Management of short-term risks

The benefit score is the total score for each Alternative (sum of benefit points x benefit weight). The benefit ratio is the individual Alternative score relative to the Alternative with the greatest benefit score. Benefit scores and ratios are summarized in Table 17 and discussed in Section 3.5.2.1.

3.5.2.1 Cost-Benefit Ratio Results

The benefit scores are assessed relative to costs in Table 18 and Figure 34. Cost details are provided in the description of each Alternative and supported by Tables 12-16. A range of costs are provided, the low estimate is the sum of direct and indirect costs with sales tax but no contingency, and the high cost includes a standard 50-percent contingency.

The results of the benefit ranking indicate that Alternative 4 (IS-SEE) and Alternative 5 (IS-TD) are the highest ranked because the remedies provide the greatest permanence and effectiveness over the long-term, although all Alternatives are ranked similarly high as indicated by the benefit ratios 0.82 for Alternative 1 (Soil Containment and NSZD) to 1.0 for Alternatives 4 and 5.

However, when costs are considered, Alternative 1 provides the greatest relative benefit for cost (ratio = 1.2), followed by Alternative 3 (3.9 to 4.1), Alternative 4 (17.4), Alternative 2 (21.5 to 22.3), and Alternative 5 (31.4 to 31.5). This is because the costs associated with Alternatives 2, 4, and 5 are disproportionately higher than Alternatives 1 and 3.

Per the MTCA DCA (WAC 173-340-350 (8)(b)(i) and WAC 173-340-360 (3)(e)), the costs of Alternatives 2, 4, and 5 are clearly disproportionate to the benefits achieved. Al-

ternatives 1 and 3 should be carried forward and compared to the “reasonable restoration time frame” criterion.

3.5.3 Comparison with “Reasonable Restoration Time Frame” Criterion

This criterion requires that a cleanup action be completed within a reasonable amount of time (WAC 173-340-360(4)). The MTCA definition of *completed* is that cleanup levels have been met at the point of compliance. The amount of time for a cleanup action to be completed is the restoration time frame. The reasonableness of the restoration time frame is determined by the following factors:

- Potential Risk
- Practicality of Achieving Shorter Time Frame
- Availability of Alternate Water Supplies
- Likely Effectiveness and Reliability of Institutional Controls
- Ability to Control and Monitor Contaminant Migration
- Potential for Contaminant Degradation Over time

Each of the Alternatives has a reasonable restoration time frame because groundwater has met cleanup levels at the point of compliance, so by this criterion cleanup action has been completed. But, because an indirect point of compliance in groundwater is used for the standard soil POC, Alternatives 1 and 3 should still be compared to the above listed factors.

3.5.3.1 Alternative 1: Soil Containment and Natural Source Zone Depletion (NSZD) Remedy

The restoration time frame is 6 months to complete the Soil Containment portion through a Restrictive Environmental Covenant. The restoration time frame to reduce soil concentrations to below MCTA A Industrial cleanup levels by NSZD is likely greater than 10 years.

The potential risk to soil direct contact and vapor pathway receptors is mitigated by controls and protocols in a Restrictive Environmental Covenant. The risk to groundwater from soil leaching is low because the source zone has already been sufficiently depleted, as empirically demonstrated in the 2011 RI and will remain low as the covenant will maintain the asphalt paving. The Boiler Room Site is a mature site. Significant degradation has likely occurred and sufficient physical or chemical changes are unlikely that would cause a dissolved plume to migrate to receptors.

The institutional controls contained in the Restrictive Covenant are likely to be effective and reliable because they essentially codify the practices and protocols currently in use at the Site, which are effective for protecting human health and the environment.

The ability to control contaminant migration with this remedy is good. Since the LNAPL is not migrating or mobile in free or dissolved phases, hydraulic and physical controls are

not necessary. A long-term monitoring network will serve to monitor the Site for significant changes in contaminant migration.

Contaminants at the Site are mostly associated with the LNAPL-soil body at residual saturation. Monitoring wells do not exceed cleanup levels for COCs, indicating the rate of mass loss to dissolved phase groundwater is matched by the rate of biodegradation, which occurs over a very short distance. So, degradation is likely to continue over time, but the rate cannot be readily quantified.

3.5.3.2 Alternative 3: Soil Containment, Natural Source Zone Depletion (NSZD) Remedy, and Shallow Area Excavation

The restoration time frame is 6 months to complete the Soil Containment portion through a Restrictive Environmental Covenant, and 6 months to complete the full excavation of the Shallow Areas from 0 to 15 feet bgs. The restoration time frame to reduce soil concentrations to below MTCA A Industrial cleanup levels in the Main Area by NSZD is likely greater than 10 years.

The potential risk to soil direct contact is removed by the Shallow Area excavation. The potential risk to vapor pathway receptors is mitigated by controls and protocols in a Restrictive Environmental Covenant. The risk to groundwater from soil leaching is low because the Main Area source zone has already been sufficiently depleted, as empirically demonstrated in the 2011 RI and will remain low as the Covenant maintains the asphalt paving. The Boiler Room Site is a mature site. Significant degradation has likely occurred and sufficient physical or chemical changes are unlikely that would cause a dissolved plume to migrate to receptors.

The institutional controls contained in the Restrictive Covenant are likely to be effective and reliable because they essentially codify the practices and protocols currently in use at the Site, which are effective for protecting human health and the environment.

The ability to control contaminant migration with this remedy is good. Since the LNAPL is not migrating or mobile in free or dissolved phases, hydraulic and physical controls are not necessary. A long-term monitoring network will serve to monitor the Site for significant changes in contaminant migration.

Contaminants at the Site are mostly associated with the LNAPL body at residual saturation. Monitoring wells do not exceed cleanup levels for COCs, indicating the rate of mass loss to dissolved phase groundwater is matched by the rate of biodegradation, which occurs over a very short distance. So, degradation of the Main Area is likely to continue over time, but the rate cannot be readily quantified.

3.6 SELECTION OF PREFERRED ALTERNATIVE

Alternatives 1 and 3 meet all the substantive requirements of MTCA including Threshold Criteria, the Permanent Solutions to the Maximum Extent Practicable Criterion, and the Reasonable Restoration Time Frame Criterion. Alternative 1 meets these requirements at a significantly lower cost to achieve a similar benefit. The additional benefit of Alternative 3 is to permanently remove the soil direct contact risk by excavation rather than

through a Restrictive Environmental Covenant; however, the additional cost of Shallow Area excavation may not be justified based on the relative reduction of risk or benefit.

Alternative 1, Soil Containment and Natural Source Zone Depletion is the preferred alternative remedy for this Site and it is protective of human health and the environment.

4.0 REFERENCES

- Adamski, Mark. May 2, 2011. LNAPL in Fine Grained Soil Webinar. Hosted by Midwest Geosciences Group.
- Barkau, L., Adamski, M., and Hers, I. May 27, 2011. LNAPL Training Part 1: An Improved Understanding of LNAPL Behavior in the Subsurface. ITRC Internet-based Training Program. Sponsored by Interstate Technology and Regulatory Council (www.itrcweb.org) and hosted by US EPA Clean Up Information Network (www.cluin.org).
- Brown and Caldwell. July 1985. Clover/Chambers Creek Basin Geohydrologic Study. Report prepared for the Tacoma Pierce County Health Department.
- CDM. April 2, 2009. Final Focused Feasibility Study Well 12A Superfund Site Tacoma, Washington. U.S. Environmental Protection Agency Region X Task Order No. 014A. The Parametrix/CDM Federal Programs Corporation (CDM).
- City of Tacoma. 2011. Website of GIS mapping information; accessed September and October 2011. <http://www.govme.org/govMe/Maps/Inter/MapGuideCS/MGMain.aspx>
- City of Tacoma. January 23, 2008. 2006 Comprehensive Water Plan Update Volume I. Comprehensive Water System Plan for the City of Tacoma Water Division.
- Cohen, Robert M., and Mercer, James W. February 1993. DNAPL Site Evaluation. Robert S. Kerr Environmental Research Laboratory Office of Research and Development U.S. Environmental Protection Agency. EPA Contract No 68-C8-0058.
- Fehseke, S. September 23, 2011. Email communication between S. Fehseke of Pinnacle Foods Group LLC and I. Jackson of Pacific Groundwater Group.
- Griffin, W. C., Steva, J. E., Swenson, A., and Mundorff, M. J. 1962. Water Resources of the Tacoma Area, Washington. Water Supply Bulletin No. 19.
- ITRC (Interstate Technology & Regulatory Council). 2009. Evaluating Natural Source Zone Depletion at Sites with LNAPL. LNAPL-1. Washington, D.D.: Interstate Technology & Regulatory Council, LNAPLs Team. www.itrcweb.org
- Jones, M.A. Orr, L.A., Ebbert, C., and Sumioka, S.S., 1999. Ground-Water Hydrology of the Tacoma-Puyallup Area, Pierce County, Washington. U.S. Geological Survey Water-Resources Investigations Report 99-4013. Prepared in cooperation with the Washington Department of Ecology, Tacoma-Pierce County Health Department, City of Puyallup, and City of Tacoma.
- McMeen, Chris. November 18, 2010. Personal communication with J. Van Hulle of Pacific Groundwater Group.
- National Oceanic and Atmospheric Administration (NOAA). November 2006. No. 6 Fuel Oil (Bunker C) Spills. Office of Response and Restoration Fact Sheet.
- National Research Council. 2005. Contaminants in the Subsurface Source Zone Assessment and Remediation. The National Academies Press, Washington, D.C.
- Nowicki & Associates. October 30, 1990a. Underground Oil Storage Tank Removal. Consultant's report prepared for Nalley's Fine Foods.

Nowicki & Associates. December 13, 1990b. Underground Oil Storage Tank Removal Tank Number 2. Consultant's report prepared for Nalley's Fine Foods.

Nowicki & Associates. July 11, 1991. Monitoring Well Installation Report. Consultant's report prepared for Nalley's Fine Foods.

Nowicki & Associates. January 15, 1992a. Nalley's Fine Foods Remedial Investigation Report. Consultant's report prepared for Nalley's Fine Foods.

Nowicki & Associates. September 8, 1992b. Letter from R. Nowicki of Nowicki & Associates to Mr. John Hildenbrand of TPCHD on the Subject of Consultant Selection Review Participation. Consultant's letter prepared for Nalley's Fine Foods.

Olsen, Rob. November 24, 2010. Personal communication with I. Jackson of Pacific Groundwater Group.

Pacific Groundwater Group. January 14, 1992²¹. Groundwater Remedial Investigation Report Nalley's Fine Foods, Tacoma, Washington. Consultant's report prepared for Nalley's Fine Foods.

Pacific Groundwater Group, Nowicki & Associates, Inc. July 10, 1992. Phase II Remedial Investigation Report Nalley's Fine Foods, Tacoma, Washington. Consultant's report prepared for Nalley's Fine Foods.

Pacific Groundwater Group. October 13, 1992c. Nalley's Fine Foods Third Quarter 1992 Groundwater Monitoring. Consultant's report prepared for Nalley's Fine Foods.

Pacific Groundwater Group. January 20, 1993. Letter from R. Prior of Pacific Groundwater Group to Mr. Brad Harp of Tacoma-Pierce County Health Department. Subject: Response to TPCHD Comments on the Remedial Design Report.

Pierce, D and Rogers, S, 1982. South Tacoma Industrial Waste Survey. Tacoma-Pierce County Health Department Environmental Health.

Prior, Russell C. March 8, 2010. Personal communication between R. Prior former project manager at Pacific Groundwater Group and I. Jackson of Pacific Groundwater Group.

Potter, Amber. August 18, 2011a. Email communication between A. Potter of Puget Sound Energy and I. Jackson of Pacific Groundwater Group.

Potter, Amber, August 22, 2011b. Telephone communication between A. Potter of Puget Sound Energy and I. Jackson of Pacific Groundwater Group.

RZA Agra. July 1992a. Nalley's Fine Foods Feasibility Study. Consultant's report prepared for Nalley's Fine Foods.

RZA Agra, Inc. December, 1992b. Steam Mobilization and Bioremediation of Bunker C, at Nalley's Fine Foods Tacoma, Washington. Consultant's report prepared for Nalley's Fine Foods.

Reid, Graeme. June 19, 1992. Memo to Steve Mallory, Subject: Potential Insurance Coverage for Soil/Water Remediation Project. Internal Nalley's Fine Foods correspondence.

²¹ Cover page for this report lists date as January 14, 1991; however, the report documents activities performed in late 1991.

- Reid, Graeme. October 30, 1996. Communication to Phil Holcomb from Graeme Reid of Nalley's Fine Foods. Subject: Soil Remediation Project AFE 4-4043. Internal Nalley's Fine Foods files.
- Robinson, Noble, Saltbush Inc. December 2007. Tacoma Water Well 2C Construction and Testing Report. Consultant's report prepared for the City of Tacoma.
- Schenck, Norman. February 9, 1993. Letter from N. Schenck, Water Quality Program Southwest Regional Office Department of Ecology to Mr. Graeme Reid, Nalley Fine Foods.
- Tacoma Public Library Image Archives. Website accessed in September and October 2011 for Richards Studio Collection Series D34852-1 (08-25-1948), Series D34852-4 (08-25-1948), Series A120358-48 (c 1959), Series A120358-49 (c. 1959), Series D23572-7 (09-07-1946), Series D99926-8 (06-26-1956), Series A52319-2 (08-05-1950), Series A52319-4 (08-05-1950), Series A52377-7 (08-25-1950), Series A28361-1 (06-13-1947), Series A52020-2 (08-09-1950), and Series C52474-1 (09-01-1950). <http://search.tacomapubliclibrary.org/images/default.asp>
- Tacoma Water Tacoma Public Utilities January 23, 2008. 2006 Comprehensive Water Plan Update Volume I.
- Troost, K.G., in review, Geologic map of the Tacoma South 7.5-minute quadrangle, Washington: U.S. Geological Survey Miscellaneous Field Investigation, scale 1:24,000.
- Trowbridge, P., Tomlinson, D., Ueland, S. 2011. LNAPL Training Part 2: LNAPL Characterization and Recoverability – Improved Analysis. ITRC Internet-based Training Program. Sponsored by Interstate Technology and Regulatory Council (www.itrcweb.org) and hosted by US EPA Clean Up Information Network (www.cluin.org).
- Washington State Department of Ecology. July 2005. Natural Attenuation Analysis Tool Package for Petroleum-Contamination Ground Water. Package A – Natural Attenuation Tool Package (Modules 1,2 and 3). http://www.ecy.wa.gov/programs/tcp/policies/pol_main.html
- Washington State Department of Ecology, 2005. Report of Examination For Change to Transfer Water Right, Lakewood Water District Application Number 5046, Permit Number 4681, and Certificate Number 4585-A.
- Washington State Department of Ecology. October 2009. Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action. Review DRAFT. Publication no. 09-09-047
- Washington State Department of Ecology. September, 2011. Guidance for Remediation of Petroleum Contaminated Sites. Toxics Cleanup Program Publication No. 10-09-057.
- Western Regional Climate Center. Website accessed October 19, 2011 for Tacoma 1, Washington (458278) monthly climate summary data. <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?watac1>
- Unknown Author. January 1990. Generalized Closure Plan Prepared for the Tacoma Pierce County Health Department. Partial copy of document included in the Washington State Archives public files for the Birds Eye Foods site.

U.S. Conference of Mayors. April 1999. Recycling America's Land. A National Report on Brownfields Redevelopment, Volume II.

U.S. Environmental Protection Agency. December 2003. Toxicological Review of 2-methylnaphthalene (CAS No. 91-57-6) In Support of Summary Information on the Integrated Risk Information System (IRIS).

Table 1. Boiler Room Site UST and AST Summary

Identification			Status and Closure				Release		
Hazardous Substance	Type	Size (gal)	Tank ID	Date Install	In Use (Y/N)	Date Closed	Closure Method	Past (Y/N)	Current (Y/N)
Bunker C/ Diesel	UST	20,000	A	1975	N	1990	Removed	Y	N
Bunker C/ Diesel	UST	10,000	B	Unknown	N	1990	Removed	Y	N
Diesel	AST	2,000	Unknown	Unknown	Unknown	Not Closed	---	Unknown	Unknown

Table 2. Summary of Nearby Tacoma Water Wells

Well	Year Drilled	Approximate Distance From Former Birds Eye USTs (ft)	Screened Interval (ft bgs)	Aquifer	Status
Well 2A	Unknown	600	44-74; 112-132; 139-144	Shallow (Carr Ass., 1990)	Inactive or Converted to Observation Well
Well 2B	1949	600	58-78	Shallow (Carr Ass., 1990)	Active (Emergency Supply)
Well 2C	2007	600	1110-1115; 1135-1295	Deep	Active
Well 9A	1949	1500	90-110	Shallow (Based on screen depth)	Active (Emergency Supply). Somewhat impacted by Time Oil site contamination (TPCHD, 2002)
Well 12A	1957	1800	14-167	Shallow (PGG, 1992b)	EPA Superfund Site: Operating since 1983 with air-stripping system to manage groundwater contamination from Time Oil site
Well 4A	1930	2800	Total Depth 204	Shallow (TPCHD, 2002)	Active
Well 11A	1948	4000	Total Depth 113	Shallow (Draft 1993 Wellhead Protection Program)	Active
Well 6A	1940	4200	Unknown	Shallow (Draft 1993 Wellhead Protection Program)	Inactive or Converted to Observation Well; replaced by Well 6B (TPCHD, 2002)
Well 6B	2001	4200	Total Depth 112		Active

Well Construction information for Well 2A, 12A, 9A reproduced from 1992 RI; Well logs not identified in Ecology Database

Table 3. Vertical Groundwater Gradients, Birds Eye Boiler Room Site

Well Pair	Screen Interval (ft bgs)		Difference Between Screen Midpoints (ft)	Historic Vertical Gradients (ft/ft) ¹		
	Top	Bottom		Minimum	Average	Maximum
MW-4S	22.5	32.5	42 ²	0.010	0.014	0.017
MW-4D	67	72				
MW-9S	22	37	49 ³	-0.003	0.006	0.015
MW-9D	76	81				

¹ Water levels from 1991-1999 for MW-4S/D pair and 1994-1999 for MW-9S/D well pair. Positive value represents a downward gradient.

² In the 1992 Groundwater RI this was erroneously reported as a 27.5 foot difference in screen depth

³ When MW-9S water level was within the screen, the difference between saturated screen midpoints was used in the vertical gradient calculation.

Table 4. Aquifer Properties, Birds Eye Boiler Room Site

		Minimum	Average	Maximum
Upper Sand Aquifer				
Hydraulic Conductivity (cm/s)	Min. 9 Slug Tests/3 Wells	8.0×10^{-3}	1.2×10^{-2}	1.6×10^{-2}
Transmissivity (gpd/ft)	6 data sets from 4 wells	63,500	92,000	163,700
Storage (unitless)	3 data sets from 3 wells	0.0002	0.0137	0.05
Upper Gravel Aquifer				
Hydraulic Conductivity (cm/s)	Min. 3 Slug Tests/1 Well	---	4.0×10^{-3}	---

Hydraulic Conductivity: minimum of 3 slug tests were performed in each monitoring well tested; range of values tabulated above as presented in 1992 Groundwater RI (PGG, 1992a)

Transmissivity/Storage: Estimated from 25-hour pumping test in pilot extraction well; 1 data set represents either drawdown or recovery data from a single well.

Table 5. Summary of Investigations and Groundwater Monitoring at the Birds Eye Boiler Room Site

Site Status	Author	Date	Report Title	Prepared For:	Notes
Site Discovery					
	Nowicki & Associates	10/30/90	Letter Report to Mr. Graeme Reid; Subject Underground Oil Storage Tank Removal	Nalley's Fine Foods	Documentation of North Tank Removal
	Nowicki & Associates	12/13/90	Letter Report to Mr. Graeme Reid; Subject Underground Oil Storage Tank Removal Tank Number 2	Nalley's Fine Foods	Documentation of South Tank Removal
Pre-RI Soil and Groundwater Investigation					
	Nowicki & Associates	7/11/91	Nalley's Fine Foods Monitoring Well Installation	Nalley's Fine Foods	
1992 Remedial Investigations					
	Pacific Groundwater Group	1/14/92	Groundwater Remedial Investigation Report Nalley's Fine Foods, Tacoma, Washington	Nalley's Fine Foods	Original report cover misdated 1/14/91
	Nowicki & Associates	1/15/92	Nalley's Fine Foods Remedial Investigation Report	Nalley's Fine Foods	Soil Remedial Investigation
	Pacific Groundwater Group, Nowicki & Associates	7/10/92	Phase II Remedial Investigation Report Nalley's Fine Foods, Tacoma, Washington	Nalley's Fine Foods	In combined Nalleys Fine Foods Remediation Investigation/Feasibility Study binder
	RZA Agra	7/10/92	Draft Nalley's Fine Foods Feasibility Study	Nalley's Fine Foods	In combined Nalleys Fine Foods Remediation Investigation/Feasibility Study binder
Remediation System Design					
	RZA Agra, Inc.	Dec-92	Steam Mobilization and Bioremediation of Bunker C, at Nalley's Fine Foods Tacoma, Washington	Nalley's Fine Foods	

Table 5. Summary of Investigations and Groundwater Monitoring at the Birds Eye Boiler Room Site

Site Status	Author	Date	Report Title	Prepared For:	Notes
	Pacific Groundwater Group	2/21/94	Remediation Well Construction Documentation	Nalley's Fine Foods	
Groundwater Monitoring - Quarterly					
	Pacific Groundwater Group	10/13/92	Third Quarter 1992 Groundwater Monitoring	Nalley's Fine Foods	Includes installation of MW-9D and sampling/water level monitoring associated with pumping Well 2B
	Pacific Groundwater Group	1/8/93	Fourth Quarter 1992 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	4/28/93	First Quarter 1993 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	10/29/93	Third Quarter 1993 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	1/26/94	Fourth Quarter 1993 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	4/22/94	First Quarter 1994 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	8/25/94	Second Quarter 1994 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	1/12/95	Third Quarter 1994 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	6/15/95	Fourth Quarter 1994 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	6/20/95	First Quarter 1995 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	7/28/95	Second Quarter 1995 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	8/29/95	Third Quarter 1995 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	3/12/96	Fourth Quarter 1995 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	7/10/96	First Quarter 1996 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	9/9/96	Second Quarter 1996 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	11/27/96	Third Quarter 1996 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	1/24/97	Fourth Quarter 1996 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	5/21/97	First Quarter 1997 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	9/16/97	Second Quarter 1997 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	2/23/98	Third Quarter 1997 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	2/23/98	Fourth Quarter 1997 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	6/29/98	First Quarter 1998 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	9/22/98	Second Quarter 1998 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	2/7/99	Fourth Quarter 1999 Groundwater Monitoring	Nalley's Fine Foods	

Table 5. Summary of Investigations and Groundwater Monitoring at the Birds Eye Boiler Room Site

Site Status	Author	Date	Report Title	Prepared For:	Notes
	Pacific Groundwater Group	4/1/99	Third Quarter 1998 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	4/1/99	Fourth Quarter 1998 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	8/24/99	First Quarter 1999 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	10/19/99	Second Quarter 1999 Groundwater Monitoring	Nalley's Fine Foods	
	Pacific Groundwater Group	10/19/99	Third Quarter 1999 Groundwater Monitoring	Nalley's Fine Foods	
Groundwater Monitoring - Annual					
	Pacific Groundwater Group	8/15/01	2001 Groundwater Monitoring	Agri-Link Foods	
	Pacific Groundwater Group	11/14/02	2002 Groundwater Monitoring	Agri-Link Foods	
	Pacific Groundwater Group	10/28/03	2003 Groundwater Monitoring	Birds Eye Foods	
	Pacific Groundwater Group	10/7/04	2004 Groundwater Monitoring	Birds Eye Foods	
	Pacific Groundwater Group	8/9/05	2005 Groundwater Monitoring	Birds Eye Foods	
	Pacific Groundwater Group	11/14/06	2006 Groundwater Monitoring	Birds Eye Foods	Original mis-dated 11/14/05
	Pacific Groundwater Group	12/9/07	2007 Groundwater Monitoring	Birds Eye Foods	
	Pacific Groundwater Group	4/10/09	2008 Groundwater Monitoring	Birds Eye Foods	
	Pacific Groundwater Group	3/5/10	2009 Groundwater Monitoring	Birds Eye Foods	
	Pacific Groundwater Group	2/28/10	2010 Groundwater Monitoring	Birds Eye Foods	
2011 Soil Investigations					
Summarized in Appendices A2-1 and A2-2 to this 2011 RI/FS					

Table 6. Environmental Well Inventory and Status, Birds Eye Boiler Room Site

Status	Well Name	Installed	Diameter (in)	Depth (ft bgs)	Purpose	Water Quality Monitoring Period	Monitoring Frequency	No. Sampling Events	No. Events with Exceedance ¹	Notes
Active										
	MW-9S	Nov-91	2	37	Monitoring	2/1992 - 12/2010	Quarterly then Annual	41	5	Annual Monitoring Well
	MW-9D	Sep-92	2	81	Monitoring	9/1992 - 12/2010	Quarterly then Annual	40	6	Annual Monitoring Well
	MW-10	Nov-91	2	37.5	Monitoring	2/1992 - 12/2010	Quarterly then Annual	41	2	Annual Monitoring Well
	PW-2	Nov-93	2	34	Monitoring (performance well)	5/1995 - 12/2010	Quarterly then Annual	29	1	Annual Monitoring Well
	PW-4	Nov-93	2	34	Monitoring (performance well)	5/1995 - 12/2010	Quarterly then Annual	30	24	Annual Monitoring Well
	PW-6	Nov-93	2	34	Monitoring (performance well)	5/1995 - 12/2010	Quarterly then Annual	29	26	Annual Monitoring Well
Decommissioned										
	MW-1	May-91	2	32.5 (?)	Initial GW Investigation	2/1992 - 2/1995	Quarterly	12	0	Sealed in Place July 2003
	MW-2	May-91	2	27.5	Initial GW Investigation	2/1992 - 5/1994	Semi-annual	6	0	Decommissioned
	MW-3	May-91	2	32.5	Initial GW Investigation	2/1992 - 2/1995	Quarterly	12	0	Sealed in Place July 2003
	MW-4S	May-91	2	32.5	Initial GW Investigation	2/1992 - 5/1999	Annual	10	1	Sealed in Place July 2003
	MW-4D	Nov-91	2	72.5	Monitoring	2/1992 - 5/1999	Annual	10	1	Overdrilled July 2003
	MW-5	May-91	2	32.5	Initial GW Investigation	2/1992 - 5/1994	3 Quarters then Annual	5	5	Sealed in Place July 2003
	MW-6	May-91	2	32.5	Initial GW Investigation	2/1992 - 11/1992	3 Quarters			Decommissioned 1993*
	MW-7	Nov-91	2	37	Monitoring	2/1992 - 2/1995	Quarterly	12	0	Overdrilled July 2003
	MW-8	Nov-91	2	35	Monitoring	2/1992 - 5/1999	Annual	10	1	Overdrilled July 2003
	MW-11	Nov-92	2	34	Monitoring	9/1992 - 11/1999	Semi-annual	16	1	Sealed in Place July 2003
	PW-3	Nov-93	2	34	Monitoring (performance well)	5/1995 - 5/1999	Annual	5	5	Sealed in Place July 2003
	PW-5	Nov-93	2	34	Monitoring (performance well)	5/1995 - 5/1999	Annual	5	1	Sealed in Place July 2003
	PW-7	Nov-93	2	34	Monitoring (performance well)	5/1995 - 11/1999	Semi-annual	10	10	Sealed in Place July 2003
	PW-8	Nov-93	2	34	Monitoring (performance well)	5/1995 - 11/1999	Semi-annual	9	1	Sealed in Place July 2003
	PR-1	Nov-93	4	23.5	Remediation (product recovery)	Not Sampled	Not Sampled			Sealed in Place July 2003
	PR-2	Nov-93	4	23.5	Remediation (product recovery)	Not Sampled	Not Sampled			Sealed in Place July 2003
	PR-3	Nov-93	4	23.5	Remediation (product recovery)	Not Sampled	Not Sampled			Sealed in Place July 2003
	PR-4	Nov-93	4	23.5	Remediation (product recovery)	Not Sampled	Not Sampled			Sealed in Place July 2003
	PR-5	Nov-93	4	23.5	Remediation (product recovery)	Not Sampled	Not Sampled			Sealed in Place July 2003
	PR-6	Nov-93	4	23.5	Remediation (product recovery)	Not Sampled	Not Sampled			Sealed in Place July 2003
	PR-7	Nov-93	4	23.5	Remediation (product recovery)	Not Sampled	Not Sampled			Sealed in Place July 2003
	PR-8	Nov-93	4	23.5	Remediation (product recovery)	Not Sampled	Not Sampled			Sealed in Place July 2003
	PR-9	Nov-93	4	23.5	Remediation (product recovery)	Not Sampled	Not Sampled			Sealed in Place July 2003
	PR-10	Nov-93	4	23.5	Remediation (product recovery)	Not Sampled	Not Sampled			Sealed in Place July 2003
	PR-11	Nov-93	4	23.5	Remediation (product recovery)	Not Sampled	Not Sampled			Sealed in Place July 2003
	PR-12	Nov-93	4	23.5	Remediation (product recovery)	Not Sampled	Not Sampled			Sealed in Place July 2003
	SI-1	Nov-93	4	23.5	Remediation (Steam Injection)	Not Sampled	Not Sampled			Sealed in Place July 2003
	SI-2	Nov-93	4	23.5	Remediation (Steam Injection)	Not Sampled	Not Sampled			Sealed in Place July 2003
	SI-3	Nov-93	4	23.5	Remediation (Steam Injection)	Not Sampled	Not Sampled			Sealed in Place July 2003
	GIW-1	Nov-93	6	67	Remediation (injection well)	Not Sampled	Not Sampled			Sealed in Place July 2003
	GIW-2	Nov-93	6	73	Remediation (injection well)	Not Sampled	Not Sampled			Sealed in Place July 2003
	GIW-3	Nov-93	6	67	Remediation (injection well)	Not Sampled	Not Sampled			Sealed in Place July 2003

Table 6. Environmental Well Inventory and Status, Birds Eye Boiler Room Site

Status	Well Name	Installed	Diameter (in)	Depth (ft bgs)	Purpose	Water Quality Monitoring Period	Monitoring Frequency	No. Sampling Events	No. Events with Exceedance ¹	Notes
	GIW-4	Nov-93	6	67	Remediation (injection well)	Not Sampled	Not Sampled			Sealed in Place July 2003
	GEW-1	Oct-92	6	46	Remediation (extraction well)	Not Sampled	Not Sampled			Sealed in Place July 2003
	GEW-2	Dec-93	8	47	Remediation (extraction well)	Not Sampled	Not Sampled			Sealed in Place July 2003
	P-1	Apr-92	1	33	Piezometer (water level)	Not Sampled	Not Sampled			Overdrilled July 2003
	P-2	Apr-92	1	34	Piezometer (water level)	Not Sampled	Not Sampled			Overdrilled July 2003
	P-3	Apr-92	1	33	Piezometer (water level)	Not Sampled	Not Sampled			Overdrilled July 2003
	P-4	Apr-92	1	34	Piezometer (water level)	Not Sampled	Not Sampled			Overdrilled July 2003
	P-5	Apr-92	1	33	Piezometer (water level)	Not Sampled	Not Sampled			Overdrilled July 2003
	P-6	Apr-92	1	33.5	Piezometer (water level)	Not Sampled	Not Sampled			Overdrilled July 2003

³⁴ Bottom of screen interval listed; well log does not specify bottom of tail pipe.

Letter from Brad Harp to Ron Nowicki, July 8, 1993 approved decommissioning of MW-6 due to structural problems.

Original name for GEW-1 was PW-1

Table 7. Summary of 2011 Total Petroleum Hydrocarbon Soil Results, Birds Eye Boiler Room Site

Investigation	Sample ID (borehole ID- sample depth in feet bgs)	Units	Gasoline Range	Diesel Range	Heavy Oil Range
			Organics	Organics	Organics
			MTCA Method A Industrial Land Use Cleanup Levels:		
			30 mg/kg	2,000 mg/kg (Note 1)	2,000 mg/kg (Note 1)
Jan-11	B11-01-20	mg/kg	5.4 U	5.5 U	11 U
Jan-11	B11-01-26	mg/kg		640	60
Jan-11	B11-01-30	mg/kg	1,900	10,000	1200 U
Jan-11	B11-02-15	mg/kg		5.4 U	11 U
Jan-11	B11-02-20	mg/kg		5.5 U	11 U
Jan-11	B11-02-23.5	mg/kg		4,400	560 U
Jan-11	B11-02-30	mg/kg		10,000	1,200
Jan-11	B11-03-15	mg/kg		5.2 U	10 U
Jan-11	B11-03-20	mg/kg		5.7 U	12 U
Jan-11	B11-03-24	mg/kg	6.8 U		
Jan-11	B11-03-25	mg/kg		5.8 U	12 U
Jan-11	B11-03-29	mg/kg		5.9 U	12 U
Jan-11	B11-04-15	mg/kg		5.4 U	11 U
Jan-11	B11-04-20	mg/kg		5.7 U	11 U
Jan-11	B11-04-25	mg/kg		5.6 U	11 U
Jan-11	B11-05-15	mg/kg		5.3 U	11 U
Jan-11	B11-05-20	mg/kg		5.2 U	10 U
Jan-11	B11-05-25	mg/kg		5.9 U	12 U
Jan-11	B11-05-30	mg/kg		5.8 U	12 U
Jan-11	B11-06-15	mg/kg	3.9 U	6.7	11 U
Jan-11	B11-06-20	mg/kg	440	1,500	1,100
Jan-11	B11-06-25	mg/kg	700	6,600	5,200
Jan-11	B11-06-30	mg/kg	670	9,800	10,000
Jan-11	B11-07-15	mg/kg		5.4 U	11 U
Jan-11	B11-07-20	mg/kg		5.2 U	10 U
Jan-11	B11-07-25	mg/kg		5.5 U	11 U
Jan-11	B11-08-15	mg/kg		2,200	1,400
Jan-11	B11-08-20	mg/kg	450	5,500	12,000
Jan-11	B11-08-25	mg/kg	470	5,500	16,000
Jan-11	B11-08-30	mg/kg	930	21,000	20,000
Jan-11	B11-09-14	mg/kg		3,900	6,700
Jan-11	B11-09-19	mg/kg		4,500	7,700
Jan-11	B11-09-23.5	mg/kg	82	2,200	3,600
Jan-11	B11-10-15	mg/kg		5.2 U	10 U
Jan-11	B11-10-20	mg/kg		5.2 U	10 U
Jan-11	B11-10-25	mg/kg		6.2 U	12 U
Jan-11	B11-10-30	mg/kg		5.4 U	11 U
Jan-11	B11-11-10	mg/kg	6.4 U	5.8 U	12 U

Table 7. Summary of 2011 Total Petroleum Hydrocarbon Soil Results, Birds Eye Boiler Room Site

Investigation	Sample ID (borehole ID- sample depth in feet bgs)	Units	Gasoline Range	Diesel Range	Heavy Oil Range
			Organics	Organics	Organics
			MTCA Method A Industrial Land Use Cleanup Levels:		
			30 mg/kg	2,000 mg/kg (Note 1)	2,000 mg/kg (Note 1)
Jan-11	B11-12-10	mg/kg	1,200	7,100	610 U
Jan-11	B11-12-15	mg/kg	5.4 U	5.3 U	11 U
Jan-11	B11-12-20	mg/kg	5.7 U	5.6 U	11 U
Jan-11	B11-12-25	mg/kg		5.7 U	12 U
Jan-11	B11-12-30	mg/kg		5.9 U	12 U
Jan-11	B11-12-35	mg/kg		5.7 U	11 U
Jan-11	B11-13-15	mg/kg		5.4 U	11 U
Jan-11	B11-13-20	mg/kg		5.5 U	11 U
Jan-11	B11-13-23	mg/kg		5.7 U	11 U
Jan-11	B11-13-30	mg/kg		5.9 U	12 U
Jan-11	B11-14-09	mg/kg	5.5 U	2,400	270 U
Jan-11	B11-14-15	mg/kg		5.4 U	11 U
Jan-11	B11-14-20	mg/kg		7,100	1,100
Jan-11	B11-14-23	mg/kg		88	12 U
Jan-11	B11-14-30	mg/kg		15,000	1,700
Jan-11	B11-15-15	mg/kg		5.8 U	12 U
Jan-11	B11-15-20	mg/kg		5.5 U	11 U
Jan-11	B11-15-25	mg/kg		5.7 U	11 U
Jan-11	B11-15-30	mg/kg		5.4 U	11 U
Jan-11	B11-16-12	mg/kg	1,200		
Jan-11	B11-16-15	mg/kg		5.5 U	11 U
Jan-11	B11-16-20	mg/kg		5.7 U	11 U
Jan-11	B11-16-25	mg/kg		5.6 U	11 U
Jan-11	B11-16-30	mg/kg		5 U	10 U
Jan-11	B11-17-10	mg/kg	1,400	2,500	120
Jan-11	B11-17-15	mg/kg	6.4 U	2,000	260 U
Jan-11	B11-17-20	mg/kg	55	440	53 U
Jan-11	B11-17-25	mg/kg		270	57 U
Jan-11	B11-17-30	mg/kg	See Appendix E	190	13
Jul-11	B11-18-40	mg/kg	14	270	250 U
Jul-11	B11-18-51	mg/kg	2 U	50 U	250 U
Jul-11	B11-18-52	mg/kg	2 U	50 U	250 U
Jul-11	B11-19-45	mg/kg	2 U	50 U	250 U
Jul-11	B11-19-50	mg/kg	2 U	50 U	250 U
Jul-11	B11-19-55	mg/kg	2 U	50 U	250 U
Jul-11	B11-20-32	mg/kg	2 U	50 U	250 U
Jul-11	B11-21-16	mg/kg	2 U	50 U	250 U
Jul-11	B11-21-21	mg/kg	2 U	50 U	250 U

Table 7. Summary of 2011 Total Petroleum Hydrocarbon Soil Results, Birds Eye Boiler Room Site

Investigation	Sample ID (borehole ID- sample depth in feet bgs)	Units	Gasoline Range	Diesel Range	Heavy Oil Range
			Organics	Organics	Organics
			MTCA Method A Industrial Land Use Cleanup Levels:		
			30 mg/kg	2,000 mg/kg (Note 1)	2,000 mg/kg (Note 1)
Jul-11	B11-21-25	mg/kg	2 U	50 U	250 U
Jul-11	B11-21-30	mg/kg	2 U	50 U	250 U
Jul-11	B11-21-35	mg/kg	2 U	50 U	250 U
Jul-11	B11-21-50	mg/kg	2 U	50 U	250 U
Jul-11	B11-21-55	mg/kg	2 U	50 U	250 U
Jul-11	B11-22-38	mg/kg	2 U	50 U	250 U
Jul-11	B11-23-15	mg/kg	2 U	50 U	250 U
Jul-11	B11-23-20	mg/kg	2 U	50 U	250 U
Jul-11	B11-23-25	mg/kg	2 U	50 U	250 U
Jul-11	B11-23-35	mg/kg	2 U	50 U	250 U
Jul-11	B11-23-40	mg/kg	2 U	50 U	250 U
Jul-11	B11-23-45	mg/kg	2 U	50 U	250 U
Jul-11	B11-23-50	mg/kg	2 U	50 U	250 U
Jul-11	B11-23-55	mg/kg	2 U	50 U	250 U

CUL: Cleanup Level, MTCA Method A Unrestricted Land Use

Note 1: Cleanup level for diesel+heavy oil range organics is 2000 mg/kg unless there is clear evidence in chromatogram that petroleum at the site consists of a mixture of two products

U: compound not detected, number associated is the lab reporting limit

Bold Red: concentration exceeds MTCA Method A Cleanup Level

Positive detection in gasoline-range organics that does not match an identifiable gasoline pattern

Table 8. Summary of 2011 BTEX Soil Results, Birds Eye Boiler Room Site

Investigation	Sample ID (borehole ID- sample depth in feet bgs)	Units	Benzene	Ethylbenzene	Toluene	o-Xylene	m+p Xylenes	Sum of Xylenes	Xylenes, Total
			MTCA Method A Industrial Land Use Cleanup Levels:						
			30 ug/kg	6,000 ug/kg	7,000 ug/kg	Not Established	Not Established	9,000 ug/kg	9,000 ug/kg
Jan-11	B11-01-20	ug/kg	13 U	13 U	13 U	13 U	27 U	Xylenes not detected	---
Jan-11	B11-01-30	ug/kg	9.9 U	130 U	130 U	690	2,000	2,690	---
Jan-11	B11-03-24	ug/kg	17 U	17 U	17 U	17 U	34 U	Xylenes not detected	---
Jan-11	B11-06-15	ug/kg	9.8 U	9.8 U	9.8 U	9.8 U	20 U	Xylenes not detected	---
Jan-11	B11-06-20	ug/kg	11 U	44 U	44 U	180	290	470	---
Jan-11	B11-06-25	ug/kg	30	55 U	55 U	270	570	840	---
Jan-11	B11-06-30	ug/kg	290	280	52 U	360	100 U	360	---
Jan-11	B11-08-20	ug/kg	19	950	44 U	240	88 U	240	---
Jan-11	B11-08-25	ug/kg	80	1,300	50 U	210	130	340	---
Jan-11	B11-08-30	ug/kg	880	2,600	46 U	420	2,700	3,120	---
Jan-11	B11-09-23.5	ug/kg	10 U	100	10 U	56	36	92	---
Jan-11	B11-11-10	ug/kg	16 U	16 U	16 U	16 U	32 U	Xylenes not detected	---
Jan-11	B11-12-10	ug/kg	12 U	1,100	57 U	710	200	910	---
Jan-11	B11-12-15	ug/kg	11 U	13 U	13 U	13 U	27 U	Xylenes not detected	---
Jan-11	B11-12-20	ug/kg	14 U	14 U	14 U	14 U	28 U	Xylenes not detected	---
Jan-11	B11-14-09	ug/kg	14 U	14 U	14 U	14 U	27 U	Xylenes not detected	---
Jan-11	B11-14-30	ug/kg	16	2,400	950 U	950 U	1,900 U	Xylenes not detected	---
Jan-11	B11-16-12	ug/kg	12 U	150 U	150 U	290	300 U	290	---
Jan-11	B11-17-10	ug/kg	12 U	1,000	150 U	150 U	300 U	Xylenes not detected	---
Jan-11	B11-17-15	ug/kg	16 U	16 U	16 U	16 U	32 U	Xylenes not detected	---
Jan-11	B11-17-20	ug/kg	16 U	16 U	16 U	16 U	32 U	Xylenes not detected	---
Jan-11	B11-17-30	ug/kg	12 U	1,200 U	1,200 U	1,200 U	2,400 U	Xylenes not detected	---
Jul-11	B11-18-40	ug/kg	20 U	37	20 U	---	---	---	110
Jul-11	B11-18-51	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-18-52	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-19-45	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-19-50	ug/kg	20 U	20 U	20 U	---	---	---	60 U

Table 8. Summary of 2011 BTEX Soil Results, Birds Eye Boiler Room Site

Investigation	Sample ID (borehole ID- sample depth in feet bgs)	Units	Benzene	Ethylbenzene	Toluene	o-Xylene	m+p Xylenes	Sum of Xylenes	Xylenes, Total
			MTCA Method A Industrial Land Use Cleanup Levels:						
			30 ug/kg	6,000 ug/kg	7,000 ug/kg	Not Established	Not Established	9,000 ug/kg	9,000 ug/kg
Jul-11	B11-19-55	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-20-32	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-21-16	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-21-21	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-21-25	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-21-30	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-21-35	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-21-50	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-21-55	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-22-38	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-23-15	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-23-20	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-23-25	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-23-35	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-23-40	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-23-45	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-23-50	ug/kg	20 U	20 U	20 U	---	---	---	60 U
Jul-11	B11-23-55	ug/kg	20 U	20 U	20 U	---	---	---	60 U

CUL: Cleanup Level, MTCA Method A Unrestricted Land Use

U: compound not detected, number associated is the lab reporting limit

Red: concentration exceeds MTCA Method A Cleanup Level

Table 9. Summary of 2011 PAH/VPH/EPH Soil Results, Birds Eye Boiler Room Site

MTCA Method A Industrial Cleanup Level			B11-06-25	B11-08-20	B11-09-23.5	B11-14-30	B11-17-30
PAHs							
1-Methylnaphthalene	ug/kg		25,000	16,000	6,300	38,000	130
2-Methylnaphthalene	ug/kg		32,000	20,000	9,500	46,000	120
Acenaphthene	ug/kg		3,900	2,000	880	220 U	64 U
Acenaphthylene	ug/kg		380 U	760 U	420 U	220 U	64 U
Anthracene	ug/kg		1,600	760 U	440	220 U	64 U
Benzo(a)anthracene	ug/kg	Table 10	6,800	810	850	1,200	64 U
Benzo(a)pyrene	ug/kg	2,000	3,000	760 U	440	380	64 U
Benzo(g,h,i)perylene	ug/kg		770	760 U	420 U	220 U	64 U
Chrysene	ug/kg	Table 10	11,000	4,100	2,200	2,600	64 U
Dibenz(a,h)anthracene	ug/kg	Table 10	870	760 U	420 U	220 U	64 U
Dibenzofuran	ug/kg		2,800	1,600	450	3,200	64 U
Fluoranthene	ug/kg		1,200	1,200	420 U	220 U	64 U
Fluorene	ug/kg		6,000	2,600	1,700	8,800	72
Indeno(1,2,3-cd)pyrene	ug/kg	Table 10	380 U	760 U	420 U	220 U	64 U
Naphthalene	ug/kg	5,000	380 U	2,800	1,800	12,000	64 U
Phenanthrene	ug/kg		22,000	12,000	4,700	24,000	190
Pyrene	ug/kg		7,000	2,100	2,400	2,700	64 U
Total Benzofluoranthenes	ug/kg	Table 10	1,900	760 U	530	330	64 U
VPH							
Benzene	ug/kg		1,200 U	930 U	680 U	950 U	1,200 U
Ethylbenzene	ug/kg		1,200 U	950	680 U	2,400	1,200 U
Toluene	ug/kg		1,200 U	930 U	680 U	950 U	1,200 U
o-Xylene	ug/kg		1,200 U	930 U	680 U	950 U	1,200 U
Xylene Isomers, M+P	ug/kg		2,300 U	1,900 U	1,400 U	1,900 U	2,400 U
Methyl tert-Butyl Ether	ug/kg		1,200 U	930 U	680 U	950 U	1,200 U
n-Decane	ug/kg		1,300	2,400	740	3,900	1,200 U
n-Dodecane	ug/kg		10,000	3,600	1,400	4,200	1,200 U
n-Hexane	ug/kg		1,200 U	930 U	680 U	950 U	1,200 U
n-Octane	ug/kg		1,600	2,000	680 U	3,700	1,200 U
n-Pentane	ug/kg		1200 U	930 U	680 U	950 U	1,200 U
C5-C6 Aliphatics	ug/kg		12,000 U	9,300 U	6,800 U	9,500 U	12,000 U
C6-C8 Aliphatics	ug/kg		12,000 U	9,300 U	6,800 U	17,000	12,000 U
C8-C10 Aliphatics	ug/kg		14,000	10,000	6,800 U	9,500 U	12,000 U
C10-C12 Aliphatics	ug/kg		12,000 U	9,300 U	6,800 U	33,000	12,000 U
C8-C10 Aromatics	ug/kg		63,000	31,000	9,000	72,000	12,000 U
C10-C12 Aromatics	ug/kg		320,000	120,000	38,000	180,000	12,000 U
C12-C13 Aromatics	ug/kg		390,000	170,000	58,000	180,000	12,000 U
EPH							
C8-C10 Aliphatics	ug/kg		33,000	41,000 U	26,000	160,000	2,400 U
C10-C12 Aliphatics	ug/kg		190,000	150,000	150,000	680,000	2,900
C12-C16 Aliphatics	ug/kg		1,100,000	1,100,000	900,000	3,700,000	31,000
C16-C21 Aliphatics	ug/kg		1,700,000	1,800,000	1,300,000	4,500,000	53,000
C21-C34 Aliphatics	ug/kg		1,400,000	5,700,000	3,400,000	1,300,000	12,000
C8-C10 Aromatics	ug/kg		56,000 U	210,000 U	110,000 U	55,000 U	2,400 U
C10-C12 Aromatics	ug/kg		56,000 U	210,000 U	110,000 U	63,000	2,400 U
C12-C16 Aromatics	ug/kg		580,000	380,000	220,000	820,000	11,000
C16-C21 Aromatics	ug/kg		2,200,000	1,400,000	1,100,000	2,700,000	42,000
C21-C34 Aromatics	ug/kg		3,300,000	3,500,000	2,100,000	1,200,000	14,000

CUL: Cleanup Level, MTCA Method A Unrestricted Land Use

U: compound not detected, number associated is the lab reporting limit

Bold Red: concentration exceeds MTCA Method A Cleanup Level

Table 10. Summary of 2011 Soil Carcinogenic PAH Toxicity Equivalency Methodology, Birds Eye Boiler Room Site

Concentrations of cPAHs in 2011 Site Soil Samples							TEF (unitless)	Toxic Equivalent Concentration of Benzo(a)Pyrene in 2011 Site Soil Samples ¹				
B11-06-25	B11-08-20	B11-09-23.5	B11-14-30	B11-17-30				B11-06-25	B11-08-20	B11-09-23.5	B11-14-30	B11-17-30
Carcinogenic PAHs												
Benzo(a)anthracene	ug/kg	6,800	810	850	1,200	64 U	0.1	680	81	85	120	Non-detect
Benzo(a)pyrene	ug/kg	3,000	760 U	440	380	64 U	1	3000	Non-detect	440	380	Non-detect
Chrysene	ug/kg	11,000	4,100	2,200	2,600	64 U	0.01	110	41	22	26	Non-detect
Dibenz(a,h)anthracene	ug/kg	870	760 U	420 U	220 U	64 U	0.1	87	Non-detect	Non-detect	Non-detect	Non-detect
Indeno(1,2,3-cd)pyrene	ug/kg	380 U	760 U	420 U	220 U	64 U	0.1	Non-detect	Non-detect	Non-detect	Non-detect	Non-detect
Total Benzofluoranthenes	ug/kg	1,900	760 U	530	330	64 U	0.1	190	Non-detect	53	33	Non-detect
								↓	↓	↓	↓	↓
SUM (total toxic equivalent concentration of Benzo(a)pyrene):								4,067	122	600	559	NA
MTCA Method A Industrial Cleanup Level for Benzo(a)pyrene (ug/kg):								2,000	2,000	2,000	2,000	2,000

¹ WAC 173-340-900 Table 740-1 If other carcinogenic PAHs are suspected of being present at the site, test for them and use this value as the total concentration that all carcinogenic PAHs must meet using the toxicity equivalency methodology in WAC 173-340-708(8).

TEF = Toxicity Equivalency Factors, reference WAC 173-340-900 Table 708-2 (<http://apps.leg.wa.gov/wac/default.aspx?cite=173-340-900>)

U: compound not detected, number associated is the lab reporting limit

Bold Red: concentration exceeds MTCA Method A Industrial Cleanup Level

Table 11. Boiler Room Site-Wide Groundwater Quality Trend Analyses

Parameter Group	n	Standard Deviation	p-level	tau
BTEX (EPA 8020)	29	38.98	0.012	-0.333
NWTPH Analytes	40	6.85	0.044	-0.223
PAHs	29	67.31	0.010	-0.340

NWTPH Analytes: Diesel-, Heavy Oil-, Gasoline-range organics

p<0.05 means significant trend

negative tau means downward trend

PAH data from 11/1/1994 and 3/8/1995 have been removed because higher concentration well were not included in these events

Data from monitoring wells MW-5, MW-6, PW-3, PW-7 were removed because the short duration of sampling skewed results.

Table 12. Alternative 1 Cost Estimate: Soil Containment and Natural Source Zone Depletion

Cost Component	Unit	Quantity	Unit Cost	Total Cost	Source	Comments
Direct Costs						
1. Soil Containment						
Restrictive Environmental Covenant	LS	1	\$ 14,654	\$ 14,654	PGG	Assumes PGG time only using boiler plate language
Survey for Environmental Covenant	LS	1	\$ 6,740	\$ 6,740	PGG and PLS Surveying	Assumes survey of "Site"
Maintenance of Asphalt Cap, year 0 to 10	LS	1	\$ 2,500	\$ 2,500	PGG	Assumes patching and seal coat, \$0.25 per sq ft for 10000 sq ft
2. Natural Source Zone Depletion Long Term Groundwater Monitoring						
Mark drilling locations and Underground Utility Locate	LS	1	\$ 1,000	\$ 1,000	PGG	Assumes 5 hrs, site visit, and private locate
Install 6 new monitoring wells	LS	1	\$ 28,130	\$ 28,130	PGG and Cascade	Assumes 3 shallow and 3 deep wells and onsite geologist
Lab Analyses (soil)	LS	1	\$ 1,483	\$ 1,483	PGG and FB	Assumes 2 soil samples per well location for COC list
Manage drilling waste stream	LS	1	\$ 3,940	\$ 3,940	PGG and Marvac	Assumes 18 drums of soil cuttings
Wellhead Survey	LS	1	\$ 2,390	\$ 2,390	PGG and PLS Surveying	Assumes well head survey
Quarterly Groundwater Sampling, 1-year	LS	4	\$ 8,789	\$ 35,156	PGG and ARI	Assumes sampling for COC list at 8 wells, incl time and analytical
Quarterly Purge Water Disposal	LS	4	\$ 376	\$ 1,504	PGG and Marvac	Assumes 110 gal per event
Quarterly Data Reports	LS	4	\$ 1,590	\$ 6,360	PGG	Assumes short letter report
Long-term Monitoring, every 18 months, year 2 to 5, 2 events	LS	1	\$ 24,366	\$ 24,366	PGG	Assumes year 2.5 and 5, +5% per annum
Long-term Monitoring, every 18 months, year 2 to 6, 3 events	LS	1	\$ 47,822	\$ 47,822	PGG	Assumes year 6.5, 8, and 9.5 +5% per annum
Subtotal (Direct Costs)				\$ 176,044		
Contingency (of Direct Costs)	50%	--	--	\$ 88,022		
Indirect Costs						
1. Project Managament	8%	--	--	\$ 14,084	EPA 540-R-00-002, 2000	
Subtotal (Indirect Costs)				\$ 14,084		
Estimated Total Cost & 9.3% state tax				\$ 207,809	Direct + Indirect Costs (no contingency) + 9.3% state tax	
Estimated Total Cost w/ Contingency & 9.3% state tax				\$ 304,017	Direct + Contingency + Indirect Costs + 9.3% state tax	

Table 13. Alternative 2 Cost Estimate: Full Excavation

Cost Component	Unit	Quantity	Unit Cost	Total Cost	Source	Comments
Direct Costs						
1. Full Excavation						
Mobilization /Demobilization	LS	1	\$ 175,000	\$ 175,000	EE	8% of total direct cost without disposal
Construction Surveying	LS	1	\$ 20,000	\$ 20,000	EE	
Site Preparation						
Potato/Boiler Building Demo and Rebuild	LS	1	\$ 692,537	\$ 692,537	RS Means and EE	Assume demo cost = \$38,737, rebuild both buildings = \$513,800
Electric transmission line Bypass and Replacement	LS	1	\$ 28,000	\$ 28,000	EE	Assume replacement with 2 new taller poles outside of removal footprint. Assume 2 to handle the larger span. Includes installation, stringing wire, temporary closure, and communication wires.
Gas Line Relocation	LS	1	\$ 22,400	\$ 22,400	EE	Assume install temp reroute of 6" line for 160 ft. Includes trenching, backfill/compacting, and new pipe. This assumes NO hot tapping of lines.
Local Storm Drains and Water Lines Temporary Bypass and Replacement	LS	1	\$ 20,000	\$ 20,000	EE	Assumes 200 lineal feet and the replacement of 3 CBs. Includes the replacement of HDPE piping, trenching and backfill.
RR Tracks	LS	1	\$ 36,457	\$ 36,457	EE	Assume removal and replacement of 200ft of track. Track will remain out of service during the excavation work. Material costs from RS Means 2011
Dewatering System - Installation and Operation	LS	1	\$ 201,300	\$ 201,300	Quote from DGS	Assumes deep well dewatering and vacuum WellPoint system and total of 3 weeks operation
Water Disposal	LS	1	\$ 30,240	\$ 30,240	EE	Assumes 3 weeks of operation at 1,000 gpm average flow. Discharge \$0.001/gallon for clean water
Stormwater/Wastewater Management Excavation and Disposal	LS	1	\$ 10,000	\$ 10,000	EE	Includes City of Tacoma Permitting fees and the development of SWPPP
Excavation and Stockpile	CY	15,074	\$ 28	\$ 414,535	RS Means 2011 31.23.16.42 4400/4450	Includes 6,000cy clean overburden and 9,000cy impacted soils removed from a confined area
Hauling and Disposal	TON	15,388	\$ 59	\$ 907,916	Quote from WM	Impacted soils, clean soil reused as backfill on the site; quote from another project
Structural Backfill (Import)	TON	15,388	\$ 10	\$ 153,884	EE	Based on previous projects
Place Backfill (import and clean overburden)	CY	15,074	\$ 6	\$ 90,444	EE	Unit Cost increased for confined placement
Shoring	LS	1	\$ 412,586	\$ 412,586	EE	Assume 470 lineal feet shoring to 40 ft, soil nails and shotcrete. Unit costs from RS Means 2011. Includes estimate for shoring of pallet building
Confirmation Sampling	LS	1	\$ 40,000	\$ 40,000	EE	
Restoration of Site - Asphalt Pavement	SY	1,257	\$ 18	\$ 22,940	RS Means 2011 32.12.16.16 0200	Assume 4in thick, includes trenching areas for utilities
Subtotal (Direct Costs)			\$	3,278,239		
Contingency (of Direct Costs)	50%	--	--	\$ 1,639,119		
Indirect Costs						
1. Full Excavation						
Remedial Design (% of Direct Costs)	8%	---	---	\$ 262,259	Crete- EPA 540-R-00-002, 2000	
Project Management (% of Direct Costs)	5%	---	---	\$ 163,912	Crete- EPA 540-R-00-002, 2000	
Construction Management/Quality Assurance Support (% of Direct Costs)	6%	---	---	\$ 196,694	Crete- EPA 540-R-00-002, 2000	
Air Monitoring (% of Direct Costs)	1%	---	---	\$ 32,782	Crete-EE	
Agency Oversight (% of Direct Costs)	3%	---	---	\$ 98,347	Crete-EE	
Subtotal (Indirect Costs)			\$	753,995		
Estimated Total Cost & 9.3% state tax				\$ 4,407,232	Direct + Indirect Costs (no contingency) + 9.3% state tax	
Estimated Total Cost w/ Contingency & 9.3% state tax				\$ 6,198,789	Direct + Contingency + Indirect Costs + 9.3% state tax	

Table 14. Alternative 3 Cost Estimate: Soil Containment, Natural Source Zone Depletion, and Partial Excavation

Cost Component	Unit	Quantity	Unit Cost	Total Cost	Source	Comments
Direct Costs						
1. Soil Containment						
Restrictive Environmental Covenant	LS	1	\$ 14,654	\$ 14,654	PGG	Assumes PGG time only using boiler plate language
Survey for Environmental Covenant	LS	1	\$ 6,740	\$ 6,740	PGG and PLS Surveying	Assumes survey of "Site"
Maintenance of Asphalt Cap, year 0 to 10	LS	1	\$ 2,500	\$ 2,500	PGG	Assumes patching and seal coat, \$0.25 per sq ft for 10000 sq ft
2. Natural Source Zone Depletion Long Term Groundwater Monitoring						
Mark drilling locations and Underground Utility Locate	LS	1	\$ 1,000	\$ 1,000	PGG	Assumes 5 hrs, site visit, and private locate
Install 6 new monitoring wells	LS	1	\$ 28,130	\$ 28,130	PGG and Cascade	Assumes 3 shallow and 3 deep wells and onsite geologist
Lab Analyses (soil)	LS	1	\$ 1,483	\$ 1,483	PGG and FB	Assumes 2 soil samples per well location for COC list
Manage drilling waste stream	LS	1	\$ 3,940	\$ 3,940	PGG and Marvac	Assumes 18 drums of soil cuttings
Wellhead Survey	LS	1	\$ 2,390	\$ 2,390	PGG and PLS Surveying	Assumes well head survey
Quarterly Groundwater Sampling, 1-year	LS	4	\$ 8,789	\$ 35,156	PGG and ARI	Assumes sampling for COC list at 8 wells, incl time and analytical
Quarterly Purge Water Disposal	LS	4	\$ 376	\$ 1,504	PGG and Marvac	Assumes 110 gal per event
Quarterly Data Reports	LS	4	\$ 1,590	\$ 6,360	PGG	Assumes short letter report
Long-term Monitoring, every 18 months, year 2 to 5, 2 events	LS	1	\$ 24,366	\$ 24,366	PGG	Assumes year 2.5 and 5, +5% per annum
Long-term Monitoring, every 18 months, year 2 to 6, 3 events	LS	1	\$ 47,822	\$ 47,822	PGG	Assumes year 6.5, 8, and 9.5 +5% per annum
3. Partial Excavation						
Mobilization /Demobilization	LS	1	\$ 12,000	\$ 12,000	Crete-EE	8% of total direct cost without disposal
Construction Surveying	LS	1	\$ 15,000	\$ 15,000	Crete-EE	
Site Preparation						
Gas Line Relocation	LS	1	\$ 22,400	\$ 22,400	Crete-EE	Assume install temp reroute of 6" line for 160 ft. Includes trenching, backfill/compacting, and new pipe. This assumes NO hot tapping of lines.
Local Storm Drains Replacement	LS	1	\$ 15,000	\$ 15,000	Crete-EE	
Stormwater/Wastewater Management	LS	1	\$ 6,000	\$ 6,000	Crete-EE	Includes City of Tacoma Permitting fees and the development of SWPPP
Excavation and Disposal						
Excavation and Stockpile	CY	1,889	\$ 15	\$ 28,486	Crete-RS Means 2011 31.23.16.42	All soil removed, additional volume assumed for side walls 2:1 slope for shoring recent quote from another project
Hauling and Disposal	TON	3,211	\$ 59	\$ 189,467	Crete-Quote from WM	
Structural Backfill (Import)	TON	3,211	\$ 10	\$ 32,113	Crete-EE	
Place Backfill (import and clean overburden)	CY	1,889	\$ 4	\$ 7,556	Crete-EE	
Shoring	LS	1	\$ 10,000	\$ 10,000	Crete-EE	Includes estimate for shoring of pallet building only.
Confirmation Sampling	LS	1	\$ 10,000	\$ 10,000	Crete-EE	
	SY	416	\$ 18	\$ 7,592	Crete-RS Means 2011 32.12.16.16 0200	
Restoration of Site - Asphalt Pavement						Assume 4-in thick, includes trenching areas for utilities
Reporting	LS	1	\$ 5,000	\$ 5,000	PGG	Assumes short letter report of confirmation sampling results
Subtotal (Direct Costs)				\$ 536,658		
Contingency (of Direct Costs)	50%	--	--	\$ 268,329		
Indirect Costs						
1. Soil Containment						
Project Management (% of Direct Costs)	8%	---	---	\$ 1,912	EPA 540-R-00-002, 2000	
2. Natural Source Zone Depletion Long Term Groundwater Monitoring						
Project Management (% of Direct Costs)	8%	---	---	\$ 12,172	EPA 540-R-00-002, 2000	
3. Partial Excavation						
Remedial Design (% of Direct Costs)	15%	---	---	\$ 54,092	Crete- EPA 540-R-00-002, 2000	
Project Management (% of Direct Costs)	8%	---	---	\$ 28,849	Crete- EPA 540-R-00-002, 2000	
Construction Management/Quality Assurance Support (% of Direct Costs)	10%	---	---	\$ 36,061	Crete- EPA 540-R-00-002, 2000	
Air Monitoring (% of Direct Costs)	2%	---	---	\$ 7,212	Crete-EE	
Agency Oversight (% of Direct Costs)	5%	---	---	\$ 18,031	Crete-EE	
Subtotal (Indirect Costs)				\$ 158,329		
Estimated Total Cost & 9.3% state tax				\$ 759,620	Direct + Indirect Costs (no contingency) + 9.3% state tax	
Estimated Total Cost w/ Contingency & 9.3% state tax				\$ 1,052,904	Direct + Contingency + Indirect Costs + 9.3% state tax	

Table 15. Alternative 4 Cost Estimate: In-Situ Steam Enhanced Extraction and Bioremediation

Cost Component	Unit	Quantity	Unit Cost	Total Cost	Source	Comments
Direct Costs						
1. In-Situ Steam Enhanced Extraction						
Design and Procurement	LS	1	\$ 233,709	\$ 233,709	TerraTherm	See Appendix H for TerraTherm assumptions
Site Preparation	LS	1	\$ 70,400	\$ 70,400	Crete-EE	Assumes relocation of gas line, 21-inch storm line, local storm lines, and water
Construction and Operation	LS	1	\$ 2,072,000	\$ 2,072,000	TerraTherm	See Appendix H for TerraTherm assumptions
Utilities	LS	1	\$ 313,000	\$ 313,000	TerraTherm	See Appendix H for TerraTherm assumptions
Disposal of Waste Stream	LS	1	\$ 50,000	\$ 50,000	PGG	7000 Cccf Treated effluents, Granulated Activated Carbon waste, and 333 gal LNAPL waste; Gross Estimate assumes effluents to City sanitary sewer, solid waste and NAPL to waste handlers
Permits	LS	1	\$ 2,000	\$ 2,000	PGG	Assumes 20 hours @ \$100 per hour
Well Decomissioning, IS-SEE wells	LS	1	\$ 106,500	\$ 106,500	PGG	Assumes 71 IS-SEE wells @\$1500 per well
Site Restoration	SY	240	\$ 18	\$ 4,375	Crete-RS Means 2011 32.12.16.16 0200	Assume 4-in thick, includes 100X20 ft2 trenching areas for utilities, and 71 well patches
Reporting	LS	1	\$ 5,000	\$ 5,000	PGG	Assumes short letter report
2. In-Situ Bioremediation						
Characterize residual petroleum hydrocarbons	LS	1	\$ 16,028	\$ 16,028	PGG	Assumes soil and groundwater sampling, 5 soil borings and 10 samples, and 4 groundwater samples
In-situ bioremediation	LS	1	\$ 100,000	\$ 100,000	PGG	Gross, order of magnitude estimate
Soil confirmation sampling	LS	1	\$ 11,643	\$ 11,643	PGG, Cascade, and FB	Assumes 5 borings and 10 samples for COC list
8 quarters of groundwater monitoring	LS	1	\$ 73,320	\$ 73,320	PGG	Assumes sampling for COC list at 8 existing wells, incl time, lab, waste disposal, etc.
Reporting	LS	1	\$ 10,000	\$ 10,000	PGG	Assumes two short letter reports
Subtotal (Direct Costs)				\$ 3,067,975		
Contingency (of Direct Costs)	50%	--	--	\$ 1,533,987		
Indirect Costs						
1. In-Situ Steam Enhanced Extraction						
Project Management (% of Direct Costs)	8%	---	---	\$ 219,129	EPA 540-R-00-002, 2000	
2. In-Situ Bioremediation						
Project Management (% of Direct Costs)	8%	---	---	\$ 16,879	EPA 540-R-00-002, 2000	
Subtotal (Indirect Costs)				\$ 236,008		
Estimated Total Cost & 9.3% state tax				\$ 3,611,253		Direct + Indirect Costs (no contingency) + 9.3% state tax
Estimated Total Cost w/ Contingency & 9.3% state tax				\$ 5,287,902		Direct + Contingency + Indirect Costs + 9.3% state tax

Table 16. Alternative 5 Cost Estimate: In-Situ Thermal Desorption

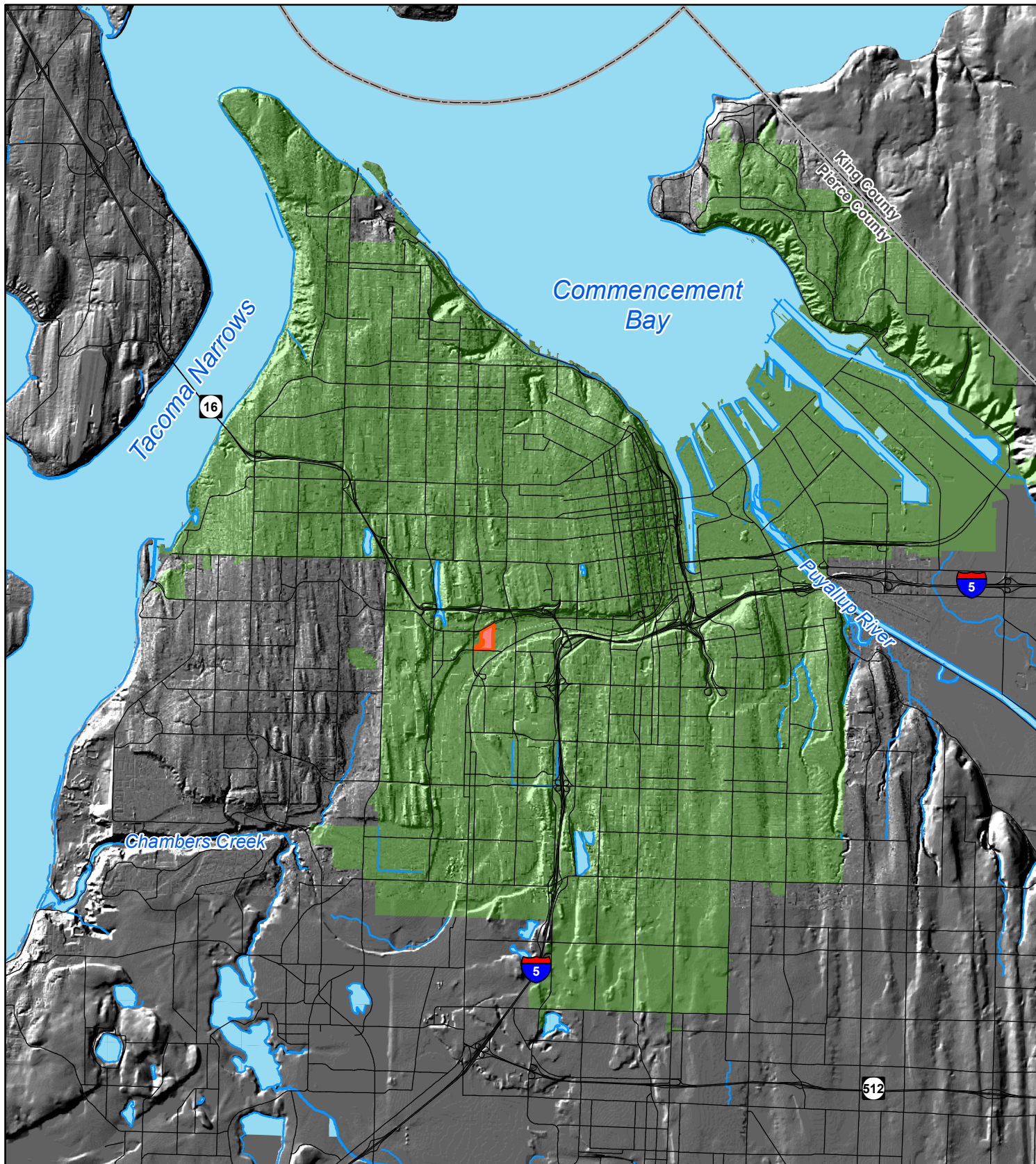
Cost Component	Unit	Quantity	Unit Cost	Total Cost	Source	Comments
Direct Costs						
1. In-Situ Thermal Desorption						
Design and Procurement	LS	1	\$ 334,426	\$ 334,426	TerraTherm	See Appendix H for TerraTherm assumptions
Site Preparation	LS	1	\$ 70,400	\$ 70,400	Crete-EE	Assumes relocation of gas line, 21-inch storm line, local storm lines, and water
Construction and Operation	LS	1	\$ 3,657,000	\$ 3,657,000	TerraTherm	See Appendix H for TerraTherm assumptions
Utilities	LS	1	\$ 1,039,000	\$ 1,039,000	TerraTherm	See Appendix H for TerraTherm assumptions
Disposal of Waste Stream	LS	1	\$ 25,000	\$ 25,000	PGG	1300 Cccf Treated effluents, Granulated Activated Carbon waste, and 67 gal LNAPL waste; Gross Estimate assumes effluents to city sanitary sewer, solid waste and NAPL to waste handlers
Permits	LS	1	\$ 4,000	\$ 4,000	PGG	Assumes 40 hours @ \$100 per hour
Well Decomissioning, IS-TD wells	LS	1	\$ 373,500	\$ 373,500	PGG	Assumes 249 IS-TD wells @\$1500 per well
Site Restoration	SY	285	\$ 18	\$ 5,201	Crete-RS Means 2011 32.12.16.16 0200	Assume 4-in thick, includes 100X20 ft2 trenching areas for utilities, and 249 well patches
Soil confirmation sampling	LS	1	\$ 11,643	\$ 11,643	PGG, Cascade, and FB	Assumes 5 borings and 10 samples for COC list
4 quarters of groundwater monitoring	LS	1	\$ 36,660	\$ 36,660	PGG	Assumes sampling for COC list at 8 existing wells, incl time, lab, waste disposal, etc.
Reporting	LS	1	\$ 10,000	\$ 10,000	PGG	Assumes letter report
Subtotal (Direct Costs)				\$ 5,566,830		
Contingency (of Direct Costs)	50%	--	--	\$ 2,783,415		
Indirect Costs						
1. In-Situ Thermal Desorption						
Project Management (% of Direct Costs)	8%	---	---	\$ 410,066	EPA 540-R-00-002, 2000	
Subtotal (Indirect Costs)				\$ 410,066		
Estimated Total Cost & 9.3% state tax				\$ 6,532,748		Direct + Indirect Costs (no contingency) + 9.3% state tax
Estimated Total Cost w/ Contingency & 9.3% state tax				\$ 9,575,020		Direct + Contingency + Indirect Costs + 9.3% state tax


Table 17. Disproportionate Cost Analysis Matrix, Boiler Room Site

FS Alternative No. and Description		Protectiveness	Permanence	Effectiveness over the Long-term	Technical and administrative implementability	Consideration of Public concerns	Management of Short-term risks	Benefit Score	Benefit Ratio
Multiplier:		6	5	4	3	2	1		
1)	Soil Containment and Natural Source Zone Depletion	5	1	4	5	5	5	81	0.82
	Environmental Covenant prevents soil direct contact, provides protocol for Site work (e.g. utility trenches), and calls for vapor investigation if new Site use occurs in future (e.g. permanant offices). Groundwater is protected by empirical demonstration in RI, to be monitored for to 10 years.		All NSZD reductions via biodegradation are permanent, but rates of LNAPL dissolution and biodegradation are not permanent.	Effective for soil contamination at residual contamination as long as Environmental Covenant remains in place to protect direct contact and vaopr pathways, and long-term monitoring supports the diminished risk to groundwater	Simple to implement	No disruption to gas, electrical, storm line, or traffic.	Human health and environment protected by environmental covenant and soil is protective of groundwater as empirically demonstrated in the RI, and monitored in the long-term as part of this remedy.		
2)	Full Excavation	5	5	5	3	3	4	94	0.95
	Fully removes soil contamination.		Permanent reduction in soil toxicity at Site.	Effective.	Technically feasible, though technically difficult to implement due to depth of the excavtion and the gas, storm line, electrical, water lines, and railroad tracks through the Site.	May cause temporary disruption to gas lines, electrical transmission lines, and storm line.	Remedial action can increase risk of soil direct contact and vapor inhalation during excavation and disposal. Protective equipment will mitigate the risk of soil direct contact and vapor inhalation.		
3)	Soil Containment, Natural Source Zone Depletion, and Partial Excavation	5	3	5	4	4	4	89	0.90
	Excavation removes all soil contamination from 0 to 15 ft, but leaves Main Area LNAPL in place. Environmental Covenant would provide protocol for vapor investigation if new Site use occurs in future (e.g. permanant offices) and deep excavation/drilling.		Permanent reduction in soil toxicity at Site for 0 to 15 ft bgs. All NSZD reductions via biodegradation are permanent, but rates of LNAPL dissolution and biodegradation are not permanent.	Effective for soil direct contact pathway 0 to 15 ft bgs, which is removed by excavation. Effective for deeper Main Area contamination at residual contamination as long as Enivronmental Covenant remains in place to protect vapor pathways, and long-term monitoring supports the diminished risk to groundwater	Technically feasible excavation, although relocating gas, storm line, and water lines may create some complications.	May cause temporary disruption to gas lines, and storm line.	Remedial action can increase risk of soil direct contact and vapor inhalation during excavation and disposal. Protective equipment will mitigate the risk of soil direct contact and vapor inhalation.		
4)	In-Situ Steam Enhanced Extraction (IS-SEE) and In-Situ Bioremediation (IS-B)	5	5	5	4	4	4	99	1.00
	IS-SEE would remove LNAPL and IS-B to complete remediation to cleanup levels. Soil confirmation and groundwater compliance monitoring to demonstrate protectiveness of remedy.		Permanent reduction in soil toxicity at Site.	Effective.	Technically feasible, though technically difficult to implement due to the gas, storm line, electrical, water lines, and railroad tracks through the Site, and the neccessity of two treatment phases IS-SEE and a biopolishing IS-B phase	May cause temporary disruption to gas lines, and storm line.	Remedial action can increase risk of soil direct contact and vapor inhalation during drilling 71 wells, extracting NAPL, treating effluent, and waste stream disposal.		
5)	In-Situ Thermal Desoprtion	5	5	5	4	4	4	99	1.00
	IS-TD would remove LNAPL and residual soil hydrocarbons to below soil cleanup levels. Soil confirmation sampling to demonstrate the protectiveness of the remedy		Permanent reduction in soil toxicity at Site.	Effective.	Technically feasible, though technically difficult to implement due to the gas, storm line, electrical, water lines, and railroad tracks through the Site.	May cause temporary disruption to gas lines, and storm line.	Remedial action can increase risk of soil direct contact and vapor inhalation during drilling 249 wells, and waste stream treatment and disposal.		

Table 18. Disproportionate Cost Analysis Results, Boiler Room Site

Alternative	Benefit Score	Benefit Ratio	Alternative Cost		Cost Relative to Least Expensive Alternative		Cost/Benefit Ratio	
			Low	High	Low	High	Low	High
1) Soil Containment and Natural Source Zone Depletion	81	0.82	\$207,809	\$304,017	1.0	1.0	1.2	1.2
2) Full Excavation	94	0.95	\$4,407,232	\$6,198,789	21.2	20.4	22.3	21.5
3) Soil Containment, Natural Source Zone Depletion, and Partial Excavation	89	0.90	\$759,620	\$1,052,904	3.7	3.5	4.1	3.9
4) In-Situ Steam Enhanced Extraction and In-Situ Bioremediation	99	1.00	\$3,611,253	\$5,287,902	17.4	17.4	17.4	17.4
5) In-Situ Thermal Desorption	99	1.00	\$6,532,748	\$9,575,020	31.4	31.5	31.4	31.5



-  Birds Eye Parcels
-  City of Tacoma

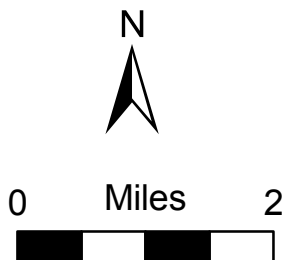
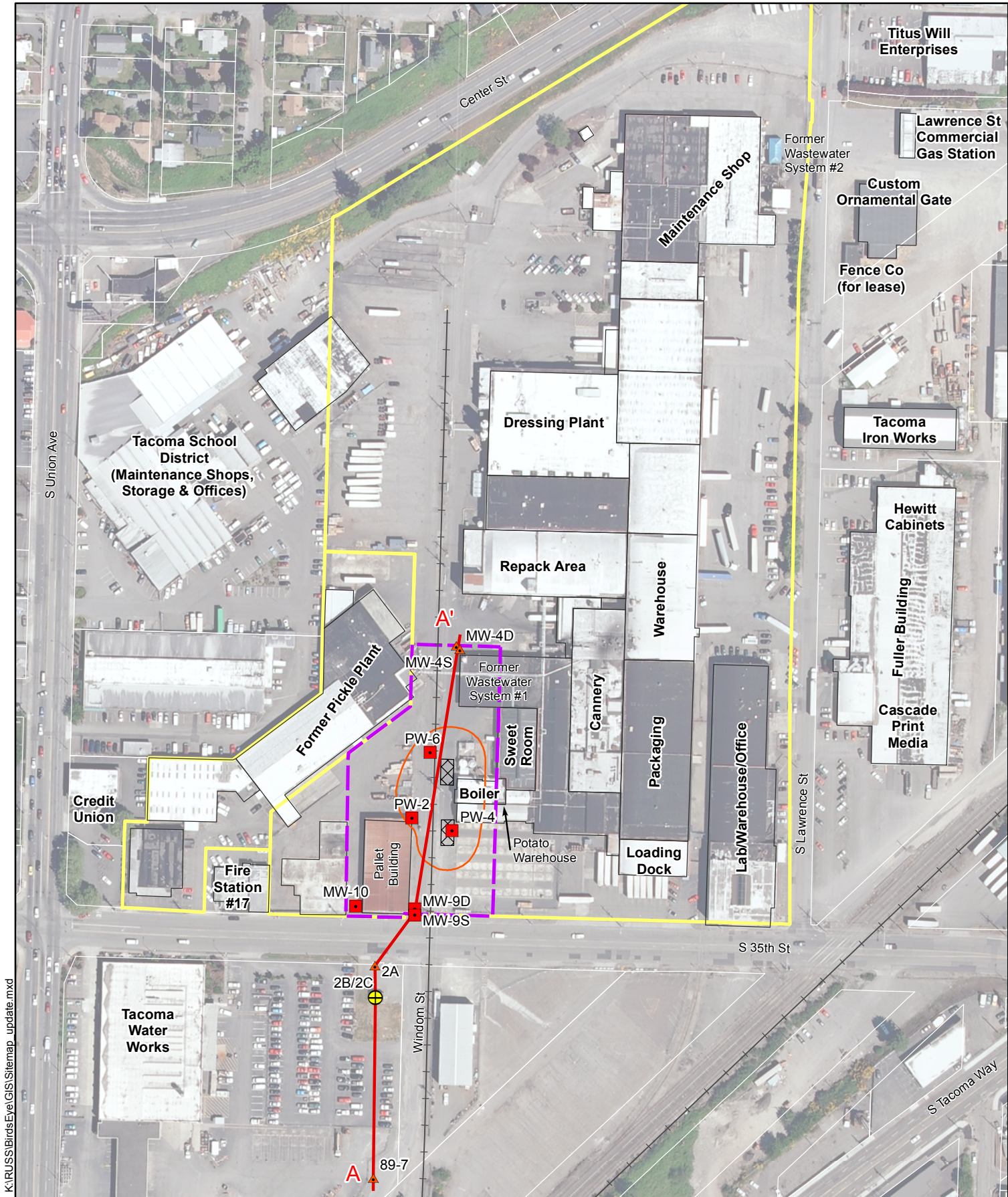


Figure 1
Site Vicinity

Birds Eye 2011 RI/FS



K:\RUSS\BirdsEye\GIS\Site\map_update.mxd

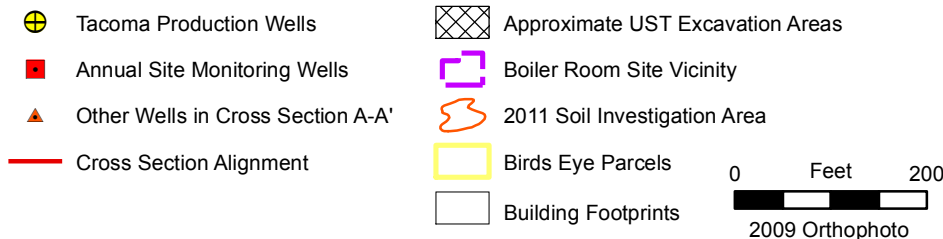


Figure 2
Birds Eye Foods Site
and Adjacent Parcels

Birds Eye 2011 RI/FS

pgg

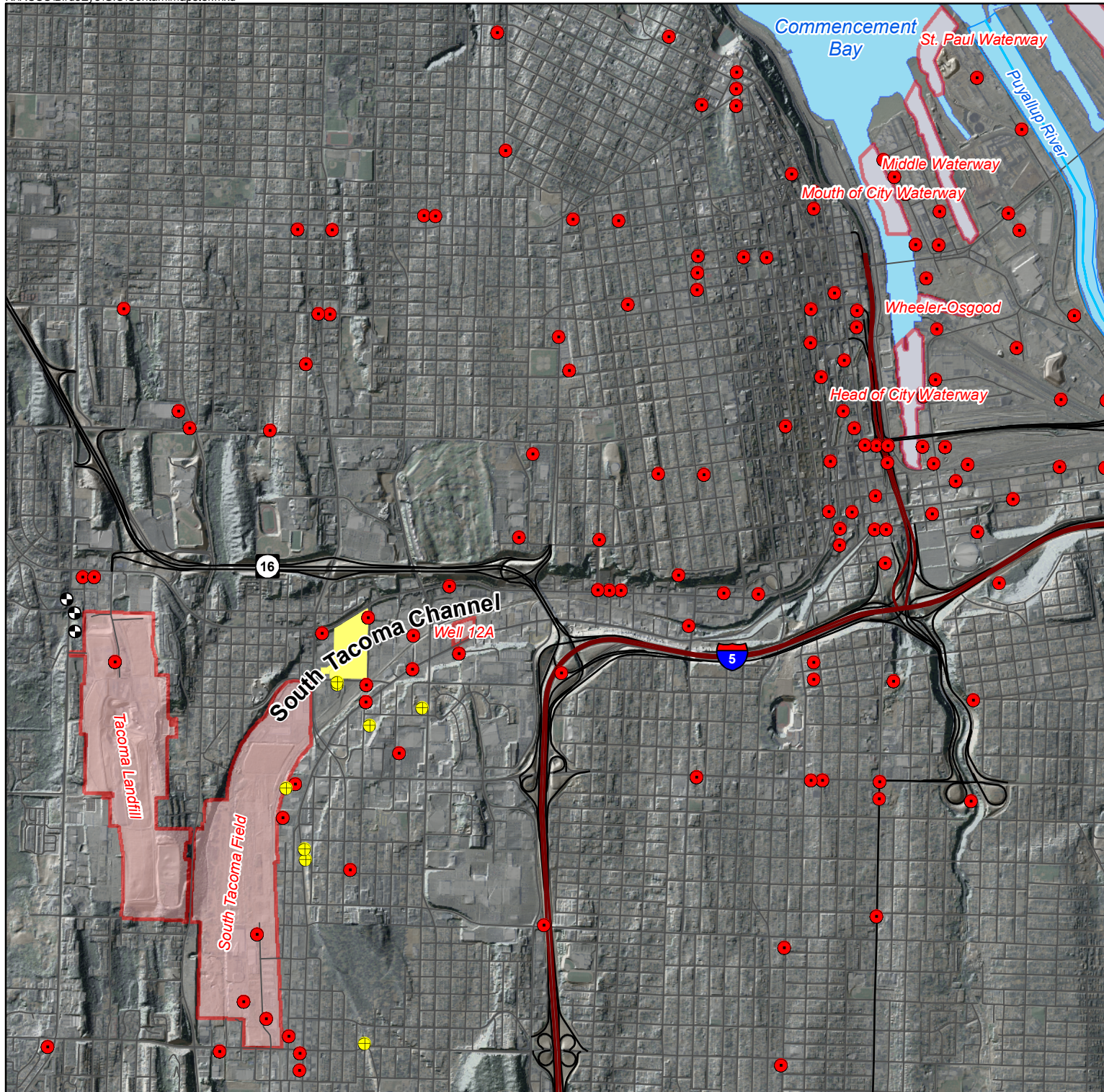






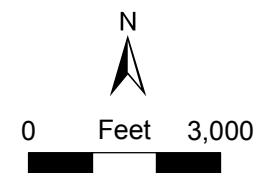
Figure 4

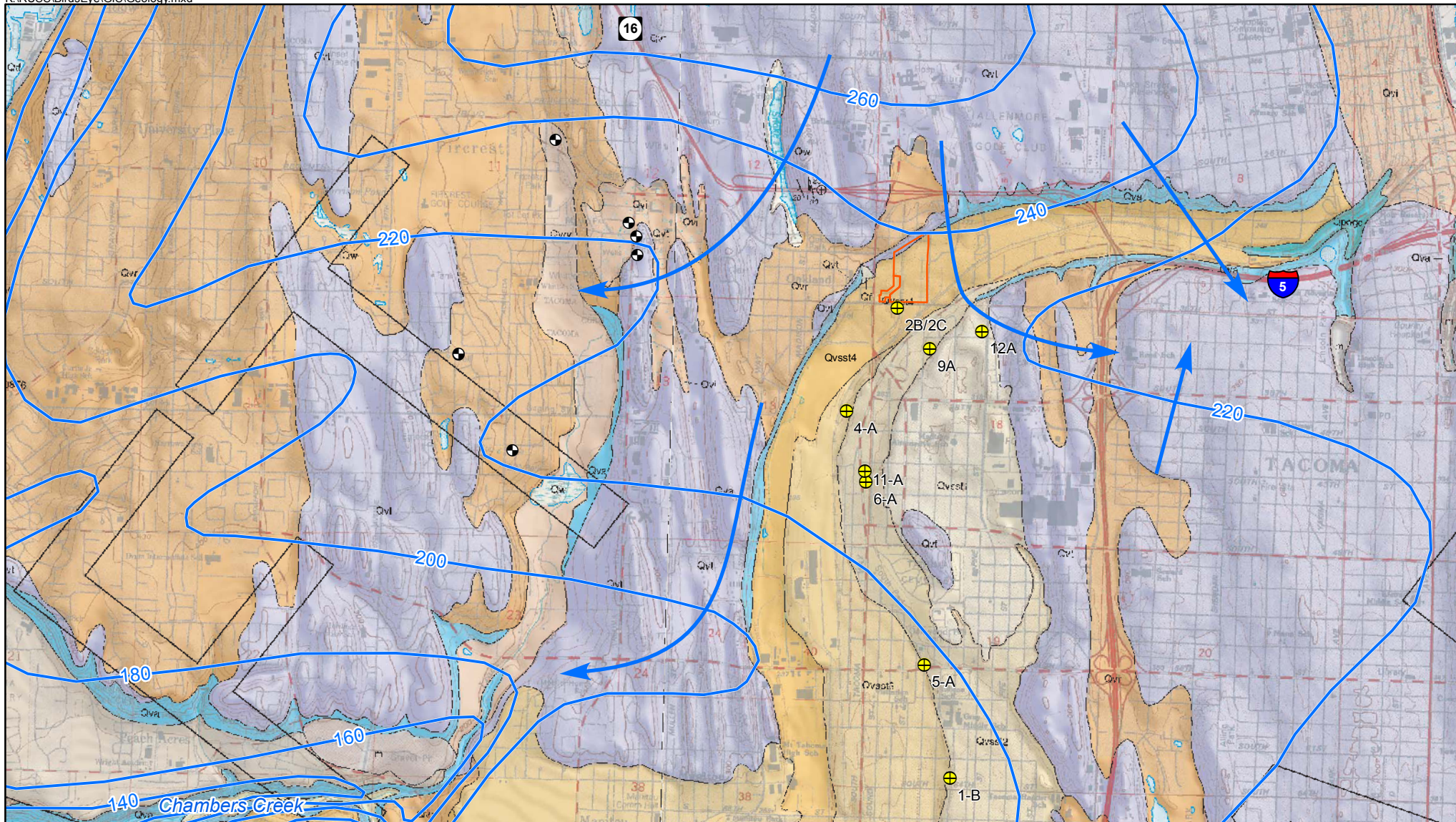
Central Tacoma Area EPA & Ecology Environmental Sites

Birds Eye 2011 RI/FS



-  Ecology Confirmed & Suspected Contaminated Sites
-  EPA Superfund Sites
-  Tacoma Production Wells
-  Fircrest Production Wells
-  Birds Eye Facility





- Birds Eye Parcels
- Tacoma Production Wells
- Fircrest Production Wells
- Groundwater Elevation Contours (Brown & Caldwell, 1985)
- Regional Groundwater Flow Direction

Unit	Description
m	Modified land
Qw	Wetland deposits
Qtf	Tideflat deposits
Qvr	Recessional outwash deposits
Qvry	Younger Recessional outwash deposits
Qvs	Stellacoom Gravel of Walters and Kimmel (1968)
Qvs st4	South Tacoma deposit at elevation <240 ft
Qvs st3	South Tacoma deposit at elevation 240 – 260 ft
Qvs st2	South Tacoma deposit at elevation 260 – 300 ft
Qvs st1	South Tacoma deposit at elevation 280 – 340 ft
Qvi	Ice-contact deposits
Qvt	Vashon till
Qva	Advance outwash deposits
Qpogc	Coarse-grained glacial deposits of pre-Olympia age

●
 Surficial Geology from:
 Troost, K.G. et al, in review,
 Geologic map of the Stellacoom and
 Tacoma South 7.5-minute quadrangles,
 2004, USGS Miscellaneous Field Investigation

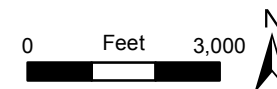
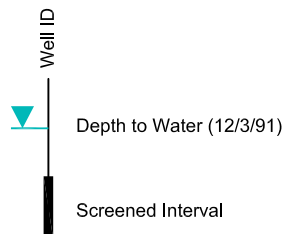
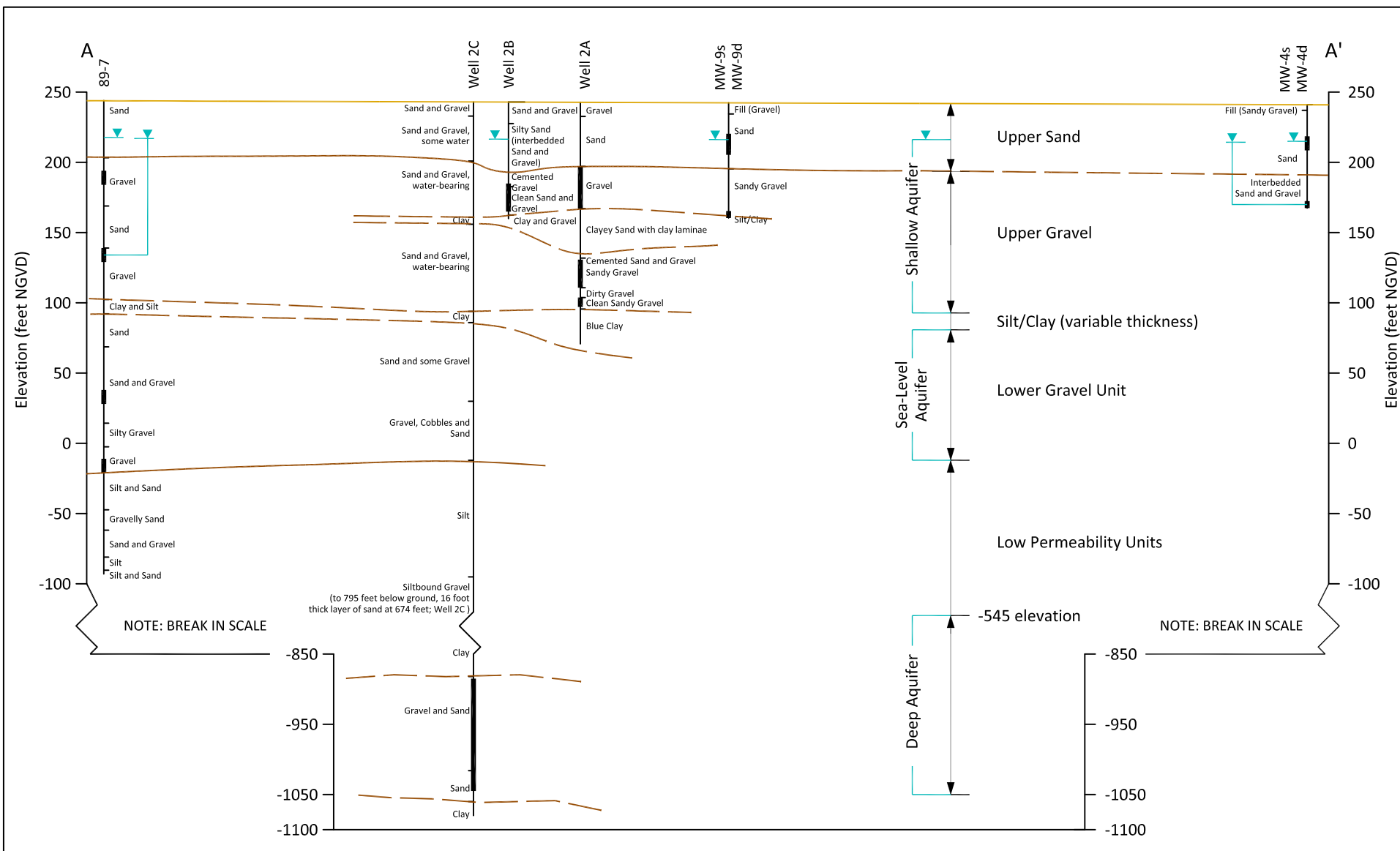


Figure 5
Surficial Geology
and Regional
Groundwater Flow

Birds Eye 2011 RI/FS

pgg



Well 2A converted to observation well or decommissioned
Figure Modified from Phase II RI (PGG et al, 1992)

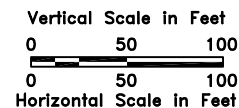
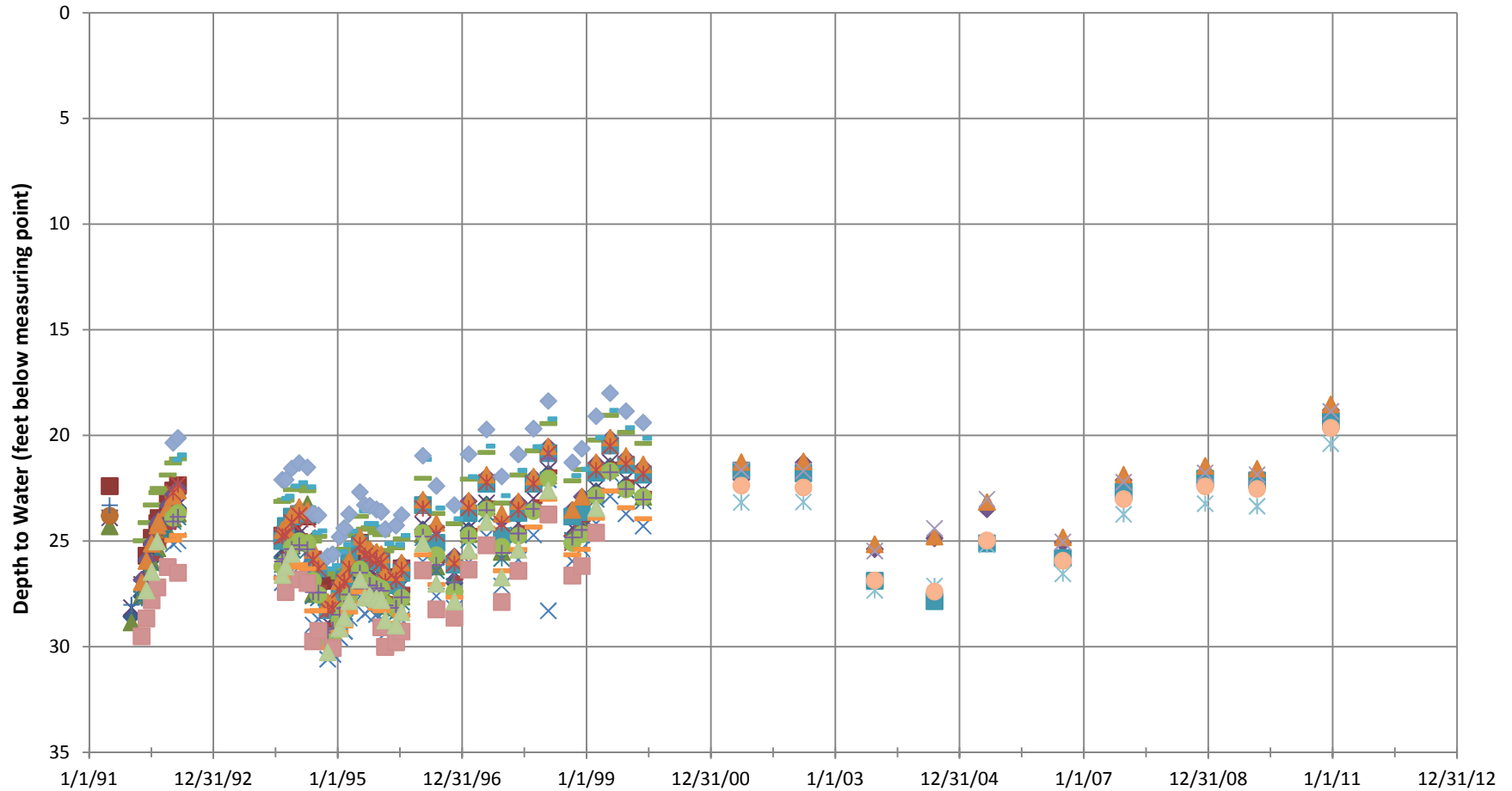


Figure 6
Hydrogeologic Cross Section A-A'

Birds Eye 2011 RI/FS



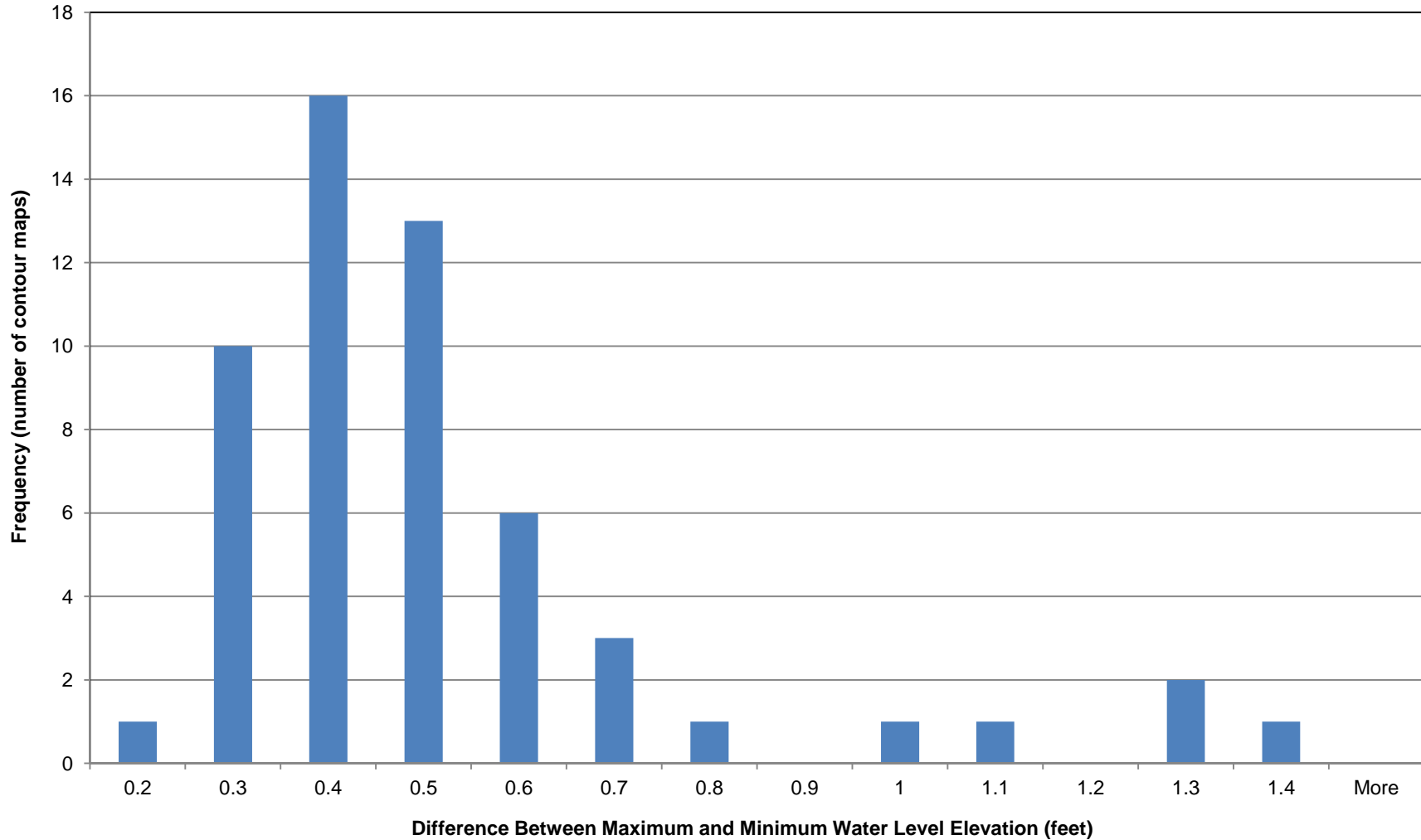


◆ MW-1 ■ MW-2 ▲ MW-3 ✕ MW-4S ✕ MW-4D ● MW-5 + MW-6 - MW-7
 — MW-8 ◆ MW-9s ■ MW-9d ▲ MW-10 ✕ MW-11 ✕ P-1 ● P-2 + P-3
 — P-4 — P-5 ◆ P-6 ■ HC-7 ▲ WELL 2B ✕ PW-2 ✕ PW-4 ● PW-6

Site monitoring wells completed with flush monuments. Depth to water below the well measuring points approximates depth to water below ground surface.

Figure 7
Boiler Room Site Hydrographs

Birds Eye 2011 RI/FS



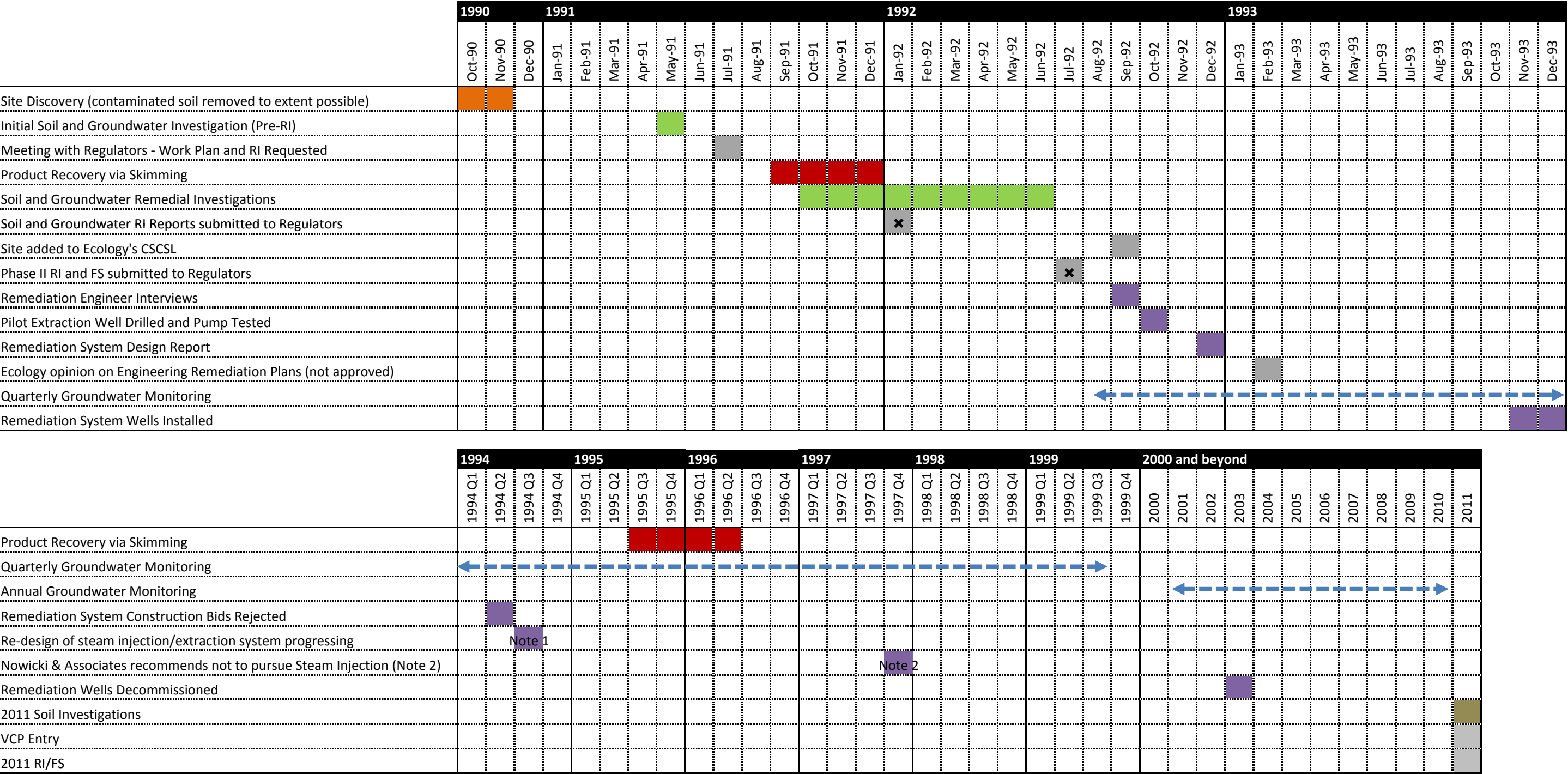
56 Contour Figures represented in Histogram
Groundwater Contour Maps produced November 1991 through November 1999 for previous reports; reproduced in Appendix C

Figure 8
Histogram of Groundwater Elevation Differences
per Contour Figure 1991-1999
Birds Eye Boiler Room Site

Birds Eye Foods 2011 RI/FS



Figure 9. Timeline of Boiler Room Site Investigations and Remediation System Planning



See bottom half of page for Timeline continuation

CSCSL = Confirmed and Suspected Contaminated Sites List

Note 1: 9/26/1994 letter from Nowicki & Associates to Cynthia Ruggiero, TPCHD states "re-design of the steam injection/extraction system is progressing;" details of the re-design not identified or reviewed in preparation of this RI/FS

Note 2: 11/10/97 letter from Nowicki & Associates to Graeme Reid, Nalley's Fine Foods. Recommends continued monitoring, oil absorbent pads, active vacuum or pumping system for groundwater.

Site Discovery

Soil and Groundwater Investigation

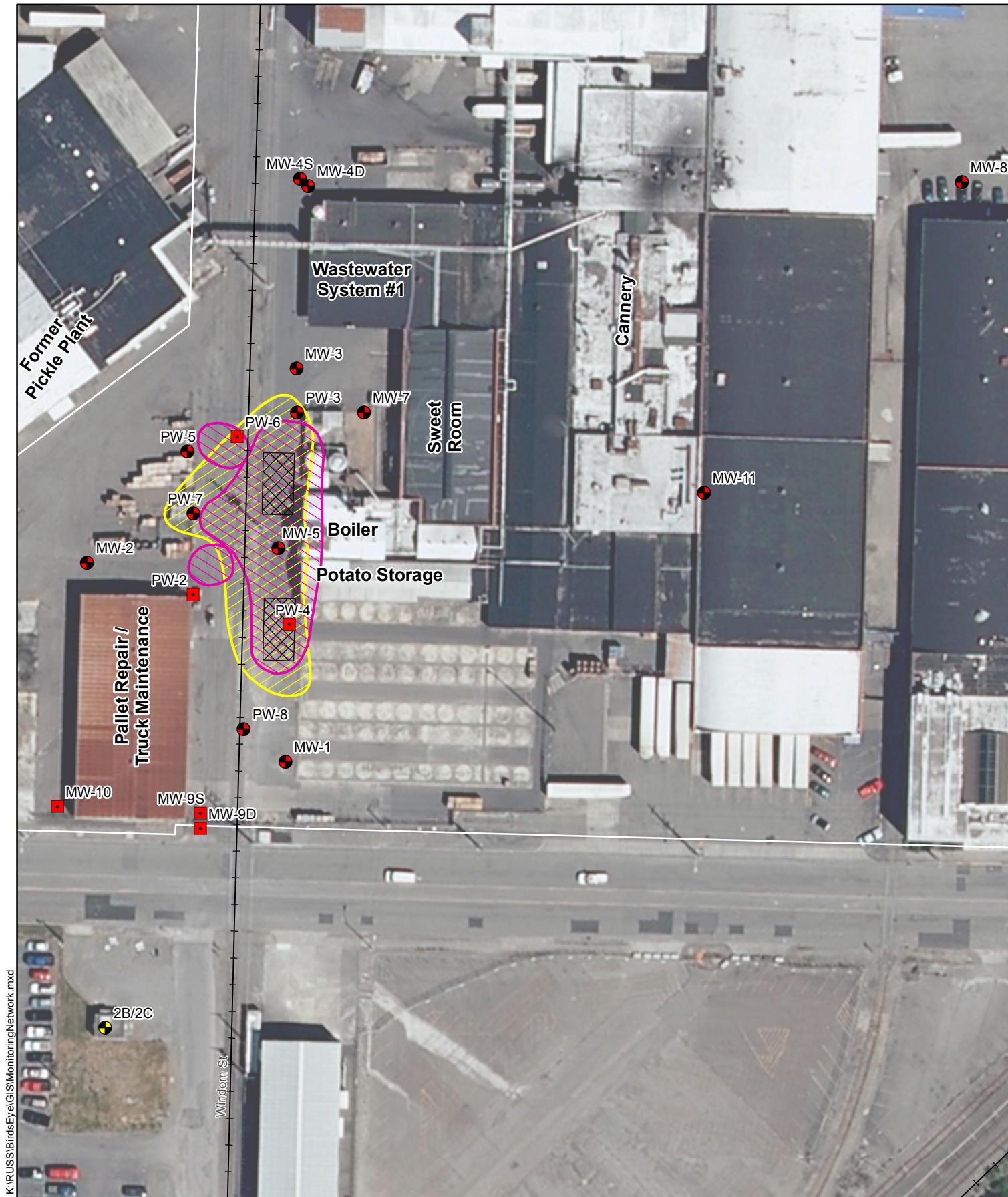
Soil Investigation

Product Skimming

Regulatory Interaction (not comprehensive)

Related to Design of Preferred Remedial System

Groundwater Monitoring



K:\RUSS\BirdsEye\GIS\MonitoringNetwork.mxd

Figure 10
Historic & Current
Groundwater Monitoring
Network
Birds Eye 2011 RI/FS

pgg

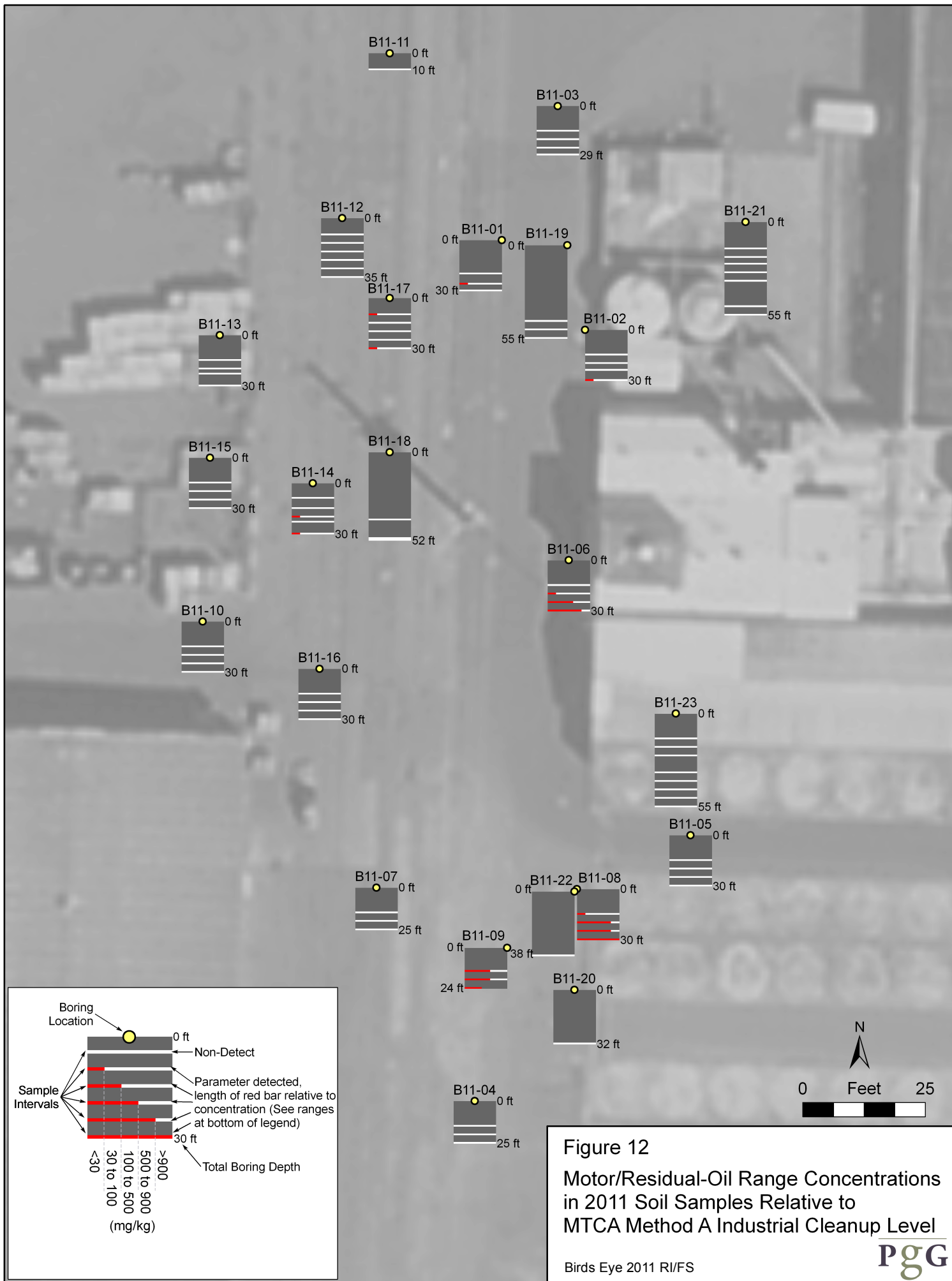


Figure 12
 Motor/Residual-Oil Range Concentrations
 in 2011 Soil Samples Relative to
 MTCA Method A Industrial Cleanup Level

Birds Eye 2011 RI/FS



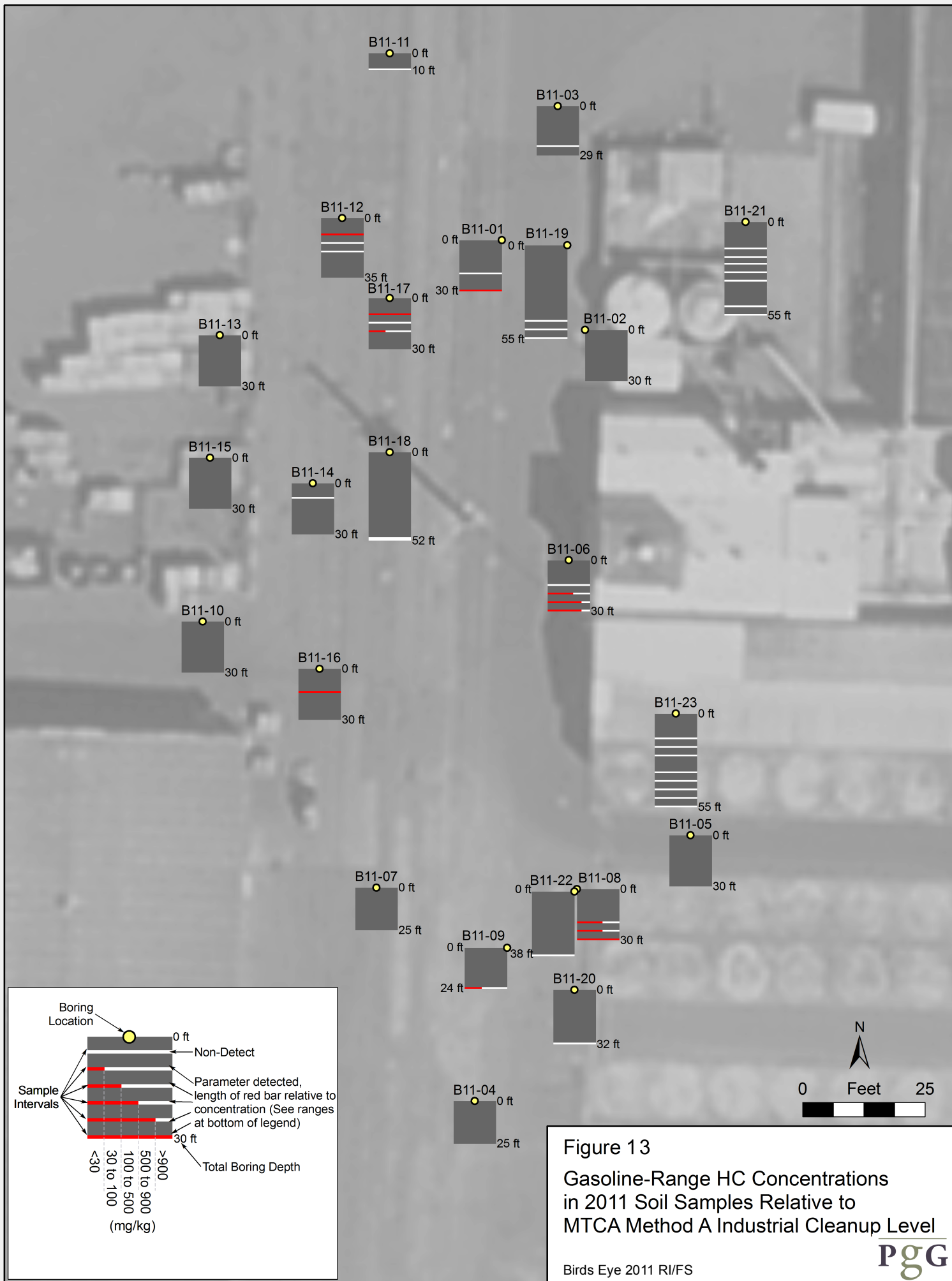


Figure 13
 Gasoline-Range HC Concentrations
 in 2011 Soil Samples Relative to
 MTCA Method A Industrial Cleanup Level

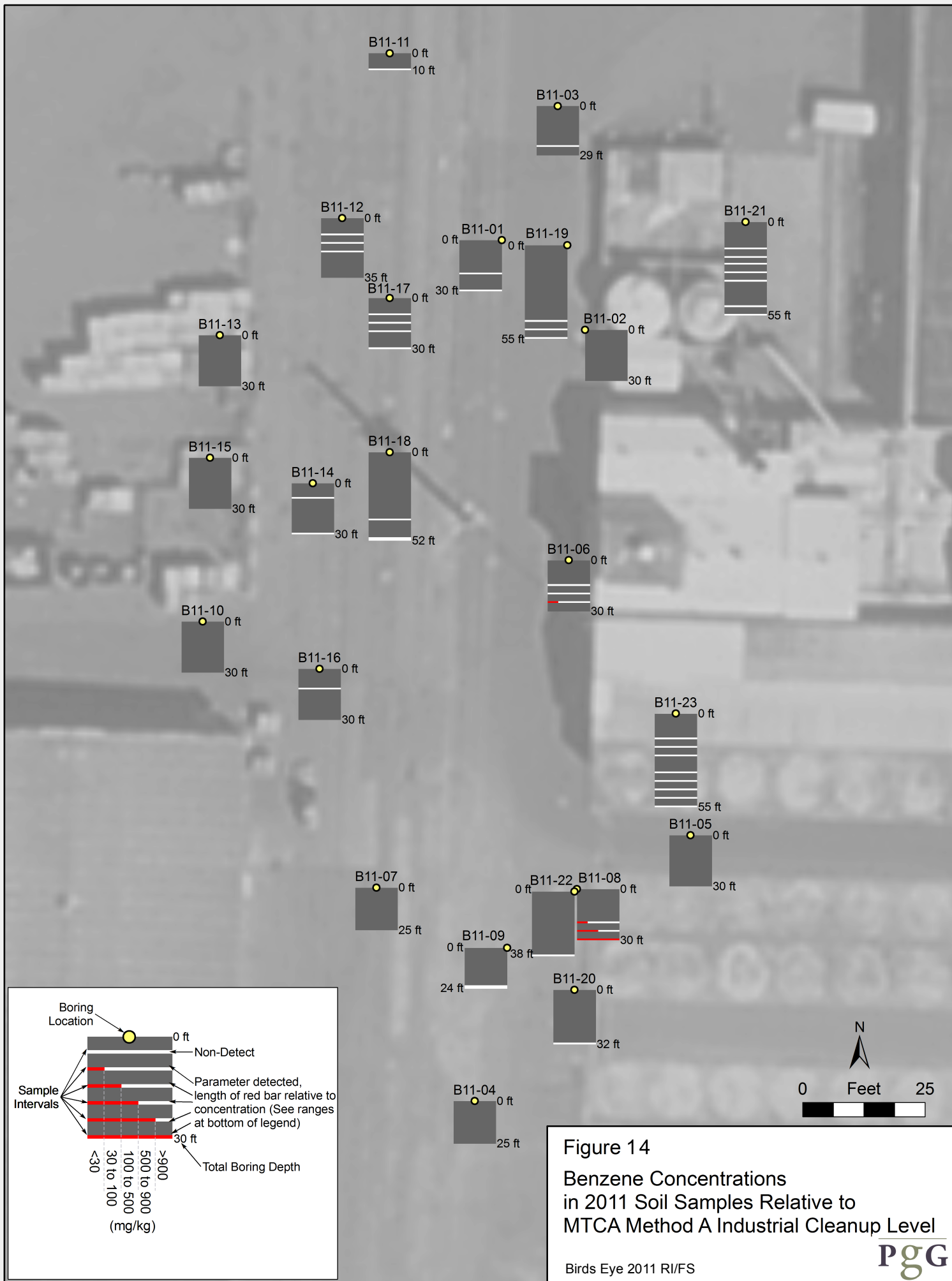


Figure 14
 Benzene Concentrations
 in 2011 Soil Samples Relative to
 MTCA Method A Industrial Cleanup Level

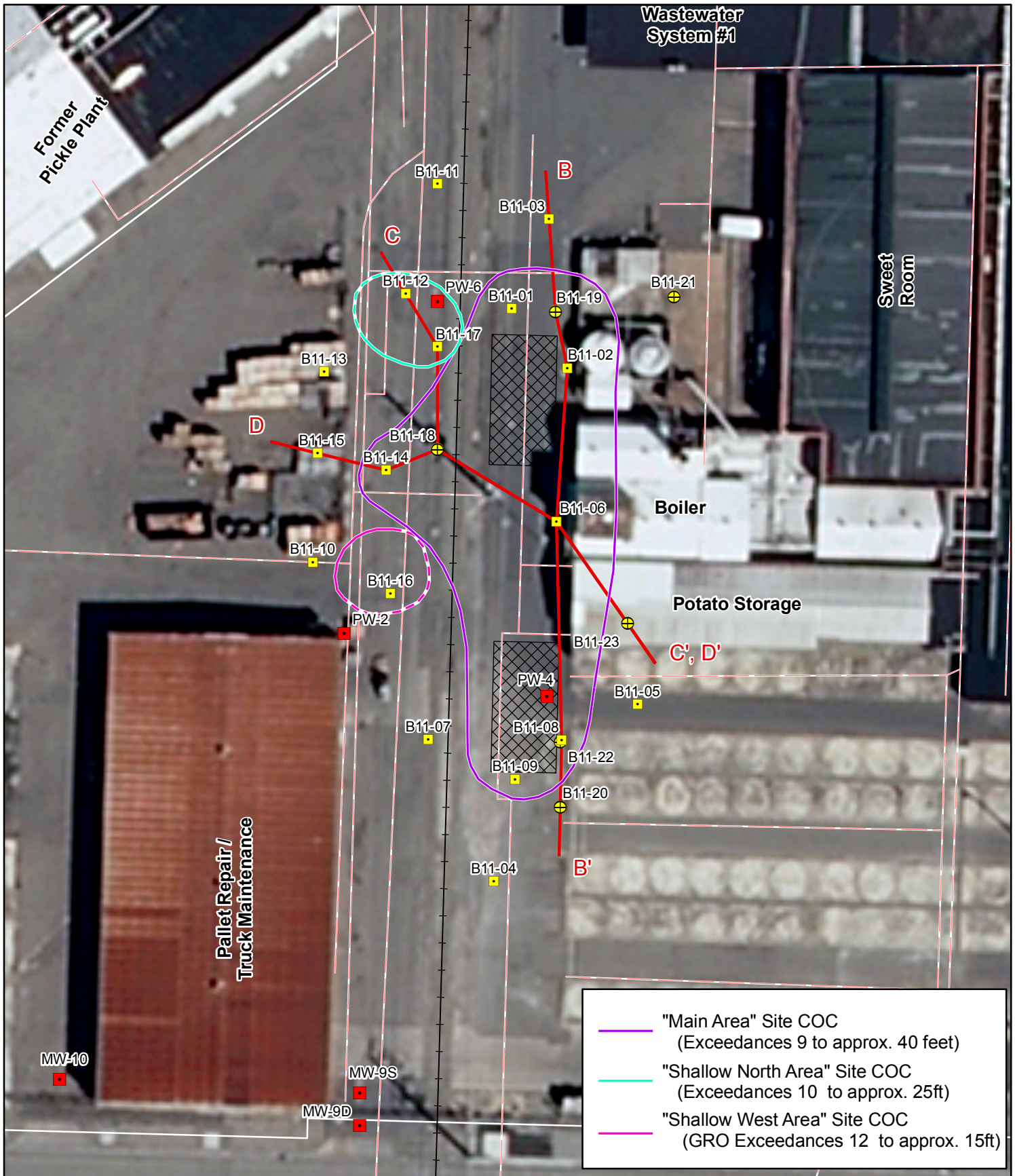
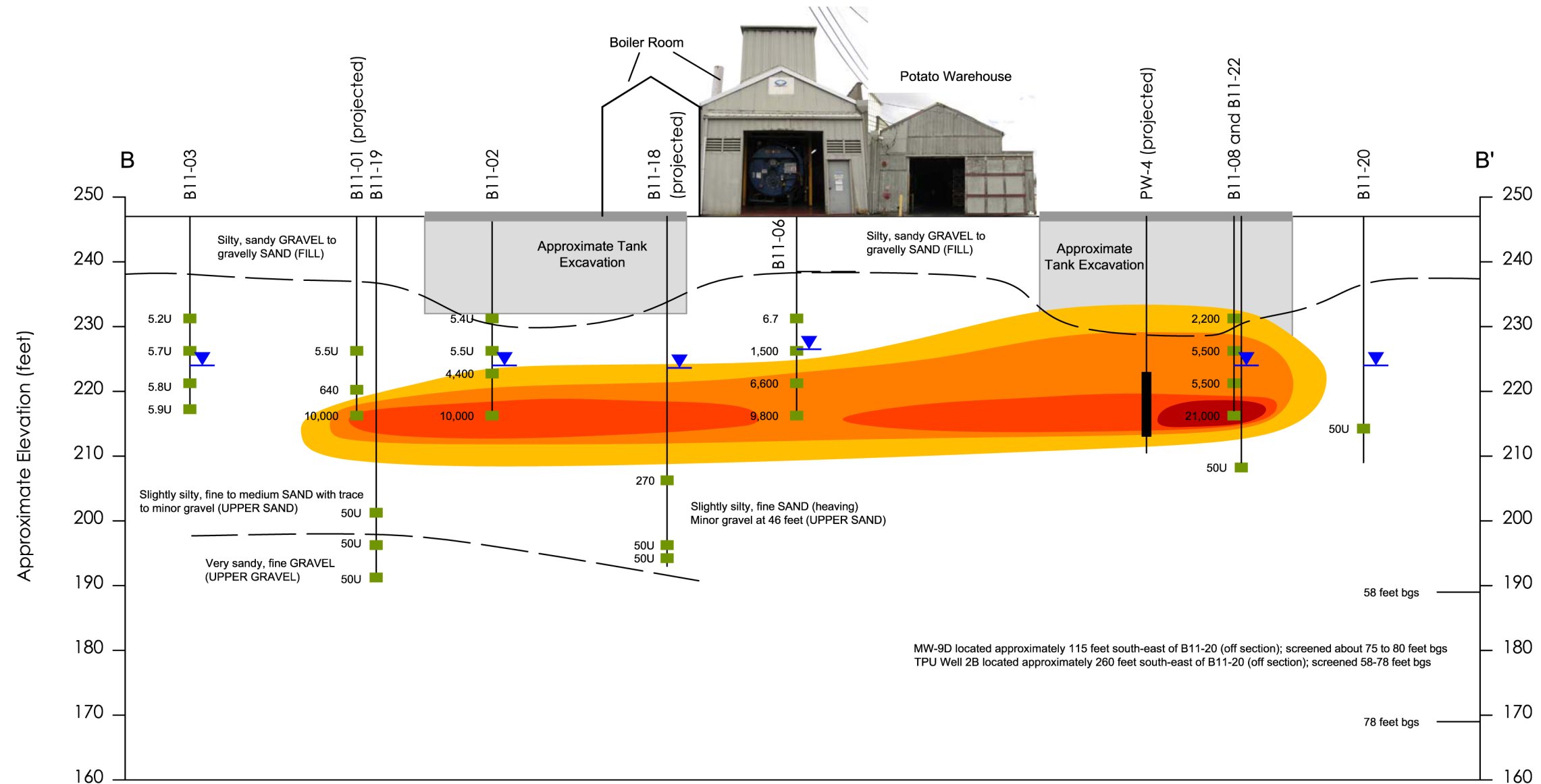


Figure 15
Lateral Extent of
2011 Soil Results Exceeding
MTCA Method A Industrial
Cleanup Levels
 Birds Eye 2011 RI/FS

- Approximate Jan/Feb 2011 Direct Push Boring Location (Not Surveyed)
 - ⊕ Approximate July 2011 HSA Boring Location (Not Surveyed)
 - Annual Site Monitoring Wells
 - Cross Section Alignment
 - ▨ Approximate UST Excavation Areas
 - - - Utilities (Approximate, Not Surveyed)
- 0 Feet 40

 2009 Orthophoto



LEGEND



- Diesel Range Organic concentrations exceed MTCA Method A Industrial CUL (2,000 mg/kg)
- Diesel Range Organic concentrations exceed 5,000 mg/kg
- Diesel Range Organic concentrations exceed 10,000 mg/kg
- Diesel Range Organic concentrations exceed 20,000 mg/kg

B11-02

50U

1,500

Borehole location showing depths of soil samples collected for lab analyses

PW-4

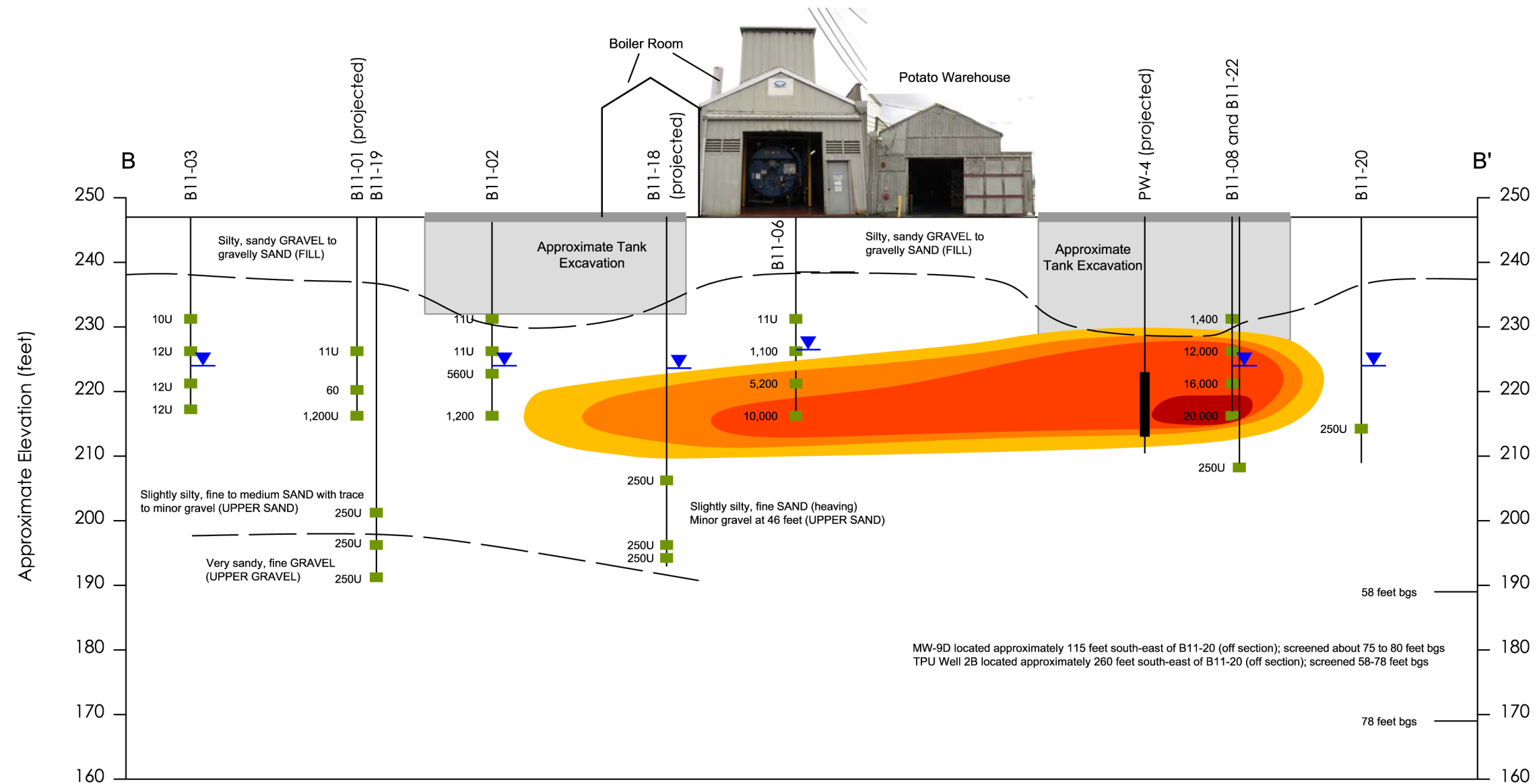
Annual Monitoring Well location and screened interval

Horizontal Scale In Feet
0 10 20
0 10 20
Vertical Scale In Feet

FIGURE 16
Diesel-Range HC Concentrations in 2011 Soil Samples Collected Along Profile B-B"
Birds Eye Foods 2011 Soil Investigation

Birds Eye 2011 RI/FS
JI1001.03, BB_October2011.dwg

PgG



LEGEND

- Motor/Heavy Oil Range Organic concentrations exceed MTCA Method A Industrial CUL (2,000 mg/kg)
- Motor/Heavy Oil Range Organic concentrations exceed 5,000 mg/kg
- Motor/Heavy Oil Range Organic concentrations exceed 10,000 mg/kg
- Motor/Heavy Oil Range Organic concentrations exceed 20,000 mg/kg

B11-02

50U

1,500

Borehole location showing depths of soil samples collected for lab analyses

Concentrations in mg/kg

PW-4

Annual Monitoring Well location and screened interval

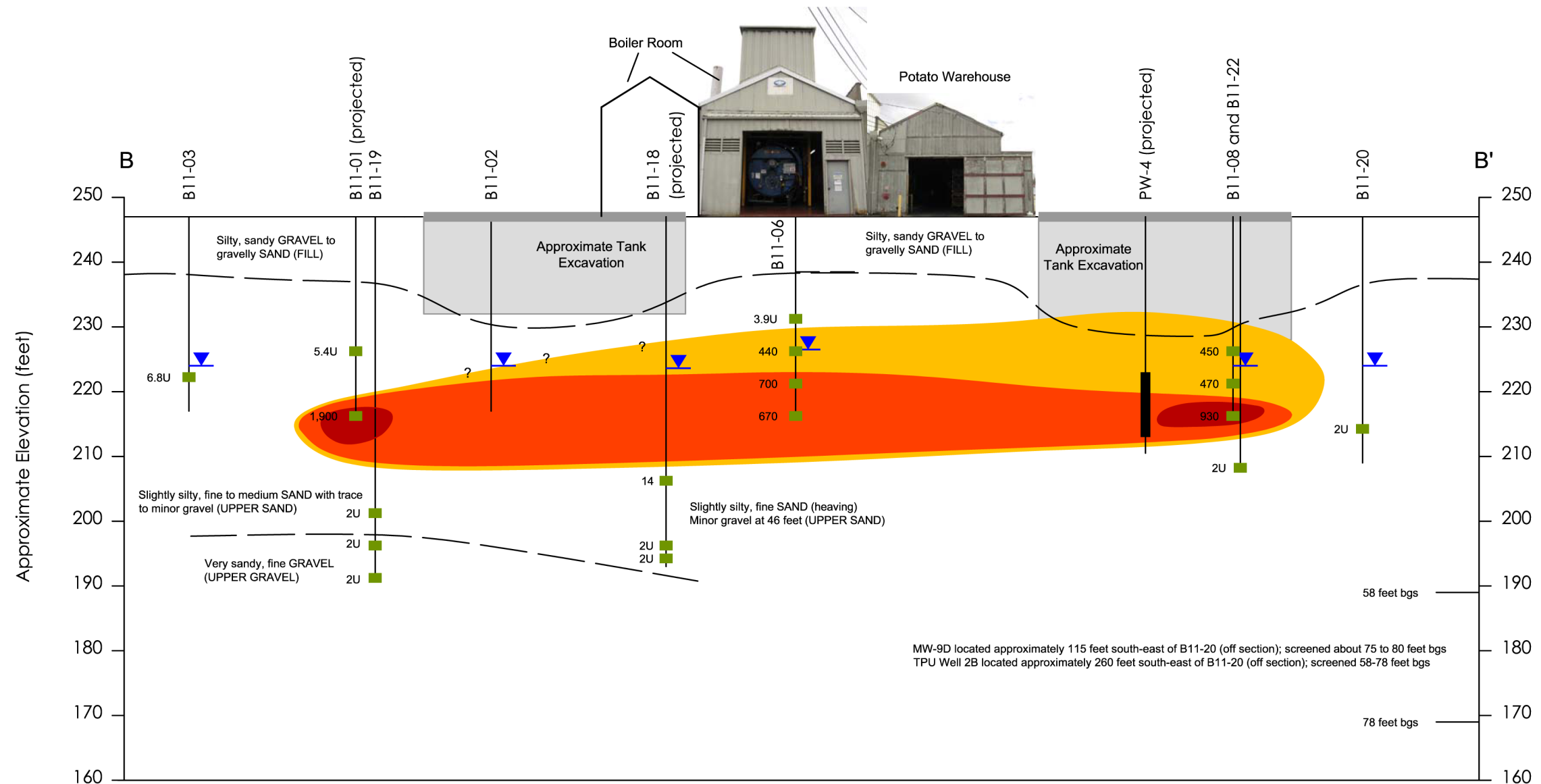
Horizontal Scale in Feet
0 10 20

Vertical Scale in Feet
0 10 20

FIGURE 17
Heavy Oil-Range HC Concentrations in 2011 Soil Samples Collected Along Profile B-B'
Birds Eye Foods 2011 Soil Investigation

Birds Eye 2011 RI/FS
JI1001.03, BB_October2011.dwg

pgg



LEGEND

- Gasoline Range Organic concentrations exceed MTCA Method A Industrial CUL (30 mg/kg)
- Gasoline Range Organic concentrations exceed 500 mg/kg
- Gasoline Range Organic concentrations exceed 900 mg/kg

B11-02

50U

1,500

Borehole location showing depths of soil samples collected for lab analyses

Concentrations in mg/kg

PW-4

Annual Monitoring Well location and screened interval

Horizontal Scale in Feet

0 10 20

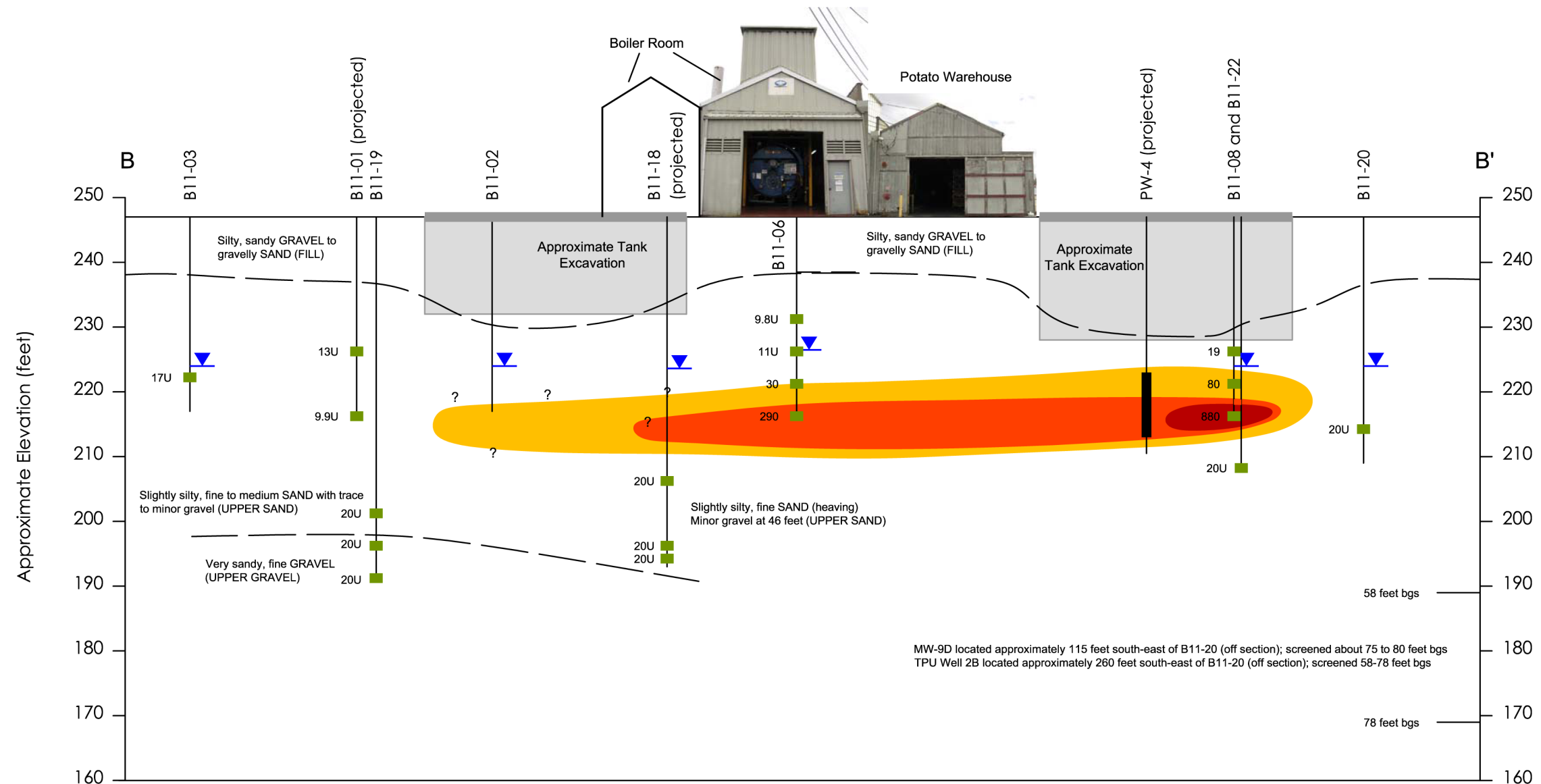
0 10 20

Vertical Scale in Feet

FIGURE 18
Gasoline-Range HC Concentrations in 2011 Soil Samples Collected Along Profile B-B'
Birds Eye Foods 2011 Soil Investigation

Birds Eye 2011 RI/FS
JI1001.03, BB_October2011.dwg

PgG



LEGEND

- Benzene concentrations exceed MTCA Method A Industrial CUL (30 ug/kg)
- Benzene concentrations exceed 100 ug/kg
- Benzene concentrations exceed 500 ug/kg

B11-02
50U Borehole location showing depths of soil samples collected for lab analyses
1,500 Concentrations in ug/kg

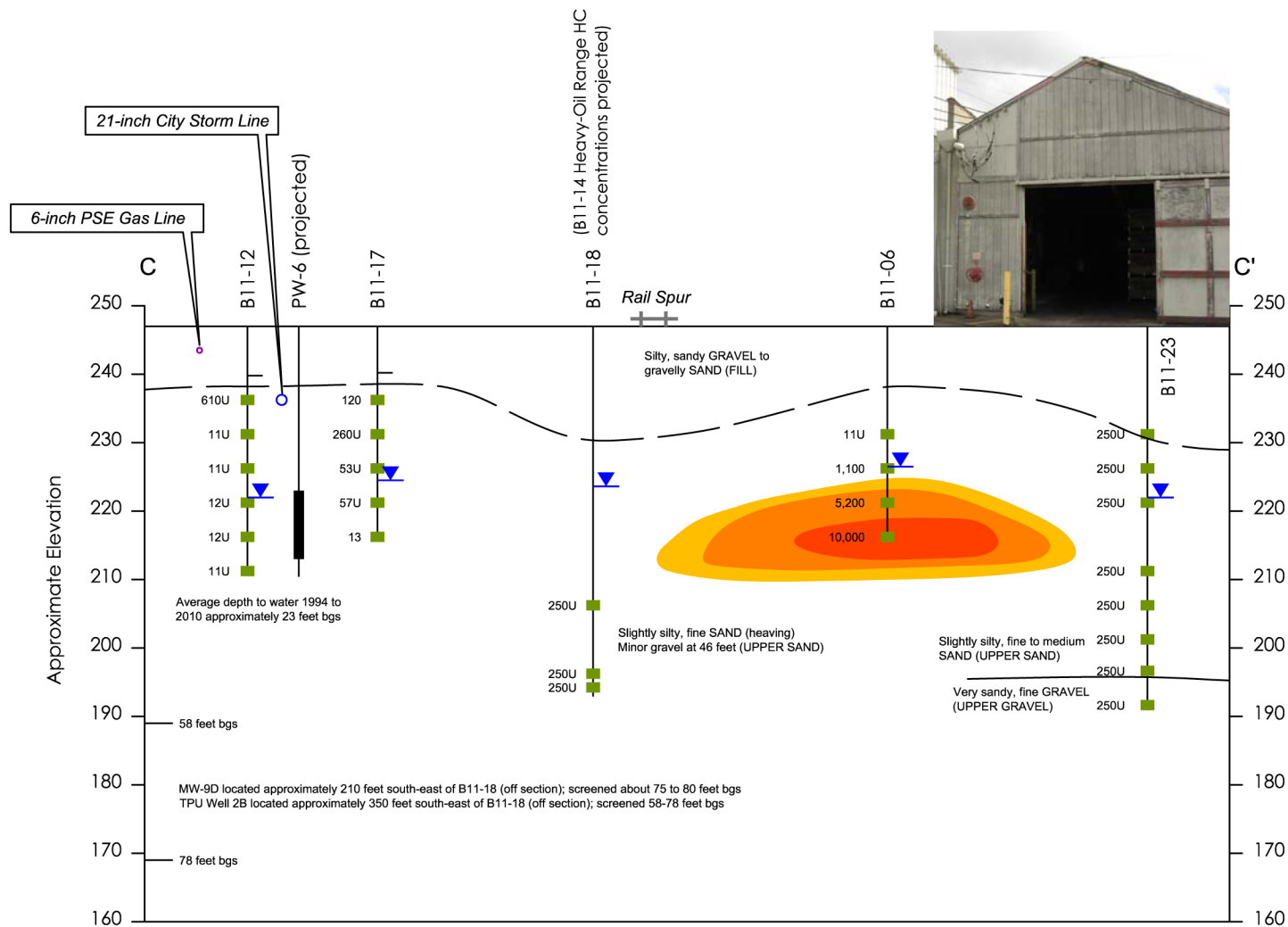
PW-4
Annual Monitoring Well location and screened interval

Horizontal Scale In Feet
0 10 20
0 10 20
Vertical Scale In Feet

FIGURE 19
Benzene Concentrations in 2011 Soil Samples
Collected Along Profile B-B'
Birds Eye Foods 2011 Soil Investigation

Birds Eye 2011 RI/FS
JI1001.03, BB_October2011.dwg

pgg



LEGEND

- Motor/Heavy Oil concentrations exceed MTCA Method A Industrial CUL (2,000 mg/kg)
- Motor/Heavy Oil concentrations exceed 5,000 mg/kg
- Motor/Heavy Oil concentrations exceed 10,000 mg/kg

Borehole location and depths of soil samples collected for lab analyses

Concentrations in mg/kg

Utility Locations Approximate

B11-12

50U

950

Annual Monitoring Well location and screened interval

PW-6

Horizontal Scale in Feet

0 25

Vertical Scale in Feet

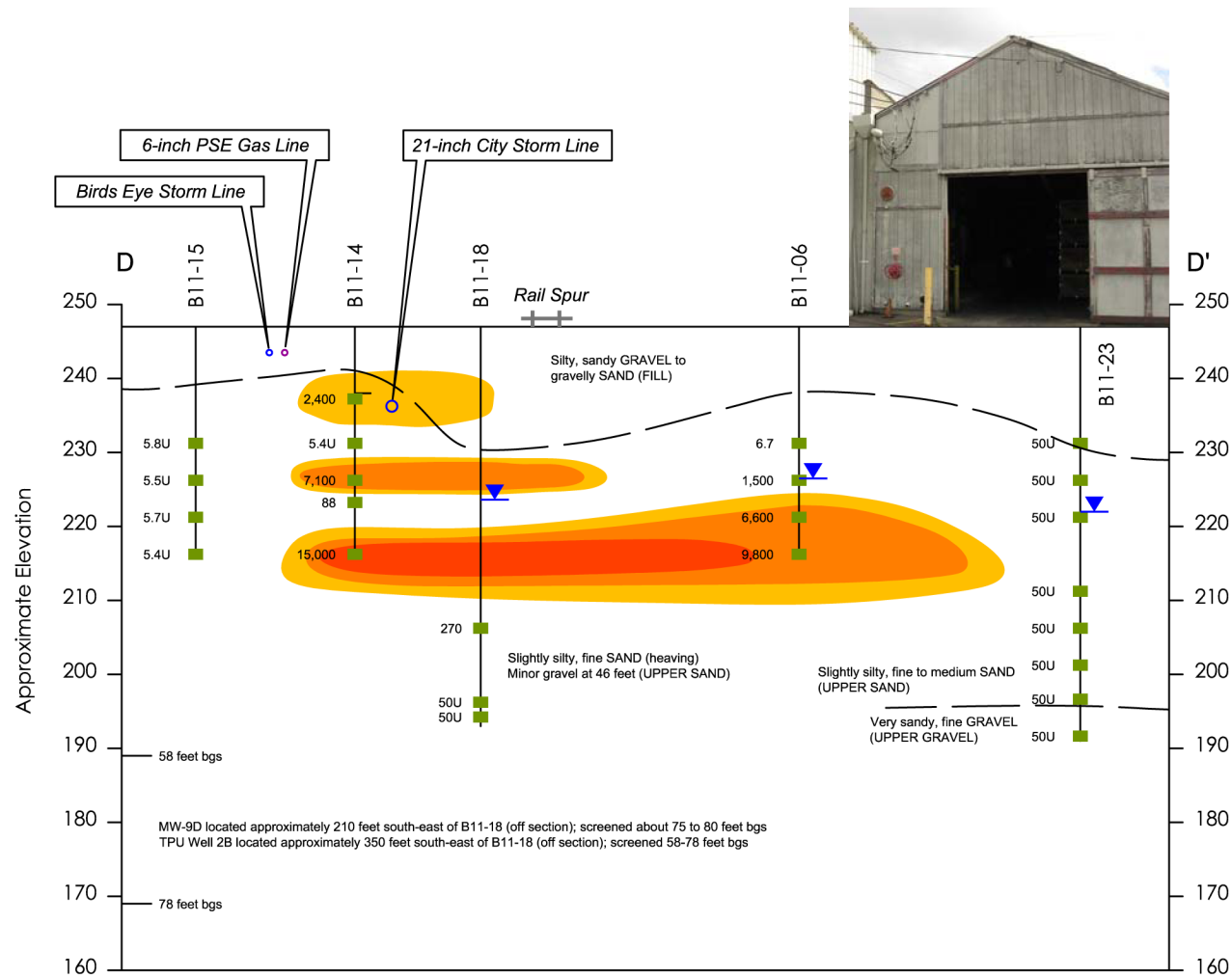
0 25

FIGURE 21

Heavy-Oil Range HC Concentrations in 2011
 Soil Samples Collected Along Profile C-C'
 Birds Eye Foods 2011 Soil Investigation

PgG

Birds Eye 2011 RI/FS



LEGEND

- Diesel concentrations exceed MTCA Method A Industrial CUL (2,000 mg/kg)
- Diesel concentrations exceed 5,000 mg/kg
- Diesel concentrations exceed 10,000 mg/kg

Borehole location and depths of soil samples collected for lab analyses

Concentrations in mg/kg

Utility Locations Approximate

Horizontal Scale in Feet

Vertical Scale in Feet

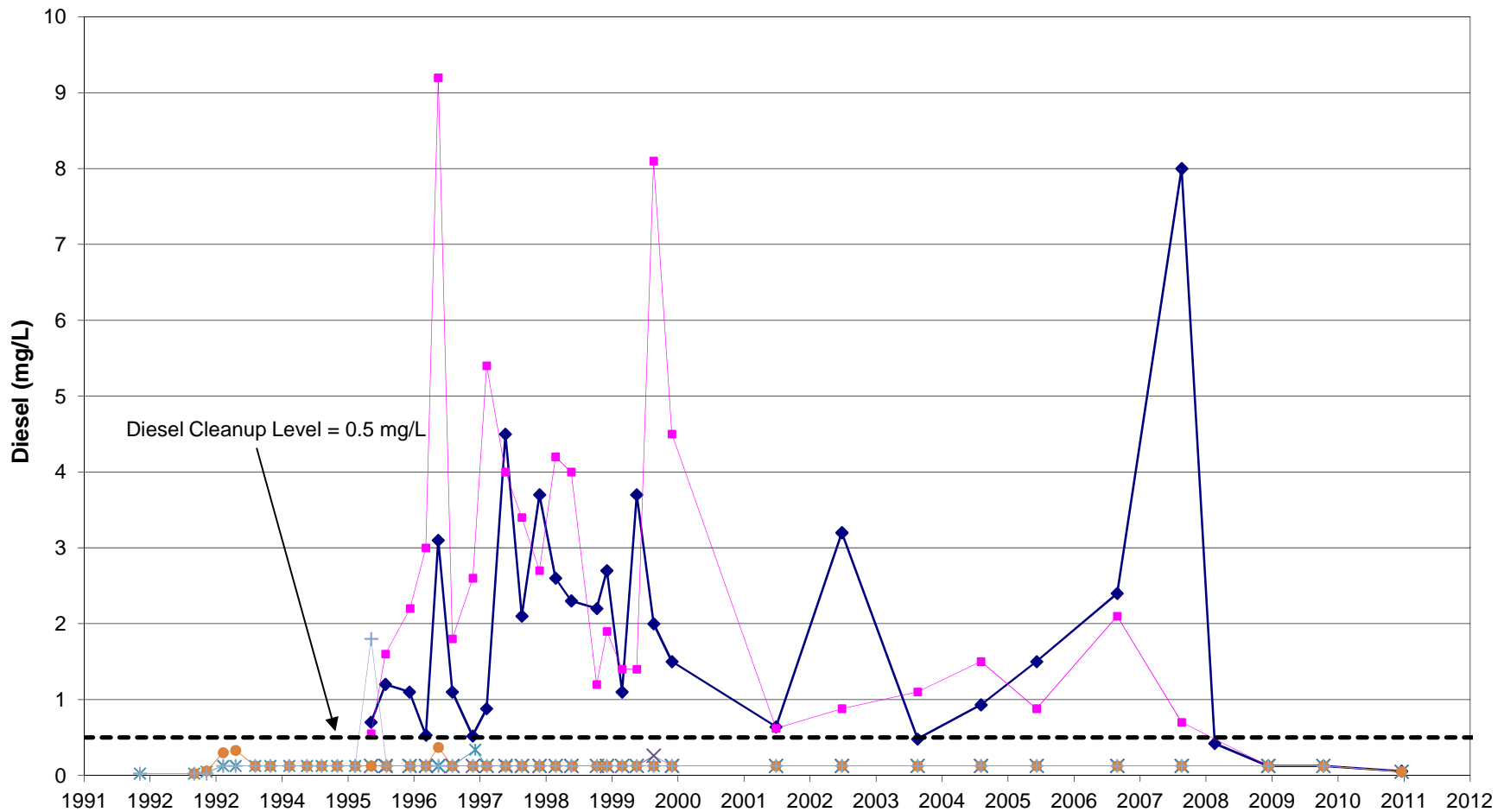
FIGURE 23

Diesel-Range HC Concentrations in 2011 Soil Samples Collected Along Profile D-D'

Birds Eye Foods 2011 Soil Investigation

PgG

Birds Eye 2011 RI/FS



Legend

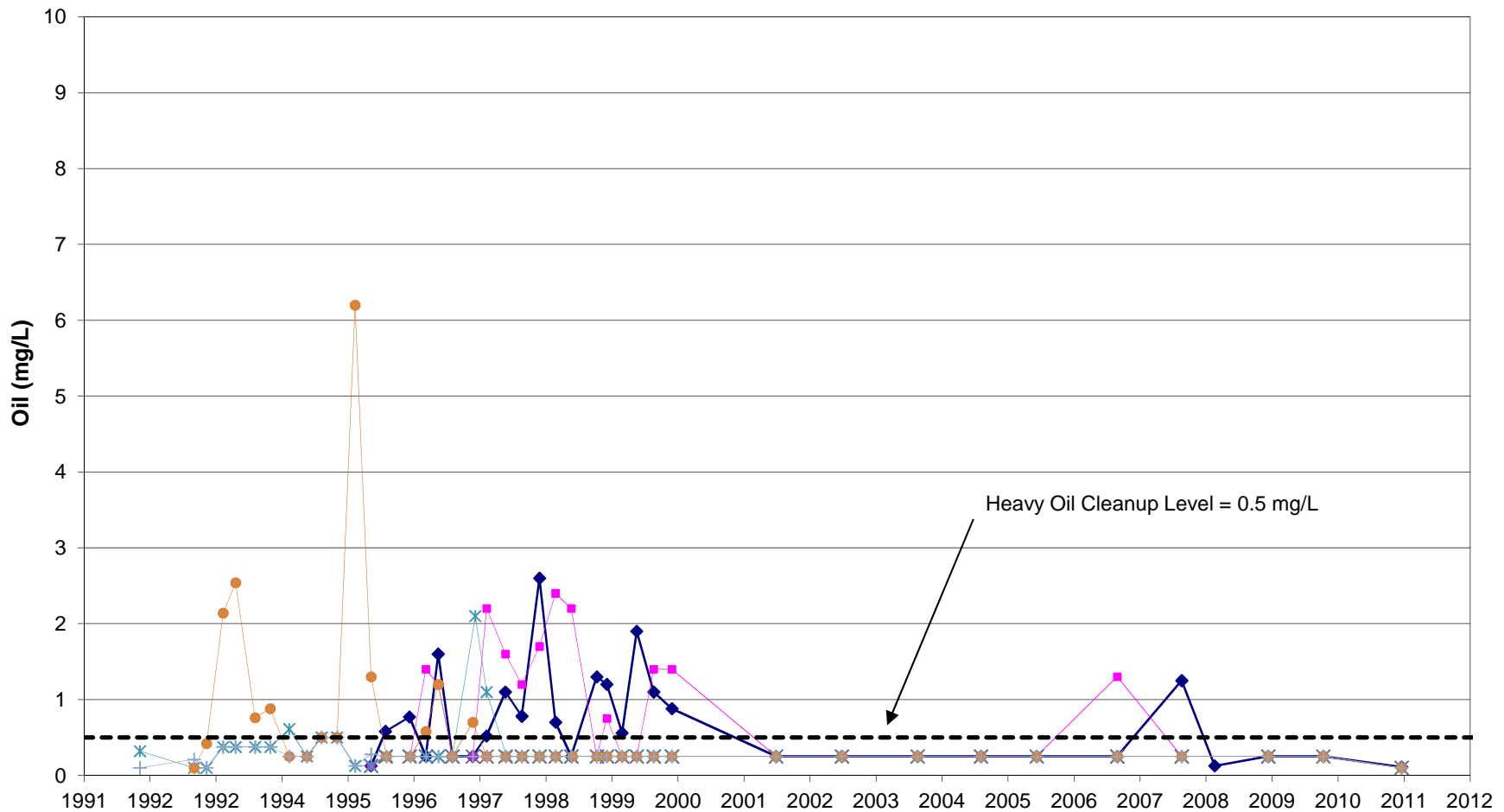
◆ PW-4 ■ PW-6 × PW-2 * MW-9S ● MW-9D + MW-10

Non-detect results plotted as half the detection limit

Figure 24
Diesel-Range HC Concentrations in Groundwater
Samples Collected from Annual Monitoring Well
Network

JP0309, Birds Eye Foods





Legend

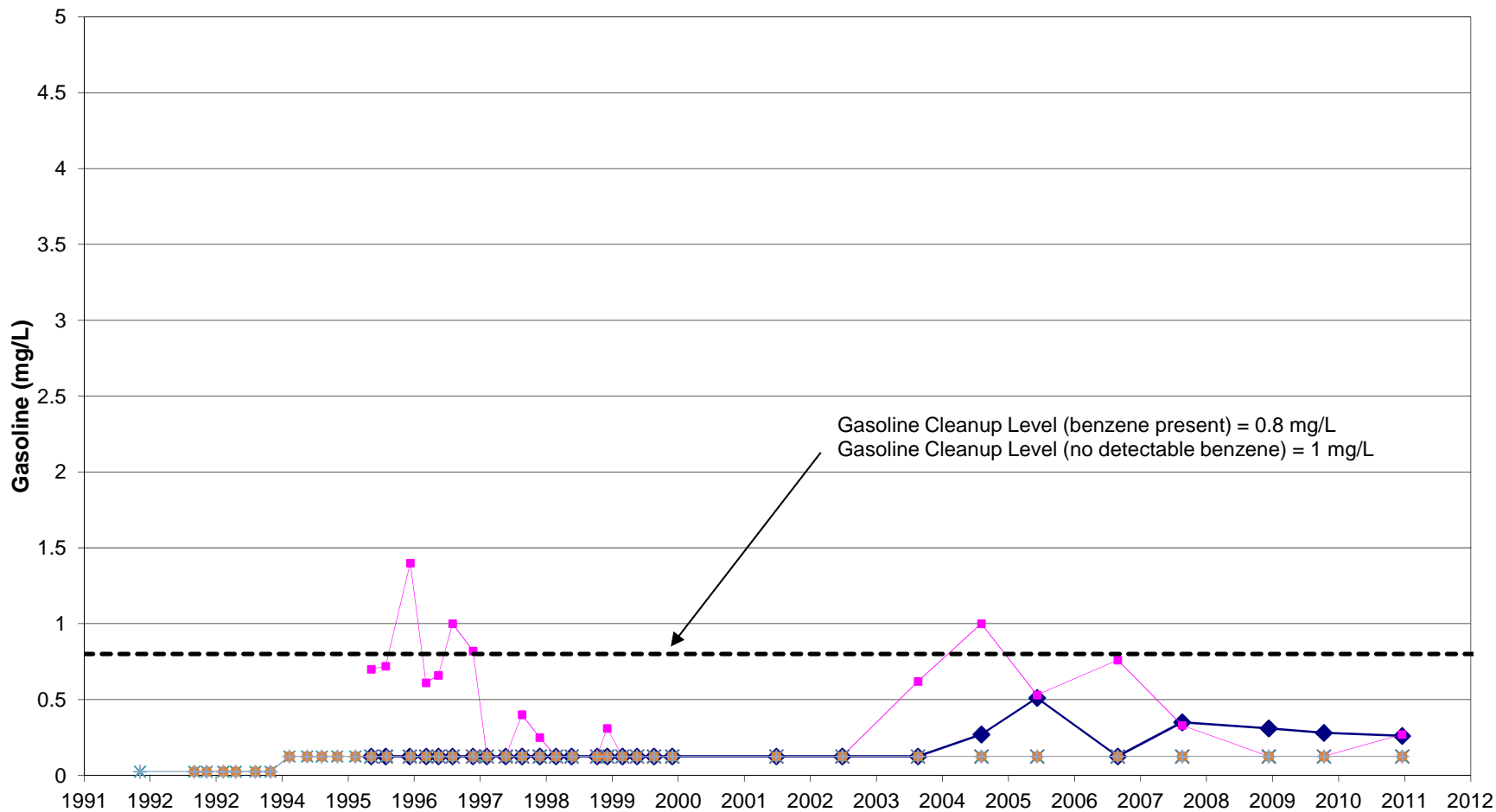
◆ PW-4 ■ PW-6 × PW-2 * MW-9S ● MW-9D + MW-10

Non-detect results plotted as half the detection limit

Figure 25
Heavy Oil-Range HC Concentrations in
Groundwater Samples Collected from Annual
Monitoring Well Network

JP0309, Birds Eye Foods





Legend

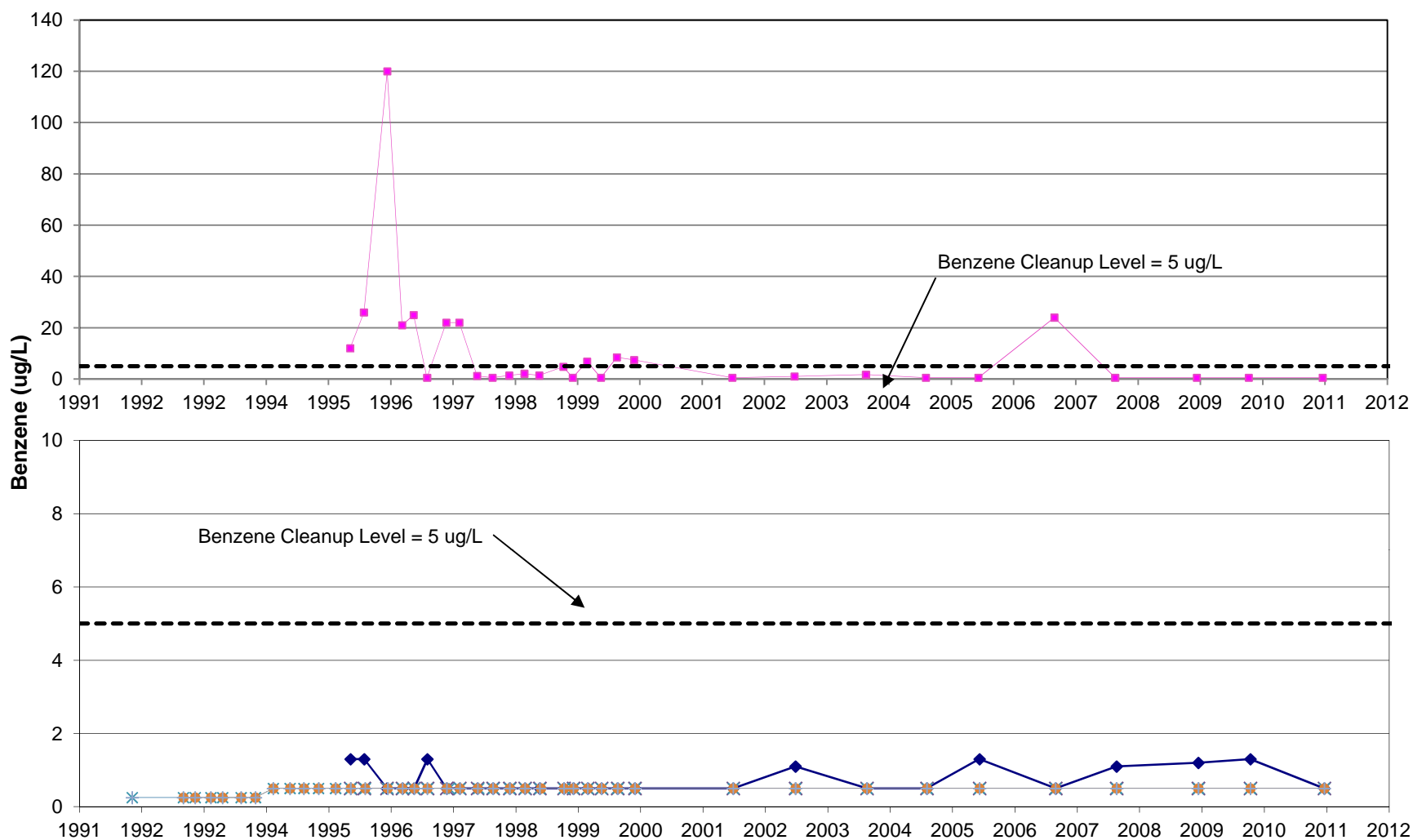
◆ PW-4 ■ PW-6 × PW-2 * MW-9S ● MW-9D + MW-10

Non-detect results plotted as half the detection limit

Figure 26
Gasoline-Range HC Concentrations in
Groundwater Samples collected from Annual
Monitoring Well Network

JP0309, Birds Eye Foods





Legend

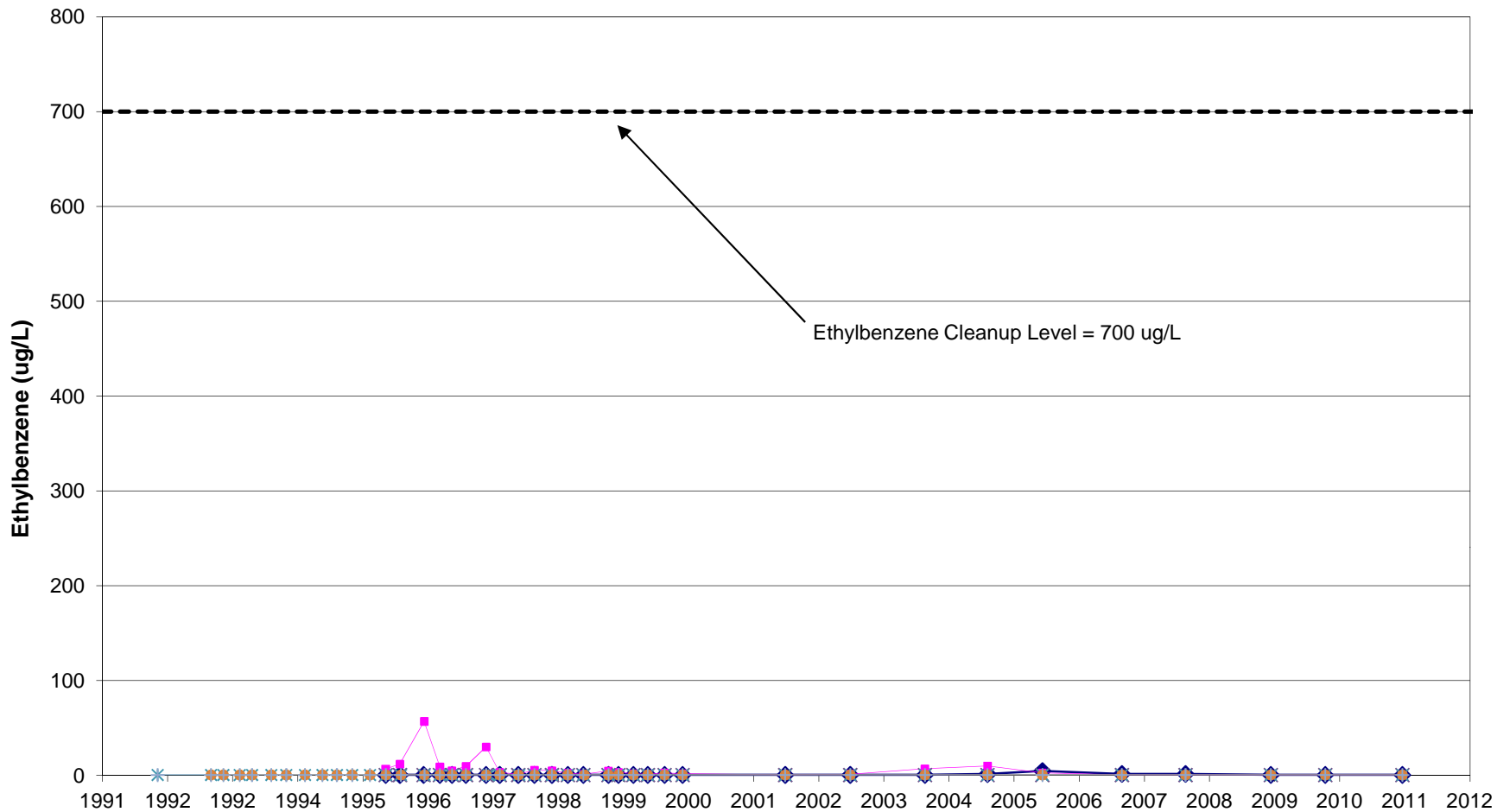
■ PW-6
 ◆ PW-4
 × PW-2
 ✱ MW-9S
 ● MW-9D
 + MW-10

Non-detect results plotted as half the detection limit

Figure 27
Benzene Concentrations in Groundwater Samples
collected from Annual Monitoring Well Network

JP0309, Birds Eye Foods





Legend

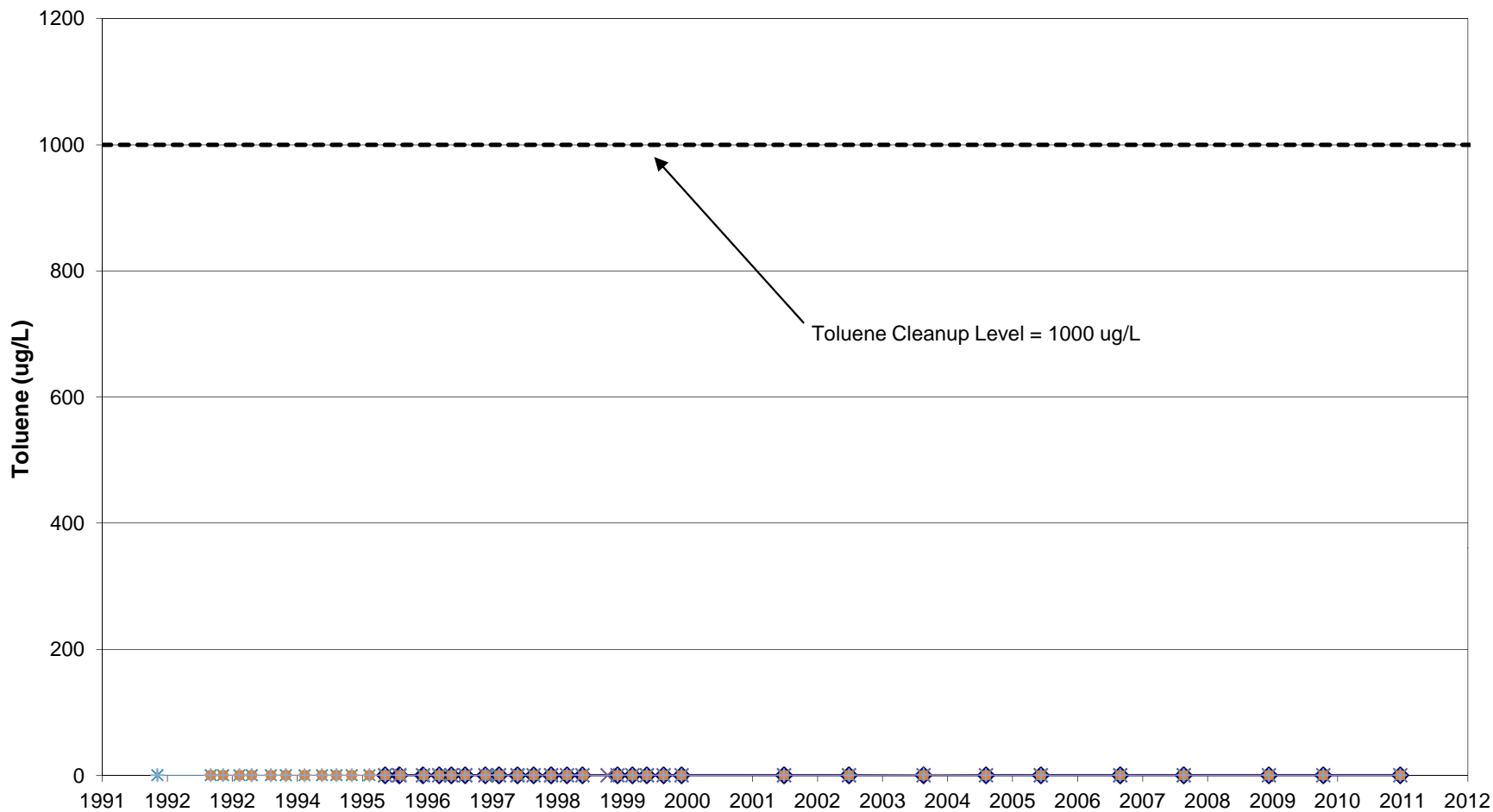
◆ PW-4 ■ PW-6 × PW-2 * MW-9S ● MW-9D + MW-10

Non-detect results plotted as half the detection limit

Figure 28
Ethylbenzene Concentrations in Groundwater
Samples collected from Annual Monitoring Well
Network

JP0309, Birds Eye Foods





Legend

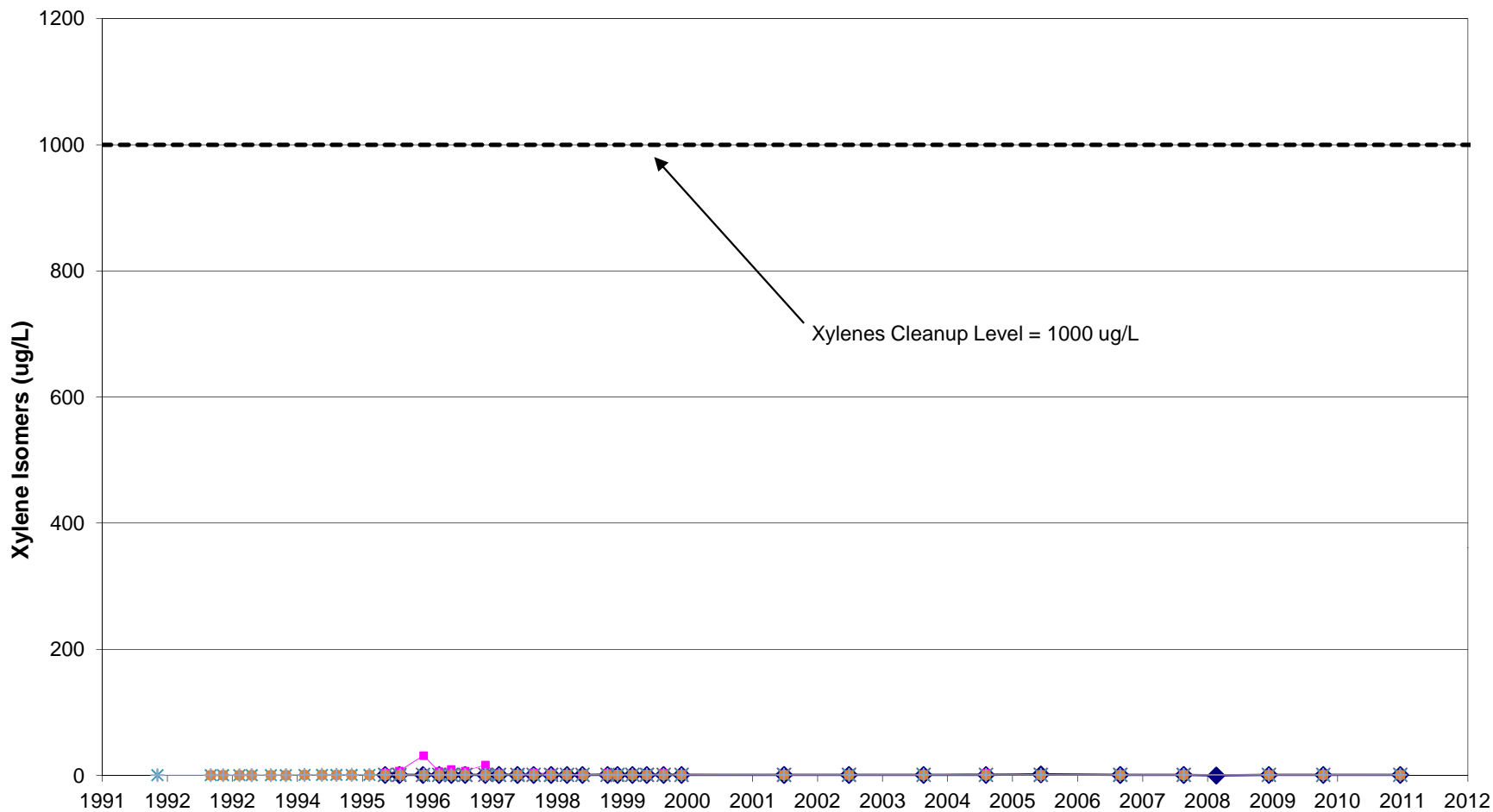
◆ PW-4 ■ PW-6 × PW-2 * MW-9S ● MW-9D + MW-10

Non-detect results plotted as half the detection limit

Figure 29
Toluene Concentrations in Groundwater Samples
collected from Annual Monitoring Well Network

JP0309, Birds Eye Foods





Legend

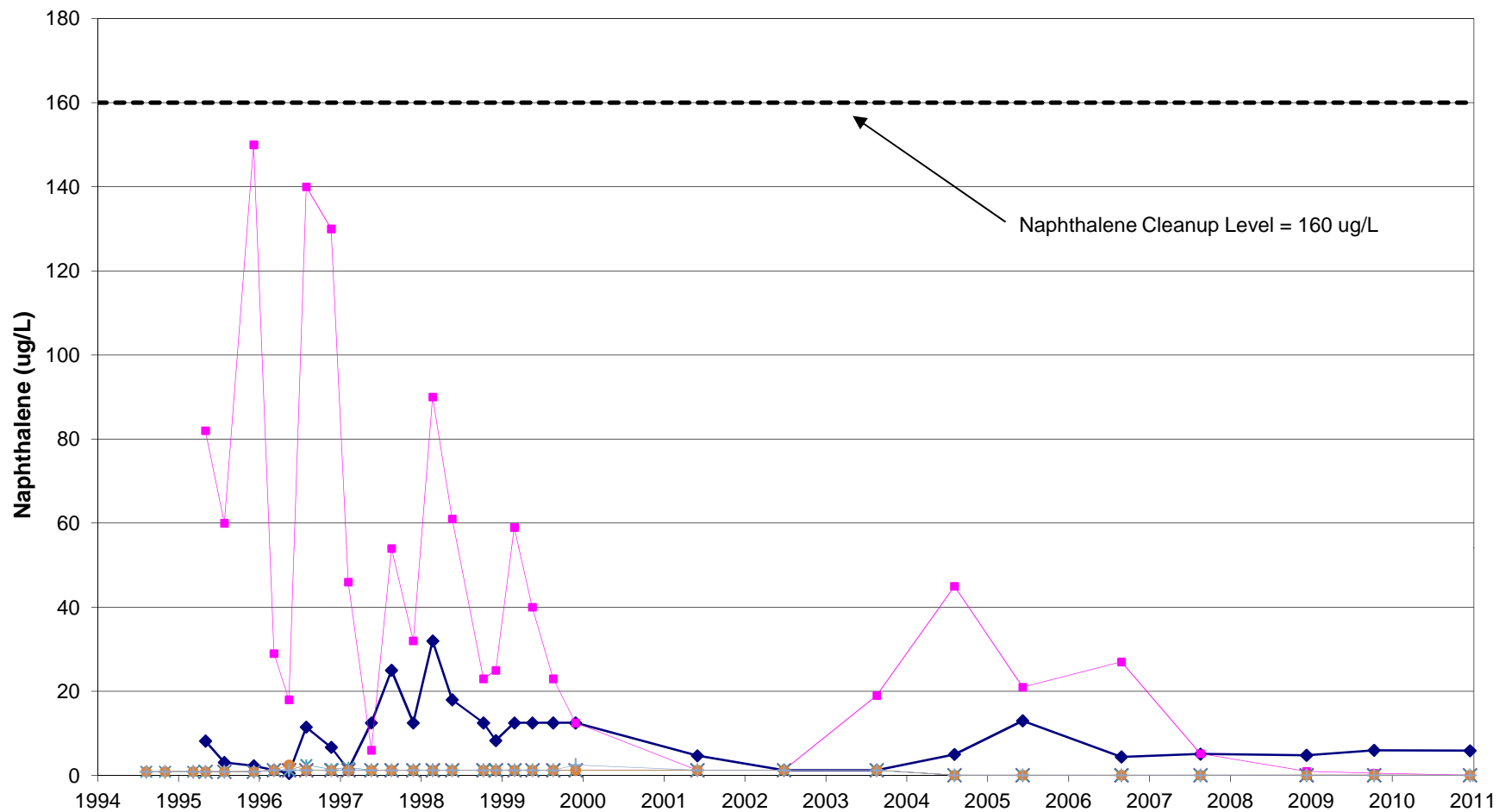
◆ PW-4
 ■ PW-6
 × PW-2
 ✱ MW-9S
 ● MW-9D
 + MW-10

Non-detect results plotted as half the detection limit

Figure 30
Total Xylenes Concentrations in Groundwater
Samples Collected from Annual Monitoring Well
Network

JP0309, Birds Eye Foods





Legend

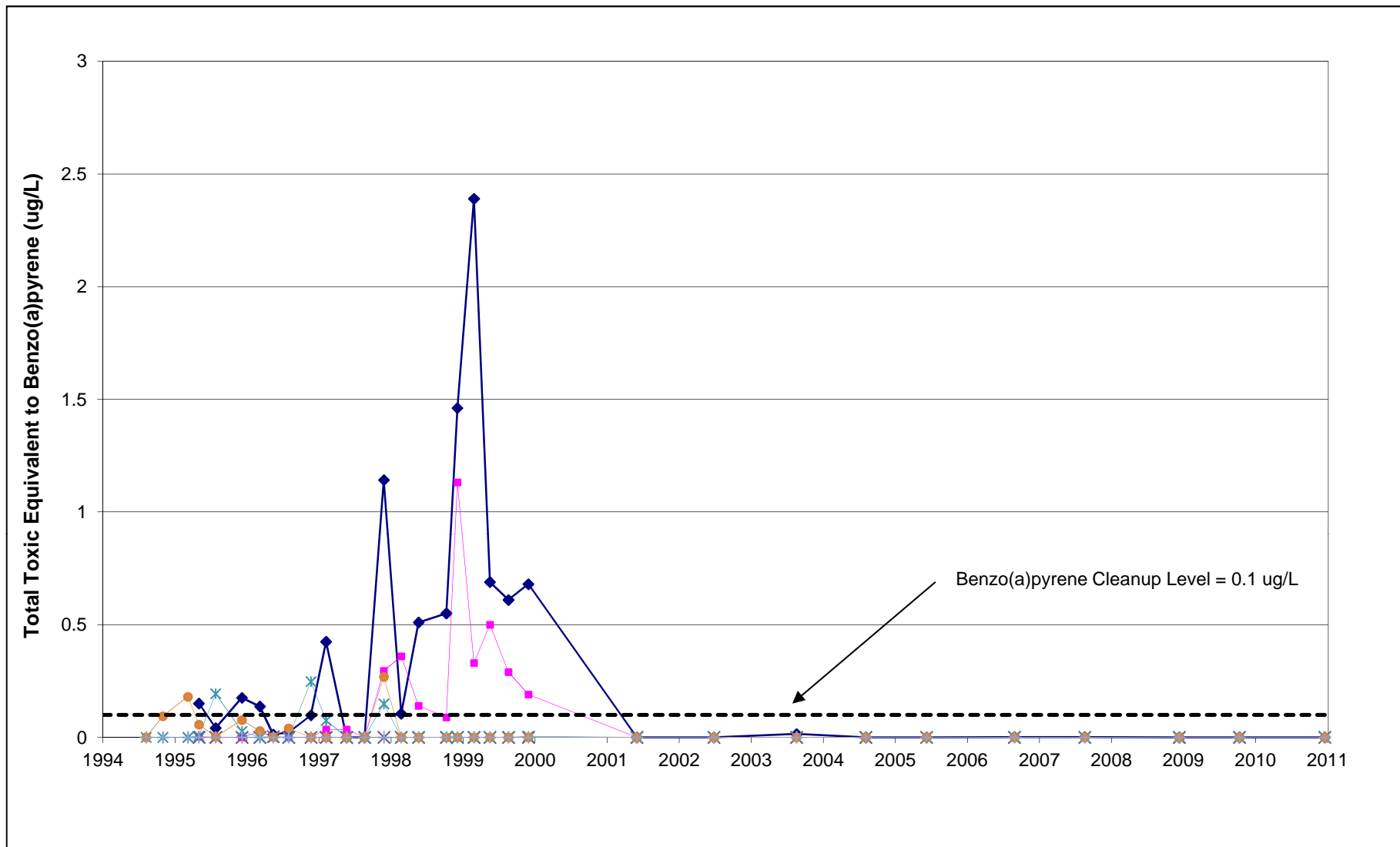
◆ PW-4 ■ PW-6 × PW-2 * MW-9S ● MW-9D + MW-10

Non-detect results plotted as half the detection limit

Figure 31
Naphthalene Concentrations in Groundwater
Samples Collected from Annual Monitoring Well
Network

JP0309, Birds Eye Foods





Legend

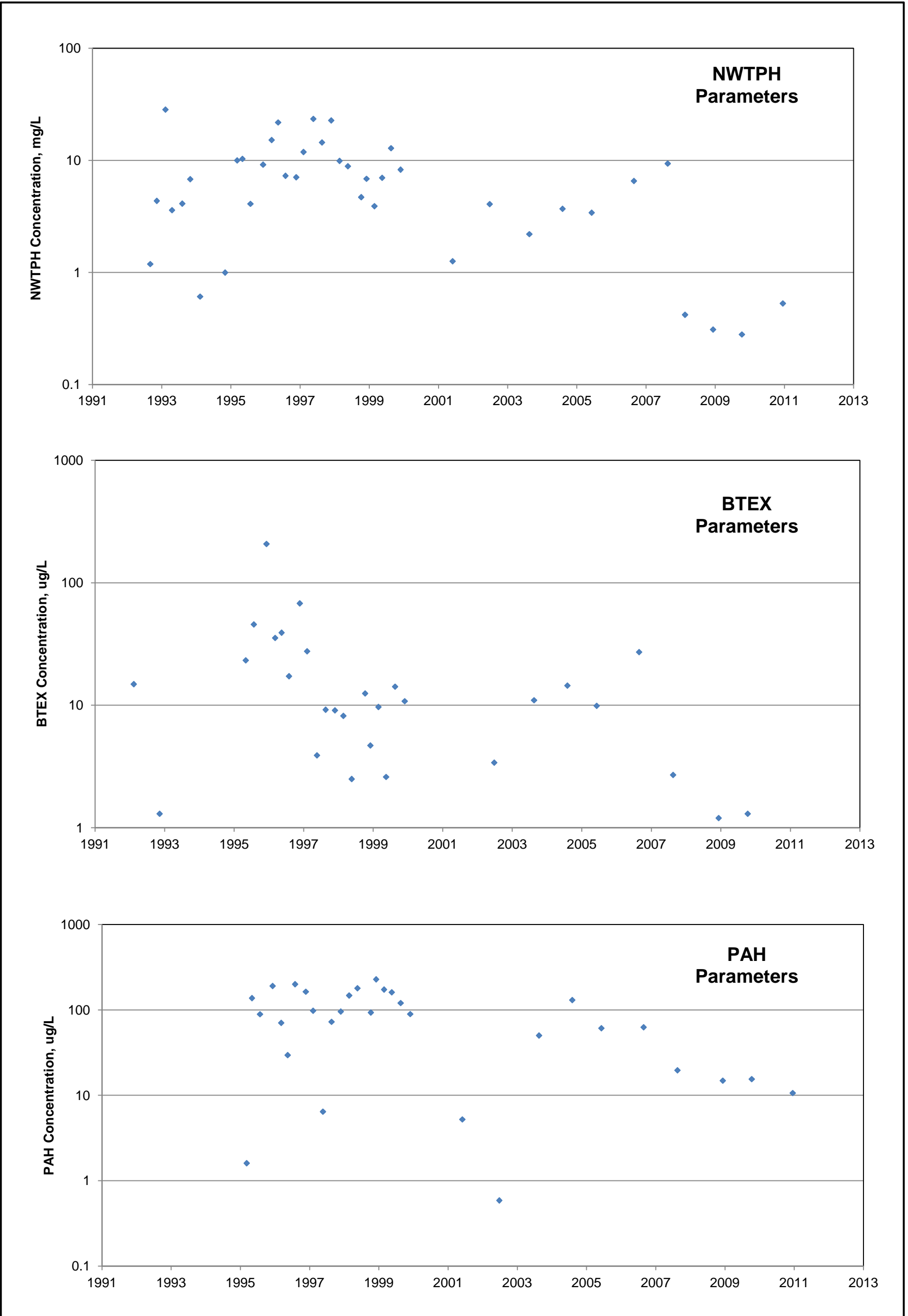
◆ PW-4 ■ PW-6 × PW-2 * MW-9S ● MW-9D + MW-10

Non-detect results represented as 0 in TEF calculation

Figure 32
Toxic Equivalents of Carcinogenic PAHs in
Groundwater Samples Collected from Annual
Monitoring Well Network

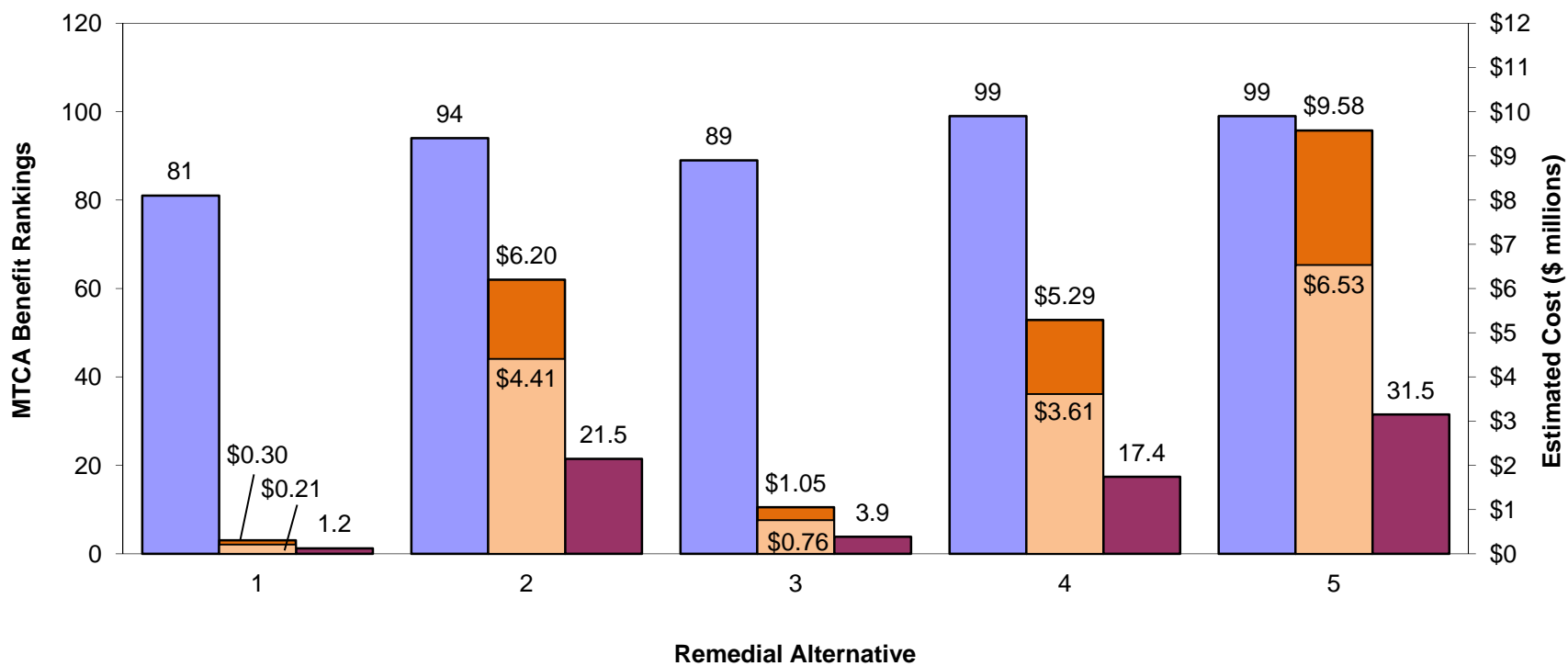
JP0309, Birds Eye Foods





NWTPH Parameters: Diesel-, Heavy Oil-, and Gasoline-Range Organics
BTEX Parameters: Benzene, Toluene, Ethylbenzene, and Xylenes
PAH Parameters: Polynuclear Aromatic Hydrocarbons

Figure 33. Total Site-wide Groundwater Quality Trend Analyses, Constituents of Concern



- Benefit Rank
- Cost/Benefit Ratio
- Cost-High
- Cost-Low

Figure 34. Disproportionate Cost Analysis Rankings

Boiler Room Site 2011 RI/FS
Birds Eye Facility



APPENDIX A1
SUMMARY OF PRE-2011 ENVIRONMENTAL INVESTIGATIONS

TANK REMOVAL AND ASSOCIATED SOIL EXCAVATION (1991)

The following discussion of UST removal and site discovery is based on letter reports prepared by Nowicki & Associates on behalf of Nalley's Fine Foods (Nowicki & Associates, 1990a and 1990b).

In 1990 as part of a property-wide program, two USTs were removed from an area immediately west of the Boiler Room (Figure 3, Main Report) and petroleum-contamination in soil was observed:

- Tank B or North Tank: 10,000 gallon capacity, removed October 2-3, 1990; contents reported as Bunker C oil and some records report diesel¹.
- Tank A or South Tank: 20,000 gallon capacity, removed November 26-27, 1990; contents reported as residual oil and Bunker C oil²; installed in 1975 and used sporadically until 1982 when it was emptied (Reid, 1992).

Tank removals were performed by Boston's Contractors and observed by Nalley's Fine Foods consultants, Nowicki & Associates. Representatives of the Tacoma Pierce County Health Department (TPCHD) were periodically onsite during removal of Tank B (North Tank; Nowicki & Associates, 1990a); documentation of regulators onsite during removal of Tank A (South Tank) has not been identified.

Tank B/North Tank

Following removal of Tank B, no rust was evident and areas of rupture were not observed (Nowicki & Associates, 1990a). The excavation surrounding the North Tank was approximately 22 feet x 43 feet x 15 feet deep. Soil in an area surrounding the fill pipe near the south-east corner of the tank appeared to be contaminated with petroleum and was removed to 2-feet below ground and 10-feet long. Samples were not collected to characterize this contamination.

"Petroleum product" was observed on the excavation walls in seams of loose sand at 8- and 10-feet below ground. The product was observed in the south excavation wall; in the west excavation wall (southern 22 feet of the west wall only), and in the east excavation wall (southern 10 feet of the east wall only). Soil samples for lab analyses were collected from each excavation sidewall, and at the request of TPCHD, from the excavation floor. Analysis by EPA Method 418.1 confirmed the presence of total petroleum hydrocarbons ranging from 2,078 to 25,698 ppm. The analytical results were communicated via telephone with TPCHD and Ecology representatives on October 4, 1990. Excavation of soil around the former Tank B was halted when structural risk to the rail tracks and boiler room were identified. TPCHD and Washington State Department of Ecology personnel were consulted prior to backfilling the excavation with clean fill (Nowicki & Associates, October 30, 1990).

¹ The North Tank contained heavy fuel oil throughout its history, except for a two month period in early 1989 during which the tank contained diesel (PGG, 1992a). A site UST Generalized Closure Plan prepared for TPCHD identified the contents of both Tanks A and B as #2 Diesel fuel (Unknown Author, January 1990).

² A site UST Generalized Closure Plan prepared for TPCHD identified the contents of both Tanks A and B as #2 Diesel fuel (Unknown Author, January 1990).

Tank A/South Tank

Tank A was removed on November 26 and 27, 1990. The tank was uniformly scaled to a one-quarter inch depth and two small holes, reportedly less than one-quarter inch, were observed. Over its history, the tank was subjected to run-off from pickle vats, pickle brine, and water passing through salt spillage. These influences were thought to have degraded the condition of the tank. The lateral dimensions of soil excavation around the South Tank were not documented in reports reviewed for this RI/FS. Based on the saw-cut measurements, the excavation surrounding the South Tank was approximately 48 feet x 15 feet³ and the depth excavated was 19 feet (Nowicki & Associates, 1990b).

Soil under the storage tank was found to be uniformly contaminated with residual oil from 15 feet to at least 19 feet below ground. The lateral limits of contamination were not delineated. Excavation was halted at 19 feet due to limitations in the equipment and safety concerns regarding the stability of the sidewalls. Field observations indicated the north end of the excavation was more heavily impacted by petroleum product. Analysis by EPA Method 418.1 of soil samples collected from the north, west, and east sidewalls; and bottom of the excavation confirmed the presence of petroleum ranging from 15,370 to 61,600 ppm (Nowicki & Associates, December 13, 1990). Contaminated soil was still present at 19 feet below ground when excavation was terminated due to the risk of undermining adjacent buildings. Therefore, some contaminated soil was left in place.

PRE-RI MONITORING WELL INSTALLATION, SOIL SAMPLING, AND GROUND-WATER SAMPLING

In May 1991 a series of monitoring wells were installed surrounding the former Boiler Room USTs to further evaluate petroleum impacts to soil and groundwater. A total of 6 monitoring wells (MW-1 through MW-6) were installed as directed by Nowicki & Associates with input from TPCHD (Nowicki & Associates, 1991). Monitoring Well locations are presented in a figure to this Appendix⁴. Monitoring wells MW-1 through MW-4 were located approximately 100 to 275 feet north, west, and south of the former Boiler Room UST excavations; monitoring well MW-5 was installed between the former UST excavations; and MW-6 was installed through and below the Tank 2 excavation (South Tank). Well MW-6 was drilled at the request of TPCHD.

Soil samples were analyzed in the field by Thin Layer Chromatography (TLC) and select were analyzed for the following parameters with input from TPCHD:

- Volatile organics by method EPA 8240
- Semi-volatile organics by method 8270
- Benzene, toluene, ethylbenzene, and xylenes (BTEX) by method EPA-8020
- Total petroleum fuel hydrocarbons by EPA-8015
- Total metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver)

³ Saw-cut measurements provided in Nowicki & Associates, December 20, 1990 SK-2

⁴ MW-4 is not shown on the Appendix figure; it was located approximately 120 feet north of MW-3. MW-4 was later re-named MW-4S (Figure 10 of main RI/FS report).

One round of pre-RI groundwater quality monitoring was performed by Nowicki & Associates and select groundwater samples were analyzed for:

- Volatile organics by method EPA-8240
- Petroleum hydrocarbons by method 418.1
- Total petroleum fuel hydrocarbons by EPA 8015
- Semi-volatile organics by method 8270
- Polynuclear aromatic hydrocarbons (PAHs) – method not specified

The main findings of the 1991 Monitoring Well Installation program were that soil samples collected from Wells MW-5 and MW-6 (between and within the former UST excavations) had concentrations of diesel/heavy oil and xylenes above Ecology screening limits at the time, and as reported in the summary report (Nowicki & Associates, 1991). The lab reports appended to the Monitoring Well Installation Summary Report indicate elevated concentrations of ethylbenzene, toluene, and xylenes in soil from MW-5 and MW-6; however, these detections were not discussed relative to Ecology screening limits in the summary report.

In addition, groundwater samples collected from Wells 5 and 6 had concentrations of total petroleum hydrocarbons, diesel/heavy oil, 2-methylnaphthalene, and anthracene above Ecology screening limits at the time, and as reported in the summary report (Nowicki & Associates, 1991). Summary tables of analytical results from the 1991 Monitoring Well Installation are presented as tables to this Appendix (Tables A1-1, A1-2, A1-4 and A1-5).

SOIL AND GROUNDWATER REMEDIAL INVESTIGATIONS (1992)

As directed by TPCHD, field work associated with remedial investigations of soil and groundwater was performed in 1991. A collaborative soil and groundwater remedial investigation work plan was reviewed by TPCHD and Ecology prior to initiating field activities (PGG, 1992 RI). Nalley's Fine Foods Remedial Investigation Report (Nowicki & Associates, 1992a) documents the soil investigation and Groundwater Remedial Investigation Report (PGG, 1992) documents the groundwater investigation.

Soil Remedial Investigation

Seventeen boreholes were drilled in the vicinity of the former Boiler Room USTs to delineate the extent of petroleum-contaminated soil, defined as any detectable presence of petroleum compounds. Select soil samples were analyzed for:

- Total petroleum hydrocarbons by Method 418.1
- Gasoline, diesel, and hydraulic oil by Method 8015
- BTEX by method "purge and trap"
- Total lead by method 6010
- PAHs by EPA method 3540/8310

Samples of product were skimmed from a well and from a recovery storage tank. The product samples were analyzed for metals, volatile halogenated organic compounds, cyanide, and sulfide.

Groundwater Remedial Investigation

Site and regional hydrogeology were evaluated and described by Pacific Groundwater Group (PGG). Five new monitoring wells were installed in November 1991 to further characterize the hydrogeology and extent of groundwater contamination. Monthly water level monitoring rounds were performed from November 1991 to January 1992 to assess groundwater flow direction, and slug tests were performed in select monitoring wells to estimate hydraulic conductivity. In addition, continuous water level data were recorded in a site monitoring well during a 14-day period of Well 2B pumping and non-pumping.

PGG collected one round of RI groundwater sampling in November 1991 from the expanded monitoring well network. Samples were analyzed for:

- Sodium by EPA 6010
- Chloride by EPA 300
- BTEX by EPA 8020
- Total petroleum hydrocarbons by EPA 418.1 and 8015
- PAHs by EPA 8310

In addition, a groundwater sample was collected from Well 2B and analyzed for chloride, VOCs, and SVOCs.

Summary of Major Findings, 1992 Soil and 1992 Groundwater RI

The major findings of the two 1992 RI reports were:

- The extent of petroleum-contaminated soil was delineated as any detectable presence of petroleum compounds. This resulted in a lateral footprint of approximately 11,000 square feet on both the east and west sides of the railroad spur. The depths of soil contamination ranged from approximately 14 to 29 feet below ground in the vicinity of the former tanks. Groundwater at the time of drilling was at approximately 27 feet below ground. The highest diesel concentrations were found in soil sampled from the North Tank area (SB-5 and SB-16 on a figure to this Appendix). Soil data presented in lab reports from the soil remedial investigation report (Nowicki, 1992) have been summarized in Tables A1-1 and A1-3.
- Subsurface characterization of the hydrogeologic units was performed. The local groundwater flow direction under non-pumping conditions was toward the northeast. However, when nearby shallow Tacoma Public Utility (TPU) production wells were pumped, groundwater flow direction could be reversed.
- Groundwater seepage velocity was estimated to be between 0.02 to 0.3 feet per day in ambient conditions (PGG, 1992a).

- Free product (mixture of diesel and heavy oil) was found in two monitoring wells – one installed between the two tanks and one installed in the footprint of the former South Tank.
- Groundwater samples were collected in November 1991. Concentrations of total petroleum, diesel, and benzene in monitoring wells in the vicinity of the former tanks and to the north of the former tanks were elevated above state cleanup levels established at the time. Data are summarized in Tables A1-6 and A1-7.
- Additionally, November 1991 groundwater concentrations of chloride and sodium in virtually all site monitoring wells were elevated above Washington State groundwater contaminant levels⁵. Data are summarized in Tables A1-6 and A1-7.

The Well 2B water quality data was not tabulated in the 1992 Groundwater RI and the analytical lab report was not reviewed in preparation of this 2011 RI/FS. Therefore, the data are not summarized in Appendix A-1. The text of the 1992 report states:

The analytical results of samples from City of Tacoma Well 2B, using EPA Method 8240 for volatile organics and EPA Method 8270 for semivolatiles show no detects for all but two compounds. Di-n-butylphthalate was detected at 22 and 13 ug/L in the August and September samples (respectively).....The chloride concentration [sic] of a September, 1991 sample was 146.5 mg/L.

PHASE II REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (1992)

A second groundwater remedial investigation was performed in the spring of 1992 to address comments made by TPCHD and Ecology following review of the initial RI reports. One new monitoring well and six piezometers were installed to further characterize site hydrogeology and the extent of contamination associated with the Boiler Room USTs. Three soil samples collected during installation of the new monitoring well (MW-11) were analyzed for:

- PAHs by EPA 3540/8310
- Total petroleum hydrocarbons by WTPH-418.1 and WTPH-D
- Total lead by EPA 7420
- BTEX by EPA 5030/8020

Water levels were measured in February 1992 and monthly from April to June 1992. Two additional RI groundwater quality monitoring events were performed in February and May 1992. Well 2B was included in the May 1992 water quality monitoring round. Groundwater samples were analyzed for:

- Gasoline, diesel, and “other” petroleum hydrocarbons by method EPA 8015M
- TPH by EPA 418.1

⁵ Chloride concentrations in site groundwater samples ranged from 42 to 925 mg/L; relative to the Washington State maximum contaminant level (MCL, WAC 173-200) of 250 mg/L. Sodium concentrations in site groundwater samples ranged from 47.4 to 590 mg/L; relative to the EPA-recommended maximum level of 20 mg/L for those on sodium-restricted diets.

- BTEX by method 8020
- PAHs by EPA 8310
- Chloride by EPA 300
- Sodium by EPA 6010
- Total coliform
- Nitrate+nitrite
- Ammonium

The hydraulic effects of Well 2B on groundwater near the former Boiler Room UST site were further evaluated using a generic numerical groundwater model to calculate the advective travel time from the contaminated portion of the site to Tacoma Well 2B.

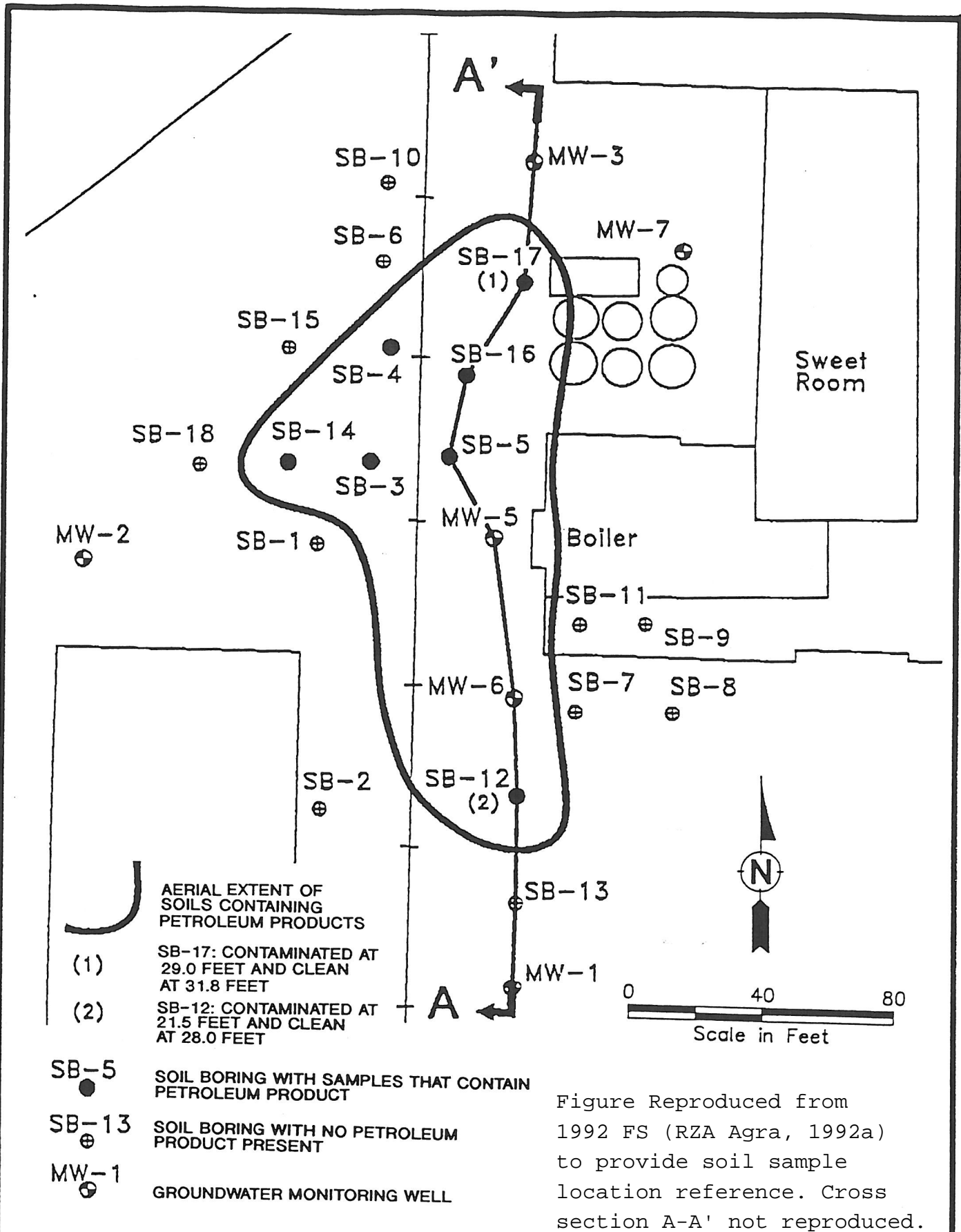
The results were presented in a Phase II Remedial Investigation Report (PGG et al., 1992) and the major findings were:

- The hydraulic gradient under ambient (non-pumping) conditions was found to be very low, on the order of 0.0005 feet/foot.
- A numerical groundwater model assessed that under the influence of continuous pumping TPU Well 2B, groundwater on the former Nalley's site in the petroleum contamination footprint would take over 11 months to travel to, or be captured by, Well 2B (PGG et. al., 1992).
- Dissolved heavy petroleum concentrations in groundwater samples collected in February and May 1992 near the former tanks exceeded state cleanup levels established at the time for MTCA Method A.
- Chloride concentrations in groundwater samples collected in February and May 1992 were elevated above Washington State groundwater contaminant levels⁶ and appeared to be higher in the southern portion of the site than the north (PGG et. al., 1992).
- Quarterly groundwater monitoring began.

A Feasibility Study was performed by RZA Agra (RZA, 1992a) to evaluate a range of remedial action alternatives for the site including institutional controls, containment, in-situ treatment (biological, chemical/physical, thermal), and excavation. The preferred remedy identified was steam injection and product recovery followed by enhanced biodegradation. The general approach was to inject steam from the facility boiler to the vadose (unsaturated) zone to mobilize the Bunker C oil. Free product would then be recovered from product recovery wells and transferred offsite for recycling. This phase of remediation would continue until product recovery was no longer considered cost effective. Following steam injection and once temperatures in the vadose zone reached optimum levels, residual soil contamination above the water table would be remediated through enhanced biodegradation. This would be achieved by injecting the vadose zone with nitrified, oxygenated, inoculated water from a bioreactor.

⁶ Chloride concentrations in site groundwater samples ranged from 3.7 to 1200 mg/L; relative to the Washington State MCL of 250 mg/L. Sodium concentrations in site groundwater samples ranged from 14 to 679 mg/L; relative to the EPA-recommended maximum level of 20 mg/L for those on sodium-restricted diets.

Groundwater remediation was to be achieved by on-site pumping, passing the extracted water through an oil/water separator, treating it above ground via active biodegradation in a bioreactor, and reinjecting clean, treated water.



RZA-AGRA
ENGINEERING & ENVIRONMENTAL SERVICES
11335 N.E. 122nd Way
Suite 100
Kirkland, Washington
98034-6918

W.O. W-8331
DESIGN MR
DRAWN MJF
DATE JUL 1992
SCALE NOTED

**NALLEY FEASIBILITY STUDY
TACOMA, WASHINGTON**

**AIRIAL EXTENT OF SOIL
CONTAMINANT PLUME**

FIGURE 2

Table A1-1. Petroleum Concentrations in Soil Samples Collected for Previous Remedial Investigations, Former Nalley's Fine Foods Site

			TPH (418.1) mg/kg	Gas (8015) mg/kg	TPH (8015) mg/kg	Diesel (8015) mg/kg	Other-Hydraulic Oil (8015) mg/kg	Benzene ug/kg	Toluene ug/kg	Ethylbenzene ug/kg	Xylenes ug/kg
2011 MTCA Method A Industrial Cleanup Levels:			NA	30		2,000	2,000	30	7,000	6,000	9,000
Soil Sample	Data Source	Sample Date									
(MW-1) W1-32.5	Nowicki, 1991	May-91			10 U			50 U	50 U	50 U	50 U
(MW-2) W2-27.5	Nowicki, 1991	May-91			10 U			50 U	50 U	50 U	50 U
(MW-3) W3-32.5	Nowicki, 1991	May-91			10 U			50 U	50 U	50 U	50 U
(MW-4) W4-32.5	Nowicki, 1991	May-91			10.0 U			50 U	50 U	50 U	50 U
(MW-5) W5-7.5	Nowicki, 1991	May-91			10.0 U			50 U	50 U	50 U	50 U
(MW-5) W5-10	Nowicki, 1991	May-91			45,000			50 U	2100	12000	77000
(MW-5) W5-11.5	Nowicki, 1991	May-91			10.0 U			50 U	50 U	50 U	50 U
(MW-5) W5-12.5	Nowicki, 1991	May-91			10.0 U			50 U	50 U	50 U	50 U
(MW-5) W5-14	Nowicki, 1991	May-91			1,600			50 U	50 U	50 U	50 U
(MW-5) W5-15.0	Nowicki, 1991	May-91			10.0 U			50 U	50 U	50 U	50 U
(MW-5) W5-17.5	Nowicki, 1991	May-91			10.0 U			50 U	50 U	50 U	50 U
(MW-5) W5-22.5	Nowicki, 1991	May-91			13,000			50 U	60	410	2200
(MW-5) W5-27.5	Nowicki, 1991	May-91			11,000			50 U	320	1700	8300
(MW-5) W5-32.5	Nowicki, 1991	May-91			---			---	---	---	---
(MW-6) W6-27.5	Nowicki, 1991	May-91			2,800			50 U	70	290	1100
(MW-6) W6-32.5	Nowicki, 1991	May-91			180			---	---	---	---
MW-7 S-2	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-7 S-7	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-7 S-11	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-7 S-13	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-8 S-1	Nowicki, 1992	Oct-91	40	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-8 S-6	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-8 S-11	Nowicki, 1992	Oct-91	105	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-8 S-13	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-9 S-1	Nowicki, 1992	Oct-91	111	10 U		10 U	66	50 U	100 U	100 U	100 U
MW-9 S-4	Nowicki, 1992	Oct-91	42	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-9 S-10	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-9 S-13	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-4D S-1	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-4D S-4	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-4D S-8	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-4D S-12	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-4D S-13	Nowicki, 1992	Oct-91	70	10 U		10 U	40 U	50 U	100 U	100 U	100 U

Table A1-1. Petroleum Concentrations in Soil Samples Collected for Previous Remedial Investigations, Former Nalley's Fine Foods Site

			TPH (418.1) mg/kg	Gas (8015) mg/kg	TPH (8015) mg/kg	Diesel (8015) mg/kg	Other-Hydraulic Oil (8015) mg/kg	Benzene ug/kg	Toluene ug/kg	Ethylbenzene ug/kg	Xylenes ug/kg
2011 MTCA Method A Industrial Cleanup Levels:			NA	30		2,000	2,000	30	7,000	6,000	9,000
Soil Sample	Data Source	Sample Date									
MW-4D S-16	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-4D S-18	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-4D S-19	Nowicki, 1992	Oct-91	NA	NA		NA	NA	50 U	100 U	100 U	100 U
MW-10 S-2	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-10 S-4	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-10 S-10	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-10 S-13	Nowicki, 1992	Oct-91	25 U	10 U		10 U	40 U	50 U	100 U	100 U	100 U
MW-11 S-6	PGG, 1992b	May-92	25 U			25 U	100 U	50 U	100 U	100 U	100 U
MW-11 S-7	PGG, 1992b	May-92	25 U			25 U	100 U	50 U	100 U	100 U	100 U
MW-11 S-10	PGG, 1992b	May-92	25 U			25 U	100 U	50 U	100 U	100 U	100 U
SB1-21'	Nowicki, 1992	Oct-91	10 U	---		50 U	---	20 U	20 U	20 U	70 U
SB2-15.5'	Nowicki, 1992	Oct-91	10 U	---		50 U	---	20 U	20 U	20 U	70 U
SB2-23'	Nowicki, 1992	Oct-91	10 U	---		50 U	---	20 U	20 U	20 U	70 U
SB2-31'	Nowicki, 1992	Oct-91	10 U	---		50 U	---	20 U	20 U	20 U	70 U
SB3-13.5'	Nowicki, 1992	Oct-91	10 U	---		50 U	---	20 U	20 U	20 U	70 U
SB3-21'	Nowicki, 1992	Oct-91	10 U	---		50 U	---	20 U	20 U	20 U	70 U
SB3-26'	Nowicki, 1992	Oct-91	3,100	---		3,900	---	260	810	1,300	6,200
SB4-15.5'	Nowicki, 1992	Oct-91	580	---		980	---	20 U	20 U	20 U	70 U
SB4-21'	Nowicki, 1992	Oct-91	57	---		150	---	20 U	20 U	20 U	70 U
SB4-25.5'	Nowicki, 1992	Oct-91	980	---		7,000	---	20 U	390	870	2,100
SB5-14'	Nowicki, 1992	Oct-91	7,600	---		10,000	---	1,000	2,100	2,500	12,000
SB5-21.5'	Nowicki, 1992	Oct-91	15,000	---		24,000	---	1,400	920	4,500	17,000
SB5-26.5'	Nowicki, 1992	Oct-91	9,000	---		15,000	---	20 U	770	3,300	13,000
SB6-13.5'	Nowicki, 1992	Oct-91	10 U	---		50 U	---	20 U	20 U	100	70 U
SB6-20'	Nowicki, 1992	Oct-91	10 U	---		50 U	---	20 U	20 U	20 U	70 U
SB6-24'	Nowicki, 1992	Oct-91	10 U	---		53	---	20 U	20 U	20 U	70 U
SB10-6'	Nowicki, 1992	Oct-91	56	---		16	---	50	20 U	20 U	70 U
SB10-9'	Nowicki, 1992	Oct-91	10 U	---		10 U	---	40	20 U	20 U	70 U
SB10-12'	Nowicki, 1992	Oct-91	10 U	---		10 U	---	30	20 U	20 U	70 U
SB7-5-14'	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20	20 U	20 U	70 U
SB7-9-24'	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB7-12-31'6"	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U

Table A1-1. Petroleum Concentrations in Soil Samples Collected for Previous Remedial Investigations, Former Nalley's Fine Foods Site

			TPH (418.1) mg/kg	Gas (8015) mg/kg	TPH (8015) mg/kg	Diesel (8015) mg/kg	Other-Hydraulic Oil (8015) mg/kg	Benzene ug/kg	Toluene ug/kg	Ethylbenzene ug/kg	Xylenes ug/kg
2011 MTCA Method A Industrial Cleanup Levels:			NA	30		2,000	2,000	30	7,000	6,000	9,000
Soil Sample	Data Source	Sample Date									
SB8-5-14'	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB8-9-24'	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB8-12-31'6"	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB11-3-16'6"	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB11-6-24'	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB11-9-31'6"	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB12-4-11'6"	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB12-6-16'6"	Nowicki, 1992	Oct-91	5,700	---		5,700	---	20 U	20 U	20 U	210
SB12-10-26'6"	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB13-6-16'6"	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB13-9-24'	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB13-12-31'	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB14-6-16'6"	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB14-9-24'	Nowicki, 1992	Oct-91	450	---		300	---	20 U	20 U	20 U	70 U
SB14-12-31'6"	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB15-6-16'6"	Nowicki, 1992	Oct-91	42	---		61	---	20 U	20 U	20 U	70 U
SB15-9-24'	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB15-12-31'6"	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB16-6-16'6"	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB16-8-21'6"	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB16-11-29'	Nowicki, 1992	Oct-91	15,000	---		28,000	---	20 U	20 U	11,000	41,000
SB17-6-16'6"	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB17-9-24'	Nowicki, 1992	Oct-91	10 U	---		10 U	---	20 U	20 U	20 U	70 U
SB17-12-31'6"	Nowicki, 1992	Oct-91	34	---		88	---	20 U	20 U	20 U	70 U
SB18-8(1)	PGG, 1992b	Apr-92	10 U	---		10 U	---	---	---	---	---
SB18-8(2)	PGG, 1992b	Apr-92	10	---		10 U	---	---	---	---	---

10 U - compound not detected; associated number is lab reporting limit

Bold - result exceeds 2011 MTCA Method A Industrial Cleanup Level

Table A1-2. VOC and SVOC Concentrations in Soil Samples Collected for May 1991 Pre-Remedial Investigations

		MW-5 W5-32.5	MW-6 W6-32.5
VOCs by Method 8240			
Chloromethane	ug/kg	400 U	400 U
Bromomethane	ug/kg	400 U	400 U
Vinyl Chloride	ug/kg	400 U	400 U
Chloroethane	ug/kg	400 U	400 U
Methylene Chloride	ug/kg	200 U	200 U
Acetone	ug/kg	4,000 U	4,000 U
Carbon Disulfide	ug/kg	200 U	200 U
1,1-Dichloroethene	ug/kg	200 U	200 U
1,1-Dichloroethane	ug/kg	200 U	200 U
1,2-Dichloroethene (Total)	ug/kg	200 U	200 U
Chloroform	ug/kg	200 U	200 U
1,2-Dichloroethane	ug/kg	200 U	200 U
2-Butanone	ug/kg	4,000 U	4,000 U
1,1,1-Trichloroethane	ug/kg	200 U	200 U
Carbon Tetrachloride	ug/kg	200 U	200 U
Vinyl Acetate	ug/kg	2,000 U	2,000 U
Bromodichloromethane	ug/kg	200 U	200 U
1,2-Dichloropropane	ug/kg	200 U	200 U
Cis-1,3-Dichloropropene	ug/kg	200 U	200 U
Trichloroethene	ug/kg	200 U	200 U
Dibromochloromethane	ug/kg	200 U	200 U
1,1,2-Trichloroethane	ug/kg	200 U	200 U
Benzene	ug/kg	200 U	200 U
Trans-1,3-Dichloropropene	ug/kg	200 U	200 U
Bromoform	ug/kg	200 U	200 U
4-Methyl-2-Pentanone	ug/kg	2,000 U	2,000 U
2-Hexanone	ug/kg	200 U	200 U
Tetrachloroethene	ug/kg	200 U	200 U
1,1,2,2-Tetrachloroethane	ug/kg	200 U	200 U
Toluene	ug/kg	200 U	200 U
Chlorobenzene	ug/kg	200 U	200 U
Ethylbenzene	ug/kg	200 U	200 U
Styrene	ug/kg	200 U	200 U
Total Xylenes	ug/kg	200 U	200 U
SVOCs by Method 8270 (PAH results repeated in Table A1-4)			
Phenol	ug/kg	1,000 U	1,000 U
bis(2-Chloroethyl)ether	ug/kg	1,000 U	1,000 U
2-Chlorophenol	ug/kg	1,000 U	1,000 U
1,3-Dichlorobenzene	ug/kg	1,000 U	1,000 U
1,4-Dichlorobenzene	ug/kg	1,000 U	1,000 U
Benzyl Alcohol	ug/kg	1,000 U	1,000 U
1,2-Dichlorobenzene	ug/kg	1,000 U	1,000 U
2-Methylphenol	ug/kg	1,000 U	1,000 U
bis(2-Chloroisopropyl)ether	ug/kg	1,000 U	1,000 U
4-Methylphenol	ug/kg	1,000 U	1,000 U
N-Nitroso-Di-N-propylamine	ug/kg	1,000 U	1,000 U
Hexachloroethane	ug/kg	1,000 U	1,000 U

Table A1-2. VOC and SVOC Concentrations in Soil Samples Collected for May 1991 Pre-Remedial Investigations

		MW-5	MW-6
		W5-32.5	W6-32.5
Nitrobenzene	ug/kg	1,000 U	1,000 U
Isophorone	ug/kg	1,000 U	1,000 U
2-Nitrophenol	ug/kg	1,000 U	1,000 U
2,4-Dimethylphenol	ug/kg	1,000 U	1,000 U
Benzoic Acid	ug/kg	5,000 U	5,000 U
bis(2-Chloroethoxy)methane	ug/kg	1,000 U	1,000 U
2,4-Dichlorophenol	ug/kg	1,000 U	1,000 U
1,2,4-Trichlorobenzene	ug/kg	1,000 U	1,000 U
Naphthalene	ug/kg	1,000 U	1,000 U
4-Chloroaniline	ug/kg	2,000 U	2,000 U
Hexachlorobutadiene	ug/kg	1,000 U	1,000 U
4-Chloro-3-methylphenol	ug/kg	2,000 U	2,000 U
2-Methylnaphthalene	ug/kg	1,000	1,000 U
Hexachlorocyclopentadiene	ug/kg	1,000 U	1,000 U
2,4,6-Trichlorophenol	ug/kg	1,000 U	1,000 U
2,4,5-Trichlorophenol	ug/kg	1,000 U	1,000 U
2-Chloronaphthalene	ug/kg	1,000 U	1,000 U
2-Nitroaniline	ug/kg	5,000 U	5,000 U
Dimethyl phthalate	ug/kg	1,000 U	1,000 U
Acenaphthylene	ug/kg	1,000 U	1,000 U
3-Nitroaniline	ug/kg	5,000 U	5,000 U
Acenaphthene	ug/kg	1,000 U	1,000 U
2,4-Dinitrophenol	ug/kg	5,000 U	5,000 U
4-Nitrophenol	ug/kg	5,000 U	5,000 U
Dibenzofuran	ug/kg	1,000 U	1,000 U
2,4-Dinitrotoluene	ug/kg	1,000 U	1,000 U
2,6-Dinitrotoluene	ug/kg	1,000 U	1,000 U
Diethylphthalate	ug/kg	1,000 U	1,000 U
4-Chlorophenyl phenyl ether	ug/kg	1,000 U	1,000 U
Fluorene	ug/kg	1,000 U	1,000 U
4-Nitroaniline	ug/kg	1,000 U	1,000 U
4,6-Dinitro-2-methylphenol	ug/kg	5,000 U	5,000 U
N-Nitrosodiphenylamine	ug/kg	5,000 U	5,000 U
4-Bromophenyl phenyl ether	ug/kg	1,000 U	1,000 U
Hexachlorobenzene	ug/kg	1,000 U	1,000 U
Pentachlorophenol	ug/kg	5,000 U	5,000 U
Phenanthrene	ug/kg	1,000 U	1,000 U
Anthracene	ug/kg	1,000 U	1,000 U
Di-n-butylphthalate	ug/kg	1,000 U	1,000 U

10 U - compound not detected; associated number is lab reporting limit

Data Source: July 11, 1991 Monitoring Well Installation Report, Nowicki & Associates

MTCA Method A Industrial Cleanup Level for soil not established for 2-methylnaphthalene;

Method B cleanup level is 320,000 ug/kg

Table A1-3. PAH Concentrations in Soil Samples Collected for Previous Remedial Investigations, Former Nalley's Fine Foods Site

				Naphthalene	Acenaphthene	Acenaphthylene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(g,h,i)perylene	Benzo(a)pyrene (BAP) (cPAH)	Benzo(a)anthracene (cPAH)	Chrysene (cPAH)	Benzo(b)fluoranthene (cPAH)	Benzo(k)fluoranthene (cPAH)	Dibenz(a,h)anthracene (cPAH)	Indeno(1,2,3-cd)pyrene (cPAH)		Toxic Equivalent of cPAHs to BAP
2011 MTCA Method A Industrial Cleanup Level				5	---	---	---	---	---	---	---		2 Calculate Toxic Equivalent to BAP, sum of Toxic Equivalents for all cPAHs not to exceed BAP CUL								2
Soil Sample	Unit	Data Source	Sample Date																		
(MW-5) W5-32.5	mg/kg	Nowicki, 1991	May-91	1 U	1 U	1 U	1 U	1 U	1 U												
(MW-6) W6-32.5	mg/kg	Nowicki, 1991	May-91	1 U	1 U	1 U	1 U	1 U	1 U												
SB1-21'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB2-1515	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB2-23@5'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB2-31'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB3-13.5'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB3-21'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB3-26'	mg/kg	Nowicki, 1992	Oct-91	0.4	1.3	1 U	1	19 U	19 U	38 U	38 U	38 U	19 U	19 U	19 U	38 U	19 U	19 U	19 U		
SB4-15.5'	mg/kg	Nowicki, 1992	Oct-91	0.1	1 U	0.8	0.1	1 U	1 U	2 U	2 U	2 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U		
SB4-21'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.05	0.01 U	0.2	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB4-25.5'	mg/kg	Nowicki, 1992	Oct-91	1.1	1 U	1 U	1.2	10 U	10 U	20 U	20 U	20 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U		
SB5-14'	mg/kg	Nowicki, 1992	Oct-91	0.9	1 U	1 U	2.6	25 U	25 U	50 U	50 U	50 U	25 U	25 U	25 U	50 U	25 U	25 U	25 U		
SB5-21.5'	mg/kg	Nowicki, 1992	Oct-91	2.1	2 U	2 U	1.1	10 U	10 U	20 U	20 U	20 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U		
SB5-26.5	mg/kg	Nowicki, 1992	Oct-91	3.3	1 U	1 U	1.1	9 U	9 U	18 U	18 U	18 U	9 U	9 U	9 U	18 U	9 U	9 U	9 U		
SB6-20	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB6-24.0	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.04	0.01 U	0.1	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB6-13.5	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB10-6	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB10-9	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB10-12	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB7-5-14'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB7-9-24'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB7-12-31'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB8-5-14'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB8-9-24"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB8-12-31'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB11-3-16'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB11-6-24'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB11-9-31'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB12-4-11'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB12-16'6"	mg/kg	Nowicki, 1992	Oct-91	10 U	10 U	10 U	2.8	9.7	1.4	20 U	20 U	20 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U		
SB12-10-26'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB13-6-16'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB13-9-24'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB13-12-31'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB14-6'-16'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB14-9-24'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.03	0.25 U	0.25 U	0.5 U	0.5 U	0.5 U	0.25 U	0.25 U	0.25 U	0.5 U	0.25 U	0.25 U	0.25 U		
SB14-12-31'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB15-6-16'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB15-9-24'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		

Table A1-3. PAH Concentrations in Soil Samples Collected for Previous Remedial Investigations, Former Nalley's Fine Foods Site

				Naphthalene	Acenaphthene	Acenaphthylene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(g,h,i)perylene	Benzo(a)pyrene (BAP) (cPAH)	Benz(a)anthracene (cPAH)	Chrysene (cPAH)	Benzo(b)fluoranthene (cPAH)	Benzo(k)fluoranthene (cPAH)	Dibenz(a,h)anthracene (cPAH)	Indeno(1,2,3-cd)pyrene (cPAH)		Toxic Equivalent of cPAHs to BAP
2011 MTCA Method A Industrial Cleanup Level				5	---	---	---	---	---	---	---	---	2 Calculate Toxic Equivalent to BAP, sum of Toxic Equivalents for all cPAHs not to exceed BAP CUL								2
Soil Sample	Unit	Data Source	Sample Date																		
SB15-12-31'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB16-6-16'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB16-8-24'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB16-11-29	mg/kg	Nowicki, 1992	Oct-91	5.5	10 U	10 U	7.4	19.5	1.5	2 U	2 U	2 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U		
SB17-6-16'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.02	0.2 U	0.4 U	0.4 U	0.4 U	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U		
SB17-9-24'	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
SB17-12-31'6"	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.07	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-7 S-2	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.2	0.1	0.06 U	0.06	0.05	0.07	0.04	0.02	0.01 U	0.03 U	→	0.0717
MW-7 S-7	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-7 S-11	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-7 S-13	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-8 S-1	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-8 S-6	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-8 S-11	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-8 S-13	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-9 S-1	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.03	0.01 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U	0.1 U		
MW-9 S-4	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.03	0.01 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U	0.1 U		
MW-9 S-10	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-9 S-13	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-4D S-1	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-4D S-4	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-4D S-8	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-4D S-12	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.03	0.01 U	0.07	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-4D S-13	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-4D S-16	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-4D S-18	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-4D S-19	mg/kg	Nowicki, 1992	Oct-91	0.2 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.6 U	0.6 U	0.02 U	0.01 U	0.01 U	0.01 U	0.05	0.01 U	0.01 U	0.01 U	→	0.005
MW-10 S-2	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-10 S-4	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-10 S-10	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-10 S-13	mg/kg	Nowicki, 1992	Oct-91	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-11 S-6	mg/kg	PGG, 1992b	May-92	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-11 S-10	mg/kg	PGG, 1992b	May-92	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		
MW-11 S-7	mg/kg	PGG, 1992b	May-92	0.1 U	0.1 U	0.1 U	0.02 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U		

10 U - compound not detected; associated number is lab reporting limit

Bold - result exceeds MTCA Method A Cleanup Level

Note: Sum of toxic equivalents of cPAHs detected in MW-7 S-2 and MW-4d S-19 do not exceed MTCA Method A Unrestricted Cleanup Level for BAP

MW-9-S-1 Parameter detected

Table A1-4. Metals Concentrations in Soil Samples Collected for 1991 Pre-Remedial Investigations Monitoring Well Installation, 1991 Soil RI, and 1992 RI/FS

(Station) Sample ID	Data Source	Sample Date	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Total Lead (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)
2011 MTCA Method A Industrial Cleanup Level			20	NA-Method A 16,000 Method B	2	2000	1000	1000	2	NA-Method A 400 Method B	NA-Method A 400 Method B
(MW-5) W5-32.5	Nowicki, 1991	May-91	6.0 U	33	0.46	29	4		0.1 U	9.0 U	0.6
(MW-6) W6-32.5	Nowicki, 1991	May-91	5.4	30	0.63	24	4.4		0.1 U	6.1 U	0.41 U
SB1-21'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.9	---	---	---
SB2-15.5'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.3	---	---	---
SB2-23'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.7	---	---	---
SB2-31'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.6	---	---	---
SB3-13.5'	Nowicki, 1992	Oct-91	---	---	---	---	---	3.4	---	---	---
SB3-21'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.6	---	---	---
SB3-26'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.1	---	---	---
SB4-15.5'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.4	---	---	---
SB4-21'	Nowicki, 1992	Oct-91	---	---	---	---	---	3	---	---	---
SB4-25.5'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.8	---	---	---
SB5-14'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.7	---	---	---
SB5-21.5'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.8	---	---	---
SB5-26.5'	Nowicki, 1992	Oct-91	---	---	---	---	---	3	---	---	---
SB6-13.5'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.5	---	---	---
SB6-20'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.3	---	---	---
SB6-24'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.5	---	---	---
SB10-6'	Nowicki, 1992	Oct-91	---	---	---	---	---	3.7	---	---	---
SB10-9'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.6	---	---	---
SB10-12'	Nowicki, 1992	Oct-91	---	---	---	---	---	1.9	---	---	---
SB7-5-14'	Nowicki, 1992	Oct-91	---	---	---	---	---	3.2	---	---	---
SB7-9-24'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.9	---	---	---
SB7-12-31'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	2.7	---	---	---
SB8-5-14'	Nowicki, 1992	Oct-91	---	---	---	---	---	3.4	---	---	---
SB8-9-24'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.9	---	---	---
SB8-12-31'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	2.5	---	---	---
SB11-3-16'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	3.7	---	---	---
SB11-6-24'	Nowicki, 1992	Oct-91	---	---	---	---	---	3.3	---	---	---
SB11-9-31'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	2.8	---	---	---
SB12-4-11'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	2.9	---	---	---
SB12-6-16'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	5	---	---	---
SB12-10-26'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	3	---	---	---
SB13-6-16'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	3.7	---	---	---
SB13-9-24'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.8	---	---	---

Table A1-4. Metals Concentrations in Soil Samples Collected for 1991 Pre-Remedial Investigations Monitoring Well Installation, 1991 Soil RI, and 1992 RI/FS

(Station) Sample ID	Data Source	Sample Date	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Total Lead (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)
2011 MTCA Method A Industrial Cleanup Level			20	NA-Method A 16,000 Method B	2	2000	1000	1000	2	NA-Method A 400 Method B	NA-Method A 400 Method B
SB13-12-31'	Nowicki, 1992	Oct-91	---	---	---	---	---	1.9	---	---	---
SB14-6-16'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	2.9	---	---	---
SB14-9-24'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.3	---	---	---
SB14-12-31'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	2.7	---	---	---
SB15-6-16'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	3.7	---	---	---
SB15-9-24'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.1	---	---	---
SB15-12-31'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	2.9	---	---	---
SB16-6-16'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	2.6	---	---	---
SB16-8-21'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	3.7	---	---	---
SB16-11-29'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.9	---	---	---
SB17-6-16'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	2.7	---	---	---
SB17-9-24'	Nowicki, 1992	Oct-91	---	---	---	---	---	2.6	---	---	---
SB17-12-31'6"	Nowicki, 1992	Oct-91	---	---	---	---	---	2.4	---	---	---
MW-7 S-2	Nowicki, 1992	Oct-91	---	---	---	---	---	6	---	---	---
MW-7 S-7	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-7 S-11	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-7 S-13	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-8 S-1	Nowicki, 1992	Oct-91	---	---	---	---	---	6	---	---	---
MW-8 S-6	Nowicki, 1992	Oct-91	---	---	---	---	---	5	---	---	---
MW-8 S-11	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-8 S-13	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-9 S-1	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-9 S-4	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-9 S-10	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-9 S-13	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-4D S-1	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-4D S-4	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-4D S-8	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-4D S-12	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-4D S-13	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-4D S-16	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-4D S-18	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-4D S-19	Nowicki, 1992	Oct-91	---	---	---	---	---	---	---	---	---
MW-10 S-2	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-10 S-4	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---

Table A1-4. Metals Concentrations in Soil Samples Collected for 1991 Pre-Remedial Investigations Monitoring Well Installation, 1991 Soil RI, and 1992 RI/FS

(Station) Sample ID	Data Source	Sample Date	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Total Lead (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)
2011 MTCA Method A Industrial Cleanup Level			20	NA-Method A 16,000 Method B	2	2000	1000	1000	2	NA-Method A 400 Method B	NA-Method A 400 Method B
MW-10 S-10	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-10 S-13	Nowicki, 1992	Oct-91	---	---	---	---	---	5 U	---	---	---
MW-11 S-6	PGG et.al., 1992	May-92	---	---	---	---	---	5 U	---	---	---
MW-11 S-7	PGG et.al., 1992	May-92	---	---	---	---	---	5 U	---	---	---
MW-11 S-10	PGG et.al., 1992	May-92	---	---	---	---	---	5 U	---	---	---

10 U - compound not detected; associated number is lab reporting limit

Table A1-5. Summary of Groundwater Quality Results, May 1991 Pre-Remedial Investigation

		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	1991 Ecology "Limit" Identified in Well Report	2011 MTCA Method A (Unrestricted) Cleanup Level
Total Petroleum Hydrocarbons (TPH)									
TPH by Method 418.1	mg/L	1.0 U	1.0 U	---	---	815	1000	1000	NA
TPH by Method EPA 8015	mg/L	---	1.0 U	1.0 U	1.0 U	880	130	1000	NA
VOCs by Method 8240									
Chloromethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	Not Identified	NA
Bromomethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	Not Identified	NA (Method B: 11)
Vinyl Chloride	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	Not Identified	0.2
Chloroethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	Not Identified	NA
Methylene Chloride	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	5
Acetone	ug/L	100 U	100 U	100 U	100 U	100 U	100 U	Not Identified	NA (Method B: 7,200)
Carbon Disulfide	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA (Method B: 820)
1,1-Dichloroethene	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA (Method B: 400)
1,1-Dichloroethane	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA (Method B: 1,600)
1,2-Dichloroethene (Total)	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	5
Chloroform	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA (Method B: 81)
1,2-Dichloroethane	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	5
2-Butanone	ug/L	100 U	100 U	100 U	100 U	100 U	100 U	Not Identified	NA
1,1,1-Trichloroethane	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	200
Carbon Tetrachloride	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA (Method B: 0.63)
Vinyl Acetate	ug/L	50 U	50 U	50 U	50 U	50 U	50 U	Not Identified	NA (Method B: 8,000)
Bromodichloromethane	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA (Method B: 0.71)
1,2-Dichloropropane	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA
Cis-1,3-Dichloropropene	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA (Method B: 0.44)
Trichloroethene	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	5
Dibromochloromethane	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA (Method B: 0.52)
1,1,2-Trichloroethane	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA (Method B: 0.77)
Benzene	ug/L	5 U	5 U	5 U	5 U	52	5 U	5	5
Trans-1,3-Dichloropropene	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA (Method B: 0.44)
Bromoform	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	5.5
4-Methyl-2-Pentanone	ug/L	50 U	50 U	50 U	50 U	50 U	50 U	Not Identified	NA
2-Hexanone	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA
Tetrachloroethene	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	5
1,1,2,2-Tetrachloroethane	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA (Method B: 0.22)
Toluene	ug/L	5 U	5 U	5 U	5 U	14	5 U	Not Identified	1,000
Chlorobenzene	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA (Method B: 160)
Ethylbenzene	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	700
Styrene	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	Not Identified	NA (Method B: 1,600)
Total Xylenes	ug/L	5 U	5 U	5 U	5 U	160	5 U	20	1,000

Table A1-5. Summary of Groundwater Quality Results, May 1991 Pre-Remedial Investigation

		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	1991 Ecology "Limit" Identified in Well Report	2011 MTCA Method A (Unrestricted) Cleanup Level
SVOCs by Method 8270									
Phenol	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 2,400)
bis(2-Chloroethyl)ether	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 0.04)
2-Chlorophenol	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 40)
1,3-Dichlorobenzene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA
1,4-Dichlorobenzene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA
Benzyl Alcohol	ug/L	---	---	---	---	220 U	45 U	Not Identified	NA (Method B: 800)
1,2-Dichlorobenzene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 720)
2-Methylphenol	ug/L	---	---	---	---	110 U	23 U	Not Identified	
bis(2-Chloroisopropyl)ether	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA
4-Methylphenol	ug/L	---	---	---	---	110 U	23 U	Not Identified	
N-Nitroso-Di-N-propylamine	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA
Hexachloroethane	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 3.1)
Nitrobenzene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 16)
Isophorone	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 46)
2-Nitrophenol	ug/L	---	---	---	---	110 U	23 U	Not Identified	
2,4-Dimethylphenol	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 160)
Benzoic Acid	ug/L	---	---	---	---	540 U	110 U	Not Identified	NA (Method B: 64,000)
bis(2-Chloroethoxy)methane	ug/L	---	---	---	---	110 U	23 U	Not Identified	
2,4-Dichlorophenol	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 24)
1,2,4-Trichlorobenzene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 1.5)
Naphthalene	ug/L	---	---	---	---	110 U	23 U	Not Identified	160
4-Chloroaniline	ug/L	---	---	---	---	220 U	45 U	Not Identified	NA (Method B: 0.22)
Hexachlorobutadiene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 0.56)
4-Chloro-3-methylphenol	ug/L	---	---	---	---	220 U	45 U	Not Identified	
2-Methylnaphthalene	ug/L	---	---	---	---	330	23	110	
Hexachlorocyclopentadiene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 48)
2,4,6-Trichlorophenol	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 4)
2,4,5-Trichlorophenol	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 800)
2-Chloronaphthalene	ug/L	---	---	---	---	110 U	23 U	Not Identified	
2-Nitroaniline	ug/L	---	---	---	---	540 U	110 U	Not Identified	NA (Method B: 160)
Dimethyl phthalate	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA
Acenaphthylene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA
3-Nitroaniline	ug/L	---	---	---	---	540 U	110 U	Not Identified	
PAH Acenaphthene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 960)
2,4-Dinitrophenol	ug/L	---	---	---	---	540 U	110 U	Not Identified	NA (Method B: 32)
4-Nitrophenol	ug/L	---	---	---	---	540 U	110 U	Not Identified	
Dibenzofuran	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 16)

Table A1-5. Summary of Groundwater Quality Results, May 1991 Pre-Remedial Investigation

		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	1991 Ecology "Limit" Identified in Well Report	2011 MTCA Method A (Unrestricted) Cleanup Level
2,4-Dinitrotoluene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 32)
2,6-Dinitrotoluene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 16)
Diethylphthalate	ug/L	---	---	---	---	110 U	23 U	Not Identified	
4-Chlorophenyl phenyl ether	ug/L	---	---	---	---	110 U	23 U	Not Identified	
Fluorene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 640)
4-Nitroaniline	ug/L	---	---	---	---	110 U	23 U	Not Identified	
4,6-Dinitro-2-methylphenol	ug/L	---	---	---	---	540 U	110 U	Not Identified	
N-Nitrosodiphenylamine	ug/L	---	---	---	---	540 U	110 U	Not Identified	NA
4-Bromophenyl phenyl ether	ug/L	---	---	---	---	110 U	23 U	Not Identified	
Hexachlorobenzene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 0.055)
Pentachlorophenol	ug/L	---	---	---	---	540 U	110 U	Not Identified	NA (Method B: 0.22)
Phenanthrene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA
Anthracene	ug/L	---	---	---	---	110 U	31	23	NA (Method B: 4,800)
Di-n-butylphthalate	ug/L	---	---	---	---	110 U	23 U	Not Identified	
Fluoranthene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 640)
Pyrene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 480)
Butyl benzyl phthalate	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 46)
3,3'-Dichlorobenzidine	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA (Method B: 0.19)
Benzo(a)anthracene	ug/L	---	---	---	---	110 U	23 U	Not Identified	Sum TEF cPAH < 0.1
bis(2-ethylhexyl)phthalate	ug/L	---	---	---	---	110 U	23 U	Not Identified	
Chrysene	ug/L	---	---	---	---	110 U	23 U	Not Identified	Sum TEF cPAH < 0.1
Di-n-octyl phthalate	ug/L	---	---	---	---	110 U	23 U	Not Identified	
Benzo(b)fluoranthene	ug/L	---	---	---	---	110 U	23 U	Not Identified	Sum TEF cPAH < 0.1
Benzo(k)fluoranthene	ug/L	---	---	---	---	110 U	23 U	Not Identified	Sum TEF cPAH < 0.1
Benzo(a)pyrene	ug/L	---	---	---	---	110 U	23 U	Not Identified	0.1
Indeno(1,2,3-cd)pyrene	ug/L	---	---	---	---	110 U	23 U	Not Identified	Sum TEF cPAH < 0.1
Dibenz(a,h)anthracene	ug/L	---	---	---	---	110 U	23 U	Not Identified	Sum TEF cPAH < 0.1
Benzo(g,h,i)perylene	ug/L	---	---	---	---	110 U	23 U	Not Identified	NA

10 U - compound not detected; associated number is lab reporting limit

Data Source: July 11, 1991 Monitoring Well Installation Report, Nowicki & Associates

23 Parameter detected above lab reporting limit; does not reflect comparison to 1991 or 2011 Screening Levels

Table A1-6. Remedial Investigation Groundwater Samples, Collected November 5-7, 1991

Constituent	Method	Units	MW-1	MW-2	MW-3	MW-4S	MW-4D	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	2011 MTCA Method A (Unrestricted) Cleanup Level
Gasoline	EPA 8015M	ug/L	ND	---	140	ND	ND	---	ND	100	ND	ND	ND	800
Diesel	EPA 8015M	ug/L	ND	---	720	ND	ND	---	82,000	560	ND	ND	ND	500
Other	EPA 8015M	ug/L	ND	---	ND	ND	ND	---	49,000	1,300	ND	ND	ND	500
TPH	EPA 418.1	mg/L	0.6	---	0.7	0.5	0.8	---	92.8	2.6	0.9	0.9	0.5	NA
Benzene	EPA 8020	ug/L	ND	---	18.2	ND	ND	---	1.4	2.2	ND	ND	ND	5
Toluene	EPA 8020	ug/L	ND	---	ND	ND	ND	---	ND	ND	ND	ND	ND	1000
Ethylbenzene	EPA 8020	ug/L	ND	---	9	ND	ND	---	1	9	ND	ND	ND	700
Xylenes	EPA 8020	ug/L	ND	---	9	ND	ND	---	ND	5	ND	ND	ND	1000
Chloride	EPA 300	mg/L	627	---	188	368	41.9	---	401	278	47.5	925	466	NA
Sodium	EPA 6010	mg/L	461	---	293	431	47.4	---	378	281	79.6	590	335	NA
PAHs	EPA 8310	ug/L	ND	---	ND	ND	ND	---	**	ND	ND	ND	ND	0.1 *

ND = not detected; lab report not reviewed in preparation of this RI/FS and reporting limits not available

NA = MTCA Method A cleanup level not established; EPA recommended drinking water level for sodium is 200 mg/L for those on sodium restricted diet

--- Not sampled, MW-2 was dry during the sampling event and MW-5 was outfitted with a floating product recovery system

Standard used to quantify TPH as "other" for EPA 8015M was 30-weight motor oil

* Calculate Toxic Equivalent to benzo(a)pyrene (BAP), sum of Toxic Equivalents for all cPAHs not to exceed BAP CUI

PAH results as presented in summary tables in January 1992 Groundwater RI and July 1992 RI/FS. Lab data not appended to reports reviewed in preparation of this 2011 RI/FS

***Elevated MRL's due to matrix interferences may mask concentrations below 10 or 20 ug/L (compound specific)." In Figure 17 of July 1992 RI/FS, November 1991 PAH results for MW-6 are noted as "not detected at elevated detection limit"

Source Groundwater Remedial Investigation Report Nalley's Fine Foods, Tacoma Washington. PGG January 14, 1992

Table A1-7. Remedial Investigation Groundwater Samples, Collected February 1992

Constituent	Method	Units	MW-1	MW-2	MW-3	MW-4S	MW-4D	MW-5	MW-6	MW-7	MW-8	MW-9	2011 MTCA Method A	
													MW-10	(Unrestricted) Cleanup Level
Gasoline	EPA 8015M	ug/L	50 U	50 U	130	50 U	50 U	1080	390	60	50 U	50 U	50 U	800
Diesel	EPA 8015M	ug/L	50 U	50 U	680	50 U	50 U	25,000	27,000	450	50 U	50 U	50 U	500
Other	EPA 8015M	ug/L	50 U	50 U	500	270	250	11,000	13,000	900	360	320	50 U	500
TPH	EPA 418.1	mg/L	0.5 U	0.5 U	1.0 U	0.5	0.7	77	50	1	0.5 U	0.5 U	1	NA
Benzene	EPA 8020	ug/L	0.5 U	0.5 U	2.2	0.5 U	0.5 U	22	3.1	0.7	0.5 U	0.5 U	0.5 U	5
Toluene	EPA 8020	ug/L	1 U	1 U	1 U	1 U	1 U	1	1 U	1 U	1 U	1 U	1 U	1000
Ethylbenzene	EPA 8020	ug/L	1 U	1 U	8	1 U	1 U	20	4	4	1 U	1 U	1 U	700
Xylenes	EPA 8020	ug/L	1 U	1 U	1 U	1 U	1 U	71	6	1 U	1 U	1 U	1 U	1000
Chloride	EPA 300	mg/L	630	110	390	350	42	480	1100	260	34	970	510	NA
Sodium	EPA 6010	mg/L	510	74.9	430	400	42.7	300	740	280	73.1	710	380	NA
Tot. Coliform		MPN/100 mL	4	170	>2400	8	2	110	> 2400	> 2400	17	920	23	NA
NO2+NO3	EPA 353.2	mg/L	1.7	7.2	0.2 U	1.4	3.7	0.2 U	0.2 U	0.2 U	9.6	1.7	1.7	NA
Ammonium	EPA 350.3	mg/L	0.06 U	0.06 U	3.29	0.06 U	0.06 U	0.45	2.7	3.65	0.06 U	0.06 U	0.06 U	NA
Naphthalene	EPA 8310	ug/L	1 U	1 U	1 U	1 U	1 U	100 U	10 U	1 U	1 U	1 U	1 U	160
Acenaphthene	EPA 8310	ug/L	1 U	1 U	1 U	1 U	1 U	100 U	10 U	1 U	1 U	1 U	1 U	
Acenaphthylene	EPA 8310	ug/L	1 U	1 U	1 U	1 U	1 U	100 U	10 U	1 U	1 U	1 U	1 U	
Fluorene	EPA 8310	ug/L	0.2 U	0.2 U	1.2	0.2 U	0.2 U	20 U	4.5	0.2 U	0.2 U	0.2 U	0.2 U	
Phenanthrene	EPA 8310	ug/L	0.1 U	0.1 U	0.7	0.1 U	0.1 U	10 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	
Anthracene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	10 U	2.2	0.1 U	0.1 U	0.1 U	0.1 U	
Fluoranthene	EPA 8310	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	20 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	
Pyrene	EPA 8310	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	20 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	
Benz(a)anthracene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	10 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	*
Chrysene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	10 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	*
Benzo(b)fluoranthene	EPA 8310	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	20 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	*
Benzo(k)fluoranthene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	10 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	*
Benzo(a)pyrene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	12	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 *
Diben(a,h)anthracene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	10 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	*
Benzo(g,h,i)perylene	EPA 8310	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	20 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	
Indeno(1,2,3-cd)pyrene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	10 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	*

Standard used to quantify TPH as "other" for EPA 8015M was hydraulic oil

NA = MTCA Method A cleanup level not established; EPA recommended drinking water level for sodium is 200 mg/L for those on sodium restricted diet:

* Calculate Toxic Equivalent to benzo(a)pyrene (BAP), sum of Toxic Equivalents for all cPAHs not to exceed BAP CUI

Source 1992 RI/FS

Table A1-8. Remedial Investigation Groundwater Samples, Collected May 1992

Constituent	Method	Units	MW-1	MW-2	MW-3	MW-4S	MW-4D	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	Well 2B
Gasoline	EPA 8015M	ug/L	50 U	50 U	50 U	50 U	50 U	2,140	560	50 U	50 U	50 U	50 U	50 U	50 U
Diesel	EPA 8015M	ug/L	50 U	50 U	376	50 U	50 U	49,000	52,000	112	50 U	50 U	50 U	50 U	50 U
Oil	EPA 8015M	ug/L	200 U	200 U	70	830	200 U	20,000	21,000	570	350	200 U	200 U	770	200 U
TPH	EPA 418.1	mg/L	0.5 U	0.5 U	0.5 U	0.5 U	1.1	49.9	55.3	0.6	0.5 U	0.5 U	0.5 U	1	0.5 U
Benzene	EPA 8020	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	49.9	2.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	EPA 8020	ug/L	1 U	1 U	1 U	1 U	1 U	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	EPA 8020	ug/L	1 U	1 U	1 U	1 U	1 U	31	5	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes	EPA 8020	ug/L	1 U	1 U	1 U	1 U	1 U	117	3	1 U	1 U	1 U	1 U	1 U	1 U
Chloride	EPA 300	mg/L	670	190	310	420	84	470	950	320	39	1,200	750	3.7	230
Sodium	EPA 6010	mg/L	459	111	353	383	62	279	679	320	87.6	792	428	13.9	101
Tot. Coliform		MPN/100 mL	4	920	> 2400	130	8	> 2400	> 2400	> 2400	2	21	4	> 2400	2 U
Fecal Coliform		MPN/100 mL	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
NO2+NO3	EPA 353.2	mg/L	2.2	9.5	0.2 U	1.9	4.1	0.2 U	0.2 U	0.2 U	9.6	3.9	2.8	0.2	2.1
Ammonia	EPA 350.3	mg/L	0.05 U	0.05 U	2.42	0.05 U	0.05 U	1.1	0.54	3.47	0.05 U	0.05 U	0.05 U	0.05	0.05 U
Naphthalene	EPA 8310	ug/L	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U
Acenaphthene	EPA 8310	ug/L	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U
Acenaphthylene	EPA 8310	ug/L	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U
Fluorene	EPA 8310	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Phenanthrene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Anthracene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Fluoranthene	EPA 8310	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Pyrene	EPA 8310	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Benz(a)anthracene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chrysene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(b)fluoranthene	EPA 8310	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzo(k)fluoranthene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(a)pyrene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Diben(a,h)anthracene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(g,h,i)perylene	EPA 8310	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Indeno(1,2,3-cd)pyrene	EPA 8310	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

Note, total coliform result for duplicate sample collected at MW-11 was 540 MPN/100ml

Source 1992 RI/FS

APPENDIX A2-1
SUMMARY OF JANUARY/FEBRUARY 2011 SOIL INVESTIGATION
BIRDS EYE FOODS, TACOMA

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ATTACHMENTS

Attachment A: MTCA Method B and C Site Specific Cleanup Levels – Ecology Workbook
Output

Attachment B: Boring Logs B11-01 through B11-17

Attachment C: Lab Analytical Reports (digital copy only)

1.0 INTRODUCTION

This appendix summarizes the analytical results of soil investigations performed in January and February 2011 at the former Nalley's Fine Foods site (Nalley's) in Tacoma, Washington. This work was authorized by Birds Eye Foods on January 25, 2011.

In late 1990, petroleum-contaminated soil was identified at the site following removal of two fuel underground storage tanks (USTs) located near the boiler room (Figure 3 of main RI/FS report body). Concentrations of petroleum compounds in site soil had not been evaluated since the 1992 Remedial Investigations (1992 Soil RI, Nowicki, 1992). Groundwater monitoring for petroleum compounds has been ongoing since 1992 by concurrence with the Washington State Department of Ecology (Ecology) and Tacoma Pierce County Health Department (TPCHD).

Upon review of the site conditions in 2010, Birds Eye authorized Pacific Groundwater Group (PGG) to perform the January/February 2011 Soil Investigation to assess the current nature and extent of soil contamination and identify regulatory and/or cleanup options to facilitate property transfer.

Pacific Groundwater Group's professional services were performed, our findings obtained, and this memo prepared in accordance with hydrogeologic and environmental practices generally accepted at this time and in this area for the exclusive use of Birds Eye Foods and their agents, for specific application to the former Nalley's Fine Foods site. This warranty is in lieu of all other warranties, express or implied.

1.1 SUMMARY OF FINDINGS

The 2011 Soil Investigation characterizes the nature and extent of soil contamination with access limitations to the east. Three areas where soil concentrations of petroleum hydrocarbons exceeded Washington State and site-specific cleanup levels (see discussion of cleanup levels) were delineated by these investigations.

- The Main Area of soil contamination where concentrations of diesel and oil-range hydrocarbons exceeded cleanup levels as shallow as 14 feet below ground and extending to a minimum of 30 feet in depth.
- A smaller, shallow area of soil contamination at the northwest extent of the Main Area where concentrations of diesel (10 feet in depth) and gasoline-range hydrocarbons (extending to at least 20 feet in depth) exceeded cleanup levels.
- A second, smaller, shallow area of soil contamination at the western extent of the Main Area where concentrations of gasoline-range hydrocarbons (12 feet in depth) exceeded cleanup levels.
- Non-aqueous phase liquid (NAPL) was observed during drilling.

2.0 SUMMARY OF FIELD INVESTIGATION AND SOIL SAMPLING

A direct-push drilling rig was used to advance seventeen boreholes and collect soil samples on January 31, and February 1, 2011 by a Washington State licensed driller with Cascade Drilling. The approximate locations of boreholes B11-01 through B11-17 are presented in Figure 3 of main RI/FS report body. The drilling locations were adjusted from those proposed based on underground utilities and observations made in the field. Also, based on field observations and verbal authorization from Pinnacle, three boreholes were added to the number originally proposed. Note that the locations of utilities and boreholes presented on Figure 3 of main RI/FS report body are approximate; they have not been surveyed.

Site hydrogeology is summarized in the main body of the 2011 RI/FS and is not repeated in this appendix. Boring logs are presented as Attachment B.

The anticipated drilling depth was 35 feet below ground; however, only one borehole (B11-12) was advanced to 35 feet. Total depths at the remaining boreholes were limited by:

- drilling refusal by nature of the soils encountered, or
- limitations of the drilling methods used for this scope of work to effectively seal off shallow NAPL from influencing deeper soil samples (i.e. collect representative soil samples deeper than NAPL)

Note that direct-push drilling technology was recommended in PGG's January 2011 proposal because it is a cost effective exploration method in favorable soil, and that drilling refusal was cited as potential for adjustment to the scope of work.

During drilling, sheen tests and a photoionization detector (PID) were used as screening tools to assess the presence of petroleum compounds.

Non-aqueous phase liquid (NAPL) was observed during drilling of B11-01 (30 feet), B11-02 (23 and 30 feet), B11-09 (23.5 feet), B11-12 (10 feet), and B11-14 (30 feet). Visual sheen tests were positive in borings B11-06, B11-08, B11-09, B11-14, B11-16, and B11-17.

Site soil data collected for previous investigations between ground and approximately 14 feet deep did not exceed cleanup levels with the exception of one area about 35 feet north of PW-6 (B11-11 area, Figure 3 of main RI/FS report body). Therefore, depths below 15 feet were generally targeted to collect soil samples for lab analysis. Soil shallower than 15 feet was collected for lab analysis from B11-11 and where field screening tests indicated petroleum concentrations may be elevated.

“Grab” soil samples were collected in laboratory-provided containers. Diesel and oil were the primary analytes for this investigation based on the contents of the former USTs and 1992 RI soil results. Select samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX); and for gasoline. Samples were analyzed by the following methods:

- Diesel-range and heavy oil-range hydrocarbons (DRO and HORO by Method NWTPH-Dx
- BTEX by EPA Methods 8021B and 8260
- Gasoline-range hydrocarbons (GRO) by Method NWTPH-G

In addition, select samples were analyzed for Washington State Department of Ecology's Volatile Petroleum Hydrocarbon/Extractable Petroleum Hydrocarbon (VPH/EPH) fraction analyses and polynuclear aromatic hydrocarbons (PAHs, Method 8270D).

3.0 CLEANUP LEVELS

In Washington, cleanup levels are established for numerous toxic substances in different media (soil, groundwater, etc.) under the Model Toxics Control Act (MTCA, Washington State Administrative Code 173-340), which is regulated by the Washington State Department of Ecology (Ecology). MTCA Method A (Method A) cleanup levels may be applied to sites that have few hazardous substances.

There are Method A **soil** cleanup levels for unrestricted land use and for industrial site use¹. An industrial use means properties that are or have been characterized by, or are to be committed to, traditional industrial uses such as processing or manufacturing of materials; marine terminal and transportation areas and facilities; fabrication, assembly, treatment, or distribution of manufactured products; or storage of bulk materials that are zoned industrial. The Nalley's site would likely qualify as an industrial property.

MTCA Method B (Method B) cleanup levels apply to more complex contaminated sites. Method B cleanup levels are calculated by Ecology based on default formulas and assumptions; modified Method B chemical-specific or site-specific cleanup levels may be calculated using Ecology tools and chemistry data from the project site.

3.1 SUMMARY OF ANALYTICAL RESULTS COMPARED TO MTCA METHOD A INDUSTRIAL

Soil analytical results for the 2011 investigation are summarized in Tables 7-10 of the main RI/FS report body. Lab reports are presented in Attachment C to this appendix. The sample identifications are the borehole name followed by the approximate depth below ground in feet that the sample was collected. For example, sample B11-03-20 was collected from borehole B11-03 at approximately 20 feet below ground.

The analytical data indicate that concentrations of petroleum compounds in site soils exceeded Method A Industrial cleanup levels (Tables 7-10 of the main RI/FS report body).

¹ The former Nalley's site Method A cleanup levels have been applied to groundwater investigations performed at the former Nalley's site since the 1992 Remedial Investigations.

One of the analytical tools used by the lab for hydrocarbon analyses is a chromatogram – a graphical representation of the signals created by analytes as they pass through the lab instruments. The lab analysts made two key notes based on chromatograms for the 2011 Nalley’s soil samples:

- The signals of gasoline-range hydrocarbons in samples with detections of GRO did not match the pattern of an identifiable gasoline chromatogram
- There was evidence in the chromatograms that there are two distinct signals in the DRO and HORO ranges – not a single signal that spans both ranges

The analyst’s notes about the gasoline chromatograms suggest that the source of hydrocarbons in the GRO is not a gasoline source. Potential origins of the GRO detections in site soil include degradation of diesel or heavy oil range hydrocarbons.

The lab’s notes about the DRO/HORO chromatograms relate to Method A Industrial soil cleanup levels for diesel and heavy oil range hydrocarbons. Under MTCA, if there is clear evidence in the chromatogram that petroleum at the site consists of a mixture of diesel and oil, the Method A Industrial soil cleanup level for diesel is 2,000 mg/kg and the cleanup level for heavy oil is 2,000 mg/kg. This is consistent with the chromatograms of Nalley’s 2011 soil samples. If there is not clear evidence in the chromatogram of two distinct peaks or signals, the combined Method A Industrial oil cleanup level for diesel plus heavy oil range hydrocarbons is 2,000 mg/kg (total).

Considering the analytical results and sample depths, the lateral extent of soil with petroleum concentrations that exceeded Method A Industrial cleanup levels can be represented by three areas described in the following and outlined in Figure 15 in the main RI/FS report body.

3.1.1 Main Area

The “Main Area” (outlined in Figure 15 in the main RI/FS report body) represents the area of soil contamination dominated by DRO and HORO concentrations that exceeded Method A Industrial cleanup levels as shallow as 14 feet and extending to a minimum of 30 feet below ground². The total depth of contamination could not be estimated from these investigations because of limitations of the drilling method noted in the field investigation section of this memo. The lateral extent of the Main Area is estimated to the north, west, and south based on analytical results for samples collected in boreholes B11-03, B11-13, B11-15, B11-10, B11-07, and B11-04, which did not exceed Method A Industrial cleanup levels for petroleum compounds. Additionally, samples collected below 15 feet from boreholes B11-12, B11-17, and B11-16 did not exceed Method A Industrial cleanup levels for DRO or HORO. The lateral extent to the southeast is estimated based on analytical results from borehole B11-05, which did not exceed industrial cleanup levels for petroleum compounds. The lateral extent of the Main Area to the east is likely under the facility buildings and could not be estimated from these investigations because of limited drill rig access.

² See Shallow Area description for discussion of B11-14-09 results

Soil samples with petroleum concentrations above Method A Industrial cleanup levels were encountered at shallower depths in the vicinity of the former southern UST than in the vicinity of the former northern UST (Figure 15 in the main RI/FS report body). In boreholes B11-08 and B11-09, samples collected at approximately 15 feet below ground exceeded Method A Industrial cleanup levels for DRO and HORO. However, in B11-01 and B11-02, the shallowest soil samples that exceeded Method A Industrial cleanup levels for DRO and HORO were collected at 30 and 23.5 feet below ground respectively.

3.1.2 Shallow Areas

There are two additional areas of soil contamination that can be distinguished from the Main Area based on the depths of contamination.

The North Shallow Area was encountered during drilling B11-12 and B11-17 (Figure 15 in the main RI/FS report body). Samples collected at 10 feet below ground from these boreholes exceeded the industrial cleanup levels for DRO and GRO. Unlike boreholes in the Main Area, deeper soil samples collected from B11-12 and B11-17 did not exceed the Method A Industrial cleanup level for DRO. The soil sample collected from B11-17 at approximately 20 feet below ground also exceeded the Method A Industrial cleanup level for GRO. Soil samples were not collected west and north-west of B11-12 so the lateral extent of this shallow area is not defined by the data. The North Shallow Area may extend to B11-14, where DRO concentrations exceeded Method A Industrial cleanup levels at 9 feet below ground. Unlike B11-12 and B11-17, DRO concentrations at B11-14 are also elevated at 20 feet below ground and deeper. B11-14 could be located in a vicinity where the North Shallow Area overlies the Main Area.

A second shallow area of soil contamination, the West Shallow Area, was encountered during drilling at B11-16. The concentration of GRO in the sample collected from B11-16 at approximately 12 feet below ground exceeded the Method A Industrial cleanup level. While deeper samples from this borehole were not analyzed for GRO, sheen tests performed on soil deeper than 12 feet were negative and PID readings were 0 parts per million (ppm). Based on these screening tests, GRO likely does not exceed cleanup levels at depths greater than approximately 12 feet below ground. DRO and HORO were not detected in soil samples collected at B11-16.

3.1.3 PAHs

As described in the Field Investigation section of this memo, the primary analytes for the January/February 2011 Soil Investigation were diesel and heavy oil range hydrocarbons. PAHs were analyzed in select samples from boreholes located within the Main Area of soil contamination described above. PAHs were analyzed to facilitate calculation of Method B and C site-specific cleanup levels (described in the following section). However, Method A Industrial soil cleanup levels are established for some PAHs.

The concentrations of benzo(a)pyrene in samples B11-06-25, B11-09-23.5, and B11-14-30 exceeded the Method A Industrial soil cleanup level. In addition, the concentration of naphthalene in sample B11-14-30 exceeded the Method A Industrial soil cleanup level (Table 9 of the main RI/FS report body).

Under Method A Industrial, the soil cleanup level established for benzo(a)pyrene is used to represent the cleanup level for total carcinogenic PAHs present in site soil. Concentrations of individual carcinogenic PAHs in a sample are multiplied by established toxicity equivalency factors (TEF) to calculate the toxic equivalent concentration of benzo(a)pyrene. The total toxic equivalent concentration of benzo(a)pyrene is then compared to the cleanup level for benzo(a)pyrene.

A summary of the carcinogenic PAH toxic equivalents evaluation is presented in Table 10 of the main RI/FS report body. The results indicate the total toxic equivalent concentrations of benzo(a)pyrene in samples B11-06-25, B11-08-20, B11-09-23.5, and B11-14-30 exceeded the Method A Industrial soil cleanup level for benzo(a)pyrene.

3.2 SUMMARY OF SOIL RESULTS COMPARED TO MTCA METHOD B AND C

Select soil samples were analyzed for petroleum fractions VPH/EPH and PAHs. These results are summarized in Table 9 of the main RI/FS report body. The VPH/EPH fractions do not have specific MTCA cleanup levels; however, under Method B and C, these data can be used to calculate site-specific petroleum cleanup levels (modified MTCA Method B and C cleanup levels). Unlike Method A, Method B and C cleanup levels can be developed for a specific exposure pathway, such as direct contact with soil or soil leaching to groundwater. Depending on the petroleum mixture present at a site, the site-specific cleanup levels can be more or less stringent than Method A cleanup levels.

Site-specific Method B and C cleanup levels were calculated for total petroleum hydrocarbons from VPH/EPH and PAH data from five soil samples (B11-06-25, B11-08-20, B11-09-23.5, B11-14-30, and B11-17-30) using Ecology's *Workbook for Calculating Cleanup Levels for Petroleum Contamination Sites*. Cleanup levels were calculated for direct contact with soil, and soil leaching to groundwater pathways. Output from Ecology's workbook and a summary of cleanup levels are presented in Attachment A.

The total petroleum hydrocarbon (TPH) concentrations in the Nalley's site soils selected for VPH/EPH analyses range from 182 mg/kg (B11-17-30) to 15,742 mg/kg (B11-14-30). These values are summarized in Attachment A.

3.2.1 Direct Contact

For the direct contact exposure pathway, Method B cleanup levels are applicable for unrestricted site use and Method C cleanup levels are applicable for Industrial site use. An Industrial use means properties that are or have been characterized by, or are to be committed to, traditional Industrial uses such as processing or manufacturing of materials; marine terminal and transportation areas and facilities; fabrication, assembly, treatment, or distribution of manufactured products; or storage of bulk materials that are zoned Industrial. The Nalley's site would likely qualify as an Industrial property.

For the direct contact exposure pathway, the point of compliance is throughout the site in soil down to 15 feet below ground. A point of compliance is the point, or points, where cleanup levels are established at a site.

The most stringent Method C soil cleanup level for TPH that is protective of direct contact exposure for the petroleum mixture present in Nalley's site soil is 11,316 mg/kg. The most stringent Method B soil cleanup level for TPH that is protective of direct contact exposure for the petroleum mixture present in site soil is 281 mg/kg.

TPH concentrations for two of the five samples selected for VPH/EPH analyses exceeded this site-specific Method C direct-contact cleanup level. For reference, the MTCA A cleanup levels for diesel range hydrocarbons and heavy oil range hydrocarbons are 2,000 mg/kg. Therefore, the site-specific Method C cleanup level that is protective of direct contact is higher, or less stringent, than the Method A Industrial cleanup level.

3.2.2 Soil Leaching to Groundwater

For the soil leaching to groundwater pathway, Method B cleanup levels are applicable because the soil cleanup level protects unrestricted use of groundwater and associated groundwater cleanup levels. The most stringent cleanup level that is protective of soil leaching to groundwater for the petroleum mixture present in Nalley's site soil is 6.2 mg/kg.

TPH concentrations for all five samples selected for VPH/EPH analyses exceeded this soil leaching to groundwater cleanup level. The site-specific Method B cleanup level that is protective of soil leaching to groundwater is lower, or more stringent, than Method A Industrial cleanup levels (Tables 7 and 8 of the main RI/FS report body).

4.0 REFERENCES

Pacific Groundwater Group. December 10, 2010. Former Nalley's Fine Foods Site Petroleum-Impacted Media 2010 Status Report. Consultant's report prepared for Bird's Eye Foods.

Nowicki & Associates. January 15, 1992. Nalley's Fine Foods Remedial Investigation Report. Consultant's report prepared for Nalley's Fine Foods.

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Table A2-1. Summary of PAH/EPH/VPD Calculated TPH Cleanup Levels, Nalley's Site 2011 Soil Investigation

Exposure Pathway	MTCA Method	Soil Criteria	B11-06-25	B11-08-20	B11-09-23.5	B11-14-30	B11-17-30	Most Stringent CUL	Average CUL	
Protection of Soil Direct Contact: Human Health	Method B	HI =1	mg/kg	2,655	4,069	3,855	2,820	3,139	2,655	3,307
		Total Risk=1E-5	mg/kg	2,810	23,891	14,936	26,150	4,167	2,810	3,307
		Risk of Benzene= 1E-6	mg/kg	6,597,244	6,858,770	33,596,771	17,867,682	549,382	549,382	14,391
		Risk of cPAHs mixture= 1E-6	mg/kg	281	2,390	1,494	2,615	417	281	1,439
	Method C	HI =1	mg/kg	33,306	50,171	47,429	36,132	38,558	33,306	41,119
		Total Risk=1E-5	mg/kg	11,316	96,232	60,155	105,322	16,789	11,316	57,963
Protection of Ground Water Quality: Leaching	Method B	HI=1	mg/kg	7.7	24	41	7.1	17	7.1	19
		Total Risk = 1E-5	mg/kg	1,873	1,682	100% NAPL	100% NAPL	70	70	1,209
		Total Risk = 1E-6	mg/kg	77	88	538	257	6.2	6.2	193
		Risk of cPAHs mixture= 1E-5	mg/kg	100% NAPL	100% NAPL	100% NAPL	100% NAPL	100% NAPL	100% NAPL	100% NAPL
		Benzene MCL = 5 ug/L	mg/kg	796	772	100% NAPL	100% NAPL	44	44	537
		Target TPH GW Conc. @ 500 ug/L	mg/kg	18	72	170	15	13	13	58

CUL = Clean Up Level

HI = Hazard Index

Table A2-2. Summary of Measured Soil TPH Concentrations, Nalley's Site 2011 Soil Investigation

		B11-06-25	B11-08-20	B11-09-23.5	B11-14-30	B11-17-30
Measured TPH Concentration (From Ecology Workbook)	mg/kg	10,898	14,200	9,250	15,742	182

ATTACHMENT A
MTCA METHOD B AND C SITE SPECIFIC CLEANUP LEVELS –
ECOLOGY WORKBOOK OUTPUT

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 01/31/11

Site Name: Birds Eye Foods - Soil Investigation

Sample Name: B11-06-25 (max)

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis	Composition Ratio
	mg/kg	%
<u>Petroleum EC Fraction</u>		
AL_EC >5-6	5.4	0.05%
AL_EC >6-8	6	0.06%
AL_EC >8-10	33	0.30%
AL_EC >10-12	190	1.74%
AL_EC >12-16	1100	10.09%
AL_EC >16-21	1700	15.60%
AL_EC >21-34	1400	12.85%
AR_EC >8-10	62.1325	0.57%
AR_EC >10-12	319.81	2.93%
AR_EC >12-16	523	4.80%
AR_EC >16-21	2200	20.19%
AR_EC >21-34	3275.99	30.06%
Benzene	0.03	0.00%
Toluene	0.0275	0.00%
Ethylbenzene	0.0275	0.00%
Total Xylenes	0.84	0.01%
Naphthalene	0.19	0.00%
1-Methyl Naphthalene	25	0.23%
2-Methyl Naphthalene	32	0.29%
n-Hexane	0.6	0.01%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	7	0.06%
Benzo(b)fluoranthene	0.475	0.00%
Benzo(k)fluoranthene	0.475	0.00%
Benzo(a)pyrene	3	0.03%
Chrysene	12	0.11%
Dibenz(a,h)anthracene	0.87	0.01%
Indeno(1,2,3-cd)pyrene	0.19	0.00%
Sum	10898.0575	100.00%

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	1	Unitless

4. Target TPH Ground Water Concentration (if adjusted)

If you adjusted the target TPH ground water

concentration, enter adjusted value here: 500 ug/L

Notes for Data Entry

Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:

VPH analysis AL C8-C10: 14,000 ug/kg
 EPH analysis AL C8-C10: 33,000 ug/kg **used in calculation
 VPH analysis AL C10-C12: <12,000 ug/kg
 EPH analysis AL C10-C12: 190,000 ug/kg **used in calculation
 VPH analysis AR C8-C10: 63,000 ug/kg **used in calculation
 EPH analysis AR C8-C10: <56,000 ug/kg
 VPH analysis AR C10-C12: 320,000 ug/kg **used in calculation
 EPH analysis AR C10-C12: <56,000 ug/kg
 MTBE, ND at 1200 ug/kg **used no value in calculation
 n-Hexane ND at 1200 ug/kg

B value from SW8260C used in calculation because greatest (only) detection
 ETX: values used from SW8260C because lower reporting limits and hits for Xylenes

Naphthalene ND at 380 ug/kg
 2-Methylnaphthalene: 32,000 ug/kg (dilution result) used in calculation because non-diluted result exceeded sensor (E qual)
 1-Methylnaphthalene: 25,000 ug/kg (non-dilution result) used in calculation because greater than diluted result (23,000 ug/kg)

Values of N-Hexane, EX, N, 1&2 MN, and CPAHs were subtracted from the appropriate EC-Fraction to avoid double counting.

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 1/31/2011

Site Name: Birds Eye Foods - Soil Investigation

Sample Name: B11-06-25 (max)

Measured Soil TPH Concentration, mg/kg: **10,898.058**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	281	3.88E-05	4.11E+00	Fail
	Method C	11,316	9.63E-06	3.27E-01	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	8	1.54E-05	1.35E+01	Fail
	Target TPH GW Conc. @ 500 ug/L	18	NA	NA	Fail

Warning! Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (Refer to WAC 173-340-7490 through ~7494).

Warning! Check Residual Saturation (WAC340-747(10)).

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	280.98	11,315.91
Most Stringent Criterion	Risk of cPAHs mixture= 1E-6	Total Risk=1E-5

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	NO	2.65E+03	9.45E-06	1.00E+00	NO	3.33E+04	2.94E-05	1.00E+00
Total Risk=1E-5	NO	2.81E+03	1.00E-05	1.06E+00	YES	1.13E+04	1.00E-05	3.40E-01
Risk of Benzene= 1E-6	NO	6.60E+06	2.35E-02	2.49E+03	NA			
Risk of cPAHs mixture= 1E-6	YES	2.81E+02	1.00E-06	1.06E-01				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	HI=1
Protective Ground Water Concentration, ug/L	259.04
Protective Soil Concentration, mg/kg	7.65

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	2.59E+02	2.05E-07	1.00E+00	7.65E+00
Total Risk = 1E-5	NO	2.62E+03	1.00E-05	1.28E+01	1.87E+03
Total Risk = 1E-6	NO	1.23E+03	1.00E-06	5.73E+00	7.71E+01
Risk of cPAHs mixture= 1E-5	NO	2.78E+03	1.71E-05	1.37E+01	100% NAPL
Benzene MCL = 5 ug/L	NO	2.43E+03	6.37E-06	1.19E+01	7.96E+02
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 84000 mg/kg TPH.

3.2. Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	5.00E+02	3.27E-07	2.06E+00	1.79E+01

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 01/31/11

Site Name: Birds Eye Foods

Sample Name: B11-08-20 (max) BTEX from B11-08-30

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis	Composition Ratio
	mg/kg	%
<u>Petroleum EC Fraction</u>		
AL_EC >5-6	4.185	0.03%
AL_EC >6-8	4.65	0.03%
AL_EC >8-10	10	0.07%
AL_EC >10-12	150	1.06%
AL_EC >12-16	1100	7.75%
AL_EC >16-21	1800	12.68%
AL_EC >21-34	5700	40.14%
AR_EC >8-10	29.74	0.21%
AR_EC >10-12	117.2	0.83%
AR_EC >12-16	344	2.42%
AR_EC >16-21	1400	9.86%
AR_EC >21-34	3493.57	24.60%
Benzene	0.0376	0.00%
Toluene	0.0225	0.00%
Ethylbenzene	0.97	0.01%
Total Xylenes	0.29	0.00%
Naphthalene	2.8	0.02%
1-Methyl Naphthalene	16	0.11%
2-Methyl Naphthalene	20	0.14%
n-Hexane	0.465	0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.81	0.01%
Benzo(b)fluoranthene	0.19	0.00%
Benzo(k)fluoranthene	0.19	0.00%
Benzo(a)pyrene	0.38	0.00%
Chrysene	4.1	0.03%
Dibenz(a,h)anthracene	0.38	0.00%
Indeno(1,2,3-cd)pyrene	0.38	0.00%
Sum	14200.3601	100.00%

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	1	Unitless

4. Target TPH Ground Water Concentration (if adjusted)

If you adjusted the target TPH ground water

concentration, enter adjusted value here: 500 ug/L

Notes for Data Entry

Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:

Total benzofloranthene reported by lab. ND at 0.76 mg/kg. In this calculation, represent a total of 1/2 RL between benzo(b) and benzo(k)

Non-detect parameters represented as 1/2 RL in calculation EXCEPT MTBE (see below)

Benzene from B11-08-30 = 880 and is 2.14 % of the total TPH-D(880/19800 *100% = 2.146 %); So, the Benzene at B11-08-20 is increased from 19 to 37.6 ug/kg (19*1.0214= 37.56). Note, the ETX values are also increased in a proportional way.

MTBE ND at 930 ug/kg. No value used in this calculation.

VPH ALC10-12 ND at 9,300 ug/kg

EPH ALC10-12 150,000 ug/kg **used in calculation

VPH ALC8-10 10,000 ug/kg **used in calculation

EPH ALC8-10 ND at 41,000 ug/kg

Values of N-Hexane, EX, N, 1&2 MN, and CPAHs were subtracted from the appropriate EC-Fraction to avoid double counting.

DF=1 for saturated soil

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 1/31/2011

Site Name: Birds Eye Foods

Sample Name: B11-08-20 (max) BTEX from B11-08-30

Measured Soil TPH Concentration, mg/kg: **14,200.360**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	2,390	5.94E-06	3.49E+00	Fail
	Method C	50,171	1.48E-06	2.83E-01	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	24	1.79E-05	6.18E+00	Fail
	Target TPH GW Conc. @ 500 ug/L	72	NA	NA	Fail

Warning! Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (Refer to WAC 173-340-7490 through ~7494).

Warning! Check Residual Saturation (WAC340-747(10)).

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	2,389.89	50,170.91
Most Stringent Criterion	Risk of cPAHs mixture= 1E-6	HI =1

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	NO	4.07E+03	1.70E-06	1.00E+00	YES	5.02E+04	5.21E-06	1.00E+00
Total Risk=1E-5	NO	2.39E+04	1.00E-05	5.87E+00	NO	9.62E+04	1.00E-05	1.92E+00
Risk of Benzene= 1E-6	NO	6.86E+06	2.87E-03	1.69E+03	NA			
Risk of cPAHs mixture= 1E-6	YES	2.39E+03	1.00E-06	5.87E-01				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	HI=1
Protective Ground Water Concentration, ug/L	257.46
Protective Soil Concentration, mg/kg	24.02

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	2.57E+02	2.92E-07	1.00E+00	2.40E+01
Total Risk = 1E-5	NO	1.17E+03	1.00E-05	5.62E+00	1.68E+03
Total Risk = 1E-6	NO	5.53E+02	1.00E-06	2.42E+00	8.77E+01
Risk of cPAHs mixture= 1E-5	NO	1.27E+03	1.95E-05	6.26E+00	100% NAPL
Benzene MCL = 5 ug/L	NO	1.08E+03	6.30E-06	5.11E+00	7.72E+02
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 78000 mg/kg TPH.

3.2. Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	5.00E+02	8.29E-07	2.15E+00	7.19E+01

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 01/31/11

Site Name: Birds Eye Foods

Sample Name: B11-09-23.5 (max)

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis	Composition Ratio
	mg/kg	%
<u>Petroleum EC Fraction</u>		
AL_EC >5-6	3.4	0.04%
AL_EC >6-8	3.4	0.04%
AL_EC >8-10	26	0.28%
AL_EC >10-12	150	1.62%
AL_EC >12-16	900	9.73%
AL_EC >16-21	1300	14.05%
AL_EC >21-34	3400	36.76%
AR_EC >8-10	8.808	0.10%
AR_EC >10-12	36.2	0.39%
AR_EC >12-16	204.2	2.21%
AR_EC >16-21	1100	11.89%
AR_EC >21-34	2095.56	22.66%
Benzene	0.005	0.00%
Toluene	0.005	0.00%
Ethylbenzene	0.1	0.00%
Total Xylenes	0.092	0.00%
Naphthalene	1.8	0.02%
1-Methyl Naphthalene	6.3	0.07%
2-Methyl Naphthalene	9.5	0.10%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.85	0.01%
Benzo(b)fluoranthene	0.265	0.00%
Benzo(k)fluoranthene	0.265	0.00%
Benzo(a)pyrene	0.44	0.00%
Chrysene	2.2	0.02%
Dibenz(a,h)anthracene	0.21	0.00%
Indeno(1,2,3-cd)pyrene	0.21	0.00%
Sum	9249.81	100.00%

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	1	Unitless

4. Target TPH Ground Water Concentration (if adjusted)

If you adjusted the target TPH ground water

concentration, enter adjusted value here: 500 ug/L

Notes for Data Entry

Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:

Lab reported Total Benzofluoranthenes. Total concentration (530 ug/kg) divided equally between benzo(b) and benzo(k) for this calculation.

BTEX results from SW8021B because lower reporting limits than WAVPH

ND represented as 1/2 RL in calculation with exception of MTBE (see below)

n-Hexane and MTBE ND at 680 ug/kg. No value used in this calculation. Note n-hexane fraction is included in the AL-EC 5-6 fraction

VPH ALC8-10 ND at 6,800 ug/kg

VPH ALC10-12 ND at 6,800 ug/kg

VPH ARC8-10 9,000 ug/kg **used in this calculation

VPH ARC10-12 38,000 ug/kg **used in this calculation

EPH ALC8-10 26,000 ug/kg **used in this calculation

EPH ALC10-12 150,000 ug/kg **used in this calculation

VPH ARC8-10 ND at 110,000 ug/kg

VPH ARC10-12 ND at 110,000 ug/kg

Values of E&X, N, 1&2 MN, and CPAHs were subtracted from the appropriate EC-Fraction to avoid double counting.

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 1/31/2011
Site Name: Birds Eye Foods
Sample Name: B11-09-23.5 (max)
Measured Soil TPH Concentration, mg/kg: 9,249.810

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	1,494	6.19E-06	2.40E+00	Fail
	Method C	47,429	1.54E-06	1.95E-01	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	41	3.40E-06	3.52E+00	Fail
	Target TPH GW Conc. @ 500 ug/L	170	NA	NA	Fail

Warning! Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (Refer to WAC 173-340-7490 through ~7494).

Warning! Check Residual Saturation (WAC340-747(10)).

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	1,493.68	47,428.85
Most Stringent Criterion	Risk of cPAHs mixture= 1E-6	HI =1

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	NO	3.86E+03	2.58E-06	9.99E-01	YES	4.74E+04	7.88E-06	1.00E+00
Total Risk=1E-5	NO	1.49E+04	1.00E-05	3.87E+00	NO	6.02E+04	1.00E-05	1.27E+00
Risk of Benzene= 1E-6	NO	3.36E+07	2.25E-02	8.71E+03	NA			
Risk of cPAHs mixture= 1E-6	YES	1.49E+03	1.00E-06	3.87E-01				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	HI=1
Protective Ground Water Concentration, ug/L	277.89
Protective Soil Concentration, mg/kg	41.44

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	2.78E+02	1.15E-07	1.00E+00	4.14E+01
Total Risk = 1E-5	NO	7.92E+02	3.92E-06	3.58E+00	100% NAPL
Total Risk = 1E-6	NO	6.53E+02	1.00E-06	2.88E+00	5.38E+02
Risk of cPAHs mixture= 1E-5	NO	7.92E+02	3.92E-06	3.58E+00	100% NAPL
Benzene MCL = 5 ug/L	NO	7.92E+02	3.92E-06	3.58E+00	100% NAPL
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 78000 mg/kg TPH.

3.2. Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	5.00E+02	3.90E-07	2.09E+00	1.70E+02

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 01/31/11

Site Name: Birds Eye Foods

Sample Name: B11-14-30 (max)

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis	Composition Ratio
	mg/kg	%
<u>Petroleum EC Fraction</u>		
AL_EC >5-6	4.275	0.03%
AL_EC >6-8	17	0.11%
AL_EC >8-10	160	1.02%
AL_EC >10-12	680	4.32%
AL_EC >12-16	3700	23.50%
AL_EC >16-21	4500	28.59%
AL_EC >21-34	1300	8.26%
AR_EC >8-10	174.1	1.11%
AR_EC >10-12	467	2.97%
AR_EC >12-16	736	4.68%
AR_EC >16-21	2700	17.15%
AR_EC >21-34	1194.57	7.59%
Benzene	0.016	0.00%
Toluene		0.00%
Ethylbenzene	5.9	0.04%
Total Xylenes		0.00%
Naphthalene	13	0.08%
1-Methyl Naphthalene	38	0.24%
2-Methyl Naphthalene	46	0.29%
n-Hexane	0.475	0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	1.6	0.01%
Benzo(b)fluoranthene	0.165	0.00%
Benzo(k)fluoranthene	0.165	0.00%
Benzo(a)pyrene	0.38	0.00%
Chrysene	2.9	0.02%
Dibenz(a,h)anthracene	0.11	0.00%
Indeno(1,2,3-cd)pyrene	0.11	0.00%
Sum	15741.766	100.00%

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	1	Unitless

4. Target TPH Ground Water Concentration (if adjusted)

If you adjusted the target TPH ground water

concentration, enter adjusted value here: 500 ug/L

Notes for Data Entry

Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:

B: ND at 950 ug/kg

B: 16 ug/kg re-analyzed out of hold

E: 2400 ug/kg (raw sample)

E: 5900 ug/kg (diluted sample)

T: ND at 950 ug/kg

o-Xylenes: ND at 950 ug/kg

m+p Xylenes: ND at 1900 ug/kg

MTBE ND at 950 ug/kg

n-Hexane ND at 950 ug/kg

VPH: ALC5-6 ND at 9500 ug/kg

VPH: AL C6-8 17,000 ug/kg

VPH: ALC8-10 ND at 9500 ug/kg

VPH: ALC10-12 110,000 ug/kg

VPH: ARC8-10 180,000 **used in calculation

VPH: ARC10-12 480,000 ug/kg **used in calculation

EPH: ALC8-10 160,000 ug/kg **used in calculation

EPH: ALC10-12 680,000 ug/kg **used in calculation

EPH: AR8-10 ND at 55,000 ug/kg

EPH: AR10-12 63,000 ug/kg

Total benzofluoranthenes reported by lab (330 ug/kg).

In calculation split between benzo(b) and benzo(k)

Values of N-Hexane, EX, N, 1&2 MN, and CPAHs were subtracted from the appropriate EC-Fraction to avoid double counting.

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 1/31/2011
Site Name: Birds Eye Foods
Sample Name: B11-14-30 (max)
Measured Soil TPH Concentration, mg/kg: 15,741.766

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	2,615	6.02E-06	5.58E+00	Fail
	Method C	36,132	1.49E-06	4.35E-01	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	7	5.64E-06	1.40E+01	Fail
	Target TPH GW Conc. @ 500 ug/L	15	NA	NA	Fail

Warning! Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (Refer to WAC 173-340-7490 through ~7494).

Warning! Check Residual Saturation (WAC340-747(10)).

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	2,615.34	36,131.82
Most Stringent Criterion	Risk of cPAHs mixture= 1E-6	HI =1

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	NO	2.82E+03	1.08E-06	1.00E+00	YES	3.61E+04	3.43E-06	1.00E+00
Total Risk=1E-5	NO	2.61E+04	1.00E-05	9.27E+00	NO	1.05E+05	1.00E-05	2.91E+00
Risk of Benzene= 1E-6	NO	1.79E+07	6.83E-03	6.34E+03	NA			
Risk of cPAHs mixture= 1E-6	YES	2.62E+03	1.00E-06	9.27E-01				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	HI=1
Protective Ground Water Concentration, ug/L	271.46
Protective Soil Concentration, mg/kg	7.07

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	2.71E+02	5.09E-08	1.00E+00	7.07E+00
Total Risk = 1E-5	NO	3.38E+03	6.00E-06	1.40E+01	100% NAPL
Total Risk = 1E-6	NO	2.35E+03	1.00E-06	1.01E+01	2.57E+02
Risk of cPAHs mixture= 1E-5	NO	3.38E+03	6.00E-06	1.40E+01	100% NAPL
Benzene MCL = 5 ug/L	NO	3.38E+03	6.00E-06	1.40E+01	100% NAPL
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 75000 mg/kg TPH.

3.2. Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	5.00E+02	8.43E-08	1.93E+00	1.50E+01

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 01/31/11

Site Name: Birds Eye Foods

Sample Name: B11-17-30

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
<u>Petroleum EC Fraction</u>		
AL_EC >5-6	6	3.31%
AL_EC >6-8	6	3.31%
AL_EC >8-10	1.2	0.66%
AL_EC >10-12	2.9	1.60%
AL_EC >12-16	31	17.08%
AL_EC >16-21	53	29.20%
AL_EC >21-34	12	6.61%
AR_EC >8-10	1.2	0.66%
AR_EC >10-12	1.168	0.64%
AR_EC >12-16	10.75	5.92%
AR_EC >16-21	42	23.14%
AR_EC >21-34	13.808	7.61%
Benzene	0.006	0.00%
Toluene		0.00%
Ethylbenzene		0.00%
Total Xylenes		0.00%
Naphthalene	0.032	0.02%
1-Methyl Naphthalene	0.13	0.07%
2-Methyl Naphthalene	0.12	0.07%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.032	0.02%
Benzo(b)fluoranthene	0.016	0.01%
Benzo(k)fluoranthene	0.016	0.01%
Benzo(a)pyrene	0.032	0.02%
Chrysene	0.032	0.02%
Dibenz(a,h)anthracene	0.032	0.02%
Indeno(1,2,3-cd)pyrene	0.032	0.02%
Sum	181.506	100.00%

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	1	Unitless

4. Target TPH Ground Water Concentration (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here: ug/L

Notes for Data Entry

Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:

B: ND at 1200 ug/kg

B: ND at 12U ug/kg re-analyzed out of hold, value input = 1/2 MRL

E: ND at 1200 ug/kg

T: ND at 1200 ug/kg

o-Xylenes: ND at 1200 ug/kg

m+p Xylenes: ND at 2400 ug/kg

MTBE ND at 1200 ug/kg

n-Hexane ND at 1200 ug/kg

VPH: all ND at 12000 ug/kg

EPH: ALC8-10 ND at 2400 ug/kg

EPH: AR8-10 ND at 2400 ug/kg

EPH: AR10-12 ND at 2400 ug/kg

Total benzofluoranthenes reported by lab

In calculation split between benzo(b) and benzo(k)

Values of N, 1&2 MN, and CPAHs were subtracted from the appropriate EC-Fraction to avoid double counting, eventhough the results at AR 8-10 and AR 10-12 were ND

DF=1, saturated.

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 1/31/2011
Site Name: Birds Eye Foods
Sample Name: B11-17-30
Measured Soil TPH Concentration, mg/kg: 181.506

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	417	4.36E-07	5.78E-02	Pass
	Method C	16,789	1.08E-07	4.71E-03	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	17	2.38E-05	3.62E+00	Fail
	Target TPH GW Conc. @ 500 ug/L	13	NA	NA	Fail

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	417.04	16,789.14
Most Stringent Criterion	Risk of cPAHs mixture= 1E-6	Total Risk=1E-5

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI=1	NO	3.14E+03	7.53E-06	1.00E+00	NO	3.86E+04	2.30E-05	1.00E+00
Total Risk=1E-5	NO	4.17E+03	1.00E-05	1.33E+00	YES	1.68E+04	1.00E-05	4.35E-01
Risk of Benzene= 1E-6	NO	5.49E+05	1.32E-03	1.75E+02	NA			
Risk of cPAHs mixture= 1E-6	YES	4.17E+02	1.00E-06	1.33E-01				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	HI=1
Protective Ground Water Concentration, ug/L	610.03
Protective Soil Concentration, mg/kg	17.02

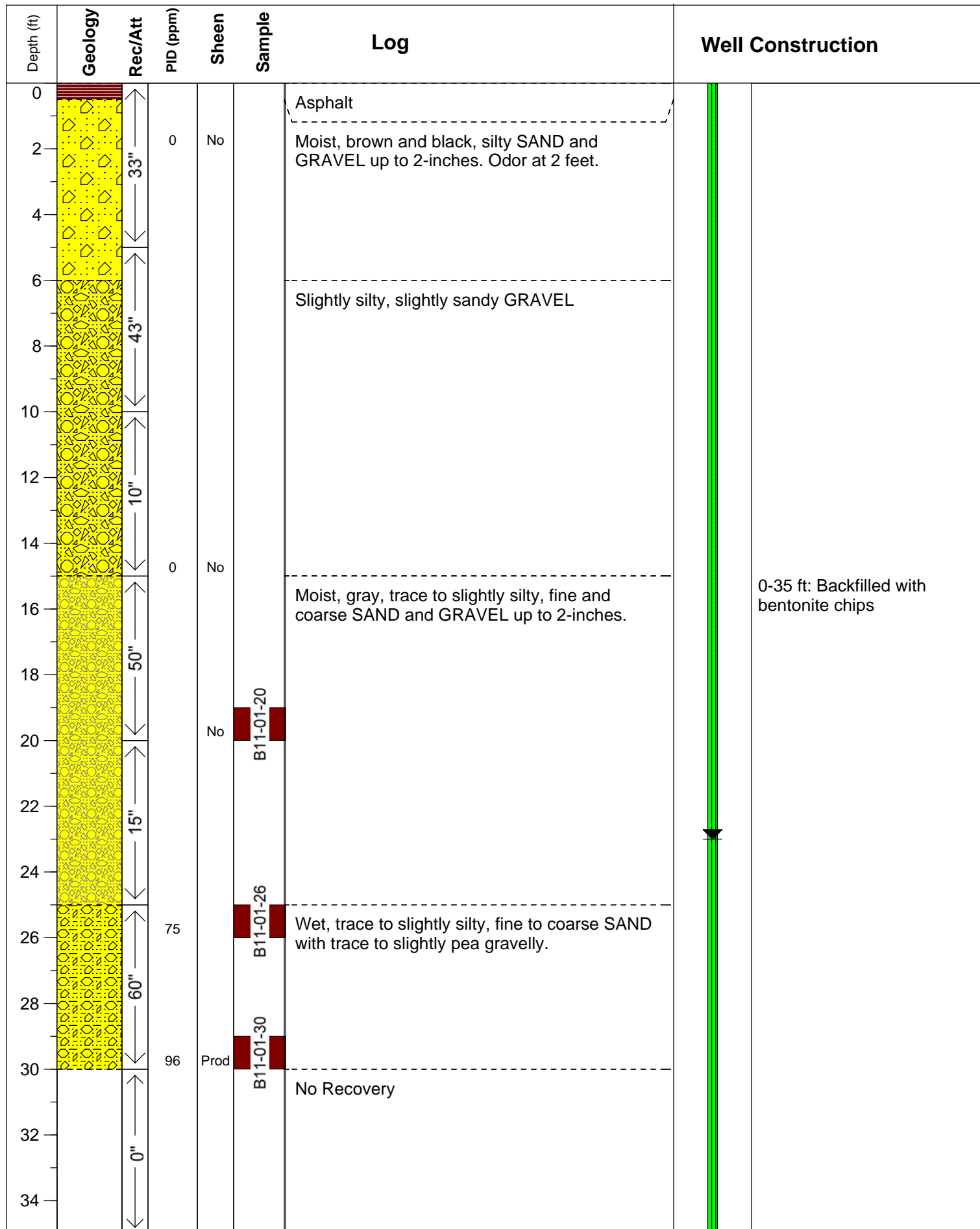
Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	6.10E+02	2.56E-06	1.00E+00	1.70E+01
Total Risk = 1E-5	NO	1.53E+03	1.00E-05	2.35E+00	7.03E+01
Total Risk = 1E-6	YES	2.72E+02	1.00E-06	4.61E-01	6.23E+00
Risk of cPAHs mixture= 1E-5	NO	5.00E+03	1.82E-04	8.86E+00	100% NAPL
Benzene MCL = 5 ug/L	NO	1.15E+03	6.33E-06	1.80E+00	4.36E+01
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 75000 mg/kg TPH.

3.2. Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	5.00E+02	1.98E-06	8.29E-01	1.30E+01

ATTACHMENT B BORING LOGS



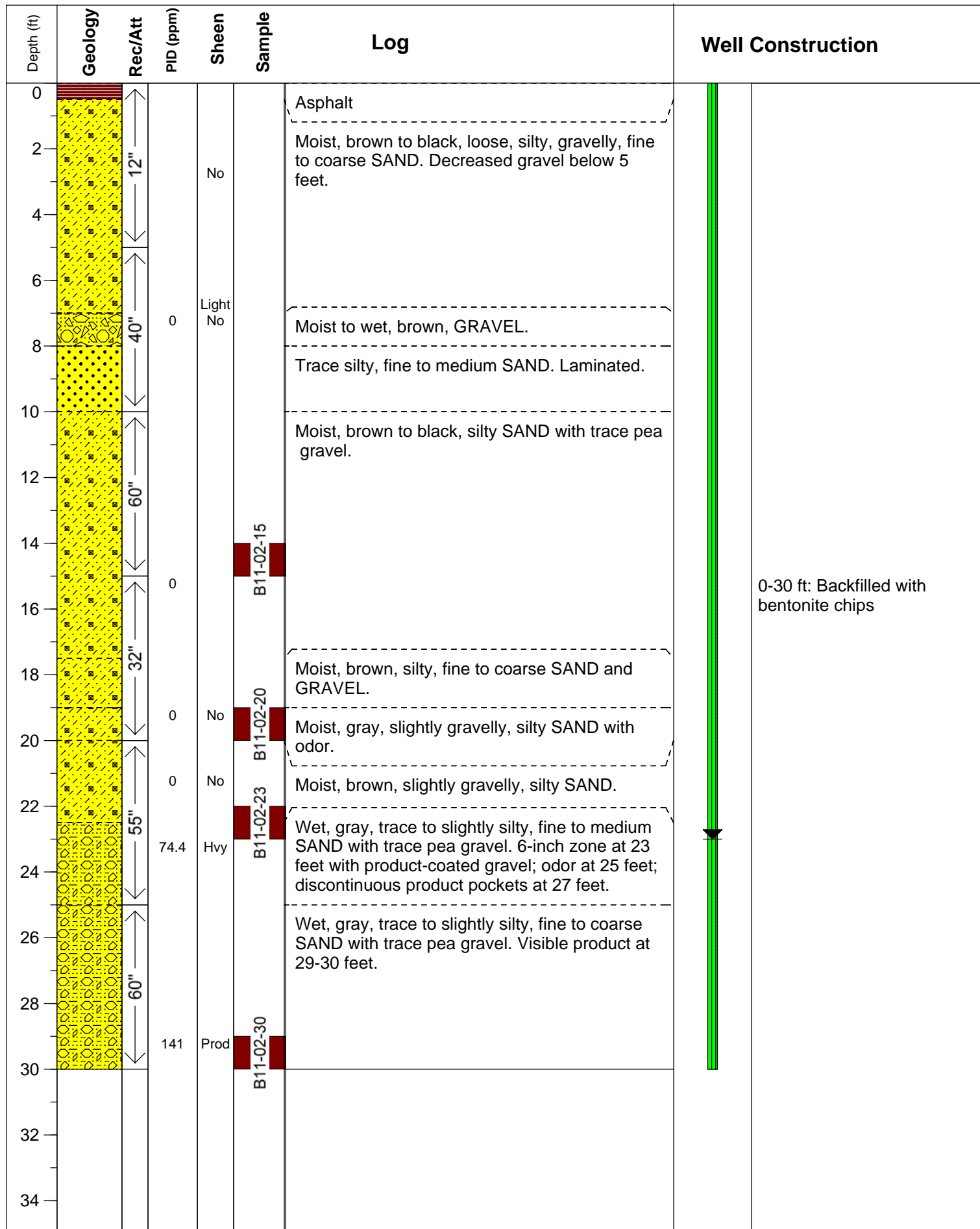
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 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-01
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 1
GEOLOGIC LOG AND AS-BUILT
FOR BOREHOLE B11-01

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





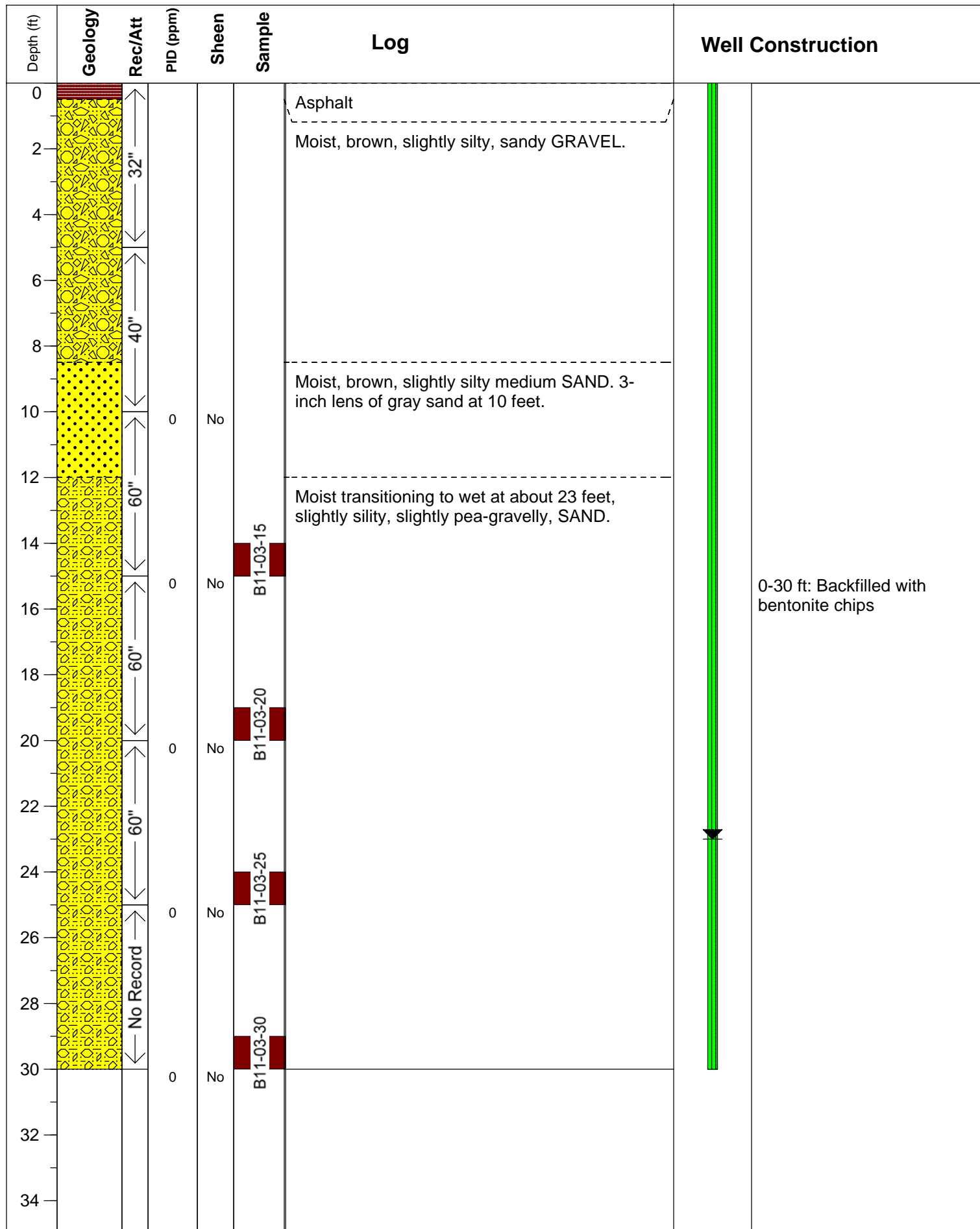
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-02
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 2 GEOLOGIC LOG AND AS-BUILT FOR BOREHOLE B11-02

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





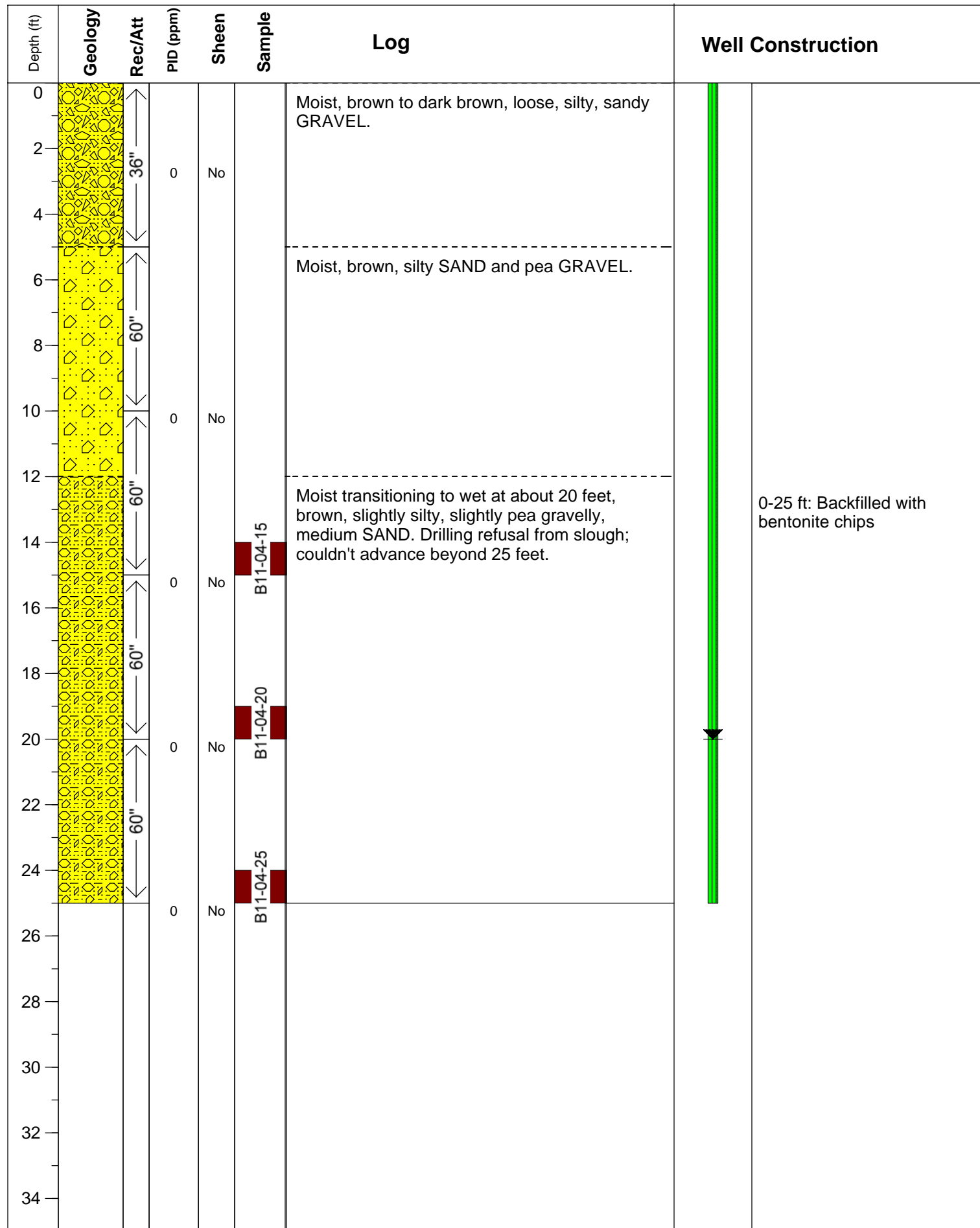
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-03
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 3
GEOLOGIC LOG AND AS-BUILT
FOR BOREHOLE B11-03

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





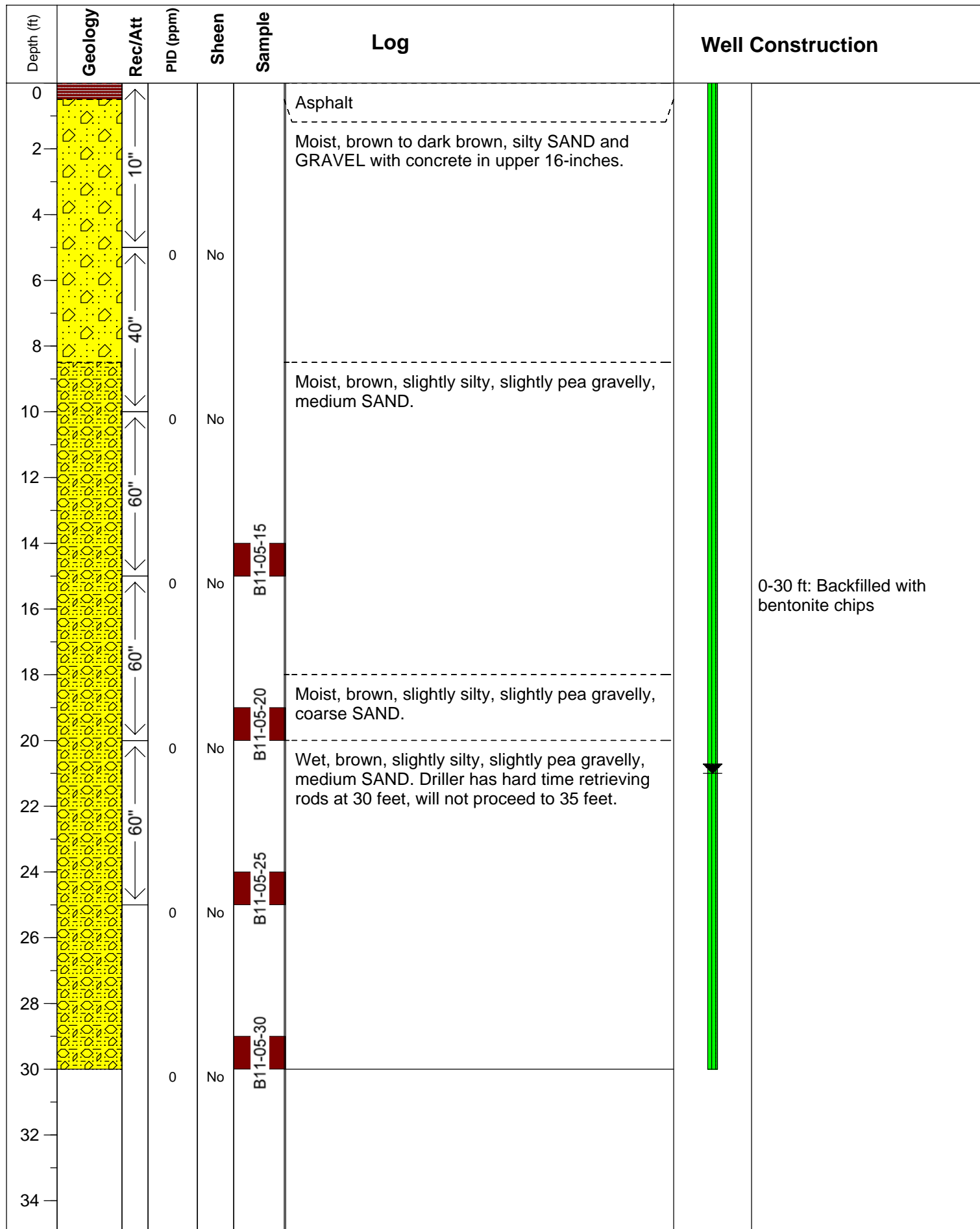
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-04
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 4
GEOLOGIC LOG AND AS-BUILT
FOR BOREHOLE B11-04

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





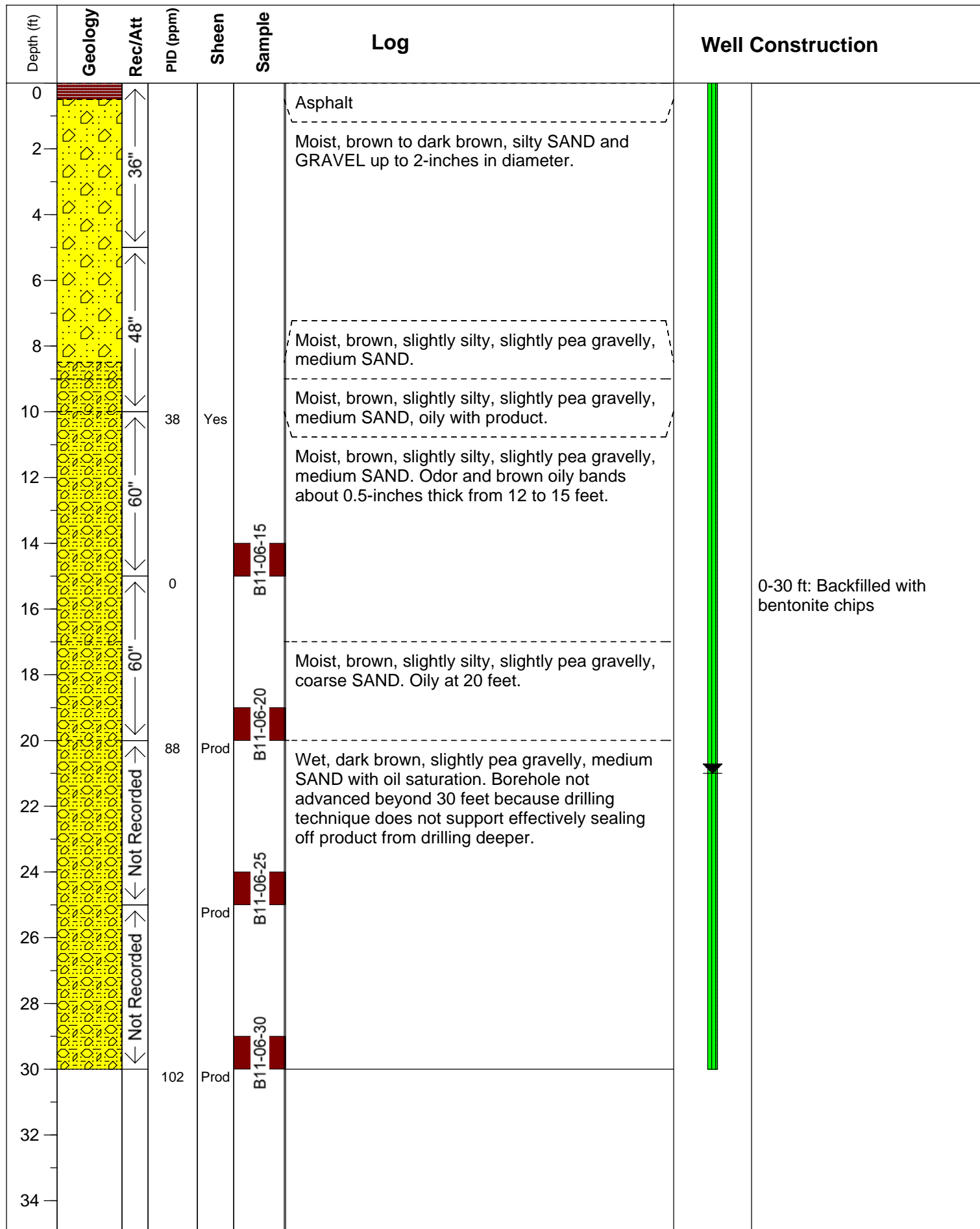
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-05
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 5 GEOLOGIC LOG AND AS-BUILT FOR BOREHOLE B11-05

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





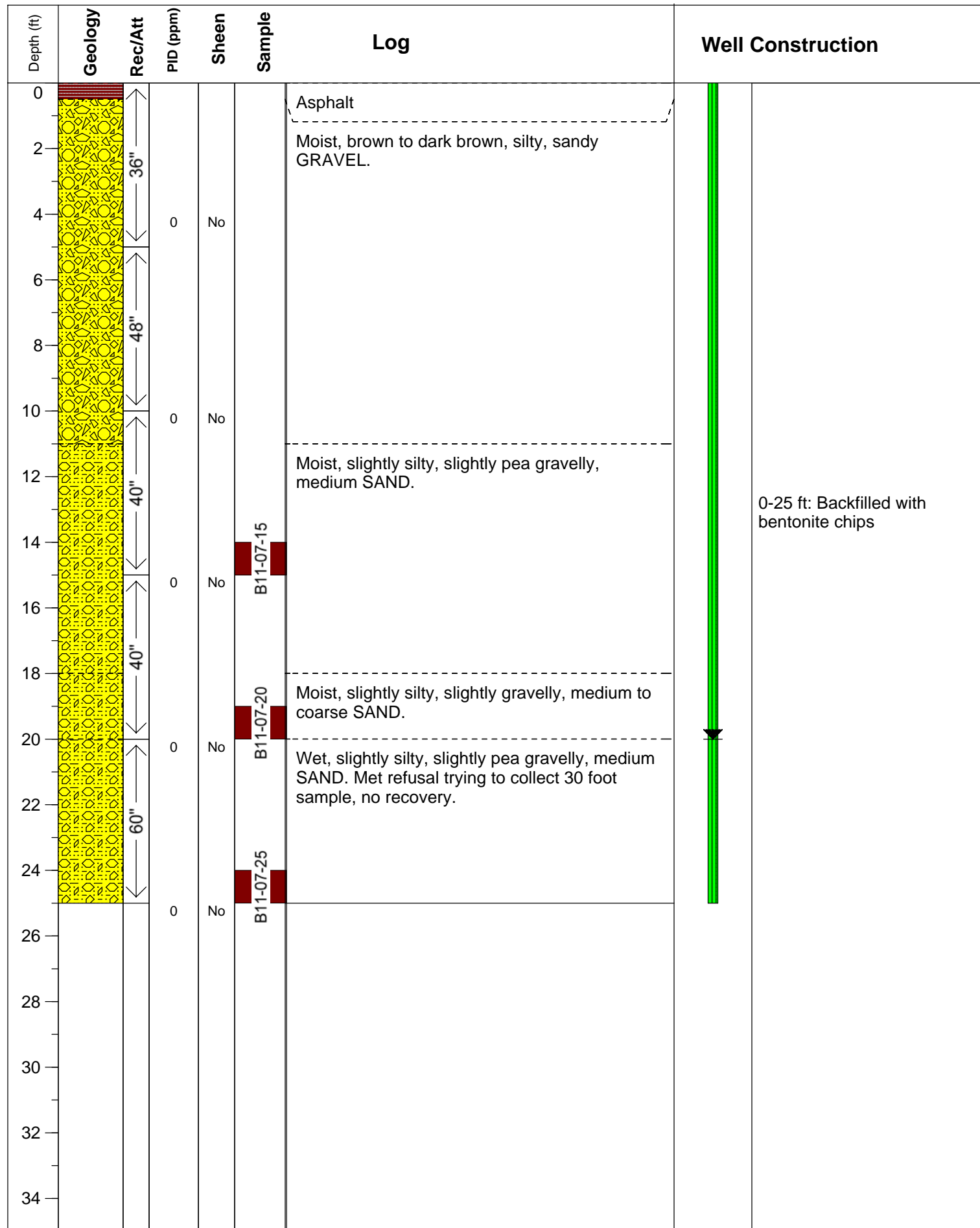
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-06
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 6 GEOLOGIC LOG AND AS-BUILT FOR BOREHOLE B11-06

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





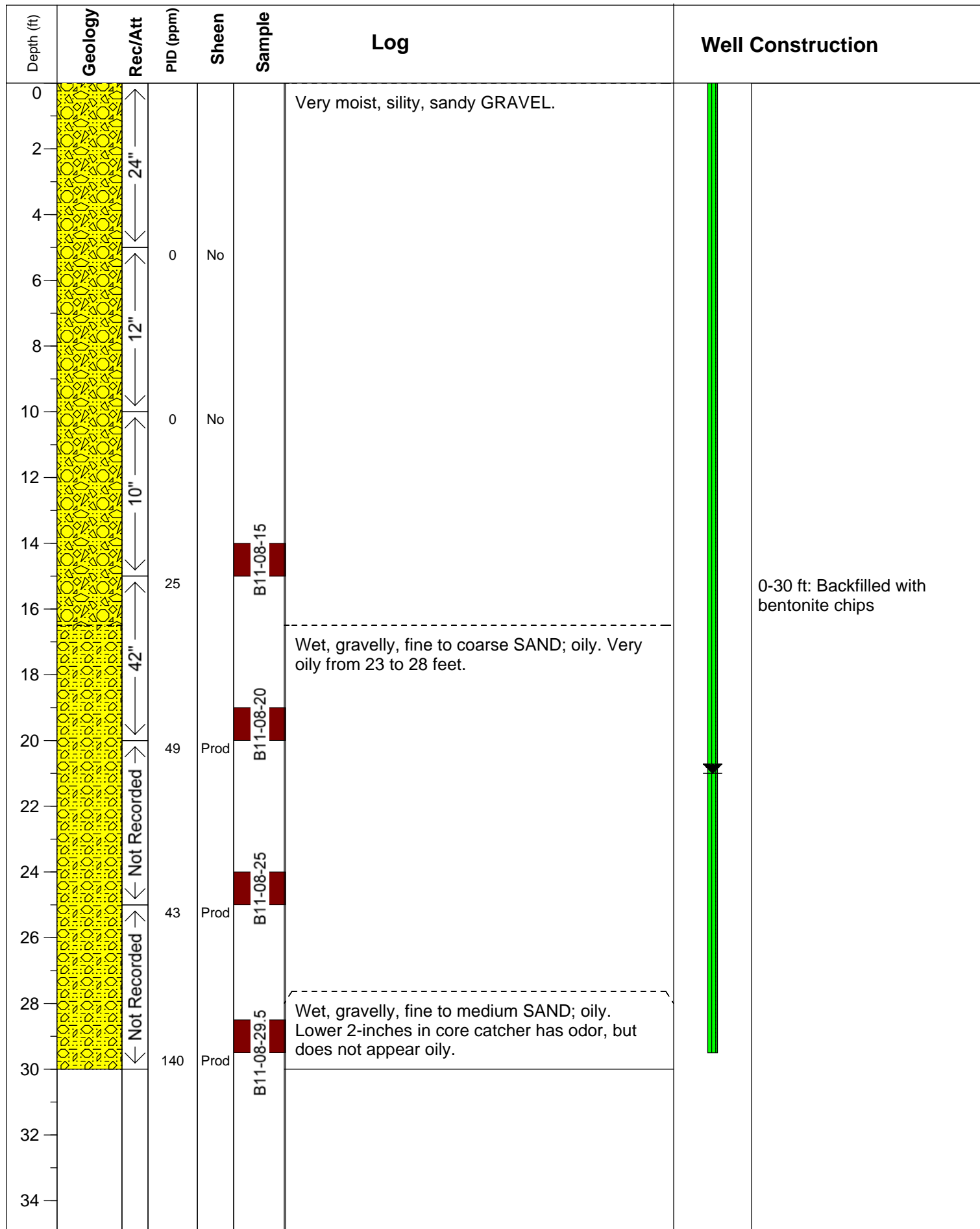
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-07
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 7 GEOLOGIC LOG AND AS-BUILT FOR BOREHOLE B11-07

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





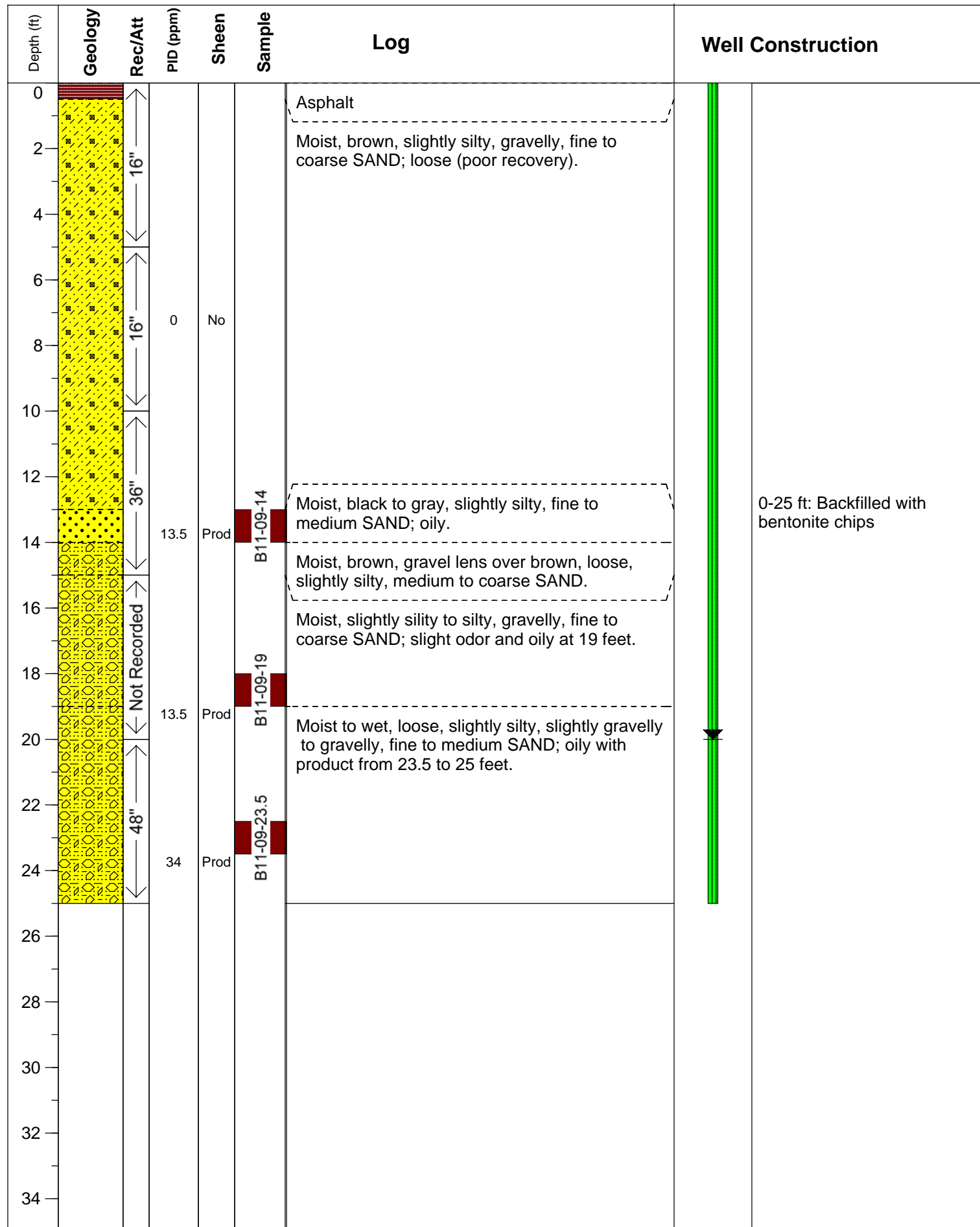
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-08
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 8
GEOLOGIC LOG AND AS-BUILT
FOR BOREHOLE B11-08

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





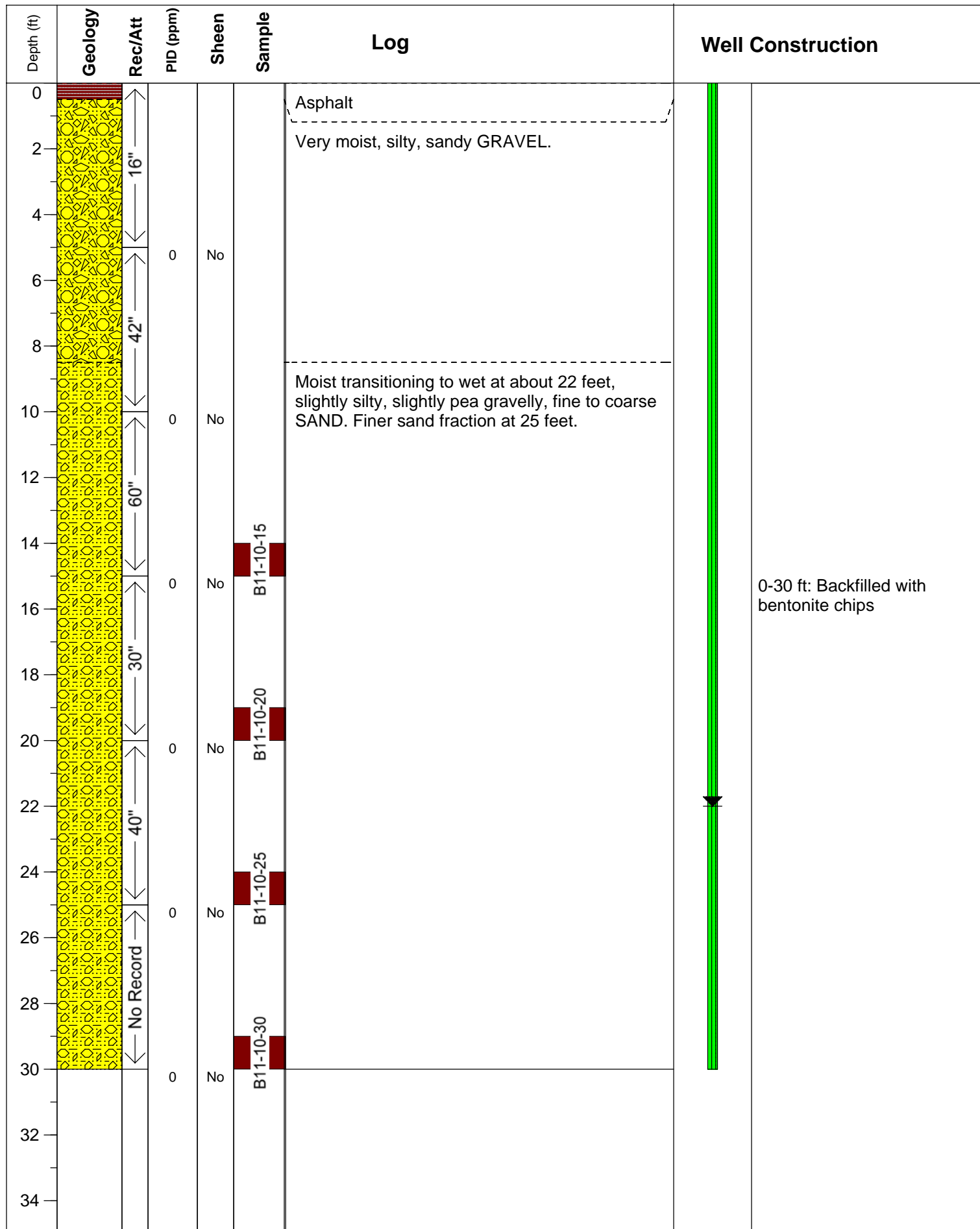
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-09
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 9
GEOLOGIC LOG AND AS-BUILT
FOR BOREHOLE B11-09

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





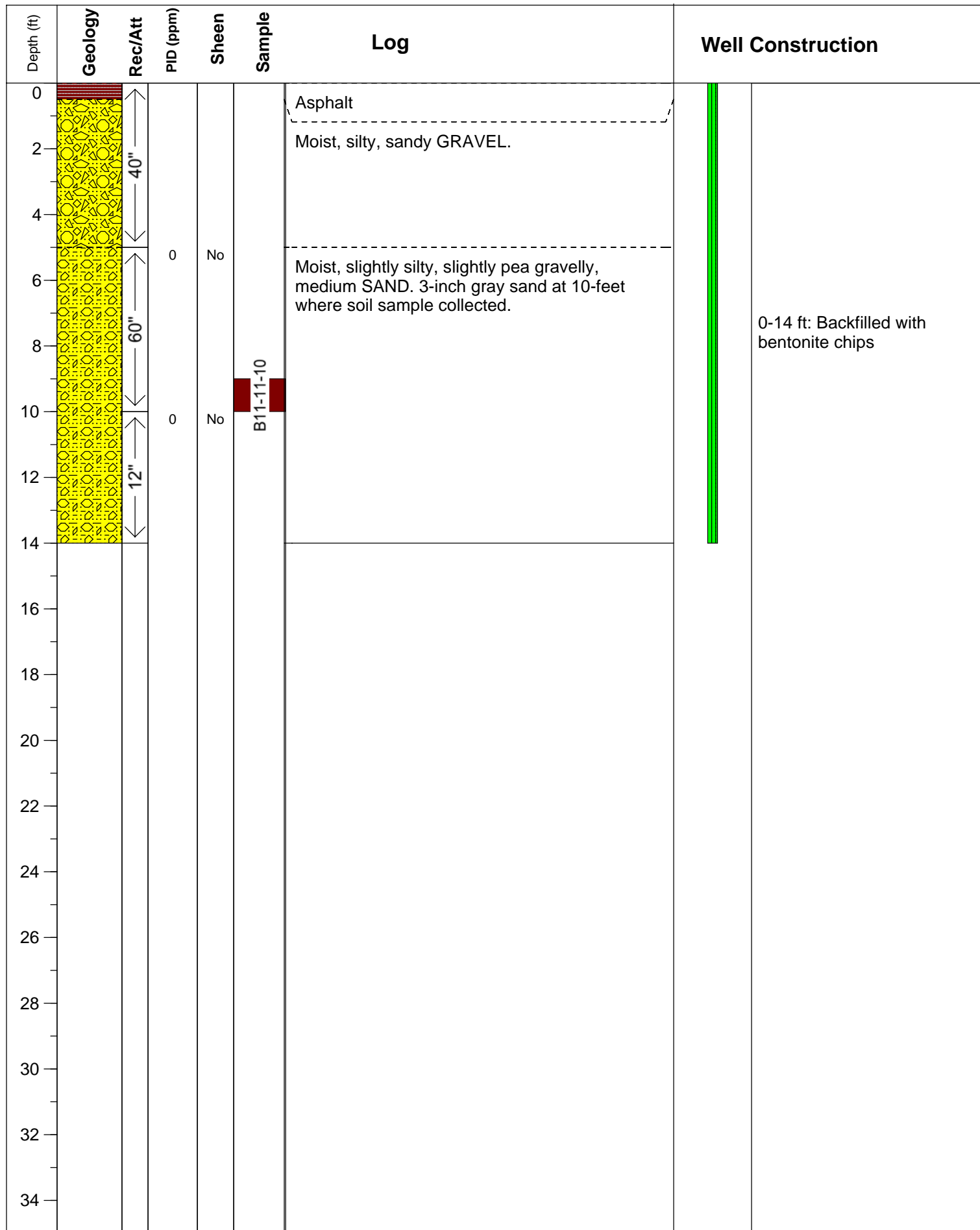
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-10
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 10 GEOLOGIC LOG AND AS-BUILT FOR BOREHOLE B11-10

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





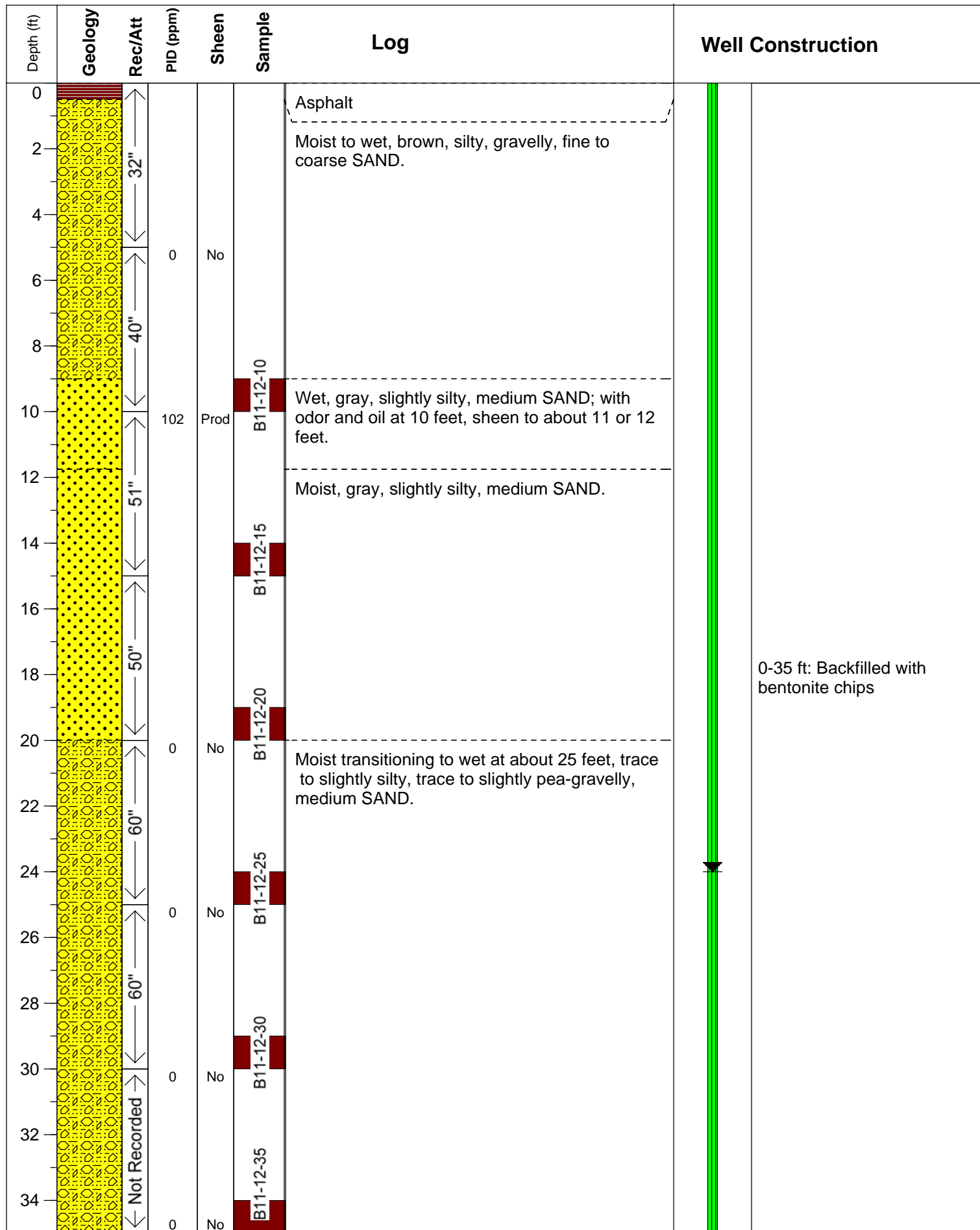
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-11
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 11
GEOLOGIC LOG AND AS-BUILT
FOR BOREHOLE B11-11

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





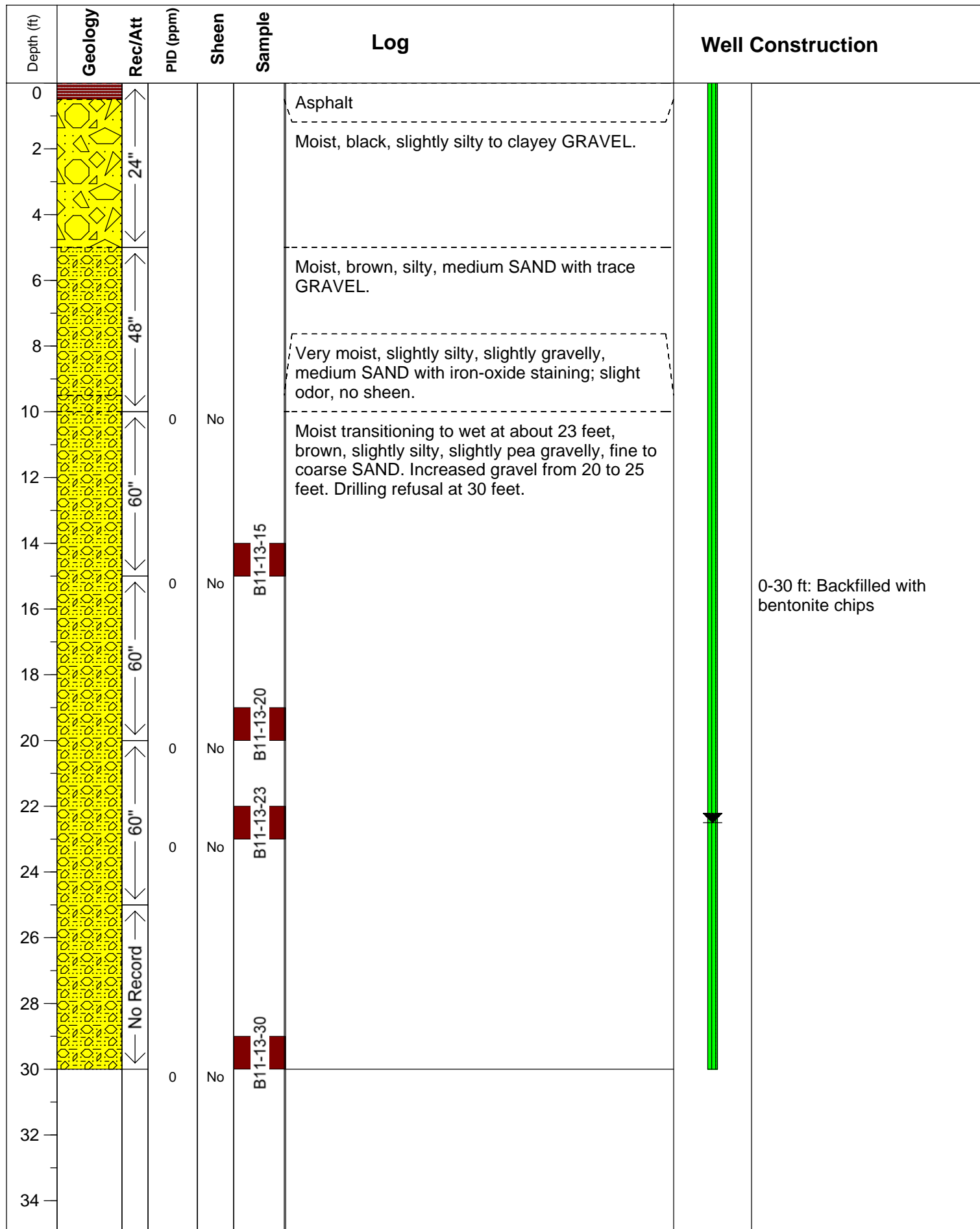
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-12
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 12 GEOLOGIC LOG AND AS-BUILT FOR BOREHOLE B11-12

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





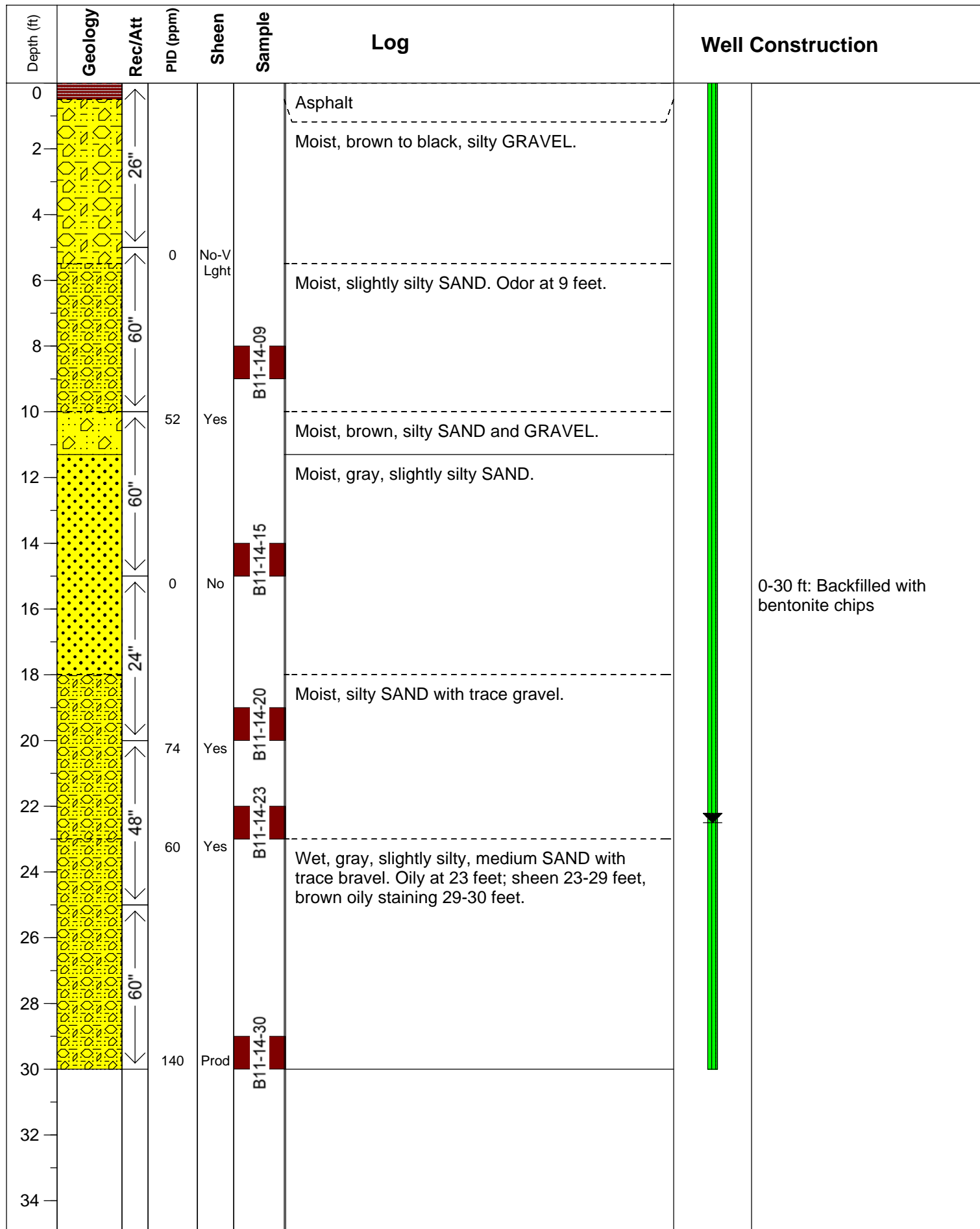
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-13
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 13 GEOLOGIC LOG AND AS-BUILT FOR BOREHOLE B11-13

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





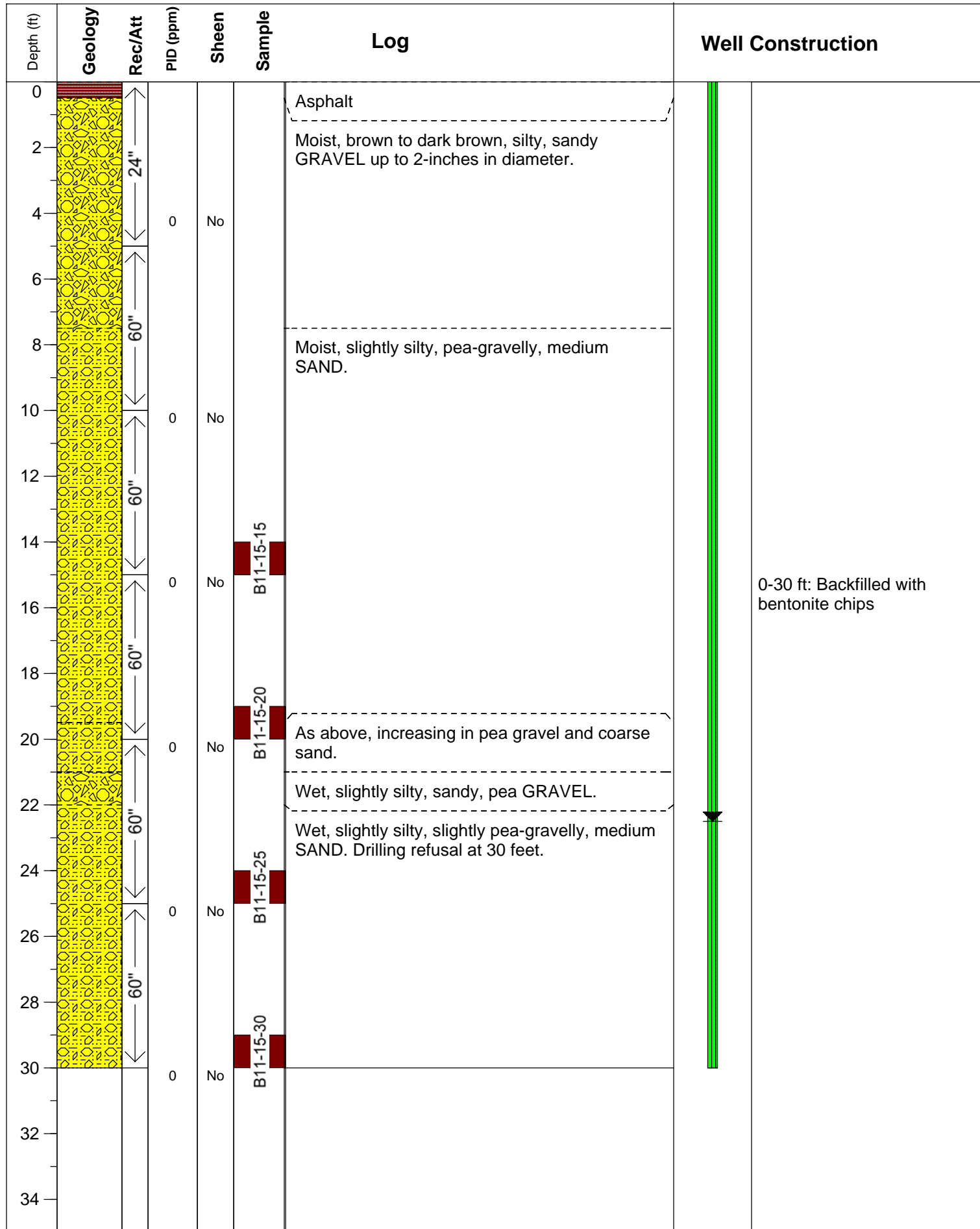
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-14
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 14
GEOLOGIC LOG AND AS-BUILT
FOR BOREHOLE B11-14

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





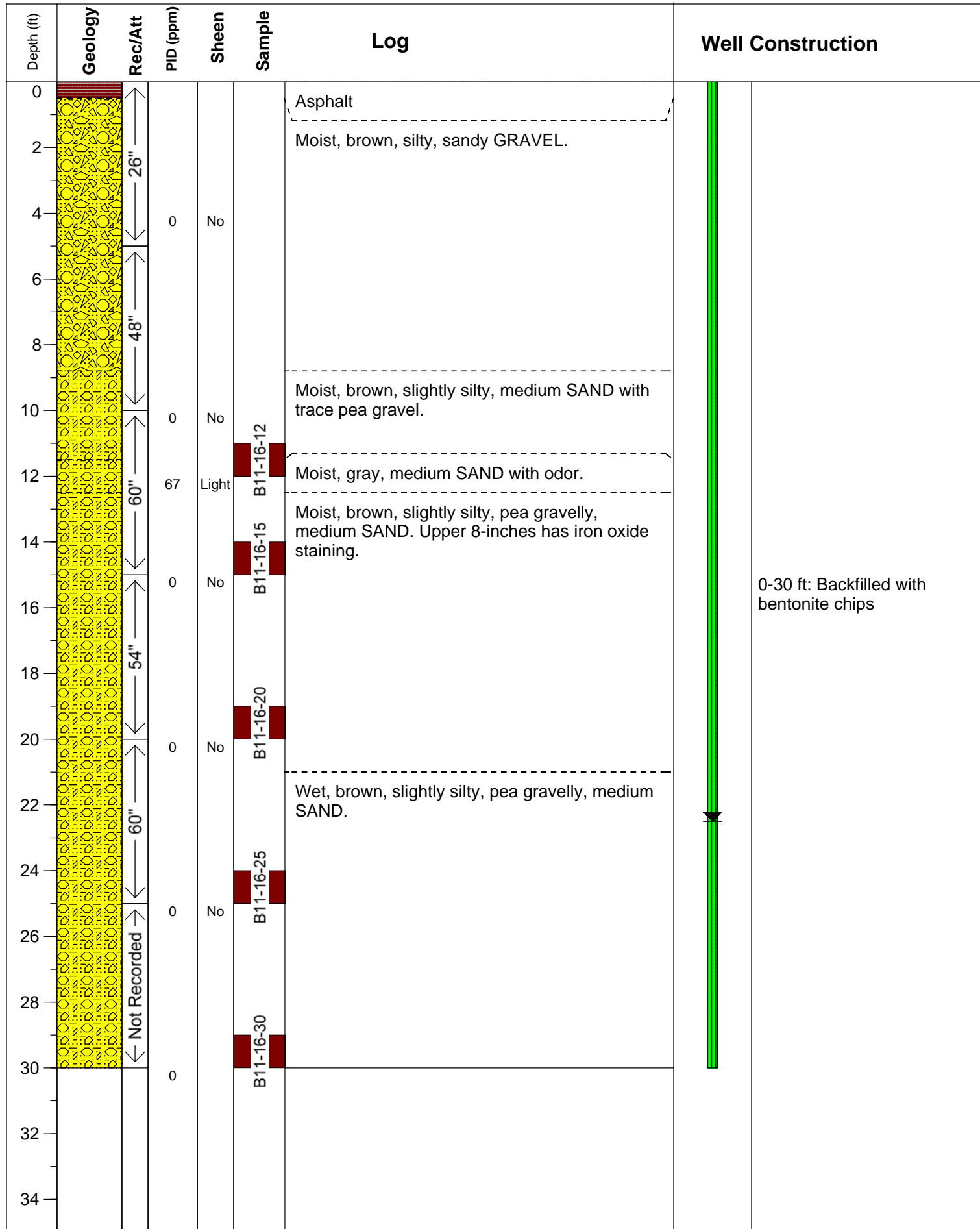
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-15
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 15
GEOLOGIC LOG AND AS-BUILT
FOR BOREHOLE B11-15

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





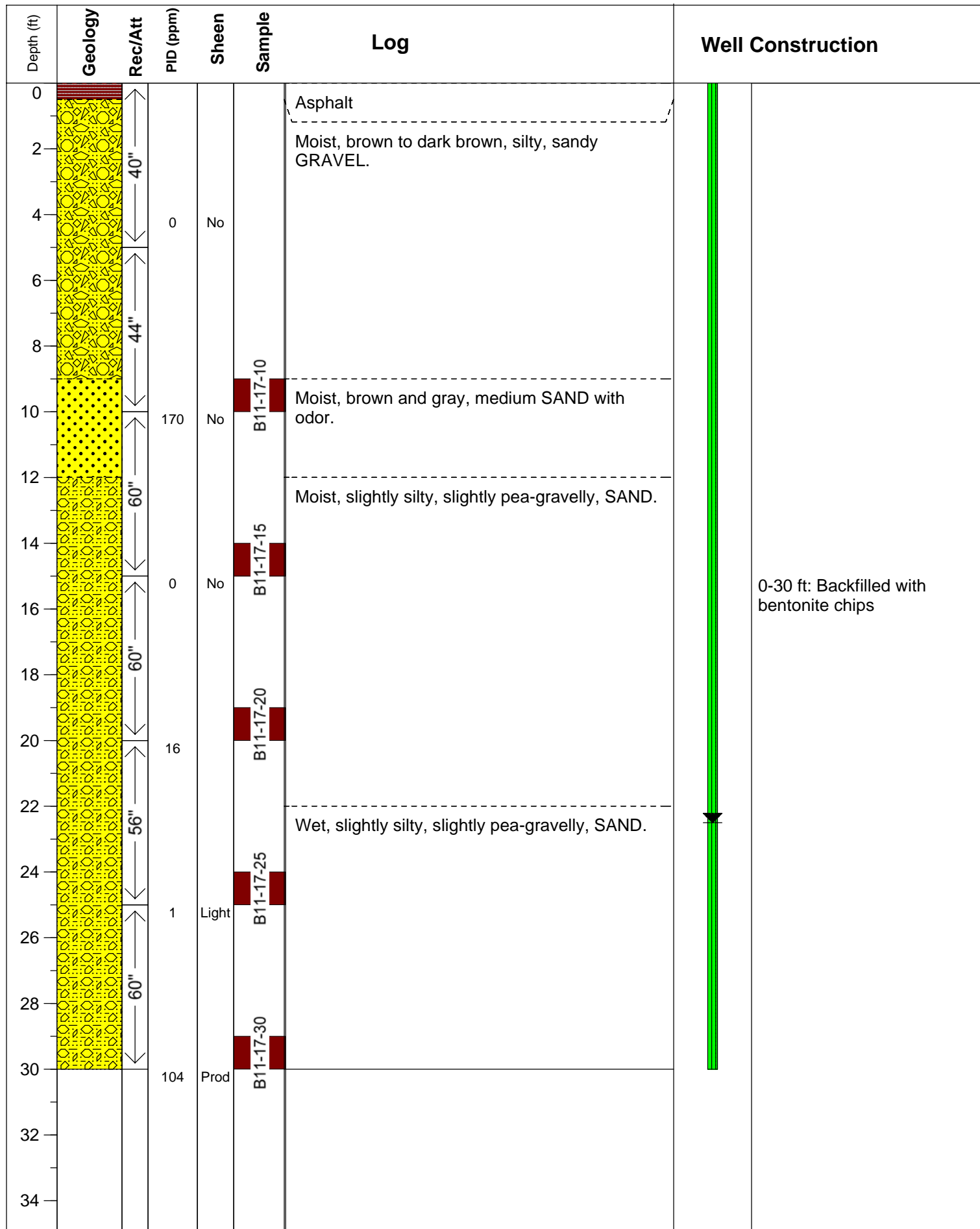
Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-16
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 16
GEOLOGIC LOG AND AS-BUILT
FOR BOREHOLE B11-16

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





Project Name: BEF 2011 Soil Investigation
 Drilling Method: GeoProbe
 Driller: Kasey Goble
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: J. Parker

Borehole Name: B11-17
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 1/31/2011
 DTW:

FIGURE 17
GEOLOGIC LOG AND AS-BUILT
FOR BOREHOLE B11-17

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011



**ATTACHMENT C
LAB ANALYTICAL REPORTS**

(SEE DIGITAL COPY OF BIRDS EYE FOODS 2011 RI/FS)



Analytical Resources, Incorporated
Analytical Chemists and Consultants

February 15, 2011

Inger Jackson
Pacific Groundwater Group
2377 Eastlake Ave. East, Suite 200
Seattle, WA 98102

Project: Birds Eye Soil JI1001
ARI ID: SH13

Dear Ms. Jackson:

Please find enclosed the original Chain of Custody record, sample receipt documentation, and the final data for the samples from the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. Should you have any questions or concerns, please feel free to call me at your convenience.

Respectfully,
ANALYTICAL RESOURCES, INC.

Eric Branson
Project Manager
(206) 695-6213
eric@arilabs.com
www.arilabs.com



Case Narrative

- Sample Receipt & Analytical Details -

Sample Receipt

Analytical Resources, Inc. accepted twenty soil samples intact on February 2, 2011. Select containers arrived at -1.6°C, but volume was noted to not be frozen. For further details regarding sample receipt please refer to the enclosed Cooler Receipt Form.

Selected samples were analyzed for the parameters listed below, as requested on the Chain of Custody.

Benzene by 8260C SIM was not originally requested, but was added to select required samples in order to meet reporting requirements, per client approval.

Benzene by EPA Method 8260C SIM (Selected Ion Monitoring)

There were no irregularities with this analysis.

8021 BETX + Gasoline Range Organics by NWTPH-G

Benzene was out of control high in both the LCS and LCSD. The LCS and LCSD met overall acceptance criteria. Benzene was not detected in any of the samples.

There were no other irregularities with this analysis.

Diesel Range Organics (Extended) by NWTPH-Dx

The surrogate was diluted beyond recovery for samples "B11-01-30," "B11-02-23.5," and "B11-02-30" due to the high dilution level necessary to properly quantify detections within a reportable range.

There were no other irregularities with this analysis.



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 \geq the Reporting Limit
- N** Matrix Spike recovery not within established control limits
- NA** Not Applicable, analyte not spiked
- H** The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L** Analyte concentration is ≤ 5 times the Reporting Limit and the replicate control limit defaults to ± 1 RL instead of the normal 20% RPD

Organic Data

- U** Indicates that the target analyte was not detected at the reported concentration
- *** Flagged value is not within established control limits
- B** Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J** Estimated concentration when the value is less than ARI's established reporting limits
- D** The spiked compound was not detected due to sample extract dilution
- E** Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
- 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.
- Y 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 $\geq 40\%$ 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



Analytical Resources, Incorporated
Analytical Chemists and Consultants

- 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

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: SH13	Turn-around Requested: Standard	Page: 1 of 1
ARI Client Company: Pacific Groundwater Group	Phone: 206 329 0141	Date: 2/2/11
Client Contact: Inger Jackson	Cooler Temps: No. of Coolers:	

Client Project Name: Birds Eye Soil	Sampers: J. Jackson, J. Parker
Client Project #: J11001	

Sample ID	Date	Time	Matrix	No. Containers
B11-01-20	1/31/11	1055	Soil	4
B11-01-26	1/31/11	1124		1
B11-01-30	1/31/11	1110		4
B11-02-15	1/31/11	945		1
B11-02-20	1/31/11	1000		1
B11-02-23.5	1/31/11	1005		1
B11-02-30	1/31/11	1015		1
B11-03-15	1/31/11	1500		1
B11-03-20	1/31/11	1505		1
B11-03-24	1/31/11	1515		3

Comments/Special Instructions	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>
	Printed Name: A. Veigardsen	Printed Name:
	Company: ARI	Company:
	Date & Time: 2/2/11 1035	Date & Time: 2/2/11 1035

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.

SH13:00006



Analytical Resources, Incorporated
Analytical Chemists and Consultants
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: SH13	Turn-around Requested: Standard	Page: 2 of
ARI Client Company: Pacific Groundwater Group	Phone: 206 329 0141	Date: 2/2/11
Client Contact: Inger Jackson		No. of Coolers: Cooler Temps:



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				Notes/Comments
					NUTRA-Q/ BETX	Total Bridg	VPH	EPH	
B11-03-05	1/31/11	1511	Soil	1	1				
B11-03-28	1/31/11	1520		1	1				
B11-04-15	2/1/11	830		1	1				
B11-04-20	2/1/11	833		1	1				
B11-04-25	2/1/11	843		1	1				
B11-05-15	2/1/11	1236		1	1				
B11-05-20	2/1/11	1242		1	1				
B11-05-25	2/1/11	1247		1	1				
B11-05-30	2/1/11	1250		1	1				
B11-06-15	2/1/11	1120		4	1	2	1		
Comments/Special Instructions	Relinquished by: (Signature) <i>Inger Jackson</i> Printed Name: Inger Jackson Company: ARI Date & Time: 2/2/11				Received by: (Signature) <i>A. Volgardsen</i> Printed Name: A. Volgardsen Company: ARI Date & Time: 2/2/11 1035				

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.

SH13: 00007



Cooler Receipt Form

ARI Client: PLG

Project Name: Birds Eye Soil

COC No(s): _____

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: SH13

Tracking No: _____

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) 0.8 -1.6 1.6

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90941619

Cooler Accepted by: AV Date: 2/2/11 Time: 1035

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: _____

Was Sample Split by ARI: NA YES ☐ Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: MM Date: 2/2/11 Time: 1130

**** 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 cooler out of temp compliance (-1.6) however samples were not frozen.

By: _____ Date: _____

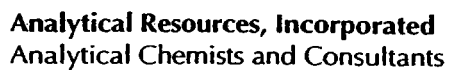


Small → "sm"

Peabubbles → "pb"

Large → "lg"

Headspace → "hs"



Cooler Temperature Compliance Form

00070F

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: B11-01-30
Page 1 of 1 **SAMPLE**

Lab Sample ID: SH13C

LIMS ID: 11-2101

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/14/11

QC Report No: SH13-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: 01/31/11

Date Received: 02/02/11

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 19:49

Sample Amount: 20.2 mg-dry-wt

Purge Volume: 10.0 mL

Moisture: 13.5%

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	9.9	< 9.9	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane 102%

SW8260-SIM SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH13-Pacific Groundwater Group
Project: Birds Eye Soil
JI1001

<u>Client ID</u>	<u>DCE</u>	<u>TOT OUT</u>
MB-020911	116%	0
LCS-020911	102%	0
B11-01-30	102%	0

	<u>LCS/MB LIMITS</u>	<u>QC LIMITS</u>
(DCE) = d4-1,2-Dichloroethane	(30-160)	(30-160)

Prep Method: SW5030
Log Number Range: 11-2101 to 11-2101

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: LCS-020911

Page 1 of 1

LAB CONTROL SAMPLE

Lab Sample ID: LCS-020911

LIMS ID: 11-2101

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/14/11

QC Report No: SH13-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: NA

Date Received: NA

Instrument/Analyst LCS: NT7/PKC

Date Analyzed LCS: 02/09/11 14:33

Sample Amount LCS: 20.0 mg-dry-wt

Purge Volume LCS: 10.0 mL

Analyte	LCS	Spike Added	Recovery
Benzene	420	500	84.0%

Reported in µg/kg (ppb)

NA-No recovery due to high concentration of analyte in original sample,
calculated negative recovery, or undetected spike.

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: MB-020911

Page 1 of 1

METHOD BLANK

Lab Sample ID: MB-020911

LIMS ID: 11-2101

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/14/11

QC Report No: SH13-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: NA

Date Received: NA

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 15:24

Sample Amount: 20.0 mg-dry-wt

Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	10	< 10	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane 116%

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: B11-01-20

SAMPLE

Lab Sample ID: SH13A

LIMS ID: 11-2099

Matrix: Soil

Data Release Authorized: *AS*

Reported: 02/14/11

QC Report No: SH13-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 15:39

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 93 mg-dry-wt

Percent Moisture: 9.6%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	13	< 13 U
108-88-3	Toluene	13	< 13 U
100-41-4	Ethylbenzene	13	< 13 U
179601-23-1	m,p-Xylene	27	< 27 U
95-47-6	o-Xylene	13	< 13 U

Gasoline Range Hydrocarbons	5.4	< 5.4 U	GAS ID ---
-----------------------------	-----	---------	---------------

BETX Surrogate Recovery

Trifluorotoluene	100%
Bromobenzene	101%

Gasoline Surrogate Recovery

Trifluorotoluene	99.1%
Bromobenzene	113%

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.

2/14/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a022.d ARI ID: SH13A
Data file 2: /chem3/pid2.i/020411-2.b/0204a022.d Client ID: B11-01-20
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 15:39
Instrument: pid2.i Matrix: SOIL
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.143	0.015	4000	50445	99.1	TFT(Surr)
14.756	0.002	2818	26325	113.2	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	43129	0.094
8015B 2MP-TMB (4.81 to 15.47)	907748	35592	0.039
AK101 nC6-nC10 (5.25 to 14.35)	626837	11375	0.018
NWTPHG Tol-Nap (9.88 to 18.21)	481270	43553	0.090

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
8.170	0.014	2422	100.3	TFT(Surr)
14.771	0.002	6675	100.6	BB(Surr)

SW8021 (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/pid2.i/020411-1.b/0204s022.d

Date : 04-FEB-2011 15:39

Client ID: B11-01-20

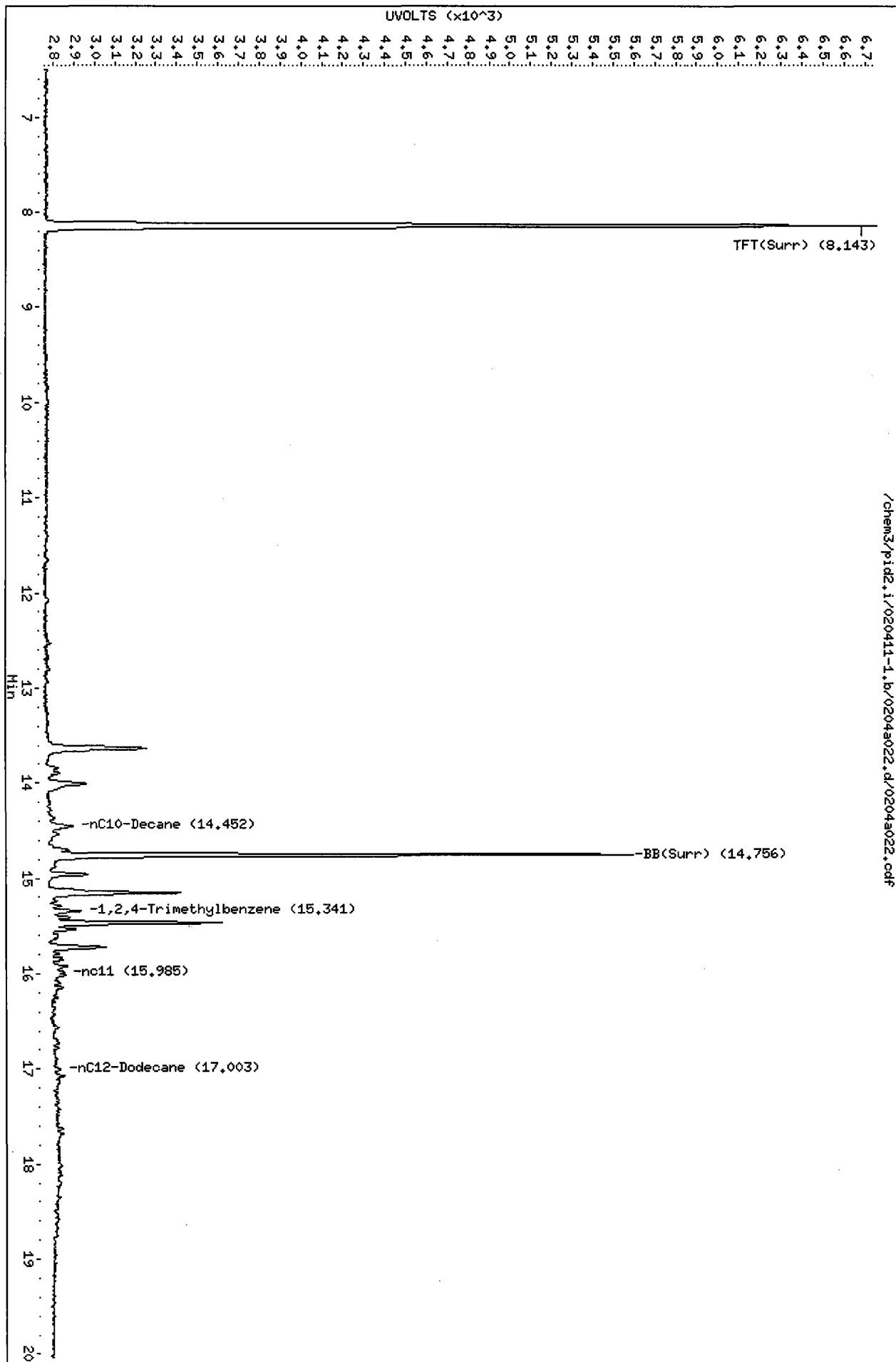
Sample Info: SH13A

Instrument: pid2.i

Operator: MH

Column diameter: 0.18

Column phase: RTX 502-2 FID



Data File: /chem3/pid2.i/020411-2.b/0204a022.d

Date : 04-FEB-2011 15:39

Client ID: B11-01-20

Sample Info: SH13A

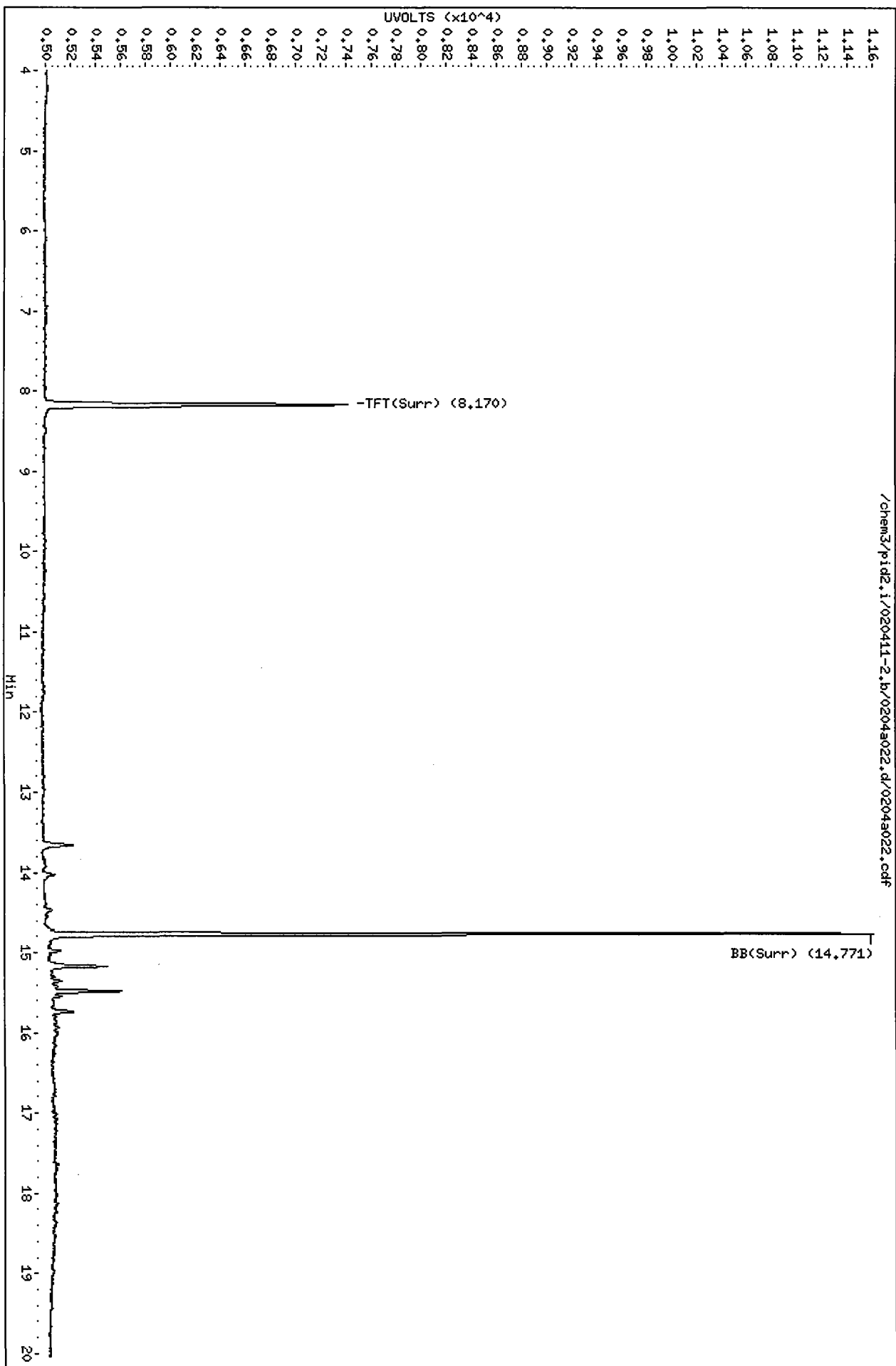
Column phase: RTX 502-2 PID

Instrument: pid2.i

Operator: HH

Column diameter: 0.18

Page 1



SH13 : 00017

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: B11-01-30

SAMPLE

Lab Sample ID: SH13C

LIMS ID: 11-2101

Matrix: Soil

Data Release Authorized:

Reported: 02/14/11

QC Report No: SH13-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 16:07

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 10 mg-dry-wt

Percent Moisture: 13.5%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	130	< 130 U
108-88-3	Toluene	130	< 130 U
100-41-4	Ethylbenzene	130	< 130 U
179601-23-1	m,p-Xylene	250	2,000
95-47-6	o-Xylene	130	690

Gasoline Range Hydrocarbons	50	1,900	GAS ID GRO
-----------------------------	----	-------	---------------

BETX Surrogate Recovery

Trifluorotoluene	99.2%
Bromobenzene	103%

Gasoline Surrogate Recovery

Trifluorotoluene	97.9%
Bromobenzene	117%

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
2/14/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a023.d	ARI ID: SH13C
Data file 2: /chem3/pid2.i/020411-2.b/0204a023.d	Client ID: B11-01-30
Method: /chem3/pid2.i/020411-2.b/PIDB.m	Injection Date: 04-FEB-2011 16:07
Instrument: pid2.i	Matrix: SOIL
Gas Ical Date: 27-JAN-2011	Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011	

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
---	-----	-----	-----	-----	-----
8.131	0.003	3950	51713	97.9	TFT(Surr)
14.753	0.000	2910	28294	116.9	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
-----	----	-----	-----
WAGas Tol-C12 (9.88 to 17.08)	460088	1376621	2.992 M
8015B 2MP-TMB (4.81 to 15.47)	907748	791698	0.872 M
AK101 nC6-nC10 (5.25 to 14.35)	626837	481645	0.768 M
NWTPHG Tol-Nap (9.88 to 18.21)	481270	1790000	3.719 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
---	-----	-----	-----	-----
8.158	0.002	2396	99.2	TFT(Surr)
14.770	0.000	6841	103.1	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
---	-----	-----	-----	-----
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
12.688	-0.005	634	3.95	M/P-Xylene
13.497	-0.012	201	1.38	O-Xylene
ND	---	---	---	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

SH13:00019

Data File: /chem3/pid2.i/020411-1.b/0204s023.d

Date : 04-FEB-2011 16:07

Client ID: B11-01-30

Sample Info: SH13C

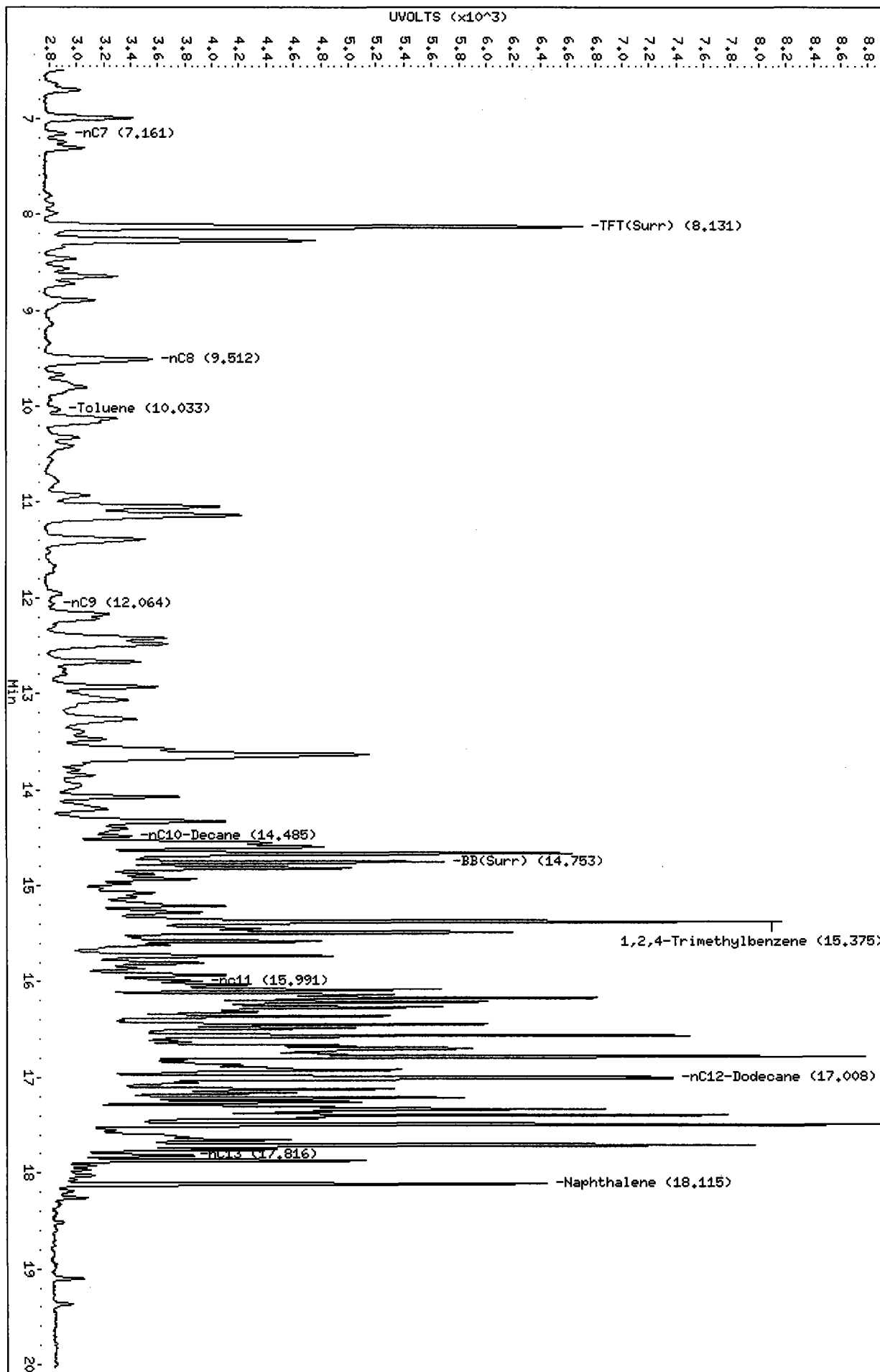
Instrument: pid2.i

Operator: MH

Column diameter: 0.18

Column phase: RTX 502-2 FID

/chem3/pid2.i/020411-1.b/0204s023.d/0204s023.cdf



Data File: /chem3/pid2.i/020411-2.b/0204a023.d

Date : 04-FEB-2011 16:07

Client ID: B11-01-30

Sample Info: SH13C

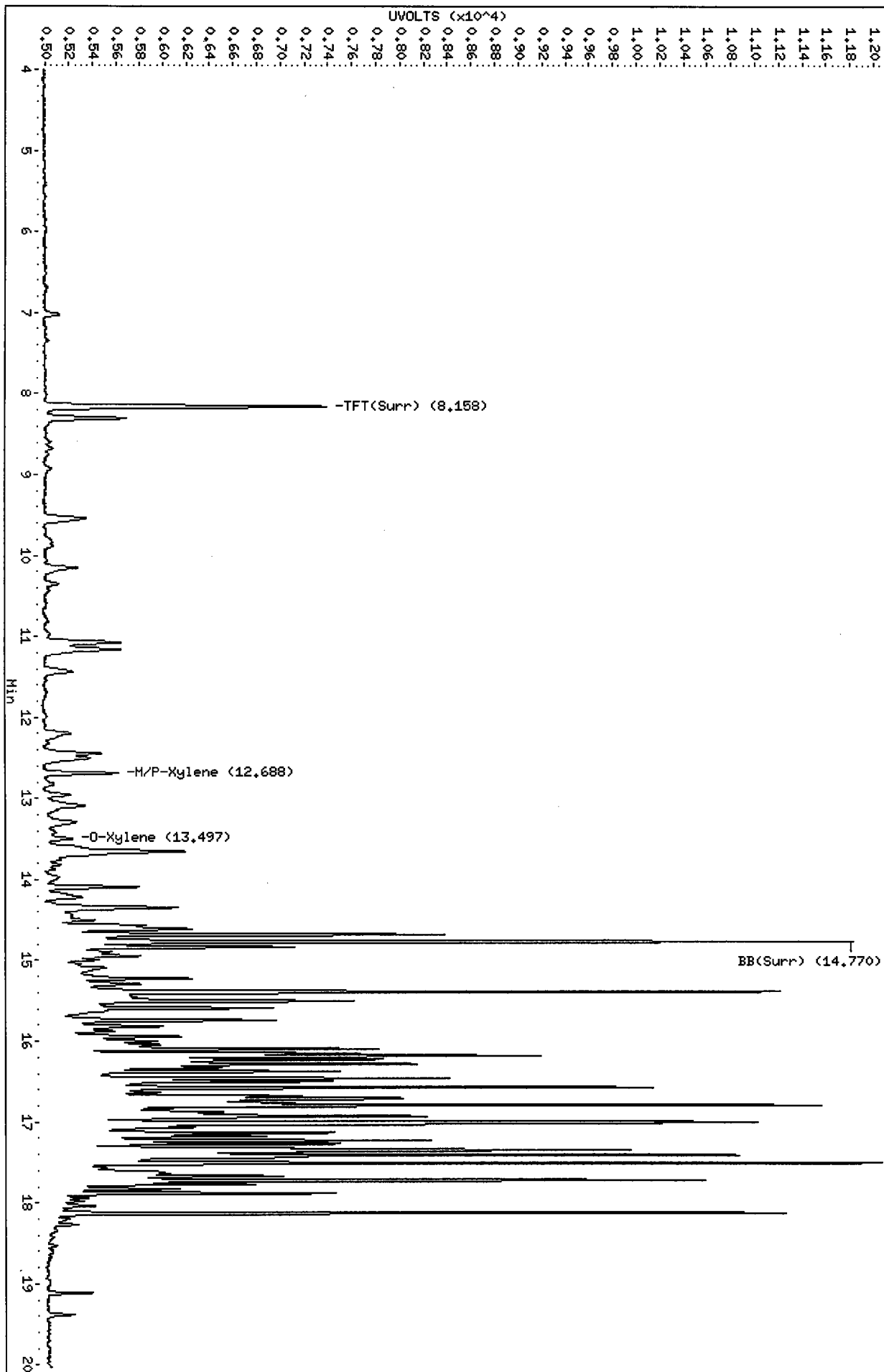
Instrument: pid2.i

Operator: HH

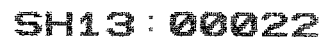
Column diameter: 0.18

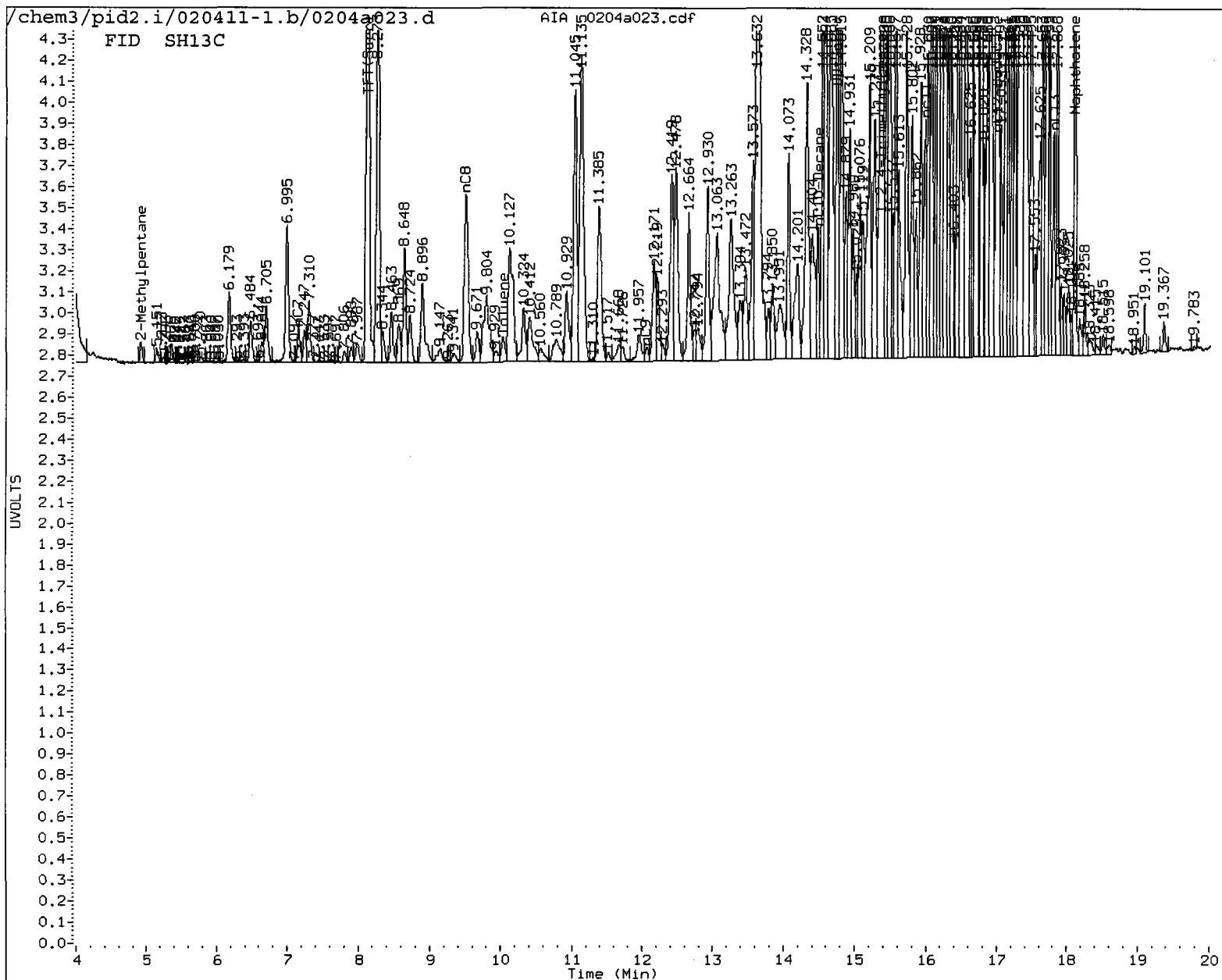
Column phase: RTX 502-2 PID

/chem3/pid2.i/020411-2.b/0204a023.d/0204a023.cdf



AIA 0204a023.cdf: -0.507 to 20.711 Mm






ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: B11-03-24
SAMPLE

Lab Sample ID: SH13J

LIMS ID: 11-2108

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH13-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 14:15

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 74 mg-dry-wt

Percent Moisture: 15.7%

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	34	< 34 U
95-47-6	o-Xylene	17	< 17 U

Gasoline Range Hydrocarbons	6.8	< 6.8 U	GAS ID ---
-----------------------------	-----	---------	---------------

BETX Surrogate Recovery

Trifluorotoluene	99.4%
Bromobenzene	95.4%

Gasoline Surrogate Recovery

Trifluorotoluene	99.0%
Bromobenzene	95.2%

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.

2/14/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a019.d ARI ID: SH13J
Data file 2: /chem3/pid2.i/020411-2.b/0204a019.d Client ID: B11-03-24
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 14:15
Instrument: pid2.i Matrix: SOIL
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.130	0.002	3994	51095	99.0	TFT(Surr)
14.753	0.000	2371	20142	95.2	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	0	0.000
8015B 2MP-TMB (4.81 to 15.47)	907748	0	0.000
AK101 nC6-nC10 (5.25 to 14.35)	626837	0	0.000
NWTPHG Tol-Nap (9.88 to 18.21)	481270	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

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.158	0.001	2400	99.4	TFT(Surr)
14.769	0.000	6328	95.4	BB(Surr)

SW8021 (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

SH13:00025

Data File: /chem3/pid2.i/020411-1.b/0204a019.d

Page 1

Date : 04-FEB-2011 14:15

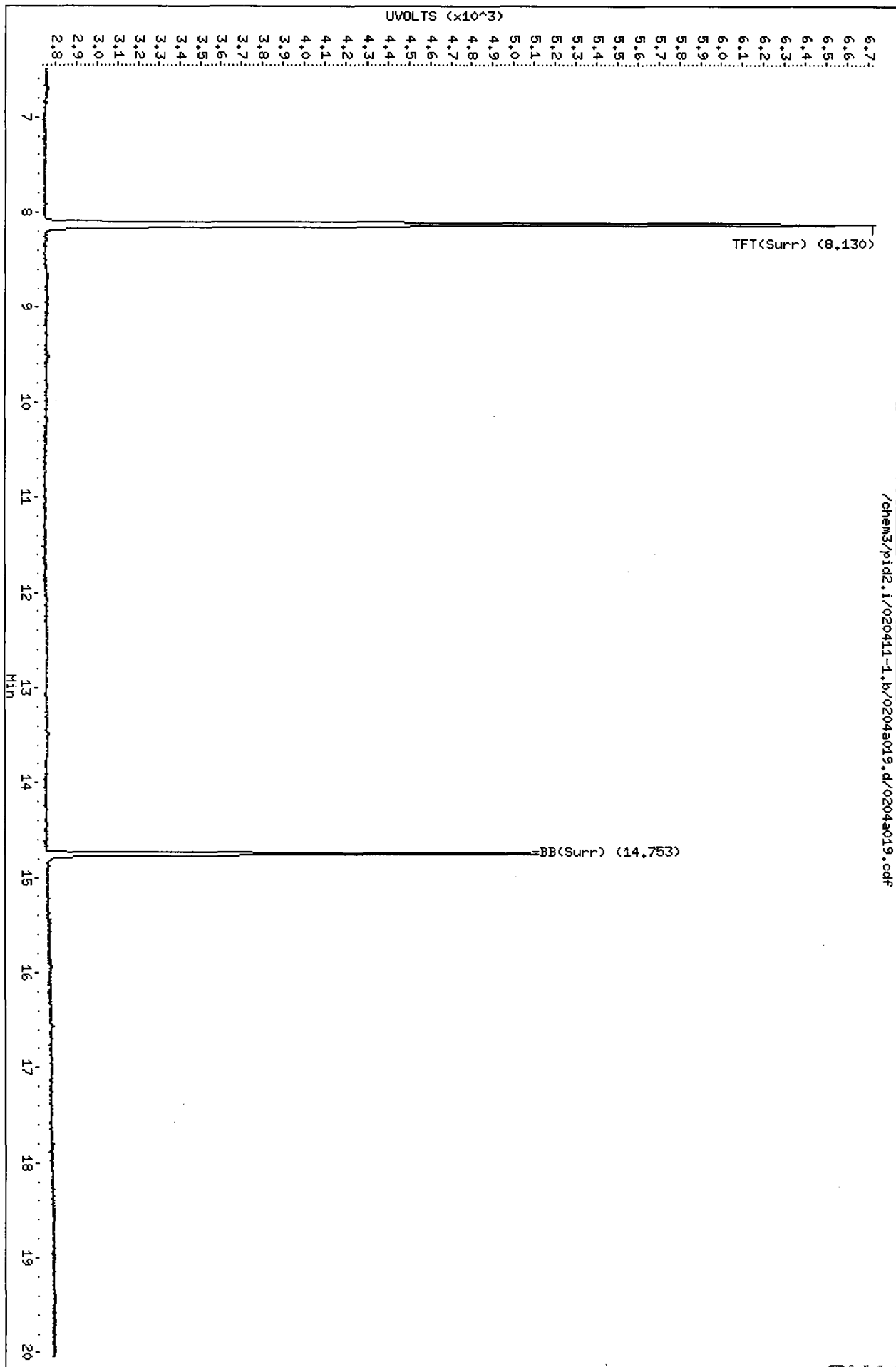
Client ID: B11-03-24

Sample Info: SH13J

Instrument: pid2.i

Column phase: RTX 502-2 FID

Operator: MH
Column diameter: 0.18



SH13 : 00026

Data File: /chem3/pid2.i/020411-2.b/0204a019.d

Date : 04-FEB-2011 14:15

Client ID: B11-03-24

Sample Info: SH13J

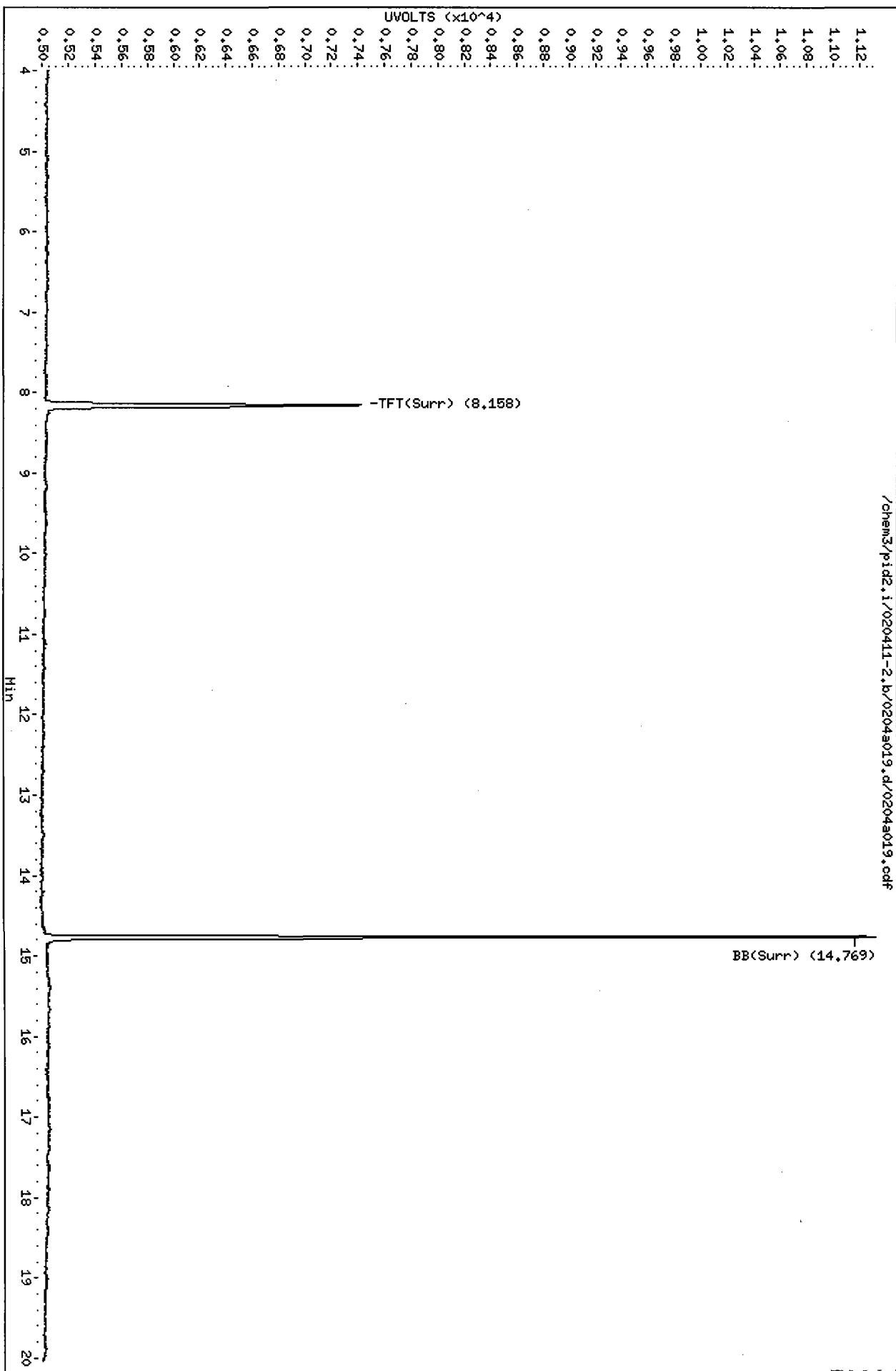
Page 1

Instrument: pid2.i

Operator: HH

Column diameter: 0.18

Column phase: RTX 502-2 PID



SH13 : 00027

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: B11-06-15

SAMPLE

Lab Sample ID: SH13T

LIMS ID: 11-2118

Matrix: Soil

Data Release Authorized:

Reported: 02/14/11

QC Report No: SH13-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 14:43

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 130 mg-dry-wt

Percent Moisture: 6.8%

CAS Number	Analyte	RL	Result	
71-43-2	Benzene	9.8	< 9.8 U	
108-88-3	Toluene	9.8	< 9.8 U	
100-41-4	Ethylbenzene	9.8	< 9.8 U	
179601-23-1	m,p-Xylene	20	< 20 U	
95-47-6	o-Xylene	9.8	< 9.8 U	
	Gasoline Range Hydrocarbons	3.9	< 3.9 U	GAS ID ---

BETX Surrogate Recovery

Trifluorotoluene	102%
Bromobenzene	98.5%

Gasoline Surrogate Recovery

Trifluorotoluene	101%
Bromobenzene	98.6%

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.

MH
2/4/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a020.d ARI ID: SH13T
Data file 2: /chem3/pid2.i/020411-2.b/0204a020.d Client ID: B11-06-15
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 14:43
Instrument: pid2.i Matrix: SOIL
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.130	0.002	4057	51825	100.6	TFT(Surr)
14.753	0.000	2455	20771	98.6	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	0	0.000
8015B 2MP-TMB (4.81 to 15.47)	907748	1	0.000
AK101 nC6-nC10 (5.25 to 14.35)	626837	1	0.000
NWTPHG Tol-Nap (9.88 to 18.21)	481270	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

PID Surrogates

RT	Shift	Response	%Rec	Compound
8.157	0.001	2464	102.1	TFT(Surr)
14.770	0.000	6533	98.5	BB(Surr)

SW8021 (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/pid2.i/020411-1.b/0204a020.d

Date : 04-FEB-2011 14:43

Client ID: B11-06-15

Sample Info: SH13T

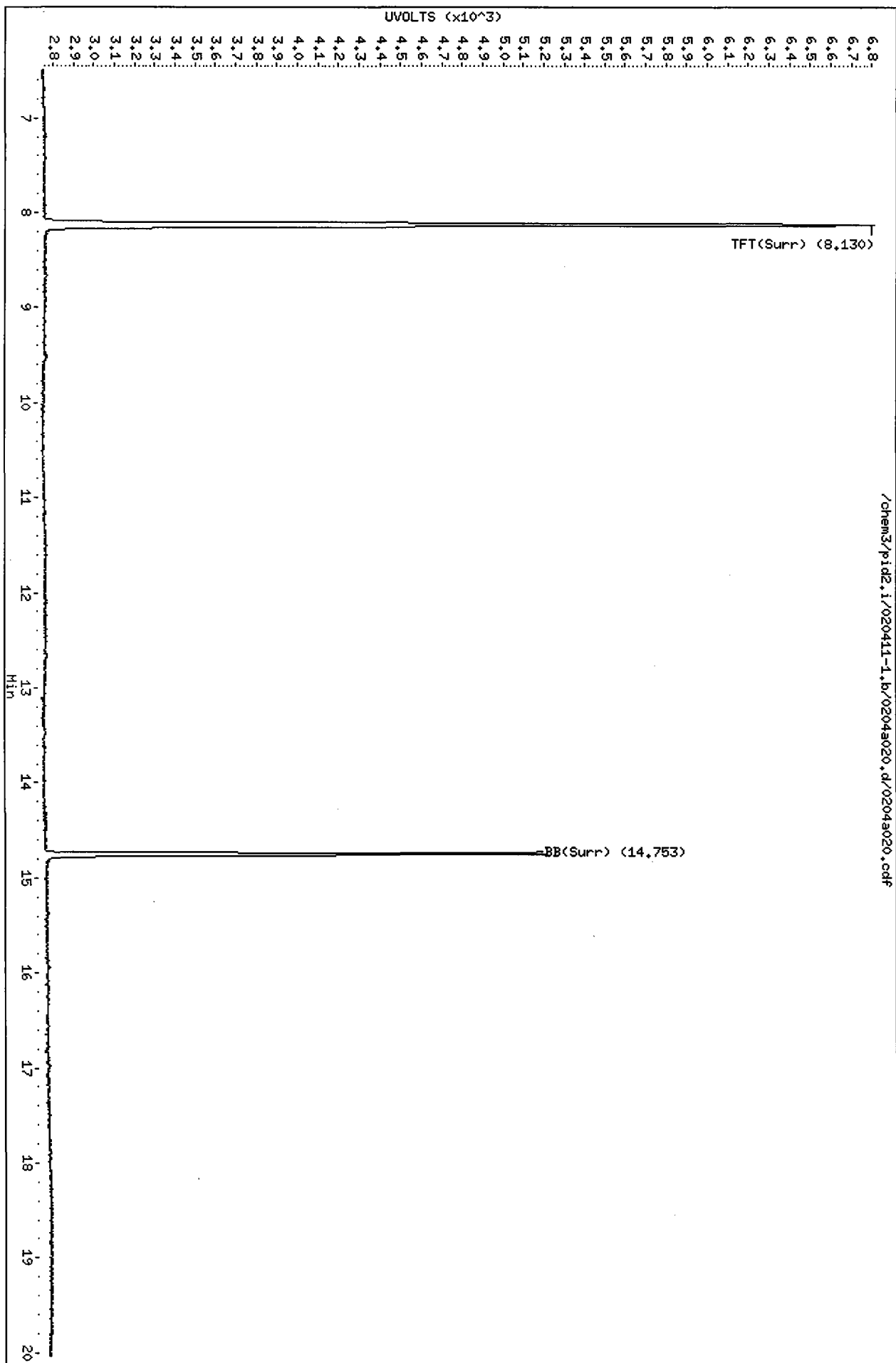
Page 1

Instrument: pid2.i

Operator: MH

Column diameter: 0.18

Column phase: RTX 502-2 FID



SH13 : 00030

Data File: /chem3/pid2.i/020411-2.b/0204a020.d

Date : 04-FEB-2011 14:43

Client ID: B11-06-15

Sample Info: SH13T

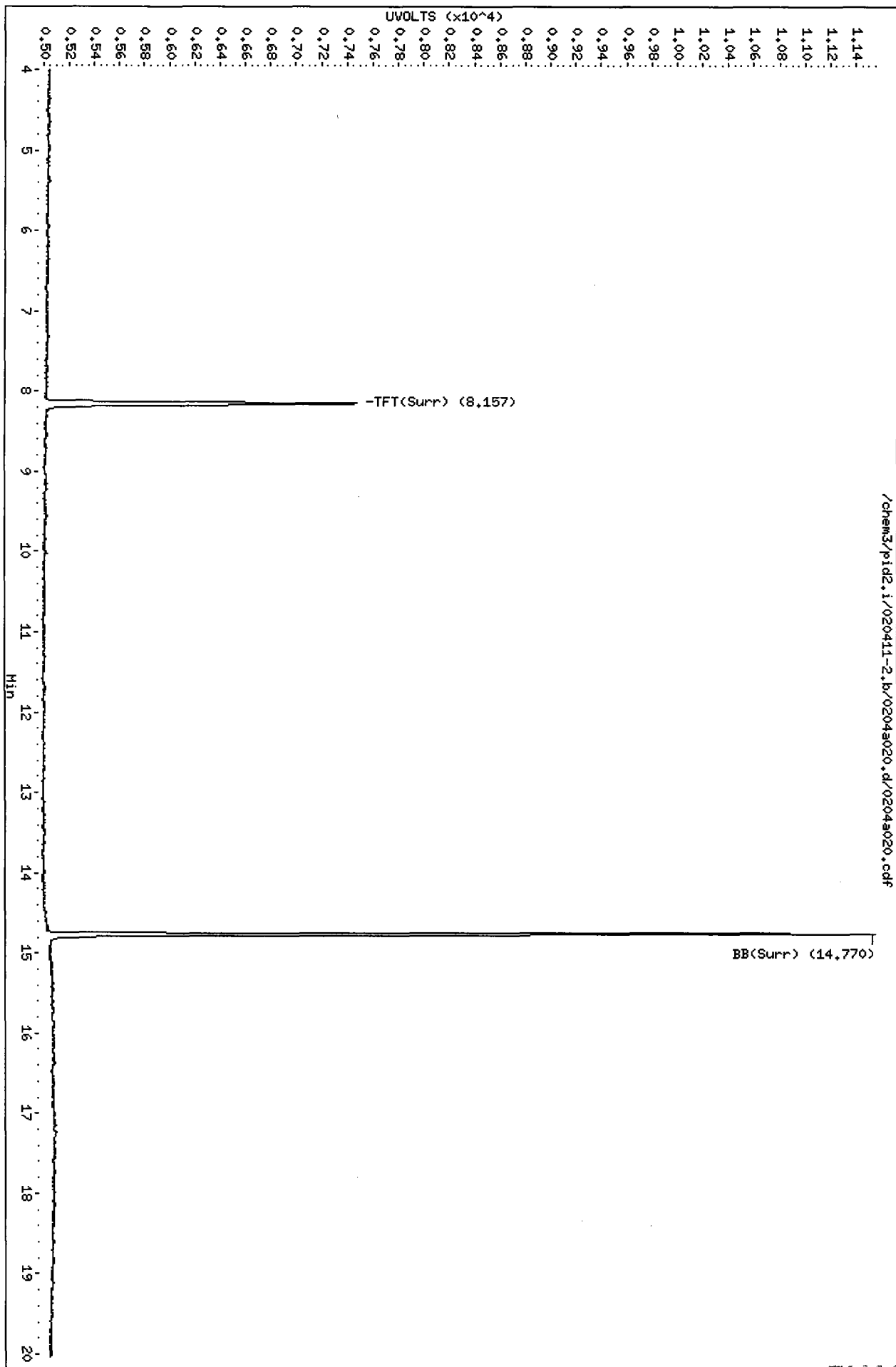
Page 1

Instrument: pid2.i

Operator: HH

Column diameter: 0.18

Column phase: RTX 502-2 PID



SH13: 00031

TPHG SOIL SURROGATE RECOVERY SUMMARY

ARI Job: SH13
Matrix: Soil

QC Report No: SH13-Pacific Groundwater Group
Project: Birds Eye Soil
Event: JI1001

<u>Client ID</u>	<u>BFB</u>	<u>TFT</u>	<u>BBZ</u>	<u>TOT</u>	<u>OUT</u>
MB-020411	NA	97.5%	95.7%	0	
LCS-020411	NA	99.5%	98.6%	0	
LCSD-020411	NA	100%	99.9%	0	
B11-01-20	NA	99.1%	113%	0	
B11-01-30	NA	97.9%	117%	0	
B11-03-24	NA	99.0%	95.2%	0	
B11-06-15	NA	101%	98.6%	0	

	<u>LCS/MB LIMITS</u>	<u>QC LIMITS</u>
(BFB) = Bromofluorobenzene	(70-130)	(70-130)
(TFT) = Trifluorotoluene	(80-120)	(66-123)
(BBZ) = Bromobenzene	(80-120)	(62-130)

Log Number Range: 11-2099 to 11-2118

FORM II TPHG

Page 1 for SH13

SH13:00032

BETX SOIL SURROGATE RECOVERY SUMMARY

ARI Job: SH13
Matrix: Soil

QC Report No: SH13-Pacific Groundwater Group
Project: Birds Eye Soil
Event: JI1001

<u>Client ID</u>	<u>TFT</u>	<u>BBZ</u>	<u>TOT OUT</u>
MB-020411	99.1%	95.7%	0
LCS-020411	100%	96.6%	0
LCSD-020411	101%	98.6%	0
B11-01-20	100%	101%	0
B11-01-30	99.2%	103%	0
B11-03-24	99.4%	95.4%	0
B11-06-15	102%	98.5%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(68-124)
(BBZ) = Bromobenzene	(77-120)	(62-134)

Log Number Range: 11-2099 to 11-2118

FORM II BETX

Page 1 for SH13

SH13:00033

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
Page 1 of 1

Sample ID: LCS-020411
LAB CONTROL SAMPLE

Lab Sample ID: LCS-020411
LIMS ID: 11-2099
Matrix: Soil
Data Release Authorized: *[Signature]*
Reported: 02/14/11

QC Report No: SH13-Pacific Groundwater Group
Project: Birds Eye Soil
Event: JI1001
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 02/04/11 06:55
LCSD: 02/04/11 07:23
Instrument/Analyst LCS: PID2/MH
LCSD: PID2/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	141	105	134%	139	105	132%	1.4%
Toluene	1510	1440	105%	1490	1440	103%	1.3%
Ethylbenzene	470	460	102%	465	460	101%	1.1%
m,p-Xylene	1760	1690	104%	1730	1690	102%	1.7%
o-Xylene	736	700	105%	730	700	104%	0.8%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	100%	101%
Bromobenzene	96.6%	98.6%

ORGANICS ANALYSIS DATA SHEET

TPHG by Method NWTPHG

Page 1 of 1


Sample ID: LCS-020411

LAB CONTROL SAMPLE

Lab Sample ID: LCS-020411

LIMS ID: 11-2099

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH13-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed LCS: 02/04/11 06:55

Purge Volume: 5.0 mL

LCSD: 02/04/11 07:23

Instrument/Analyst LCS: PID2/MH

Sample Amount LCS: 100 mg-dry-wt

LCSD: PID2/MH

LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	51.6	50.0	103%	50.6	50.0	101%	2.0%

Reported in mg/kg (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	99.5%	100%
Bromobenzene	98.6%	99.9%

2/4/11
M4

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a004.d
Data file 2: /chem3/pid2.i/020411-2.b/0204a004.d
Method: /chem3/pid2.i/020411-2.b/PIDB.m
Instrument: pid2.i
Gas Ical Date: 27-JAN-2011
BETX Ical Date: 27-JAN-2011

ARI ID: LCS0204
Client ID:
Injection Date: 04-FEB-2011 06:55
Matrix: WATER
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
--	-----	-----	----	----	-----
8.126	-0.002	4016	52736	99.5	TFT(Surr)
14.751	-0.002	2455	21098	98.6	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
-----	----	-----	-----
WAGas Tol-C12 (9.88 to 17.08)	460088	471725	1.025 M
8015B 2MP-TMB (4.81 to 15.47)	907748	967800	1.066 M
AK101 nC6-nC10 (5.25 to 14.35)	626837	673274	1.074 M
NWTPHG Tol-Nap (9.88 to 18.21)	481270	496752	1.032 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
--	-----	-----	----	-----
8.154	-0.002	2424	100.4	TFT(Surr)
14.768	-0.001	6410	96.6	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
--	-----	-----	-----	-----
7.470	0.001	440	2.82	Benzene
10.009	-0.003	4878	30.21	Toluene
12.554	-0.003	1419	9.39	Ethylbenzene
12.694	0.000	5649	35.17	M/P-Xylene
13.506	-0.003	2146	14.71	O-Xylene
5.195	0.003	3903	95.09	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

SH13:00036

Data File: /chem3/pid2.i/020411-1.b/0204a004.d

Date : 04-FEB-2011 06:55

Client ID:

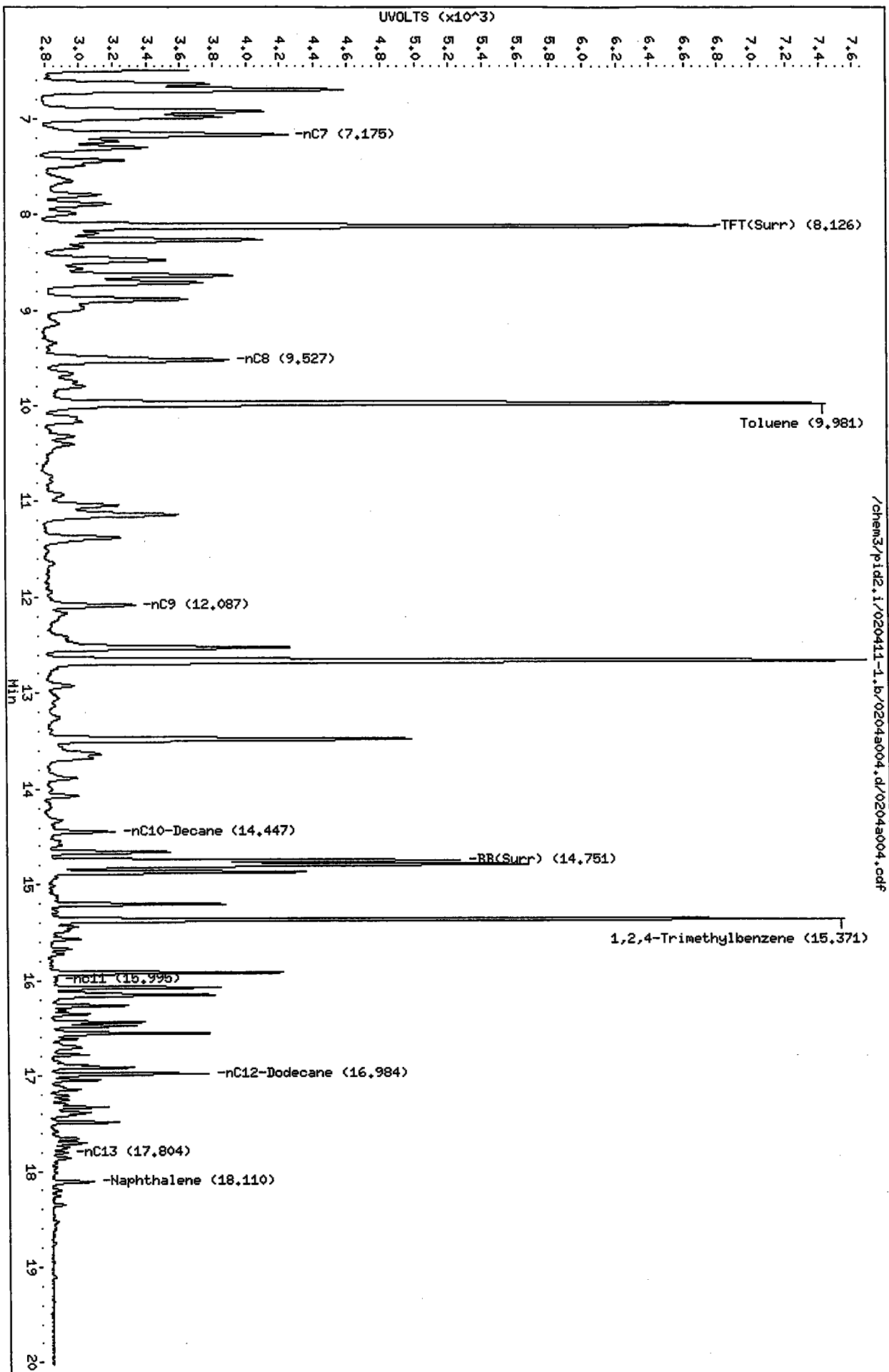
Sample Info: LCS0204

Column phase: RTX 502-2 FID

Instrument: pid2.i

Operator: HH

Column diameter: 0.18



Data File: /chem3/pid2.i/020411-2.b/0204a004.d

Date : 04-FEB-2011 06:56

Client ID:

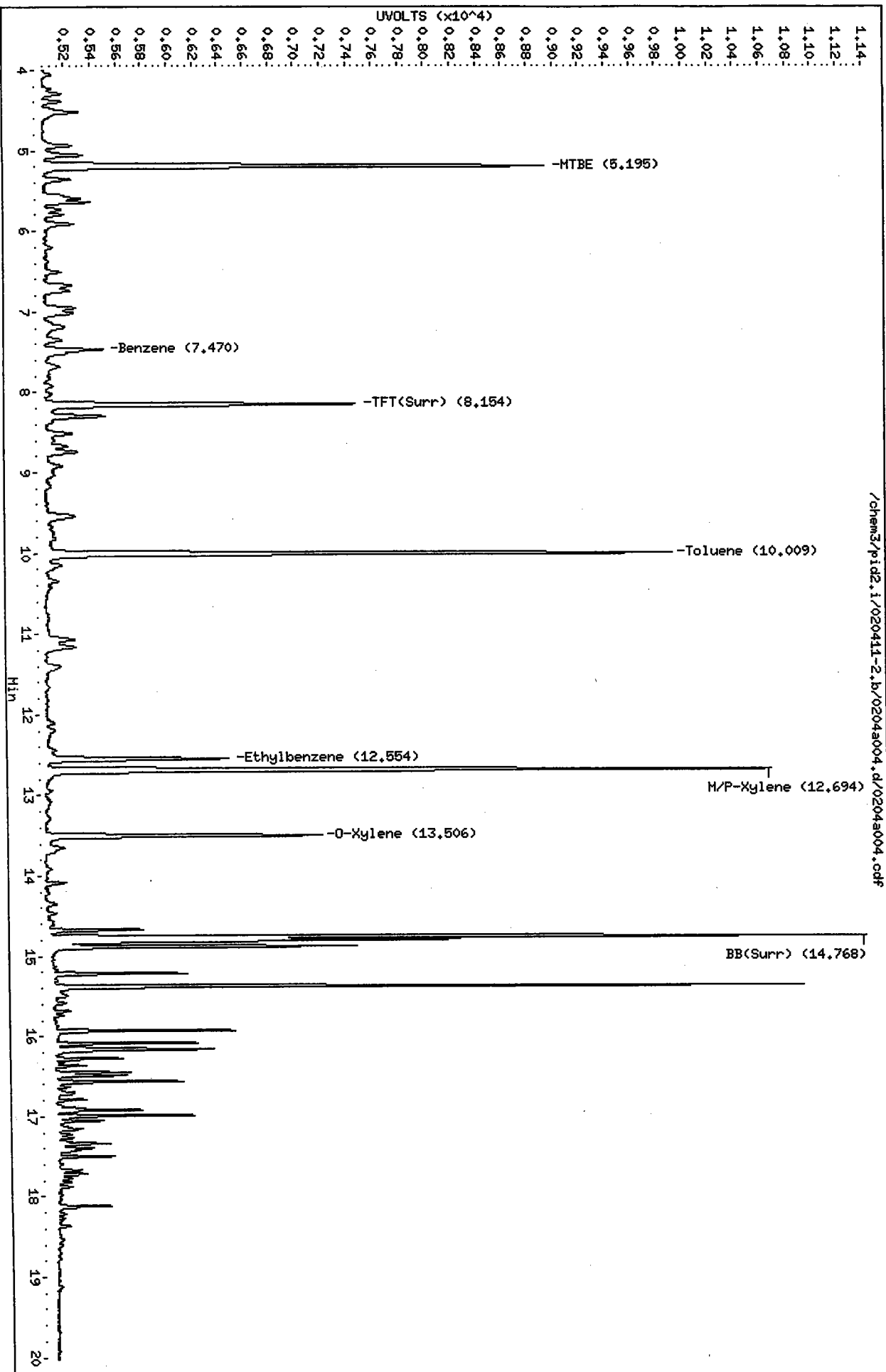
Sample Info: LCS0204

Column phase: RTX 502-2 PID

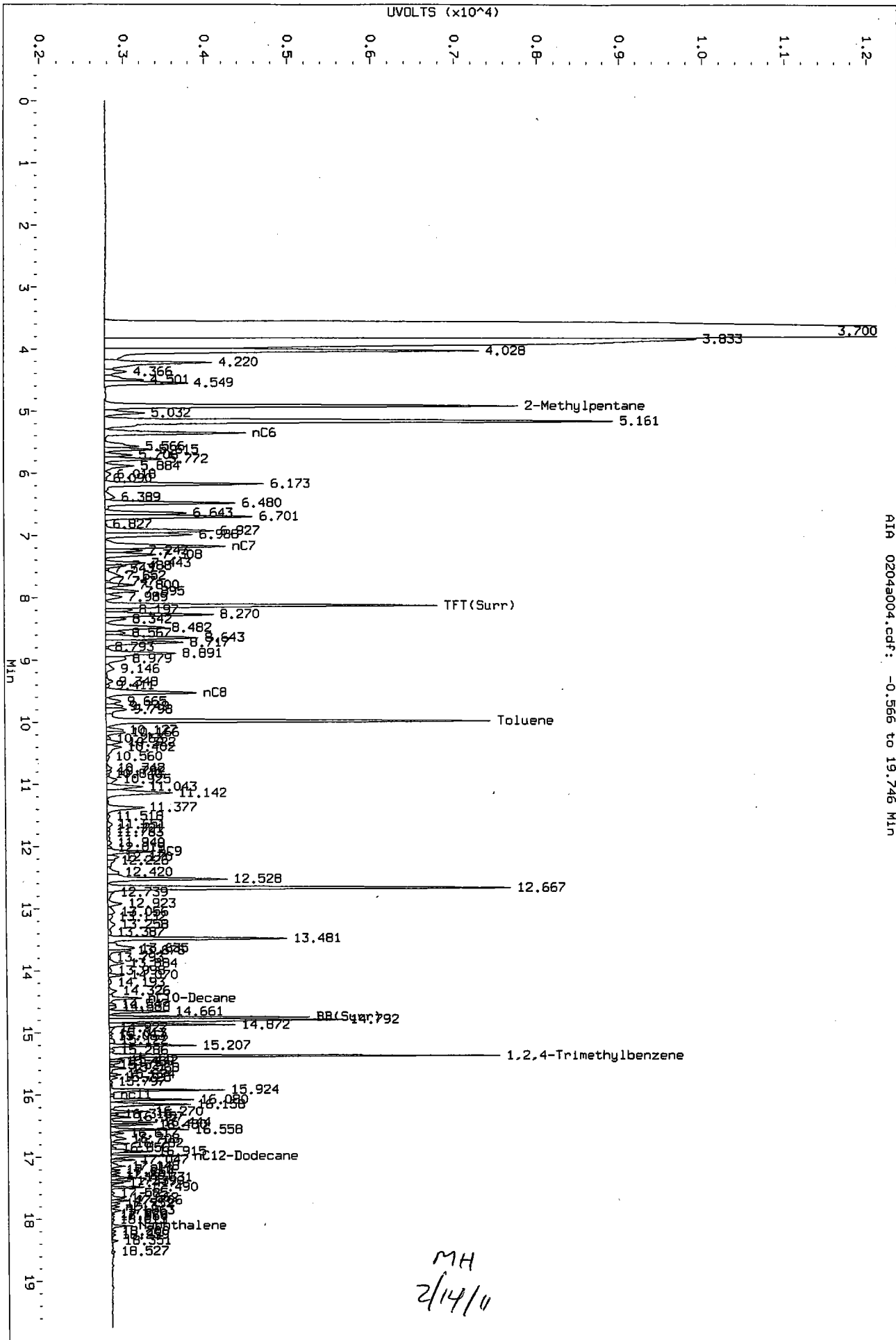
Instrument: pid2.i

Operator: MH

Column diameter: 0.18



Data File: /chem3/pid2.1/020411-1.b/0204a004.d/0204a004.cdf
Injection Date: 04-FEB-2011 06:55
Instrument: pid2.1
Client Sample ID:



147
2/4/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a005.d ARI ID: LCSD0204
Data file 2: /chem3/pid2.i/020411-2.b/0204a005.d Client ID:
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 07:23
Instrument: pid2.i Matrix: WATER
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.127	-0.001	4056	53261	100.5	TFT(Surr)
14.752	-0.001	2488	21395	99.9	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	460784	1.002 M
8015B 2MP-TMB (4.81 to 15.47)	907748	937024	1.032 M
AK101 nC6-nC10 (5.25 to 14.35)	626837	648183	1.034 M
NWTPHG Tol-Nap (9.88 to 18.21)	481270	486497	1.011 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
8.155	-0.002	2432	100.7	TFT(Surr)
14.769	-0.001	6541	98.6	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
7.470	0.002	434	2.78	Benzene
10.009	-0.002	4817	29.83	Toluene
12.555	-0.003	1405	9.30	Ethylbenzene
12.694	0.000	5569	34.67	M/P-Xylene
13.507	-0.002	2130	14.60	O-Xylene
5.194	0.003	3813	92.89	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

SH13:00041

Data File: /chem3/pid2.i/020411-1.b/0204s005.d

Date : 04-FEB-2011 07:23

Client ID:

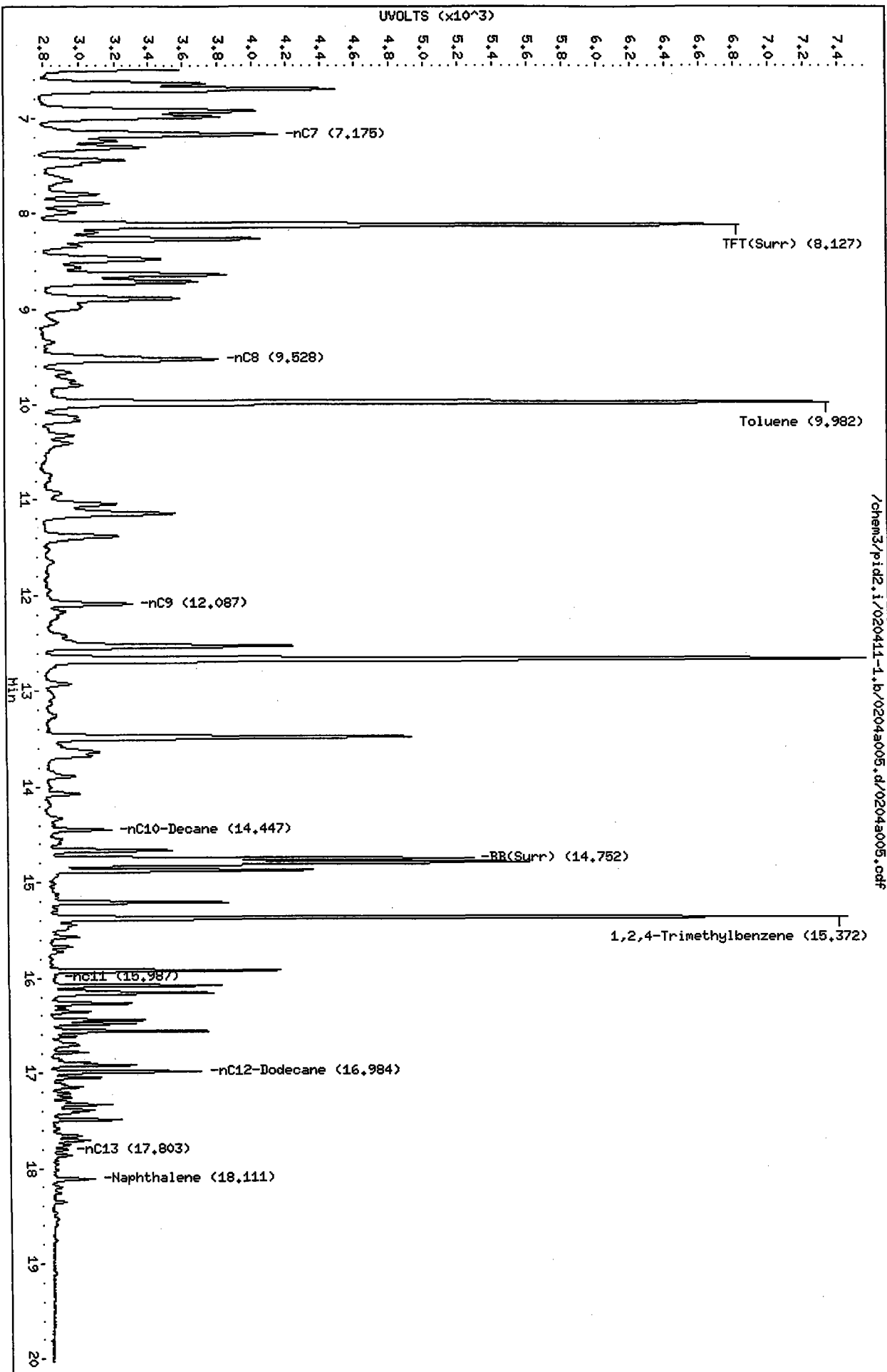
Sample Info: LCS00204

Instrument: pid2.i

Operator: MH

Column diameter: 0.18

Column phase: RTX 502-2 FID



Data File: /chem3/pid2.i/020411-2.b/0204a005.d

Date : 04-FEB-2011 07:23

Client ID:

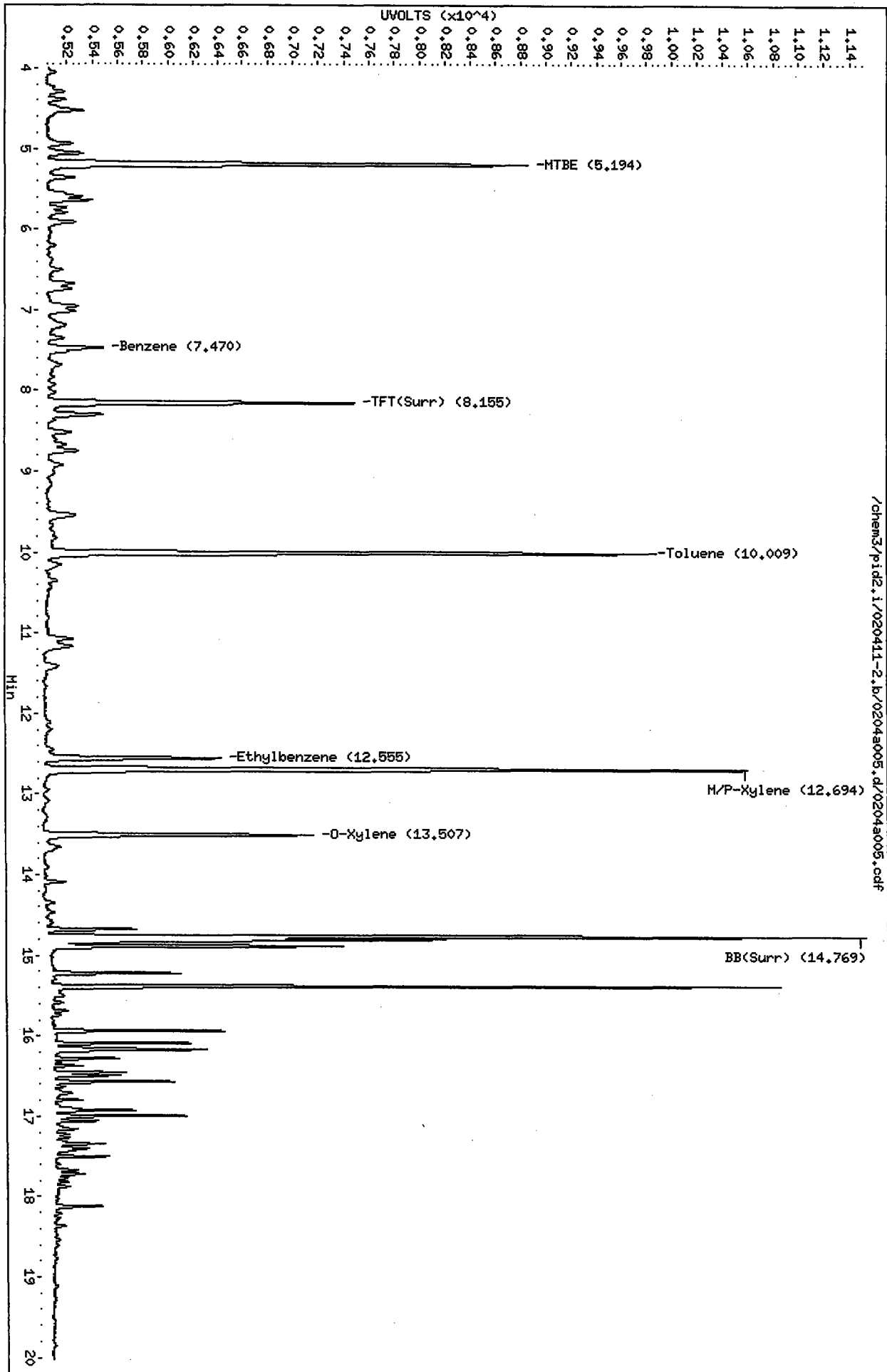
Sample Info: LCSD0204

Instrument: pid2.i

Page 1

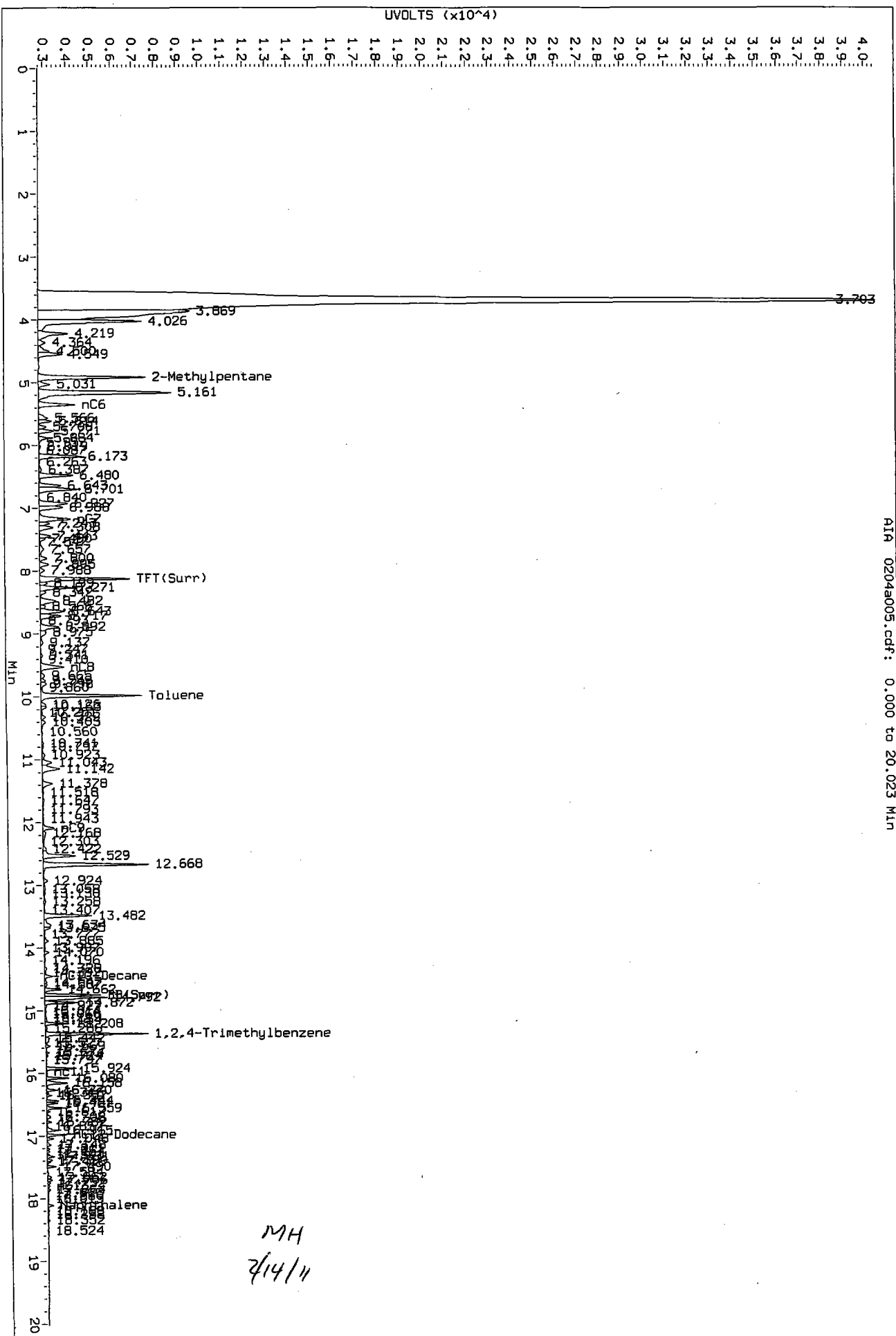
Column phase: RTX 502-2 PID

Operator: MH
Column diameter: 0.18

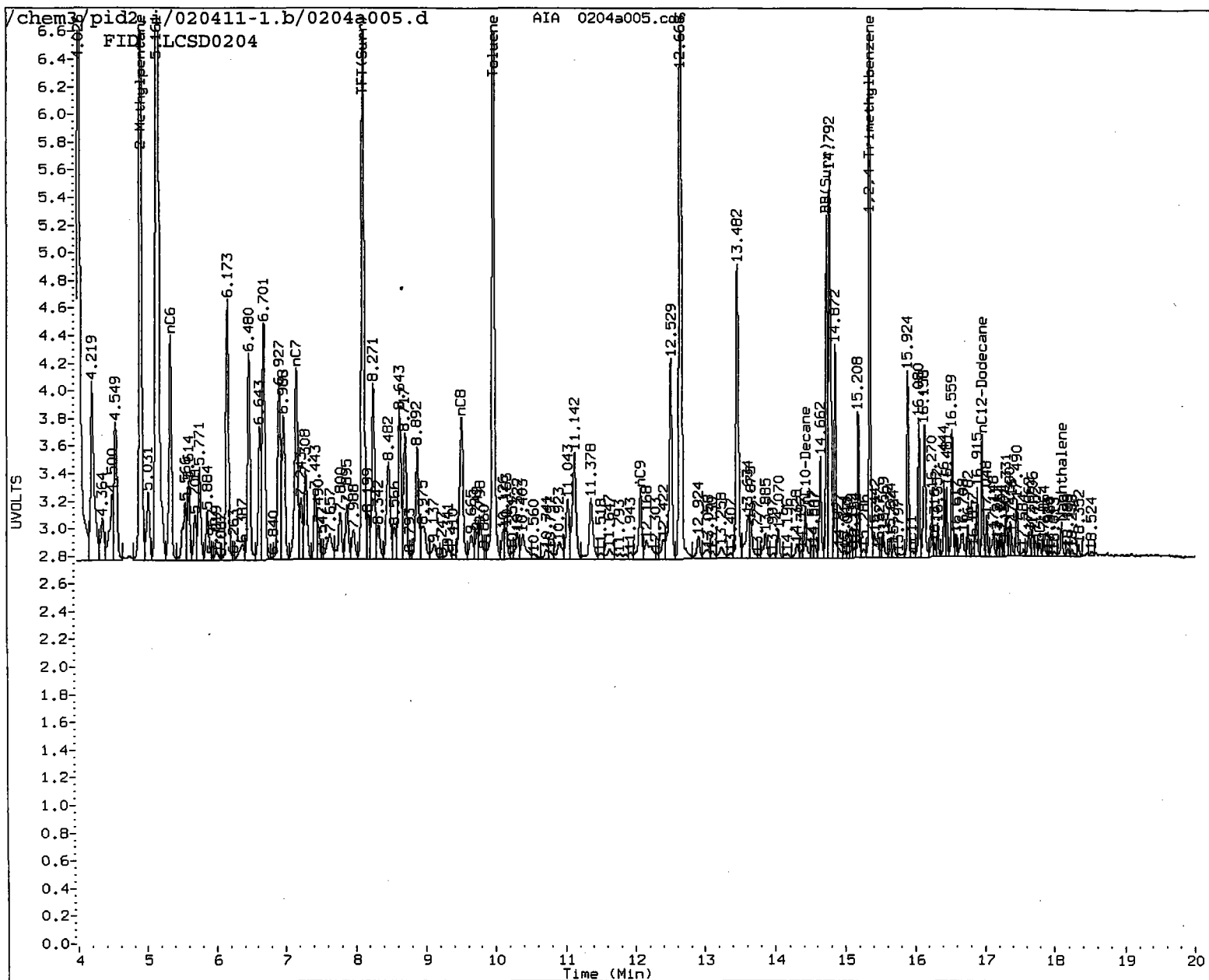


SH13: 00043

Data File: /chem3/pid2.1/020411-1.b/0204a005.d/0204a005.cdf
Injection Date: 04-FEB-2011 07:23
Instrument: pid2.1
Client Sample ID:



SH13: 00044



MANUAL INTEGRATION

- ☒ Baseline correction
- ☐ 2. Poor chromatography
- ☐ 3. Peak not found
- ☐ 4. Totals calculation

5. Other _____

Analyst: MH

Date: 2/4/11

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1


Sample ID: MB-020411

METHOD BLANK

Lab Sample ID: MB-020411

LIMS ID: 11-2099

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH13-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed: 02/04/11 07:51

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 100 mg-dry-wt

CAS Number	Analyte	RL	Result	
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	GAS ID ---
BETX Surrogate Recovery				
	Trifluorotoluene	99.1%		
	Bromobenzene	95.7%		
Gasoline Surrogate Recovery				
	Trifluorotoluene	97.5%		
	Bromobenzene	95.7%		

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.

2/14/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a006.d
Data file 2: /chem3/pid2.i/020411-2.b/0204a006.d
Method: /chem3/pid2.i/020411-2.b/PIDB.m
Instrument: pid2.i
Gas Ical Date: 27-JAN-2011
BETX Ical Date: 27-JAN-2011

ARI ID: MB0204
Client ID:
Injection Date: 04-FEB-2011 07:51
Matrix: WATER
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.126	-0.002	3935	50032	97.5	TFT(Surr)
14.751	-0.002	2383	19855	95.7	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	902	0.002
8015B 2MP-TMB (4.81 to 15.47)	907748	504	0.001
AK101 nC6-nC10 (5.25 to 14.35)	626837	0	0.000
NWTPHG Tol-Nap (9.88 to 18.21)	481270	902	0.002

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
8.154	-0.002	2393	99.1	TFT(Surr)
14.767	-0.002	6350	95.7	BB(Surr)

SW8021 (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

SH13:00047

Data File: /chem3/pid2.i/020411-1.b/0204a006.d

Page 1

Date : 04-FEB-2011 07:51

Client ID:

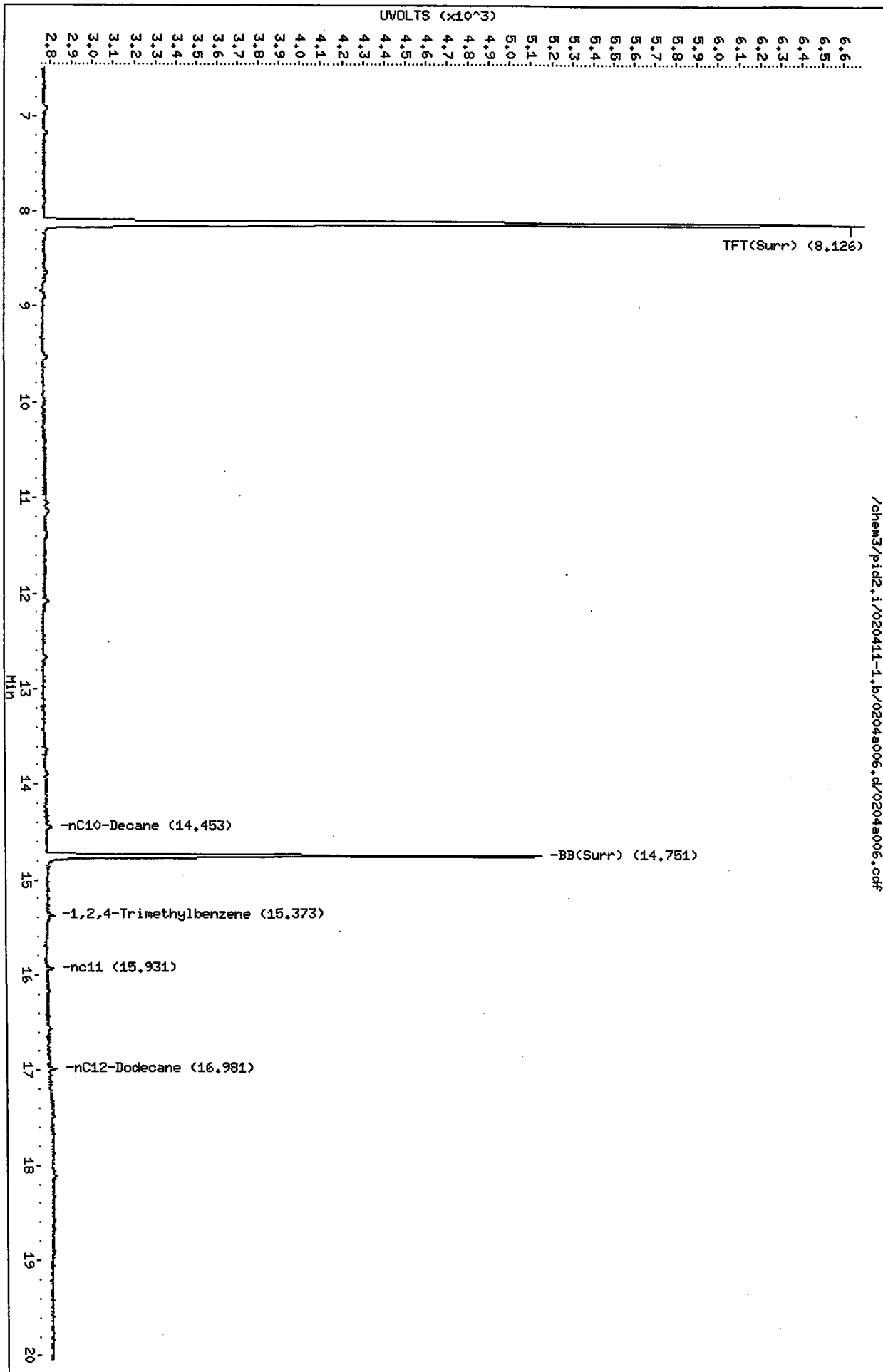
Instrument: pid2.i

Sample Info: HB0204

Operator: MH

Column phase: RTX 502-2 FID

Column diameter: 0.18



SH13: 00048

Data File: /chem3/pid2.i/020411-2.b/0204a006.d

Date : 04-FEB-2011 07:51

Client ID:

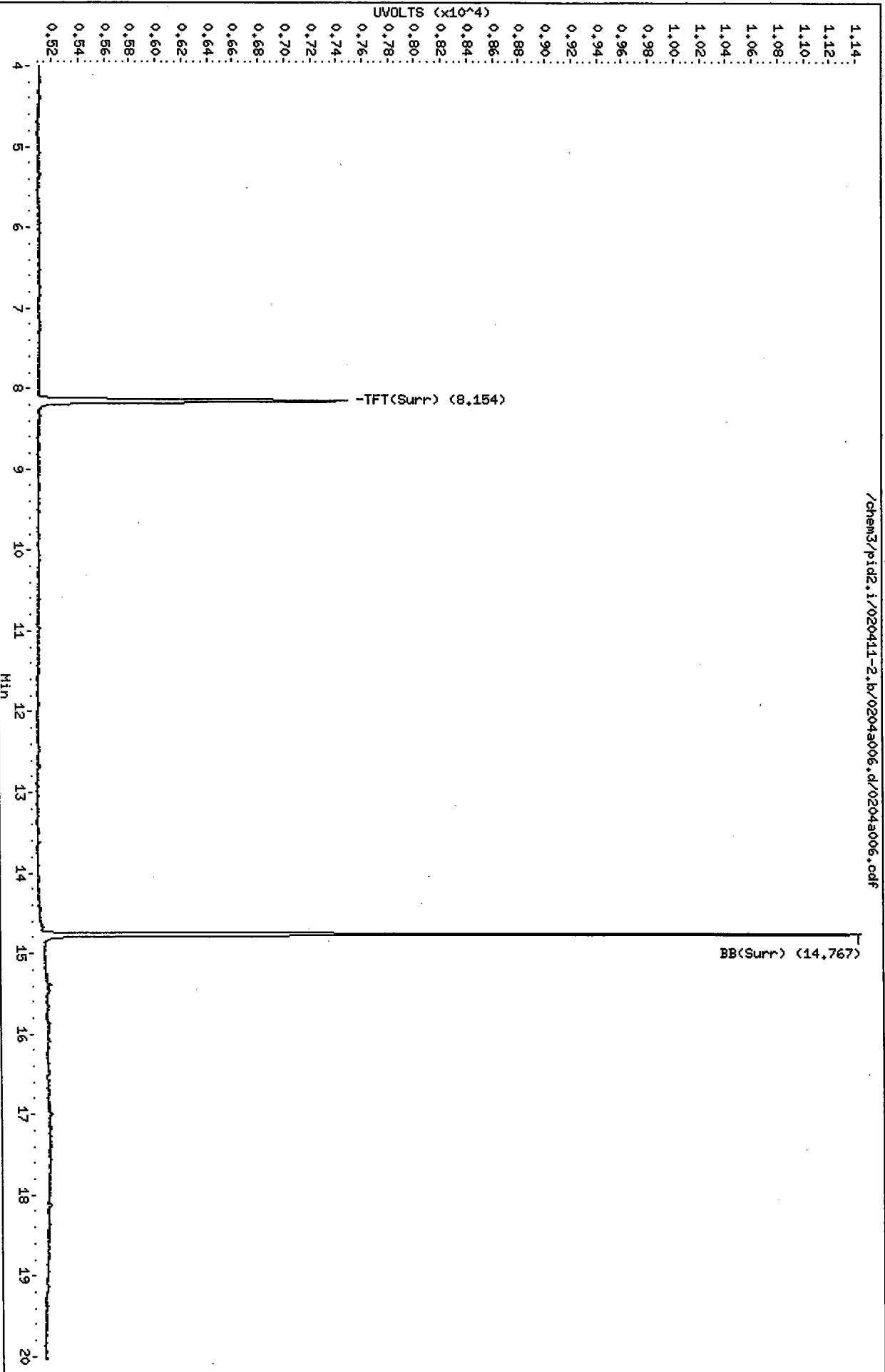
Sample Info: MB0204

Column phase: RTX 502-2 PID

Instrument: pid2.i

Operator: HH

Column diameter: 0.18



ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Page 1 of 2
Matrix: Soil

QC Report No: SH13-Pacific Groundwater Group
Project: Birds Eye Soil
JI1001
Date Received: 02/02/11

Data Release Authorized: *mw*
Reported: 02/08/11

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
MB-020311 11-2099	Method Blank HC ID: ---	02/03/11	02/04/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.0 10	< 5.0 U < 10 U 85.5%
SH13A 11-2099	B11-01-20 HC ID: ---	02/03/11	02/04/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.5 11	< 5.5 U < 11 U 85.6%
SH13B 11-2100	B11-01-26 HC ID: DIESEL/MOTOR OIL	02/03/11	02/04/11 FID9	1.00 5.0	Diesel Motor Oil o-Terphenyl	28 56	640 60 100%
SH13C 11-2101	B11-01-30 HC ID: DIESEL	02/03/11	02/05/11 FID9	1.00 100	Diesel Motor Oil o-Terphenyl	580 1,200	10,000 < 1,200 U D
SH13D 11-2102	B11-02-15 HC ID: ---	02/03/11	02/04/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.4 11	< 5.4 U < 11 U 87.4%
SH13E 11-2103	B11-02-20 HC ID: ---	02/03/11	02/04/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.5 11	< 5.5 U < 11 U 90.9%
SH13F 11-2104	B11-02-23.5 HC ID: DIESEL	02/03/11	02/05/11 FID9	1.00 50	Diesel Motor Oil o-Terphenyl	280 560	4,400 < 560 U D
SH13G 11-2105	B11-02-30 HC ID: DIESEL/MOTOR OIL	02/03/11	02/05/11 FID9	1.00 100	Diesel Motor Oil o-Terphenyl	580 1,200	10,000 1,200 D
SH13H 11-2106	B11-03-15 HC ID: ---	02/03/11	02/04/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.2 10	< 5.2 U < 10 U 87.8%
SH13I 11-2107	B11-03-20 HC ID: ---	02/03/11	02/04/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.7 12	< 5.7 U < 12 U 90.8%
SH13K 11-2109	B11-03-25 HC ID: ---	02/03/11	02/04/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.8 12	< 5.8 U < 12 U 93.8%
SH13L 11-2110	B11-03-29 HC ID: ---	02/03/11	02/04/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.9 12	< 5.9 U < 12 U 92.6%
SH13M 11-2111	B11-04-15 HC ID: ---	02/03/11	02/05/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.4 11	< 5.4 U < 11 U 88.1%

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Page 2 of 2
Matrix: Soil

QC Report No: SH13-Pacific Groundwater Group
Project: Birds Eye Soil
JI1001
Date Received: 02/02/11

Data Release Authorized: *MW*
Reported: 02/08/11

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
SH13N 11-2112	B11-04-20 HC ID: ---	02/03/11	02/05/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.7 11	< 5.7 U < 11 U 85.5%
SH13O 11-2113	B11-04-25 HC ID: ---	02/03/11	02/05/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.6 11	< 5.6 U < 11 U 88.6%
SH13P 11-2114	B11-05-15 HC ID: ---	02/03/11	02/05/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.3 11	< 5.3 U < 11 U 90.0%
SH13Q 11-2115	B11-05-20 HC ID: ---	02/03/11	02/05/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.2 10	< 5.2 U < 10 U 86.8%
SH13R 11-2116	B11-05-25 HC ID: ---	02/03/11	02/05/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.9 12	< 5.9 U < 12 U 91.8%
SH13S 11-2117	B11-05-30 HC ID: ---	02/03/11	02/05/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.8 12	< 5.8 U < 12 U 91.1%
SH13T 11-2118	B11-06-15 HC ID: DIESEL	02/03/11	02/05/11 FID9	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.3 11	6.7 < 11 U 86.4%

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.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A006.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13MBS1
Client ID: SH13MBS1
Injection: 04-FEB-2011 18:01
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.356	0.050	4157	830	GAS (Tol-C12)	106114	5
C8	1.379	0.004	5685	8745	DIESEL (C12-C24)	23390	1
C10	1.989	0.003	1449	1913	M.OIL (C24-C38)	59579	4
C12	2.617	-0.003	301	201	AK-102 (C10-C25)	45598	2
C14	3.151	-0.005	274	266	AK-103 (C25-C36)	49061	6
C16	3.623	0.002	547	325			
C18	4.042	0.000	158	98			
C20	4.427	-0.003	30	8			
C22	4.820	0.000	81	21			
C24	5.319	0.003	220	175			
C25	5.542	0.000	271	236			
C26	5.738	-0.006	249	254			
C28	6.096	-0.003	704	640			
C32	6.687	-0.007	2019	2463	JP-4 (Tol-C14)	112900	7
C34	6.954	-0.003	813	1529	BUNKERC (C10-C38)	103906	12
Filter Peak	----						
C36	7.206	-0.002	766	767			
C38	7.447	0.000	766	1269			
C40	7.710	-0.003	558	287			
o-terph	4.161	0.000	1494357	824295	JET-A (C10-C18)	38625	3
Triacon Surr	6.416	-0.003	1193059	839428	JP8 (Tol-C16)	116726	7

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

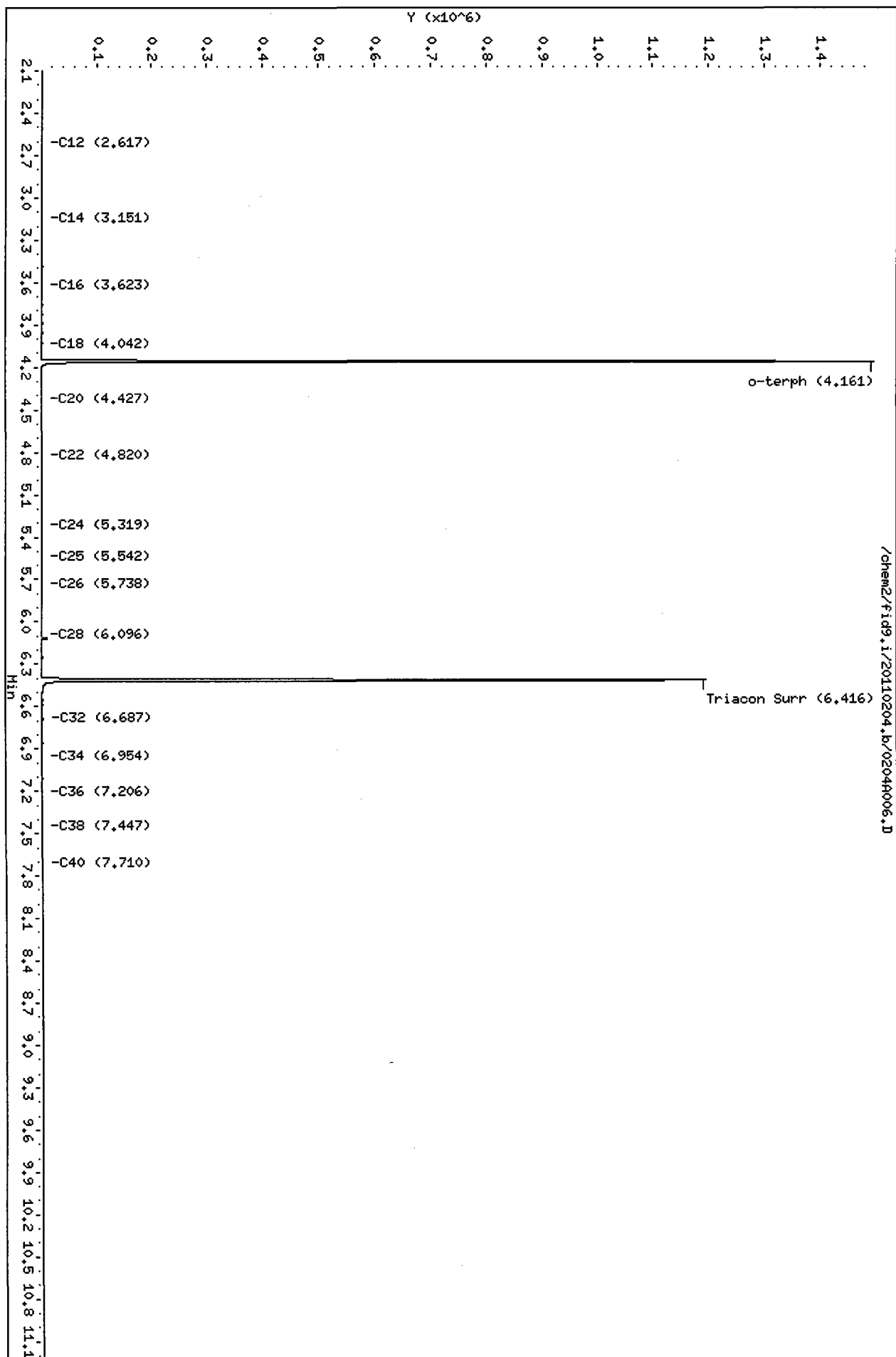
Surrogate	Area	Amount	%Rec
o-Terphenyl	824295	38.5	85.5
Triacontane	839428	47.6	105.8

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13:00052

Data File: /chem2/fid9.i/20110204.b/02040006.D
Date : 04-FEB-2011 18:01
Client ID: SH13HBS1
Sample Info: SH13HBS1
Column phase: RTX-1

Instrument: fid9.i
Operator: PC
Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A010.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13A
Client ID: B11-01-20
Injection: 04-FEB-2011 19:27
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.355	0.049	3939	2420	GAS (Tol-C12)	100916	5
C8	1.379	0.004	5284	6403	DIESEL (C12-C24)	60640	3
C10	1.987	0.000	1231	1758	M.OIL (C24-C38)	52464	4
C12	2.627	0.007	396	233	AK-102 (C10-C25)	81429	3
C14	3.147	-0.008	797	728	AK-103 (C25-C36)	44329	5
C16	3.617	-0.004	1265	1066			
C18	4.043	0.001	387	184			
C20	4.437	0.006	213	160			
C22	4.823	0.003	226	214			
C24	5.316	0.000	420	457			
C25	5.541	-0.002	705	772			
C26	5.740	-0.004	617	480			
C28	6.095	-0.004	1060	871			
C32	6.689	-0.005	2133	2176	JP-4 (Tol-C14)	116833	7
C34	6.947	-0.010	1023	1502	BUNKERC (C10-C38)	132536	16
Filter Peak	----						
C36	7.205	-0.003	417	145			
C38	7.455	0.007	897	1331			
C40	7.710	-0.003	458	151			
o-terph	4.161	0.000	1501628	825116	JET-A (C10-C18)	67080	5
Triacon Surr	6.418	-0.001	1158839	835676	JP8 (Tol-C16)	131846	7

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

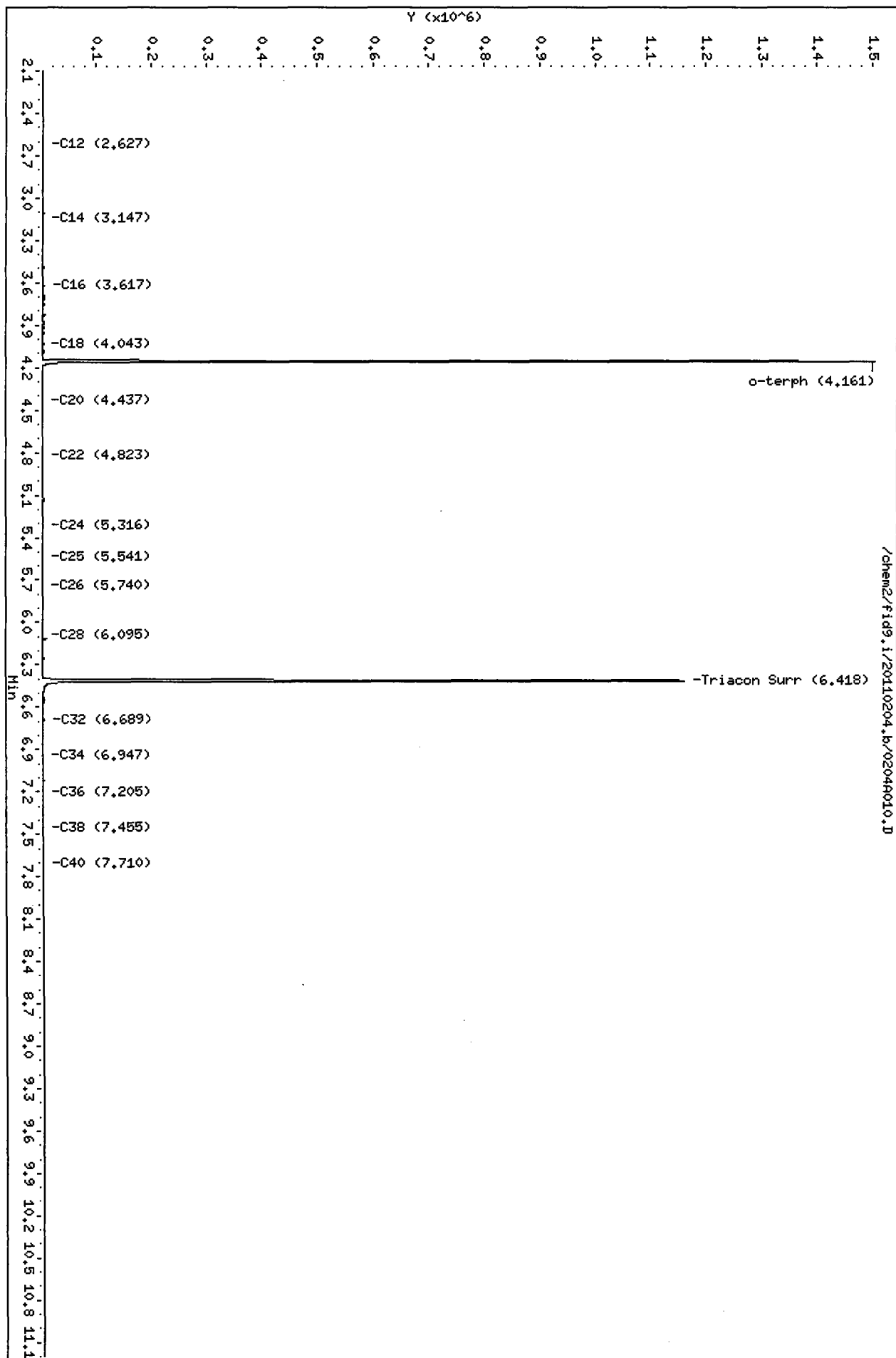
Surrogate	Area	Amount	%Rec
o-Terphenyl	825116	38.5	85.6
Triacontane	835676	47.4	105.4

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13: 00054

Data File: /chem2/fid9.i/20110204.b/02040010.D
Date : 04-FEB-2011 19:27
Client ID: B41-01-20
Sample Info: SH13A
Column phase: RTX-1

Instrument: fid9.i
Operator: PC
Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A011.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13B
Client ID: B11-01-26
Injection: 04-FEB-2011 19:49
Dilution Factor: 5
Macro: 20-JAN-2011

FID:9 RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.354	0.048	6132	7578	GAS (Tol-C12)	993574	47
C8	1.371	-0.005	3982	2716	DIESEL (C12-C24)	25944308	1145
C10	1.975	-0.012	8436	12259	M.OIL (C24-C38)	1420725	107
C12	2.626	0.006	33654	18665	AK-102 (C10-C25)	26924819	1055 M
C14	3.146	-0.009	286046	515967	AK-103 (C25-C36)	1211121	143 M
C16	3.611	-0.011	320160	596733			
C18	4.042	0.000	306188	95880			
C20	4.433	0.002	241622	71079			
C22	4.820	-0.001	72580	56548			
C24	5.310	-0.007	21470	18377			
C25	5.546	0.003	15083	8447			
C26	5.739	-0.006	13794	13273			
C28	6.093	-0.006	16595	13470			
C32	6.683	-0.011	12747	21027	JP-4 (Tol-C14)	4685038	286
C34	6.956	-0.002	11530	9969	BUNKERC (C10-C38)	28228696	3337 M
Filter Peak	----						
C36	7.207	-0.001	8091	2896			
C38	7.454	0.006	6256	2949			
C40	7.708	-0.005	3515	2290			
o-terph	4.160	-0.001	402057	192972	JET-A (C10-C18)	18124119	1312
Triacon Surr	6.407	-0.013	324264	182330	JP8 (Tol-C16)	10637199	605

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	192972	9.0	100.1
Triacontane	182330	10.3	114.9

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13:00056

Data File: /chem2/fid9.i/20110204.b/0204011.D

Date : 04-FEB-2011 19:49

Client ID: B11-01-26

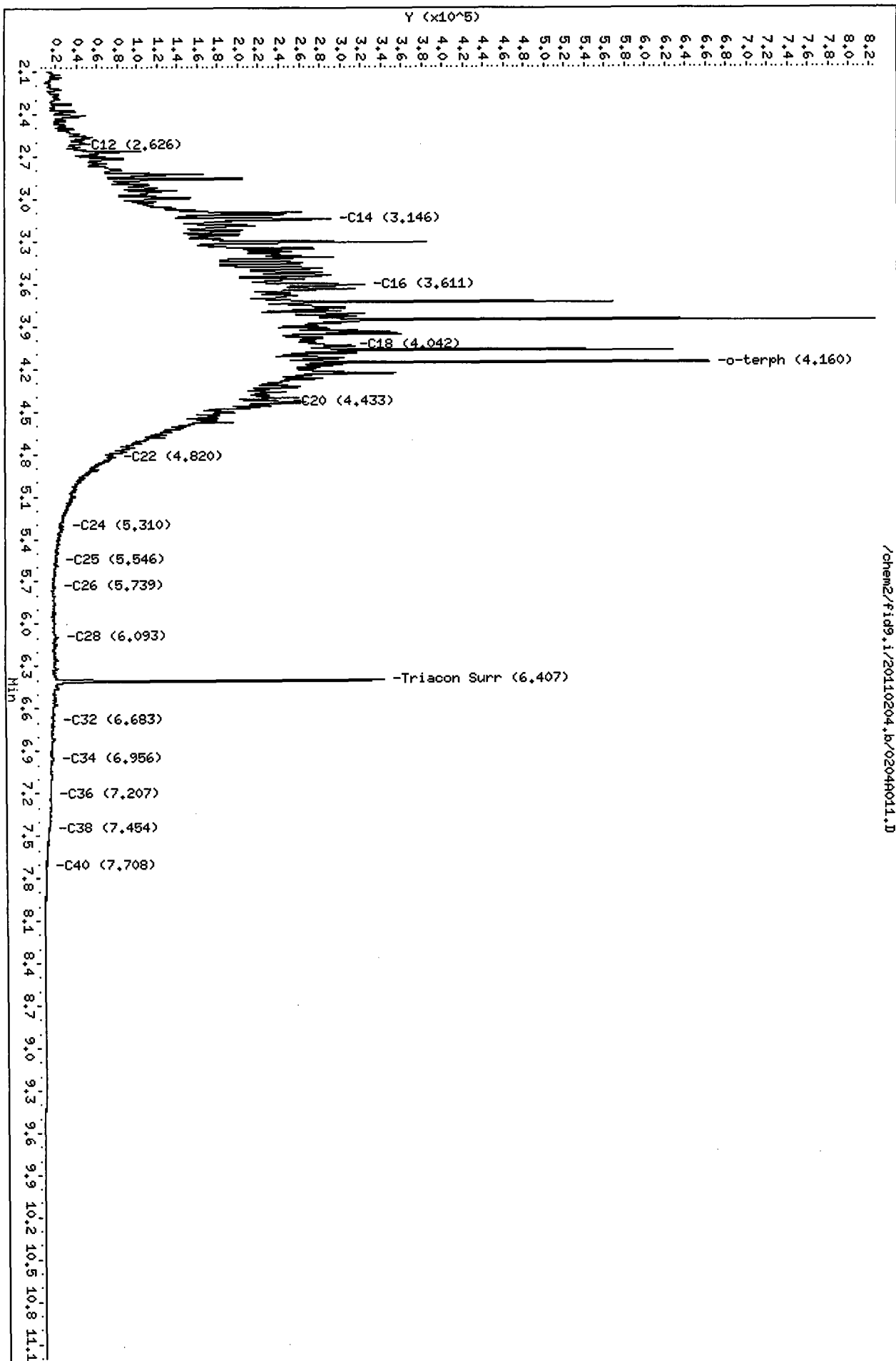
Sample Info: SH13B.5

Column phase: RTX-1

Instrument: fid9.i

Operator: PC

Column diameter: 0.25



/chem2/fid9.i/20110204.b/0204011.D

FID: 9A SIGNAL

HP6890 GC Data, 0204A011.D

Y (x10⁵)

Time (Min)

3.311

3.737

3.862

4.075

4.237

6.401 Triacon Surr

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: 14

Date:

SH13 : 00058

Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110205.b/0205A006.D
Method: /chem2/fid9.i/20110205.b/ftphfid9a.m
Instrument: fid9.i
Operator: AR
Report Date: 02/07/2011

ARI ID: SH13C
Client ID: B11-01-30
Injection: 05-FEB-2011 11:04
Dilution Factor: 100
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.363	0.057	5024	6984	GAS (Tol-C12)	1637566	78
C8	----				DIESEL (C12-C24)	20166031	890
C10	1.979	-0.004	16335	21815	M.OIL (C24-C38)	528113	40
C12	2.610	-0.009	60014	49131	AK-102 (C10-C25)	21685521	850
C14	3.153	-0.003	257175	166362	AK-103 (C25-C36)	428282	50
C16	3.621	0.000	196854	86175			
C18	4.043	0.002	227402	192396			
C20	4.436	0.008	195148	239047			
C22	4.822	0.002	49412	10714			
C24	5.318	0.003	12924	2796			
C25	5.544	0.002	9670	4843			
C26	5.737	-0.004	7283	4619			
C28	6.092	-0.004	5471	4623			
C32	6.683	-0.004	2192	2083	JP-4 (Tol-C14)	5191267	317
C34	6.951	0.003	1614	529	BUNKERC (C10-C38)	22125538	2615
Filter Peak	----						
C36	7.205	0.008	1033	795			
C38	7.438	0.003	797	342			
C40	7.709	0.006	432	189			
o-terph	----				JET-A (C10-C18)	15098616	1093
Triacon Surr	----				JP8 (Tol-C16)	9922726	564

M Indicates manual integration within range.

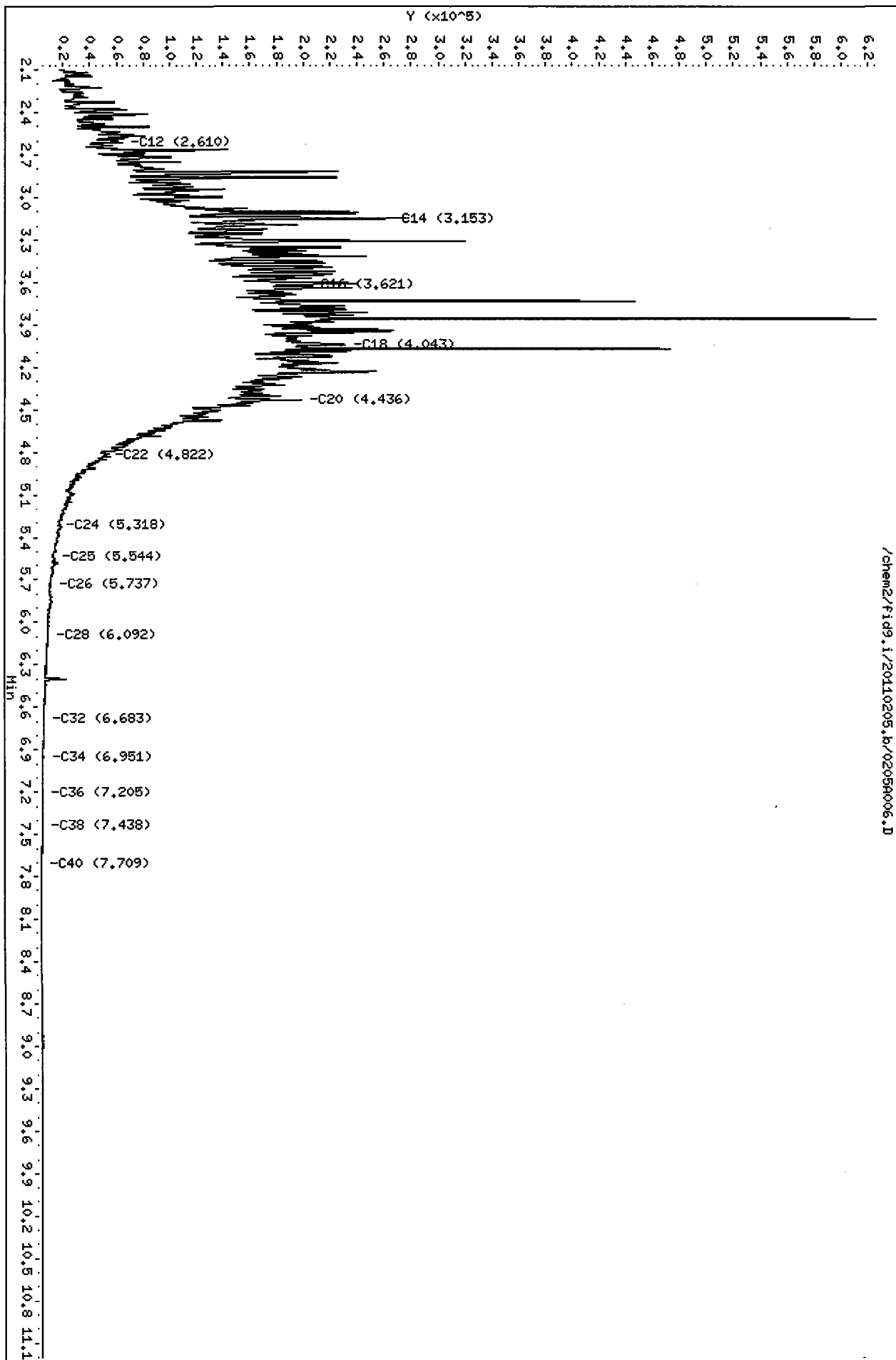
Range Times: NW Diesel(2.619 - 5.315) AK102(1.98 - 5.54) Jet A(1.98 - 4.04)
NW M.Oil(5.31 - 7.44) AK103(5.54 - 7.20) OR Diesel(1.98 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacontane	0	0.0	0.0

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

Data File: /chem2/fid9.i/20110205.b/0205006.D
Date : 05-FEB-2011 11:04
Client ID: B11-01-30
Sample Info: SH13C,100
Column phase: RTX-1

Instrument: fid9.i
Operator: AR
Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A013.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13D
Client ID: B11-02-15
Injection: 04-FEB-2011 20:32
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.323	0.017	15713	19089	GAS (Tol-C12)	142364	7
C8	1.373	-0.002	6893	12968	DIESEL (C12-C24)	91911	4
C10	1.984	-0.002	1328	1649	M.OIL (C24-C38)	103843	8
C12	2.620	0.000	402	124	AK-102 (C10-C25)	123506	5
C14	3.142	-0.013	1278	1427	AK-103 (C25-C36)	92625	11
C16	3.617	-0.005	1120	859			
C18	4.042	0.000	571	525			
C20	4.435	0.004	473	654			
C22	4.825	0.005	217	171			
C24	5.318	0.002	351	312			
C25	5.542	-0.001	205	194			
C26	5.754	0.010	11410	7899			
C28	6.095	-0.004	943	1002			
C32	6.685	-0.009	2723	3672	JP-4 (Tol-C14)	180756	11
C34	6.961	0.003	702	625	BUNKERC (C10-C38)	227120	27
Filter Peak	----						
C36	7.231	0.023	891	953			
C38	7.443	-0.005	908	1123			
C40	7.715	0.002	843	248			
o-terph	4.161	0.000	1536381	842527	JET-A (C10-C18)	99322	7
Triacon Surr	6.418	-0.002	1190324	863973	JP8 (Tol-C16)	192867	11

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

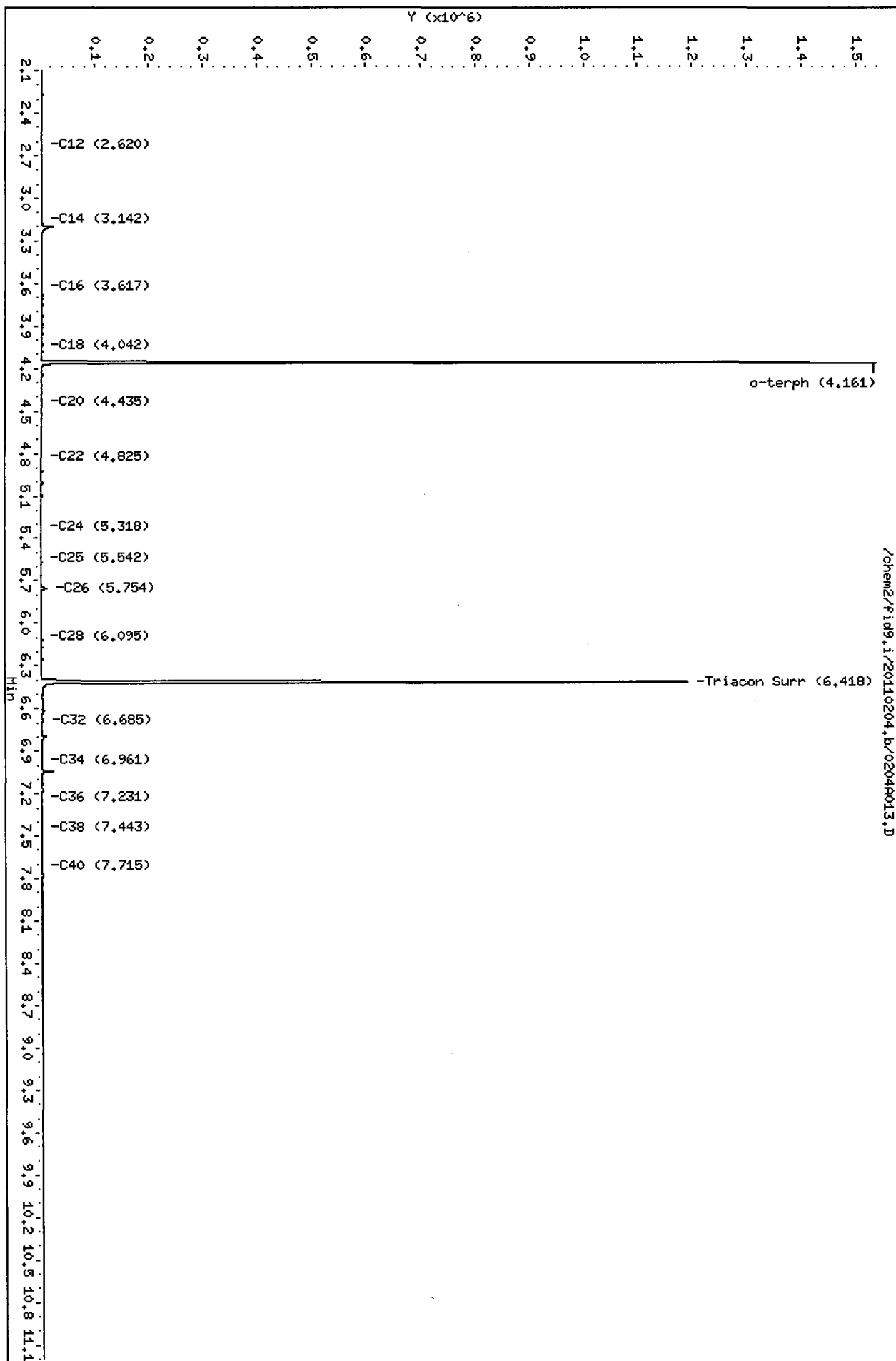
Surrogate	Area	Amount	%Rec
o-Terphenyl	842527	39.3	87.4
Triacontane	863973	49.0	108.9

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13:00061

Data File: /chem2/fid9.i/20110204.b/02040013.D
Date : 04-FEB-2011 20:32
Client ID: B41-02-15
Sample Info: SH13D
Column phase: RTX-1

Instrument: fid9.i
Operator: PC
Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A014.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13E
Client ID: B11-02-20
Injection: 04-FEB-2011 20:53
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.327	0.021	18017	21665	GAS (Tol-C12)	162381	8
C8	1.374	-0.002	6897	5597	DIESEL (C12-C24)	94586	4
C10	1.986	0.000	1522	2298	M.OIL (C24-C38)	61414	5
C12	2.625	0.005	558	565	AK-102 (C10-C25)	126186	5
C14	3.143	-0.013	1849	2351	AK-103 (C25-C36)	51603	6
C16	3.615	-0.007	2555	1654			
C18	4.052	0.010	527	319			
C20	4.435	0.004	538	457			
C22	4.824	0.004	333	269			
C24	5.317	0.001	287	237			
C25	5.541	-0.002	327	285			
C26	5.742	-0.002	339	247			
C28	6.094	-0.004	1045	1076			
C32	6.685	-0.009	2492	2979	JP-4 (Tol-C14)	185239	11
C34	6.954	-0.003	701	828	BUNKERC (C10-C38)	187340	22
Filter Peak	----						
C36	7.210	0.002	705	616			
C38	7.444	-0.004	735	536			
C40	7.716	0.003	638	174			
o-terph	4.160	-0.001	1555459	875932	JET-A (C10-C18)	108968	8
Triacon Surr	6.417	-0.002	1319481	896985	JP8 (Tol-C16)	206051	12

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

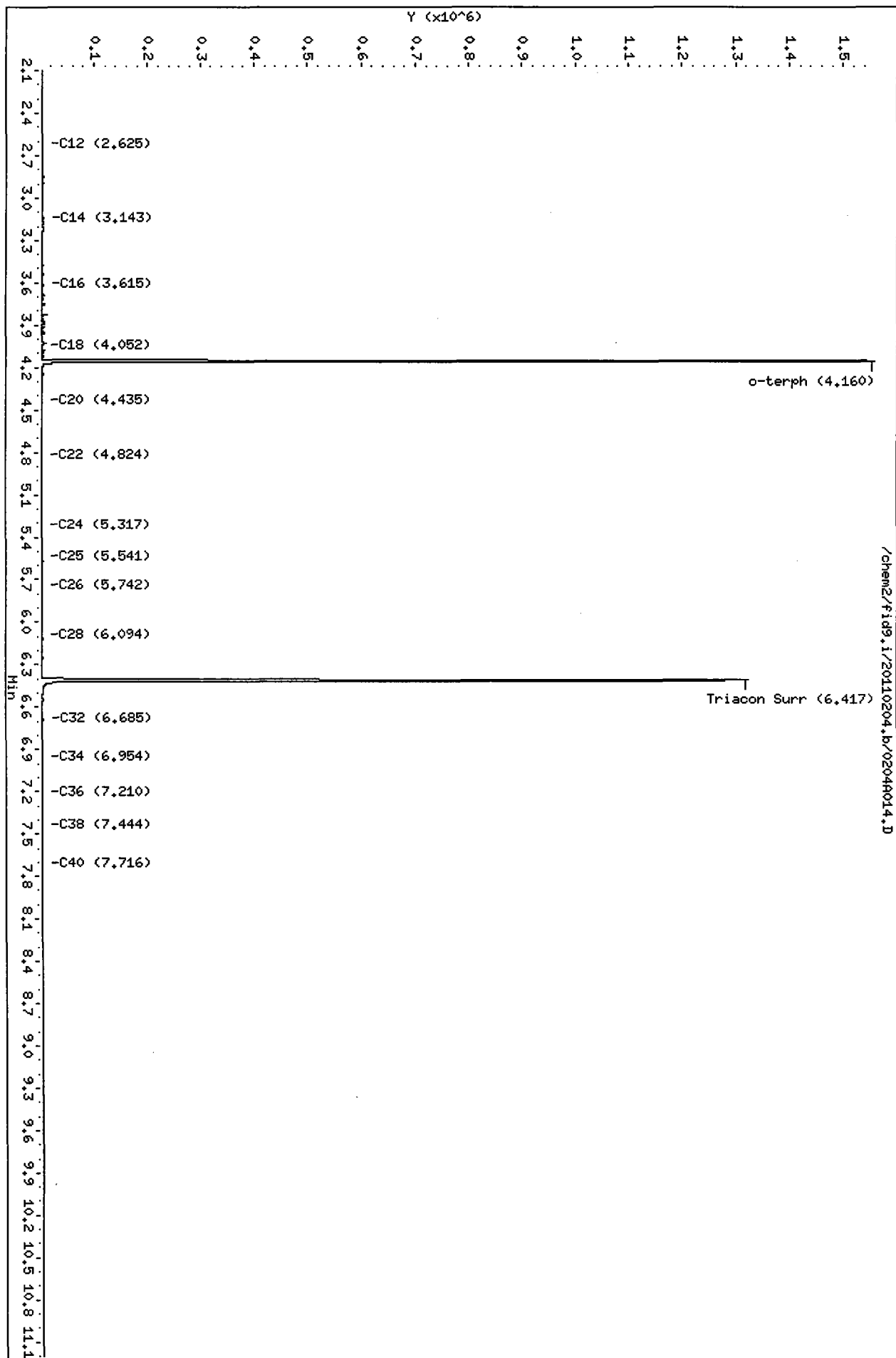
Surrogate	Area	Amount	%Rec
o-Terphenyl	875932	40.9	90.9
Triacontane	896985	50.9	113.1

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

Handwritten signature/initials

Data File: /chem2/fid9.i/20110204.b/02040014.D
Date : 04-FEB-2011 20:53
Client ID: B41-02-20
Sample Info: SH13E
Column phase: RTX-1

Instrument: fid9.i
Operator: PC
Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110205.b/0205A007.D
Method: /chem2/fid9.i/20110205.b/ftphfid9a.m
Instrument: fid9.i
Operator: AR
Report Date: 02/07/2011

ARI ID: SH13F
Client ID: B11-02-23.5
Injection: 05-FEB-2011 11:26
Dilution Factor: 50
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.359	0.053	4676	5627	GAS (Tol-C12)	1154809	55
C8	1.377	0.084	3540	2947	DIESEL (C12-C24)	17923496	791
C10	1.977	-0.006	9512	13390	M.OIL (C24-C38)	601705	45
C12	2.626	0.008	35597	20700	AK-102 (C10-C25)	19047942	746
C14	3.154	-0.001	202793	123347	AK-103 (C25-C36)	494386	58
C16	3.614	-0.007	213020	197235			
C18	4.041	0.000	196471	84021			
C20	4.428	0.001	155113	61447			
C22	4.815	-0.004	49374	42333			
C24	5.310	-0.005	14396	8898			
C25	5.542	0.001	10411	2610			
C26	5.738	-0.003	7942	3352			
C28	6.102	0.006	5791	1262			
C32	6.686	-0.001	2562	1592	JP-4 (Tol-C14)	4142221	253
C34	6.951	0.003	2020	678	BUNKERC (C10-C38)	19558336	2312
Filter Peak	----						
C36	7.199	0.002	1330	867			
C38	7.432	-0.004	1068	416			
C40	7.703	0.001	611	327			
o-terph	----				JET-A (C10-C18)	12980719	939
Triacon Surr	----				JP8 (Tol-C16)	8424795	479

M Indicates manual integration within range.

Range Times: NW Diesel(2.619 - 5.315) AK102(1.98 - 5.54) Jet A(1.98 - 4.04)
NW M.Oil(5.31 - 7.44) AK103(5.54 - 7.20) OR Diesel(1.98 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacontane	0	0.0	0.0

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13:00065

Data File: /chem2/fid9.i/20110205.b/02050007.D

Date : 05-FEB-2011 11:26

Client ID: BL1-02-23.5

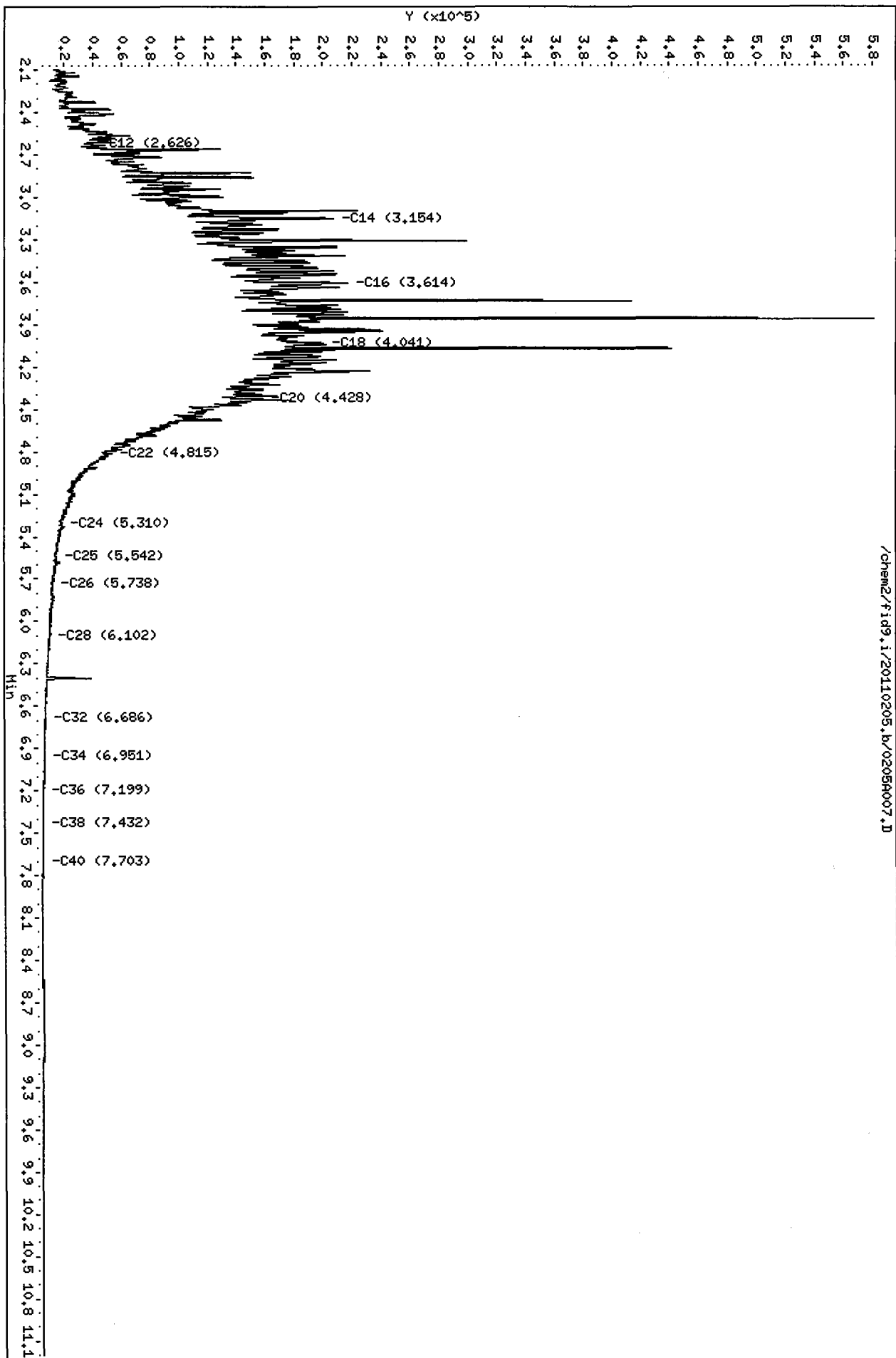
Sample Info: SH13F,50

Column phase: RTX-1

Instrument: fid9.i

Operator: AR

Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110205.b/0205A008.D
Method: /chem2/fid9.i/20110205.b/ftphfid9a.m
Instrument: fid9.i
Operator: AR
Report Date: 02/07/2011

ARI ID: SH13G
Client ID: B11-02-30
Injection: 05-FEB-2011 11:47
Dilution Factor: 100
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.357	0.051	3941	4949	GAS (Tol-C12)	1548051	74
C8	1.377	0.083	3088	2012	DIESEL (C12-C24)	19447929	859
C10	1.976	-0.007	14298	19808	M.OIL (C24-C38)	1346913	102
C12	2.626	0.007	43034	23000	AK-102 (C10-C25)	20988266	822
C14	3.146	-0.009	309498	381648	AK-103 (C25-C36)	1138834	134
C16	3.622	0.001	182809	66763			
C18	4.039	-0.002	201214	35608			
C20	4.430	0.002	168114	92783			
C22	4.822	0.003	55726	18174			
C24	5.308	-0.007	23189	20039			
C25	5.541	-0.001	19453	5710			
C26	5.740	-0.001	16955	10943			
C28	6.096	0.000	15289	9442			
C32	6.679	-0.008	7465	7358	JP-4 (Tol-C14)	5112936	312
C34	6.951	0.003	5933	5601	BUNKERC (C10-C38)	22172434	2621
Filter Peak	----						
C36	7.198	0.001	4043	1173			
C38	7.439	0.004	2895	1137			
C40	7.708	0.005	1607	857			
o-terph	----				JET-A (C10-C18)	14426168	1044
Triacon Surr	----				JP8 (Tol-C16)	9609182	546

M Indicates manual integration within range.

Range Times: NW Diesel(2.619 - 5.315) AK102(1.98 - 5.54) Jet A(1.98 - 4.04)
NW M.Oil(5.31 - 7.44) AK103(5.54 - 7.20) OR Diesel(1.98 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacotane	0	0.0	0.0

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13:00067

Data File: /chem2/fid9.i/20110205.b/02050008.D

Date : 05-FEB-2011 11:47

Client ID: B41-02-30

Sample Info: SH13G,100

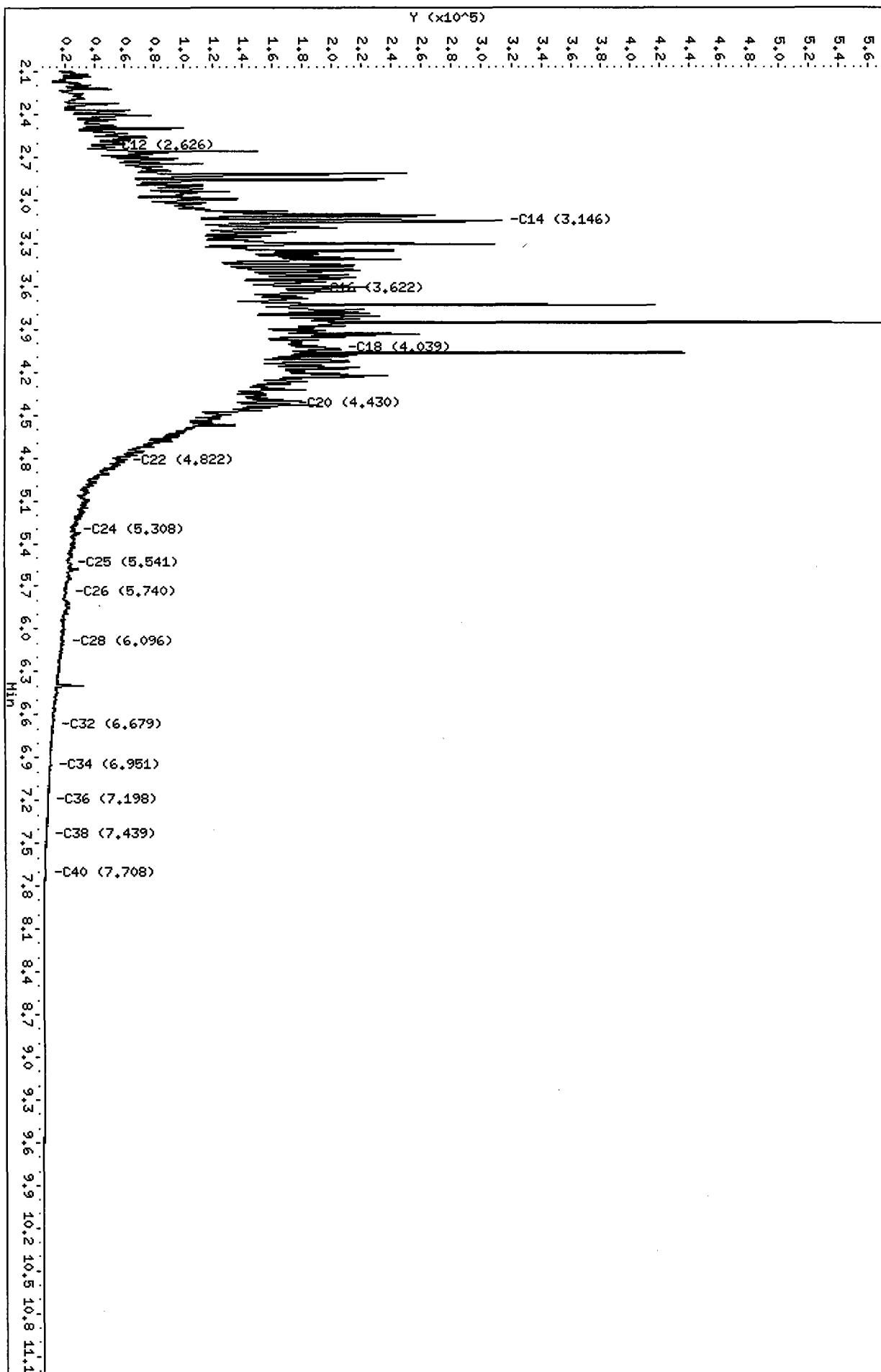
Column phase: RTX-1

Instrument: fid9.i

Operator: AR

Column diameter: 0.25

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Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A019.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13H
Client ID: B11-03-15
Injection: 04-FEB-2011 22:40
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.322	0.016	14566	16188	GAS (Tol-C12)	119604	6
C8	1.373	-0.003	5620	9008	DIESEL (C12-C24)	51040	2
C10	1.985	-0.002	1229	1786	M.OIL (C24-C38)	43798	3
C12	2.616	-0.004	282	180	AK-102 (C10-C25)	72237	3
C14	3.156	0.001	291	382	AK-103 (C25-C36)	34662	4
C16	3.619	-0.003	1756	1332			
C18	4.042	0.000	504	423			
C20	4.436	0.005	275	85			
C22	4.824	0.004	124	105			
C24	5.320	0.004	102	118			
C25	5.538	-0.005	120	135			
C26	5.743	-0.001	124	88			
C28	6.096	-0.002	522	393			
C32	6.686	-0.008	1882	2190	JP-4 (Tol-C14)	128151	8
C34	6.954	-0.003	575	685	BUNKERC (C10-C38)	115833	14
Filter Peak	----						
C36	7.206	-0.002	696	1001			
C38	7.449	0.002	796	1302			
C40	7.711	-0.002	668	425			
o-terph	4.161	0.000	1469775	846687	JET-A (C10-C18)	60777	4
Triacon Surr	6.418	-0.001	1201033	859799	JP8 (Tol-C16)	137571	8

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

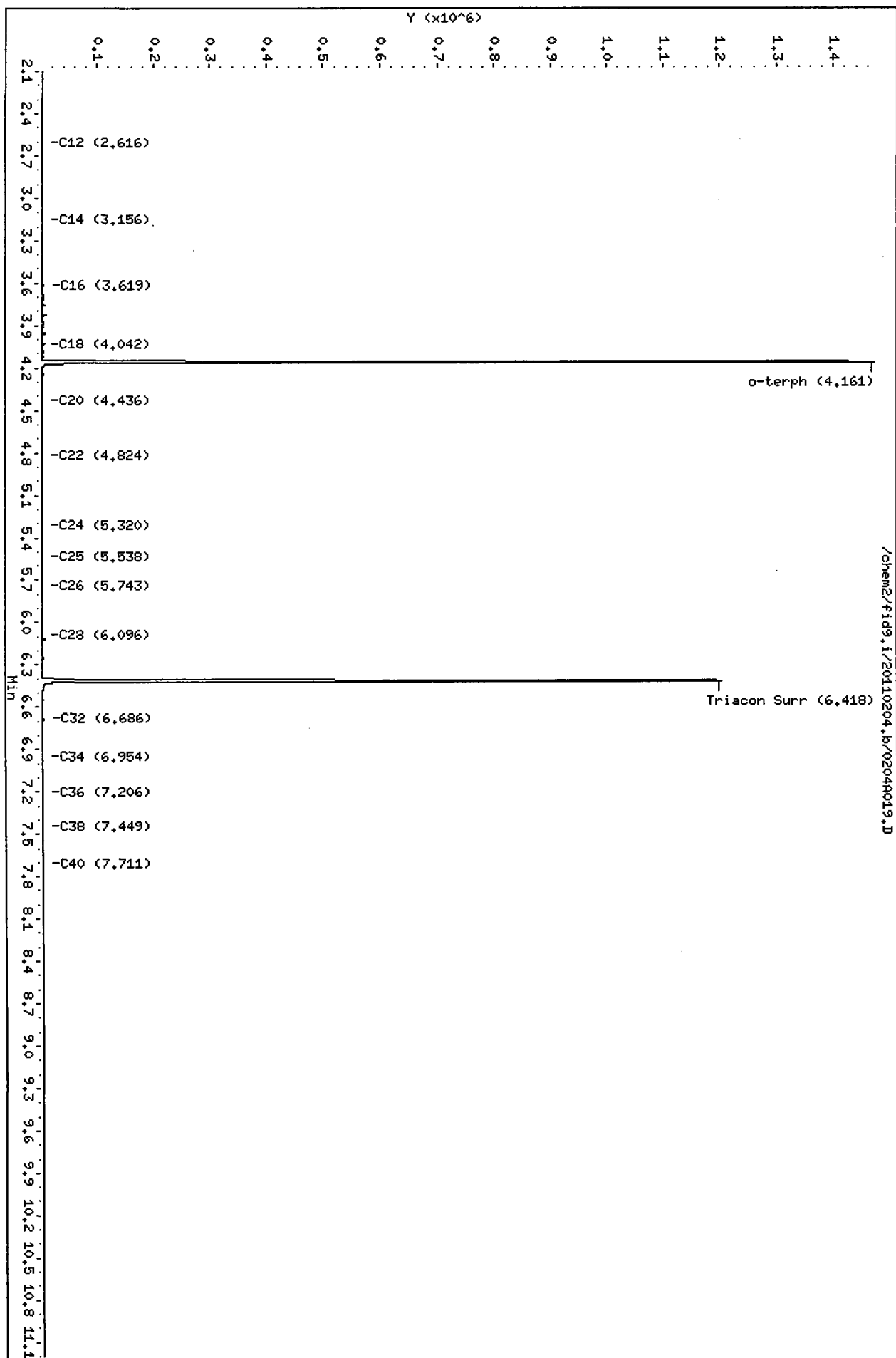
Surrogate	Area	Amount	%Rec
o-Terphenyl	846687	39.5	87.9
Triacontane	859799	48.8	108.4

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13:00069

Data File: /chem2/fid9.i/20110204.b/02040019.D
Date : 04-FEB-2011 22:40
Client ID: B41-03-15
Sample Info: SH13H
Column phase: RTX-1

Instrument: fid9.i
Operator: PC
Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A020.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13I
Client ID: B11-03-20
Injection: 04-FEB-2011 23:01
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.324	0.018	16096	21509	GAS (Tol-C12)	150788	7
C8	1.378	0.002	7704	9089	DIESEL (C12-C24)	75704	3
C10	1.986	-0.001	1525	1978	M.OIL (C24-C38)	37315	3
C12	2.627	0.007	473	295	AK-102 (C10-C25)	104804	4
C14	3.151	-0.004	606	818	AK-103 (C25-C36)	29350	3
C16	3.619	-0.003	1314	1039			
C18	4.042	0.000	1159	1066			
C20	4.435	0.005	955	1226			
C22	4.822	0.002	458	176			
C24	5.319	0.003	240	239			
C25	5.539	-0.004	305	258			
C26	5.739	-0.005	259	171			
C28	6.092	-0.006	727	614			
C32	6.682	-0.012	1988	2031	JP-4 (Tol-C14)	165679	10
C34	6.966	0.008	300	120	BUNKERC (C10-C38)	141593	17
Filter Peak	----						
C36	7.201	-0.007	484	587			
C38	7.440	-0.007	644	967			
C40	7.712	-0.001	574	338			
o-terph	4.162	0.001	1561166	874917	JET-A (C10-C18)	77629	6
Triacon Surr	6.413	-0.006	1307915	889613	JP8 (Tol-C16)	179035	10

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

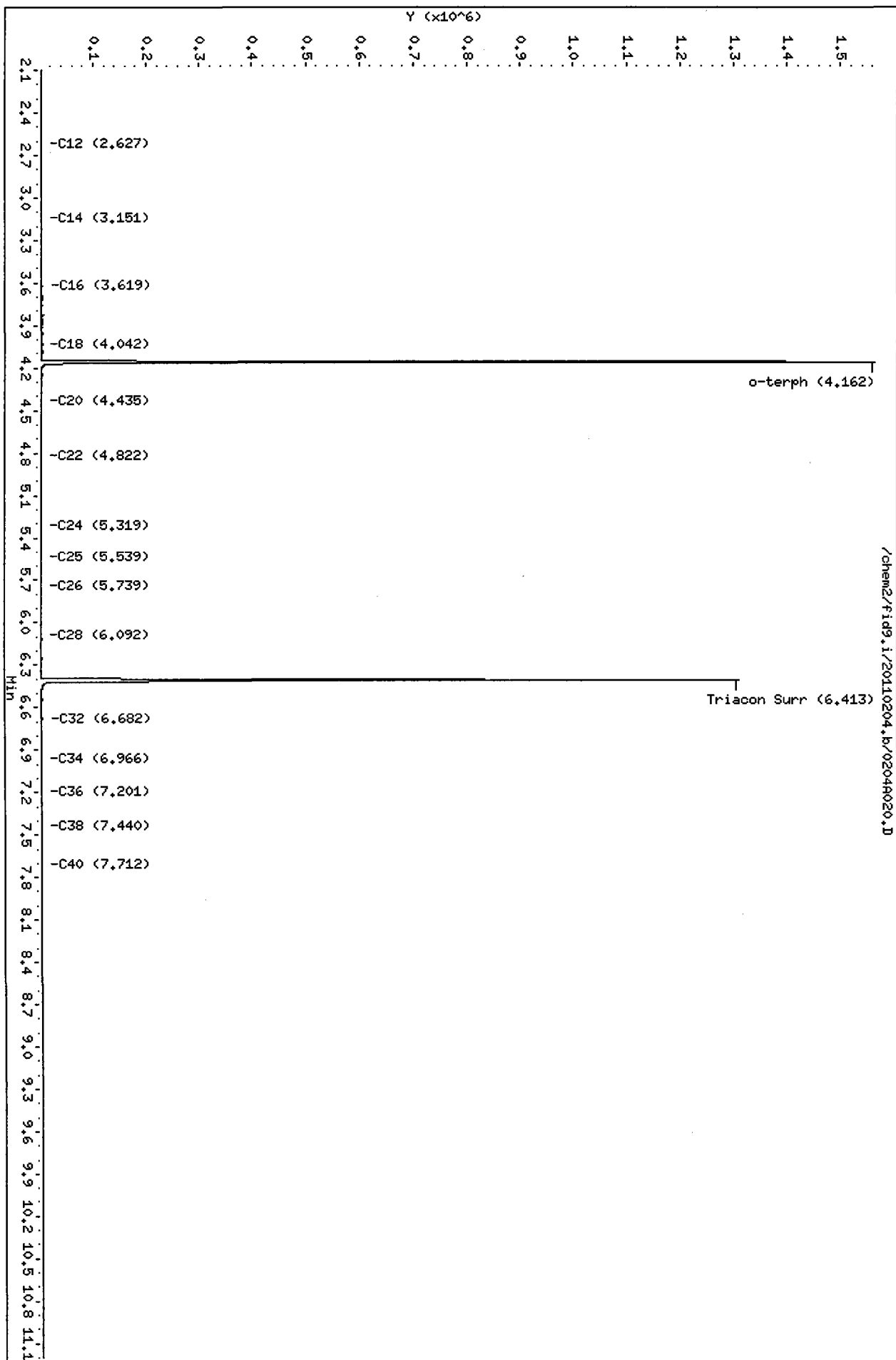
Surrogate	Area	Amount	%Rec
o-Terphenyl	874917	40.9	90.8
Triacontane	889613	50.5	112.2

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13:00071

Data File: /chem2/fid9.i/20110204.b/02040020.D
Date : 04-FEB-2011 23:01
Client ID: B11-03-20
Sample Info: SH131
Column phase: RTX-1

Instrument: fid9.i
Operator: PC
Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A021.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13K
Client ID: B11-03-25
Injection: 04-FEB-2011 23:23
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.324	0.018	12574	14244	GAS (Tol-C12)	112361	5
C8	1.377	0.002	6225	9686	DIESEL (C12-C24)	84764	4
C10	1.986	0.000	1244	1596	M.OIL (C24-C38)	50639	4
C12	2.614	-0.006	350	207	AK-102 (C10-C25)	106303	4
C14	3.157	0.002	386	373	AK-103 (C25-C36)	41098	5
C16	3.616	-0.006	4622	2720			
C18	4.042	0.000	654	322			
C20	4.438	0.007	239	306			
C22	4.824	0.004	180	159			
C24	5.317	0.001	178	197			
C25	5.539	-0.004	236	202			
C26	5.739	-0.005	217	156			
C28	6.093	-0.006	766	638			
C32	6.682	-0.012	2235	2439	JP-4 (Tol-C14)	123519	8
C34	6.949	-0.009	744	1318	BUNKERC (C10-C38)	156718	19
Filter Peak	----						
C36	7.204	-0.004	758	1065			
C38	7.441	-0.007	757	1129			
C40	7.715	0.002	631	642			
o-terph	4.161	0.000	1574766	904501	JET-A (C10-C18)	91282	7
Triacon Surr	6.415	-0.005	1321574	939966	JP8 (Tol-C16)	135469	8

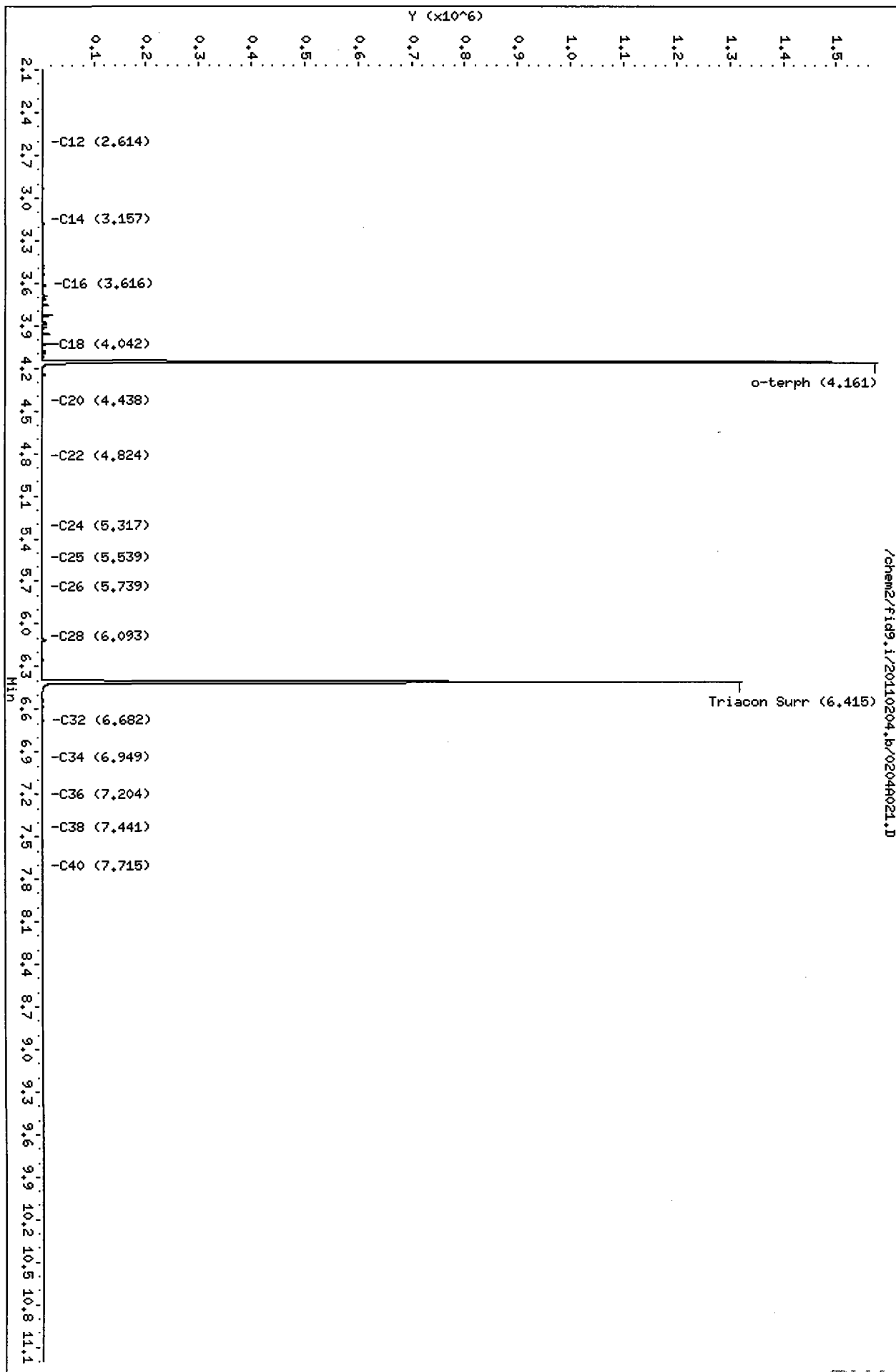
M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	904501	42.2	93.9
Triacontane	939966	53.3	118.5

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13:00073



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A022.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13L
Client ID: B11-03-29
Injection: 04-FEB-2011 23:44
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.324	0.018	14292	15483	GAS (Tol-C12)	117927	6
C8	1.377	0.001	6248	12456	DIESEL (C12-C24)	31587	1
C10	1.986	-0.001	1323	1692	M.OIL (C24-C38)	56568	4
C12	2.615	-0.005	317	182	AK-102 (C10-C25)	54640	2
C14	3.151	-0.005	225	210	AK-103 (C25-C36)	45535	5
C16	3.619	-0.003	857	639			
C18	4.042	-0.001	360	167			
C20	4.438	0.007	224	201			
C22	4.825	0.004	179	150			
C24	5.319	0.002	162	187			
C25	5.541	-0.002	226	233			
C26	5.741	-0.003	252	222			
C28	6.094	-0.005	921	708			
C32	6.685	-0.009	2331	2598	JP-4 (Tol-C14)	125201	8
C34	6.951	-0.007	714	902	BUNKERC (C10-C38)	110865	13
Filter Peak	----						
C36	7.204	-0.005	739	770			
C38	7.443	-0.004	852	1173			
C40	7.712	-0.002	747	673			
o-terph	4.161	0.000	1568855	892596	JET-A (C10-C18)	46575	3
Triacon Surr	6.416	-0.004	1294923	902104	JP8 (Tol-C16)	130078	7

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	892596	41.7	92.6
Triacantane	902104	51.2	113.7

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13:00075

Data File: /chem2/fid9.i/20110204.b/02040022.D

Date : 04-FEB-2011 23:44

Client ID: B41-03-29

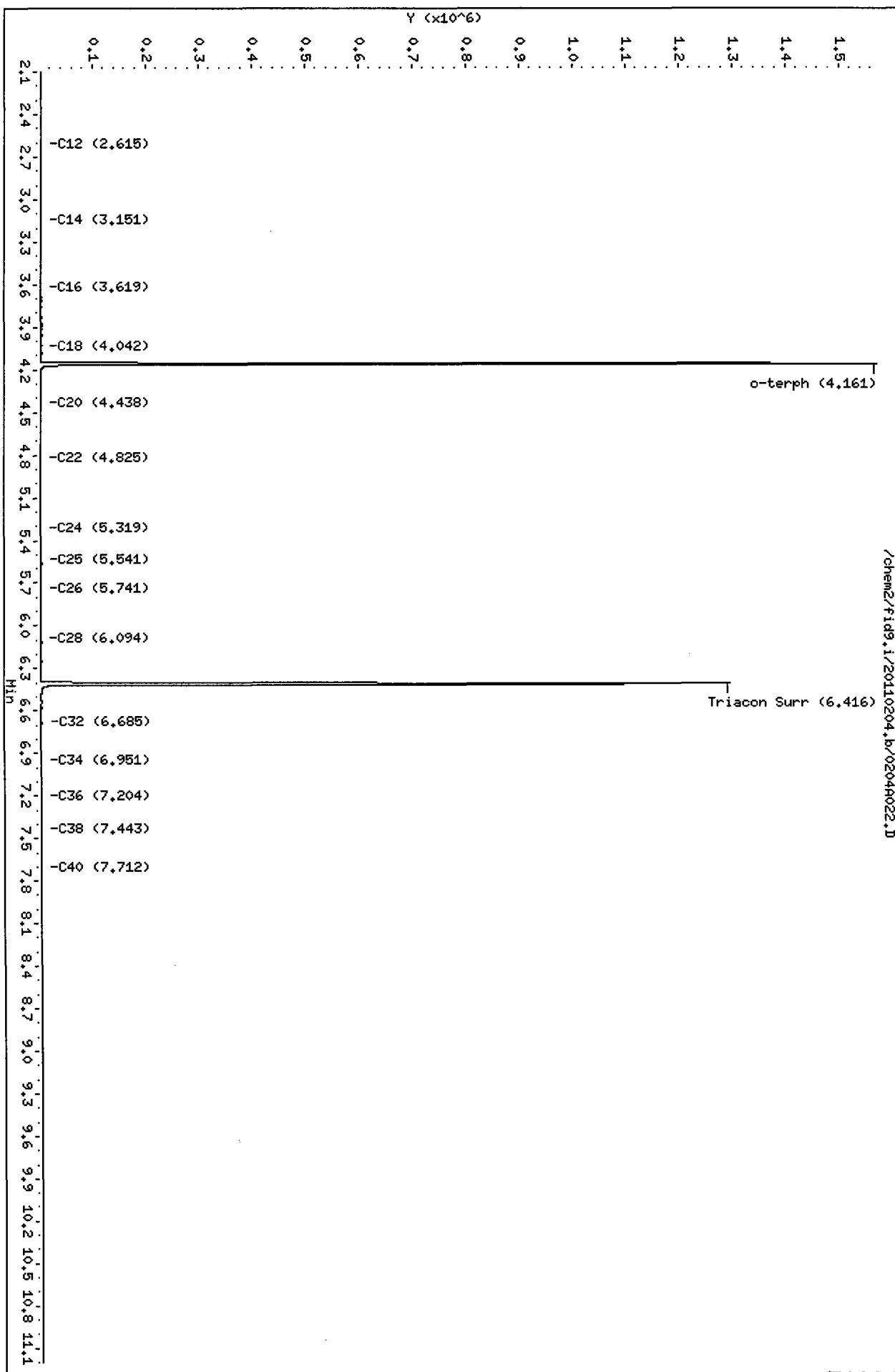
Sample Info: SH13L

Column phase: RTX-1

Instrument: fid9.i

Operator: PC

Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A023.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13M
Client ID: B11-04-15
Injection: 05-FEB-2011 00:05
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.325	0.019	14650	21945	GAS (Tol-C12)	124677	6
C8	1.386	0.010	5589	8331	DIESEL (C12-C24)	33882	1
C10	1.988	0.002	1343	2183	M.OIL (C24-C38)	46952	4
C12	2.618	-0.002	375	160	AK-102 (C10-C25)	58843	2
C14	3.159	0.004	238	149	AK-103 (C25-C36)	38475	5
C16	3.620	-0.002	923	601			
C18	4.053	0.011	171	119			
C20	4.431	0.000	88	12			
C22	4.825	0.005	98	88			
C24	5.318	0.002	121	141			
C25	5.542	0.000	167	160			
C26	5.741	-0.003	188	118			
C28	6.095	-0.004	698	615			
C32	6.683	-0.011	2076	2331	JP-4 (Tol-C14)	133144	8
C34	6.949	-0.009	649	1355	BUNKERC (C10-C38)	105582	12
Filter Peak	----						
C36	7.202	-0.006	697	860			
C38	7.438	-0.009	775	968			
C40	7.709	-0.004	714	613			
o-terph	4.161	0.000	1536777	848968	JET-A (C10-C18)	52420	4
Triacon Surr	6.415	-0.005	1214084	880222	JP8 (Tol-C16)	139000	8

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	848968	39.6	88.1
Triacotane	880222	49.9	111.0

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

Data File: /chem2/fid9.i/20110204.b/02040023.D

Date : 05-FEB-2011 00:05

Client ID: B41-04-15

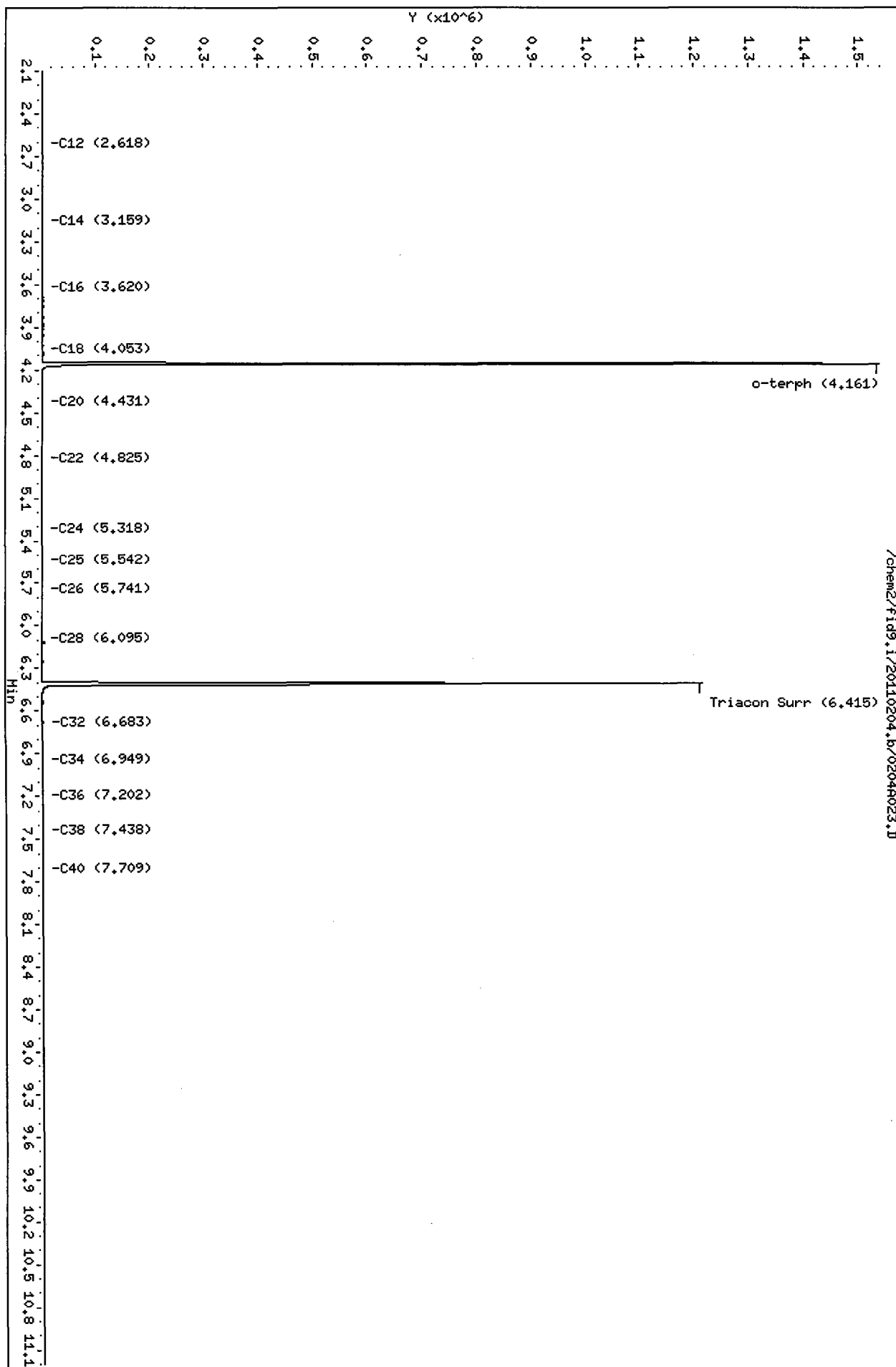
Sample Info: SH13H

Column phase: RTX-1

Instrument: fid9.i

Operator: PC

Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A024.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13N
Client ID: B11-04-20
Injection: 05-FEB-2011 00:26
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.347	0.041	5404	6461	GAS (Tol-C12)	114132	5
C8	1.381	0.006	5075	4937	DIESEL (C12-C24)	43461	2
C10	1.991	0.004	1405	2088	M.OIL (C24-C38)	50838	4
C12	2.619	-0.001	439	375	AK-102 (C10-C25)	71031	3
C14	3.152	-0.003	290	320	AK-103 (C25-C36)	40447	5
C16	3.620	-0.002	1201	845			
C18	4.042	0.000	430	342			
C20	4.428	-0.003	115	24			
C22	4.827	0.007	152	142			
C24	5.320	0.004	167	156			
C25	5.541	-0.001	203	209			
C26	5.742	-0.002	204	147			
C28	6.095	-0.003	663	578			
C32	6.684	-0.010	2199	2332	JP-4 (Tol-C14)	124674	8
C34	6.952	-0.005	798	1570	BUNKERC (C10-C38)	121578	14
Filter Peak	----						
C36	7.205	-0.003	825	987			
C38	7.443	-0.005	920	1480			
C40	7.713	0.000	785	248			
o-terph	4.160	-0.001	1439156	824359	JET-A (C10-C18)	62348	5
Triacon Surr	6.416	-0.003	1202050	863593	JP8 (Tol-C16)	131842	7

M Indicates manual integration within range.

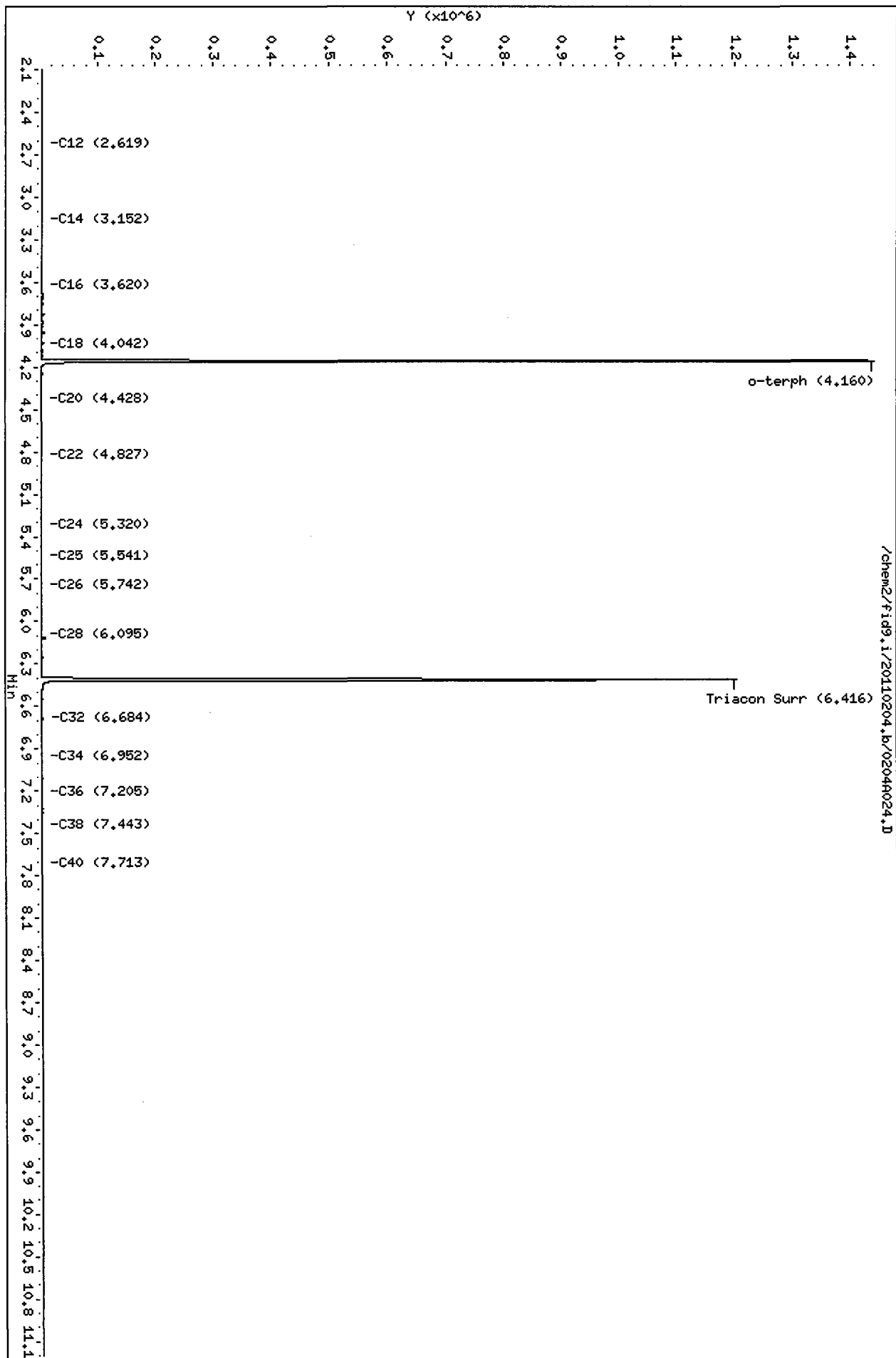
Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	824359	38.5	85.5
Triacontane	863593	49.0	108.9

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

Data File: /chem2/fid9.i/20110204.b/02040024.D
Date : 05-FEB-2011 00:26
Client ID: B41-04-20
Sample Info: SH13N
Column phase: RTX-1

Instrument: fid9.i
Operator: PC
Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A025.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH130
Client ID: B11-04-25
Injection: 05-FEB-2011 00:48
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.384	0.077	7712	7289	GAS (Tol-C12)	123891	6
C8	1.375	0.000	6800	5295	DIESEL (C12-C24)	50077	2
C10	1.989	0.002	1477	1874	M.OIL (C24-C38)	61712	5
C12	2.615	-0.006	625	695	AK-102 (C10-C25)	82303	3
C14	3.151	-0.005	346	241	AK-103 (C25-C36)	50528	6
C16	3.621	-0.001	1213	815			
C18	4.043	0.001	402	304			
C20	4.430	-0.001	147	36			
C22	4.825	0.005	160	157			
C24	5.319	0.002	204	213			
C25	5.541	-0.002	201	157			
C26	5.754	0.010	4158	3238			
C28	6.094	-0.005	778	650			
C32	6.686	-0.008	2404	2499	JP-4 (Tol-C14)	136946	8
C34	6.954	-0.003	1001	1815	BUNKERC (C10-C38)	143779	17
Filter Peak	----						
C36	7.211	0.002	1085	1444			
C38	7.449	0.002	983	1479			
C40	7.709	-0.004	729	344			
o-terph	4.161	0.000	1483826	854322	JET-A (C10-C18)	73089	5
Triacon Surr	6.416	-0.003	1226093	894623	JP8 (Tol-C16)	148506	8

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

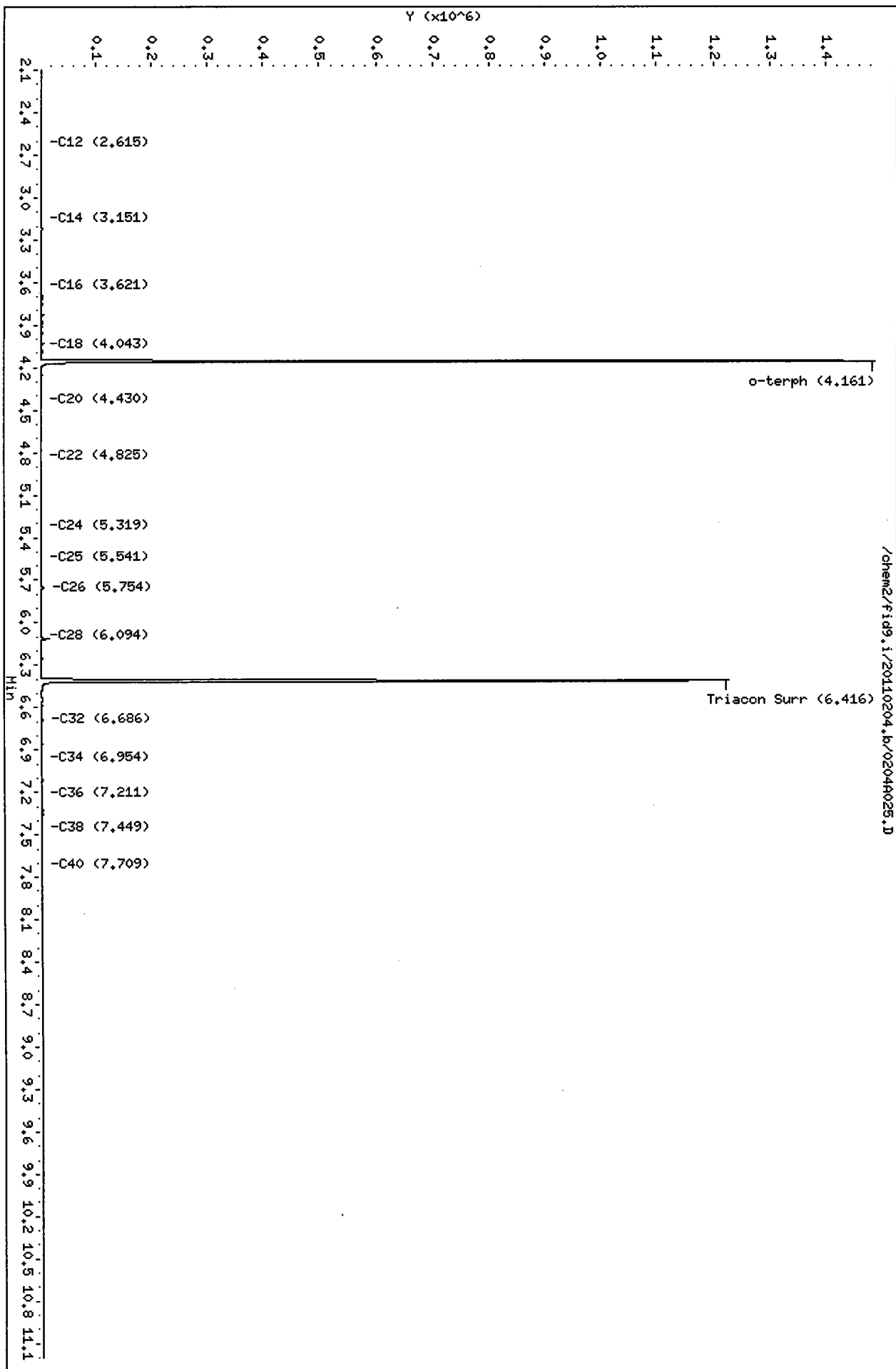
Surrogate	Area	Amount	%Rec
o-Terphenyl	854322	39.9	88.6
Triacontane	894623	50.8	112.8

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

Handwritten signature: 20 JAN 11

Data File: /chem2/fid9.i/20110204.b/0204025.D
Date : 05-FEB-2011 00:48
Client ID: B11-04-25
Sample Info: SH130
Column phase: RTX-1

Instrument: fid9.i
Operator: PC
Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A026.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13P
Client ID: B11-05-15
Injection: 05-FEB-2011 01:09
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.326	0.020	15057	17862	GAS (Tol-C12)	131853	6
C8	1.384	0.009	5934	13822	DIESEL (C12-C24)	41442	2
C10	1.987	0.001	1403	1784	M.OIL (C24-C38)	40879	3
C12	2.625	0.005	591	541	AK-102 (C10-C25)	74560	3
C14	3.153	-0.002	418	500	AK-103 (C25-C36)	32853	4
C16	3.620	-0.002	1026	725			
C18	4.042	0.000	358	193			
C20	4.439	0.008	271	215			
C22	4.827	0.006	229	242			
C24	5.318	0.001	261	248			
C25	5.538	-0.004	395	341			
C26	5.740	-0.004	421	376			
C28	6.095	-0.004	865	658			
C32	6.685	-0.009	2114	2268	JP-4 (Tol-C14)	145918	9
C34	6.962	0.004	404	213	BUNKERC (C10-C38)	115168	14
Filter Peak	----						
C36	7.206	-0.002	559	426			
C38	7.444	-0.004	663	1108			
C40	7.715	0.002	629	523			
o-terph	4.160	-0.001	1556460	866936	JET-A (C10-C18)	66721	5
Triacon Surr	6.416	-0.003	1310373	887394	JP8 (Tol-C16)	152729	9

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

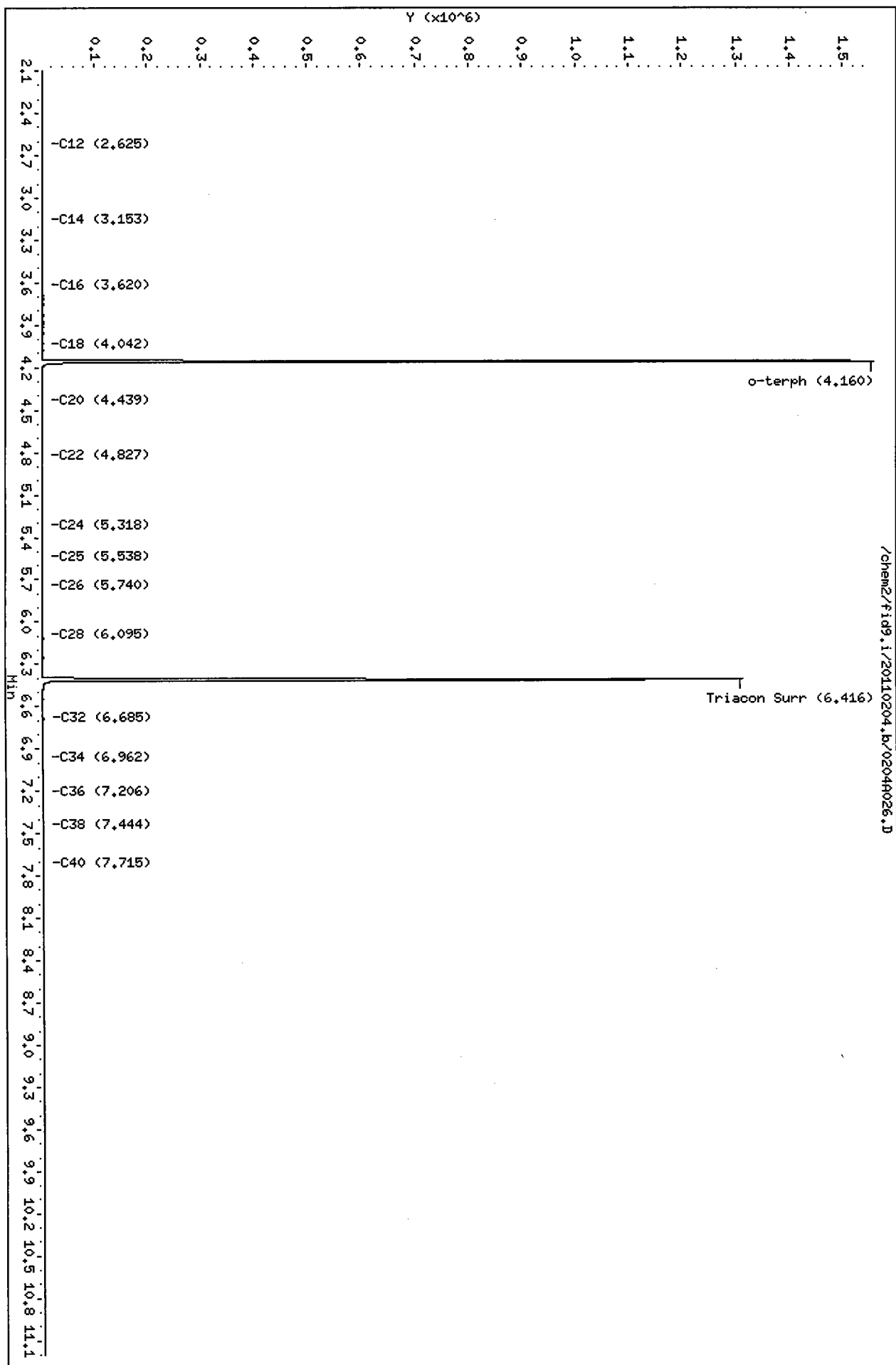
Surrogate	Area	Amount	%Rec
o-Terphenyl	866936	40.5	90.0
Triacontane	887394	50.3	111.9

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13:00083

Data File: /chem2/fid9.i/20110204.b/02040026.D
Date : 05-FEB-2011 01:09
Client ID: B11-05-15
Sample Info: SH13P
Column phase: RTX-1

Instrument: fid9.i
Operator: PC
Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A027.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13Q
Client ID: B11-05-20
Injection: 05-FEB-2011 01:30
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.350	0.044	3781	678	GAS (Tol-C12)	113159	5
C8	1.374	-0.001	4853	4410	DIESEL (C12-C24)	49425	2
C10	1.987	0.001	1468	1688	M.OIL (C24-C38)	37321	3
C12	2.616	-0.004	706	193	AK-102 (C10-C25)	86450	3
C14	3.151	-0.004	539	816	AK-103 (C25-C36)	30723	4
C16	3.621	-0.001	1216	896			
C18	4.040	-0.002	367	298			
C20	4.438	0.008	177	198			
C22	4.828	0.007	103	78			
C24	5.318	0.002	111	107			
C25	5.543	0.000	152	141			
C26	5.741	-0.003	191	118			
C28	6.095	-0.004	639	545			
C32	6.686	-0.008	1948	2072	JP-4 (Tol-C14)	130303	8
C34	6.953	-0.004	484	710	BUNKERC (C10-C38)	123589	15
Filter Peak	----						
C36	7.207	-0.001	544	963			
C38	7.443	-0.004	624	558			
C40	7.715	0.002	647	456			
o-terph	4.160	-0.001	1446474	836849	JET-A (C10-C18)	79669	6
Triacon Surr	6.416	-0.003	1211357	859977	JP8 (Tol-C16)	140248	8

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	836849	39.1	86.8
Triacontane	859977	48.8	108.4

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13: 00085

Data File: /chem2/fid9.i/20110204.b/02040027.D

Date : 05-FEB-2011 01:30

Client ID: B41-05-20

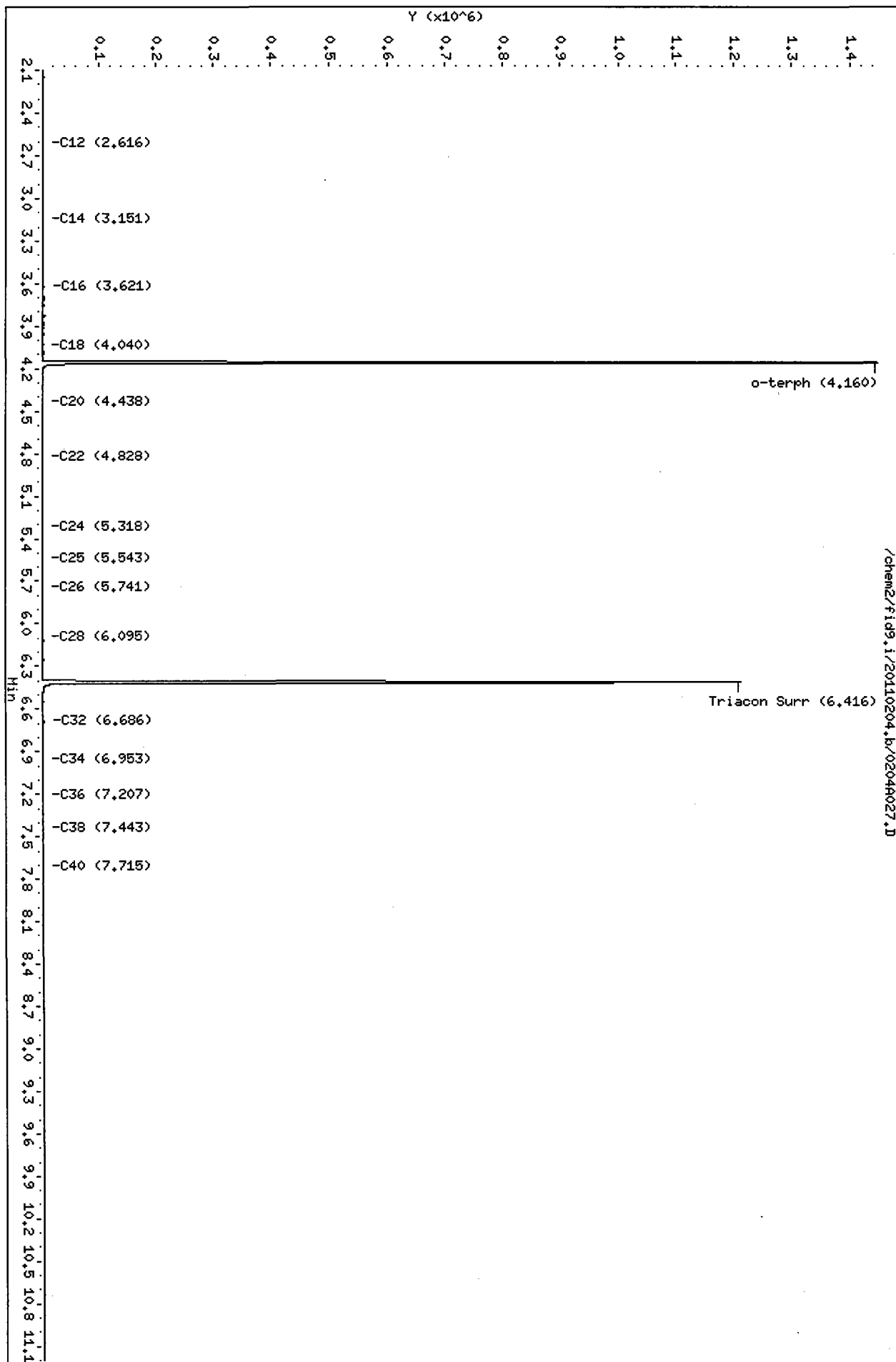
Sample Info: SH130

Column phase: RTX-1

Instrument: fid9.i

Operator: PC

Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A028.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13R
Client ID: B11-05-25
Injection: 05-FEB-2011 01:52
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.353	0.046	4161	2317	GAS (Tol-C12)	110097	5
C8	1.380	0.004	6380	9943	DIESEL (C12-C24)	77742	3
C10	1.988	0.002	1381	1561	M.OIL (C24-C38)	62338	5
C12	2.630	0.010	460	550	AK-102 (C10-C25)	104286	4
C14	3.158	0.003	355	467	AK-103 (C25-C36)	52192	6
C16	3.615	-0.006	3290	2079			
C18	4.040	-0.002	684	346			
C20	4.435	0.004	389	289			
C22	4.823	0.003	282	237			
C24	5.317	0.000	250	203			
C25	5.538	-0.005	312	286			
C26	5.739	-0.005	303	214			
C28	6.092	-0.006	908	769			
C32	6.683	-0.011	2477	2566	JP-4 (Tol-C14)	120784	7
C34	6.950	-0.007	1050	1769	BUNKERC (C10-C38)	166008	20
Filter Peak	----						
C36	7.206	-0.002	985	1332			
C38	7.445	-0.002	827	1127			
C40	7.711	-0.002	578	181			
o-terph	4.159	-0.002	1526060	884582	JET-A (C10-C18)	88642	6
Triacon Surr	6.416	-0.003	1250628	907844	JP8 (Tol-C16)	130812	7

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	884582	41.3	91.8
Triacotane	907844	51.5	114.5

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

20 JAN 11

Data File: /chem2/fid9.i/20110204.b/02040028.D

Date : 05-FEB-2011 01:52

Client ID: B41-05-25

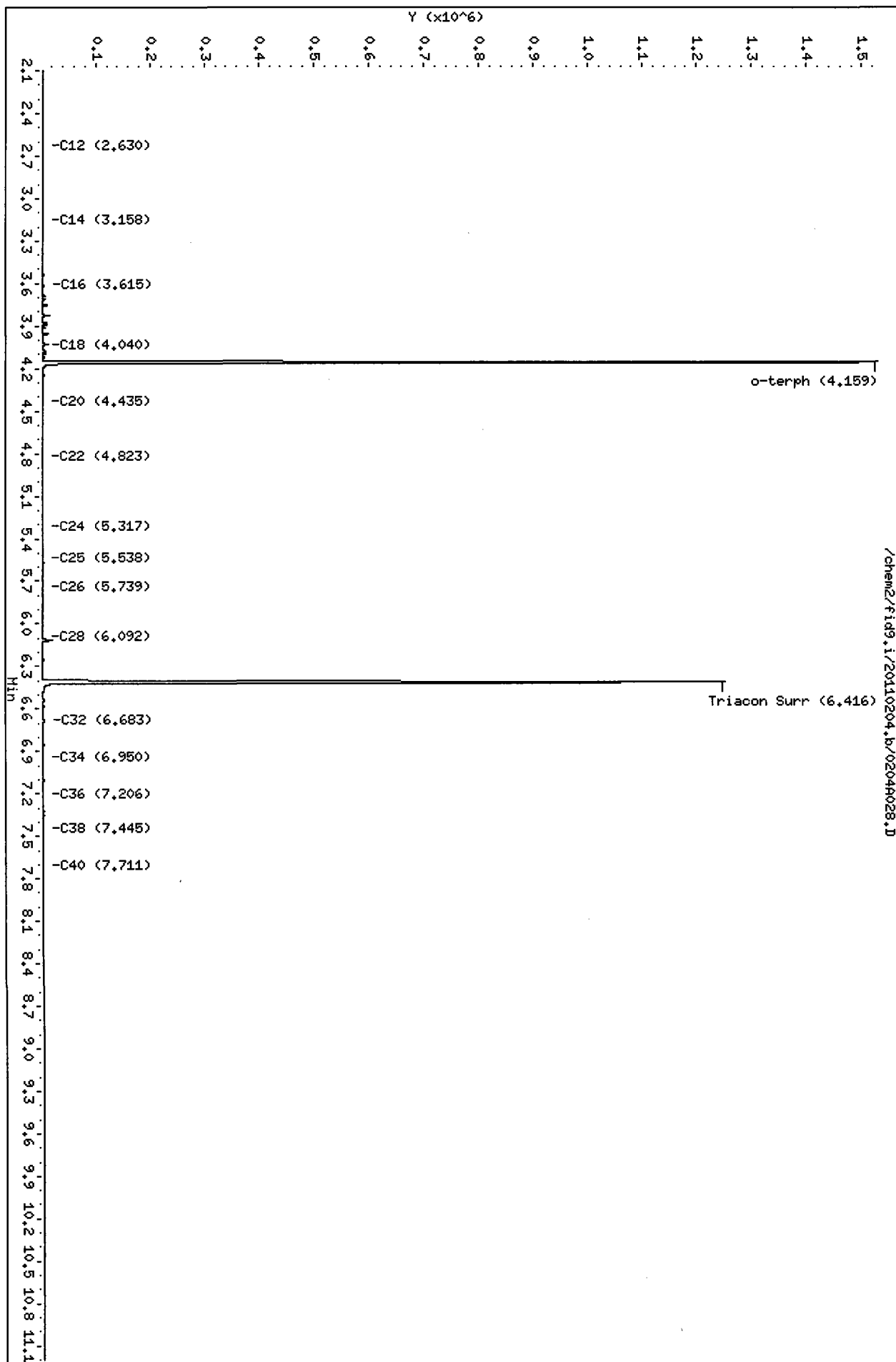
Sample Info: SH13R

Column phase: RTX-1

Instrument: fid9.i

Operator: PC

Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A029.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13S
Client ID: B11-05-30
Injection: 05-FEB-2011 02:13
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	----						
C8	1.379	0.003	6133	11684	GAS (Tol-C12)	112612	5
C10	1.986	0.000	1430	1655	DIESEL (C12-C24)	43193	2
C12	2.624	0.004	521	369	M.OIL (C24-C38)	45922	3
C14	3.149	-0.006	336	304	AK-102 (C10-C25)	72683	3
C16	3.622	0.000	1174	749	AK-103 (C25-C36)	37297	4
C18	4.041	-0.001	352	322			
C20	4.428	-0.003	145	32			
C22	4.827	0.007	159	168			
C24	5.317	0.000	206	208			
C25	5.538	-0.005	296	238			
C26	5.740	-0.004	310	193			
C28	6.095	-0.004	801	613			
C32	6.685	-0.009	2235	2323	JP-4 (Tol-C14)	124668	8
C34	6.953	-0.005	702	590	BUNKERC (C10-C38)	118434	14
Filter Peak	----						
C36	7.209	0.001	717	1123			
C38	7.445	-0.002	767	1269			
C40	7.714	0.001	658	325			
o-terph	4.161	0.000	1554330	877780	JET-A (C10-C18)	64293	5
Triacon Surr	6.417	-0.003	1316651	913130	JP8 (Tol-C16)	133103	8

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

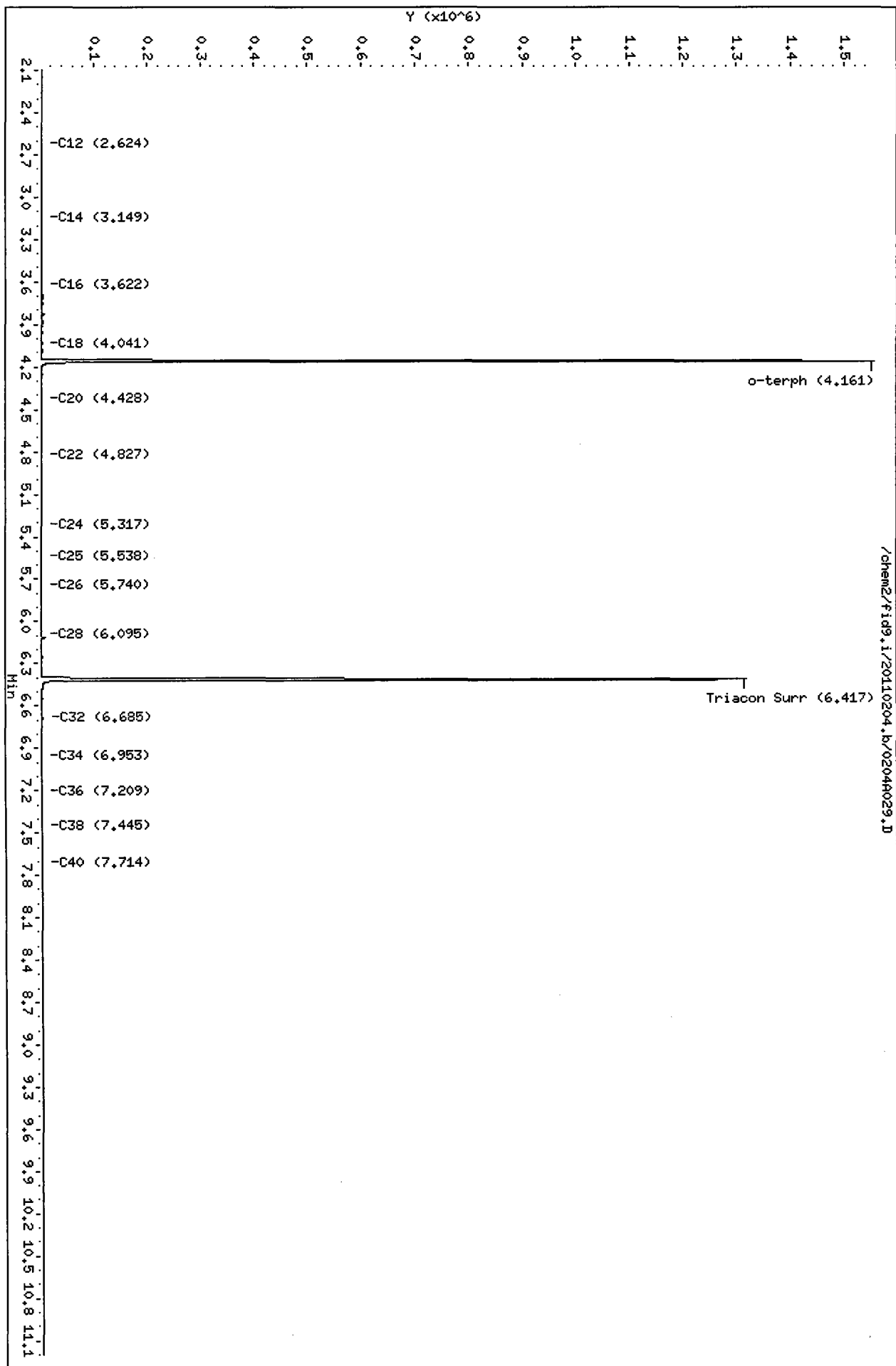
Surrogate	Area	Amount	%Rec
o-Terphenyl	877780	41.0	91.1
Triacantane	913130	51.8	115.1

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13: 00089

Data File: /chem2/fid9.i/20110204.b/0204029.D
Date : 05-FEB-2011 02:13
Client ID: B11-05-30
Sample Info: SH13S
Column phase: RTX-1

Instrument: fid9.i
Operator: PC
Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A030.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13T
Client ID: B11-06-15
Injection: 05-FEB-2011 02:34
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.385	0.079	6616	10045	GAS (Tol-C12)	89458	4
C8	1.367	-0.009	6351	6922	DIESEL (C12-C24)	1428761	63
C10	1.988	0.001	1034	944	M.OIL (C24-C38)	692978	52
C12	2.626	0.006	491	473	AK-102 (C10-C25)	1503299	59 M
C14	3.166	0.010	9447	5516	AK-103 (C25-C36)	610770	72 M
C16	3.621	-0.001	14133	20283			
C18	4.047	0.005	17223	17760			
C20	4.436	0.006	25239	21606			
C22	4.812	-0.008	10518	10928			
C24	5.308	-0.009	8461	8817			
C25	5.536	-0.007	7456	4538			
C26	5.749	0.005	8466	4135			
C28	6.102	0.003	8785	3068			
C32	6.702	0.008	3617	1836	JP-4 (Tol-C14)	119692	7
C34	6.950	-0.007	2537	3386	BUNKERC (C10-C38)	2133416	252 M
Filter Peak	----						
C36	7.209	0.001	1607	1551			
C38	7.442	-0.005	1410	1794			
C40	7.717	0.004	949	636			
o-terph	4.160	0.000	1611114	832584	JET-A (C10-C18)	661214	48
Triacon Surr	6.416	-0.003	1181675	829994	JP8 (Tol-C16)	331538	19

M Indicates manual integration within range.

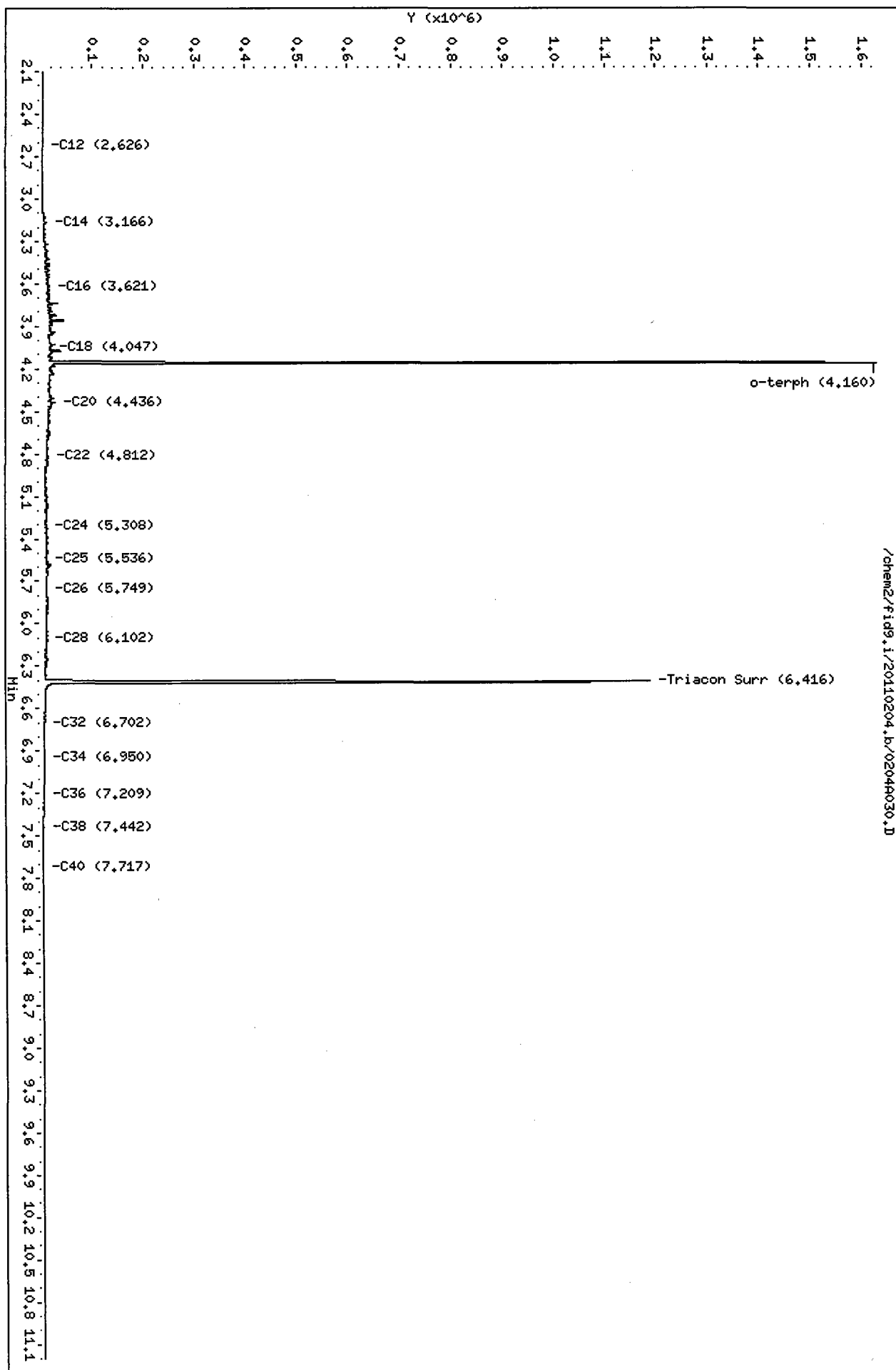
Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	832584	38.9	86.4
Triacotane	829994	47.1	104.6

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

Data File: /chem2/fid9.i/20110204.b/0204030.D
Date : 05-FEB-2011 02:34
Client ID: B11-06-15
Sample Info: SH13T
Column phase: RTX-1

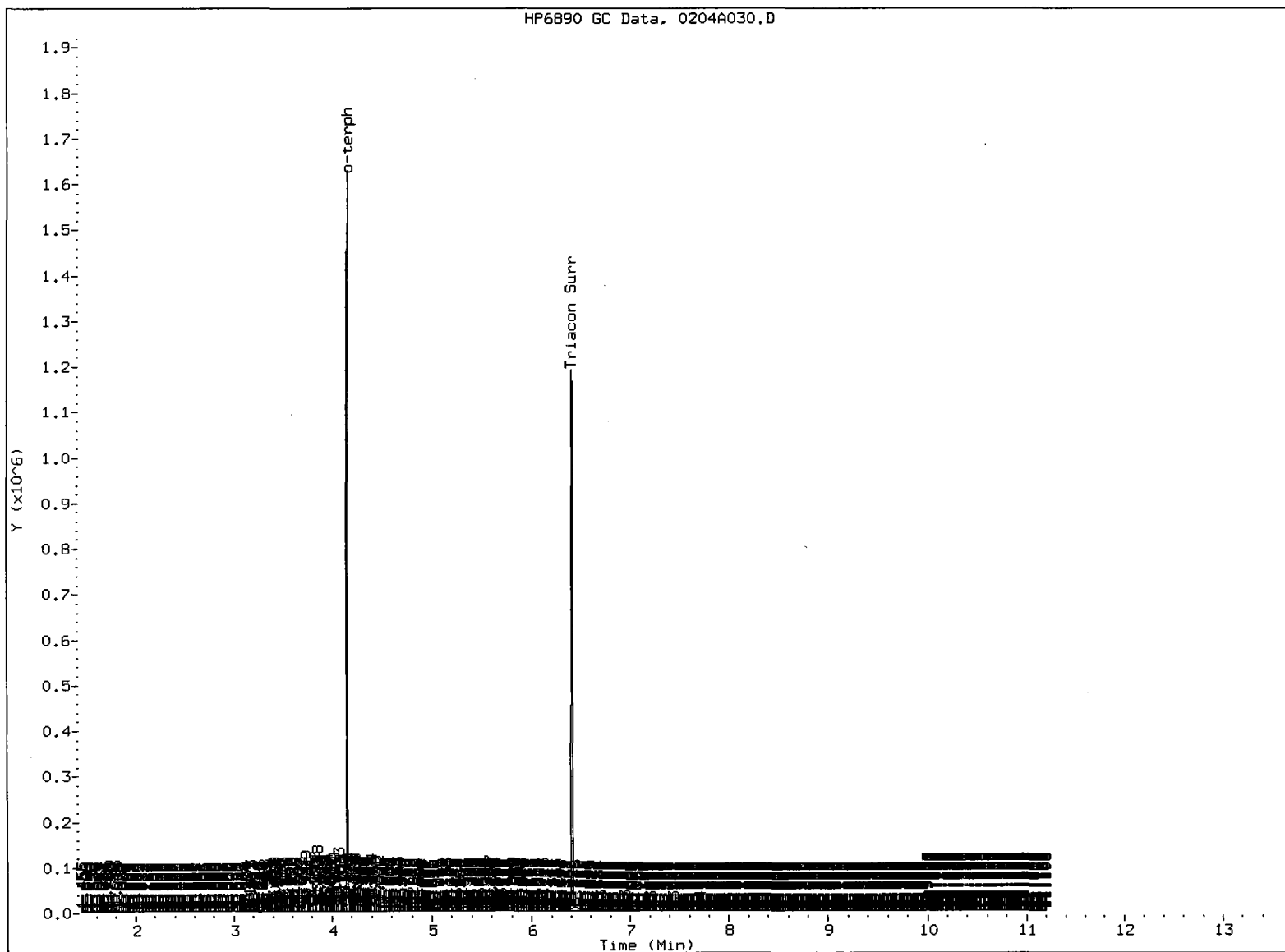
Instrument: fid9.i
Operator: PC
Column diameter: 0.25



FID:9A-2C/RTX-1 SH13T

FID:9A SIGNAL

HP6890 GC Data, 0204A030.D



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: *[Signature]*

Date: *2/2/14*

SH13:00093

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH13-Pacific Groundwater Group
Project: Birds Eye Soil
JI1001

Client ID	OTER	TOT OUT
020311MBS	85.5%	0
020311LCS	85.7%	0
020311LCSD	97.3%	0
B11-01-20	85.6%	0
B11-01-26	100%	0
B11-01-30	D	0
B11-02-15	87.4%	0
B11-02-20	90.9%	0
B11-02-23.5	D	0
B11-02-30	D	0
B11-03-15	87.8%	0
B11-03-20	90.8%	0
B11-03-25	93.8%	0
B11-03-29	92.6%	0
B11-04-15	88.1%	0
B11-04-20	85.5%	0
B11-04-25	88.6%	0
B11-05-15	90.0%	0
B11-05-20	86.8%	0
B11-05-25	91.8%	0
B11-05-30	91.1%	0
B11-06-15	86.4%	0

LCS/MB LIMITS QC LIMITS

(OTER) = o-Terphenyl

(64-134)

(52-130)

Prep Method: SW3546
Log Number Range: 11-2099 to 11-2118

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-020311
LCS/LCSD

Lab Sample ID: LCS-020311
LIMS ID: 11-2099
Matrix: Soil
Data Release Authorized: *mm*
Reported: 02/08/11

QC Report No: SH13-Pacific Groundwater Group
Project: Birds Eye Soil
JI1001
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 02/03/11
Sample Amount LCS: 10.0 g
LCSD: 10.0 g
Date Analyzed LCS: 02/04/11 18:23
Final Extract Volume LCS: 1.0 mL
LCSD: 02/04/11 18:44
LCSD: 1.0 mL
Instrument/Analyst LCS: FID9/MS
Dilution Factor LCS: 1.00
LCSD: FID9/MS
LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	120	150	80.0%	132	150	88.0%	9.5%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	85.7%	97.3%

Results reported in mg/kg
RPD calculated using sample concentrations per SW846.

Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A007.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13LCSS1
Client ID: SH13LCSS1
Injection: 04-FEB-2011 18:23
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.339	0.033	8804	7597	GAS (Tol-C12)	4013954	191
C8	1.384	0.009	22419	28536	DIESEL (C12-C24)	27059857	1195
C10	1.987	0.000	140012	117918	M.OIL (C24-C38)	312560	24
C12	2.618	-0.002	339711	270431	AK-102 (C10-C25)	30217632	1184 M
C14	3.151	-0.004	641156	497973	AK-103 (C25-C36)	212316	25
C16	3.625	0.004	1184909	1097440			
C18	4.051	0.009	1016355	826381			
C20	4.433	0.003	715282	553943			
C22	4.820	0.000	288745	223362			
C24	5.312	-0.004	79900	74973			
C25	5.537	-0.006	36638	40930			
C26	5.739	-0.005	15088	14111			
C28	6.095	-0.004	2665	2164			
C32	6.687	-0.007	1733	1491	JP-4 (Tol-C14)	8514505	519
C34	6.968	0.011	97	47	BUNKERC (C10-C38)	30432118	3597 M
Filter Peak	----						
C36	7.210	0.002	116	120			
C38	7.445	-0.003	435	495			
C40	7.709	-0.004	141	34			
o-terph	4.165	0.004	1457177	826063	JET-A (C10-C18)	22012521	1593
Triacon Surr	6.417	-0.003	1159897	832411	JP8 (Tol-C16)	15257263	867

M Indicates manual integration within range.

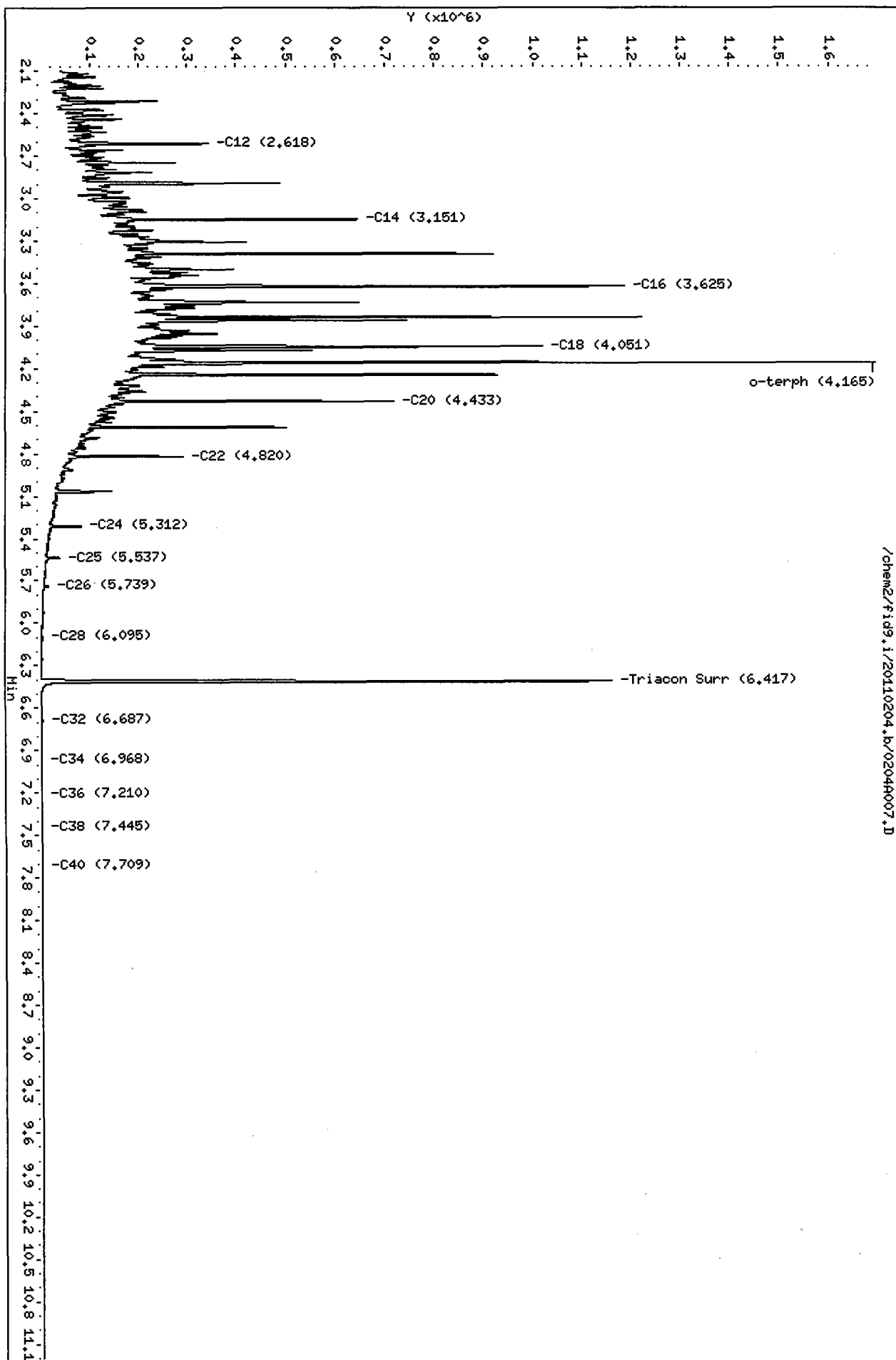
Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

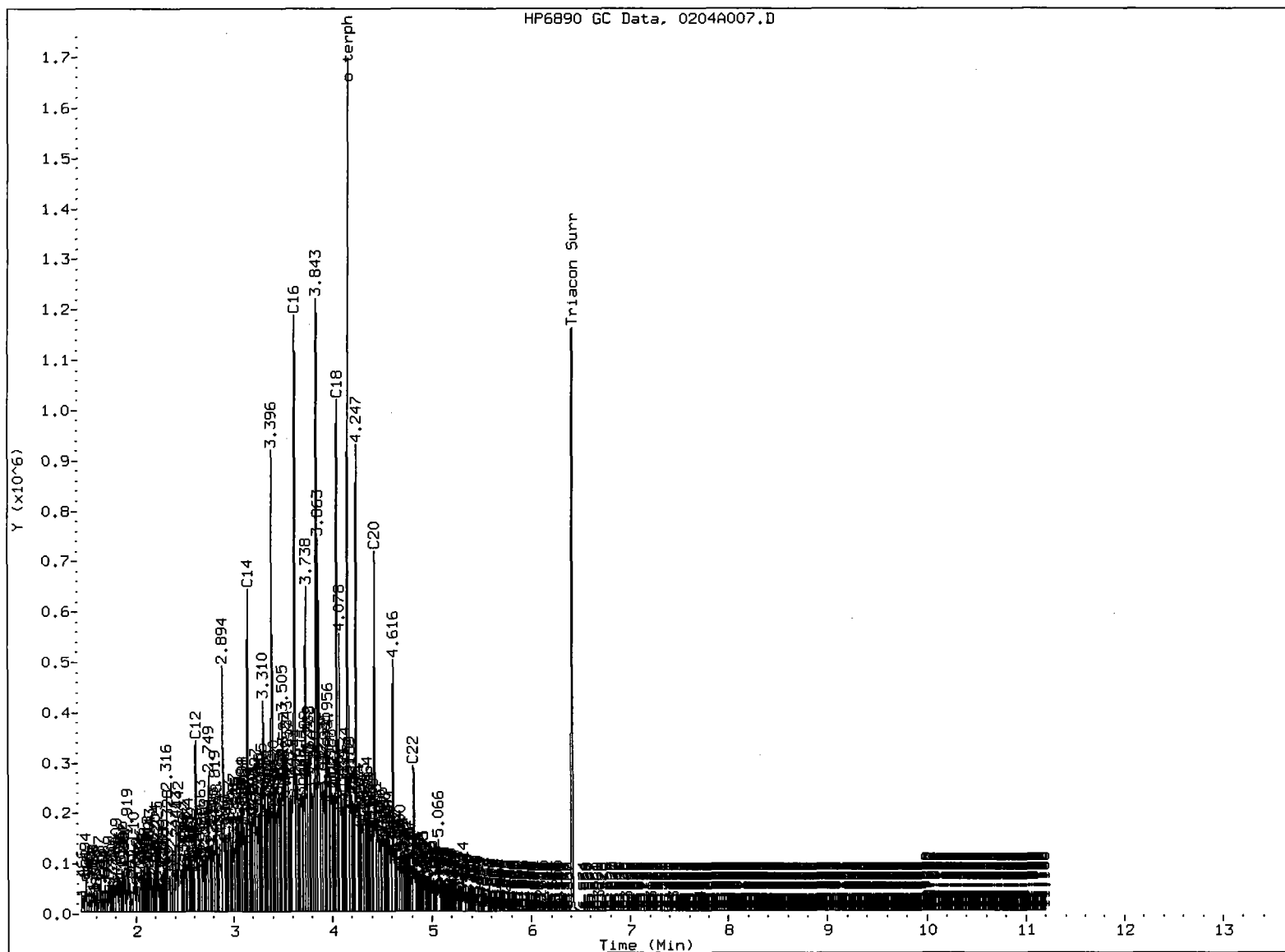
Surrogate	Area	Amount	%Rec
o-Terphenyl	826063	38.6	85.7
Triacontane	832411	47.2	104.9

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

Data File: /chem2/fid9.i/20110204.b/0204007.D
Date : 04-FEB-2011 18:23
Client ID: SH13LCSS1
Sample Info: SH13LCSS1
Column phase: RTX-1

Instrument: fid9.i
Operator: PC
Column diameter: 0.25





MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: *Ar*

Date: *2/7/11*

Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110204.b/0204A008.D
Method: /chem2/fid9.i/20110204.b/ftphfid9a.m
Instrument: fid9.i
Operator: PC
Report Date: 02/07/2011

ARI ID: SH13LCSDS1
Client ID: SH13LCSDS1
Injection: 04-FEB-2011 18:44
Dilution Factor: 1
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.341	0.035	7368	6844	GAS (Tol-C12)	4287484	204
C8	1.385	0.009	22506	26528	DIESEL (C12-C24)	29816566	1316
C10	1.987	0.000	155195	123465	M.OIL (C24-C38)	351561	27
C12	2.618	-0.002	362923	289123	AK-102 (C10-C25)	33231597	1302 M
C14	3.152	-0.003	646238	573147	AK-103 (C25-C36)	236271	28
C16	3.625	0.003	1255717	1191301			
C18	4.051	0.009	1082292	1005413			
C20	4.432	0.002	779012	692479			
C22	4.819	-0.002	301716	252463			
C24	5.311	-0.005	86741	72793			
C25	5.534	-0.008	41498	37181			
C26	5.738	-0.006	17902	17760			
C28	6.094	-0.004	2908	2421			
C32	6.691	-0.003	2001	1712	JP-4 (Tol-C14)	9194954	561
C34	6.951	-0.007	685	732	BUNKERC (C10-C38)	33470056	3956 M
Filter Peak	----						
C36	7.205	-0.003	74	17			
C38	7.444	-0.003	107	40			
C40	7.715	0.002	134	55			
o-terph	4.165	0.004	1538224	937698	JET-A (C10-C18)	24168267	1749
Triacon Surr	6.419	-0.001	1228272	907385	JP8 (Tol-C16)	16719334	950

M Indicates manual integration within range.

Range Times: NW Diesel(2.620 - 5.316) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.32 - 7.45) AK103(5.54 - 7.21) OR Diesel(1.99 - 6.10)

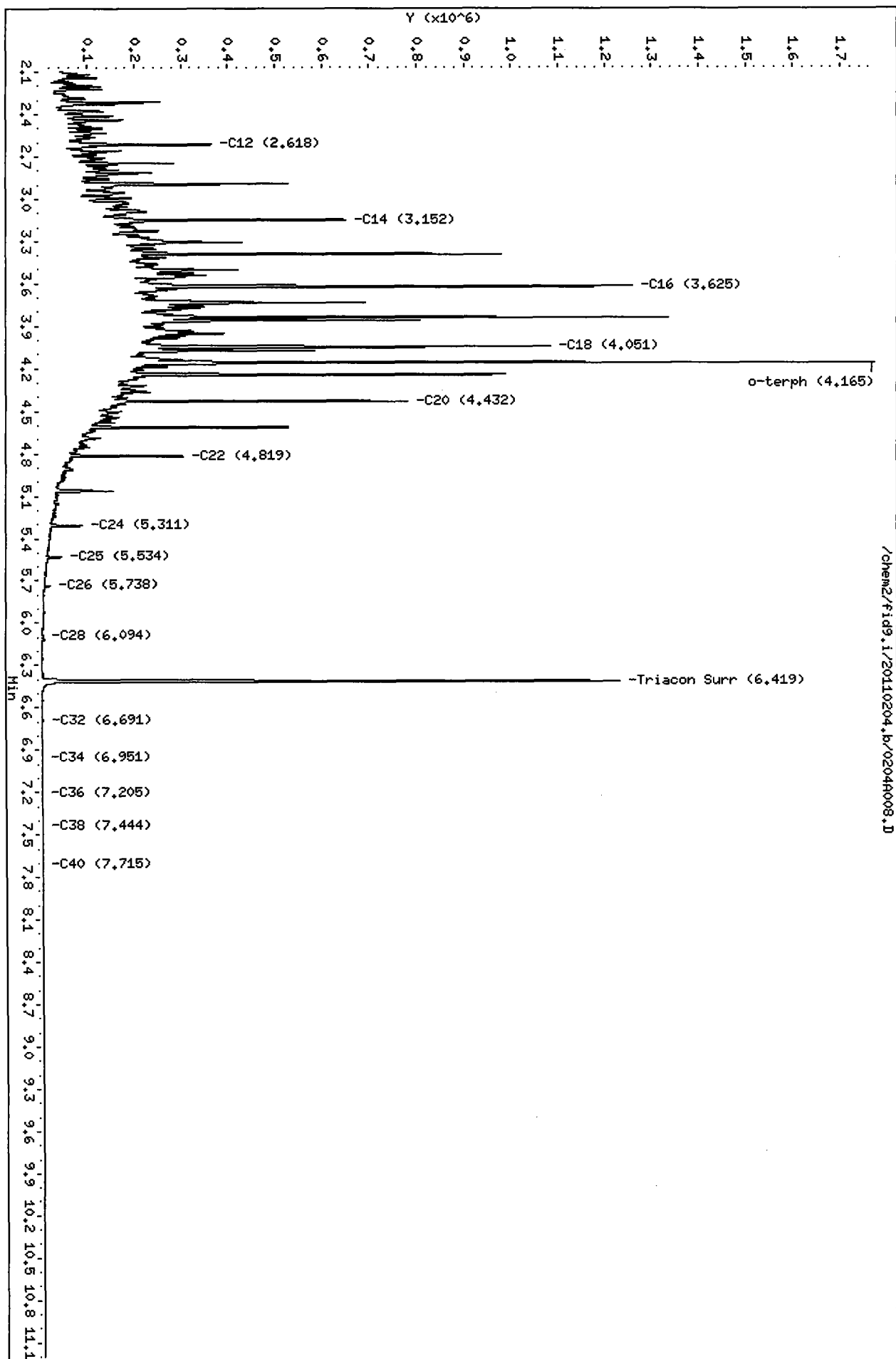
Surrogate	Area	Amount	%Rec
o-Terphenyl	937698	43.8	97.3
Triacontane	907385	51.5	114.4

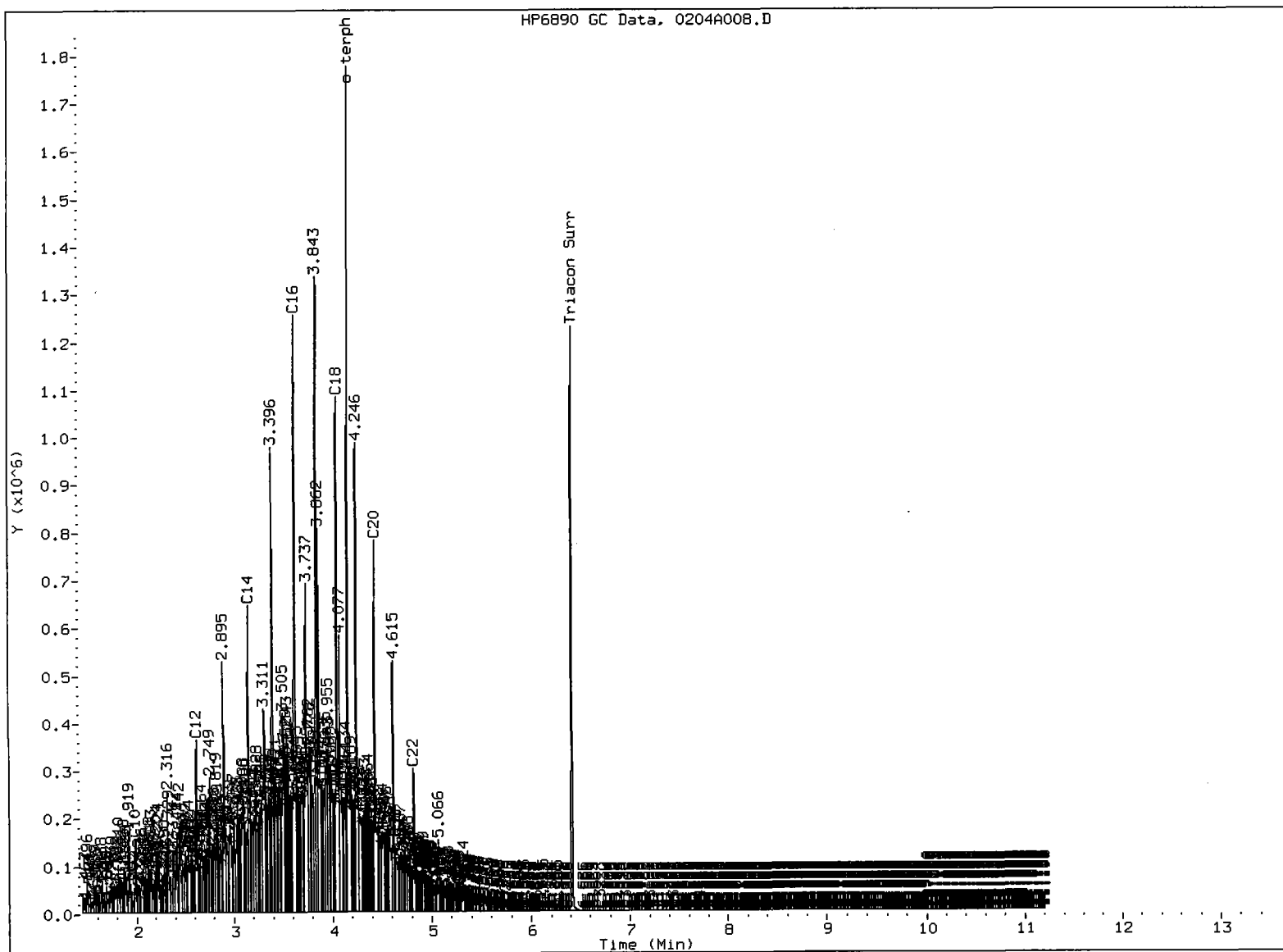
Analyte	RF	Curve Date
o-Terph Surr	21417.1	20-JAN-2011
Triacon Surr	17626.4	20-JAN-2011
Gas	21009.8	15-JUN-2010
Diesel	22653.1	20-JAN-2011
Motor Oil	13263.6	20-JAN-2011
AK102	25525.9	20-JAN-2011
AK103	8498.1	07-SEP-2010
JP4	16396.5	09-JUN-2010
JetA	13819.1	11-JUN-2010
Bunker C	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

SH13:00099

Data File: /chem2/fid9.i/20110204.b/02040008.D
Date : 04-FEB-2011 18:44
Client ID: SH13LCSDS1
Sample Info: SH13LCSDS1
Column phase: RTX-1

Instrument: fid9.i
Operator: PC
Column diameter: 0.25





MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Other _____

Analyst: Date:

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Soil
Date Received: 02/02/11

ARI Job: SH13
Project: Birds Eye Soil
JI1001

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
11-2099-020311MB1	Method Blank	10.0 g	1.00 mL	-	02/03/11
11-2099-020311LCS1	Lab Control	10.0 g	1.00 mL	-	02/03/11
11-2099-020311LCSD1	Lab Control Dup	10.0 g	1.00 mL	-	02/03/11
11-2099-SH13A	B11-01-20	9.11 g	1.00 mL	D	02/03/11
11-2100-SH13B	B11-01-26	8.91 g	1.00 mL	D	02/03/11
11-2101-SH13C	B11-01-30	8.68 g	1.00 mL	D	02/03/11
11-2102-SH13D	B11-02-15	9.30 g	1.00 mL	D	02/03/11
11-2103-SH13E	B11-02-20	9.03 g	1.00 mL	D	02/03/11
11-2104-SH13F	B11-02-23.5	8.98 g	1.00 mL	D	02/03/11
11-2105-SH13G	B11-02-30	8.54 g	1.00 mL	D	02/03/11
11-2106-SH13H	B11-03-15	9.55 g	1.00 mL	D	02/03/11
11-2107-SH13I	B11-03-20	8.71 g	1.00 mL	D	02/03/11
11-2109-SH13K	B11-03-25	8.56 g	1.00 mL	D	02/03/11
11-2110-SH13L	B11-03-29	8.50 g	1.00 mL	D	02/03/11
11-2111-SH13M	B11-04-15	9.24 g	1.00 mL	D	02/03/11
11-2112-SH13N	B11-04-20	8.83 g	1.00 mL	D	02/03/11
11-2113-SH13O	B11-04-25	8.87 g	1.00 mL	D	02/03/11
11-2114-SH13P	B11-05-15	9.36 g	1.00 mL	D	02/03/11
11-2115-SH13Q	B11-05-20	9.65 g	1.00 mL	D	02/03/11
11-2116-SH13R	B11-05-25	8.44 g	1.00 mL	D	02/03/11
11-2117-SH13S	B11-05-30	8.69 g	1.00 mL	D	02/03/11
11-2118-SH13T	B11-06-15	9.38 g	1.00 mL	D	02/03/11



Analytical Resources, Incorporated
Analytical Chemists and Consultants

February 16, 2011

Inger Jackson
Pacific Groundwater Group
2377 Eastlake Ave. East, Suite 200
Seattle, WA 98102

Project: Birds Eye Soil JI1001
ARI ID: SH23

Dear Ms. Jackson:

Please find enclosed the original Chain of Custody record, sample receipt documentation, and the final data for the samples from the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. Should you have any questions or concerns, please feel free to call me at your convenience.

Respectfully,
ANALYTICAL RESOURCES, INC.

Eric Branson
Project Manager
(206) 695-6213
eric@arilabs.com
www.arilabs.com



Case Narrative

- Sample Receipt & Analytical Details -

Sample Receipt

Analytical Resources, Inc. accepted twenty soil samples intact on February 2, 2011. Select containers arrived at -1.6°C, but volume was noted to not be frozen. For further details regarding sample receipt please refer to the enclosed Cooler Receipt Form.

Selected samples were analyzed for the parameters listed below, as requested on the Chain of Custody.

Benzene by 8260C SIM was not originally requested, but was added to select required samples in order to meet reporting requirements, per client approval.

Benzene by EPA Method 8260C SIM (Selected Ion Monitoring)

A vial that had been previously used for BETX/TPH-G analysis had to be used for the analysis of sample "B11-06-20" due to the lack of unused containers. The results for this sample should be considered qualified as such.

There were no other irregularities with this analysis.

Polynuclear Aromatic Hydrocarbons by EPA Method 8270D

Fluoranthene was out of control high in the LCS analyzed 02/09/11. The LCS met overall acceptance criteria.

A diluted analysis of sample "B11-06-25" has been performed and reported in addition to the original analysis in order to properly quantify the detection for 2-Methylnaphthalene within a reportable range.

There were no other irregularities with this analysis.

Volatile Petroleum Hydrocarbons by WAVPH

NC10, associated with the C10 range, was out of control low in the first closing continuing calibration performed 02/04/11 - associated with the analysis of samples "B11-08-20" and "B11-09-23.5" listed as "Dilution" on the result forms.

NC8, associated with the C8 range, was out of control low in the second closing continuing calibration performed 02/04/11 - associated with the analysis of samples "B11-08-20" and "B11-09-23.5."



Case Narrative

- Sample Receipt & Analytical Details -

NC12, associated with the C12 range, was out of control high on the 02/09/11 closing continuing calibration associated with the analysis of sample "B11-06-25." The sample had high detections. The sample was reanalyzed on 02/14/11 with NC12 in the closing continuing calibration once again out of control high. Both runs have been reported.

None of these calibrations were considered entirely passing due to the single outages, but no further reruns were performed due to the high detection levels, and potential damaging effects to the instrument. Two runs have been reported for each sample for review purposes.

There were no other irregularities with this analysis.

Extractable Petroleum Hydrocarbons by WAEPH

Recoveries were not possible for all but the C8-10 Aliphatics in the matrix spike and matrix spike duplicate due to the dilution level required by the associated sample.

There were no other irregularities with this analysis.

8021 BETX + Gasoline Range Organics by NWTPH-G

Benzene was out of control high in both the LCS and LCSD on 02/07/11. The LCS and LCSD met overall acceptance criteria.

There were no other irregularities with this analysis.

Diesel Range Organics (Extended) by NWTPH-Dx

The surrogate was diluted beyond recovery for many samples due to the high dilution level necessary to properly quantify detections within a reportable range. Refer to the form II for sample IDs.

There were no other irregularities with this analysis.



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 \geq the Reporting Limit
- N Matrix Spike recovery not within established control limits
- NA Not Applicable, analyte not spiked
- H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L Analyte concentration is ≤ 5 times the Reporting Limit and the replicate control limit defaults to ± 1 RL instead of the normal 20% RPD

Organic Data

- U Indicates that the target analyte was not detected at the reported concentration
- * Flagged value is not within established control limits
- B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J Estimated concentration when the value is less than ARI's established reporting limits
- D The spiked compound was not detected due to sample extract dilution
- E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
- 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 $\geq 40\%$ 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

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: SH23	Turn-around Requested: Standard
ARI Client Company: RCG	Phone: 206 329 0141
Client Contact: Inger Jackson	
Client Project Name: Birds Eye Soil	
Client Project #: J11001	
Samplers: J. Parker / I. Jackson	

Page: 3	of
Date: 2/2/11	Ice Present?
No. of Coolers:	Cooler Temps:



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				Notes/Comments	
					MRPH-DX	MRPH-G	VRH	EPH		
B11-06-20	2/1/11	1122	Soil	4	1	2				
B11-06-25	2/1/11	1130		8	1	2	2	1		
B11-06-30	2/1/11	1136		4	1	2				
B11-07-15	2/1/11	917		1	1					
B11-07-20	2/1/11	920		1	1					
B11-07-25	2/1/11	929		1	1					
B11-08-15	2/1/11	1020		1	1					
B11-08-20	2/1/11	1033		8	1	2	2	1	1	
B11-08-25	2/1/11	1040		4	1	2				
B11-08-30	2/1/11	1050		4	1	2				

Comments/Special Instructions	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>
	Printed Name: Inger Jackson	Printed Name: A. Volgardsen
	Company: RCG	Company: ARI
	Date & Time: 2/2/11 1035	Date & Time: 2/2/11 1035

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

ARI Assigned Number: 2423	Turn-around Requested: Standard	Page: 4 of
ARI Client Company: Pacific Groundwater Group	Phone: 206 339 0141	Date: 2/2/11
Client Contact: Inger Jackson		No. of Coolers: 2
Client Project Name: Birds Eye - Soil		Cooler Temps:
Client Project #: JE1001		



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				Notes/Comments
					NWTPH-1	NWTPH-2	NWTPH-3	NWTPH-4	
B11-09-14	1/31/11	840	Soil	1					
B11-09-19	1/31/11	845		1					
B11-09-23.5	1/31/11	854		7					
B11-10-15	2/1/11	1320		1					
B11-10-20	2/1/11	1321		1					
B11-10-25	2/1/11	1323		1					
B11-10-30	2/1/11	1327		1					
B11-11-10	2/1/11	1555		4					
B11-12-10	1/31/11	1135		4					
B11-12-15	1/31/11	1148		4					

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Inger Jackson	Printed Name: A. Volgardsen
	Company: RCG	Company: ARI
	Date & Time: 2/2/11 1035	Date & Time: 2/2/11 1035

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 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: PRG

Project Name: Birds Eye Soil

COC No(s): _____ (NA)

Delivered by: Fed-Ex UPS Courier (Hand Delivered Other: _____)

Assigned ARI Job No: SH23

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES (NO)

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 0.8 -1.6 1.6

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90941619

Cooler Accepted by: AV Date: 2/2/11 Time: 1035

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: NA

Was sufficient ice used (if appropriate)? 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: 2/2/11 Time: 1448

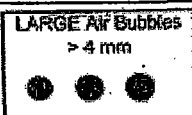
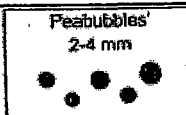
**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____

Date: _____



Small → "sm"

Peabubbles → "pb"

Large → "lg"

Headspace → "hs"



Cooler Temperature Compliance Form

SH23

Cooler#:	Temperature(°C):	
Sample ID	Bottle Count	Bottle Type
B11-06-20	2	2-40 mL VOA
B11-06-25	5	4-40 mL VOA, 1 8oz jar
B11-06-30	2	2-40 mL VOA
B11-08-20	4	4-40 mL VOA
B11-08-25	2	2-40 mL VOA
B11-08-30	2	1
B11-09-14	1	1-8oz jar
B11-09-23.5	6	4-40 mL VOA, 1-1/2oz jar, 1-8oz jar
Cooler#:	Temperature(°C):	
Sample ID	Bottle Count	Bottle Type
B11-10-20	1	1-8oz jar
B11-10-25	1	1
B11-11-10	2	2-40 mL VOA
B11-12-10	3	2-40 mL VOA, 1-1/2oz jar
B11-12-15	4	2-40 mL VOA, 1-1/2oz jar, 1-8oz jar
Cooler#:	Temperature(°C):	
Sample ID	Bottle Count	Bottle Type
Cooler#:	Temperature(°C):	
Sample ID	Bottle Count	Bottle Type

Completed by: JM Date: 2/7/11 Time: 1435

00070F Cooler outside temp Cooler Temperature Compliance Form
* Compliance, but samples not frozen.

Sample ID Cross Reference Report



ARI Job No: SH23
Client: Pacific Groundwater Group
Project Event: JI1001
Project Name: Birds Eye Soil

Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1. B11-06-20	SH23A	11-2184	Soil	02/01/11 11:22	02/02/11 10:35
2. B11-06-25	SH23B	11-2185	Soil	02/01/11 11:30	02/02/11 10:35
3. B11-06-30	SH23C	11-2186	Soil	02/01/11 11:36	02/02/11 10:35
4. B11-07-15	SH23D	11-2187	Soil	02/01/11 09:17	02/02/11 10:35
5. B11-07-20	SH23E	11-2188	Soil	02/01/11 09:20	02/02/11 10:35
6. B11-07-25	SH23F	11-2189	Soil	02/01/11 09:29	02/02/11 10:35
7. B11-08-15	SH23G	11-2190	Soil	02/01/11 10:00	02/02/11 10:35
8. B11-08-20	SH23H	11-2191	Soil	02/01/11 10:33	02/02/11 10:35
9. B11-08-25	SH23I	11-2192	Soil	02/01/11 10:40	02/02/11 10:35
10. B11-08-30	SH23J	11-2193	Soil	02/01/11 10:50	02/02/11 10:35
11. B11-09-14	SH23K	11-2194	Soil	01/31/11 08:40	02/02/11 10:35
12. B11-09-19	SH23L	11-2195	Soil	01/31/11 08:45	02/02/11 10:35
13. B11-09-23.5	SH23M	11-2196	Soil	01/31/11 08:54	02/02/11 10:35
14. B11-10-15	SH23N	11-2197	Soil	02/01/11 13:20	02/02/11 10:35
15. B11-10-20	SH23O	11-2198	Soil	02/01/11 13:21	02/02/11 10:35
16. B11-10-25	SH23P	11-2199	Soil	02/01/11 13:23	02/02/11 10:35
17. B11-10-30	SH23Q	11-2200	Soil	02/01/11 13:27	02/02/11 10:35
18. B11-11-10	SH23R	11-2201	Soil	02/01/11 15:55	02/02/11 10:35
19. B11-12-10	SH23S	11-2202	Soil	01/31/11 11:35	02/02/11 10:35
20. B11-12-15	SH23T	11-2203	Soil	01/31/11 11:48	02/02/11 10:35
21. B11-06-25	SH23U	11-3111	Soil	02/01/11 11:30	02/02/11 10:35
22. B11-08-20	SH23V	11-3112	Soil	02/01/11 10:33	02/02/11 10:35
23. B11-09-23.5	SH23W	11-3113	Soil	01/31/11 08:54	02/02/11 10:35

Printed 02/14/11

SH23: 00011


ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: B11-06-20
Page 1 of 1 SAMPLE

Lab Sample ID: SH23A

LIMS ID: 11-2184

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 20:15

Sample Amount: 18.9 mg-dry-wt

Purge Volume: 10.0 mL

Moisture: 5.5%

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	11	< 11	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	97.8%
-----------------------	-------


ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: B11-06-25
Page 1 of 1 SAMPLE

Lab Sample ID: SH23B

LIMS ID: 11-2185

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: 02/01/11

Date Received: 02/02/11

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 20:40

Sample Amount: 14.5 mg-dry-wt

Purge Volume: 10.0 mL

Moisture: 13.5%

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	14	30	

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane 95.2%

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: B11-06-30
Page 1 of 1 SAMPLE

Lab Sample ID: SH23C

LIMS ID: 11-2186

Matrix: Soil

Data Release Authorized: *AS*

Reported: 02/14/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 21:06

Sample Amount: 18.0 mg-dry-wt

Purge Volume: 10.0 mL

Moisture: 13.4%

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	11	290	

Reported in $\mu\text{g/kg}$ (ppb)Volatile Surrogate Recovery

d4-1,2-Dichloroethane	98.4%
-----------------------	-------


ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: B11-08-20
Page 1 of 1 SAMPLE

Lab Sample ID: SH23H

LIMS ID: 11-2191

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 21:32

Sample Amount: 22.4 mg-dry-wt

Purge Volume: 10.0 mL

Moisture: 4.8%

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	8.9	19	

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	96.6%
-----------------------	-------

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: B11-08-25
Page 1 of 1 **SAMPLE**

Lab Sample ID: SH23I

LIMS ID: 11-2192

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/14/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: 02/01/11

Date Received: 02/02/11

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 21:57

Sample Amount: 18.5 mg-dry-wt

Purge Volume: 10.0 mL

Moisture: 9.7%

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	11	60	

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane 90.0%

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: B11-08-30
Page 1 of 1 **SAMPLE**

Lab Sample ID: SH23J

LIMS ID: 11-2193

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/14/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: 02/01/11

Date Received: 02/02/11

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 22:23

Sample Amount: 21.2 mg-dry-wt

Purge Volume: 10.0 mL

Moisture: 8.0%

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	9.5	660	

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane 91.3%

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: B11-12-10
Page 1 of 1 **SAMPLE**

Lab Sample ID: SH23S

LIMS ID: 11-2202

Matrix: Soil

Data Release Authorized: *AS*

Reported: 02/14/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: 01/31/11

Date Received: 02/02/11

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 22:48

Sample Amount: 17.1 mg-dry-wt

Purge Volume: 10.0 mL

Moisture: 19.3%

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	12	< 12	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane 92.7%

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: B11-12-15
Page 1 of 1 **SAMPLE**

Lab Sample ID: SH23T

LIMS ID: 11-2203

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/14/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: 01/31/11

Date Received: 02/02/11

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 23:14

Sample Amount: 17.8 mg-dry-wt

Purge Volume: 10.0 mL

Moisture: 9.3%

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	11	< 11	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane 94.2%

SW8260-SIM SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH23-Pacific Groundwater Group
Project: Birds Eye Soil
JI1001

<u>Client ID</u>	<u>DCE</u>	<u>TOT OUT</u>
MB-020911	116%	0
LCS-020911	102%	0
B11-06-20	97.8%	0
B11-06-25	95.2%	0
B11-06-30	98.4%	0
B11-08-20	96.6%	0
B11-08-25	90.0%	0
B11-08-30	91.3%	0
B11-12-10	92.7%	0
B11-12-15	94.2%	0

LCS/MB LIMITS QC LIMITS

(DCE) = d4-1,2-Dichloroethane (30-160) (30-160)

Prep Method: SW5030
Log Number Range: 11-2184 to 11-2203

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: LCS-020911


Page 1 of 1

LAB CONTROL SAMPLE

Lab Sample ID: LCS-020911

LIMS ID: 11-2184

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: NA

Date Received: NA

Instrument/Analyst LCS: NT7/PKC

Date Analyzed LCS: 02/09/11 14:33

Sample Amount LCS: 20.0 mg-dry-wt

Purge Volume LCS: 10.0 mL

Analyte	LCS	Spike Added	Recovery
Benzene	420	500	84.0%

Reported in µg/kg (ppb)

NA-No recovery due to high concentration of analyte in original sample,
calculated negative recovery, or undetected spike.

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: MB-020911


Page 1 of 1

METHOD BLANK

Lab Sample ID: MB-020911

LIMS ID: 11-2184

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: NA

Date Received: NA

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 15:24

Sample Amount: 20.0 mg-dry-wt

Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	10	< 10	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	116%
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ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1


Sample ID: B11-06-25

SAMPLE

Lab Sample ID: SH23B

LIMS ID: 11-2185

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Date Analyzed: 02/09/11 19:55

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Alumina: No

Silica Gel: Yes

Sample Amount: 3.98 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 3.00

Percent Moisture: 13.5%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	380	< 380 U
91-57-6	2-Methylnaphthalene	380	33,000 E
90-12-0	1-Methylnaphthalene	380	25,000
208-96-8	Acenaphthylene	380	< 380 U
83-32-9	Acenaphthene	380	3,900
86-73-7	Fluorene	380	6,000
85-01-8	Phenanthrene	380	22,000
120-12-7	Anthracene	380	1,600
206-44-0	Fluoranthene	380	1,200
129-00-0	Pyrene	380	7,000
56-55-3	Benzo (a) anthracene	380	6,800
218-01-9	Chrysene	380	11,000
50-32-8	Benzo (a) pyrene	380	3,000
193-39-5	Indeno (1,2,3-cd) pyrene	380	< 380 U
53-70-3	Dibenz (a,h) anthracene	380	870
191-24-2	Benzo (g,h,i) perylene	380	770
132-64-9	Dibenzofuran	380	2,800
TOTBFA	Total Benzofluoranthenes	380	1,900

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	86.9%
2-Fluorobiphenyl	90.1%

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1


Sample ID: B11-06-25

DILUTION

Lab Sample ID: SH23B

LIMS ID: 11-2185

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Date Analyzed: 02/10/11 16:35

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Alumina: No

Silica Gel: Yes

Sample Amount: 3.98 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 10.0

Percent Moisture: 13.5%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	1,300	< 1,300 U
91-57-6	2-Methylnaphthalene	1,300	32,000
90-12-0	1-Methylnaphthalene	1,300	23,000
208-96-8	Acenaphthylene	1,300	< 1,300 U
83-32-9	Acenaphthene	1,300	3,700
86-73-7	Fluorene	1,300	5,800
85-01-8	Phenanthrene	1,300	21,000
120-12-7	Anthracene	1,300	1,800
206-44-0	Fluoranthene	1,300	1,400
129-00-0	Pyrene	1,300	6,000
56-55-3	Benzo (a) anthracene	1,300	7,000
218-01-9	Chrysene	1,300	12,000
50-32-8	Benzo (a) pyrene	1,300	2,300
193-39-5	Indeno (1,2,3-cd) pyrene	1,300	< 1,300 U
53-70-3	Dibenz (a,h) anthracene	1,300	< 1,300 U
191-24-2	Benzo (g,h,i) perylene	1,300	< 1,300 U
132-64-9	Dibenzofuran	1,300	2,200
TOTBFA	Total Benzofluoranthenes	1,300	1,800

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	79.2%
2-Fluorobiphenyl	87.2%

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1


Sample ID: B11-08-20

SAMPLE

Lab Sample ID: SH23H

LIMS ID: 11-2191

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted: 02/09/11

Date Analyzed: 02/10/11 15:24

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Alumina: No

Silica Gel: Yes

Sample Amount: 1.97 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 3.00

Percent Moisture: 4.8%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	760	2,800
91-57-6	2-Methylnaphthalene	760	20,000
90-12-0	1-Methylnaphthalene	760	16,000
208-96-8	Acenaphthylene	760	< 760 U
83-32-9	Acenaphthene	760	2,000
86-73-7	Fluorene	760	2,600
85-01-8	Phenanthrene	760	12,000
120-12-7	Anthracene	760	< 760 U
206-44-0	Fluoranthene	760	1,200
129-00-0	Pyrene	760	2,100
56-55-3	Benzo(a)anthracene	760	810
218-01-9	Chrysene	760	4,100
50-32-8	Benzo(a)pyrene	760	< 760 U
193-39-5	Indeno(1,2,3-cd)pyrene	760	< 760 U
53-70-3	Dibenz(a,h)anthracene	760	< 760 U
191-24-2	Benzo(g,h,i)perylene	760	< 760 U
132-64-9	Dibenzofuran	760	1,600
TOTBFA	Total Benzofluoranthenes	760	< 760 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	78.8%
2-Fluorobiphenyl	76.8%

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1


Sample ID: B11-09-23.5

SAMPLE

Lab Sample ID: SH23M

LIMS ID: 11-2196

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Extracted: 02/09/11

Date Analyzed: 02/10/11 15:57

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Alumina: No

Silica Gel: Yes

Sample Amount: 3.59 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 3.00

Percent Moisture: 13.8%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	420	1,800
91-57-6	2-Methylnaphthalene	420	9,500
90-12-0	1-Methylnaphthalene	420	6,300
208-96-8	Acenaphthylene	420	< 420 U
83-32-9	Acenaphthene	420	880
86-73-7	Fluorene	420	1,700
85-01-8	Phenanthrene	420	4,700
120-12-7	Anthracene	420	440
206-44-0	Fluoranthene	420	< 420 U
129-00-0	Pyrene	420	2,400
56-55-3	Benzo(a)anthracene	420	850
218-01-9	Chrysene	420	2,200
50-32-8	Benzo(a)pyrene	420	440
193-39-5	Indeno(1,2,3-cd)pyrene	420	< 420 U
53-70-3	Dibenz(a,h)anthracene	420	< 420 U
191-24-2	Benzo(g,h,i)perylene	420	< 420 U
132-64-9	Dibenzofuran	420	450
TOTBFA	Total Benzofluoranthenes	420	530

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	80.9%
2-Fluorobiphenyl	81.0%

SW8270 PNA SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH23-Pacific Groundwater Group
Project: Birds Eye Soil
JI1001

Client ID	TER	FBP	TOT OUT
MB-020411	81.2%	66.0%	0
LCS-020411	84.8%	70.4%	0
B11-06-25	86.9%	90.1%	0
B11-06-25 DL	79.2%	87.2%	0
MB-020911	79.6%	60.4%	0
LCS-020911	80.8%	63.6%	0
B11-08-20	78.8%	76.8%	0
B11-09-23.5	80.9%	81.0%	0

	LCS/MB LIMITS	QC LIMITS
(TER) = d14-p-Terphenyl	(30-160)	(30-160)
(FBP) = 2-Fluorobiphenyl	(30-160)	(30-160)

Prep Method: SW3546
Log Number Range: 11-2185 to 11-2196

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1


Sample ID: LCS-020411

LAB CONTROL

Lab Sample ID: LCS-020411

LIMS ID: 11-2185

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: NA

Date Received: 02/02/11

Date Extracted: 02/04/11

Date Analyzed: 02/09/11 17:45

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Silica Gel Cleanup: Yes

Sample Amount: 7.50 g-dry-wt

Final Extract Volume: 0.50 mL

Dilution Factor: 1.00

Alumina Cleanup: No

Analyte	Lab Control	Spike Added	Recovery
Naphthalene	1110	1670	66.5%
2-Methylnaphthalene	1040	1670	62.3%
1-Methylnaphthalene	1120	1670	67.1%
Acenaphthylene	1330	1670	79.6%
Acenaphthene	1250	1670	74.9%
Fluorene	1400	1670	83.8%
Phenanthrene	1480	1670	88.6%
Anthracene	1490	1670	89.2%
Fluoranthene	1680	1670	101%
Pyrene	1460	1670	87.4%
Benzo(a)anthracene	1550	1670	92.8%
Chrysene	1520	1670	91.0%
Benzo(a)pyrene	1380	1670	82.6%
Indeno(1,2,3-cd)pyrene	1350	1670	80.8%
Dibenz(a,h)anthracene	1360	1670	81.4%
Benzo(g,h,i)perylene	1300	1670	77.8%
Dibenzofuran	1320	1670	79.0%
Total Benzofluoranthenes	3070	3330	92.2%

Semivolatile Surrogate Recovery

d14-p-Terphenyl	84.8%
2-Fluorobiphenyl	70.4%

Results reported in µg/kg

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1




Sample ID: MB-020411

METHOD BLANK

Lab Sample ID: MB-020411

LIMS ID: 11-2185

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: NA

Date Received: NA

Date Extracted: 02/04/11

Date Analyzed: 02/09/11 17:12

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Alumina: No

Silica Gel: Yes

Sample Amount: 7.50 g

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: NA

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	67	< 67 U
91-57-6	2-Methylnaphthalene	67	< 67 U
90-12-0	1-Methylnaphthalene	67	< 67 U
208-96-8	Acenaphthylene	67	< 67 U
83-32-9	Acenaphthene	67	< 67 U
86-73-7	Fluorene	67	< 67 U
85-01-8	Phenanthrene	67	< 67 U
120-12-7	Anthracene	67	< 67 U
206-44-0	Fluoranthene	67	< 67 U
129-00-0	Pyrene	67	< 67 U
56-55-3	Benzo(a)anthracene	67	< 67 U
218-01-9	Chrysene	67	< 67 U
50-32-8	Benzo(a)pyrene	67	< 67 U
193-39-5	Indeno(1,2,3-cd)pyrene	67	< 67 U
53-70-3	Dibenz(a,h)anthracene	67	< 67 U
191-24-2	Benzo(g,h,i)perylene	67	< 67 U
132-64-9	Dibenzofuran	67	< 67 U
TOTBFA	Total Benzofluoranthenes	67	< 67 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	81.2%
2-Fluorobiphenyl	66.0%

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1


Sample ID: LCS-020911

LAB CONTROL

Lab Sample ID: LCS-020911

LIMS ID: 11-2191

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: NA

Date Received: 02/02/11

Date Extracted: 02/09/11

Date Analyzed: 02/10/11 12:29

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Silica Gel Cleanup: Yes

Sample Amount: 7.50 g-dry-wt

Final Extract Volume: 0.50 mL

Dilution Factor: 1.00

Alumina Cleanup: No

Analyte	Lab Control	Spike Added	Recovery
Naphthalene	1090	1670	65.3%
2-Methylnaphthalene	993	1670	59.5%
1-Methylnaphthalene	1060	1670	63.5%
Acenaphthylene	1190	1670	71.3%
Acenaphthene	1120	1670	67.1%
Fluorene	1220	1670	73.1%
Phenanthrene	1300	1670	77.8%
Anthracene	1330	1670	79.6%
Fluoranthene	1450	1670	86.8%
Pyrene	1430	1670	85.6%
Benzo(a)anthracene	1430	1670	85.6%
Chrysene	1380	1670	82.6%
Benzo(a)pyrene	1280	1670	76.6%
Indeno(1,2,3-cd)pyrene	1270	1670	76.0%
Dibenz(a,h)anthracene	1280	1670	76.6%
Benzo(g,h,i)perylene	1240	1670	74.3%
Dibenzofuran	1180	1670	70.7%
Total Benzofluoranthenes	2870	3330	86.2%

Semivolatile Surrogate Recovery

d14-p-Terphenyl	80.8%
2-Fluorobiphenyl	63.6%

Results reported in µg/kg

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1


Sample ID: MB-020911

METHOD BLANK

Lab Sample ID: MB-020911

LIMS ID: 11-2191

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: NA

Date Received: NA

Date Extracted: 02/09/11

Date Analyzed: 02/10/11 11:57

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Alumina: No

Silica Gel: Yes

Sample Amount: 7.50 g

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: NA

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	67	< 67 U
91-57-6	2-Methylnaphthalene	67	< 67 U
90-12-0	1-Methylnaphthalene	67	< 67 U
208-96-8	Acenaphthylene	67	< 67 U
83-32-9	Acenaphthene	67	< 67 U
86-73-7	Fluorene	67	< 67 U
85-01-8	Phenanthrene	67	< 67 U
120-12-7	Anthracene	67	< 67 U
206-44-0	Fluoranthene	67	< 67 U
129-00-0	Pyrene	67	< 67 U
56-55-3	Benzo(a)anthracene	67	< 67 U
218-01-9	Chrysene	67	< 67 U
50-32-8	Benzo(a)pyrene	67	< 67 U
193-39-5	Indeno(1,2,3-cd)pyrene	67	< 67 U
53-70-3	Dibenz(a,h)anthracene	67	< 67 U
191-24-2	Benzo(g,h,i)perylene	67	< 67 U
132-64-9	Dibenzofuran	67	< 67 U
TOTBFA	Total Benzofluoranthenes	67	< 67 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	79.6%
2-Fluorobiphenyl	60.4%

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1

Sample ID: B11-06-25

SAMPLE

Lab Sample ID: SH23U

LIMS ID: 11-3111

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/09/11 22:54

Instrument/Analyst: PID1/MH

Purge Volume: 10 mL

Sample Amount: 42.9 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1200	< 1,200 U
108-88-3	Toluene	1200	< 1,200 U
100-41-4	Ethylbenzene	1200	< 1,200 U
179601-23-1	m,p-Xylene	2300	< 2,300 U
95-47-6	o-Xylene	1200	< 1,200 U
1634-04-4	Methyl tert-Butyl Ether	1200	< 1,200 U
109-66-0	n-Pentane	1200	< 1,200 U
110-54-3	n-Hexane	1200	< 1,200 U
111-65-9	n-Octane	1200	1,600
124-18-5	n-Decane	1200	1,300
112-40-3	n-Dodecane	1200	10,000

Range	RL	Result
C8-C10 Aromatics	12,000	63,000
C10-C12 Aromatics	12,000	320,000
C12-C13 Aromatics	12,000	390,000
C5-C6 Aliphatics	12,000	< 12,000 U
C6-C8 Aliphatics	12,000	< 12,000 U
C8-C10 Aliphatics	12,000	14,000
C10-C12 Aliphatics	12,000	< 12,000 U

Values reported in µg/kg (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	81.8%
FID: 2,5-Dibromotoluene	91.0%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

Data File: /chem3/pid1.i/vpcc0209-2.b/0209a032.d
Report Date: 15-Feb-2011 07:43

Page 1

2/15/11
MH

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0209-2.b/0209a032.d
Lab Smp Id: SH23U Client Smp ID: B11-06-25
Inj Date : 09-FEB-2011 22:54
Operator : MH Inst ID: pid1.i
Smp Info : SH23U
Misc Info : 11-3111
Comment :
Method : /chem3/pid1.i/vpcc0209-2.b/VPHARO.m
Meth Date : 09-Feb-2011 06:36 monicah Quant Type: ESTD
Cal Date : 08-FEB-2011 17:14 Cal File: 0208a021.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waarom.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable

Local Compound Variable

Compounds	RT	EXP RT	DLT RT	RESPONSE	CONCENTRATIONS	
					ON-COLUMN	FINAL
					(ug/ml)	(ug/Kg)
1 MtBE	5.143	5.130	0.013	21	0.01880	0.0188
2 BENZENE	7.657	7.660	-0.003	338	0.11170	0.112
4 TOLUENE	9.973	9.977	-0.004	182	0.06450	0.0645
5 ETHYLBENZENE	11.933	11.953	-0.020	5673	2.60471	2.60
6 M/P-XYLENE	12.043	12.060	-0.017	6164	2.02956	2.03
7 O-XYLENE	12.647	12.643	0.004	4333	1.72730	1.73
9 TRIMETHYLBEN	15.063	15.070	-0.007	47354	24.6543	24.6
10 NAPHTHALENE	18.287	18.290	-0.003	22643	19.5901	19.6
11 1-METHYLNAP	20.130	20.130	0.000	84912	126.776	127
\$ 37 DIBROMOTOL	19.930	19.930	0.000	37148	40.9456	40.9 (M)

QC Flag Legend

M - Compound response manually integrated.

SH23:000000

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0209-1.b/0209a032.d
Lab Smp Id: SH23U Client Smp ID: B11-06-25
Inj Date : 09-FEB-2011 22:54
Operator : MH Inst ID: pid1.i
Smp Info : SH23U
Misc Info : 11-3111
Comment :
Method : /chem3/pid1.i/vpcc0209-1.b/VPHALI.m
Meth Date : 09-Feb-2011 06:37 monicah Quant Type: ESTD
Cal Date : 08-FEB-2011 17:14 Cal File: 0208a021.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waaliph.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds	RT	EXP RT	DLT RT	RESPONSE	CONCENTRATIONS	
					ON-COLUMN	FINAL
					(ng/mL)	(ug/Kg)
1 nC5						
Compound Not Detected.						
2 nC6	5.407	5.403	0.004	53	0.12588	0.126
4 nC8	9.613	9.650	-0.037	2359	6.93436	6.93
5 nC10	13.450	13.457	-0.007	1783	5.47206	5.47
7 nC12	16.597	16.590	0.007	12949	43.9326	43.9
\$ 8 2,5-DBT	19.927	19.930	-0.003	6282	45.4696	45.5 (RM)

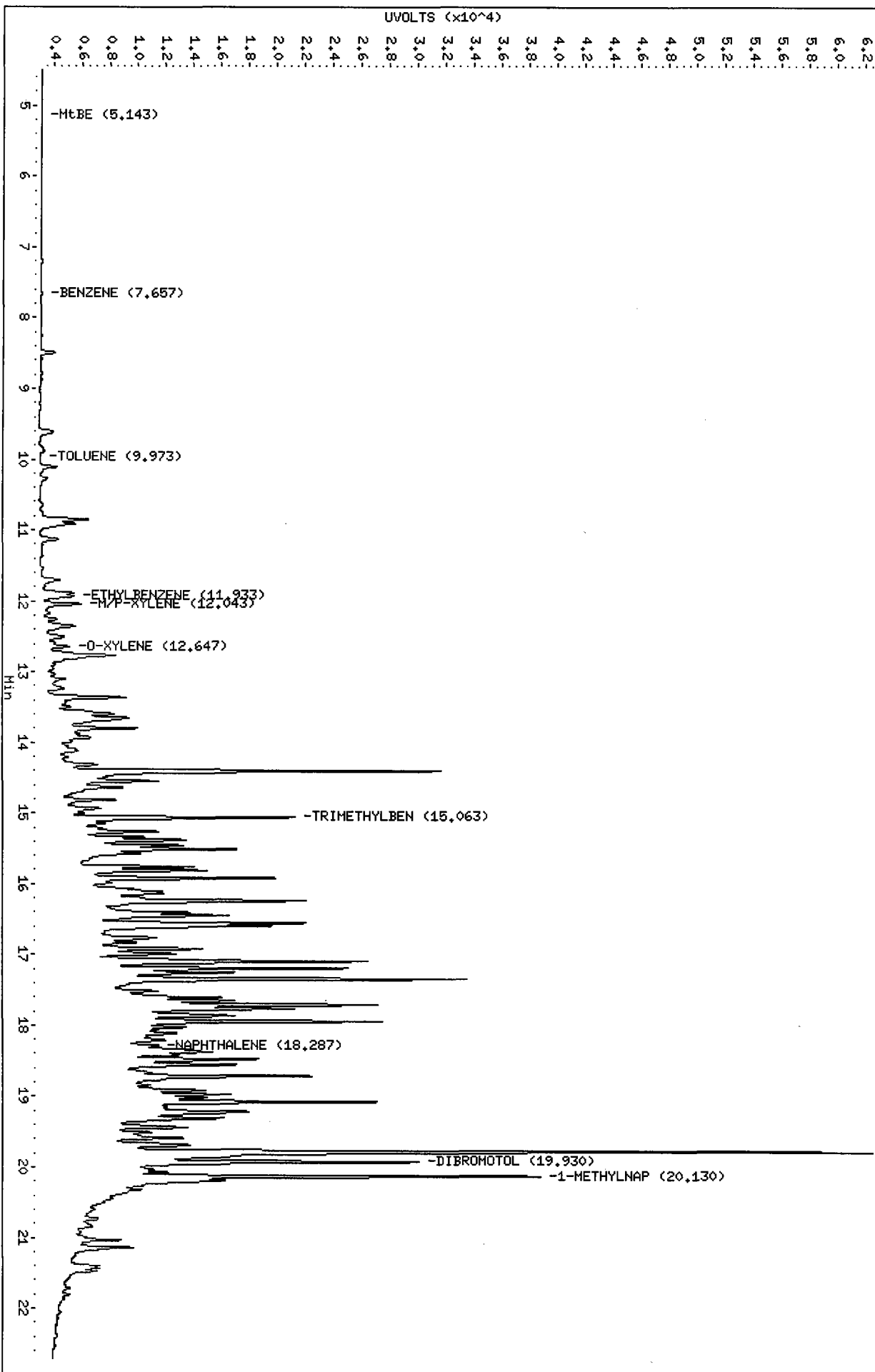
QC Flag Legend

R - Spike/Surrogate failed recovery limits.
M - Compound response manually integrated.

Data File: /chem3/pid1.i/vpoco209-2.b/0209a032.d
Date : 09-FEB-2011 22:54
Client ID: B11-06-25
Sample Info: SH23U
Column phase: RTX 502-2 AR0

Instrument: pid1.i
Operator: MH
Column diameter: 0.18

/chem3/pid1.i/vpoco209-2.b/0209a032.d/0209a032.cdf

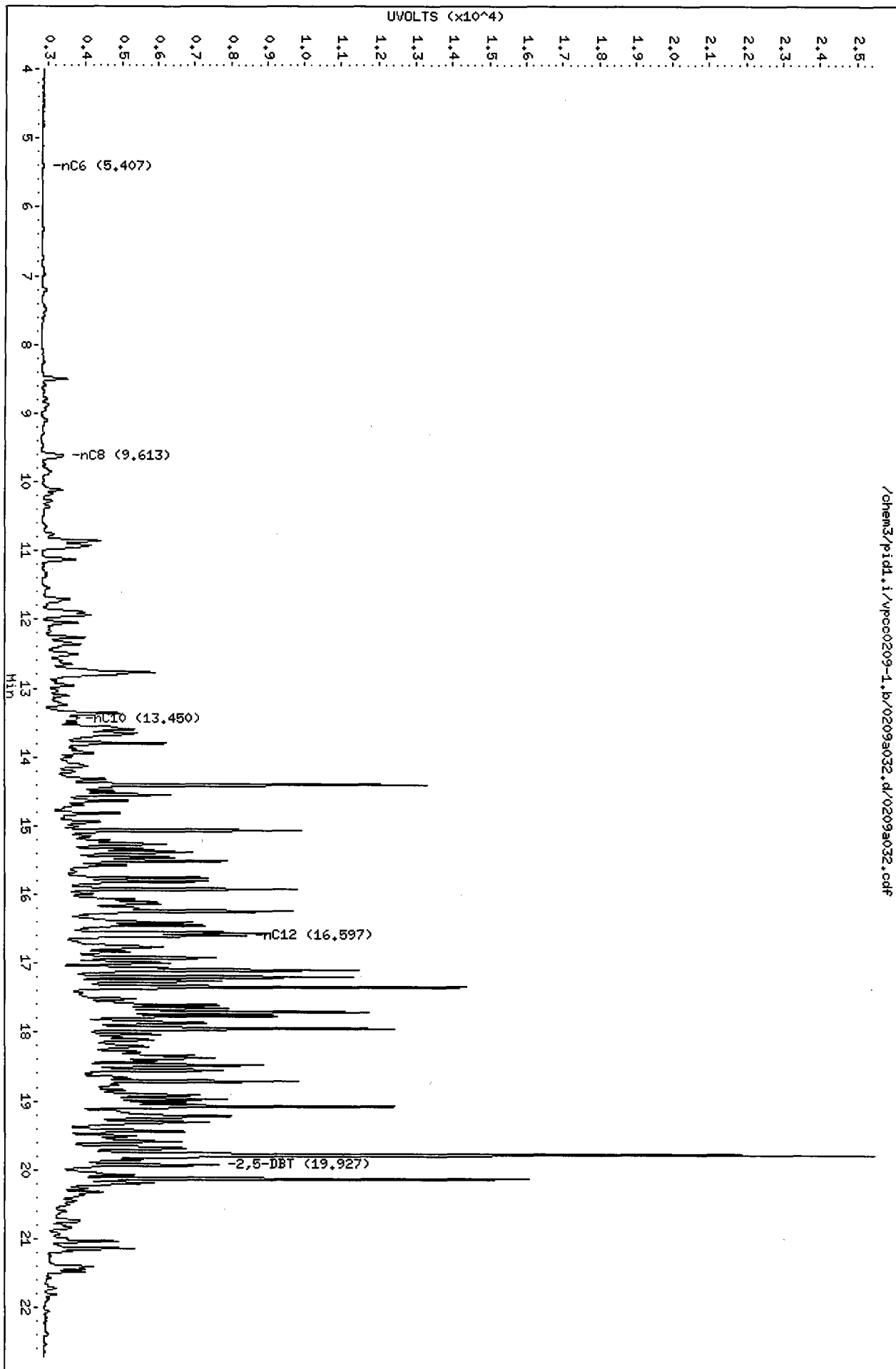


Data File: /chem3/pid1.i/vpcc0209-1.b/0209a032.d
Date : 09-FEB-2011 22:54
Client ID: B11-06-25
Sample Info: SH23U

Instrument: pid1.i
Operator: MH
Column diameter: 0.18

Column phase: RTX502-2 ALI

/chem3/pid1.i/vpcc0209-1.b/0209a032.d/0209a032.cdf



Analytical Resources Inc.
WAVPH Aromatics Report

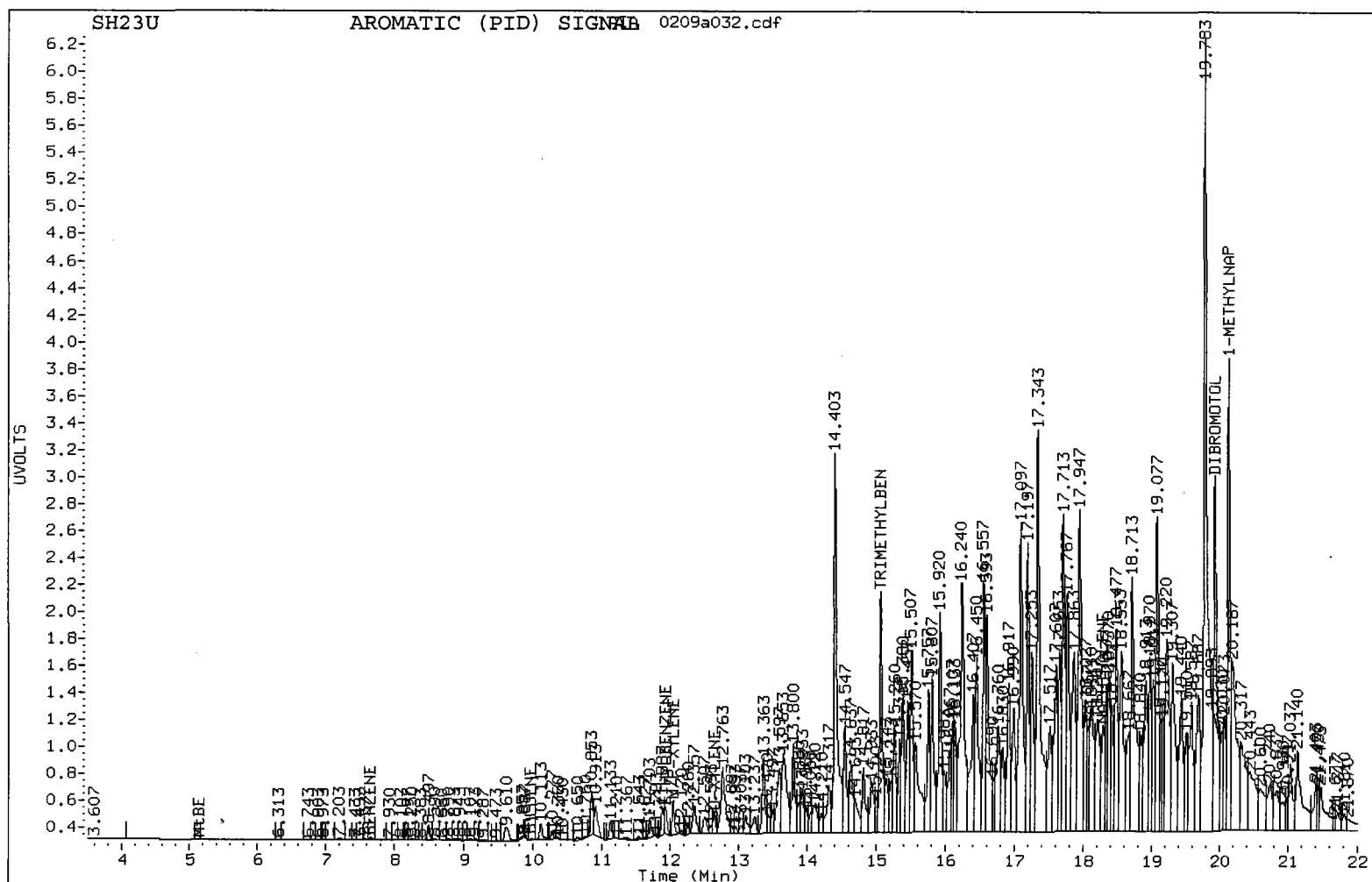
Data file: /chem3/pid1.i/vpcc0209-2.b/0209a032.d
Method: /chem3/pid1.i/vpcc0209-2.b/VPHARO.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH23U
Client ID: B11-06-25
Injection: 09-FEB-2011 22:54
Matrix: SOIL
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.143	0.013	9	0.0	C8-C10 Arom.	516389*	268.8
BENZENE	7.657	-0.003	141	0.1	C10-C12 Arom.	1594647	1379.6
TOLUENE	9.973	-0.003	69	0.1	C12-C13 Arom.	1122938	1676.6
ETHYLBENZENE	11.933	-0.020	1941	2.6			
M/P-XYLENE	12.043	-0.017	2589	2.0			
O-XYLENE	12.647	0.003	1598	1.7			
TRIMETHYLBEN	15.063	-0.007	17746	24.7			
NAPHTHALENE	18.287	-0.003	7817	19.6			
1-METHYLNAP	20.130	0.000	34963	126.8			
DIBROMOTOL	19.930	0.000	18214	40.9	DBT Recovery:	81.9	

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0209-1.b/0209a032.d
Method: /chem3/pid1.i/vpcc0209-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH23U
Client ID: B11-06-25
Injection: 09-FEB-2011 22:54
Matrix: SOIL
Dilution Factor: 1

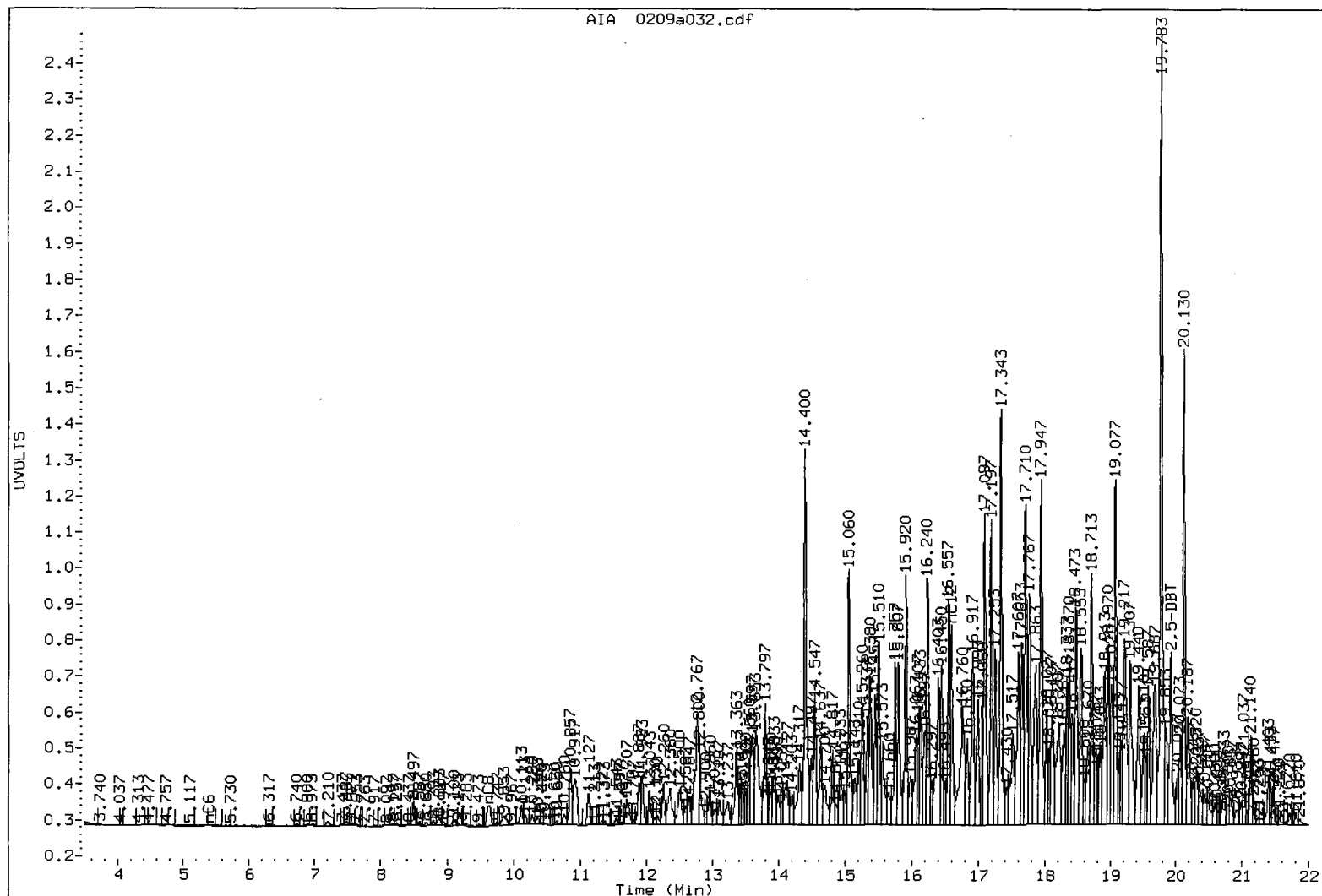
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	-----				C5-C6 Aliph.	224	0.6
nC6	5.407	0.003	21	53	C6-C8 Aliph.	7990*	23.5
nC8	9.613	-0.037	546	2359	C8-C10 Aliph.	106795	327.6
nC10	13.450	-0.007	895	1783	C10-C12 Aliph.	346349*	1175.1
nC12	16.597	0.007	5545	12949			

* Indicates surrogate area subtracted

SH23U

ALIPHATIC (FID) SIGNAL



SH23: 00030

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1

Sample ID: B11-06-25

DILUTION

Lab Sample ID: SH23U

LIMS ID: 11-3111

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/14/11 18:40

Instrument/Analyst: PID1/MH

Purge Volume: 10 mL

Sample Amount: 42.9 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1200	< 1,200 U
108-88-3	Toluene	1200	< 1,200 U
100-41-4	Ethylbenzene	1200	< 1,200 U
179601-23-1	m,p-Xylene	2300	< 2,300 U
95-47-6	o-Xylene	1200	< 1,200 U
1634-04-4	Methyl tert-Butyl Ether	1200	< 1,200 U
109-66-0	n-Pentane	1200	< 1,200 U
110-54-3	n-Hexane	1200	< 1,200 U
111-65-9	n-Octane	1200	1,600
124-18-5	n-Decane	1200	1,500
112-40-3	n-Dodecane	1200	10,000

Range	RL	Result
C8-C10 Aromatics	12,000	60,000
C10-C12 Aromatics	12,000	290,000
C12-C13 Aromatics	12,000	350,000
C5-C6 Aliphatics	12,000	< 12,000 U
C6-C8 Aliphatics	12,000	< 12,000 U
C8-C10 Aliphatics	12,000	< 12,000 U
C10-C12 Aliphatics	12,000	< 12,000 U

Values reported in µg/kg (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	75.0%
FID: 2,5-Dibromotoluene	90.0%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

Data File: /chem3/pid1.i/vpcc0214-2.b/0214a026.d
Report Date: 15-Feb-2011 08:22

Page 1

MH
2/15/11

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0214-2.b/0214a026.d
Lab Smp Id: SH23B0 MH 2/15 Client Smp ID: B11-06-25
Inj Date : 14-FEB-2011 18:40
Operator : MH Inst ID: pid1.i
Smp Info : SH23B
Misc Info : 11-2185
Comment :
Method : /chem3/pid1.i/vpcc0214-2.b/VPHARO.m
Meth Date : 15-Feb-2011 08:18 monicah Quant Type: ESTD
Cal Date : 14-FEB-2011 12:17 Cal File: 0214a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waarom.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable

Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/Kg)
-----	--	-----	-----	-----	-----	-----
1 MtBE	Compound Not Detected.					
2 BENZENE	7.663	7.667	-0.004	346	0.12082	0.121
4 TOLUENE	9.987	9.983	0.004	188	0.07048	0.0705
5 ETHYLBENZENE	11.940	11.960	-0.020	5377	2.51615	2.52
6 M/P-XYLENE	12.053	12.060	-0.007	6248	2.22455	2.22
7 O-XYLENE	12.653	12.650	0.003	3762	1.60366	1.60
9 TRIMETHYLBEN	15.070	15.073	-0.003	47304	24.1775	24.2
10 NAPHTHALENE	18.297	18.297	0.000	21122	16.2345	16.2
11 1-METHYLNAP	20.140	20.137	0.003	90821	118.402	118
\$ 37 DIBROMOTOL	19.937	19.937	0.000	39835	37.4531	37.4 (M)

QC Flag Legend

M - Compound response manually integrated.

SH23: 00040

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0214-1.b/0214a026.d
Lab Smp Id: SH2380 MHZ/IS Client Smp ID: B11-06-25
Inj Date : 14-FEB-2011 18:40
Operator : MH Inst ID: pid1.i
Smp Info : SH23B
Misc Info : 11-2185
Comment :
Method : /chem3/pid1.i/vpcc0214-1.b/VPHALI.m
Meth Date : 15-Feb-2011 08:19 monicah Quant Type: ESTD
Cal Date : 14-FEB-2011 12:17 Cal File: 0214a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waaliph.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

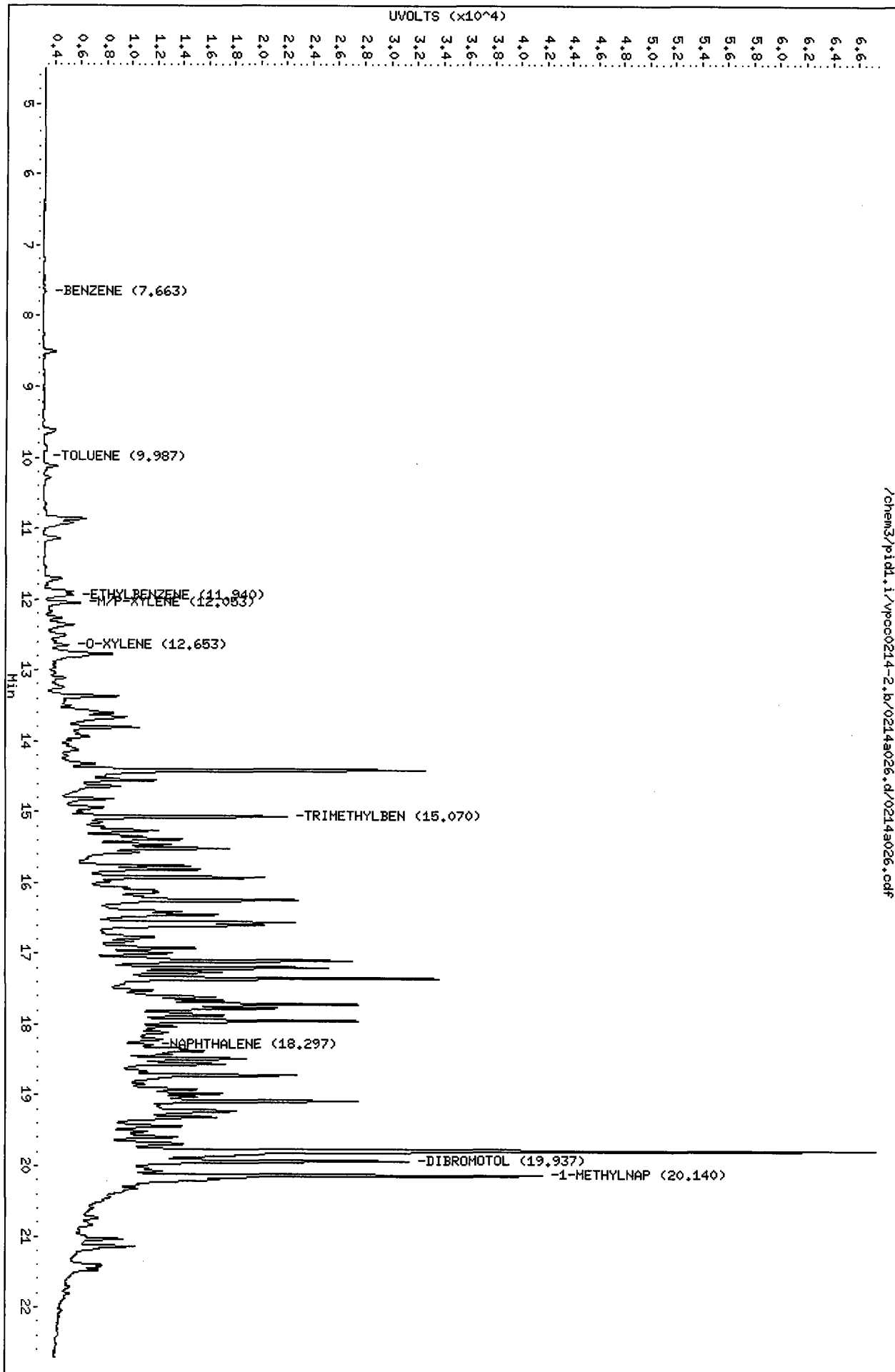
Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/Kg)
=====	==	=====	=====	=====	=====	=====
1 nC5	3.890	3.920	-0.030	98	0.28058	0.280
2 nC6	5.410	5.413	-0.003	97	0.22176	0.222
4 nC8	9.627	9.663	-0.036	2375	6.64534	6.64
5 nC10	13.463	13.463	0.000	2179	6.53323	6.53
7 nC12	16.603	16.597	0.006	13719	43.7934	43.8
\$ 8 2,5-DBT	19.937	19.937	0.000	6597	44.9791	45.0 (RM)

QC Flag Legend

R - Spike/Surrogate failed recovery limits.
M - Compound response manually integrated.

Data File: /chem3/pid1.i/vpcc0214-2.b/0214a026.d
Date: 14-FEB-2011 18:40
Client ID: B11-06-25
Sample Info: SH23B
Column phase: RTX 502-2 ARO

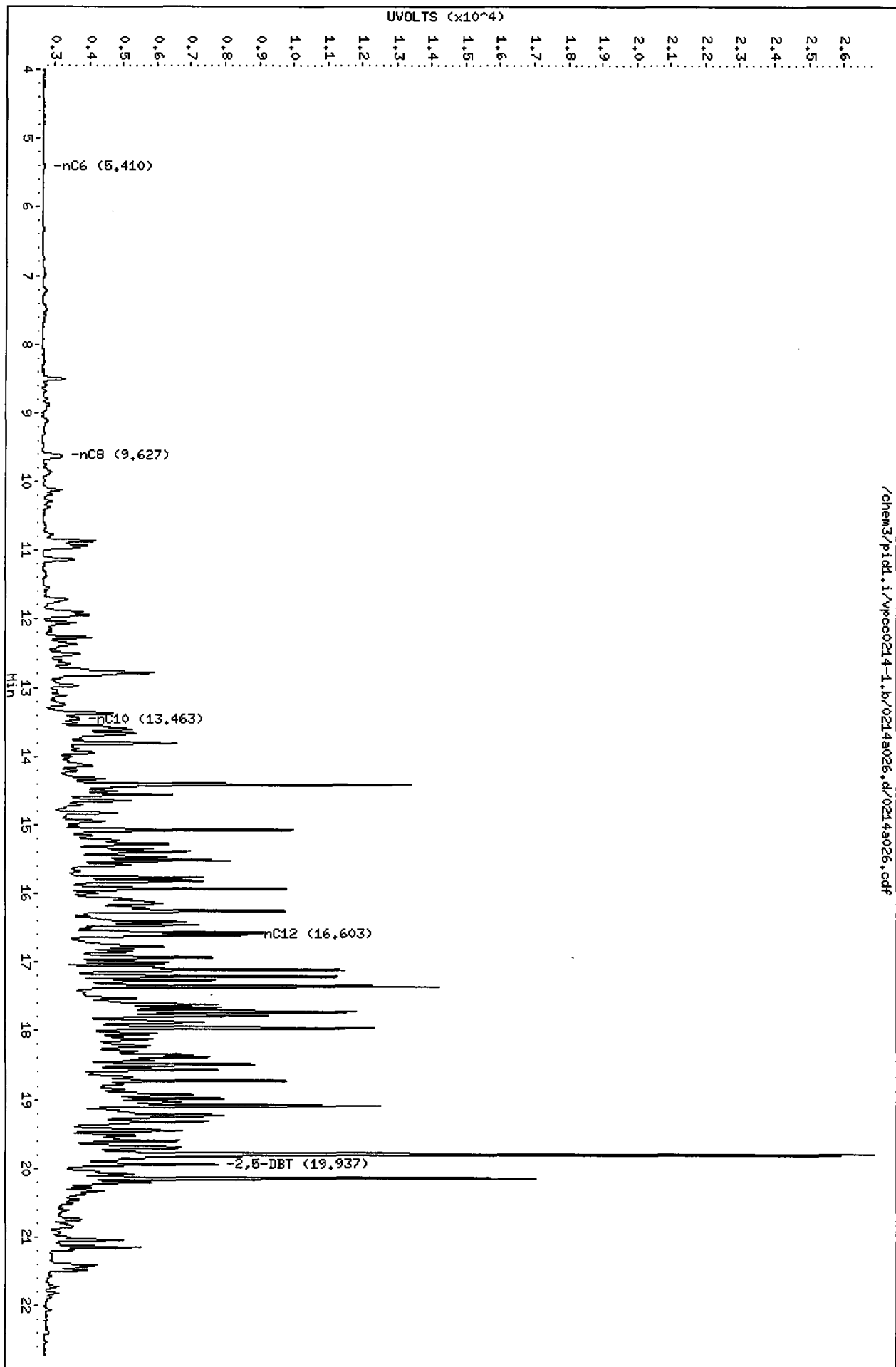
Instrument: pid1.i
Operator: HH
Column diameter: 0.18



Data File: /chem3/pid1.i/vpcc0214-1.b/0214a026.d
Date : 14-FEB-2011 18:40
Client ID: B11-06-25
Sample Info: SH23B
Column phase: RTX502-2 ALI

Instrument: pid1.i
Operator: MH
Column diameter: 0.18

/chem3/pid1.i/vpcc0214-1.b/0214a026.d/0214a026.cdf



Analytical Resources Inc.
WAVPH Aromatics Report

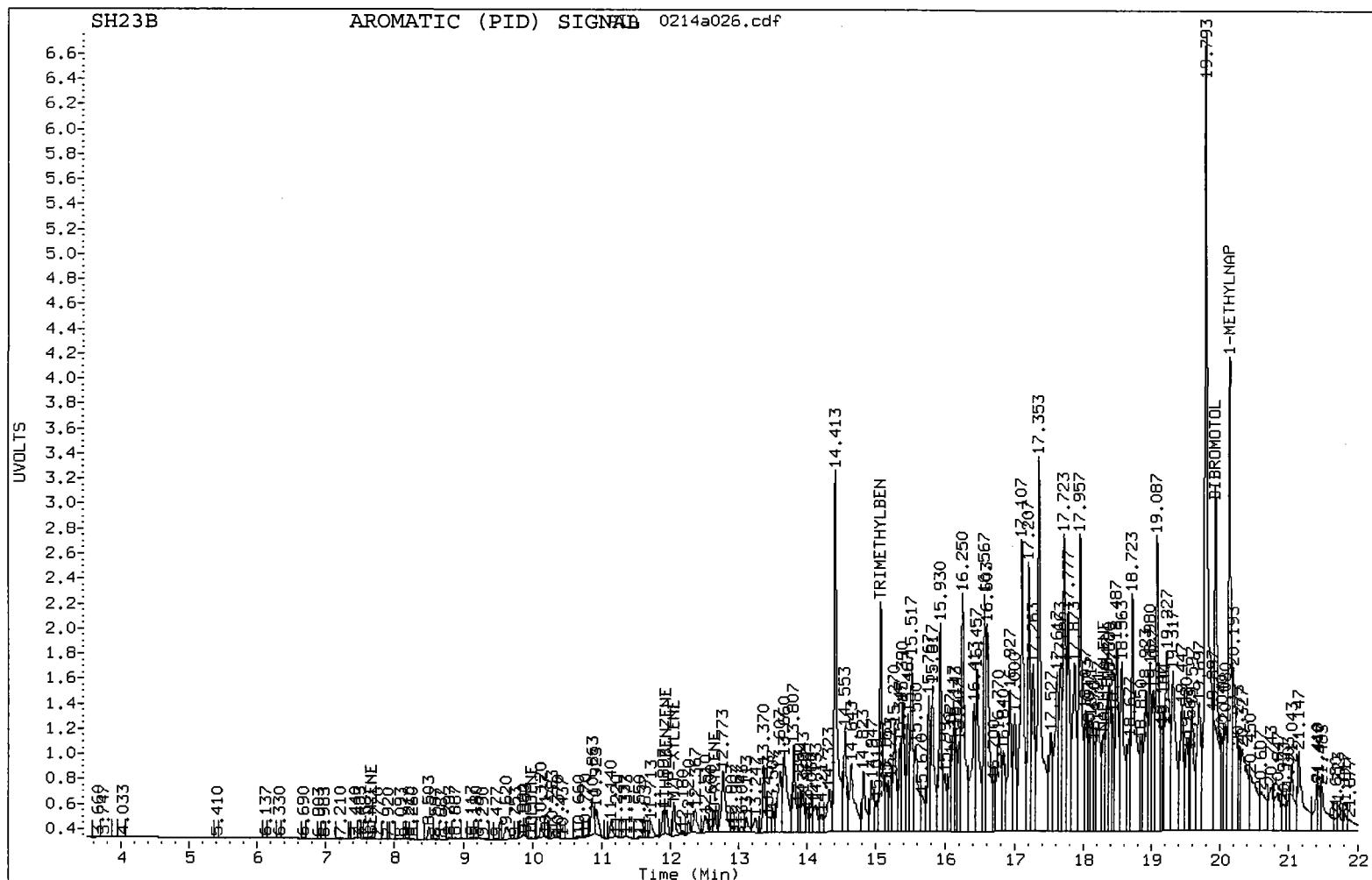
Data file: /chem3/pid1.i/vpcc0214-2.b/0214a026.d
Method: /chem3/pid1.i/vpcc0214-2.b/VPHARO.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH23B
Client ID: B11-06-25
Injection: 14-FEB-2011 18:40
Matrix: SOIL
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	----				C8-C10 Arom.	504715*	258.0
BENZENE	7.663	-0.003	138	0.1	C10-C12 Arom.	1598772	1228.8
TOLUENE	9.987	0.003	69	0.1	C12-C13 Arom.	1144544	1492.1
ETHYLBENZENE	11.940	-0.020	1827	2.5			
M/P-XYLENE	12.053	-0.007	2592	2.2			
O-XYLENE	12.653	0.003	1442	1.6			
TRIMETHYLBEN	15.070	-0.003	18343	24.2			
NAPHTHALENE	18.297	0.000	7771	16.2			
1-METHYLNAP	20.140	0.003	37791	118.4			
DIBROMOTOL	19.937	0.000	19367	37.5	DBT Recovery:	74.9	

* Indicates surrogate area subtracted



SH23: 00044

Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0214-1.b/0214a026.d
Method: /chem3/pid1.i/vpcc0214-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH23B
Client ID: B11-06-25
Injection: 14-FEB-2011 18:40
Matrix: SOIL
Dilution Factor: 1

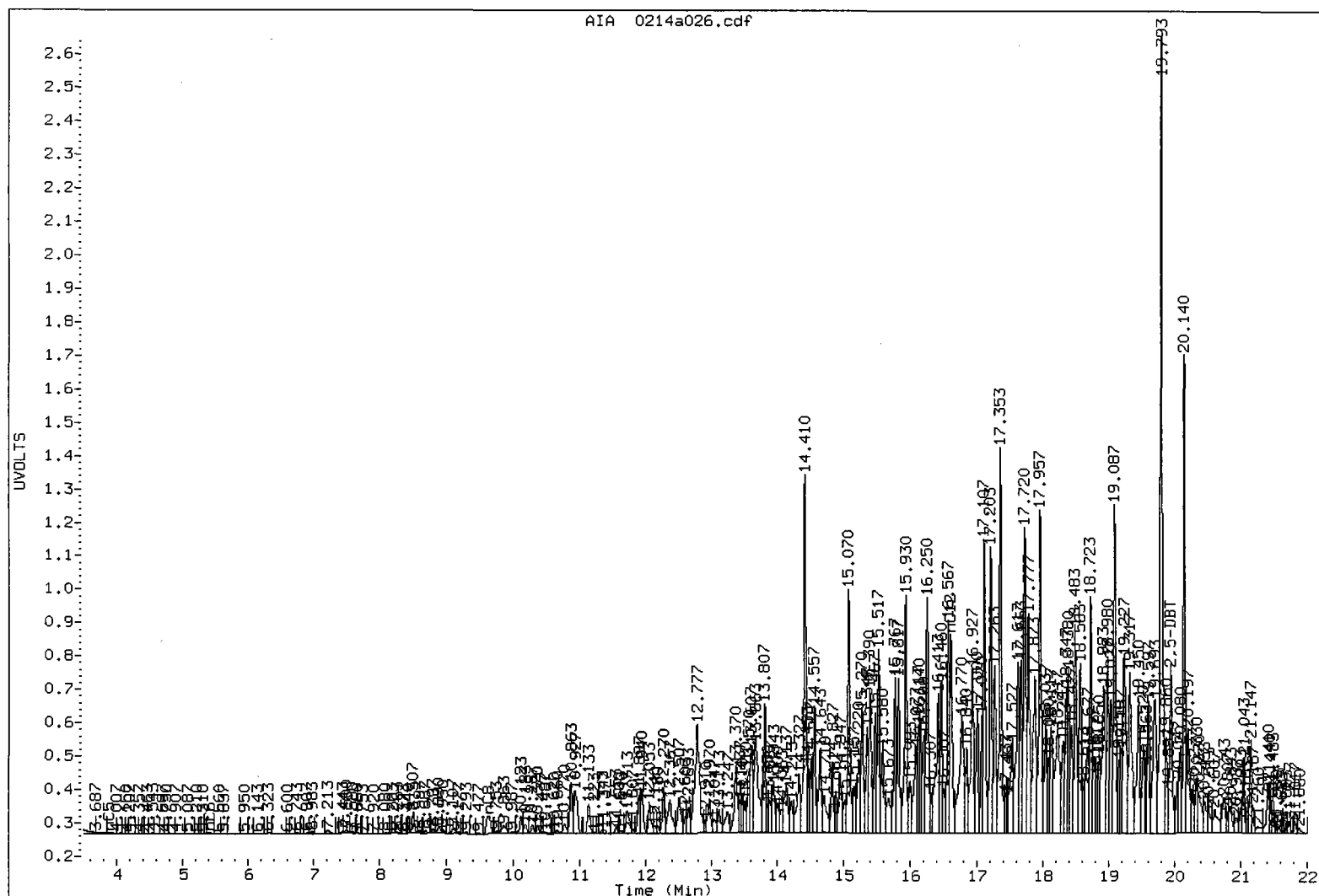
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.890	-0.030	23	98	C5-C6 Aliph.	489	1.2
nC6	5.410	-0.003	35	97	C6-C8 Aliph.	8062*	22.5
nC8	9.627	-0.037	545	2375	C8-C10 Aliph.	96865	290.3
nC10	13.463	0.000	1034	2179	C10-C12 Aliph.	373313*	1191.6
nC12	16.603	0.007	5959	13719			

* Indicates surrogate area subtracted

SH23B

ALIPHATIC (FID) SIGNAL



SH23: 00045

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

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Sample ID: B11-08-20

SAMPLE

Lab Sample ID: SH23V

LIMS ID: 11-3112

Matrix: Soil

Data Release Authorized: *B*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 14:51

Instrument/Analyst: PID1/MH

Purge Volume: 10 mL

Sample Amount: 53.5 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	930	< 930 U
108-88-3	Toluene	930	< 930 U
100-41-4	Ethylbenzene	930	950
179601-23-1	m,p-Xylene	1900	< 1,900 U
95-47-6	o-Xylene	930	< 930 U
1634-04-4	Methyl tert-Butyl Ether	930	< 930 U
109-66-0	n-Pentane	930	< 930 U
110-54-3	n-Hexane	930	< 930 U
111-65-9	n-Octane	930	2,000
124-18-5	n-Decane	930	2,400
112-40-3	n-Dodecane	930	3,600

Range	RL	Result
C8-C10 Aromatics	9,300	31,000
C10-C12 Aromatics	9,300	120,000
C12-C13 Aromatics	9,300	170,000
C5-C6 Aliphatics	9,300	< 9,300 U
C6-C8 Aliphatics	9,300	< 9,300 U
C8-C10 Aliphatics	9,300	10,000
C10-C12 Aliphatics	9,300	< 9,300 U

Values reported in µg/kg (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	68.6%
FID: 2,5-Dibromotoluene	90.8%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a016.d
Report Date: 15-Feb-2011 09:01

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MTH

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a016.d
Lab Smp Id: SH23V Client Smp ID: B11-08-20
Inj Date : 04-FEB-2011 14:51
Operator : MH Inst ID: pid1.i
Smp Info : SH23V
Misc Info : 11-2191
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul Quant Type: ESTD
Cal Date : 20-DEC-2010 21:58 Cal File: 1220a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waarom.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/Kg)
-----	==	=====	=====	=====	=====	=====
1 MtBE	Compound Not Detected.					
2 BENZENE	7.650	7.647	0.003	330	0.10014	0.100
4 TOLUENE	9.973	9.960	0.013	189	0.06192	0.0619
5 ETHYLBENZENE	11.943	11.933	0.010	13254	5.06520	5.06
6 M/P-XYLENE	12.043	12.037	0.006	1030	0.33487	0.335
7 O-XYLENE	12.647	12.623	0.024	4312	1.58542	1.58
9 TRIMETHYLBEN	15.063	15.047	0.016	15912	6.70255	6.70
10 NAPHTHALENE	18.287	18.270	0.017	46109	21.1487	21.1
11 1-METHYLNAP	20.130	20.110	0.020	69212	62.3710	62.4
\$ 37 DIBROMOTOL	19.930	19.910	0.020	63261	34.2735	34.3 (M)

QC Flag Legend

M - Compound response manually integrated.

SH23:00047

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a016.d
Lab Smp Id: SH23V Client Smp ID: B11-08-20
Inj Date : 04-FEB-2011 14:51
Operator : MH Inst ID: pid1.i
Smp Info : SH23V
Misc Info : 11-2191
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul Quant Type: ESTD
Cal Date : 20-DEC-2010 21:58 Cal File: 1220a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waaliph.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

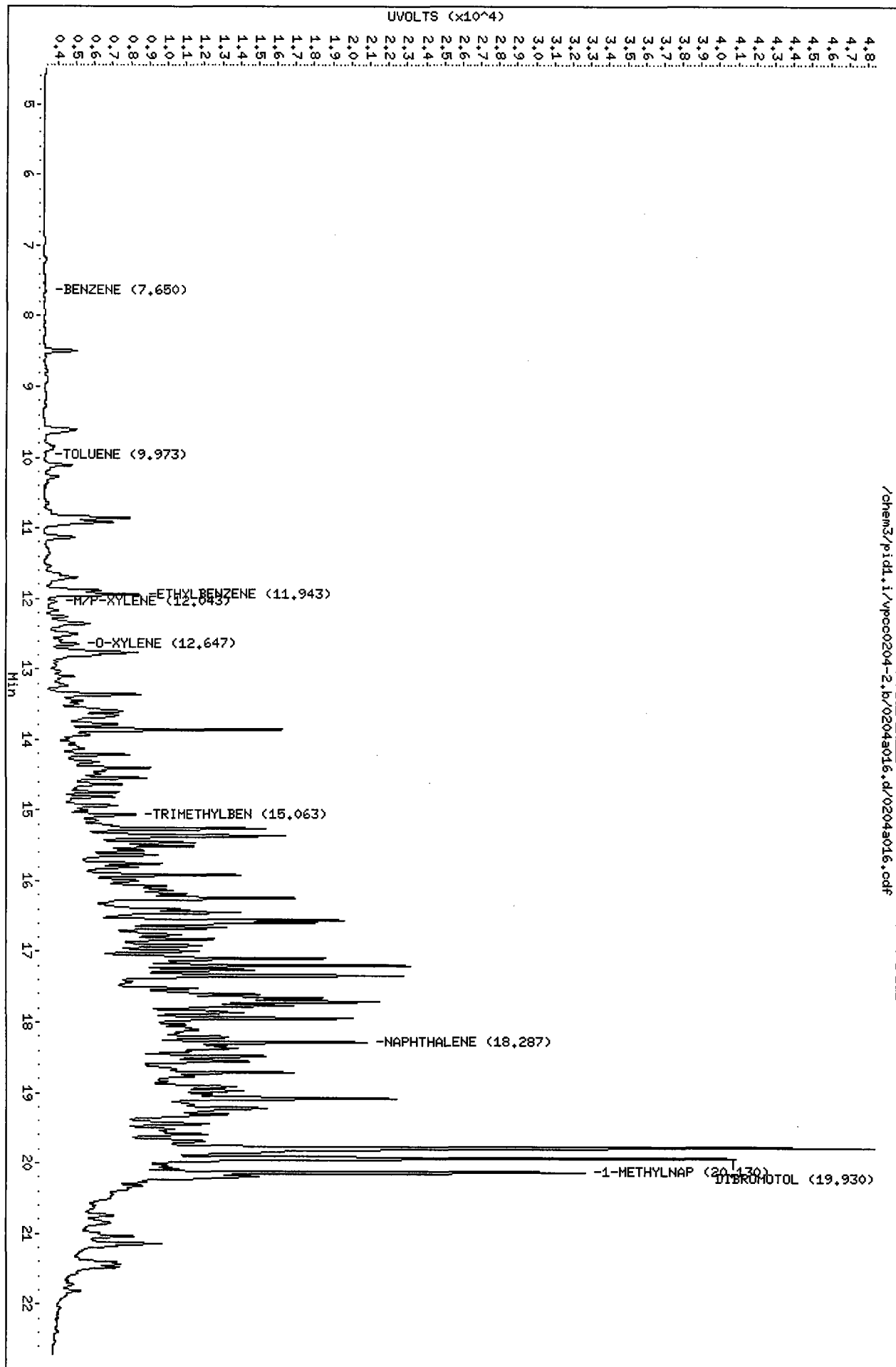
Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/Kg)
1 nC5	3.837	3.850	-0.013	73	0.16993	0.170
2 nC6	5.397	5.393	0.004	59	0.11661	0.117
4 nC8	9.630	9.640	-0.010	4530	10.4810	10.5
5 nC10	13.450	13.440	0.010	5360	12.7279	12.7
7 nC12	16.557	16.573	-0.016	8126	19.0754	19.1
\$ 8 2,5-DBT	19.927	19.913	0.014	7222	45.3989	45.4 (RM)

QC Flag Legend

R - Spike/Surrogate failed recovery limits.
M - Compound response manually integrated.

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a016.d
Date : 04-FEB-2011 14:51
Client ID: B11-08-20
Sample Info: SH23V
Column phase: RTX 502-2 ARO

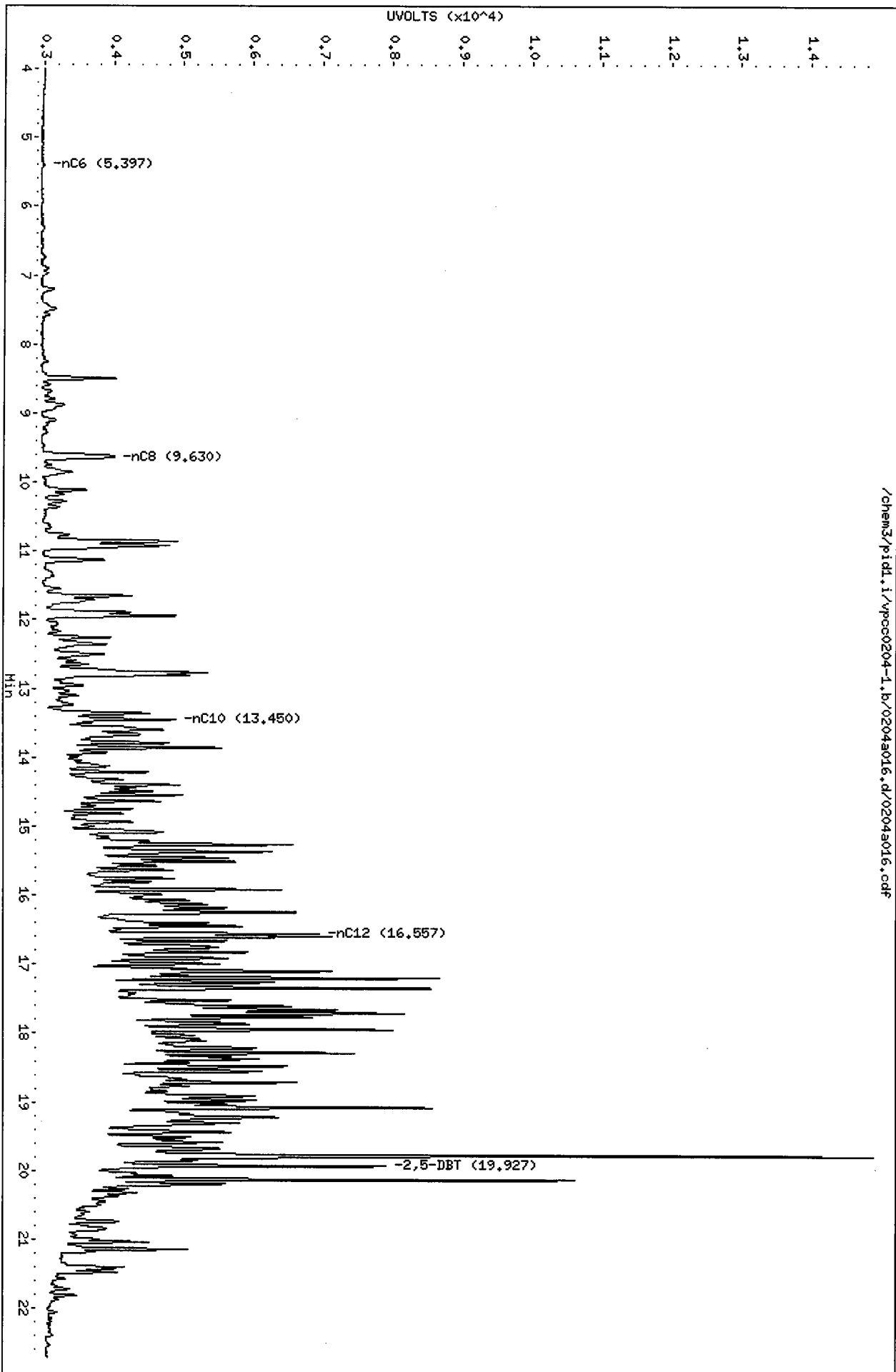
Instrument: pid1.i
Operator: MH
Column diameter: 0.18



Data File: /chem3/pid1.i/vpoco204-1.b/0204a016.d
Date : 04-FEB-2011 14:51
Client ID: B11-08-20
Sample Info: SH23V
Column phase: RTX502-2 ALI

Instrument: pid1.i
Operator: NH
Column diameter: 0.18

/chem3/pid1.i/vpoco204-1.b/0204a016.d/0204a016.cdf



Analytical Resources Inc.
WAVPH Aromatics Report

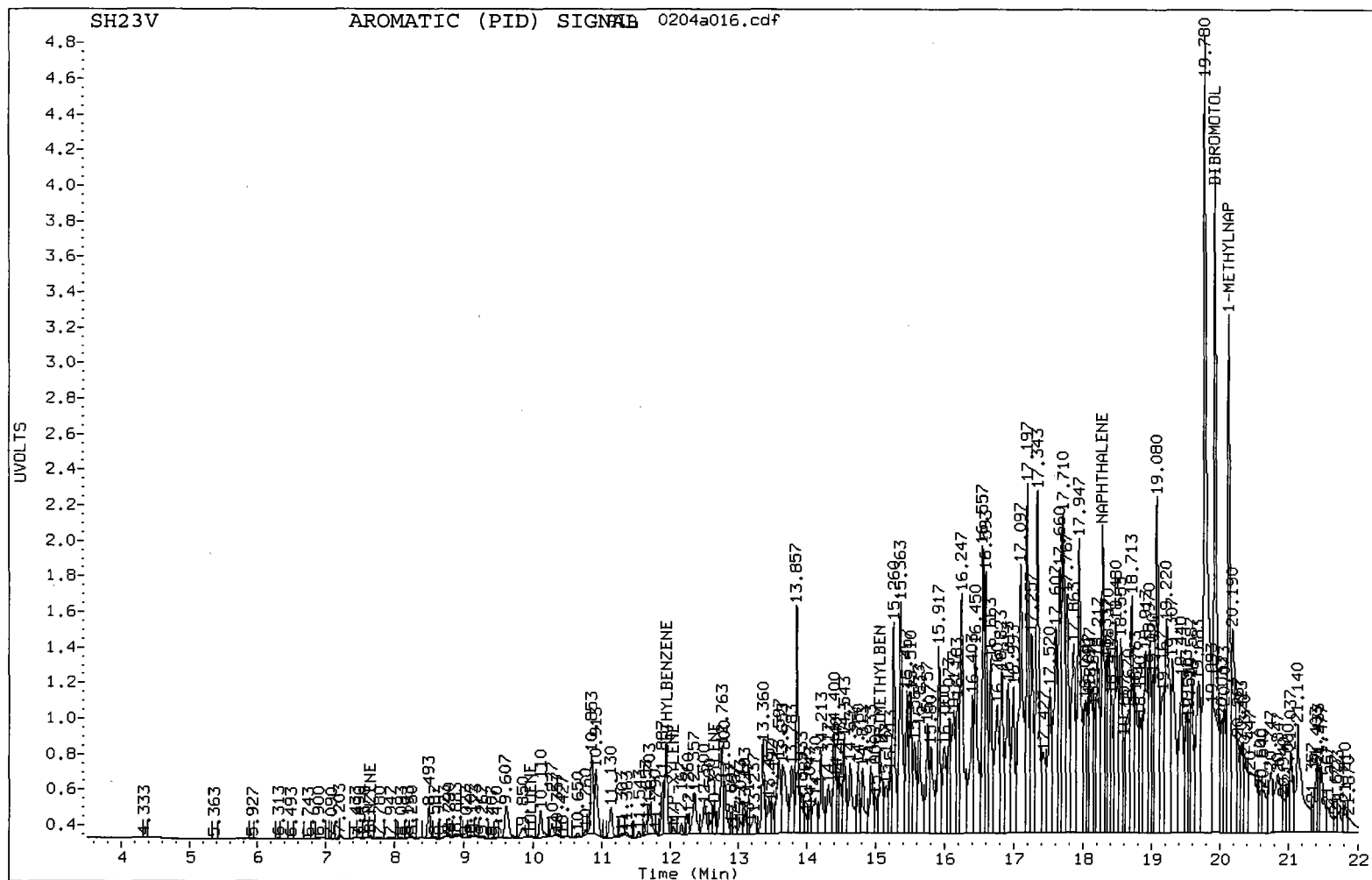
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Method: /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH23V
Client ID: B11-08-20
Injection: 04-FEB-2011 14:51
Matrix: SOIL
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	----				C8-C10 Arom.	392148*	165.2
BENZENE	7.650	0.003	139	0.1	C10-C12 Arom.	1346697	617.7
TOLUENE	9.973	0.013	69	0.1	C12-C13 Arom.	968972	873.2
ETHYLBENZENE	11.943	0.010	5034	5.1			
M/P-XYLENE	12.043	0.007	432	0.3			
O-XYLENE	12.647	0.023	1655	1.6			
TRIMETHYLBEN	15.063	0.017	4738	6.7			
NAPHTHALENE	18.287	0.017	17256	21.1			
1-METHYLNAP	20.130	0.020	29081	62.4			
DIBROMOTOL	19.930	0.020	30611	34.3	DBT Recovery:	68.5	

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pidl.i/vpcc0204-1.b/0204a016.d
Method: /chem3/pidl.i/vpcc0204-1.b/VPHALI.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH23V
Client ID: B11-08-20
Injection: 04-FEB-2011 14:51
Matrix: SOIL
Dilution Factor: 1

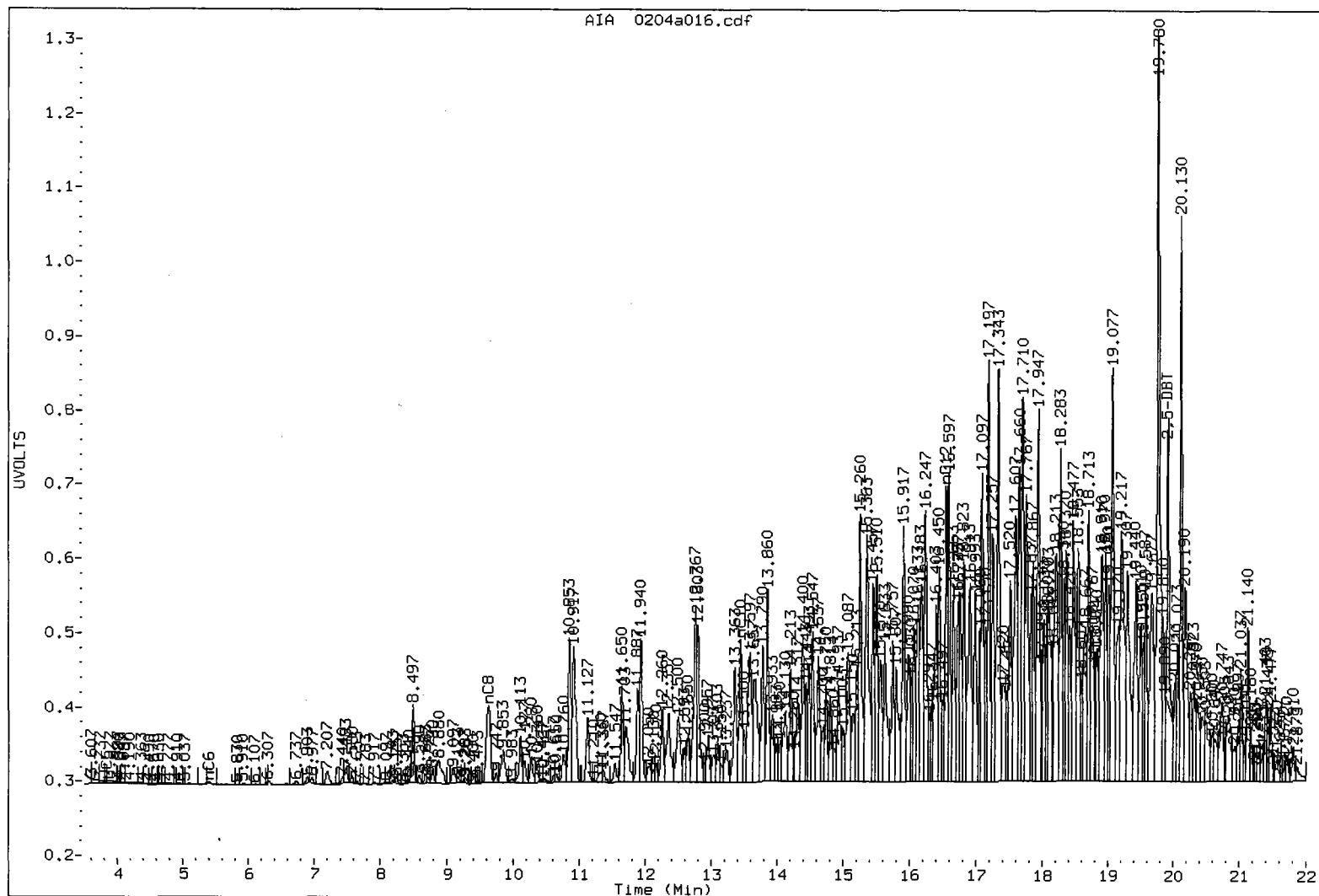
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.837	-0.013	34	73	C5-C6 Aliph.	953	2.0
nC6	5.397	0.003	23	59	C6-C8 Aliph.	14128*	32.7
nC8	9.630	-0.010	1026	4530	C8-C10 Aliph.	93004	220.8
nC10	13.450	0.010	1909	5360	C10-C12 Aliph.	251477*	590.3
nC12	16.557	-0.017	3975	8126			

* Indicates surrogate area subtracted

SH23V

ALIPHATIC (FID) SIGNAL



SH23: 00051

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1



Sample ID: B11-08-20

DILUTION

Lab Sample ID: SH23V

LIMS ID: 11-3112

Matrix: Soil

Data Release Authorized: *CP*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 11:51

Instrument/Analyst: PID1/MH

Purge Volume: 10 mL

Sample Amount: 5.35 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	9300	< 9,300 U
108-88-3	Toluene	9300	< 9,300 U
100-41-4	Ethylbenzene	9300	< 9,300 U
179601-23-1	m,p-Xylene	19000	< 19,000 U
95-47-6	o-Xylene	9300	< 9,300 U
1634-04-4	Methyl tert-Butyl Ether	9300	< 9,300 U
109-66-0	n-Pentane	9300	< 9,300 U
110-54-3	n-Hexane	9300	< 9,300 U
111-65-9	n-Octane	9300	< 9,300 U
124-18-5	n-Decane	9300	< 9,300 U
112-40-3	n-Dodecane	9300	< 9,300 U

Range	RL	Result
C8-C10 Aromatics	93,000	< 93,000 U
C10-C12 Aromatics	93,000	< 93,000 U
C12-C13 Aromatics	93,000	170,000
C5-C6 Aliphatics	93,000	< 93,000 U
C6-C8 Aliphatics	93,000	< 93,000 U
C8-C10 Aliphatics	93,000	< 93,000 U
C10-C12 Aliphatics	93,000	< 93,000 U

Values reported in µg/kg (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	100%
FID: 2,5-Dibromotoluene	103%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

FORM I

SH23: 00002

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a010.d
Report Date: 15-Feb-2011 09:01

Page 1

2/15/11
M

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a010.d
Lab Smp Id: SH23V Client Smp ID: B11-08-20
Inj Date : 04-FEB-2011 11:51
Operator : MH Inst ID: pid1.i
Smp Info : SH23V
Misc Info : 11-2191
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul Quant Type: ESTD
Cal Date : 20-DEC-2010 21:58 Cal File: 1220a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waarom.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable

Local Compound Variable

Compounds	RT	EXP RT	DLT RT	RESPONSE	CONCENTRATIONS	
					ON-COLUMN (ug/ml)	FINAL (ug/Kg)
1 MtBE	5.040	5.097	-0.057	34	0.02304	0.0230
2 BENZENE	7.653	7.647	0.006	48	0.01457	0.0146
4 TOLUENE	9.967	9.960	0.007	37	0.01212	0.0121
5 ETHYLBENZENE	11.943	11.933	0.010	740	0.28280	0.283
6 M/P-XYLENE	12.050	12.037	0.013	147	0.04779	0.0478
7 O-XYLENE	12.633	12.623	0.010	953	0.35040	0.350
9 TRIMETHYLBEN	15.063	15.047	0.016	688	0.28980	0.290
10 NAPHTHALENE	18.283	18.270	0.013	3466	1.58975	1.59
11 1-METHYLNAP	20.127	20.110	0.017	9946	8.96292	8.96
\$ 37 DIBROMOTOL	19.927	19.910	0.017	92364	50.0409	50.0

SH23: 00055

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a010.d
Lab Smp Id: SH23V Client Smp ID: B11-08-20
Inj Date : 04-FEB-2011 11:51
Operator : MH Inst ID: pid1.i
Smp Info : SH23V
Misc Info : 11-2191
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul Quant Type: ESTD
Cal Date : 20-DEC-2010 21:58 Cal File: 1220a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waaliph.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

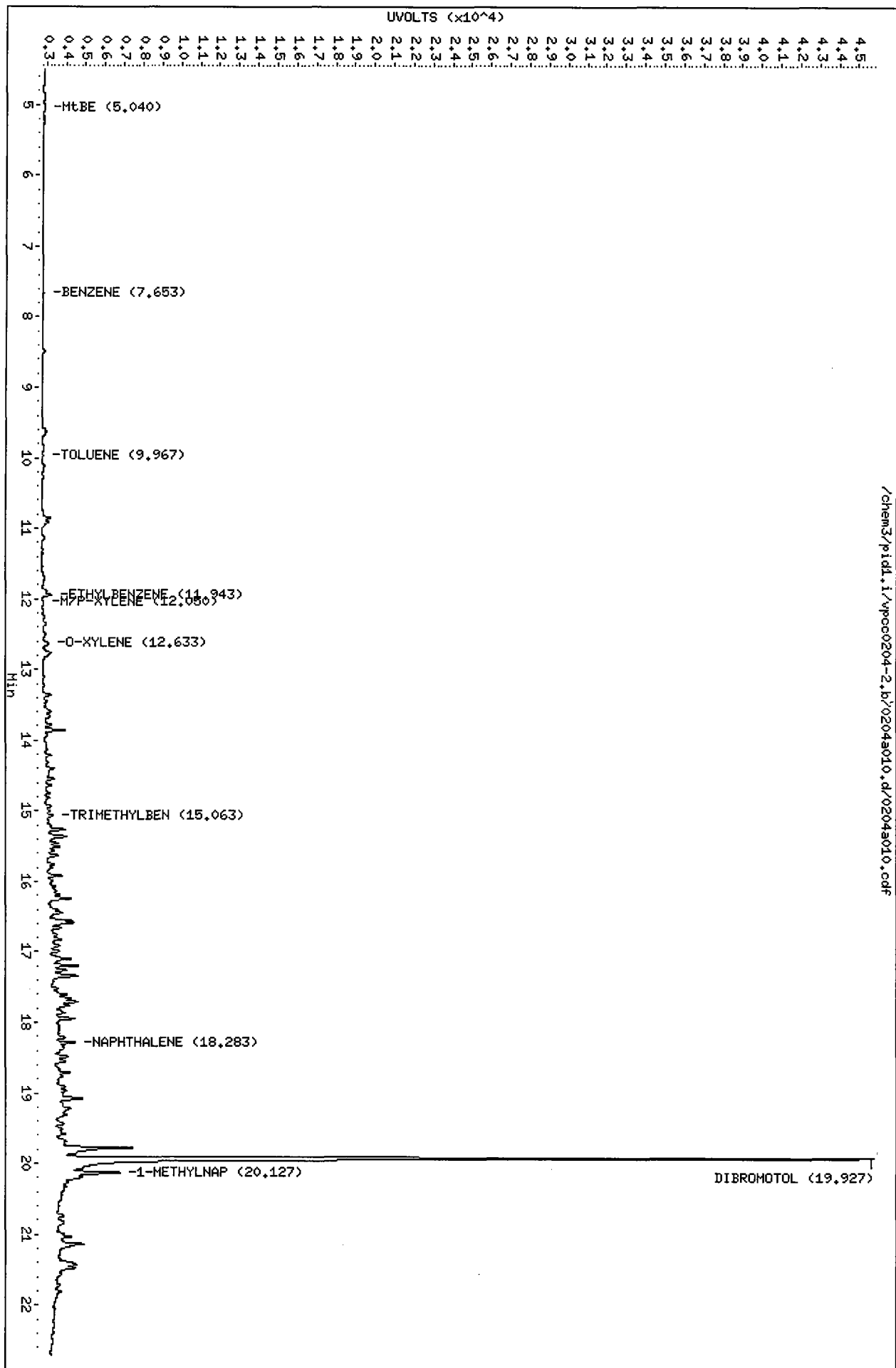
Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/Kg)
1 nC5				Compound Not Detected.		
2 nC6	5.400	5.393	0.007	26	0.05139	0.0514
4 nC8	9.643	9.640	0.003	179	0.41415	0.414
5 nC10	13.450	13.440	0.010	420	0.99733	0.997
7 nC12	16.593	16.573	0.020	951	2.23243	2.23
\$ 8 2,5-DBT	19.923	19.913	0.010	8172	51.3708	51.4 (RM)

QC Flag Legend

R - Spike/Surrogate failed recovery limits.
M - Compound response manually integrated.

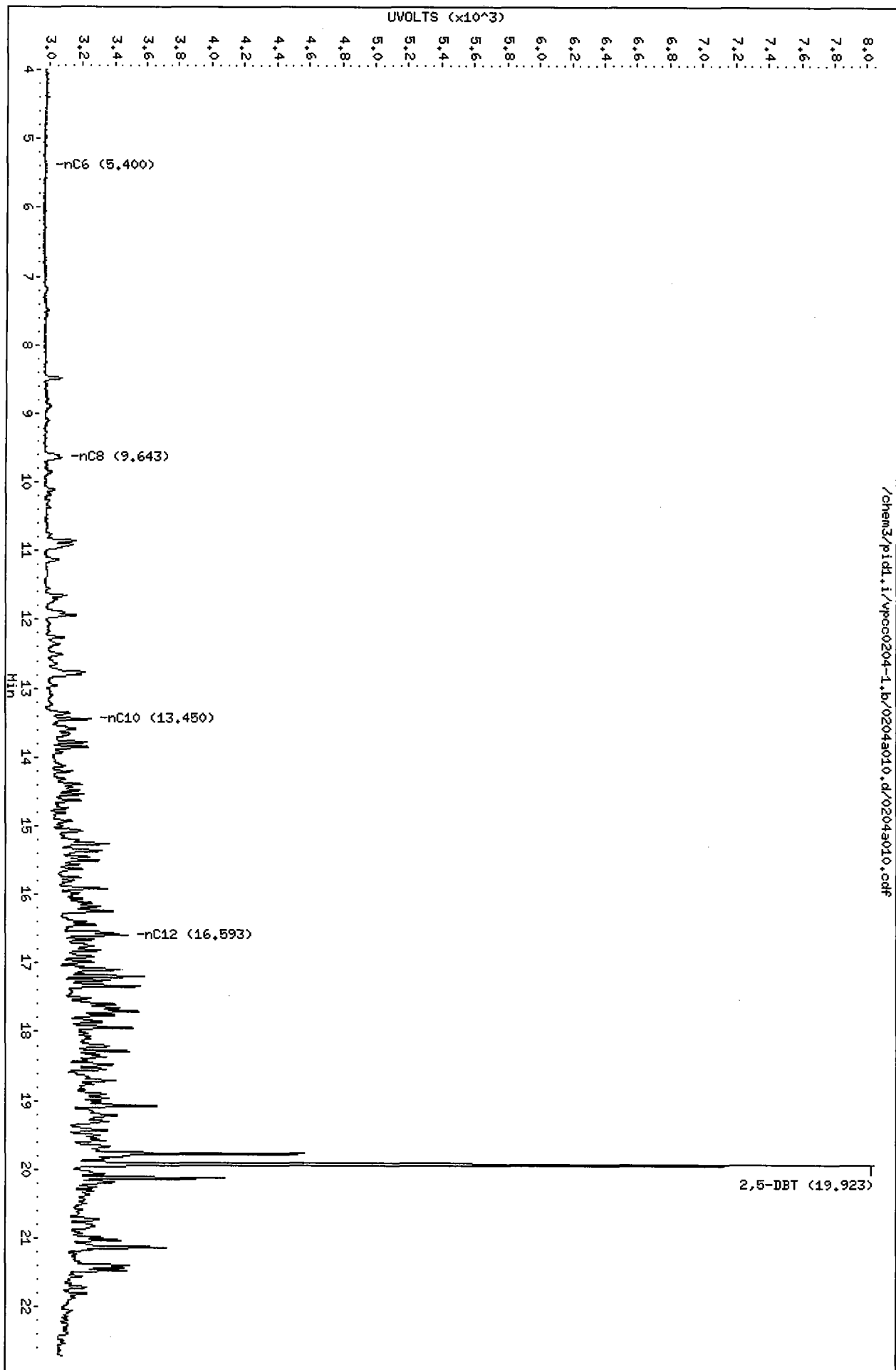
Data File: /chem3/pid1.i/vpcc0204-2.b/0204a010.d
Date : 04-FEB-2011 11:51
Client ID: B11-08-20
Sample Info: SH23V
Column phase: RTX 502-2 ARO

Instrument: pid1.i
Operator: NH
Column diameter: 0.18



Data File: /chem3/pid1.i/vpcc0204-1.b/0204a010.d
Date : 04-FEB-2011 11:51
Client ID: B11-08-20
Sample Info: SH23V
Column phase: RTX502-2 ALI

Instrument: pid1.i
Operator: HH
Column diameter: 0.18



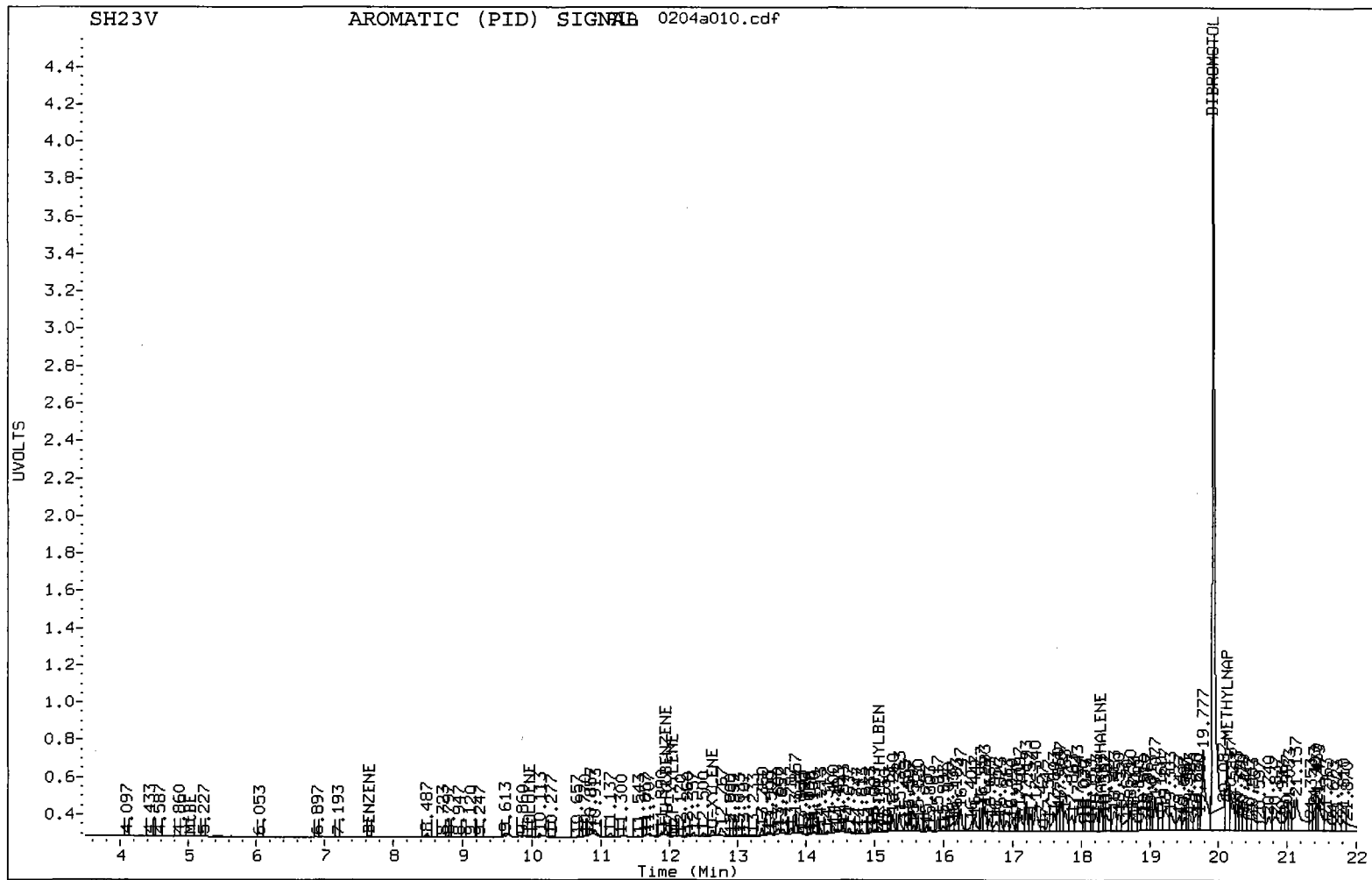
Analytical Resources Inc.
WAVPH Aromatics Report

Data file: /chem3/pid1.i/vpcc0204-2.b/0204a010.d
Method: /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH23V
Client ID: B11-08-20
Injection: 04-FEB-2011 11:51
Matrix: SOIL
Dilution Factor: 1

VPH-AROMATIC RESULTS								
Compound	RT	Shift	Height	Amount	Range	Total Area	Conc	
MtBE	5.040	-0.057	8	0.0	C8-C10	Arom.	19867*	8.4
BENZENE	7.653	0.007	22	0.0	C10-C12	Arom.	90573	41.5
TOLUENE	9.967	0.007	17	0.0	C12-C13	Arom.	102414	92.3
ETHYLBENZENE	11.943	0.010	360	0.3				
M/P-XYLENE	12.050	0.013	54	0.0				
O-XYLENE	12.633	0.010	305	0.4				
TRIMETHYLBEN	15.063	0.017	286	0.3				
NAPHTHALENE	18.283	0.013	1384	1.6				
1-METHYLNAP	20.127	0.017	3664	9.0				
DIBROMOTOL	19.927	0.017	41643	50.0	DBT Recovery: 100.1			

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0204-1.b/0204a010.d
Method: /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH23V
Client ID: B11-08-20
Injection: 04-FEB-2011 11:51
Matrix: SOIL
Dilution Factor: 1

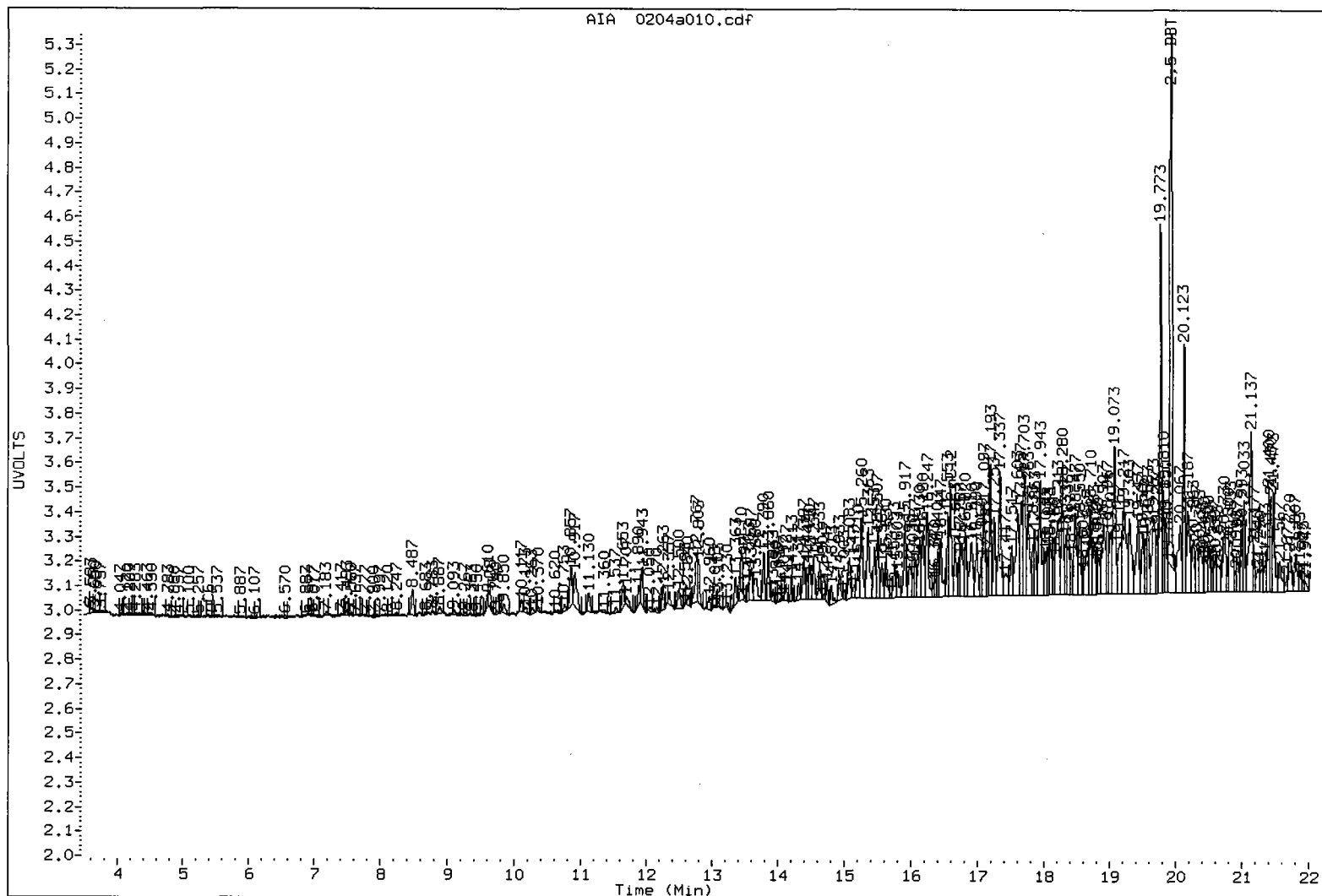
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	----				C5-C6 Aliph.	278	0.6
nC6	5.400	0.007	12	26	C6-C8 Aliph.	1158*	2.7
nC8	9.643	0.003	73	179	C8-C10 Aliph.	5383	12.8
nC10	13.450	0.010	221	420	C10-C12 Aliph.	17237*	40.5
nC12	16.593	0.020	431	951			

* Indicates surrogate area subtracted

SH23V

ALIPHATIC (FID) SIGNAL



ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

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Sample ID: B11-09-23.5

SAMPLE

Lab Sample ID: SH23W

LIMS ID: 11-3113

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 15:21

Instrument/Analyst: PID1/MH

Purge Volume: 10 mL

Sample Amount: 73.0 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	680	< 680 U
108-88-3	Toluene	680	< 680 U
100-41-4	Ethylbenzene	680	< 680 U
179601-23-1	m,p-Xylene	1400	< 1,400 U
95-47-6	o-Xylene	680	< 680 U
1634-04-4	Methyl tert-Butyl Ether	680	< 680 U
109-66-0	n-Pentane	680	< 680 U
110-54-3	n-Hexane	680	< 680 U
111-65-9	n-Octane	680	< 680 U
124-18-5	n-Decane	680	740
112-40-3	n-Dodecane	680	1,400

Range	RL	Result
C8-C10 Aromatics	6,800	9,000
C10-C12 Aromatics	6,800	38,000
C12-C13 Aromatics	6,800	58,000
C5-C6 Aliphatics	6,800	< 6,800 U
C6-C8 Aliphatics	6,800	< 6,800 U
C8-C10 Aliphatics	6,800	< 6,800 U
C10-C12 Aliphatics	6,800	< 6,800 U

Values reported in µg/kg (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	71.6%
FID: 2,5-Dibromotoluene	84.4%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a017.d
Lab Smp Id: SH23W Client Smp ID: B11-09-23.5
Inj Date : 04-FEB-2011 15:21
Operator : MH Inst ID: pid1.i
Smp Info : SH23W
Misc Info : 11-2196
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul Quant Type: ESTD
Cal Date : 20-DEC-2010 21:58 Cal File: 1220a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waarom.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/Kg)
=====	==	=====	=====	=====	=====	=====
1 MtBE	5.093	5.097	-0.004	16	0.01084	0.0108
2 BENZENE	7.657	7.647	0.010	102	0.03095	0.0310
4 TOLUENE	9.970	9.960	0.010	203	0.06651	0.0665
5 ETHYLBENZENE	11.943	11.933	0.010	5061	1.93413	1.93
6 M/P-XYLENE	12.043	12.037	0.006	1280	0.41615	0.416
7 O-XYLENE	12.637	12.623	0.014	2726	1.00229	1.00
9 TRIMETHYLBEN	15.060	15.047	0.013	20994	8.84322	8.84
10 NAPHTHALENE	18.283	18.270	0.013	36739	16.8510	16.8
11 1-METHYLNAP	20.130	20.110	0.020	43175	38.9075	38.9
\$ 37 DIBROMOTOL	19.927	19.910	0.017	66068	35.7943	35.8 (M)

QC Flag Legend

M - Compound response manually integrated.

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a017.d
Lab Smp Id: SH23W Client Smp ID: B11-09-23.5
Inj Date : 04-FEB-2011 15:21
Operator : MH Inst ID: pid1.i
Smp Info : SH23W
Misc Info : 11-2196
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul Quant Type: ESTD
Cal Date : 20-DEC-2010 21:58 Cal File: 1220a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waaliph.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

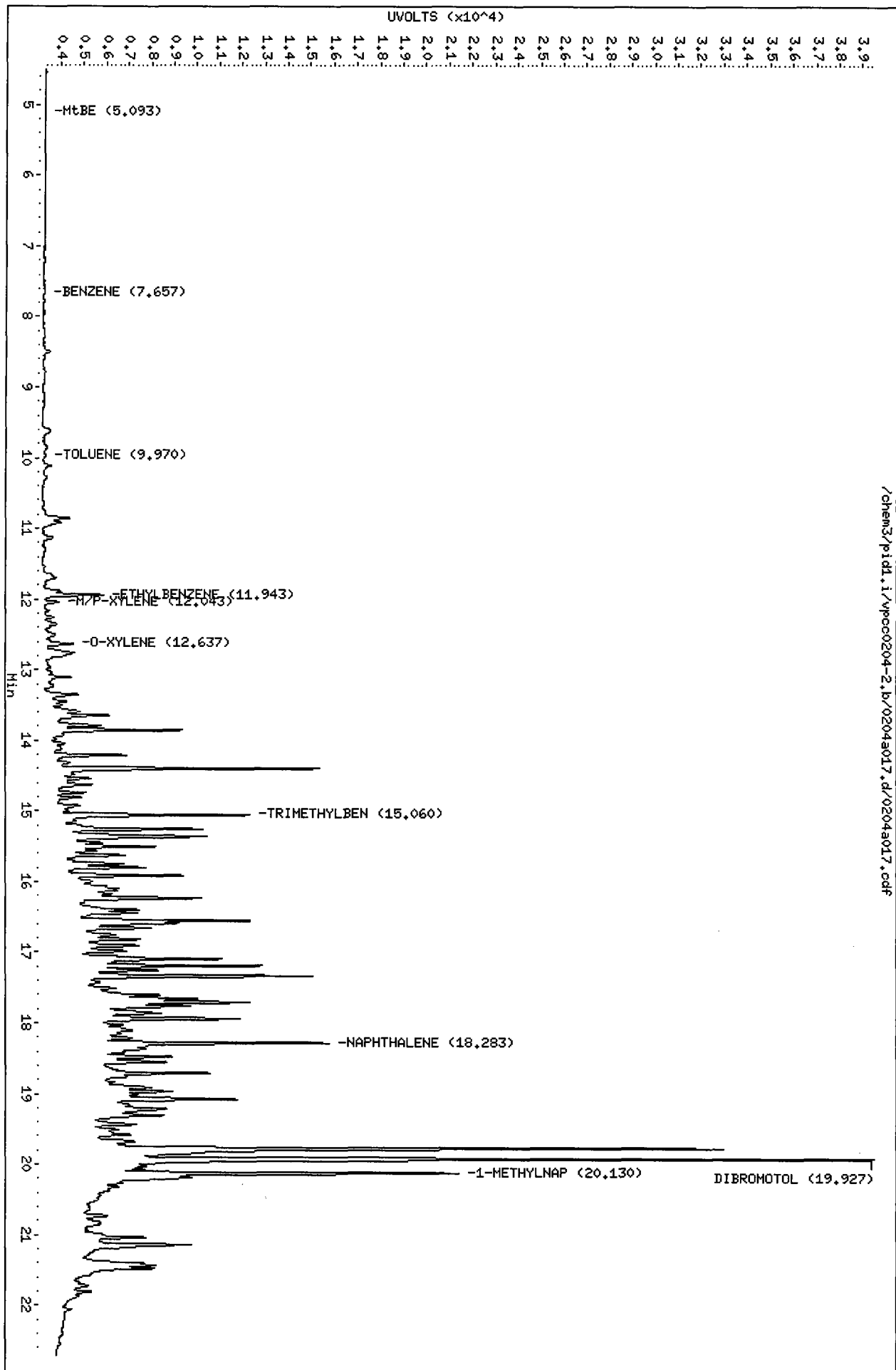
Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/Kg)
1 nC5	Compound Not Detected.					
2 nC6	5.370	5.393	-0.023	44	0.08697	0.0870
4 nC8	9.637	9.640	-0.003	875	2.02448	2.02
5 nC10	13.450	13.440	0.010	2284	5.42360	5.42
7 nC12	16.590	16.573	0.017	4506	10.5776	10.6
\$ 8 2,5-DBT	19.927	19.913	0.014	6709	42.1741	42.2 (RM)

QC Flag Legend

R - Spike/Surrogate failed recovery limits.
M - Compound response manually integrated.

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a017.d
Date : 04-FEB-2011 15:24
Client ID: B41-09-23.5
Sample Info: SH23M
Column phase: RTX 502-2 ARO

Instrument: pid1.i
Operator: MH
Column diameter: 0.18



SH23: 00002

Data File: /chem3/pid1.i/vpcc0204-1.b/0204a017.d

Date : 04-FEB-2011 15:21

Client ID: B11-09-23.5

Sample Info: SH23M

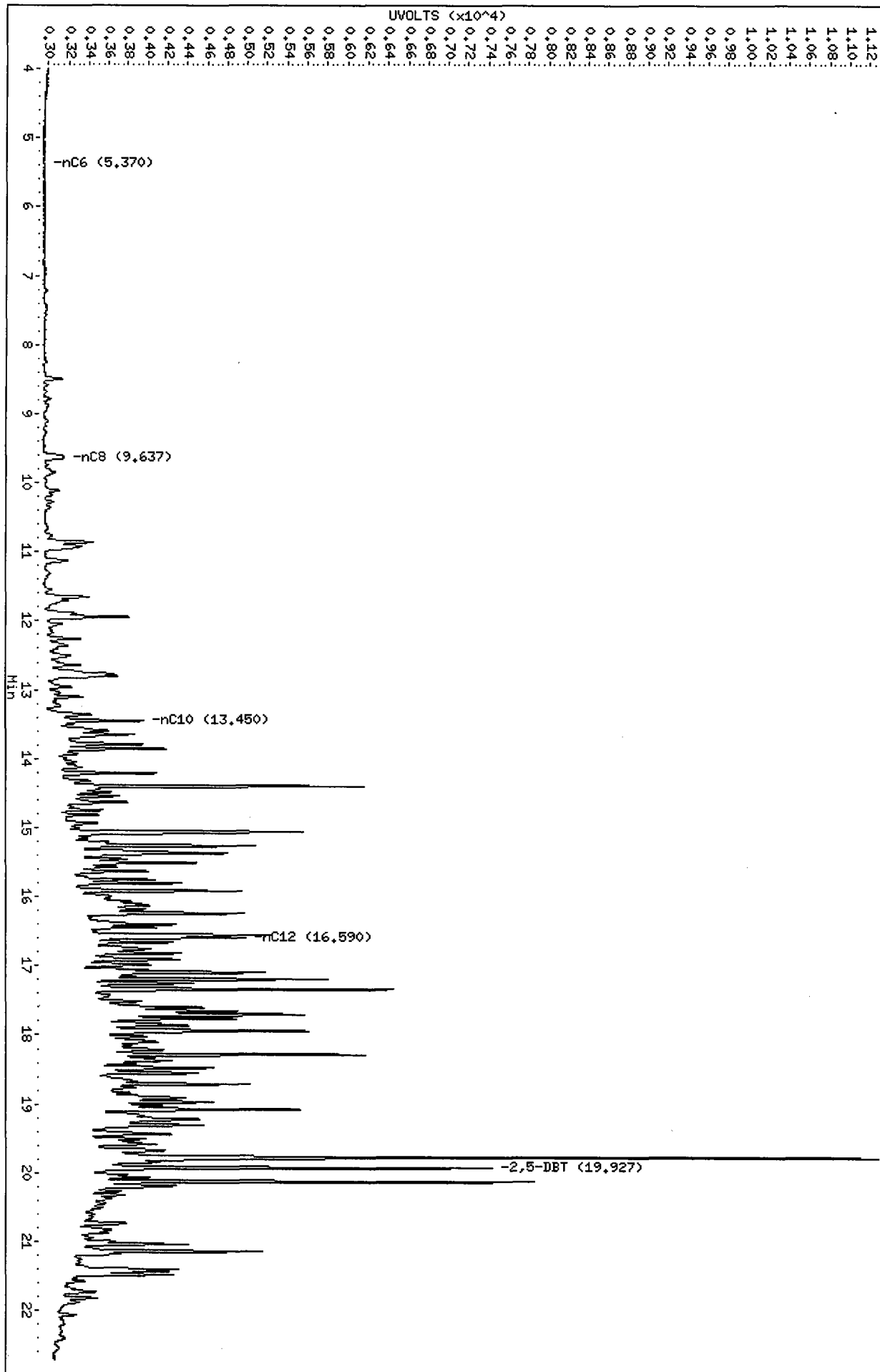
Column phase: RTX502-2 ALI

Instrument: pid1.i

Operator: HH

Column diameter: 0.18

/chem3/pid1.i/vpcc0204-1.b/0204a017.d/0204a017.cdf



Analytical Resources Inc.
WAVPH Aromatics Report

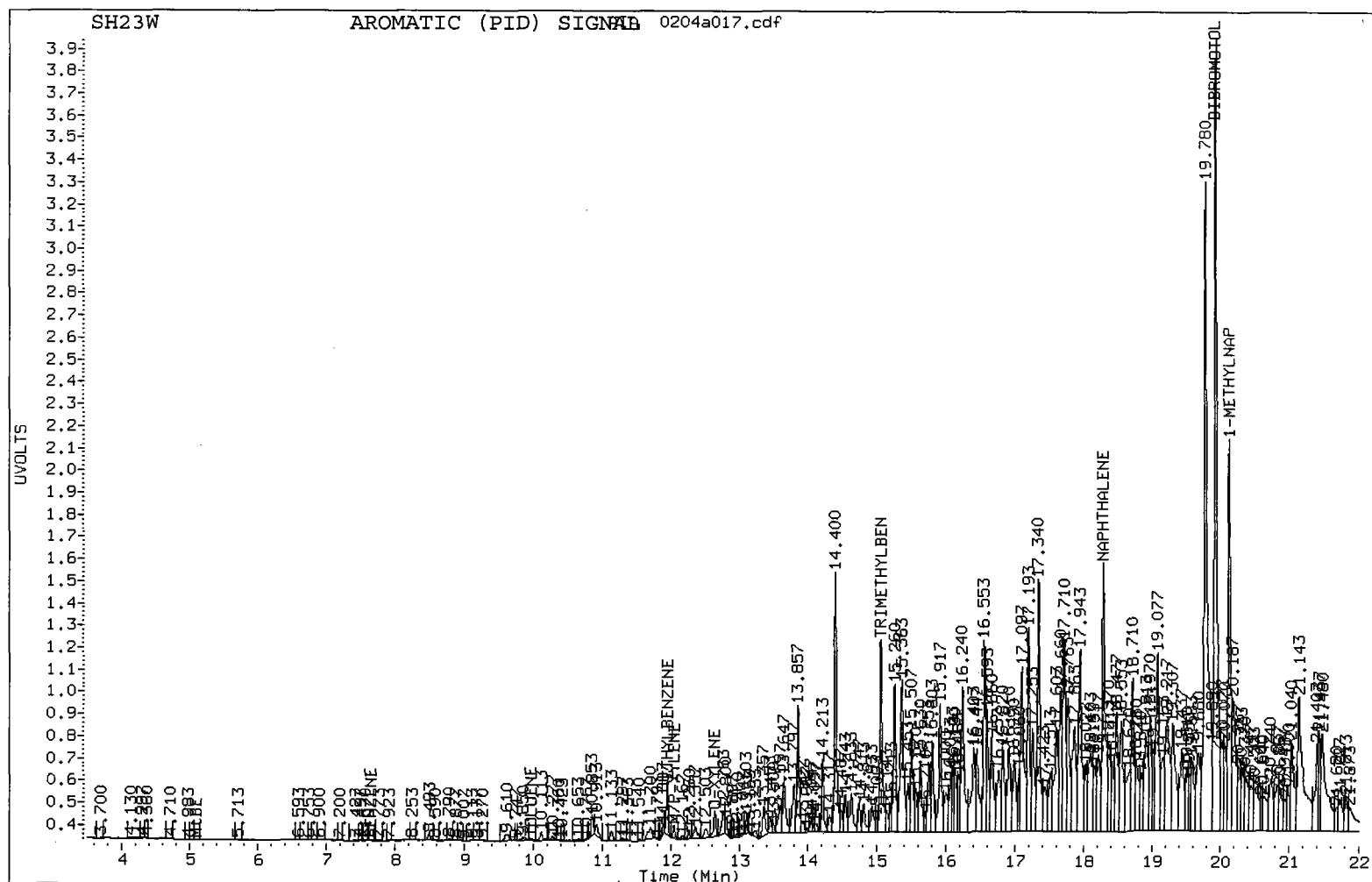
Data file: /chem3/pidl.i/vpcc0204-2.b/0204a017.d
Method: /chem3/pidl.i/vpcc0204-2.b/VPHARO.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH23W
Client ID: B11-09-23.5
Injection: 04-FEB-2011 15:21
Matrix: SOIL
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.093	-0.003	6	0.0	C8-C10 Arom.	156639*	66.0
BENZENE	7.657	0.010	38	0.0	C10-C12 Arom.	596869	273.8
TOLUENE	9.970	0.010	85	0.1	C12-C13 Arom.	473048	426.3
ETHYLBENZENE	11.943	0.010	2395	1.9			
M/P-XYLENE	12.043	0.007	604	0.4			
O-XYLENE	12.637	0.013	1133	1.0			
TRIMETHYLBEN	15.060	0.013	8681	8.8			
NAPHTHALENE	18.283	0.013	12097	16.9			
1-METHYLNAP	20.130	0.020	17653	38.9			
DIBROMOTOL	19.927	0.017	31779	35.8	DBT Recovery:	71.6	

* Indicates surrogate area subtracted



SH23: 00004

Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pidl.i/vpcc0204-1.b/0204a017.d
Method: /chem3/pidl.i/vpcc0204-1.b/VPHALI.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH23W
Client ID: B11-09-23.5
Injection: 04-FEB-2011 15:21
Matrix: SOIL
Dilution Factor: 1

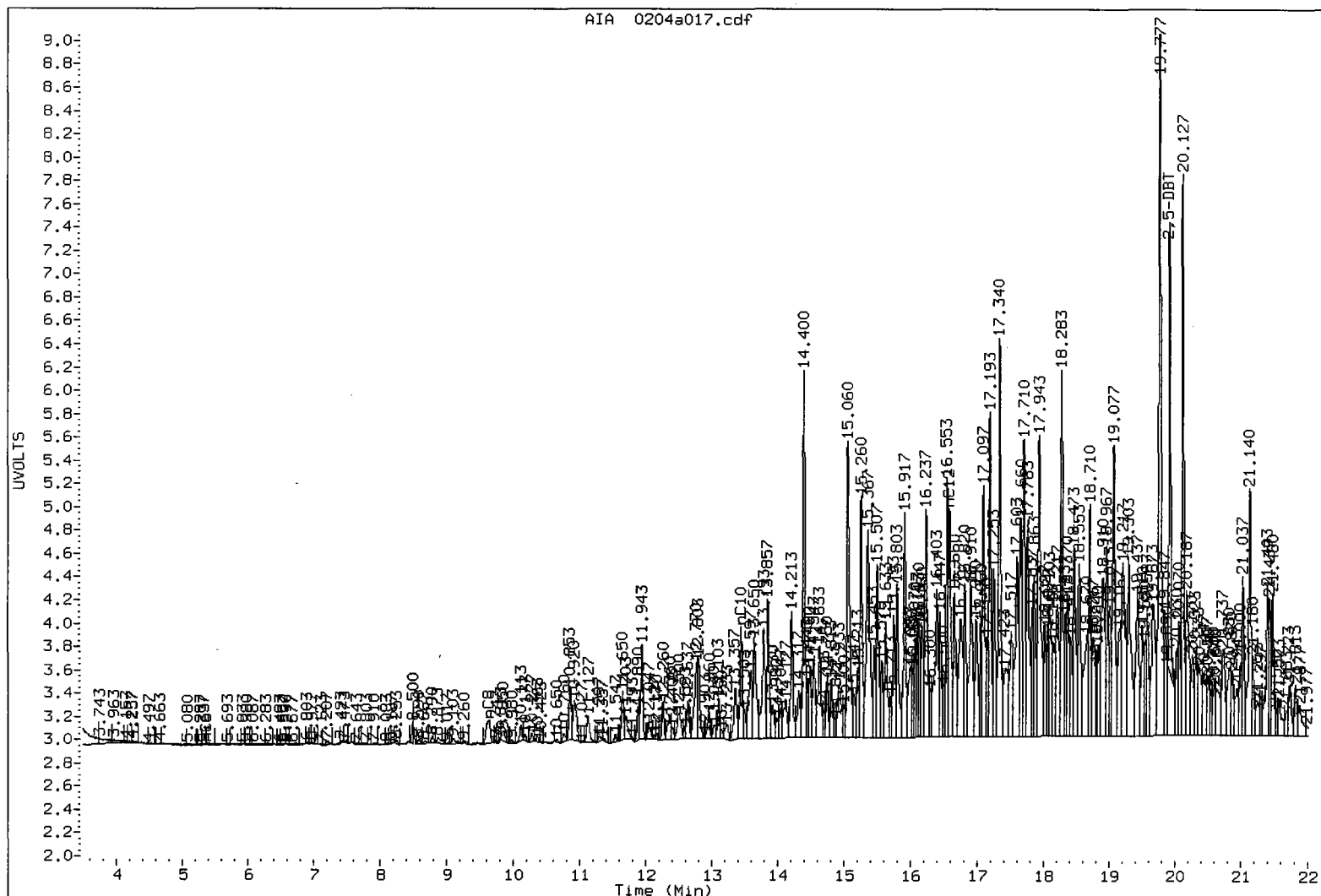
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	-----				C5-C6 Aliph.	500	1.1
nC6	5.370	-0.023	9	44	C6-C8 Aliph.	2635*	6.1
nC8	9.637	-0.003	194	875	C8-C10 Aliph.	25490	60.5
nC10	13.450	0.010	955	2284	C10-C12 Aliph.	118448*	278.1
nC12	16.590	0.017	1955	4506			

* Indicates surrogate area subtracted

SH23W

ALIPHATIC (FID) SIGNAL



SH23: 00005

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

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Sample ID: B11-09-23.5

DILUTION

Lab Sample ID: SH23W

LIMS ID: 11-3113

Matrix: Soil

Data Release Authorized: 

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 12:19

Instrument/Analyst: PID1/MH

Purge Volume: 10 mL

Sample Amount: 14.6 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	3400	< 3,400 U
108-88-3	Toluene	3400	< 3,400 U
100-41-4	Ethylbenzene	3400	< 3,400 U
179601-23-1	m,p-Xylene	6800	< 6,800 U
95-47-6	o-Xylene	3400	< 3,400 U
1634-04-4	Methyl tert-Butyl Ether	3400	< 3,400 U
109-66-0	n-Pentane	3400	< 3,400 U
110-54-3	n-Hexane	3400	< 3,400 U
111-65-9	n-Octane	3400	< 3,400 U
124-18-5	n-Decane	3400	< 3,400 U
112-40-3	n-Dodecane	3400	< 3,400 U

Range	RL	Result
C8-C10 Aromatics	34,000	< 34,000 U
C10-C12 Aromatics	34,000	< 34,000 U
C12-C13 Aromatics	34,000	49,000
C5-C6 Aliphatics	34,000	< 34,000 U
C6-C8 Aliphatics	34,000	< 34,000 U
C8-C10 Aliphatics	34,000	< 34,000 U
C10-C12 Aliphatics	34,000	< 34,000 U

Values reported in µg/kg (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	83.2%
FID: 2,5-Dibromotoluene	86.0%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a011.d
Report Date: 15-Feb-2011 09:01

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Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a011.d
Lab Smp Id: SH23W Client Smp ID: B11-09-23.5
Inj Date : 04-FEB-2011 12:19
Operator : MH Inst ID: pid1.i
Smp Info : SH23W
Misc Info : 11-2196
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul Quant Type: ESTD
Cal Date : 20-DEC-2010 21:58 Cal File: 1220a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waarom.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds	RT	EXP RT	DLT RT	RESPONSE	CONCENTRATIONS	
					ON-COLUMN	FINAL
					(ug/ml)	(ug/Kg)
1 MtBE						
2 BENZENE	7.637	7.647	-0.010	32	0.00971	0.00971
4 TOLUENE	9.967	9.960	0.007	47	0.01540	0.0154
5 ETHYLBENZENE	11.943	11.933	0.010	906	0.34624	0.346
6 M/P-XYLENE	12.047	12.037	0.010	274	0.08908	0.0891
7 O-XYLENE	12.633	12.623	0.010	1018	0.37430	0.374
9 TRIMETHYLBEN	15.060	15.047	0.013	3381	1.42416	1.42
10 NAPHTHALENE	18.283	18.270	0.013	6125	2.80934	2.81
11 1-METHYLNAP	20.127	20.110	0.017	16393	14.7727	14.8
\$ 37 DIBROMOTOL	19.927	19.910	0.017	76774	41.5946	41.6

SH23: 00057

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a011.d
Lab Smp Id: SH23W Client Smp ID: B11-09-23.5
Inj Date : 04-FEB-2011 12:19
Operator : MH Inst ID: pid1.i
Smp Info : SH23W
Misc Info : 11-2196
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul Quant Type: ESTD
Cal Date : 20-DEC-2010 21:58 Cal File: 1220a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waaliph.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/Kg)
1 nC5	3.840	3.850	-0.010	22	0.05121	0.0512
2 nC6	5.397	5.393	0.004	23	0.04546	0.0454
4 nC8	9.637	9.640	-0.003	58	0.13419	0.134
5 nC10	13.453	13.440	0.013	278	0.66014	0.660
7 nC12	16.587	16.573	0.014	745	1.74885	1.75
\$ 8 2,5-DBT	19.923	19.913	0.010	6834	42.9599	43.0 (RM)

QC Flag Legend

R - Spike/Surrogate failed recovery limits.
M - Compound response manually integrated.

Data File: /chem3/pidl.1/vpcc0204-2.b/0204a011.d

Date: 04-FEB-2011 12:19

Client ID: B41-09-23.5

Sample Info: SH23M

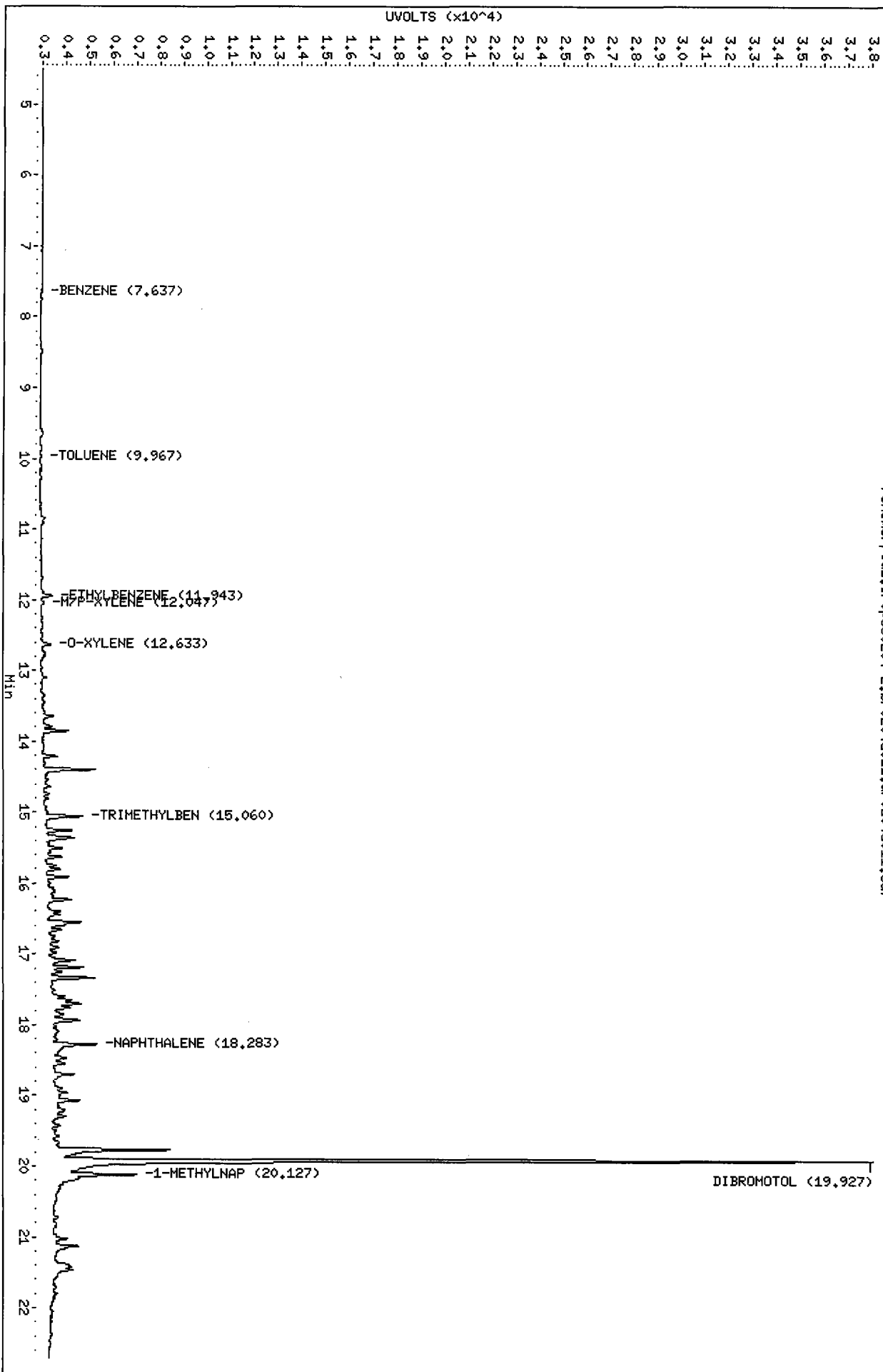
Column phase: RTX 502-2 AR0

Instrument: pidl.i

Operator: MH

Column diameter: 0.18

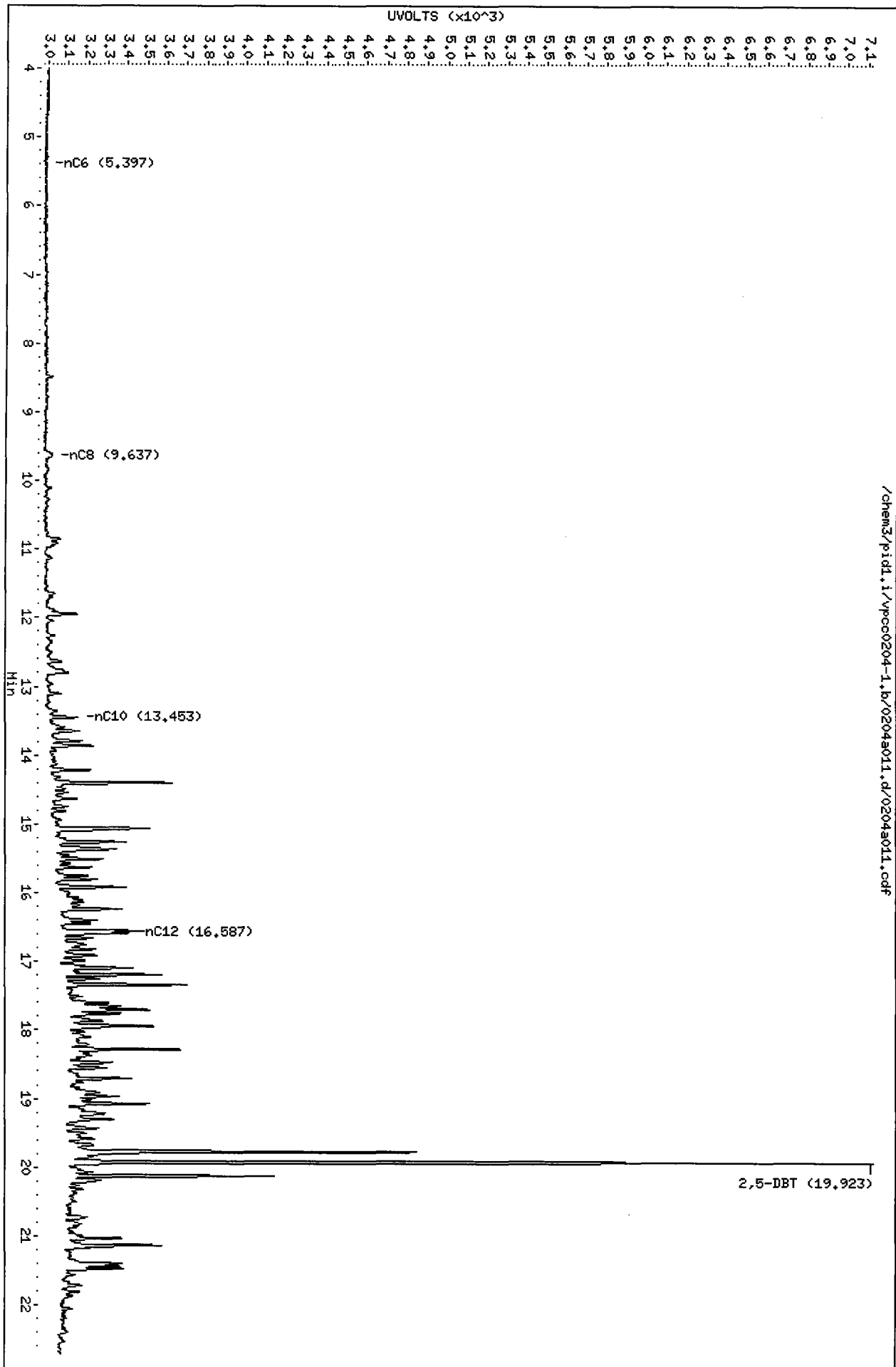
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Data File: /chem3/pid1.i/vpcc0204-1.b/0204s011.d
Date : 04-FEB-2011 12:19
Client ID: B11-09-23.5
Sample Info: SH23M

Instrument: pid1.i
Operator: HH
Column diameter: 0.18

Column phase: RTX502-2 ALI



Analytical Resources Inc.
WAVPH Aromatics Report

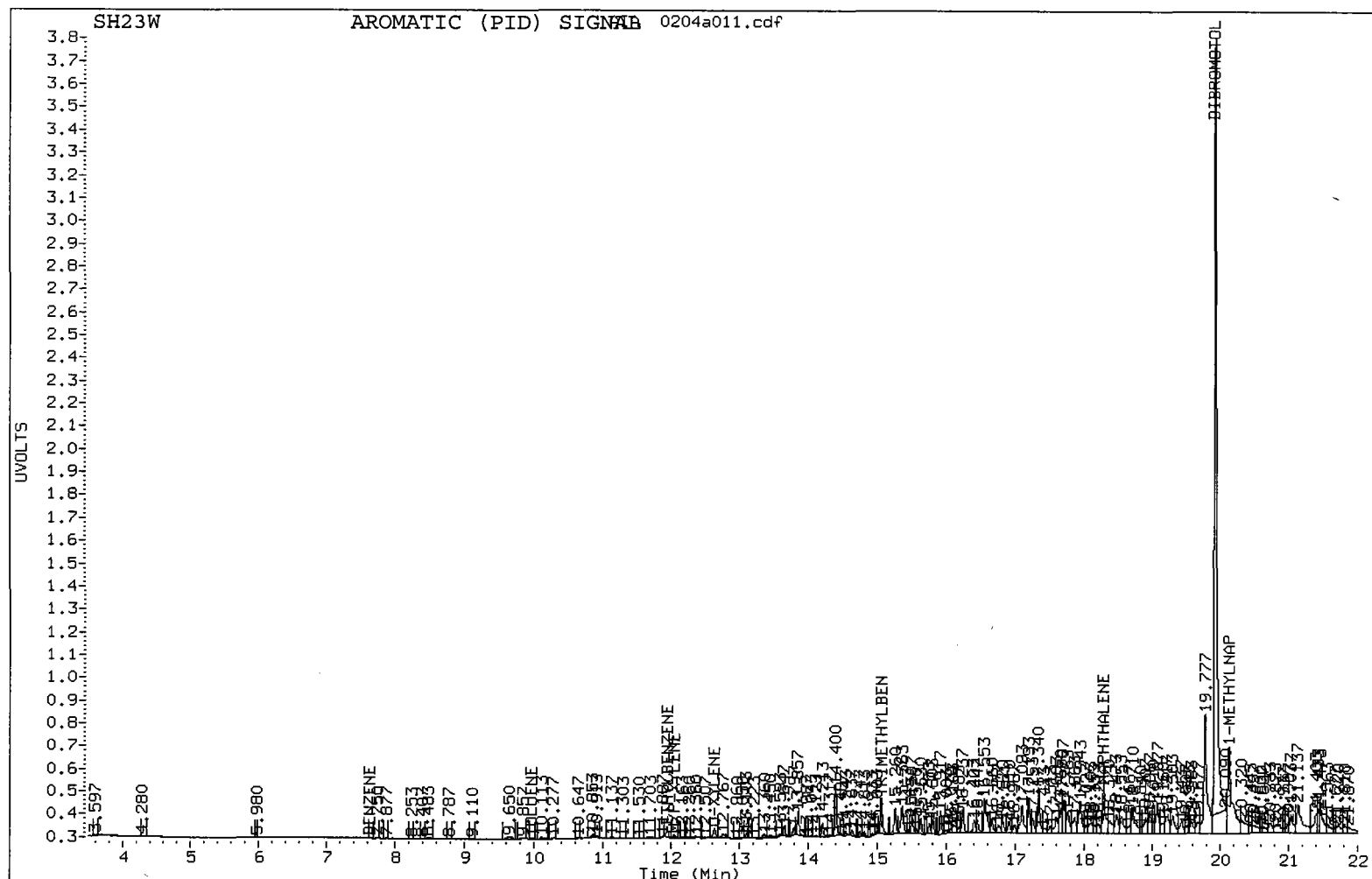
Data file: /chem3/pidl.i/vpcc0204-2.b/0204a011.d
Method: /chem3/pidl.i/vpcc0204-2.b/VPHARO.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH23W
Client ID: B11-09-23.5
Injection: 04-FEB-2011 12:19
Matrix: SOIL
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	----				C8-C10 Arom.	20469*	8.6
BENZENE	7.637	-0.010	14	0.0	C10-C12 Arom.	77758	35.7
TOLUENE	9.967	0.007	22	0.0	C12-C13 Arom.	79749	71.9
ETHYLBENZENE	11.943	0.010	449	0.3			
M/P-XYLENE	12.047	0.010	127	0.1			
O-XYLENE	12.633	0.010	389	0.4			
TRIMETHYLBEN	15.060	0.013	1545	1.4			
NAPHTHALENE	18.283	0.013	2086	2.8			
1-METHYLNAP	20.127	0.017	3751	14.8			
DIBROMOTOL	19.927	0.017	34014	41.6	DBT Recovery:	83.2	

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0204-1.b/0204a011.d
Method: /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH23W
Client ID: B11-09-23.5
Injection: 04-FEB-2011 12:19
Matrix: SOIL
Dilution Factor: 1

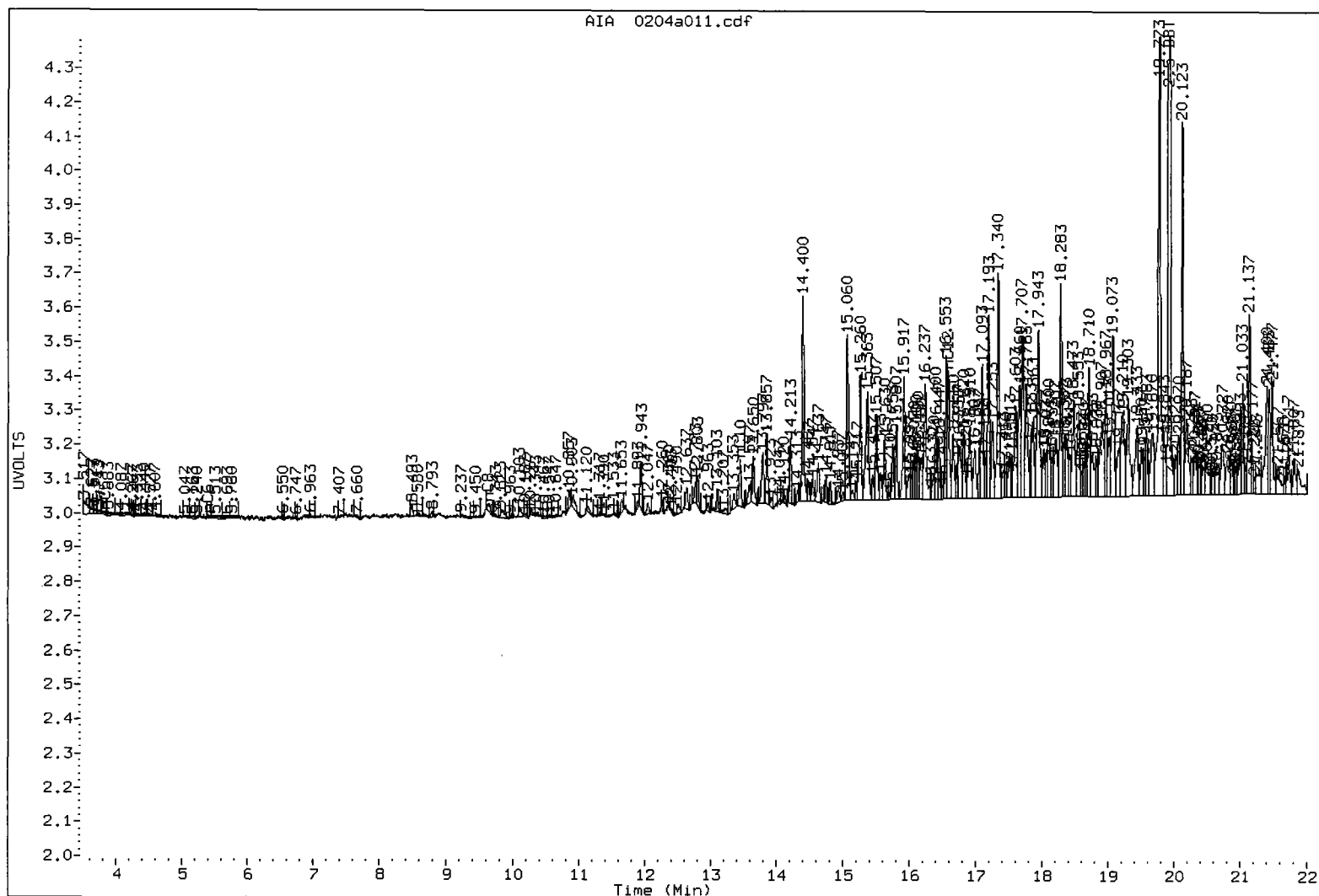
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.840	-0.010	9	22	C5-C6 Aliph.	312	0.7
nC6	5.397	0.003	9	23	C6-C8 Aliph.	518*	1.2
nC8	9.637	-0.003	20	58	C8-C10 Aliph.	2476	5.9
nC10	13.453	0.013	139	278	C10-C12 Aliph.	15145*	35.6
nC12	16.587	0.013	374	745			

* Indicates surrogate area subtracted

SH23W

ALIPHATIC (FID) SIGNAL



VPH SURROGATE RECOVERY SUMMARY



Matrix: Soil

QC Report No: SH23-Pacific Groundwater Group
Project: Birds Eye Soil
JI1001

Client ID	PDBT	FDBT	TOT	OUT
MB-020911	129%	102%		0
LCS-020911	110%	100%		0
LCSD-020911	110%	100%		0
B11-06-25	81.8%	91.0%		0
B11-06-25 DL	75.0%	90.0%		0
MB-020411	85.6%	84.2%		0
LCS-020411	99.0%	92.4%		0
LCSD-020411	94.0%	88.8%		0
B11-08-20	68.6%	90.8%		0
B11-08-20 DL	100%	103%		0
MB-021411	96.6%	96.0%		0
LCS-021411	99.4%	98.8%		0
LCSD-021411	98.6%	95.8%		0
B11-09-23.5	71.6%	84.4%		0
B11-09-23.5 DL	83.2%	86.0%		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: 11-3111 to 11-3113

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1

Sample ID: LCS-020411

LCS/LCSD

Lab Sample ID: LCS-020411

LIMS ID: 11-3112

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/16/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: NA

Date Received: NA

Date Analyzed LCS: 02/04/11 08:05

Purge Volume: 10 mL

Date Analyzed LCSD: 02/04/11 08:35

Sample Amount: 111 mg-dry-wt

Instrument/Analyst: PID1/MH

Analyte/Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	4650	4500	103%	4540	4500	101%	2.4%
Toluene	4720	4500	105%	4610	4500	102%	2.4%
Ethylbenzene	4860	4500	108%	4760	4500	106%	2.1%
m,p-Xylene	9720	9010	108%	9450	9010	105%	2.8%
o-Xylene	4720	4500	105%	4640	4500	103%	1.7%
Methyl tert-Butyl Ether	4220	4500	93.8%	4130	4500	91.8%	2.2%
Naphthalene	4370	4500	97.1%	4280	4500	95.1%	2.1%
1,2,3-Trimethylbenzene	5020	4500	112%	4910	4500	109%	2.2%
1-Methylnaphthalene	4440	4500	98.7%	4200	4500	93.3%	5.6%
n-Pentane	4260	4500	94.7%	4090	4500	90.9%	4.1%
n-Hexane	4190	4500	93.1%	4030	4500	89.6%	3.9%
n-Octane	4340	4500	96.4%	4150	4500	92.2%	4.5%
n-Decane	4470	4500	99.3%	4360	4500	96.9%	2.5%
n-Dodecane	4090	4500	90.9%	4050	4500	90.0%	1.0%

Values reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

VPH Surrogate Recovery

	LCS	LCSD
PID: 2,5-Dibromotoluene	99.0%	94.0%
FID: 2,5-Dibromotoluene	92.4%	88.8%

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a004.d
Report Date: 11-Feb-2011 08:55

Page 1

MH
2/11/11

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a004.d
Lab Smp Id: LCS0204
Inj Date : 04-FEB-2011 08:05
Operator : MH
Smp Info : LCS0204
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable

Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 MtBE	5.103	5.097	0.006	69222	46.9123	46.9
2 BENZENE	7.653	7.647	0.006	170406	51.7097	51.7
4 TOLUENE	9.973	9.960	0.013	160158	52.4707	52.5
5 ETHYLBENZENE	11.947	11.933	0.014	141193	53.9591	54.0
6 M/P-XYLENE	12.050	12.037	0.013	331291	107.708	108
7 O-XYLENE	12.637	12.623	0.014	142606	52.4332	52.4
9 TRIMETHYLBEN	15.063	15.047	0.016	132505	55.8147	55.8
10 NAPHTHALENE	18.287	18.270	0.017	106064	48.6486	48.6
11 1-METHYLNAP	20.130	20.110	0.020	54716	49.3085	49.3
\$ 37 DIBROMOTOL	19.927	19.910	0.017	91347	49.4905	49.5

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a004.d
Lab Smp Id: LCS0204
Inj Date : 04-FEB-2011 08:05
Operator : MH
Smp Info : LCS0204
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 nC5	3.853	3.850	0.003	20319	47.2998	47.3
2 nC6	5.400	5.393	0.007	23578	46.6032	46.6
4 nC8	9.653	9.640	0.013	20825	48.1829	48.2
5 nC10	13.453	13.440	0.013	20934	49.7114	49.7
7 nC12	16.587	16.573	0.014	19326	45.3679	45.4
\$ 8 2,5-DBT	19.927	19.913	0.014	7352	46.2193	46.2

Data File: /chem3/pidl.i/vpcc0204-2.b/0204a004.d

Date : 04-FEB-2011 08:05

Client ID:

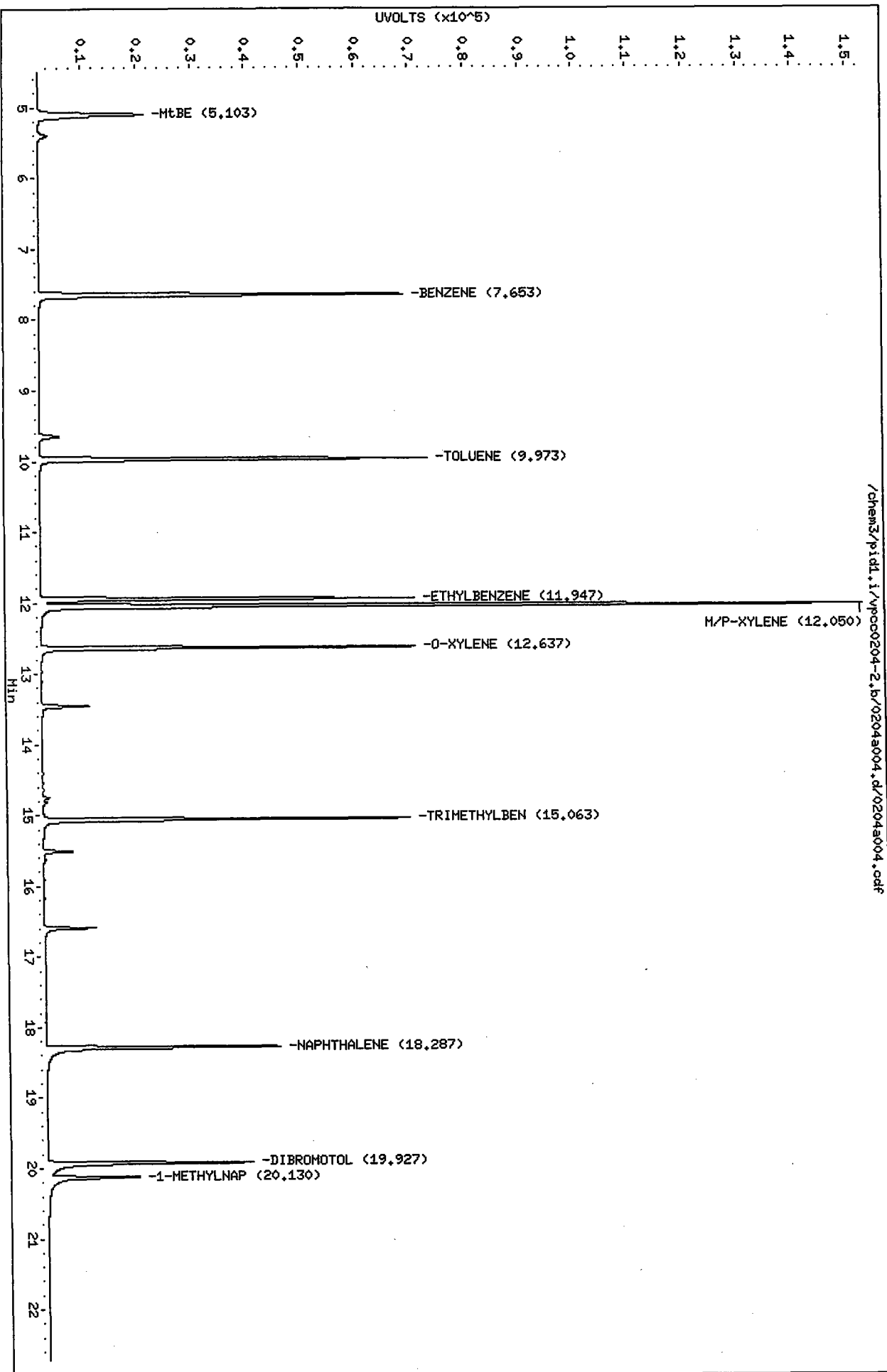
Sample Info: LCS0204

Column phase: RTX 502-2 ARO

Instrument: pidl.i

Operator: HH

Column diameter: 0.18



Data File: /chem3/pid1.i/vpcc0204-1.b/0204a004.d

Date : 04-FEB-2011 08:05

Client ID:

Sample Info: LCS0204

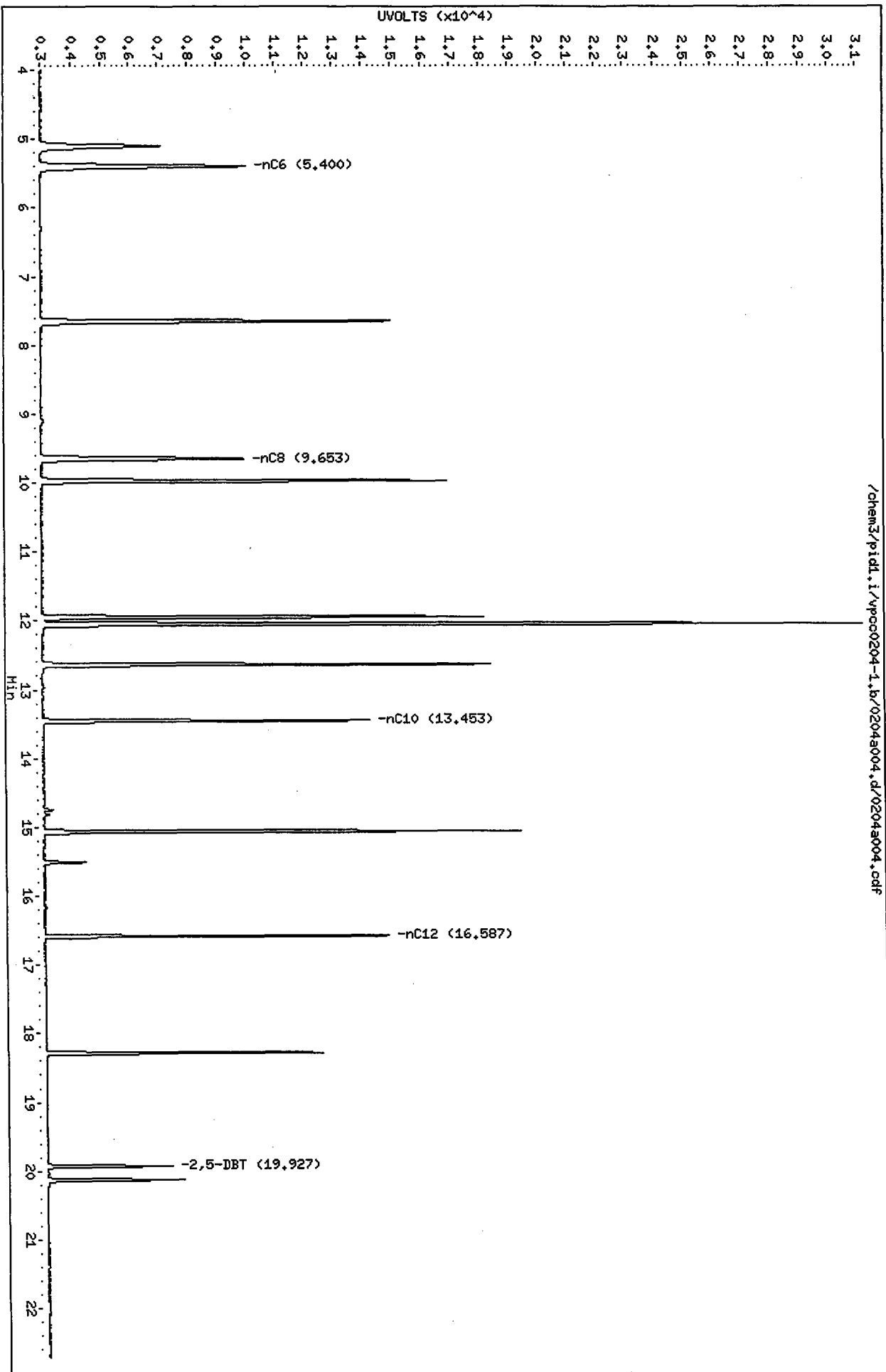
Column phase: RTX502-2 ALI

Instrument: pid1.i

Operator: HH

Column diameter: 0.18

Page 2



5123: 00070

Analytical Resources Inc.
WAVPH Aromatics Report

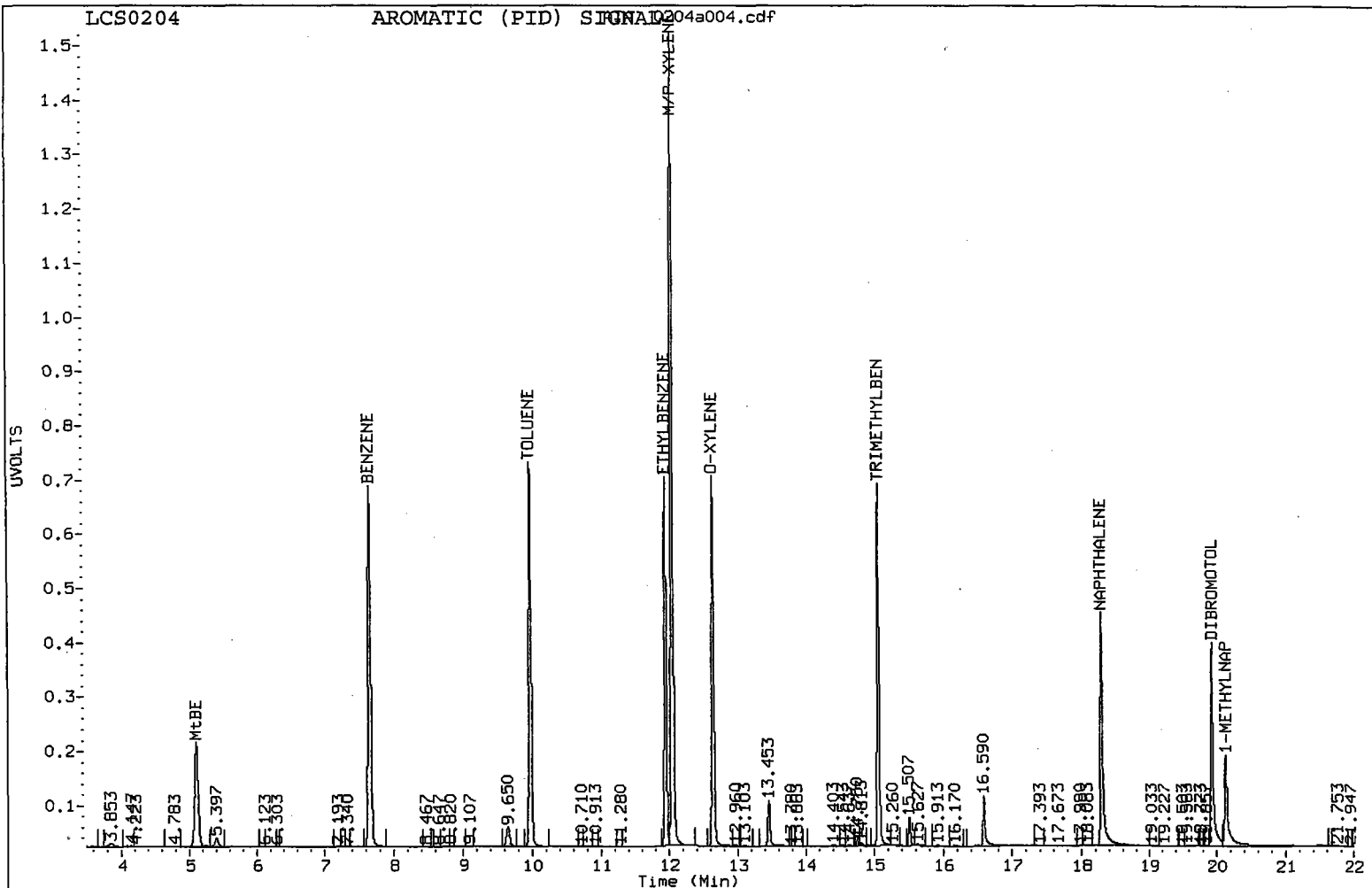
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Method: /chem3/pidl.i/vpcc0204-2.b/VPHARO.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCS0204
Client ID:
Injection: 04-FEB-2011 08:05
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.103	0.007	19115	46.9	C8-C10 Arom.	769566*	324.2
BENZENE	7.653	0.007	66376	51.7	C10-C12 Arom.	139403	63.9
TOLUENE	9.973	0.013	70791	52.5	C12-C13 Arom.	55008	49.6
ETHYLBENZENE	11.947	0.013	68043	54.0			
M/P-XYLENE	12.050	0.013	149931	107.7			
O-XYLENE	12.637	0.013	68300	52.4			
TRIMETHYLBEN	15.063	0.017	66748	55.8			
NAPHTHALENE	18.287	0.017	42968	48.6			
1-METHYLNAP	20.130	0.020	16667	49.3			
DIBROMOTOL	19.927	0.017	37501	49.5	DBT Recovery: 99.0		

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0204-1.b/0204a004.d
Method: /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCS0204
Client ID:
Injection: 04-FEB-2011 08:05
Matrix: WATER
Dilution Factor: 1

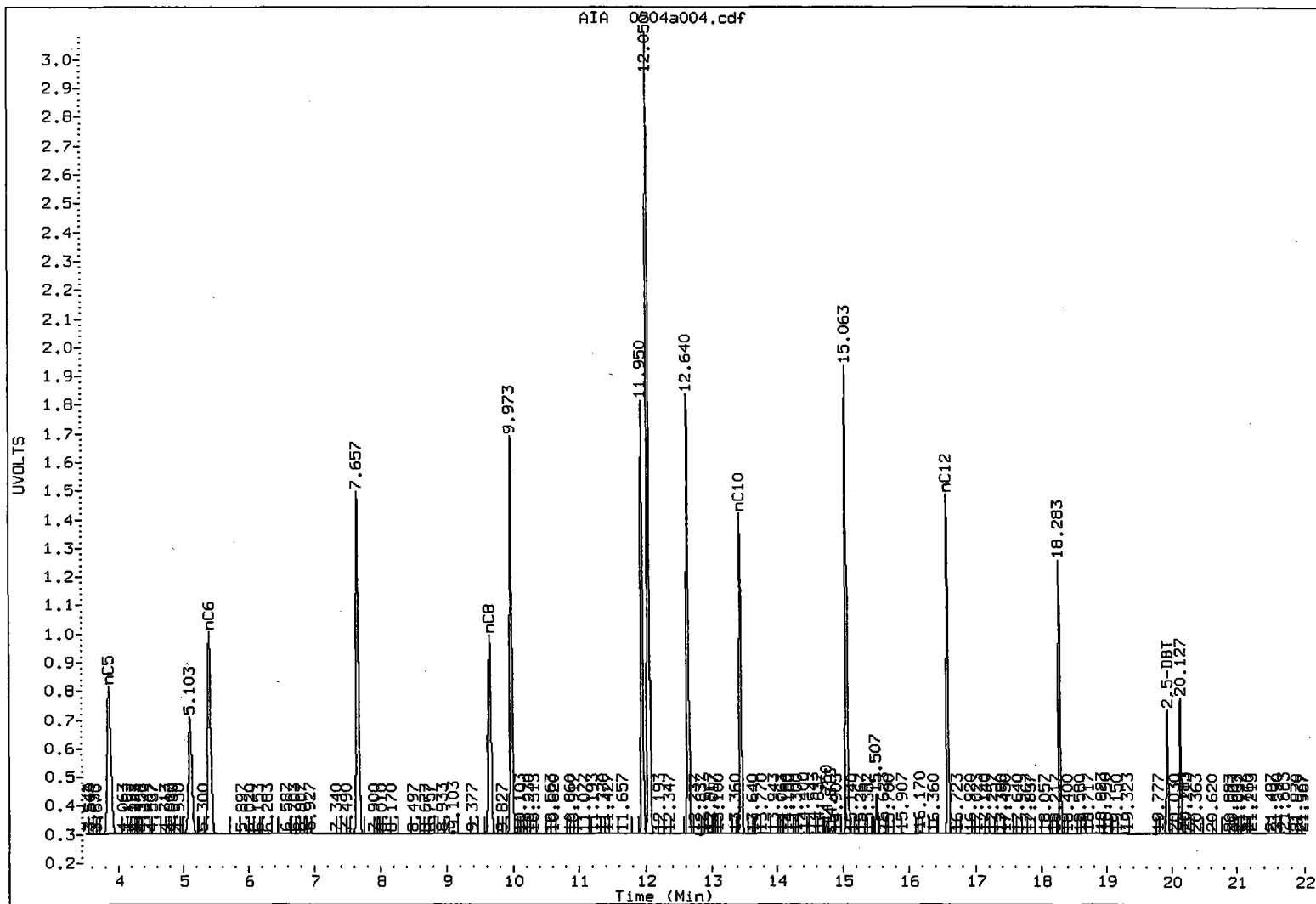
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.853	0.003	5140	20319	C5-C6 Aliph.	58995	126.1
nC6	5.400	0.007	7061	23578	C6-C8 Aliph.	51565*	119.3
nC8	9.653	0.013	6942	20825	C8-C10 Aliph.	170972	406.0
nC10	13.453	0.013	11202	20934	C10-C12 Aliph.	52664*	123.6
nC12	16.587	0.013	11830	19326			

* Indicates surrogate area subtracted

LCS0204

ALIPHATIC (FID) SIGNAL



SH20: 000000

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a005.d
Report Date: 11-Feb-2011 08:55

Page 1

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a005.d
Lab Smp Id: LCSD0204
Inj Date : 04-FEB-2011 08:35
Operator : MH
Smp Info : LCSD0204
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 MtBE	5.100	5.097	0.003	67757	45.9195	45.9
2 BENZENE	7.653	7.647	0.006	166564	50.5441	50.5
4 TOLUENE	9.973	9.960	0.013	156233	51.1847	51.2
5 ETHYLBENZENE	11.947	11.933	0.014	138317	52.8598	52.8
6 M/P-XYLENE	12.050	12.037	0.013	323752	105.257	105
7 O-XYLENE	12.637	12.623	0.014	140056	51.4956	51.5
9 TRIMETHYLBEN	15.063	15.047	0.016	129568	54.5777	54.6
10 NAPHTHALENE	18.287	18.270	0.017	103669	47.5502	47.6
11 1-METHYLNAP	20.127	20.110	0.017	51826	46.7039	46.7
\$ 37 DIBROMOTOL	19.927	19.910	0.017	86810	47.0321	47.0

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a005.d
Lab Smp Id: LCSD0204
Inj Date : 04-FEB-2011 08:35
Operator : MH
Smp Info : LCSD0204
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 nC5	3.850	3.850	0.000	19517	45.4327	45.4
2 nC6	5.397	5.393	0.004	22671	44.8099	44.8
4 nC8	9.653	9.640	0.013	19930	46.1124	46.1
5 nC10	13.453	13.440	0.013	20410	48.4669	48.5
7 nC12	16.587	16.573	0.014	19182	45.0308	45.0
\$ 8 2,5-DBT	19.923	19.913	0.010	7069	44.4390	44.4

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a005.d

Date: 04-FEB-2011 08:35

Client ID:

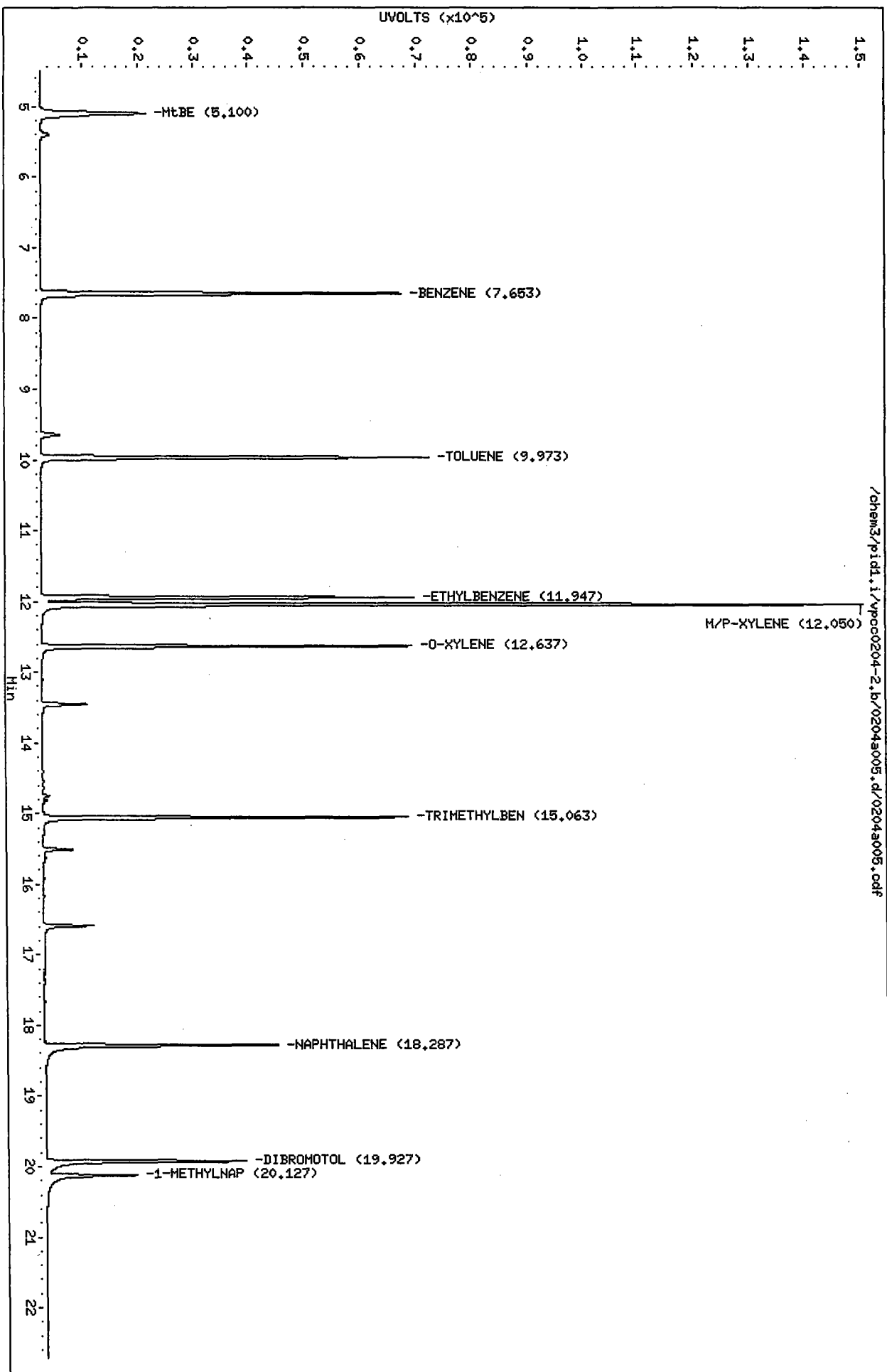
Sample Info: LCSD0204

Column phase: RTX 502-2 AR0

Instrument: pid1.i

Operator: MH

Column diameter: 0.18



Data File: /chem3/pid1.i/vpcc0204-1.b/0204a005.d

Date: 04-FEB-2011 08:36

Client ID:

Sample Info: LCS00204

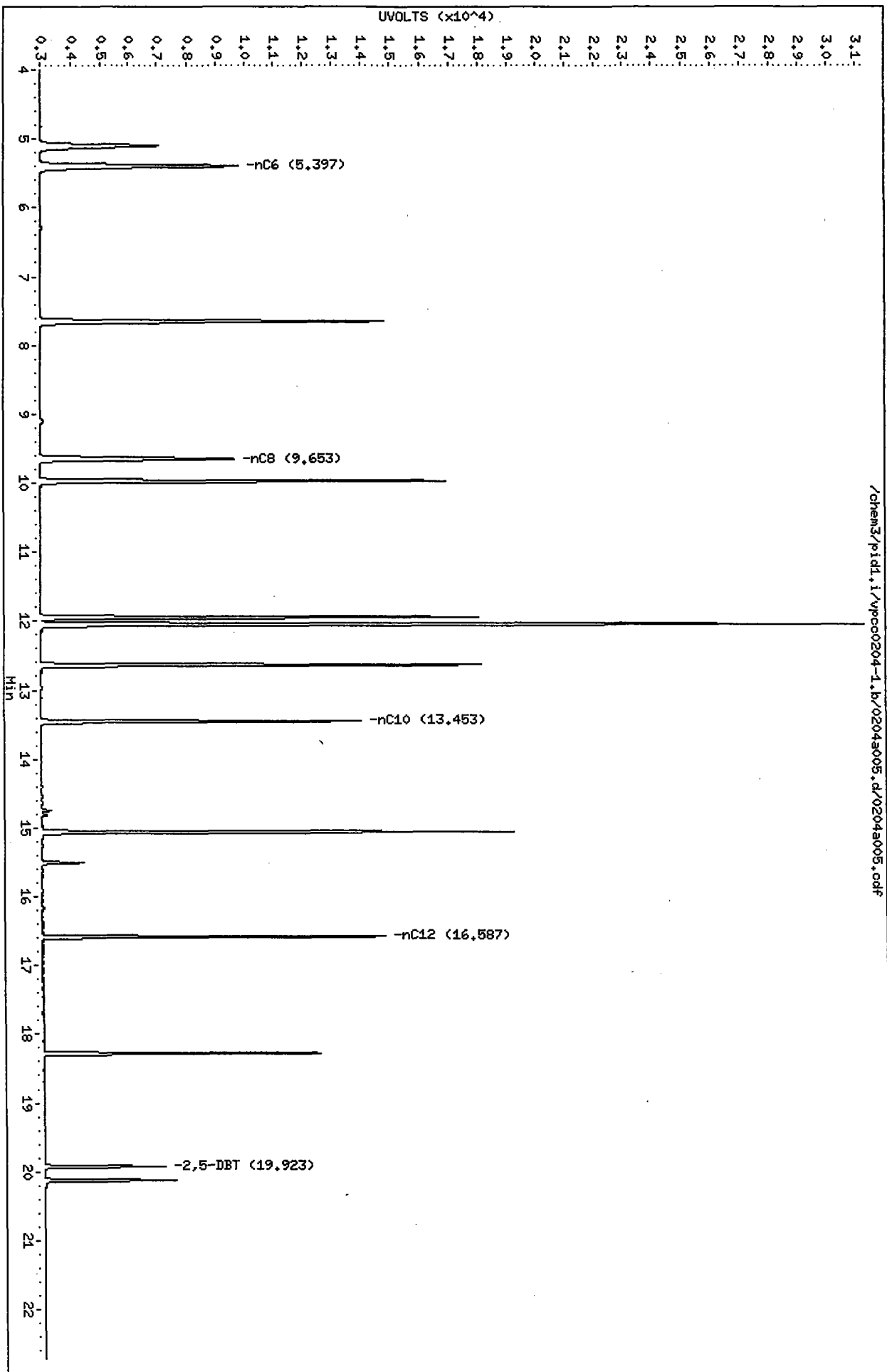
Column phase: RTX502-2 ALI

Instrument: pid1.i

Operator: MH

Column diameter: 0.18

Page 2



0204: 0204

Analytical Resources Inc.
WAVPH Aromatics Report

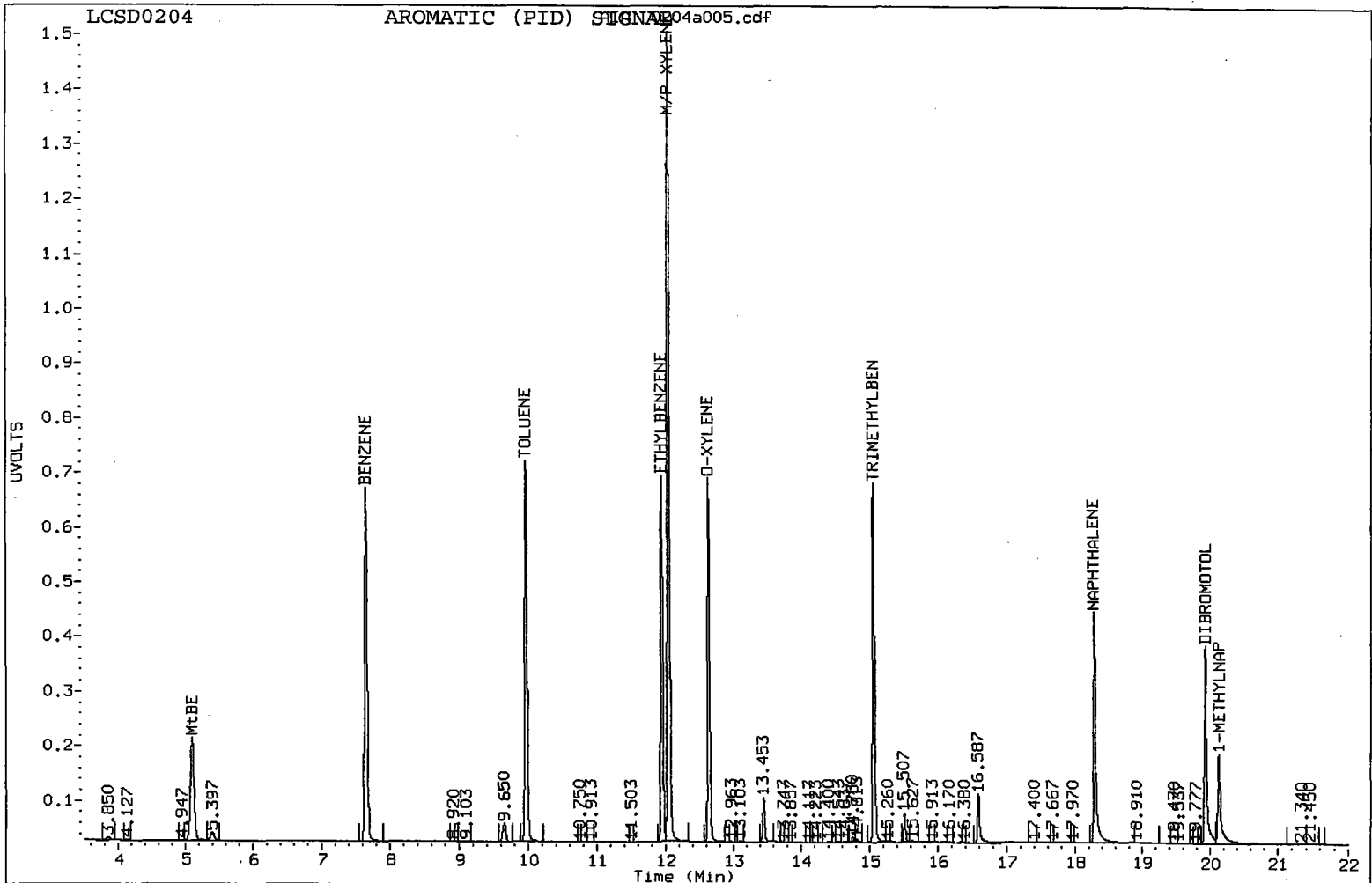
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Method: /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCSD0204
Client ID:
Injection: 04-FEB-2011 08:35
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.100	0.003	18701	45.9	C8-C10 Arom.	751993*	316.8
BENZENE	7.653	0.007	64624	50.5	C10-C12 Arom.	135589	62.2
TOLUENE	9.973	0.013	69640	51.2	C12-C13 Arom.	52049	46.9
ETHYLBENZENE	11.947	0.013	66833	52.9			
M/P-XYLENE	12.050	0.013	147731	105.3			
O-XYLENE	12.637	0.013	66517	51.5			
TRIMETHYLBEN	15.063	0.017	65627	54.6			
NAPHTHALENE	18.287	0.017	42279	47.6			
1-METHYLNAP	20.127	0.017	16283	46.7			
DIBROMOTOL	19.927	0.017	36168	47.0	DBT Recovery:	94.1	

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0204-1.b/0204a005.d
Method: /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCSD0204
Client ID:
Injection: 04-FEB-2011 08:35
Matrix: WATER
Dilution Factor: 1

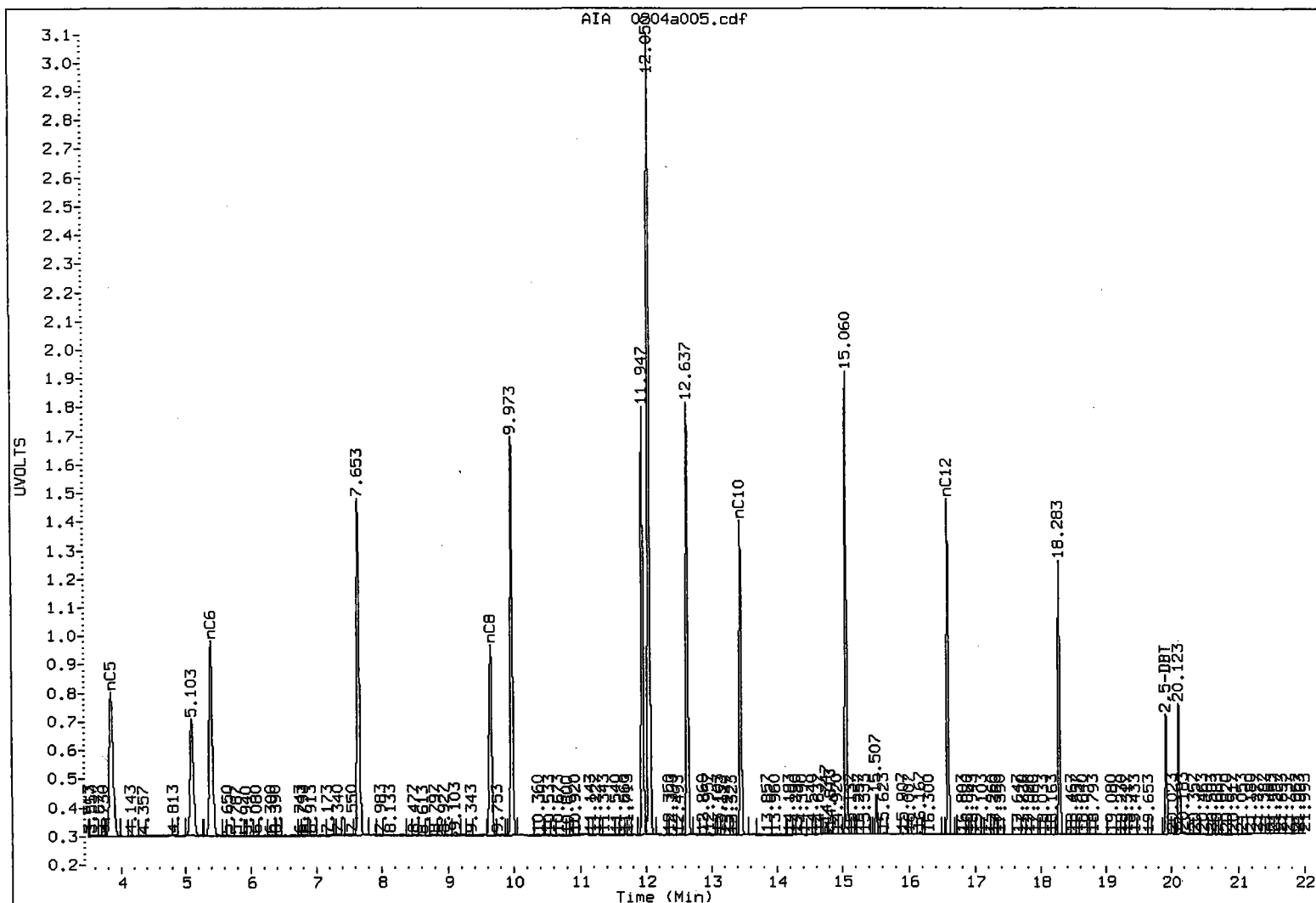
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.850	0.000	5005	19517	C5-C6 Aliph.	56773	121.4
nC6	5.397	0.003	6808	22671	C6-C8 Aliph.	50479*	116.8
nC8	9.653	0.013	6650	19930	C8-C10 Aliph.	168960	401.2
nC10	13.453	0.013	10993	20410	C10-C12 Aliph.	52300*	122.8
nC12	16.587	0.013	11758	19182			

* Indicates surrogate area subtracted

LCSD0204

ALIPHATIC (FID) SIGNAL



SH23: 000000

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

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Sample ID: MB-020411

METHOD BLANK

Lab Sample ID: MB-020411

LIMS ID: 11-3112

Matrix: Soil

Data Release Authorized: 

Reported: 02/16/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed: 02/04/11 09:36

Instrument/Analyst: PID1/MH

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	85.6%
FID: 2,5-Dibromotoluene	84.2%

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a007.d
Report Date: 11-Feb-2011 08:55

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M4

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a007.d
Lab Smp Id: MB0204
Inj Date : 04-FEB-2011 09:36
Operator : MH
Smp Info : MB0204
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 MtBE	Compound Not Detected.					
2 BENZENE	7.650	7.647	0.003	43	0.01311	0.0131
4 TOLUENE	9.970	9.960	0.010	52	0.01717	0.0172
5 ETHYLBENZENE	11.943	11.933	0.010	49	0.01888	0.0189
6 M/P-XYLENE	12.047	12.037	0.010	95	0.03111	0.0311
7 O-XYLENE	12.630	12.623	0.007	684	0.25186	0.252
9 TRIMETHYLBEN	15.003	15.047	-0.044	410	0.17287	0.173
10 NAPHTHALENE	18.283	18.270	0.013	422	0.19393	0.194
11 1-METHYLNAP	20.123	20.110	0.013	3146	2.83522	2.84
\$ 37 DIBROMOTOL	19.927	19.910	0.017	79056	42.8315	42.8

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a007.d
Lab Smp Id: MB0204
Inj Date : 04-FEB-2011 09:36
Operator : MH
Smp Info : MB0204
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds				RESPONSE	CONCENTRATIONS	
	RT	EXP RT	DLT RT		ON-COLUMN	FINAL
	==	=====	=====	=====	(ng/mL)	(ug/L)
1 nC5	3.873	3.850	0.023	27	0.06332	0.0633
2 nC6	5.370	5.393	-0.023	19	0.03874	0.0387
4 nC8	9.660	9.640	0.020	83	0.19412	0.194
5 nC10	13.453	13.440	0.013	229	0.54521	0.545
7 nC12	16.583	16.573	0.010	408	0.96011	0.960
\$ 8 2,5-DBT	19.923	19.913	0.010	6705	42.1521	42.2

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a007.d

Date : 04-FEB-2011 09:36

Client ID:

Sample Info: MB0204

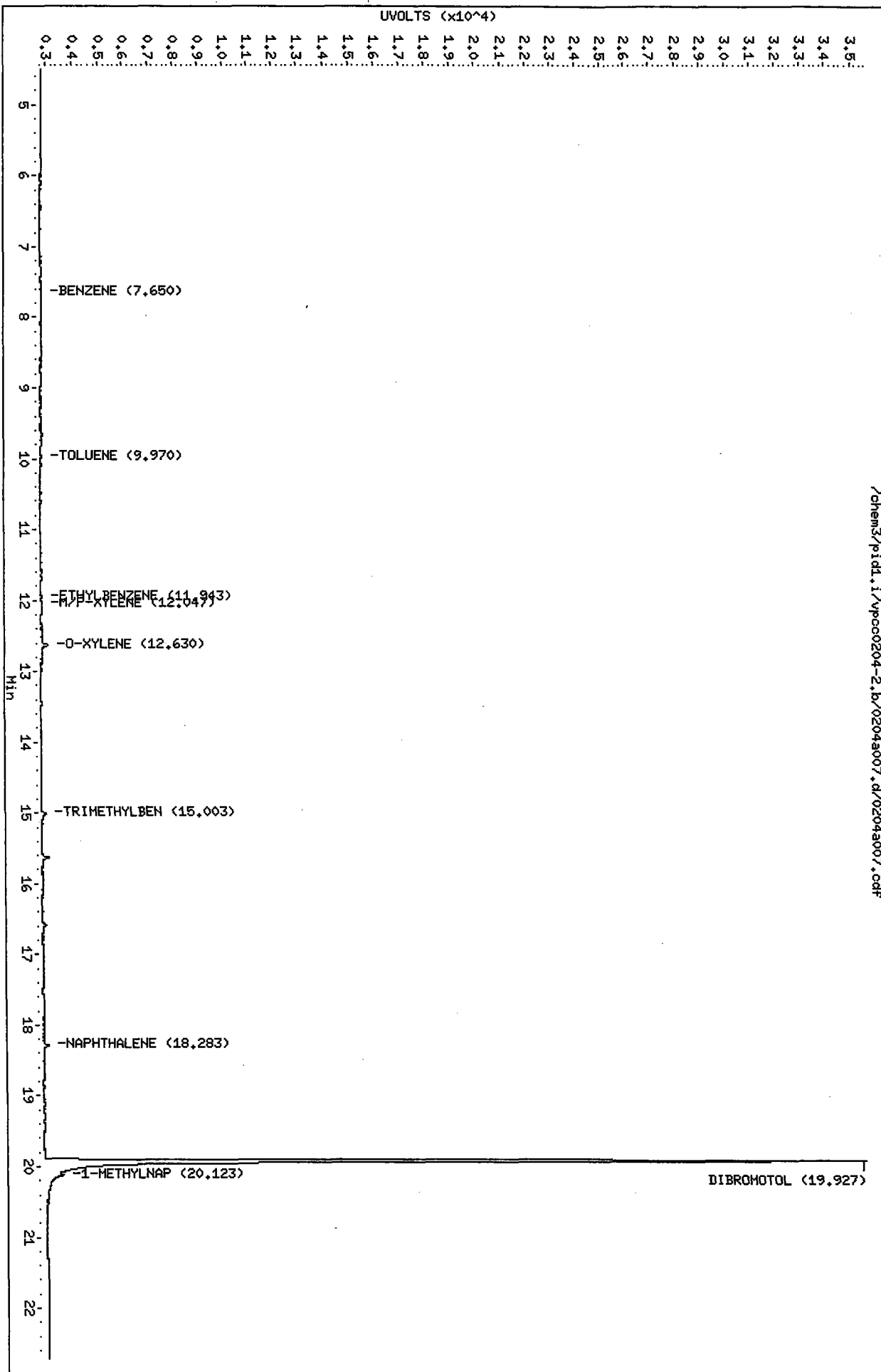
Column phase: RTX 502-2 AR0

Instrument: pid1.i

Operator: MH

Column diameter: 0.18

Page 2



SH23: 000000

Data File: /chem3/pid1.i/vpcc0204-1.b/0204a007.d

Date: 04-FEB-2011 09:36

Client ID:

Sample Info: MB0204

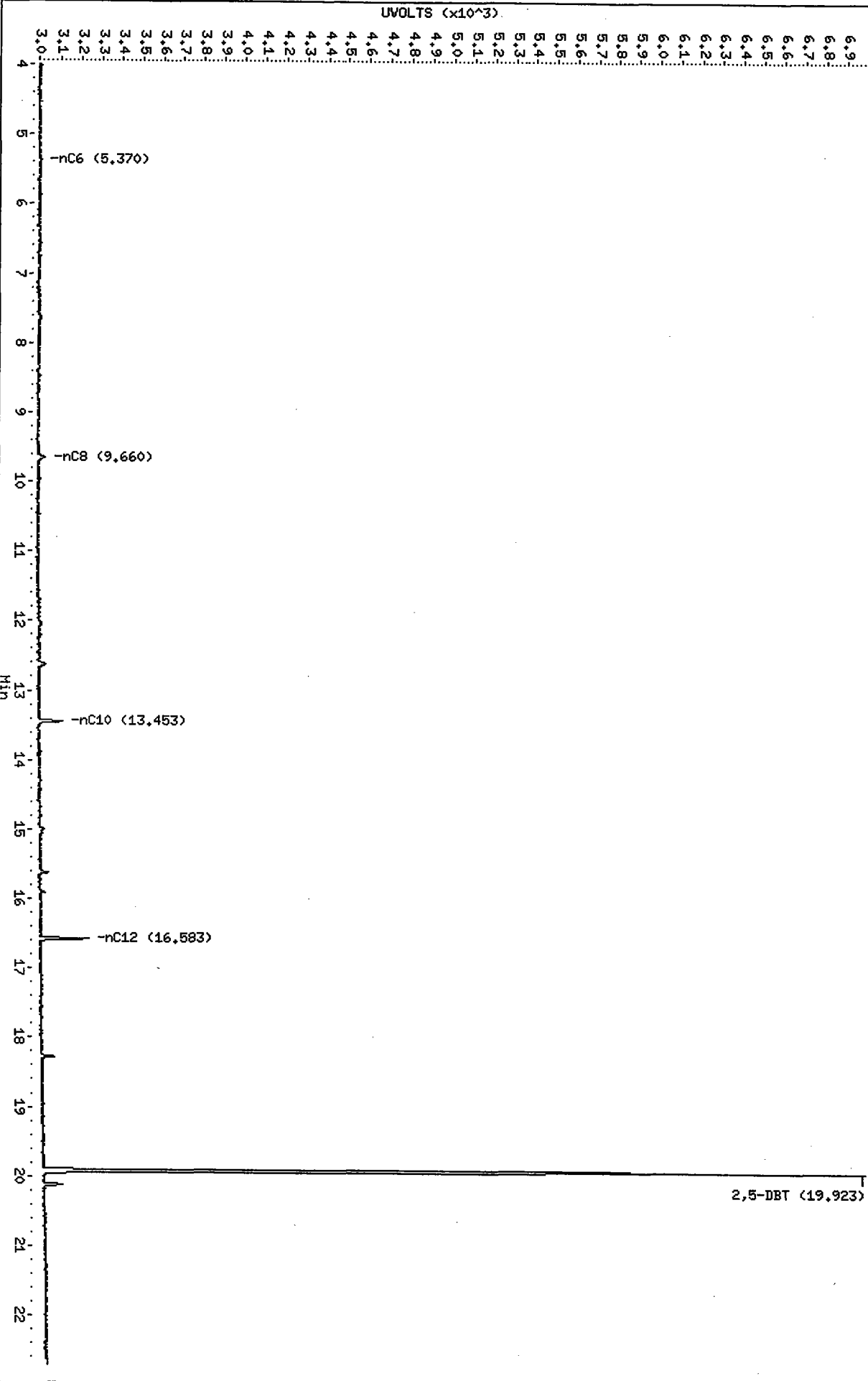
Instrument: pid1.i

Operator: MH

Column diameter: 0.18

Column phase: RTX502-2 ALI

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10000 5120

Analytical Resources Inc.
WAVPH Aromatics Report

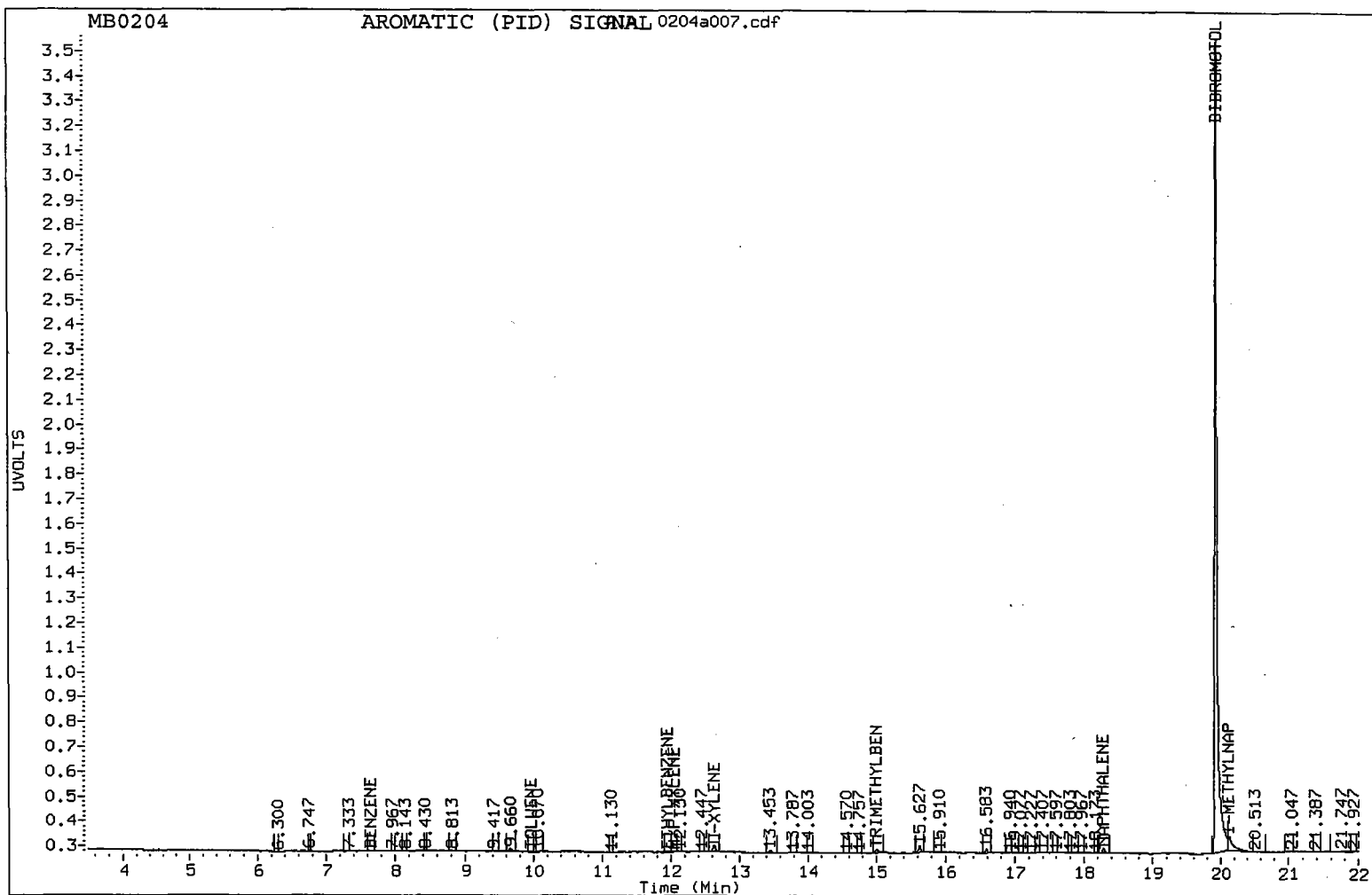
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Method: /chem3/pid1.i/vpcc0204-2.b/VPHAROM.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: MB0204
Client ID:
Injection: 04-FEB-2011 09:36
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	----				C8-C10 Arom.	1534*	0.6
BENZENE	7.650	0.003	19	0.0	C10-C12 Arom.	1486	0.7
TOLUENE	9.970	0.010	22	0.0	C12-C13 Arom.	3147	2.8
ETHYLBENZENE	11.943	0.010	17	0.0			
M/P-XYLENE	12.047	0.010	43	0.0			
O-XYLENE	12.630	0.007	250	0.3			
TRIMETHYLBEN	15.003	-0.043	133	0.2			
NAPHTHALENE	18.283	0.013	181	0.2			
1-METHYLNAP	20.123	0.013	579	2.8			
DIBROMOTOL	19.927	0.017	32785	42.8	DBT Recovery:	85.7	

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0204-1.b/0204a007.d
Method: /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: MB0204
Client ID:
Injection: 04-FEB-2011 09:36
Matrix: WATER
Dilution Factor: 1

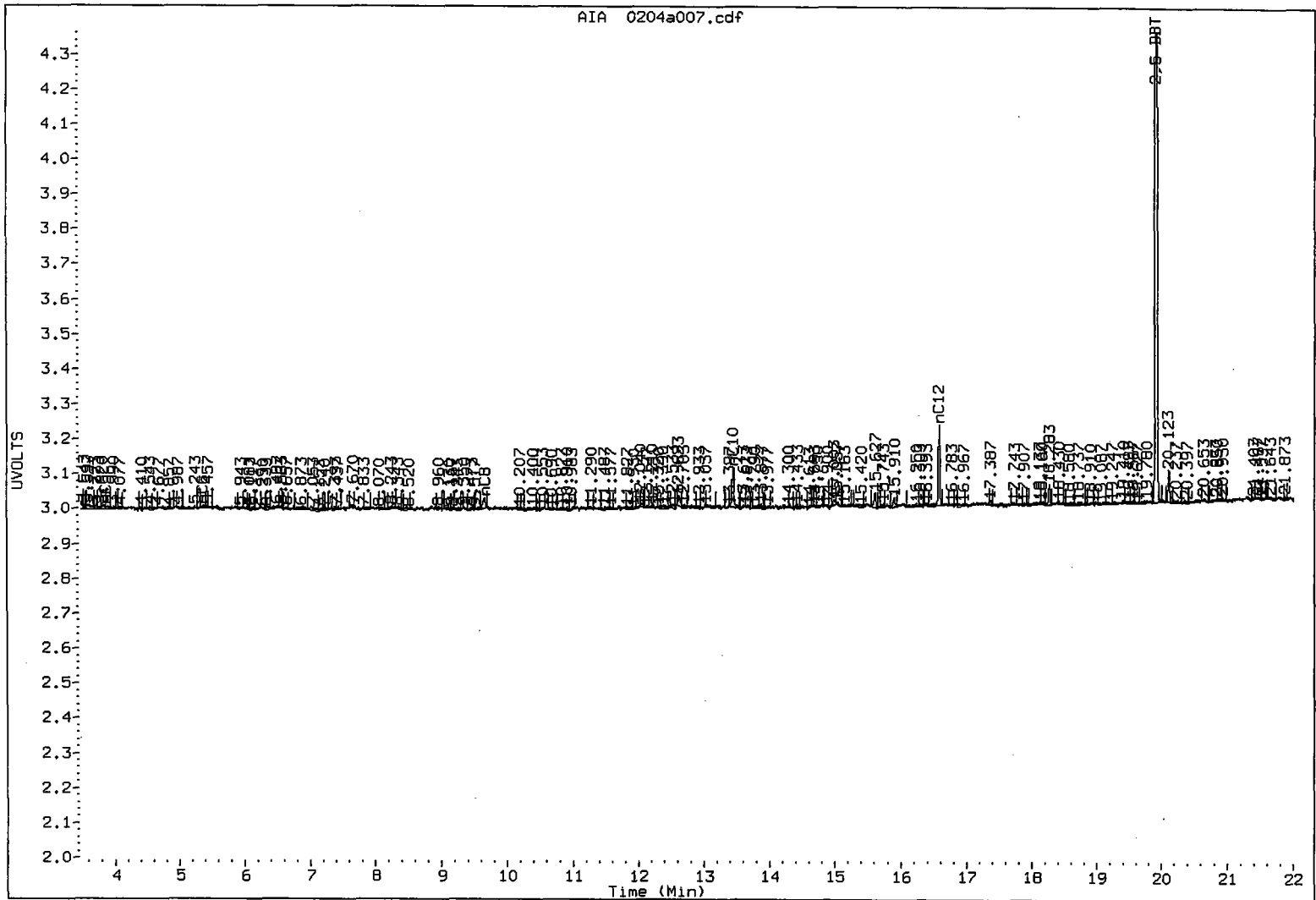
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.873	0.023	11	27	C5-C6 Aliph.	276	0.6
nC6	5.370	-0.023	6	19	C6-C8 Aliph.	685*	1.6
nC8	9.660	0.020	31	83	C8-C10 Aliph.	802	1.9
nC10	13.453	0.013	114	229	C10-C12 Aliph.	934*	2.2
nC12	16.583	0.010	231	408			

* Indicates surrogate area subtracted

MB0204

ALIPHATIC (FID) SIGNAL



ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1

Sample ID: LCS-020911

LCS/LCSD

Lab Sample ID: LCS-020911

LIMS ID: 11-3111

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: NA

Date Received: NA

Date Analyzed LCS: 02/09/11 08:48

Date Analyzed LCSD: 02/09/11 09:19

Instrument/Analyst: PID1/MH

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	4870	4500	108%	4790	4500	106%	1.7%
Toluene	4870	4500	108%	4820	4500	107%	1.0%
Ethylbenzene	4980	4500	111%	4990	4500	111%	0.2%
m,p-Xylene	9720	9010	108%	9630	9010	107%	0.9%
o-Xylene	4820	4500	107%	4760	4500	106%	1.3%
Methyl tert-Butyl Ether	5030	4500	112%	4900	4500	109%	2.6%
Naphthalene	5650	4500	126%	5620	4500	125%	0.5%
1,2,3-Trimethylbenzene	5210	4500	116%	5110	4500	114%	1.9%
1-Methylnaphthalene	5290	4500	118%	5360	4500	119%	1.3%
n-Pentane	5490	4500	122%	5360	4500	119%	2.4%
n-Hexane	4990	4500	111%	4860	4500	108%	2.6%
n-Octane	5020	4500	112%	4780	4500	106%	4.9%
n-Decane	5360	4500	119%	5000	4500	111%	6.9%
n-Dodecane	5820	4500	129%	5670	4500	126%	2.6%

Values reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

VPH Surrogate Recovery

	LCS	LCSD
PID: 2,5-Dibromotoluene	110%	110%
FID: 2,5-Dibromotoluene	100%	100%

Data File: /chem3/pid1.i/vpcc0209-2.b/0209a005.d
Report Date: 15-Feb-2011 07:43

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mt.
2/15/11

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0209-2.b/0209a005.d
Lab Smp Id: LCS0209
Inj Date : 09-FEB-2011 08:48
Operator : MH
Smp Info : LCS0209
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0209-2.b/VPHARO.m
Meth Date : 09-Feb-2011 06:36 monicah
Cal Date : 08-FEB-2011 17:14
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 0208a021.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds	RT	EXP RT	DLT RT	RESPONSE	CONCENTRATIONS	
					ON-COLUMN	FINAL
					(ug/ml)	(ug/L)
1 MtBE	5.127	5.130	-0.003	65375	55.8627	55.9
2 BENZENE	7.657	7.660	-0.003	164077	54.1274	54.1
4 TOLUENE	9.973	9.977	-0.004	153491	54.1313	54.1
5 ETHYLBENZENE	11.947	11.953	-0.006	120484	55.3114	55.3
6 M/P-XYLENE	12.050	12.060	-0.010	328988	108.317	108
7 O-XYLENE	12.637	12.643	-0.006	134507	53.6110	53.6
9 TRIMETHYLBEN	15.060	15.070	-0.010	111225	57.9069	57.9
10 NAPHTHALENE	18.283	18.290	-0.007	72652	62.8550	62.8
11 1-METHYLNAP	20.127	20.130	-0.003	39386	58.8038	58.8 (M)
\$ 37 DIBROMOTOL	19.923	19.930	-0.007	49880	54.9780	55.0

QC Flag Legend

M - Compound response manually integrated.

5123:00000

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0209-1.b/0209a005.d
Lab Smp Id: LCS0209
Inj Date : 09-FEB-2011 08:48
Operator : MH
Smp Info : LCS0209
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0209-1.b/VPHALI.m
Meth Date : 09-Feb-2011 06:37 monicah
Cal Date : 08-FEB-2011 17:14
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 0208a021.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

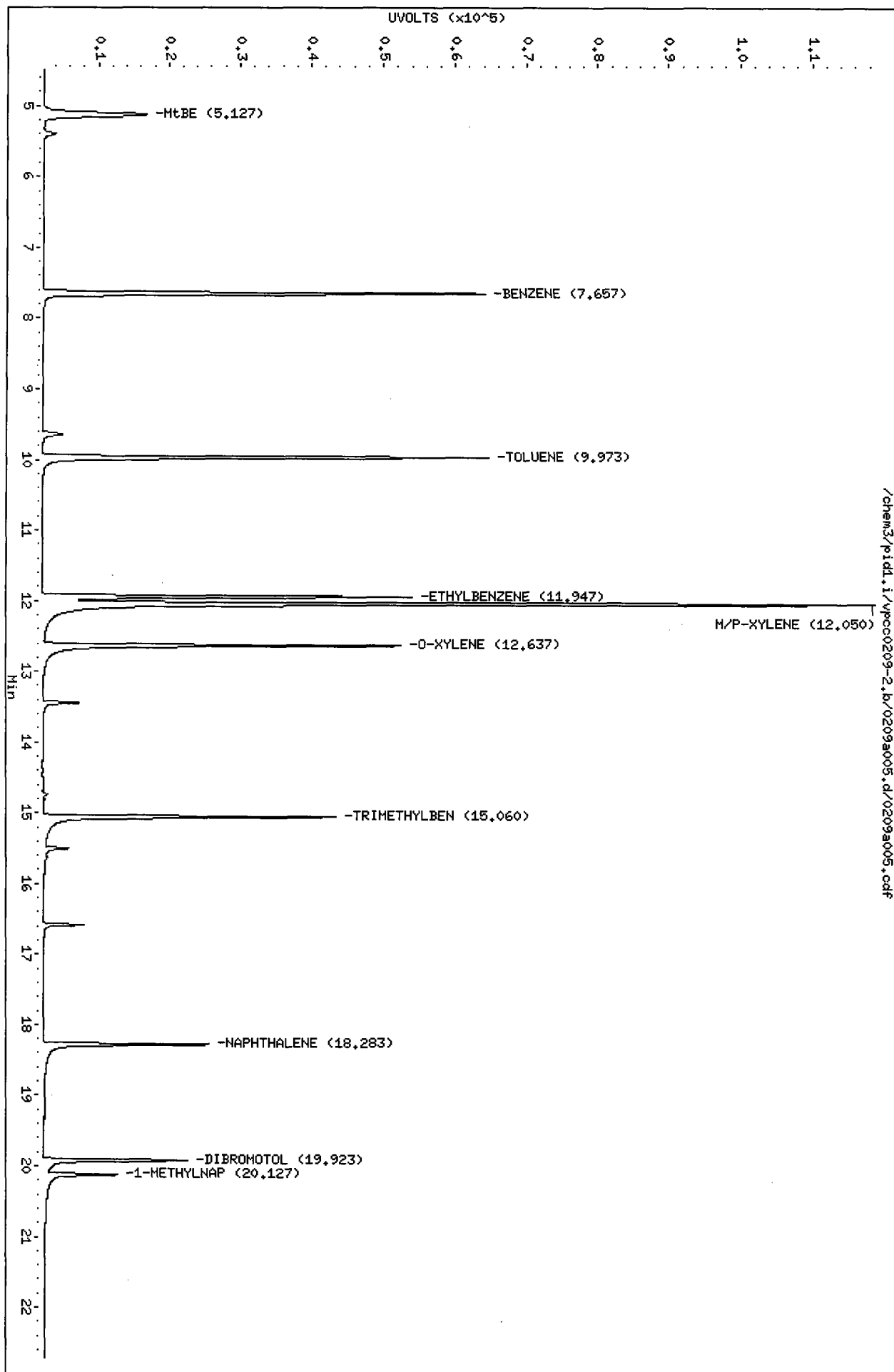
Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
1 nC5	3.910	3.920	-0.010	21708	61.0344	61.0
2 nC6	5.400	5.403	-0.003	23575	55.3645	55.4
4 nC8	9.650	9.650	0.000	19003	55.8434	55.8
5 nC10	13.453	13.457	-0.004	19439	59.6285	59.6 (M)
7 nC12	16.587	16.590	-0.003	19078	64.7267	64.7
\$ 8 2,5-DBT	19.923	19.930	-0.007	6920	50.0827	50.1

QC Flag Legend

M - Compound response manually integrated.

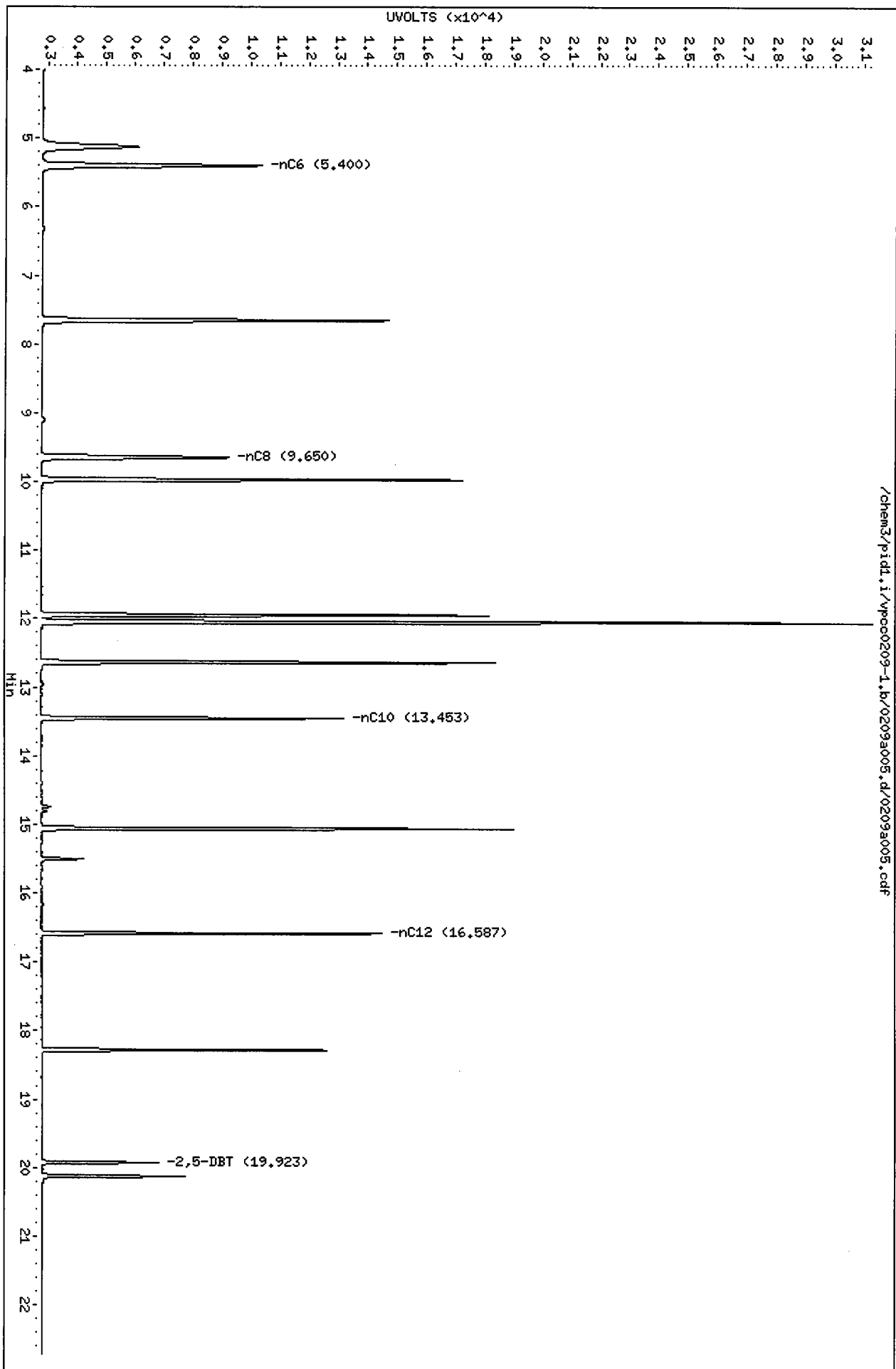
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Date : 09-FEB-2011 08:48
Client ID:
Sample Info: LCS0209
Column phase: RTX 502-2 ARD

Instrument: pid1.i
Operator: MH
Column diameter: 0.18



Data File: /chem3/pid1.i/vpcc0209-1.b/0209a005.d
Date : 09-FEB-2011 08:48
Client ID:
Sample Info: LCS0209
Column phase: RTX502-2 ALI

Instrument: pid1.i
Operator: MH
Column diameter: 0.18



5123 : 00000

Analytical Resources Inc.
WAVPH Aromatics Report

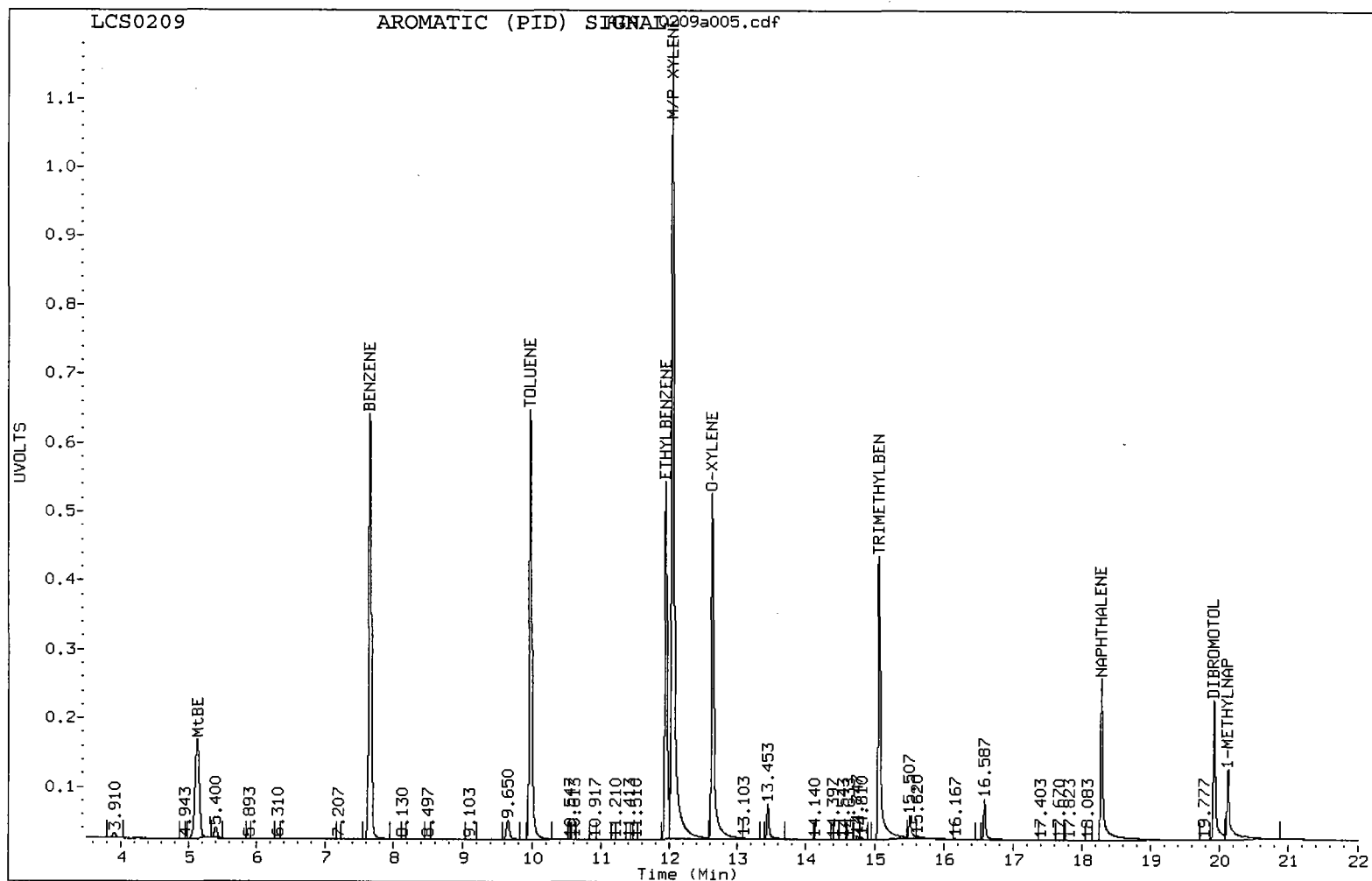
Data file: /chem3/pid1.i/vpcc0209-2.b/0209a005.d
Method: /chem3/pid1.i/vpcc0209-2.b/VPHARO.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCS0209
Client ID:
Injection: 09-FEB-2011 08:48
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.127	-0.003	14474	55.9	C8-C10 Arom.	709839*	369.6
BENZENE	7.657	-0.003	61762	54.1	C10-C12 Arom.	99980	86.5
TOLUENE	9.973	-0.003	62392	54.1	C12-C13 Arom.	39431	58.9
ETHYLBENZENE	11.947	-0.007	51766	55.3			
M/P-XYLENE	12.050	-0.010	116413	108.3			
O-XYLENE	12.637	-0.007	50044	53.6			
TRIMETHYLBEN	15.060	-0.010	41110	57.9			
NAPHTHALENE	18.283	-0.007	23419	62.9			
1-METHYLNAP	20.127	-0.003	10279	58.8			
DIBROMOTOL	19.923	-0.007	20316	55.0	DBT Recovery: 110.0		

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0209-1.b/0209a005.d
Method: /chem3/pid1.i/vpcc0209-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCS0209
Client ID:
Injection: 09-FEB-2011 08:48
Matrix: WATER
Dilution Factor: 1

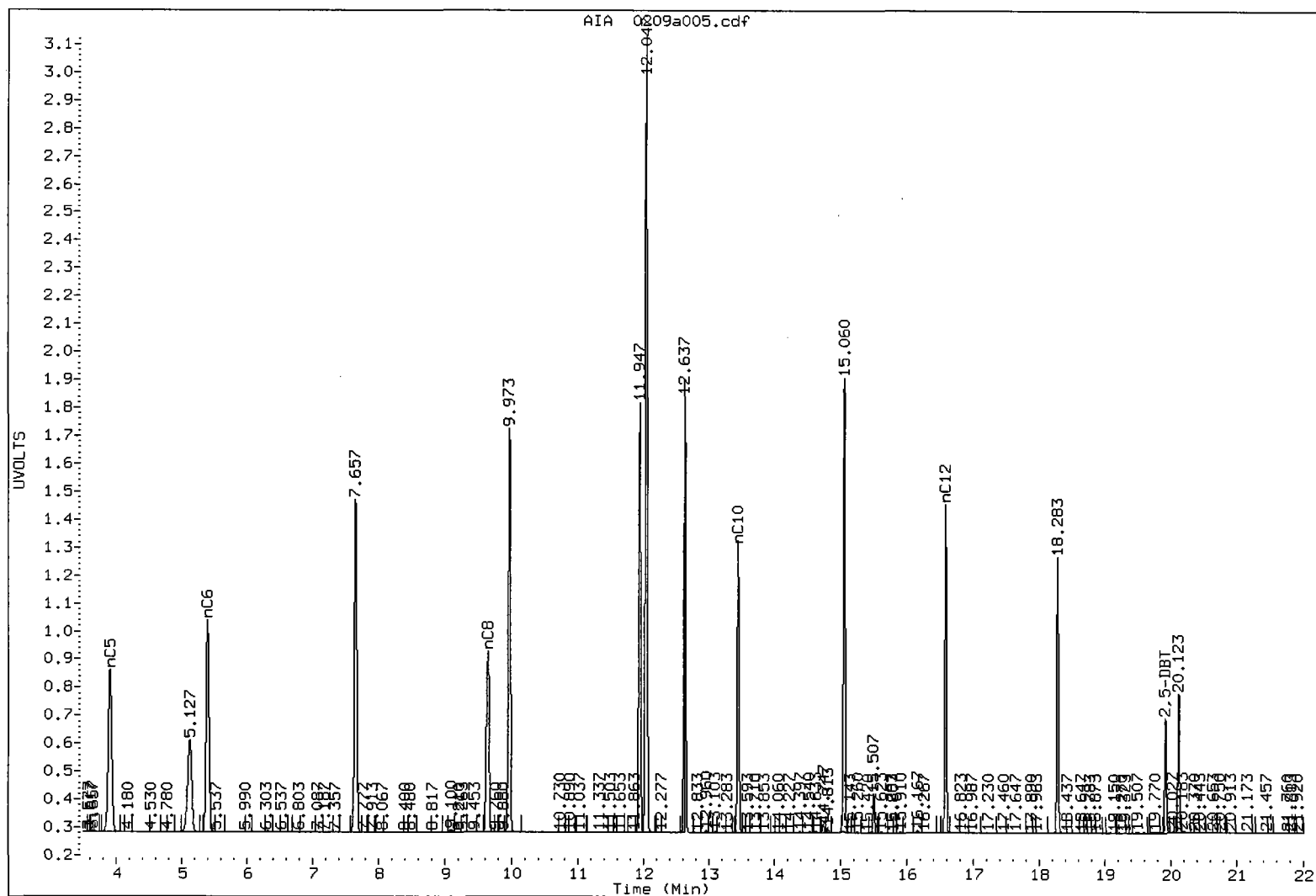
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.910	-0.010	5802	21708	C5-C6 Aliph.	60017	153.6
nC6	5.400	-0.003	7540	23575	C6-C8 Aliph.	49812*	146.4
nC8	9.650	0.000	6432	19003	C8-C10 Aliph.	156312	479.5
nC10	13.453	-0.003	10399	19439	C10-C12 Aliph.	52351*	177.6
nC12	16.587	-0.003	11722	19078			

* Indicates surrogate area subtracted

LCS0209

ALIPHATIC (FID) SIGNAL



SH20: 00100

Data File: /chem3/pid1.i/vpcc0209-2.b/0209a006.d
Report Date: 15-Feb-2011 07:43

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Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0209-2.b/0209a006.d
Lab Smp Id: LCSD0209
Inj Date : 09-FEB-2011 09:19
Operator : MH
Smp Info : LCSD0209
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0209-2.b/VPHARO.m
Meth Date : 09-Feb-2011 06:36 monicah
Cal Date : 08-FEB-2011 17:14
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 0208a021.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
-----	--	-----	-----	-----	-----	-----
1 MtBE	5.130	5.130	0.000	63683	54.4169	54.4
2 BENZENE	7.657	7.660	-0.003	161241	53.1918	53.2
4 TOLUENE	9.973	9.977	-0.004	152083	53.6347	53.6 (M)
5 ETHYLBENZENE	11.947	11.953	-0.006	120631	55.3789	55.4
6 M/P-XYLENE	12.050	12.060	-0.010	323713	106.580	106
7 O-XYLENE	12.637	12.643	-0.006	132690	52.8868	52.9
9 TRIMETHYLBEN	15.060	15.070	-0.010	109173	56.8386	56.8
10 NAPHTHALENE	18.280	18.290	-0.010	72131	62.4042	62.4
11 1-METHYLNAP	20.123	20.130	-0.007	39907	59.5816	59.6 (M)
\$ 37 DIBROMOTOL	19.923	19.930	-0.007	49734	54.8171	54.8

QC Flag Legend

M - Compound response manually integrated.

5425:00101

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0209-1.b/0209a006.d
Lab Smp Id: LCSD0209
Inj Date : 09-FEB-2011 09:19
Operator : MH
Smp Info : LCSD0209
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0209-1.b/VPHALI.m
Meth Date : 09-Feb-2011 06:37 monicah
Cal Date : 08-FEB-2011 17:14
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 0208a021.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

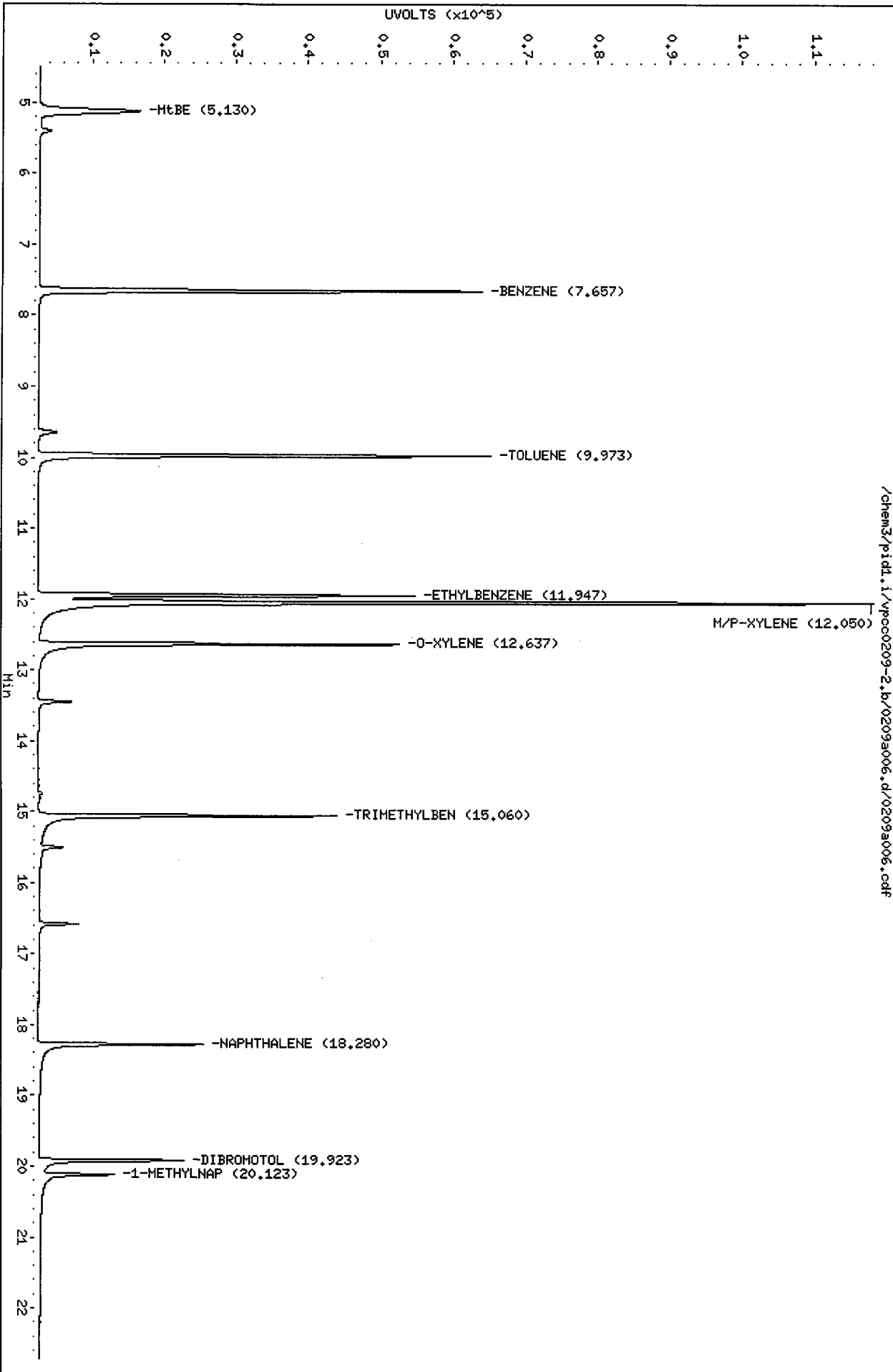
Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
1 nC5	3.913	3.920	-0.007	21180	59.5499	59.5
2 nC6	5.403	5.403	0.000	22972	53.9484	53.9
4 nC8	9.650	9.650	0.000	18057	53.0635	53.1
5 nC10	13.450	13.457	-0.007	18140	55.6439	55.6
7 nC12	16.583	16.590	-0.007	18568	62.9964	63.0
\$ 8 2,5-DBT	19.923	19.930	-0.007	6906	49.9814	50.0

Data File: /chem3/pid1.i/vpcc0209-2.b/0209a006.d
Date : 09-FEB-2011 09:19
Client ID:
Sample Info: LCSD0209

Column phase: RTX 502-2 AR0

Instrument: pid1.i
Operator: HH
Column diameter: 0.18

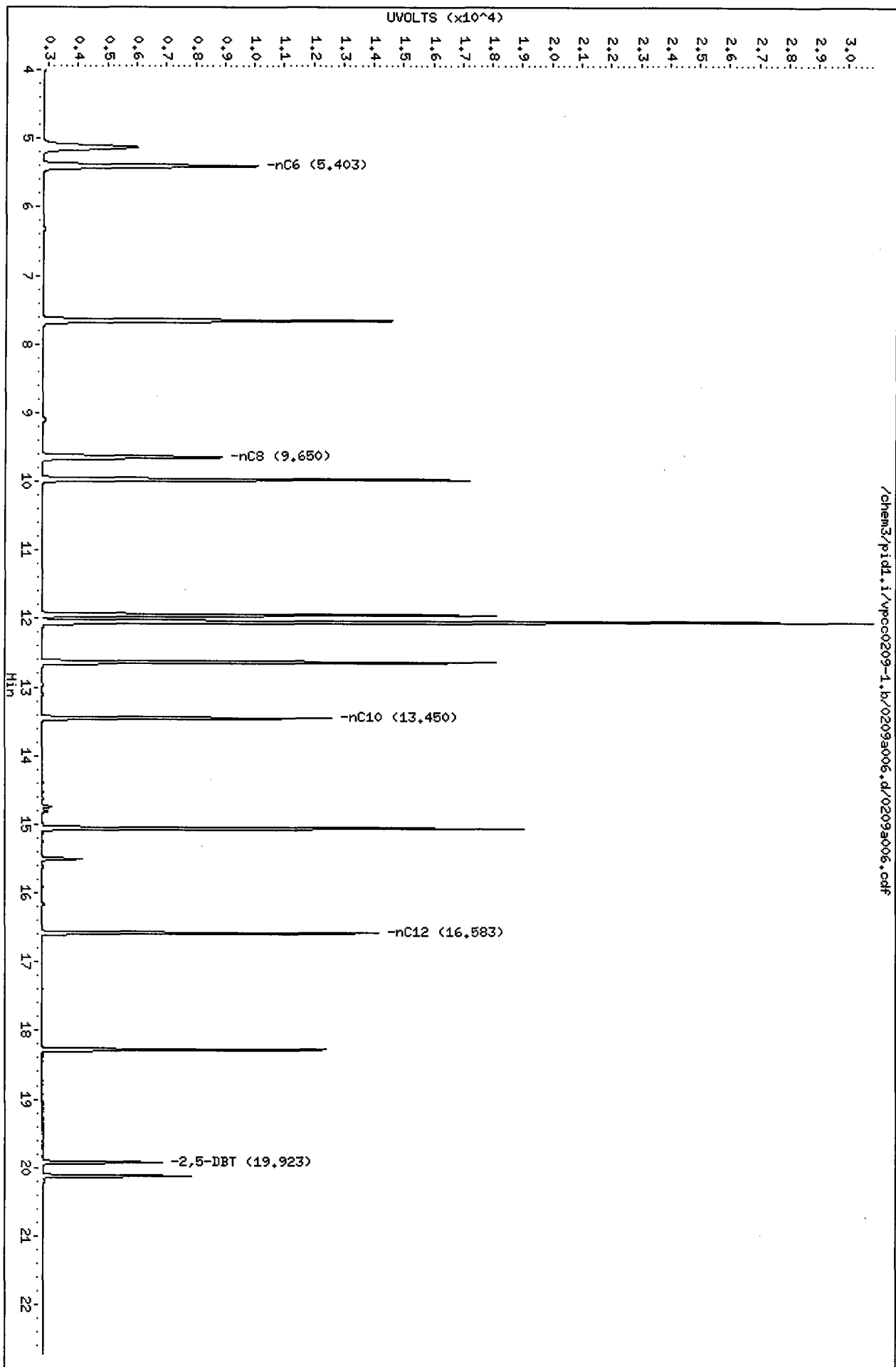
Page 2



5423:00100

Data File: /chem3/pid1.i/vpcc0209-1.b/0209a006.d
Date : 09-FEB-2011 09:19
Client ID:
Sample Info: LCSD0209
Column phase: RTX02-2 ALI

Instrument: pid1.i
Operator: MH
Column diameter: 0.18



5420:08104

Analytical Resources Inc.
WAVPH Aromatics Report

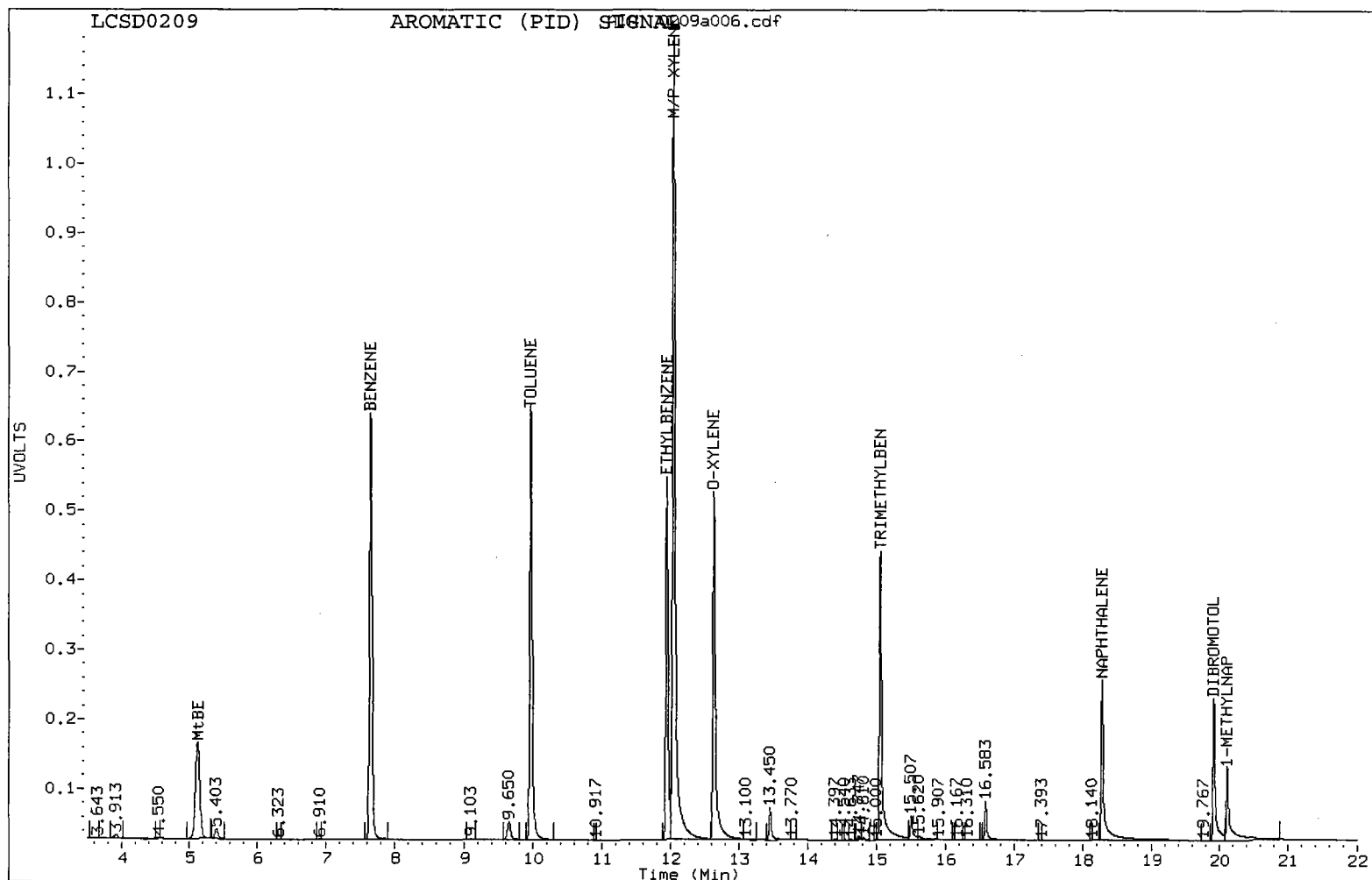
Data file: /chem3/pid1.i/vpcc0209-2.b/0209a006.d
Method: /chem3/pid1.i/vpcc0209-2.b/VPHARO.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCSD0209
Client ID:
Injection: 09-FEB-2011 09:19
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.130	0.000	13880	54.4	C8-C10 Arom.	699903*	364.4
BENZENE	7.657	-0.003	61223	53.2	C10-C12 Arom.	97602	84.4
TOLUENE	9.973	-0.003	62725	53.6	C12-C13 Arom.	39976	59.7
ETHYLBENZENE	11.947	-0.007	52111	55.4			
M/P-XYLENE	12.050	-0.010	115513	106.6			
O-XYLENE	12.637	-0.007	49866	52.9			
TRIMETHYLBEN	15.060	-0.010	41340	56.8			
NAPHTHALENE	18.280	-0.010	22964	62.4			
1-METHYLNAP	20.123	-0.007	10519	59.6			
DIBROMOTOL	19.923	-0.007	20244	54.8	DBT Recovery: 109.6		

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pidl.i/vpcc0209-1.b/0209a006.d
Method: /chem3/pidl.i/vpcc0209-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCSD0209
Client ID:
Injection: 09-FEB-2011 09:19
Matrix: WATER
Dilution Factor: 1

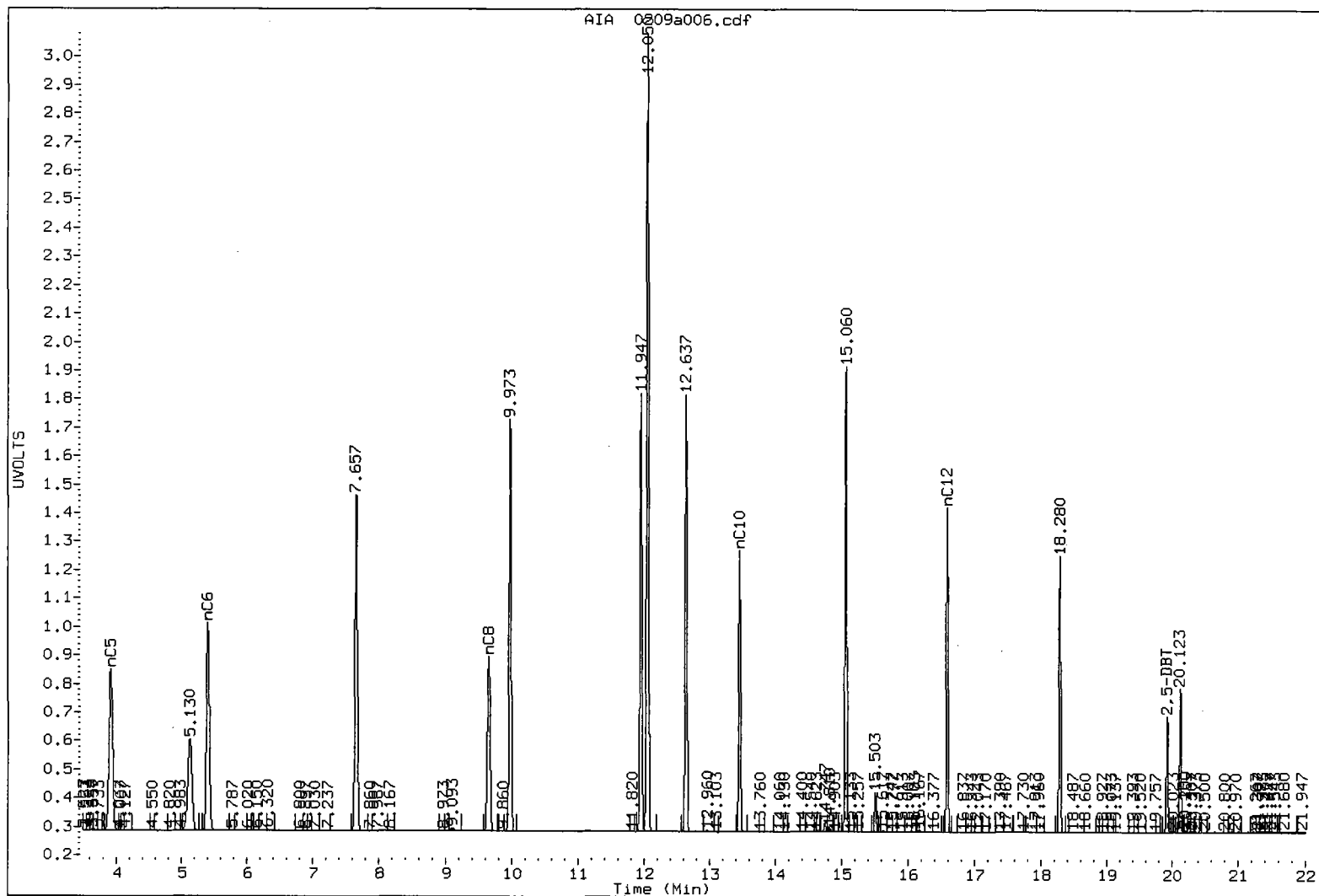
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.913	-0.007	5644	21180	C5-C6 Aliph.	58717	150.3
nC6	5.403	0.000	7266	22972	C6-C8 Aliph.	48654*	143.0
nC8	9.650	0.000	6102	18057	C8-C10 Aliph.	167396	513.5
nC10	13.450	-0.007	9841	18140	C10-C12 Aliph.	51452*	174.6
nC12	16.583	-0.007	11384	18568			

* Indicates surrogate area subtracted

LCSD0209

ALIPHATIC (FID) SIGNAL



5423:00106

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1

Sample ID: MB-020911

METHOD BLANK

Lab Sample ID: MB-020911

LIMS ID: 11-3111

Matrix: Soil

Data Release Authorized: *B*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed: 02/09/11 10:59

Instrument/Analyst: PID1/MH

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	129%
FID: 2,5-Dibromotoluene	102%

Data File: /chem3/pid1.i/vpcc0209-2.b/0209a009.d
Report Date: 15-Feb-2011 07:43

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MH
2/15/11

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0209-2.b/0209a009.d
Lab Smp Id: MB0209
Inj Date : 09-FEB-2011 10:59
Operator : MH
Smp Info : MB0209
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0209-2.b/VPHARO.m
Meth Date : 09-Feb-2011 06:36 monicah
Cal Date : 08-FEB-2011 17:14
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 0208a021.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
1 MtBE				Compound Not Detected.		
2 BENZENE	7.653	7.660	-0.007	20	0.00660	0.00660
4 TOLUENE	9.973	9.977	-0.004	26	0.00917	0.00917
5 ETHYLBENZENE				Compound Not Detected.		
6 M/P-XYLENE	12.053	12.060	-0.007	39	0.01284	0.0128
7 O-XYLENE	12.627	12.643	-0.016	359	0.14309	0.143
9 TRIMETHYLBEN	15.000	15.070	-0.070	225	0.11714	0.117
10 NAPHTHALENE	18.280	18.290	-0.010	60	0.05191	0.0519
11 1-METHYLNAP				Compound Not Detected.		
\$ 37 DIBROMOTOL	19.923	19.930	-0.007	58688	64.6863	64.7 (M)

QC Flag Legend

M - Compound response manually integrated.

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0209-1.b/0209a009.d
Lab Smp Id: MB0209
Inj Date : 09-FEB-2011 10:59
Operator : MH
Smp Info : MB0209
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0209-1.b/VPHALI.m
Meth Date : 09-Feb-2011 06:37 monicah
Cal Date : 08-FEB-2011 17:14
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 0208a021.d
Compound Sublist: waaliph.sub

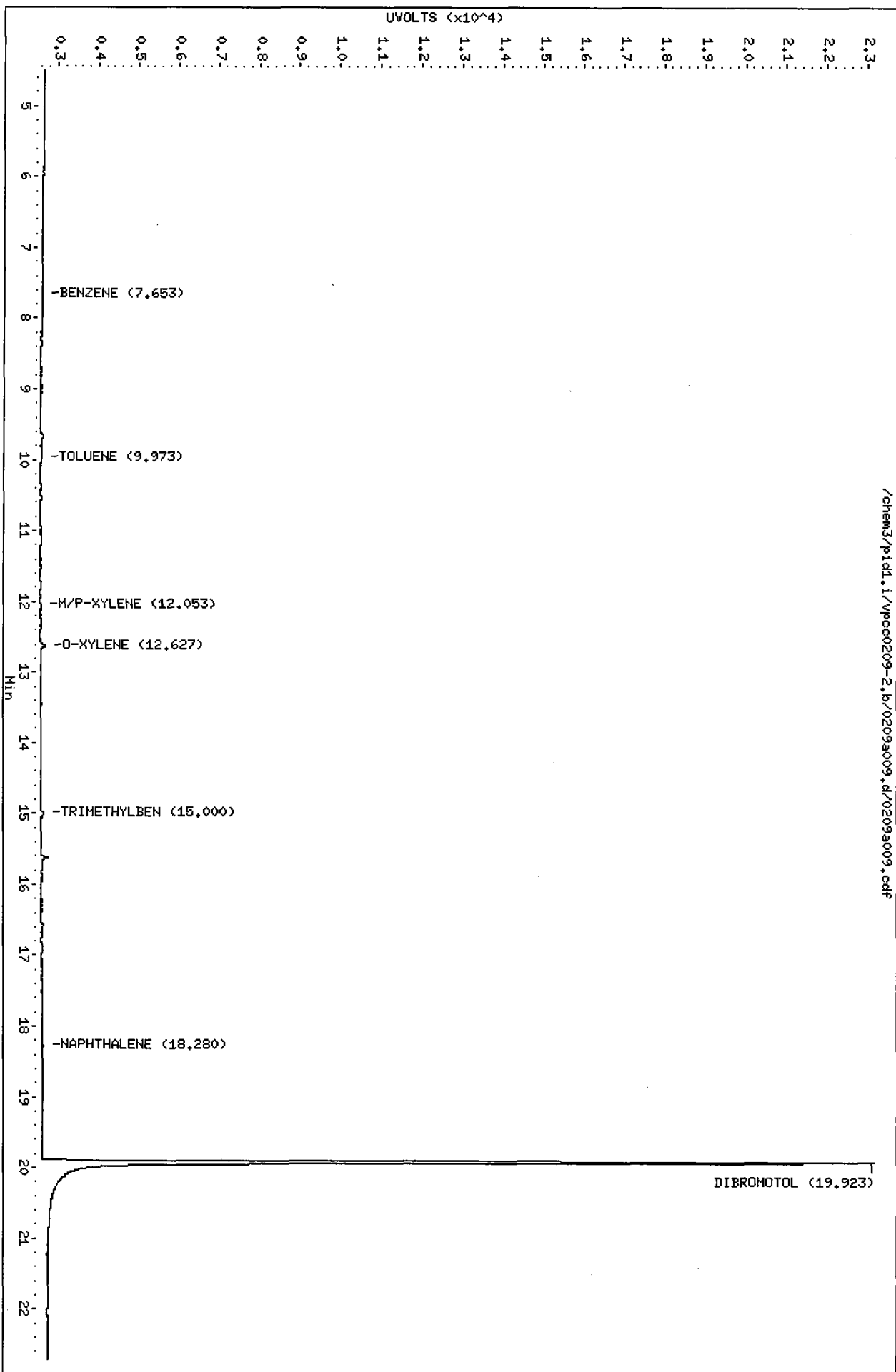
Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
1 nC5	Compound Not Detected.					
2 nC6	5.363	5.403	-0.040	27	0.06341	0.0634
4 nC8	9.643	9.650	-0.007	91	0.26742	0.267
5 nC10	13.453	13.457	-0.004	91	0.27914	0.279
7 nC12	16.583	16.590	-0.007	219	0.74301	0.743
\$ 8 2,5-DBT	19.923	19.930	-0.007	7030	50.8788	50.9

Data File: /chem3/pid1.i/vpcc0209-2.b/0209a009.d
Date : 09-FEB-2011 10:59
Client ID:
Sample Info: MB0209
Column phase: RTX 502-2 AR0

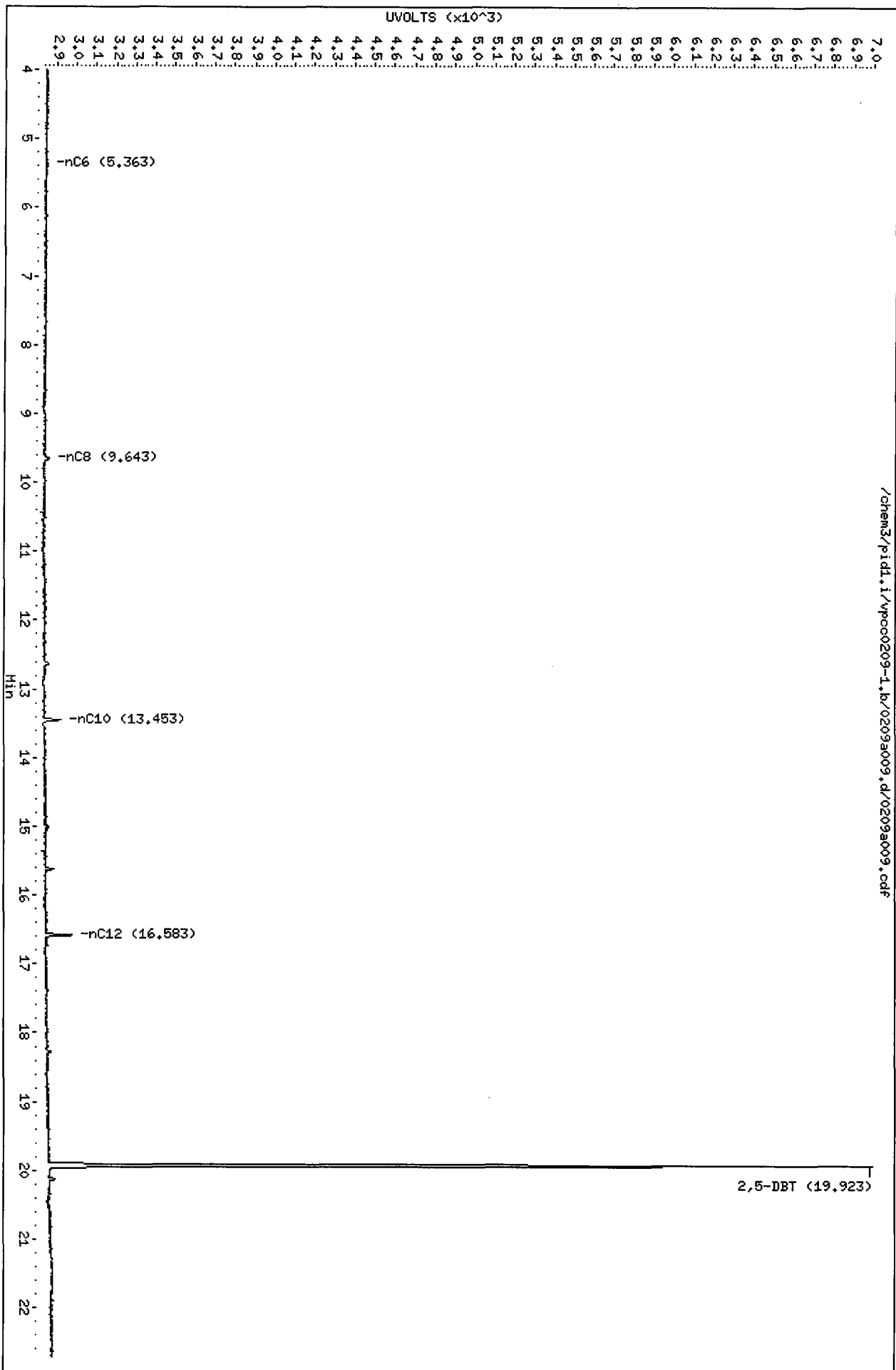
Instrument: pid1.i
Operator: MH
Column diameter: 0.18



Data File: /chem3/prid1.i/vpcc0209-1.b/0209a009.d
Date : 09-FEB-2011 10:59
Client ID:
Sample Info: MB0209
Column phase: RTX502-2 ALI

```
Instrument: pid1.i
Operator: MH
Column diameter: 0.18
```

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Analytical Resources Inc.
WAVPH Aromatics Report

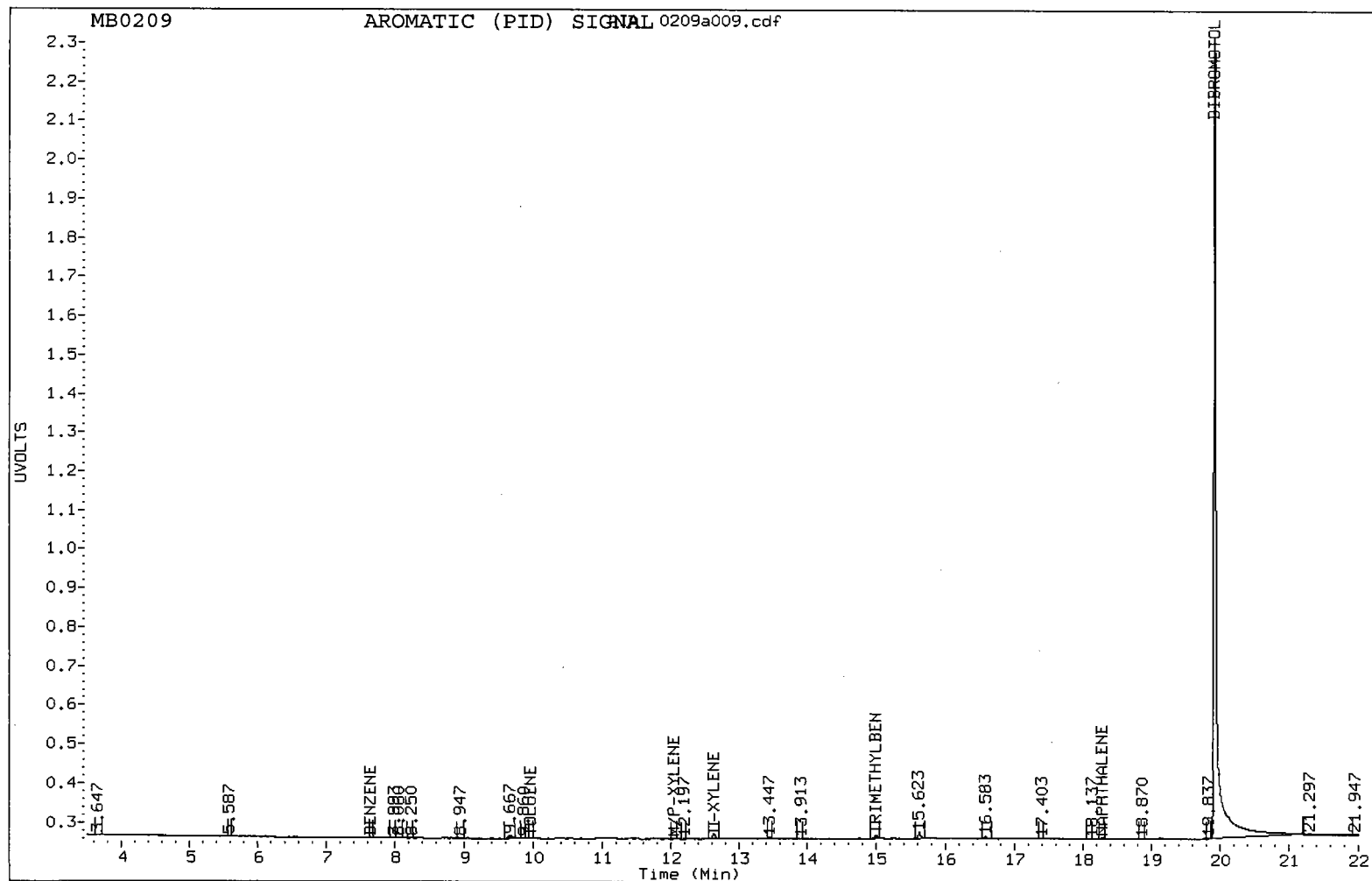
Data file: /chem3/pid1.i/vpcc0209-2.b/0209a009.d
Method: /chem3/pid1.i/vpcc0209-2.b/VPHARO.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: MB0209
Client ID:
Injection: 09-FEB-2011 10:59
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	----				C8-C10 Arom.	712*	0.4
BENZENE	7.653	-0.007	12	0.0	C10-C12 Arom.	564	0.5
TOLUENE	9.973	-0.003	14	0.0	C12-C13 Arom.	28	0.0
ETHYLBENZENE	----						
M/P-XYLENE	12.053	-0.007	15	0.0			
O-XYLENE	12.627	-0.017	124	0.1			
TRIMETHYLBEN	15.000	-0.070	76	0.1			
NAPHTHALENE	18.280	-0.010	34	0.1			
1-METHYLNAP	----						
DIBROMOTOL	19.923	-0.007	20526	64.7	DBT Recovery: 129.4		

* Indicates surrogate area subtracted



0923:00112

Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0209-1.b/0209a009.d
Method: /chem3/pid1.i/vpcc0209-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: MB0209
Client ID:
Injection: 09-FEB-2011 10:59
Matrix: WATER
Dilution Factor: 1

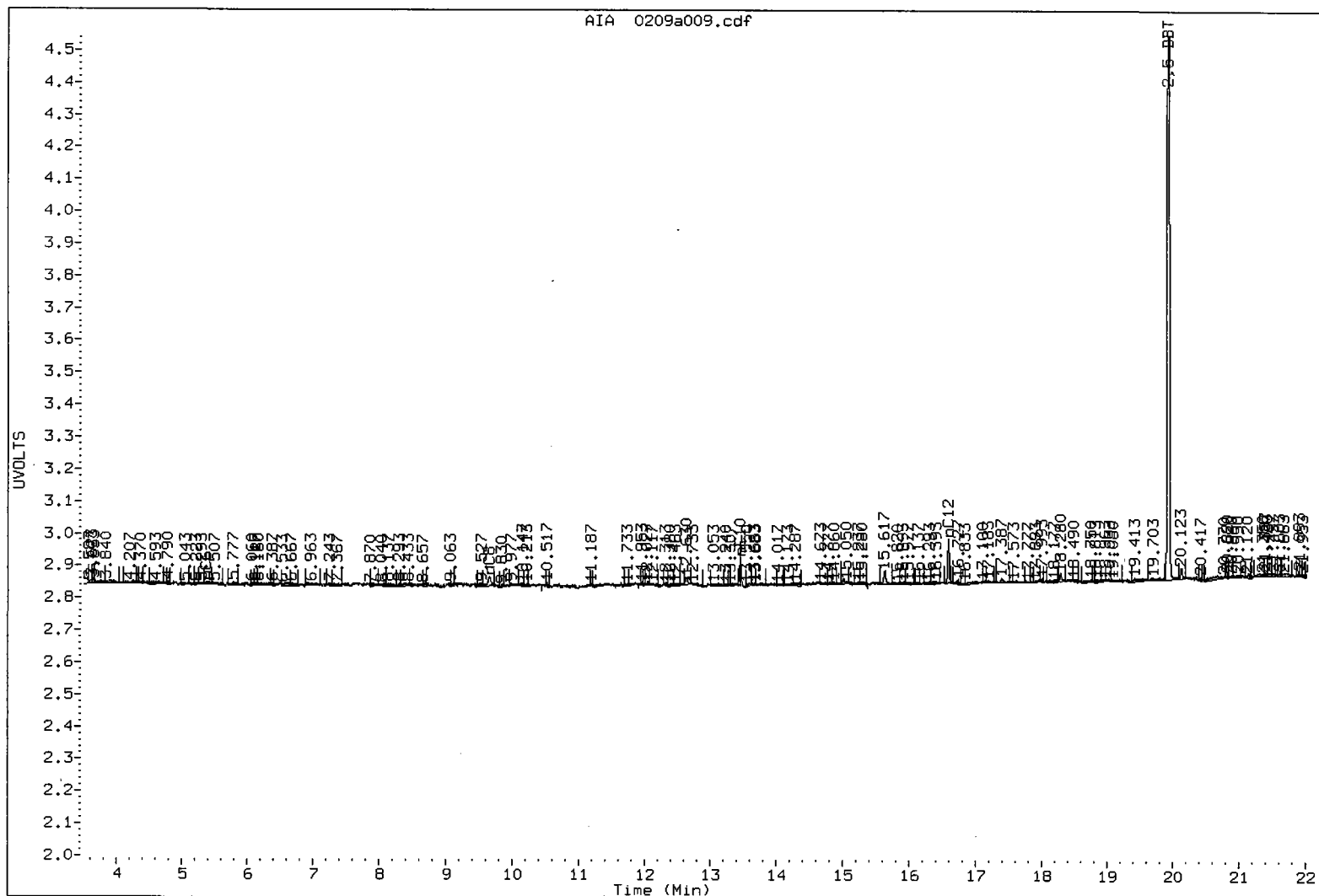
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	-----				C5-C6 Aliph.	320	0.8
nC6	5.363	-0.040	7	27	C6-C8 Aliph.	609*	1.8
nC8	9.643	-0.007	28	91	C8-C10 Aliph.	530	1.6
nC10	13.453	-0.003	85	91	C10-C12 Aliph.	764*	2.6
nC12	16.583	-0.007	133	219			

* Indicates surrogate area subtracted

MB0209

ALIPHATIC (FID) SIGNAL



ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1

Sample ID: LCS-021411

LCS/LCSD

Lab Sample ID: LCS-021411

LIMS ID: 11-3113

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: NA

Date Received: NA

Date Analyzed LCS: 02/14/11 12:47

Date Analyzed LCSD: 02/14/11 15:07

Instrument/Analyst: PID1/MH

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	4730	4500	105%	4680	4500	104%	1.1%
Toluene	4740	4500	105%	4700	4500	104%	0.8%
Ethylbenzene	4900	4500	109%	4860	4500	108%	0.8%
m,p-Xylene	9540	9010	106%	9450	9010	105%	0.9%
o-Xylene	4780	4500	106%	4720	4500	105%	1.3%
Methyl tert-Butyl Ether	4720	4500	105%	4650	4500	103%	1.5%
Naphthalene	4900	4500	109%	4830	4500	107%	1.4%
1,2,3-Trimethylbenzene	4950	4500	110%	4890	4500	109%	1.2%
1-Methylnaphthalene	5260	4500	117%	5570	4500	124%	5.7%
n-Pentane	5490	4500	122%	5390	4500	120%	1.8%
n-Hexane	4760	4500	106%	4720	4500	105%	0.8%
n-Octane	4600	4500	102%	4400	4500	97.8%	4.4%
n-Decane	4500	4500	100%	4540	4500	101%	0.9%
n-Dodecane	5290	4500	118%	5590	4500	124%	5.5%

Values reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

VPH Surrogate Recovery

	LCS	LCSD
PID: 2,5-Dibromotoluene	99.4%	98.6%
FID: 2,5-Dibromotoluene	98.8%	95.8%

Data File: /chem3/pid1.i/vpcc0214-2.b/0214a015.d
Report Date: 15-Feb-2011 08:22

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Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0214-2.b/0214a015.d
Lab Smp Id: VPH ICV
Inj Date : 14-FEB-2011 12:47
Operator : MH
Smp Info : VPH ICV
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0214-2.b/VPHARO.m
Meth Date : 15-Feb-2011 08:18 monicah
Cal Date : 14-FEB-2011 12:17
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i

Quant Type: ESTD
Cal File: 0214a014.d

Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable

Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
1 MtBE	5.140	5.140	0.000	58914	52.3903	52.4
2 BENZENE	7.670	7.667	0.003	150878	52.5638	52.6
4 TOLUENE	9.987	9.983	0.004	140588	52.7071	52.7
5 ETHYLBENZENE	11.960	11.960	0.000	116433	54.4813	54.5
6 M/P-XYLENE	12.063	12.060	0.003	296965	105.722	106
7 O-XYLENE	12.650	12.650	0.000	124520	53.0731	53.1
9 TRIMETHYLBEN	15.077	15.073	0.004	107610	54.9995	55.0
10 NAPHTHALENE	18.297	18.297	0.000	70763	54.3867	54.4
11 1-METHYLNAP	20.140	20.137	0.003	44826	58.4387	58.4
\$ 37 DIBROMOTOL	19.940	19.937	0.003	52824	49.6654	49.7

SH23:00115

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0214-1.b/0214a015.d
Lab Smp Id: VPH ICV
Inj Date : 14-FEB-2011 12:47
Operator : MH
Smp Info : VPH ICV
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0214-1.b/VPHALI.m
Meth Date : 15-Feb-2011 08:19 monicah
Cal Date : 14-FEB-2011 12:17
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 0214a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

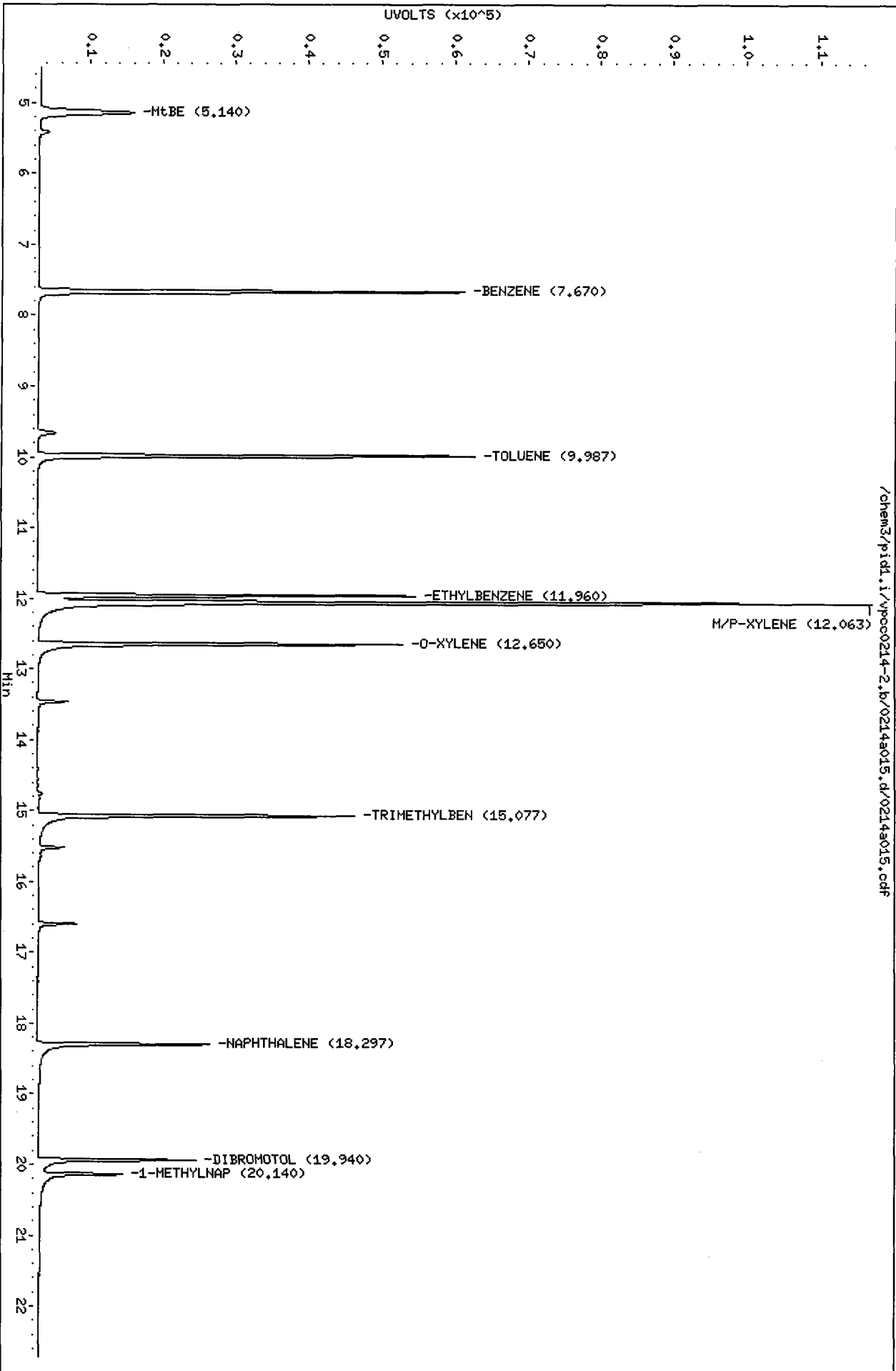
Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 nC5	3.923	3.920	0.003	21495	61.0434	61.0
2 nC6	5.417	5.413	0.004	23161	52.8962	52.9
4 nC8	9.663	9.663	0.000	18262	51.0805	51.1
5 nC10	13.467	13.463	0.004	16694	50.0325	50.0
7 nC12	16.600	16.597	0.003	18404	58.7458	58.7
\$ 8 2,5-DBT	19.940	19.937	0.003	7248	49.4155	49.4

Data File: /chem3/pid1.i/vpoc0214-2.b/0214a015.d
Date: 14-FEB-2011 12:47

Client ID:
Sample Info: WPH ICV

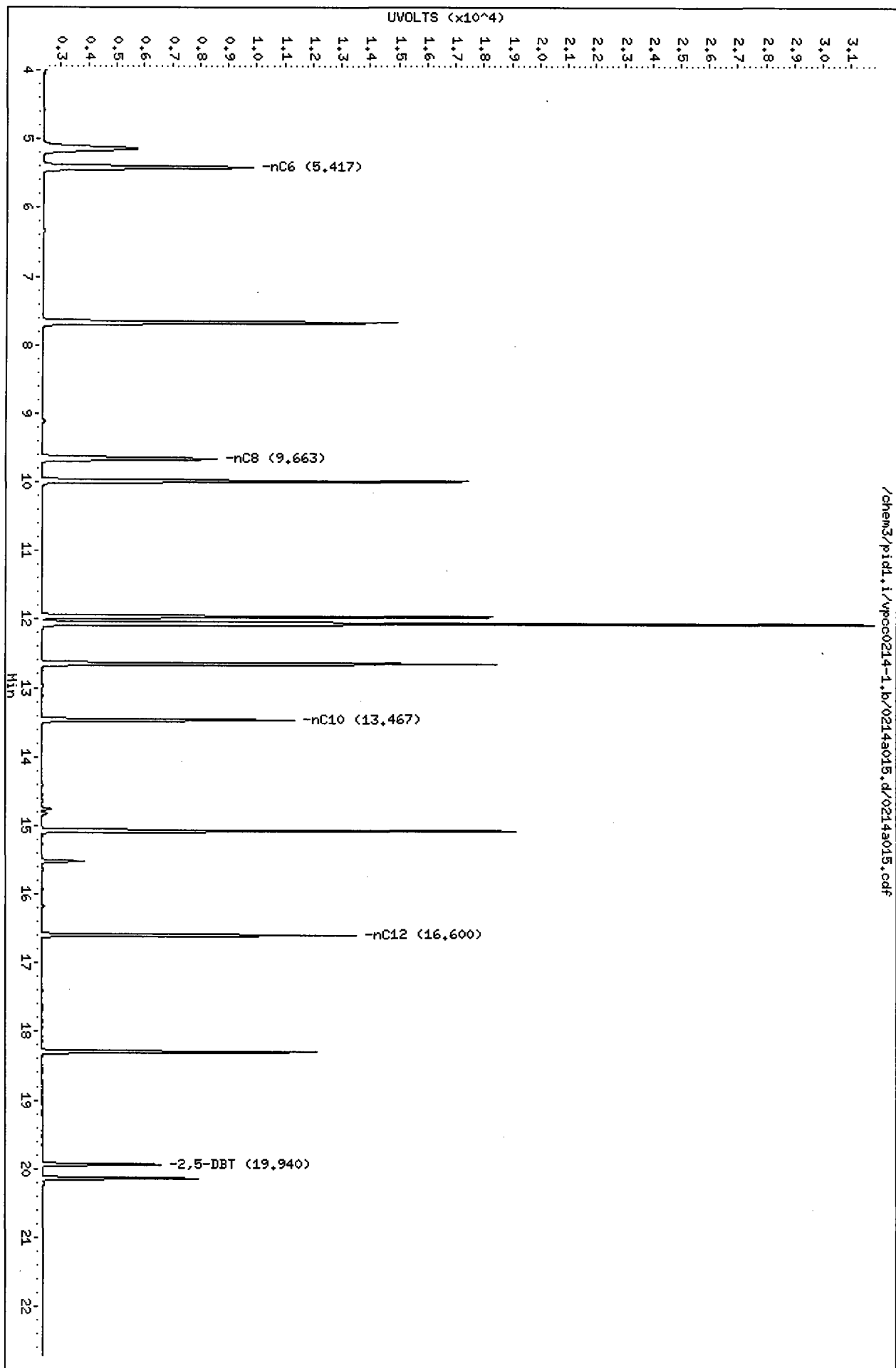
Column phase: RTX 502-2 ARO

Instrument: pid1.i
Operator: MH
Column diameter: 0.18



Data File: /chem3/pid1.i/vpcc0214-1.b/0214a015.d
Date : 14-FEB-2011 12:47
Client ID:
Sample Info: WPH ICV
Column phase: RTX502-2 ALI

Instrument: pid1.i
Operator: MH
Column diameter: 0.18



SH23:00110

Analytical Resources Inc.
WAVPH Aromatics Report

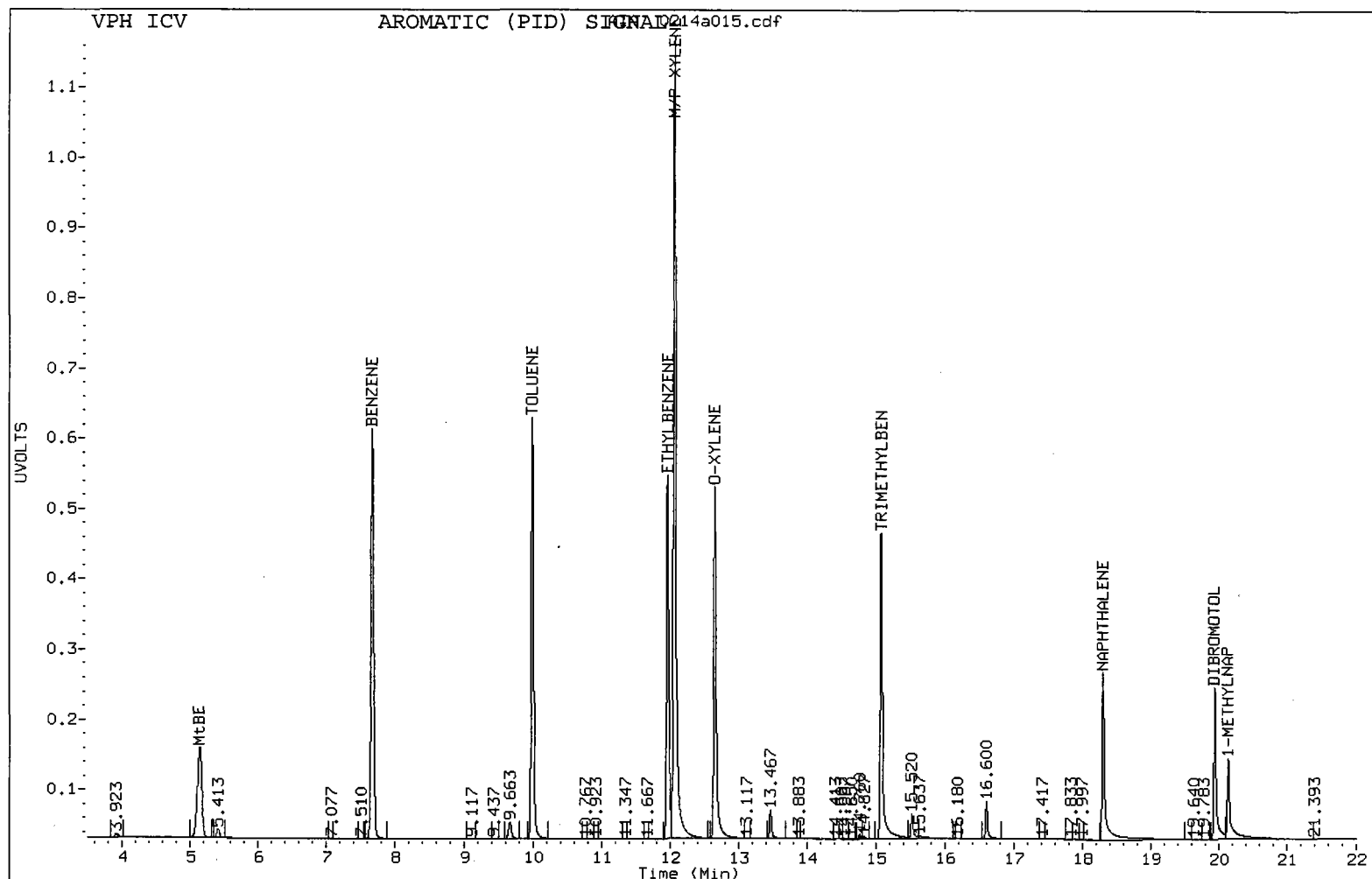
Data file: /chem3/pid1.i/vpcc0214-2.b/0214a015.d
Method: /chem3/pid1.i/vpcc0214-2.b/VPHARO.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: VPH ICV
Client ID:
Injection: 14-FEB-2011 12:47
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.140	0.000	12914	52.4	C8-C10 Arom.	657454*	336.0
BENZENE	7.670	0.003	58275	52.6	C10-C12 Arom.	92243	70.9
TOLUENE	9.987	0.003	59925	52.7	C12-C13 Arom.	44900	58.5
ETHYLBENZENE	11.960	0.000	51693	54.5			
M/P-XYLENE	12.063	0.003	114179	105.7			
O-XYLENE	12.650	0.000	49979	53.1			
TRIMETHYLBEN	15.077	0.003	43412	55.0			
NAPHTHALENE	18.297	0.000	23764	54.4			
1-METHYLNAP	20.140	0.003	11495	58.4			
DIBROMOTOL	19.940	0.003	21610	49.7	DBT Recovery:	99.3	

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pidl.i/vpcc0214-1.b/0214a015.d
Method: /chem3/pidl.i/vpcc0214-1.b/VPHALI.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: VPH ICV
Client ID:
Injection: 14-FEB-2011 12:47
Matrix: WATER
Dilution Factor: 1

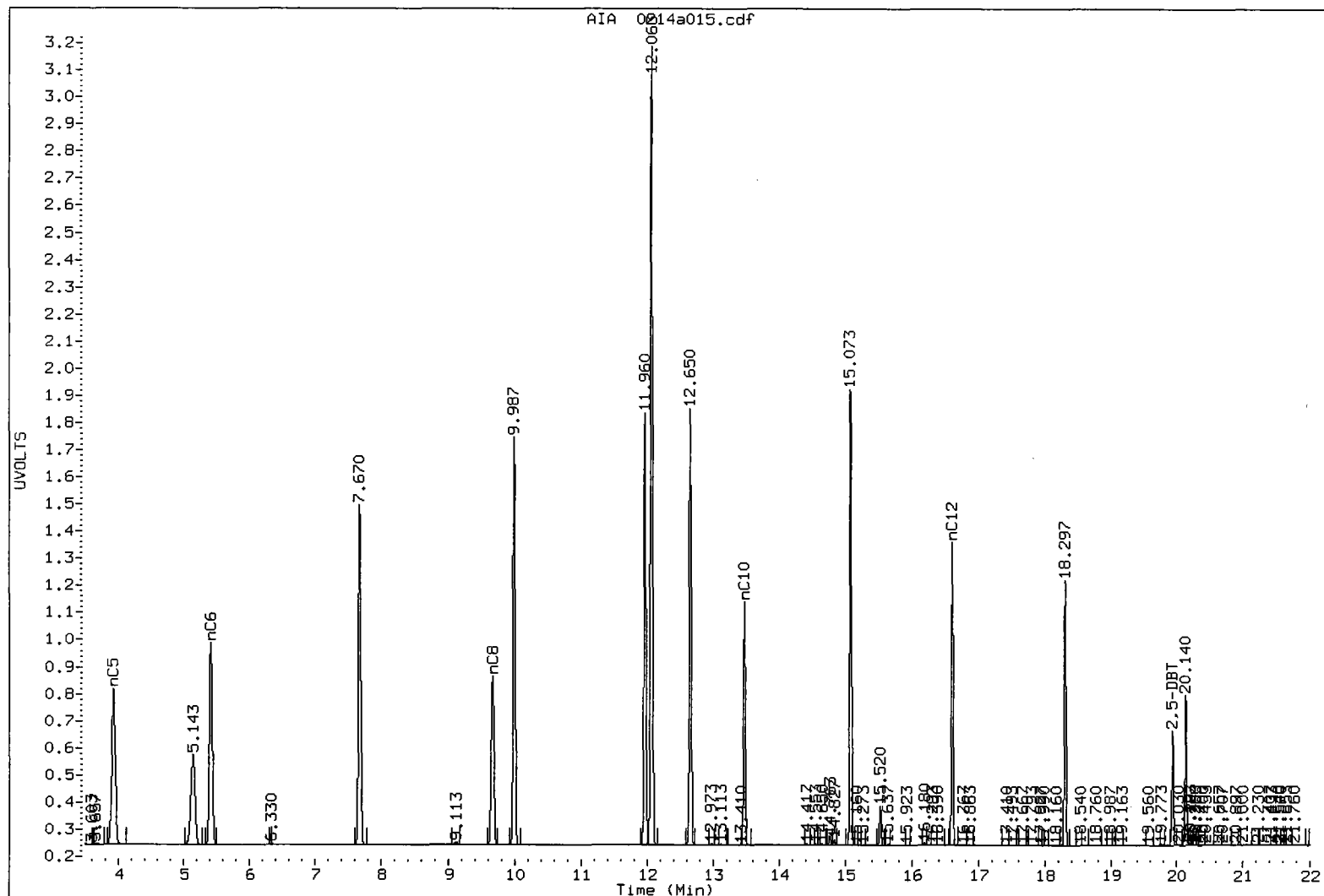
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.923	0.003	5745	21495	C5-C6 Aliph.	59668	151.1
nC6	5.417	0.003	7444	23161	C6-C8 Aliph.	50076*	140.1
nC8	9.663	0.000	6222	18262	C8-C10 Aliph.	172772	517.8
nC10	13.467	0.003	8976	16694	C10-C12 Aliph.	52811*	168.6
nC12	16.600	0.003	11174	18404			

* Indicates surrogate area subtracted

VPH ICV

ALIPHATIC (FID) SIGNAL



Data File: /chem3/pid1.i/vpcc0214-2.b/0214a019.d
Report Date: 15-Feb-2011 08:22

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Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0214-2.b/0214a019.d
Lab Smp Id: LCSD0214
Inj Date : 14-FEB-2011 15:07
Operator : MH
Smp Info : LCSD0214
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0214-2.b/VPHARO.m
Meth Date : 15-Feb-2011 08:18 monicah
Cal Date : 14-FEB-2011 12:17
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 0214a014.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds	RT	EXP RT	DLT RT	RESPONSE	CONCENTRATIONS	
					ON-COLUMN	FINAL
					(ug/ml)	(ug/L)
1 MtBE	5.140	5.140	0.000	58140	51.7020	51.7 (M)
2 BENZENE	7.667	7.667	0.000	149263	52.0011	52.0
4 TOLUENE	9.987	9.983	0.004	139355	52.2448	52.2
5 ETHYLBENZENE	11.960	11.960	0.000	115316	53.9587	54.0
6 M/P-XYLENE	12.063	12.060	0.003	294856	104.971	105
7 O-XYLENE	12.650	12.650	0.000	122890	52.3783	52.4
9 TRIMETHYLBEN	15.073	15.073	0.000	106324	54.3422	54.3
10 NAPHTHALENE	18.297	18.297	0.000	69852	53.6865	53.7
11 1-METHYLNAP	20.137	20.137	0.000	47468	61.8830	61.9
\$ 37 DIBROMOTOL	19.937	19.937	0.000	52423	49.2884	49.3

QC Flag Legend

M - Compound response manually integrated.

SH23:00121

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0214-1.b/0214a019.d
Lab Smp Id: LCSD0214
Inj Date : 14-FEB-2011 15:07
Operator : MH
Smp Info : LCSD0214
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0214-1.b/VPHALI.m
Meth Date : 15-Feb-2011 08:19 monicah
Cal Date : 14-FEB-2011 12:17
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 0214a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

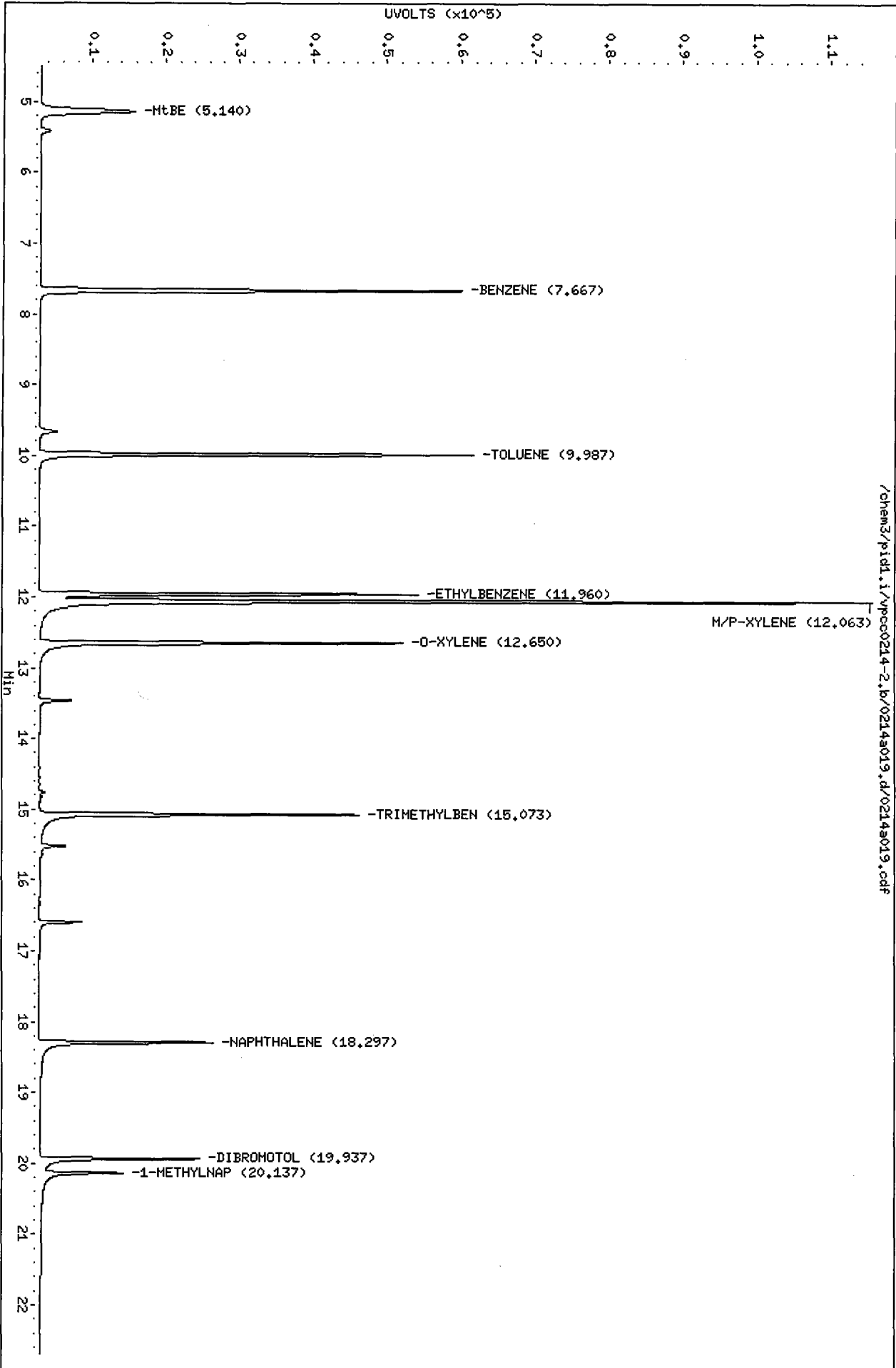
Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
1 nC5	3.923	3.920	0.003	21078	59.8592	59.8
2 nC6	5.413	5.413	0.000	22966	52.4509	52.4
4 nC8	9.660	9.663	-0.003	17492	48.9268	48.9
5 nC10	13.463	13.463	0.000	16818	50.4041	50.4
7 nC12	16.597	16.597	0.000	19462	62.1229	62.1
\$ 8 2,5-DBT	19.937	19.937	0.000	7021	47.8679	47.9

Data File: /chem3/pid1.i/vpcc0214-2.b/0214a019.d
Date: 14-FEB-2011 15:07

Client ID:
Sample Info: LCSD0214

Column phase: RTX 502-2 ARO

Instrument: pid1.i
Operator: MH
Column diameter: 0.18

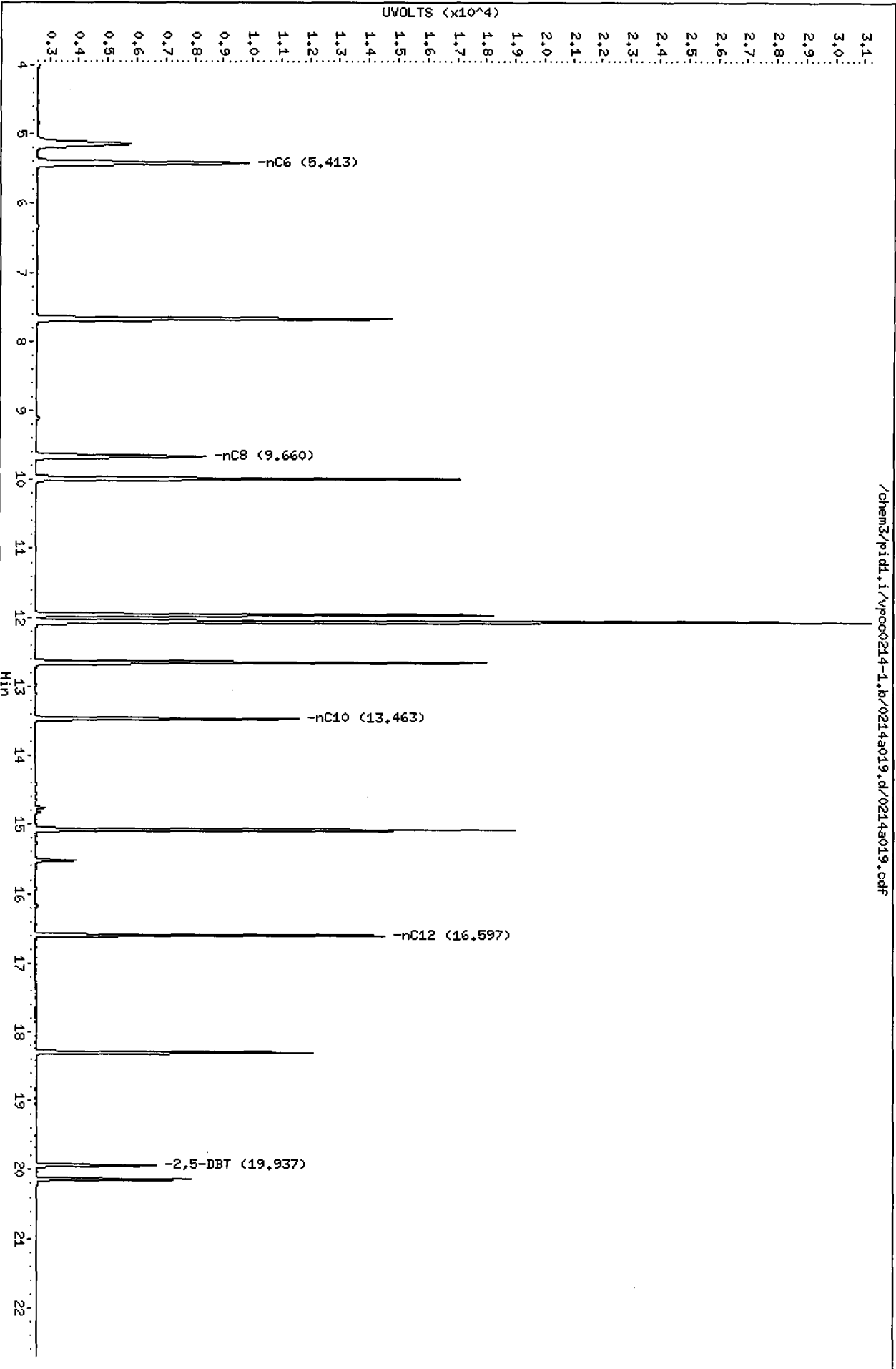


Data File: /chem3/pid1.i/vpcc0214-1.b/0214a019.d
Date : 14-FEB-2011 15:07

Client ID:
Sample Info: LCS00214

Column Phase: RTX502-2 ALI

Instrument: pid1.i
Operator: MH
Column diameter: 0.18



Analytical Resources Inc.
WAVPH Aromatics Report

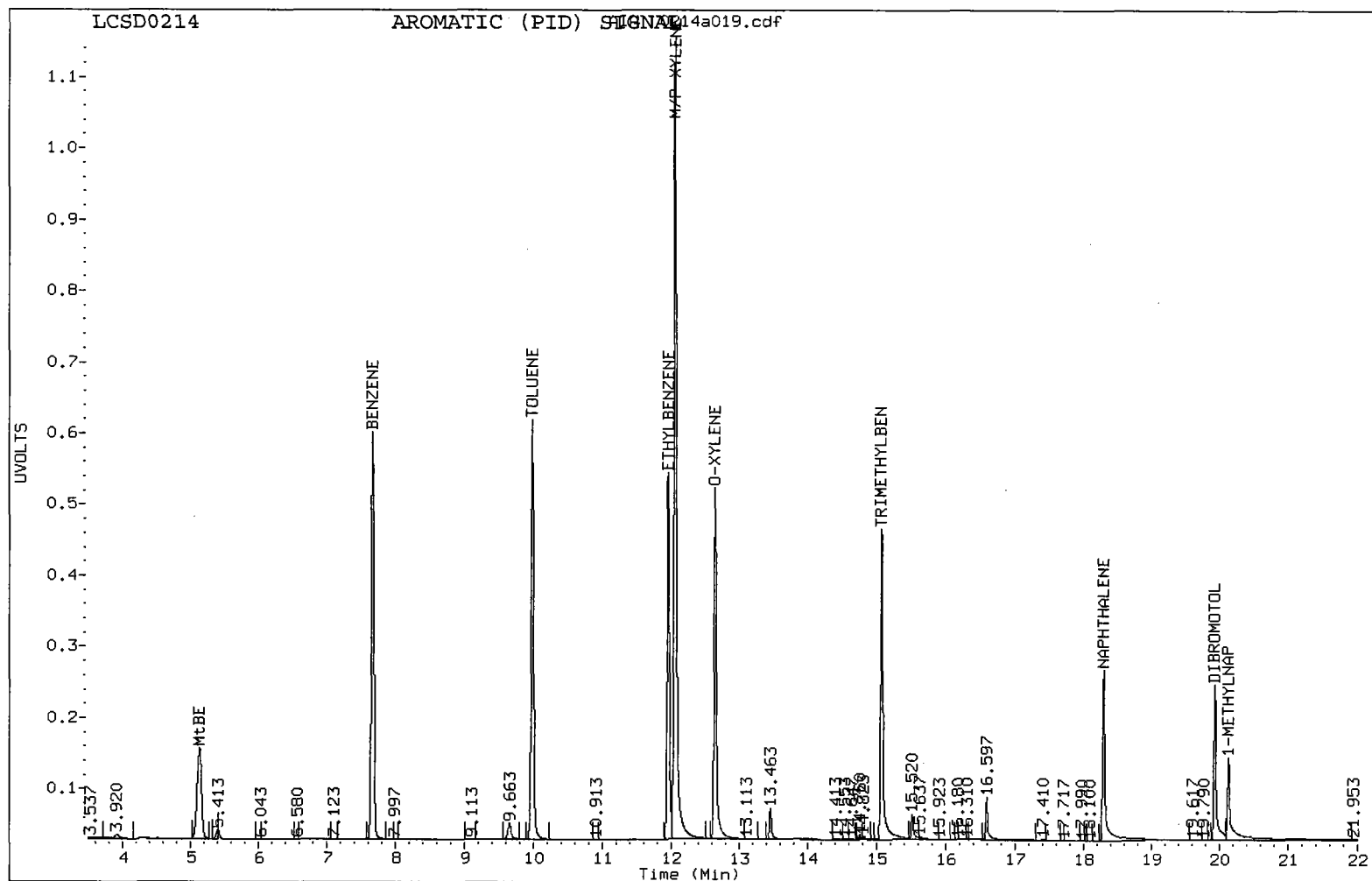
Data file: /chem3/pidl.i/vpcc0214-2.b/0214a019.d
Method: /chem3/pidl.i/vpcc0214-2.b/VPHARO.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCSD0214
Client ID:
Injection: 14-FEB-2011 15:07
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.140	0.000	12712	51.7	C8-C10 Arom.	652882*	333.7
BENZENE	7.667	0.000	57208	52.0	C10-C12 Arom.	94051	72.3
TOLUENE	9.987	0.003	58872	52.2	C12-C13 Arom.	47557	62.0
ETHYLBENZENE	11.960	0.000	51445	54.0			
M/P-XYLENE	12.063	0.003	112655	105.0			
O-XYLENE	12.650	0.000	49338	52.4			
TRIMETHYLBEN	15.073	0.000	43530	54.3			
NAPHTHALENE	18.297	0.000	23874	53.7			
1-METHYLNAP	20.137	0.000	11383	61.9			
DIBROMOTOL	19.937	0.000	21697	49.3	DBT Recovery:	98.6	

* Indicates surrogate area subtracted



SH23:00125

Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0214-1.b/0214a019.d
Method: /chem3/pid1.i/vpcc0214-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCSD0214
Client ID:
Injection: 14-FEB-2011 15:07
Matrix: WATER
Dilution Factor: 1

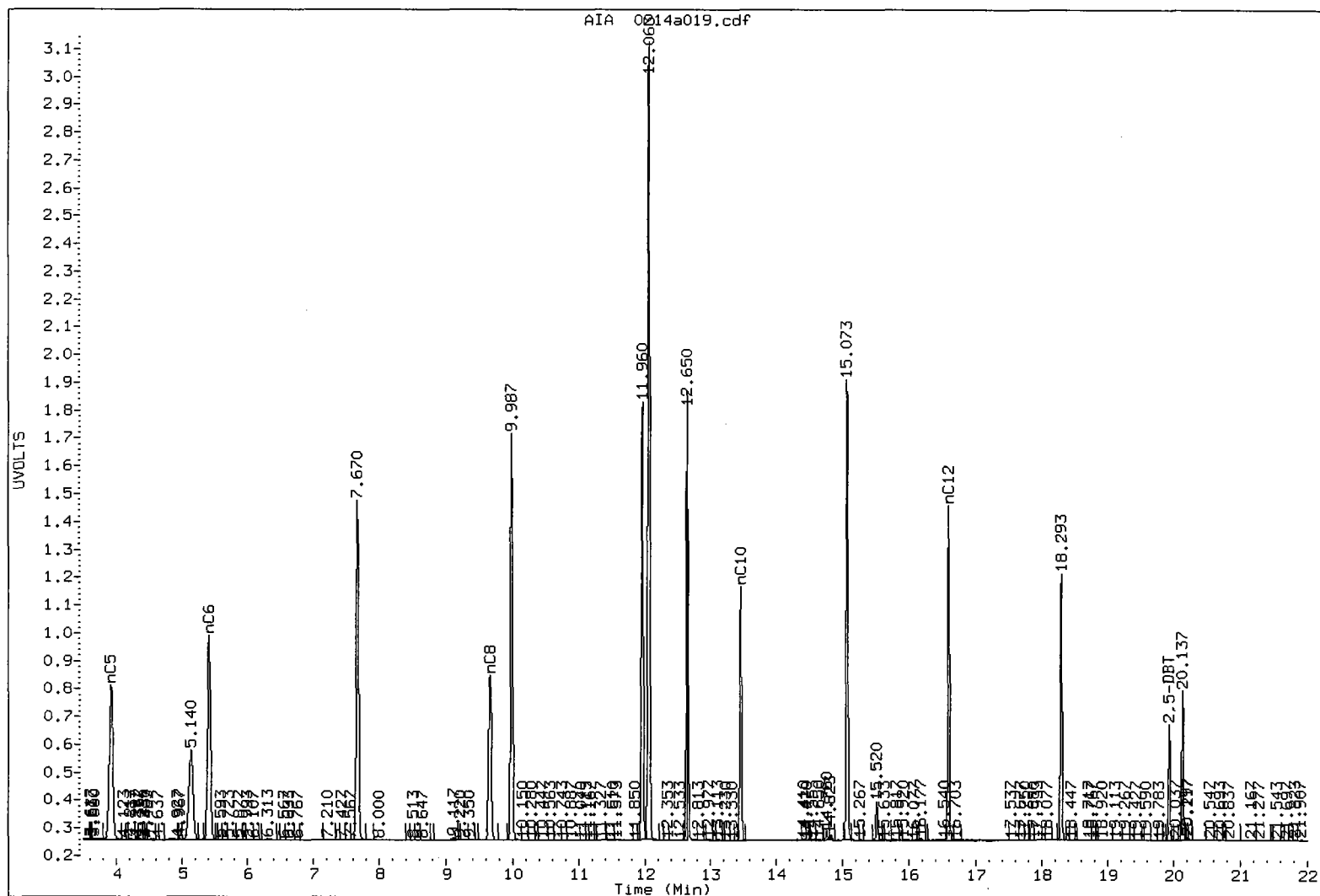
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.923	0.003	5551	21078	C5-C6 Aliph.	59049	149.5
nC6	5.413	0.000	7325	22966	C6-C8 Aliph.	49234*	137.7
nC8	9.660	-0.003	5888	17492	C8-C10 Aliph.	155204	465.2
nC10	13.463	0.000	9101	16818	C10-C12 Aliph.	52836*	168.7
nC12	16.597	0.000	12000	19462			

* Indicates surrogate area subtracted

LCSD0214

ALIPHATIC (FID) SIGNAL



5H23:00126

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1

Sample ID: MB-021411

METHOD BLANK

Lab Sample ID: MB-021411

LIMS ID: 11-3113

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed: 02/14/11 14:32

Instrument/Analyst: PID1/MH

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	96.6%
FID: 2,5-Dibromotoluene	96.0%

Data File: /chem3/pid1.i/vpcc0214-2.b/0214a018.d
Report Date: 15-Feb-2011 08:41

Page 1

7/5/11

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0214-2.b/0214a018.d
Lab Smp Id: MB0214
Inj Date : 14-FEB-2011 14:32
Operator : MH
Smp Info : MB0214
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0214-2.b/VPHARO.m
Meth Date : 15-Feb-2011 08:35 monicah
Cal Date : 14-FEB-2011 12:17
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 0214a014.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable

Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
-----	==	=====	=====	=====	=====	=====
1 MtBE	Compound Not Detected.					
2 BENZENE	7.667	7.667	0.000	32	0.01125	0.0112
4 TOLUENE	9.987	9.983	0.004	45	0.01695	0.0169
5 ETHYLBENZENE	11.960	11.960	0.000	21	0.00992	0.00992
6 M/P-XYLENE	12.057	12.060	-0.003	25	0.00901	0.00901
7 O-XYLENE	12.640	12.650	-0.010	191	0.08175	0.0817
9 TRIMETHYLBEN	15.070	15.073	-0.003	19	0.01022	0.0102
10 NAPHTHALENE	18.293	18.297	-0.004	94	0.07240	0.0724
11 1-METHYLNAP	20.130	20.137	-0.007	101	0.13219	0.132 (M)
\$ 37 DIBROMOTOL	19.937	19.937	0.000	58961	55.4362	55.4 (M)

QC Flag Legend

M - Compound response manually integrated.

5123:00128

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0214-1.b/0214a018.d
Lab Smp Id: MB0214
Inj Date : 14-FEB-2011 14:32
Operator : MH
Smp Info : MB0214
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0214-1.b/VPHALI.m
Meth Date : 15-Feb-2011 08:19 monicah
Cal Date : 14-FEB-2011 12:17
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 0214a014.d
Compound Sublist: waaliph.sub

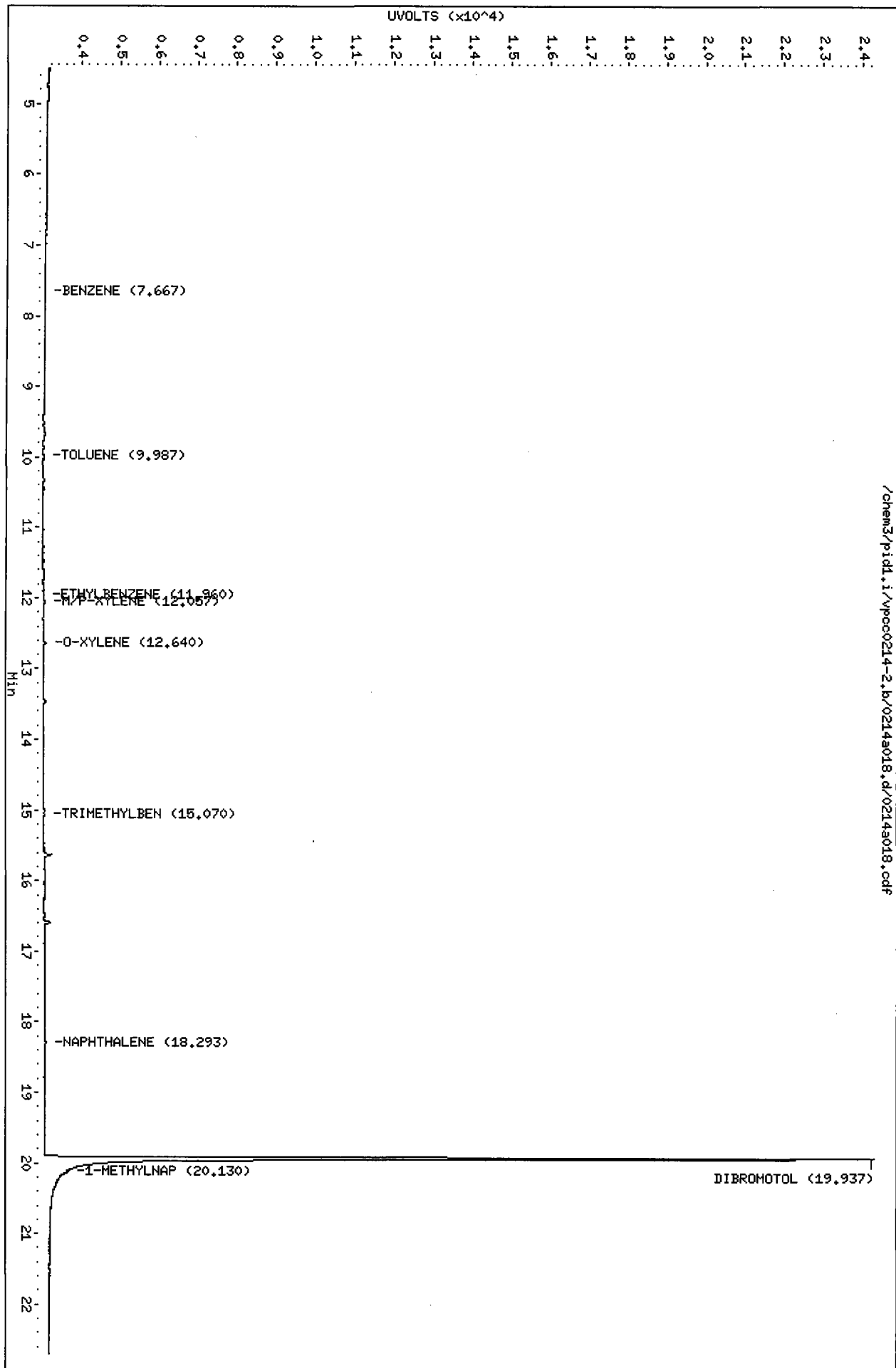
Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds	RT	EXP RT	DLT RT	RESPONSE	CONCENTRATIONS	
					ON-COLUMN	FINAL
					(ng/mL)	(ug/L)
1 nC5	3.880	3.920	-0.040	20	0.05680	0.0568
2 nC6	Compound Not Detected.					
4 nC8	9.657	9.663	-0.006	123	0.34404	0.344
5 nC10	13.460	13.463	-0.003	429	1.28573	1.28
7 nC12	16.593	16.597	-0.004	608	1.94074	1.94
\$ 8 2,5-DBT	19.937	19.937	0.000	7034	47.9565	48.0

Data File: /chem3/pid1.i/vpcc0214-2.b/0214s018.d
Date : 14-FEB-2011 14:32
Client ID:
Sample Info: MB0214
Column Phase: RTX 502-2 AR0

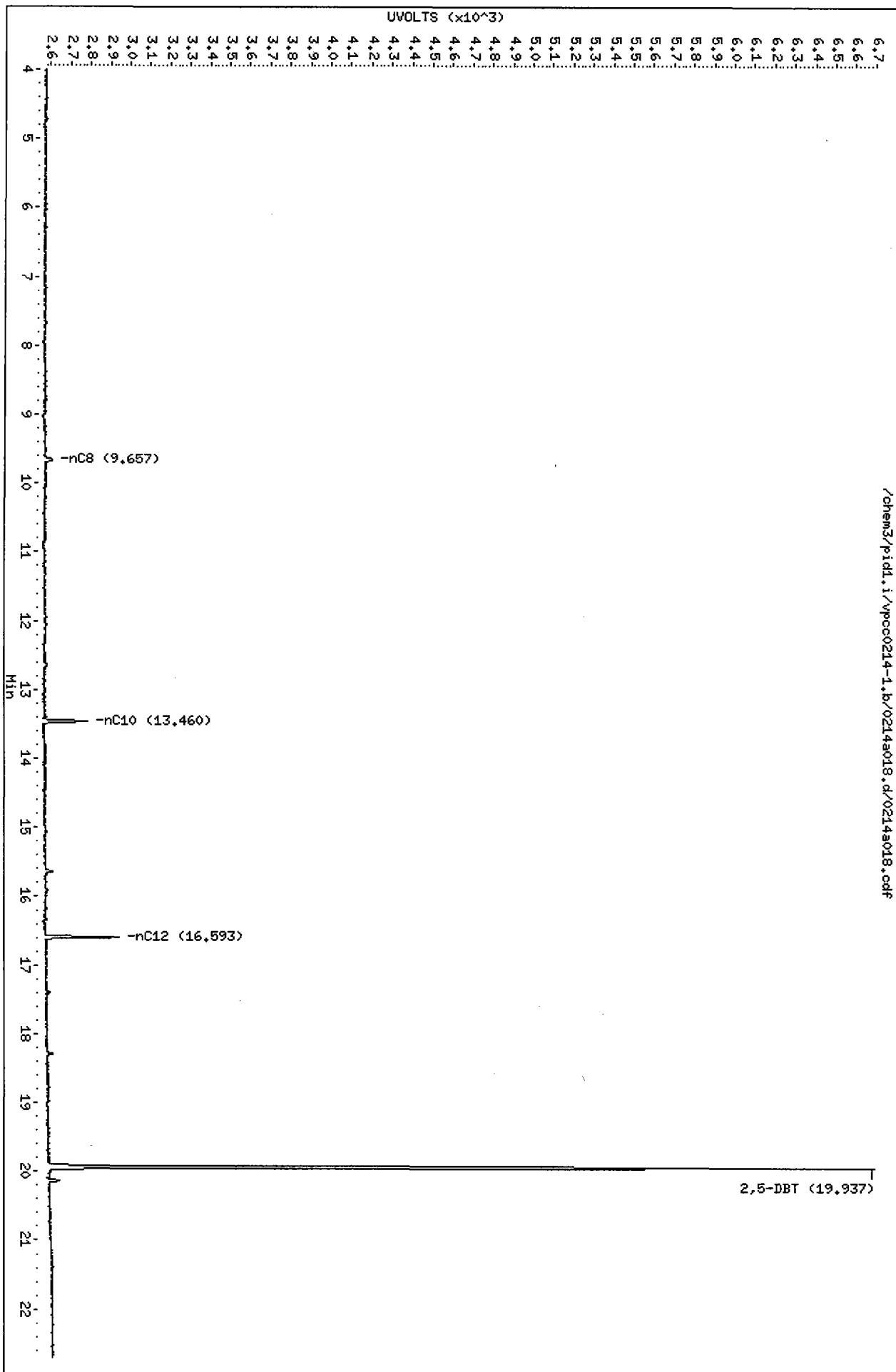
Instrument: pid1.i
Operator: MH
Column diameter: 0.18



0214 : 0214

Data File: /chem3/pid1.i/vpcc0214-1.b/0214a018.d
Date : 14-FEB-2011 14:32
Client ID:
Sample Info: MB0214
Column Phase: RTX502-2 ALI

Instrument: pid1.i
Operator: MH
Column diameter: 0.18



05:23:0010

Analytical Resources Inc.
WAVPH Aromatics Report

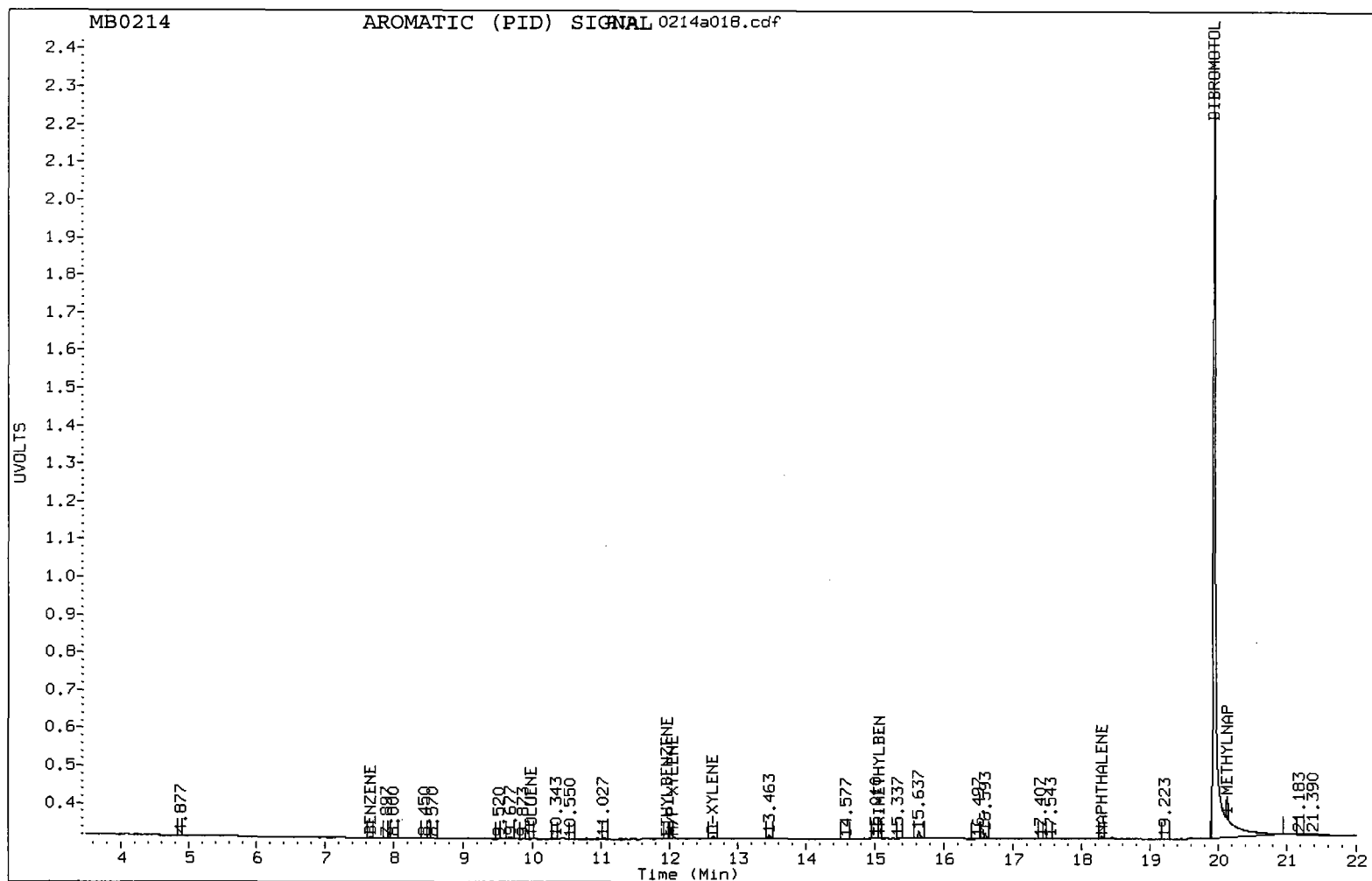
Data file: /chem3/pid1.i/vpcc0214-2.b/0214a018.d
Method: /chem3/pid1.i/vpcc0214-2.b/VPHARO.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: MB0214
Client ID:
Injection: 14-FEB-2011 14:32
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	----				C8-C10 Arom.	580*	0.3
BENZENE	7.667	0.000	16	0.0	C10-C12 Arom.	852	0.7
TOLUENE	9.987	0.003	20	0.0	C12-C13 Arom.	137	0.2
ETHYLBENZENE	11.960	0.000	12	0.0			
M/P-XYLENE	12.057	-0.003	39	0.0			
O-XYLENE	12.640	-0.010	65	0.1			
TRIMETHYLBEN	15.070	-0.003	13	0.0			
NAPHTHALENE	18.293	-0.003	49	0.1			
1-METHYLNAP	20.130	-0.007	60	0.1			
DIBROMOTOL	19.937	0.000	21215	55.4	DBT Recovery: 110.9		

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0214-1.b/0214a018.d
Method: /chem3/pid1.i/vpcc0214-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: MB0214
Client ID:
Injection: 14-FEB-2011 14:32
Matrix: WATER
Dilution Factor: 1

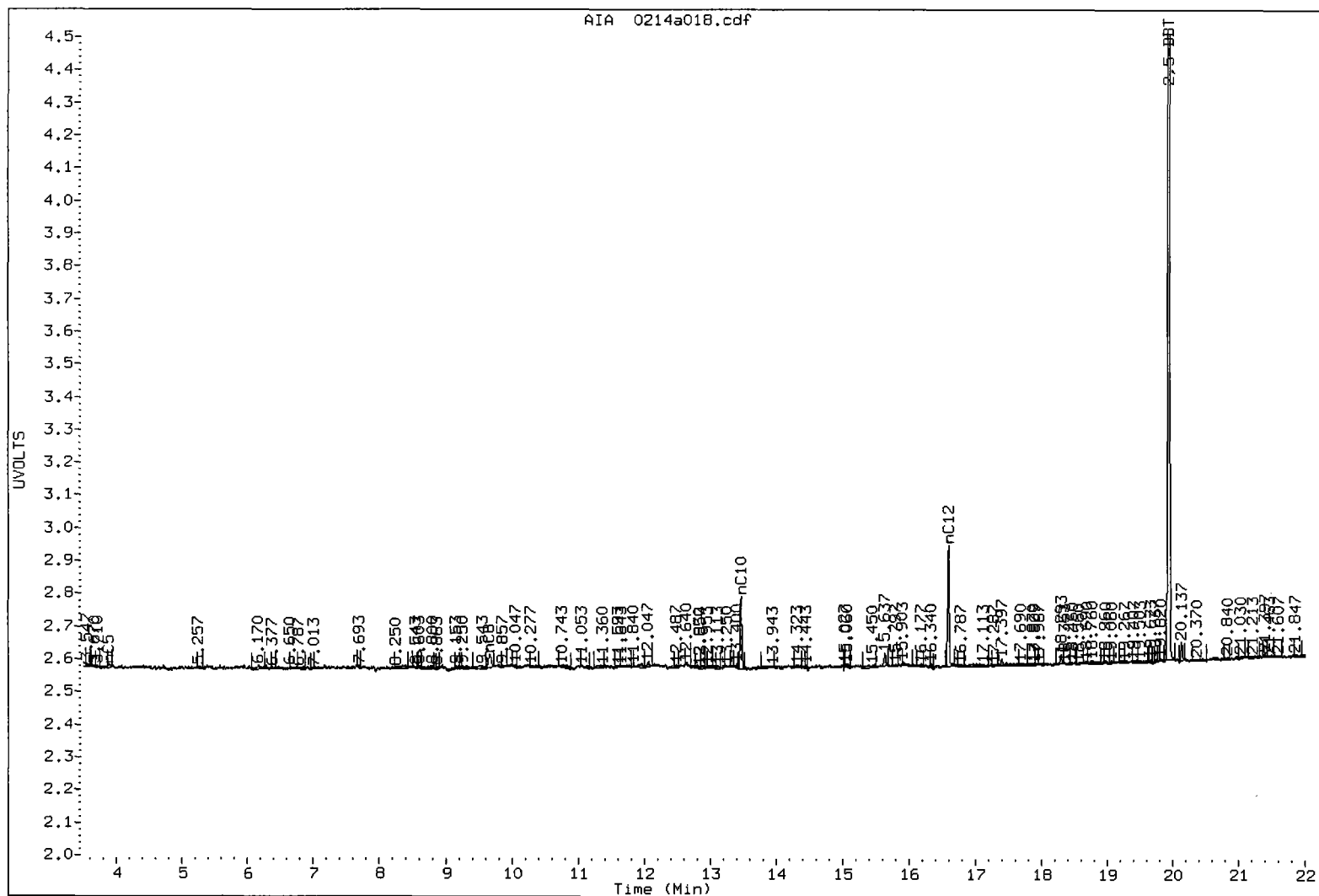
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.880	-0.040	7	20	C5-C6 Aliph.	32	0.1
nC6	-----				C6-C8 Aliph.	573	1.6
nC8	9.657	-0.007	38	123	C8-C10 Aliph.	910	2.7
nC10	13.460	-0.003	220	429	C10-C12 Aliph.	945*	3.0
nC12	16.593	-0.003	367	608			

* Indicates surrogate area subtracted

MB0214

ALIPHATIC (FID) SIGNAL



0214a018

ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1

Sample ID: B11-06-25

SAMPLE

Lab Sample ID: SH23B

LIMS ID: 11-2185

Matrix: Soil

Data Release Authorized:

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Percent Moisture: 13.5%

Sample Amount: 8.88 g-dry-wt

Final Extract Volume: 1.0 mL

Aliphatic

Date Analyzed: 02/10/11 17:29

Instrument/Analyst: FID8/MS

Dilution Factor: 5.00

Aromatic

Date Analyzed: 02/10/11 22:03

Instrument/Analyst: FID8/MS

Dilution Factor: 25.0

Range	RL	Result
C8-C10 Aliphatics	11,000	33,000
C10-C12 Aliphatics	11,000	190,000
C12-C16 Aliphatics	11,000	1,100,000
C16-C21 Aliphatics	11,000	1,700,000
C21-C34 Aliphatics	11,000	1,400,000
C8-C10 Aromatics	56,000	< 56,000 U
C10-C12 Aromatics	56,000	< 56,000 U
C12-C16 Aromatics	56,000	580,000
C16-C21 Aromatics	56,000	2,200,000
C21-C34 Aromatics	56,000	3,300,000

Reported in µg/kg (ppb)

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	84.5%
Aromatic	o-Terphenyl	80.0%

Analytical Resources Inc.
WA. EPH Aliphatics Report

Data file: /chem2/fid8.i/20110210ALIPH.b/0210A006.D
Method: /chem2/fid8.i/20110210ALIPH.b/EPHAliph.m
Instrument: fid8.i
Operator: MS
Macro: ALIPH090410FID8

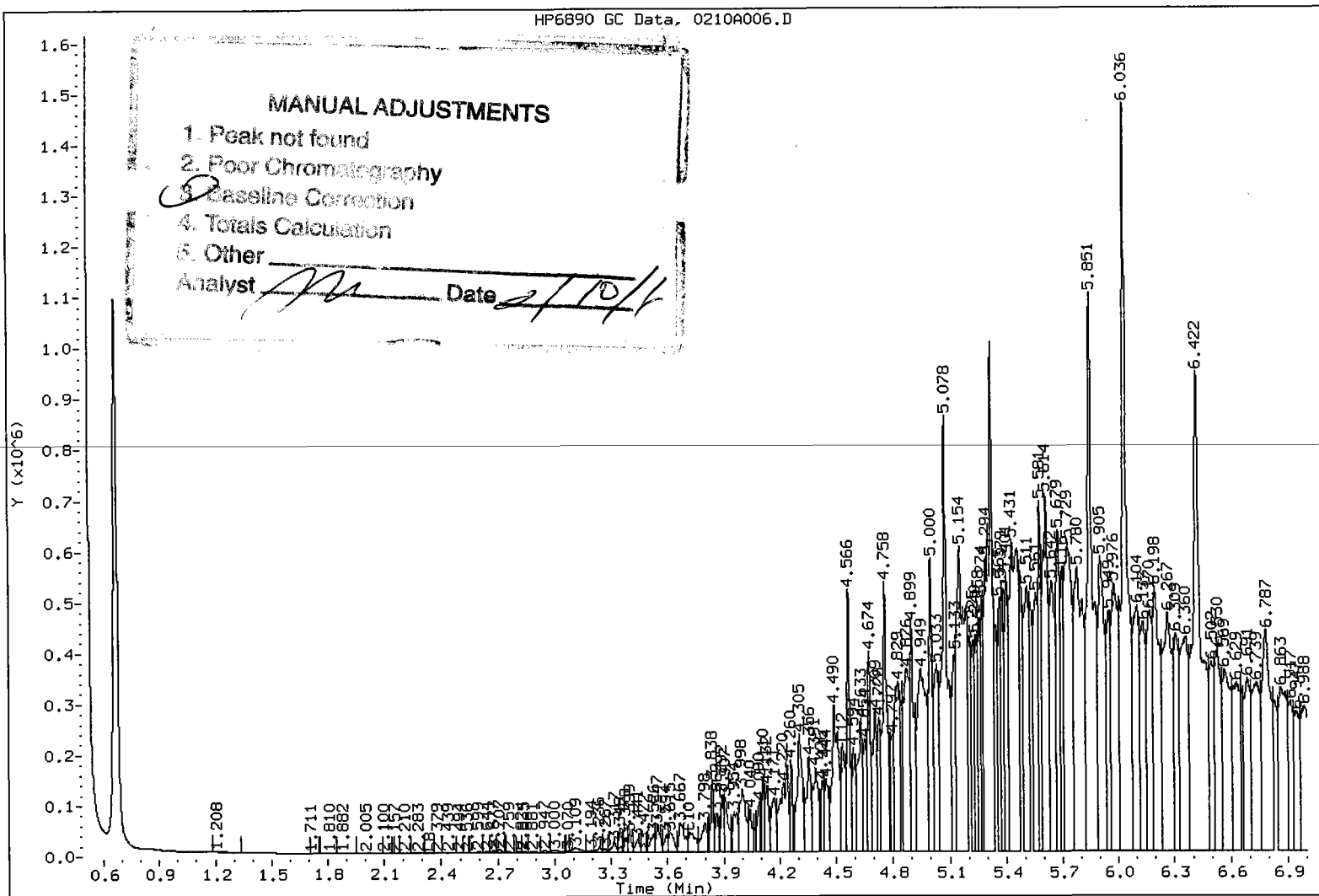
ARI ID: SH23B
Client ID: B11-06-25
Injection: 10-FEB-2011 17:29
Matrix: SOIL
Dilution Factor: 5

EPH-ALIPHATIC RESULTS

Quant	Range	Area	Conc	Time Range
C8-C10	Aliph.	1027565	59	(2.254 - 3.842)
C10-C12	Aliph.	5335118	335	(3.842 - 4.624)
C12-C16	Aliph.	29361477	1984	(4.624 - 5.801)
C16-C21	Aliph.	40732151	2940	(5.801 - 8.031)
C21-C34	Aliph.	27007632	2442	(8.031 - 12.757)

Surrogate Rec: 84.5%

FID-8A/ZB-5 SH23B



SECRET

Data File: /chem2/fid8.1/20110210ALIPH.b/02100006.D

Date : 10-FEB-2011 17:29

Client ID: B41-06-25

Sample Info: SH23B.5

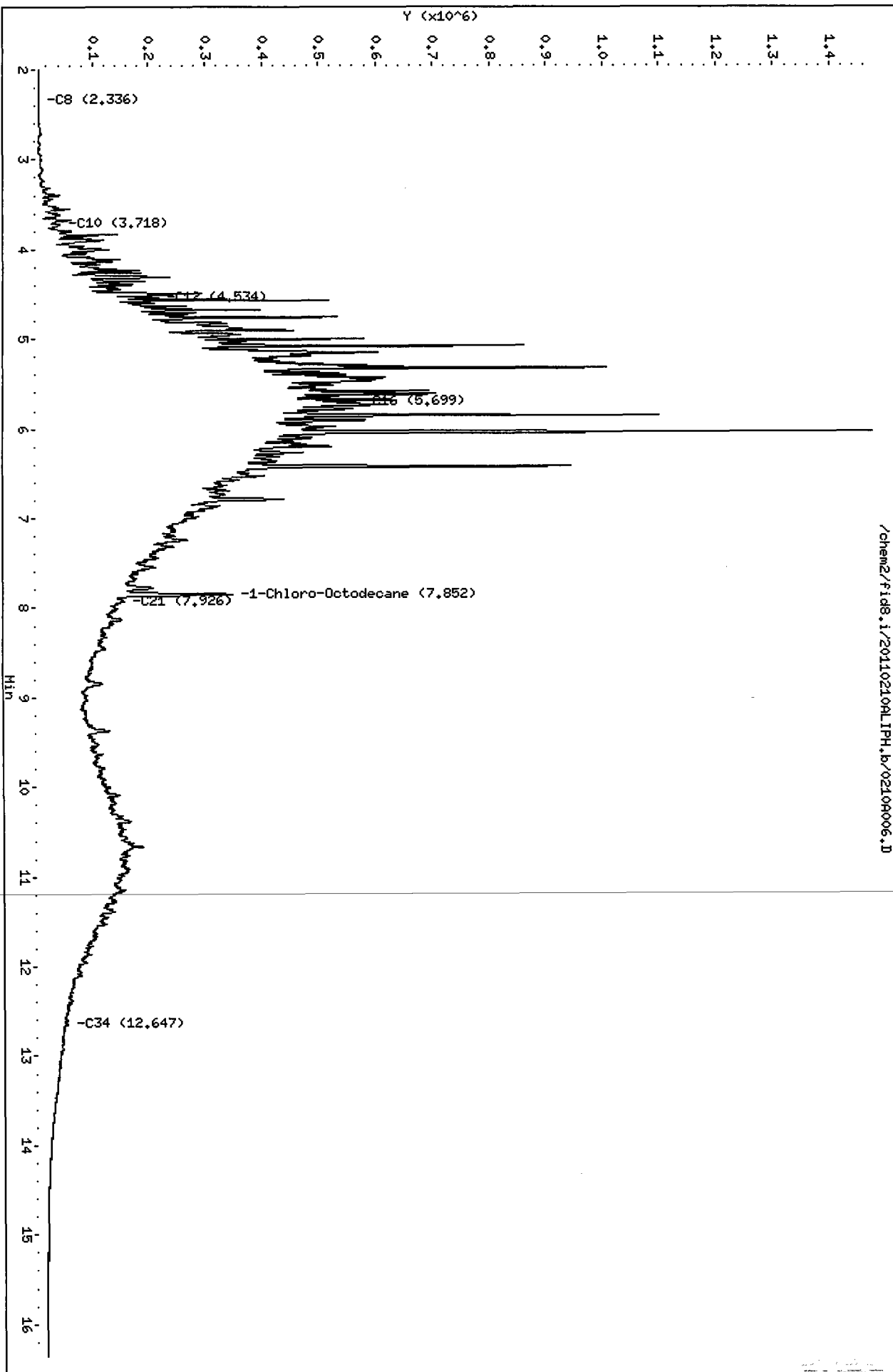
Column phase: ZB-5

Instrument: fid8.1

Operator: MS

Column diameter: 0.32

Page 1



SH23 . 00100

Analytical Resources Inc.
EPH Aromatics Report

Data file: /chem2/fid8.i/20110210AROM.b/0210A017.D
Method: /chem2/fid8.i/20110210AROM.b/EPHArOm.m
Instrument: fid8.i
Operator: MS
Report Date: 02/11/2011
Macro: AROM072710FID8

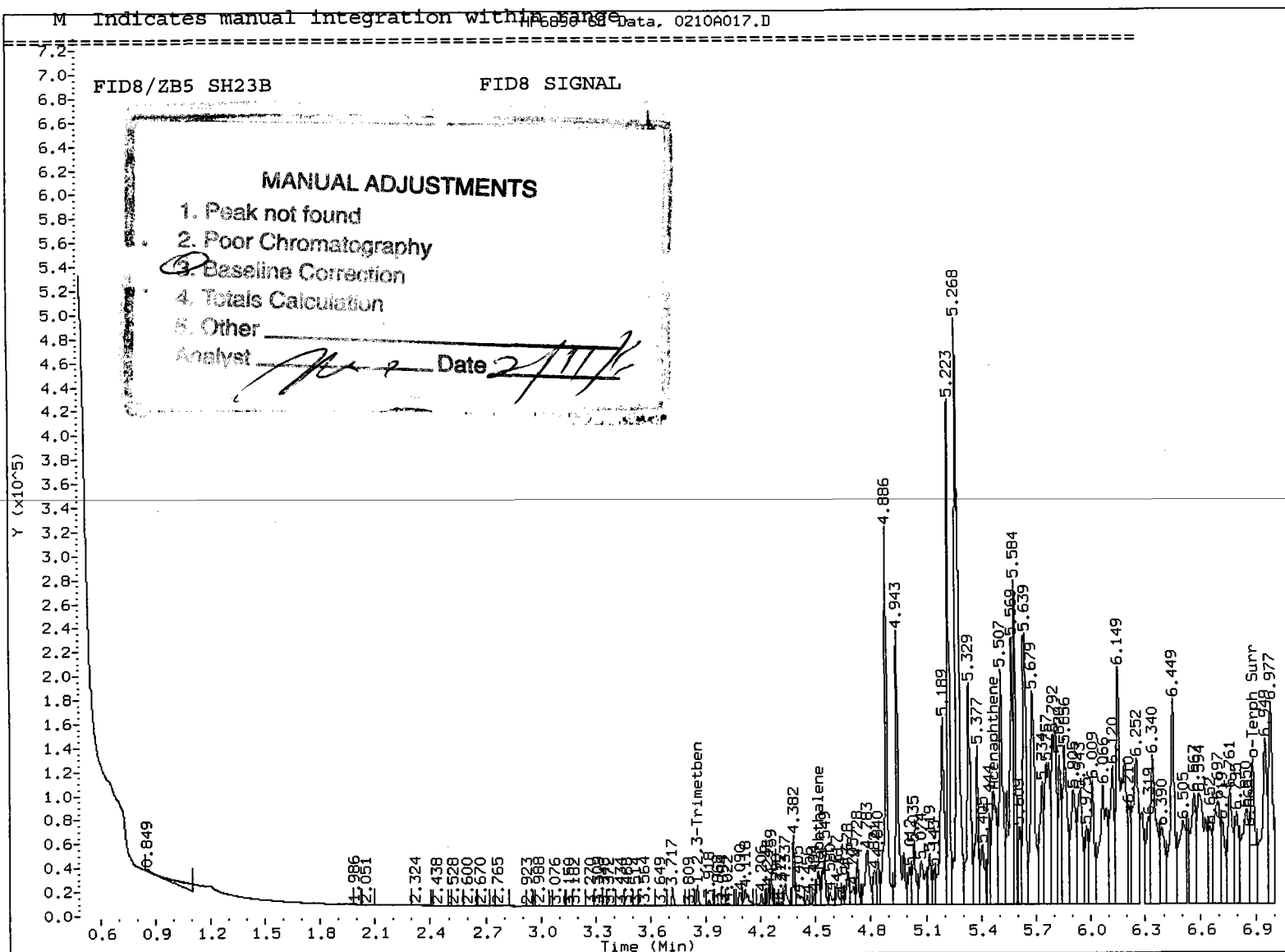
ARI ID: SH23B
Client ID: B11-06-25
Injection: 10-FEB-2011 22:03
Matrix: SOIL
Dilution Factor: 5

EPH-AROMATIC RESULTS

Quant Range	RF	Area	Conc	Time Range
C8-C10 Arom.	17167	30937	2	(1.730 - 3.956)
C10-C12 Arom.	16689	253664	15	(3.956 - 4.616)
C12-C16 Arom.	15441	3201109	207	(4.616 - 5.567)
C16-C21 Arom.	14112	10942204	775	(5.567 - 8.293) M
C21-C34 Arom.	12993	15208850	1171	(8.293 - 12.503)

Surrogate Rec: 16.0% $\times 5 = 80\%$

M Indicates manual integration within a range. Data, 0210A017.D



Data File: /chem2/fid8.i/20110210AR0H.b/0210A017.D

Date : 10-FEB-2011 22:03

Client ID: R11-06-25

Sample Info: SH23B.5

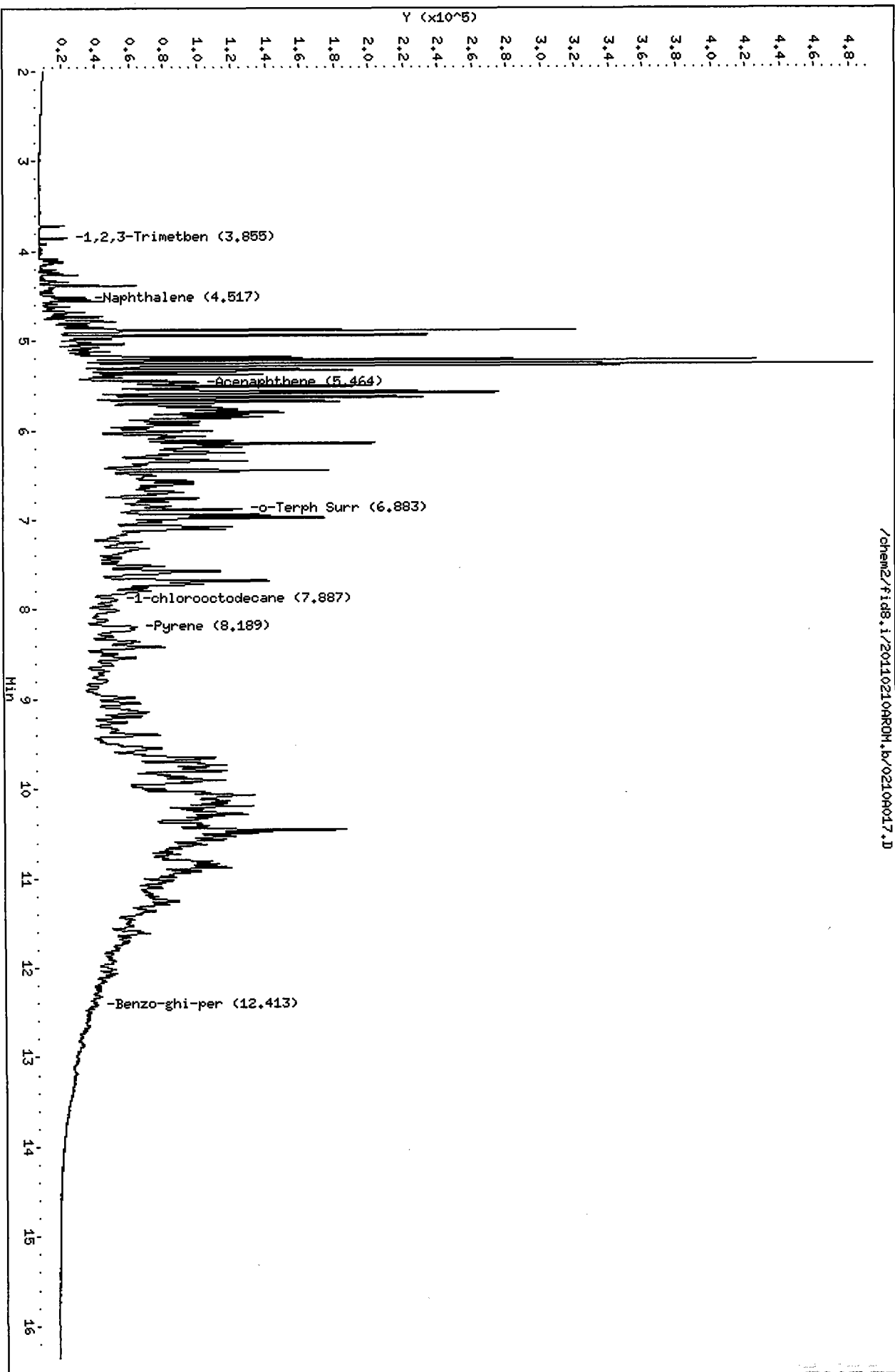
Column phase: ZB-5

Instrument: fid8.i

Operator: MS

Column diameter: 0.32

/chem2/fid8.i/20110210AR0H.b/0210A017.D



ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1

Sample ID: B11-08-20

SAMPLE

Lab Sample ID: SH23H

LIMS ID: 11-2191

Matrix: Soil

Data Release Authorized: *BB*

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Percent Moisture: 4.8%

Sample Amount: 9.72 g-dry-wt

Final Extract Volume: 1.0 mL

Aliphatic

Date Analyzed: 02/10/11 18:44

Instrument/Analyst: FID8/MS

Dilution Factor: 20.0

Aromatic

Date Analyzed: 02/10/11 23:18

Instrument/Analyst: FID8/MS

Dilution Factor: 100

Range	RL	Result
C8-C10 Aliphatics	41,000	< 41,000 U
C10-C12 Aliphatics	41,000	150,000
C12-C16 Aliphatics	41,000	1,100,000
C16-C21 Aliphatics	41,000	1,800,000
C21-C34 Aliphatics	41,000	5,700,000
C8-C10 Aromatics	210,000	< 210,000 U
C10-C12 Aromatics	210,000	< 210,000 U
C12-C16 Aromatics	210,000	380,000
C16-C21 Aromatics	210,000	1,400,000
C21-C34 Aromatics	210,000	3,500,000

Reported in µg/kg (ppb)

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	78.3%
Aromatic	o-Terphenyl	90.5%

Analytical Resources Inc.
WA. EPH Aliphatics Report

Data file: /chem2/fid8.i/20110210ALIPH.b/0210A009.D
Method: /chem2/fid8.i/20110210ALIPH.b/EPHALiph.m
Instrument: fid8.i
Operator: MS
Macro: ALIPH090410FID8

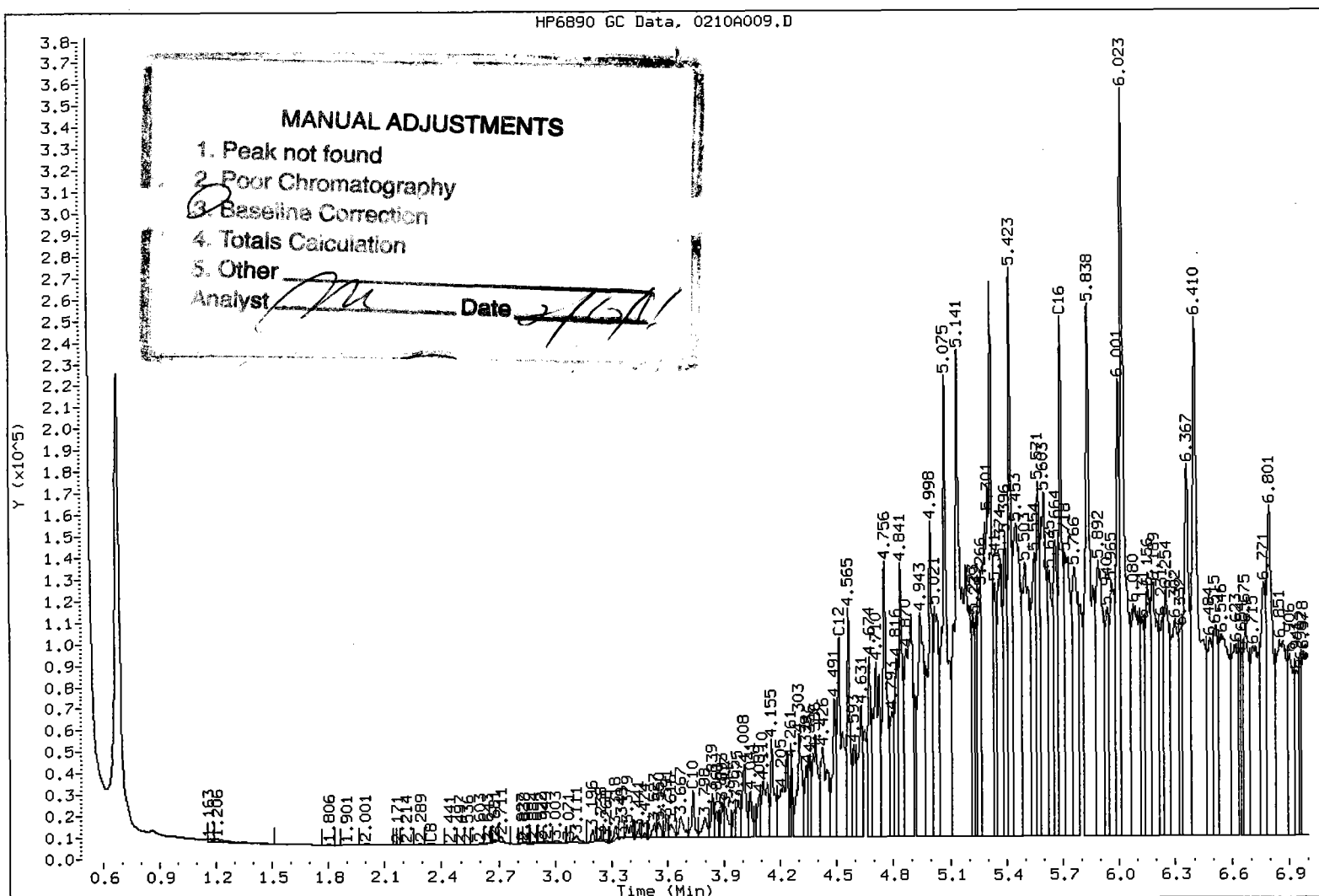
ARI ID: SH23H
Client ID: B11-08-20
Injection: 10-FEB-2011 18:44
Matrix: SOIL
Dilution Factor: 20

EPH-ALIPHATIC RESULTS

Quant Range	Area	Conc	Time Range
C8-C10 Aliph.	157384	9	(2.254 - 3.842)
C10-C12 Aliph.	1172036	74	(3.842 - 4.624)
C12-C16 Aliph.	7625591	515	(4.624 - 5.801)
C16-C21 Aliph.	12296525	888	(5.801 - 8.031)
C21-C34 Aliph.	30760572	2781	(8.031 - 12.757)

Surrogate Rec: 78.3%

FID-8A/ZB-5 SH23H



SH23: 00140

Data File: /chem2/fid8.i/20110210ALIPH.b/0210A009.D

Date : 10-FEB-2011 18:44

Client ID: B11-08-20

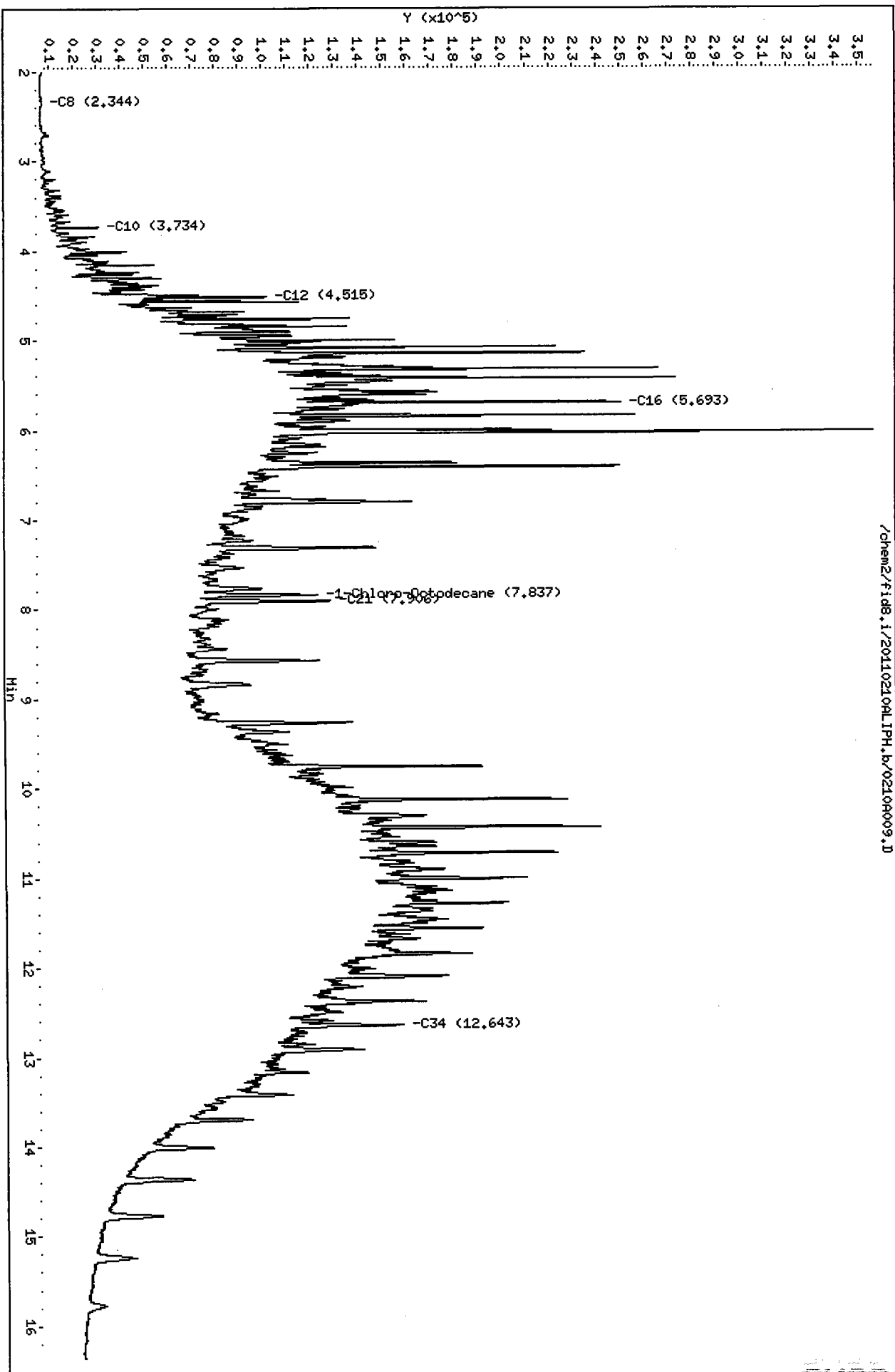
Sample Info: SH23H,20

Column phase: ZB-5

Instrument: fid8.i

Operator: MS

Column diameter: 0.32



Analytical Resources Inc.
EPH Aromatics Report

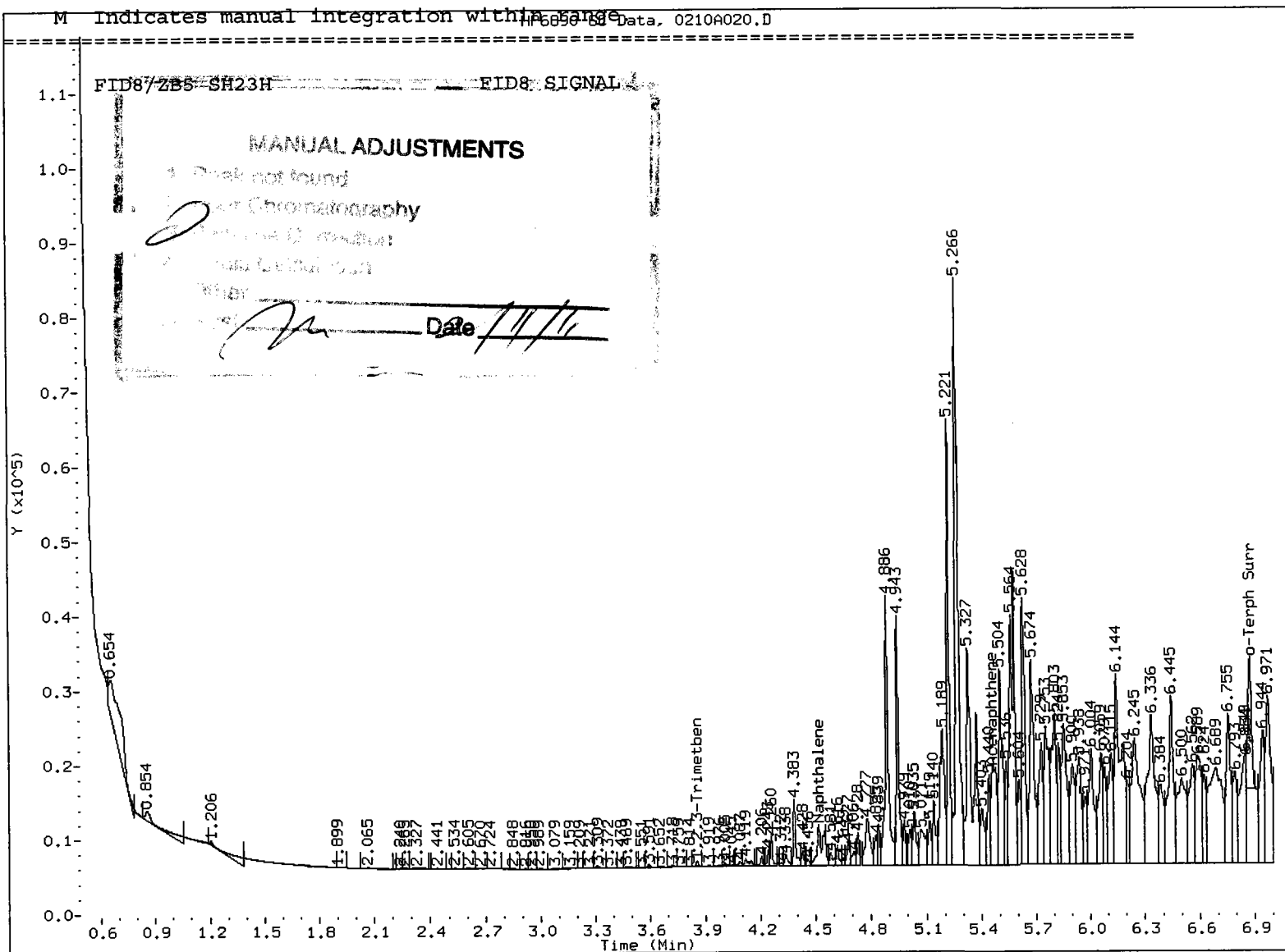
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Method: /chem2/fid8.i/20110210AROM.b/EPHArOm.m
Instrument: fid8.i
Operator: MS
Report Date: 02/11/2011
Macro: AROM072710FID8

ARI ID: SH23H
Client ID: B11-08-20
Injection: 10-FEB-2011 23:18
Matrix: SOIL
Dilution Factor: 20

EPH-AROMATIC RESULTS

Quant Range		RF	Area	Conc	Time Range
C8-C10	Arom.	17167	4718	0	(1.730 - 3.956)
C10-C12	Arom.	16689	38389	2	(3.956 - 4.616)
C12-C16	Arom.	15441	570253	37	(4.616 - 5.567)
C16-C21	Arom.	14112	1991729	141	(5.567 - 8.293) M
C21-C34	Arom.	12993	4396951	338	(8.293 - 12.503)

Surrogate Rec: $18.1\% \times 5 \text{ mL FEV} = 90.5\%$



Data File: /chem2/fid8.i/20110210AR04.b/0210A020.D

Date : 10-FEB-2011 23:18

Client ID: B11-08-20

Sample Info: SH23H.20

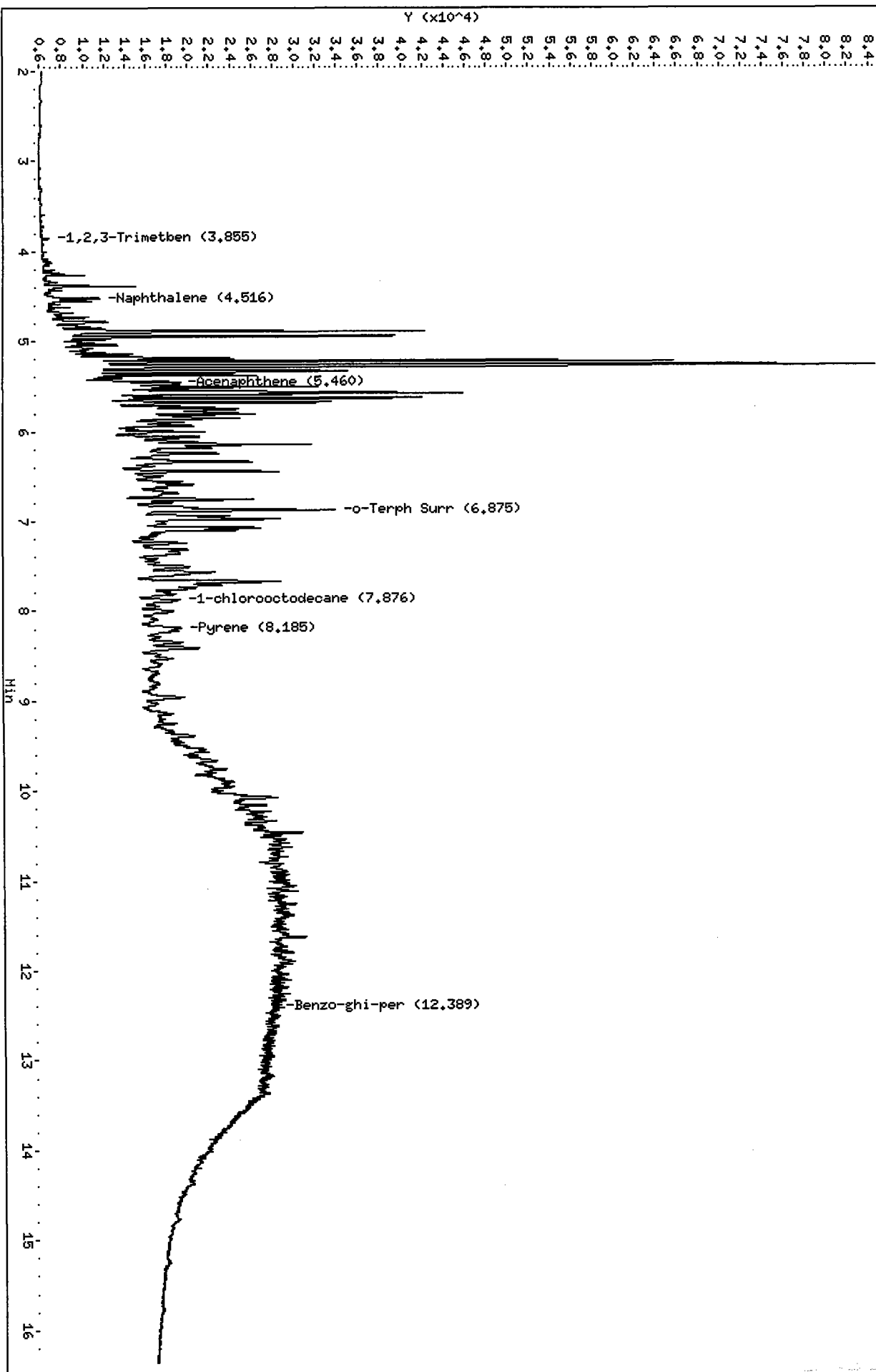
Column phase: ZB-5

Instrument: fid8.i

Operator: MS

Column diameter: 0.32

/chem2/fid8.i/20110210AR04.b/0210A020.D



ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1

Sample ID: B11-09-23.5

SAMPLE

Lab Sample ID: SH23M

LIMS ID: 11-2196

Matrix: Soil

Data Release Authorized: *MB*

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Percent Moisture: 13.8%

Sample Amount: 8.88 g-dry-wt

Final Extract Volume: 1.0 mL

Aliphatic

Date Analyzed: 02/10/11 19:09

Instrument/Analyst: FID8/MS

Dilution Factor: 10.0

Aromatic

Date Analyzed: 02/10/11 23:43

Instrument/Analyst: FID8/MS

Dilution Factor: 50.0

Range	RL	Result
C8-C10 Aliphatics	23,000	26,000
C10-C12 Aliphatics	23,000	150,000
C12-C16 Aliphatics	23,000	900,000
C16-C21 Aliphatics	23,000	1,300,000
C21-C34 Aliphatics	23,000	3,400,000
C8-C10 Aromatics	110,000	< 110,000 U
C10-C12 Aromatics	110,000	< 110,000 U
C12-C16 Aromatics	110,000	220,000
C16-C21 Aromatics	110,000	1,100,000
C21-C34 Aromatics	110,000	2,100,000

Reported in µg/kg (ppb)

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	67.4%
Aromatic	o-Terphenyl	64.0%

Analytical Resources Inc.
WA. EPH Aliphatics Report

Data file: /chem2/fid8.i/20110210ALIPH.b/0210A010.D
Method: /chem2/fid8.i/20110210ALIPH.b/EPHALiph.m
Instrument: fid8.i
Operator: MS
Macro: ALIPH090410FID8

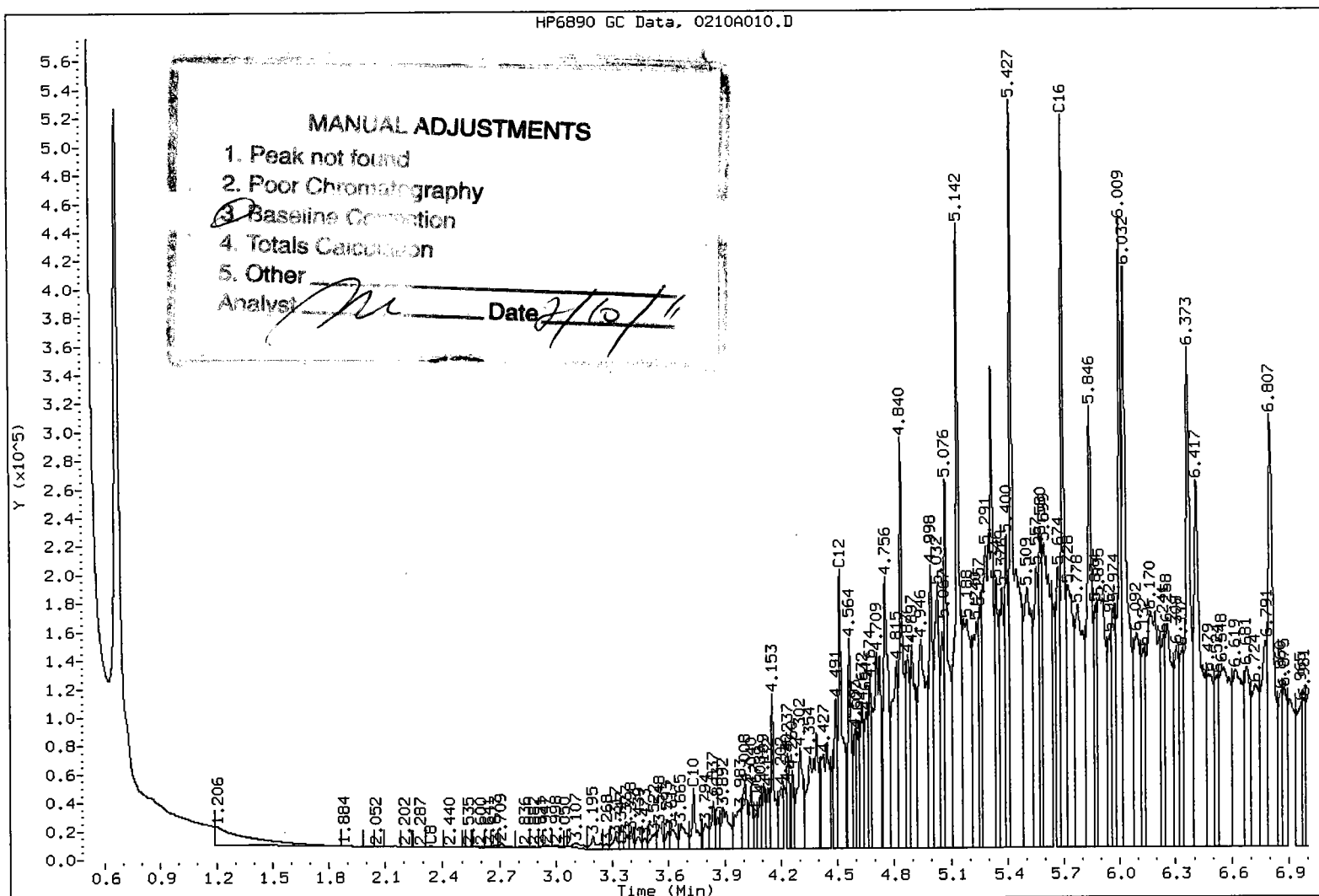
ARI ID: SH23M
Client ID: B11-09-23.5
Injection: 10-FEB-2011 19:09
Matrix: SOIL
Dilution Factor: 10

EPH-ALIPHATIC RESULTS

Quant Range	Area	Conc	Time Range
C8-C10 Aliph.	399658	23	(2.254 - 3.842)
C10-C12 Aliph.	2173054	136	(3.842 - 4.624)
C12-C16 Aliph.	11829355	799	(4.624 - 5.801)
C16-C21 Aliph.	16011339	1156	(5.801 - 8.031)
C21-C34 Aliph.	33557610	3034	(8.031 - 12.757)

Surrogate Rec: 67.4%

FID-8A/ZB-5 SH23M



Data File: /chem2/fid8.i/20110210ALIPH.b/02100010.D

Date : 10-FEB-2011 19:09

Client ID: B41-09-23.5

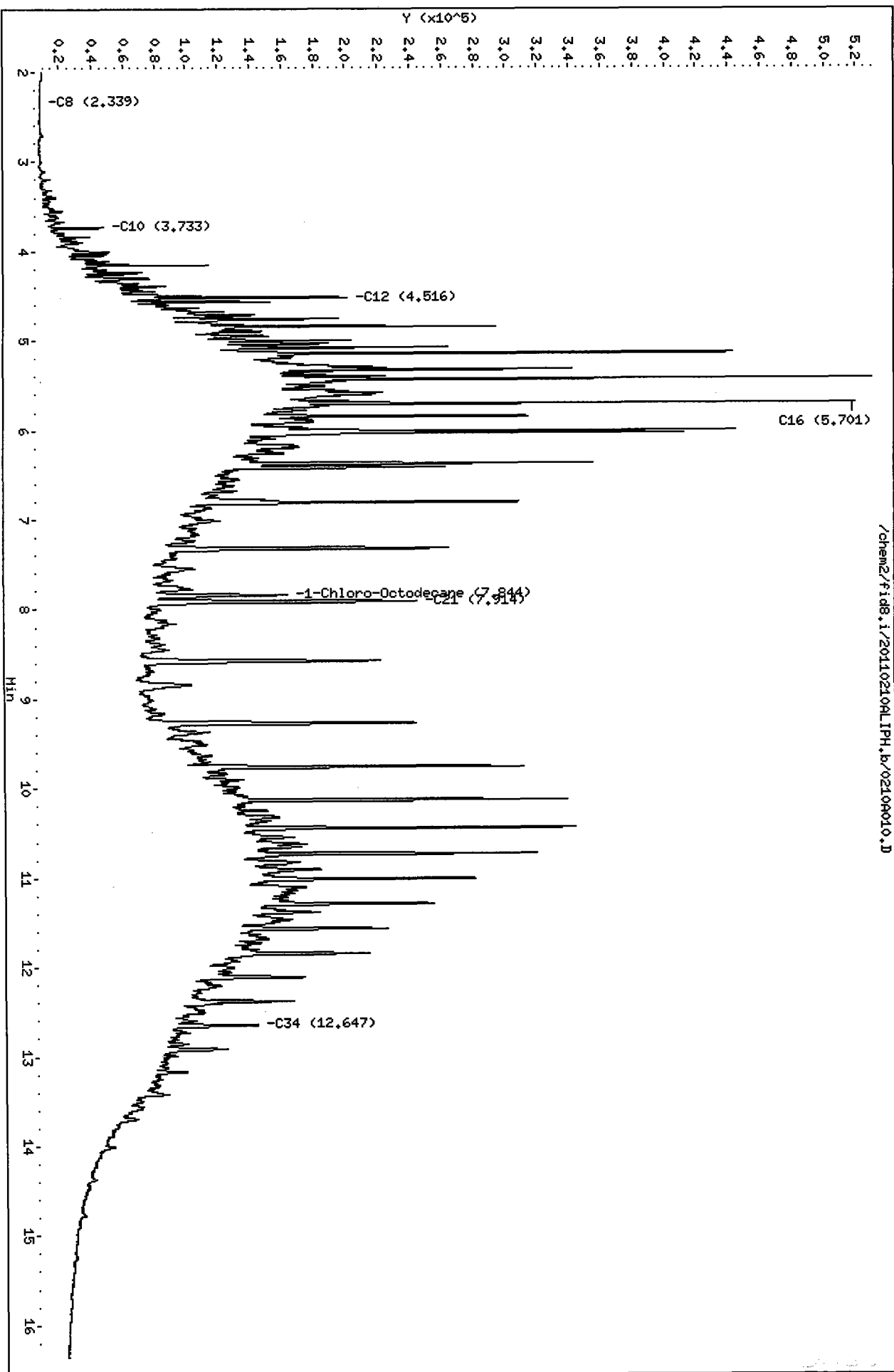
Sample Info: SH23M.10

Column phase: ZB-5

Instrument: fid8.i

Operator: MS

Column diameter: 0.32



Analytical Resources Inc.
EPH Aromatics Report

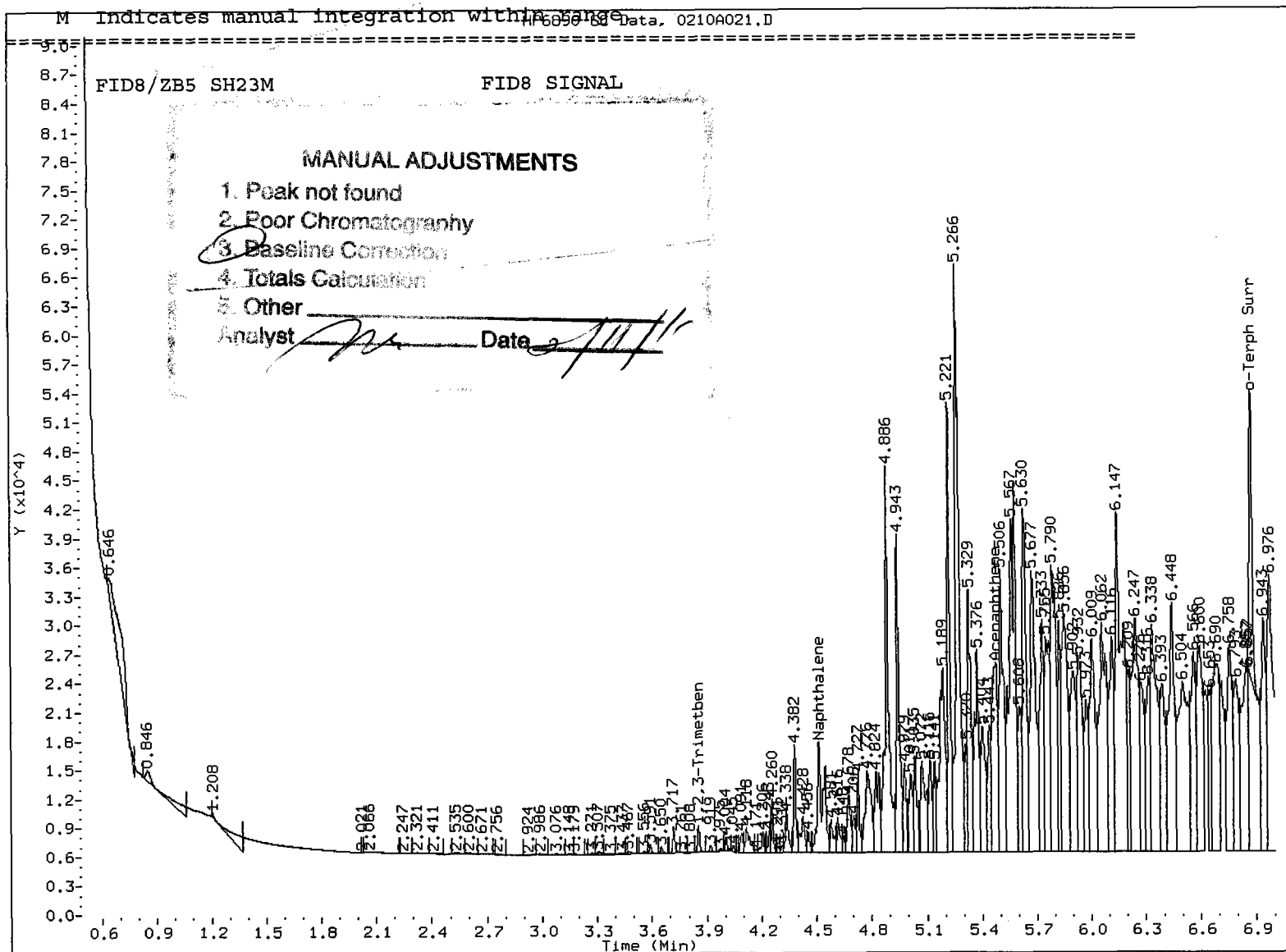
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Method: /chem2/fid8.i/20110210AROM.b/EPHArOm.m
Instrument: fid8.i
Operator: MS
Report Date: 02/11/2011
Macro: AROM072710FID8

ARI ID: SH23M
Client ID: B11-09-23.5
Injection: 10-FEB-2011 23:43
Matrix: SOIL
Dilution Factor: 10

EPH-AROMATIC RESULTS

Quant Range	RF	Area	Conc	Time Range
C8-C10 Arom.	17167	9242	1	(1.730 - 3.956)
C10-C12 Arom.	16689	67638	4	(3.956 - 4.616)
C12-C16 Arom.	15441	604415	39	(4.616 - 5.567)
C16-C21 Arom.	14112	2849481	202	(5.567 - 8.293) M
C21-C34 Arom.	12993	4912412	378	(8.293 - 12.503)

Surrogate Rec: 12.8% x 5 mL FEV = 64%



Data File: /chem2/fid8.i/20110210AR0H.b/0210A021.D

Date : 10-FEB-2011 23:43

Client ID: B11-09-23.5

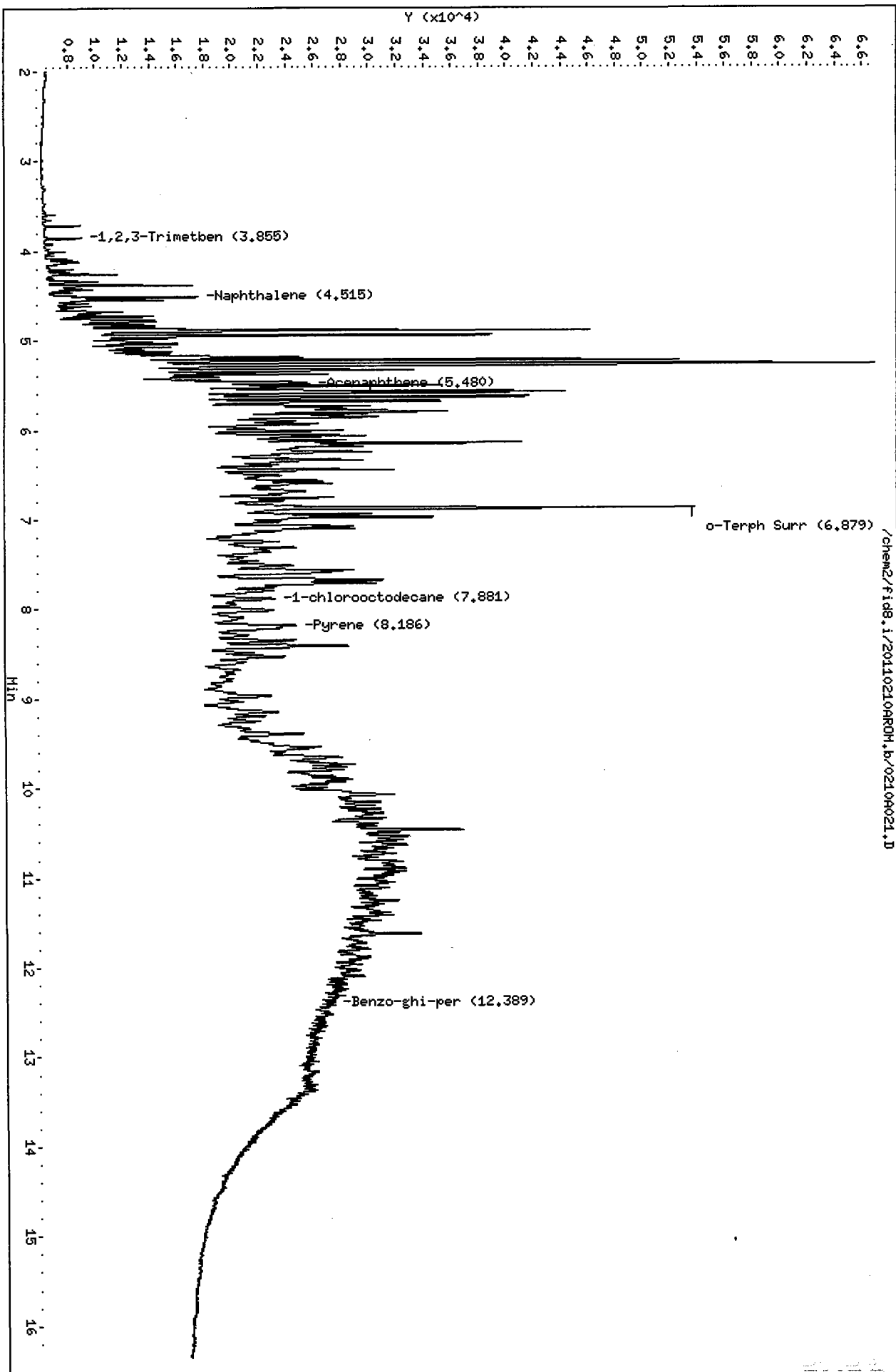
Sample Info: SH23M.10

Column phase: ZB-5

Instrument: fid8.i

Operator: MS

Column diameter: 0.32



ALEPH SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH23-Pacific Groundwater Group
Project: Birds Eye Soil
JI1001

<u>Client ID</u>	<u>COD</u>	<u>TOT OUT</u>
MB-020411	81.6% 0	
LCS-020411	73.9% 0	
B11-06-25	84.5% 0	
B11-06-25 MS	86.1% 0	
B11-06-25 MSD	84.5% 0	
B11-08-20	78.3% 0	
B11-09-23.5	67.4% 0	

	LCS/MB LIMITS	QC LIMITS
(COD) = 1-Chlorooctadecane	(27-128)	(39-131)

Prep Method: SW3510C
Log Number Range: 11-2185 to 11-2196

AREPH SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH23-Pacific Groundwater Group
Project: Birds Eye Soil
JI1001

<u>Client ID</u>	<u>OTER</u>	<u>TOT OUT</u>
MB-020411	73.0%	0
LCS-020411	90.7%	0
B11-06-25	80.0%	0
B11-06-25 MS	74.0%	0
B11-06-25 MSD	77.5%	0
B11-08-20	90.5%	0
B11-09-23.5	64.0%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(34-133)	(10-143)

Prep Method: SW3510C
Log Number Range: 11-2185 to 11-2196

ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1

Sample ID: B11-06-25

MS/MSD

Lab Sample ID: SH23B

LIMS ID: 11-2185

Matrix: Soil

Data Release Authorized:

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted MS/MSD: 02/04/11

Sample Amount MS: 8.75 g-dry-wt

MSD: 8.70 g-dry-wt

Final Extract Volume MS: 1.0 mL

MSD: 1.0 mL

Aliphatic

Date Analyzed MS: 02/10/11 17:54

MSD: 02/10/11 18:19

Instrument/Analyst MS: FID8/MS

MSD: FID8/MS

Dilution Factor MS: 5.00

MSD: 5.00

Aromatic

Date Analyzed MS: 02/10/11 22:28

MSD: 02/10/11 22:53

Instrument/Analyst MS: FID8/MS

MSD: FID8/MS

Dilution Factor MS: 25.0

MSD: 25.0

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
C8-C10 Aliphatics	33200	42900	17100	56.6%	37900	17200	27.3%	12.4%
C10-C12 Aliphatics	189000	221000	17100	NA	199000	17200	NA	10.5%
C12-C16 Aliphatics	1110000	1310000	17100	NA	1200000	17200	NA	8.8%
C16-C21 Aliphatics	1660000	1880000	17100	NA	1680000	17200	NA	11.2%
C10-C12 Aromatics	< 56300	NA	17100	NA%	NA	17200	NA%	NA
C12-C16 Aromatics	583000	569000	17100	NA	609000	17200	NA	6.8%
C16-C21 Aromatics	2180000	2170000	34300	NA	1950000	34500	NA	10.7%
C21-C34 Aromatics	3290000	3430000	34300	NA	2960000	34500	NA	14.7%

Results reported in µg/kg

RPD calculated using sample concentrations per SW846.

NA-No recovery due to high concentration of analyte in original sample and/or calculated negative recovery.

ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1

Sample ID: B11-06-25

MATRIX SPIKE

Lab Sample ID: SH23B

LIMS ID: 11-2185

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Percent Moisture: 13.5%

Sample Amount: 8.75 g-dry-wt

Final Extract Volume: 1.0 mL

Aliphatic

Date Analyzed: 02/10/11 17:54

Instrument/Analyst: FID8/MS

Dilution Factor: 5.00

Aromatic

Date Analyzed: 02/10/11 22:28

Instrument/Analyst: FID8/MS

Dilution Factor: 25.0

Range	RL	Result
C8-C10 Aliphatics	11,000	---
C10-C12 Aliphatics	11,000	---
C12-C16 Aliphatics	11,000	---
C16-C21 Aliphatics	11,000	---
C21-C34 Aliphatics	11,000	1,500,000
C8-C10 Aromatics	57,000	< 57,000 U
C10-C12 Aromatics	57,000	---
C12-C16 Aromatics	57,000	---
C16-C21 Aromatics	57,000	---
C21-C34 Aromatics	57,000	---

Reported in µg/kg (ppb)

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	86.1%
Aromatic	o-Terphenyl	74.0%

Analytical Resources Inc.
WA. EPH Aliphatics Report

Data file: /chem2/fid8.i/20110210ALIPH.b/0210A007.D
Method: /chem2/fid8.i/20110210ALIPH.b/EPHALiph.m
Instrument: fid8.i
Operator: MS
Macro: ALIPH090410FID8

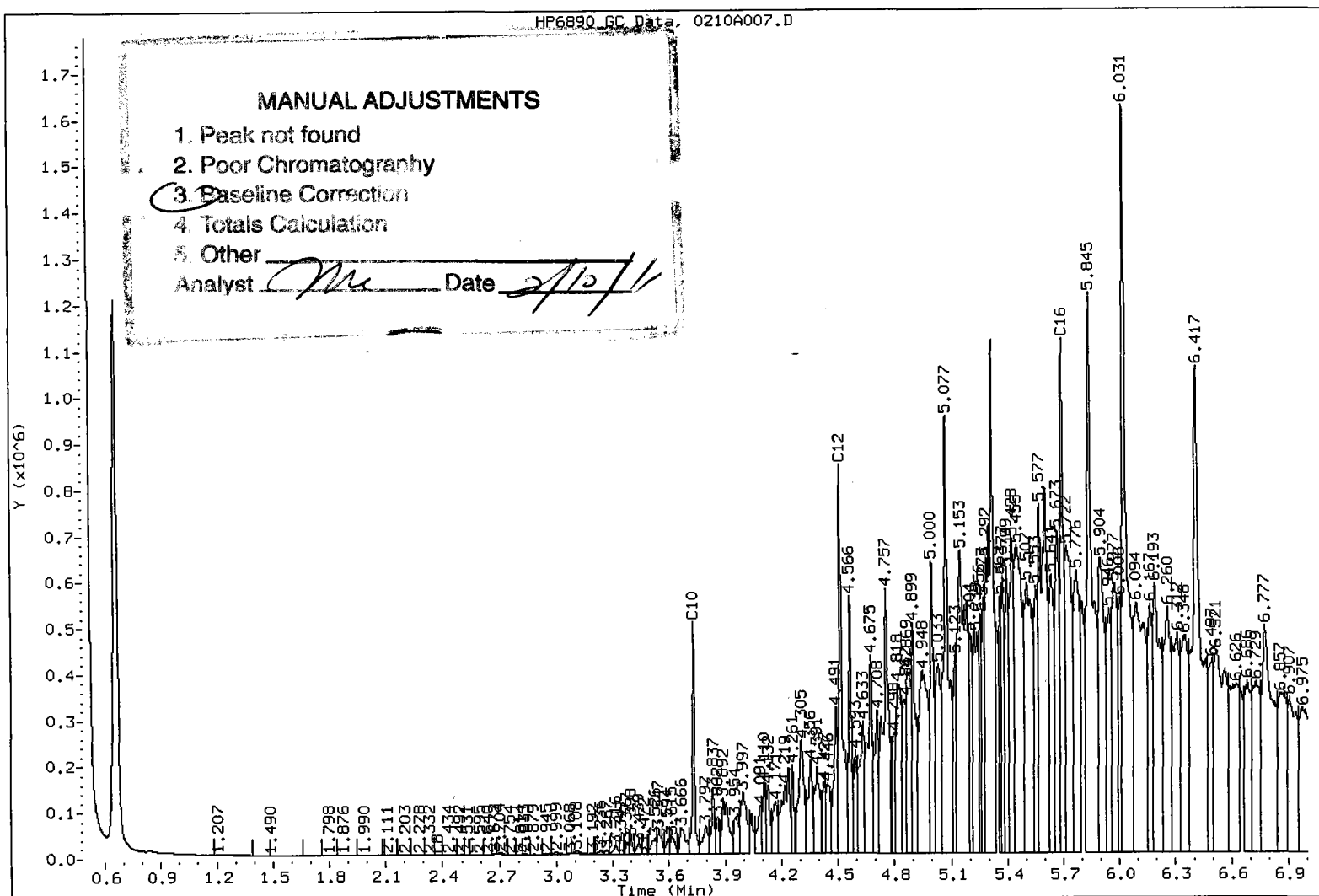
ARI ID: SH23BMS
Client ID: B11-06-25 MS
Injection: 10-FEB-2011 17:54
Matrix: SOIL
Dilution Factor: 5

EPH-ALIPHATIC RESULTS

Quant Range	Area	Conc	Time Range
C8-C10 Aliph.	1311367	75	(2.254 - 3.842)
C10-C12 Aliph.	6168649	387	(3.842 - 4.624)
C12-C16 Aliph.	34076146	2303	(4.624 - 5.801)
C16-C21 Aliph.	45575680	3290	(5.801 - 8.031)
C21-C34 Aliph.	28604909	2586	(8.031 - 12.757)

Surrogate Rec: 86.1%

FID-8A/ZB-5 SH23BMS



Data File: /chem2/fid8.i/20110210ALIPH.b/02104007.D

Date : 10-FEB-2011 17:54

Client ID: B11-06-25 MS

Sample Info: SH23BHS,5

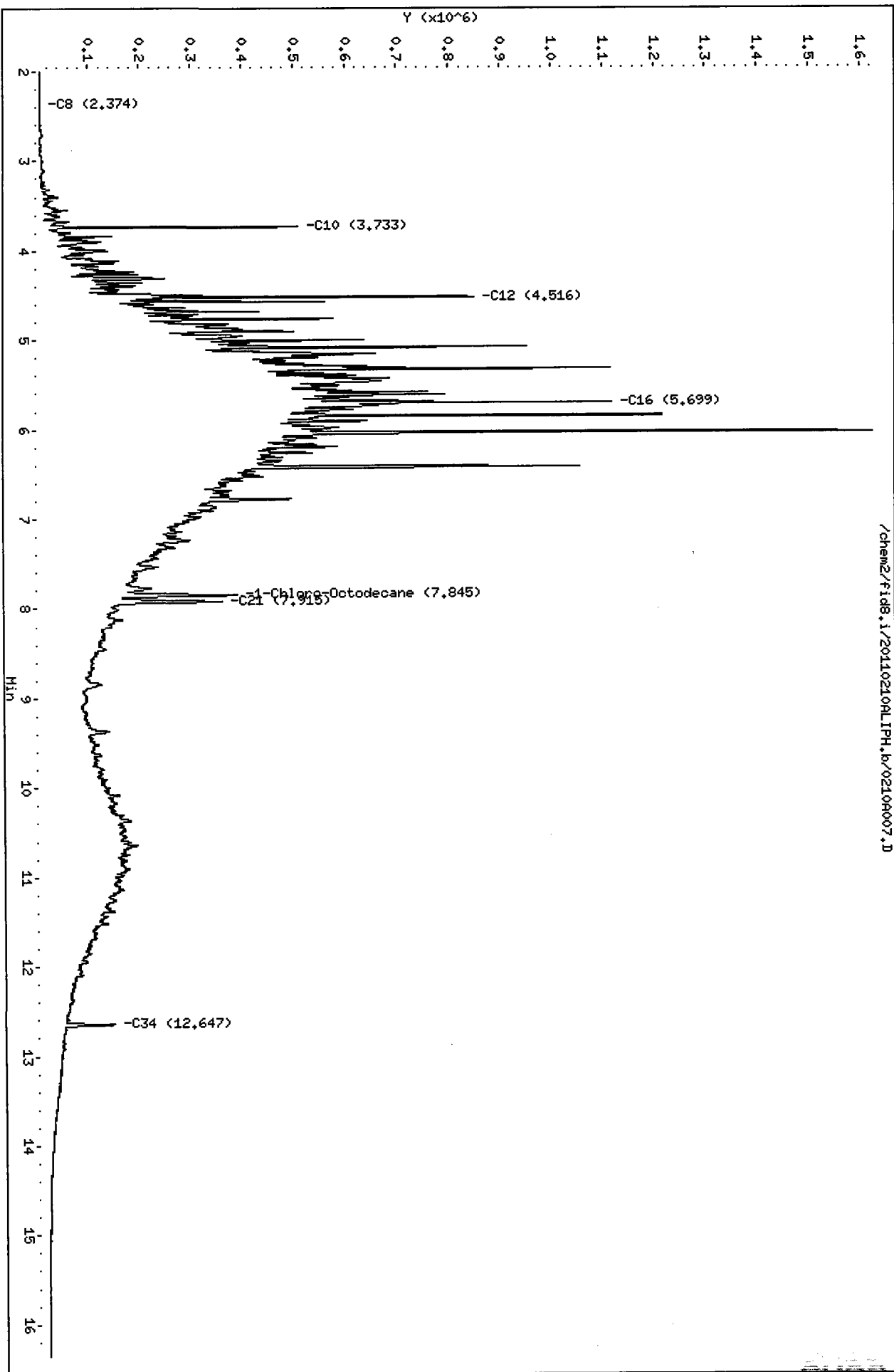
Column phase: ZB-5

Instrument: fid8.i

Operator: MS

Column diameter: 0.32

Page 1



Analytical Resources Inc.
EPH Aromatics Report

Data file: /chem2/fid8.i/20110210AROM.b/0210A018.D
Method: /chem2/fid8.i/20110210AROM.b/EPHArOm.m
Instrument: fid8.i
Operator: MS
Report Date: 02/11/2011
Macro: AROM072710FID8

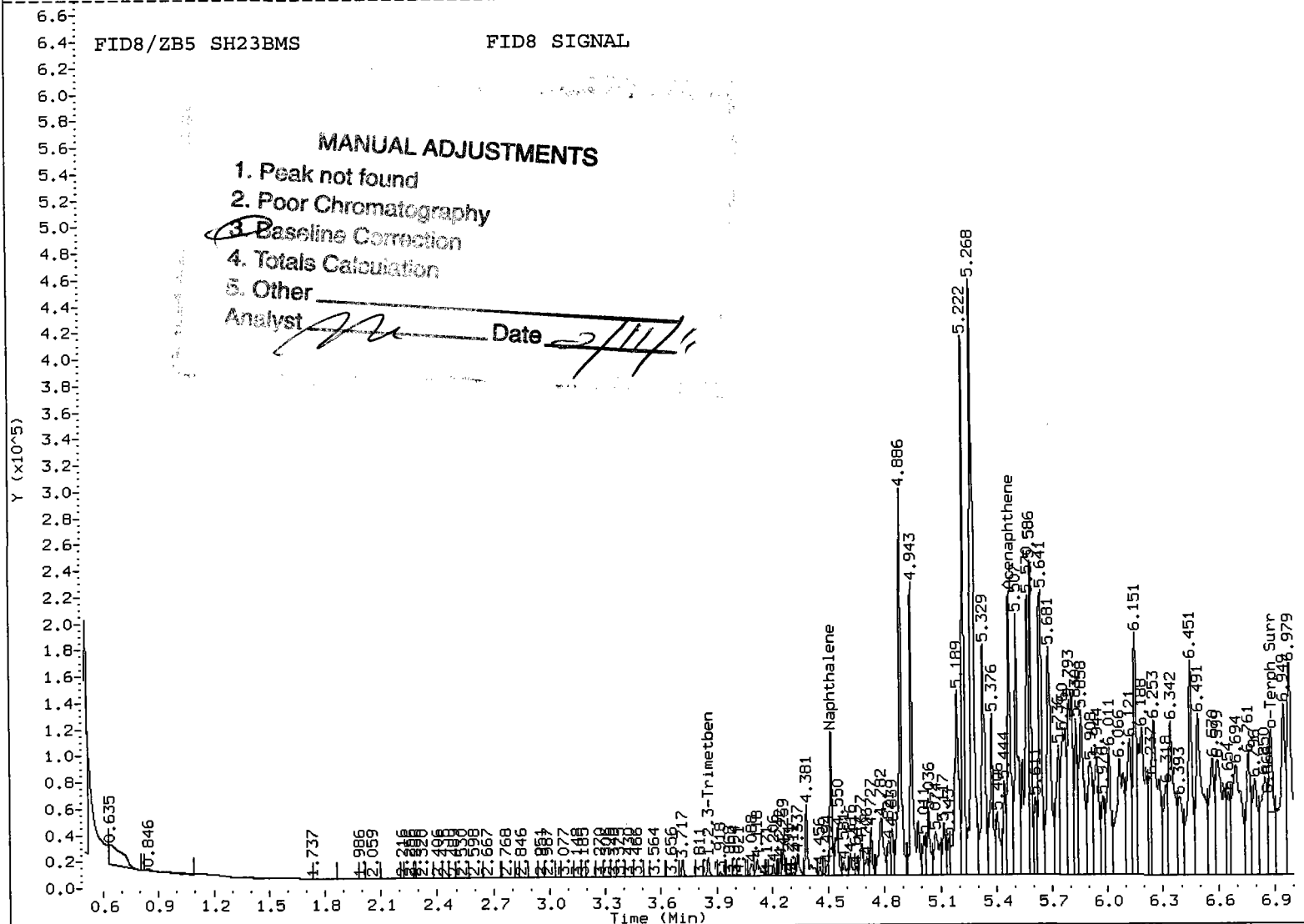
ARI ID: SH23BMS
Client ID: B11-06-25 MS
Injection: 10-FEB-2011 22:28
Matrix: SOIL
Dilution Factor: 5

EPH-AROMATIC RESULTS

Quant Range	RF	Area	Conc	Time Range
C8-C10 Arom.	17167	26723	2	(1.730 - 3.956)
C10-C12 Arom.	16689	289781	17	(3.956 - 4.616)
C12-C16 Arom.	15441	3070370	199	(4.616 - 5.567)
C16-C21 Arom.	14112	10739479	761	(5.567 - 8.293) M
C21-C34 Arom.	12993	15559875	1198	(8.293 - 12.503)

Surrogate Rec: 14.8% x 5 mL F.E.V. = 74%

M indicates manual integration within range. Data, 0210A018.D



Data File: /chem2/fid8.i/20110210AR04.b/02104018.D

Date : 10-FEB-2011 22:28

Client ID: B11-06-25 HS

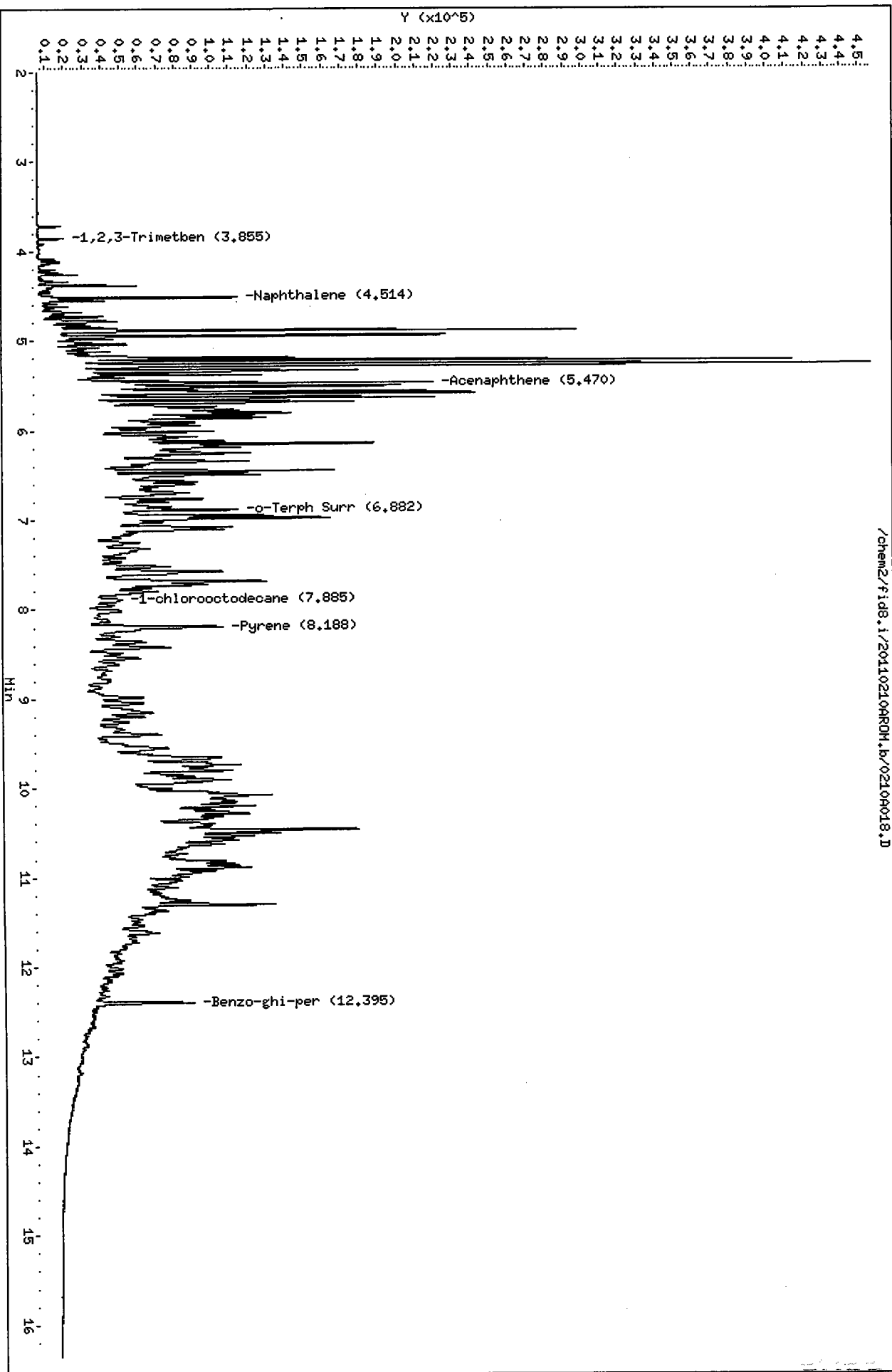
Sample Info: SH23BHS,5

Column phase: ZB-5

Instrument: fid8.i

Operator: HS

Column diameter: 0.32



ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1


Sample ID: B11-06-25

MATRIX SPIKE DUP

Lab Sample ID: SH23B

LIMS ID: 11-2185

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Percent Moisture: 13.5%

Sample Amount: 8.70 g-dry-wt

Final Extract Volume: 1.0 mL

Aliphatic

Date Analyzed: 02/10/11 18:19

Instrument/Analyst: FID8/MS

Dilution Factor: 5.00

Aromatic

Date Analyzed: 02/10/11 22:53

Instrument/Analyst: FID8/MS

Dilution Factor: 25.0

Range	RL	Result
C8-C10 Aliphatics	11,000	---
C10-C12 Aliphatics	11,000	---
C12-C16 Aliphatics	11,000	---
C16-C21 Aliphatics	11,000	---
C21-C34 Aliphatics	11,000	1,300,000
C8-C10 Aromatics	57,000	< 58,000 U
C10-C12 Aromatics	57,000	---
C12-C16 Aromatics	57,000	---
C16-C21 Aromatics	57,000	---
C21-C34 Aromatics	57,000	---

Reported in µg/kg (ppb)

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	84.5%
Aromatic	o-Terphenyl	77.5%

Analytical Resources Inc.
WA. EPH Aliphatics Report

Data file: /chem2/fid8.i/20110210ALIPH.b/0210A008.D
Method: /chem2/fid8.i/20110210ALIPH.b/EPHALiph.m
Instrument: fid8.i
Operator: MS
Macro: ALIPH090410FID8

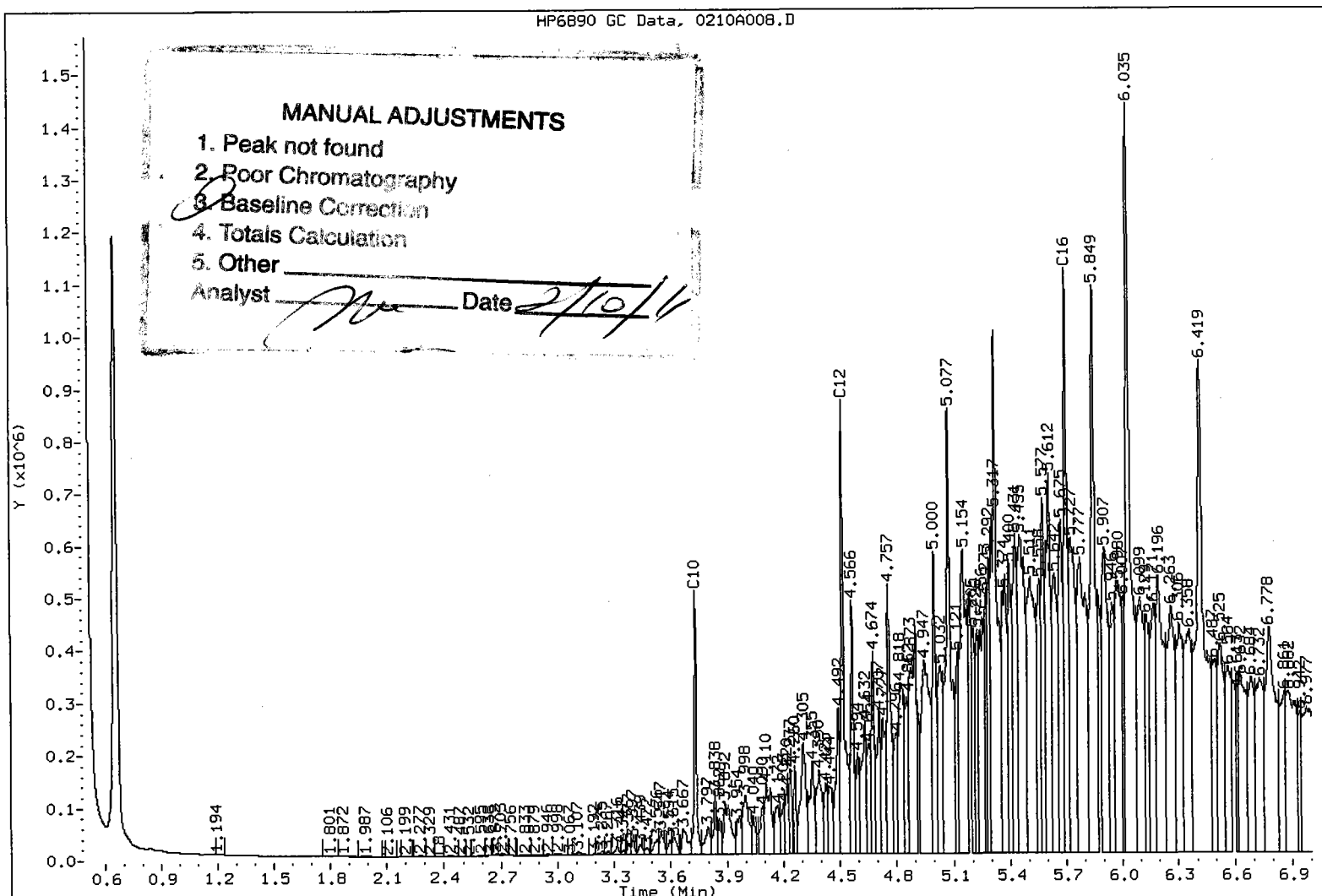
ARI ID: SH23BMSD
Client ID: B11-06-25 MSD
Injection: 10-FEB-2011 18:19
Matrix: SOIL
Dilution Factor: 5

EPH-ALIPHATIC RESULTS

Quant Range	Area	Conc	Time Range
C8-C10 Aliph.	1161948	66	(2.254 - 3.842)
C10-C12 Aliph.	5510351	346	(3.842 - 4.624)
C12-C16 Aliph.	30920081	2089	(4.624 - 5.801)
C16-C21 Aliph.	40583926	2930	(5.801 - 8.031)
C21-C34 Aliph.	24426362	2208	(8.031 - 12.757)

Surrogate Rec: 84.5%

FID-8A/ZB-5 SH23BMSD



Data File: /chem2/fid8.i/20110210ALIPH.b/02100008.D

Date : 10-FEB-2011 18:19

Client ID: B11-06-25 HSD

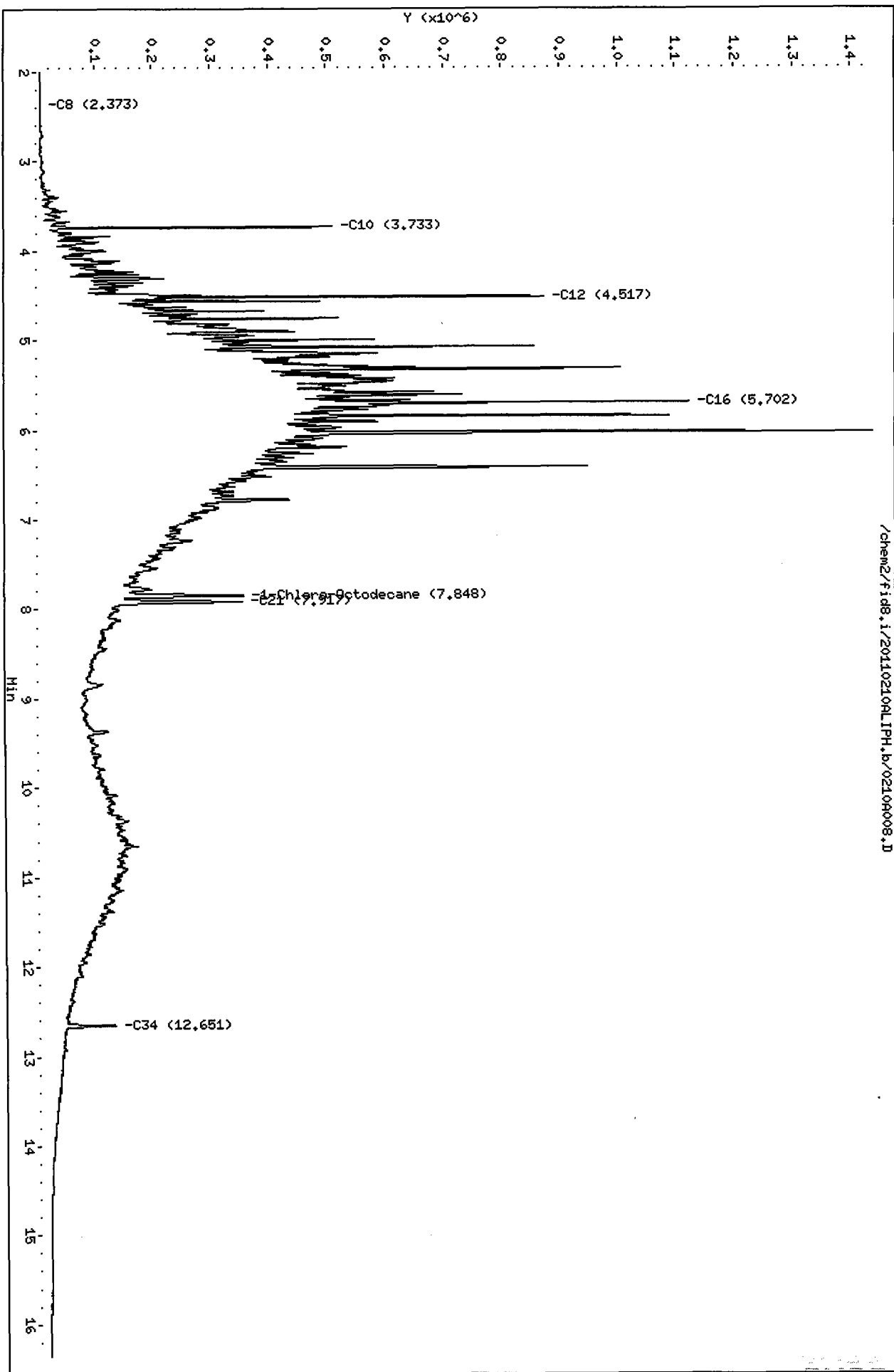
Sample Info: SH23BHSD,5

Column phase: ZB-5

Instrument: fid8.i

Operator: MS

Column diameter: 0.32



Analytical Resources Inc.
EPH Aromatics Report

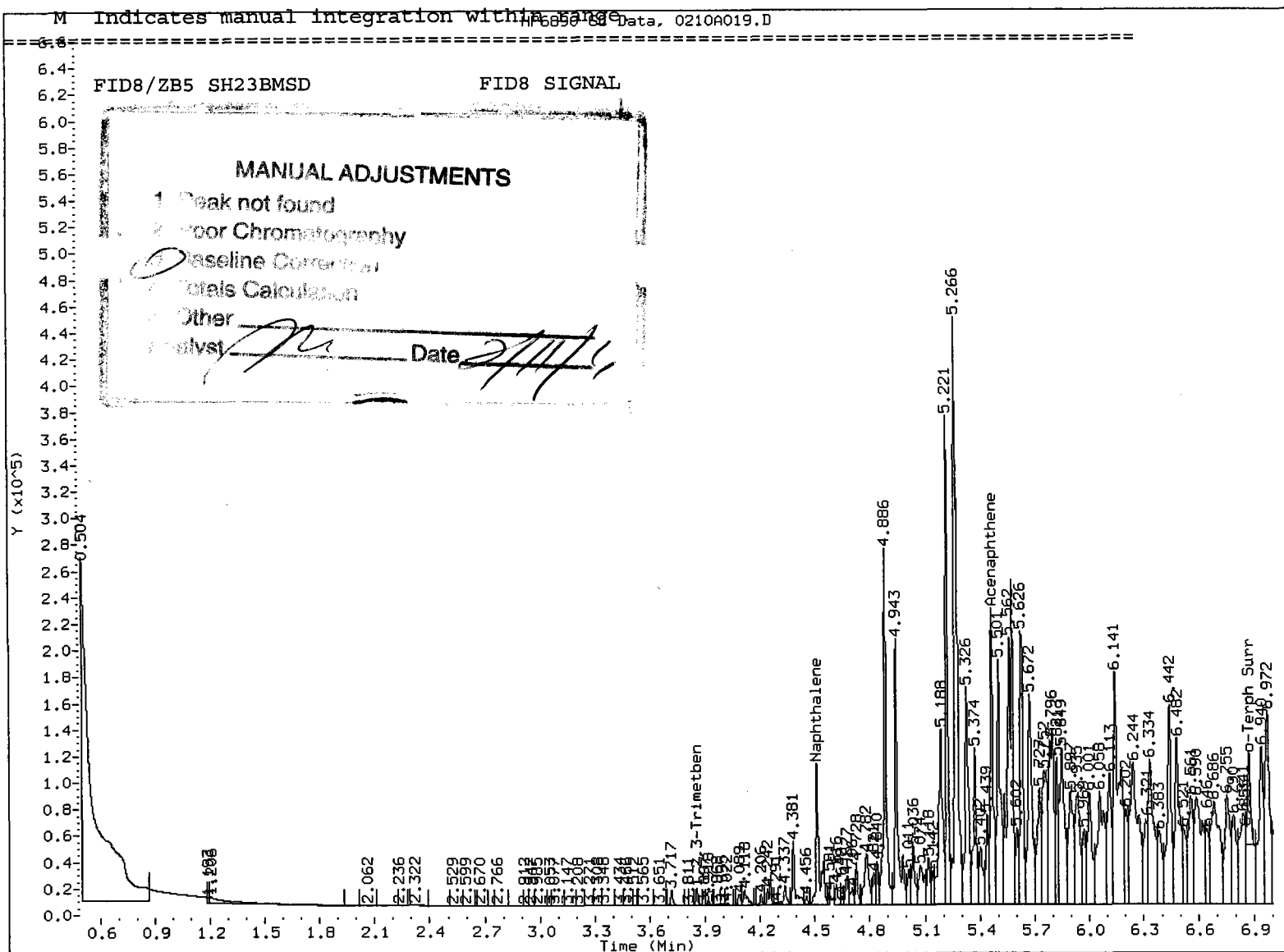
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Method: /chem2/fid8.i/20110210AROM.b/EPHArOm.m
Instrument: fid8.i
Operator: MS
Report Date: 02/11/2011
Macro: AROM072710FID8

ARI ID: SH23BMSD
Client ID: B11-06-25 MSD
Injection: 10-FEB-2011 22:53
Matrix: SOIL
Dilution Factor: 5

EPH-AROMATIC RESULTS

Quant Range	RF	Area	Conc	Time Range
C8-C10 Arom.	17167	23796	1	(1.730 - 3.956)
C10-C12 Arom.	16689	247583	15	(3.956 - 4.616)
C12-C16 Arom.	15441	3267700	212	(4.616 - 5.567)
C16-C21 Arom.	14112	9597109	680	(5.567 - 8.293) M
C21-C34 Arom.	12993	13351264	1028	(8.293 - 12.503)

Surrogate Rec: 15.5% x 5 ml FEV = 77.5%.



Data File: /chem2/fid8.i/20110210AR04.b/0210A019.D

Date: 10-FEB-2011 22:53

Client ID: B41-06-25 HSD

Sample Info: SH23BHSD.5

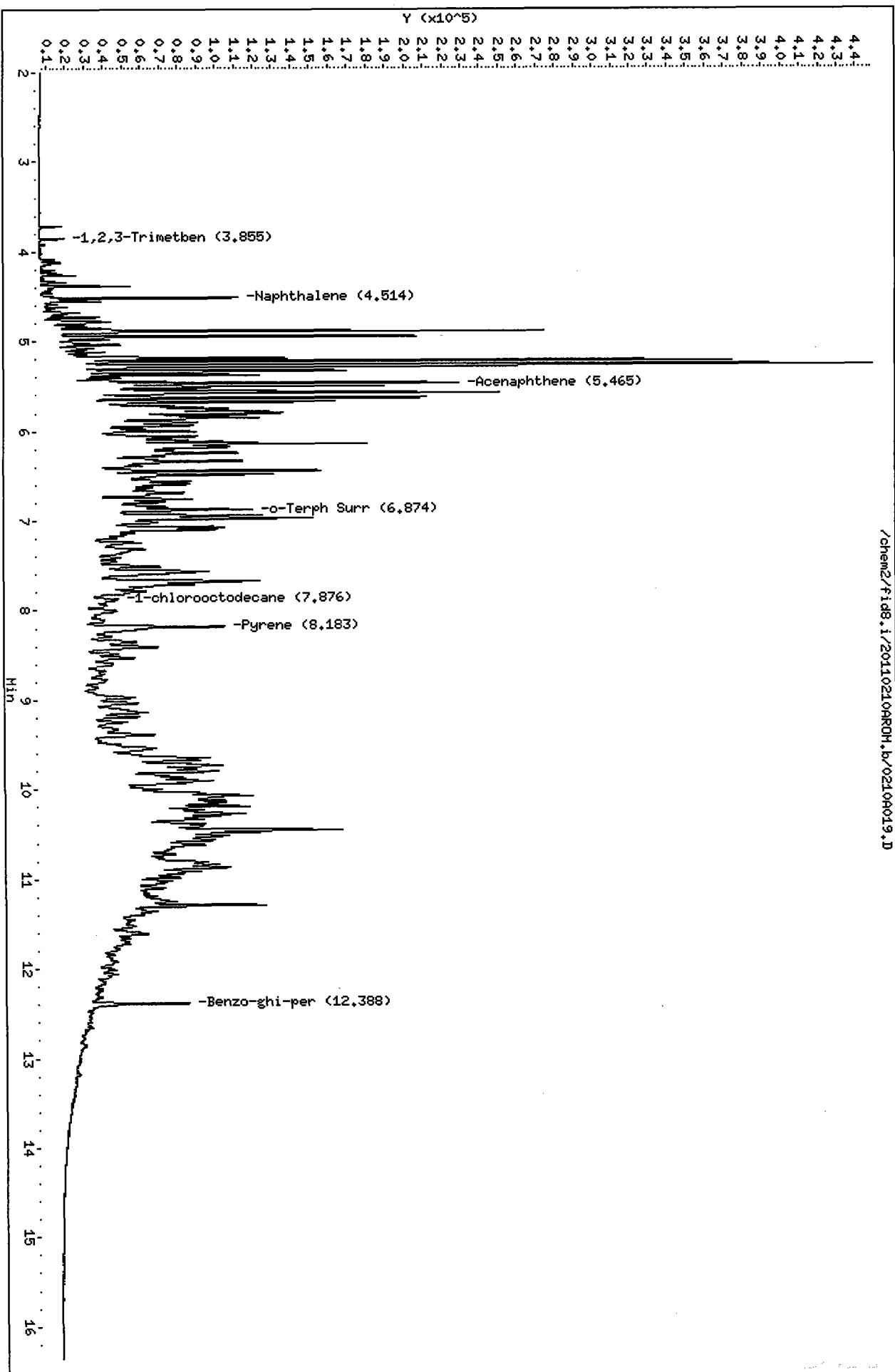
Column phase: ZB-5

Instrument: fid8.i

Operator: HS

Column diameter: 0.32

/chem2/fid8.i/20110210AR04.b/0210A019.D



ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1

Sample ID: LCS-020411

LAB CONTROL

Lab Sample ID: LCS-020411

LIMS ID: 11-2185

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: NA

Date Received: NA

Date Extracted: 02/04/11

Sample Amount: 10.0 g-as-rec

Final Extract Volume: 1.0 mL

Aliphatic

Date Analyzed: 02/10/11 20:24

Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Aromatic

Date Analyzed: 02/11/11 00:58

Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
C8-C10 Aliphatics	12000	15000	80.0%
C10-C12 Aliphatics	11000	15000	73.3%
C12-C16 Aliphatics	12000	15000	80.0%
C16-C21 Aliphatics	11000	15000	73.3%
C10-C12 Aromatics	9100	15000	60.7%
C12-C16 Aromatics	12300	15000	82.0%
C16-C21 Aromatics	29300	30000	97.7%
C21-C34 Aromatics	24900	30000	83.0%

Results reported in µg/kg

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	73.9%
Aromatic	o-Terphenyl	90.7%

Analytical Resources Inc.
WA. EPH Aliphatics Report

Data file: /chem2/fid8.i/20110210ALIPH.b/0210A013.D
Method: /chem2/fid8.i/20110210ALIPH.b/EPHALiph.m
Instrument: fid8.i
Operator: MS
Macro: ALIPH090410FID8

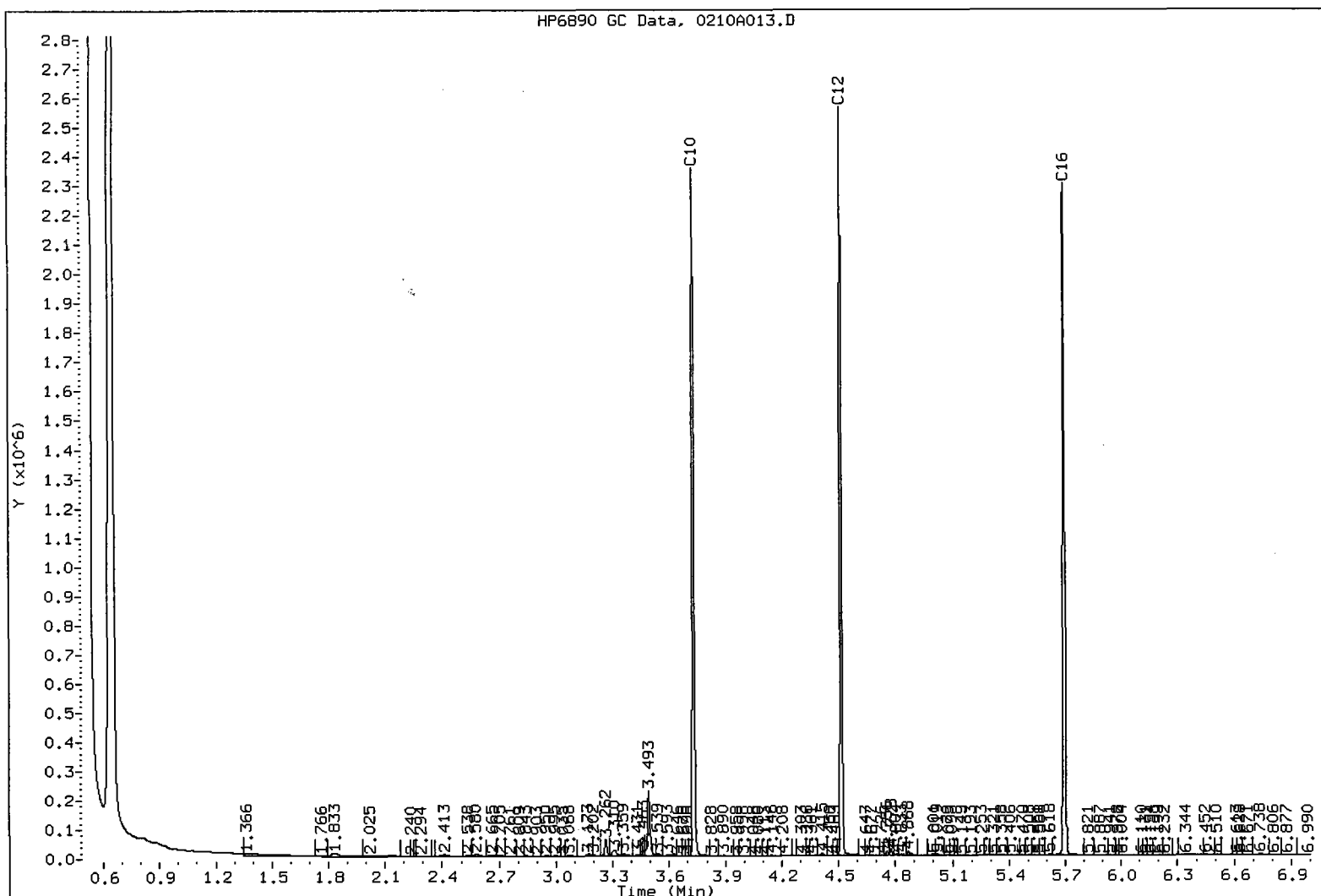
ARI ID: SH23LCSS1
Client ID: SH23LCSS1
Injection: 10-FEB-2011 20:24
Matrix: SOIL
Dilution Factor: 1

EPH-ALIPHATIC RESULTS

Quant Range	Area	Conc	Time Range
C8-C10 Aliph.	2123529	121	(2.254 - 3.842)
C10-C12 Aliph.	1721112	108	(3.842 - 4.624)
C12-C16 Aliph.	1718599	116	(4.624 - 5.801)
C16-C21 Aliph.	1562077	113	(5.801 - 8.031)
C21-C34 Aliph.	621615	56	(8.031 - 12.757)

Surrogate Rec: 73.9%

FID-8A/ZB-5 SH23LCSS1



SH23: 0210A013.D

Data File: /chem2/fid8.i/20110210ALIPH.b/02104013.D

Date : 10-FEB-2011 20:24

Client ID: SH23LCSS1

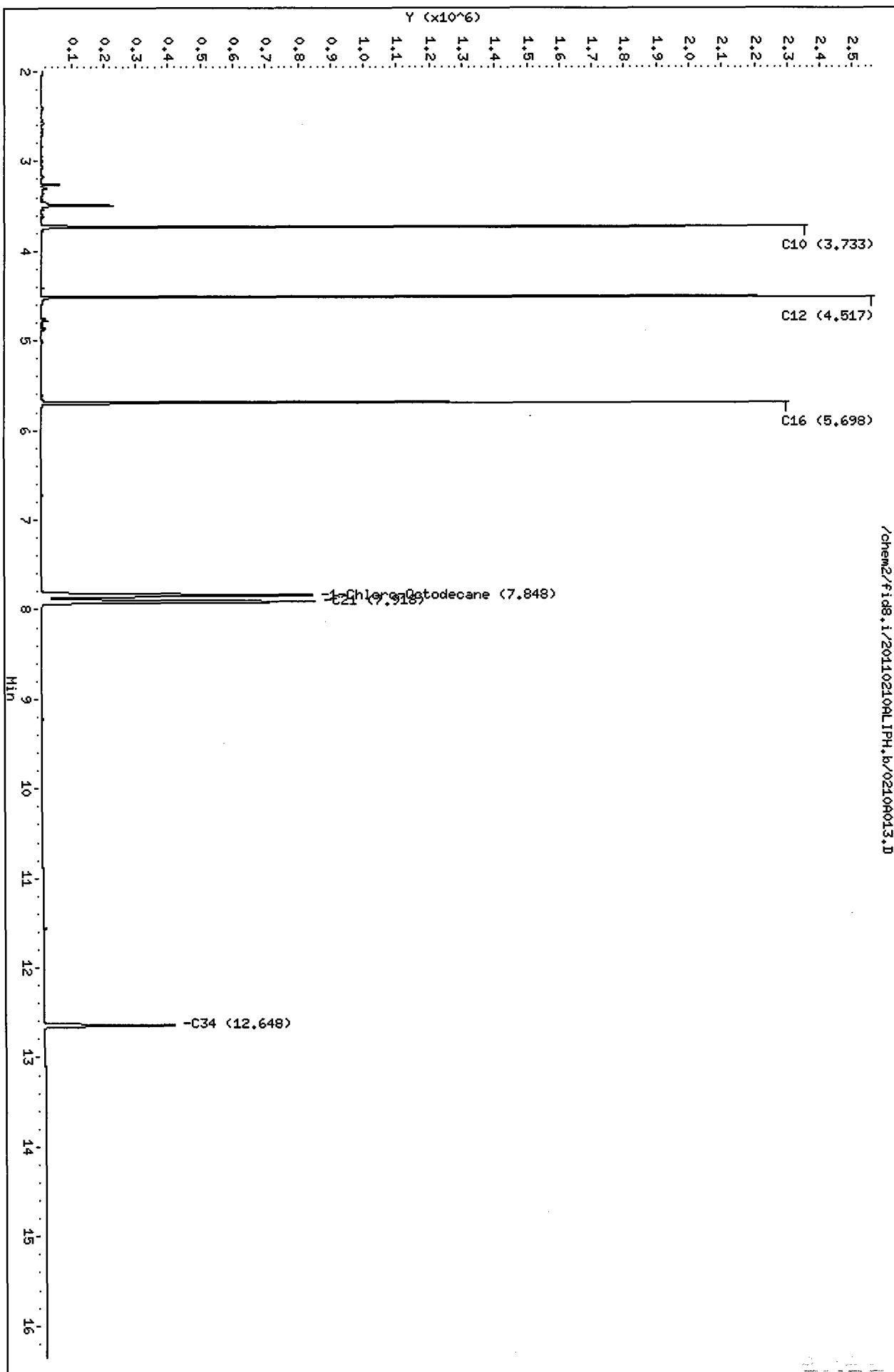
Sample Info: SH23LCSS1

Column phase: ZB-5

Instrument: fid8.i

Operator: MS

Column diameter: 0.32



Analytical Resources Inc.
EPH Aromatics Report

Data file: /chem2/fid8.i/20110210AROM.b/0210A024.D
Method: /chem2/fid8.i/20110210AROM.b/EPHArOm.m
Instrument: fid8.i
Operator: MS
Report Date: 02/11/2011
Macro: AROM072710FID8

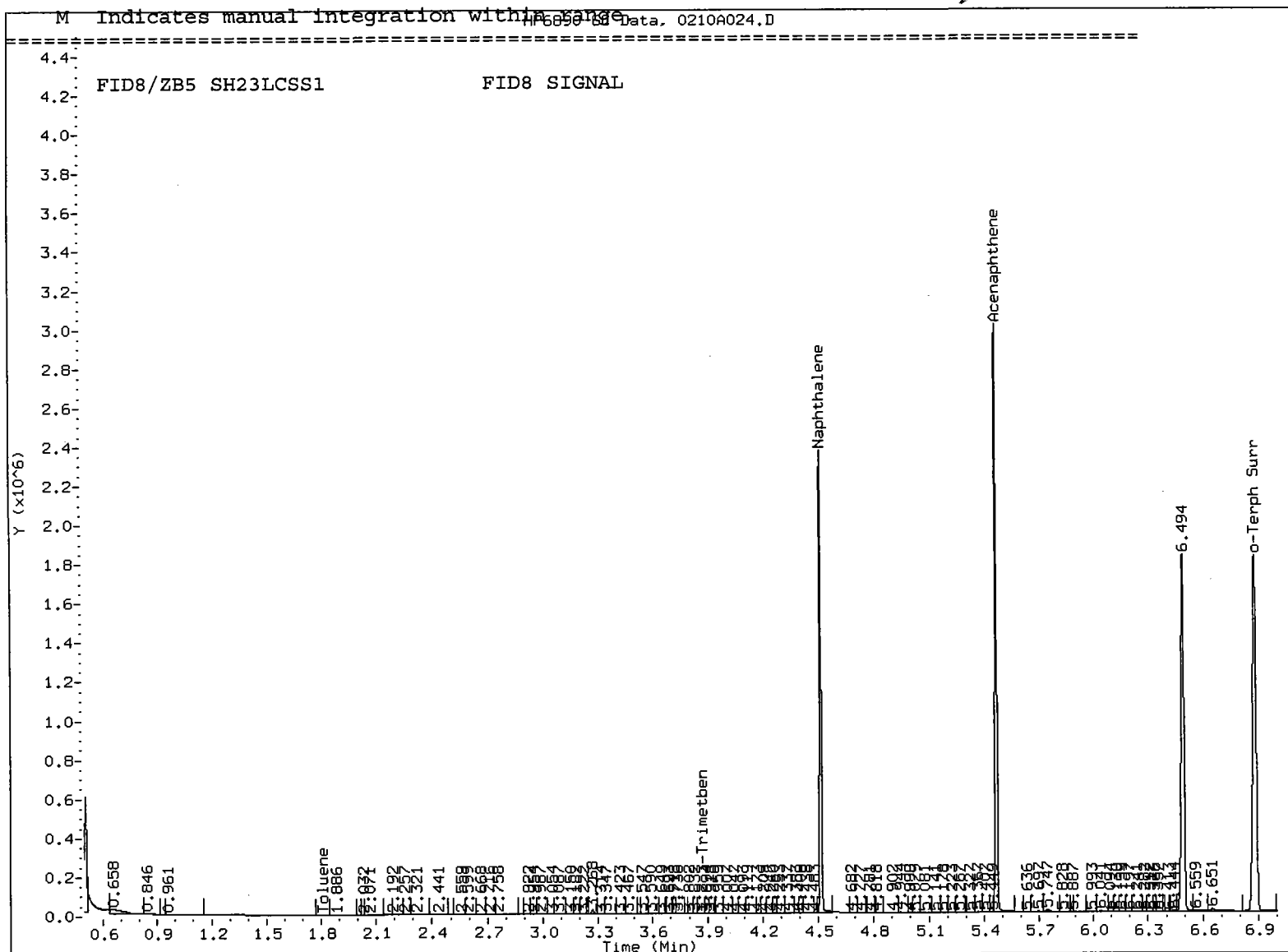
ARI ID: SH23LCSS1
Client ID: SH23LCSS1
Injection: 11-FEB-2011 00:58
Matrix: SOIL
Dilution Factor: 1

EPH-AROMATIC RESULTS

Quant Range	RF	Area	Conc	Time Range
C8-C10 Arom.	17167	34258	2	(1.730 - 3.956)
C10-C12 Arom.	16689	1512659	91	(3.956 - 4.616)
C12-C16 Arom.	15441	1891681	123	(4.616 - 5.567)
C16-C21 Arom.	14112	4132674	293	(5.567 - 8.293)
C21-C34 Arom.	12993	3238429	249	(8.293 - 12.503)

Surrogate Rec: 90.7%

ms 11/11



Data File: /chem2/fid8.i/20110210AROH.b/0210A024.D

Date : 11-FEB-2011 00:58

Client ID: SH23LCSS1

Sample Info: SH23LCSS1

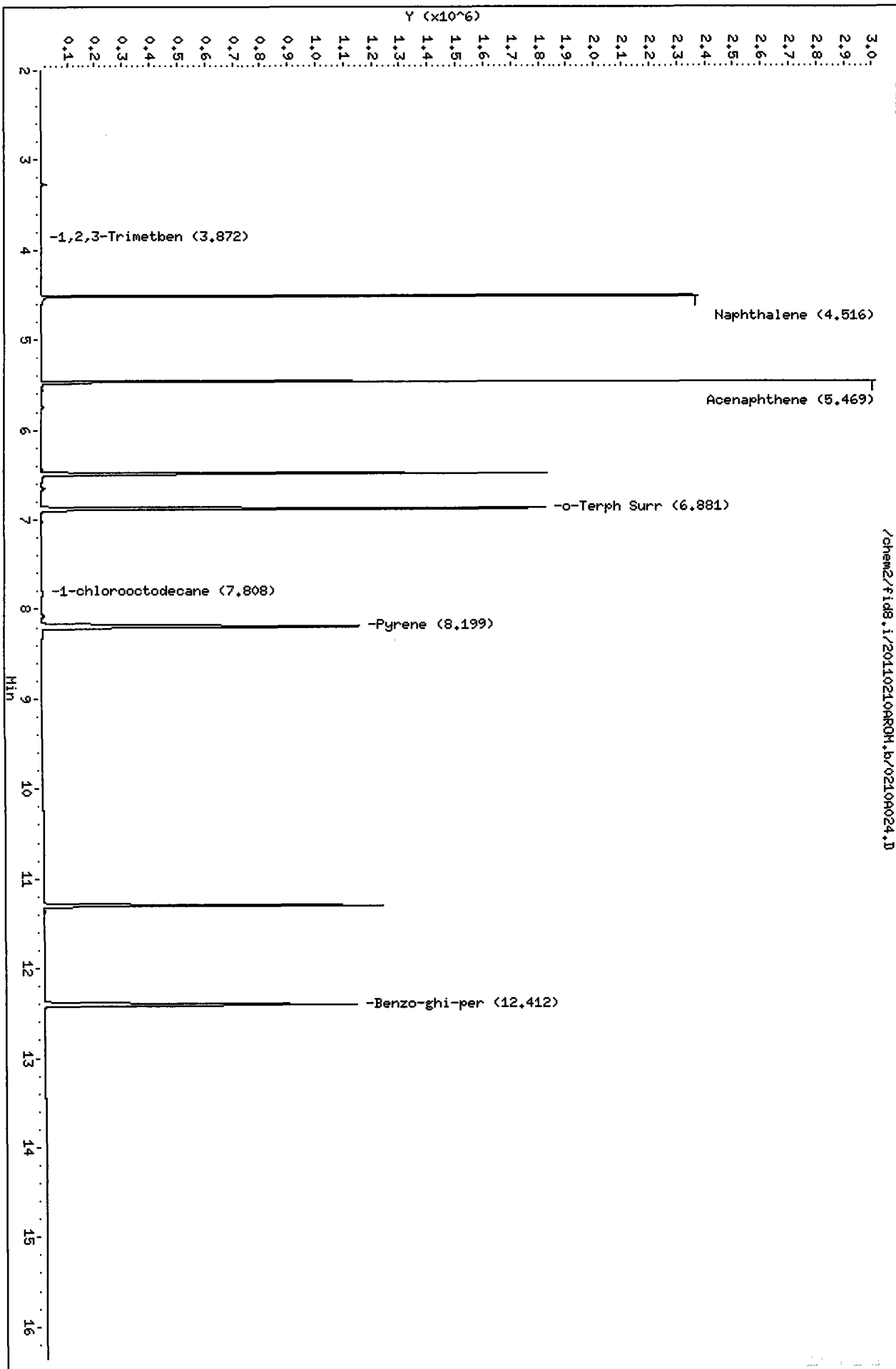
Column phase: ZB-5

Instrument: fid8.i

Operator: MS

Column diameter: 0.32

Page 1



ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1

Sample ID: MB-020411

METHOD BLANK

Lab Sample ID: MB-020411

LIMS ID: 11-2185

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/11/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

J11001

Date Sampled: NA

Date Received: NA

Date Extracted: 02/04/11

Percent Moisture: NA

Sample Amount: 10.0 g-as-rec

Final Extract Volume: 1.0 mL

Aliphatic

Date Analyzed: 02/10/11 20:49

Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Aromatic

Date Analyzed: 02/11/11 01:23

Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Range	RL	Result
C8-C10 Aliphatics	2,000	< 2,000 U
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	81.6%
Aromatic	o-Terphenyl	73.0%

Analytical Resources Inc.
WA. EPH Aliphatics Report

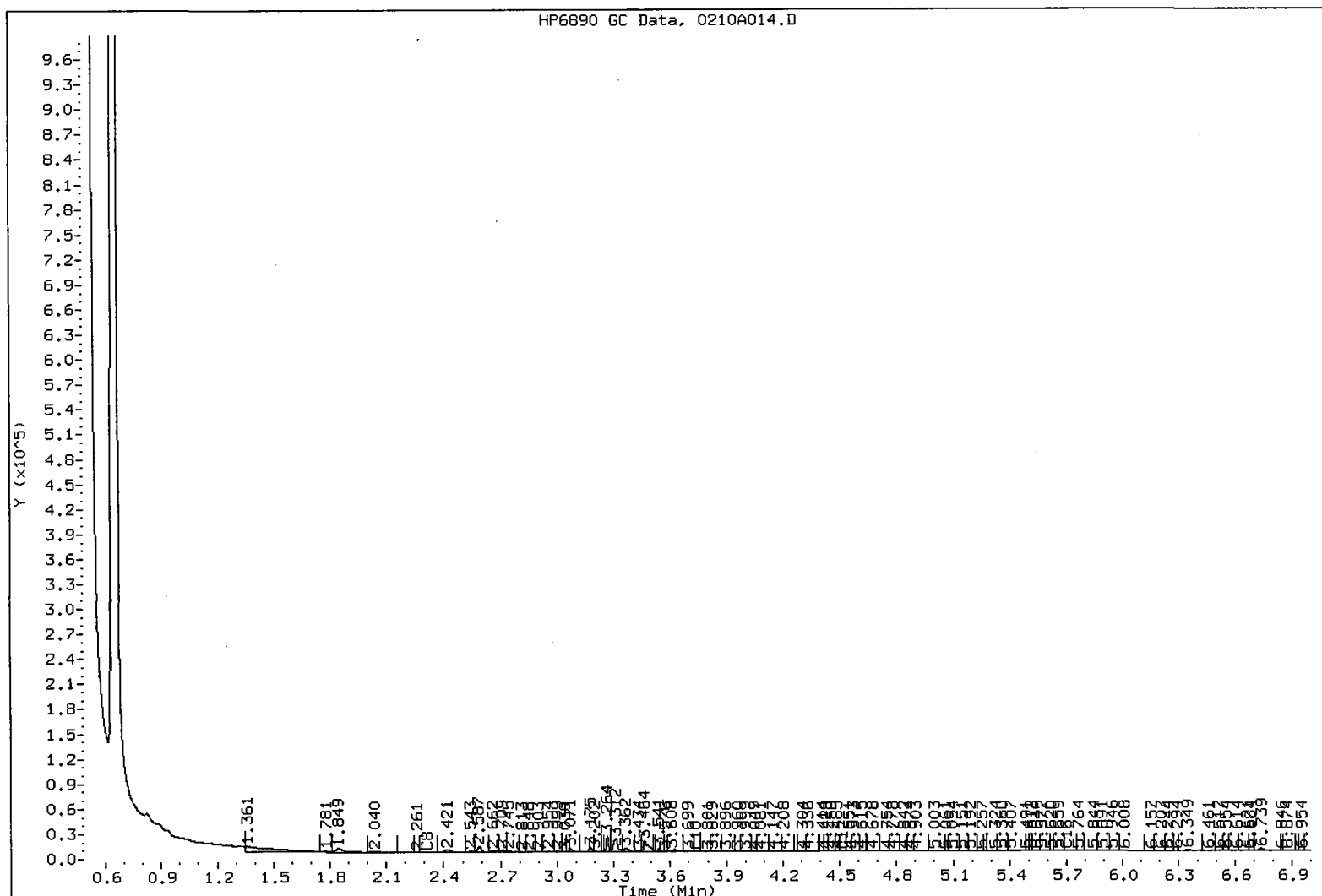
Data file: /chem2/fid8.i/20110210ALIPH.b/0210A014.D
Method: /chem2/fid8.i/20110210ALIPH.b/EPHALiph.m
Instrument: fid8.i
Operator: MS
Macro: ALIPH090410FID8

ARI ID: SH23MBS1
Client ID: SH23MBS1
Injection: 10-FEB-2011 20:49
Matrix: SOIL
Dilution Factor: 1

EPH-ALIPHATIC RESULTS

Quant Range	Area	Conc	Time Range
C8-C10 Aliph.	135226	8	(2.254 - 3.842)
C10-C12 Aliph.	7967	1	(3.842 - 4.624)
C12-C16 Aliph.	6046	0	(4.624 - 5.801)
C16-C21 Aliph.	21293	2	(5.801 - 8.031)
C21-C34 Aliph.	22039	2	(8.031 - 12.757)
Surrogate Rec: 81.6%			

FID-8A/ZB-5 SH23MBS1



Data File: /chem2/fid8.i/20110210PLIPH.b/0210A014.D

Date : 10-FEB-2011 20:49

Client ID: SH23MBS1

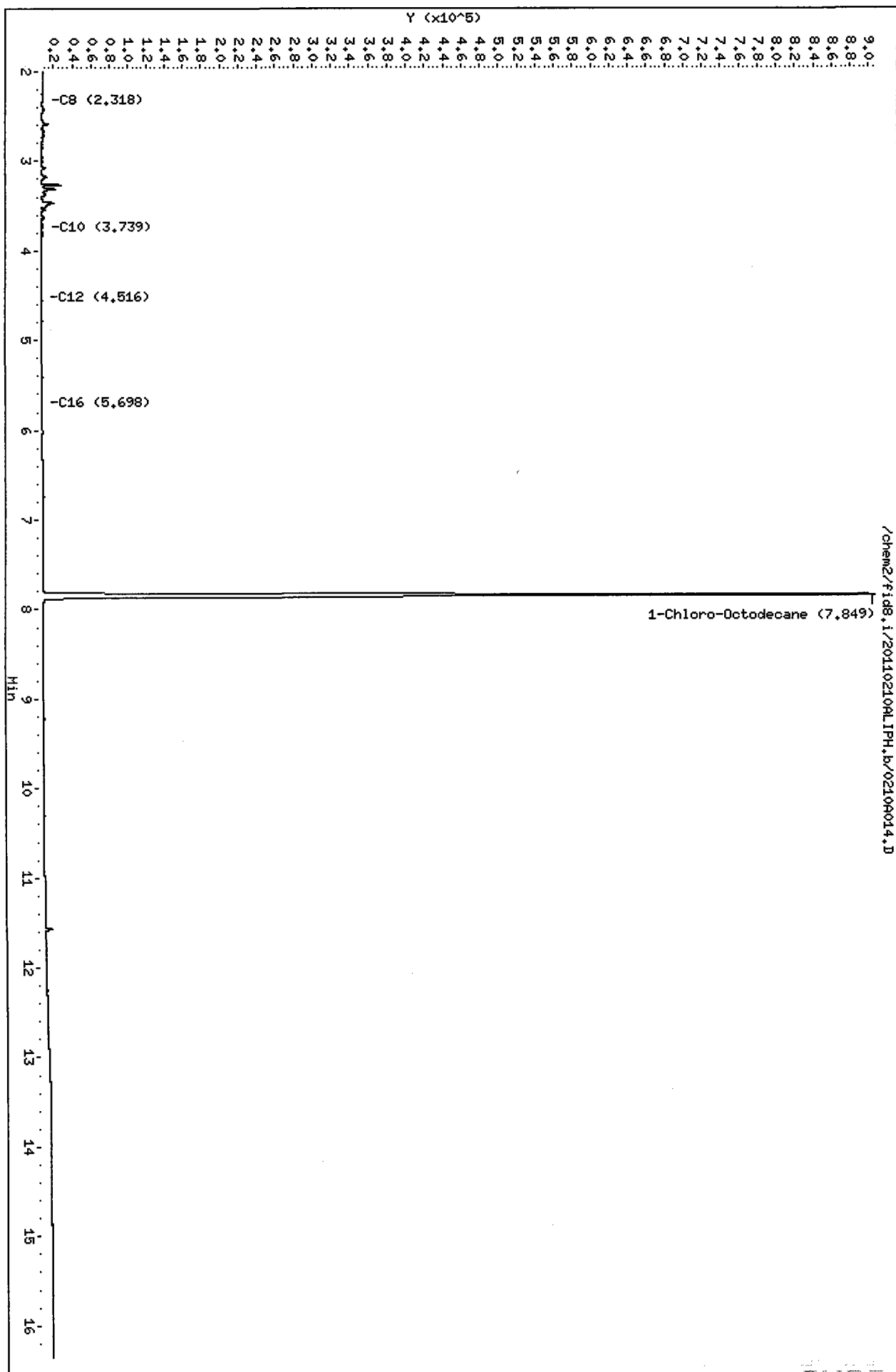
Sample Info: SH23MBS1

Column phase: ZB-5

Instrument: fid8.i

Operator: HS

Column diameter: 0.32



Analytical Resources Inc.
EPH Aromatics Report

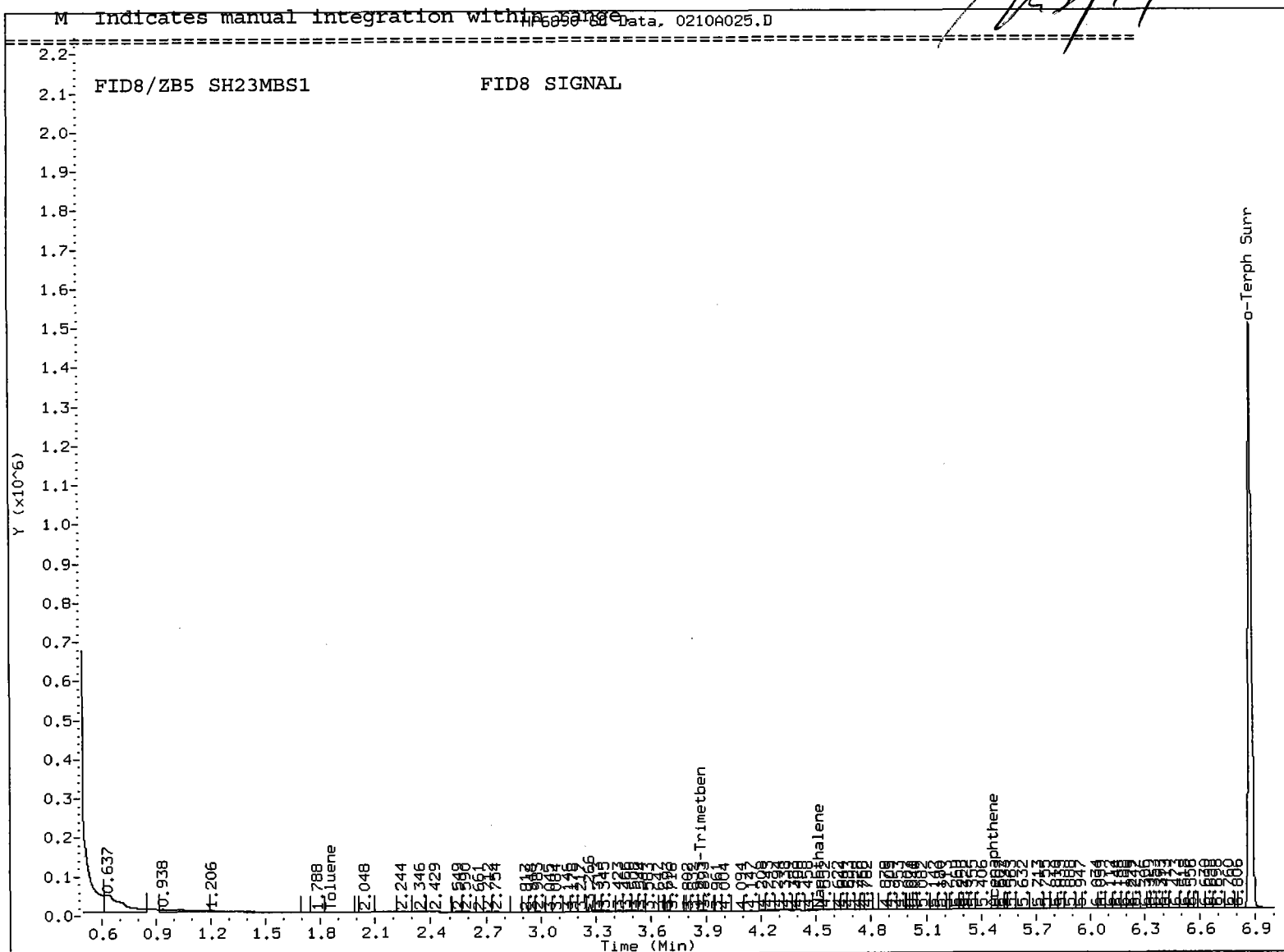
Data file: /chem2/fid8.i/20110210AROM.b/0210A025.D
Method: /chem2/fid8.i/20110210AROM.b/EPHArOm.m
Instrument: fid8.i
Operator: MS
Report Date: 02/11/2011
Macro: AROM072710FID8

ARI ID: SH23MBS1
Client ID: SH23MBS1
Injection: 11-FEB-2011 01:23
Matrix: SOIL
Dilution Factor: 1

EPH-AROMATIC RESULTS

Quant Range	RF	Area	Conc	Time Range
C8-C10 Arom.	17167	28330	2	(1.730 - 3.956)
C10-C12 Arom.	16689	2125	0	(3.956 - 4.616)
C12-C16 Arom.	15441	2044	0	(4.616 - 5.567)
C16-C21 Arom.	14112	19047	1	(5.567 - 8.293)
C21-C34 Arom.	12993	6206	0	(8.293 - 12.503)

Surrogate Rec: 73.0%



SH23: 00170

Data File: /chem2/fid8.i/20110210AR04.b/0210A025.D

Date : 11-FEB-2011 01:23

Client ID: SH23HBS1

Sample Info: SH23HBS1

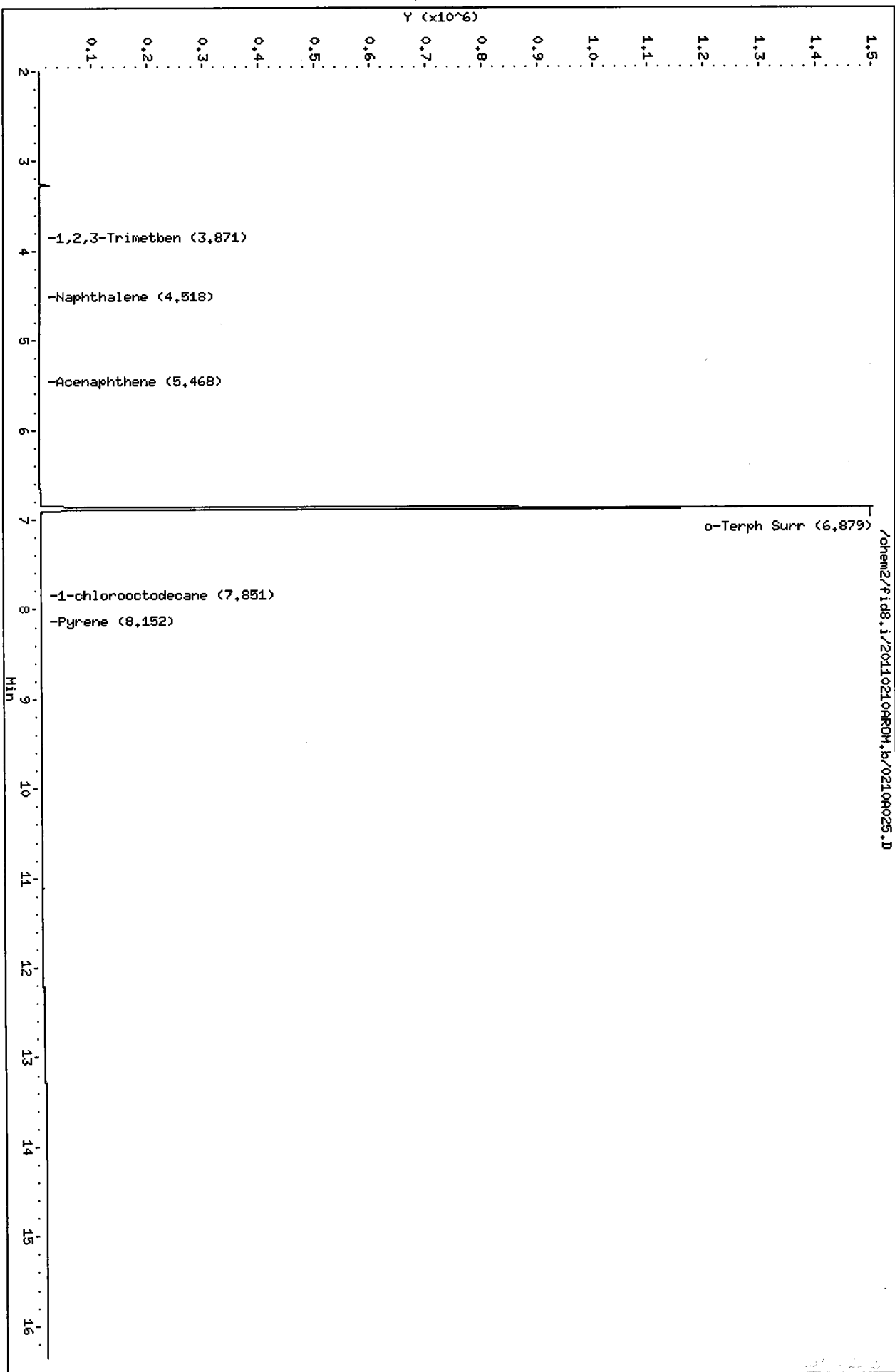
Column phase: ZB-5

Instrument: fid8.i

Operator: MS

Column diameter: 0.32

Page 1



SH23: 00171

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1


Sample ID: B11-06-20

SAMPLE

Lab Sample ID: SH23A

LIMS ID: 11-2184

Matrix: Soil

Data Release Authorized: 

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/07/11 13:03

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 28 mg-dry-wt

Percent Moisture: 5.5%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	44	< 44 U
108-88-3	Toluene	44	< 44 U
100-41-4	Ethylbenzene	44	< 44 U
179601-23-1	m,p-Xylene	88	290
95-47-6	o-Xylene	44	180

Gasoline Range Hydrocarbons

18

440

GAS ID
GRO

BETX Surrogate Recovery

Trifluorotoluene	104%
Bromobenzene	102%

Gasoline Surrogate Recovery

Trifluorotoluene	104%
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.

2/11/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020711-1.b/0207a007.d
Data file 2: /chem3/pid2.i/020711-2.b/0207a007.d
Method: /chem3/pid2.i/020711-2.b/PIDB.m
Instrument: pid2.i
Gas Ical Date: 27-JAN-2011
BETX Ical Date: 27-JAN-2011

ARI ID: SH23A
Client ID: B11-06-20
Injection Date: 07-FEB-2011 13:03
Matrix: SOIL
Dilution Factor: 1.000

=====

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
---	----	-----	----	-----	-----
8.144	0.003	4200	53875	104.1	TFT(Surr)
14.757	0.001	2732	25134	109.7	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
-----	----	-----	-----
WAGas Tol-C12 (9.89 to 17.08)	460088	848328	1.844 M
8015B 2MP-TMB (4.84 to 15.48)	907748	359890	0.396 M
AK101 nC6-nC10 (5.28 to 14.35)	626837	176472	0.282 M
NWTPHG Tol-Nap (9.89 to 18.21)	481270	1215873	2.526 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
---	----	-----	-----	-----
8.171	0.003	2517	104.3	TFT(Surr)
14.773	0.001	6790	102.4	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
---	----	-----	-----	-----
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
12.695	-0.003	268	1.67	M/P-Xylene
13.506	-0.006	147	1.01	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/pid2.i/020711-1.b/0207a007.d

Date : 07-FEB-2011 13:03

Client ID: B11-06-20

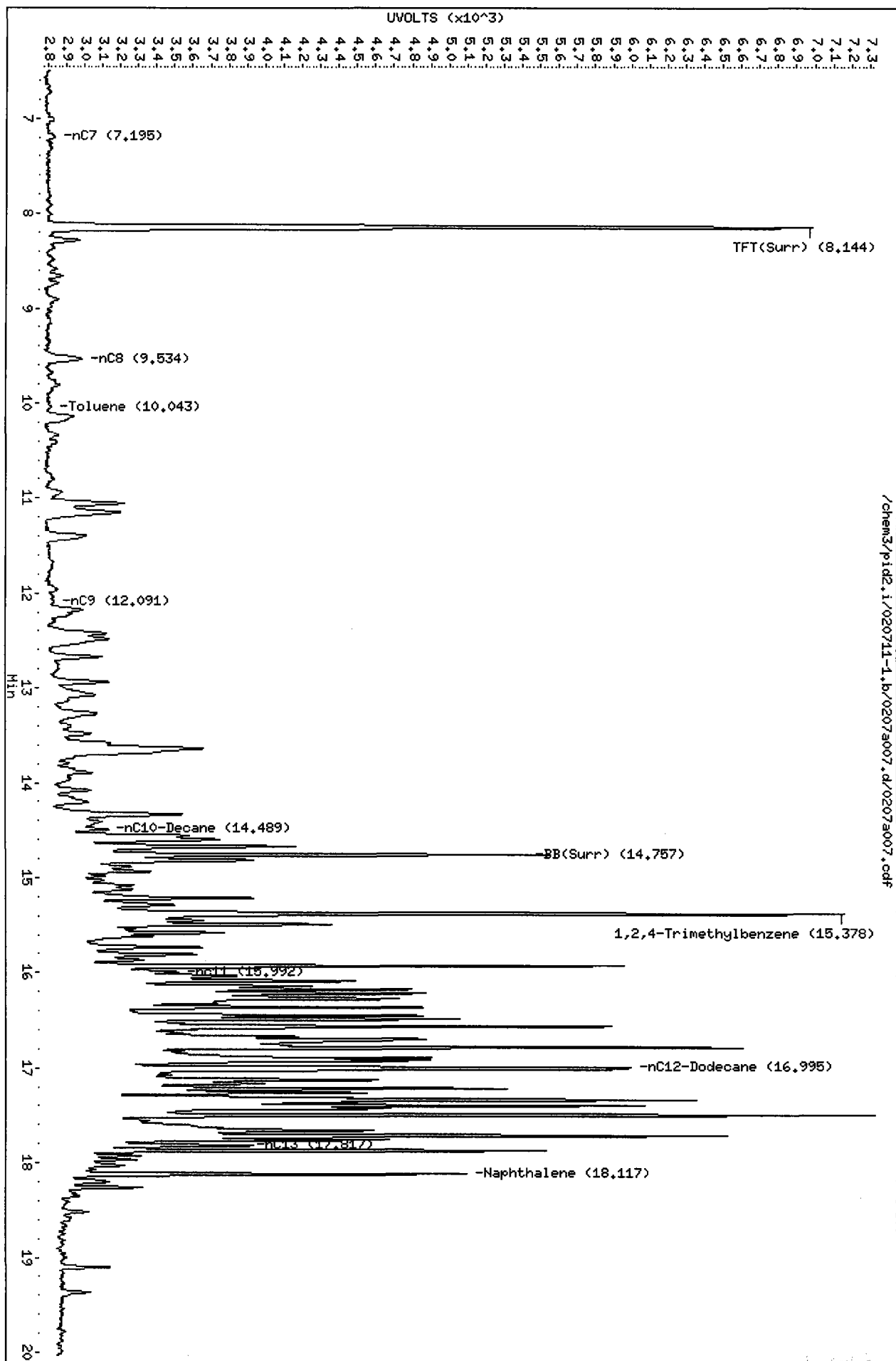
Sample Info: SH23A

Column phase: RTX 502-2 FID

Instrument: pid2.i

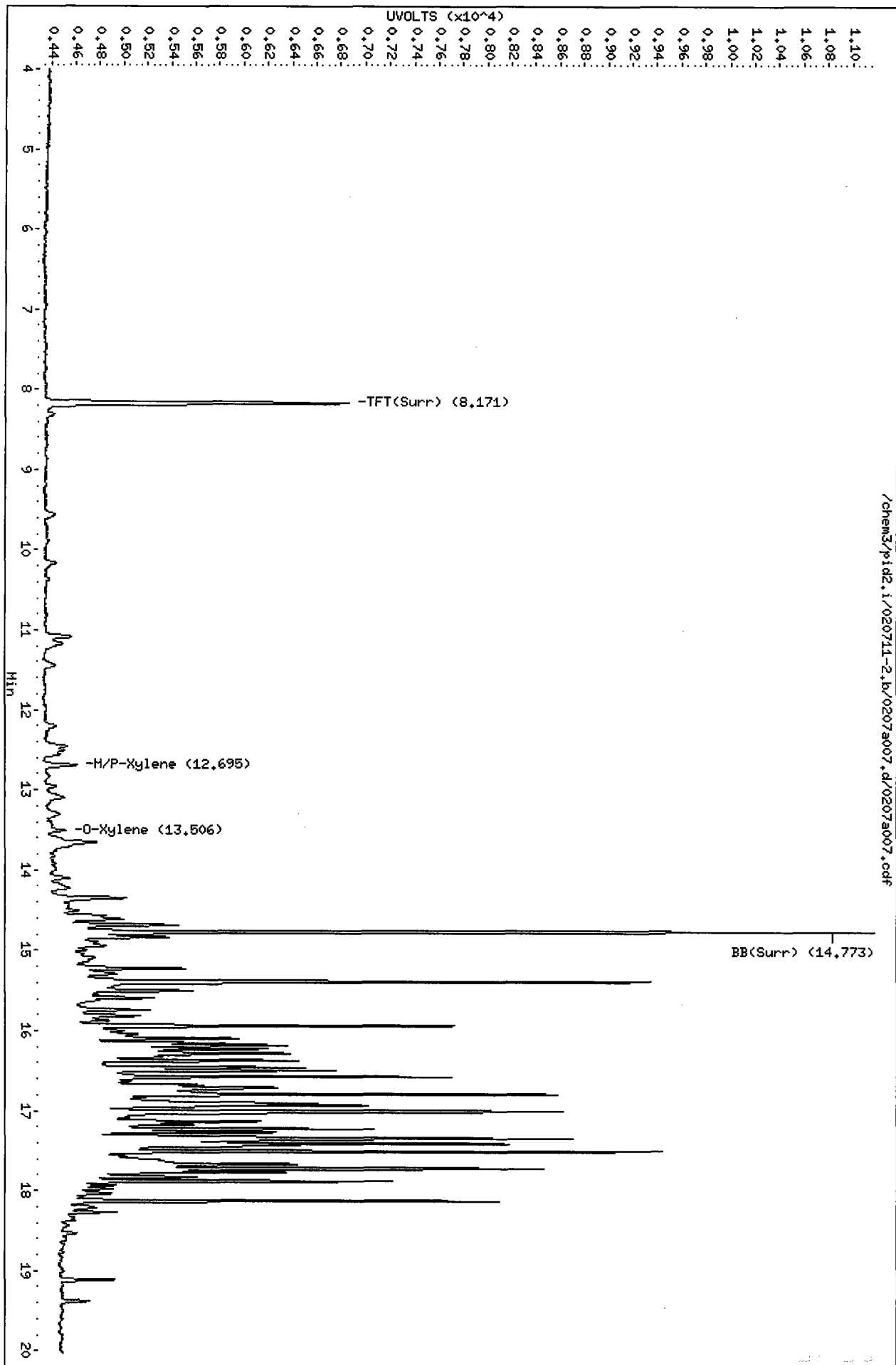
Operator: HH

Column diameter: 0.18



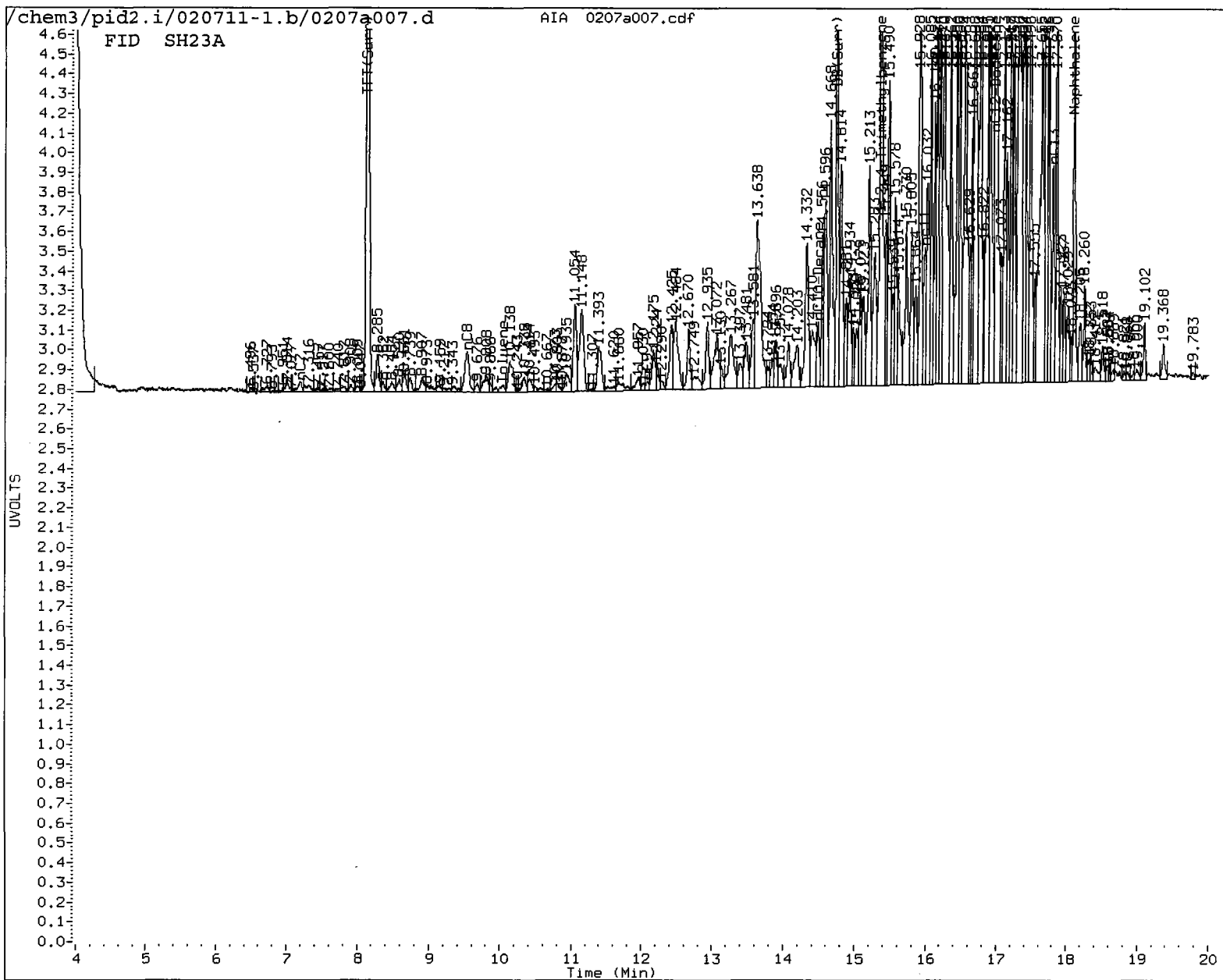
Data File: /chem3/pid2.i/020711-2.b/0207a007.d
Date : 07-FEB-2011 13:03
Client ID: B11-06-20
Sample Info: SH23A
Column phase: RTX 502-2 PID

Instrument: pid2.i
Operator: HH
Column diameter: 0.18



AIA 0207a007.cdf: 0.149 to 20.413 Min





ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: B11-06-25

SAMPLE

Lab Sample ID: SH23B

LIMS ID: 11-2185

Matrix: Soil

Data Release Authorized: *AS*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/07/11 13:31

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 23 mg-dry-wt

Percent Moisture: 13.5%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	55	< 55 U
108-88-3	Toluene	55	< 55 U
100-41-4	Ethylbenzene	55	< 55 U
179601-23-1	m,p-Xylene	110	570
95-47-6	o-Xylene	55	270

Gasoline Range Hydrocarbons

22

700

GAS ID
GRO

BETX Surrogate Recovery

Trifluorotoluene	102%
Bromobenzene	101%

Gasoline Surrogate Recovery

Trifluorotoluene	103%
Bromobenzene	114%

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/020711-1.b/0207a008.d
Data file 2: /chem3/pid2.i/020711-2.b/0207a008.d
Method: /chem3/pid2.i/020711-2.b/PIDB.m
Instrument: pid2.i
Gas Ical Date: 27-JAN-2011
BETX Ical Date: 27-JAN-2011

ARI ID: SH23B
Client ID: B11-06-25
Injection Date: 07-FEB-2011 13:31
Matrix: SOIL
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.142	0.001	4161	53426	103.1	TFT(Surr)
14.755	0.000	2844	27755	114.2	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.89 to 17.08)	460088	1162352	2.526 M
8015B 2MP-TMB (4.84 to 15.48)	907748	546601	0.602 M
AK101 nC6-nC10 (5.28 to 14.35)	626837	285109	0.455 M
NWTPHG Tol-Nap (9.89 to 18.21)	481270	1536834	3.193 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
8.169	0.001	2461	101.9	TFT(Surr)
14.772	0.000	6726	101.4	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
12.693	-0.005	421	2.62	M/P-Xylene
13.500	-0.012	180	1.23N	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/pid2.i/020711-1.b/0207a008.d

Date : 07-FEB-2011 13:34

Client ID: B11-06-25

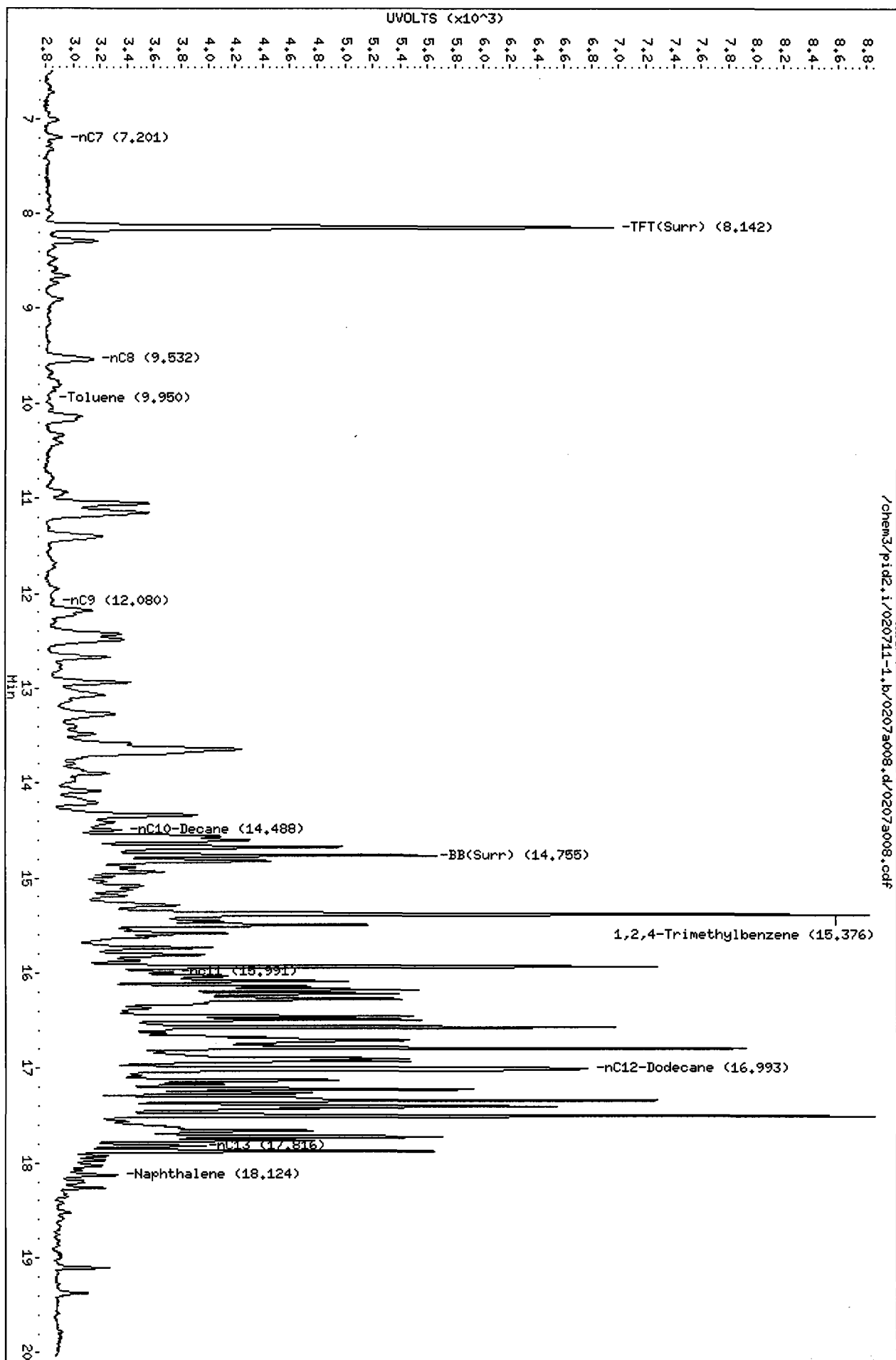
Sample Info: SH23B

Column phase: RTX 502-2 FID

Instrument: pid2.i

Operator: HH

Column diameter: 0.18



Data File: /chem3/pid2.i/020711-2.b/0207a008.d

Date : 07-FEB-2011 13:31

Client ID: B11-06-25

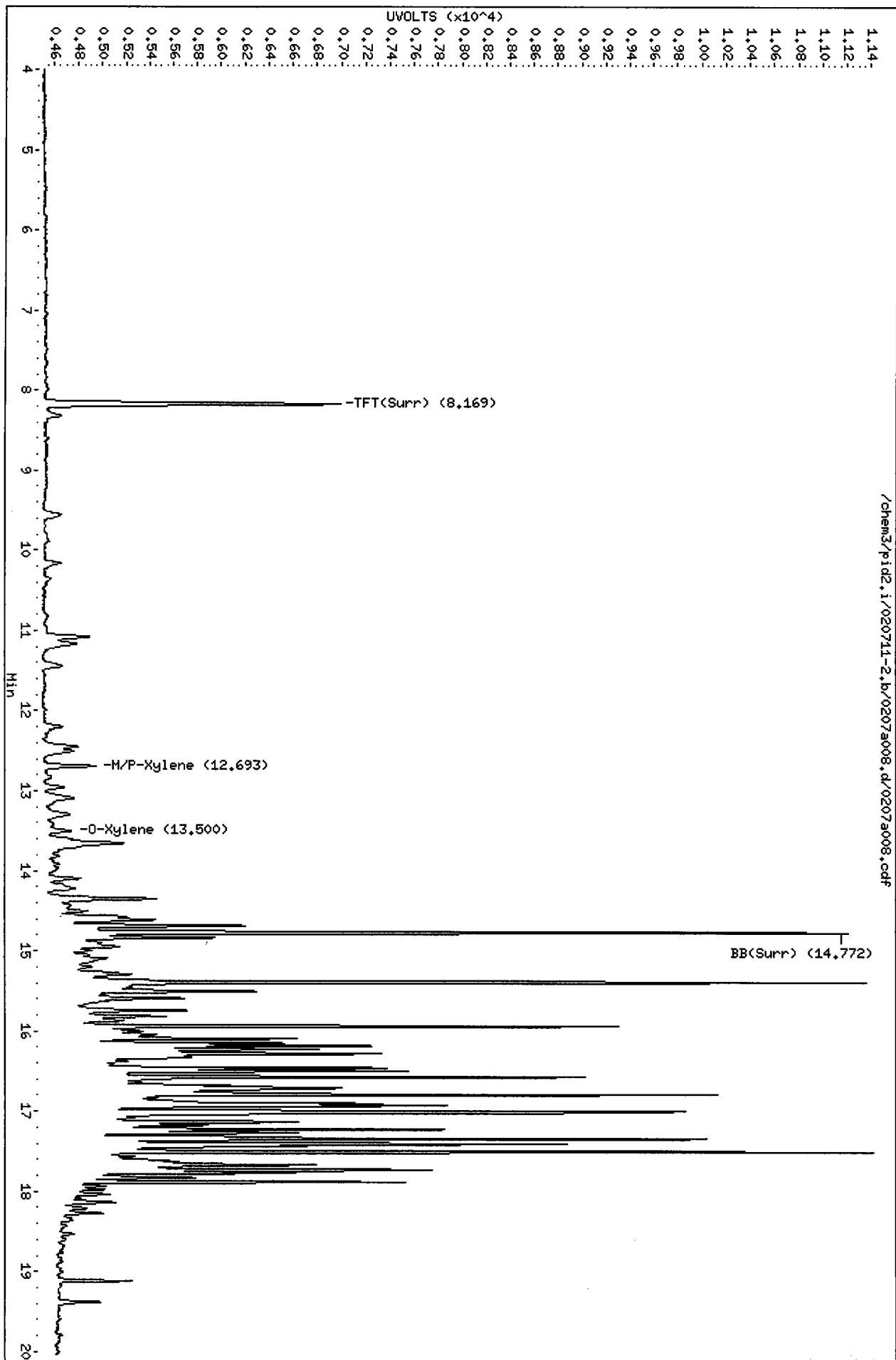
Sample Info: SH23B

Column phase: RTX 502-2 PID

Instrument: pid2.i

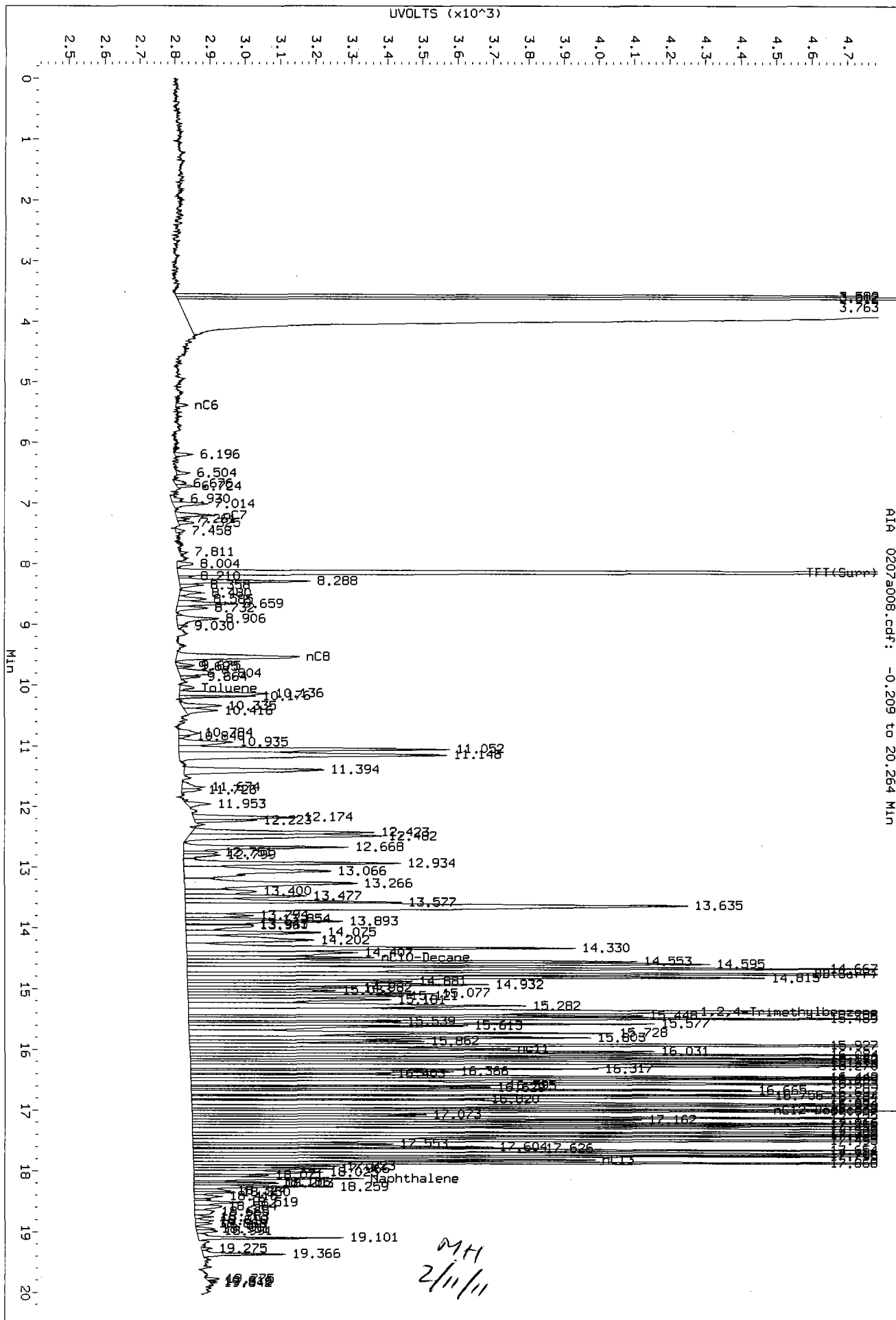
Operator: HH

Column diameter: 0.18

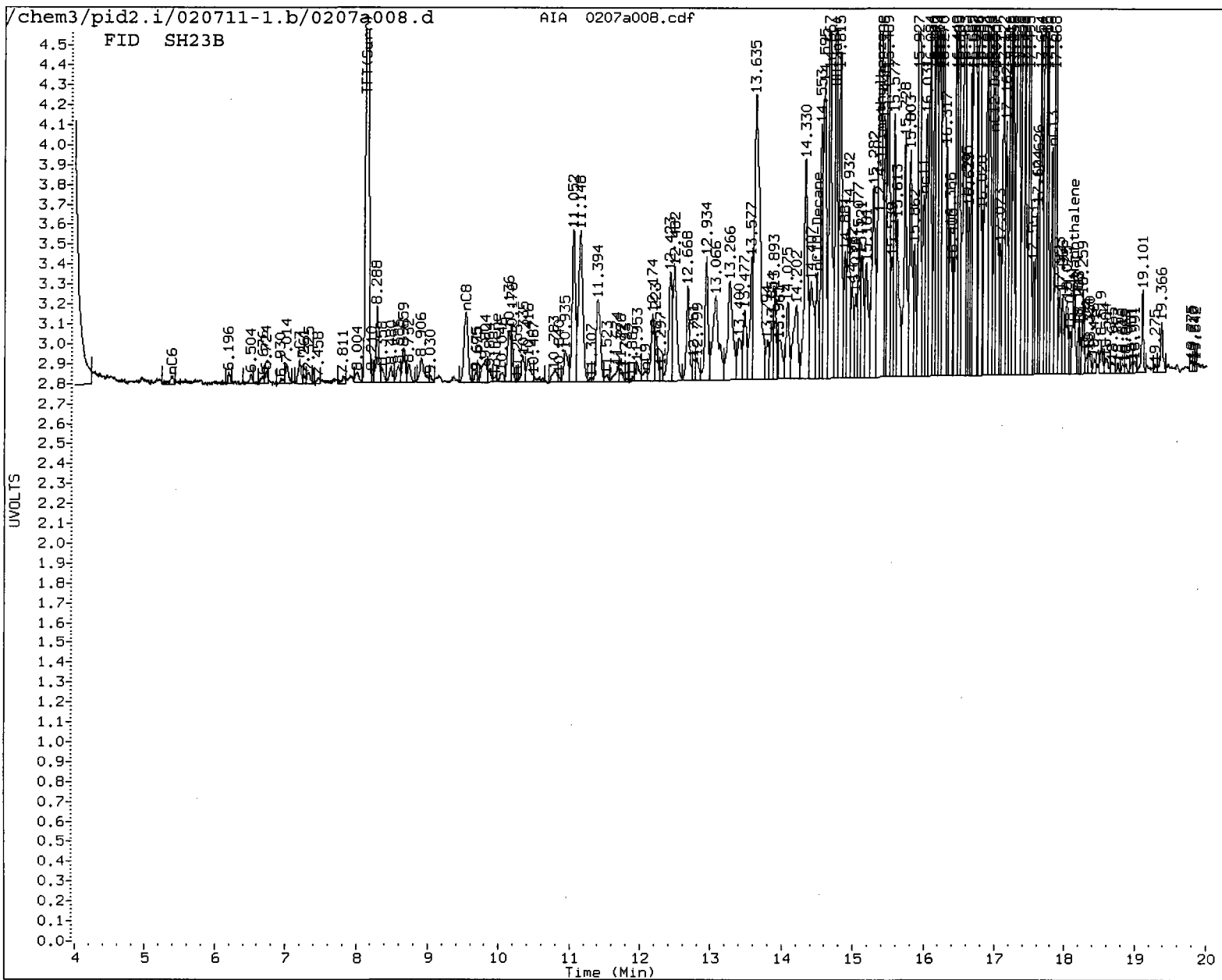


10100
SH23

Data File: /chem3/pid2.1/020711-1.b/0207a008.d/0207a008.cdf
Injection Date: 07-FEB-2011 13:31
Instrument: pid2.1
Client Sample ID: B11-06-25



SH23:00102



MANUAL INTEGRATION

- ☒ Baseline correction
- ☐ 2. Poor chromatography
- ☐ 3. Peak not found
- ☐ 4. Totals calculation

5. Other _____

Analyst: MH

Date: 2/11/11

Sample ID: B11-06-30
SAMPLE



Lab Sample ID: SH23C
LIMS ID: 11-2186
Matrix: Soil
Data Release Authorized: *AB*
Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group
Project: Birds Eye Soil
Event: JI1001
Date Sampled: 02/01/11
Date Received: 02/02/11

Date Analyzed: 02/07/11 13:59
Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL
Sample Amount: 24 mg-dry-wt
Percent Moisture: 13.4%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	52	260
108-88-3	Toluene	52	< 52 U
100-41-4	Ethylbenzene	52	280
179601-23-1	m,p-Xylene	100	< 100 U
95-47-6	o-Xylene	52	360

Gasoline Range Hydrocarbons	21	670	GAS ID GRO
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BETX Surrogate Recovery

Trifluorotoluene	94.8%
Bromobenzene	94.3%

Gasoline Surrogate Recovery

Trifluorotoluene	96.1%
Bromobenzene	108%

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/020711-1.b/0207a009.d
Data file 2: /chem3/pid2.i/020711-2.b/0207a009.d
Method: /chem3/pid2.i/020711-2.b/PIDB.m
Instrument: pid2.i
Gas Ical Date: 27-JAN-2011
BETX Ical Date: 27-JAN-2011

ARI ID: SH23C
Client ID: B11-06-30
Injection Date: 07-FEB-2011 13:59
Matrix: SOIL
Dilution Factor: 1.000

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.141	0.000	3877	50046	96.1	TFT(Surr)
14.754	-0.002	2683	26313	107.8	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.89 to 17.08)	460088	1146964	2.493 M
8015B 2MP-TMB (4.84 to 15.48)	907748	701001	0.772 M
AK101 nC6-nC10 (5.28 to 14.35)	626837	472756	0.754 M
NWTPHG Tol-Nap (9.89 to 18.21)	481270	1534492	3.188 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
8.169	0.001	2289	94.8	TFT(Surr)
14.770	-0.002	6256	94.3	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
7.492	0.005	194	1.24	Benzene
ND	---	---	---	Toluene
12.553	-0.008	200	1.32N	Ethylbenzene
12.687	-0.011	45	0.28N	M/P-Xylene
13.502	-0.010	249	1.71	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/pid2.i/020711-1.b/0207a009.d

Date : 07-FEB-2011 13:59

Client ID: B41-06-30

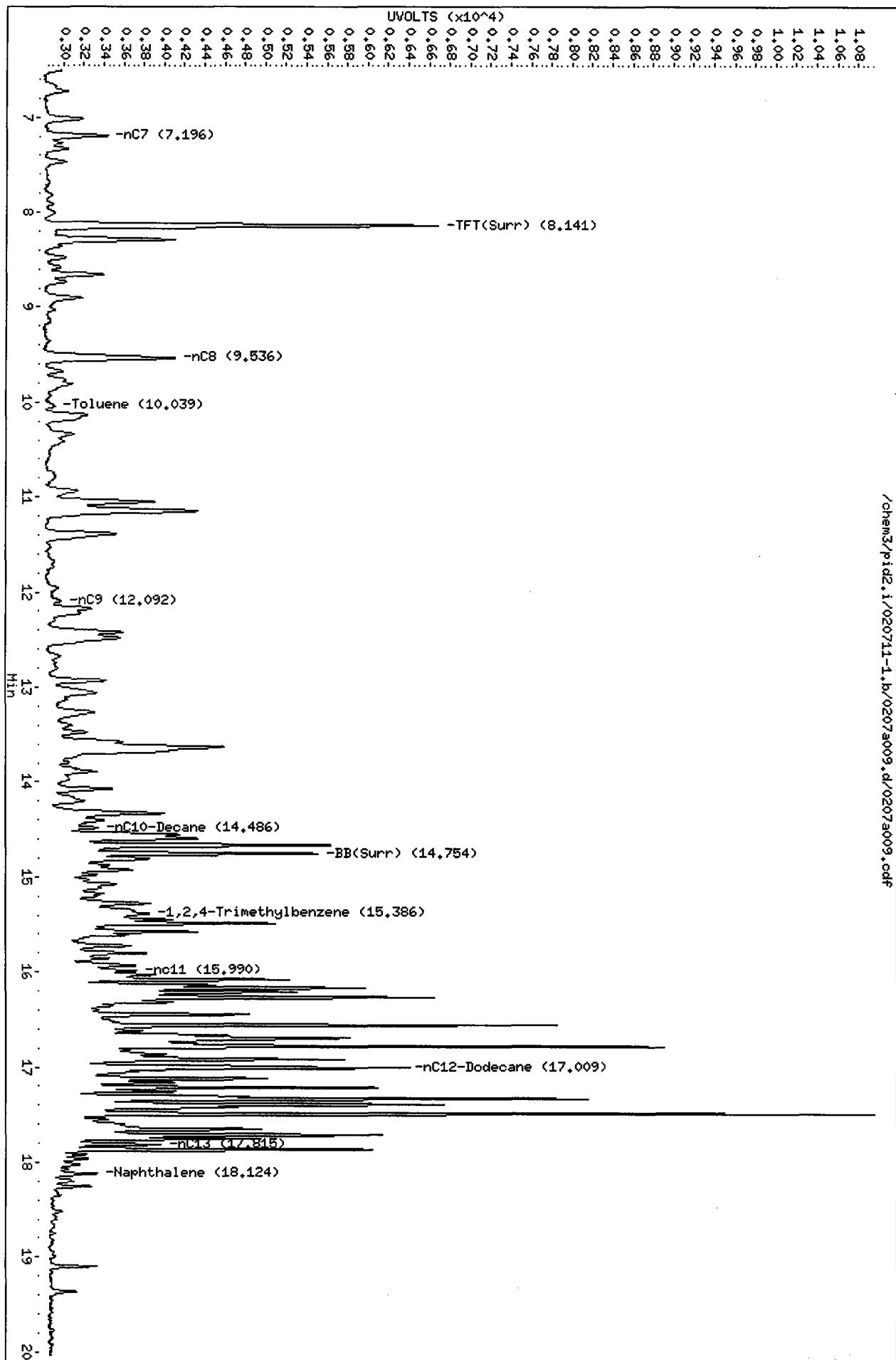
Sample Info: SH23C

Column phase: RTX 502-2 FID

Instrument: pid2.i

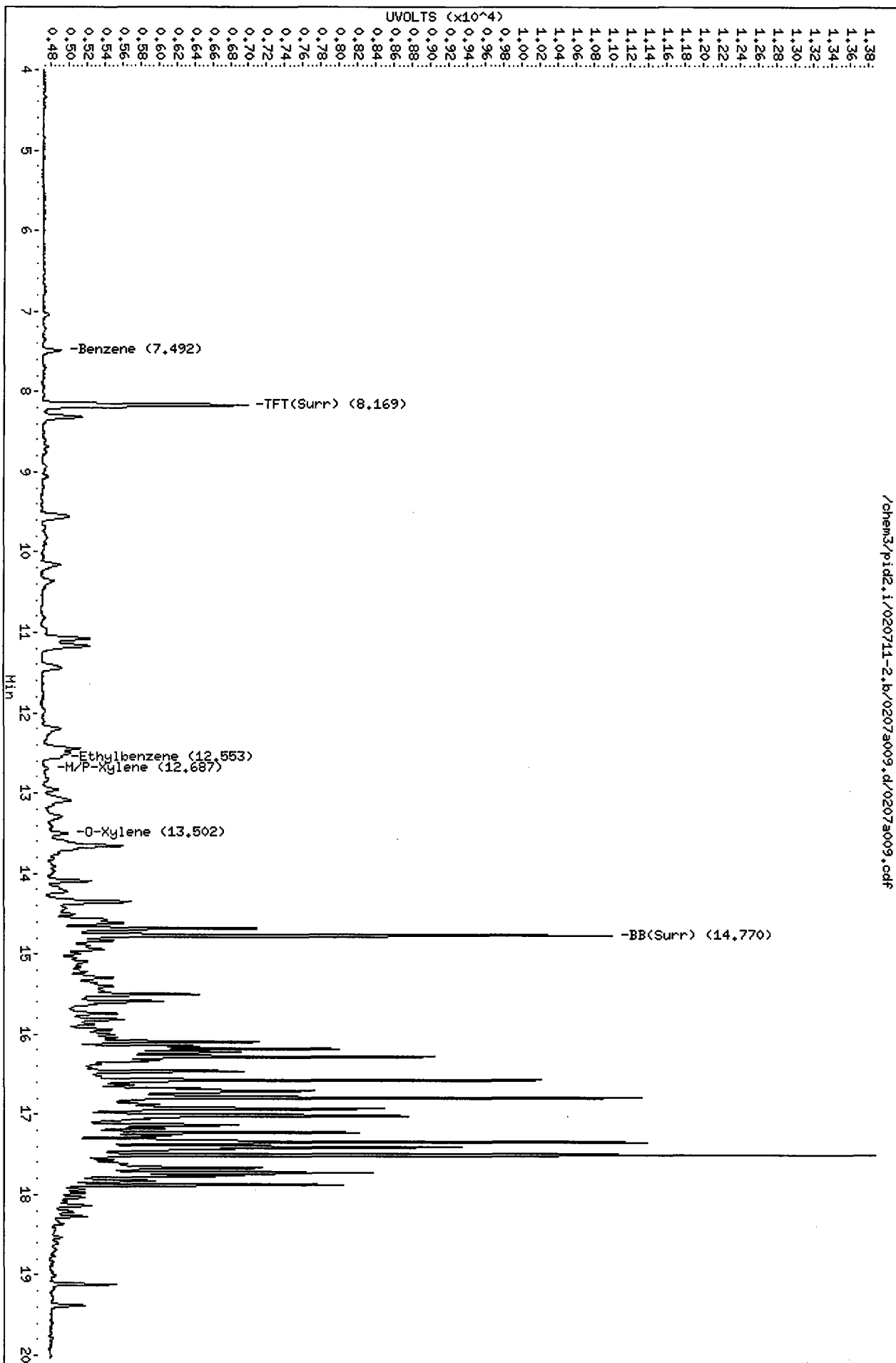
Operator: HH

Column diameter: 0.18

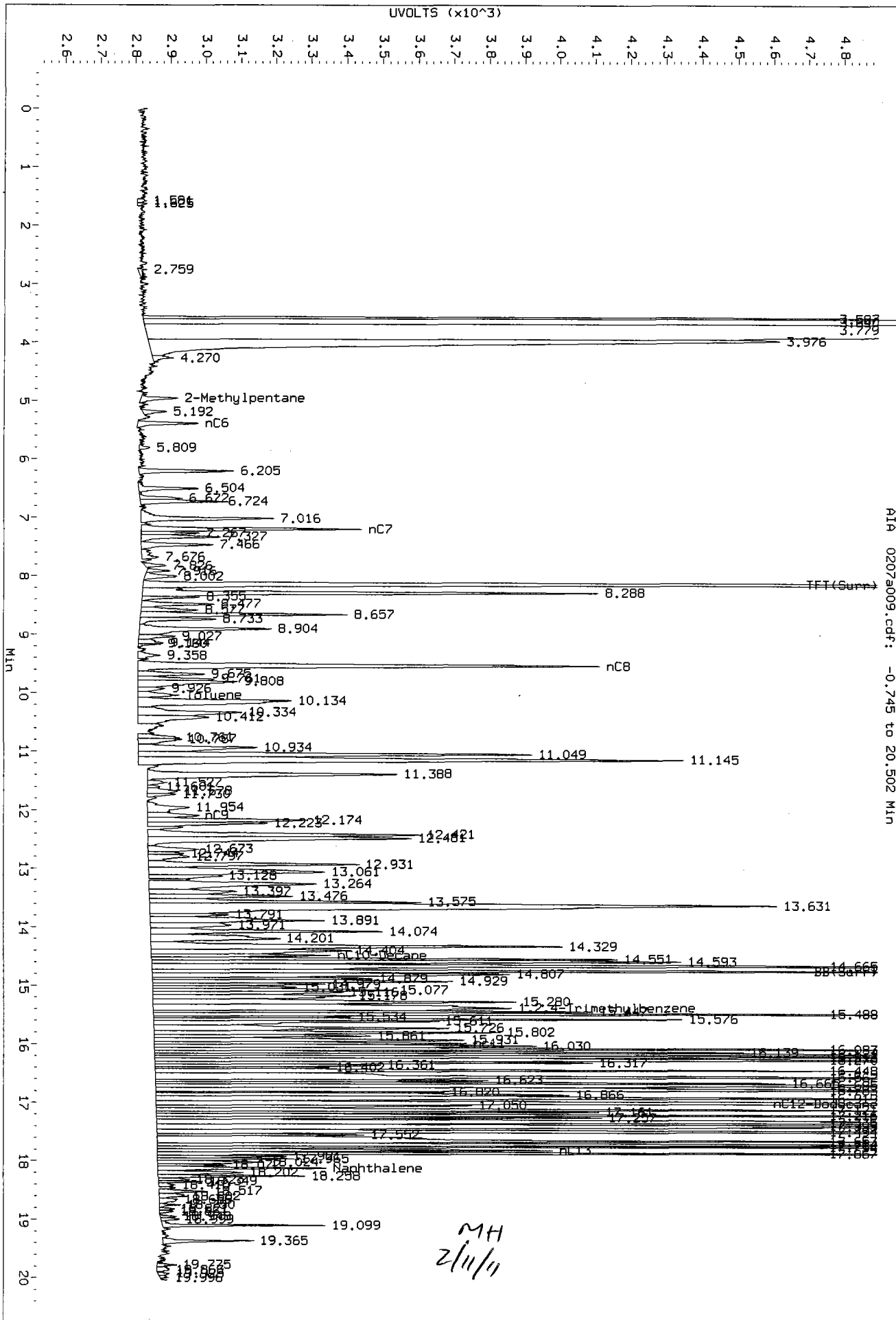


Data File: /chem3/pid2.i/020711-2.b/0207a009.d
Date : 07-FEB-2011 13:59
Client ID: B11-06-30
Sample Info: SH23C
Column phase: RTX 502-2 PID

Instrument: pid2.i
Operator: HH
Column diameter: 0.18




Data File: /chem3/pid2.1/020711-1.b/0207a009.d/0207a009.cdf
Injection Date: 07-FEB-2011 13:59
Instrument: pid2.1
Client Sample ID: B11-06-30



MH
2/11/11

Sample ID: B11-08-20
SAMPLE

Lab Sample ID: SH23H
LIMS ID: 11-2191
Matrix: Soil
Data Release Authorized: 
Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group
Project: Birds Eye Soil
Event: JI1001
Date Sampled: 02/01/11
Date Received: 02/02/11

Date Analyzed: 02/07/11 14:28
Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL
Sample Amount: 28 mg-dry-wt
Percent Moisture: 4.8%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	44	< 44 U
108-88-3	Toluene	44	< 44 U
100-41-4	Ethylbenzene	44	630
179601-23-1	m,p-Xylene	88	< 88 U
95-47-6	o-Xylene	44	240

Gasoline Range Hydrocarbons

18

450

GAS ID
GRO

BETX Surrogate Recovery

Trifluorotoluene	95.8%
Bromobenzene	95.3%

Gasoline Surrogate Recovery

Trifluorotoluene	97.6%
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.

M
2/11/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020711-1.b/0207a010.d	ARI ID: SH23H
Data file 2: /chem3/pid2.i/020711-2.b/0207a010.d	Client ID: B11-08-20
Method: /chem3/pid2.i/020711-2.b/PIDB.m	Injection Date: 07-FEB-2011 14:28
Instrument: pid2.i	Matrix: SOIL
Gas Ical Date: 27-JAN-2011	Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011	

=====

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
--	----	-----	----	----	-----
8.141	0.000	3938	50385	97.6	TFT(Surr)
14.753	-0.003	2590	24082	104.0	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
-----	----	-----	-----
WAGas Tol-C12 (9.89 to 17.08)	460088	886501	1.927 M
8015B 2MP-TMB (4.84 to 15.48)	907748	520955	0.574 M
AK101 nC6-nC10 (5.28 to 14.35)	626837	357987	0.571 M
NWTPHG Tol-Nap (9.89 to 18.21)	481270	1228318	2.552 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
--	----	-----	----	-----
8.169	0.001	2312	95.8	TFT(Surr)
14.771	-0.002	6321	95.3	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
--	----	-----	-----	-----
7.490	0.003	35	0.22N	Benzene
ND	---	---	---	Toluene
12.558	-0.003	537	3.56	Ethylbenzene
12.693	-0.004	77	0.48N	M/P-Xylene
13.499	-0.013	196	1.34	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/pid2.i/020711-1.b/0207a010.d

Date : 07-FEB-2011 14:28

Client ID: B11-08-20

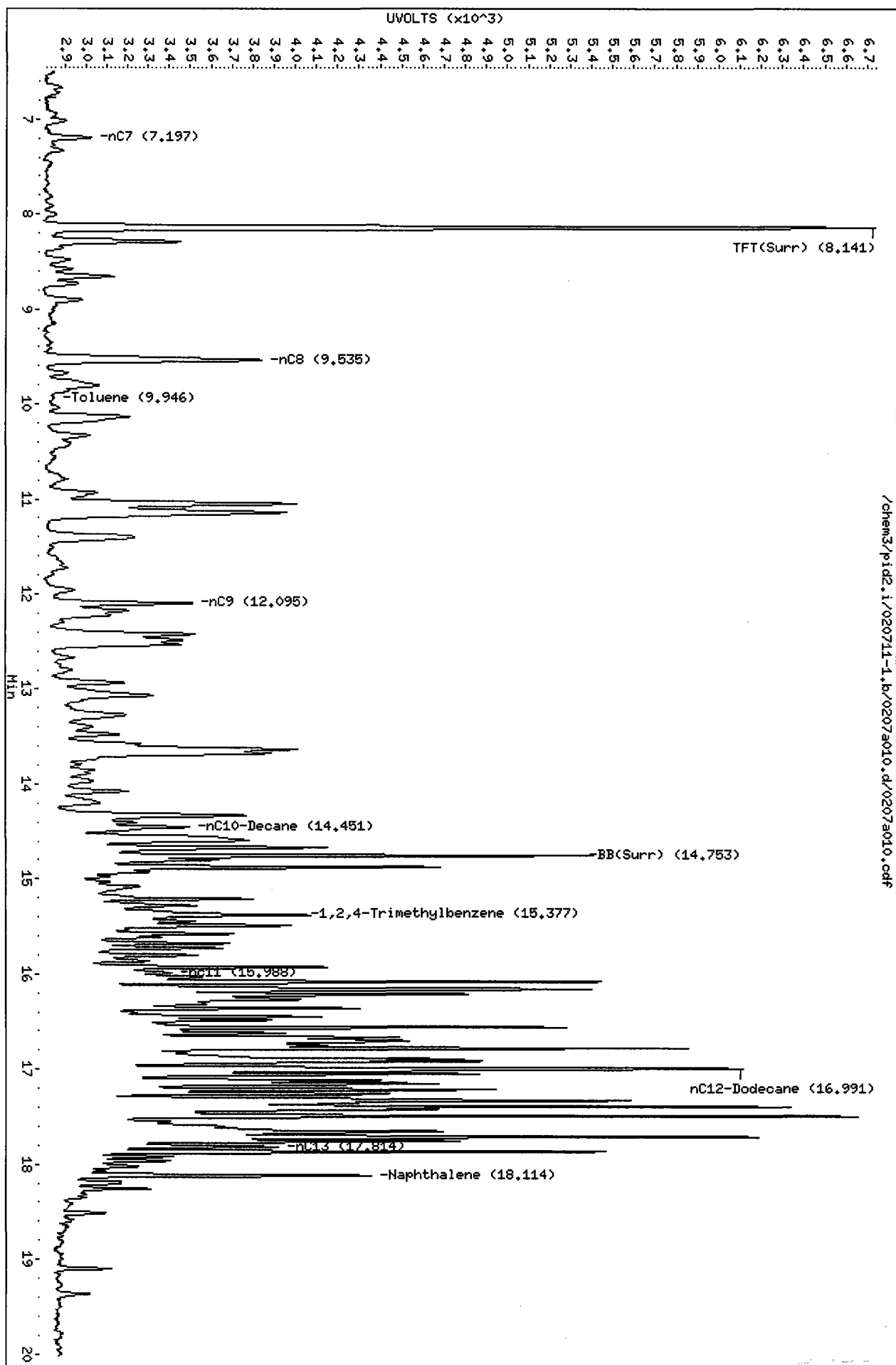
Sample Info: SH23H

Column phase: RTX 502-2 FID

Instrument: pid2.i

Operator: MH

Column diameter: 0.18



Data File: /chem3/pid2.i/020711-2.b/0207a010.d

Date : 07-FEB-2011 14:28

Client ID: B11-08-20

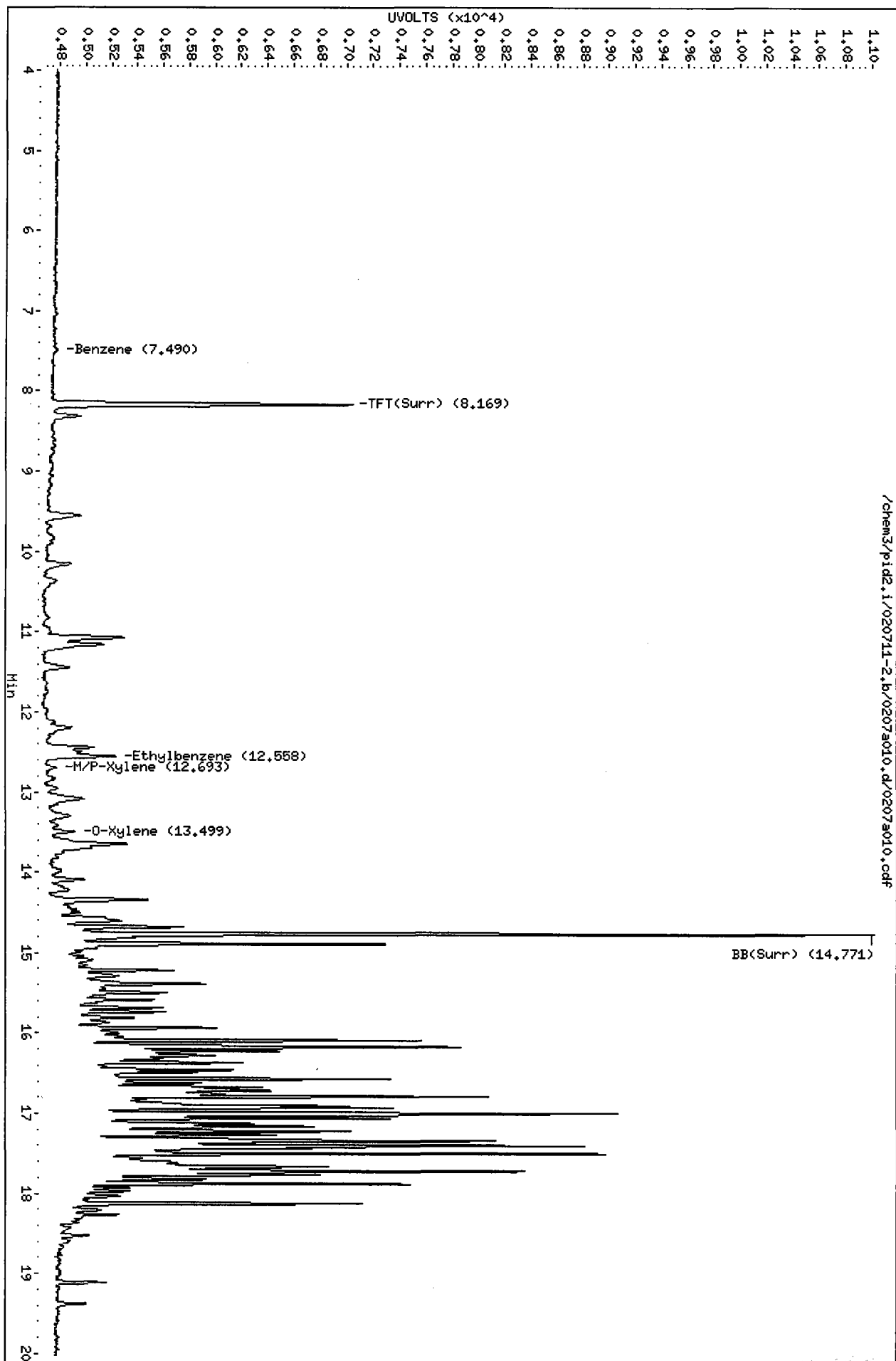
Sample Info: SH23H

Column Phase: RTX 502-2 PID

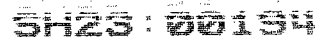
Instrument: pid2.i

Operator: HH

Column diameter: 0.18



AIA 0207a010.cdf: 0.208 to 20.491 Min



ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: B11-08-25

SAMPLE

Lab Sample ID: SH23I

LIMS ID: 11-2192

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/07/11 14:56

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 25 mg-dry-wt

Percent Moisture: 9.7%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	50	80
108-88-3	Toluene	50	< 50 U
100-41-4	Ethylbenzene	50	1,300
179601-23-1	m,p-Xylene	100	130
95-47-6	o-Xylene	50	210

Gasoline Range Hydrocarbons

20

470

GAS ID
GRO

BETX Surrogate Recovery

Trifluorotoluene	93.3%
Bromobenzene	92.6%

Gasoline Surrogate Recovery

Trifluorotoluene	95.1%
Bromobenzene	102%

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.

2/11/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020711-1.b/0207a011.d	ARI ID: SH23I
Data file 2: /chem3/pid2.i/020711-2.b/0207a011.d	Client ID: B11-08-25
Method: /chem3/pid2.i/020711-2.b/PIDB.m	Injection Date: 07-FEB-2011 14:56
Instrument: pid2.i	Matrix: SOIL
Gas Ical Date: 27-JAN-2011	Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011	

=====

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
---	----	-----	----	-----	-----
8.142	0.001	3836	49727	95.1	TFT(Surr)
14.754	-0.002	2534	23716	101.8	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
-----	----	-----	-----
WAGas Tol-C12 (9.89 to 17.08)	460088	827323	1.798 M
8015B 2MP-TMB (4.84 to 15.48)	907748	536910	0.591 M
AK101 nC6-nC10 (5.28 to 14.35)	626837	369739	0.590 M
NWTPHG Tol-Nap (9.89 to 18.21)	481270	1145796	2.381 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
---	----	-----	-----	-----
8.169	0.002	2252	93.3	TFT(Surr)
14.771	-0.001	6140	92.6	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
---	----	-----	-----	-----
7.493	0.006	62	0.40N	Benzene
ND	---	---	---	Toluene
12.559	-0.002	1012	6.70	Ethylbenzene
12.693	-0.004	101	0.63N	M/P-Xylene
13.501	-0.011	154	1.06	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/pid2.i/020711-1.b/0207a011.d

Date : 07-FEB-2011 14:56

Client ID: B11-08-25

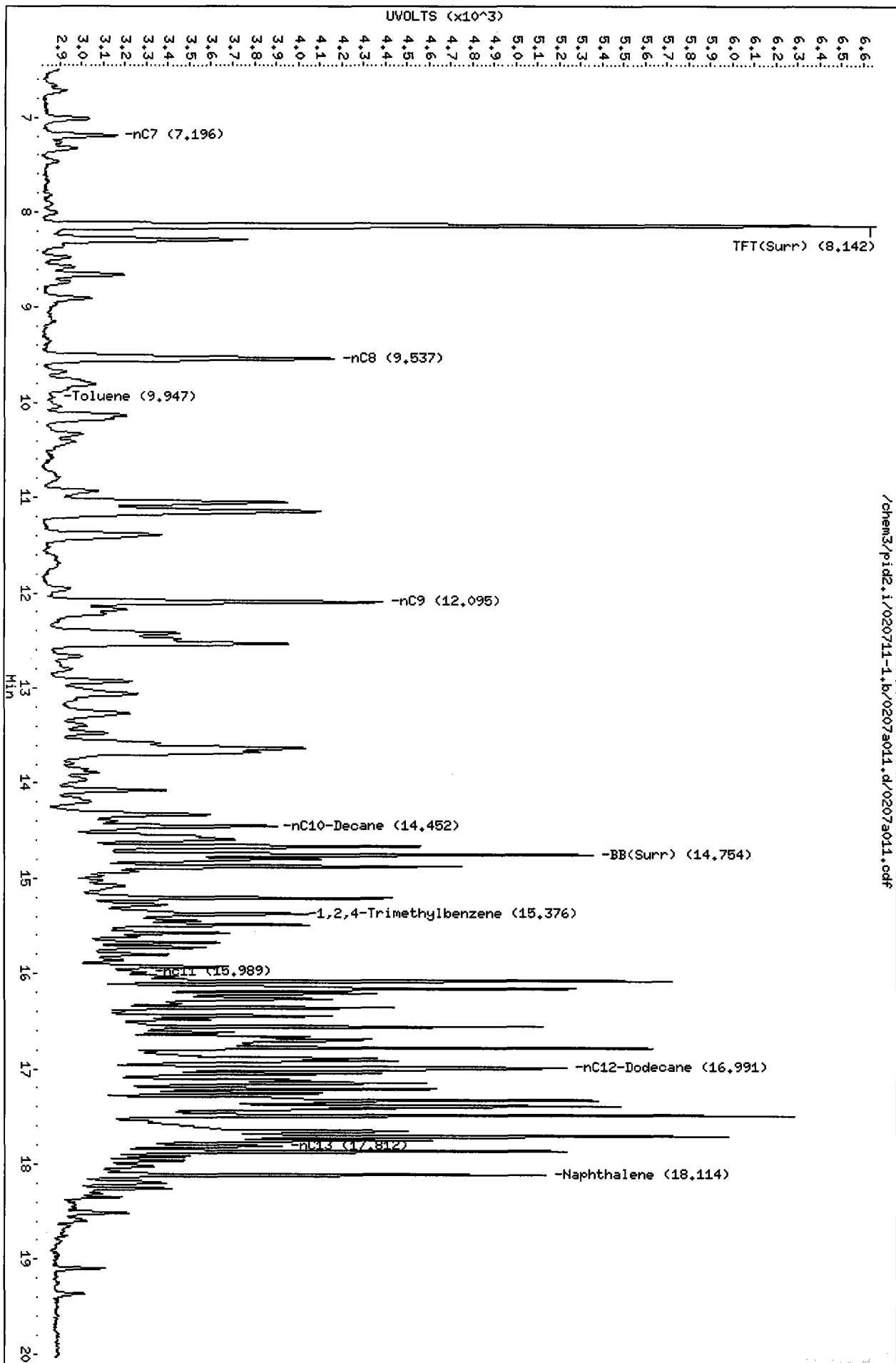
Sample Info: SH231

Column phase: RTX 502-2 FID

Instrument: pid2.i

Operator: HH

Column diameter: 0.18



Data File: /chem3/pid2.i/020711-2.b/0207a011.d

Date : 07-FEB-2011 14:56

Client ID: B41-08-25

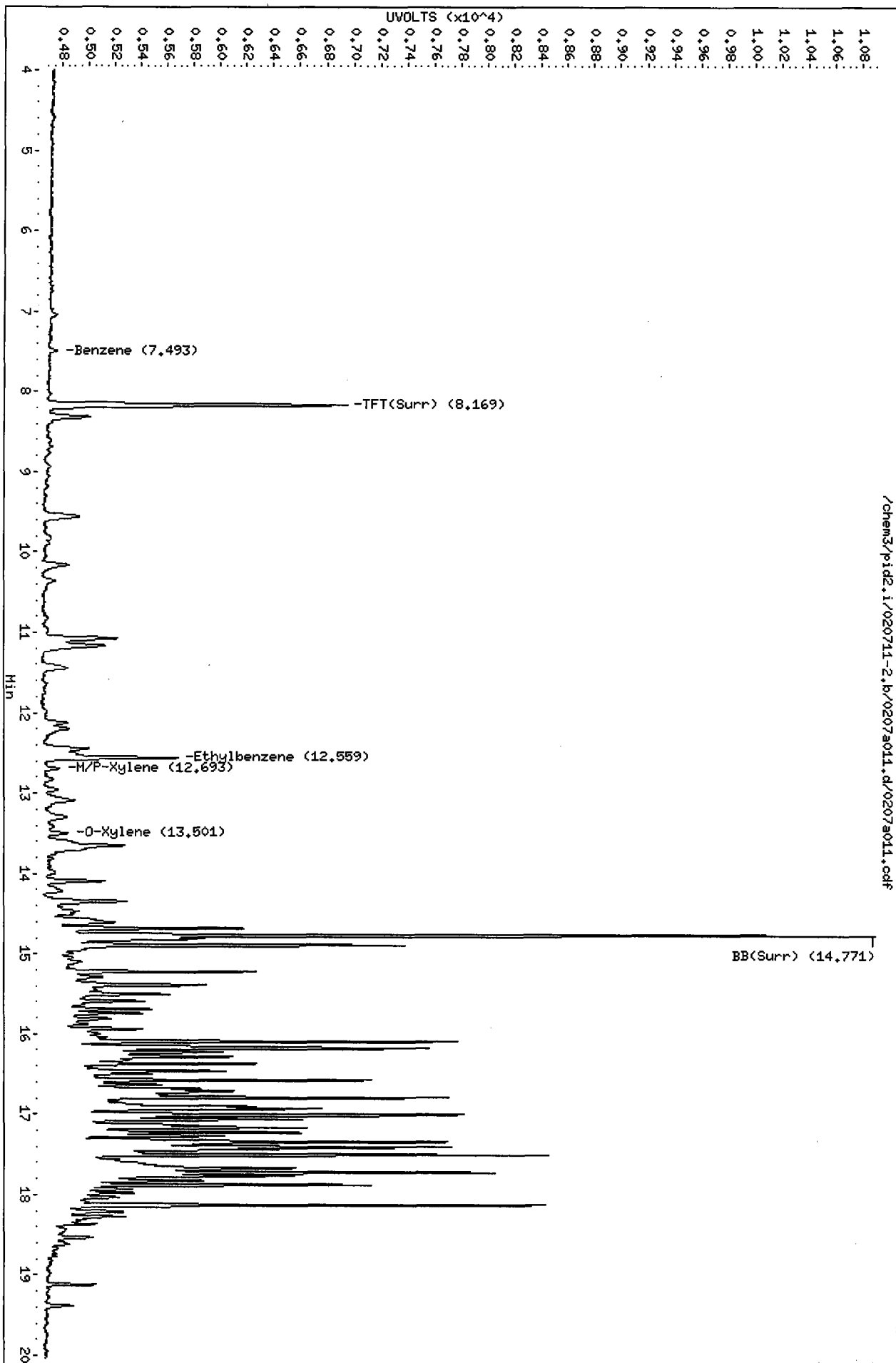
Sample Info: SH231

Column phase: RTX 502-2 PID

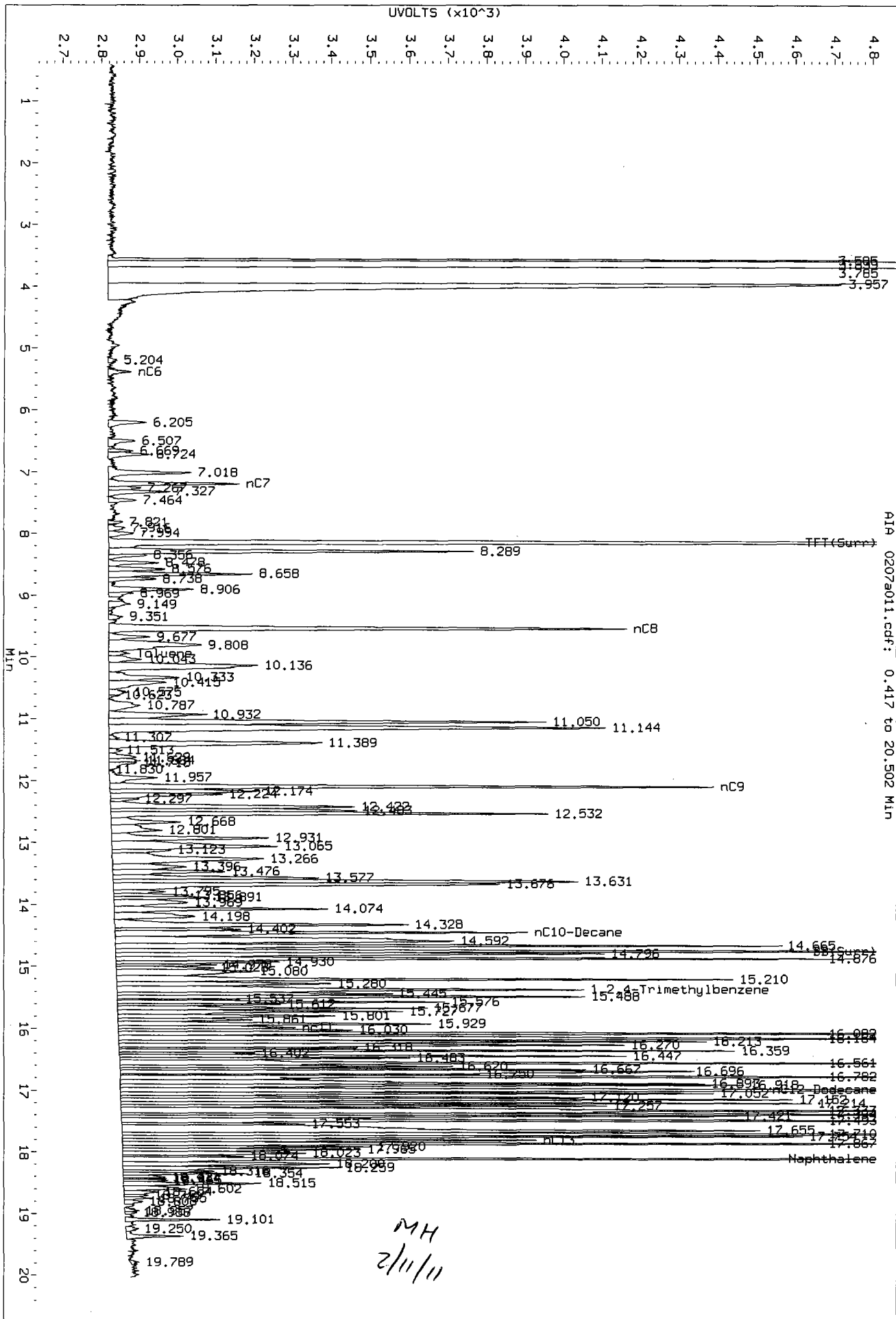
Instrument: pid2.i

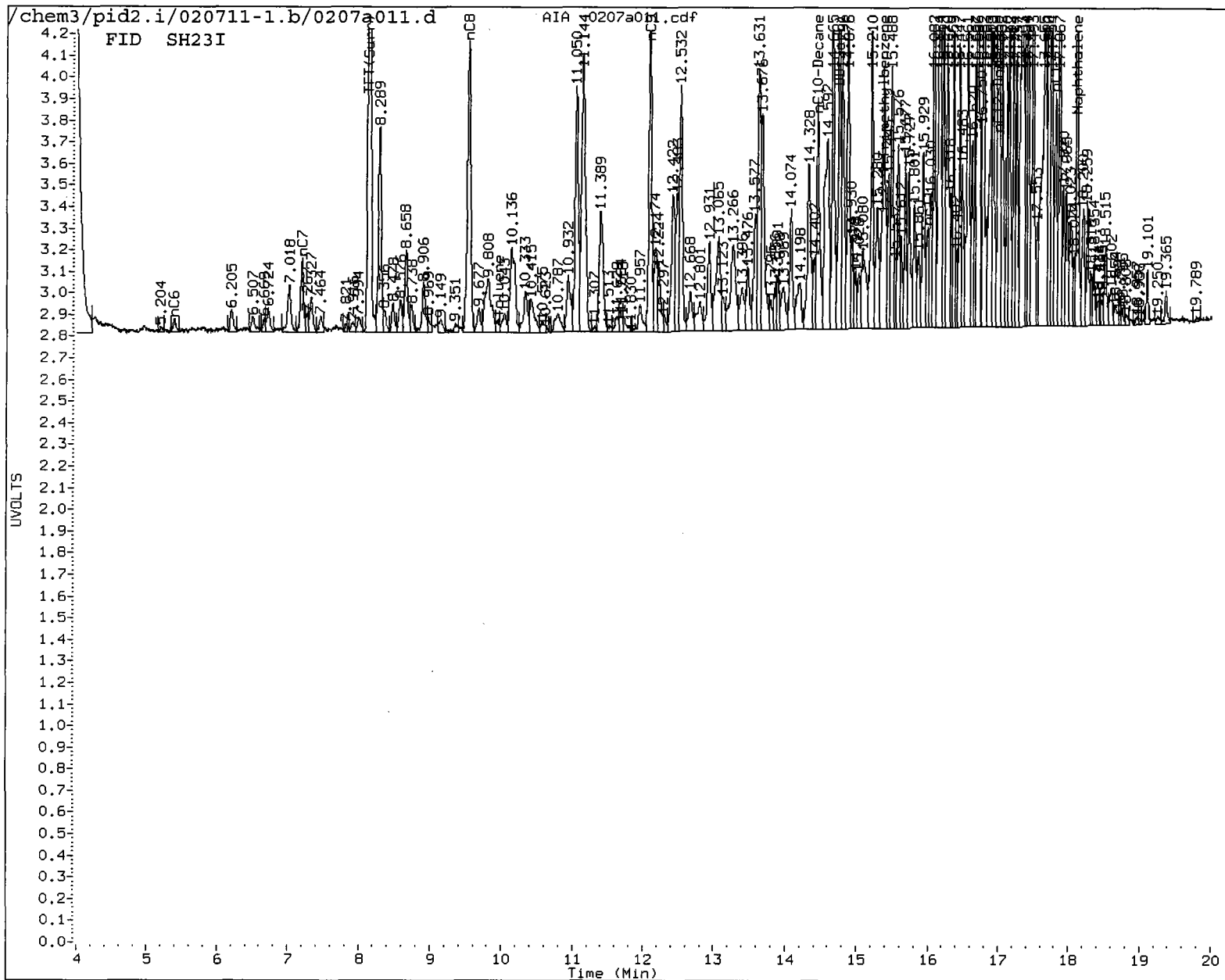
Operator: HH

Column diameter: 0.18



Data File: /chem3/pid2.1/020711-1.b/0207a011.d/0207a011.cdf
Injection Date: 07-FEB-2011 14:56
Instrument: pid2.1
Client Sample ID: B11-08-25





ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: B11-08-30
SAMPLE



Lab Sample ID: SH23J

LIMS ID: 11-2193

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/07/11 15:24

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 27 mg-dry-wt

Percent Moisture: 8.0%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	46	880
108-88-3	Toluene	46	< 46 U
100-41-4	Ethylbenzene	46	2,600
179601-23-1	m,p-Xylene	93	2,700
95-47-6	o-Xylene	46	420

Gasoline Range Hydrocarbons

19

930

GAS ID
GRO

BETX Surrogate Recovery

Trifluorotoluene	97.3%
Bromobenzene	99.0%

Gasoline Surrogate Recovery

Trifluorotoluene	97.8%
Bromobenzene	114%

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.

2/11/11
M.

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020711-1.b/0207a012.d
Data file 2: /chem3/pid2.i/020711-2.b/0207a012.d
Method: /chem3/pid2.i/020711-2.b/PIDB.m
Instrument: pid2.i
Gas Ical Date: 27-JAN-2011
BETX Ical Date: 27-JAN-2011

ARI ID: SH23J
Client ID: B11-08-30
Injection Date: 07-FEB-2011 15:24
Matrix: SOIL
Dilution Factor: 1.000

=====

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
---	----	-----	----	----	-----
8.141	0.001	3947	51158	97.8	TFT(Surr)
14.754	-0.001	2830	26363	113.7	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
-----	----	-----	-----
WAGas Tol-C12 (9.89 to 17.08)	460088	2023828	4.399 M
8015B 2MP-TMB (4.84 to 15.48)	907748	1388688	1.530 M
AK101 nC6-nC10 (5.28 to 14.35)	626837	924353	1.475 M
NWTPHG Tol-Nap (9.89 to 18.21)	481270	2397714	4.982 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
---	----	-----	----	-----
8.170	0.002	2348	97.3	TFT(Surr)
14.772	0.000	6566	99.0	BB(Surr)

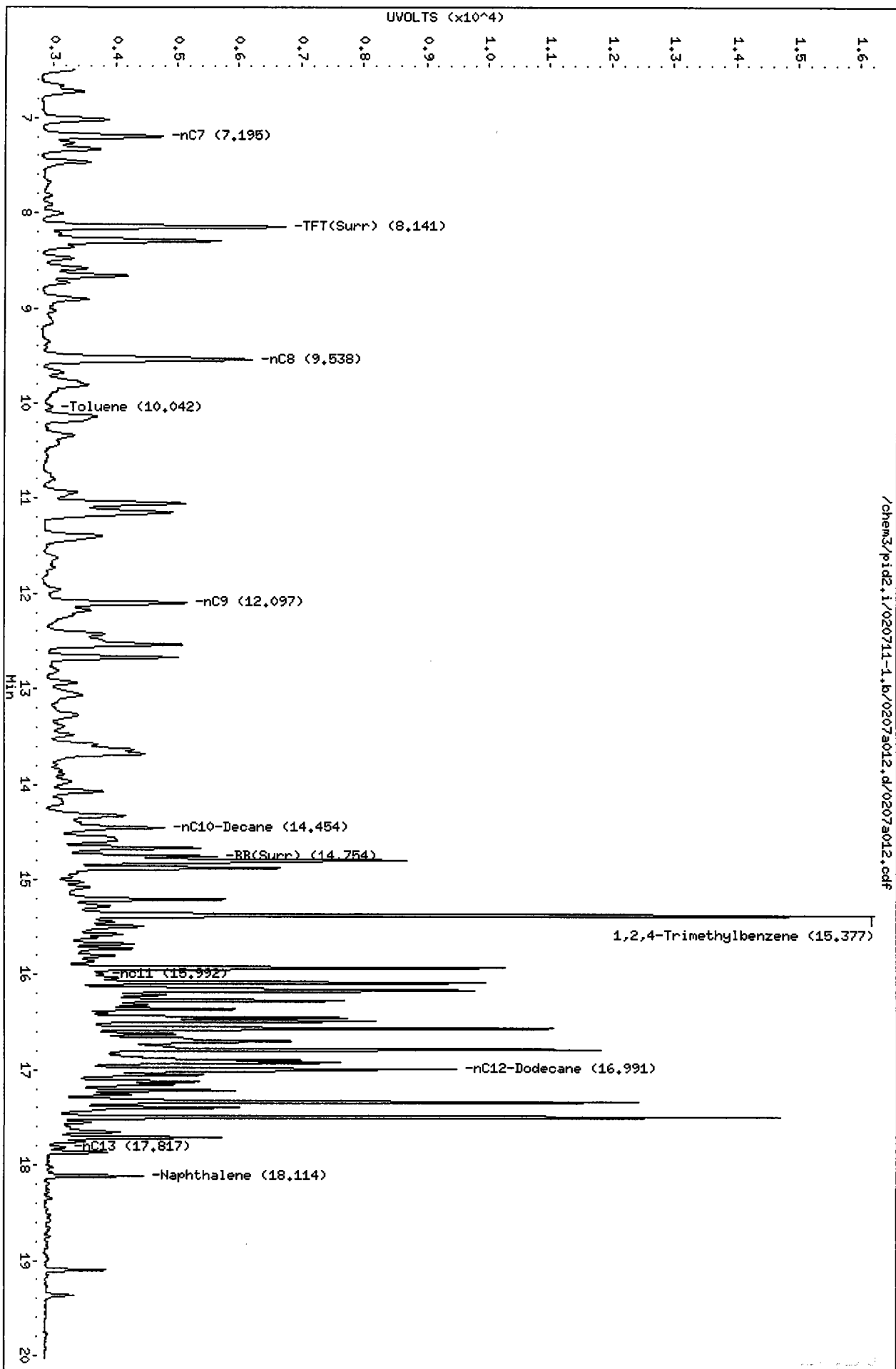
SW8021 (PID)

RT	Shift	Response	Amount	Compound
---	----	-----	-----	-----
7.493	0.006	742	4.75	Benzene
ND	---	---	---	Toluene
12.560	-0.001	2084	13.80N	Ethylbenzene
12.693	-0.005	2345	14.60	M/P-Xylene
13.506	-0.006	330	2.26	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/pid2.i/020711-1.b/0207a012.d
Date : 07-FEB-2011 15:24
Client ID: B11-08-30
Sample Info: SH23J
Column phase: RTX 502-2 FID

Instrument: pid2.i
Operator: HH
Column diameter: 0.18



Data File: /chem3/pid2.i/020711-2.b/0207a012.d

Date : 07-FEB-2011 15:24

Client ID: B41-08-30

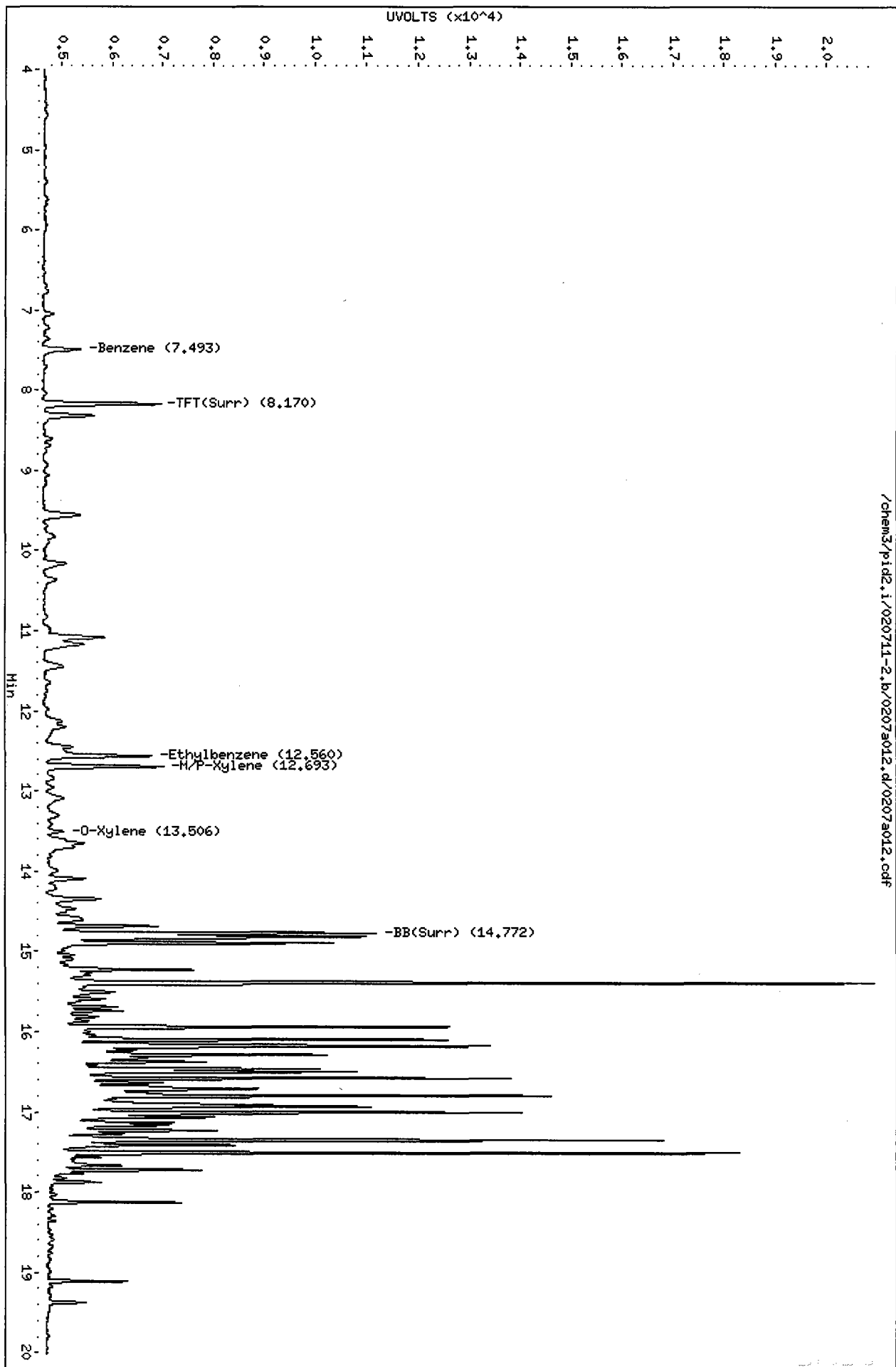
Sample Info: SH23J

Column phase: RTX 502-2 PID

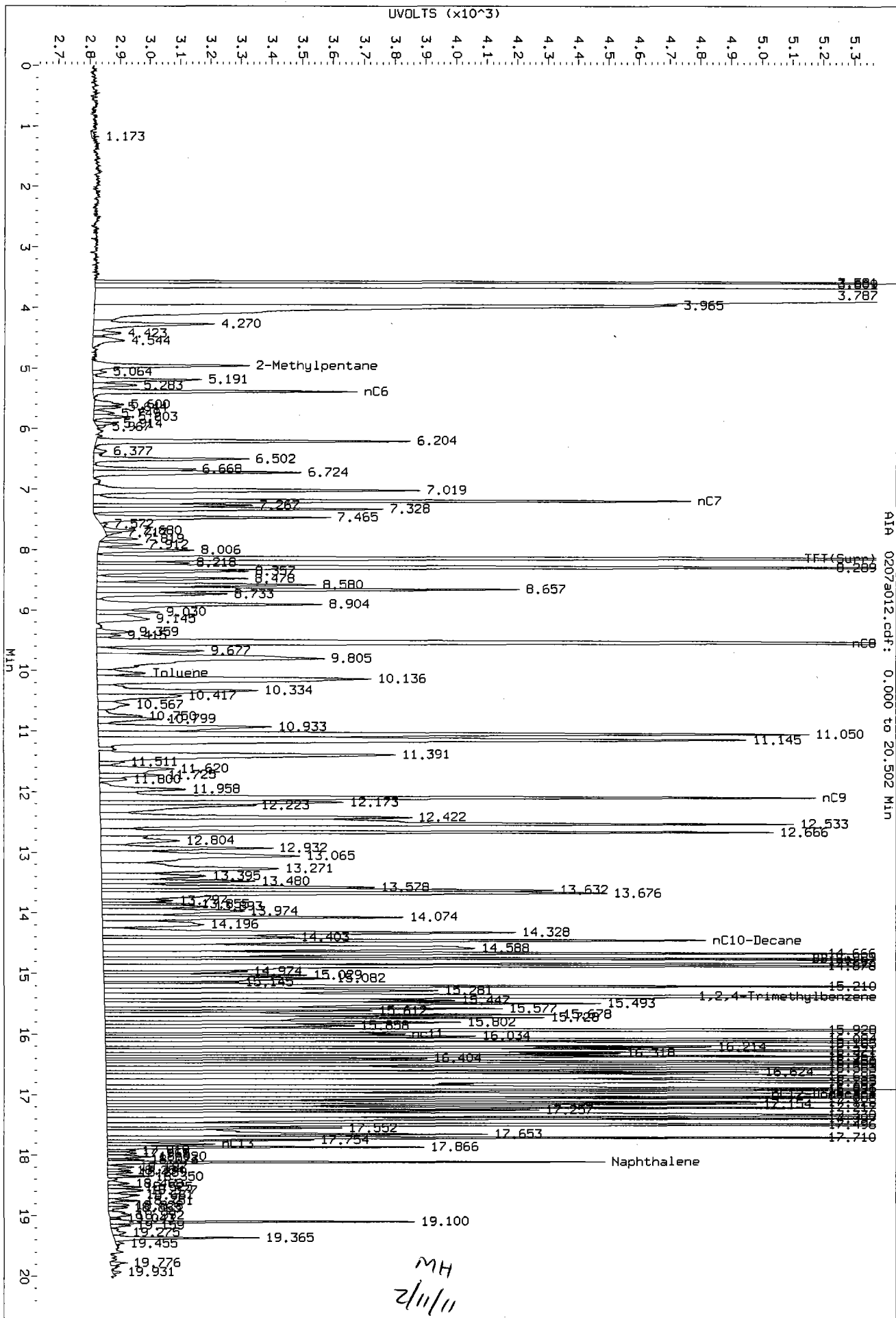
Instrument: pid2.i

Operator: HH

Column diameter: 0.18




Data File: /chem3/pid2.1/020711-1.b/0207a012.d/0207a012.cdf
Injection Date: 07-FEB-2011 15:24
Instrument: pid2.1
Client Sample ID: B11-08-30



5123: 00206

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: B11-09-23.5
SAMPLE

Lab Sample ID: SH23M
LIMS ID: 11-2196
Matrix: Soil
Data Release Authorized: 
Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group
Project: Birds Eye Soil
Event: JI1001
Date Sampled: 01/31/11
Date Received: 02/02/11

Date Analyzed: 02/09/11 14:52
Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL
Sample Amount: 120 mg-dry-wt
Percent Moisture: 13.8%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	10	< 10 U
108-88-3	Toluene	10	< 10 U
100-41-4	Ethylbenzene	10	100
179601-23-1	m,p-Xylene	21	36
95-47-6	o-Xylene	10	56

Gasoline Range Hydrocarbons	4.1	82	GAS ID GRO
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BETX Surrogate Recovery

Trifluorotoluene	102%
Bromobenzene	106%

Gasoline Surrogate Recovery

Trifluorotoluene	102%
Bromobenzene	113%

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/pid3.i/20110209-2.b/0209a019.d ARI ID: SH23M
Data file 2: /chem3/pid3.i/20110209-1.b/0209a019.d Client ID: B11-09-23.5
Method: /chem3/pid3.i/20110209-1.b/PIDB.m Injection Date: 09-FEB-2011 14:52
Instrument: pid3.i Matrix: SOIL
Gas Ical Date: 08-FEB-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
7.342	-0.003	6817	82894	101.5	TFT (Surr)
14.206	0.001	3671	61830	112.9	BB (Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.08 to 17.39)	874780	1212774	1.386 M
8015B 2MP-TMB (3.73 to 15.33)	1692925	398720	0.236 M
AK101 nC6-nC10 (4.22 to 13.94)	1377819	217881	0.158 M
NWTPHG Tol-Nap (9.08 to 18.34)	916507	1814290	1.980 M
CalGas nC6-nC12 (4.22 to 17.39)	1726695	1234229	0.715 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
7.341	0.003	19830	101.5	TFT (Surr)
14.204	-0.001	35326	106.0	BB (Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
11.771	-0.002	2757	2.46	Ethylbenzene
11.912	-0.005	1011	0.86	M/P-Xylene
12.715	0.003	1349	1.35	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/20110209-2.b/0209a019.d

Date : 09-FEB-2011 14:52

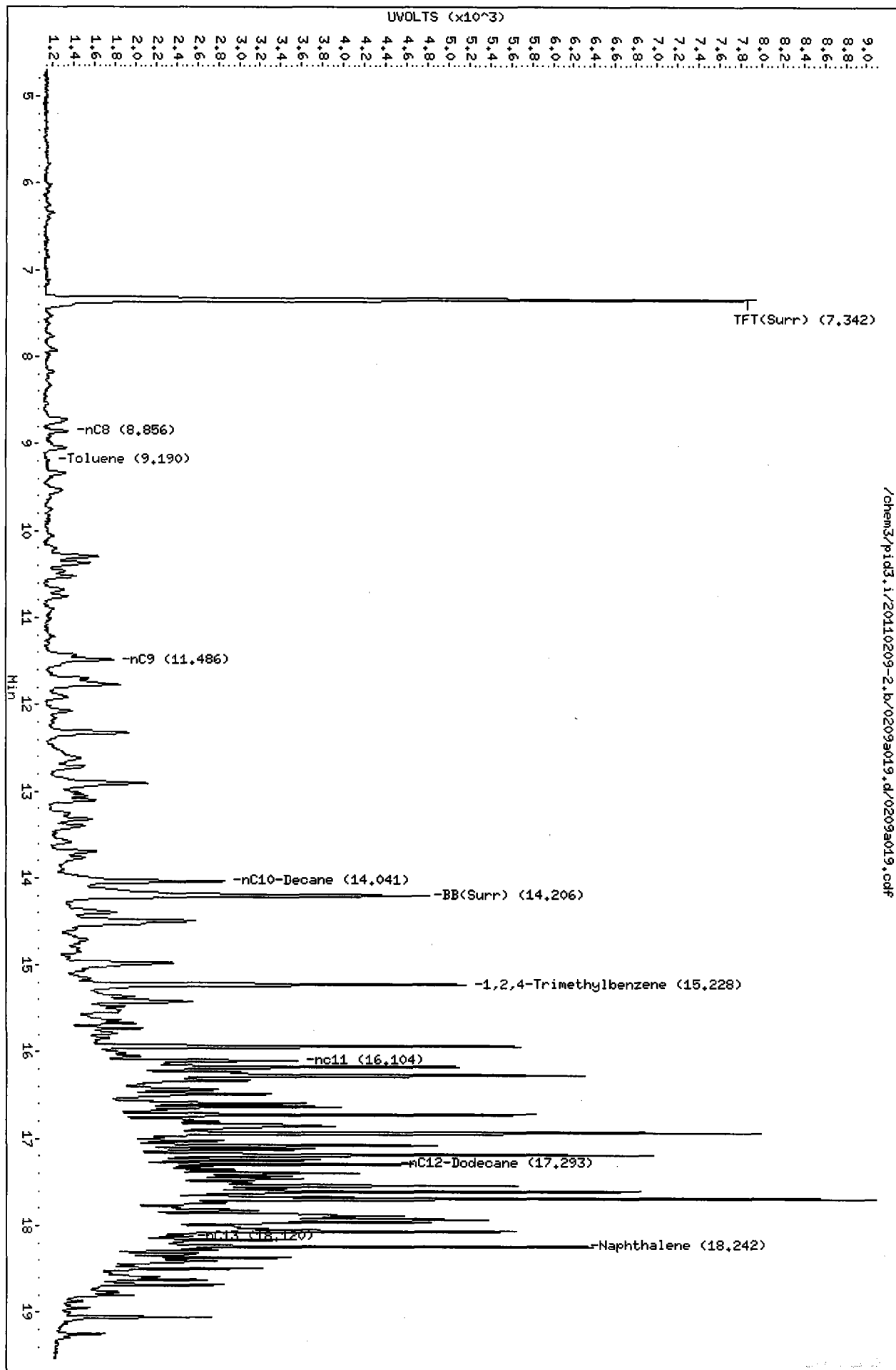
Client ID: B11-09-23.5

Sample Info: SH23H

Page 1

Column phase: RTX 502-2 FID

Instrument: pid3.i
Operator: HH
Column diameter: 0.18



SH23 01209

Data File: /chem3/pid3.i/20110209-1.b/0209a019.d

Date : 09-FEB-2011 14:52

Client ID: B11-09-23.5

Sample Info: SH23H

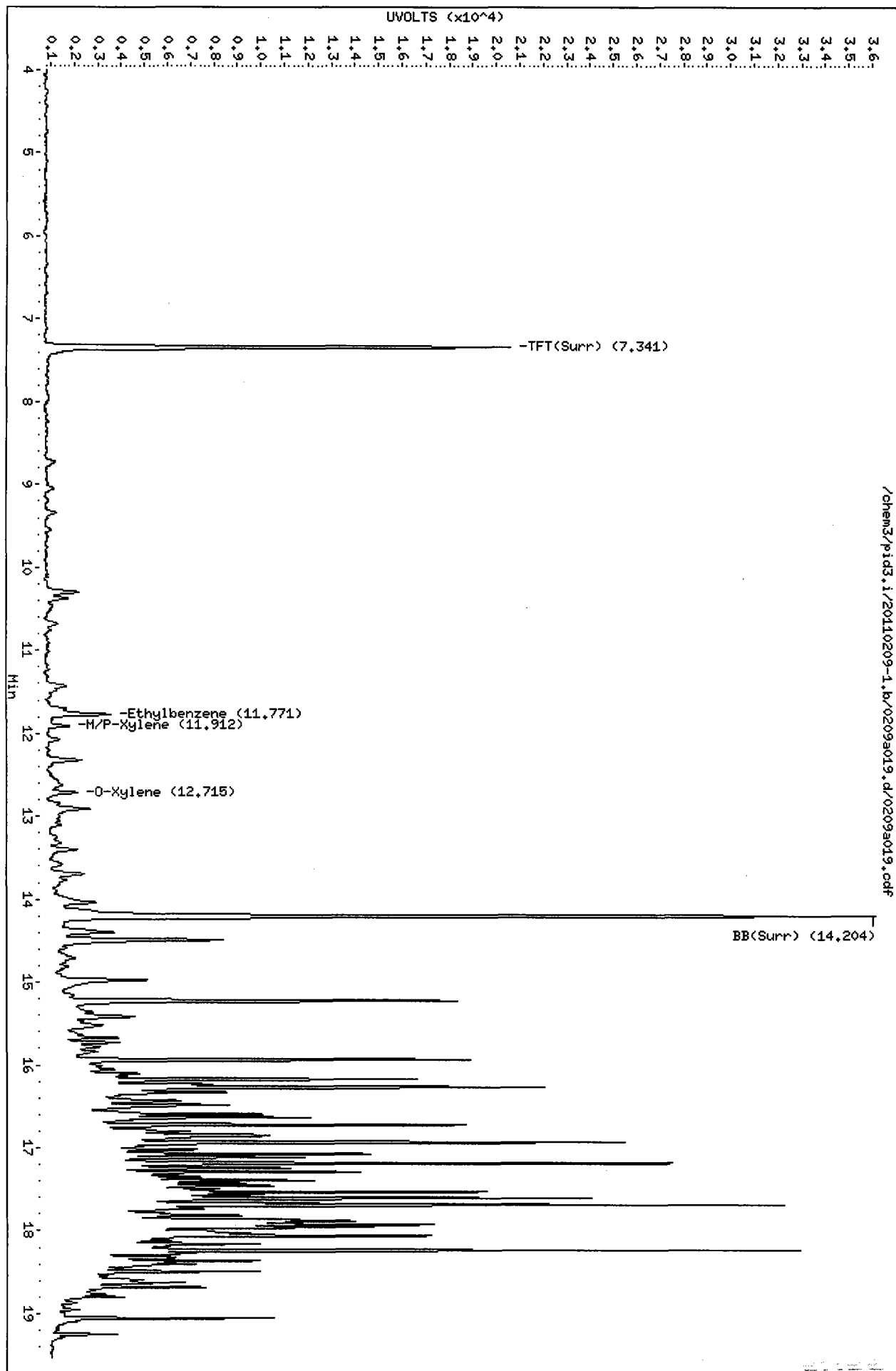
Column phase: RTX 502-2 PID

Instrument: pid3.i

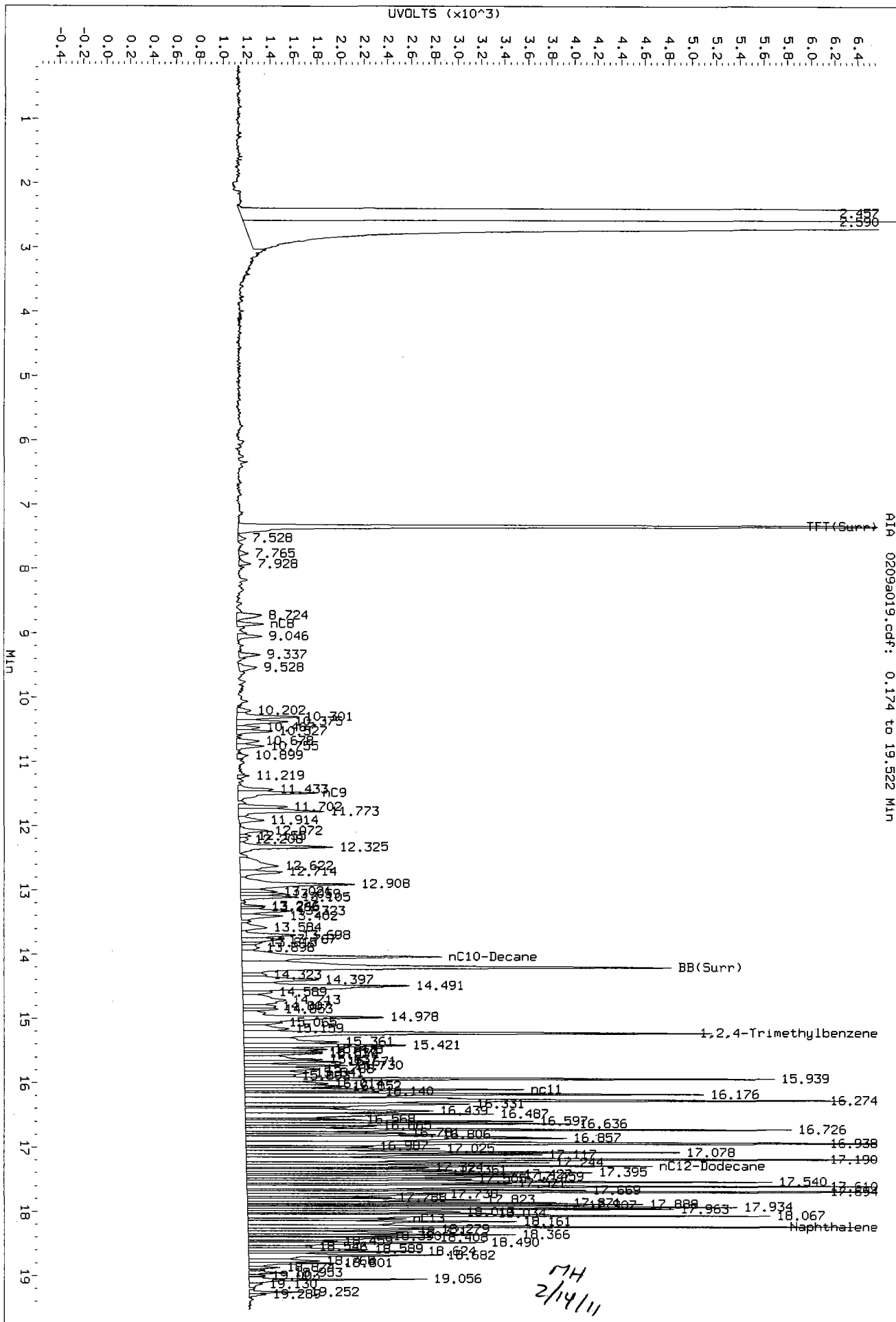
Operator: NH

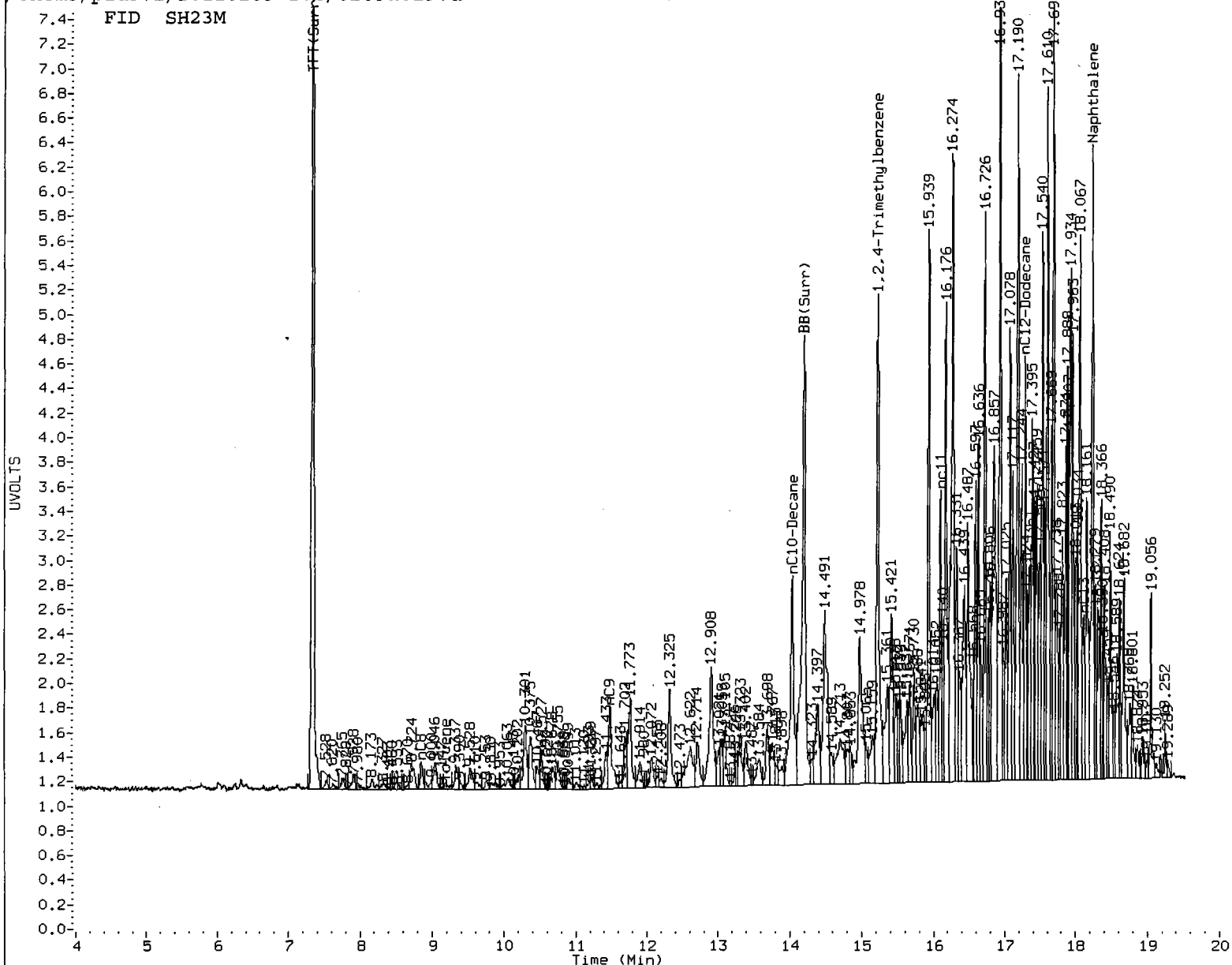
Column diameter: 0.18

Page 1



Data File: /chem3/pid3.1/20110209-2.b/2009a019.d/2009a019.cdf
Injection Date: 09-FEB-2011 14:52
Instrument: pid3.1
Client Sample ID: B11-09-23.5





MANUAL INTEGRATION

- ☒ 1. Baseline correction
- ☐ 2. Poor chromatography
- ☐ 3. Peak not found
- ☐ 4. Totals calculation

5. Other _____

Analyst: MH

Date: 2/14/11

Sample ID: B11-11-10
SAMPLE

Lab Sample ID: SH23R

LIMS ID: 11-2201

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/09/11 13:48

Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL

Sample Amount: 78 mg-dry-wt

Percent Moisture: 15.0%

CAS Number	Analyte	RL	Result
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	6.4	< 6.4 U	GAS ID ---
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BETX Surrogate Recovery

Trifluorotoluene	101%
Bromobenzene	100%

Gasoline Surrogate Recovery

Trifluorotoluene	101%
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.

2/14/11
MH

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20110209-2.b/0209a017.d ARI ID: SH23R
Data file 2: /chem3/pid3.i/20110209-1.b/0209a017.d Client ID: B11-11-10
Method: /chem3/pid3.i/20110209-1.b/PIDB.m Injection Date: 09-FEB-2011 13:48
Instrument: pid3.i Matrix: SOIL
Gas Ical Date: 08-FEB-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
7.343	-0.002	6773	78339	100.8	TFT(Surr)
14.206	0.001	3265	34232	100.4	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.08 to 17.39)	874780	1028	0.001
8015B 2MP-TMB (3.73 to 15.33)	1692925	2225	0.001
AK101 nC6-nC10 (4.22 to 13.94)	1377819	2224	0.002
NWTPHG Tol-Nap (9.08 to 18.34)	916507	1028	0.001
CalGas nC6-nC12 (4.22 to 17.39)	1726695	2225	0.001

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
7.342	0.003	19731	101.0	TFT(Surr)
14.205	0.000	33443	100.4	BB(Surr)

SW8021 (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/20110209-2.b/0209a017.d

Date : 09-FEB-2011 13:48

Client ID: B11-11-10

Sample Info: SH23R

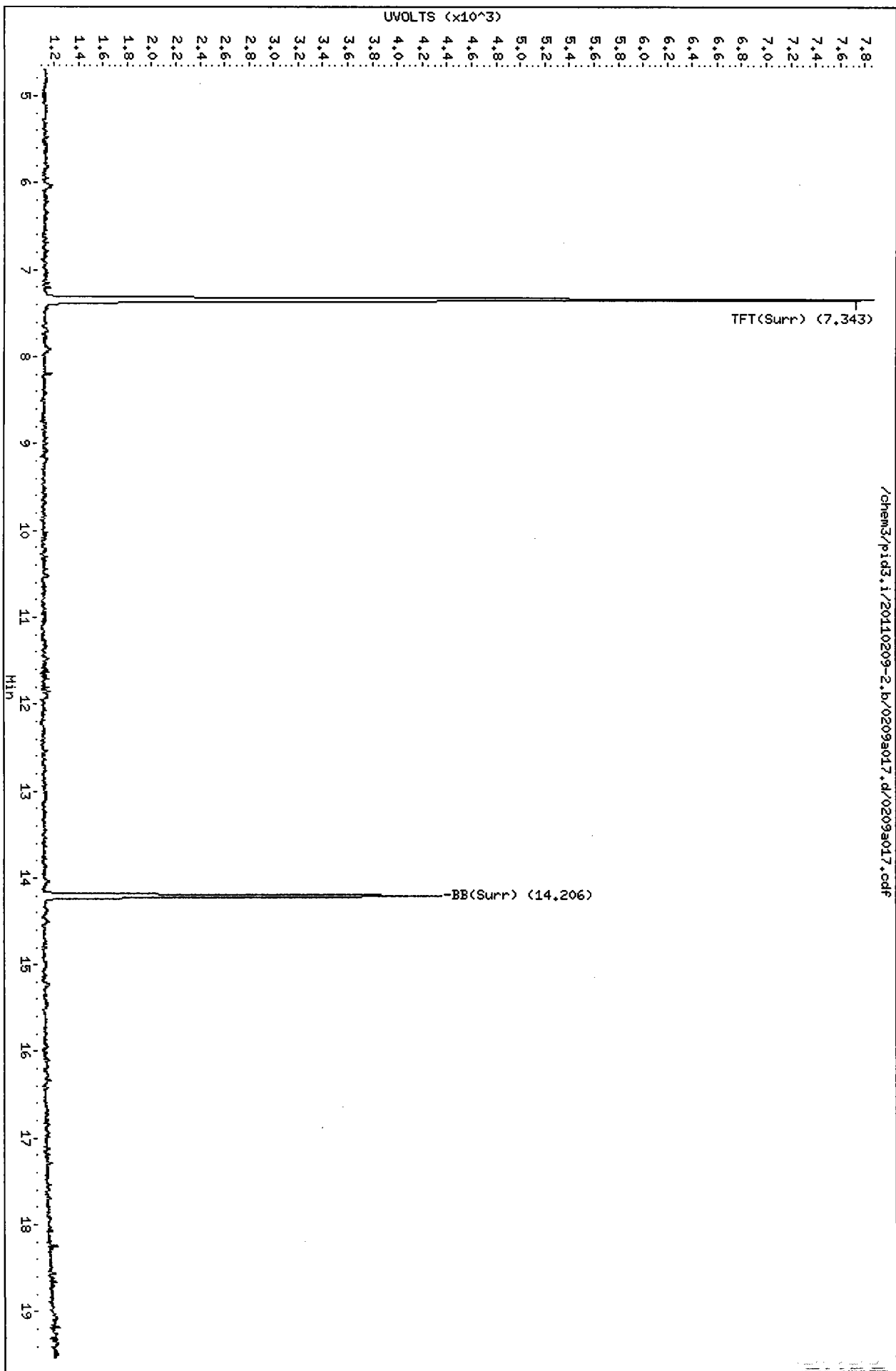
Page 1

Instrument: pid3.i

Operator: MH

Column diameter: 0.18

Column phase: RTX 502-2 FID



Data File: /chem3/pid3.i/20110209-1.b/0209a017.d

Date : 09-FEB-2011 13:48

Client ID: B11-11-10

Sample Info: SH23R

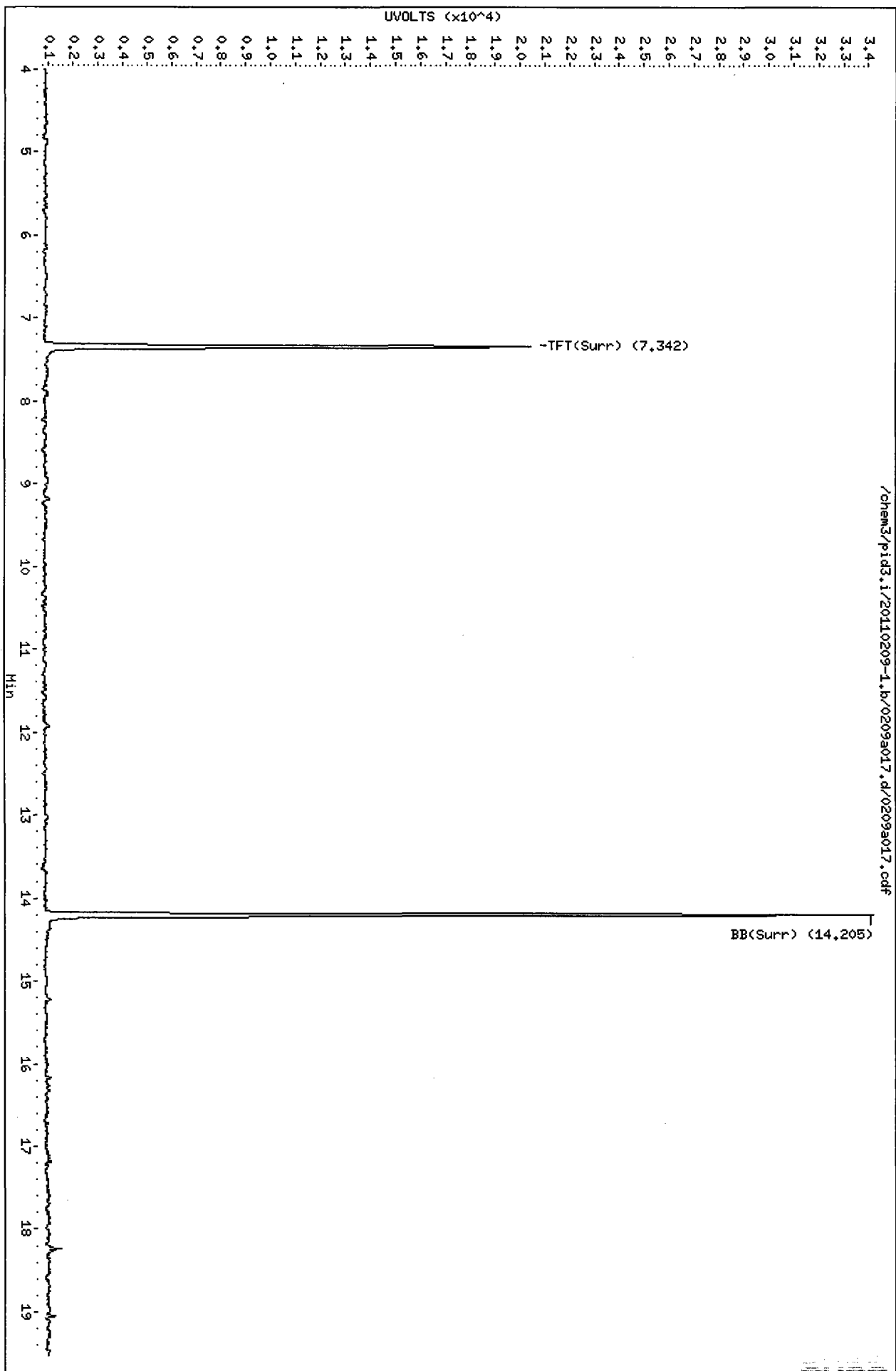
Page 1

Instrument: pid3.i

Operator: MH

Column diameter: 0.18

Column phase: RTX 502-2 PID



ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1


Sample ID: B11-12-10

SAMPLE

Lab Sample ID: SH23S

LIMS ID: 11-2202

Matrix: Soil

Data Release Authorized: 

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Analyzed: 02/09/11 15:18

Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL

Sample Amount: 22 mg-dry-wt

Percent Moisture: 19.3%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	57	< 57 U
108-88-3	Toluene	57	< 57 U
100-41-4	Ethylbenzene	57	1,100
179601-23-1	m,p-Xylene	120	200
95-47-6	o-Xylene	57	710

Gasoline Range Hydrocarbons

23

1,200

GAS ID
GRO

BETX Surrogate Recovery

Trifluorotoluene	103%
Bromobenzene	121%

Gasoline Surrogate Recovery

Trifluorotoluene	102%
Bromobenzene	116%

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.

2/14/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20110209-2.b/0209a020.d	ARI ID: SH23S
Data file 2: /chem3/pid3.i/20110209-1.b/0209a020.d	Client ID: B11-12-10
Method: /chem3/pid3.i/20110209-1.b/PIDB.m	Injection Date: 09-FEB-2011 15:18
Instrument: pid3.i	Matrix: SOIL
Gas Ical Date: 08-FEB-2011	Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011	

=====

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
---	-----	-----	-----	-----	-----
7.343	-0.002	6827	80202	101.6	TFT(Surr)
14.210	0.005	3779	49117	116.3	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
-----	-----	-----	-----
WAGas Tol-C12 (9.08 to 17.39)	874780	3782616	4.324 M
8015B 2MP-TMB (3.73 to 15.33)	1692925	1730630	1.022 M
AK101 nC6-nC10 (4.22 to 13.94)	1377819	1006198	0.730 M
NWTPHG Tol-Nap (9.08 to 18.34)	916507	4626443	5.048 M
CalGas nC6-nC12 (4.22 to 17.39)	1726695	3955051	2.291 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
---	-----	-----	-----	-----
7.342	0.003	20136	103.1	TFT(Surr)
14.205	0.001	40254	120.8	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
---	-----	-----	-----	-----
ND	---	---	---	Benzene
ND	---	---	---	Toluene
11.745	-0.028	5334	4.77	Ethylbenzene
11.908	-0.009	1037	0.88	M/P-Xylene
12.730	0.018	3106	3.10	O-Xylene
ND	---	---	---	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

SH23: 00219

Data File: /chem3/pid3.i/20110209-2.b/0209a020.d

Date : 09-FEB-2011 15:18

Client ID: Btl-12-10

Sample Info: SH235

Page 1

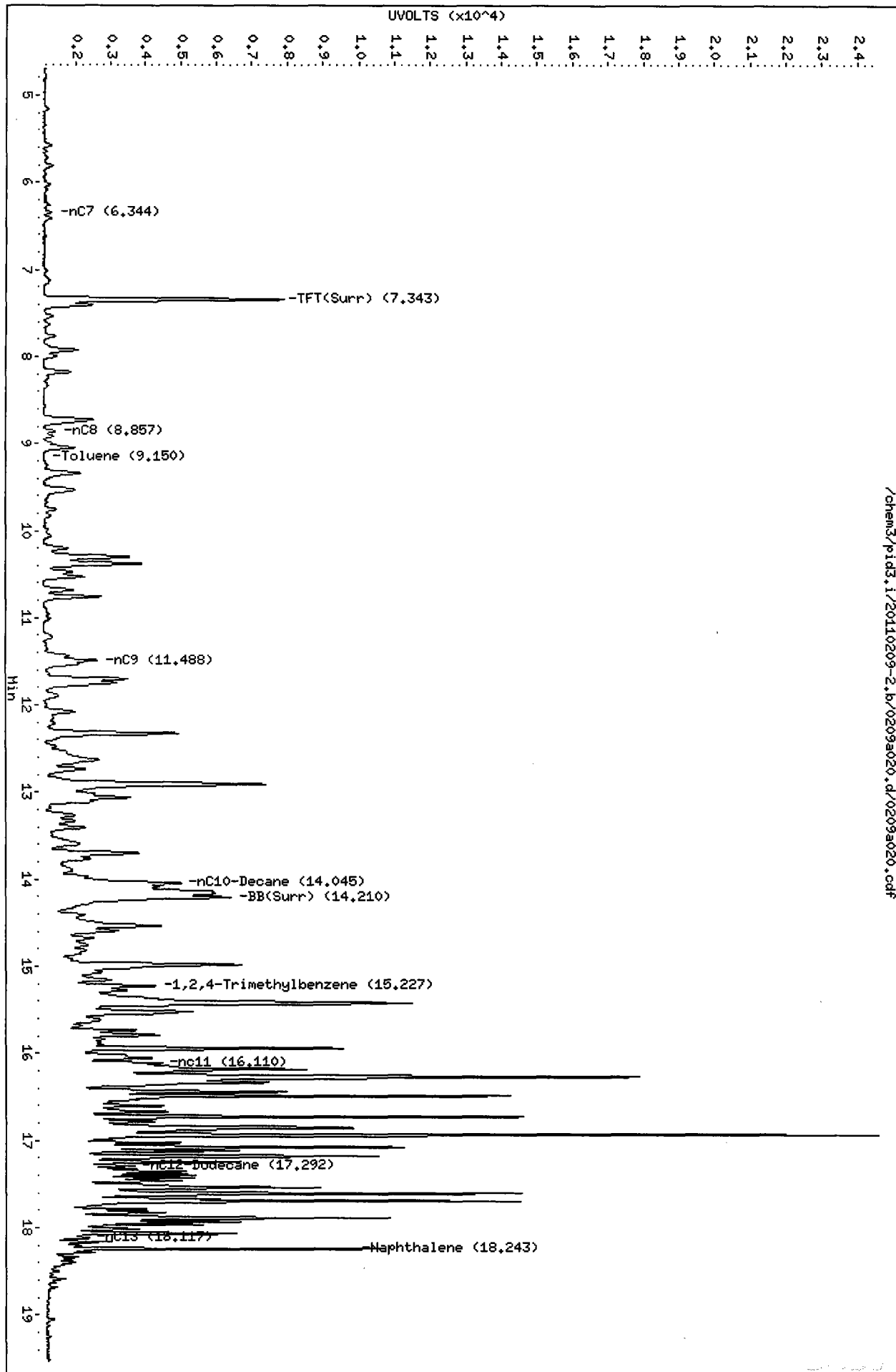
Instrument: pid3.i

Operator: HH

Column diameter: 0.18

Column phase: RTX 502-2 FID

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SH235 002220

Data File: /chem3/pid3.i/20110209-1.b/0209a020.d

Date : 09-FEB-2011 15:18

Client ID: B11-12-10

Sample Info: SH235

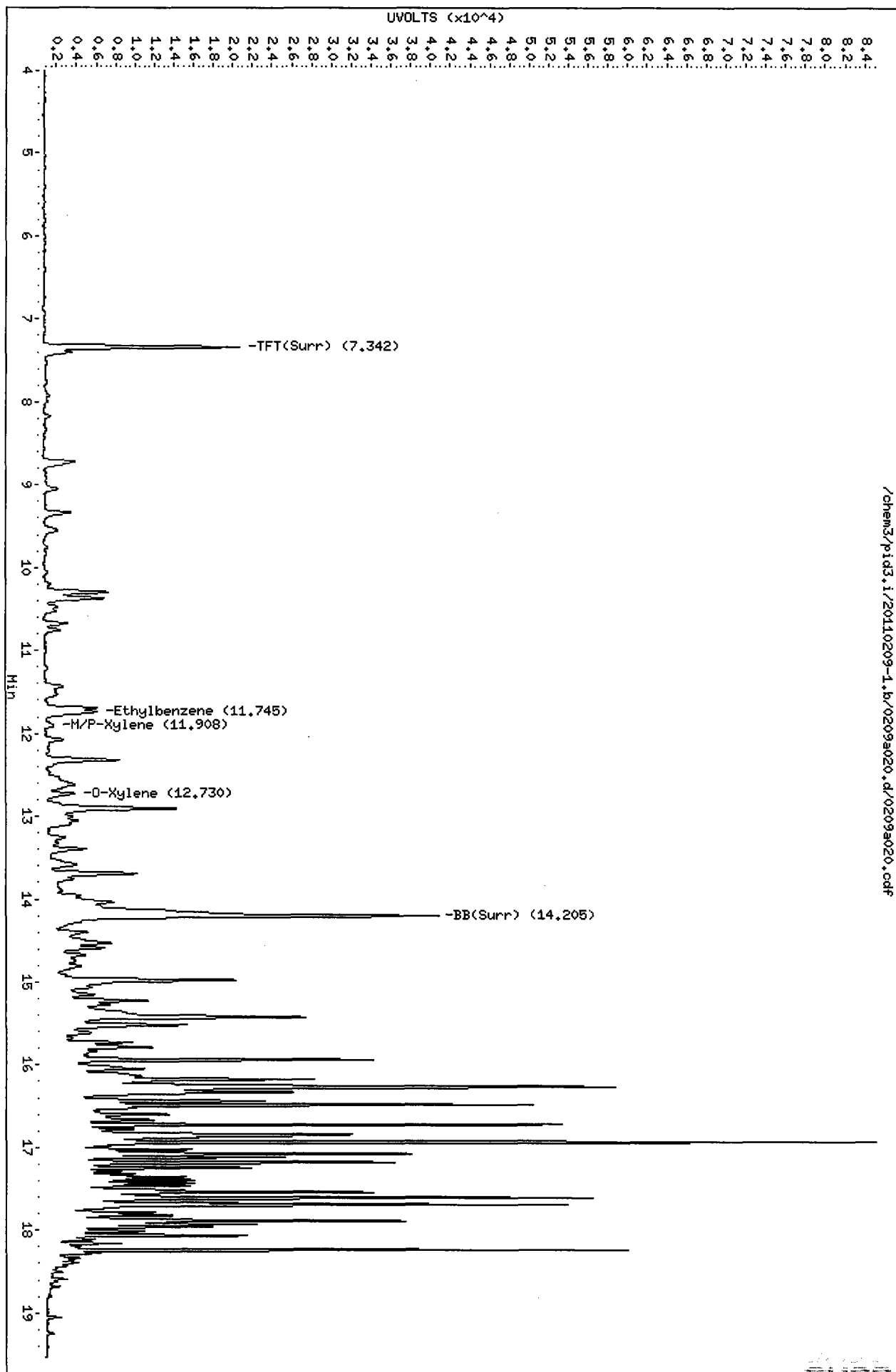
Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: MH

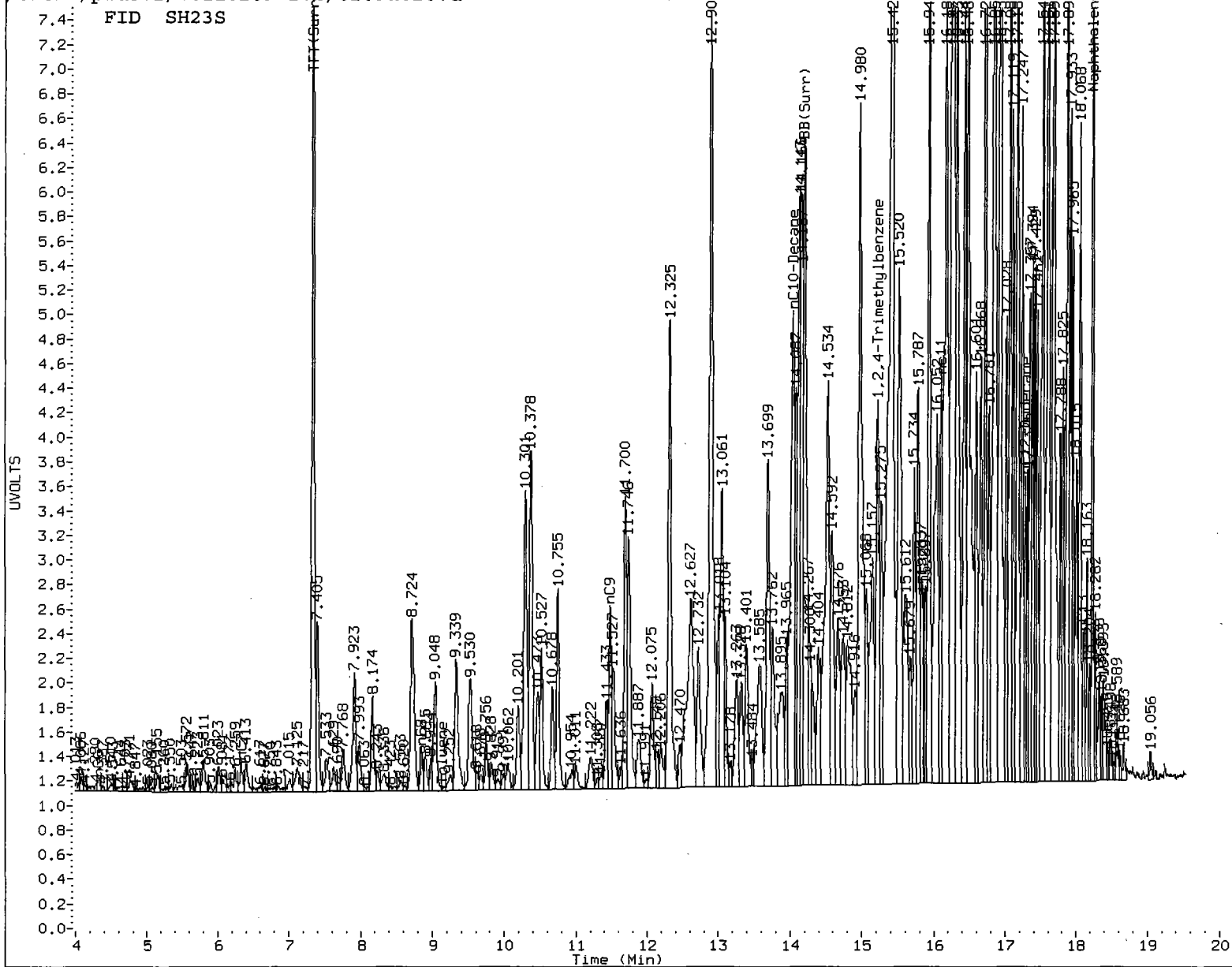
Column diameter: 0.18

Page 1



AIA 0209a020.cdf: 0.989 to 19.516 Min





MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: MH

Date: 2/14/11

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: B11-12-15

SAMPLE

Lab Sample ID: SH23T

LIMS ID: 11-2203

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Analyzed: 02/09/11 14:25

Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL

Sample Amount: 93 mg-dry-wt

Percent Moisture: 9.3%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	13	< 13 U
108-88-3	Toluene	13	< 13 U
100-41-4	Ethylbenzene	13	< 13 U
179601-23-1	m,p-Xylene	27	< 27 U
95-47-6	o-Xylene	13	< 13 U

Gasoline Range Hydrocarbons	5.4	< 5.4 U	GAS ID ---
-----------------------------	-----	---------	---------------

BETX Surrogate Recovery

Trifluorotoluene	101%
Bromobenzene	100%

Gasoline Surrogate Recovery

Trifluorotoluene	101%
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.

144
2/14/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20110209-2.b/0209a018.d ARI ID: SH23T
Data file 2: /chem3/pid3.i/20110209-1.b/0209a018.d Client ID: B11-12-15
Method: /chem3/pid3.i/20110209-1.b/PIDB.m Injection Date: 09-FEB-2011 14:25
Instrument: pid3.i Matrix: SOIL
Gas Ical Date: 08-FEB-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
7.338	-0.007	6774	79114	100.8	TFT(Surr)
14.206	0.001	3250	34815	100.0	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.08 to 17.39)	874780	2482	0.003
8015B 2MP-TMB (3.73 to 15.33)	1692925	1240	0.001
AK101 nC6-nC10 (4.22 to 13.94)	1377819	0	0.000
NWTPHG Tol-Nap (9.08 to 18.34)	916507	2482	0.003
CalGas nC6-nC12 (4.22 to 17.39)	1726695	2482	0.001

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
7.337	-0.001	19707	100.9	TFT(Surr)
14.205	0.000	33477	100.5	BB(Surr)

SW8021 (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/20110209-2.b/0209a018.d

Date : 09-FEB-2011 14:25

Client ID: B11-12-15

Sample Info: SH23T

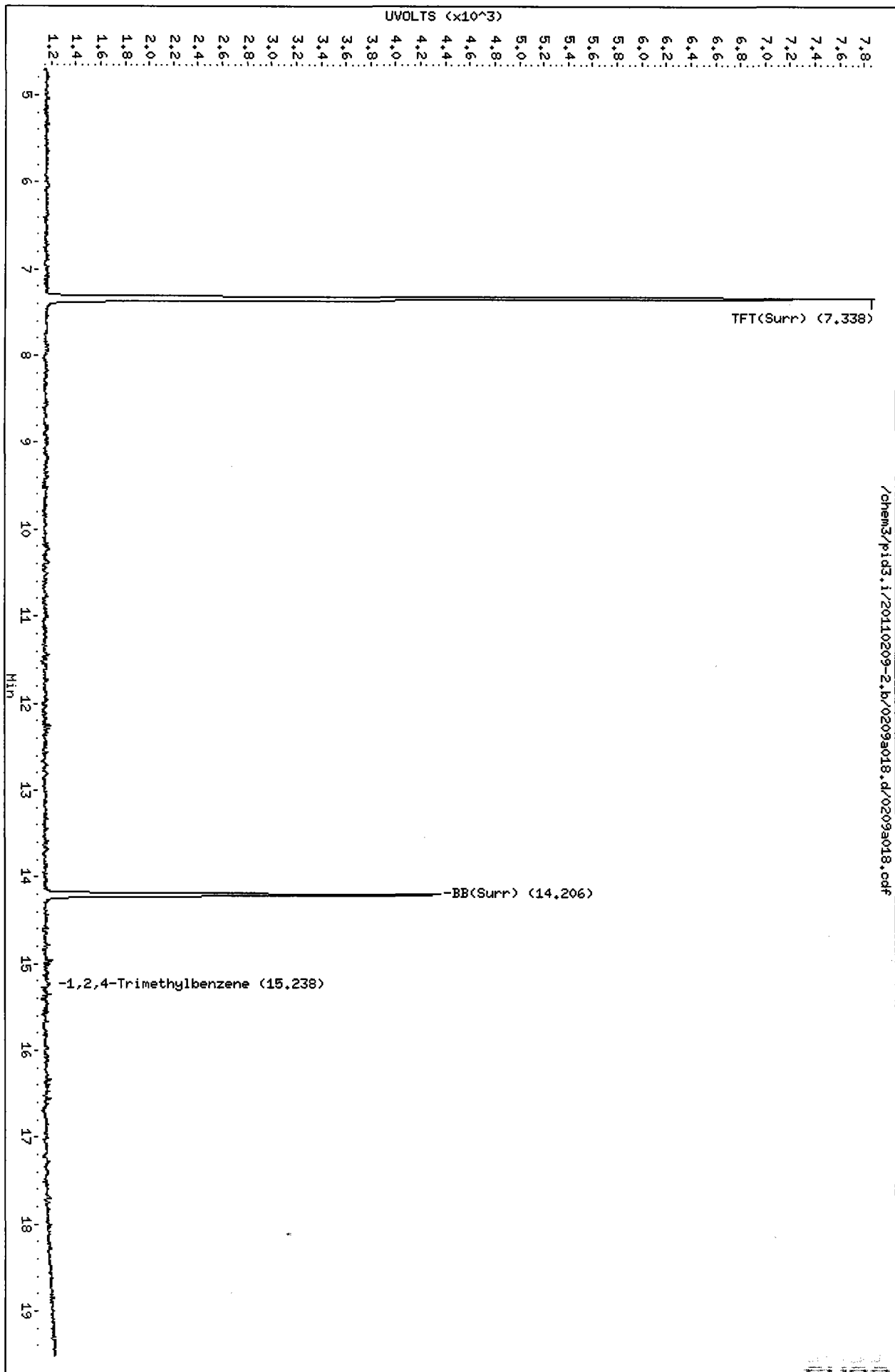
Page 1

Instrument: pid3.i

Operator: HH

Column diameter: 0.18

Column phase: RTX 502-2 FID



Data File: /chem3/pid3.i/20110209-1.b/0209a018.d

Date : 09-FEB-2011 14:25

Client ID: B11-12-15

Sample Info: SH23T

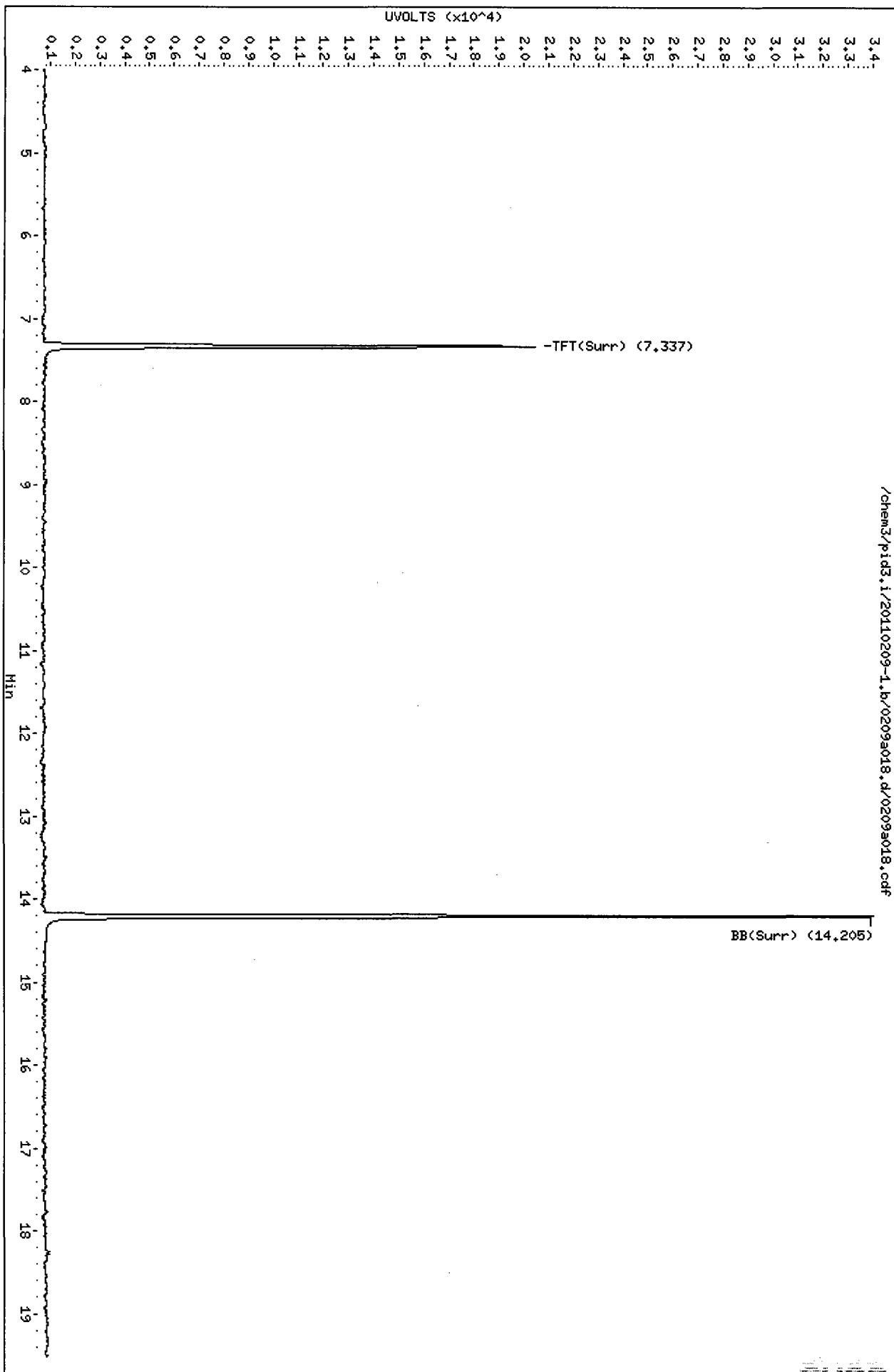
Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: HH

Column diameter: 0.18

Page 1



BETX SOIL SURROGATE RECOVERY SUMMARY

ARI Job: SH23
Matrix: Soil

QC Report No: SH23-Pacific Groundwater Group
Project: Birds Eye Soil
Event: JI1001

Client ID	TFT	BBZ	TOT OUT
MB-020711	90.8%	87.6%	0
LCS-020711	94.3%	91.4%	0
LCSD-020711	95.8%	93.3%	0
B11-06-20	104%	102%	0
B11-06-25	102%	101%	0
B11-06-30	94.8%	94.3%	0
B11-08-20	95.8%	95.3%	0
B11-08-25	93.3%	92.6%	0
B11-08-30	97.3%	99.0%	0
MB-020911	102%	101%	0
LCS-020911	105%	104%	0
LCSD-020911	109%	106%	0
B11-09-23.5	102%	106%	0
B11-11-10	101%	100%	0
B11-12-10	103%	121%	0
B11-12-15	101%	100%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(68-124)
(BBZ) = Bromobenzene	(77-120)	(62-134)

Log Number Range: 11-2184 to 11-2203

TPHG SOIL SURROGATE RECOVERY SUMMARY

ARI Job: SH23
Matrix: Soil

QC Report No: SH23-Pacific Groundwater Group
Project: Birds Eye Soil
Event: JI1001

Client ID	BFB	TFT	BBZ	TOT	OUT
MB-020711	NA	91.3%	89.8%	0	
LCS-020711	NA	97.2%	96.3%	0	
LCSD-020711	NA	98.1%	97.4%	0	
B11-06-20	NA	104%	110%	0	
B11-06-25	NA	103%	114%	0	
B11-06-30	NA	96.1%	108%	0	
B11-08-20	NA	97.6%	104%	0	
B11-08-25	NA	95.1%	102%	0	
B11-08-30	NA	97.8%	114%	0	
MB-020911	NA	99.7%	99.3%	0	
LCS-020911	NA	109%	104%	0	
LCSD-020911	NA	110%	105%	0	
B11-09-23.5	NA	102%	113%	0	
B11-11-10	NA	101%	100%	0	
B11-12-10	NA	102%	116%	0	
B11-12-15	NA	101%	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: 11-2184 to 11-2203

ORGANICS ANALYSIS DATA SHEET

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: LCS-020711

LAB CONTROL SAMPLE

Lab Sample ID: LCS-020711

LIMS ID: 11-2184

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed LCS: 02/07/11 11:14

Purge Volume: 5.0 mL

LCSD: 02/07/11 11:42

Instrument/Analyst LCS: PID2/MH

Sample Amount LCS: 100 mg-dry-wt

LCSD: PID2/MH

LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	51.6	50.0	103%	48.6	50.0	97.2%	6.0%

Reported in mg/kg (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	97.2%	98.1%
Bromobenzene	96.3%	97.4%

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

Page 1 of 1

Sample ID: LCS-020711

LAB CONTROL SAMPLE

Lab Sample ID: LCS-020711

LIMS ID: 11-2184

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed LCS: 02/07/11 11:14

Purge Volume: 5.0 mL

LCSD: 02/07/11 11:42

Instrument/Analyst LCS: PID2/MH

Sample Amount LCS: 100 mg-dry-wt

LCSD: PID2/MH

LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	134	105	128%	130	105	124%	3.0%
Toluene	1440	1440	100%	1420	1440	98.6%	1.4%
Ethylbenzene	453	460	98.5%	444	460	96.5%	2.0%
m,p-Xylene	1680	1690	99.4%	1670	1690	98.8%	0.6%
o-Xylene	710	700	101%	704	700	101%	0.8%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	94.3%	95.8%
Bromobenzene	91.4%	93.3%

MH
2/11/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020711-1.b/0207a004.d ARI ID: LCS0207
Data file 2: /chem3/pid2.i/020711-2.b/0207a004.d Client ID:
Method: /chem3/pid2.i/020711-2.b/PIDB.m Injection Date: 07-FEB-2011 11:14
Instrument: pid2.i Matrix: WATER
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.139	-0.002	3921	51547	97.2	TFT(Surr)
14.753	-0.002	2399	21068	96.3	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.89 to 17.08)	460088	469602	1.021 M
8015B 2MP-TMB (4.84 to 15.48)	907748	955650	1.053 M
AK101 nC6-nC10 (5.28 to 14.35)	626837	667800	1.065 M
NWTPHG Tol-Nap (9.89 to 18.21)	481270	496124	1.031 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
8.166	-0.002	2276	94.3	TFT(Surr)
14.770	-0.002	6063	91.4	BB(Surr)

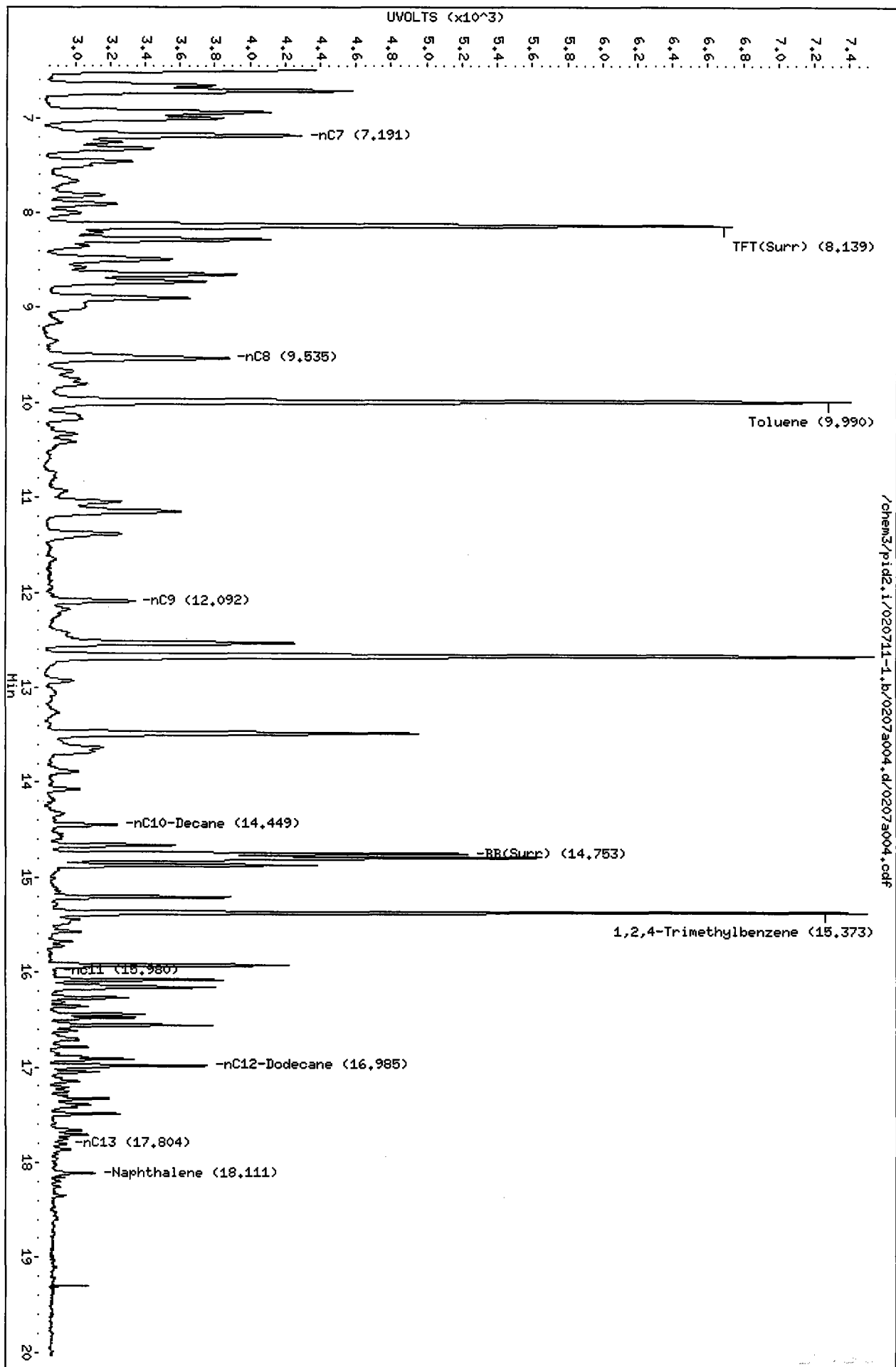
SW8021 (PID)

RT	Shift	Response	Amount	Compound
7.487	0.000	417	2.67	Benzene
10.018	-0.002	4664	28.89	Toluene
12.559	-0.003	1368	9.06	Ethylbenzene
12.698	0.000	5398	33.60	M/P-Xylene
13.509	-0.003	2073	14.21	O-Xylene
5.222	0.001	3558	86.68	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid2.i/020711-1.b/0207a004.d
Date : 07-FEB-2011 11:14
Client ID:
Sample Info: LCS0207
Column phase: RTX 502-2 FID

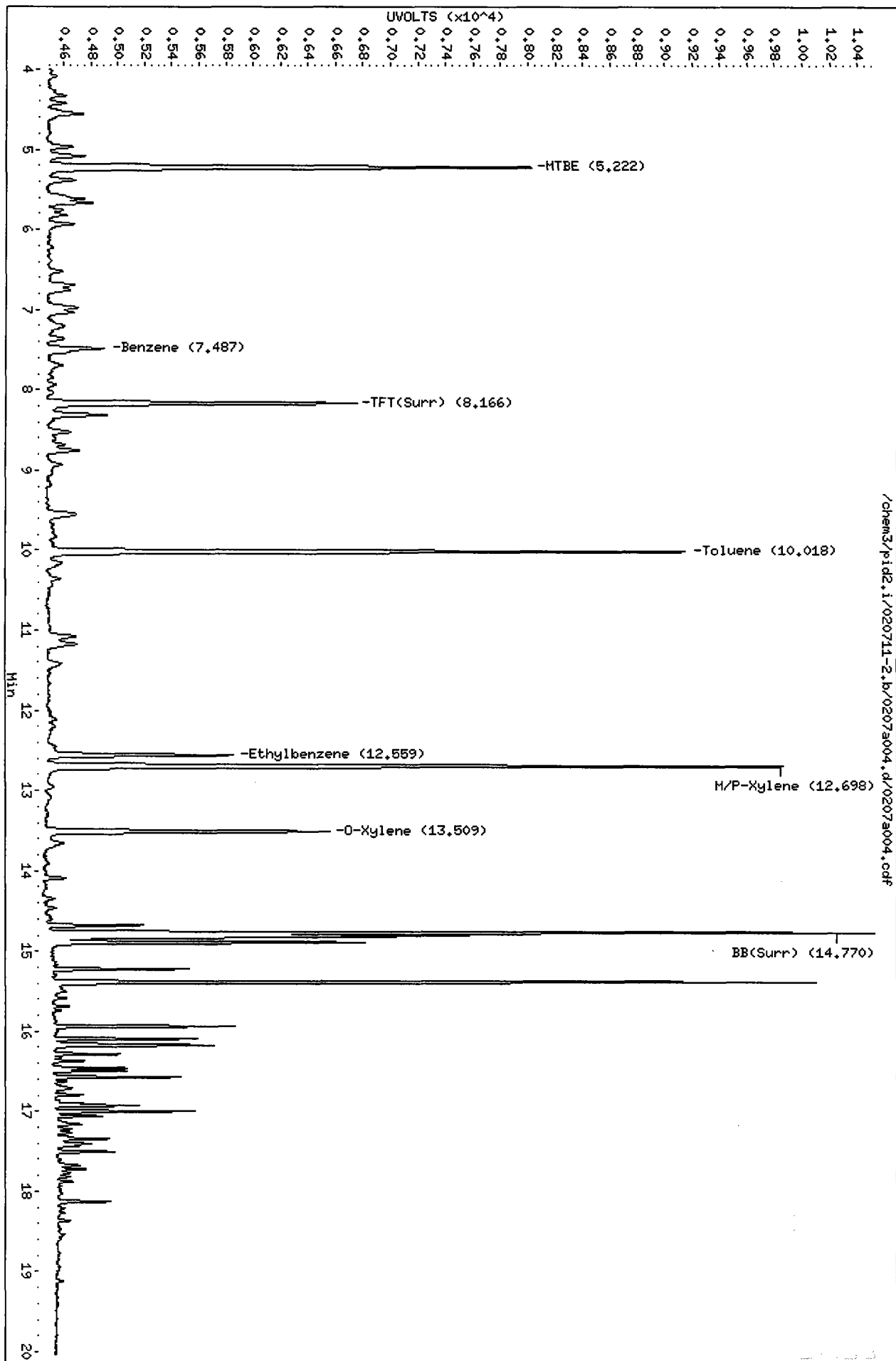
Instrument: pid2.i
Operator: MH
Column diameter: 0.18



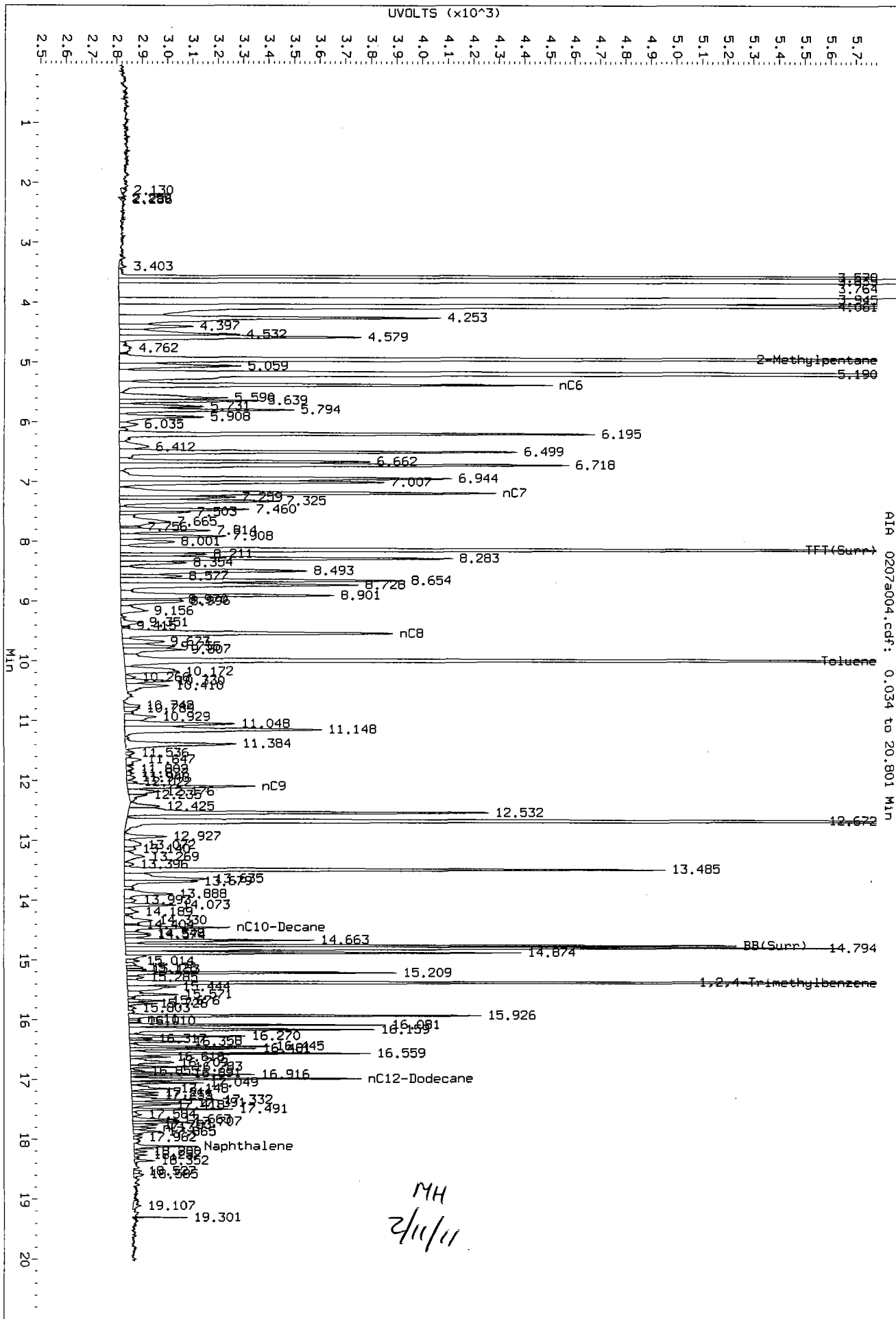
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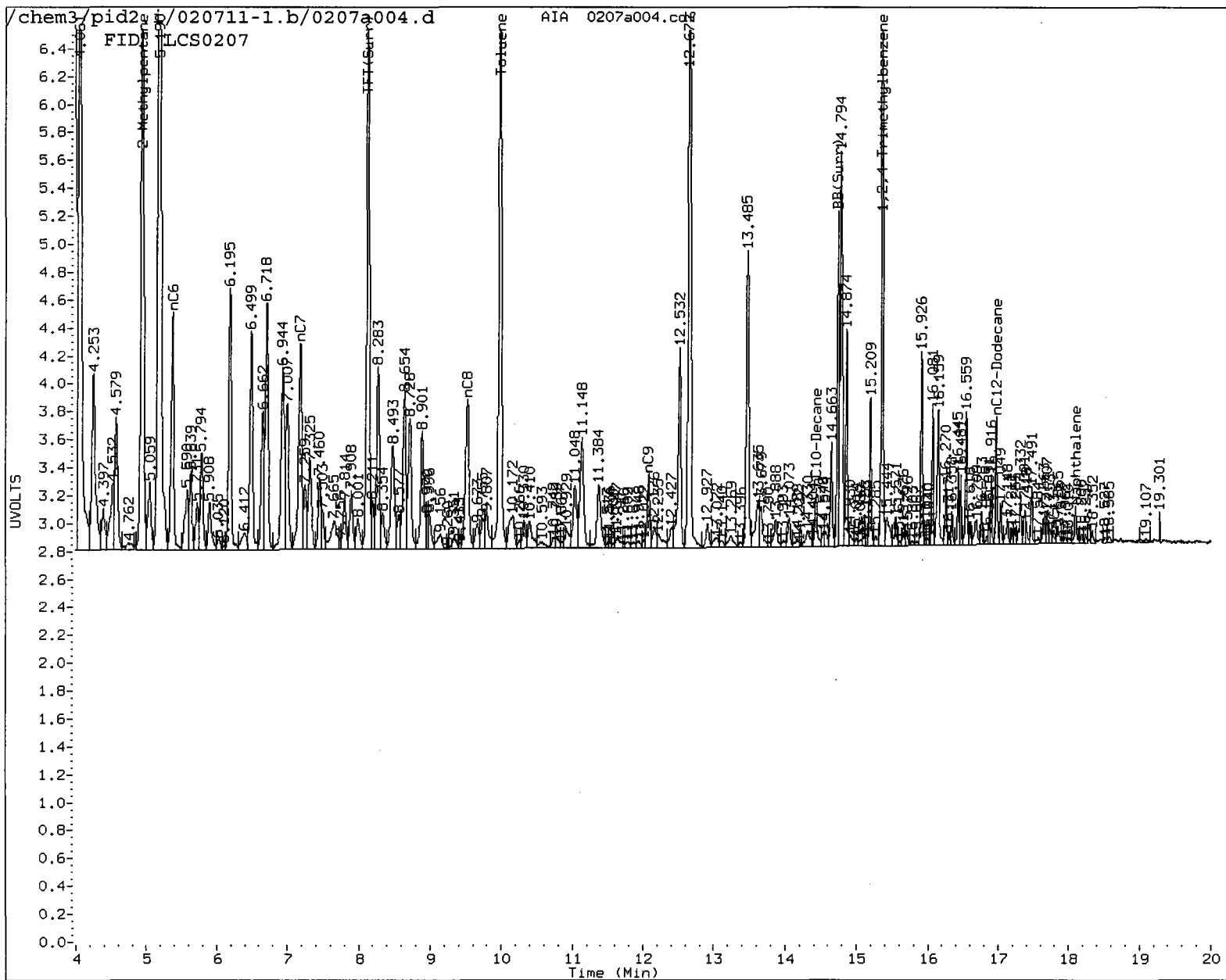
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Date : 07-FEB-2011 11:14
Client ID:
Sample Info: LCS0207
Column phase: RTX 502-2 PID

Instrument: pid2.i
Operator: HH
Column diameter: 0.18



Data File: /chem3/pid2.i/020711-1.b/0207a004.d/0207a004.cdf
Injection Date: 07-FEB-2011 11:14
Instrument: pid2.i
Client Sample ID:





MANUAL INTEGRATION

- ☒ Baseline correction
- ☐ 2. Poor chromatography
- ☐ 3. Peak not found
- ☐ 4. Totals calculation
- ☐ 5. Other _____

Analyst: MH

Date: 2/11/11

2/11/11
M4

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020711-1.b/0207a005.d ARI ID: LCSD0207
Data file 2: /chem3/pid2.i/020711-2.b/0207a005.d Client ID:
Method: /chem3/pid2.i/020711-2.b/PIDB.m Injection Date: 07-FEB-2011 11:42
Instrument: pid2.i Matrix: WATER
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

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FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
--	----	-----	----	----	-----
8.140	-0.001	3957	51811	98.1	TFT(Surr)
14.753	-0.002	2425	20987	97.4	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
-----	----	-----	-----
WAGas Tol-C12 (9.89 to 17.08)	460088	440824	0.958 M
8015B 2MP-TMB (4.84 to 15.48)	907748	910889	1.003 M
AK101 nC6-nC10 (5.28 to 14.35)	626837	632367	1.009 M
NWTPHG Tol-Nap (9.89 to 18.21)	481270	468440	0.973 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
--	----	-----	----	-----
8.167	-0.001	2314	95.8	TFT(Surr)
14.770	-0.002	6192	93.3	BB(Surr)

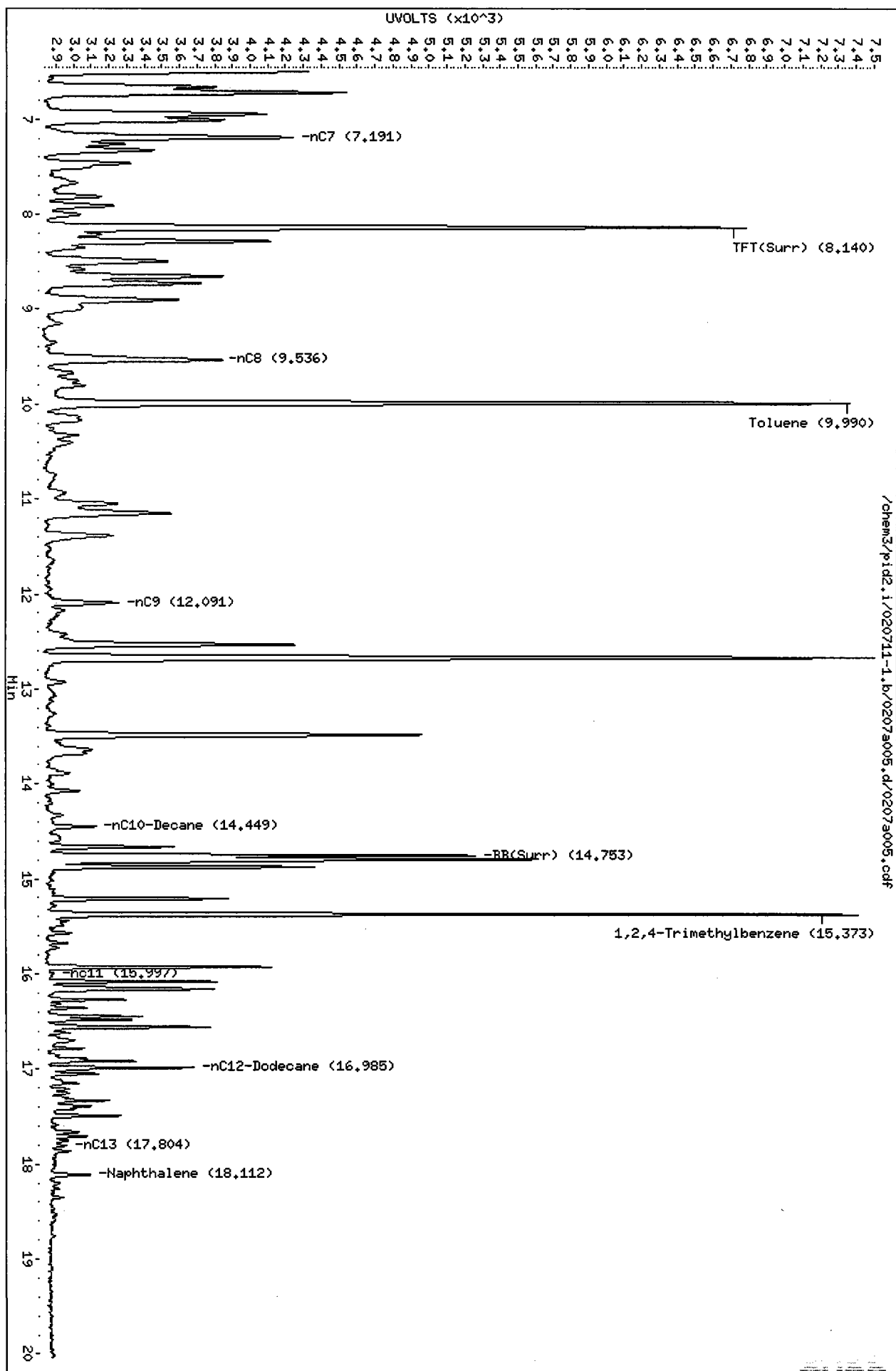
SW8021 (PID)

RT	Shift	Response	Amount	Compound
--	----	-----	-----	-----
7.488	0.001	408	2.61	Benzene
10.018	-0.002	4601	28.50	Toluene
12.559	-0.003	1340	8.87	Ethylbenzene
12.697	0.000	5378	33.48	M/P-Xylene
13.509	-0.003	2056	14.09	O-Xylene
5.224	0.003	3593	87.53	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid2.i/020711-1.b/0207a005.d
Date : 07-FEB-2011 11:42
Client ID:
Sample Info: LCSD0207
Column phase: RTX 502-2 FID

Instrument: pid2.i
Operator: HH
Column diameter: 0.18



Data File: /chem3/pid2.i/020711-2.b/0207a005.d

Date : 07-FEB-2011 11:42

Client ID:

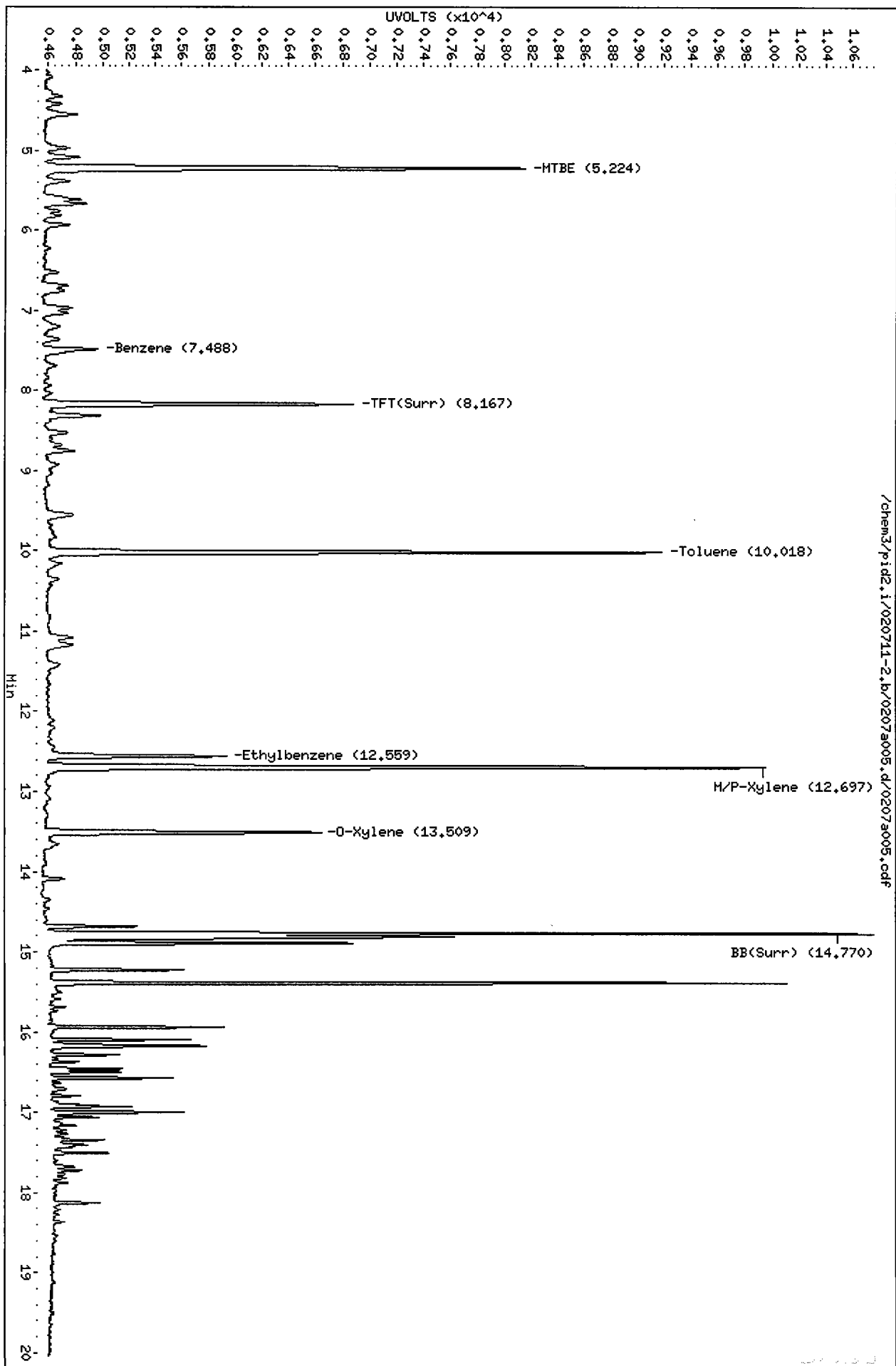
Sample Info: LCSD0207

Column phase: RTX 502-2 PID

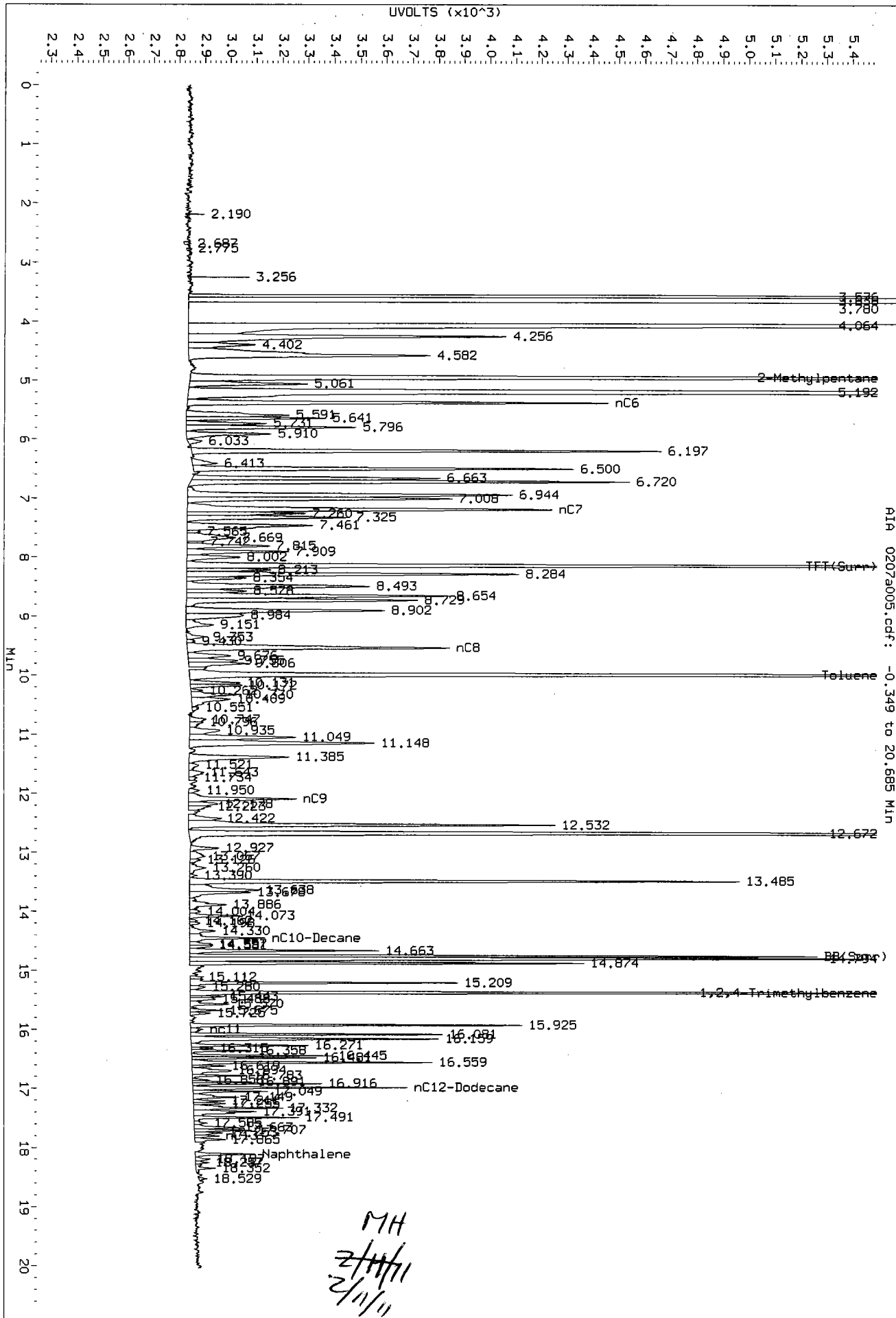
Instrument: pid2.i

Operator: HH

Column diameter: 0.18



Data File: /chem3/pid2.1/020711-1.b/0207a005.d/0207a005.cdf
Injection Date: 07-FEB-2011 11:42
Instrument: pid2.1
Client Sample ID:



SH23: 00240

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: MB-020711

METHOD BLANK

Lab Sample ID: MB-020711

LIMS ID: 11-2184

Matrix: Soil

Data Release Authorized:

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed: 02/07/11 12:10

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 100 mg-dry-wt

CAS Number	Analyte	RL	Result
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	GAS ID ---
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BETX Surrogate Recovery

Trifluorotoluene	90.8%
Bromobenzene	87.6%

Gasoline Surrogate Recovery

Trifluorotoluene	91.3%
Bromobenzene	89.8%

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.

2/11/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020711-1.b/0207a006.d ARI ID: MB0207
Data file 2: /chem3/pid2.i/020711-2.b/0207a006.d Client ID:
Method: /chem3/pid2.i/020711-2.b/PIDB.m Injection Date: 07-FEB-2011 12:10
Instrument: pid2.i Matrix: WATER
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.140	-0.001	3685	47034	91.3	TFT(Surr)
14.754	-0.002	2236	19090	89.8	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.89 to 17.08)	460088	5312	0.012
8015B 2MP-TMB (4.84 to 15.48)	907748	7277	0.008
AK101 nC6-nC10 (5.28 to 14.35)	626837	6217	0.010
NWTPHG Tol-Nap (9.89 to 18.21)	481270	5312	0.011

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
8.167	-0.001	2192	90.8	TFT(Surr)
14.771	-0.002	5811	87.6	BB(Surr)

SW8021 (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/pid2.i/020711-1.b/0207a006.d

Date : 07-FEB-2011 12:10

Client ID:

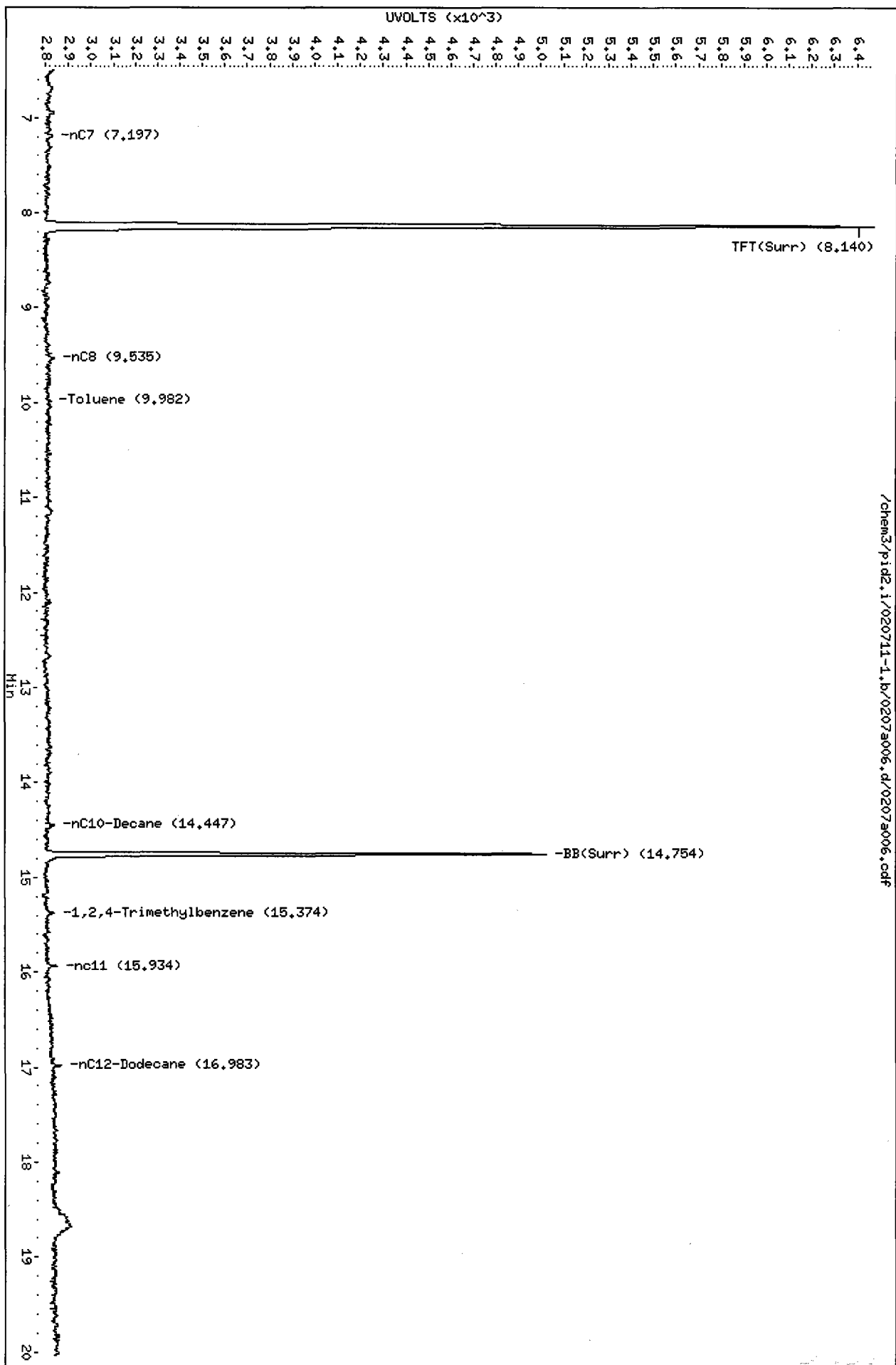
Sample Info: MB0207

Column phase: RTX 502-2 FID

Instrument: pid2.i

Operator: HH

Column diameter: 0.18



Data File: /chem3/pid2.i/020711-2.b/0207a006.d
Date : 07-FEB-2011 12:10

Client ID:

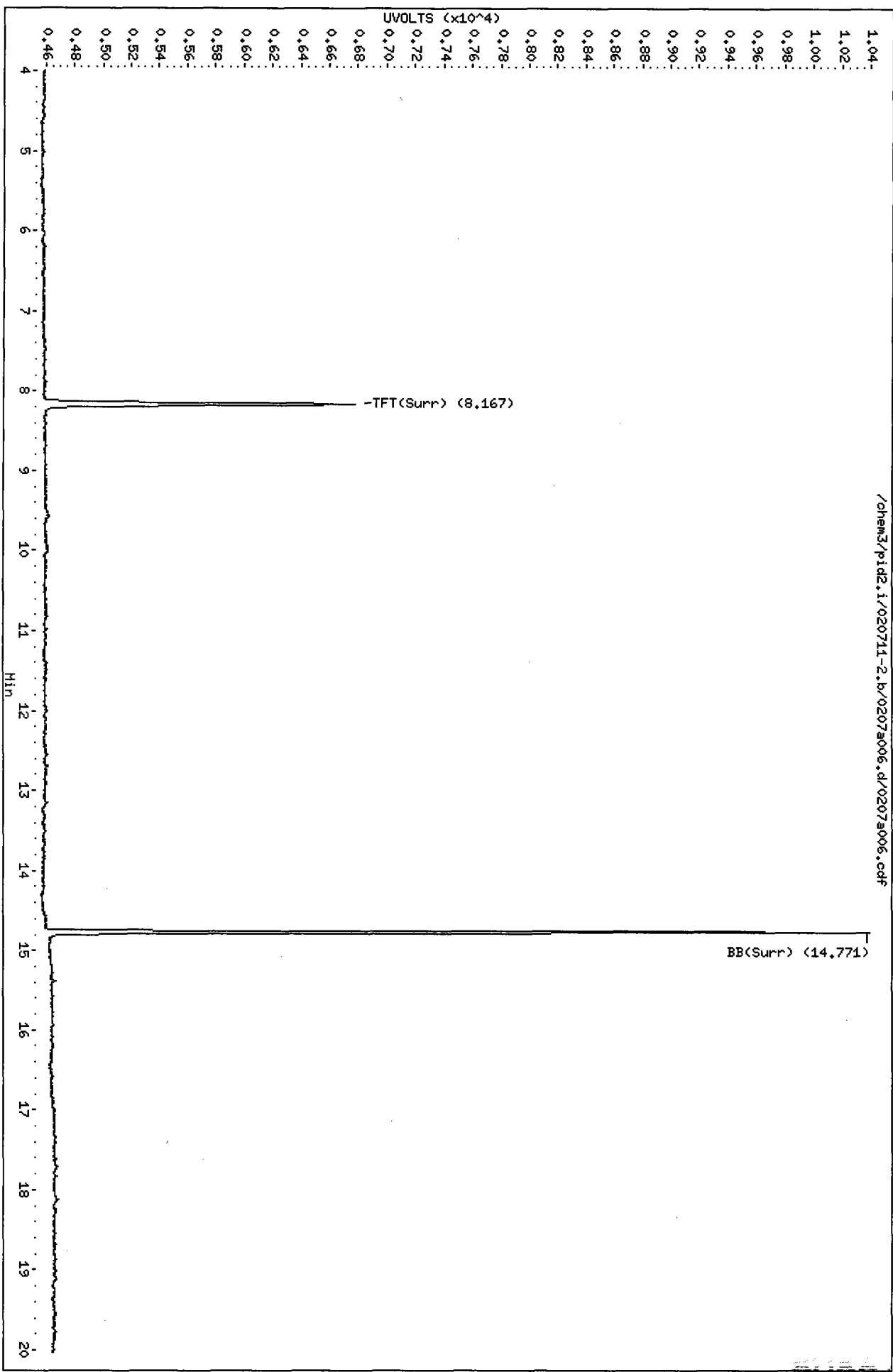
Sample Info: MB0207

Column phase: RTX 502-2 PID

Instrument: pid2.i

Operator: HH

Column diameter: 0.18



ORGANICS ANALYSIS DATA SHEET

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: LCS-020911

LAB CONTROL SAMPLE

Lab Sample ID: LCS-020911

LIMS ID: 11-2196

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed LCS: 02/09/11 07:37

Purge Volume: 5.0 mL

LCSD: 02/09/11 08:03

Instrument/Analyst LCS: PID3/MH

Sample Amount LCS: 100 mg-dry-wt

LCSD: PID3/MH

LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	46.8	50.0	93.6%	43.5	50.0	87.0%	7.3%

Reported in mg/kg (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	109%	110%
Bromobenzene	104%	105%

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

Page 1 of 1

Sample ID: LCS-020911

LAB CONTROL SAMPLE

Lab Sample ID: LCS-020911

LIMS ID: 11-2196

Matrix: Soil

Data Release Authorized: *CP*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed LCS: 02/09/11 07:37

Purge Volume: 5.0 mL

LCSD: 02/09/11 08:03

Instrument/Analyst LCS: PID3/MH

Sample Amount LCS: 100 mg-dry-wt

LCSD: PID3/MH

LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	208	185	112%	202	185	109%	2.9%
Toluene	2020	1820	111%	1960	1820	108%	3.0%
Ethylbenzene	580	535	108%	558	535	104%	3.9%
m,p-Xylene	2230	2000	112%	2150	2000	108%	3.7%
o-Xylene	1030	905	114%	986	905	109%	4.4%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	105%	109%
Bromobenzene	104%	106%

MA
2/14/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20110209-2.b/0209a004.d ARI ID: LCS0209
Data file 2: /chem3/pid3.i/20110209-1.b/0209a004.d Client ID: LCS0209S1
Method: /chem3/pid3.i/20110209-1.b/PIDB.m Injection Date: 09-FEB-2011 07:37
Instrument: pid3.i Matrix: SOIL
Gas Ical Date: 08-FEB-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
7.343	-0.002	7308	89375	108.8	TFT(Surr)
14.206	0.001	3383	48942	104.1	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.08 to 17.39)	874780	814535	0.931 M
8015B 2MP-TMB (3.73 to 15.33)	1692925	1714274	1.013 M
AK101 nC6-nC10 (4.22 to 13.94)	1377819	1392170	1.010 M
NWTPHG Tol-Nap (9.08 to 18.34)	916507	857470	0.936 M
CalGas nC6-nC12 (4.22 to 17.39)	1726695	1715038	0.993 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
7.342	0.003	20538	105.2	TFT(Surr)
14.205	0.000	34680	104.1	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
6.500	0.004	5838	4.16	Benzene
9.180	0.002	50288	40.32	Toluene
11.774	0.001	12974	11.59	Ethylbenzene
11.920	0.003	52684	44.63	M/P-Xylene
12.714	0.001	20657	20.62	O-Xylene
4.073	-0.017	1177	2.32	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20110209-2.b/0209a004.d

Date : 09-FEB-2011 07:37

Client ID:

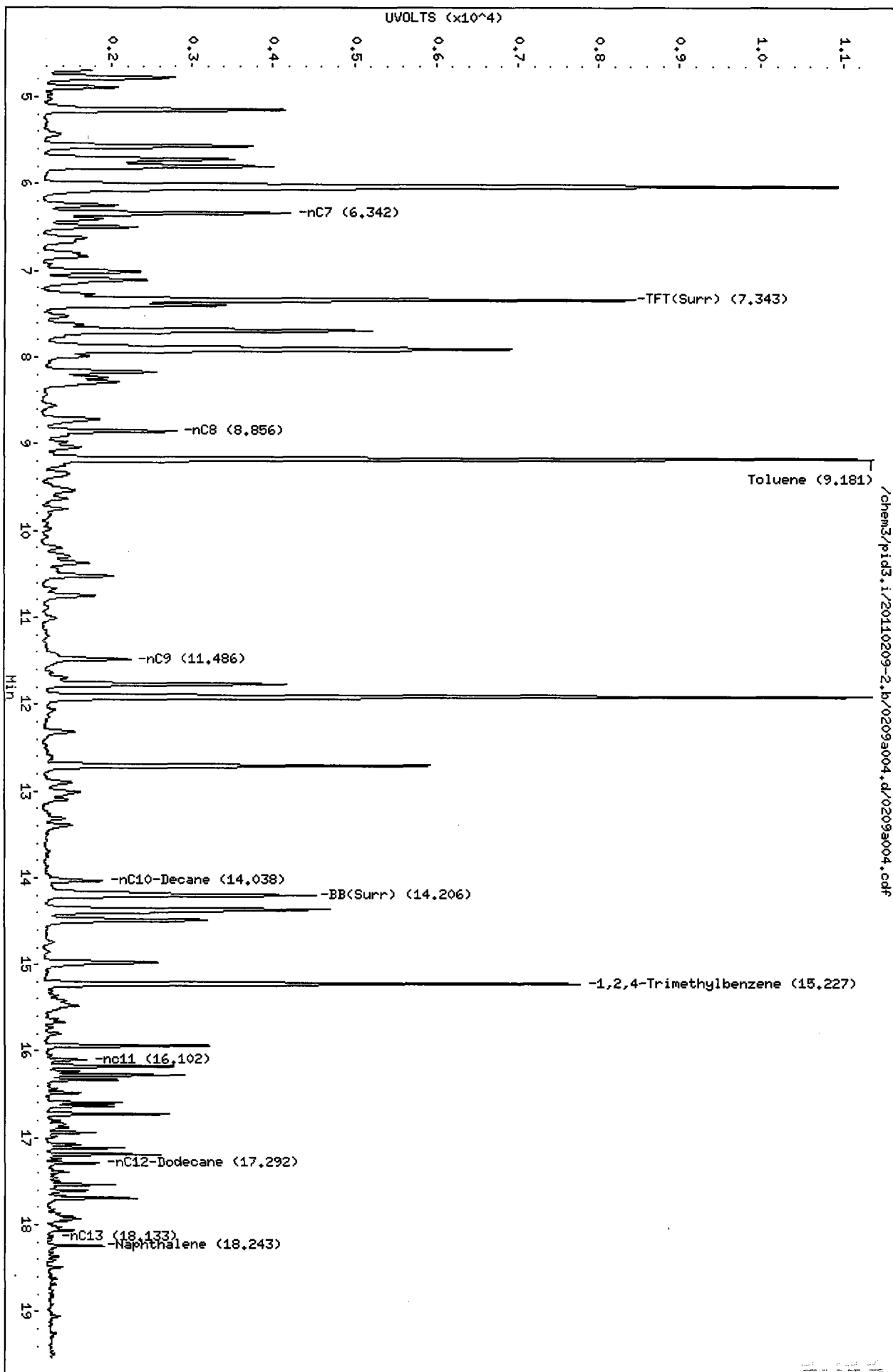
Sample Info: LCS0209

Instrument: pid3.i

Page 1

Column phase: RTX 502-2 FID

Operator: MH
Column diameter: 0.18



SH23 00240

Data File: /chem3/pid3.i/20110209-1.b/0209a004.d

Date : 09-FEB-2011 07:37

Client ID: LCS0209S1

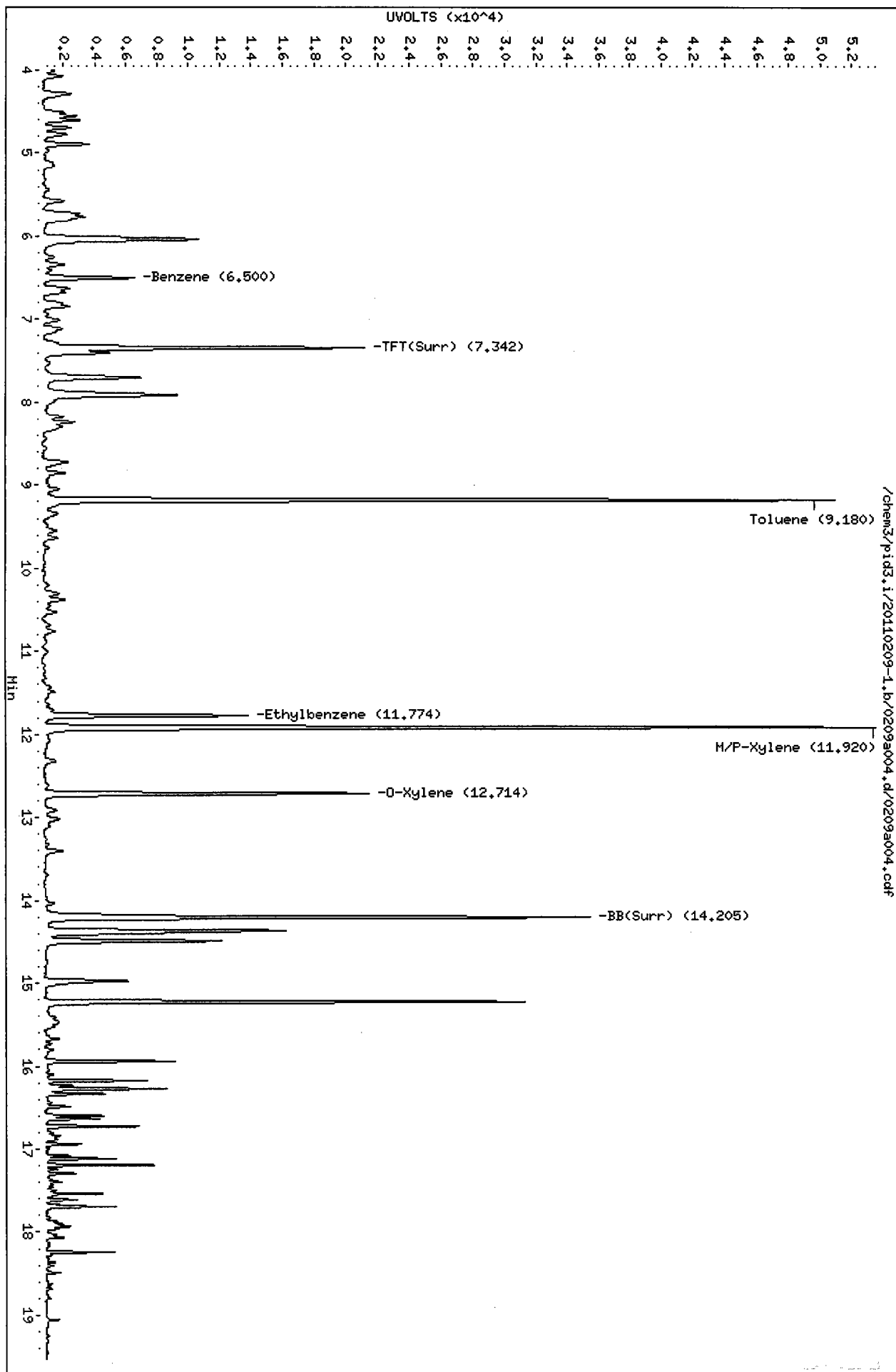
Sample Info: LCS0209

Instrument: pid3.i

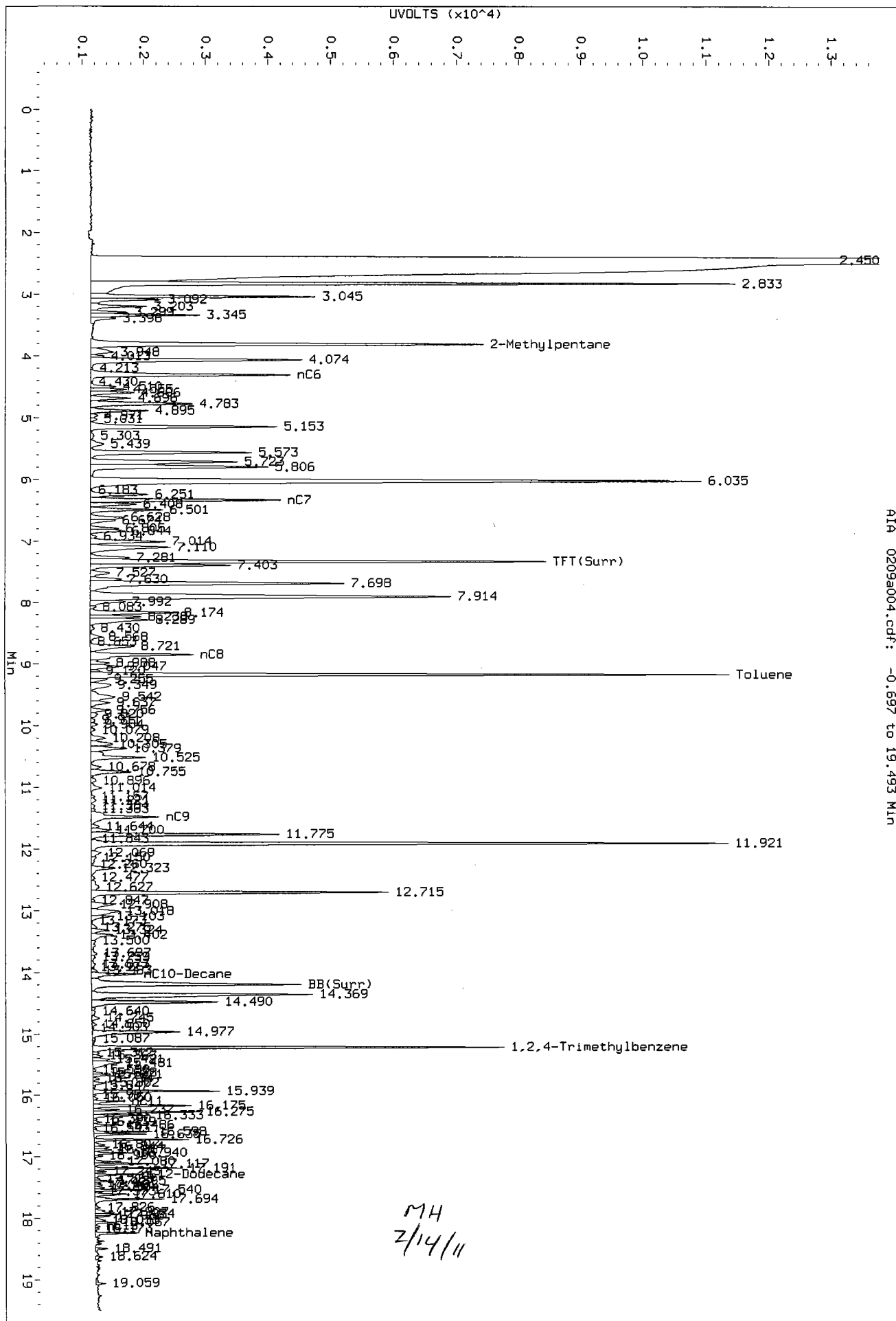
Operator: HH

Column diameter: 0.18

Column phase: RTX 502-2 PID

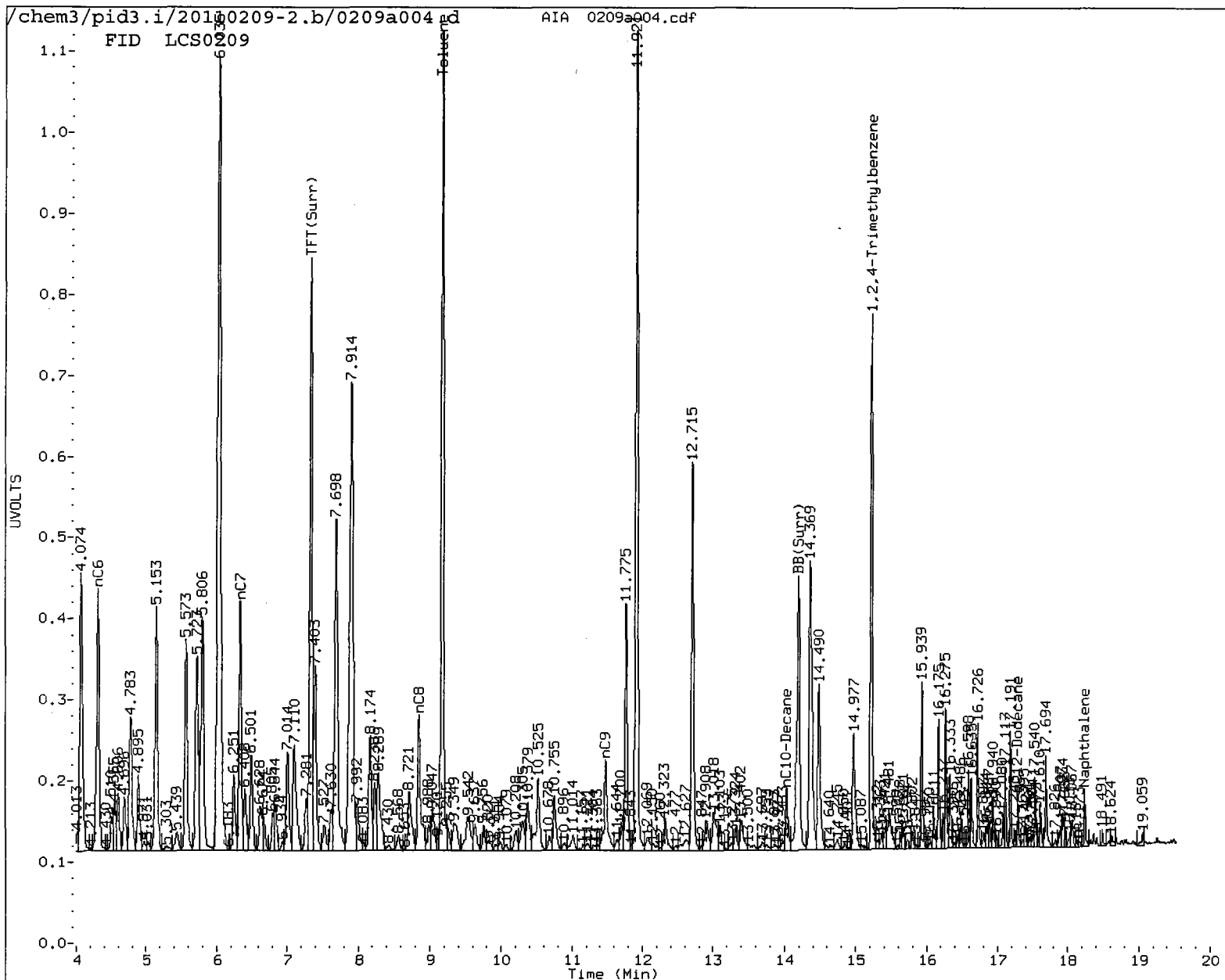


Data File: /chem3/pid3.1/20110209-2.b/0209a004.d/0209a004.cdf
Injection Date: 09-FEB-2011 07:37
Instrument: pid3.1
Client Sample ID:



AIA 0209a004.cdf: -0.697 to 19.493 Min

5123: 00201



MANUAL INTEGRATION

- ☒ 1. Baseline correction
- ☐ 2. Poor chromatography
- ☐ 3. Peak not found
- ☐ 4. Totals calculation
- ☐ 5. Other _____

Analyst: MH

Date: 2/14/11

74
2/14/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20110209-2.b/0209a005.d ARI ID: LCSD0209
Data file 2: /chem3/pid3.i/20110209-1.b/0209a005.d Client ID: LCSD0209S1
Method: /chem3/pid3.i/20110209-1.b/PIDB.m Injection Date: 09-FEB-2011 08:03
Instrument: pid3.i Matrix: SOIL
Gas Ical Date: 08-FEB-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
7.345	0.000	7415	90876	110.4	TFT(Surr)
14.205	0.000	3400	47776	104.6	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.08 to 17.39)	874780	759341	0.868 M
8015B 2MP-TMB (3.73 to 15.33)	1692925	1641700	0.970 M
AK101 nC6-nC10 (4.22 to 13.94)	1377819	1337672	0.971 M
NWTPHG Tol-Nap (9.08 to 18.34)	916507	797399	0.870 M
CalGas nC6-nC12 (4.22 to 17.39)	1726695	1625774	0.942 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
7.344	0.005	21237	108.7	TFT(Surr)
14.204	0.000	35472	106.5	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
6.503	0.006	5666	4.04	Benzene
9.181	0.004	48957	39.25	Toluene
11.774	0.001	12484	11.15	Ethylbenzene
11.920	0.003	50658	42.91	M/P-Xylene
12.713	0.001	19755	19.72	O-Xylene
4.078	-0.013	1143	2.25	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid3.i/20110209-2.b/0209a005.d

Date : 09-FEB-2011 08:03

Client ID:

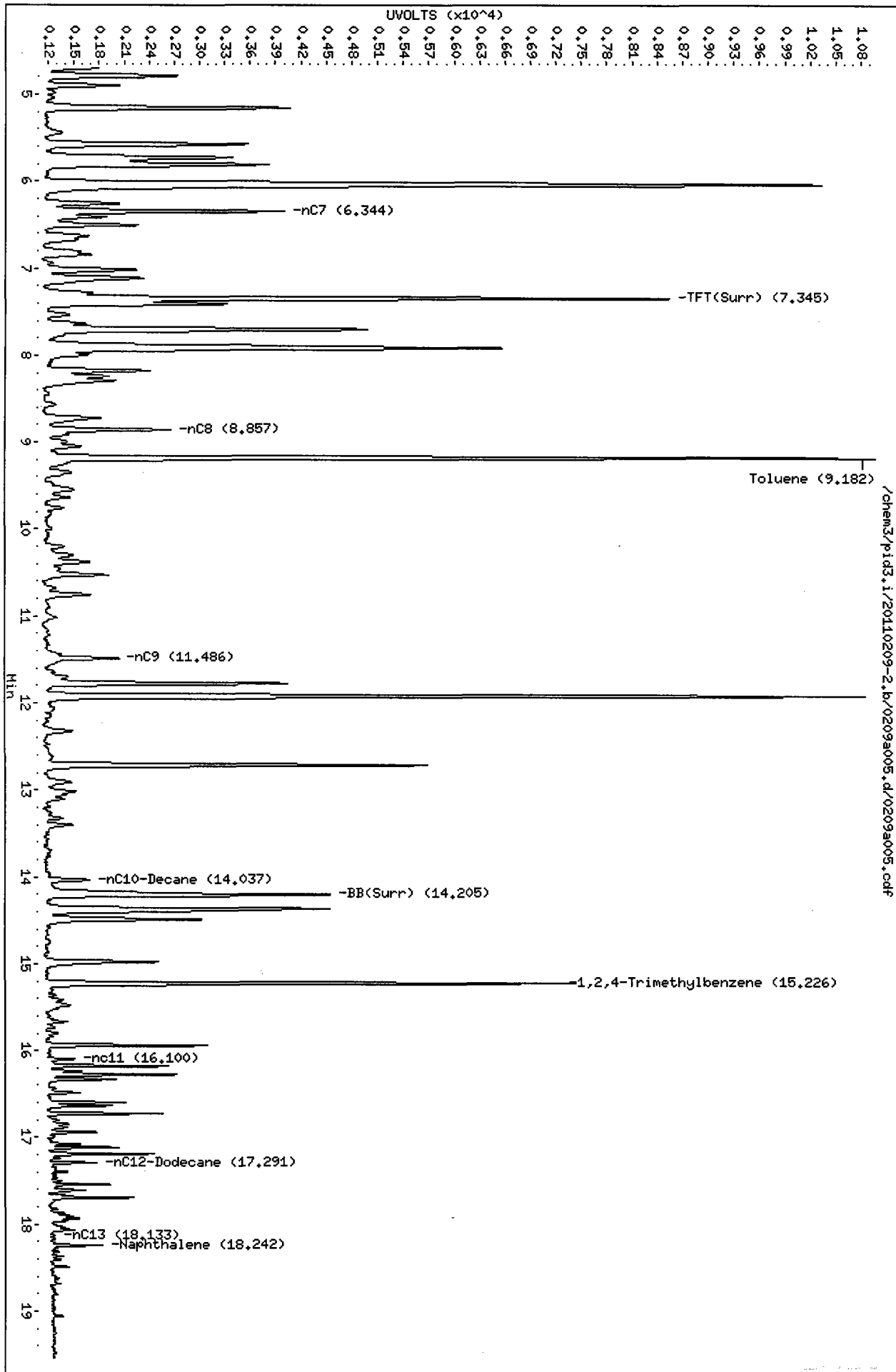
Sample Info: LCSD0209

Instrument: pid3.i

Page 1

Column phase: RTX 502-2 FID

Operator: HH
Column diameter: 0.18



Data File: /chem3/pid3.i/20110209-1.b/0209a005.d

Date : 09-FEB-2011 08:03

Client ID: LCSD0209S1

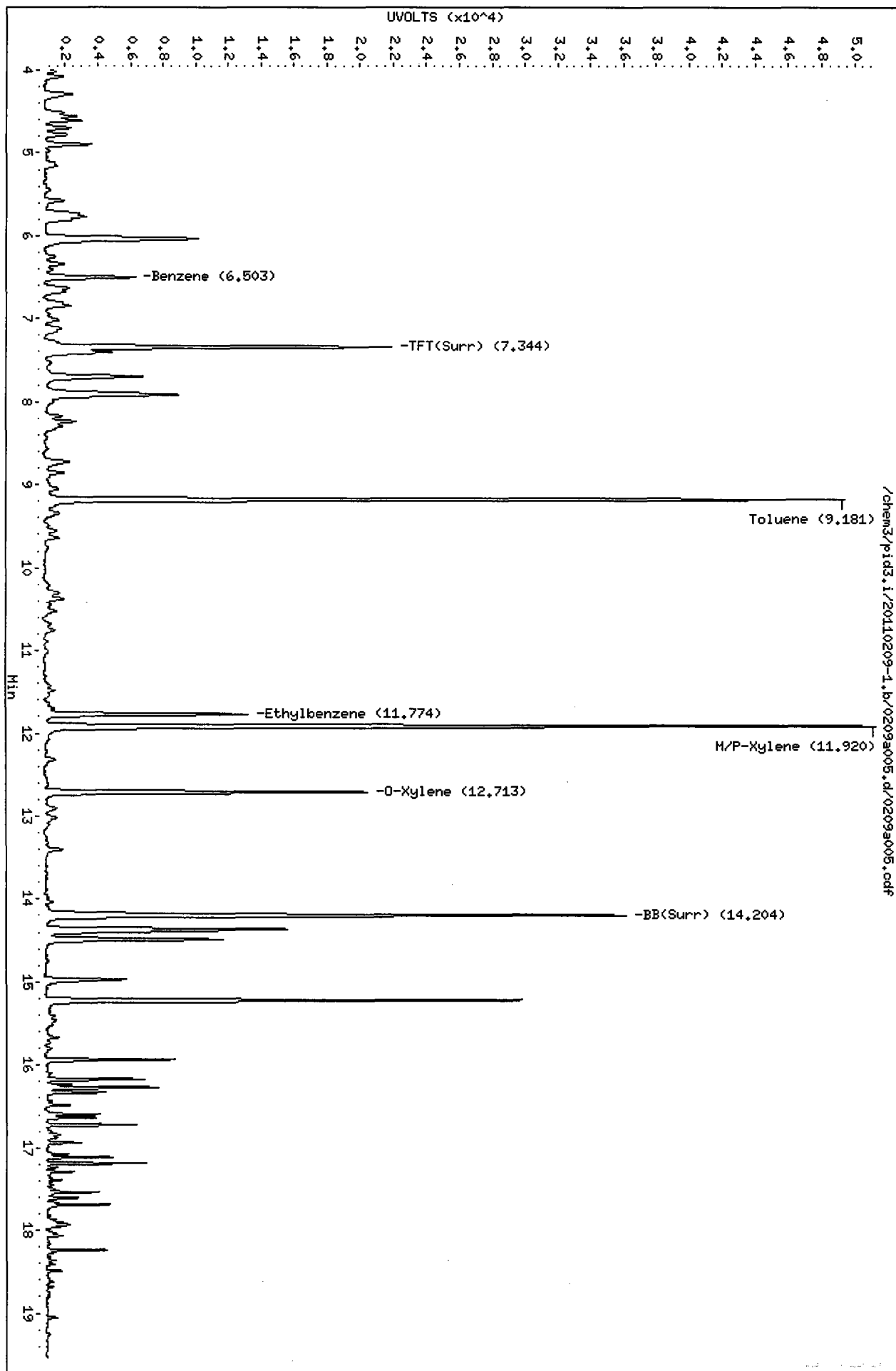
Sample Info: LCSD0209

Instrument: pid3.i

Operator: HH

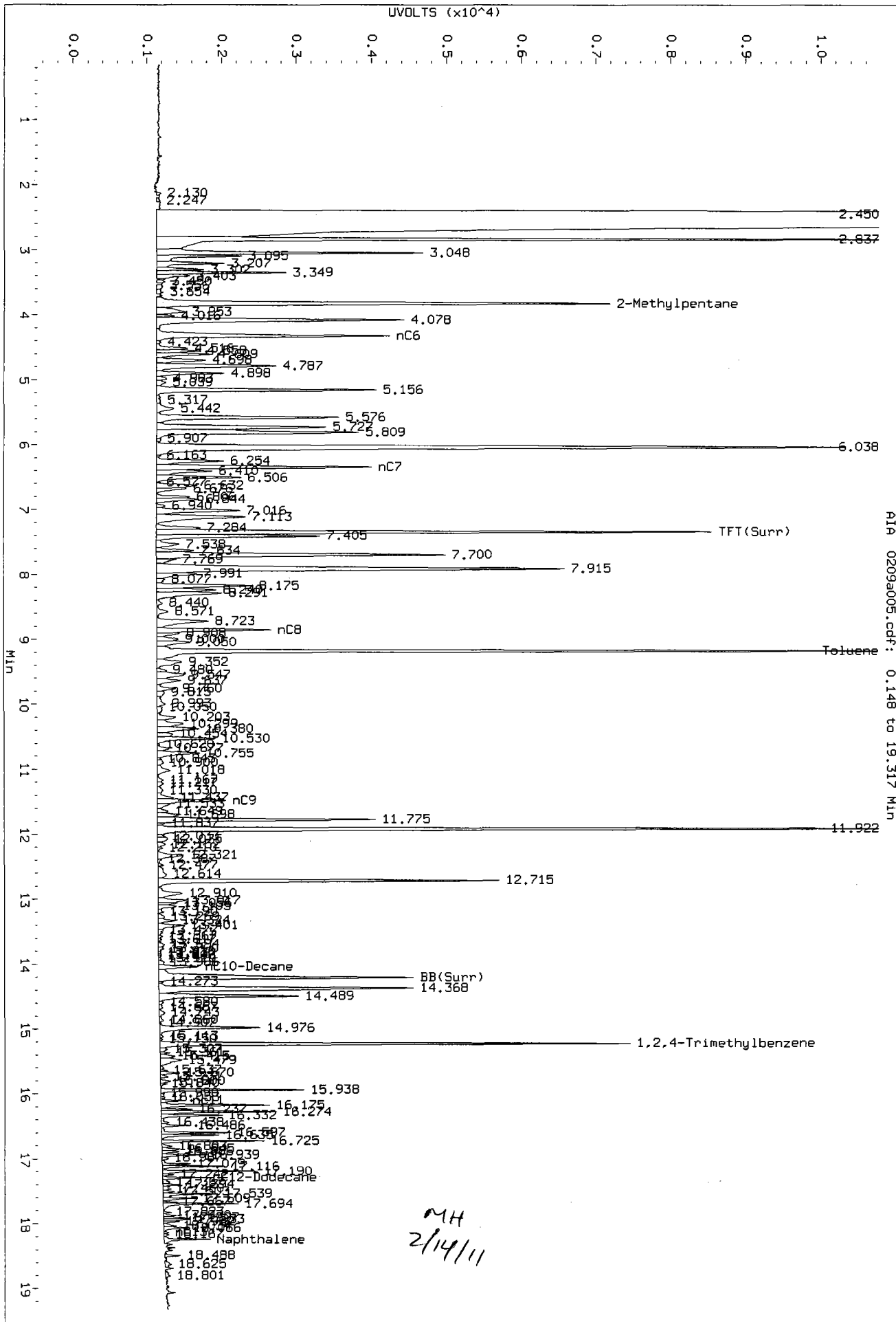
Column diameter: 0.18

Column phase: RTX 502-2 PID

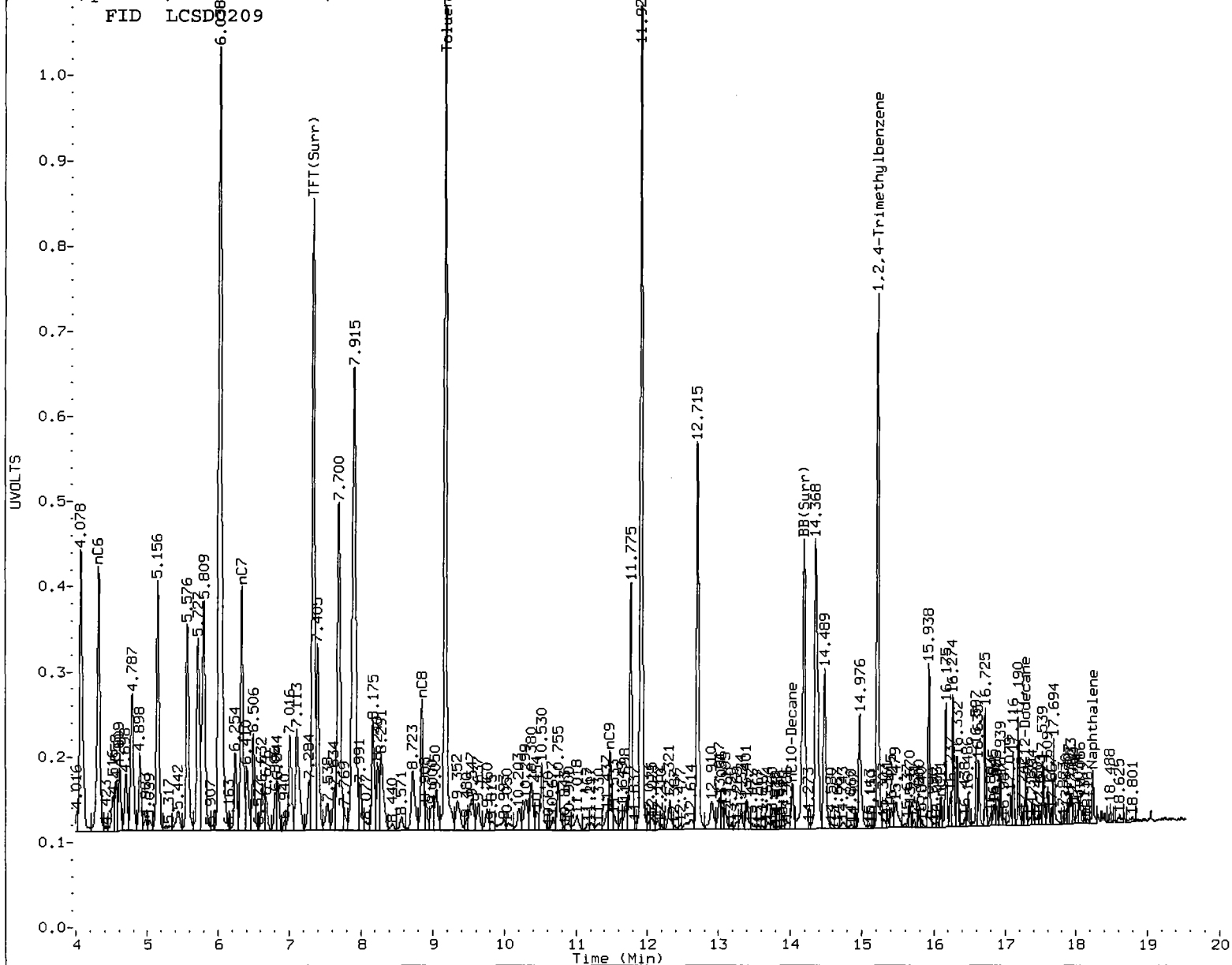


00200 5423

Data File: /chem3/pid3.i/20110209-2.b/0209a005.d/0209a005.cdf
Injection Date: 09-FEB-2011 08:03
Instrument: pid3.i
Client Sample ID:



FID LCSD0209



MANUAL INTEGRATION

- ☒ 1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Other _____

Analyst: MHDate: 2/14/11

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: MB-020911

METHOD BLANK

Lab Sample ID: MB-020911

LIMS ID: 11-2196

Matrix: Soil

Data Release Authorized: *MB*

Reported: 02/15/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

Event: JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed: 02/09/11 08:29

Instrument/Analyst: PID3/MH

Purge Volume: 5.0 mL

Sample Amount: 100 mg-dry-wt

CAS Number	Analyte	RL	Result
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	GAS ID ---
-----------------------------	-----	---------	---------------

BETX Surrogate Recovery

Trifluorotoluene	102%
Bromobenzene	101%

Gasoline Surrogate Recovery

Trifluorotoluene	99.7%
Bromobenzene	99.3%

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.

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid3.i/20110209-2.b/0209a006.d ARI ID: MB0209
Data file 2: /chem3/pid3.i/20110209-1.b/0209a006.d Client ID: MB0209S1
Method: /chem3/pid3.i/20110209-1.b/PIDB.m Injection Date: 09-FEB-2011 08:29
Instrument: pid3.i Matrix: SOIL
Gas Ical Date: 08-FEB-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
7.344	-0.001	6702	79058	99.7	TFT(Surr)
14.207	0.002	3227	34456	99.3	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.08 to 17.39)	874780	3318	0.004
8015B 2MP-TMB (3.73 to 15.33)	1692925	7541	0.004
AK101 nC6-nC10 (4.22 to 13.94)	1377819	5224	0.004
NWTPHG Tol-Nap (9.08 to 18.34)	916507	4393	0.005
CalGas nC6-nC12 (4.22 to 17.39)	1726695	7541	0.004

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
7.343	0.004	19995	102.4	TFT(Surr)
14.206	0.001	33754	101.3	BB(Surr)

SW8021 (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/20110209-2.b/0209a006.d

Date : 09-FEB-2011 08:29

Client ID:

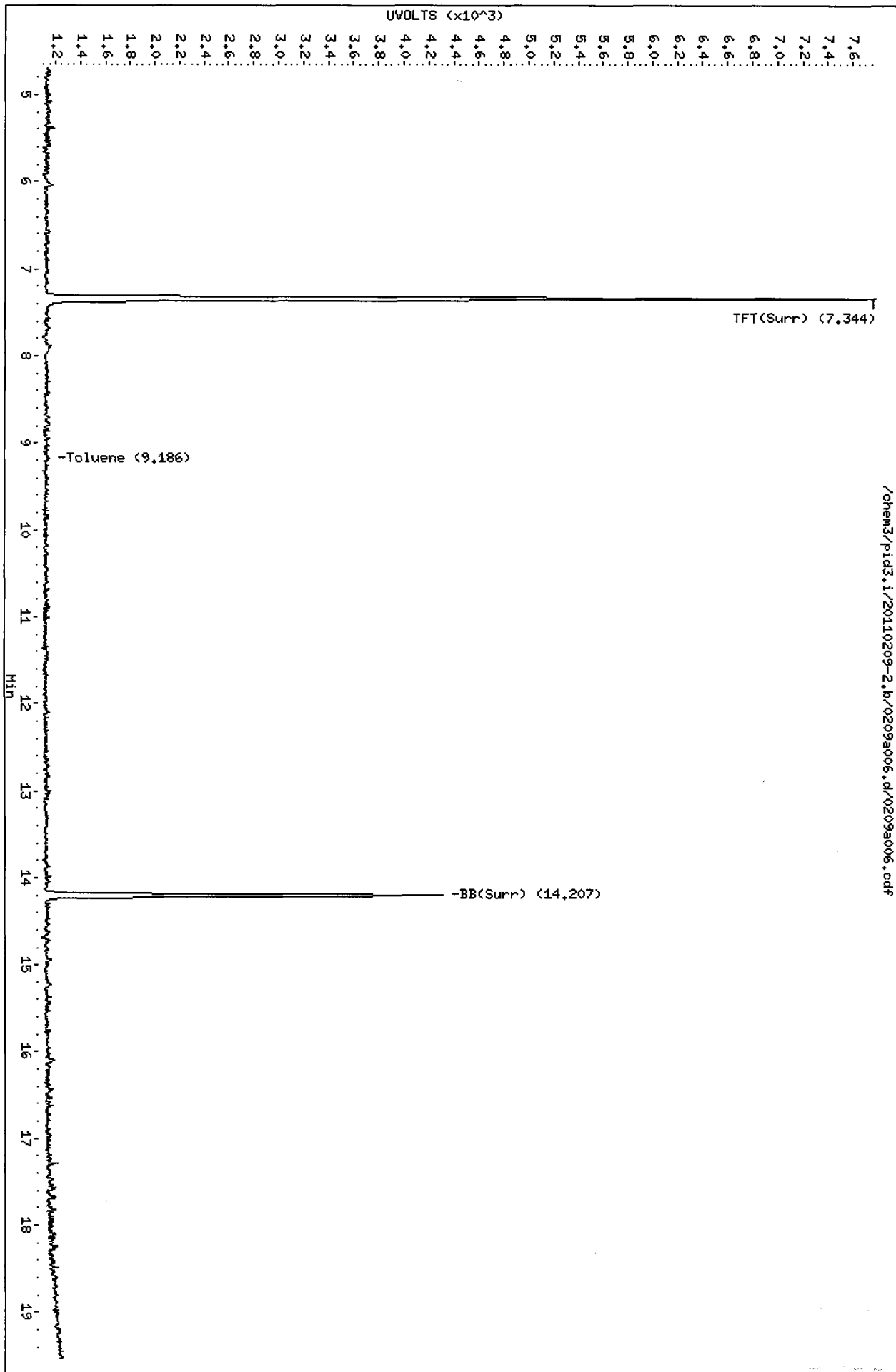
Sample Info: MB0209

Instrument: pid3.i

Operator: HH

Column diameter: 0.18

Column phase: RTX 502-2 FID



Data File: /chem3/pid3.i/20110209-1.b/0209a006.d

Date : 09-FEB-2011 08:29

Client ID: HB0209S1

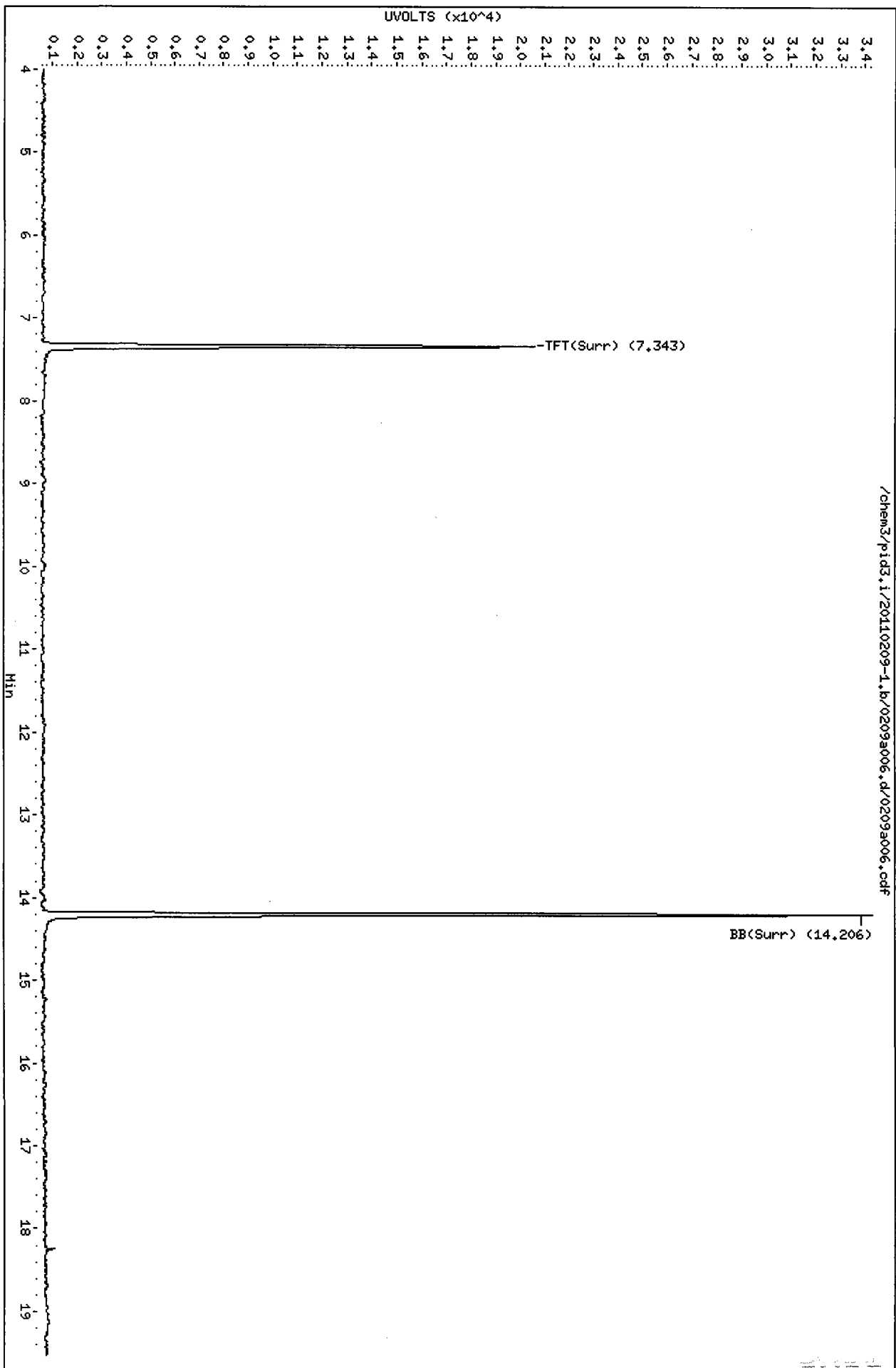
Sample Info: HB0209

Column phase: RTX 502-2 PID

Instrument: pid3.i

Operator: MH

Column diameter: 0.18



**ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS**

NWTPHD by GC/FID

Page 1 of 2

Matrix: Soil

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Received: 02/02/11

Data Release Authorized:

Reported: 02/10/11

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
SH23A 11-2184	B11-06-20 HC ID: DIESEL/MOTOR OIL	02/03/11	02/08/11 FID4A	1.00 10	Diesel Motor Oil o-Terphenyl	53 100	1,500 1,100 83.1%
SH23B 11-2185	B11-06-25 HC ID: DIESEL/MOTOR OIL	02/03/11	02/09/11 FID4A	5.00 10	Diesel Motor Oil o-Terphenyl	290 580	6,600 5,200 D
SH23C 11-2186	B11-06-30 HC ID: DIESEL/MOTOR OIL	02/03/11	02/09/11 FID4A	5.00 10	Diesel Motor Oil o-Terphenyl	280 570	9,800 10,000 D
SH23D 11-2187	B11-07-15 HC ID: ---	02/03/11	02/09/11 FID4A	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.4 11	< 5.4 U < 11 U 88.1%
SH23E 11-2188	B11-07-20 HC ID: ---	02/03/11	02/09/11 FID4A	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.2 10	< 5.2 U < 10 U 96.7%
MB-020311 11-2189	Method Blank HC ID: ---	02/03/11	02/08/11 FID4A	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.0 10	< 5.0 U < 10 U 85.6%
SH23F 11-2189	B11-07-25 HC ID: ---	02/03/11	02/09/11 FID4A	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.5 11	< 5.5 U < 11 U 94.7%
SH23G 11-2190	B11-08-15 HC ID: DIESEL/MOTOR OIL	02/03/11	02/09/11 FID9	5.00 10	Diesel Motor Oil o-Terphenyl	270 540	2,200 1,400 D
SH23H 11-2191	B11-08-20 HC ID: DIESEL/MOTOR OIL	02/03/11	02/09/11 FID4A	5.00 100	Diesel Motor Oil o-Terphenyl	2,500 5,000	5,500 12,000 D
SH23I 11-2192	B11-08-25 HC ID: DIESEL/MOTOR OIL	02/03/11	02/09/11 FID4A	5.00 100	Diesel Motor Oil o-Terphenyl	2,800 5,500	5,500 16,000 D
SH23J 11-2193	B11-08-30 HC ID: DIESEL/MOTOR OIL	02/03/11	02/09/11 FID4A	5.00 100	Diesel Motor Oil o-Terphenyl	2,700 5,300	21,000 20,000 D
SH23K 11-2194	B11-09-14 HC ID: DIESEL/MOTOR OIL	02/03/11	02/09/11 FID4A	5.00 50	Diesel Motor Oil o-Terphenyl	1,400 2,700	3,900 6,700 D
SH23L 11-2195	B11-09-19 HC ID: DIESEL/MOTOR OIL	02/03/11	02/09/11 FID4A	5.00 50	Diesel Motor Oil o-Terphenyl	1,300 2,600	4,500 7,700 D

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS

NWTPHD by GC/FID

Page 2 of 2

Matrix: Soil

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Received: 02/02/11

Data Release Authorized: *B*

Reported: 02/10/11

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
SH23M 11-2196	B11-09-23.5 HC ID: DIESEL/MOTOR OIL	02/03/11	02/09/11 FID4A	5.00 50	Diesel Motor Oil o-Terphenyl	1,400 2,900	2,200 3,600 D
SH23N 11-2197	B11-10-15 HC ID: ---	02/03/11	02/09/11 FID4A	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.2 10	< 5.2 U < 10 U 99.2%
SH23O 11-2198	B11-10-20 HC ID: ---	02/03/11	02/09/11 FID4A	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.2 10	< 5.2 U < 10 U 101%
SH23P 11-2199	B11-10-25 HC ID: ---	02/03/11	02/09/11 FID4A	1.00 1.0	Diesel Motor Oil o-Terphenyl	6.2 12	< 6.2 U < 12 U 100%
SH23Q 11-2200	B11-10-30 HC ID: ---	02/03/11	02/09/11 FID4A	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.4 11	< 5.4 U < 11 U 112%
SH23R 11-2201	B11-11-10 HC ID: ---	02/03/11	02/09/11 FID4A	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.8 12	< 5.8 U < 12 U 96.9%
SH23S 11-2202	B11-12-10 HC ID: DIESEL	02/03/11	02/09/11 FID4A	1.00 50	Diesel Motor Oil o-Terphenyl	300 610	7,100 < 610 U D
SH23T 11-2203	B11-12-15 HC ID: ---	02/03/11	02/09/11 FID4A	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.3 11	< 5.3 U < 11 U 100%

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.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a009.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23A
Client ID: B11-06-20
Injection: 08-FEB-2011 23:59
Dilution Factor: 10

FID:4A RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.547	0.007	1382	1693	GAS (Tol-C12)	1120840	57
C8	1.911	0.005	567	837	DIESEL (C12-C24)	26884287	1437
C10	3.526	-0.002	7056	2102	M.OIL (C24-C38)	12038312	1060
C12	4.521	0.006	28246	43166	AK-102 (C10-C25)	28916968	1375 M
C14	5.276	-0.011	245453	196731	AK-103 (C25-C36)	10562939	1530 M
C16	5.959	0.000	139144	63472			
C18	6.594	0.000	153665	131302	CRUDE (Tol-C40)	40369327	5345 M
C20	7.197	0.000	182789	307079	MIN.OIL (C24-C38)	12038312	898 M
C22	7.785	0.017	170758	238114			
C24	8.298	-0.004	140256	166483			
C25	8.563	0.005	126606	135655			
C26	8.800	-0.006	107242	35833			
C28	9.314	-0.002	96007	162951			
C32	10.355	-0.016	62715	129789			
C34	10.892	-0.006	25594	45873	BUNKERC (C10-C38)	39902505	5391 M
Filter Peak	12.792	0.010	7489	5295			
C36	11.411	-0.001	38591	74003			
C38	11.911	0.006	12880	12914			
C40	12.367	-0.016	22842	50779			
o-terph	6.752	-0.003	108161	58132	JET-A (C10-C18)	15606662	1071
Triacon Surr	9.842	-0.013	78497	63346			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	58132	3.7	83.2
Triacontane	63346	3.9	86.9

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	14566.6	18-JAN-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/20110208.b/0208a009.d

Date : 08-FEB-2011 23:59

Client ID: B11-06-20

Sample Info: SH239.10

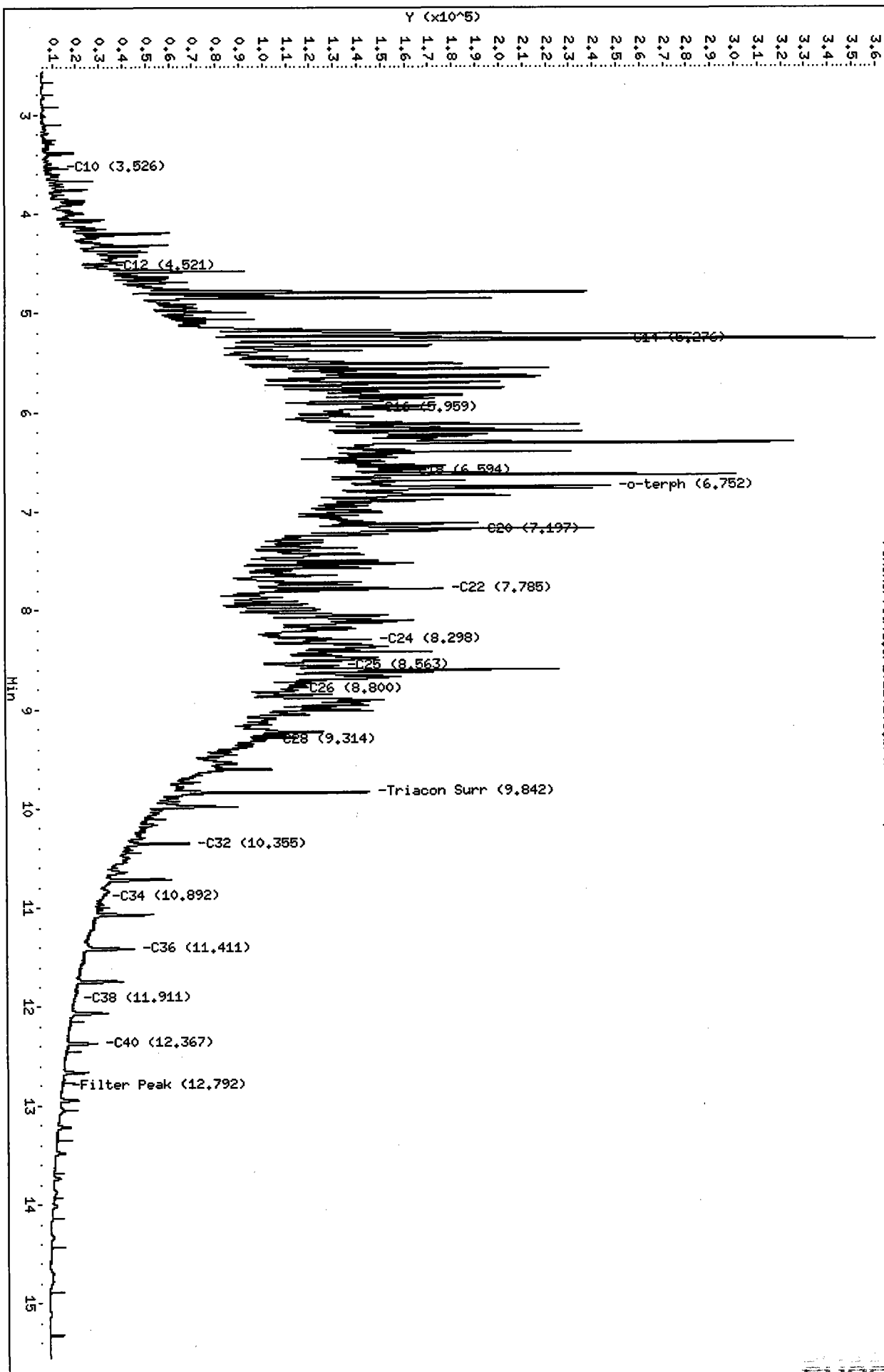
Column phase: RTX-1

Instrument: fid4a.i

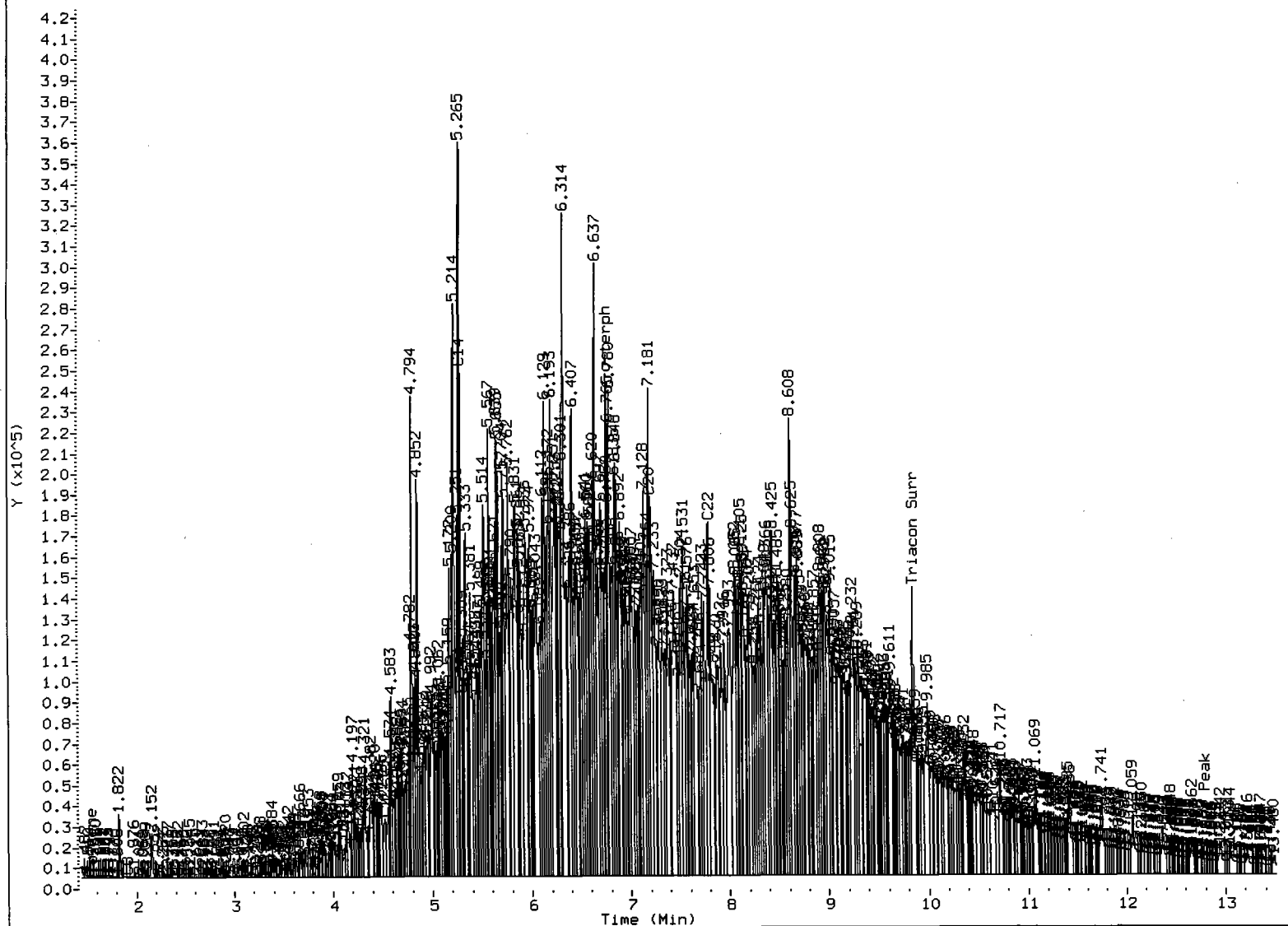
Operator: MS

Column diameter: 0.25

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HP6890 GC Data, 0208a009.d



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: MuDate: 2/7/11

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a010.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23B
Client ID: B11-06-25
Injection: 09-FEB-2011 00:23
Dilution Factor: 10

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.543	0.003	7228	3045	GAS (Tol-C12)	1057369	53
C8	1.901	-0.005	4042	1954	DIESEL (C12-C24)	21605587	1155
C10	3.526	-0.002	3191	2142	M.OIL (C24-C38)	10340236	911
C12	4.519	0.004	23256	36320	AK-102 (C10-C25)	23544866	1120 M
C14	5.297	0.010	67528	24823	AK-103 (C25-C36)	8947070	1296 M
C16	5.973	0.013	130859	165322			
C18	6.591	-0.003	123364	104837	CRUDE (Tol-C40)	33253019	4403 M
C20	7.195	-0.002	152751	113832	MIN.OIL (C24-C38)	10340236	771 M
C22	7.765	-0.002	83900	37915			
C24	8.295	-0.007	125162	142841			
C25	8.562	0.004	106879	124676			
C26	8.809	0.003	95520	55605			
C28	9.313	-0.003	81976	134750			
C32	10.354	-0.017	42960	86560			
C34	10.889	-0.009	20651	29210	BUNKERC (C10-C38)	32838927	4437 M
Filter Peak	12.783	0.000	5041	4556			
C36	11.412	0.001	27277	67348			
C38	11.912	0.008	9791	10297			
C40	12.367	-0.015	15929	36796			
o-terph	----				JET-A (C10-C18)	12292989	844
Triacon Surr	9.838	-0.016	17389	13943			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacantane	13943	0.9	19.1

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	14566.6	18-JAN-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/20110208.b/0208a010.d

Date : 09-FEB-2011 00:23

Client ID: B11-06-25

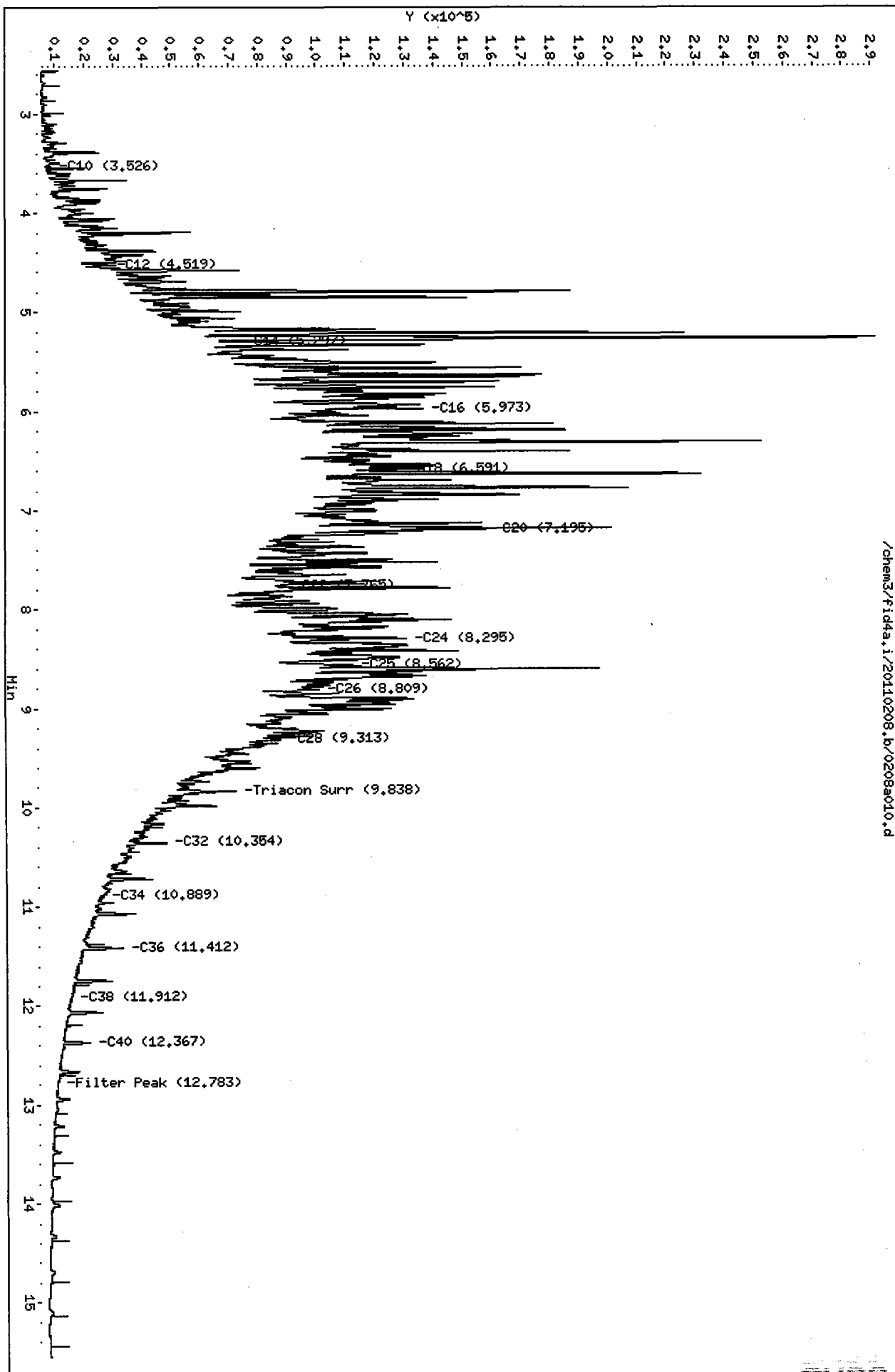
Sample Info: SH23B.10

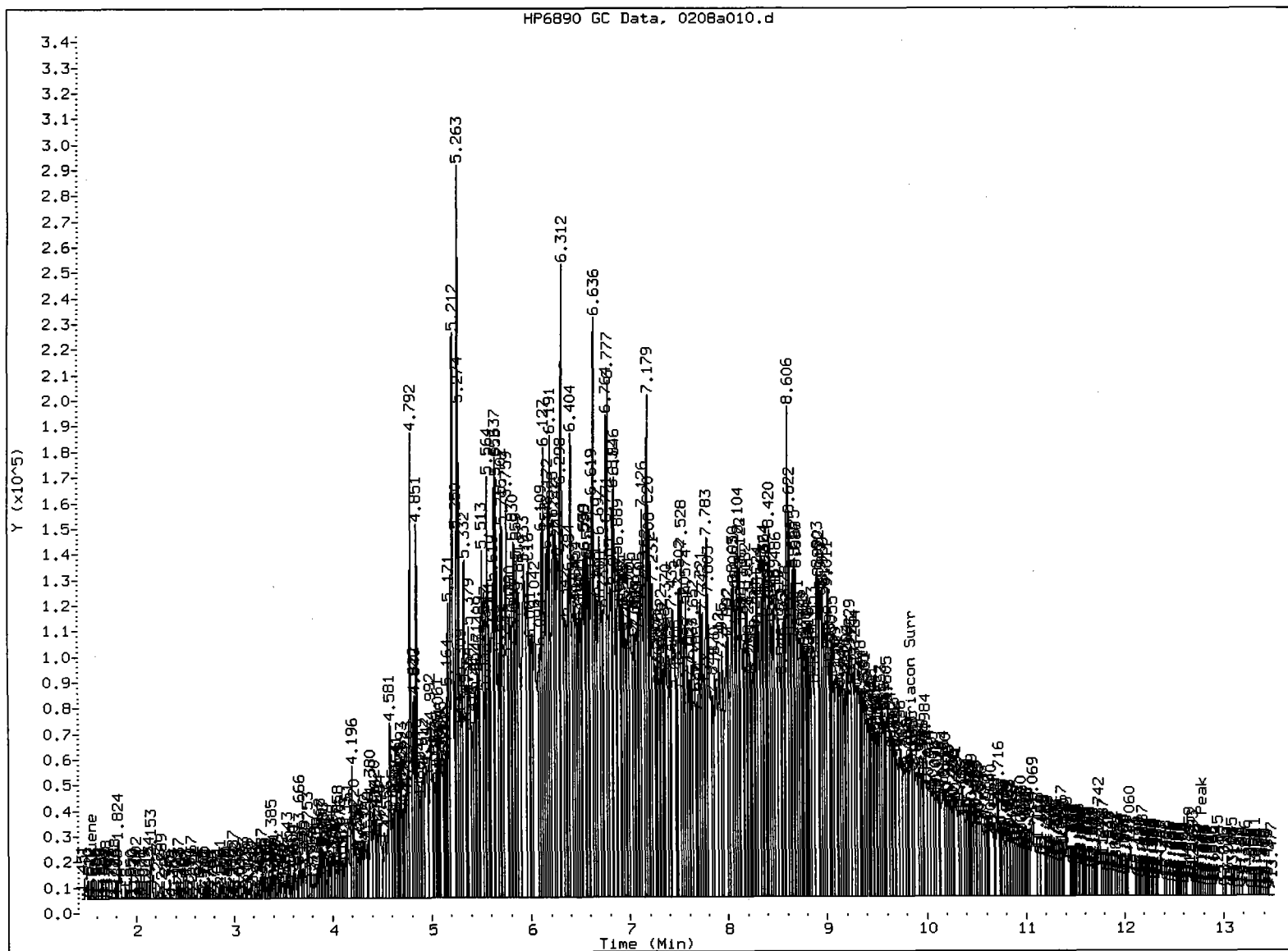
Column phase: RTX-1

Instrument: fid4a.i

Operator: MS

Column diameter: 0.25





MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: MrDate: 2/7/11

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a011.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23C
Client ID: B11-06-30
Injection: 09-FEB-2011 00:46
Dilution Factor: 10

FID:4A RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.544	0.004	12168	9078	GAS (Tol-C12)	1744963	88
C8	1.908	0.002	1949	2976	DIESEL (C12-C24)	32330164	1728
C10	3.527	-0.002	6271	4948	M.OIL (C24-C38)	20280658	1786
C12	4.520	0.004	35848	55268	AK-102 (C10-C25)	35848670	1705
C14	5.278	-0.009	295321	247267	AK-103 (C25-C36)	17626975	2554
C16	5.975	0.015	181802	314547			
C18	6.594	0.000	172989	148683	CRUDE (Tol-C40)	54814591	7258
C20	7.200	0.003	222306	176636	MIN.OIL (C24-C38)	20280658	1513
C22	7.748	-0.019	195579	339877			
C24	8.306	0.004	225214	264290			
C25	8.573	0.015	207179	289959			
C26	8.806	0.001	185382	139528			
C28	9.316	-0.001	160053	141915			
C32	10.382	0.011	57328	53939			
C34	10.897	-0.001	36644	24550	BUNKERC (C10-C38)	54078616	7306
Filter Peak	12.791	0.008	7229	4564			
C36	11.411	0.000	108506	216394			
C38	11.911	0.007	15211	9897			
C40	12.369	-0.014	57421	88352			
o-terph	----				JET-A (C10-C18)	17879982	1227
Triacon Surr	----						

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacantane	0	0.0	0.0

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	14566.6	18-JAN-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/20110208.b/0208a011.d

Date : 09-FEB-2011 00:46

Client ID: B41-06-30

Sample Info: SH23C.10

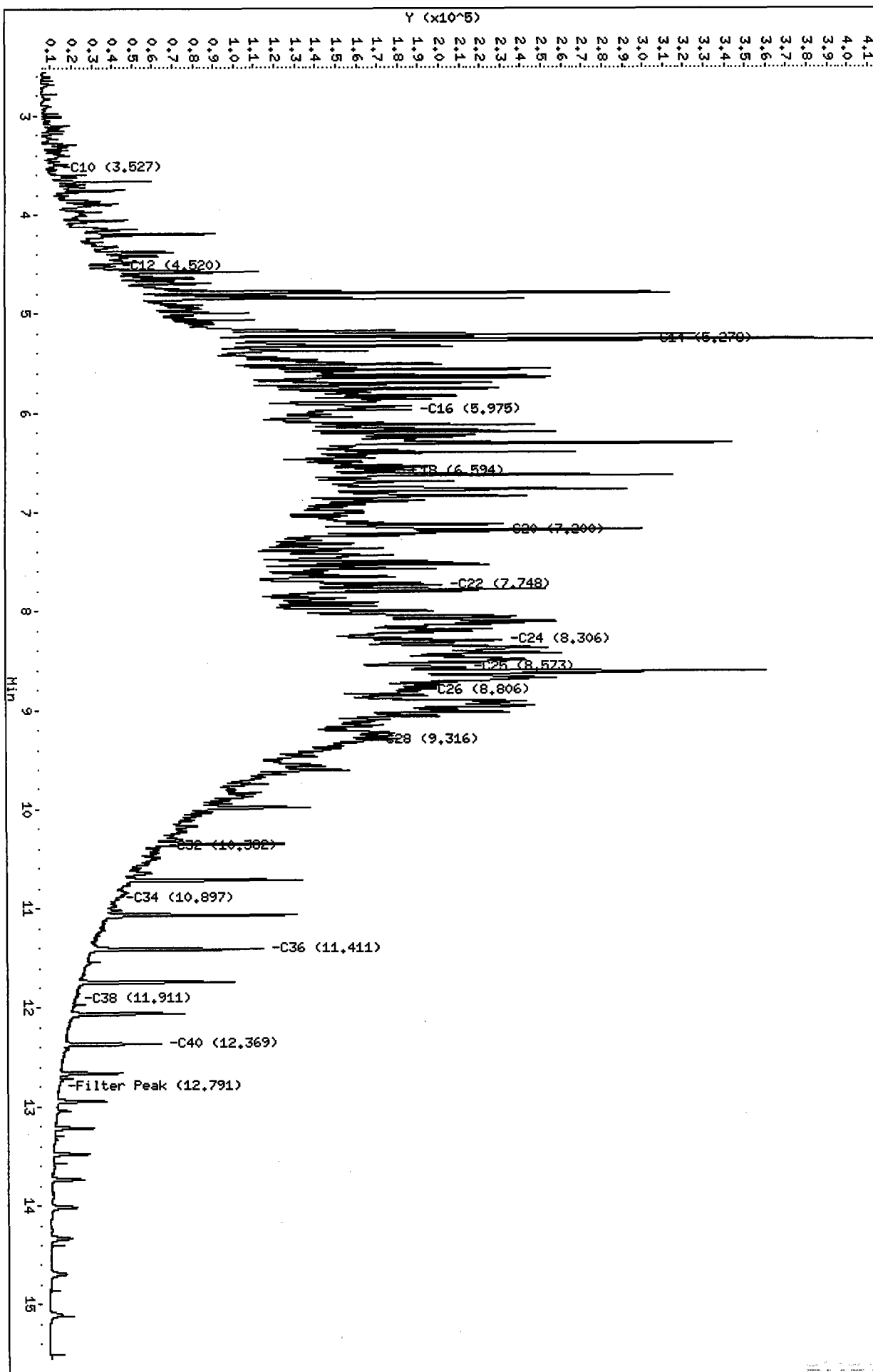
Column phase: RTX-1

Instrument: fid4a.i

Operator: MS

Column diameter: 0.25

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Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a012.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23D
Client ID: B11-07-15
Injection: 09-FEB-2011 01:09
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.550	0.010	4976	5590	GAS (Tol-C12)	104902	5
C8	1.915	0.009	751	1121	DIESEL (C12-C24)	265521	14
C10	3.529	0.001	640	538	M.OIL (C24-C38)	282045	25
C12	4.516	0.000	295	275	AK-102 (C10-C25)	296217	14
C14	5.284	-0.003	959	590	AK-103 (C25-C36)	236023	34
C16	5.956	-0.003	616	456			
C18	6.566	-0.029	2842	3636	CRUDE (Tol-C40)	700180	93
C20	7.192	-0.005	639	1027	MIN.OIL (C24-C38)	282045	21
C22	7.771	0.003	4979	1980			
C24	8.295	-0.006	926	1831			
C25	8.552	-0.006	815	770			
C26	8.799	-0.007	927	1330			
C28	9.308	-0.008	1022	1511			
C32	10.354	-0.017	19706	22767			
C34	10.907	0.009	444	522	BUNKERC (C10-C38)	568396	77
Filter Peak	12.767	-0.015	997	1971			
C36	11.411	0.000	16364	22720			
C38	11.897	-0.008	809	2463			
C40	12.366	-0.016	9282	13366			
o-terph	6.754	-0.001	842996	615874	JET-A (C10-C18)	98678	7
Triacon Surr	9.853	-0.002	674509	764717			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	615874	39.7	88.1
Triacontane	764717	47.2	104.9

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

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Data File: /chem3/fid4a.i/20110208.b/0208a012.d

Date : 09-FEB-2011 01:09

Client ID: B41-07-15

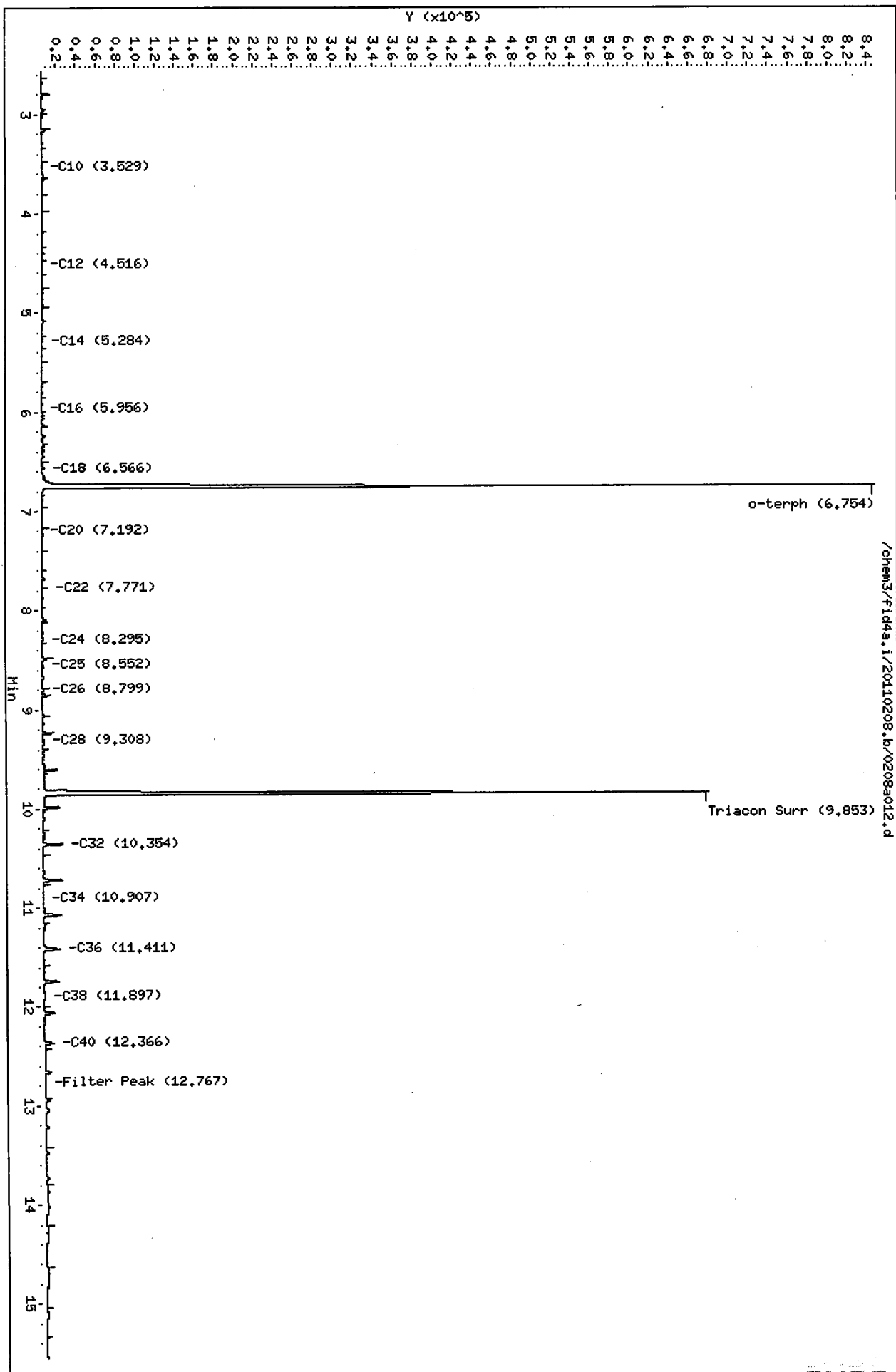
Sample Info: SH23D

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/20110208.b/0208a013.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23E
Client ID: B11-07-20
Injection: 09-FEB-2011 01:32
Dilution Factor: 1

FID:4A RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.552	0.012	14895	13093	GAS (Tol-C12)	127515	6
C8	1.898	-0.008	734	232	DIESEL (C12-C24)	209915	11
C10	3.529	0.001	979	714	M.OIL (C24-C38)	151358	13
C12	4.515	-0.001	755	1086	AK-102 (C10-C25)	237675	11
C14	5.284	-0.003	1164	671	AK-103 (C25-C36)	125747	18
C16	5.956	-0.004	997	661			
C18	6.583	-0.011	6271	1685	CRUDE (Tol-C40)	513742	68
C20	7.193	-0.004	806	1203	MIN.OIL (C24-C38)	151358	11
C22	7.763	-0.004	712	779			
C24	8.296	-0.006	849	1303			
C25	8.566	0.008	1765	2066			
C26	8.799	-0.006	1239	1133			
C28	9.307	-0.009	914	826			
C32	10.352	-0.019	10372	12332			
C34	10.886	-0.012	324	682	BUNKERC (C10-C38)	384274	52
Filter Peak	12.791	0.008	673	587			
C36	11.410	-0.002	7614	11428			
C38	11.901	-0.004	897	2817			
C40	12.366	-0.016	4724	7026			
o-terph	6.756	0.000	903796	675871	JET-A (C10-C18)	85439	6
Triacon Surr	9.852	-0.003	693538	804565			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	675871	43.5	96.7
Triacontane	804565	49.6	110.3

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

20 B/L

Data File: /chem3/fid4a.i/20110208.b/0208a013.d

Date : 09-FEB-2011 01:32

Client ID: B41-07-20

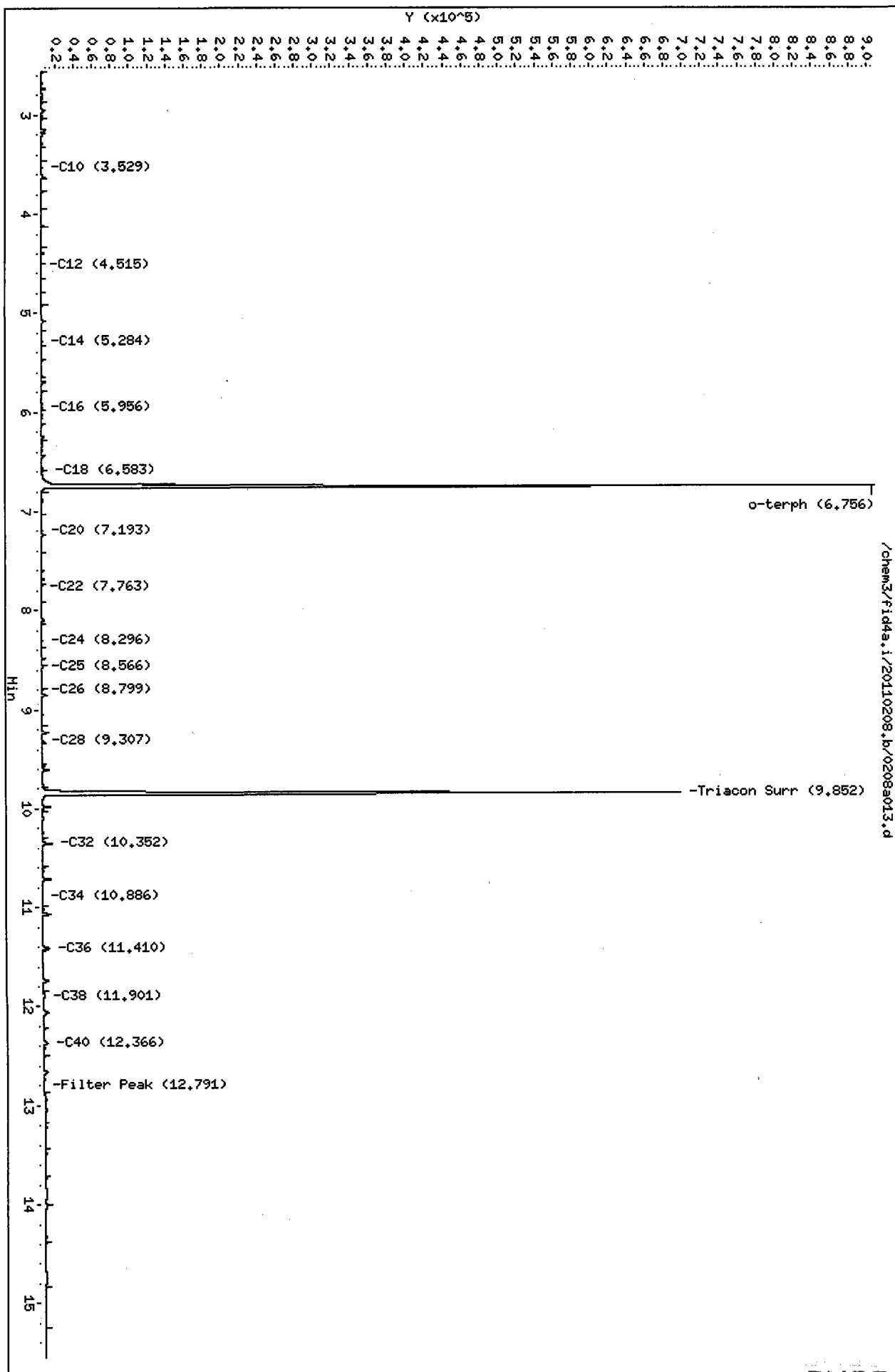
Sample Info: SH23E

Column phase: RTX-1

Instrument: fid4a.i

Operator: HS

Column diameter: 0.25



Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a006.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23MBS1
Client ID: SH23MBS1
Injection: 08-FEB-2011 22:49
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.527	-0.013	983	844	GAS (Tol-C12)	152686	8
C8	1.900	-0.006	463	424	DIESEL (C12-C24)	243154	13
C10	3.529	0.001	647	1128	M.OIL (C24-C38)	536806	47
C12	4.502	-0.014	6301	1108	AK-102 (C10-C25)	277042	13
C14	5.282	-0.005	4343	1109	AK-103 (C25-C36)	457905	66
C16	5.955	-0.004	604	763			
C18	6.588	-0.006	532	780	CRUDE (Tol-C40)	1012552	134
C20	7.196	-0.001	371	312	MIN.OIL (C24-C38)	536806	40
C22	7.765	-0.002	331	250			
C24	8.293	-0.009	1011	2087			
C25	8.552	-0.006	360	255			
C26	8.799	-0.007	307	452			
C28	9.313	-0.003	5318	1295			
C32	10.354	-0.017	55540	60659			
C34	10.873	-0.025	702	2044	BUNKERC (C10-C38)	798913	108
Filter Peak	12.828	0.046	716	549			
C36	11.411	0.000	46848	58765			
C38	11.904	-0.001	632	1676			
C40	12.366	-0.016	21591	27667			
o-terph	6.754	-0.001	836623	598510	JET-A (C10-C18)	68916	5
Triacon Surr	9.851	-0.004	663571	753890			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	598510	38.5	85.6
Triacontane	753890	46.5	103.4

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

mu 2/9/11

Data File: /chem3/fid4a.i/20110208.b/0208a006.d

Date : 08-FEB-2011 22:49

Client ID: SH23MBS1

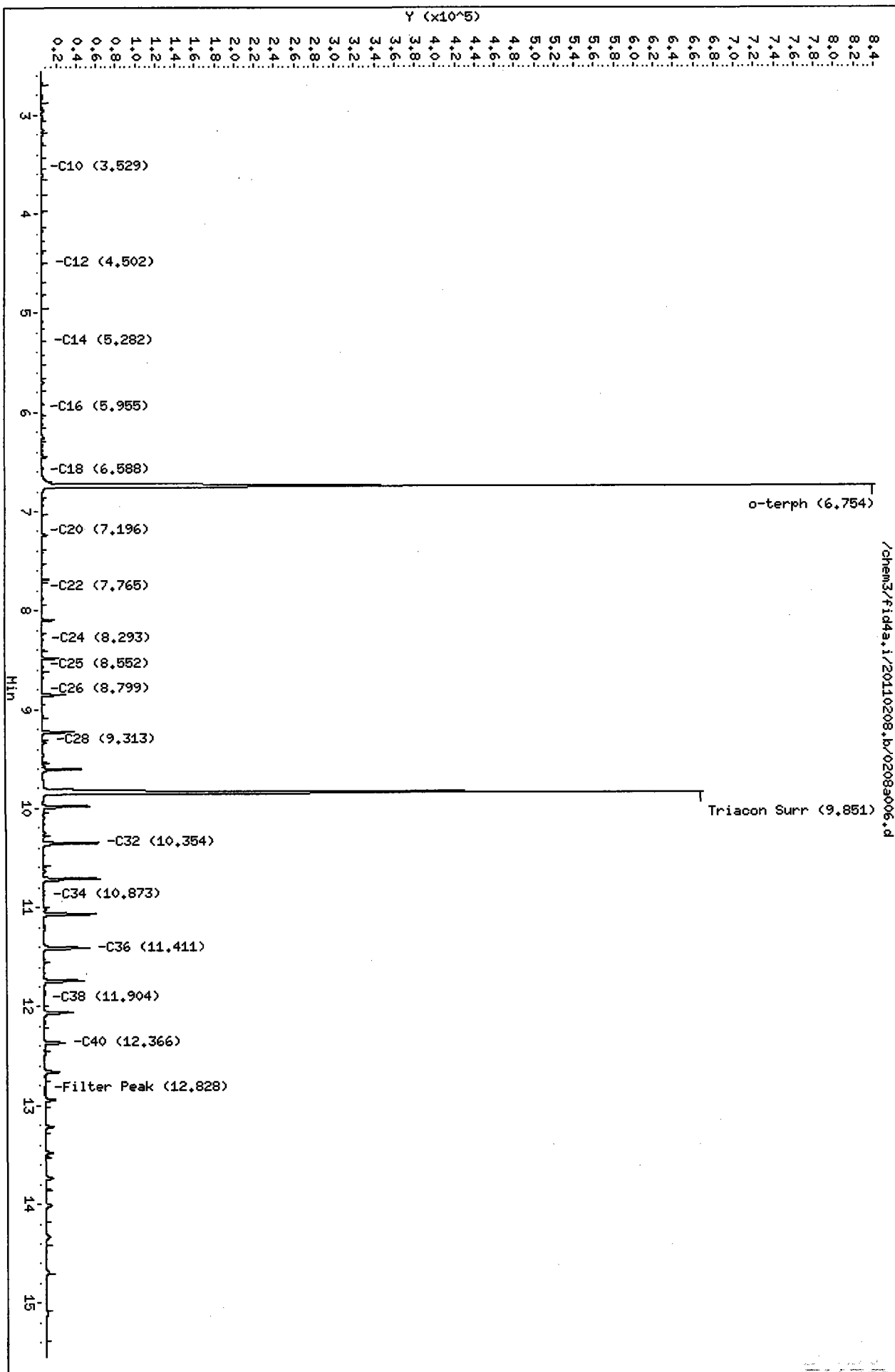
Sample Info: SH23MBS1

Column phase: RTX-1

Instrument: fid4a.i

Operator: MS

Column diameter: 0.25



SH23-00271

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a014.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23F
Client ID: B11-07-25
Injection: 09-FEB-2011 01:56
Dilution Factor: 1

FID:4A RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.552	0.012	12253	11630	GAS (Tol-C12)	155435	8
C8	1.917	0.011	1108	2134	DIESEL (C12-C24)	250693	13
C10	3.528	0.000	838	949	M.OIL (C24-C38)	519709	46
C12	4.516	0.000	412	450	AK-102 (C10-C25)	290218	14
C14	5.283	-0.004	4613	962	AK-103 (C25-C36)	448479	65
C16	5.956	-0.003	640	496			
C18	6.588	-0.006	537	744	CRUDE (Tol-C40)	998286	132
C20	7.192	-0.004	352	457	MIN.OIL (C24-C38)	519709	39
C22	7.763	-0.005	194	165			
C24	8.293	-0.009	792	1283			
C25	8.566	0.008	1112	753			
C26	8.801	-0.005	1608	1382			
C28	9.307	-0.010	579	516			
C32	10.353	-0.018	61144	64729			
C34	10.922	0.024	127	128	BUNKERC (C10-C38)	797843	108
Filter Peak	12.766	-0.017	712	2145			
C36	11.410	-0.001	49018	60207			
C38	11.876	-0.028	878	4481			
C40	12.366	-0.016	21789	27835			
o-terph	6.755	0.000	922725	662010	JET-A (C10-C18)	99878	7
Triacon Surr	9.852	-0.002	700997	822455			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	662010	42.6	94.7
Triacontane	822455	50.7	112.8

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

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Data File: /chem3/fid4a.i/20110208.b/0208a014.d

Date : 09-FEB-2011 01:56

Client ID: B11-07-25

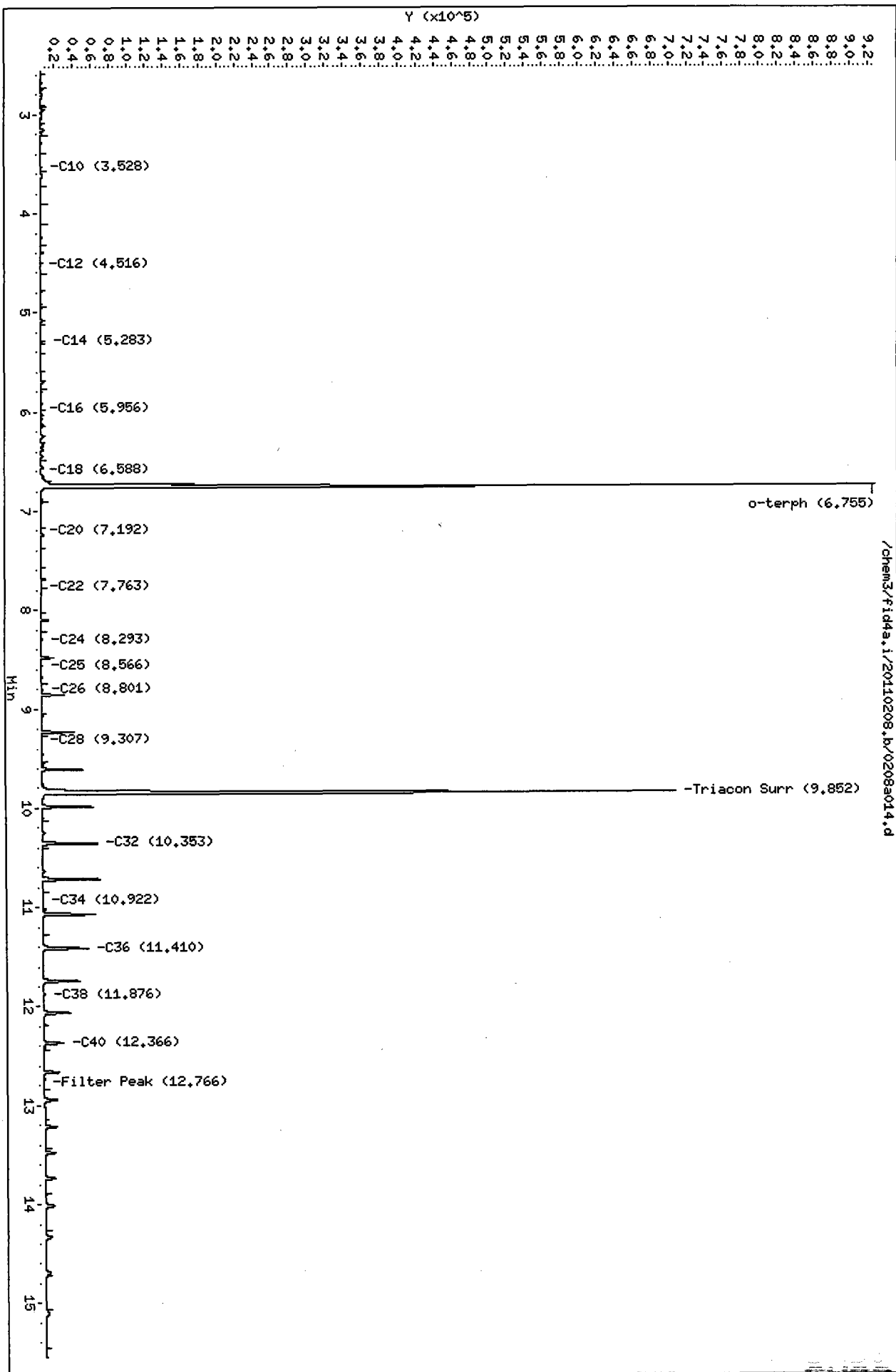
Sample Info: SH23F

Column phase: RTX-1

Instrument: fid4a.i

Operator: MS

Column diameter: 0.25



Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110209.B/0209A006.D
Method: /chem2/fid9.i/20110209.B/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 02/09/2011

ARI ID: SH23G
Client ID:
Injection: 09-FEB-2011 16:19
Dilution Factor: 10
Macro: 20-JAN-2011

FID:9 RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.364	0.006	2535	1409	GAS (Tol-C12)	431995	21
C8	1.344	0.040	2681	2924	DIESEL (C12-C24)	9249156	408
C10	1.984	-0.001	9871	7435	M.OIL (C24-C38)	3466784	261
C12	2.621	0.002	40453	36704	AK-102 (C10-C25)	9884284	387
C14	3.151	-0.004	214046	225943	AK-103 (C25-C36)	3051089	359
C16	3.618	-0.004	164040	191939			
C18	4.039	-0.003	131238	131570			
C20	4.425	-0.004	115175	88837			
C22	4.814	-0.004	74324	96484			
C24	5.306	-0.008	46356	55989			
C25	5.544	0.005	33457	24335			
C26	5.736	-0.004	43274	45939			
C28	6.090	-0.006	46658	45023			
C32	6.699	0.002	27619	7532	JP-4 (Tol-C14)	2016970	123
C34	6.966	0.002	24417	23863	BUNKERC (C10-C38)	13103987	1549
Filter Peak	----						
C36	7.228	0.007	15120	6856			
C38	7.458	-0.008	14209	23484			
C40	7.725	-0.009	7048	11473			
o-terph	----				JET-A (C10-C18)	5896060	427
Triacon Surr	----				JP8 (Tol-C16)	4063616	231

M Indicates manual integration within range.

Range Times: NW Diesel(2.619 - 5.314) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.31 - 7.47) AK103(5.54 - 7.22) OR Diesel(1.99 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacontane	0	0.0	0.0

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

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Data File: /chem2/fid9.i/20110209.B/02090006.D

Date : 09-FEB-2011 16:19

Client ID:

Sample Info: SH23C.10

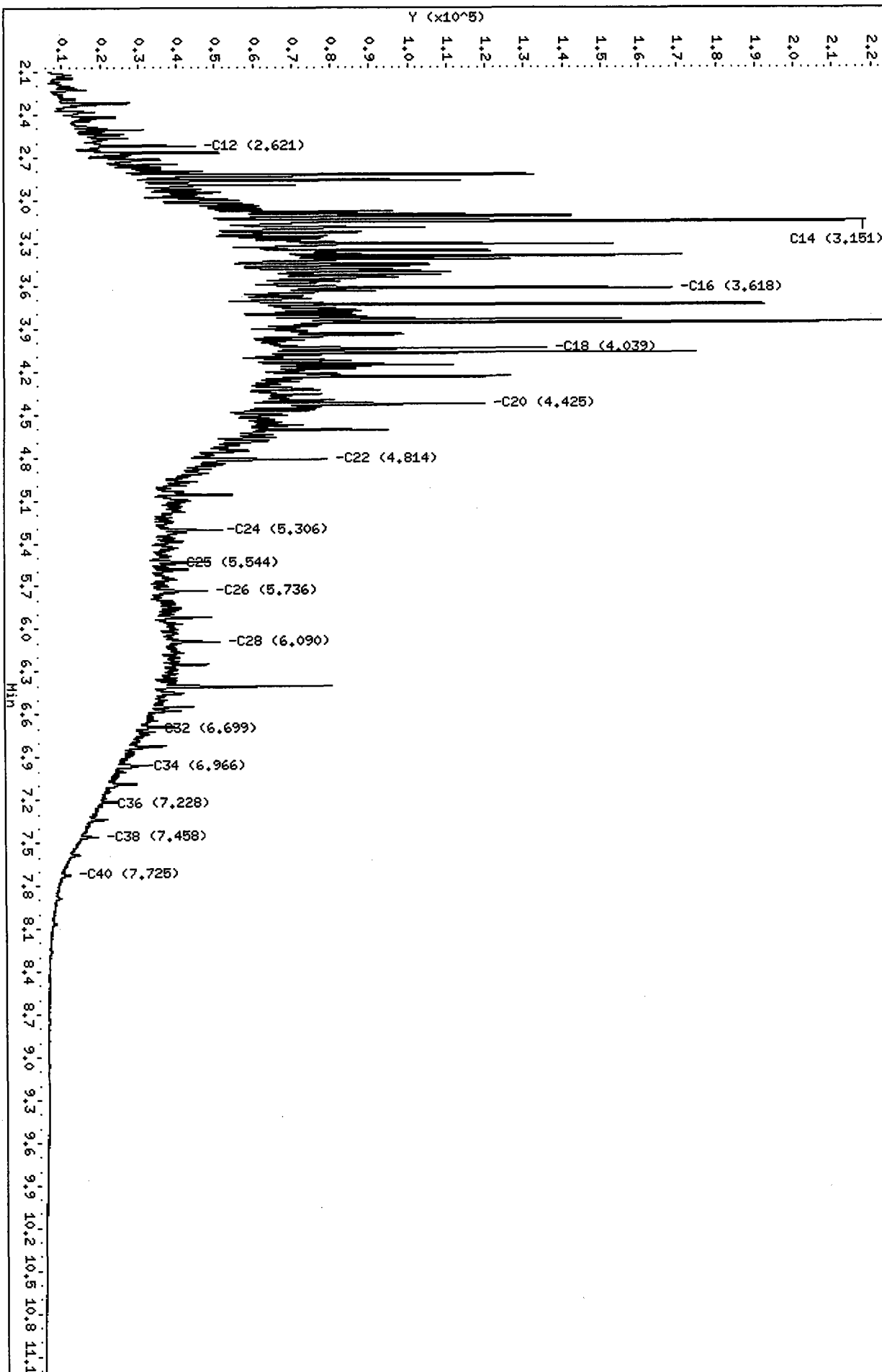
Column phase: RTX-1

Instrument: fid9.i

Operator: MS

Column diameter: 0.25

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Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a018.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23H
Client ID: B11-08-20
Injection: 09-FEB-2011 03:29
Dilution Factor: 100

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.548	0.008	1058	1589	GAS (Tol-C12)	171068	9
C8	1.912	0.006	602	1291	DIESEL (C12-C24)	2049767	110
C10	3.528	0.000	1437	906	M.OIL (C24-C38)	2797930	246
C12	4.508	-0.008	8928	3918	AK-102 (C10-C25)	2273447	108
C14	5.283	-0.004	9293	6755	AK-103 (C25-C36)	2373859	344
C16	5.956	-0.003	11911	15394			
C18	6.588	-0.006	13081	12531	CRUDE (Tol-C40)	5243893	694
C20	7.192	-0.004	16798	28289	MIN.OIL (C24-C38)	2797930	209
C22	7.763	-0.004	17104	38095			
C24	8.295	-0.007	18819	22880			
C25	8.564	0.006	15381	9861			
C26	8.800	-0.006	20083	44147			
C28	9.326	0.009	15907	11159			
C32	10.355	-0.016	33411	64142			
C34	10.886	-0.012	12968	32058	BUNKERC (C10-C38)	4923238	665
Filter Peak	12.790	0.007	4688	4797			
C36	11.410	-0.002	25052	65170			
C38	11.893	-0.012	12155	26045			
C40	12.369	-0.014	19347	39758			
o-terph	----				JET-A (C10-C18)	913724	63
Triacon Surr	----						

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacantane	0	0.0	0.0

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

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Data File: /chem3/fid4a.i/20110208.b/0208a018.d

Date : 09-FEB-2011 03:29

Client ID: B11-08-20

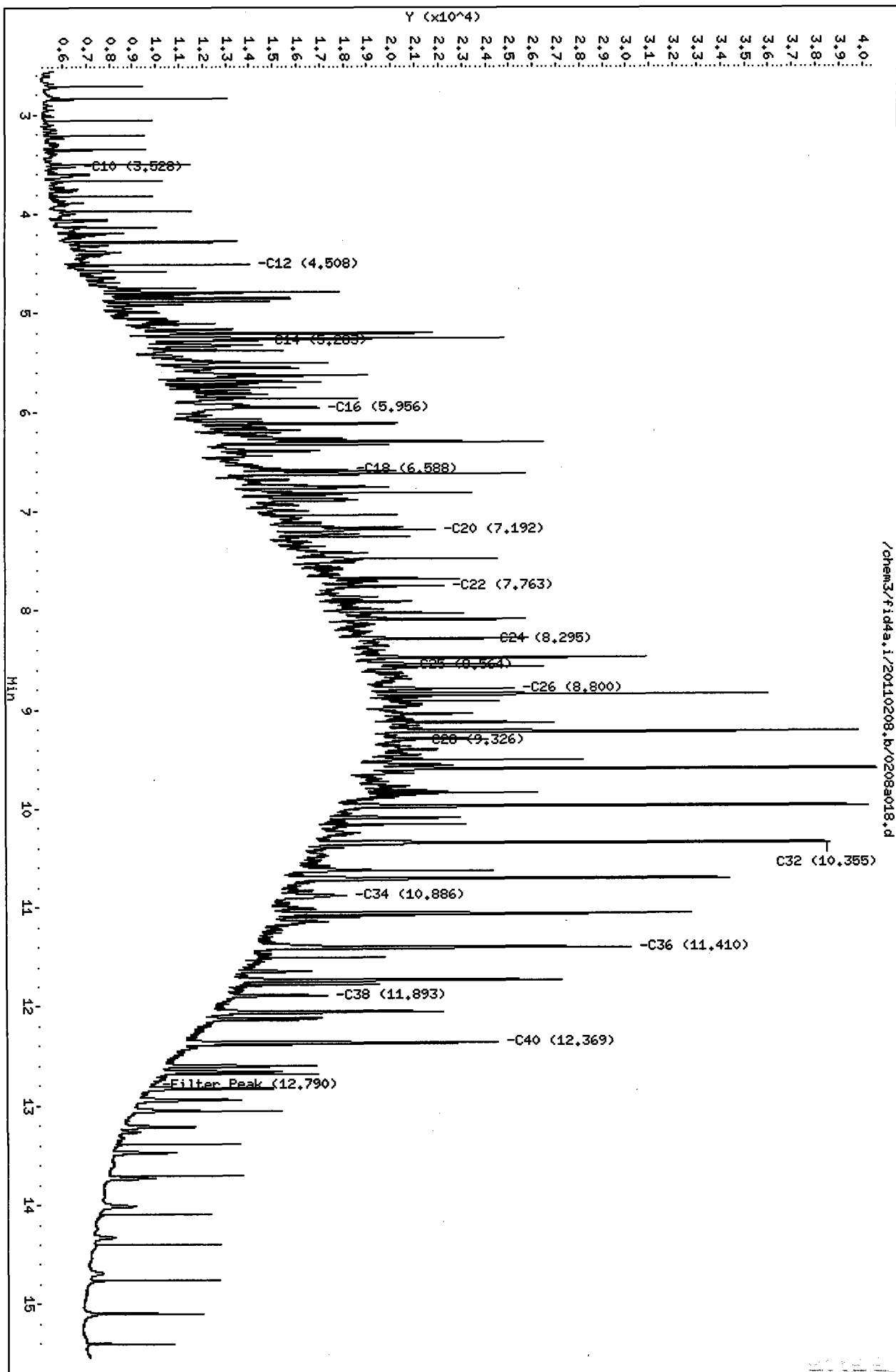
Sample Info: SH23H,100

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/20110208.b/0208a021.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23I
Client ID: B11-08-25
Injection: 09-FEB-2011 04:38
Dilution Factor: 100

FID:4A RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.552	0.012	1125	1759	GAS (Tol-C12)	151813	8
C8	1.916	0.010	641	1231	DIESEL (C12-C24)	1873130	100
C10	3.529	0.001	985	586	M.OIL (C24-C38)	3238951	285
C12	4.519	0.003	1297	1870	AK-102 (C10-C25)	2094468	100
C14	5.303	0.016	3585	3494	AK-103 (C25-C36)	2767902	401
C16	5.958	-0.002	6145	4434			
C18	6.586	-0.009	8788	9160	CRUDE (Tol-C40)	5491890	727
C20	7.198	0.001	13683	12713	MIN.OIL (C24-C38)	3238951	242
C22	7.772	0.005	14946	20911			
C24	8.302	0.000	16071	15906			
C25	8.552	-0.006	17138	14150			
C26	8.799	-0.007	17830	16465			
C28	9.318	0.001	18269	8904			
C32	10.353	-0.018	30898	70208			
C34	10.886	-0.012	14677	40753	BUNKERC (C10-C38)	5172062	699
Filter Peak	12.796	0.013	4915	6155			
C36	11.410	-0.002	27716	78472			
C38	11.892	-0.012	11354	23175			
C40	12.365	-0.017	17153	37300			
o-terph	----				JET-A (C10-C18)	686789	47
Triacon Surr	----						

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacontane	0	0.0	0.0

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

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Data File: /chem3/fid4a.i/20110208.b/0208a021.d

Date : 09-FEB-2011 04:38

Client ID: B11-08-25

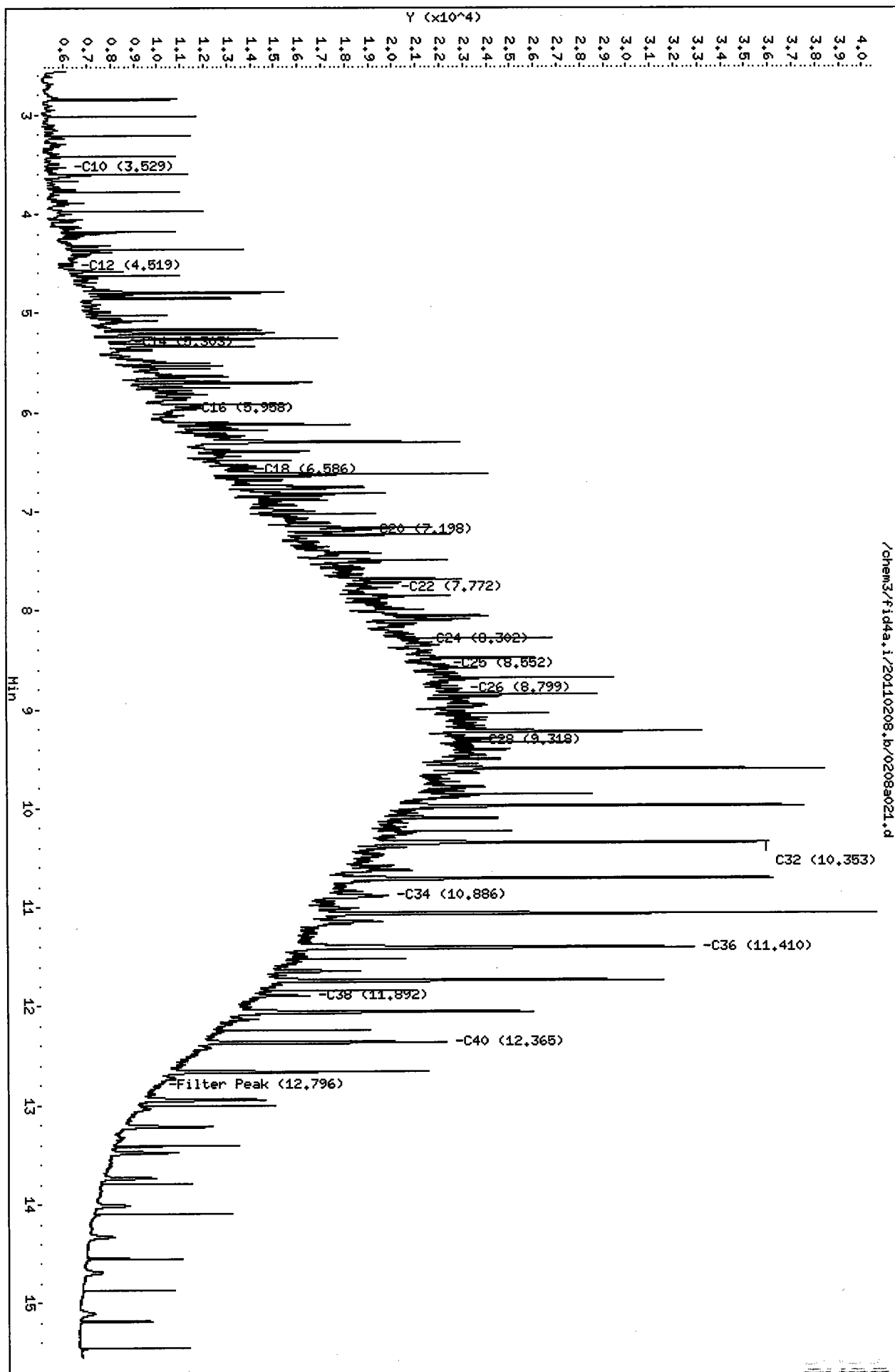
Sample Info: SH231,100

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/20110208.b/0208a022.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23J
Client ID: B11-08-30
Injection: 09-FEB-2011 05:01

Dilution Factor: 100

FID:4A RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.547	0.007	1361	2071	GAS (Tol-C12)	463379	23
C8	1.910	0.005	1397	2093	DIESEL (C12-C24)	7246155	387
C10	3.527	-0.001	9534	5422	M.OIL (C24-C38)	4205341	370
C12	4.514	-0.001	32764	30820	AK-102 (C10-C25)	7869428	374
C14	5.284	-0.003	61291	42410	AK-103 (C25-C36)	3578142	518
C16	5.957	-0.002	105537	99815			
C18	6.590	-0.004	104790	77897	CRUDE (Tol-C40)	12177647	1612
C20	7.194	-0.002	110266	126836	MIN.OIL (C24-C38)	4205341	314
C22	7.764	-0.003	112621	139712			
C24	8.298	-0.003	104157	134935			
C25	8.552	-0.006	95299	117465			
C26	8.800	-0.005	84573	103491			
C28	9.310	-0.006	60038	92918			
C32	10.359	-0.012	27126	58376			
C34	10.906	0.008	16307	27102	BUNKERC (C10-C38)	11813777	1596
Filter Peak	12.778	-0.004	5846	3435			
C36	11.407	-0.004	16824	49912			
C38	11.901	-0.003	11173	15315			
C40	12.366	-0.016	12027	29903			
o-terph	----				JET-A (C10-C18)	4092265	281
Triacon Surr	----						

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacontane	0	0.0	0.0

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	14566.6	18-JAN-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/20110208.b/0208a022.d

Date : 09-FEB-2011 05:01

Client ID: B11-08-30

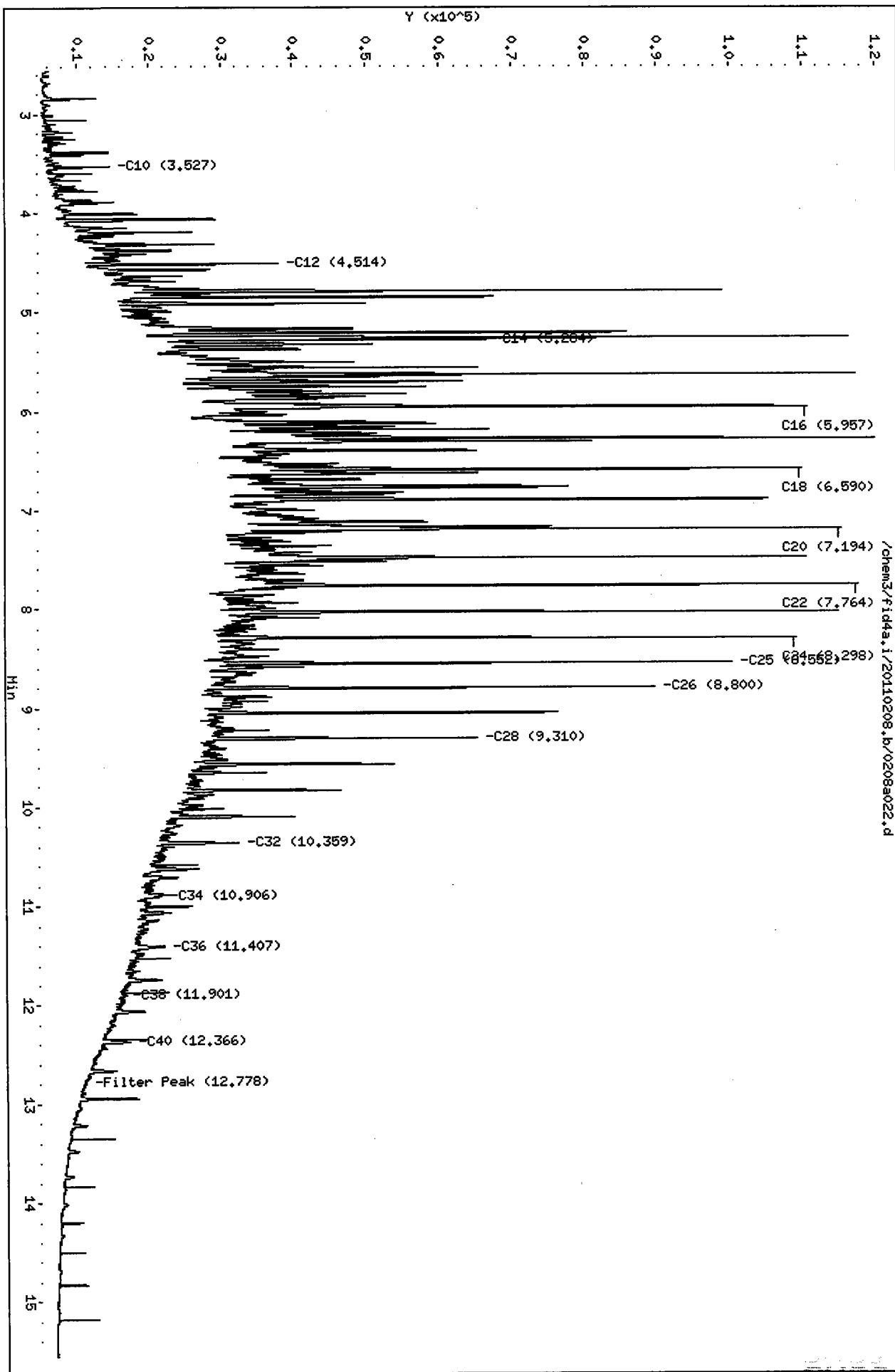
Sample Info: SH23J.100

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/20110208.b/0208a023.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23K
Client ID: B11-09-14
Injection: 09-FEB-2011 05:25
Dilution Factor: 50

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.550	0.010	1252	2063	GAS (Tol-C12)	161381	8
C8	1.914	0.008	643	1378	DIESEL (C12-C24)	2708409	145
C10	3.528	0.000	1158	739	M.OIL (C24-C38)	2816888	248
C12	4.516	0.000	3736	4923	AK-102 (C10-C25)	2951488	140
C14	5.283	-0.004	10768	7257	AK-103 (C25-C36)	2409683	349
C16	5.957	-0.003	16156	12331			
C18	6.588	-0.006	17643	18113	CRUDE (Tol-C40)	5877491	778
C20	7.193	-0.004	22665	36684	MIN.OIL (C24-C38)	2816888	210
C22	7.763	-0.004	22756	32858			
C24	8.296	-0.006	23045	23718			
C25	8.550	-0.008	22964	39973			
C26	8.797	-0.008	22426	30106			
C28	9.307	-0.010	20834	41818			
C32	10.352	-0.018	19220	49554			
C34	10.886	-0.011	12485	28194	BUNKERC (C10-C38)	5613906	758
Filter Peak	12.791	0.009	4132	2940			
C36	11.409	-0.003	16510	40129			
C38	11.909	0.005	7602	10551			
C40	12.367	-0.015	12081	30637			
o-terph	----				JET-A (C10-C18)	1265848	87
Triacon Surr	----						

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacontane	0	0.0	0.0

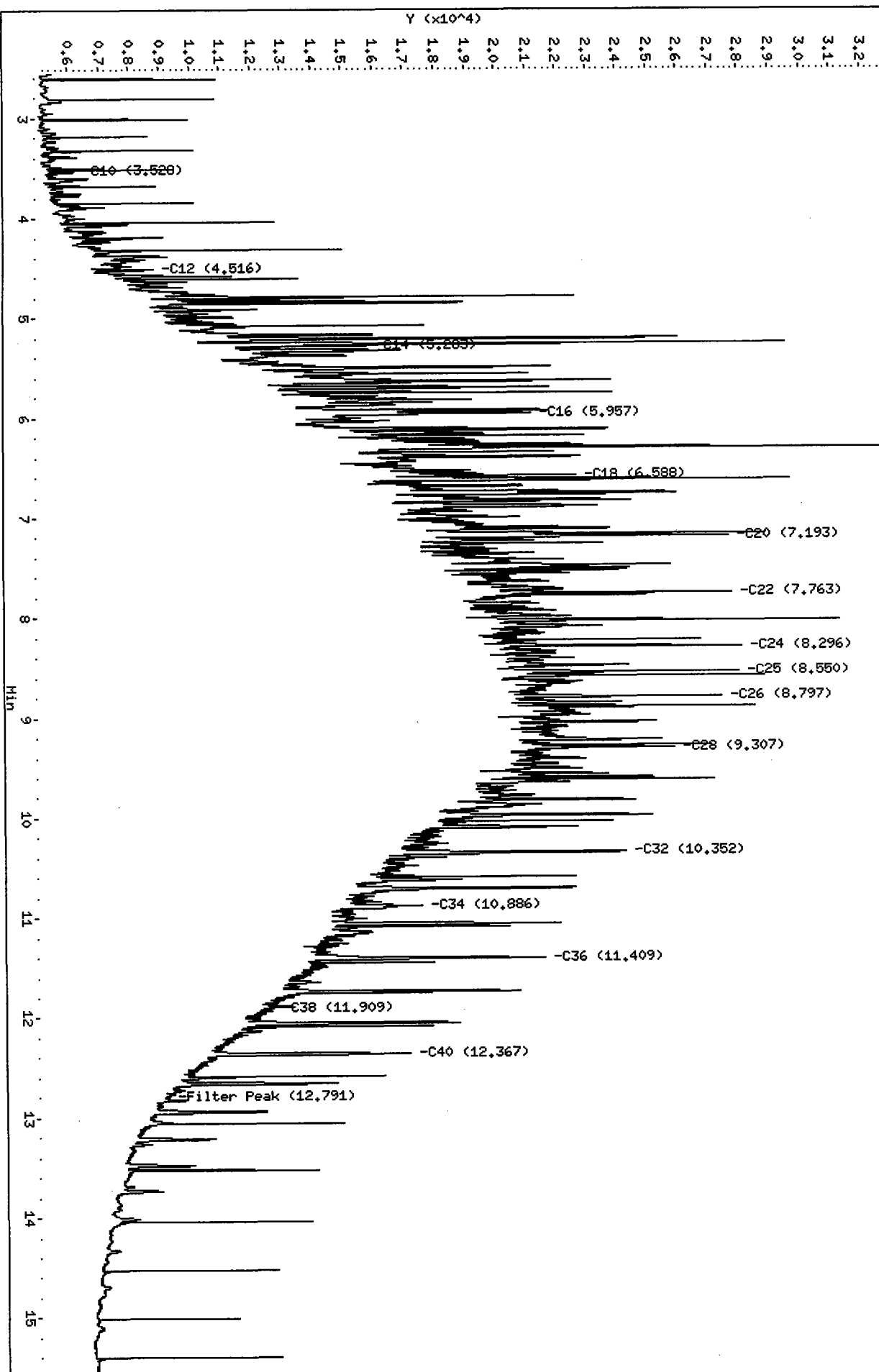
Analyte	RF	Curve Date
o-Terph Surr	15531.5	07-FEB-2011
Triacon Surr	16206.2	20-JAN-2011
Gas	19792.1	17-DEC-2010
Diesel	18711.8	07-FEB-2011
Motor Oil	11353.0	20-JAN-2011
AK102	21028.1	07-FEB-2011
AK103	6902.1	10-DEC-2009
JetA	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

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Data File: /chem3/fid4a.i/20110208.b/0208a023.d
Date : 09-FEB-2011 05:25
Client ID: B11-09-14
Sample Info: SH23K.50
Column phase: RTX-1

Instrument: fid4a.i
Operator: MS
Column diameter: 0.25

/chem3/fid4a.i/20110208.b/0208a023.d



Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a024.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23L
Client ID: B11-09-19
Injection: 09-FEB-2011 05:48
Dilution Factor: 50

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.550	0.010	1237	2093	GAS (Tol-C12)	194978	10
C8	1.903	-0.003	541	292	DIESEL (C12-C24)	3266683	175
C10	3.528	-0.001	2640	1626	M.OIL (C24-C38)	3382766	298
C12	4.514	-0.001	6276	7690	AK-102 (C10-C25)	3583245	170
C14	5.284	-0.003	13603	9567	AK-103 (C25-C36)	2940437	426
C16	5.956	-0.004	19487	25681			
C18	6.587	-0.007	22992	20851	CRUDE (Tol-C40)	7029326	931
C20	7.193	-0.004	28157	44347	MIN.OIL (C24-C38)	3382766	252
C22	7.764	-0.004	30475	48384			
C24	8.297	-0.005	31809	62521			
C25	8.550	-0.008	32814	44975			
C26	8.799	-0.006	32598	58234			
C28	9.308	-0.009	28060	66460			
C32	10.354	-0.017	21463	59576			
C34	10.884	-0.014	14811	47925	BUNKERC (C10-C38)	6772897	915
Filter Peak	12.779	-0.004	3989	2588			
C36	11.408	-0.003	15253	39849			
C38	11.895	-0.010	8739	12098			
C40	12.378	-0.005	13366	8363			
o-terph	----				JET-A (C10-C18)	1488984	102
Triacon Surr	----						

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

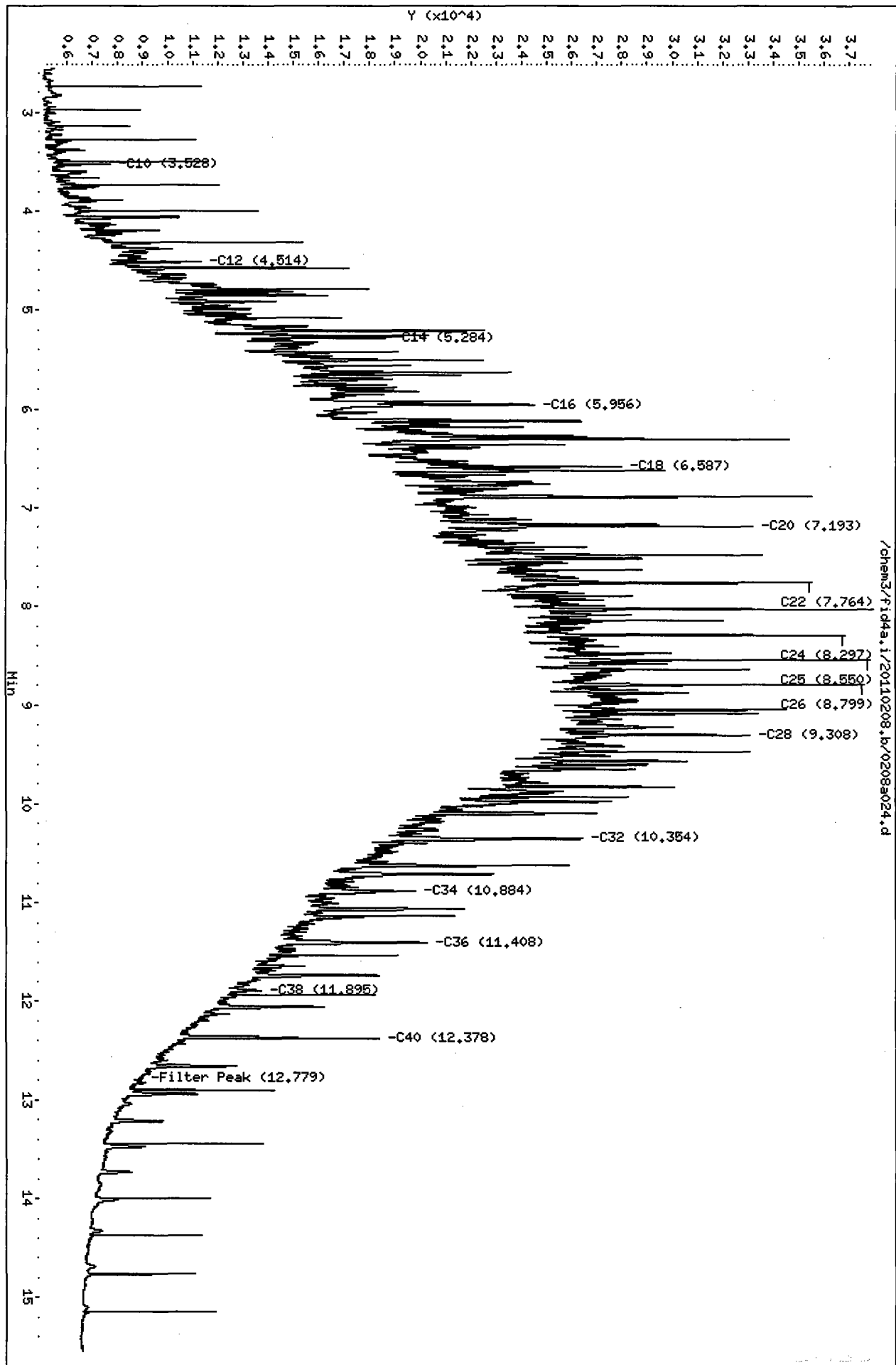
Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacontane	0	0.0	0.0

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

22/5/11

Data File: /chem3/fid4a.i/20110208.b/0208a024.d
Date : 09-FEB-2011 05:48
Client ID: B11-09-19
Sample Info: SH23L.50
Column phase: RTX-1

Instrument: fid4a.i
Operator: HS
Column diameter: 0.25



Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a025.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23M
Client ID: B11-09-23.5
Injection: 09-FEB-2011 06:11

Dilution Factor: 50

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.551	0.012	1081	1645	GAS (Tol-C12)	129812	7
C8	1.916	0.010	513	920	DIESEL (C12-C24)	1437556	77
C10	3.528	-0.001	1256	737	M.OIL (C24-C38)	1429602	126
C12	4.513	-0.002	4376	4435	AK-102 (C10-C25)	1588642	76
C14	5.283	-0.004	10439	6953	AK-103 (C25-C36)	1227994	178
C16	5.956	-0.004	14460	15271			
C18	6.588	-0.006	15235	15160	CRUDE (Tol-C40)	3078444	408
C20	7.192	-0.004	17617	23170	MIN.OIL (C24-C38)	1429602	107
C22	7.763	-0.005	18383	27801			
C24	8.296	-0.005	18582	30148			
C25	8.549	-0.008	18107	34898			
C26	8.814	0.009	8614	2707			
C28	9.307	-0.009	14353	26781			
C32	10.354	-0.017	13929	23487			
C34	10.885	-0.013	6699	12982	BUNKERC (C10-C38)	2932061	396
Filter Peak	12.776	-0.007	2106	2155			
C36	11.411	0.000	7522	21050			
C38	11.890	-0.014	4162	12656			
C40	12.366	-0.016	4855	11709			
o-terph	----				JET-A (C10-C18)	701357	48
Triacon Surr	----						

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

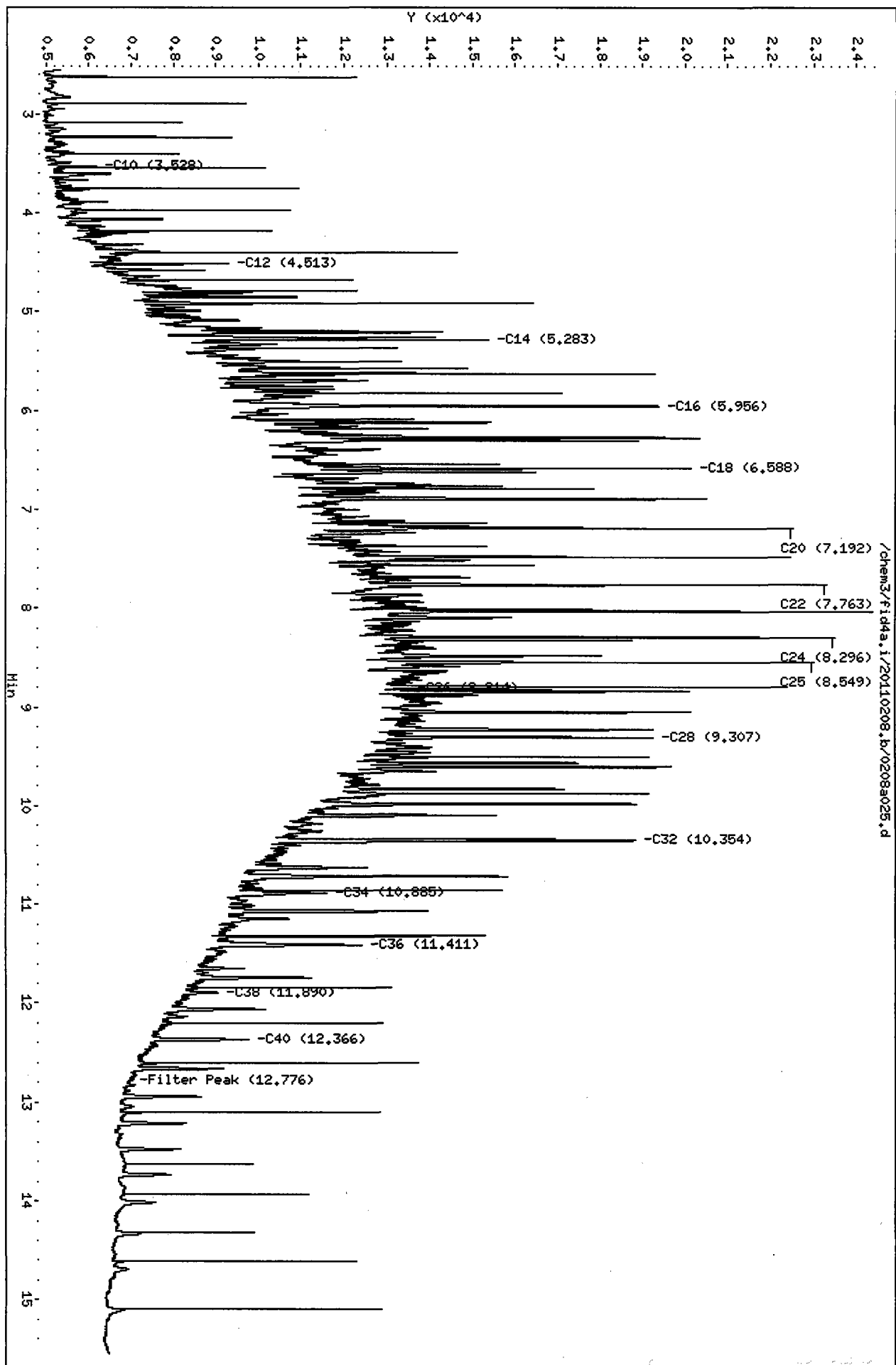
Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacontane	0	0.0	0.0

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

2015/4

Data File: /chem3/fid4a.i/20110208.b/0208a025.d
Date : 09-FEB-2011 06:11
Client ID: B11-09-23.5
Sample Info: SH23H.50
Column phase: RTX-1

Instrument: fid4a.i
Operator: HS
Column diameter: 0.25



SH23.00255

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a026.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23N
Client ID: B11-10-15
Injection: 09-FEB-2011 06:34
Dilution Factor: 1

FID:4A RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.552	0.012	3241	4108	GAS (Tol-C12)	105989	5
C8	1.917	0.011	714	1480	DIESEL (C12-C24)	212105	11
C10	3.528	0.000	1142	788	M.OIL (C24-C38)	207815	18
C12	4.514	-0.001	641	635	AK-102 (C10-C25)	245253	12
C14	5.283	-0.003	955	588	AK-103 (C25-C36)	176744	26
C16	5.956	-0.004	622	552			
C18	6.588	-0.006	505	498	CRUDE (Tol-C40)	560491	74
C20	7.193	-0.004	422	611	MIN.OIL (C24-C38)	207815	16
C22	7.764	-0.003	290	503			
C24	8.284	-0.018	539	1190			
C25	8.551	-0.007	450	306			
C26	8.800	-0.005	1514	1501			
C28	9.308	-0.009	741	705			
C32	10.352	-0.019	20225	21511			
C34	10.901	0.004	111	161	BUNKERC (C10-C38)	447529	60
Filter Peak	12.795	0.013	506	276			
C36	11.411	0.000	16960	22192			
C38	11.898	-0.006	324	550			
C40	12.363	-0.019	8655	11475			
o-terph	6.755	0.000	930893	693415	JET-A (C10-C18)	87173	6
Triacon Surr	9.851	-0.003	726895	833167			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	693415	44.6	99.2
Triacontane	833167	51.4	114.2

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

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Data File: /chem3/fid4a.i/20110208.b/0208a026.d

Date : 09-FEB-2011 06:34

Client ID: B41-10-15

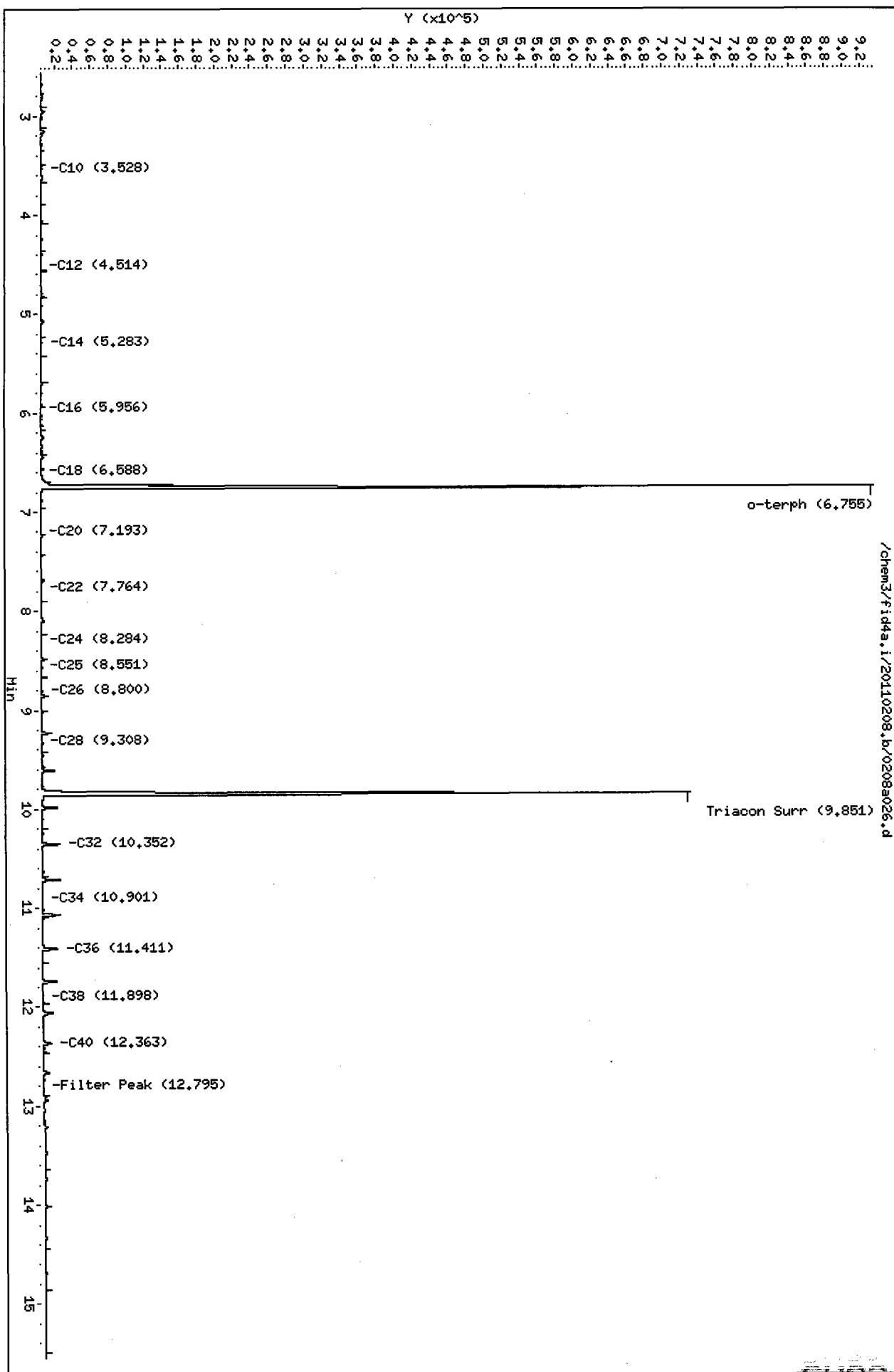
Sample Info: SH23N

Instrument: fid4a.i

Operator: MS

Column diameter: 0.25

Column phase: RTX-1



SH23 0208

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a027.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH230
Client ID: B11-10-20
Injection: 09-FEB-2011 06:57
Dilution Factor: 1

FID:4A RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.547	0.007	12125	9187	GAS (Tol-C12)	110740	6
C8	1.914	0.008	635	1180	DIESEL (C12-C24)	233742	12
C10	3.528	-0.001	680	631	M.OIL (C24-C38)	179817	16
C12	4.516	0.001	328	295	AK-102 (C10-C25)	263197	13
C14	5.283	-0.004	745	456	AK-103 (C25-C36)	158837	23
C16	5.957	-0.003	824	1089			
C18	6.589	-0.005	953	1012	CRUDE (Tol-C40)	539586	71
C20	7.188	-0.009	1012	1727	MIN.OIL (C24-C38)	179817	13
C22	7.772	0.005	716	737			
C24	8.295	-0.007	1017	1340			
C25	8.551	-0.007	7240	1714			
C26	8.800	-0.005	2302	2718			
C28	9.307	-0.010	1063	1532			
C32	10.353	-0.018	13231	15220			
C34	10.877	-0.021	348	1037	BUNKERC (C10-C38)	434605	59
Filter Peak	12.786	0.004	444	839			
C36	11.410	-0.001	7418	9738			
C38	11.894	-0.010	321	578			
C40	12.366	-0.016	2945	4351			
o-terph	6.755	-0.001	950657	703256	JET-A (C10-C18)	89751	6
Triacon Surr	9.852	-0.002	706976	796705			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	703256	45.3	100.6
Triacantane	796705	49.2	109.2

2015/4

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	14566.6	18-JAN-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/20110208.b/0208a027.d

Date : 09-FEB-2011 06:57

Client ID: B11-10-20

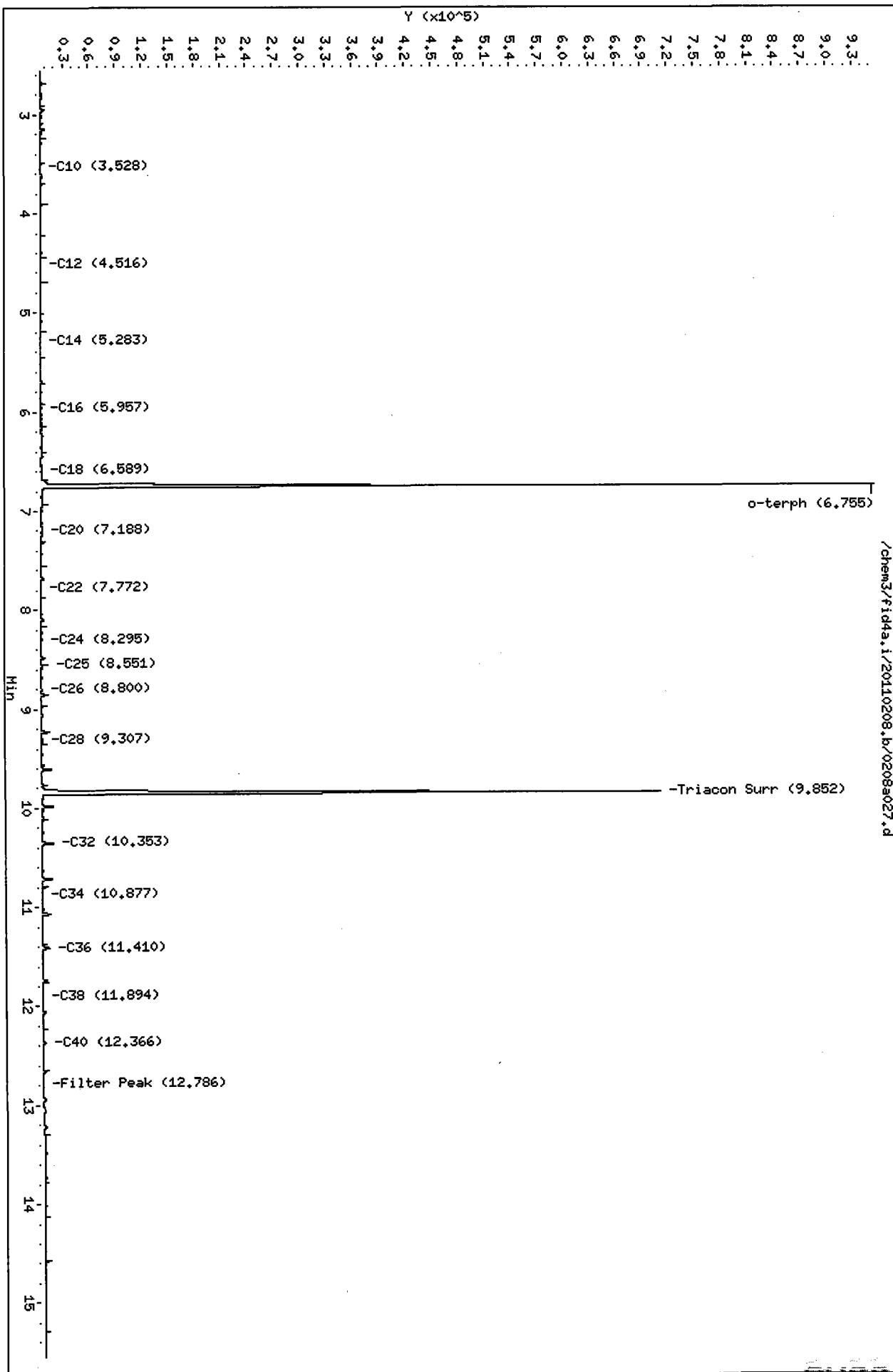
Sample Info: SH230

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/20110208.b/0208a028.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23P
Client ID: B11-10-25
Injection: 09-FEB-2011 07:20
Dilution Factor: 1

FID:4A RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.549	0.010	3839	4191	GAS (Tol-C12)	116395	6
C8	1.914	0.008	617	1136	DIESEL (C12-C24)	227859	12
C10	3.528	0.000	753	573	M.OIL (C24-C38)	219966	19
C12	4.516	0.000	441	525	AK-102 (C10-C25)	264817	13
C14	5.283	-0.004	1045	688	AK-103 (C25-C36)	184611	27
C16	5.956	-0.003	651	845			
C18	6.589	-0.005	755	709	CRUDE (Tol-C40)	600967	80
C20	7.192	-0.004	578	690	MIN.OIL (C24-C38)	219966	16
C22	7.762	-0.005	571	829			
C24	8.294	-0.008	784	1375			
C25	8.566	0.008	1409	1294			
C26	8.800	-0.006	826	897			
C28	9.307	-0.010	836	862			
C32	10.353	-0.018	18882	21192			
C34	10.906	0.008	122	149	BUNKERC (C10-C38)	477021	64
Filter Peak	12.814	0.032	474	218			
C36	11.410	-0.001	19646	24464			
C38	11.900	-0.005	340	953			
C40	12.366	-0.016	9291	12205			
o-terph	6.755	0.000	936959	699083	JET-A (C10-C18)	104767	7
Triacon Surr	9.852	-0.003	708817	806634			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	699083	45.0	100.0
Triacontane	806634	49.8	110.6

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

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Data File: /chem3/fid4a.i/20110208.b/0208a028.d

Date : 09-FEB-2011 07:20

Client ID: B41-10-25

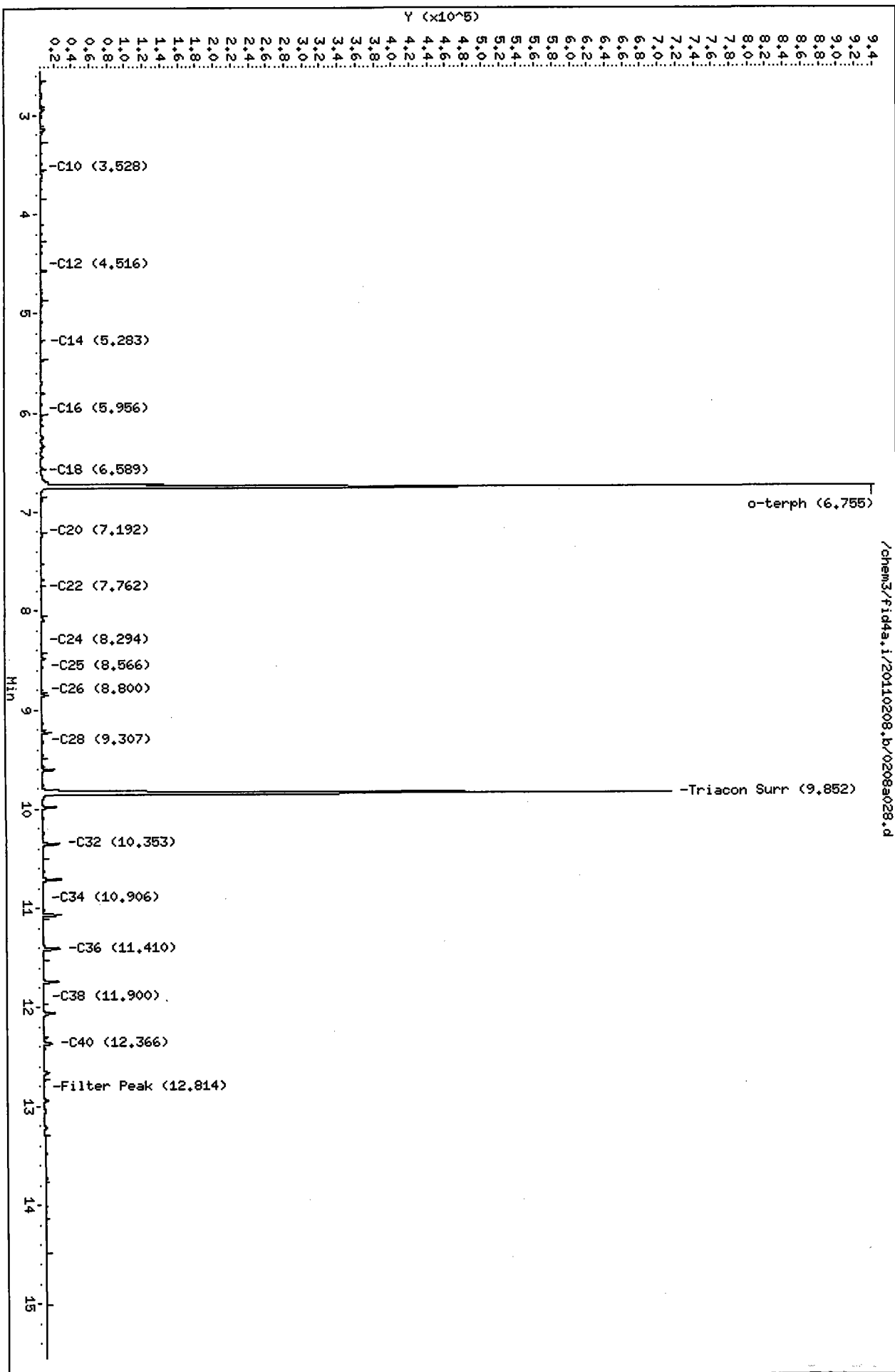
Sample Info: SH23P

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/20110208.b/0208a029.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23Q
Client ID: B11-10-30
Injection: 09-FEB-2011 07:43
Dilution Factor: 1

FID:4A RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.547	0.007	3598	4342	GAS (Tol-C12)	140351	7
C8	1.912	0.006	626	1574	DIESEL (C12-C24)	149459	8
C10	3.526	-0.003	3496	943	M.OIL (C24-C38)	112061	10
C12	4.516	0.001	734	954	AK-102 (C10-C25)	201253	10
C14	5.283	-0.004	1216	793	AK-103 (C25-C36)	92725	13
C16	5.955	-0.005	680	937			
C18	6.588	-0.006	618	617	CRUDE (Tol-C40)	419115	55
C20	7.191	-0.006	499	702	MIN.OIL (C24-C38)	112061	8
C22	7.764	-0.003	7433	2381			
C24	8.295	-0.007	797	1282			
C25	8.565	0.007	1876	1756			
C26	8.800	-0.006	3542	3184			
C28	9.306	-0.010	920	890			
C32	10.353	-0.018	6189	7541			
C34	10.910	0.012	101	49	BUNKERC (C10-C38)	308796	42
Filter Peak	12.784	0.002	389	173			
C36	11.408	-0.003	6043	7913			
C38	11.902	-0.003	381	985			
C40	12.363	-0.019	4012	5425			
o-terph	6.755	0.000	923082	781984	JET-A (C10-C18)	135841	9
Triacon Surr	9.850	-0.005	703454	809703			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	781984	50.3	111.9
Triacantane	809703	50.0	111.0

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

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Data File: /chem3/fid4a.i/20110208.b/0208a029.d

Date : 09-FEB-2011 07:43

Client ID: B41-10-30

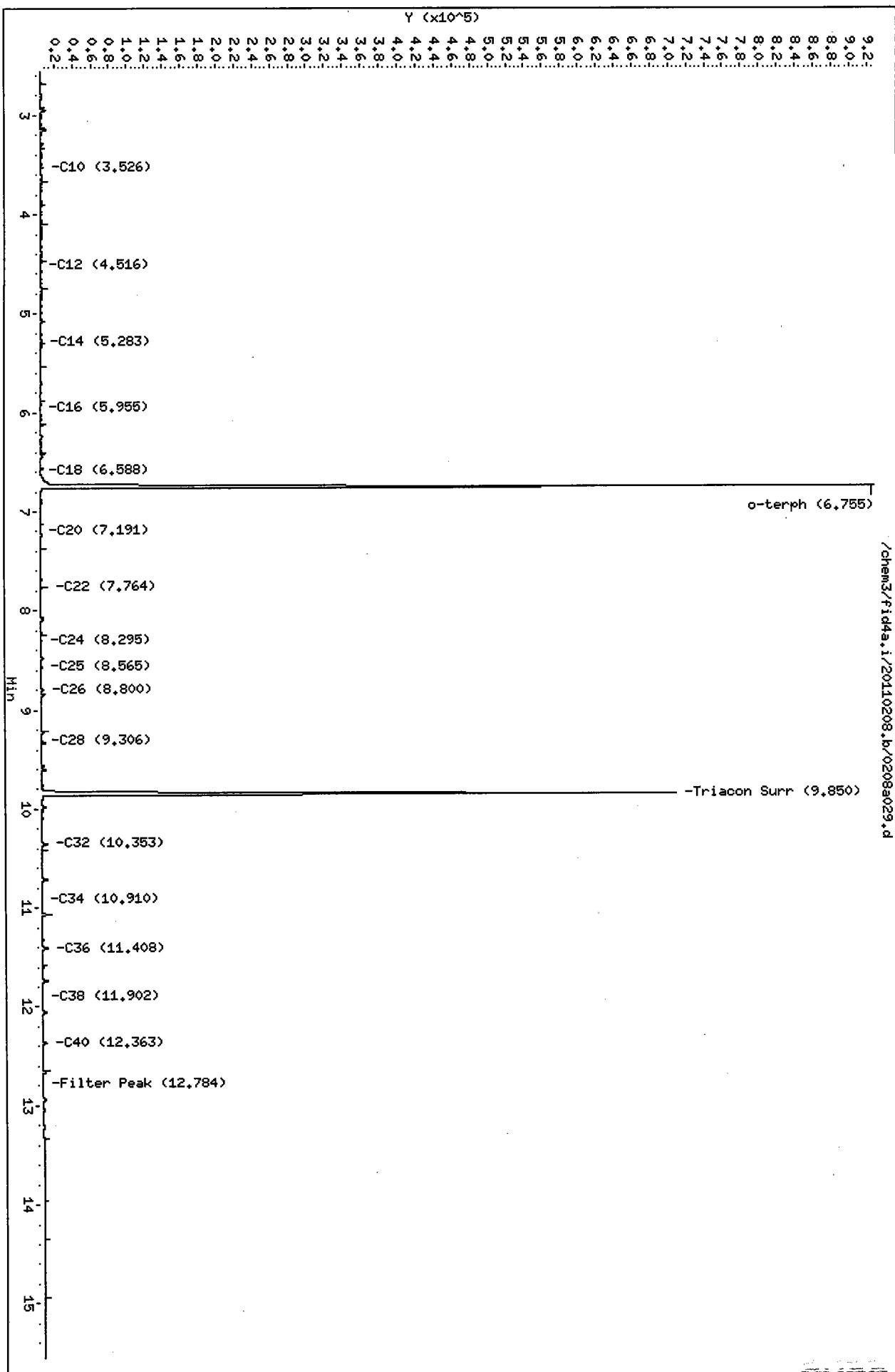
Sample Info: SH23Q

Column phase: RTX-1

Instrument: fid4a.i

Operator: HS

Column diameter: 0.25



SH23.00301

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a030.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23R
Client ID: B11-11-10
Injection: 09-FEB-2011 08:07
Dilution Factor: 1

FID:4A RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.547	0.007	3911	4067	GAS (Tol-C12)	166476	8
C8	1.912	0.006	556	1010	DIESEL (C12-C24)	375275	20
C10	3.526	-0.002	977	680	M.OIL (C24-C38)	816185	72
C12	4.515	0.000	979	1267	AK-102 (C10-C25)	470236	22
C14	5.282	-0.005	1661	1039	AK-103 (C25-C36)	733332	106
C16	5.955	-0.004	1407	1909			
C18	6.589	-0.006	1466	1462	CRUDE (Tol-C40)	1431649	190
C20	7.192	-0.005	1205	1998	MIN.OIL (C24-C38)	816185	61
C22	7.762	-0.006	782	1088			
C24	8.294	-0.008	2007	3796			
C25	8.565	0.007	1485	1276			
C26	8.799	-0.006	3853	3875			
C28	9.306	-0.011	1212	1266			
C32	10.353	-0.018	97721	101705			
C34	10.871	-0.027	759	1715	BUNKERC (C10-C38)	1259647	170
Filter Peak	12.758	-0.025	806	533			
C36	11.408	-0.003	47343	57023			
C38	11.897	-0.008	444	567			
C40	12.364	-0.019	23368	29449			
o-terph	6.755	0.000	952849	677161	JET-A (C10-C18)	225456	15
Triacon Surr	9.850	-0.004	697541	769022			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	677161	43.6	96.9
Triacontane	769022	47.5	105.4

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

Handwritten signature/initials

Data File: /chem3/fid4a.i/20110208.b/0208a030.d

Date : 09-FEB-2011 08:07

Client ID: B11-11-10

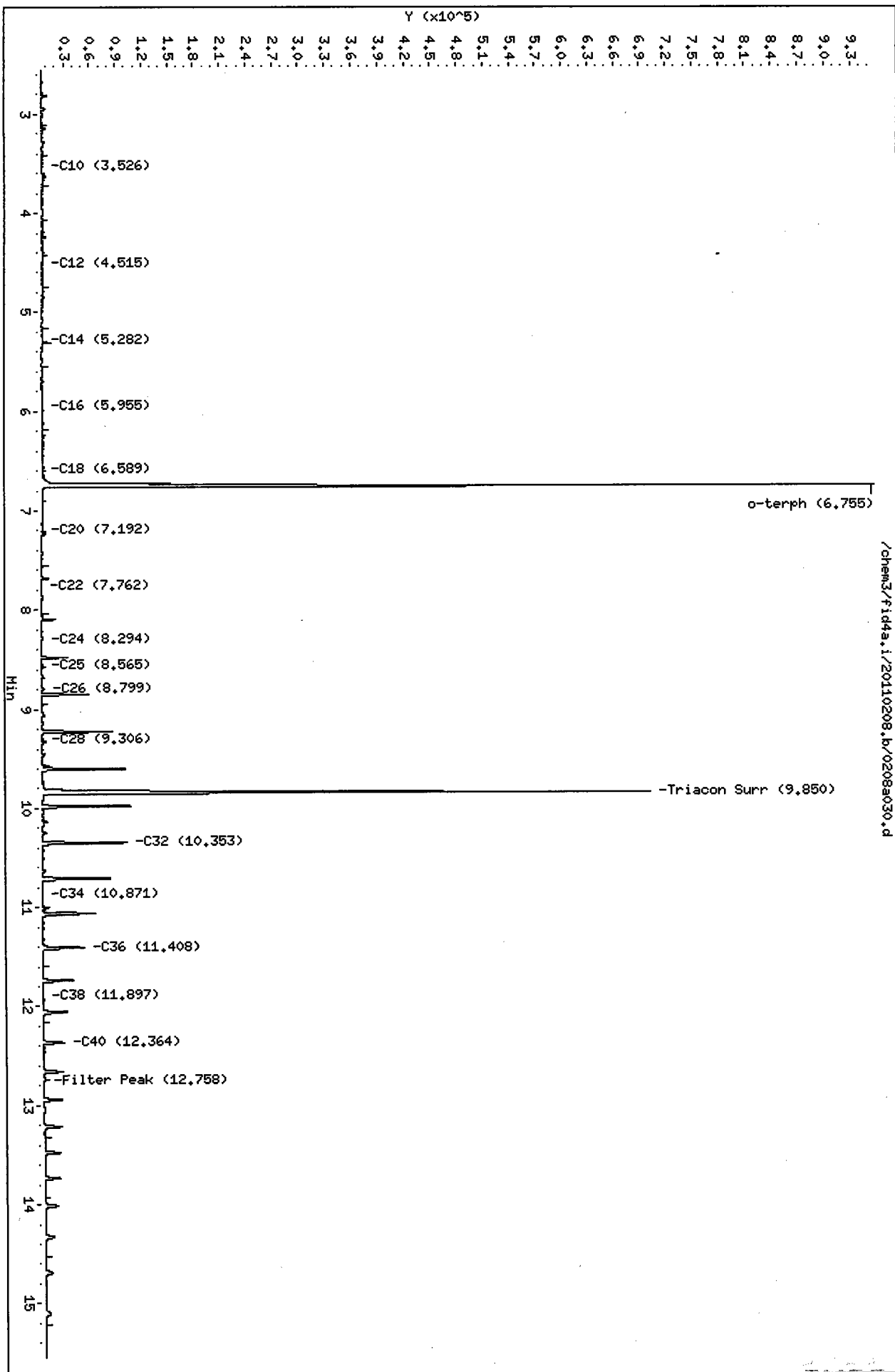
Sample Info: SH23R

Column phase: RTX-1

Instrument: fid4a.i

Operator: MS

Column diameter: 0.25



SH23 000000

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a031.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23S
Client ID: B11-12-10
Injection: 09-FEB-2011 08:30

Dilution Factor: 50

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.539	-0.001	1283	1749	GAS (Tol-C12)	2088997	106
C8	1.889	-0.017	947	1834	DIESEL (C12-C24)	21934479	1172
C10	3.525	-0.004	8738	6214	M.OIL (C24-C38)	937467	83
C12	4.519	0.003	43261	63237	AK-102 (C10-C25)	23781930	1131
C14	5.287	0.000	108353	67599	AK-103 (C25-C36)	769441	111
C16	5.963	0.003	155844	115826			
C18	6.592	-0.002	168647	161818	CRUDE (Tol-C40)	25035054	3315
C20	7.194	-0.003	130607	236696	MIN.OIL (C24-C38)	937467	70
C22	7.764	-0.003	44643	74448			
C24	8.318	0.016	12543	11655			
C25	8.562	0.004	7338	10900			
C26	8.812	0.006	4000	5317			
C28	9.322	0.005	1950	1015			
C32	10.351	-0.020	68979	71666			
C34	10.917	0.019	543	389	BUNKERC (C10-C38)	24609929	3325
Filter Peak	12.767	-0.016	875	2291			
C36	11.408	-0.003	41236	53417			
C38	11.907	0.003	563	347			
C40	12.365	-0.018	21372	27434			
o-terph	----				JET-A (C10-C18)	16287254	1118
Triacon Surr	----						

M Indicates manual integration within range.

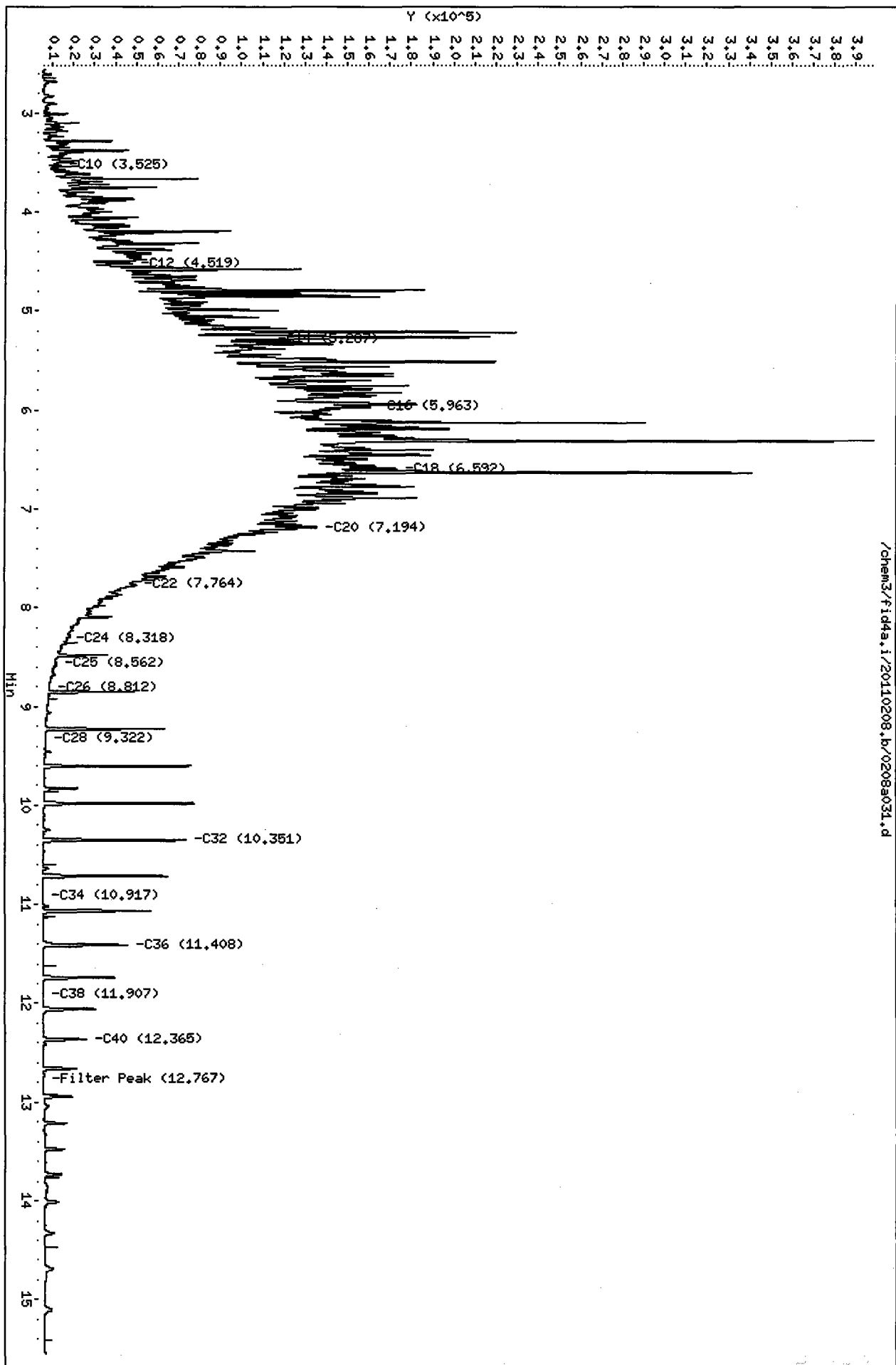
Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacontane	0	0.0	0.0

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	14566.6	18-JAN-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/20110208.b/0208a031.d
Date : 09-FEB-2011 08:30
Client ID: B41-12-10
Sample Info: SH235.50
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/20110208.b/0208a032.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23T
Client ID: B11-12-15
Injection: 09-FEB-2011 08:53
Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.549	0.009	5031	4462	GAS (Tol-C12)	140996	7
C8	1.914	0.008	668	1428	DIESEL (C12-C24)	445805	24
C10	3.528	0.000	905	663	M.OIL (C24-C38)	212469	19
C12	4.517	0.001	729	958	AK-102 (C10-C25)	503031	24
C14	5.284	-0.003	1598	1058	AK-103 (C25-C36)	174352	25
C16	5.958	-0.002	1971	1422			
C18	6.587	-0.007	2375	2469	CRUDE (Tol-C40)	844512	112
C20	7.195	-0.002	2116	4076	MIN.OIL (C24-C38)	212469	16
C22	7.762	-0.005	1023	1113			
C24	8.295	-0.007	1078	2677			
C25	8.566	0.008	1531	1502			
C26	8.800	-0.006	893	1594			
C28	9.307	-0.010	826	796			
C32	10.350	-0.021	10551	12241			
C34	10.910	0.012	212	308	BUNKERC (C10-C38)	703653	95
Filter Peak	12.767	-0.016	696	1676			
C36	11.408	-0.003	10389	14541			
C38	11.898	-0.007	637	1161			
C40	12.364	-0.018	12809	17135			
o-terph	6.756	0.000	909157	700491	JET-A (C10-C18)	246571	17
Triacon Surr	9.851	-0.003	702166	805695			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	700491	45.1	100.2
Triacontane	805695	49.7	110.5

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

Handwritten signature/initials

Data File: /chem3/fid4a.i/20110208.b/0208a032.d

Date : 09-FEB-2011 08:53

Client ID: B11-12-15

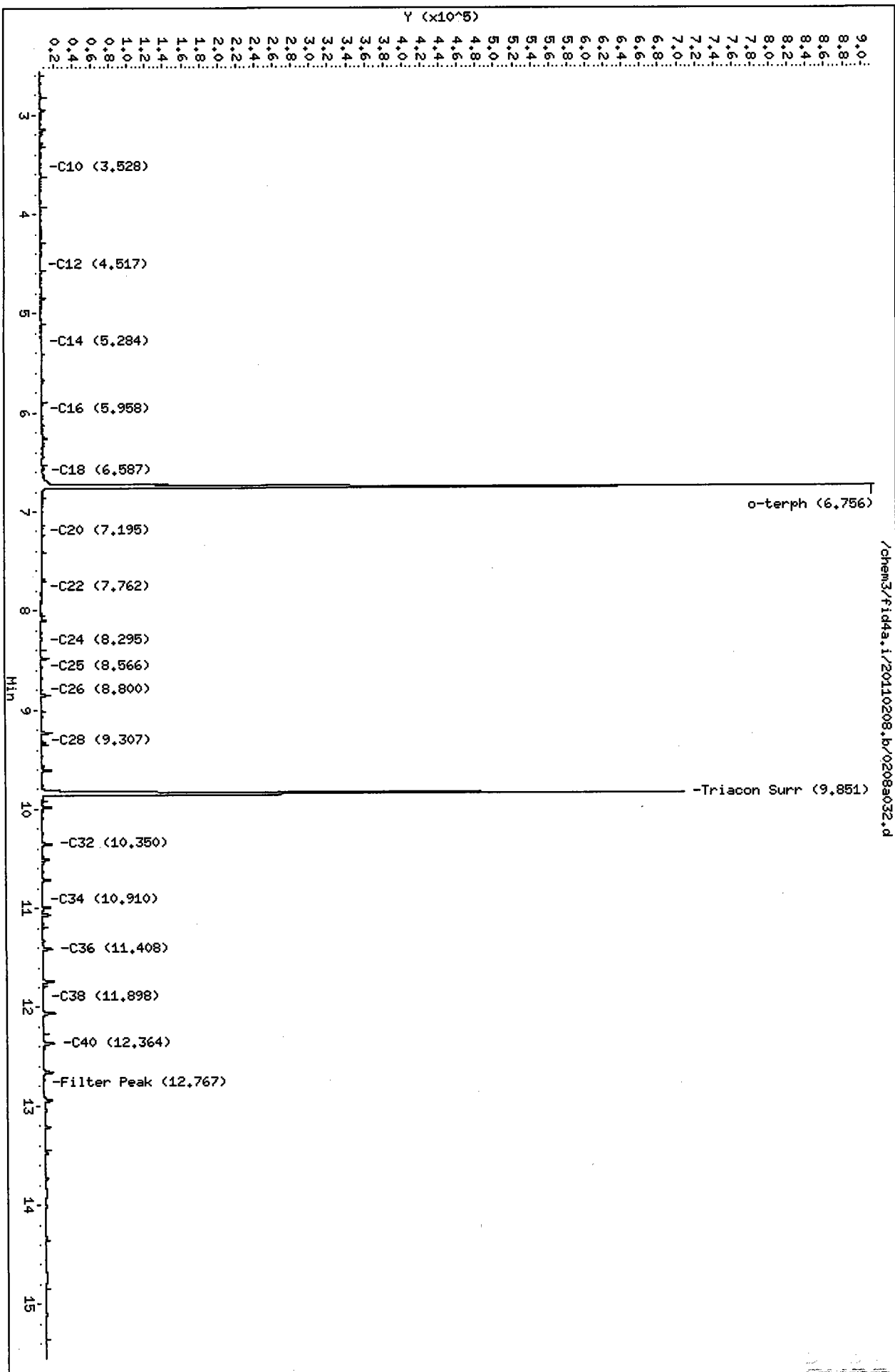
Sample Info: SH23T

Column phase: RTX-1

Instrument: fid4a.i

Operator: MS

Column diameter: 0.25



TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH23-Pacific Groundwater Group
Project: Birds Eye Soil
JI1001

Client ID	OTER	TOT OUT
B11-06-20	83.1%	0
B11-06-25	D	0
B11-06-30	D	0
B11-07-15	88.1%	0
B11-07-20	96.7%	0
020311MBS	85.6%	0
020311LCS	86.0%	0
B11-07-25	94.7%	0
B11-07-25 MS	93.2%	0
B11-07-25 MSD	95.7%	0
B11-08-15	D	0
B11-08-20	D	0
B11-08-25	D	0
B11-08-30	D	0
B11-09-14	D	0
B11-09-19	D	0
B11-09-23.5	D	0
B11-10-15	99.2%	0
B11-10-20	101%	0
B11-10-25	100%	0
B11-10-30	112%	0
B11-11-10	96.9%	0
B11-12-10	D	0
B11-12-15	100%	0

LCS/MB LIMITS QC LIMITS

(OTER) = o-Terphenyl

(64-134)

(52-130)

Prep Method: SW3546
Log Number Range: 11-2184 to 11-2203

ORGANICS ANALYSIS DATA SHEET

NWTPHD by GC/FID

Page 1 of 1

Sample ID: B11-07-25

MS/MSD

Lab Sample ID: SH23F

LIMS ID: 11-2189

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/10/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted MS/MSD: 02/03/11

Sample Amount MS: 8.91 g-dry-wt

MSD: 9.00 g-dry-wt

Date Analyzed MS: 02/09/11 02:19

Final Extract Volume MS: 1.0 mL

MSD: 02/09/11 02:42

MSD: 1.0 mL

Instrument/Analyst MS: FID4A/MS

Dilution Factor MS: 1.00

MSD: FID4A/MS

MSD: 1.00

Percent Moisture: 12.9%

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Diesel	< 5.5 U	147	168	87.5%	150	167	89.8%	2.0%

TPHD Surrogate Recovery

	MS	MSD
o-Terphenyl	93.2%	95.7%

Results reported in mg/kg

RPD calculated using sample concentrations per SW846.

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a015.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23FMS
Client ID: B11-07-25 MS
Injection: 09-FEB-2011 02:19

Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.542	0.002	1034	957	GAS (Tol-C12)	3508954	177
C8	1.912	0.006	7155	4794	DIESEL (C12-C24)	24448197	1307
C10	3.530	0.001	112747	64951	M.OIL (C24-C38)	402393	35
C12	4.518	0.003	216483	221470	AK-102 (C10-C25)	27166098	1292 M
C14	5.290	0.003	390136	323635	AK-103 (C25-C36)	274362	40
C16	5.966	0.007	678553	601440			
C18	6.600	0.006	590665	714010	CRUDE (Tol-C40)	28380972	3758 M
C20	7.200	0.004	392425	458695	MIN.OIL (C24-C38)	402393	30
C22	7.767	0.000	197968	227640			
C24	8.298	-0.004	64575	74859			
C25	8.550	-0.008	30038	42292			
C26	8.798	-0.007	12923	17319			
C28	9.308	-0.009	2161	2747			
C32	10.354	-0.017	7783	9275			
C34	10.906	0.008	60	41	BUNKERC (C10-C38)	27455610	3709 M
Filter Peak	12.766	-0.016	471	1047			
C36	11.409	-0.003	7985	10305			
C38	11.899	-0.006	368	462			
C40	12.364	-0.018	5585	7177			
o-terph	6.759	0.004	808449	651015	JET-A (C10-C18)	19814189	1360
Triacon Surr	9.851	-0.003	655471	734653			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	651015	41.9	93.1
Triacontane	734653	45.3	100.7

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

Handwritten signature and date: 2/9/11

Data File: /chem3/fid4a.i/20110208.b/0208a015.d

Date : 09-FEB-2011 02:19

Client ID: B41-07-25 HS

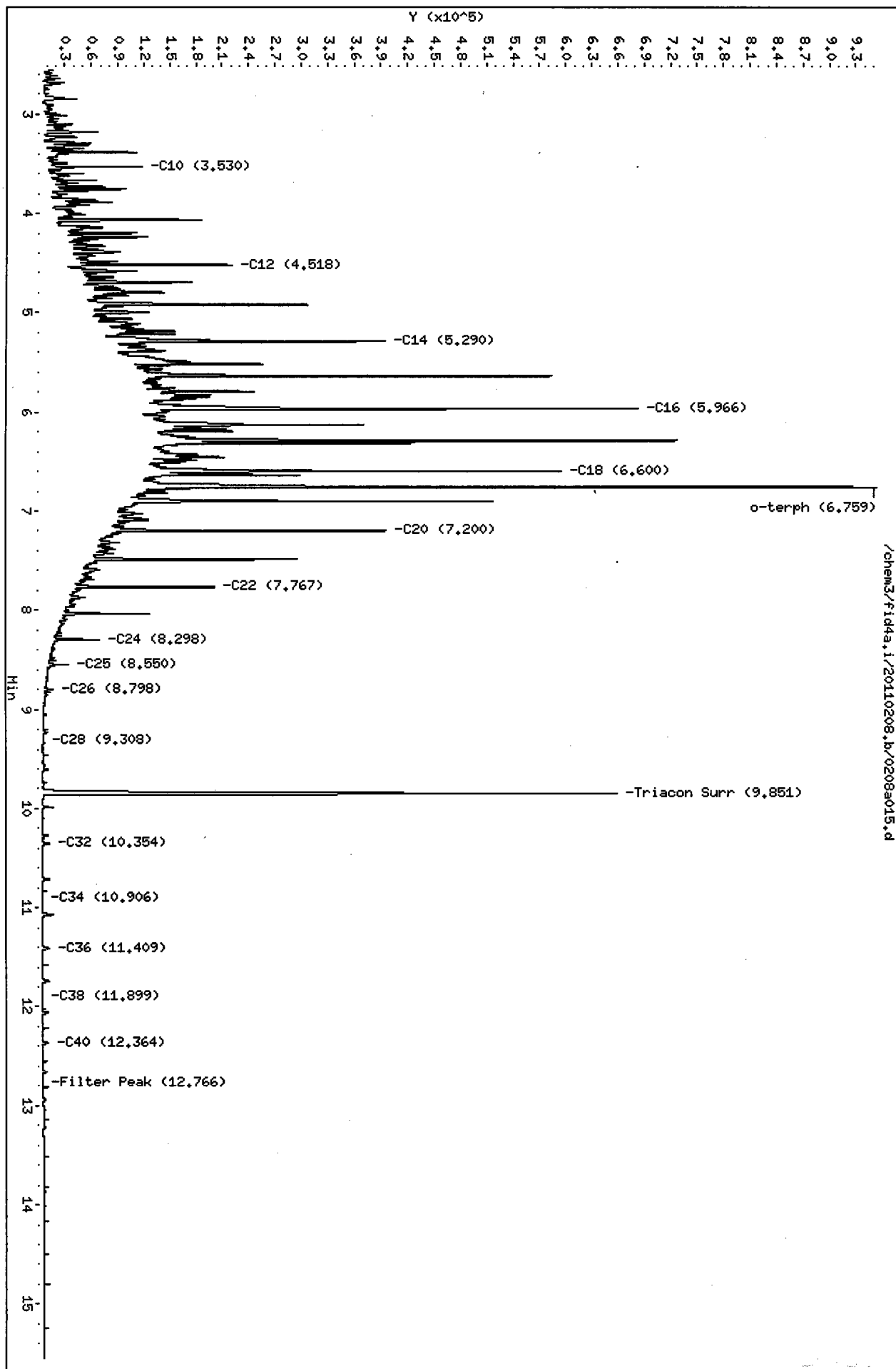
Sample Info: SH23FHS

Column phase: RTX-1

Instrument: fid4a.i

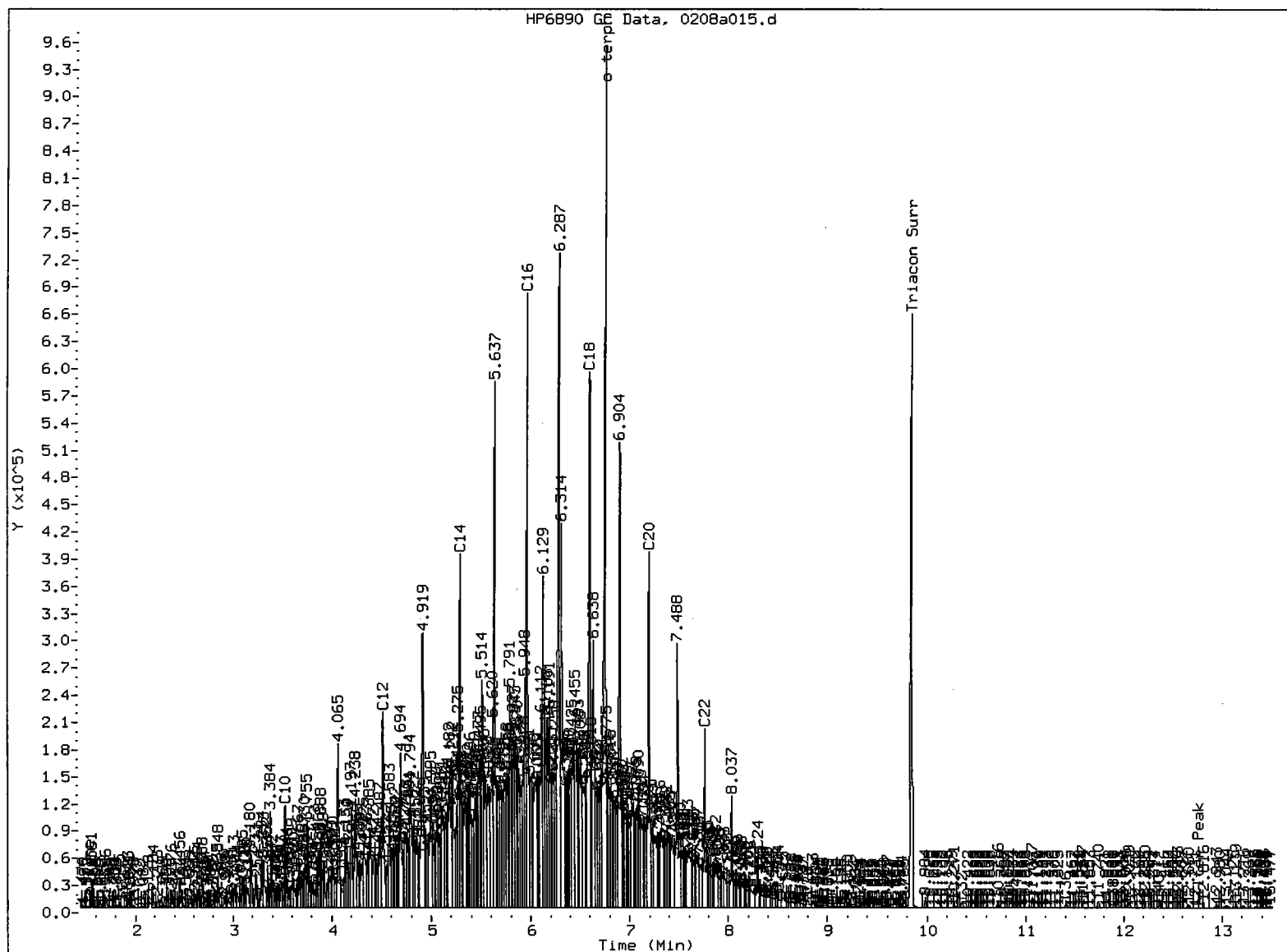
Operator: HS

Column diameter: 0.25



FID:4A-2C/RTX-1 SH23FMS

FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Other _____

Analyst: MM

Date: 2/1/11

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a016.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23FMSD
Client ID: B11-07-25 MSD
Injection: 09-FEB-2011 02:42

Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.542	0.002	10298	5737	GAS (Tol-C12)	5745040	290
C8	1.910	0.004	7141	5005	DIESEL (C12-C24)	25295301	1352
C10	3.529	0.001	114152	64923	M.OIL (C24-C38)	423176	37
C12	4.519	0.003	220933	228450	AK-102 (C10-C25)	28148368	1339 M
C14	5.291	0.004	404728	352173	AK-103 (C25-C36)	292147	42
C16	5.953	-0.006	253127	265808			
C18	6.601	0.007	603169	736506	CRUDE (Tol-C40)	31484862	4169 M
C20	7.201	0.005	409983	475227	MIN.OIL (C24-C38)	423176	32
C22	7.768	0.001	206889	208427			
C24	8.299	-0.003	73878	76443			
C25	8.550	-0.008	31051	45369			
C26	8.799	-0.007	14932	19243			
C28	9.307	-0.010	2409	2619			
C32	10.351	-0.020	8202	8143			
C34	10.874	-0.024	764	1489	BUNKERC (C10-C38)	28458367	3845 M
Filter Peak	12.794	0.011	475	523			
C36	11.409	-0.003	6980	9507			
C38	11.898	-0.007	572	1662			
C40	12.365	-0.017	4767	6475			
o-terph	6.760	0.004	775904	668608	JET-A (C10-C18)	20545116	1410
Triacon Surr	9.853	-0.002	676040	761091			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

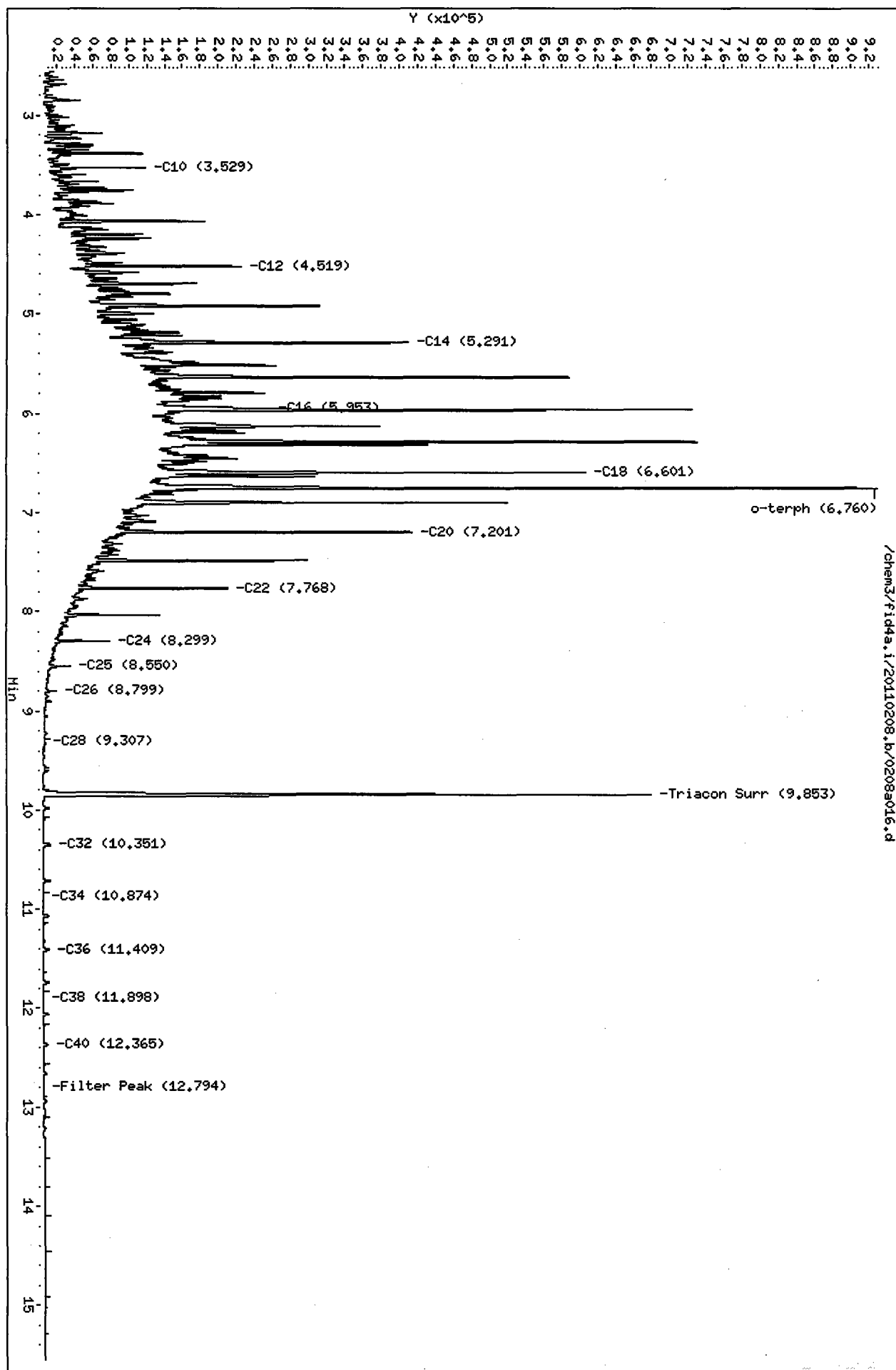
Surrogate	Area	Amount	%Rec
o-Terphenyl	668608	43.0	95.7
Triacontane	761091	47.0	104.4

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

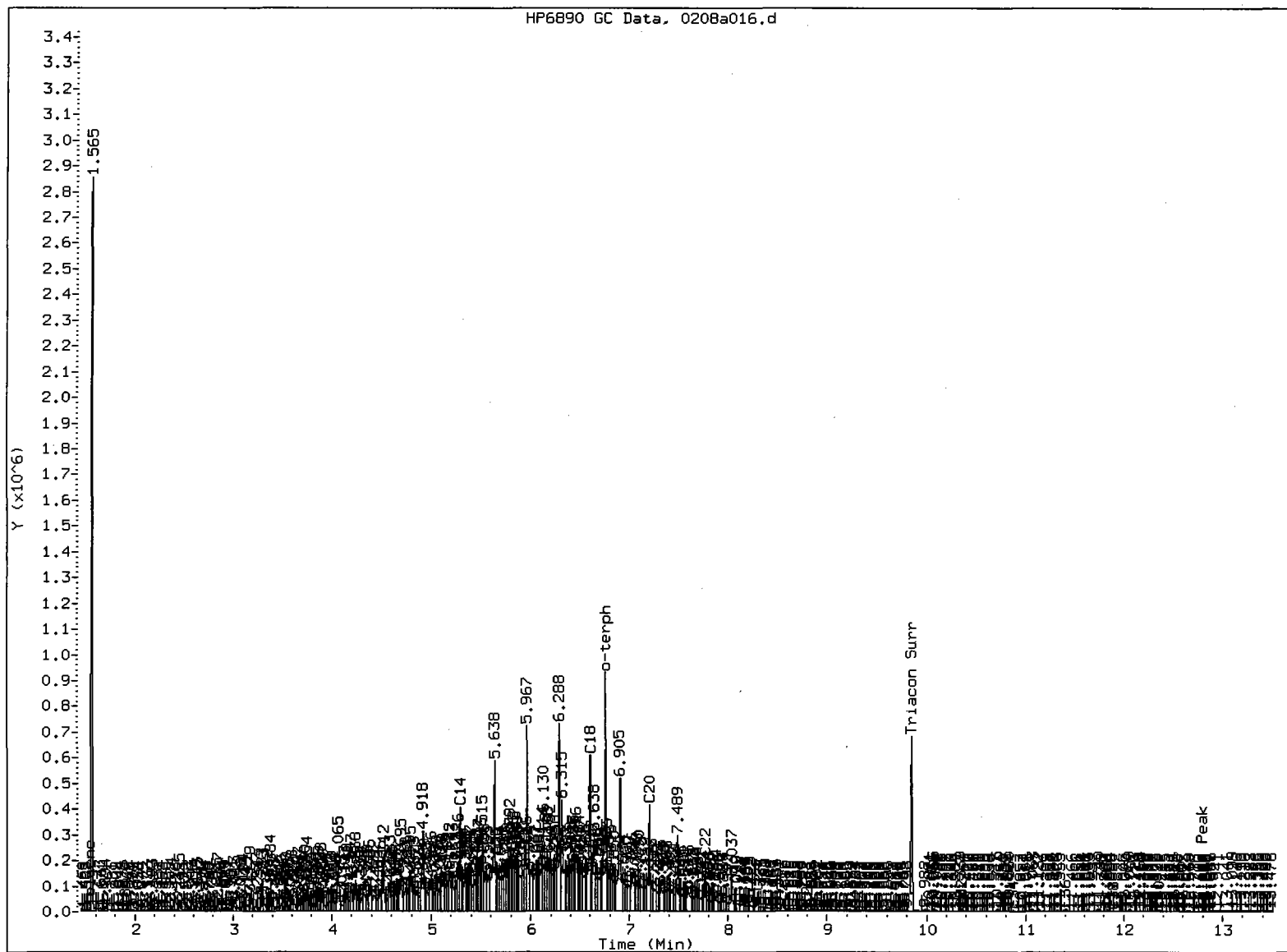
SH23:00313

Data File: /chem3/fid4a.i/20110208.b/0208a016.d
Date : 09-FEB-2011 02:42
Client ID: B41-07-25 MSD
Sample Info: SH23FHSJ
Column phase: RTX-1

Instrument: fid4a.i
Operator: HS
Column diameter: 0.25



SH23 00314



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: PCU

Date: 2/7/11

ORGANICS ANALYSIS DATA SHEET

NWTPHD by GC/FID

Page 1 of 1


Sample ID: LCS-020311

LAB CONTROL

Lab Sample ID: LCS-020311

LIMS ID: 11-2189

Matrix: Soil

Data Release Authorized: 

Reported: 02/10/11

QC Report No: SH23-Pacific Groundwater Group

Project: Birds Eye Soil

JI1001

Date Sampled: NA

Date Received: NA

Date Extracted: 02/03/11

Date Analyzed: 02/08/11 23:13

Instrument/Analyst: FID4A/MS

Sample Amount: 10.0 g

Final Extract Volume: 1.0 mL

Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	121	150	80.7%

TPHD Surrogate Recovery

o-Terphenyl	86.0%
-------------	-------

Results reported in mg/kg

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid4a.i/20110208.b/0208a007.d
Method: /chem3/fid4a.i/20110208.b/ftphfid4a.m
Instrument: fid4a.i
Operator: MS
Report Date: 02/09/2011
Macro: 07-FEB-2011
Calibration Dates: Gas:17-DEC-2010 Diesel:07-FEB-2011 M.Oil:20-JAN-2011

ARI ID: SH23LCSS1
Client ID: SH23LCSS1
Injection: 08-FEB-2011 23:13

Dilution Factor: 1

FID:4A RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.526	-0.014	1091	1592	GAS (Tol-C12)	3183989	161
C8	1.903	-0.003	7782	1564	DIESEL (C12-C24)	22627517	1209
C10	3.529	0.001	103480	57872	M.OIL (C24-C38)	757568	67
C12	4.518	0.003	200630	201857	AK-102 (C10-C25)	25073953	1192 M
C14	5.290	0.003	377047	315673	AK-103 (C25-C36)	584056	85
C16	5.967	0.007	648295	773581			
C18	6.601	0.007	563548	681657	CRUDE (Tol-C40)	26674332	3532 M
C20	7.201	0.004	361996	430351	MIN.OIL (C24-C38)	757568	57
C22	7.767	0.000	178484	187192			
C24	8.298	-0.004	58230	60289			
C25	8.550	-0.008	27394	37372			
C26	8.799	-0.007	10248	14741			
C28	9.308	-0.008	1841	1968			
C32	10.386	0.015	5588	939			
C34	10.922	0.024	102	61	BUNKERC (C10-C38)	25739848	3478 M
Filter Peak	12.824	0.042	334	277			
C36	11.412	0.001	65479	79451			
C38	11.900	-0.004	4655	1843			
C40	12.366	-0.016	31049	38826			
o-terph	6.759	0.003	759177	601399	JET-A (C10-C18)	18241350	1252
Triacon Surr	9.851	-0.004	598770	664427			

M Indicates manual integration within range.

Range Times: NW Diesel(4.516 - 8.302) AK102(3.53 - 8.56) Jet A(3.53 - 6.59)
NW M.Oil(8.30 - 11.90) AK103(8.56 - 11.41) OR Diesel(3.53 - 9.32)

Surrogate	Area	Amount	%Rec
o-Terphenyl	601399	38.7	86.0
Triacontane	664427	41.0	91.1

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	14566.6	18-JAN-2011
Min Oil	13405.9	18-JAN-2011
CRUDE	7552.8	22-MAY-2010
Bunker C	7401.6	22-DEC-2010

SH23:00317

Data File: /chem3/fid4a.i/20110208.b/0208a007.d

Date : 08-FEB-2011 23:13

Client ID: SH23LCSS1

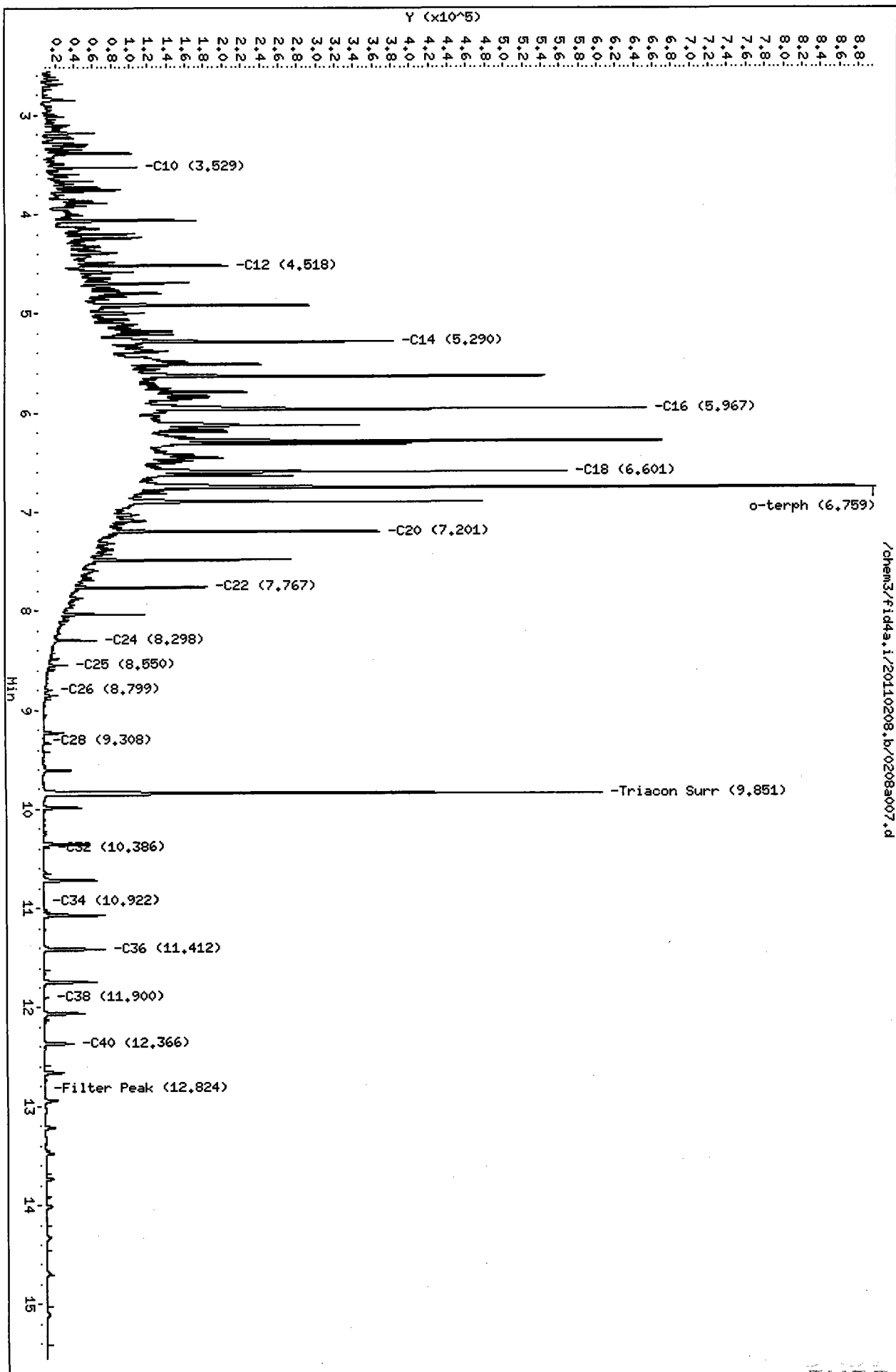
Sample Info: SH23LCSS1

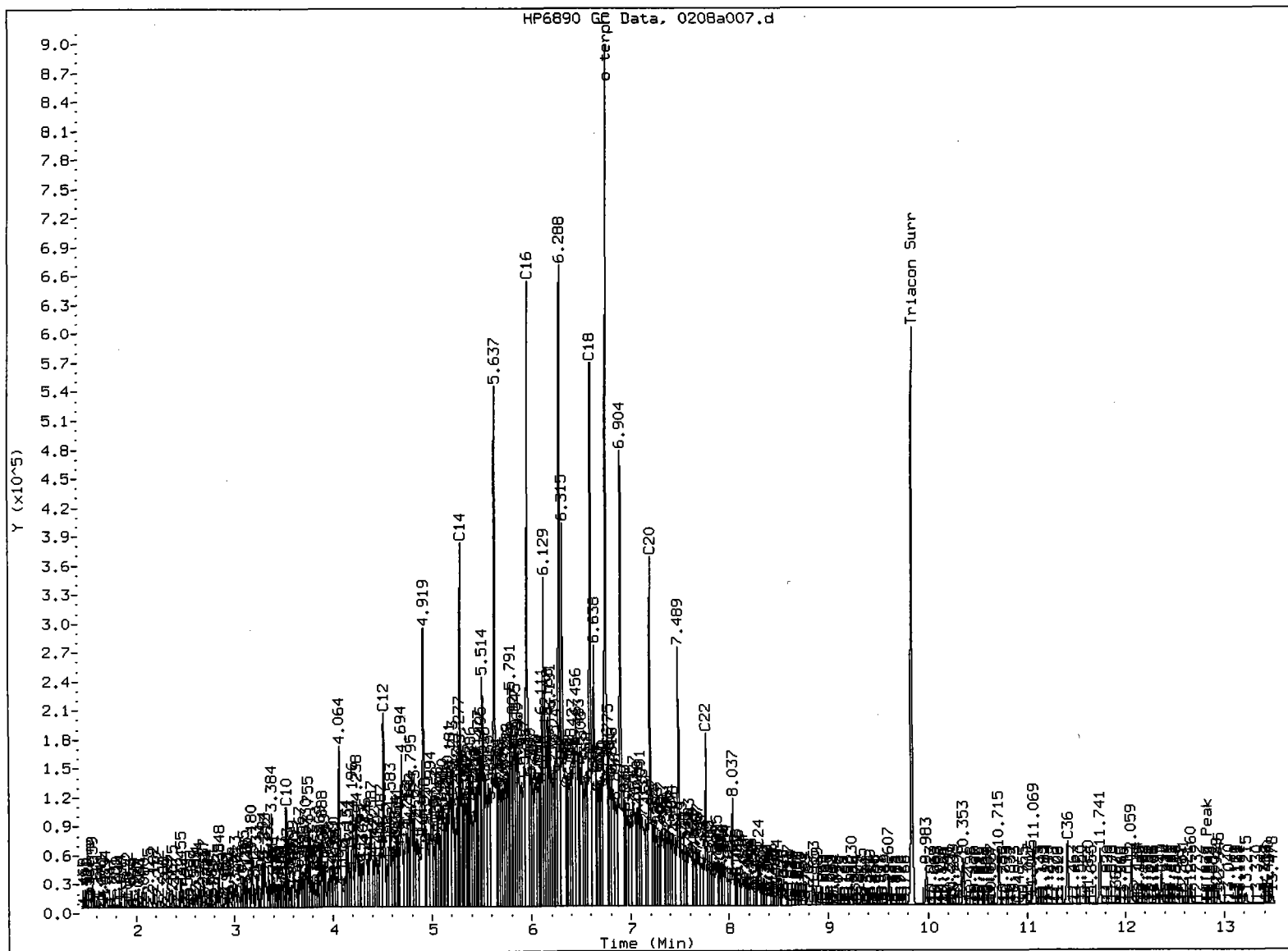
Column phase: RTX-1

Instrument: fid4a.i

Operator: MS

Column diameter: 0.25





MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Other

Analyst:

Date:

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Soil
Date Received: 02/02/11

ARI Job: SH23
Project: Birds Eye Soil
JI1001

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
11-2184-SH23A	B11-06-20	9.50 g	1.00 mL	D	02/03/11
11-2185-SH23B	B11-06-25	8.68 g	5.00 mL	D	02/03/11
11-2186-SH23C	B11-06-30	8.82 g	5.00 mL	D	02/03/11
11-2187-SH23D	B11-07-15	9.24 g	1.00 mL	D	02/03/11
11-2188-SH23E	B11-07-20	9.57 g	1.00 mL	D	02/03/11
11-2189-020311MB1	Method Blank	10.0 g	1.00 mL	-	02/03/11
11-2189-020311LCS1	Lab Control	10.0 g	1.00 mL	-	02/03/11
11-2189-SH23F	B11-07-25	9.04 g	1.00 mL	D	02/03/11
11-2189-SH23FMS	B11-07-25	8.91 g	1.00 mL	D	02/03/11
11-2189-SH23FMSD	B11-07-25	9.00 g	1.00 mL	D	02/03/11
11-2190-SH23G	B11-08-15	9.35 g	5.00 mL	D	02/03/11
11-2191-SH23H	B11-08-20	9.96 g	5.00 mL	D	02/03/11
11-2192-SH23I	B11-08-25	9.08 g	5.00 mL	D	02/03/11
11-2193-SH23J	B11-08-30	9.40 g	5.00 mL	D	02/03/11
11-2194-SH23K	B11-09-14	9.29 g	5.00 mL	D	02/03/11
11-2195-SH23L	B11-09-19	9.68 g	5.00 mL	D	02/03/11
11-2196-SH23M	B11-09-23.5	8.75 g	5.00 mL	D	02/03/11
11-2197-SH23N	B11-10-15	9.58 g	1.00 mL	D	02/03/11
11-2198-SH23O	B11-10-20	9.61 g	1.00 mL	D	02/03/11
11-2199-SH23P	B11-10-25	8.12 g	1.00 mL	D	02/03/11
11-2200-SH23Q	B11-10-30	9.26 g	1.00 mL	D	02/03/11
11-2201-SH23R	B11-11-10	8.58 g	1.00 mL	D	02/03/11
11-2202-SH23S	B11-12-10	8.23 g	1.00 mL	D	02/03/11
11-2203-SH23T	B11-12-15	9.41 g	1.00 mL	D	02/03/11

Basis: D=Dry Weight W=As Received
Diesel Extraction Report

SH23: 00320



Analytical Resources, Incorporated
Analytical Chemists and Consultants

February 17, 2011

Inger Jackson
Pacific Groundwater Group
2377 Eastlake Ave. East, Suite 200
Seattle, WA 98102

Project: Birds Eye Soil JI1001
ARI ID: SH30

Dear Ms. Jackson:

Please find enclosed the original Chain of Custody record, sample receipt documentation, and the final data for the samples from the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. Should you have any questions or concerns, please feel free to call me at your convenience.

Respectfully,
ANALYTICAL RESOURCES, INC.

Eric Branson
Project Manager
(206) 695-6213
eric@arilabs.com
www.arilabs.com



Case Narrative

- Sample Receipt & Analytical Details -

Sample Receipt

Analytical Resources, Inc. accepted twenty soil samples intact on February 2, 2011. Select containers arrived at -1.6°C, but volume was noted to not be frozen. For further details regarding sample receipt please refer to the enclosed Cooler Receipt Form.

Selected samples were analyzed for the parameters listed below, as requested on the Chain of Custody.

Benzene by 8260C SIM was not originally requested, but was added to select required samples in order to meet reporting requirements, per client approval.

Benzene by EPA Method 8260C SIM (Selected Ion Monitoring)

There were no irregularities with this analysis.

Polynuclear Aromatic Hydrocarbons by EPA Method 8270D

Fluoranthene was out of control high in the LCS. The LCS met overall acceptance criteria. This compound was not detected in the sample.

A diluted analysis of the sample has been performed and reported in addition to the original analysis in order to properly quantify E &/or S flagged values within a reportable range. Both runs have been reported.

There were no other irregularities with this analysis.

Volatile Petroleum Hydrocarbons by WAVPH

NC10, associated with the C10 range, was out of control low in the first closing continuing calibration performed 02/04/11 - associated with the analysis of the sample at 12:49 - listed as "Dilution" on the result form.

NC8, associated with the C8 range, was out of control low in the second closing continuing calibration performed 02/04/11 - associated with the analysis of the sample at 15:52.

Neither of these calibrations was considered entirely passing due to the single outages, but no further reruns were performed due to the high detection levels, and potential damaging effects to the instrument. Two runs have been reported for review purposes.



Case Narrative

- Sample Receipt & Analytical Details -

The results from the analysis at 12:49 – reported as “Dilution” should be considered more accurate based on surrogate recoveries.

There were no other irregularities with this analysis.

Extractable Petroleum Hydrocarbons by WAEPH

There were no irregularities with this analysis.

8021 BETX + Gasoline Range Organics by NWTPH-G

Benzene was out of control high in both the LCS and LCSD. The LCS and LCSD met overall acceptance criteria. Benzene was not detected in the samples.

There were no other irregularities with this analysis.

Diesel Range Organics (Extended) by NWTPH-Dx

The surrogate was diluted beyond recovery for samples “B11-14-09,” “B1114-20,” and “B11-14-30” due to the high dilution level necessary to properly quantify detections within a reportable range.

There were no other irregularities with this analysis.



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 \geq the Reporting Limit
- N** Matrix Spike recovery not within established control limits
- NA** Not Applicable, analyte not spiked
- H** The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L** Analyte concentration is ≤ 5 times the Reporting Limit and the replicate control limit defaults to ± 1 RL instead of the normal 20% RPD

Organic Data

- U** Indicates that the target analyte was not detected at the reported concentration
- *** Flagged value is not within established control limits
- B** Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J** Estimated concentration when the value is less than ARI's established reporting limits
- D** The spiked compound was not detected due to sample extract dilution
- E** Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
- 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 $\geq 40\%$ 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

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: H30	Turn-around Requested: Standard	Page: 5 of 5
ARI Client Company: Pacific Groundwater Group	Phone: 206 329 0141	Date: 2/2/11
Client Contact: Inger Jackson		No. of Coolers: 3
Client Project Name: Birds Eye - Soil		Cooler Temps:
Client Project #: JI1001		

Samplers: J. Parker, I. Jackson
--

Sample ID	Date	Time	Matrix	No. Containers
B11-12-20	1/31/11	1155	Soil	4
B11-12-25	1/31/11	1202		1
B11-12-30	1/31/11	1205		1
B11-12-35	1/31/11	1218		1
B11-13-15	1/31/11	1400		1
B11-13-20	1/31/11	1422		1
B11-13-23	1/31/11	1430		1
B11-13-30	1/31/11	1430		1
B11-14-09	1/31/11	1310		4
B11-14-15	1/31/11	1315		1

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)
	Printed Name: Inger Jackson	Printed Name:
	Company: ARI	Company:
	Date & Time: 2/2/11 1635	Date & Time: 2/2/11 1035

Analysis Requested	Notes/Comments																										
<table border="1"> <tr> <td>NUMPH -</td> <td>NUMPH - B</td> <td>NUMPH - C</td> <td>NUMPH - D</td> <td>NUMPH - E</td> <td>NUMPH - F</td> <td>NUMPH - G</td> <td>NUMPH - H</td> <td>NUMPH - I</td> <td>NUMPH - J</td> <td>NUMPH - K</td> <td>NUMPH - L</td> <td>NUMPH - M</td> <td>NUMPH - N</td> <td>NUMPH - O</td> <td>NUMPH - P</td> <td>NUMPH - Q</td> <td>NUMPH - R</td> <td>NUMPH - S</td> <td>NUMPH - T</td> <td>NUMPH - U</td> <td>NUMPH - V</td> <td>NUMPH - W</td> <td>NUMPH - X</td> <td>NUMPH - Y</td> <td>NUMPH - Z</td> </tr> </table>	NUMPH -	NUMPH - B	NUMPH - C	NUMPH - D	NUMPH - E	NUMPH - F	NUMPH - G	NUMPH - H	NUMPH - I	NUMPH - J	NUMPH - K	NUMPH - L	NUMPH - M	NUMPH - N	NUMPH - O	NUMPH - P	NUMPH - Q	NUMPH - R	NUMPH - S	NUMPH - T	NUMPH - U	NUMPH - V	NUMPH - W	NUMPH - X	NUMPH - Y	NUMPH - Z	
NUMPH -	NUMPH - B	NUMPH - C	NUMPH - D	NUMPH - E	NUMPH - F	NUMPH - G	NUMPH - H	NUMPH - I	NUMPH - J	NUMPH - K	NUMPH - L	NUMPH - M	NUMPH - N	NUMPH - O	NUMPH - P	NUMPH - Q	NUMPH - R	NUMPH - S	NUMPH - T	NUMPH - U	NUMPH - V	NUMPH - W	NUMPH - X	NUMPH - Y	NUMPH - Z		



Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

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.

5H30:00007

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 5430	Turnaround Requested: Standard	Page: 6 of 6
ABL Client Company: Pacific Groundwater Grp	Phone: 206 329 0141	Date: 2/2/11
Client Contact: Inger Jackson		Ice Present? Y
Client Project Name: Birds Eye Seal		No. of Coolers: 3
Client Project #: JE1001		Cooler Temps:



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					Notes/Comments	
					NUTRA-1	NUTRA-5	BTEX	Total Solids	VPH		EPH
B11-14-20	1/31/11	1320	Soil	1							
B11-14-23	1/31/11	1325		1							
B11-14-30	1/31/11	1330		5					2	1	1
B11-15-15	2/1/11	1347		1							
B11-15-20	2/1/11	1350		1							
B11-15-25	2/1/11	1355		1							
B11-15-30	2/1/11	1400		1							
B11-16-12	2/1/11	1500		3		2	1				
B11-16-15	2/1/11	1450		1							
B11-16-20	2/1/11	1500		1							

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Inger Jackson	Printed Name: A. Volgardsen
	Company: ARI	Company: ARI
	Date & Time: 2/2/11 1035	Date & Time: 2/2/11 1035

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.

5430-00000



Cooler Receipt Form

ARI Client: PLG

COC No(s): _____

Assigned ARI Job No: SH30

Project Name: Birds Eye Soil

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: _____

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)..... 0.8 -1.6 1.6

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 70941619

Cooler Accepted by: AV Date: 2/2/11 Time: 1035

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: mm Date: 2/3/11 Time: 0900

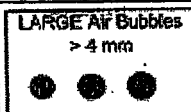
**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____

Date: _____

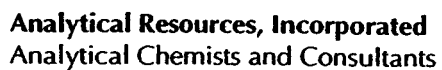


Small → "sm"

Peabubbles → "pb"

Large → "lg"

Headspace → "hs"



Cooler Temperature Compliance Form

00070F


ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: B11-16-12
Page 1 of 1 SAMPLE

Lab Sample ID: SH30R

LIMS ID: 11-2247

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/10/11 00:05

Sample Amount: 17.2 mg-dry-wt

Purge Volume: 10.0 mL

Moisture: 12.4%

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	12	< 12	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	93.2%
-----------------------	-------

SW8260-SIM SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001

<u>Client ID</u>	<u>DCE</u>	<u>TOT OUT</u>
MB-020911	116%	0
LCS-020911	102%	0
B11-16-12	93.2%	0

LCS/MB LIMITS QC LIMITS

(DCE) = d4-1,2-Dichloroethane (30-160) (30-160)

Prep Method: SW5030
Log Number Range: 11-2247 to 11-2247

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: LCS-020911

Page 1 of 1

LAB CONTROL SAMPLE

Lab Sample ID: LCS-020911

LIMS ID: 11-2247

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/14/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: NA

Date Received: NA

Instrument/Analyst LCS: NT7/PKC

Date Analyzed LCS: 02/09/11 14:33

Sample Amount LCS: 20.0 mg-dry-wt

Purge Volume LCS: 10.0 mL

Analyte	LCS	Spike Added	Recovery
Benzene	420	500	84.0%

Reported in µg/kg (ppb)

NA-No recovery due to high concentration of analyte in original sample,
calculated negative recovery, or undetected spike.

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: MB-020911


Page 1 of 1

METHOD BLANK

Lab Sample ID: MB-020911

LIMS ID: 11-2247

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

JII1001

Date Sampled: NA

Date Received: NA

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 15:24

Sample Amount: 20.0 mg-dry-wt

Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	10	< 10	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	116%
-----------------------	------

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1

Sample ID: B11-14-30

SAMPLE

Lab Sample ID: SH30M

LIMS ID: 11-2242

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/11/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Date Analyzed: 02/10/11 14:51

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Alumina: No

Silica Gel: Yes

Sample Amount: 2.23 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 10.8%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	220	12,000
91-57-6	2-Methylnaphthalene	220	37,000 ES
90-12-0	1-Methylnaphthalene	220	32,000 ES
208-96-8	Acenaphthylene	220	< 220 U
83-32-9	Acenaphthene	220	< 220 U
86-73-7	Fluorene	220	8,800
85-01-8	Phenanthrene	220	20,000 E
120-12-7	Anthracene	220	< 220 U
206-44-0	Fluoranthene	220	< 220 U
129-00-0	Pyrene	220	2,700
56-55-3	Benzo (a) anthracene	220	1,200
218-01-9	Chrysene	220	2,600
50-32-8	Benzo (a) pyrene	220	380
193-39-5	Indeno (1,2,3-cd) pyrene	220	< 220 U
53-70-3	Dibenz (a,h) anthracene	220	< 220 U
191-24-2	Benzo (g,h,i) perylene	220	< 220 U
132-64-9	Dibenzofuran	220	3,200
TOTBFA	Total Benzofluoranthenes	220	330

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	75.2%
2-Fluorobiphenyl	93.2%

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS


Page 1 of 1

Sample ID: B11-14-30
DILUTION

Lab Sample ID: SH30M

LIMS ID: 11-2242

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Date Analyzed: 02/10/11 19:38

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Alumina: No

Silica Gel: Yes

Sample Amount: 2.23 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 5.00

Percent Moisture: 10.8%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	1,100	13,000
91-57-6	2-Methylnaphthalene	1,100	46,000
90-12-0	1-Methylnaphthalene	1,100	38,000
208-96-8	Acenaphthylene	1,100	< 1,100 U
83-32-9	Acenaphthene	1,100	< 1,100 U
86-73-7	Fluorene	1,100	8,300
85-01-8	Phenanthrene	1,100	24,000
120-12-7	Anthracene	1,100	< 1,100 U
206-44-0	Fluoranthene	1,100	< 1,100 U
129-00-0	Pyrene	1,100	3,200
56-55-3	Benzo (a) anthracene	1,100	1,600
218-01-9	Chrysene	1,100	2,900
50-32-8	Benzo (a) pyrene	1,100	< 1,100 U
193-39-5	Indeno (1,2,3-cd) pyrene	1,100	< 1,100 U
53-70-3	Dibenz (a,h) anthracene	1,100	< 1,100 U
191-24-2	Benzo (g,h,i) perylene	1,100	< 1,100 U
132-64-9	Dibenzofuran	1,100	4,500
TOTBFA	Total Benzofluoranthenes	1,100	< 1,100 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	79.2%
2-Fluorobiphenyl	90.0%

SW8270 PNA SURROGATE RECOVERY SUMMARY



Matrix: Soil

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001

<u>Client ID</u>	<u>TER</u>	<u>FBP</u>	<u>TOT OUT</u>
MB-020411	81.2%	66.0%	0
LCS-020411	84.8%	70.4%	0
B11-14-30	75.2%	93.2%	0
B11-14-30 DL	79.2%	90.0%	0

	<u>LCS/MB LIMITS</u>	<u>QC LIMITS</u>
(TER) = d14-p-Terphenyl	(30-160)	(30-160)
(FBP) = 2-Fluorobiphenyl	(30-160)	(30-160)

Prep Method: SW3546
Log Number Range: 11-2242 to 11-2242

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1




Sample ID: LCS-020411

LAB CONTROL

Lab Sample ID: LCS-020411

LIMS ID: 11-2242

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: NA

Date Received: 02/02/11

Date Extracted: 02/04/11

Date Analyzed: 02/09/11 17:45

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Silica Gel Cleanup: Yes

Sample Amount: 7.50 g-dry-wt

Final Extract Volume: 0.50 mL

Dilution Factor: 1.00

Alumina Cleanup: No

Analyte	Lab Control	Spike Added	Recovery
Naphthalene	1110	1670	66.5%
2-Methylnaphthalene	1040	1670	62.3%
1-Methylnaphthalene	1120	1670	67.1%
Acenaphthylene	1330	1670	79.6%
Acenaphthene	1250	1670	74.9%
Fluorene	1400	1670	83.8%
Phenanthrene	1480	1670	88.6%
Anthracene	1490	1670	89.2%
Fluoranthene	1680	1670	101%
Pyrene	1460	1670	87.4%
Benzo(a)anthracene	1550	1670	92.8%
Chrysene	1520	1670	91.0%
Benzo(a)pyrene	1380	1670	82.6%
Indeno(1,2,3-cd)pyrene	1350	1670	80.8%
Dibenz(a,h)anthracene	1360	1670	81.4%
Benzo(g,h,i)perylene	1300	1670	77.8%
Dibenzofuran	1320	1670	79.0%
Total Benzofluoranthenes	3070	3330	92.2%

Semivolatile Surrogate Recovery

d14-p-Terphenyl	84.8%
2-Fluorobiphenyl	70.4%

Results reported in µg/kg

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1


Sample ID: MB-020411

METHOD BLANK

Lab Sample ID: MB-020411

LIMS ID: 11-2242

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: NA

Date Received: NA

Date Extracted: 02/04/11

Date Analyzed: 02/09/11 17:12

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Alumina: No

Silica Gel: Yes

Sample Amount: 7.50 g

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: NA

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	67	< 67 U
91-57-6	2-Methylnaphthalene	67	< 67 U
90-12-0	1-Methylnaphthalene	67	< 67 U
208-96-8	Acenaphthylene	67	< 67 U
83-32-9	Acenaphthene	67	< 67 U
86-73-7	Fluorene	67	< 67 U
85-01-8	Phenanthrene	67	< 67 U
120-12-7	Anthracene	67	< 67 U
206-44-0	Fluoranthene	67	< 67 U
129-00-0	Pyrene	67	< 67 U
56-55-3	Benzo(a)anthracene	67	< 67 U
218-01-9	Chrysene	67	< 67 U
50-32-8	Benzo(a)pyrene	67	< 67 U
193-39-5	Indeno(1,2,3-cd)pyrene	67	< 67 U
53-70-3	Dibenz(a,h)anthracene	67	< 67 U
191-24-2	Benzo(g,h,i)perylene	67	< 67 U
132-64-9	Dibenzofuran	67	< 67 U
TOTBFA	Total Benzofluoranthenes	67	< 67 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	81.2%
2-Fluorobiphenyl	66.0%

Sample ID: B11-14-30
SAMPLE

Lab Sample ID: SH30M
LIMS ID: 11-2242
Matrix: Soil
Data Release Authorized: *SP*
Reported: 02/15/11

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
JII1001
Date Sampled: 01/31/11
Date Received: 02/02/11

Date Analyzed: 02/04/11 15:52
Instrument/Analyst: PID1/MH

Purge Volume: 10 mL
Sample Amount: 52.4 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	950	< 950 U
108-88-3	Toluene	950	< 950 U
100-41-4	Ethylbenzene	950	2,400
179601-23-1	m,p-Xylene	1900	< 1,900 U
95-47-6	o-Xylene	950	< 950 U
1634-04-4	Methyl tert-Butyl Ether	950	< 950 U
109-66-0	n-Pentane	950	< 950 U
110-54-3	n-Hexane	950	< 950 U
111-65-9	n-Octane	950	3,700
124-18-5	n-Decane	950	3,900
112-40-3	n-Dodecane	950	4,200

Range	RL	Result
C8-C10 Aromatics	9,500	72,000
C10-C12 Aromatics	9,500	180,000
C12-C13 Aromatics	9,500	180,000
C5-C6 Aliphatics	9,500	< 9,500 U
C6-C8 Aliphatics	9,500	17,000
C8-C10 Aliphatics	9,500	< 9,500 U
C10-C12 Aliphatics	9,500	33,000

Values reported in µg/kg (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	64.2%
FID: 2,5-Dibromotoluene	88.2%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

44
2/14/11

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a018.d
Lab Smp Id: SH30M Client Smp ID: B11-14-30
Inj Date : 04-FEB-2011 15:52
Operator : MH Inst ID: pid1.i
Smp Info : SH30M
Misc Info : 11-2242
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul Quant Type: ESTD
Cal Date : 20-DEC-2010 21:58 Cal File: 1220a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waarom.sub
Target Version: 3.50
Processing Host: cserv3

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable

Local Compound Variable

Compounds				RESPONSE	CONCENTRATIONS	
	RT	EXP RT	DLT RT		ON-COLUMN	FINAL
	==	=====	=====	=====	(ug/ml)	(ug/Kg)
1 MtBE	5.103	5.097	0.006	107	0.07251	0.0725
2 BENZENE	Compound Not Detected.					
4 TOLUENE	9.977	9.960	0.017	110	0.03604	0.0360
5 ETHYLBENZENE	11.943	11.933	0.010	33510	12.8063	12.8
6 M/P-XYLENE	12.040	12.037	0.003	21019	6.83363	6.83
7 O-XYLENE	12.647	12.623	0.024	5567	2.04686	2.05
9 TRIMETHYLBEN	15.060	15.047	0.013	82311	34.6715	34.7
10 NAPHTHALENE	18.287	18.270	0.017	83772	38.4236	38.4
11 1-METHYLNAP	20.130	20.110	0.020	74655	67.2760	67.3
\$ 37 DIBROMOTOL	19.930	19.910	0.020	59178	32.0617	32.1 (M)

QC Flag Legend

M - Compound response manually integrated.

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a018.d
Lab Smp Id: SH30M
Inj Date : 04-FEB-2011 15:52
Operator : MH
Smp Info : SH30M
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT	RT	ON-COLUMN	FINAL
					(ng/mL)	(ug/L)
1 nC5	3.840	3.850	-0.010	51	0.11965	0.120
2 nC6	5.400	5.393	0.007	991	1.96029	1.96
4 nC8	9.633	9.640	-0.007	8359	19.3411	19.3
5 nC10	13.450	13.440	0.010	8539	20.2779	20.3
7 nC12	16.557	16.573	-0.016	9439	22.1586	22.2
\$ 8 2,5-DBT	19.927	19.913	0.014	7017	44.1115	44.1 (M)

QC Flag Legend

M - Compound response manually integrated.

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a018.d
Date : 04-FEB-2011 15:52

Client ID:

Sample Info: SH30H

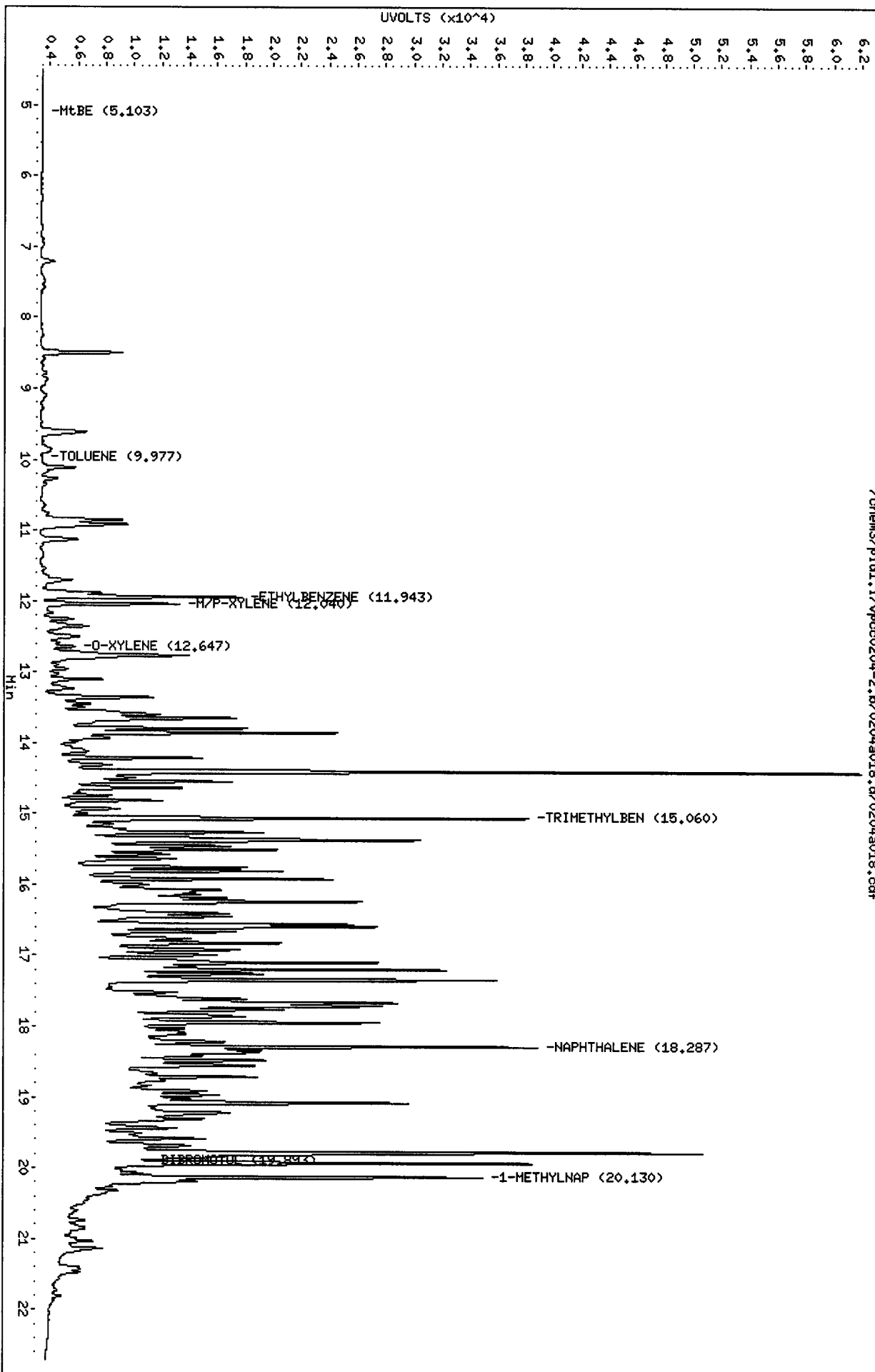
Column phase: RTX 502-2 AR0

Instrument: pid1.i

Operator: MH

Column diameter: 0.18

Page 2



SH30 : 00023

Data File: /chem3/pid1.i/vpcc0204-1.b/0204a018.d

Date : 04-FEB-2011 15:52

Client ID:

Sample Info: SH30H

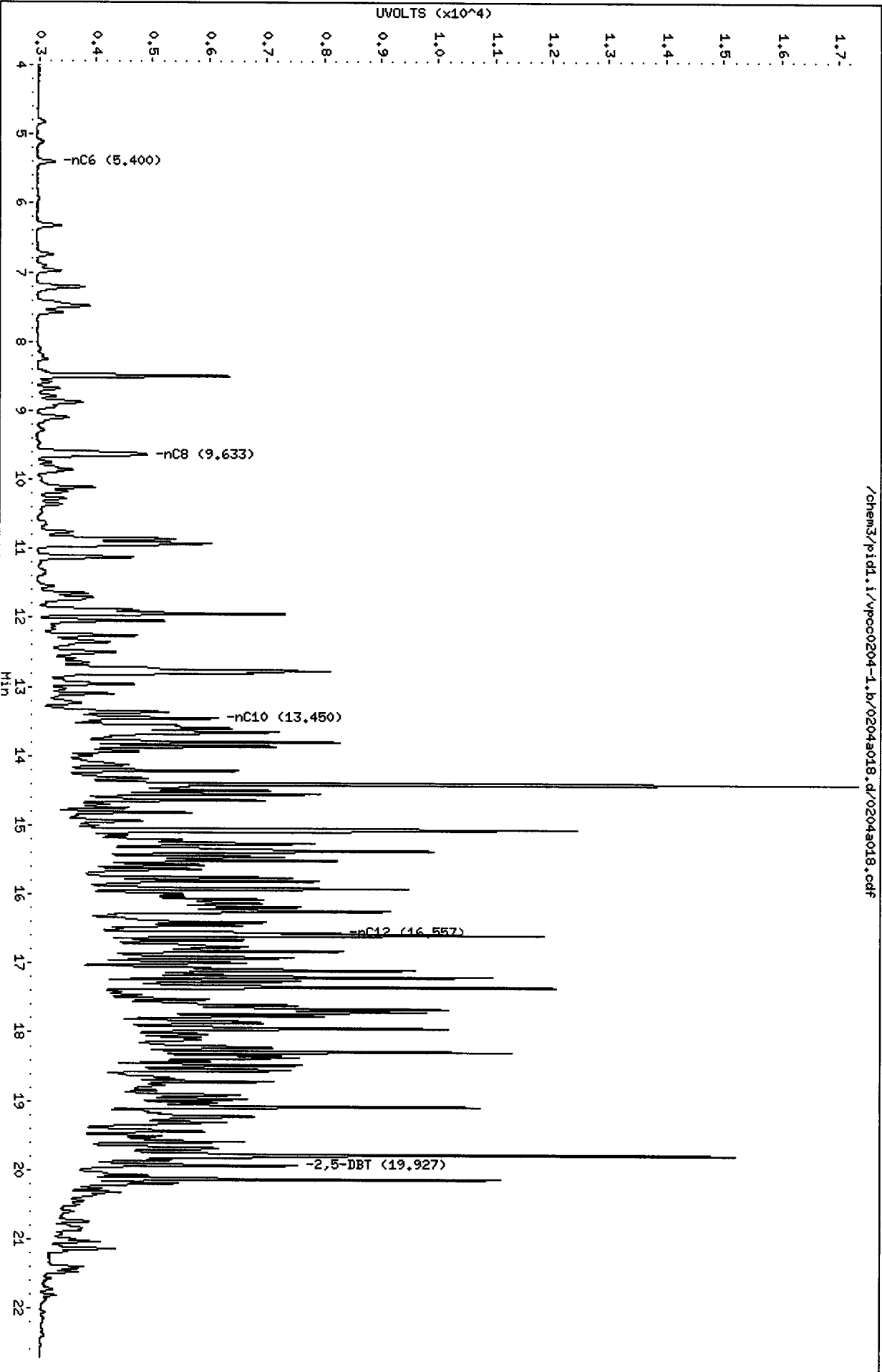
Column Phase: RTX502-2 ALI

Page 2

Instrument: pid1.i

Operator: MH

Column diameter: 0.18



SH30 : 00024

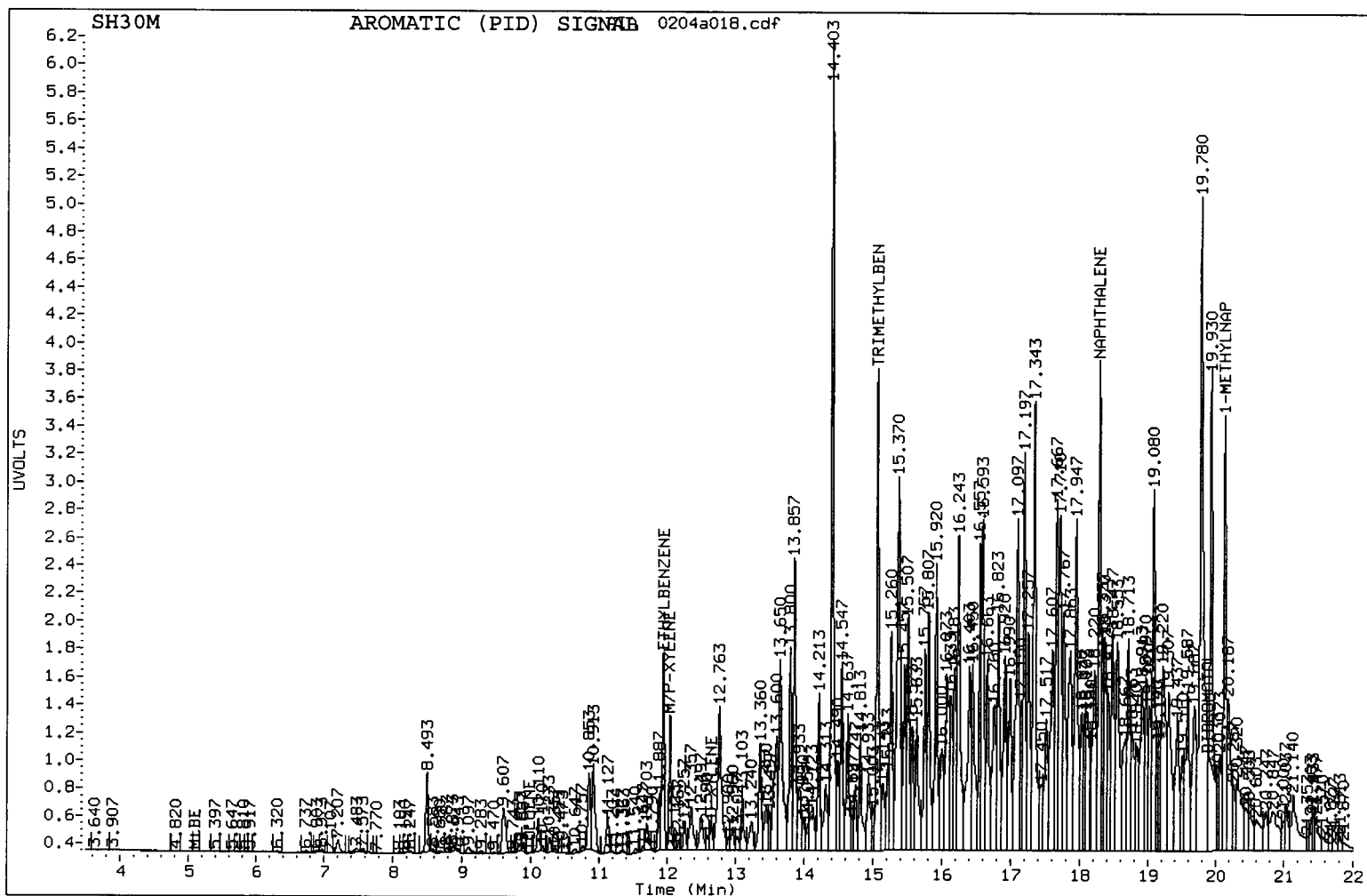
Analytical Resources Inc.
WAVPH Aromatics Report

Data file: /chem3/pid1.i/vpcc0204-2.b/0204a018.d
Method: /chem3/pid1.i/vpcc0204-2.b/VPHAROM
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH30M
Client ID:
Injection: 04-FEB-2011 15:52
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS								
Compound	RT	Shift	Height	Amount	Range	Total Area	Conc	
MtBE	5.103	0.007	34	0.1	C8-C10 Arom.	892600*	376.0	
BENZENE	-----				C10-C12 Arom.	2025566	929.1	
TOLUENE	9.977	0.017	48	0.0	C12-C13 Arom.	1069956	964.2	
ETHYLBENZENE	11.943	0.010	14165	12.8				
M/P-XYLENE	12.040	0.003	9672	6.8				
O-XYLENE	12.647	0.023	2183	2.0				
TRIMETHYLBEN	15.060	0.013	34588	34.7				
NAPHTHALENE	18.287	0.017	35204	38.4				
1-METHYLNAP	20.130	0.020	31226	67.3				
DIBROMOTOL	19.893	-0.017	6993	23.9	DBT Recovery:	47.8		

* Indicates surrogate area subtracted



SH30: 00025

Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pidl.i/vpcc0204-1.b/0204a018.d
Method: /chem3/pidl.i/vpcc0204-1.b/VPHALI.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH30M
Client ID:
Injection: 04-FEB-2011 15:52
Matrix: WATER
Dilution Factor: 1

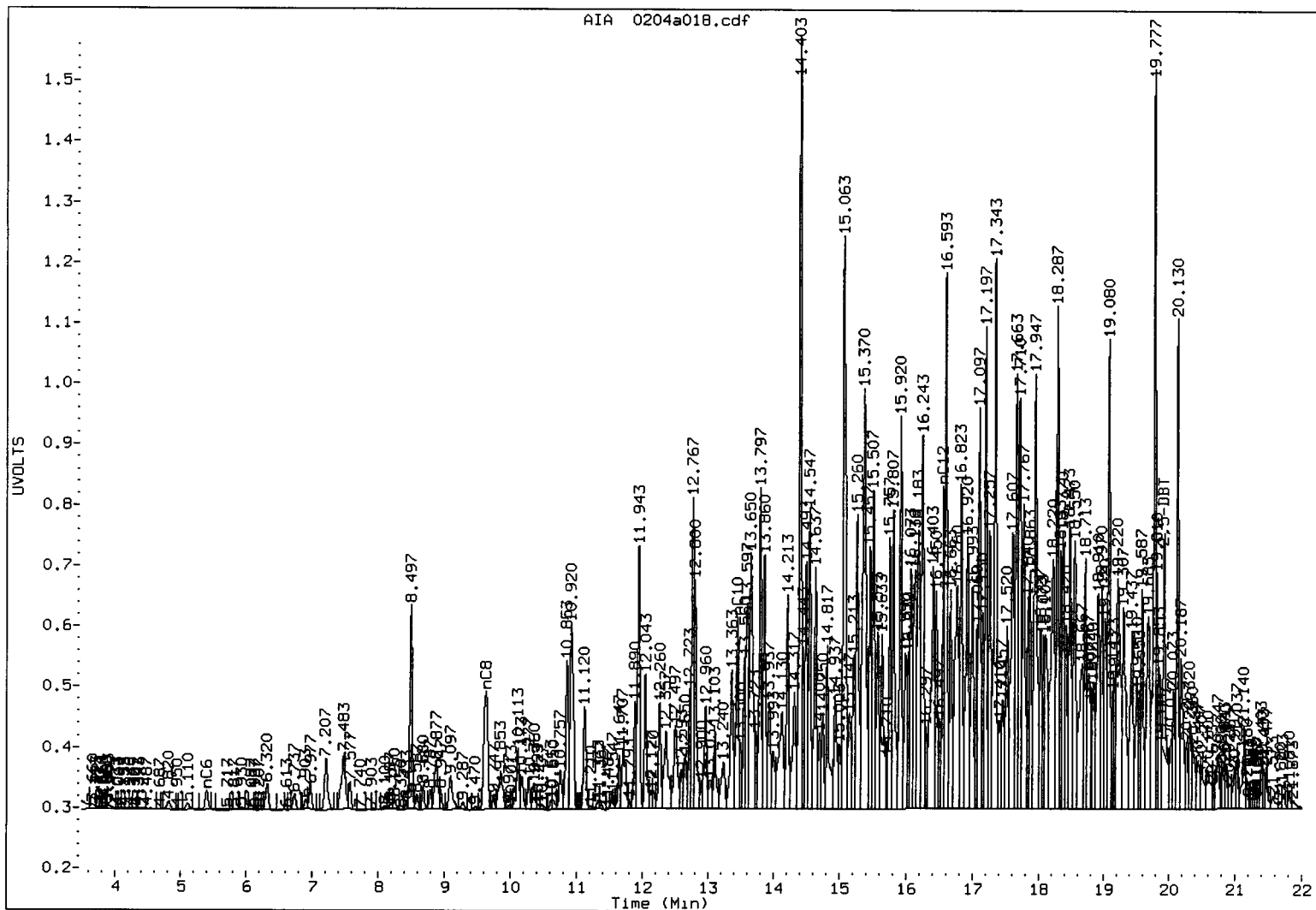
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.840	-0.010	30	51	C5-C6 Aliph.	2873	6.1
nC6	5.400	0.007	315	991	C6-C8 Aliph.	39240*	90.8
nC8	9.633	-0.007	1935	8359	C8-C10 Aliph.	156127	370.7
nC10	13.450	0.010	3156	8539	C10-C12 Aliph.	470526*	1104.5
nC12	16.557	-0.017	5311	9439			

* Indicates surrogate area subtracted

SH3 0M

ALIPHATIC (FID) SIGNAL



SH30:00026

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

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Sample ID: B11-14-30

DILUTION

Lab Sample ID: SH30M

LIMS ID: 11-2242

Matrix: Soil

Data Release Authorized: *JB*

Reported: 02/15/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 12:49

Instrument/Analyst: PID1/MH

Purge Volume: 10 mL

Sample Amount: 10.5 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	4800	< 4,800 U
108-88-3	Toluene	4800	< 4,800 U
100-41-4	Ethylbenzene	4800	5,900
179601-23-1	m,p-Xylene	9500	< 9,500 U
95-47-6	o-Xylene	4800	< 4,800 U
1634-04-4	Methyl tert-Butyl Ether	4800	< 4,800 U
109-66-0	n-Pentane	4800	< 4,800 U
110-54-3	n-Hexane	4800	< 4,800 U
111-65-9	n-Octane	4800	10,000
124-18-5	n-Decane	4800	12,000
112-40-3	n-Dodecane	4800	25,000

Range	RL	Result
C8-C10 Aromatics	48,000	180,000
C10-C12 Aromatics	48,000	480,000
C12-C13 Aromatics	48,000	630,000
C5-C6 Aliphatics	48,000	< 48,000 U
C6-C8 Aliphatics	48,000	< 48,000 U
C8-C10 Aliphatics	48,000	< 48,000 U
C10-C12 Aliphatics	48,000	110,000

Values reported in µg/kg (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	92.4%
FID: 2,5-Dibromotoluene	111%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

MH
2/14/11

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a012.d
Report Date: 14-Feb-2011 12:42

Page 1

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a012.d
Lab Smp Id: SH30M Client Smp ID: B11-14-30
Inj Date : 04-FEB-2011 12:49
Operator : MH Inst ID: pid1.i
Smp Info : SH30M
Misc Info : 11-2242
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul Quant Type: ESTD
Cal Date : 20-DEC-2010 21:58 Cal File: 1220a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waarom.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable

Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN	FINAL
	==	=====	=====	=====	(ug/ml)	(ug/Kg)
1 MtBE	5.107	5.097	0.010	12	0.00813	0.00813
2 BENZENE	7.640	7.647	-0.007	28	0.00850	0.00850
4 TOLUENE	9.973	9.960	0.013	56	0.01835	0.0183
5 ETHYLBENZENE	11.943	11.933	0.010	16303	6.23041	6.23
6 M/P-XYLENE	12.043	12.037	0.006	10215	3.32107	3.32
7 O-XYLENE	12.647	12.623	0.024	2846	1.04641	1.05
9 TRIMETHYLBEN	15.060	15.047	0.013	42186	17.7698	17.8
10 NAPHTHALENE	18.287	18.270	0.017	44216	20.2805	20.3
11 1-METHYLNAP	20.130	20.110	0.020	57641	51.9437	51.9
\$ 37 DIBROMOTOL	19.930	19.910	0.020	85239	46.1807	46.2 (M)

QC Flag Legend

M - Compound response manually integrated.

SH30 : 00028

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a012.d
Lab Smp Id: SH30M
Inj Date : 04-FEB-2011 12:49
Operator : MH
Smp Info : SH30M
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
1 nC5	3.823	3.850	-0.027	90	0.20974	0.210
2 nC6	5.393	5.393	0.000	542	1.07165	1.07
4 nC8	9.637	9.640	-0.003	4575	10.5870	10.6
5 nC10	13.450	13.440	0.010	5154	12.2401	12.2
7 nC12	16.590	16.573	0.017	11115	26.0936	26.1
\$ 8 2,5-DBT	19.927	19.913	0.014	8861	55.7033	55.7 (M)

QC Flag Legend

M - Compound response manually integrated.

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a012.d

Date: 04-FEB-2011 12:49

Client ID: B41-14-30

Sample Info: SH30H

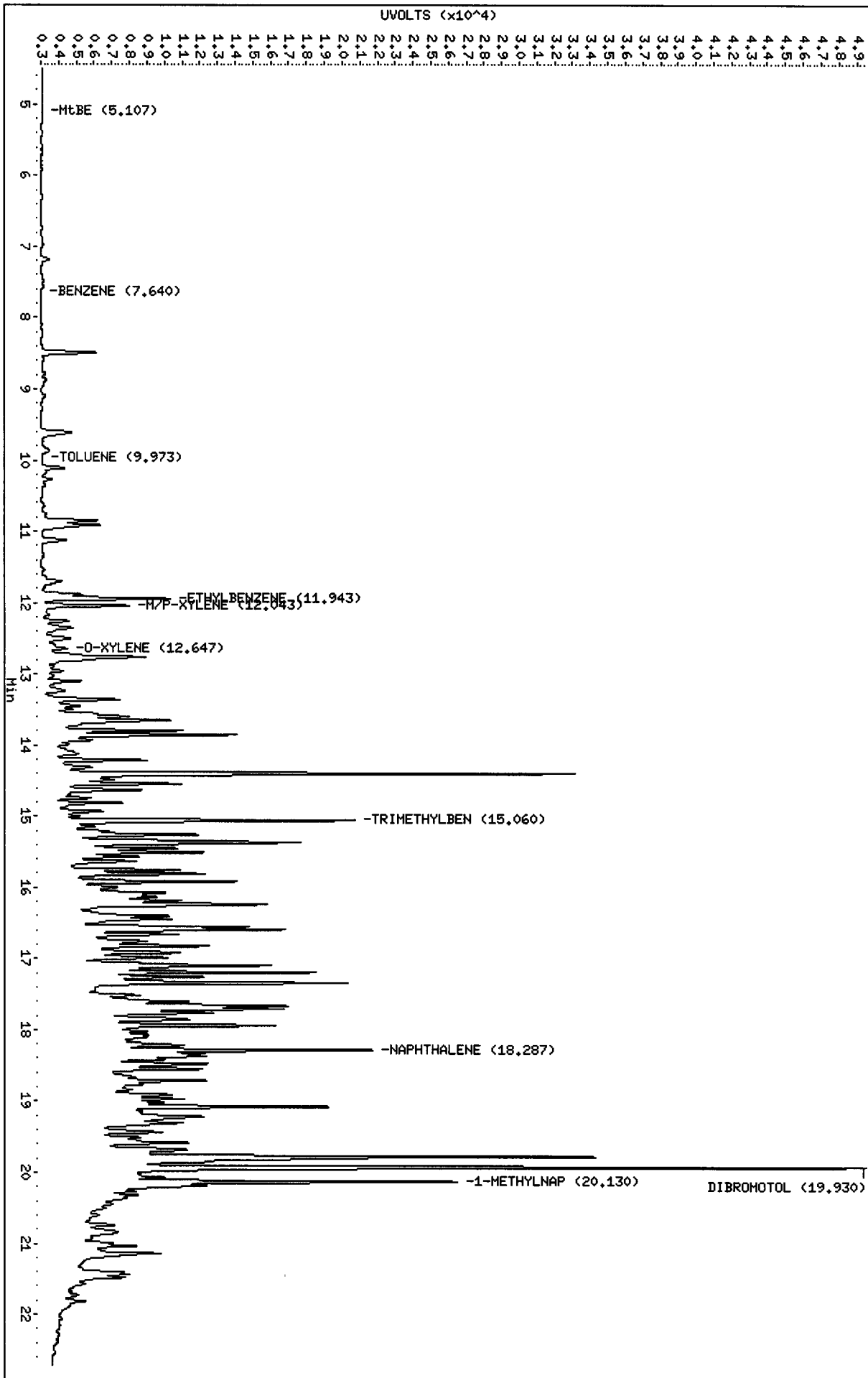
Column phase: RTX 502-2 AR0

Instrument: pid1.i

Operator: MH

Column diameter: 0.18

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Data File: /chem3/pid1.i/vpcc0204-1.b/0204a012.d

Date : 04-FEB-2011 12:49

Client ID:

Sample Info: SH30H

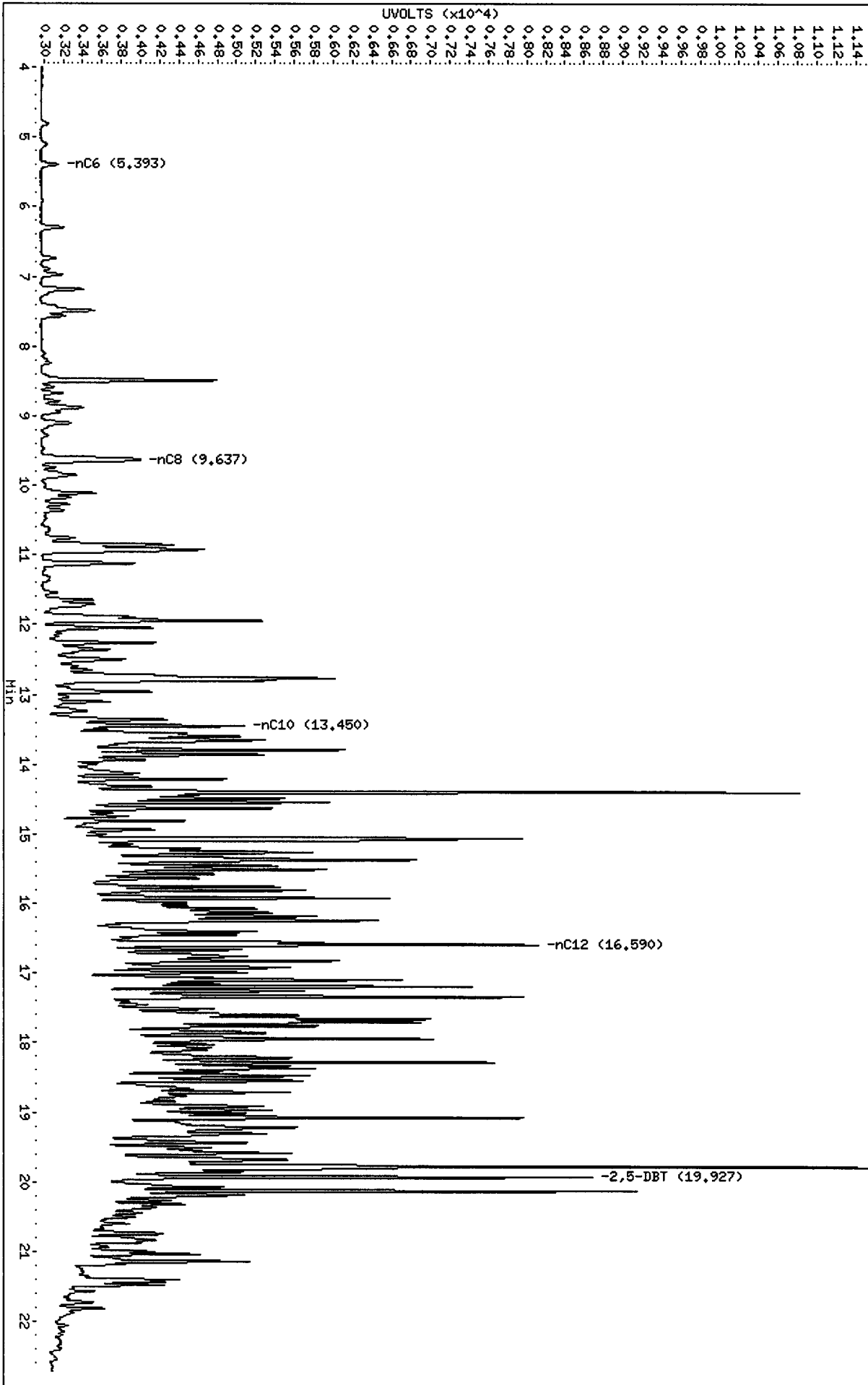
Column phase: RTX502-2 ALI

Instrument: pid1.i

Operator: MH

Column diameter: 0.18

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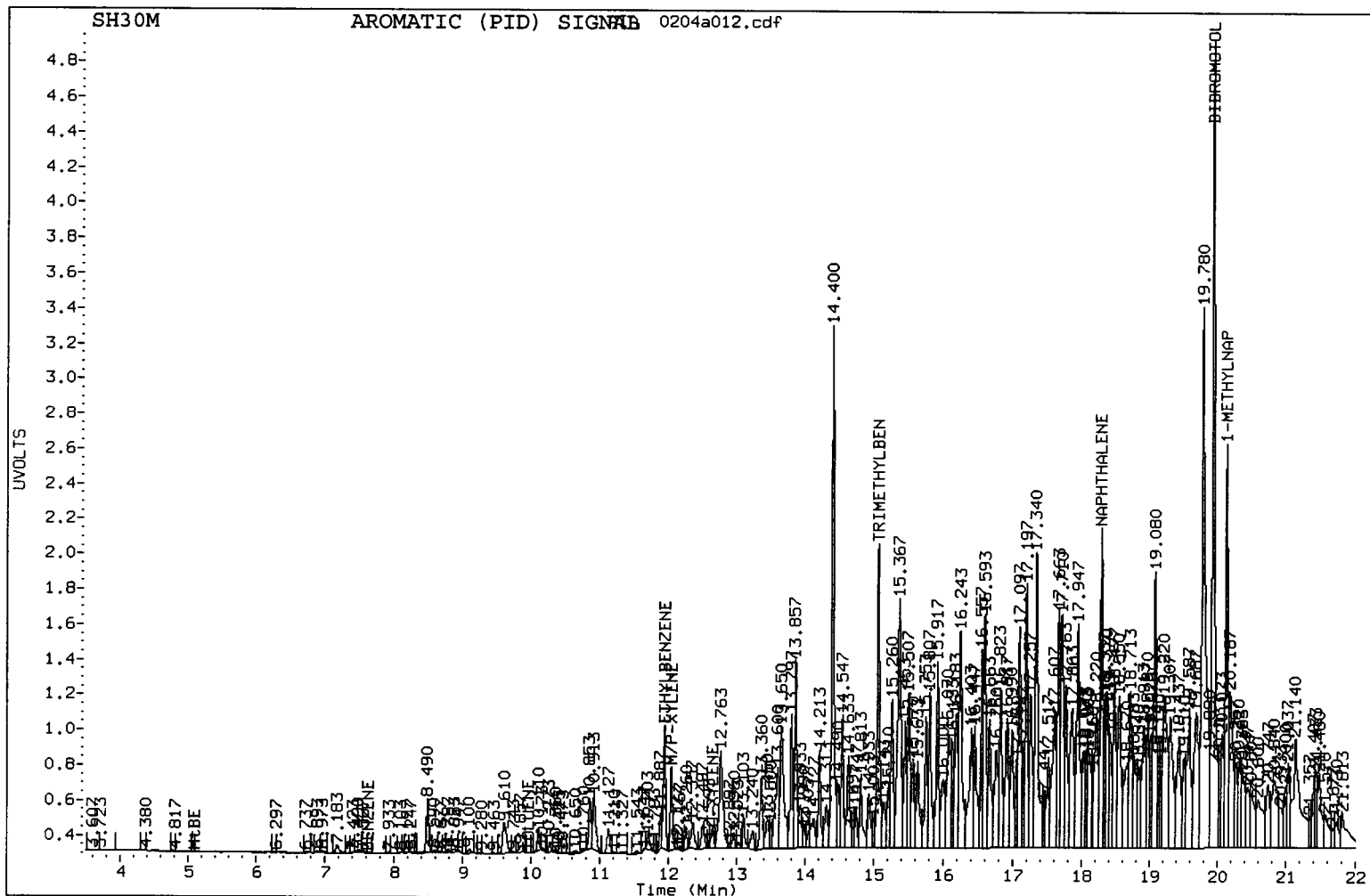
Analytical Resources Inc.
WAVPH Aromatics Report

Data file: /chem3/pid1.i/vpcc0204-2.b/0204a012.d
Method: /chem3/pid1.i/vpcc0204-2.b/VPHAROM
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH30M
Client ID: B11-14-30
Injection: 04-FEB-2011 12:49
Matrix: SOIL
Dilution Factor: 1

VPH-AROMATIC RESULTS								
Compound	RT	Shift	Height	Amount	Range	Total Area	Conc	
MtBE	5.107	0.010	20	0.0	C8-C10 Arom.	452105*	190.4	
BENZENE	7.640	-0.007	13	0.0	C10-C12 Arom.	1097590	503.4	
TOLUENE	9.973	0.013	28	0.0	C12-C13 Arom.	729537	657.4	
ETHYLBENZENE	11.943	0.010	7037	6.2				
M/P-XYLENE	12.043	0.007	4731	3.3				
O-XYLENE	12.647	0.023	1096	1.0				
TRIMETHYLBEN	15.060	0.013	17276	17.8				
NAPHTHALENE	18.287	0.017	18181	20.3				
1-METHYLNAP	20.130	0.020	22934	51.9				
DIBROMOTOL	19.930	0.020	40719	46.2	DBT Recovery:	92.4		

* Indicates surrogate area subtracted



SH30:00032

Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pidl.i/vpcc0204-1.b/0204a012.d
Method: /chem3/pidl.i/vpcc0204-1.b/VPHALI.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH30M
Client ID:
Injection: 04-FEB-2011 12:49
Matrix: WATER
Dilution Factor: 1

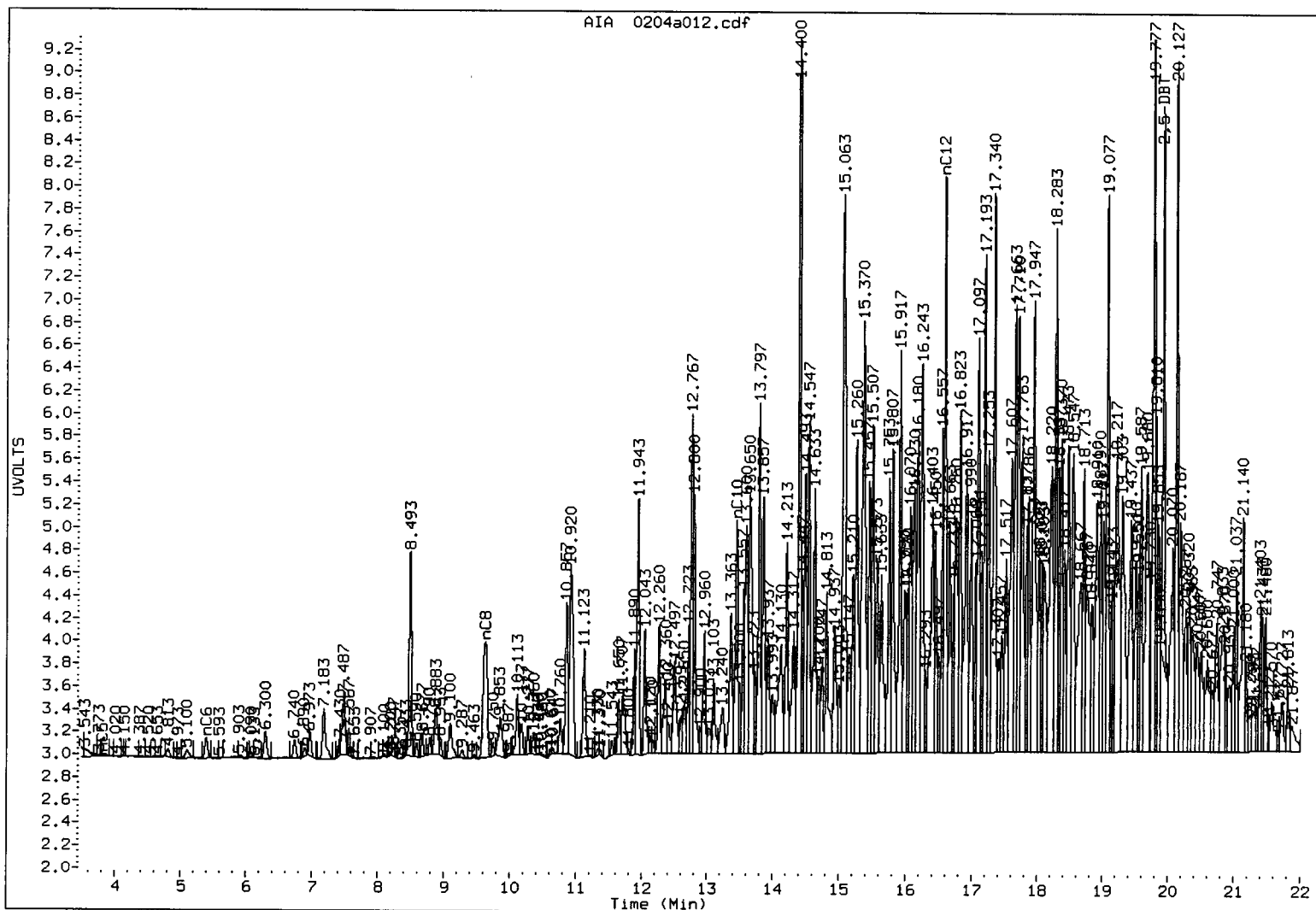
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.823	-0.027	19	90	C5-C6 Aliph.	1283	2.7
nC6	5.393	0.000	176	542	C6-C8 Aliph.	20212*	46.8
nC8	9.637	-0.003	1018	4575	C8-C10 Aliph.	83295	197.8
nC10	13.450	0.010	2048	5154	C10-C12 Aliph.	262038*	615.1
nC12	16.590	0.017	5063	11115			

* Indicates surrogate area subtracted

SH30M

ALIPHATIC (FID) SIGNAL



SH30 : 00033

VPH SURROGATE RECOVERY SUMMARY



Matrix: Soil

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001

Client ID	PDBT	FDBT	TOT	OUT
MB-020411	85.6%	84.2%	0	
LCS-020411	99.0%	92.4%	0	
LCSD-020411	94.0%	88.8%	0	
B11-14-30	64.2%	88.2%	0	
B11-14-30 DL	92.4%	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: 11-2242 to 11-2242

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1

Sample ID: LCS-020411

LCS/LCSD

Lab Sample ID: LCS-020411

LIMS ID: 11-2242

Matrix: Soil

Data Release Authorized: *B*

Reported: 02/15/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

JII1001

Date Sampled: NA

Date Received: NA

Date Analyzed LCS: 02/04/11 08:05

Date Analyzed LCSD: 02/04/11 08:35

Instrument/Analyst: PID1/MH

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	4650	4500	103%	4540	4500	101%	2.4%
Toluene	4720	4500	105%	4610	4500	102%	2.4%
Ethylbenzene	4860	4500	108%	4760	4500	106%	2.1%
m,p-Xylene	9720	9010	108%	9450	9010	105%	2.8%
o-Xylene	4720	4500	105%	4640	4500	103%	1.7%
Methyl tert-Butyl Ether	4220	4500	93.8%	4130	4500	91.8%	2.2%
Naphthalene	4370	4500	97.1%	4280	4500	95.1%	2.1%
1,2,3-Trimethylbenzene	5020	4500	112%	4910	4500	109%	2.2%
1-Methylnaphthalene	4440	4500	98.7%	4200	4500	93.3%	5.6%
n-Pentane	4260	4500	94.7%	4090	4500	90.9%	4.1%
n-Hexane	4190	4500	93.1%	4030	4500	89.6%	3.9%
n-Octane	4340	4500	96.4%	4150	4500	92.2%	4.5%
n-Decane	4470	4500	99.3%	4360	4500	96.9%	2.5%
n-Dodecane	4090	4500	90.9%	4050	4500	90.0%	1.0%

Values reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

VPH Surrogate Recovery

	LCS	LCSD
PID: 2,5-Dibromotoluene	99.0%	94.0%
FID: 2,5-Dibromotoluene	92.4%	88.8%

MH
2/11/11

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pidl.i/vpcc0204-2.b/0204a004.d
Lab Smp Id: LCS0204
Inj Date : 04-FEB-2011 08:05
Operator : MH
Smp Info : LCS0204
Misc Info :
Comment :
Method : /chem3/pidl.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pidl.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 MtBE	5.103	5.097	0.006	69222	46.9123	46.9
2 BENZENE	7.653	7.647	0.006	170406	51.7097	51.7
4 TOLUENE	9.973	9.960	0.013	160158	52.4707	52.5
5 ETHYLBENZENE	11.947	11.933	0.014	141193	53.9591	54.0
6 M/P-XYLENE	12.050	12.037	0.013	331291	107.708	108
7 O-XYLENE	12.637	12.623	0.014	142606	52.4332	52.4
9 TRIMETHYLBEN	15.063	15.047	0.016	132505	55.8147	55.8
10 NAPHTHALENE	18.287	18.270	0.017	106064	48.6486	48.6
11 1-METHYLNAP	20.130	20.110	0.020	54716	49.3085	49.3
\$ 37 DIBROMOTOL	19.927	19.910	0.017	91347	49.4905	49.5

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a004.d
Lab Smp Id: LCS0204
Inj Date : 04-FEB-2011 08:05
Operator : MH
Smp Info : LCS0204
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

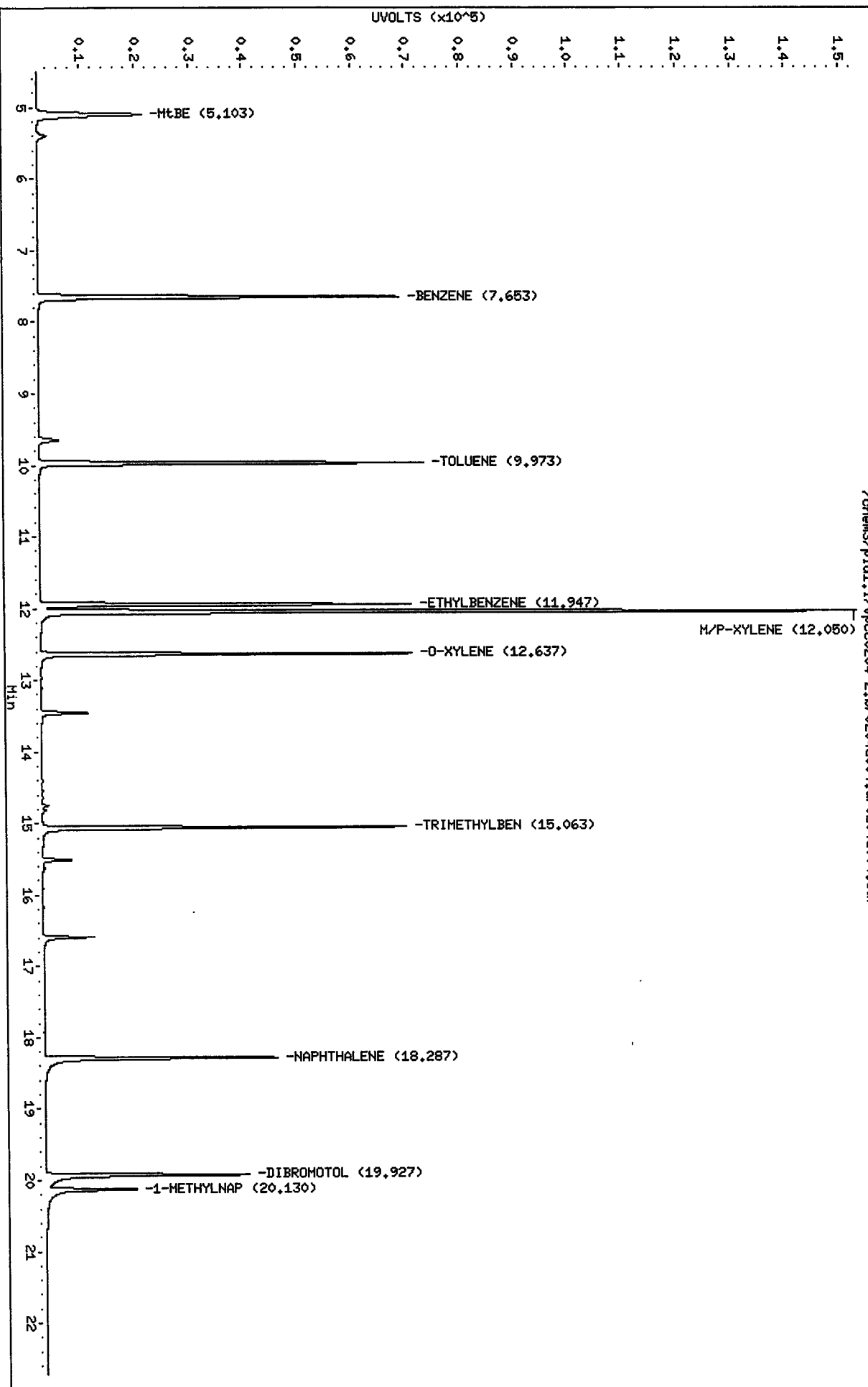
Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 nC5	3.853	3.850	0.003	20319	47.2998	47.3
2 nC6	5.400	5.393	0.007	23578	46.6032	46.6
4 nC8	9.653	9.640	0.013	20825	48.1829	48.2
5 nC10	13.453	13.440	0.013	20934	49.7114	49.7
7 nC12	16.587	16.573	0.014	19326	45.3679	45.4
\$ 8 2,5-DBT	19.927	19.913	0.014	7352	46.2193	46.2

Data File: /chem3/pid1.i/vpcc0204-2.b/0204s004.d
Date : 04-FEB-2011 08:05
Client ID:
Sample Info: LCS0204

Column phase: RTX 502-2 ARO

Instrument: pid1.i
Operator: MH
Column diameter: 0.18

/chem3/pid1.i/vpcc0204-2.b/0204s004.d/0204s004.cdf



Data File: /chem3/pid1.i/vpcc0204-1.b/0204a004.d

Page 2

Date: 04-FEB-2011 08:05

Client ID:

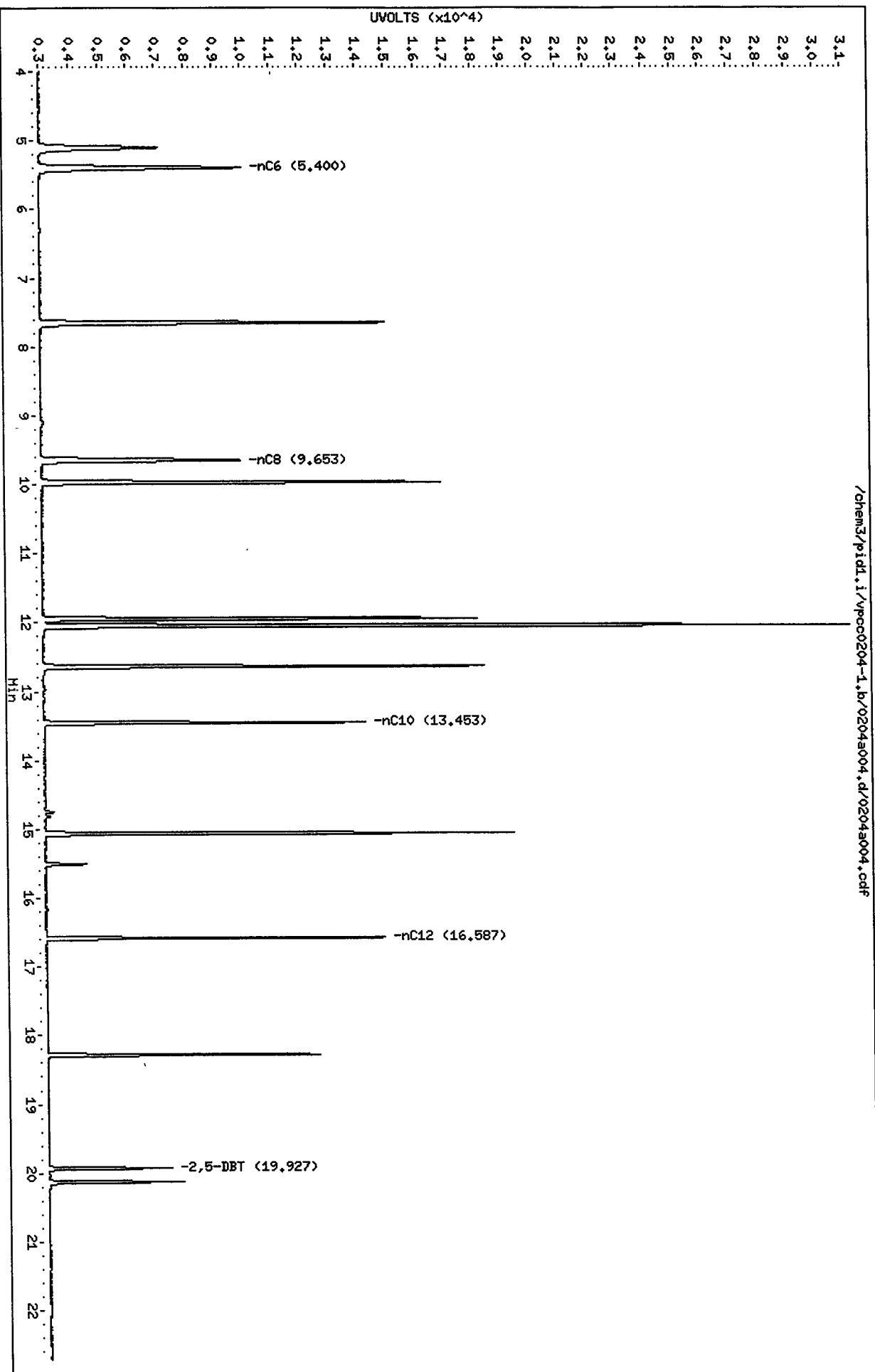
Instrument: pid1.i

Sample Info: LCS0204

Operator: MH

Column phase: RTX502-2 ALI

Column diameter: 0.18



SH30 : 00039

Analytical Resources Inc.
WAVPH Aromatics Report

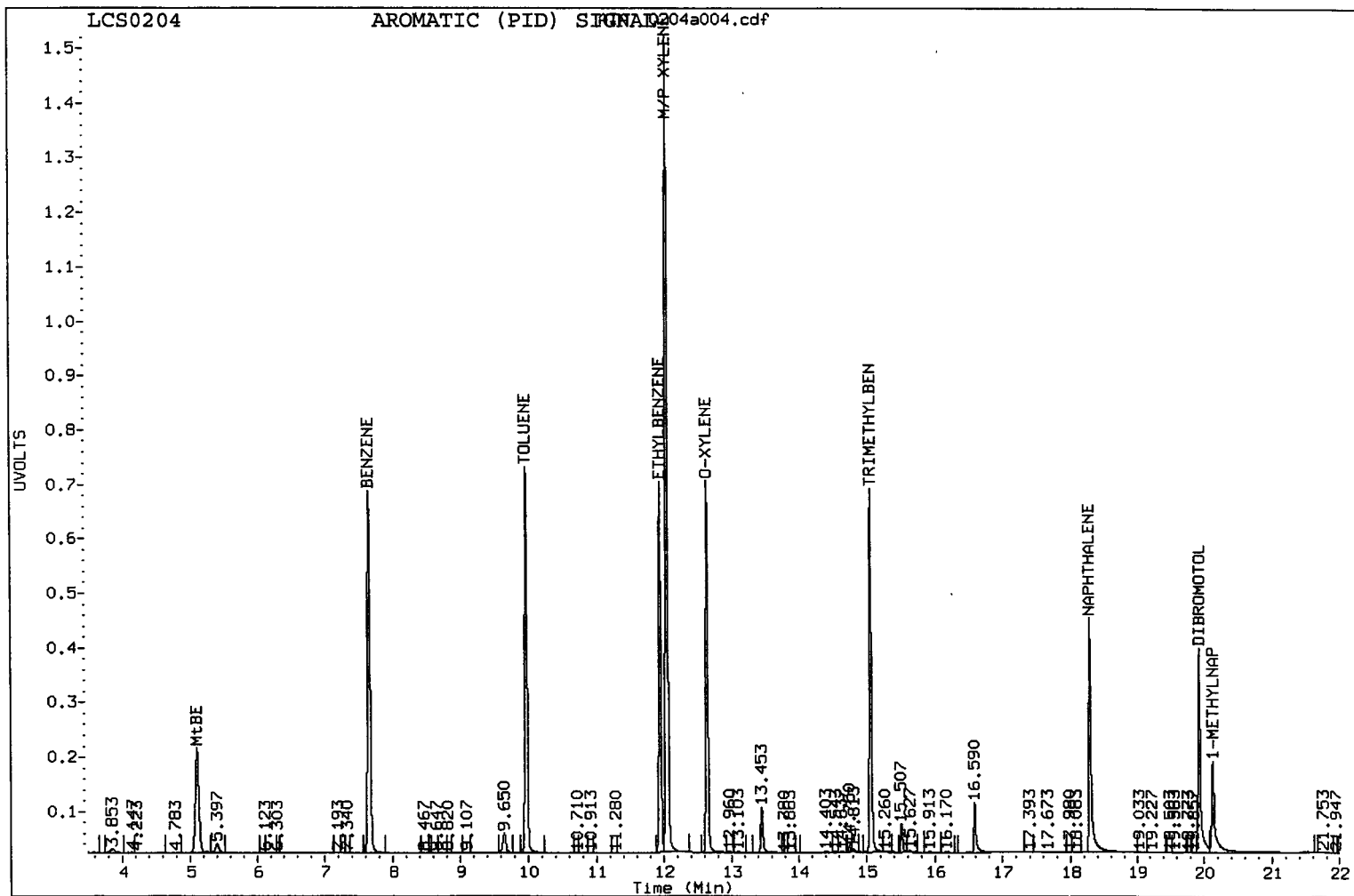
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Method: /chem3/pid1.i/vpcc0204-2.b/VPHAROM.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCS0204
Client ID:
Injection: 04-FEB-2011 08:05
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.103	0.007	19115	46.9	C8-C10 Arom.	769566*	324.2
BENZENE	7.653	0.007	66376	51.7	C10-C12 Arom.	139403	63.9
TOLUENE	9.973	0.013	70791	52.5	C12-C13 Arom.	55008	49.6
ETHYLBENZENE	11.947	0.013	68043	54.0			
M/P-XYLENE	12.050	0.013	149931	107.7			
O-XYLENE	12.637	0.013	68300	52.4			
TRIMETHYLBEN	15.063	0.017	66748	55.8			
NAPHTHALENE	18.287	0.017	42968	48.6			
1-METHYLNAP	20.130	0.020	16667	49.3			
DIBROMOTOL	19.927	0.017	37501	49.5	DBT Recovery:	99.0	

* Indicates surrogate area subtracted



SH30:00040

Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pidl.i/vpcc0204-1.b/0204a004.d
Method: /chem3/pidl.i/vpcc0204-1.b/VPHALI.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCS0204
Client ID:
Injection: 04-FEB-2011 08:05
Matrix: WATER
Dilution Factor: 1

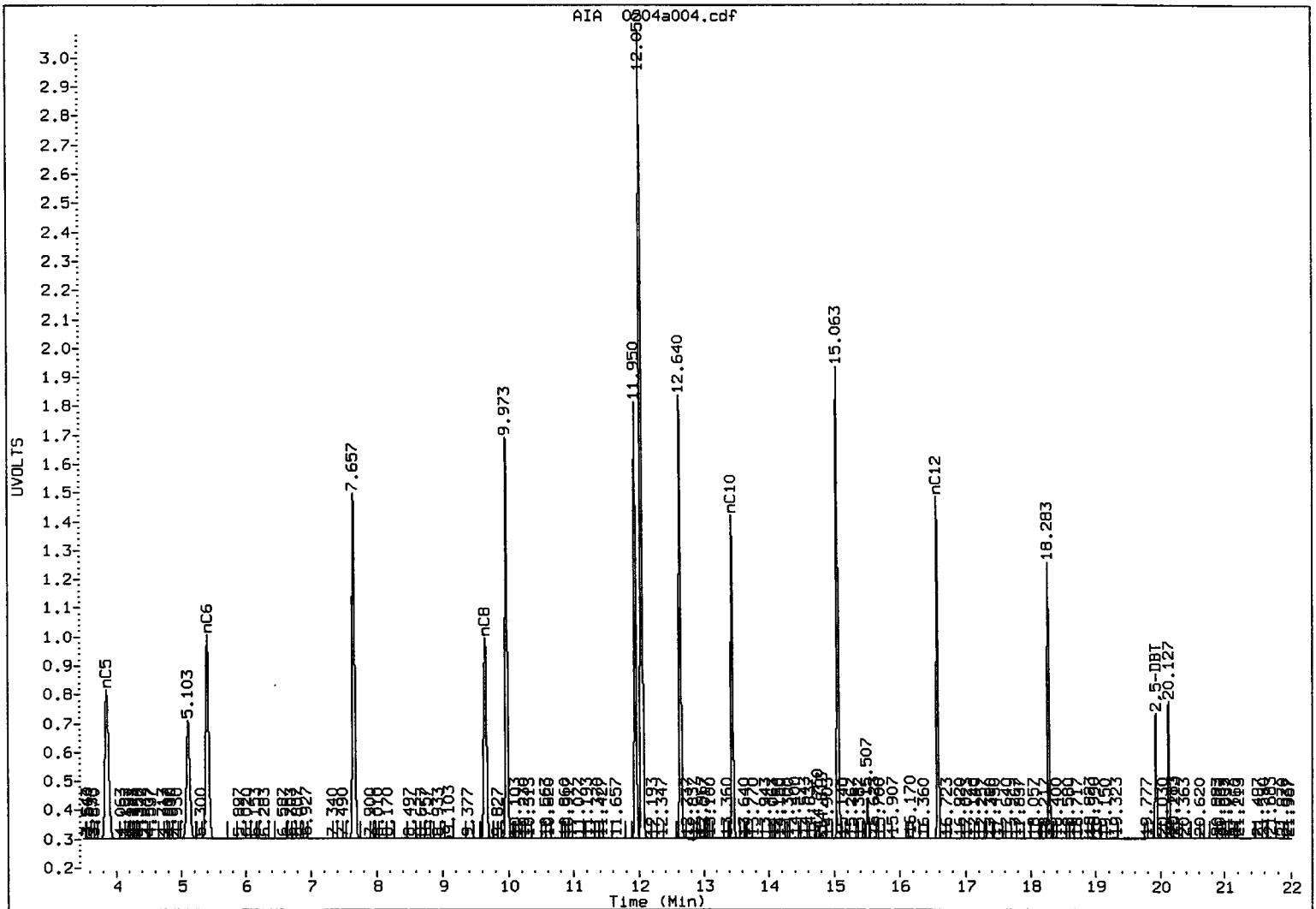
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.853	0.003	5140	20319	C5-C6 Aliph.	58995	126.1
nC6	5.400	0.007	7061	23578	C6-C8 Aliph.	51565*	119.3
nC8	9.653	0.013	6942	20825	C8-C10 Aliph.	170972	406.0
nC10	13.453	0.013	11202	20934	C10-C12 Aliph.	52664*	123.6
nC12	16.587	0.013	11830	19326			

* Indicates surrogate area subtracted

LCS0204

ALIPHATIC (FID) SIGNAL



SH30: 00041

2/11/11

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a005.d
Report Date: 11-Feb-2011 08:55

Page 1

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a005.d
Lab Smp Id: LCSD0204
Inj Date : 04-FEB-2011 08:35
Operator : MH
Smp Info : LCSD0204
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 MtBE	5.100	5.097	0.003	67757	45.9195	45.9
2 BENZENE	7.653	7.647	0.006	166564	50.5441	50.5
4 TOLUENE	9.973	9.960	0.013	156233	51.1847	51.2
5 ETHYLBENZENE	11.947	11.933	0.014	138317	52.8598	52.8
6 M/P-XYLENE	12.050	12.037	0.013	323752	105.257	105
7 O-XYLENE	12.637	12.623	0.014	140056	51.4956	51.5
9 TRIMETHYLBEN	15.063	15.047	0.016	129568	54.5777	54.6
10 NAPHTHALENE	18.287	18.270	0.017	103669	47.5502	47.6
11 1-METHYLNAP	20.127	20.110	0.017	51826	46.7039	46.7
\$ 37 DIBROMOTOL	19.927	19.910	0.017	86810	47.0321	47.0

SH30: 00042

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pidl.i/vpcc0204-1.b/0204a005.d
Lab Smp Id: LCSD0204
Inj Date : 04-FEB-2011 08:35
Operator : MH
Smp Info : LCSD0204
Misc Info : 10-
Comment :
Method : /chem3/pidl.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pidl.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
1 nC5	3.850	3.850	0.000	19517	45.4327	45.4
2 nC6	5.397	5.393	0.004	22671	44.8099	44.8
4 nC8	9.653	9.640	0.013	19930	46.1124	46.1
5 nC10	13.453	13.440	0.013	20410	48.4669	48.5
7 nC12	16.587	16.573	0.014	19182	45.0308	45.0
\$ 8 2,5-DBT	19.923	19.913	0.010	7069	44.4390	44.4

Data File: /chem3/pidl.i/vpcc0204-2.b/0204a005.d

Date: 04-FEB-2011 08:35

Client ID:

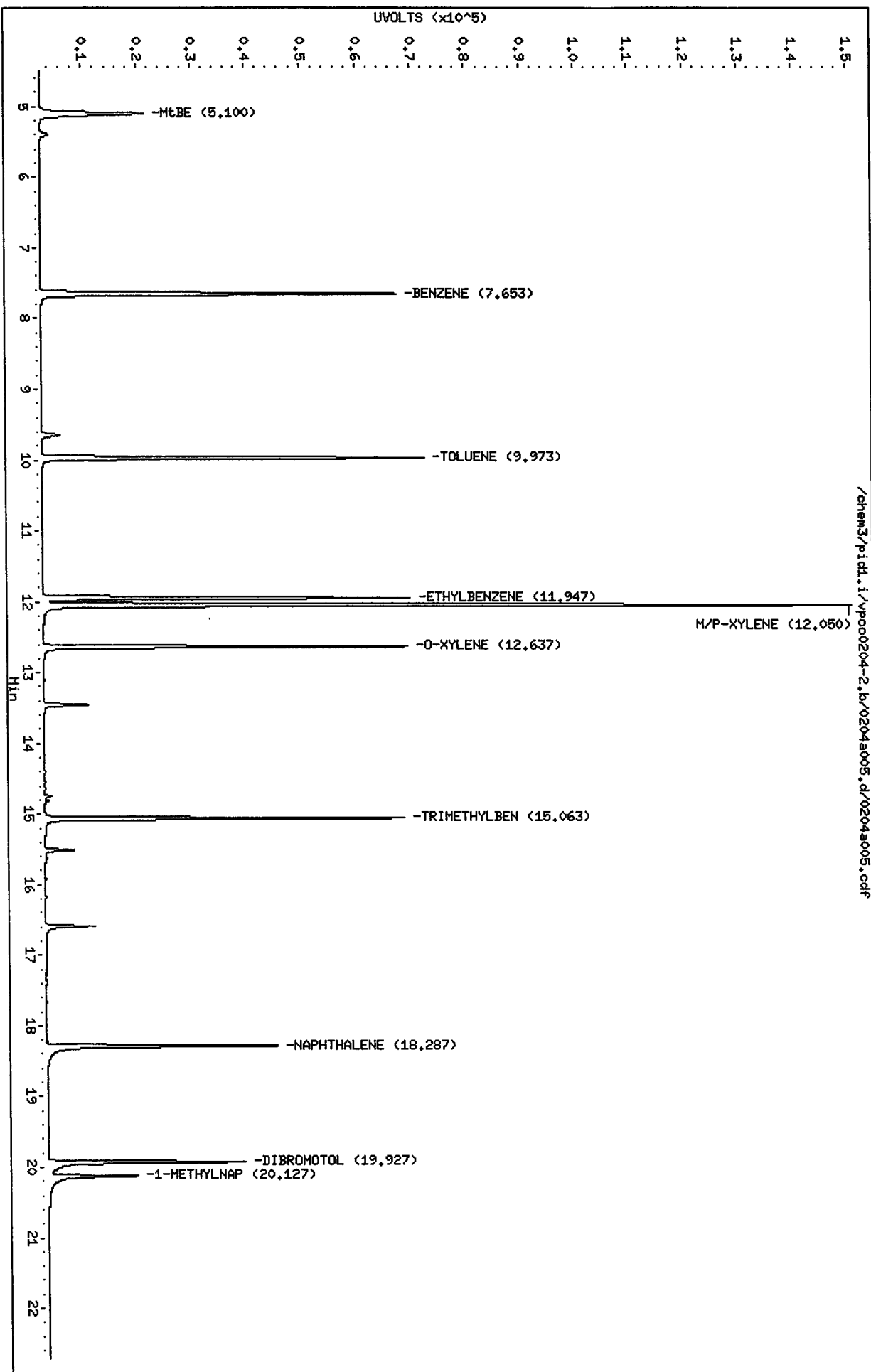
Sample Info: LCSD0204

Column phase: RTX 502-2 ARO

Instrument: pidl.i

Operator: MH

Column diameter: 0.18



Data File: /chem3/pid1.i/vpcc0204-1.b/0204a005.d

Date : 04-FEB-2011 08:35

Client ID:

Sample Info: LCS0204

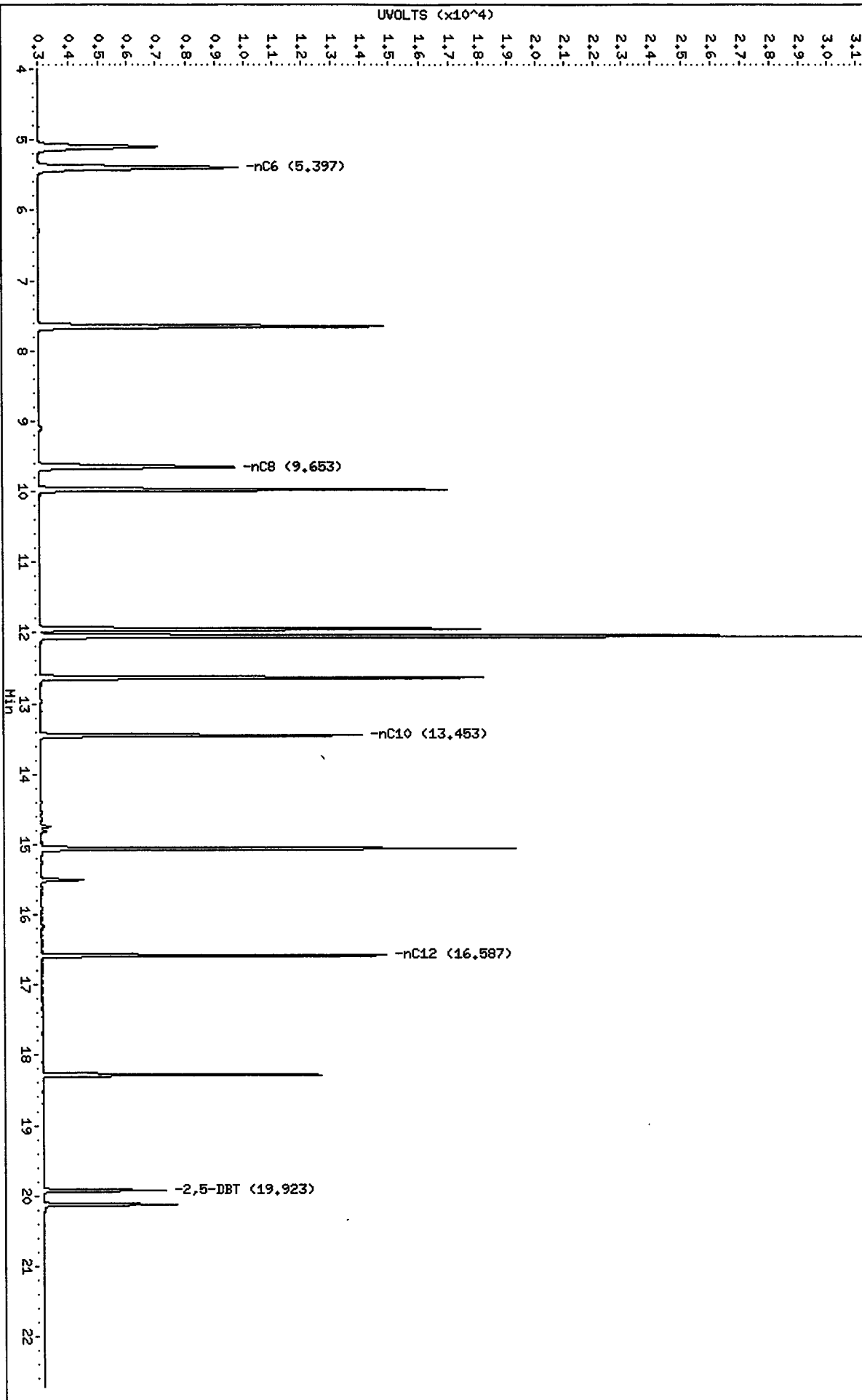
Instrument: pid1.i

Operator: MH

Column diameter: 0.18

Column phase: RTX502-2 ALI

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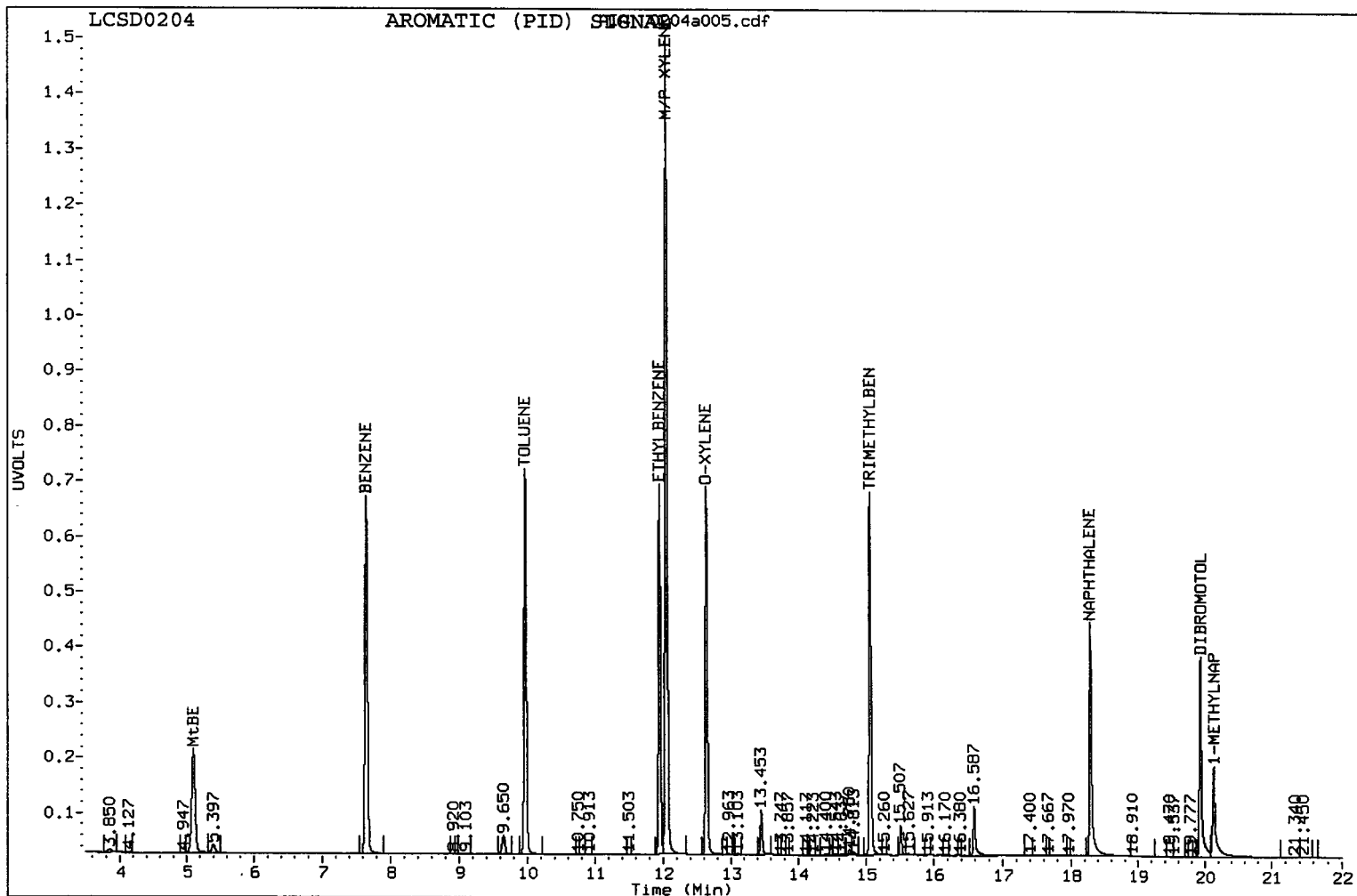
Analytical Resources Inc.
WAVPH Aromatics Report

Data file: /chem3/pidl.i/vpcc0204-2.b/0204a005.d
Method: /chem3/pidl.i/vpcc0204-2.b/VPHARO.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCSD0204
Client ID:
Injection: 04-FEB-2011 08:35
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS								
Compound	RT	Shift	Height	Amount	Range	Total Area	Conc	
MtBE	5.100	0.003	18701	45.9	C8-C10 Arom.	751993*	316.8	
BENZENE	7.653	0.007	64624	50.5	C10-C12 Arom.	135589	62.2	
TOLUENE	9.973	0.013	69640	51.2	C12-C13 Arom.	52049	46.9	
ETHYLBENZENE	11.947	0.013	66833	52.9				
M/P-XYLENE	12.050	0.013	147731	105.3				
O-XYLENE	12.637	0.013	66517	51.5				
TRIMETHYLBEN	15.063	0.017	65627	54.6				
NAPHTHALENE	18.287	0.017	42279	47.6				
1-METHYLNAP	20.127	0.017	16283	46.7				
DIBROMOTOL	19.927	0.017	36168	47.0	DBT Recovery:	94.1		

* Indicates surrogate area subtracted



SH30:00046

Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0204-1.b/0204a005.d
Method: /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCSD0204
Client ID:
Injection: 04-FEB-2011 08:35
Matrix: WATER
Dilution Factor: 1

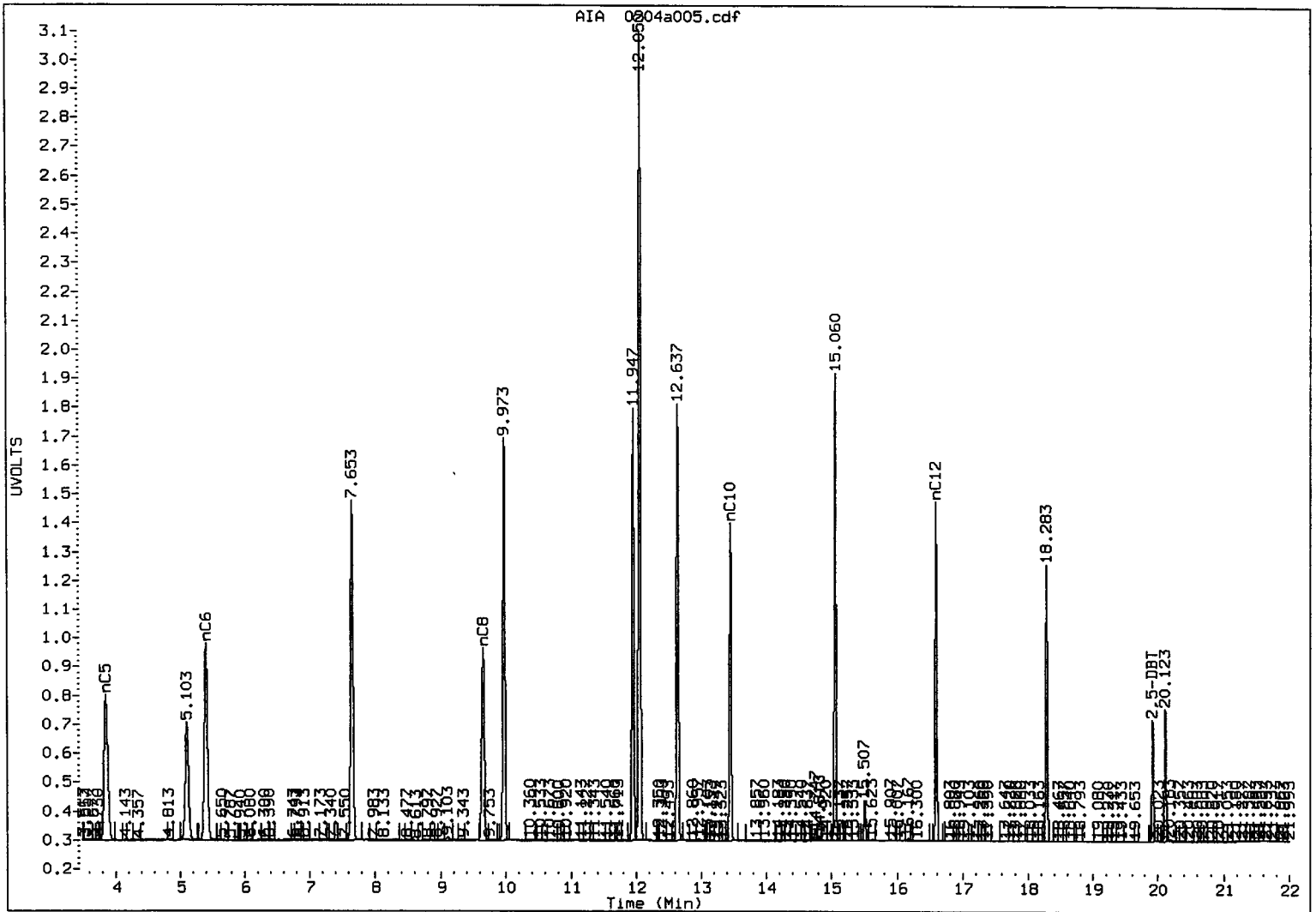
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.850	0.000	5005	19517	C5-C6 Aliph.	56773	121.4
nC6	5.397	0.003	6808	22671	C6-C8 Aliph.	50479*	116.8
nC8	9.653	0.013	6650	19930	C8-C10 Aliph.	168960	401.2
nC10	13.453	0.013	10993	20410	C10-C12 Aliph.	52300*	122.8
nC12	16.587	0.013	11758	19182			

* Indicates surrogate area subtracted

LCSD0204

ALIPHATIC (FID) SIGNAL



SH30:00047

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1

Sample ID: MB-020411

METHOD BLANK

Lab Sample ID: MB-020411

LIMS ID: 11-2242

Matrix: Soil

Data Release Authorized: *B*

Reported: 02/15/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

JII1001

Date Sampled: NA

Date Received: NA

Date Analyzed: 02/04/11 09:36

Instrument/Analyst: PID1/MH

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	85.6%
FID: 2,5-Dibromotoluene	84.2%

Data File: /chem3/pidl.i/vpcc0204-2.b/0204a007.d
Report Date: 11-Feb-2011 08:55

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~4

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pidl.i/vpcc0204-2.b/0204a007.d
Lab Smp Id: MB0204
Inj Date : 04-FEB-2011 09:36
Operator : MH
Smp Info : MB0204
Misc Info :
Comment :
Method : /chem3/pidl.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pidl.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 MtBE	Compound Not Detected.					
2 BENZENE	7.650	7.647	0.003	43	0.01311	0.0131
4 TOLUENE	9.970	9.960	0.010	52	0.01717	0.0172
5 ETHYLBENZENE	11.943	11.933	0.010	49	0.01888	0.0189
6 M/P-XYLENE	12.047	12.037	0.010	95	0.03111	0.0311
7 O-XYLENE	12.630	12.623	0.007	684	0.25186	0.252
9 TRIMETHYLBEN	15.003	15.047	-0.044	410	0.17287	0.173
10 NAPHTHALENE	18.283	18.270	0.013	422	0.19393	0.194
11 1-METHYLNAP	20.123	20.110	0.013	3146	2.83522	2.84
\$ 37 DIBROMOTOL	19.927	19.910	0.017	79056	42.8315	42.8

SH30:00049

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a007.d
Lab Smp Id: MB0204
Inj Date : 04-FEB-2011 09:36
Operator : MH
Smp Info : MB0204
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 nC5	3.873	3.850	0.023	27	0.06332	0.0633
2 nC6	5.370	5.393	-0.023	19	0.03874	0.0387
4 nC8	9.660	9.640	0.020	83	0.19412	0.194
5 nC10	13.453	13.440	0.013	229	0.54521	0.545
7 nC12	16.583	16.573	0.010	408	0.96011	0.960
\$ 8 2,5-DBT	19.923	19.913	0.010	6705	42.1521	42.2

Data File: /chem3/pidl.i/vpcc0204-2.b/0204a007.d

Date : 04-FEB-2011 09:36

Client ID:

Sample Info: HB0204

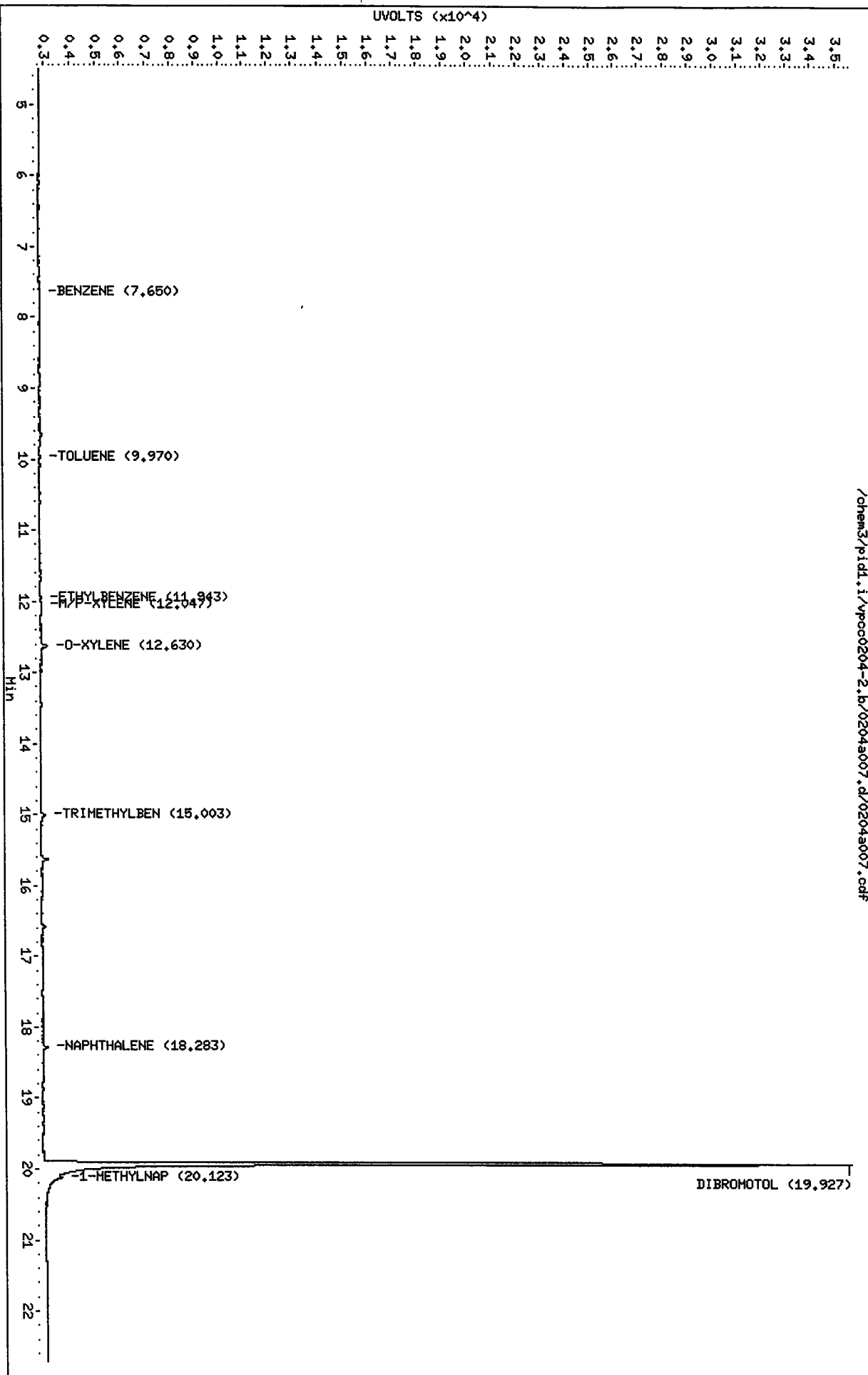
Column phase: RTX 502-2 AR0

Instrument: pidl.i

Operator: MH

Column diameter: 0.18

Page 2



SH30 : 00051

Data File: /chem3/pid1.i/vpcc0204-1.b/0204a007.d

Date : 04-FEB-2011 09:36

Client ID:

Sample Info: MB0204

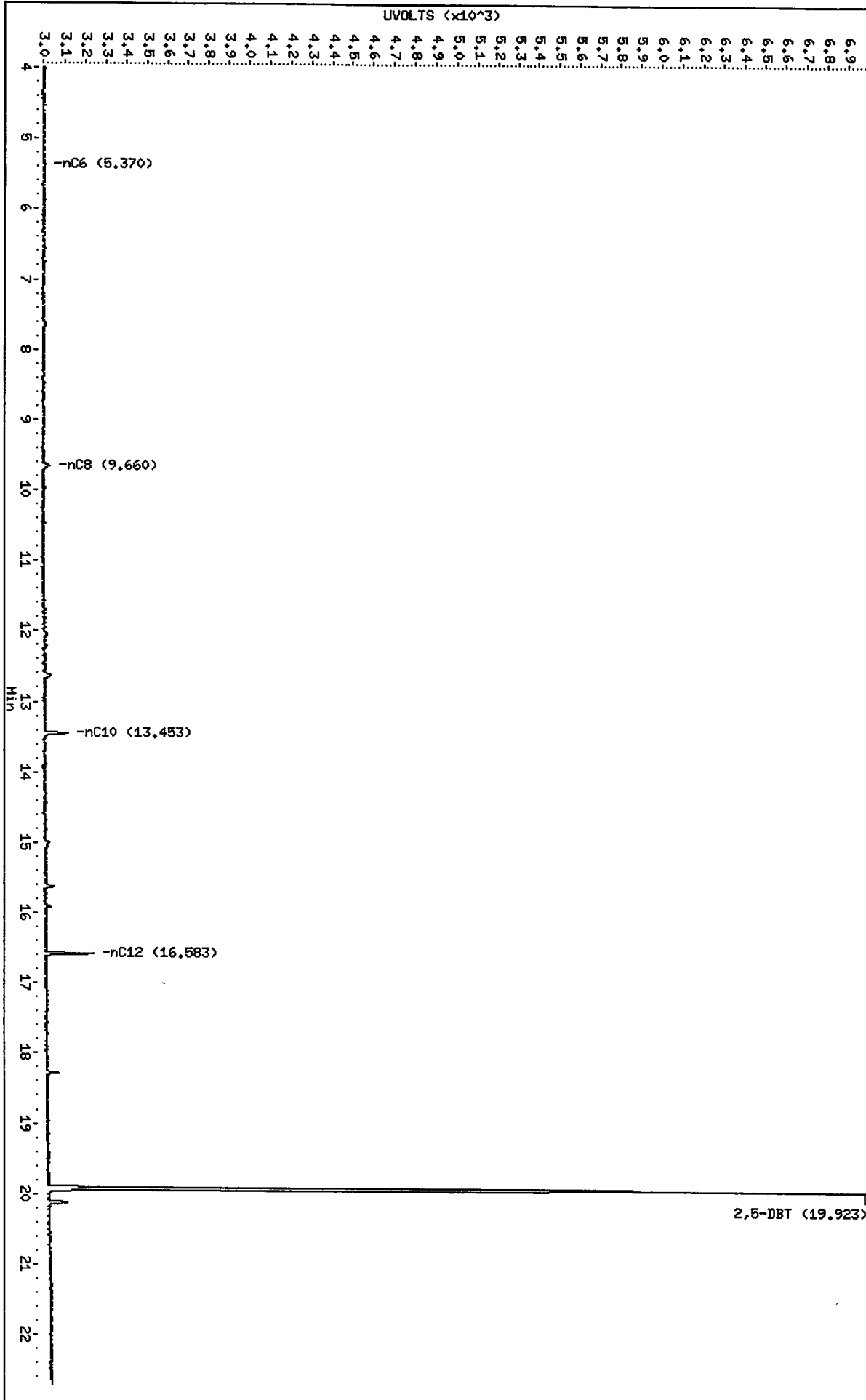
Instrument: pid1.i

Column phase: RTX502-2 ALI

Operator: MH

Column diameter: 0.18

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Analytical Resources Inc.
WAVPH Aromatics Report

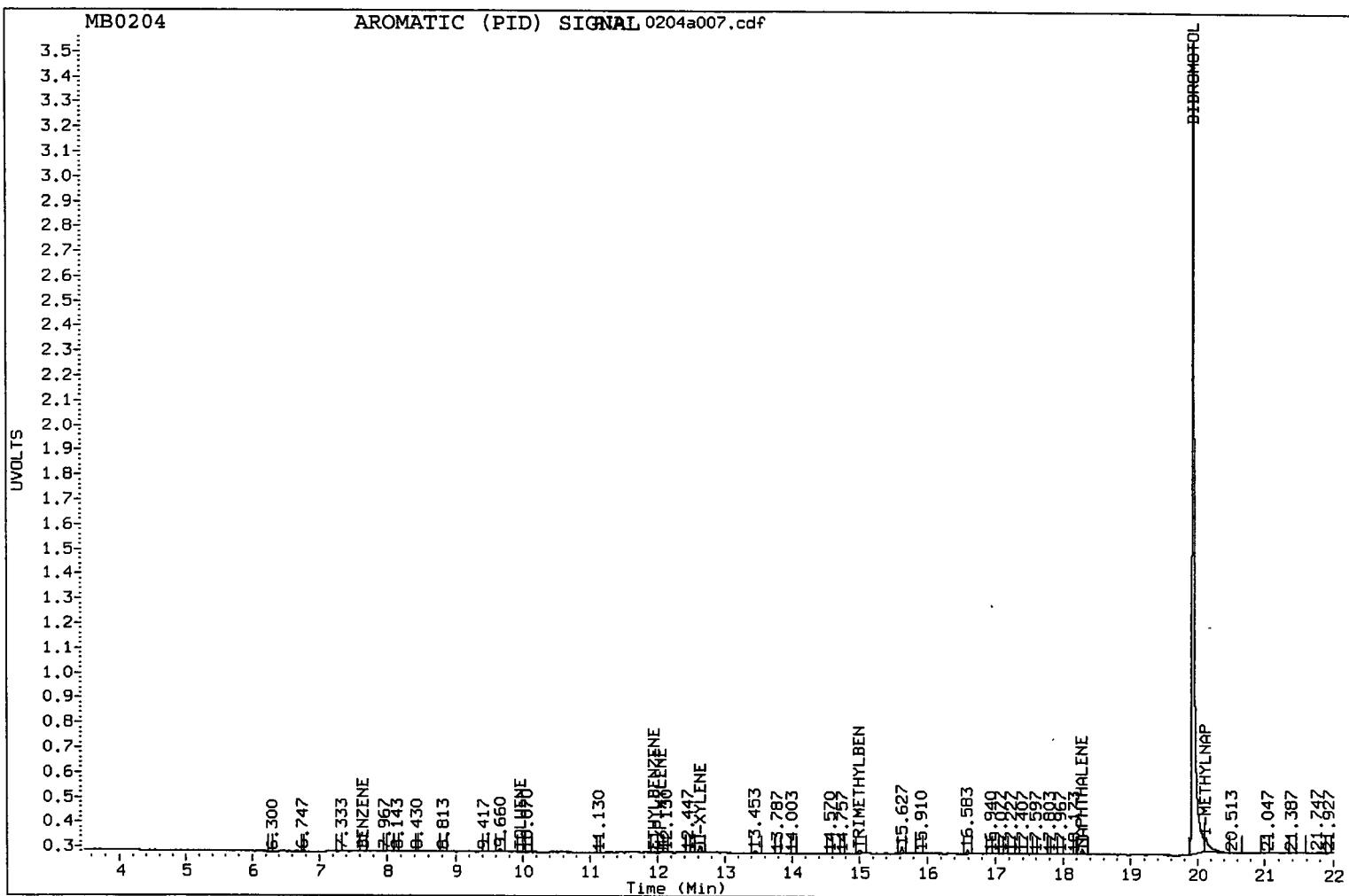
Data file: /chem3/pid1.i/vpcc0204-2.b/0204a007.d
Method: /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: MB0204
Client ID:
Injection: 04-FEB-2011 09:36
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	----				C8-C10 Arom.	1534*	0.6
BENZENE	7.650	0.003	19	0.0	C10-C12 Arom.	1486	0.7
TOLUENE	9.970	0.010	22	0.0	C12-C13 Arom.	3147	2.8
ETHYLBENZENE	11.943	0.010	17	0.0			
M/P-XYLENE	12.047	0.010	43	0.0			
O-XYLENE	12.630	0.007	250	0.3			
TRIMETHYLBEN	15.003	-0.043	133	0.2			
NAPHTHALENE	18.283	0.013	181	0.2			
1-METHYLNAP	20.123	0.013	579	2.8			
DIBROMOTOL	19.927	0.017	32785	42.8	DBT Recovery:	85.7	

* Indicates surrogate area subtracted



SH30 : 00053

Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pidl.i/vpcc0204-1.b/0204a007.d
Method: /chem3/pidl.i/vpcc0204-1.b/VPHALI.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: MB0204
Client ID:
Injection: 04-FEB-2011 09:36
Matrix: WATER
Dilution Factor: 1

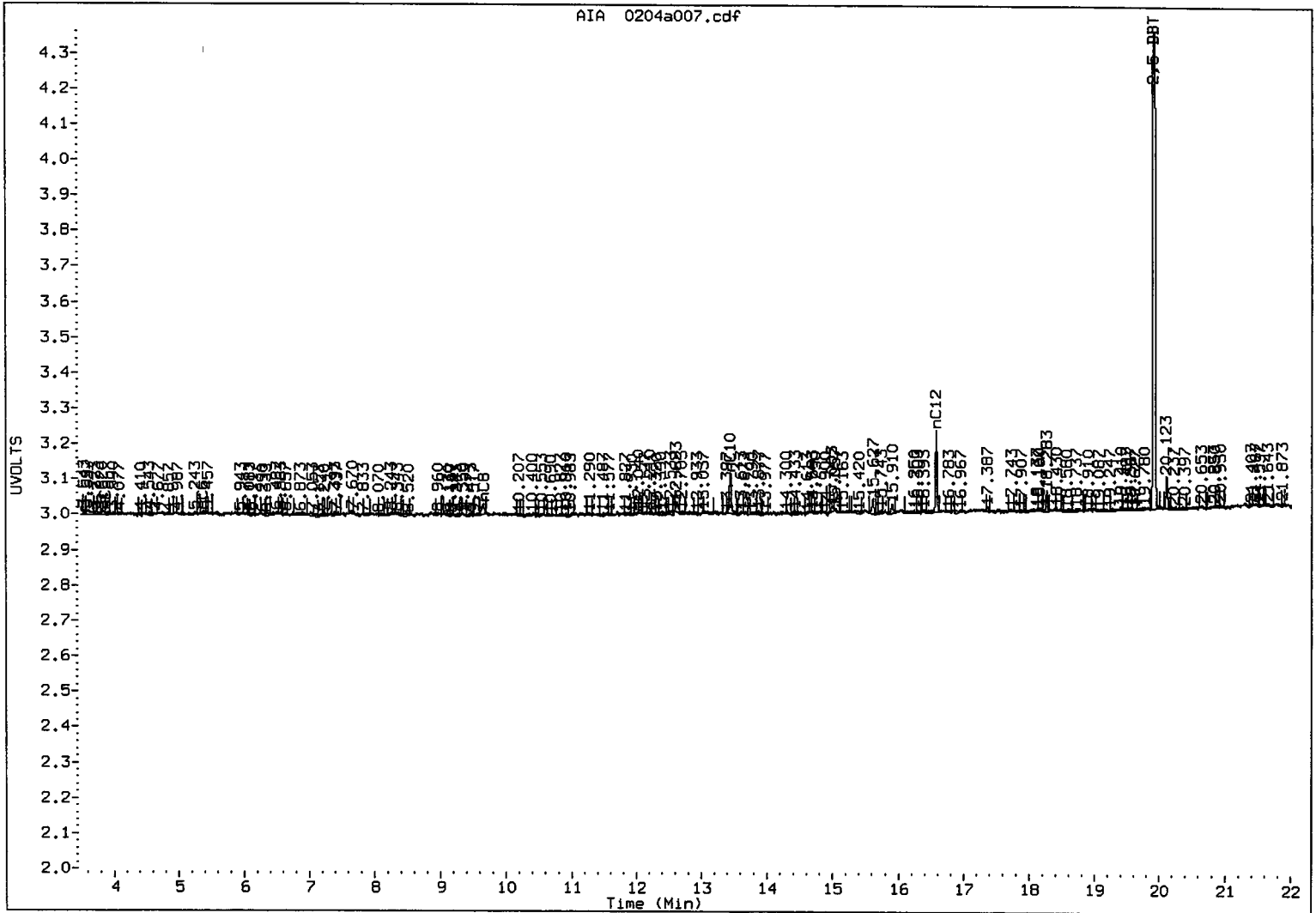
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.873	0.023	11	27	C5-C6 Aliph.	276	0.6
nC6	5.370	-0.023	6	19	C6-C8 Aliph.	685*	1.6
nC8	9.660	0.020	31	83	C8-C10 Aliph.	802	1.9
nC10	13.453	0.013	114	229	C10-C12 Aliph.	934*	2.2
nC12	16.583	0.010	231	408			

* Indicates surrogate area subtracted

MB0204

ALIPHATIC (FID) SIGNAL



SH30: 00054

ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1


Sample ID: B11-14-30

SAMPLE

Lab Sample ID: SH30M

LIMS ID: 11-2242

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Percent Moisture: 10.8%

Sample Amount: 9.07 g-dry-wt

Final Extract Volume: 1.0 mL

Aliphatic

Date Analyzed: 02/10/11 19:34

Instrument/Analyst: FID8/MS

Dilution Factor: 5.00

Aromatic

Date Analyzed: 02/11/11 00:08

Instrument/Analyst: FID8/MS

Dilution Factor: 25.0

Range	RL	Result
C8-C10 Aliphatics	11,000	160,000
C10-C12 Aliphatics	11,000	680,000
C12-C16 Aliphatics	11,000	3,700,000
C16-C21 Aliphatics	11,000	4,500,000
C21-C34 Aliphatics	11,000	1,300,000
C8-C10 Aromatics	55,000	< 55,000 U
C10-C12 Aromatics	55,000	63,000
C12-C16 Aromatics	55,000	820,000
C16-C21 Aromatics	55,000	2,700,000
C21-C34 Aromatics	55,000	1,200,000

Reported in µg/kg (ppb)

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	70.8%
Aromatic	o-Terphenyl	59.5%

Analytical Resources Inc.
WA. EPH Aliphatics Report

Data file: /chem2/fid8.i/20110210ALIPH.b/0210A011.D
Method: /chem2/fid8.i/20110210ALIPH.b/EPHALiph.m
Instrument: fid8.i
Operator: MS
Macro: ALIPH090410FID8

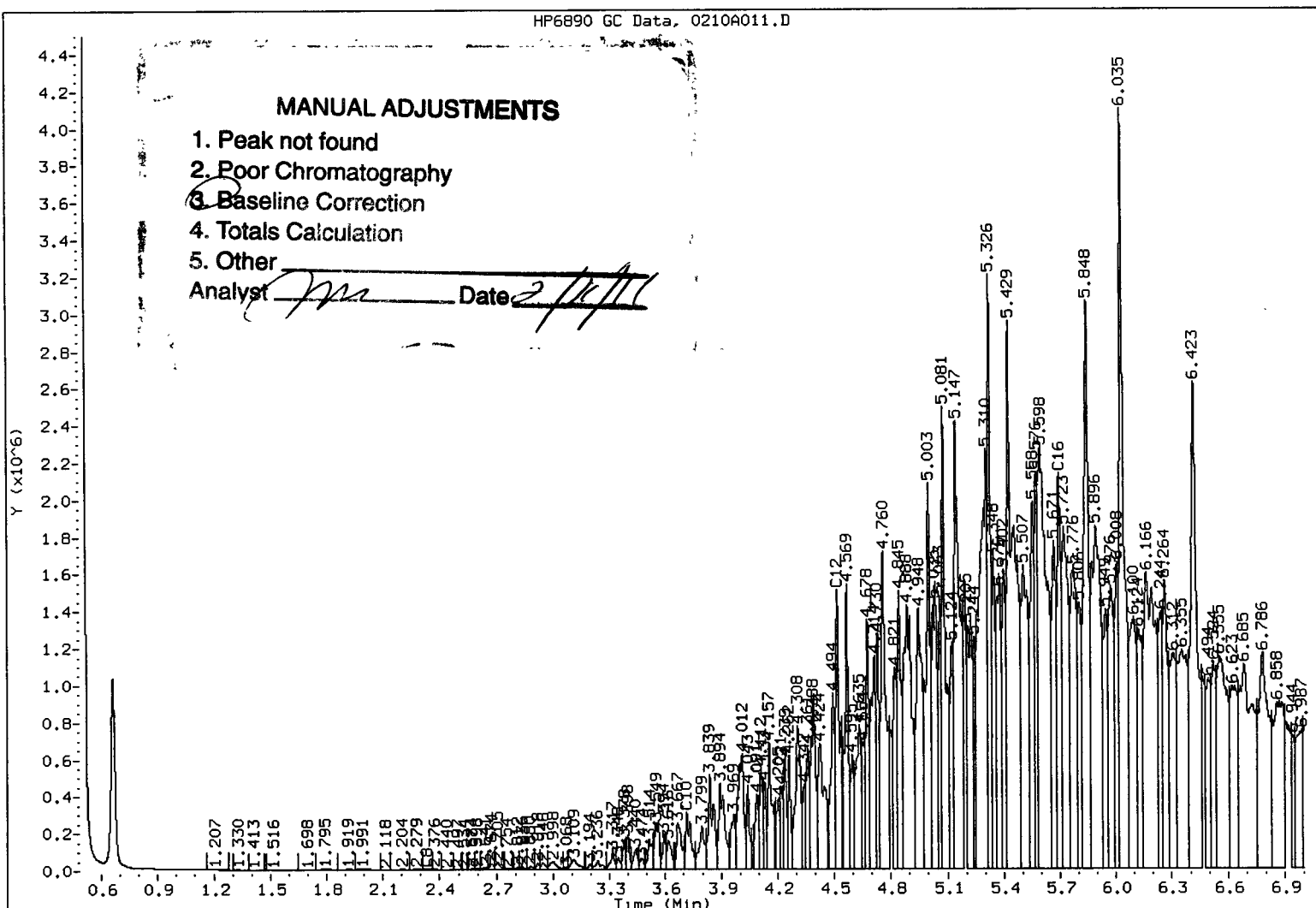
ARI ID: SH30M
Client ID: B11-14-30
Injection: 10-FEB-2011 19:34
Matrix: SOIL
Dilution Factor: 5

EPH-ALIPHATIC RESULTS

Quant Range	Area	Conc	Time Range
C8-C10 Aliph.	5129601	293	(2.254 - 3.842)
C10-C12 Aliph.	19820130	1244	(3.842 - 4.624)
C12-C16 Aliph.	98263373	6640	(4.624 - 5.801)
C16-C21 Aliph.	112624917	8130	(5.801 - 8.031)
C21-C34 Aliph.	25417110	2298	(8.031 - 12.757)

Surrogate Rec: 70.8%

FID-8A/ZB-5 SH30M



SH30: 00056

Data File: /chem2/fid8.i/20110210PLIPH.b/02100011.D

Page 1

Date : 10-FEB-2011 19:34

Client ID: B11-14-30

Sample Info: SH30H,5

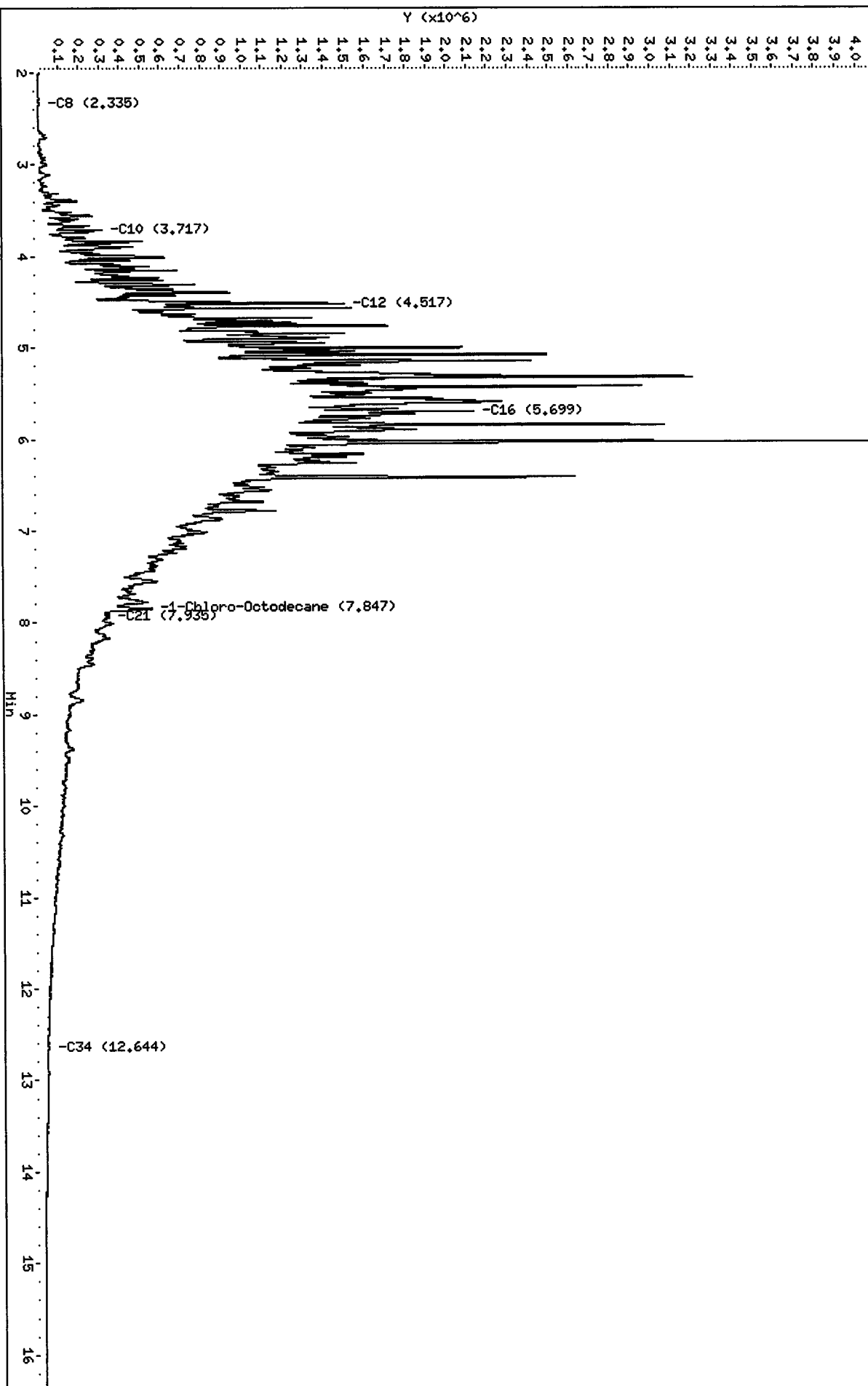
Column phase: ZB-5

Instrument: fid8.i

Operator: HS

Column diameter: 0.32

/chem2/fid8.i/20110210PLIPH.b/02100011.D



SH30 : 00057

Analytical Resources Inc.
EPH Aromatics Report

Data file: /chem2/fid8.i/20110210AROM.b/0210A022.D
Method: /chem2/fid8.i/20110210AROM.b/EPHArOm.m
Instrument: fid8.i
Operator: MS
Report Date: 02/11/2011
Macro: AROM072710FID8

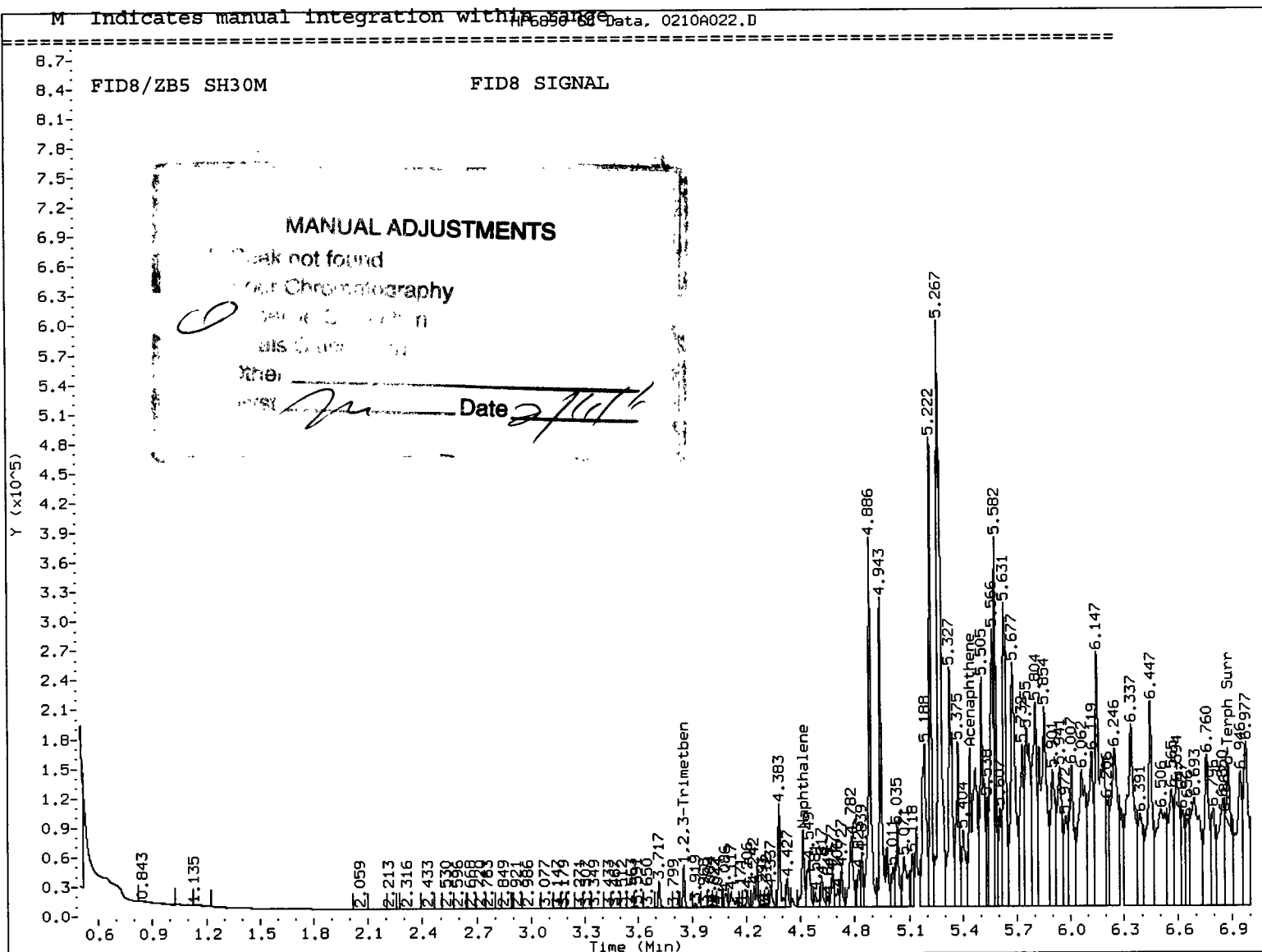
ARI ID: SH30M
Client ID: B11-14-30
Injection: 11-FEB-2011 00:08
Matrix: SOIL
Dilution Factor: 5

EPH-AROMATIC RESULTS

Quant Range	RF	Area	Conc	Time Range
C8-C10 Arom.	17167	59626	3	(1.730 - 3.956)
C10-C12 Arom.	16689	384687	23	(3.956 - 4.616)
C12-C16 Arom.	15441	4583776	297	(4.616 - 5.567)
C16-C21 Arom.	14112	13913067	986	(5.567 - 8.293) M
C21-C34 Arom.	12993	5402097	416	(8.293 - 12.503)

Surrogate Rec: 11.9% x 5mL EE.V = 59.5%

M Indicates manual integration with a range



SH30: 00058

Data File: /chem2/fid8.i/20110210AR0H.b/0210A022.D

Date : 11-FEB-2011 00:08

Client ID: B11-14-30

Sample Info: SH30M,5

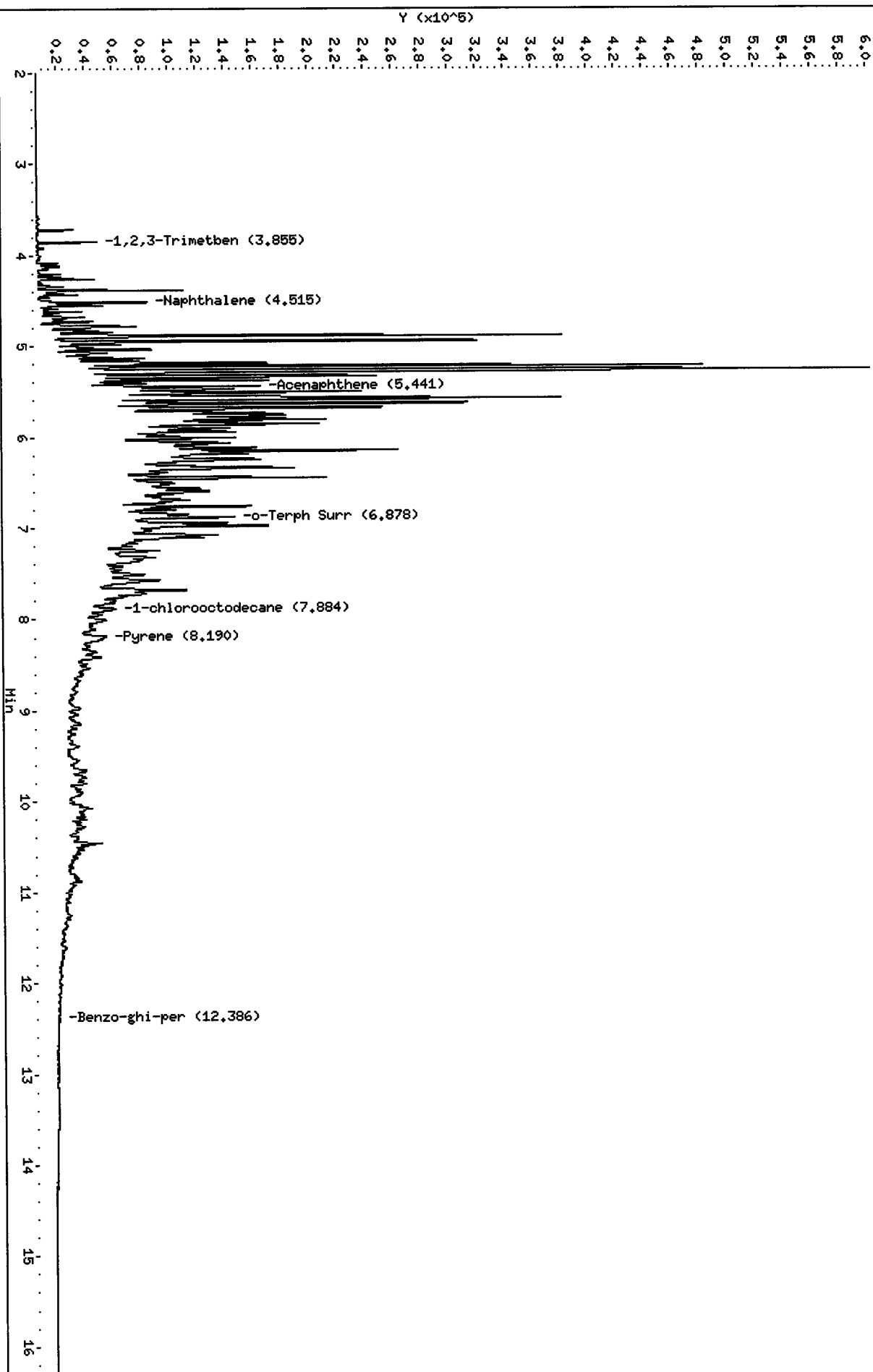
Column phase: ZB-5

Instrument: fid8.i

Operator: HS

Column diameter: 0.32

/chem2/fid8.i/20110210AR0H.b/0210A022.D



AREPH SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001

<u>Client ID</u>	<u>OTER</u>	<u>TOT OUT</u>
MB-020411	73.0%	0
LCS-020411	90.7%	0
B11-14-30	59.5%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(34-133)	(10-143)

Prep Method: SW3510C
Log Number Range: 11-2242 to 11-2242

ALEPH SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001

<u>Client ID</u>	<u>COD</u>	<u>TOT OUT</u>
MB-020411	81.6%	0
LCS-020411	73.9%	0
B11-14-30	70.8%	0

	<u>LCS/MB LIMITS</u>	<u>QC LIMITS</u>
(COD) = 1-Chlorooctadecane	(27-128)	(39-131)

Prep Method: SW3510C
Log Number Range: 11-2242 to 11-2242

ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1

Sample ID: LCS-020411
LAB CONTROL

Lab Sample ID: LCS-020411
LIMS ID: 11-2242
Matrix: Soil
Data Release Authorized: *AB*
Reported: 02/14/11

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
JII1001
Date Sampled: NA
Date Received: NA

Date Extracted: 02/04/11

Sample Amount: 10.0 g-as-rec
Final Extract Volume: 1.0 mL

Aliphatic

Date Analyzed: 02/10/11 20:24
Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Aromatic

Date Analyzed: 02/11/11 00:58
Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
C8-C10 Aliphatics	12000	15000	80.0%
C10-C12 Aliphatics	11000	15000	73.3%
C12-C16 Aliphatics	12000	15000	80.0%
C16-C21 Aliphatics	11000	15000	73.3%
C10-C12 Aromatics	9100	15000	60.7%
C12-C16 Aromatics	12300	15000	82.0%
C16-C21 Aromatics	29300	30000	97.7%
C21-C34 Aromatics	24900	30000	83.0%

Results reported in µg/kg

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	73.9%
Aromatic	o-Terphenyl	90.7%

Analytical Resources Inc.
WA. EPH Aliphatics Report

Data file: /chem2/fid8.i/20110210ALIPH.b/0210A013.D
Method: /chem2/fid8.i/20110210ALIPH.b/EPHALiph.m
Instrument: fid8.i
Operator: MS
Macro: ALIPH090410FID8

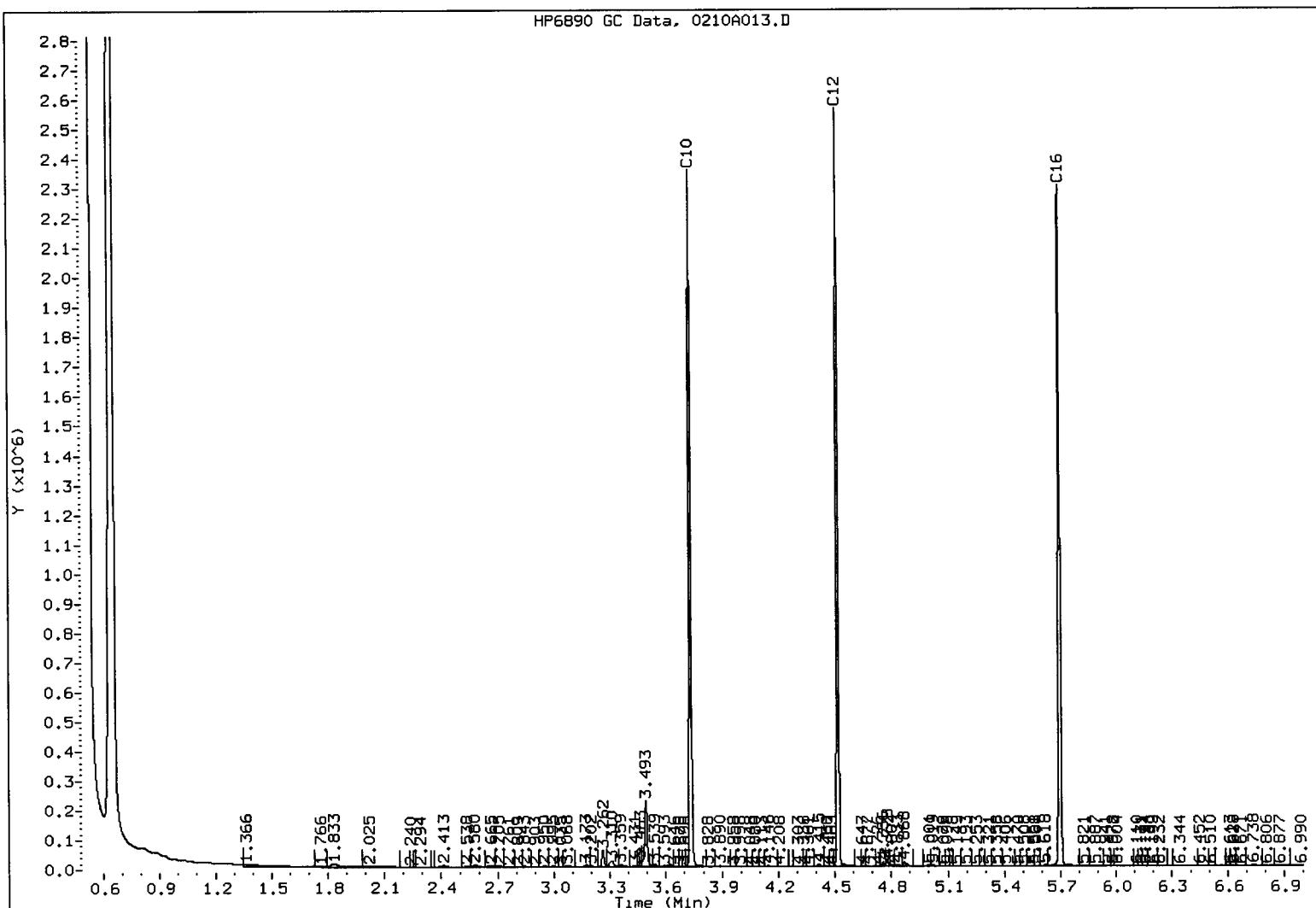
ARI ID: SH23LCSS1
Client ID: SH23LCSS1
Injection: 10-FEB-2011 20:24
Matrix: SOIL
Dilution Factor: 1

EPH-ALIPHATIC RESULTS

Quant Range	Area	Conc	Time Range
C8-C10 Aliph.	2123529	121	(2.254 - 3.842)
C10-C12 Aliph.	1721112	108	(3.842 - 4.624)
C12-C16 Aliph.	1718599	116	(4.624 - 5.801)
C16-C21 Aliph.	1562077	113	(5.801 - 8.031)
C21-C34 Aliph.	621615	56	(8.031 - 12.757)

Surrogate Rec: 73.9%

FID-8A/ZB-5 SH23LCSS1



SH30: 00063

Data File: /chem2/fid8.i/20110210ALIPH.b/02100013.D

Date : 10-FEB-2011 20:24

Client ID: SH23LCSS1

Sample Info: SH23LCSS1

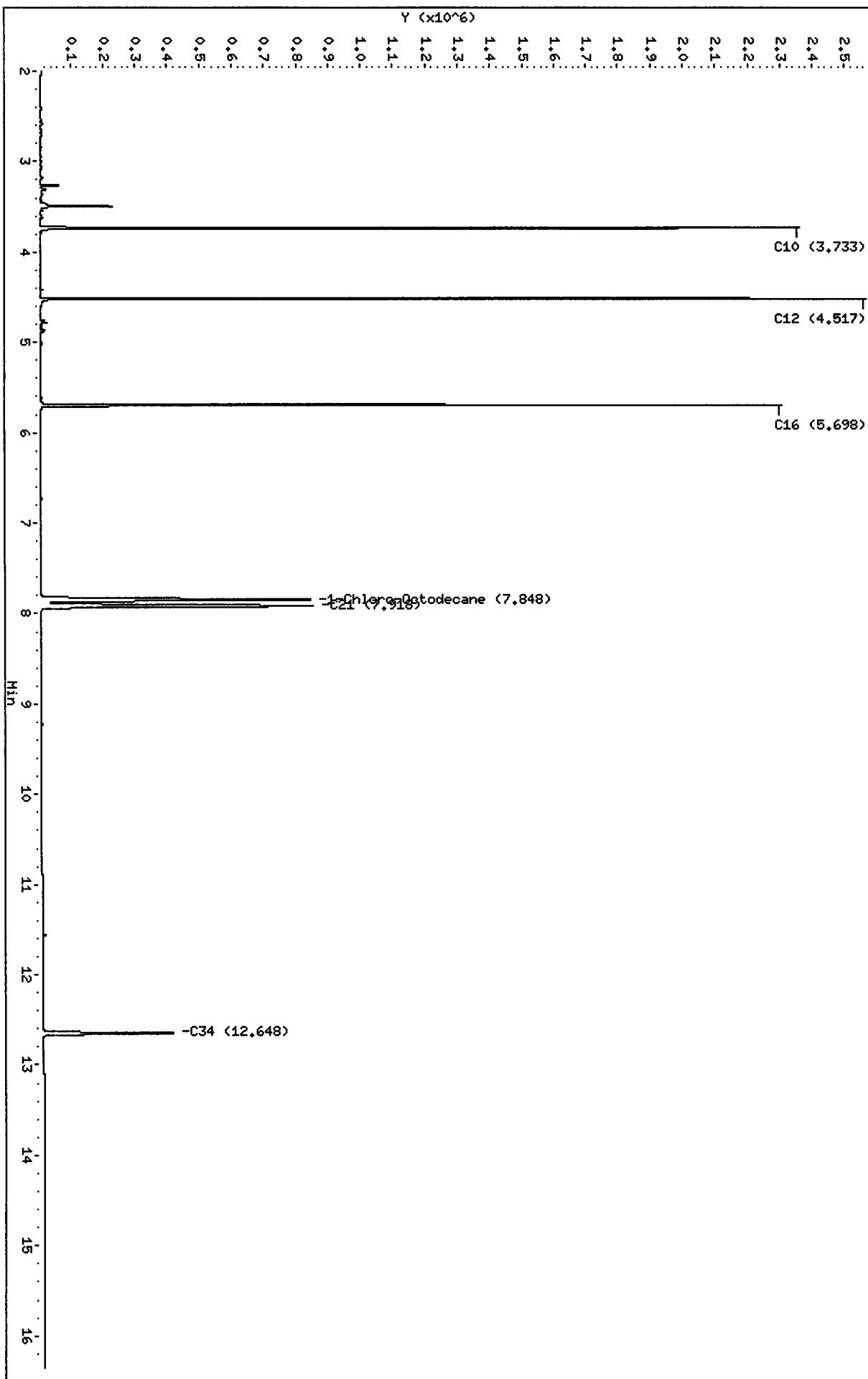
Column phase: ZB-5

Instrument: fid8.i

Operator: HS

Column diameter: 0.32

/chem2/fid8.i/20110210ALIPH.b/02100013.D



SH30 : 00064

Analytical Resources Inc.
EPH Aromatics Report

Data file: /chem2/fid8.i/20110210AROM.b/0210A024.D
Method: /chem2/fid8.i/20110210AROM.b/EPHArom.m
Instrument: fid8.i
Operator: MS
Report Date: 02/11/2011
Macro: AROM072710FID8

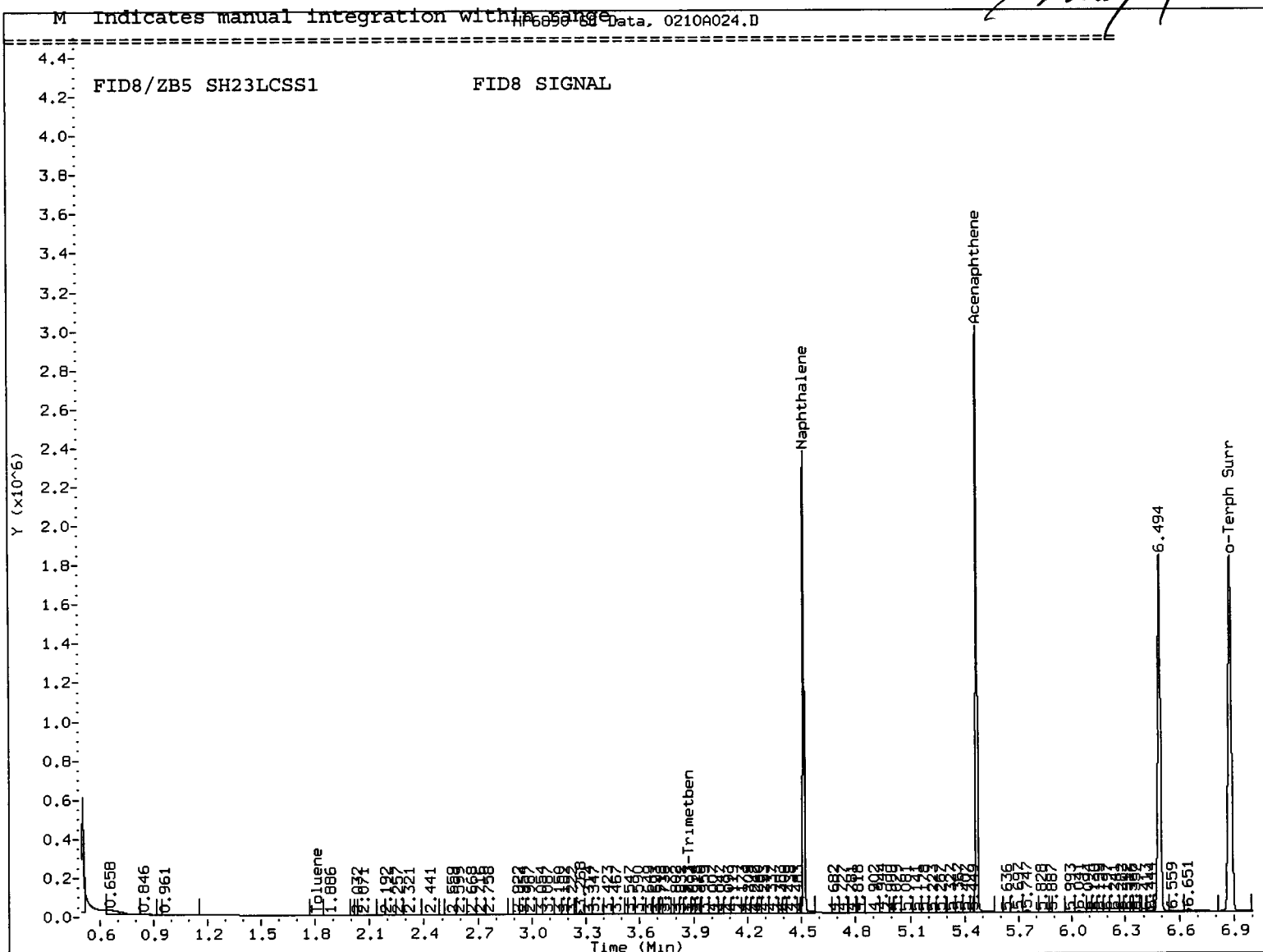
ARI ID: SH23LCSS1
Client ID: SH23LCSS1
Injection: 11-FEB-2011 00:58
Matrix: SOIL
Dilution Factor: 1

EPH-AROMATIC RESULTS

Quant Range	RF	Area	Conc	Time Range
C8-C10 Arom.	17167	34258	2	(1.730 - 3.956)
C10-C12 Arom.	16689	1512659	91	(3.956 - 4.616)
C12-C16 Arom.	15441	1891681	123	(4.616 - 5.567)
C16-C21 Arom.	14112	4132674	293	(5.567 - 8.293)
C21-C34 Arom.	12993	3238429	249	(8.293 - 12.503)

Surrogate Rec: 90.7%

M indicates manual integration within range



SH30: 00065

Data File: /chem2/fid8.i/20110210AROH.b/0210A024.D

Page 1

Date : 11-FEB-2011 00:58

Client ID: SH23LCSS1

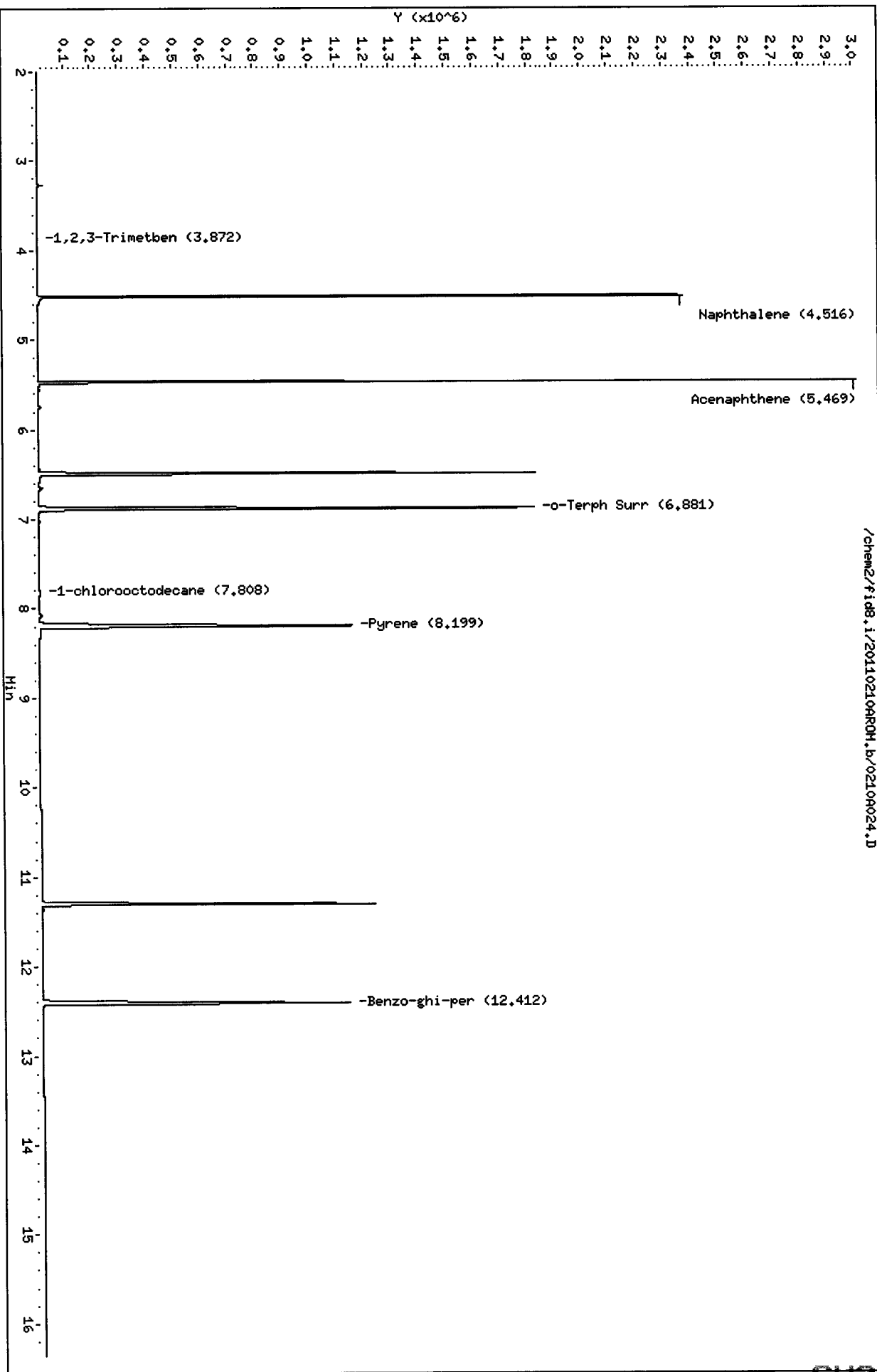
Instrument: fid8.i

Sample Info: SH23LCSS1

Operator: NS

Column phase: ZB-5

Column diameter: 0.32



SH30 : 00066

ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1

Sample ID: MB-020411

METHOD BLANK

Lab Sample ID: MB-020411

LIMS ID: 11-2242

Matrix: Soil

Data Release Authorized: *RB*

Reported: 02/14/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: NA

Date Received: NA

Date Extracted: 02/04/11

Percent Moisture: NA

Sample Amount: 10.0 g-as-rec

Final Extract Volume: 1.0 mL

Aliphatic

Date Analyzed: 02/10/11 20:49

Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Aromatic

Date Analyzed: 02/11/11 01:23

Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Range	RL	Result
C8-C10 Aliphatics	2,000	< 2,000 U
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	81.6%
Aromatic	o-Terphenyl	73.0%

Analytical Resources Inc.
WA. EPH Aliphatics Report

Data file: /chem2/fid8.i/20110210ALIPH.b/0210A014.D
Method: /chem2/fid8.i/20110210ALIPH.b/EPHALiph.m
Instrument: fid8.i
Operator: MS
Macro: ALIPH090410FID8

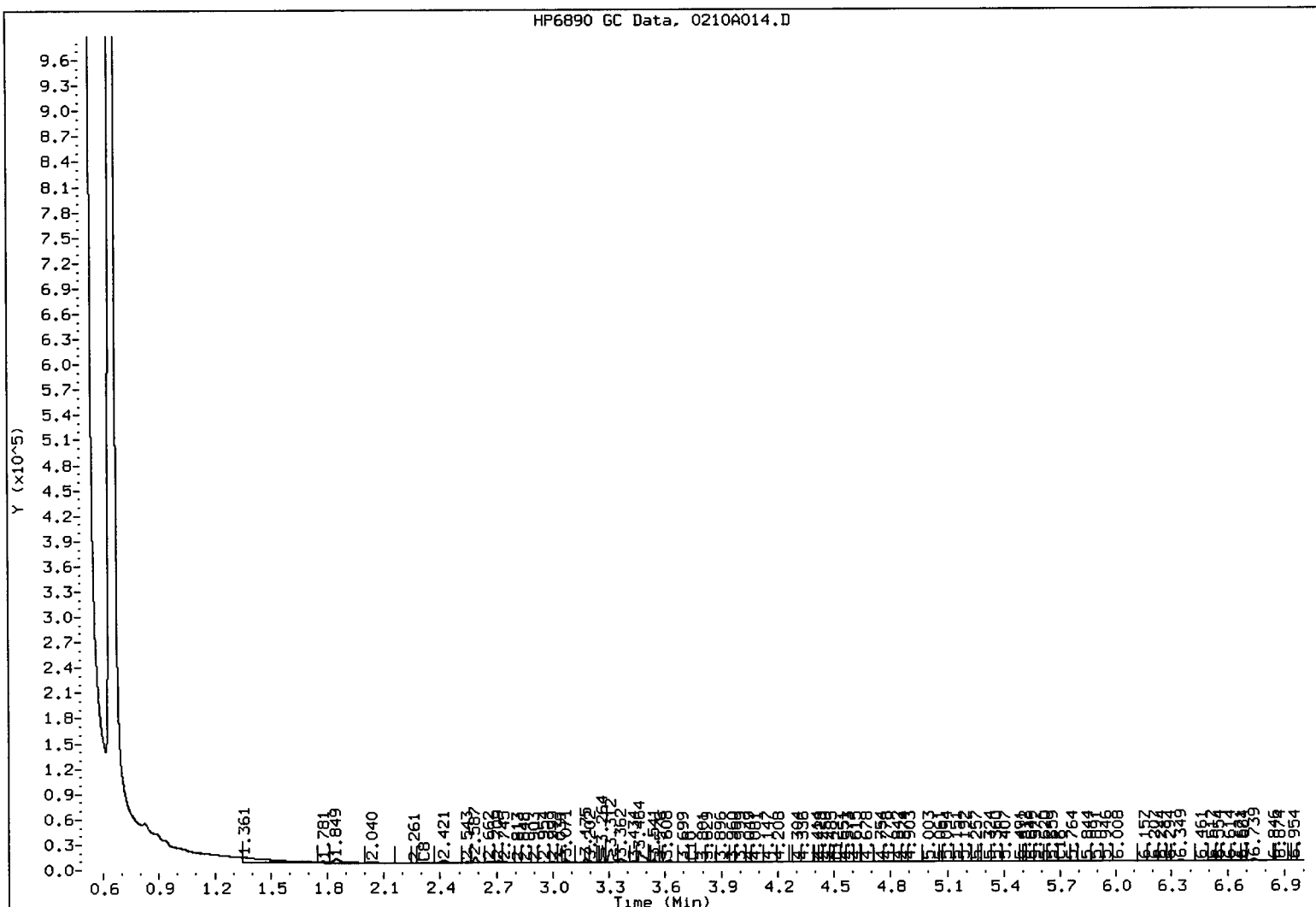
ARI ID: SH23MBS1
Client ID: SH23MBS1
Injection: 10-FEB-2011 20:49
Matrix: SOIL
Dilution Factor: 1

EPH-ALIPHATIC RESULTS

Quant Range	Area	Conc	Time Range
C8-C10 Aliph.	135226	8	(2.254 - 3.842)
C10-C12 Aliph.	7967	1	(3.842 - 4.624)
C12-C16 Aliph.	6046	0	(4.624 - 5.801)
C16-C21 Aliph.	21293	2	(5.801 - 8.031)
C21-C34 Aliph.	22039	2	(8.031 - 12.757)

Surrogate Rec: 81.6%

FID-8A/ZB-5 SH23MBS1



SH30: 00068

Data File: /chem2/fid8.i/20110210PLIPH.b/02106014.D

Date : 10-FEB-2011 20:49

Client ID: SH23HBS1

Sample Info: SH23HBS1

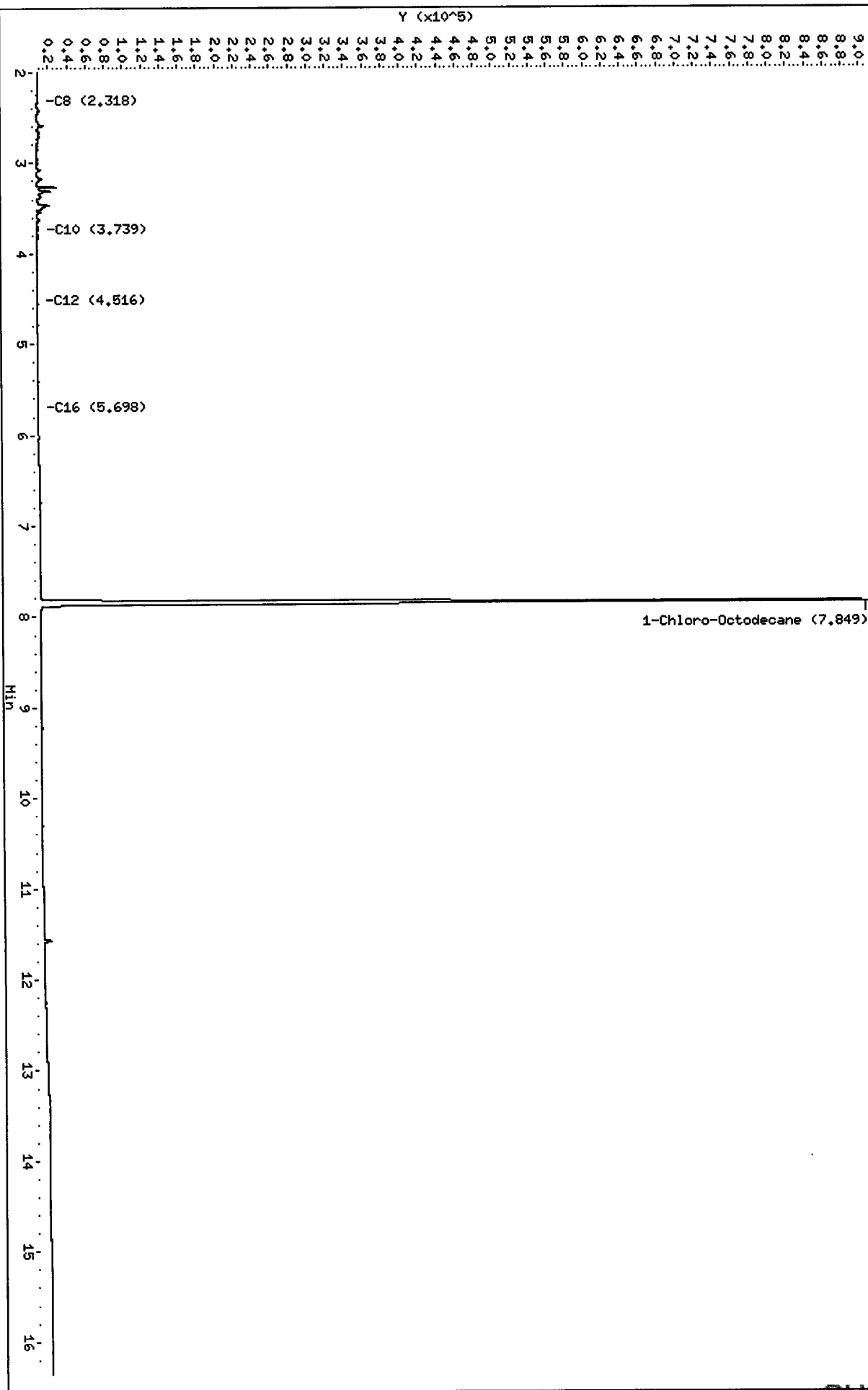
Column phase: ZB-5

Instrument: fid8.i

Operator: HS

Column diameter: 0.32

/chem2/fid8.i/20110210PLIPH.b/02106014.D



Analytical Resources Inc.
EPH Aromatics Report

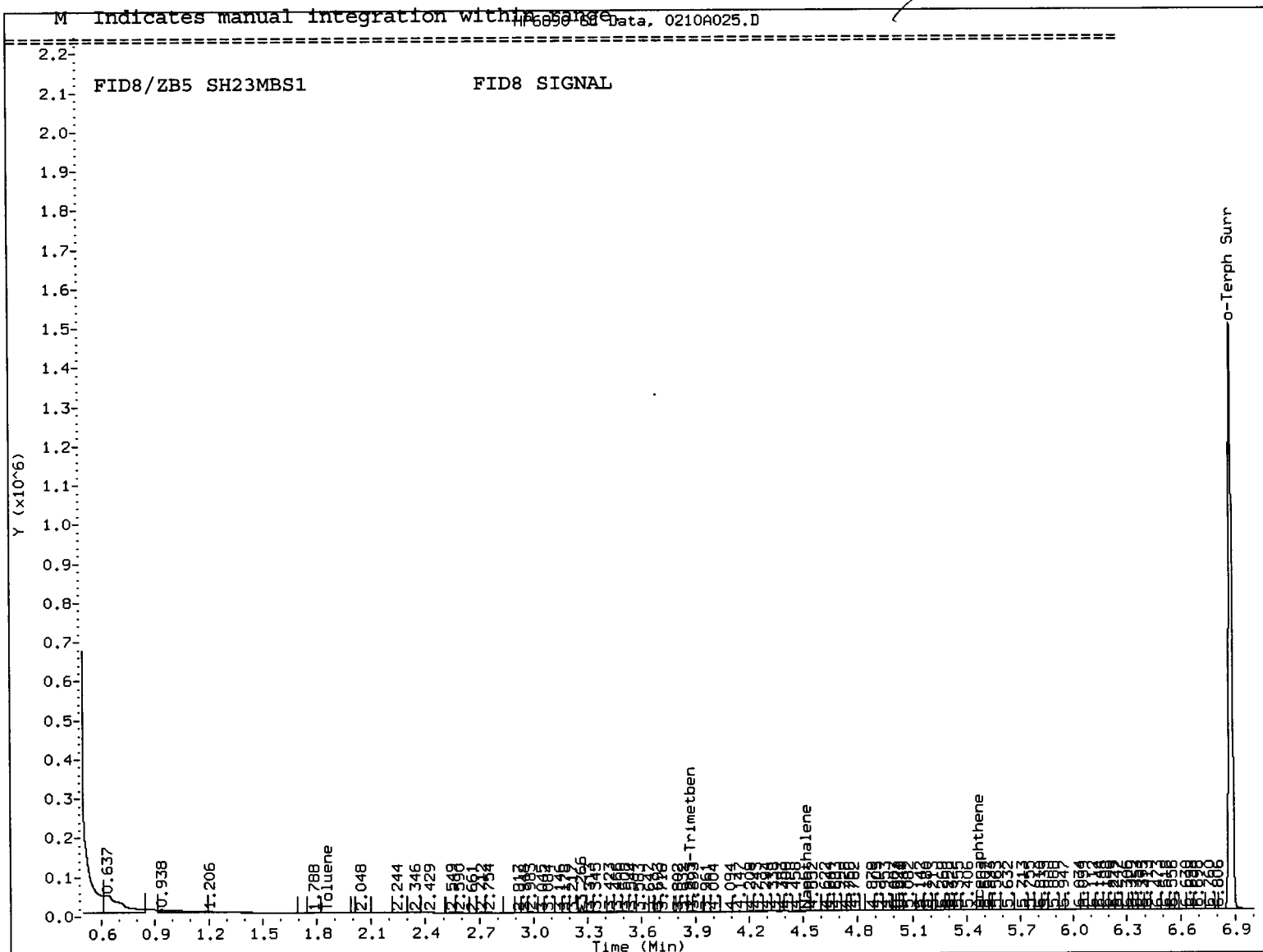
Data file: /chem2/fid8.i/20110210AROM.b/0210A025.D
Method: /chem2/fid8.i/20110210AROM.b/EPHArOm.m
Instrument: fid8.i
Operator: MS
Report Date: 02/11/2011
Macro: AROM072710FID8

ARI ID: SH23MBS1
Client ID: SH23MBS1
Injection: 11-FEB-2011 01:23
Matrix: SOIL
Dilution Factor: 1

EPH-AROMATIC RESULTS

Quant Range	RF	Area	Conc	Time Range
C8-C10 Arom.	17167	28330	2	(1.730 - 3.956)
C10-C12 Arom.	16689	2125	0	(3.956 - 4.616)
C12-C16 Arom.	15441	2044	0	(4.616 - 5.567)
C16-C21 Arom.	14112	19047	1	(5.567 - 8.293)
C21-C34 Arom.	12993	6206	0	(8.293 - 12.503)

Surrogate Rec: 73.0%



SH30: 00070

Data File: /chem2/fid8.i/20110210AR04.b/0210A025.D

Date : 11-FEB-2011 01:23

Client ID: SH23HBS1

Sample Info: SH23HBS1

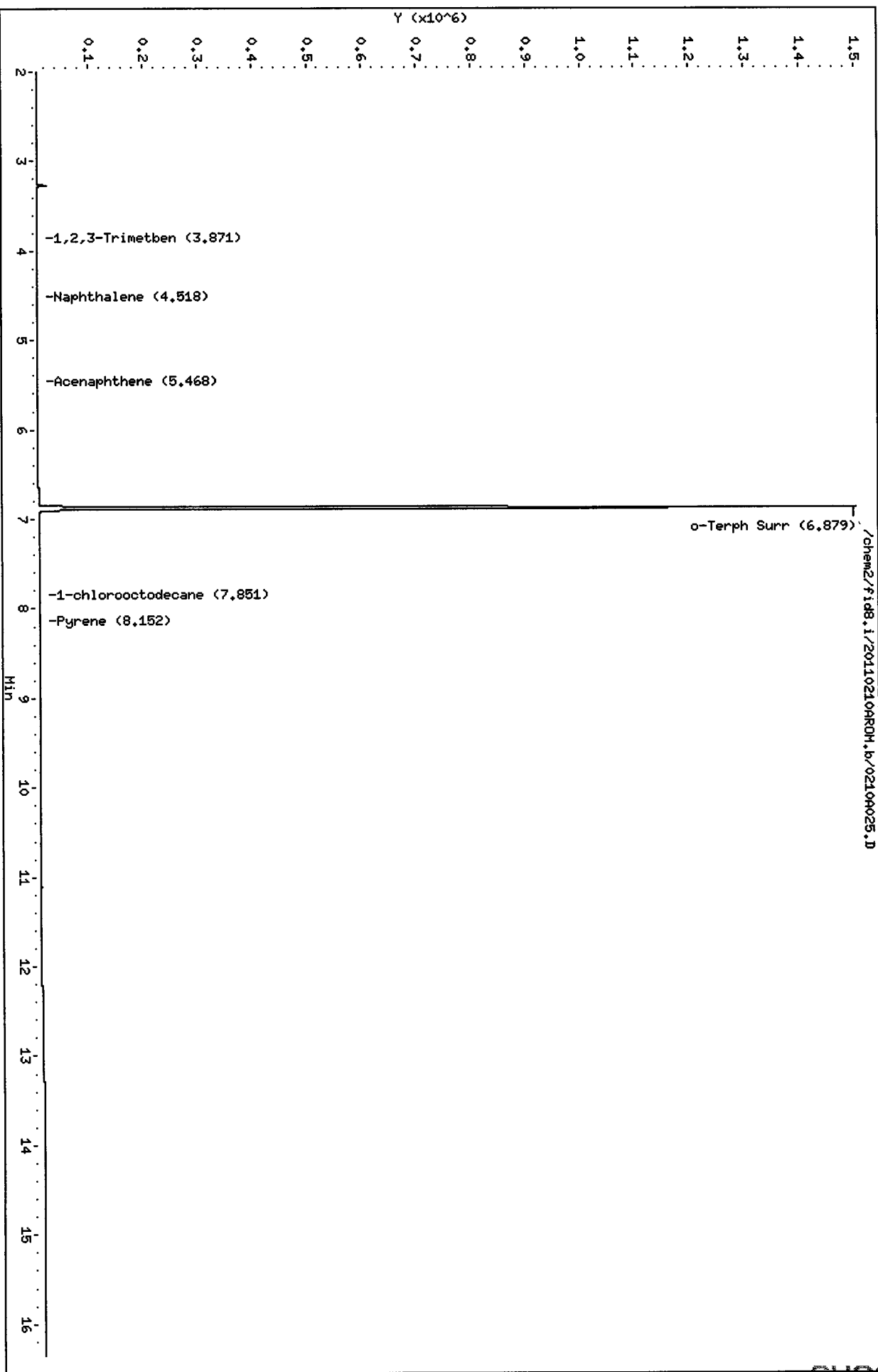
Column phase: ZB-5

Instrument: fid8.i

Operator: HS

Column diameter: 0.32

Page 1



SH30 . 00071

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: B11-12-20
SAMPLE

Lab Sample ID: SH30A'
LIMS ID: 11-2230
Matrix: Soil
Data Release Authorized:
Reported: 02/14/11

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
Event: JI1001
Date Sampled: 01/31/11
Date Received: 02/02/11

Date Analyzed: 02/04/11 17:32
Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL
Sample Amount: 88 mg-dry-wt
Percent Moisture: 11.3%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	14	< 14 U
108-88-3	Toluene	14	< 14 U
100-41-4	Ethylbenzene	14	< 14 U
179601-23-1	m,p-Xylene	28	< 28 U
95-47-6	o-Xylene	14	< 14 U

Gasoline Range Hydrocarbons	5.7	< 5.7 U	GAS ID ---
-----------------------------	-----	---------	---------------

BETX Surrogate Recovery

Trifluorotoluene	98.6%
Bromobenzene	95.4%

Gasoline Surrogate Recovery

Trifluorotoluene	100%
Bromobenzene	98.5%

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.

2/14/11
MH

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a026.d ARI ID: SH30A
Data file 2: /chem3/pid2.i/020411-2.b/0204a026.d Client ID: B11-12-20
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 17:32
Instrument: pid2.i Matrix: SOIL
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
--	----	-----	----	----	-----
8.138	0.010	4039	50721	100.1	TFT(Surr)
14.749	-0.004	2453	20820	98.5	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
-----	----	-----	-----
WAGas Tol-C12 (9.88 to 17.08)	460088	1941	0.004
8015B 2MP-TMB (4.81 to 15.47)	907748	1737	0.002
AK101 nC6-nC10 (5.25 to 14.35)	626837	526	0.001
NWTPHG Tol-Nap (9.88 to 18.21)	481270	2379	0.005

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
--	----	-----	----	-----
8.166	0.009	2381	98.6	TFT(Surr)
14.766	-0.004	6327	95.4	BB(Surr)

SW8021 (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

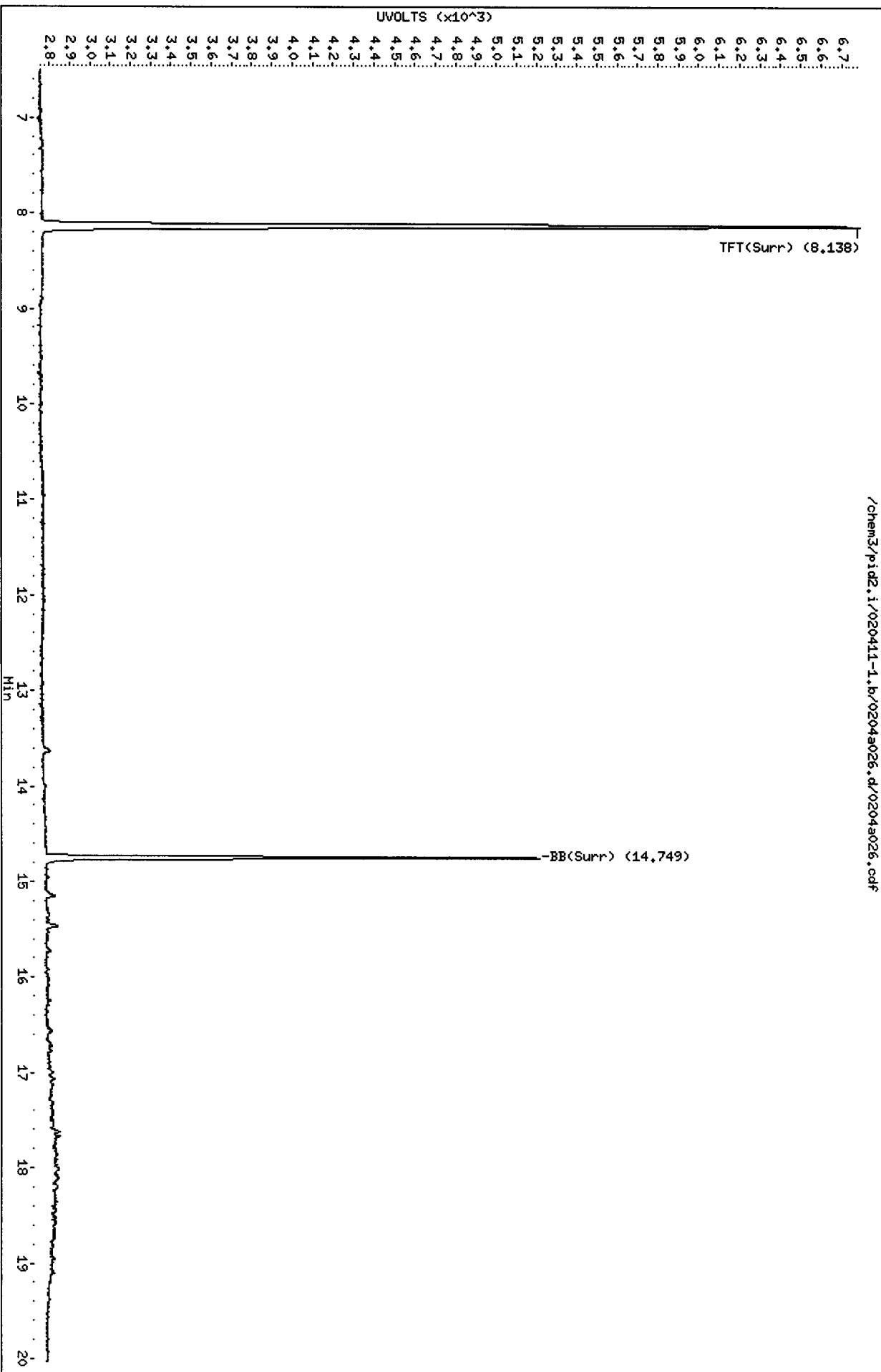
SH30:00073

Data File: /chem3/pid2.i/020411-1.b/0204a026.d
Date : 04-FEB-2011 17:32
Client ID: B11-12-20
Sample Info: SH30A

Page 1

Column phase: RTX 502-2 FID

Instrument: pid2.i
Operator: MH
Column diameter: 0.18



SH30 : 00074

Data File: /chem3/pid2.i/020411-2.b/0204s026.d

Date : 04-FEB-2011 17:32

Client ID: B11-12-20

Sample Info: SH30A

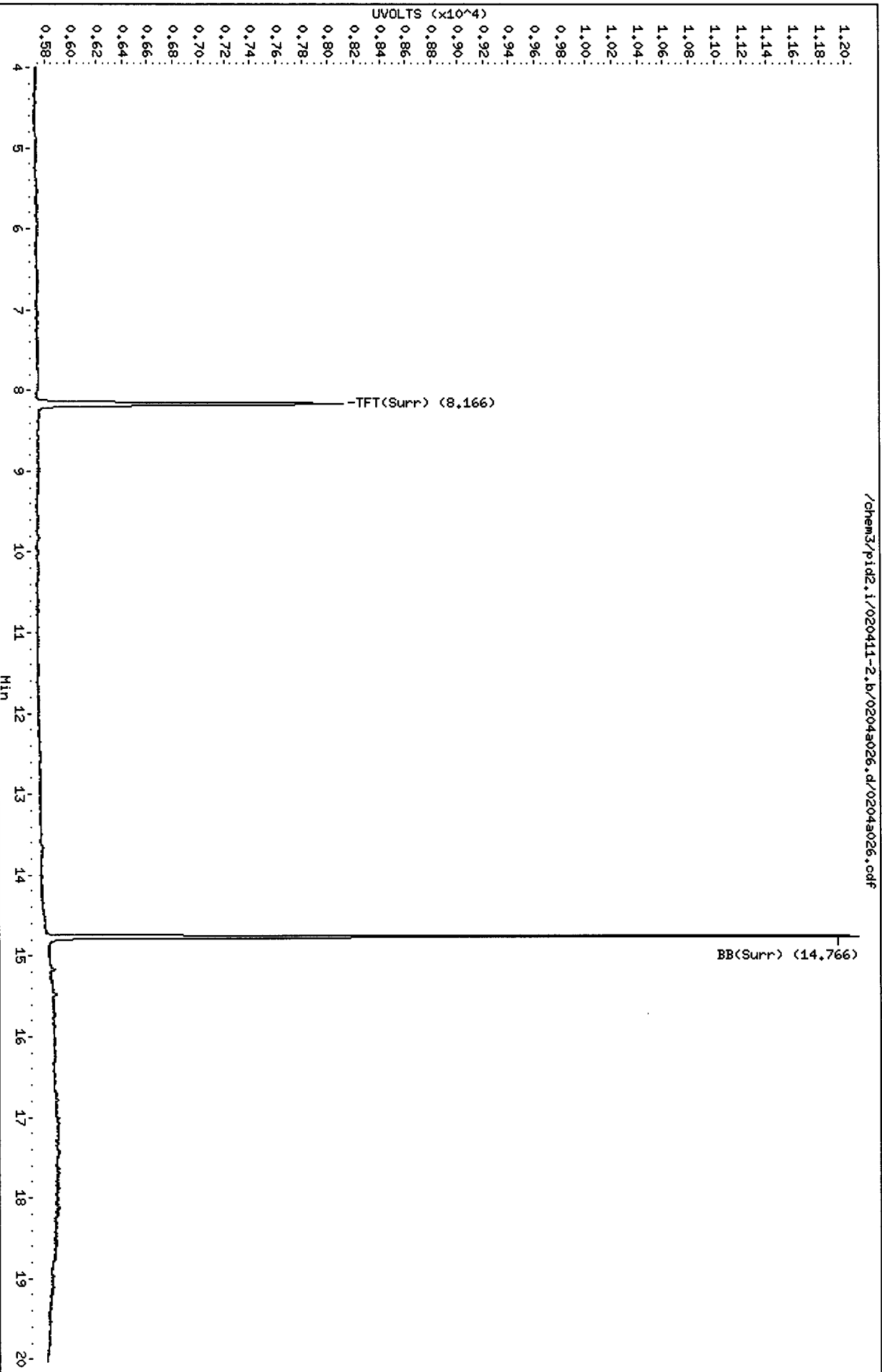
Column phase: RTX 502-2 PID

Instrument: pid2.i

Operator: HH

Column diameter: 0.18

Page 1



SH30 : 00075

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1


Sample ID: B11-14-09

SAMPLE

Lab Sample ID: SH30I

LIMS ID: 11-2238

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

Event: JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 19:24

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 91 mg-dry-wt

Percent Moisture: 9.2%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	14	< 14 U
108-88-3	Toluene	14	< 14 U
100-41-4	Ethylbenzene	14	< 14 U
179601-23-1	m,p-Xylene	27	< 27 U
95-47-6	o-Xylene	14	< 14 U

Gasoline Range Hydrocarbons	5.5	< 5.5 U	GAS ID ---
-----------------------------	-----	---------	---------------

BETX Surrogate Recovery

Trifluorotoluene	99.0%
Bromobenzene	97.8%

Gasoline Surrogate Recovery

Trifluorotoluene	101%
Bromobenzene	99.8%

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.

MH
2/14/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a030.d ARI ID: SH30I
Data file 2: /chem3/pid2.i/020411-2.b/0204a030.d Client ID: B11-14-09
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 19:24
Instrument: pid2.i Matrix: SOIL
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.139	0.011	4057	50978	100.6	TFT(Surr)
14.749	-0.004	2486	21261	99.8	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	4366	0.009
8015B 2MP-TMB (4.81 to 15.47)	907748	7056	0.008
AK101 nC6-nC10 (5.25 to 14.35)	626837	5341	0.009
NWTPHG Tol-Nap (9.88 to 18.21)	481270	4903	0.010

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
8.166	0.010	2391	99.0	TFT(Surr)
14.766	-0.004	6489	97.8	BB(Surr)

SW8021 (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

SH30: 00077

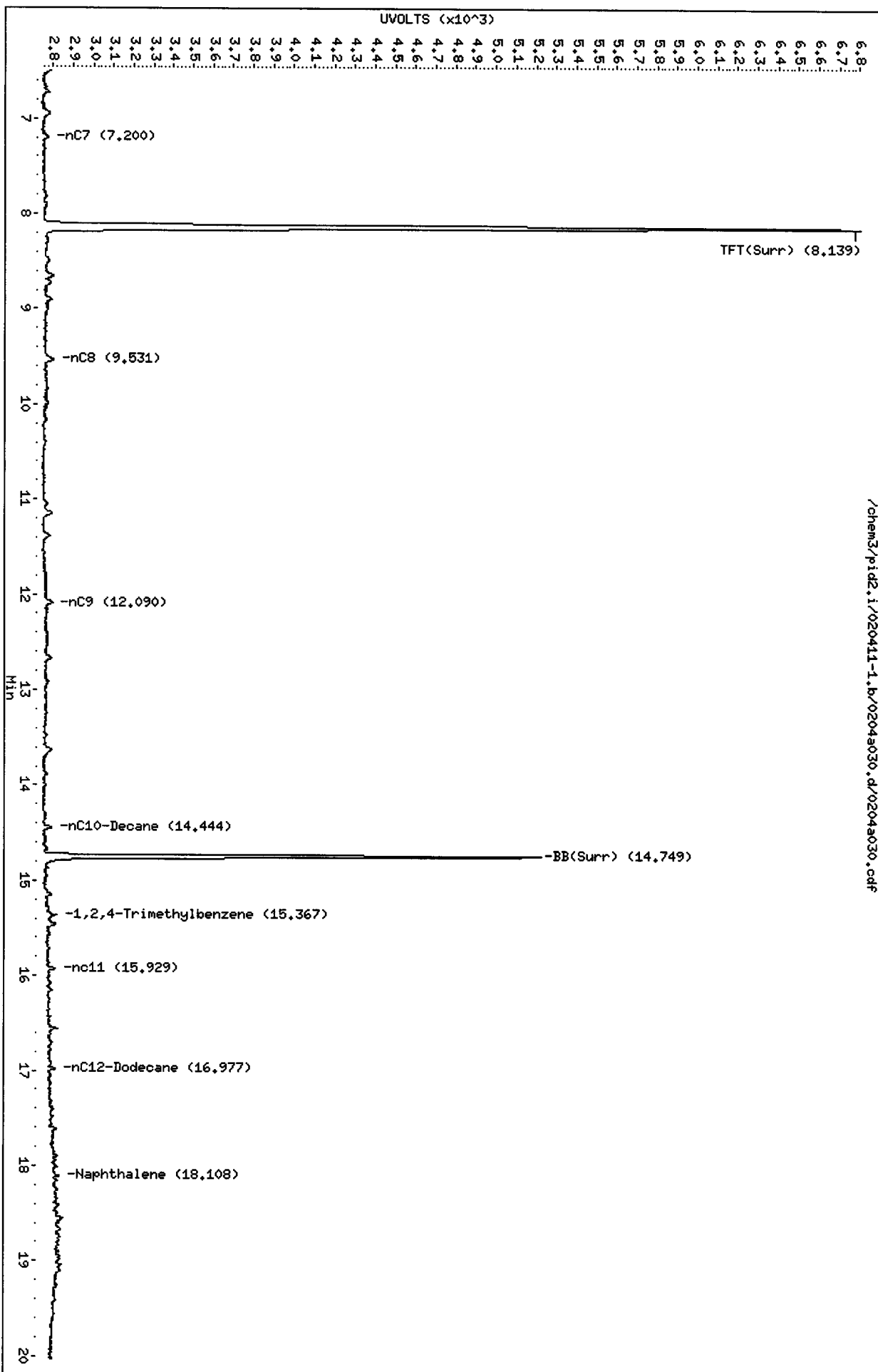
Data File: /chem3/pid2.i/020411-1.b/0204a030.d
Date : 04-FEB-2011 19:24
Client ID: B11-14-09
Sample Info: SH301

Instrument: pid2.i

Page 1

Column phase: RTX 502-2 FID

Operator: HH
Column diameter: 0.18



SH30 : 00078

Data File: /chem3/pid2.i/020411-2.b/0204a030.d

Page 1

Date : 04-FEB-2011 19:24

Client ID: B11-14-09

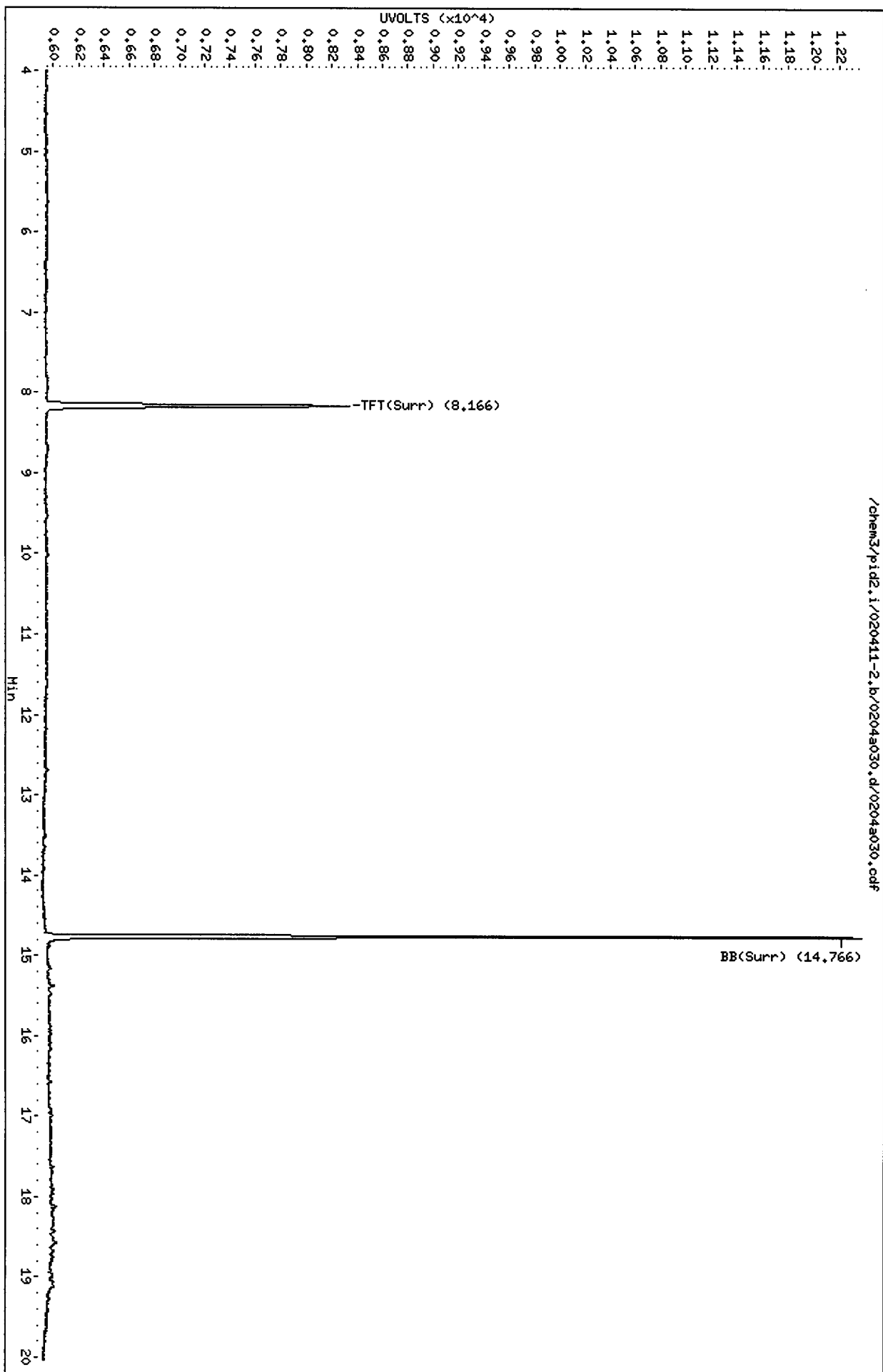
Instrument: pid2.i

Sample Info: SH30I

Operator: MH

Column phase: RTX 502-2 PID

Column diameter: 0.18



SH30 : 00079

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1


Sample ID: B11-16-12

SAMPLE

Lab Sample ID: SH30R

LIMS ID: 11-2247

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

Event: JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 19:53

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 8.3 mg-dry-wt

Percent Moisture: 12.4%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	150	< 150 U
108-88-3	Toluene	150	< 150 U
100-41-4	Ethylbenzene	150	< 150 U
179601-23-1	m,p-Xylene	300	< 300 U
95-47-6	o-Xylene	150	290

Gasoline Range Hydrocarbons

60

1,200

GAS ID
GRO

BETX Surrogate Recovery

Trifluorotoluene	97.1%
Bromobenzene	100%

Gasoline Surrogate Recovery

Trifluorotoluene	98.9%
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.

2/14/11
MH

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a031.d ARI ID: SH30R
Data file 2: /chem3/pid2.i/020411-2.b/0204a031.d Client ID: B11-16-12
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 19:53
Instrument: pid2.i Matrix: SOIL
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
--	----	-----	----	----	-----
8.139	0.011	3991	51046	98.9	TFT(Surr)
14.749	-0.004	2723	27907	109.4	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
-----	----	-----	-----
WAGas Tol-C12 (9.88 to 17.08)	460088	675222	1.468 M
8015B 2MP-TMB (4.81 to 15.47)	907748	297816	0.328 M
AK101 nC6-nC10 (5.25 to 14.35)	626837	148244	0.236 M
NWTPHG Tol-Nap (9.88 to 18.21)	481270	973310	2.022 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
--	----	-----	----	-----
8.166	0.010	2345	97.1	TFT(Surr)
14.766	-0.004	6666	100.5	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
--	----	-----	-----	-----
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
13.490	-0.019	70	0.48N	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/pid2.i/020411-1.b/0204a031.d

Date : 04-FEB-2011 19:53

Client ID: B11-16-12

Sample Info: SH30R

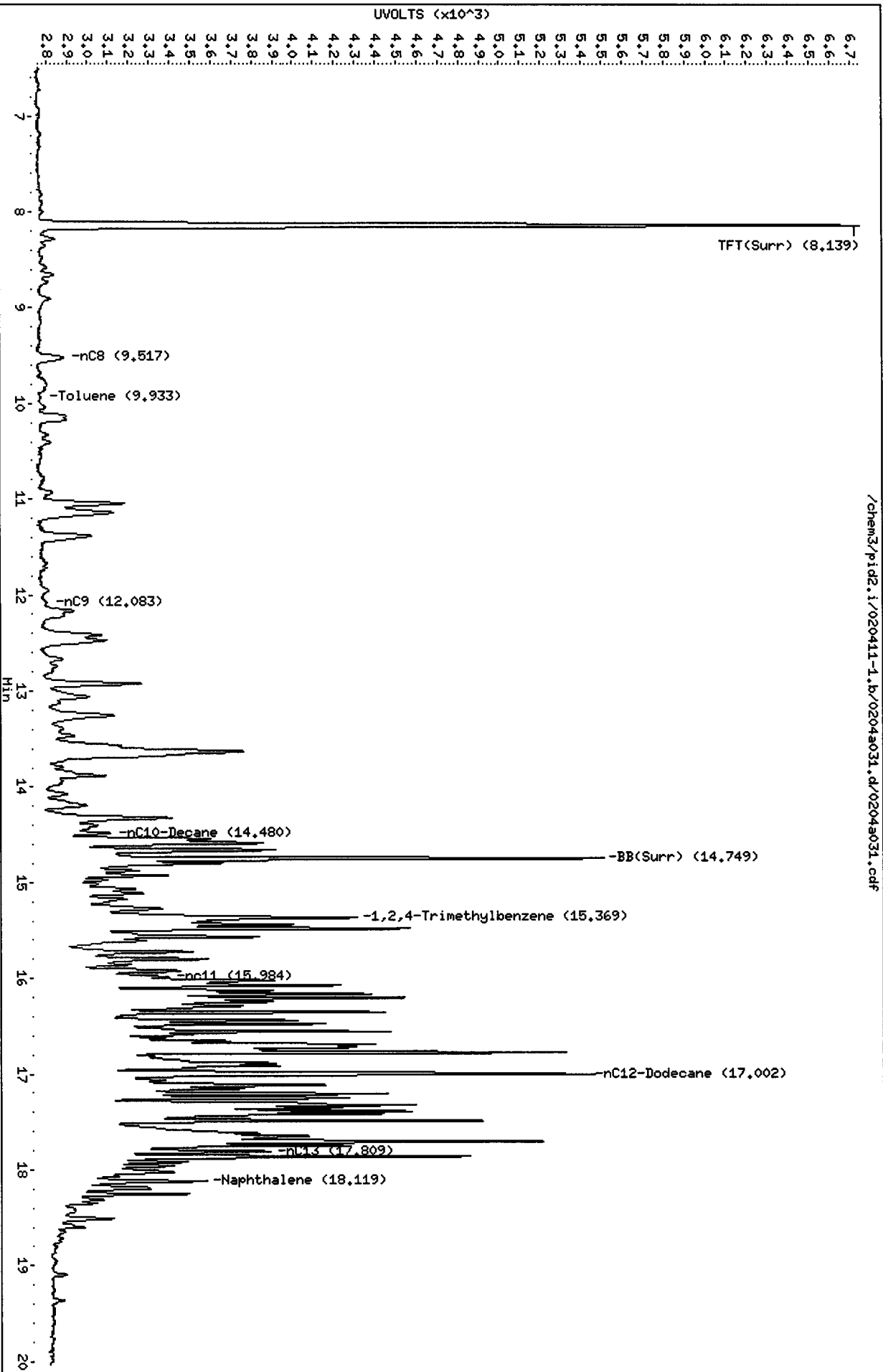
Column phase: RTX 502-2 FID

Instrument: pid2.i

Operator: HH

Column diameter: 0.18

Page 1



SH30 : 00082

Data File: /chem3/pid2.i/020411-2.b/0204a031.d

Date : 04-FEB-2011 19:53

Client ID: B11-16-12

Sample Info: SH30R

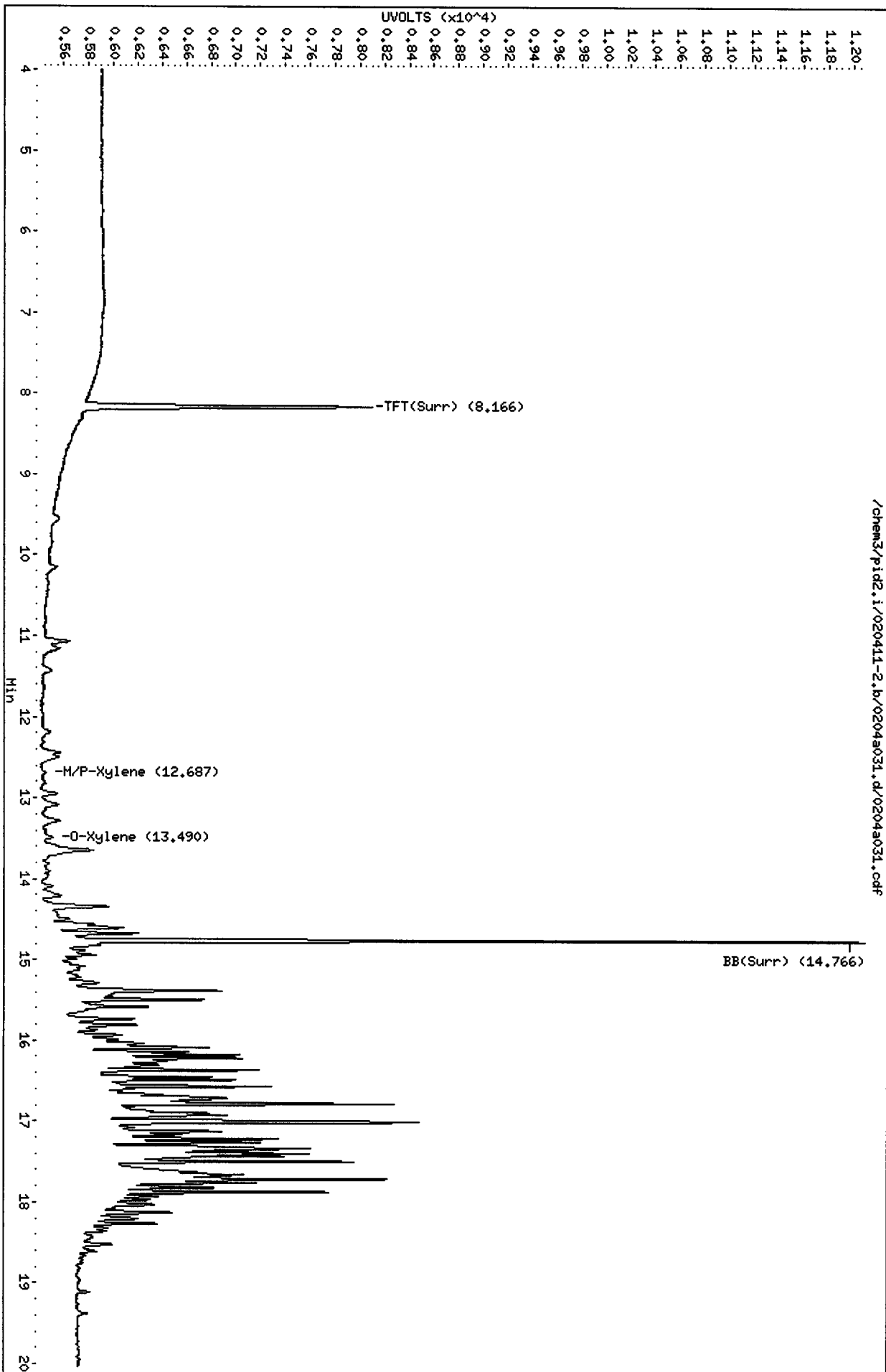
Column phase: RTX 502-2 PID

Instrument: pid2.i

Operator: MH

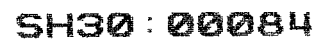
Column diameter: 0.18

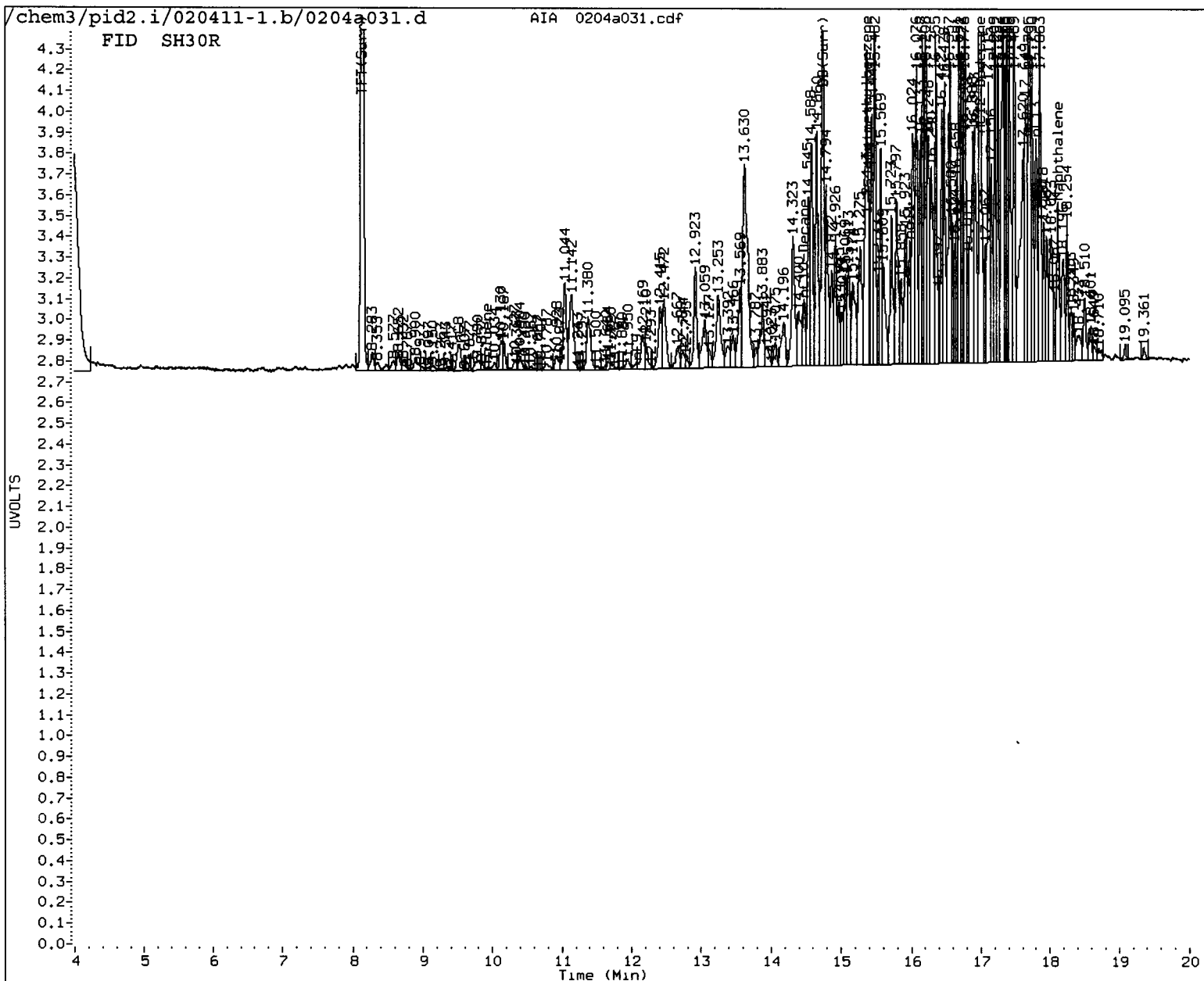
Page 1



SH30 : 00083

```
AIA 0204a031.cdf: -0.149 to 20.085 Min
```





MANUAL INTEGRATION

- ☒ Baseline correction
- 2. Poor chromatography
- 3. Peak not found
- 4. Totals calculation

5. Other _____

Analyst: MH

Date: 2/14/11

SH30: 00085

BETX SOIL SURROGATE RECOVERY SUMMARY

ARI Job: SH30
Matrix: Soil

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
Event: JI1001

<u>Client ID</u>	<u>TFT</u>	<u>BBZ</u>	<u>TOT OUT</u>
MB-020411	99.1%	95.7%	0
LCS-020411	100%	96.6%	0
LCSD-020411	101%	98.6%	0
B11-12-20	98.6%	95.4%	0
B11-14-09	99.0%	97.8%	0
B11-16-12	97.1%	100%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(68-124)
(BBZ) = Bromobenzene	(77-120)	(62-134)

Log Number Range: 11-2230 to 11-2247

FORM II BETX

Page 1 for SH30

SH30 : 00086

TPHG SOIL SURROGATE RECOVERY SUMMARY

ARI Job: SH30
Matrix: Soil

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
Event: JI1001

<u>Client ID</u>	<u>BFB</u>	<u>TFT</u>	<u>BBZ</u>	<u>TOT</u>	<u>OUT</u>
MB-020411	NA	97.5%	95.7%	0	
LCS-020411	NA	99.5%	98.6%	0	
LCSD-020411	NA	100%	99.9%	0	
B11-12-20	NA	100%	98.5%	0	
B11-14-09	NA	101%	99.8%	0	
B11-16-12	NA	98.9%	109%	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: 11-2230 to 11-2247


FORM II TPHG

Page 1 for SH30

SH30 : 00087

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
Page 1 of 1

Sample ID: LCS-020411
LAB CONTROL SAMPLE

Lab Sample ID: LCS-020411
LIMS ID: 11-2230
Matrix: Soil
Data Release Authorized: 
Reported: 02/14/11

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
Event: JI1001
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 02/04/11 06:55
LCSD: 02/04/11 07:23
Instrument/Analyst LCS: PID2/MH
LCSD: PID2/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	141	105	134%	139	105	132%	1.4%
Toluene	1510	1440	105%	1490	1440	103%	1.3%
Ethylbenzene	470	460	102%	465	460	101%	1.1%
m,p-Xylene	1760	1690	104%	1730	1690	102%	1.7%
o-Xylene	736	700	105%	730	700	104%	0.8%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	100%	101%
Bromobenzene	96.6%	98.6%

ORGANICS ANALYSIS DATA SHEET

TPHG by Method NWTPHG

Page 1 of 1


Sample ID: LCS-020411

LAB CONTROL SAMPLE

Lab Sample ID: LCS-020411

LIMS ID: 11-2230

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

Event: JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed LCS: 02/04/11 06:55

Purge Volume: 5.0 mL

LCSD: 02/04/11 07:23

Instrument/Analyst LCS: PID2/MH

Sample Amount LCS: 100 mg-dry-wt

LCSD: PID2/MH

LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	51.6	50.0	103%	50.6	50.0	101%	2.0%

Reported in mg/kg (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	99.5%	100%
Bromobenzene	98.6%	99.9%

2/4/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a004.d ARI ID: LCS0204
Data file 2: /chem3/pid2.i/020411-2.b/0204a004.d Client ID:
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 06:55
Instrument: pid2.i Matrix: WATER
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.126	-0.002	4016	52736	99.5	TFT(Surr)
14.751	-0.002	2455	21098	98.6	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	471725	1.025 M
8015B 2MP-TMB (4.81 to 15.47)	907748	967800	1.066 M
AK101 nC6-nC10 (5.25 to 14.35)	626837	673274	1.074 M
NWTPHG Tol-Nap (9.88 to 18.21)	481270	496752	1.032 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
8.154	-0.002	2424	100.4	TFT(Surr)
14.768	-0.001	6410	96.6	BB(Surr)

SW8021 (PID)

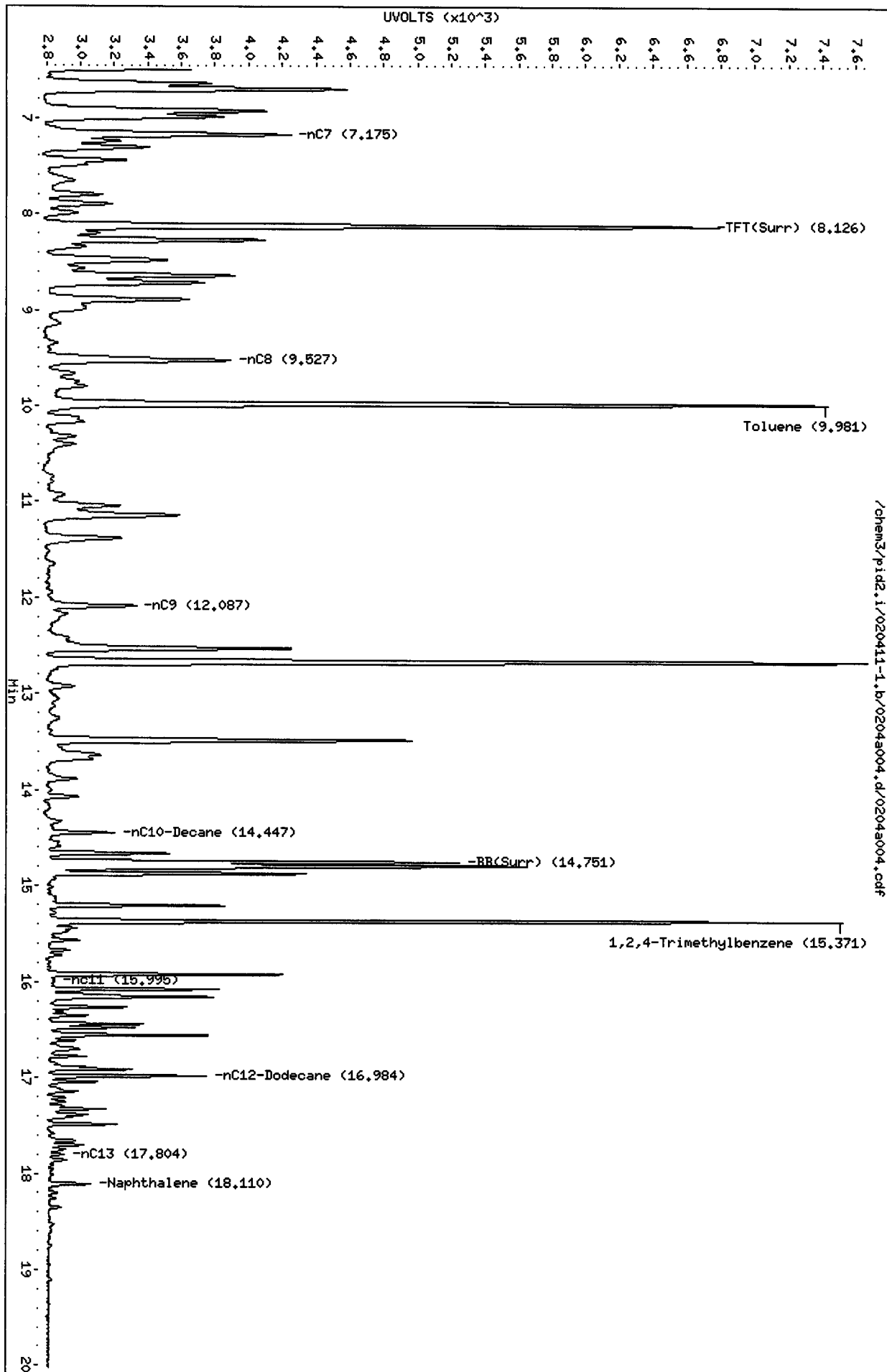
RT	Shift	Response	Amount	Compound
7.470	0.001	440	2.82	Benzene
10.009	-0.003	4878	30.21	Toluene
12.554	-0.003	1419	9.39	Ethylbenzene
12.694	0.000	5649	35.17	M/P-Xylene
13.506	-0.003	2146	14.71	O-Xylene
5.195	0.003	3903	95.09	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid2.i/020411-1.b/0204a004.d
Date : 04-FEB-2011 06:55
Client ID:
Sample Info: LCS0204

Column phase: RTX 502-2 FID

Instrument: pid2.i
Operator: HH
Column diameter: 0.18



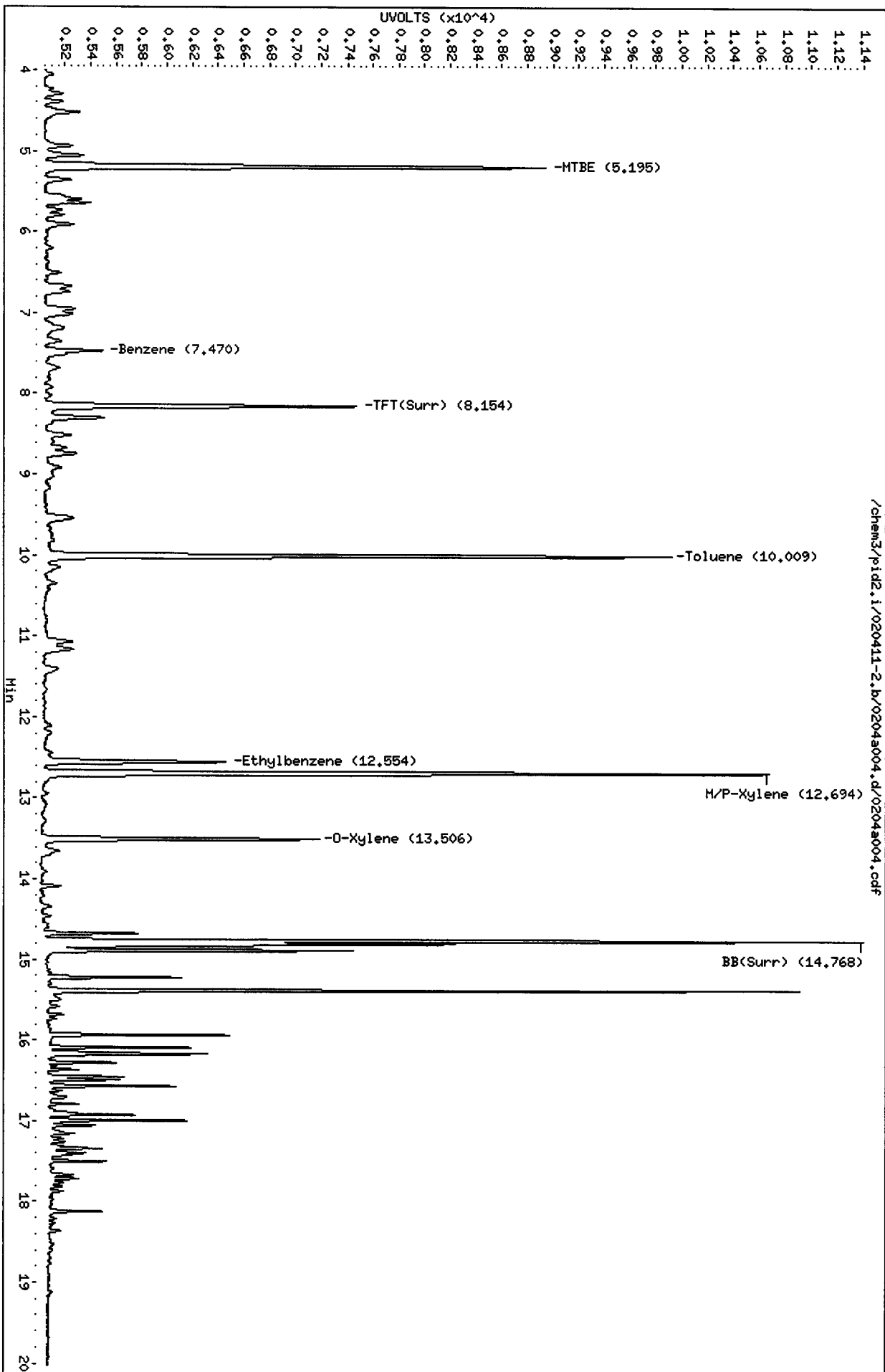
Data File: /chem3/pid2.i/020411-2.b/0204a004.d
Date : 04-FEB-2011 06:55
Client ID:
Sample Info: LCS0204

Instrument: pid2.i

Page 1

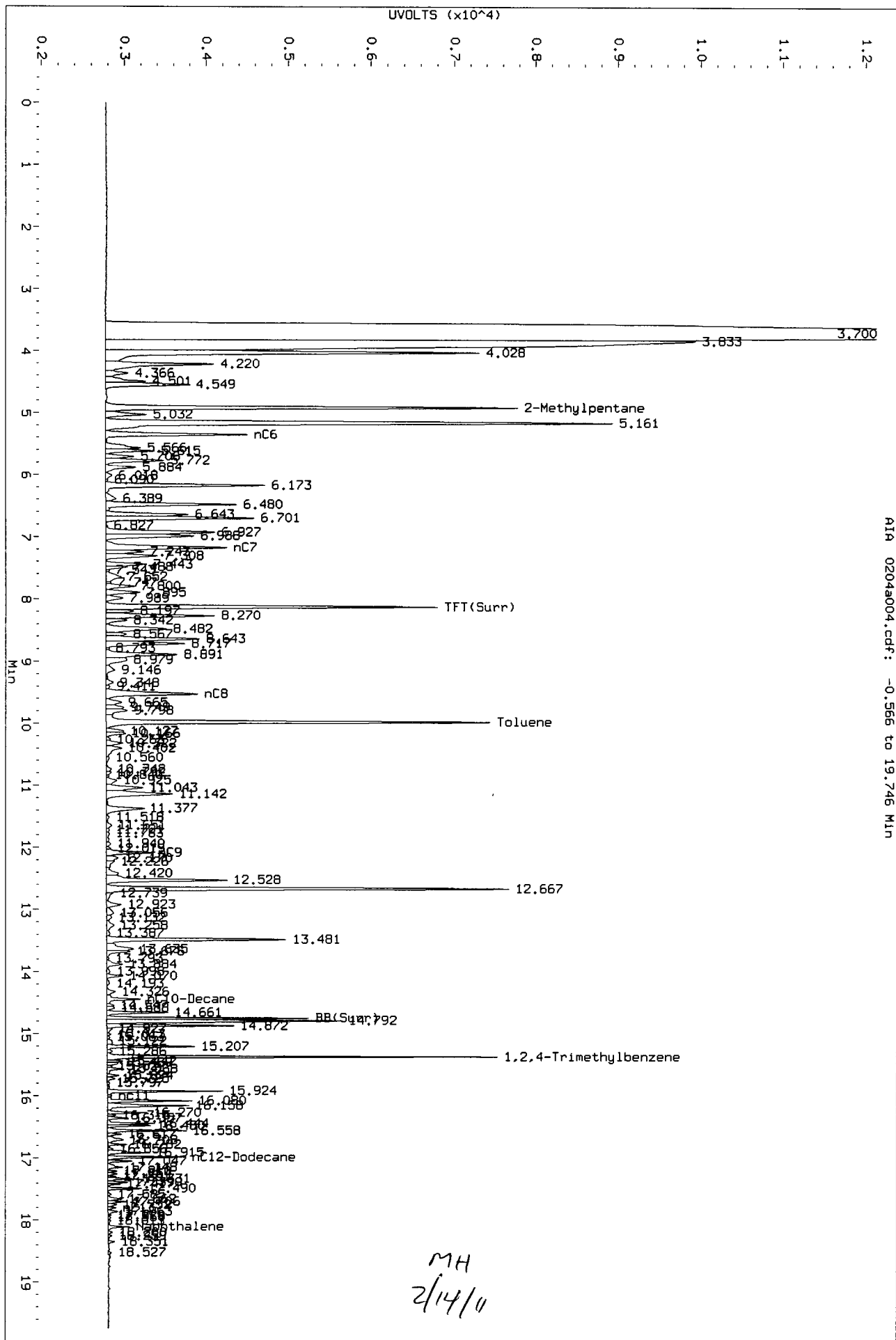
Column phase: RTX 502-2 PID

Operator: MH
Column diameter: 0.18



SH30 : 00092

Data File: /chem3/pid2.1/020411-1.b/0204a004.d/0204a004.cdf
Injection Date: 04-FEB-2011 06:55
Instrument: pid2.1
Client Sample ID:



SH30 : 00093

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a005.d ARI ID: LCSD0204
Data file 2: /chem3/pid2.i/020411-2.b/0204a005.d Client ID:
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 07:23
Instrument: pid2.i Matrix: WATER
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.127	-0.001	4056	53261	100.5	TFT(Surr)
14.752	-0.001	2488	21395	99.9	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	460784	1.002 M
8015B 2MP-TMB (4.81 to 15.47)	907748	937024	1.032 M
AK101 nC6-nC10 (5.25 to 14.35)	626837	648183	1.034 M
NWTPHG Tol-Nap (9.88 to 18.21)	481270	486497	1.011 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
8.155	-0.002	2432	100.7	TFT(Surr)
14.769	-0.001	6541	98.6	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
7.470	0.002	434	2.78	Benzene
10.009	-0.002	4817	29.83	Toluene
12.555	-0.003	1405	9.30	Ethylbenzene
12.694	0.000	5569	34.67	M/P-Xylene
13.507	-0.002	2130	14.60	O-Xylene
5.194	0.003	3813	92.89	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

SH30:00095

Data File: /chem3/pid2.i/020411-1.b/0204a005.d

Date : 04-FEB-2011 07:23

Client ID:

Sample Info: LCSD0204

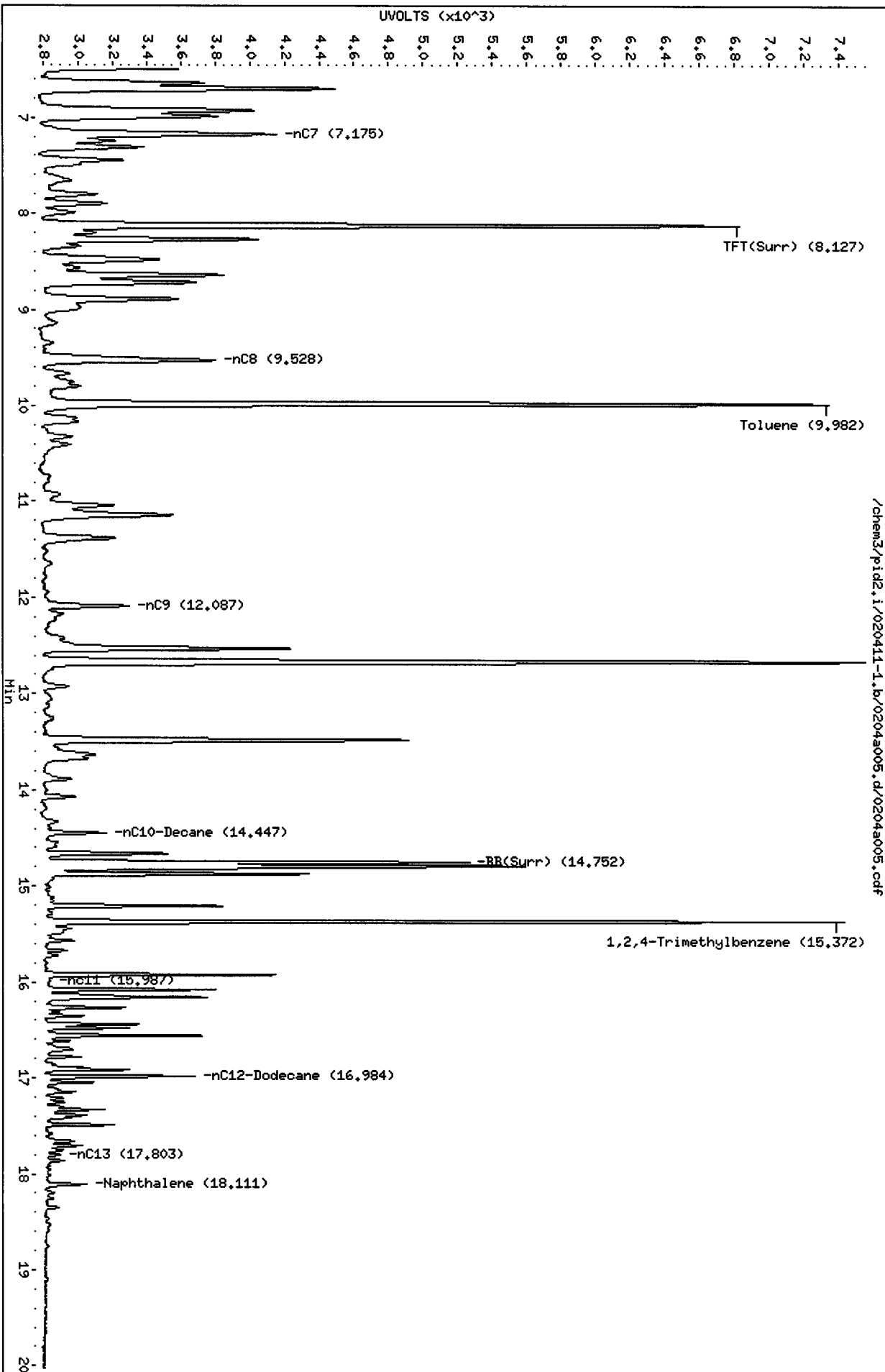
Column phase: RTX 502-2 FID

Instrument: pid2.i

Operator: HH

Column diameter: 0.18

/chem3/pid2.i/020411-1.b/0204a005.d/0204a005.cdf



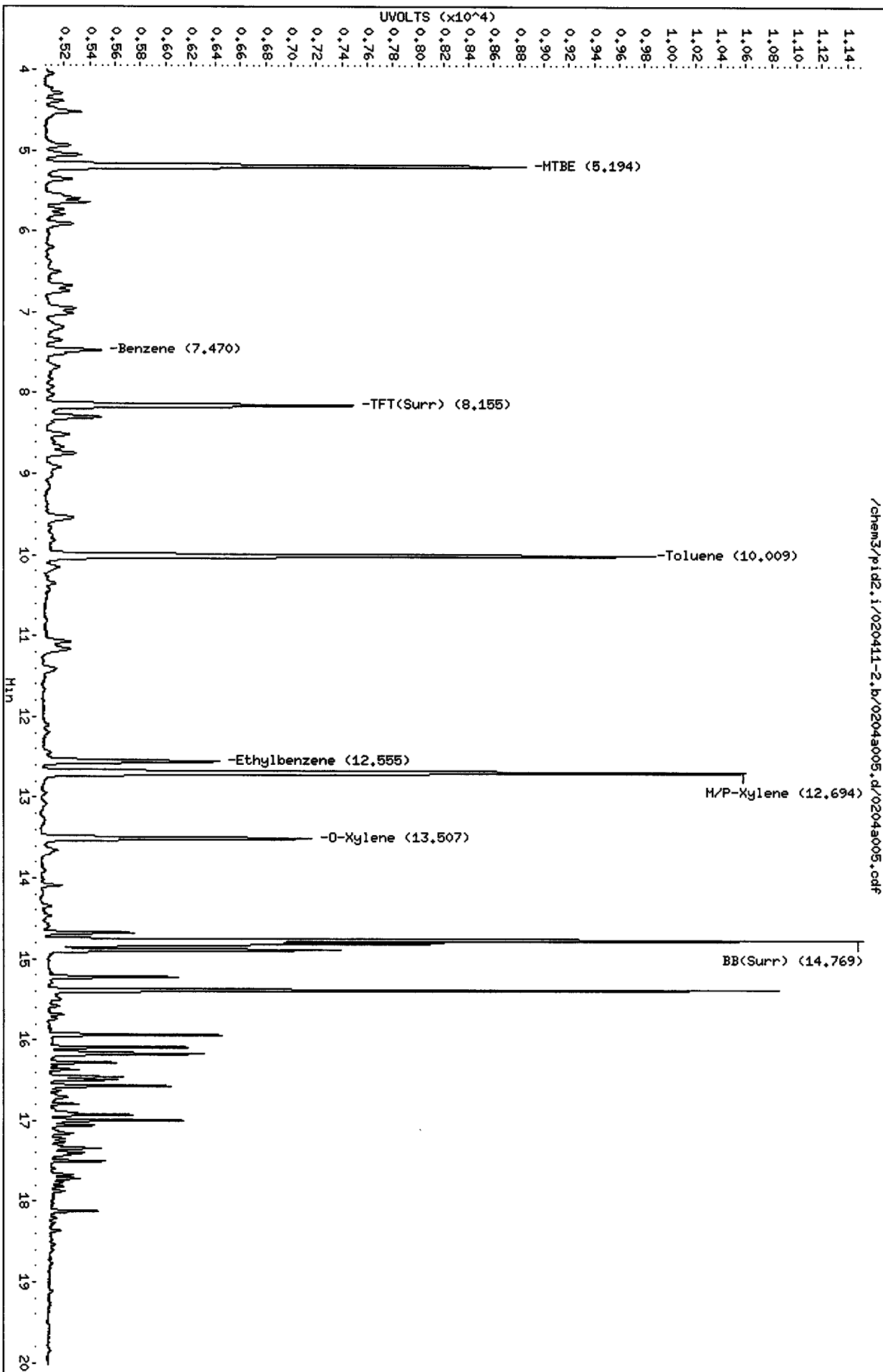
Data File: /chem3/pid2.i/020411-2.b/0204a005.d
Date : 04-FEB-2011 07:23
Client ID:
Sample Info: LCSD0204

Instrument: pid2.i

Page 1

Column phase: RTX 502-2 PID

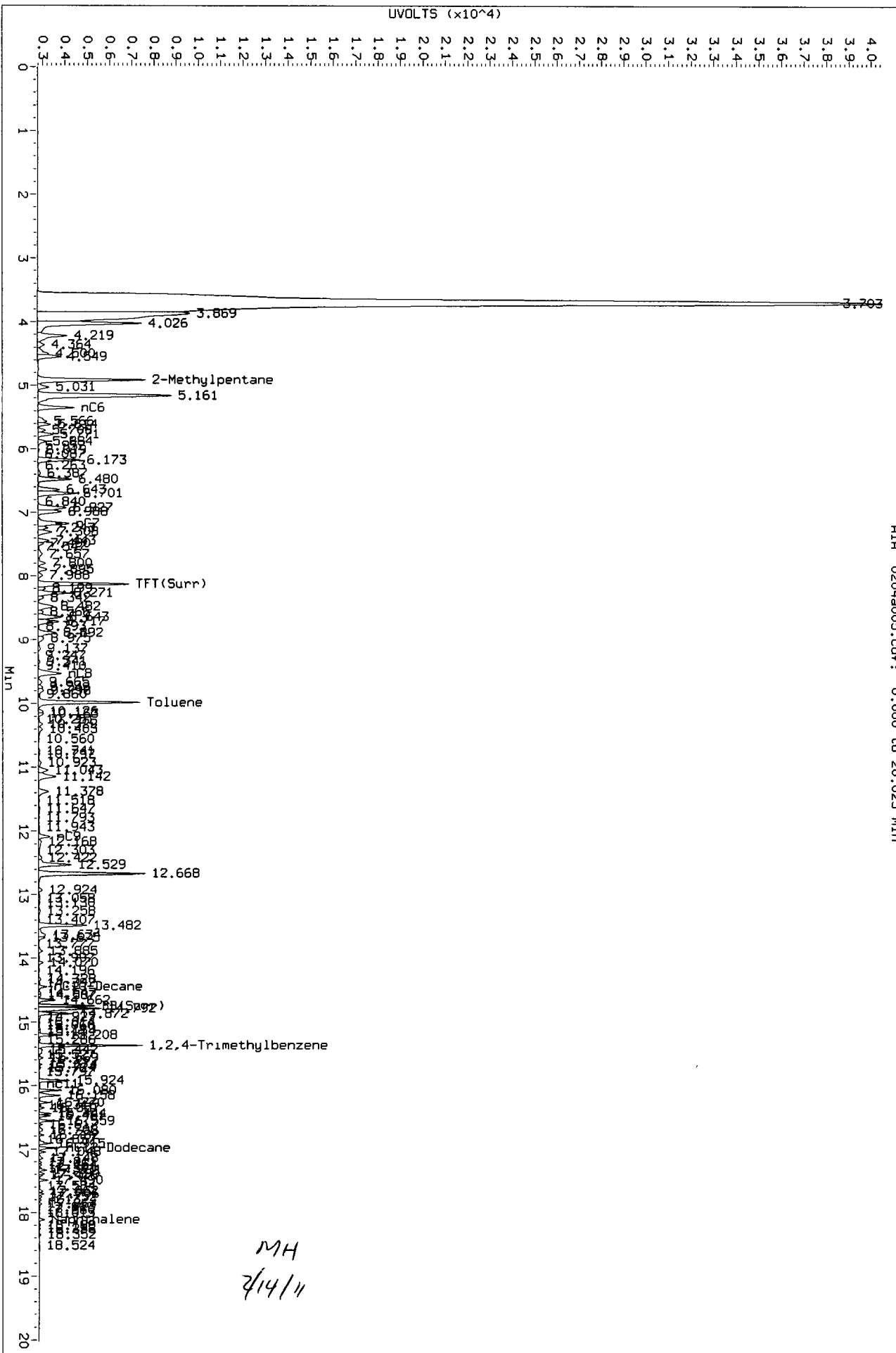
Operator: HH
Column diameter: 0.18

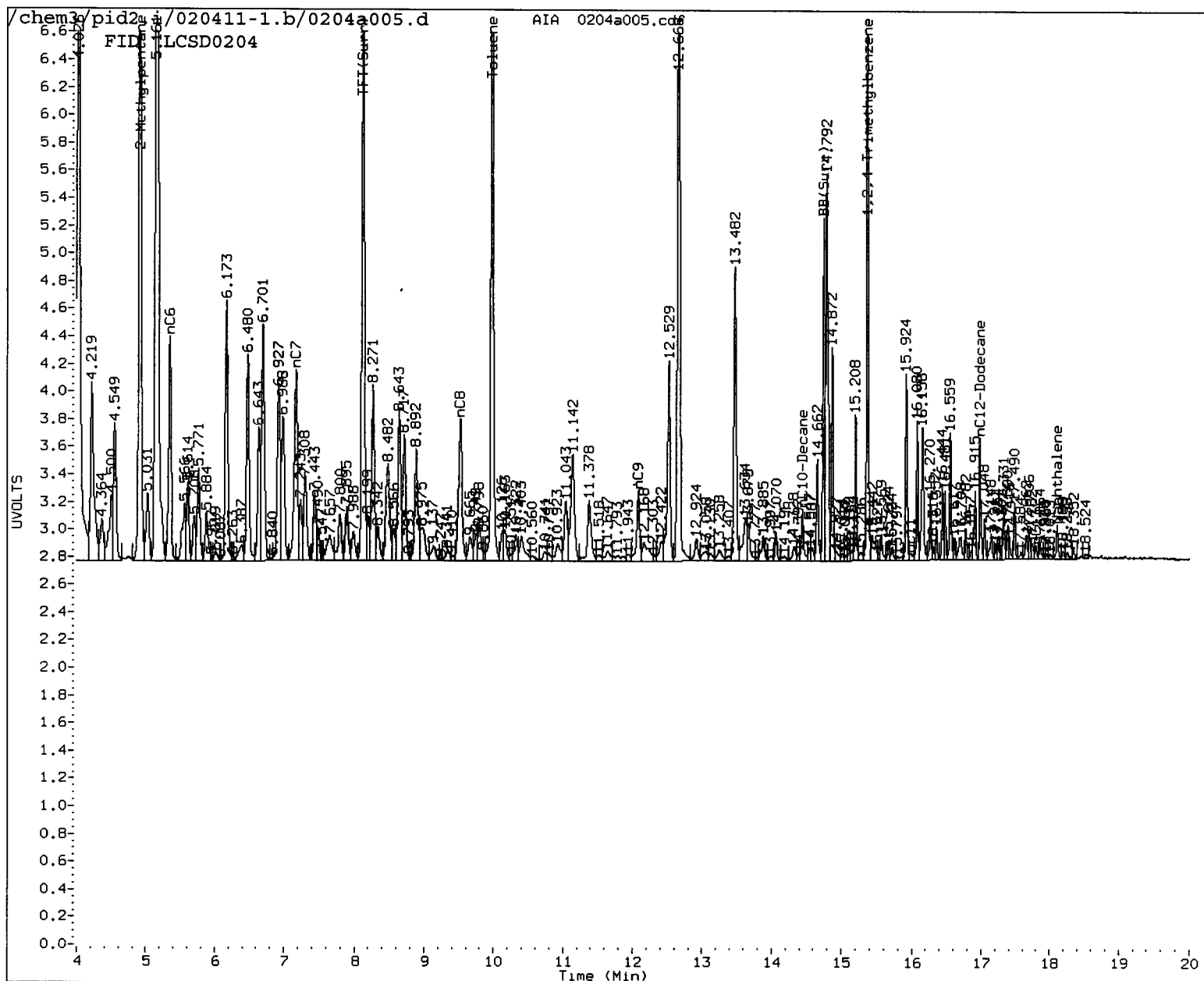


SH30 : 00097

Data File: /chem3/pid2.1/020411-1.b/0204a005.d/0204a005.cdf
Injection Date: 04-FEB-2011 07:23
Instrument: pid2.1
Client Sample ID:

AIA 0204a005.cdf: 0.000 to 20.023 Min





MANUAL INTEGRATION

- ☒ Baseline correction
- ☐ 2. Poor chromatography
- ☐ 3. Peak not found
- ☐ 4. Totals calculation

5. Other _____


Analyst: MH

Date: 2/4/11

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1



Sample ID: MB-020411
METHOD BLANK

Lab Sample ID: MB-020411
LIMS ID: 11-2230
Matrix: Soil
Data Release Authorized: 
Reported: 02/14/11

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
Event: JI1001
Date Sampled: NA
Date Received: NA

Date Analyzed: 02/04/11 07:51
Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL
Sample Amount: 100 mg-dry-wt

CAS Number	Analyte	RL	Result
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	GAS ID ---
-----------------------------	-----	---------	---------------

BETX Surrogate Recovery

Trifluorotoluene	99.1%
Bromobenzene	95.7%

Gasoline Surrogate Recovery

Trifluorotoluene	97.5%
Bromobenzene	95.7%

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
2/14/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a006.d ARI ID: MB0204
Data file 2: /chem3/pid2.i/020411-2.b/0204a006.d Client ID:
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 07:51
Instrument: pid2.i Matrix: WATER
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.126	-0.002	3935	50032	97.5	TFT(Surr)
14.751	-0.002	2383	19855	95.7	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	902	0.002
8015B 2MP-TMB (4.81 to 15.47)	907748	504	0.001
AK101 nC6-nC10 (5.25 to 14.35)	626837	0	0.000
NWTPHG Tol-Nap (9.88 to 18.21)	481270	902	0.002

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
8.154	-0.002	2393	99.1	TFT(Surr)
14.767	-0.002	6350	95.7	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

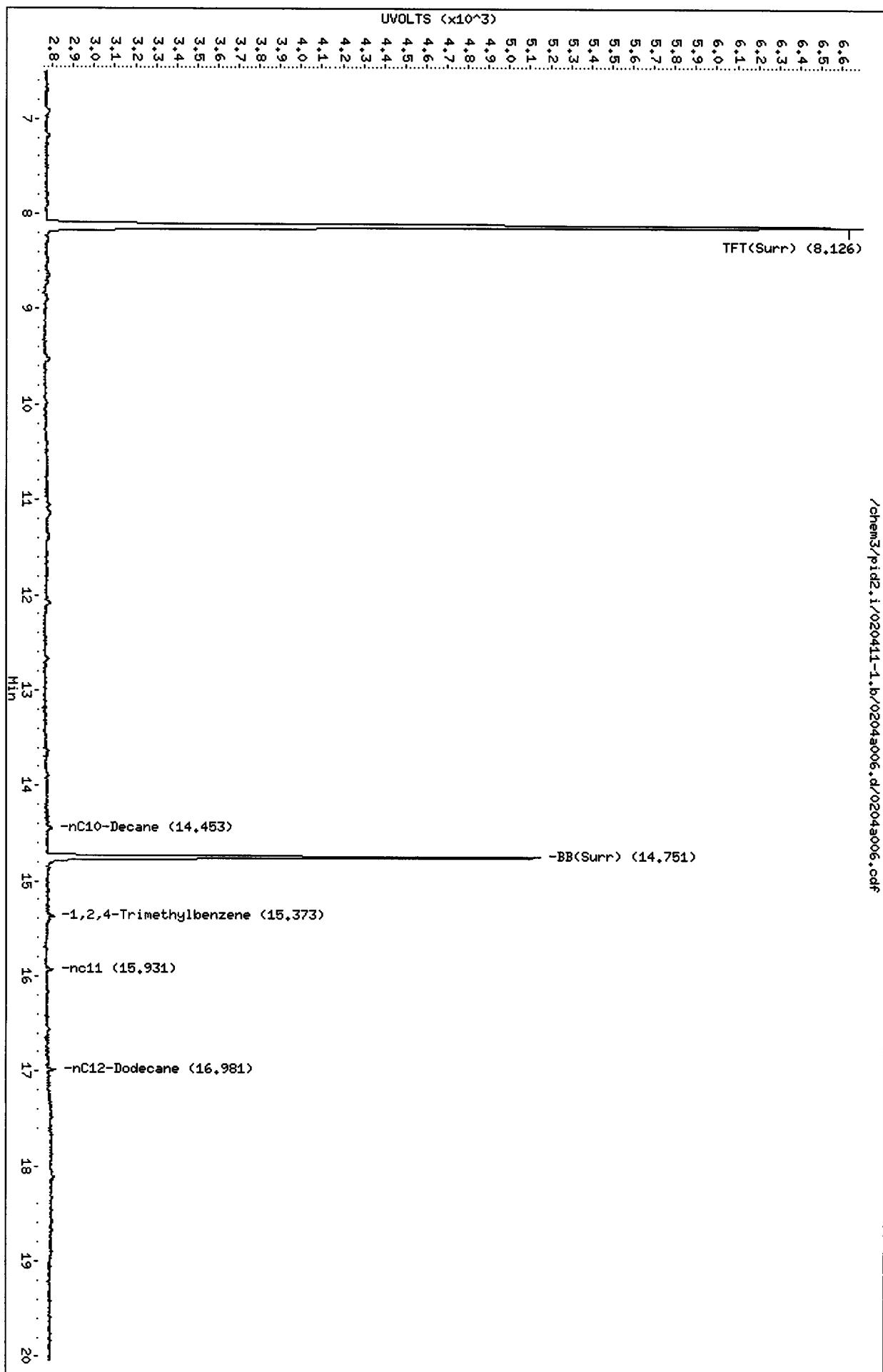
A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid2.i/020411-1.b/0204a006.d
Date : 04-FEB-2011 07:51
Client ID:
Sample Info: MB0204

Page 1

Column phase: RTX 502-2 FID

Instrument: pid2.i
Operator: MH
Column diameter: 0.18



SH30 : 00102

Data File: /chem3/pid2.i/020411-2.b/0204a006.d

Date : 04-FEB-2011 07:51

Client ID:

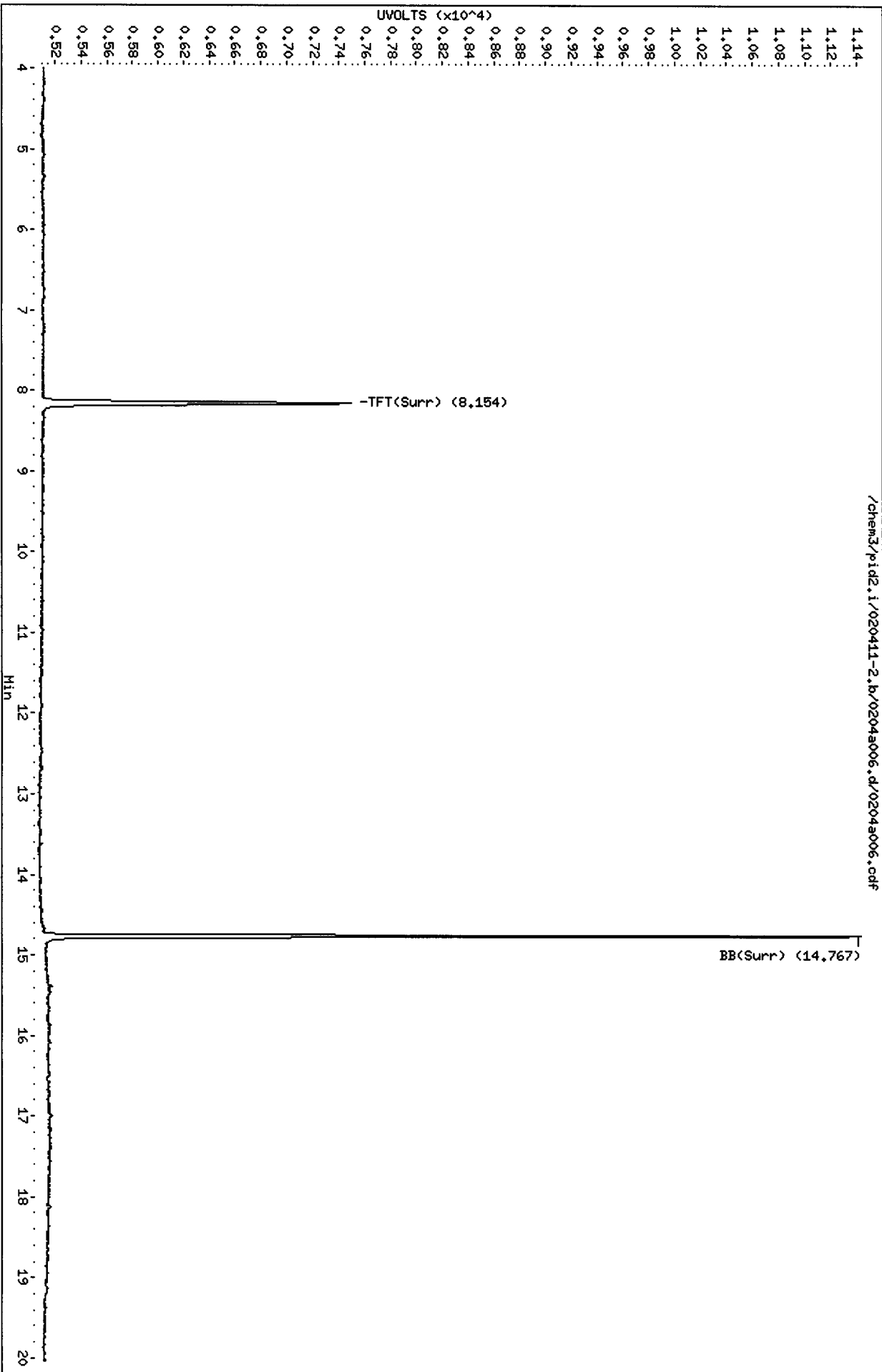
Sample Info: MB0204

Instrument: pid2.i

Operator: HH

Column diameter: 0.18

Column phase: RTX 502-2 PID



SH30 : 00103

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS

NWTPHD by GC/FID

Page 1 of 2

Matrix: Soil




QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

J11001

Date Received: 02/02/11

Data Release Authorized: 

Reported: 02/10/11

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
SH30A 11-2230	B11-12-20 HC ID: ---	02/04/11	02/07/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.6 11	< 5.6 U < 11 U 90.5%
SH30B 11-2231	B11-12-25 HC ID: ---	02/04/11	02/07/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.7 12	< 5.7 U < 12 U 95.3%
SH30C 11-2232	B11-12-30 HC ID: ---	02/04/11	02/07/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.9 12	< 5.9 U < 12 U 101%
SH30D 11-2233	B11-12-35 HC ID: ---	02/04/11	02/07/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.7 11	< 5.7 U < 11 U 102%
SH30E 11-2234	B11-13-15 HC ID: ---	02/04/11	02/07/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.4 11	< 5.4 U < 11 U 99.4%
SH30F 11-2235	B11-13-20 HC ID: ---	02/04/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.5 11	< 5.5 U < 11 U 102%
SH30G 11-2236	B11-13-23 HC ID: ---	02/04/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.7 11	< 5.7 U < 11 U 102%
SH30H 11-2237	B11-13-30 HC ID: ---	02/04/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.9 12	< 5.9 U < 12 U 112%
SH30I 11-2238	B11-14-09 HC ID: DIESEL	02/04/11	02/10/11 FID9	1.00 25	Diesel Motor Oil o-Terphenyl	140 270	2,400 < 270 U D
MB-020411 11-2239	Method Blank HC ID: ---	02/04/11	02/07/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.0 10	< 5.0 U < 10 U 104%
SH30J 11-2239	B11-14-15 HC ID: ---	02/04/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.4 11	< 5.4 U < 11 U 110%
SH30K 11-2240	B11-14-20 HC ID: DIESEL/RRO	02/04/11	02/08/11 FID3B	1.00 50	Diesel Motor Oil o-Terphenyl	280 570	7,100 1,100 D
SH30L 11-2241	B11-14-23 HC ID: DIESEL	02/04/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.8 12	88 < 12 U 106%

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS

NWTPHD by GC/FID

Page 2 of 2

Matrix: Soil



QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

J11001

Date Received: 02/02/11

Data Release Authorized: *JB*

Reported: 02/10/11

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
SH30M 11-2242	B11-14-30 HC ID: DIESEL/RRO	02/04/11	02/08/11 FID3B	1.00 100	Diesel Motor Oil o-Terphenyl	560 1,100	15,000 1,700 D
SH30N 11-2243	B11-15-15 HC ID: ---	02/04/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.8 12	< 5.8 U < 12 U 112%
SH30O 11-2244	B11-15-20 HC ID: ---	02/04/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.5 11	< 5.5 U < 11 U 110%
SH30P 11-2245	B11-15-25 HC ID: ---	02/04/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.7 11	< 5.7 U < 11 U 116%
SH30Q 11-2246	B11-15-30 HC ID: ---	02/04/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.4 11	< 5.4 U < 11 U 112%
SH30S 11-2248	B11-16-15 HC ID: ---	02/04/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.5 11	< 5.5 U < 11 U 112%
SH30T 11-2249	B11-16-20 HC ID: ---	02/04/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.7 11	< 5.7 U < 11 U 115%

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.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b017.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30A
Client ID:
Injection: 07-FEB-2011 22:18
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.247	0.003	58961	49551	GAS (Tol-C12)	338991	21
C8	1.328	0.000	9817	10560	DIESEL (C12-C24)	85686	9
C10	1.928	0.002	3105	3745	M.OIL (C24-C38)	23402	4
C12	2.670	0.004	1037	1180	AK-102 (C10-C25)	155443	14
C14	3.389	0.003	1019	1277	AK-103 (C25-C36)	16306	2
C16	4.049	0.002	711	670	OR.DIES (C10-C28)	160321	6
C18	4.677	-0.002	620	559	OR.MOIL (C28-C40)	30412	3
C20	5.281	0.000	467	606	MIN.OIL (C24-C38)	23402	4
C22	5.848	-0.002	257	231	STODDARD (C8-C12)	234625	8
C24	6.374	-0.008	435	376			
C25	6.629	-0.006	247	171			
C26	6.879	-0.008	180	169			
C28	7.394	-0.009	306	257			
C32	8.459	-0.006	455	456			
C34	8.995	0.003	96	48	CREOSOT (C8-C22)	83176	13
Filter Peak	11.145	0.004	463	245			
C36	9.501	-0.002	168	42	BUNKERC (C10-C38)	178571	21
o-terph	4.843	0.000	634235	389617	JET-A (C10-C18)	139261	27
Triacon Surr	7.931	-0.008	326271	272761	IT.MOIL (C24-C40)	308324	14

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	389617	40.7	90.5
Triacontane	272761	36.3	80.8

02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b017.d

Date : 07-FEB-2011 22:18

Client ID:

Sample Info: SH30A

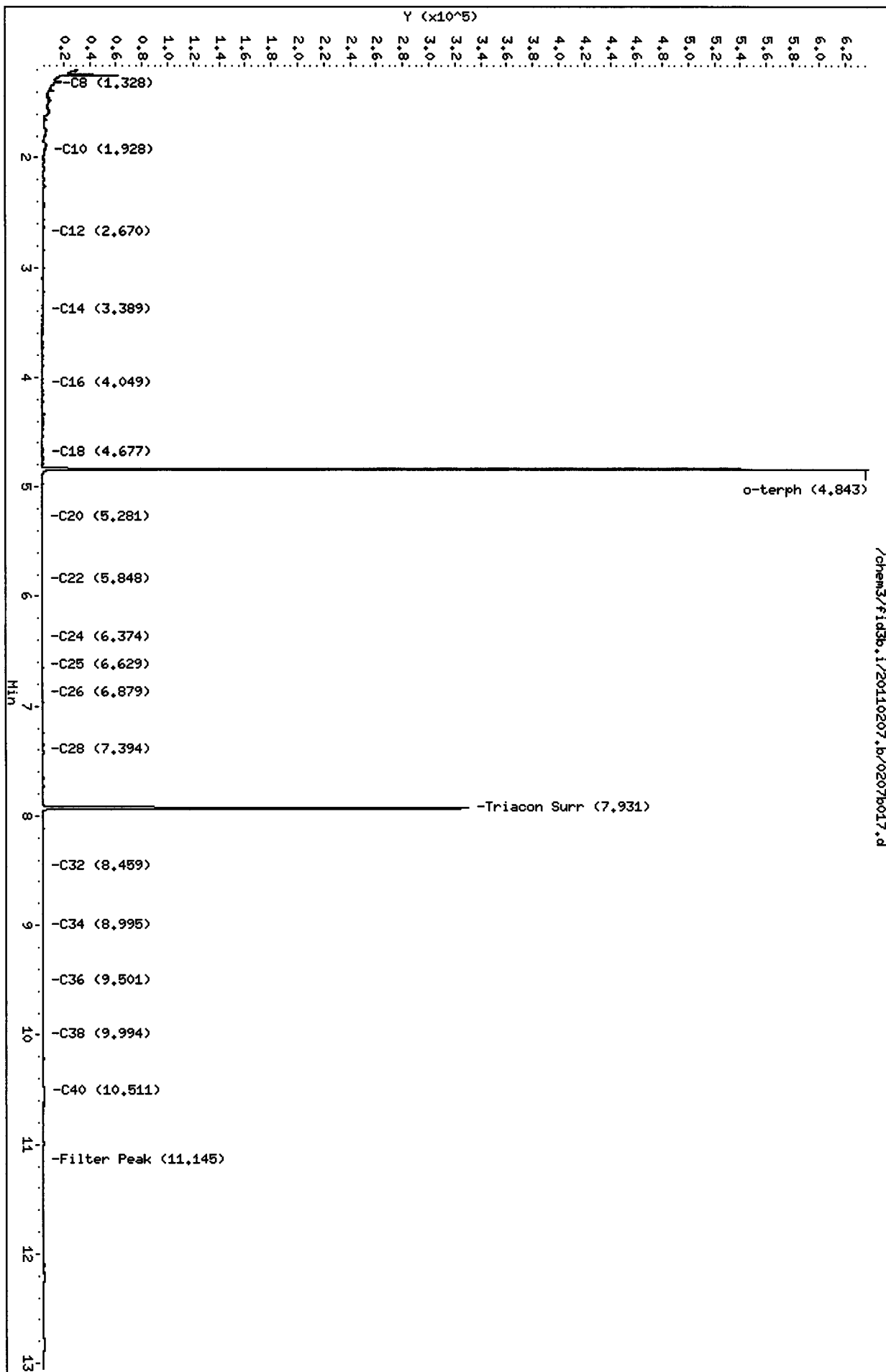
Column phase: RTX-1

Instrument: fid3b.i

Operator: HS

Column diameter: 0.25

Page 1



SH30 : 00107

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b018.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30B
Client ID:
Injection: 07-FEB-2011 22:40
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.247	0.003	23322	22398	GAS (Tol-C12)	320640	20
C8	1.330	0.002	9519	7862	DIESEL (C12-C24)	93288	10
C10	1.928	0.001	2840	3468	M.OIL (C24-C38)	29501	5
C12	2.669	0.003	903	556	AK-102 (C10-C25)	165262	15
C14	3.389	0.003	976	783	AK-103 (C25-C36)	21991	3
C16	4.051	0.003	669	698	OR.DIES (C10-C28)	169991	7
C18	4.675	-0.003	549	497	OR.MOIL (C28-C40)	34828	3
C20	5.279	-0.001	431	454	MIN.OIL (C24-C38)	29501	5
C22	5.846	-0.004	378	275	STODDARD (C8-C12)	235472	9
C24	6.375	-0.006	571	510			
C25	6.627	-0.008	542	373			
C26	6.882	-0.005	449	439			
C28	7.394	-0.009	471	383			
C32	8.458	-0.007	636	713			
C34	8.994	0.002	121	57	CREOSOT (C8-C22)	90820	14
Filter Peak	11.138	-0.003	475	250			
C36	9.507	0.004	153	73	BUNKERC (C10-C38)	194139	23
o-terph	4.842	-0.001	649001	410309	JET-A (C10-C18)	150092	29
Triacon Surr	7.932	-0.007	332786	294099	IT.MOIL (C24-C40)	334280	16

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	410309	42.9	95.3
Triacontane	294099	39.2	87.1

Handwritten signature and date: 02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b018.d

Page 1

Date : 07-FEB-2011 22:40

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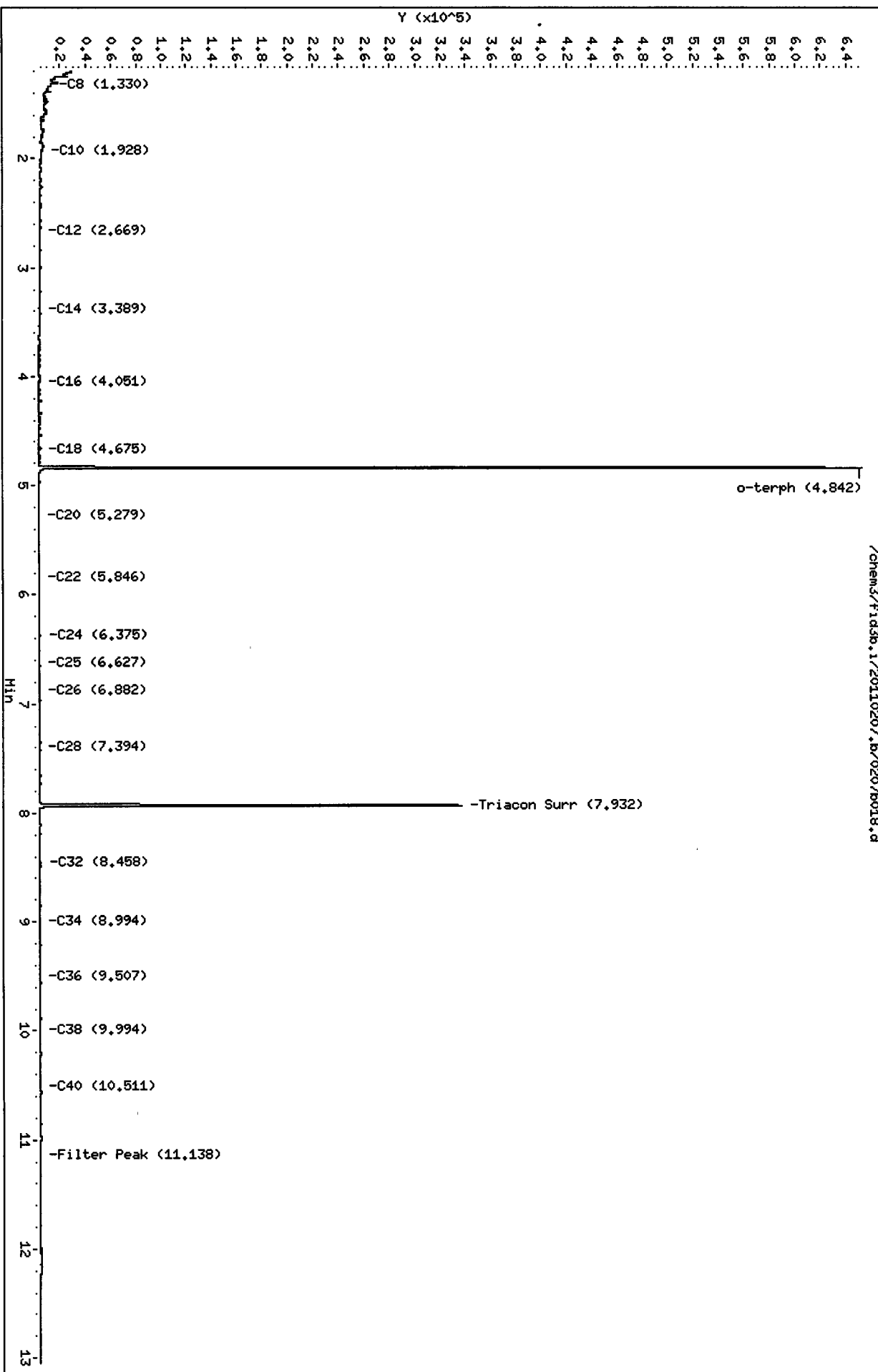
Instrument: fid3b.i

Sample Info: SH30B

Operator: HS

Column phase: RTX-1

Column diameter: 0.25



SH30 : 00109

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b019.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30C
Client ID:
Injection: 07-FEB-2011 23:02
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.247	0.002	24297	29265	GAS (Tol-C12)	330682	21
C8	1.327	-0.001	9862	13834	DIESEL (C12-C24)	118258	12
C10	1.929	0.002	2799	3461	M.OIL (C24-C38)	21611	4
C12	2.654	-0.012	1723	2213	AK-102 (C10-C25)	192158	18
C14	3.387	0.001	1448	1195	AK-103 (C25-C36)	14773	2
C16	4.048	0.001	726	819	OR.DIES (C10-C28)	195260	8
C18	4.676	-0.002	541	525	OR.MOIL (C28-C40)	27754	2
C20	5.278	-0.003	364	395	MIN.OIL (C24-C38)	21611	3
C22	5.846	-0.004	178	101	STODDARD (C8-C12)	245466	9
C24	6.389	0.007	73	32			
C25	6.629	-0.006	118	83			
C26	6.881	-0.005	137	72			
C28	7.394	-0.009	252	241			
C32	8.454	-0.011	496	519			
C34	8.996	0.004	81	34	CREOSOT (C8-C22)	115663	18
Filter Peak	11.144	0.004	475	169			
C36	9.501	-0.002	156	86	BUNKERC (C10-C38)	213118	25
o-terph	4.842	0.000	715551	433174	JET-A (C10-C18)	170949	33
Triacon Surr	7.931	-0.008	344577	317646	IT.MOIL (C24-C40)	349153	16

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	433174	45.3	100.7
Triacontane	317646	42.3	94.0

202/09/07

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b019.d

Date : 07-FEB-2011 23:02

Client ID:

Sample Info: SH30C

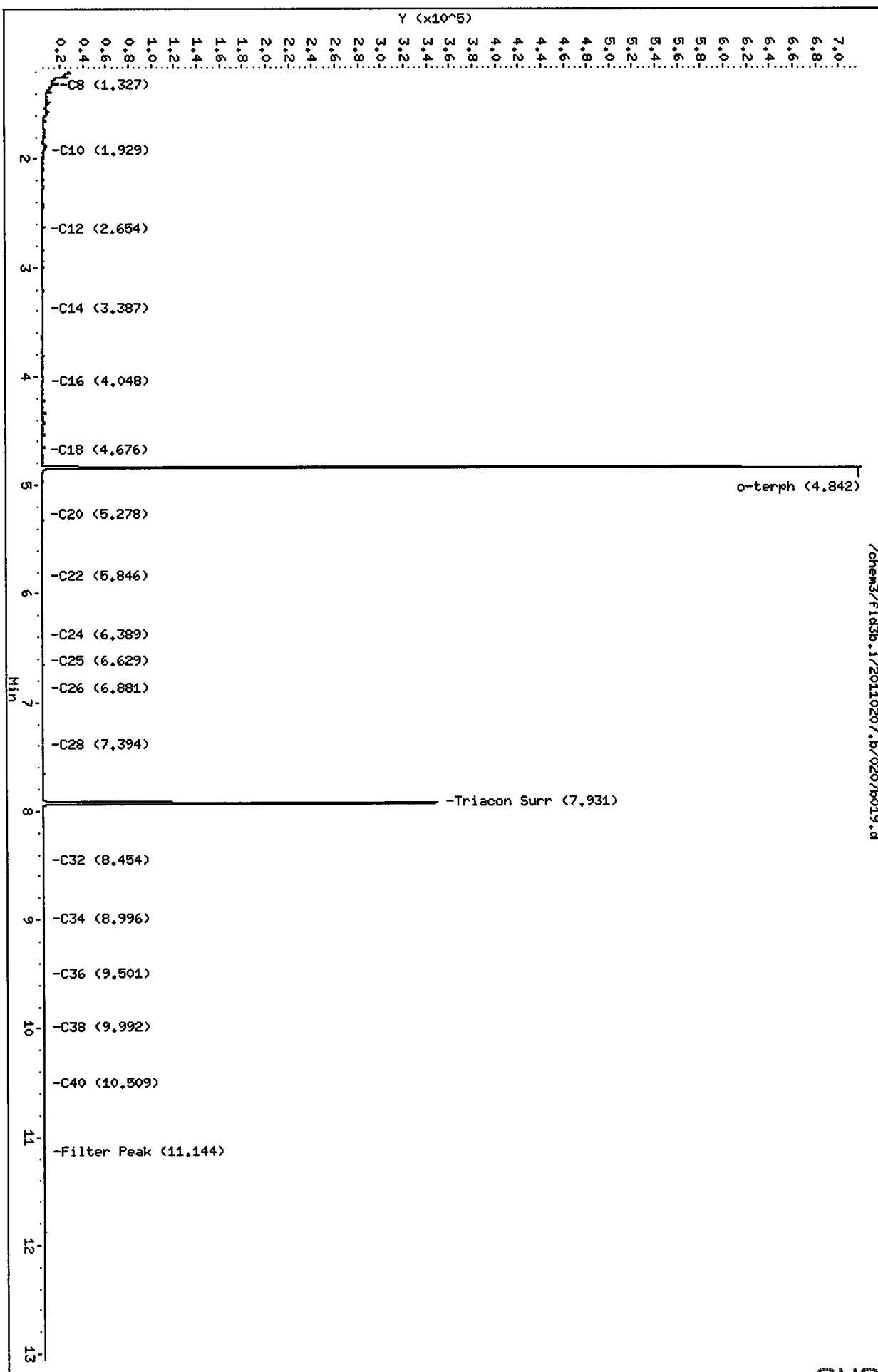
Column phase: RTX-1

Instrument: fid3b.i

Operator: HS

Column diameter: 0.25

Page 1



SH30 : 00111

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b020.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30D
Client ID:
Injection: 07-FEB-2011 23:25
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.245	0.000	25850	31660	GAS (Tol-C12)	310579	19
C8	1.329	0.001	9368	9419	DIESEL (C12-C24)	93278	10
C10	1.927	0.000	2679	3089	M.OIL (C24-C38)	20784	4
C12	2.668	0.002	803	380	AK-102 (C10-C25)	162043	15
C14	3.389	0.002	1267	1395	AK-103 (C25-C36)	14286	2
C16	4.049	0.002	711	712	OR.DIES (C10-C28)	166159	7
C18	4.677	-0.001	513	618	OR.MOIL (C28-C40)	27573	2
C20	5.280	0.000	315	265	MIN.OIL (C24-C38)	20784	3
C22	5.848	-0.002	120	91	STODDARD (C8-C12)	234278	8
C24	6.372	-0.010	388	320			
C25	6.630	-0.005	127	83			
C26	6.884	-0.002	186	89			
C28	7.395	-0.008	292	281			
C32	8.461	-0.004	511	535			
C34	8.992	0.000	94	48	CREOSOT (C8-C22)	91617	14
Filter Peak	11.144	0.004	461	237			
C36	9.502	-0.001	159	59	BUNKERC (C10-C38)	182636	21
o-terph	4.842	0.000	700887	436653	JET-A (C10-C18)	147274	29
Triacon Surr	7.935	-0.004	367449	316443	IT.MOIL (C24-C40)	348324	16

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	436653	45.7	101.5
Triacontane	316443	42.2	93.7

02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Date : 07-FEB-2011 23:25

Client ID:

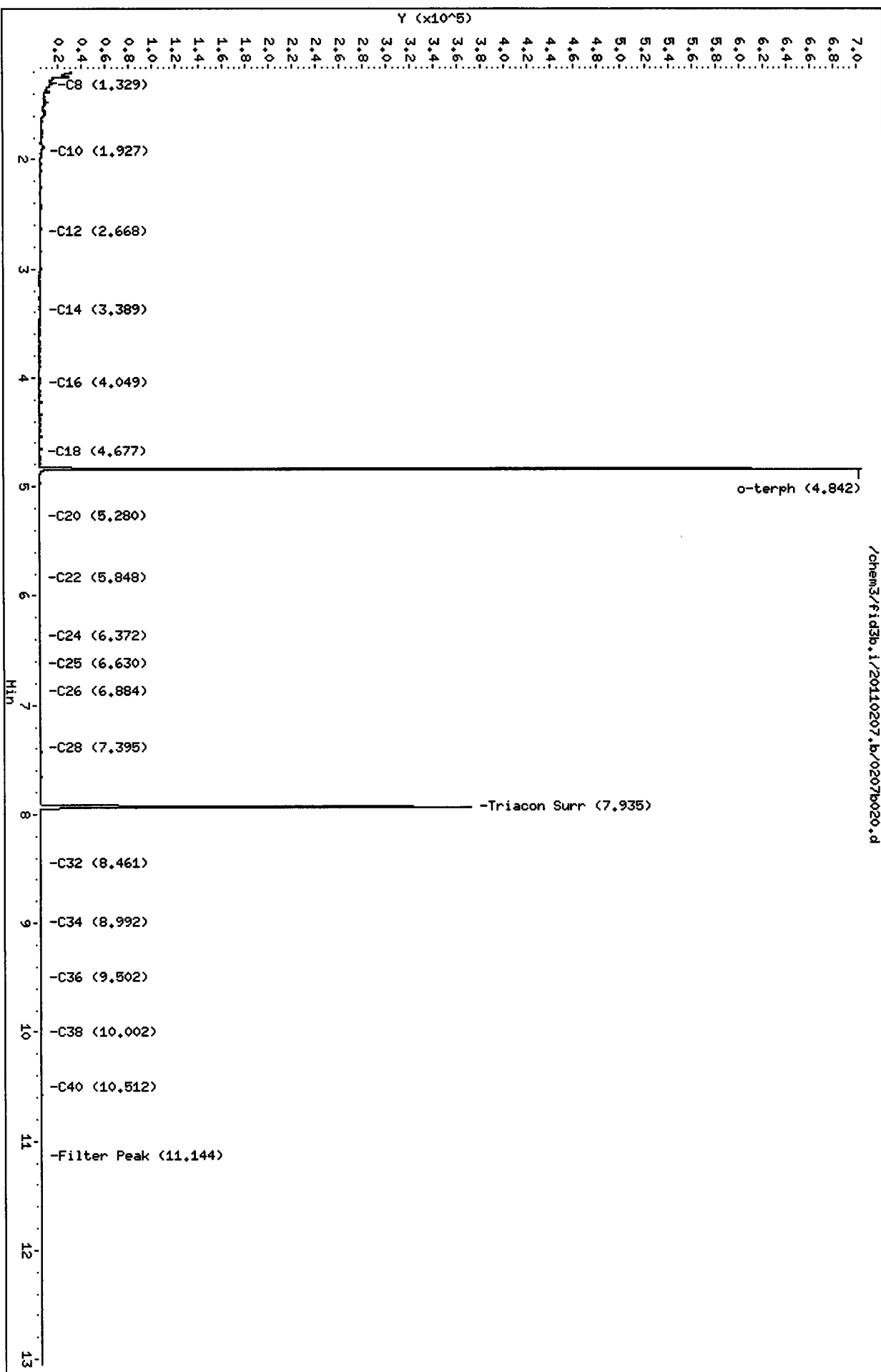
Sample Info: SH30D

Instrument: fid3b.i

Operator: HS

Column diameter: 0.25

Column phase: RTX-1



SH30D : 00113

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b021.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30E
Client ID:
Injection: 07-FEB-2011 23:47
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.248	0.003	22307	20954	GAS (Tol-C12)	322421	20
C8	1.327	-0.001	9617	12174	DIESEL (C12-C24)	106136	11
C10	1.929	0.002	2574	3344	M.OIL (C24-C38)	29510	5
C12	2.671	0.004	696	286	AK-102 (C10-C25)	177223	16
C14	3.389	0.002	814	619	AK-103 (C25-C36)	24609	3
C16	4.049	0.001	810	694	OR.DIES (C10-C28)	188271	7
C18	4.677	-0.002	843	1046	OR.MOIL (C28-C40)	24463	2
C20	5.279	-0.002	638	874	MIN.OIL (C24-C38)	29510	5
C22	5.847	-0.003	254	223	STODDARD (C8-C12)	238556	9
C24	6.369	-0.013	797	758			
C25	6.628	-0.007	398	260			
C26	6.886	-0.001	6816	4766			
C28	7.394	-0.009	705	678			
C32	8.455	-0.010	689	685			
C34	8.987	-0.005	97	49	CREOSOT (C8-C22)	102840	16
Filter Peak	11.137	-0.004	388	122			
C36	9.508	0.005	106	24	BUNKERC (C10-C38)	205993	24
o-terph	4.843	0.000	668261	427741	JET-A (C10-C18)	150819	29
Triacon Surr	7.934	-0.006	362531	326848	IT.MOIL (C24-C40)	363098	17

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	427741	44.7	99.4
Triacontane	326848	43.5	96.8

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

SH30:00114

Date : 07-FEB-2011 23:47

Client ID:

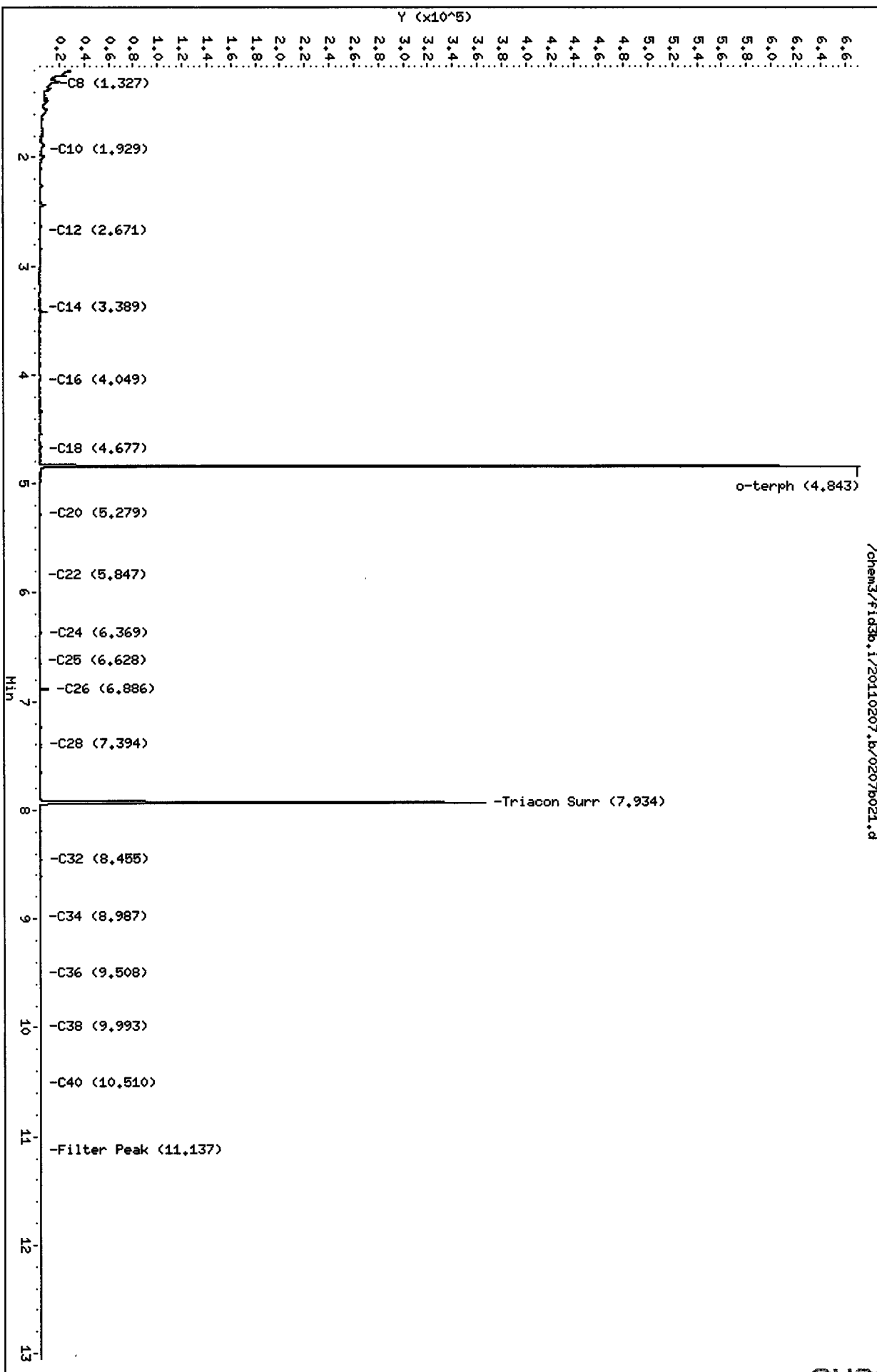
Sample Info: SH30E

Instrument: fid3b.i

Operator: HS

Column diameter: 0.25

Column phase: RTX-1



Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b022.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30F
Client ID:
Injection: 08-FEB-2011 00:10
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.246	0.001	24443	30811	GAS (Tol-C12)	327654	21
C8	1.327	-0.001	9742	11661	DIESEL (C12-C24)	111971	12
C10	1.927	0.001	2605	3145	M.OIL (C24-C38)	22180	4
C12	2.668	0.002	846	522	AK-102 (C10-C25)	181084	17
C14	3.389	0.002	1628	1579	AK-103 (C25-C36)	15571	2
C16	4.050	0.002	598	607	OR.DIES (C10-C28)	185636	7
C18	4.676	-0.003	506	416	OR.MOIL (C28-C40)	26985	2
C20	5.281	0.000	286	234	MIN.OIL (C24-C38)	22180	3
C22	5.847	-0.003	189	154	STODDARD (C8-C12)	237266	9
C24	6.375	-0.006	537	483			
C25	6.631	-0.004	521	352			
C26	6.884	-0.002	596	538			
C28	7.397	-0.005	591	460			
C32	8.460	-0.005	581	602			
C34	8.995	0.003	100	46	CREOSOT (C8-C22)	109423	17
Filter Peak	11.145	0.005	476	292			
C36	9.506	0.003	144	65	BUNKERC (C10-C38)	202983	24
o-terph	4.842	0.000	692227	438918	JET-A (C10-C18)	163197	32
Triacon Surr	7.936	-0.003	361362	331004	IT.MOIL (C24-C40)	362822	17

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	438918	45.9	102.0
Triacontane	331004	44.1	98.0

Handwritten signature/initials

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b022.d

Date : 08-FEB-2011 00:10

Client ID:

Sample Info: SH30F

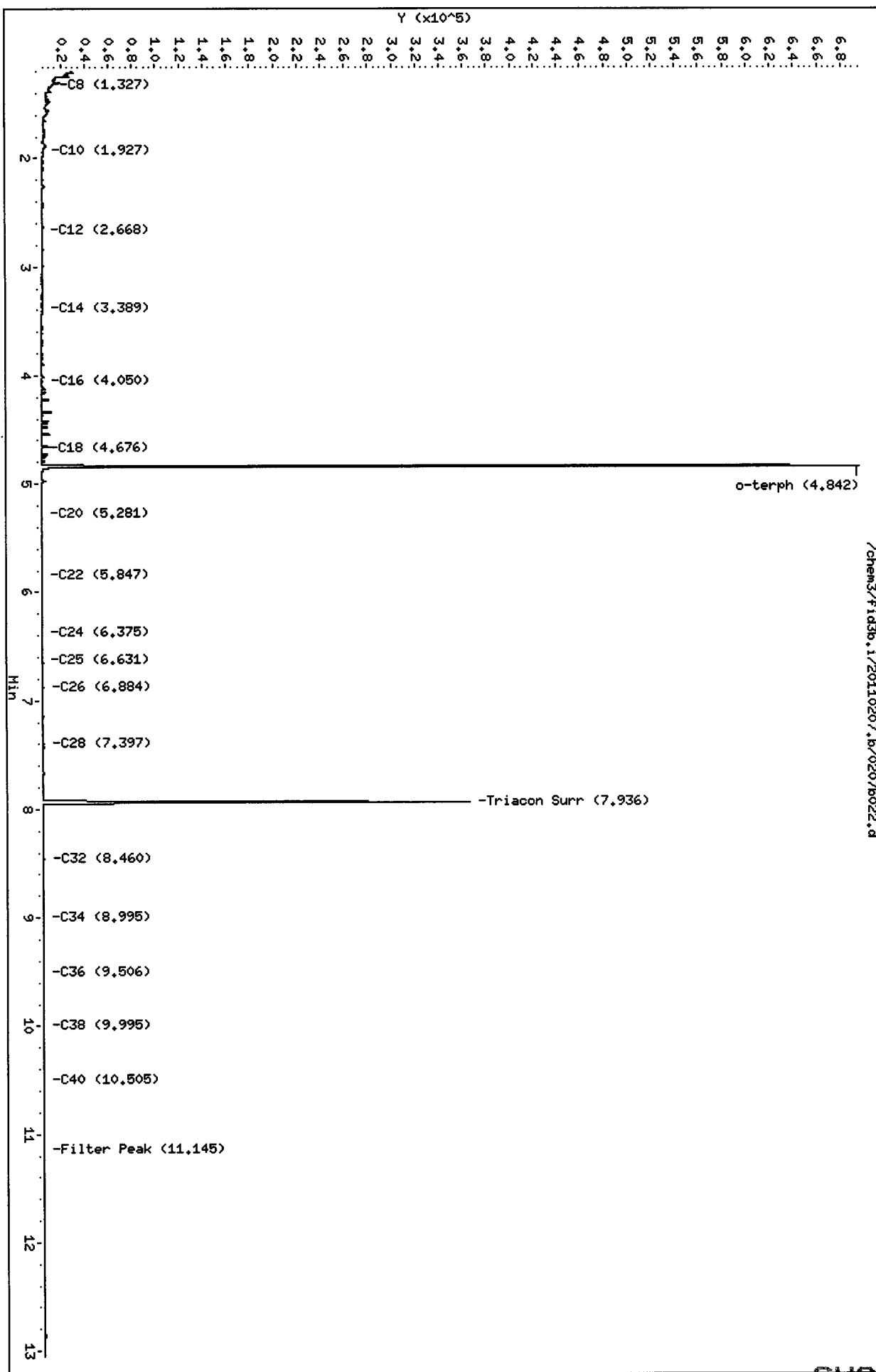
Column phase: RTX-1

Instrument: fid3b.i

Operator: HS

Column diameter: 0.25

Page 1



SH30: 00117

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b023.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30G
Client ID:
Injection: 08-FEB-2011 00:32
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.242	-0.003	25950	32401	GAS (Tol-C12)	322703	20
C8	1.326	-0.002	9660	10865	DIESEL (C12-C24)	63909	7
C10	1.925	-0.001	2356	3101	M.OIL (C24-C38)	51583	9
C12	2.670	0.003	617	193	AK-102 (C10-C25)	129284	12
C14	3.390	0.003	733	573	AK-103 (C25-C36)	43819	5
C16	4.051	0.004	405	394	OR.DIES (C10-C28)	141210	6
C18	4.677	-0.002	422	331	OR.MOIL (C28-C40)	48172	4
C20	5.281	0.001	396	376	MIN.OIL (C24-C38)	51583	8
C22	5.849	-0.001	331	247	STODDARD (C8-C12)	228208	8
C24	6.375	-0.007	721	628			
C25	6.629	-0.006	738	499			
C26	6.882	-0.004	722	820			
C28	7.397	-0.006	872	1048			
C32	8.458	-0.007	992	1090			
C34	8.986	-0.006	242	214	CREOSOT (C8-C22)	61582	10
Filter Peak	11.138	-0.002	331	212			
C36	9.493	-0.010	212	84	BUNKERC (C10-C38)	180446	21
o-terph	4.843	0.000	681644	440001	JET-A (C10-C18)	116318	23
Triacon Surr	7.937	-0.002	380365	347773	IT.MOIL (C24-C40)	408291	19

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	440001	46.0	102.2
Triacontane	347773	46.3	103.0

Handwritten signature and date: 02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b023.d

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Date : 08-FEB-2011 00:32

Client ID:

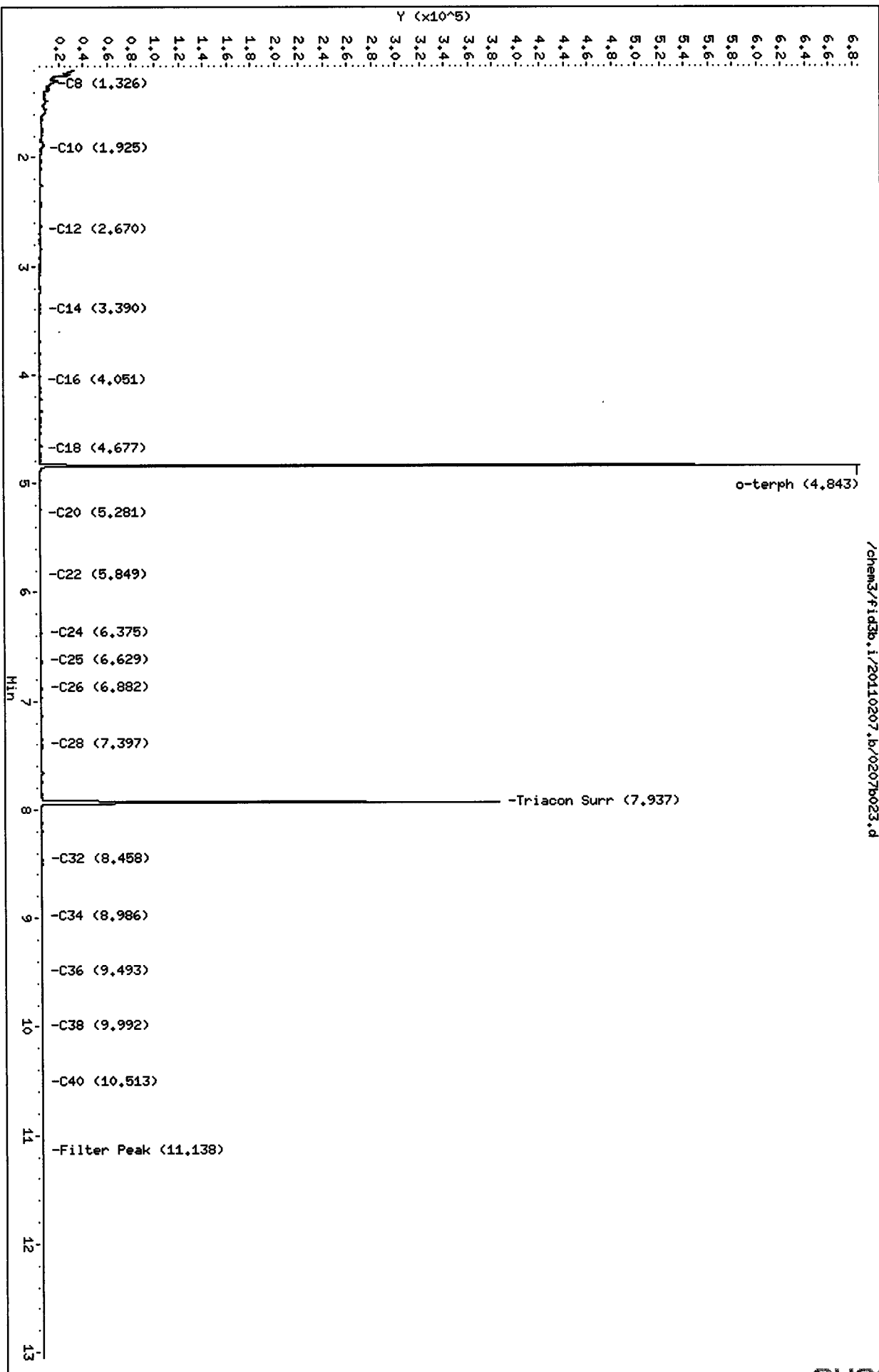
Instrument: fid3b.i

Sample Info: SH30C

Operator: HS

Column phase: RTX-1

Column diameter: 0.25



SH30 : 00110

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b024.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30H
Client ID:
Injection: 08-FEB-2011 00:55
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.244	-0.001	25949	33988	GAS (Tol-C12)	341494	21
C8	1.352	0.024	8235	9209	DIESEL (C12-C24)	76901	8
C10	1.926	-0.001	2754	3550	M.OIL (C24-C38)	21651	4
C12	2.671	0.005	869	308	AK-102 (C10-C25)	154143	14
C14	3.388	0.001	1080	1191	AK-103 (C25-C36)	14704	2
C16	4.049	0.002	457	380	OR.DIES (C10-C28)	157922	6
C18	4.675	-0.003	311	279	OR.MOIL (C28-C40)	28705	3
C20	5.281	0.000	179	161	MIN.OIL (C24-C38)	21651	3
C22	5.850	0.000	110	37	STODDARD (C8-C12)	248279	9
C24	6.373	-0.008	403	335			
C25	6.630	-0.005	164	127			
C26	6.881	-0.006	189	171			
C28	7.394	-0.009	353	290			
C32	8.459	-0.006	617	659			
C34	9.000	0.008	94	38	CREOSOT (C8-C22)	75025	12
Filter Peak	11.142	0.002	512	100			
C36	9.508	0.005	161	96	BUNKERC (C10-C38)	175578	21
o-terph	4.842	0.000	756300	482567	JET-A (C10-C18)	143768	28
Triacon Surr	7.936	-0.003	437055	381752	IT.MOIL (C24-C40)	414452	19

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	482567	50.5	112.1
Triacontane	381752	50.9	113.0

Handwritten signature

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b024.d

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Date : 08-FEB-2011 00:55

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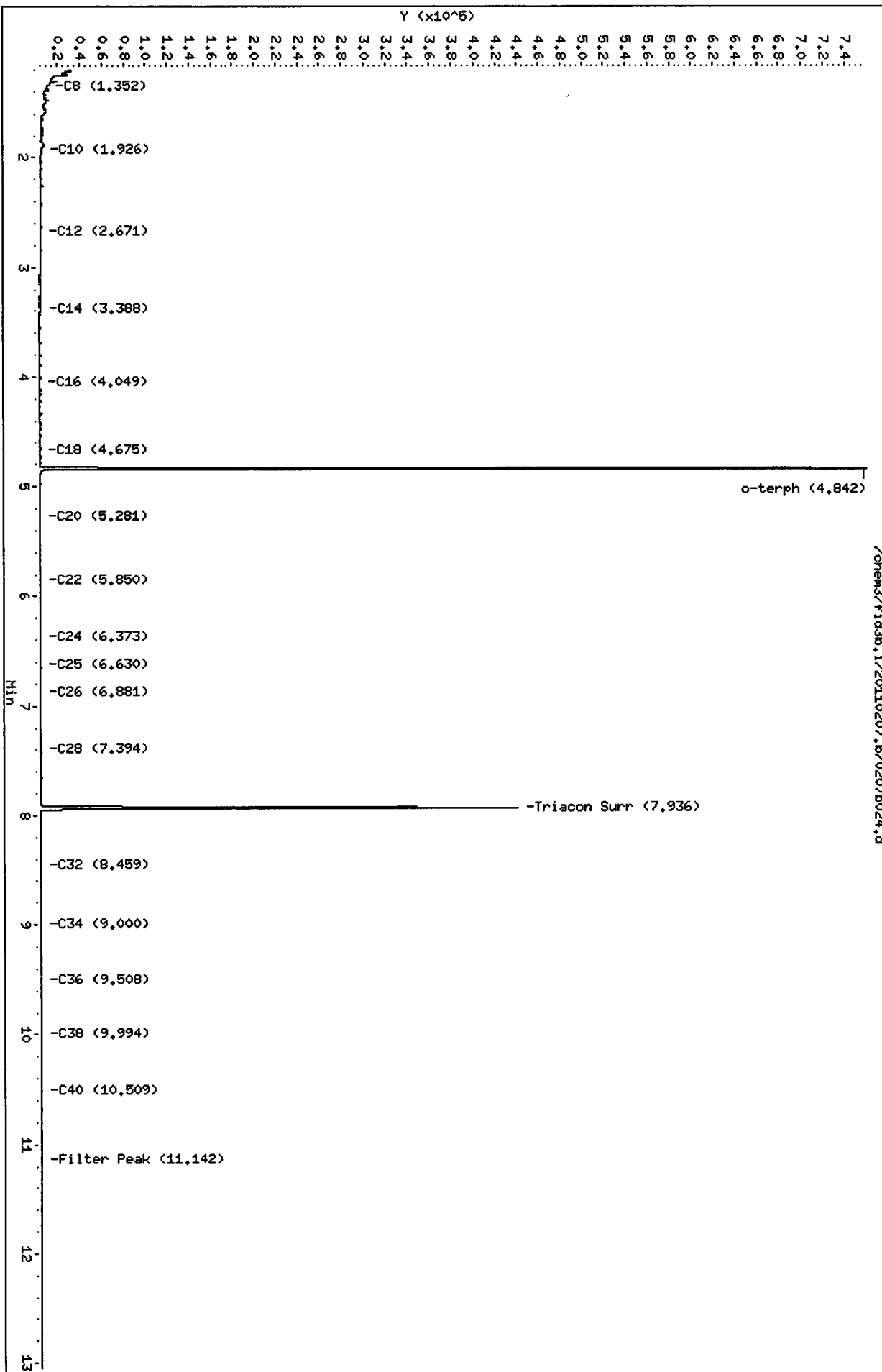
Instrument: fid3b.i

Sample Info: SH30H

Operator: MS

Column phase: RTX-1

Column diameter: 0.25



SH30 : 00121

Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110209.B/0209A035.D
Method: /chem2/fid9.i/20110209.B/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 02/10/2011

ARI ID: SH30I
Client ID:
Injection: 10-FEB-2011 02:37
Dilution Factor: 25
Macro: 20-JAN-2011

FID:9 RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.349	-0.009	20647	18130	GAS (Tol-C12)	666803	32
C8	1.402	0.098	3401	11490	DIESEL (C12-C24)	19434650	858
C10	1.980	-0.005	1284	1842	M.OIL (C24-C38)	449899	34
C12	2.624	0.005	28662	16607	AK-102 (C10-C25)	20127969	789 M
C14	3.155	0.000	117393	41250	AK-103 (C25-C36)	357626	42 M
C16	3.620	-0.002	191965	68724			
C18	4.041	-0.001	236165	63973			
C20	4.430	0.002	185977	186858			
C22	4.818	-0.001	60331	48438			
C24	5.317	0.002	14208	2779			
C25	5.538	-0.002	8929	2290			
C26	5.742	0.002	5743	2696			
C28	6.095	-0.001	3774	2358			
C32	6.696	-0.001	1336	1023	JP-4 (Tol-C14)	3223412	197
C34	6.974	0.010	958	351	BUNKERC (C10-C38)	20496427	2423 M
Filter Peak	----						
C36	7.220	0.000	705	259			
C38	7.471	0.005	403	225			
C40	7.731	-0.004	245	99			
o-terph	----				JET-A (C10-C18)	12938690	936
Triacon Surr	6.402	-0.017	64306	31534	JP8 (Tol-C16)	7483237	425

M Indicates manual integration within range.

Range Times: NW Diesel(2.619 - 5.314) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.31 - 7.47) AK103(5.54 - 7.22) OR Diesel(1.99 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacontane	31534	1.8	99.4

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

Data File: /chem2/fid9.i/20110209.B/0209A035.D

Date : 10-FEB-2011 02:37

Client ID:

Sample Info: SH301,25

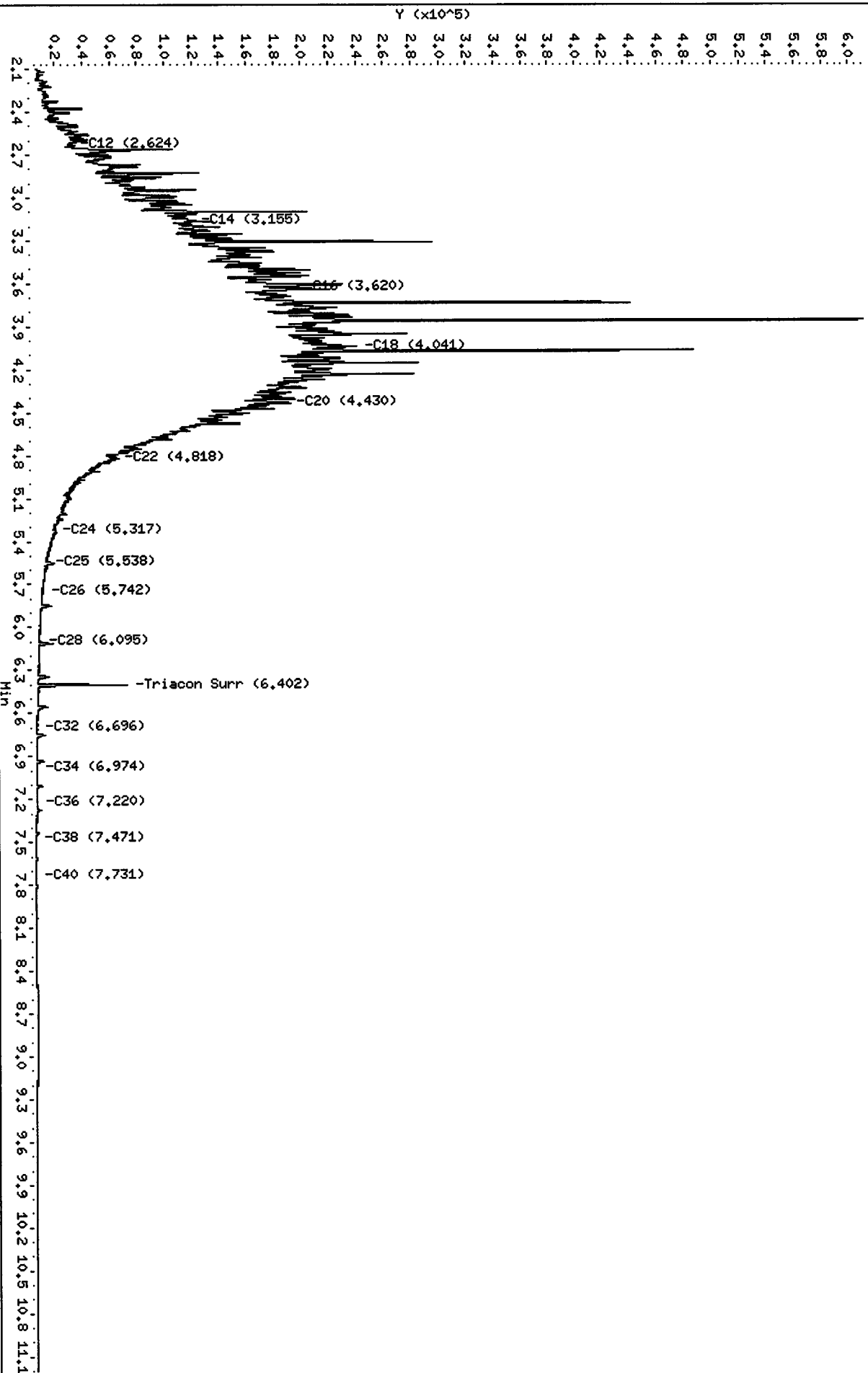
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Instrument: fid9.i

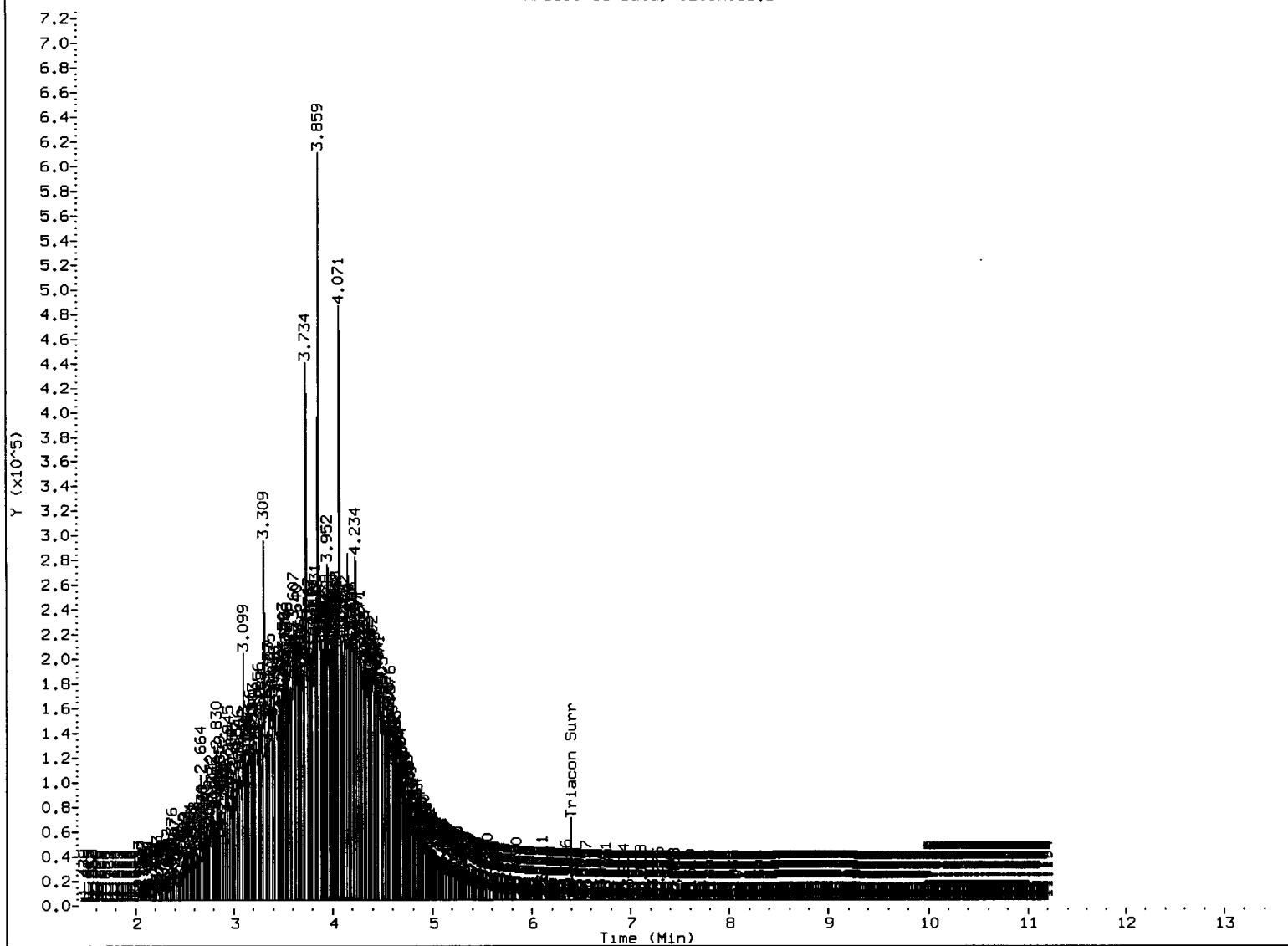
Operator: HS

Column diameter: 0.25

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HP6890 GC Data, 0209A035.D



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: MrDate: 2/10/11

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b014.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30MBS1
Client ID:
Injection: 07-FEB-2011 21:10
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.248	0.003	21410	18829	GAS (Tol-C12)	299049	19
C8	1.327	-0.001	8632	5599	DIESEL (C12-C24)	58959	6
C10	1.929	0.003	2511	3314	M.OIL (C24-C38)	161324	28
C12	2.663	-0.004	793	378	AK-102 (C10-C25)	120594	11
C14	3.389	0.003	573	335	AK-103 (C25-C36)	139897	16
C16	4.051	0.004	390	508	OR.DIES (C10-C28)	148131	6
C18	4.678	-0.001	225	214	OR.MOIL (C28-C40)	151949	13
C20	5.281	0.001	109	79	MIN.OIL (C24-C38)	161324	25
C22	5.850	0.000	75	39	STODDARD (C8-C12)	217841	8
C24	6.376	-0.005	305	241			
C25	6.632	-0.003	90	74			
C26	6.883	-0.003	103	93			
C28	7.399	-0.003	302	283			
C32	8.462	-0.003	528	450			
C34	8.995	0.003	164	59	CREOSOT (C8-C22)	56196	9
Filter Peak	11.141	0.000	538	126			
C36	9.503	0.000	217	38	BUNKERC (C10-C38)	281716	33
o-terph	4.843	0.000	707565	447205	JET-A (C10-C18)	112043	22
Triacon Surr	7.938	-0.001	345176	305217	IT.MOIL (C24-C40)	484906	23

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	447205	46.8	103.9
Triacontane	305217	40.7	90.4

Handwritten signature and date: 02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b014.d

Date : 07-FEB-2011 21:10

Client ID:

Sample Info: SH30HBS1

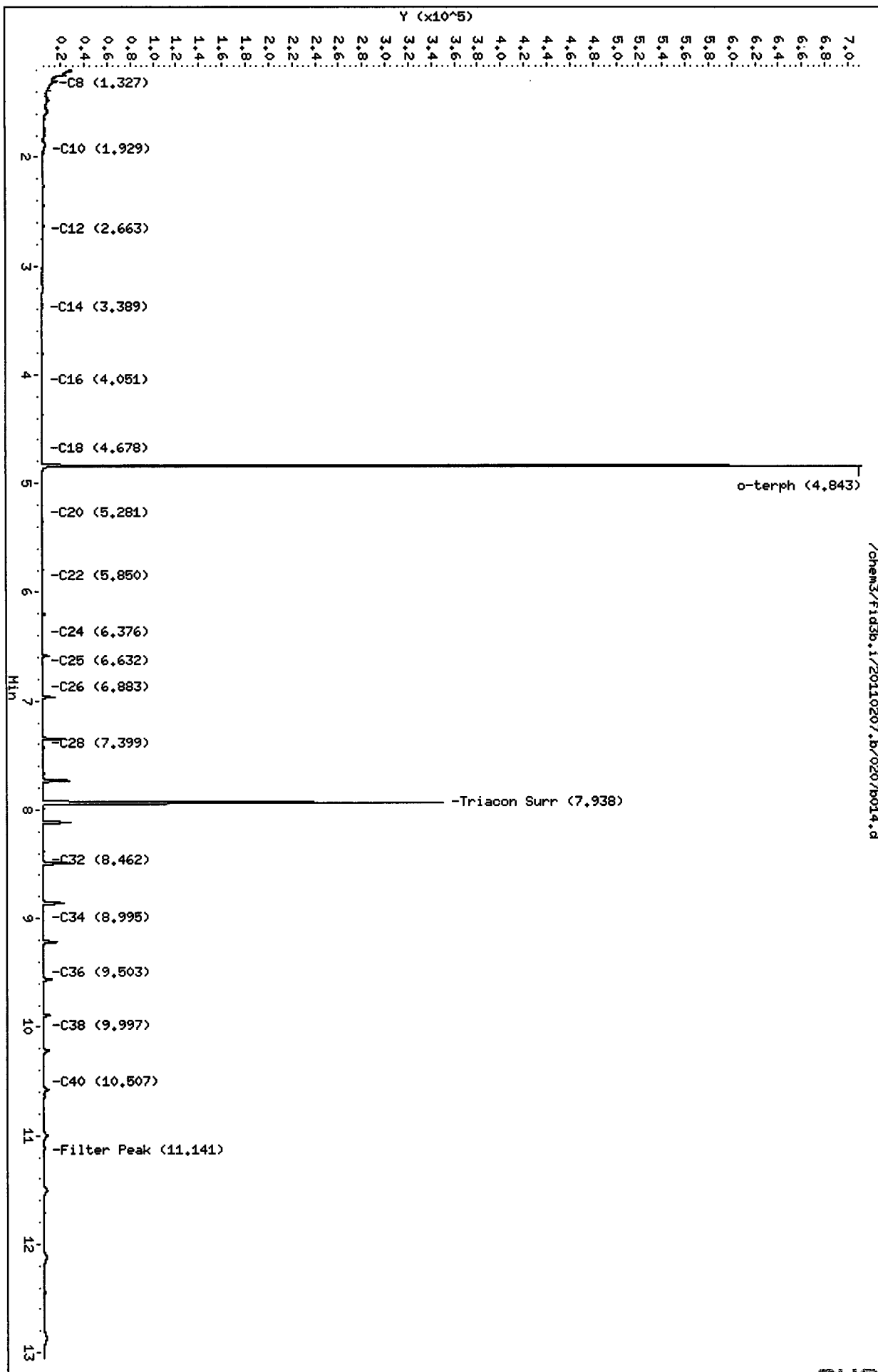
Column phase: RTX-1

Instrument: fid3b.i

Operator: MS

Column diameter: 0.25

Page 1



SH30 : 00126

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b028.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30J
Client ID:
Injection: 08-FEB-2011 14:20
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.244	0.000	28277	32660	GAS (Tol-C12)	359744	23
C8	1.325	-0.003	10499	12688	DIESEL (C12-C24)	281477	29
C10	1.923	-0.004	3024	3452	M.OIL (C24-C38)	42650	7
C12	2.663	-0.004	1186	927	AK-102 (C10-C25)	368561	34
C14	3.383	-0.003	1986	1834	AK-103 (C25-C36)	30876	4
C16	4.044	-0.004	1736	1125	OR.DIES (C10-C28)	374460	15
C18	4.683	0.004	1858	838	OR.MOIL (C28-C40)	51537	5
C20	5.285	0.005	1775	2012	MIN.OIL (C24-C38)	42650	7
C22	5.856	0.006	605	177	STODDARD (C8-C12)	266881	10
C24	6.388	0.006	136	43			
C25	6.645	0.010	1757	1151			
C26	6.880	-0.007	398	430			
C28	7.415	0.013	1179	896			
C32	8.448	-0.017	765	794			
C34	8.987	-0.005	255	64	CREOSOT (C8-C22)	273429	43
Filter Peak	11.144	0.003	484	337			
C36	9.508	0.005	337	206	BUNKERC (C10-C38)	410057	48
o-terph	4.837	-0.006	721108	475501	JET-A (C10-C18)	274587	53
Triacon Surr	7.928	-0.012	409060	380727	IT.MOIL (C24-C40)	439316	20

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	475501	49.7	110.5
Triacantane	380727	50.7	112.7

02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

SH30: 00127

Data File: /chem3/fid3b.i/20110207.b/0207b028.d

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Date : 08-FEB-2011 14:20

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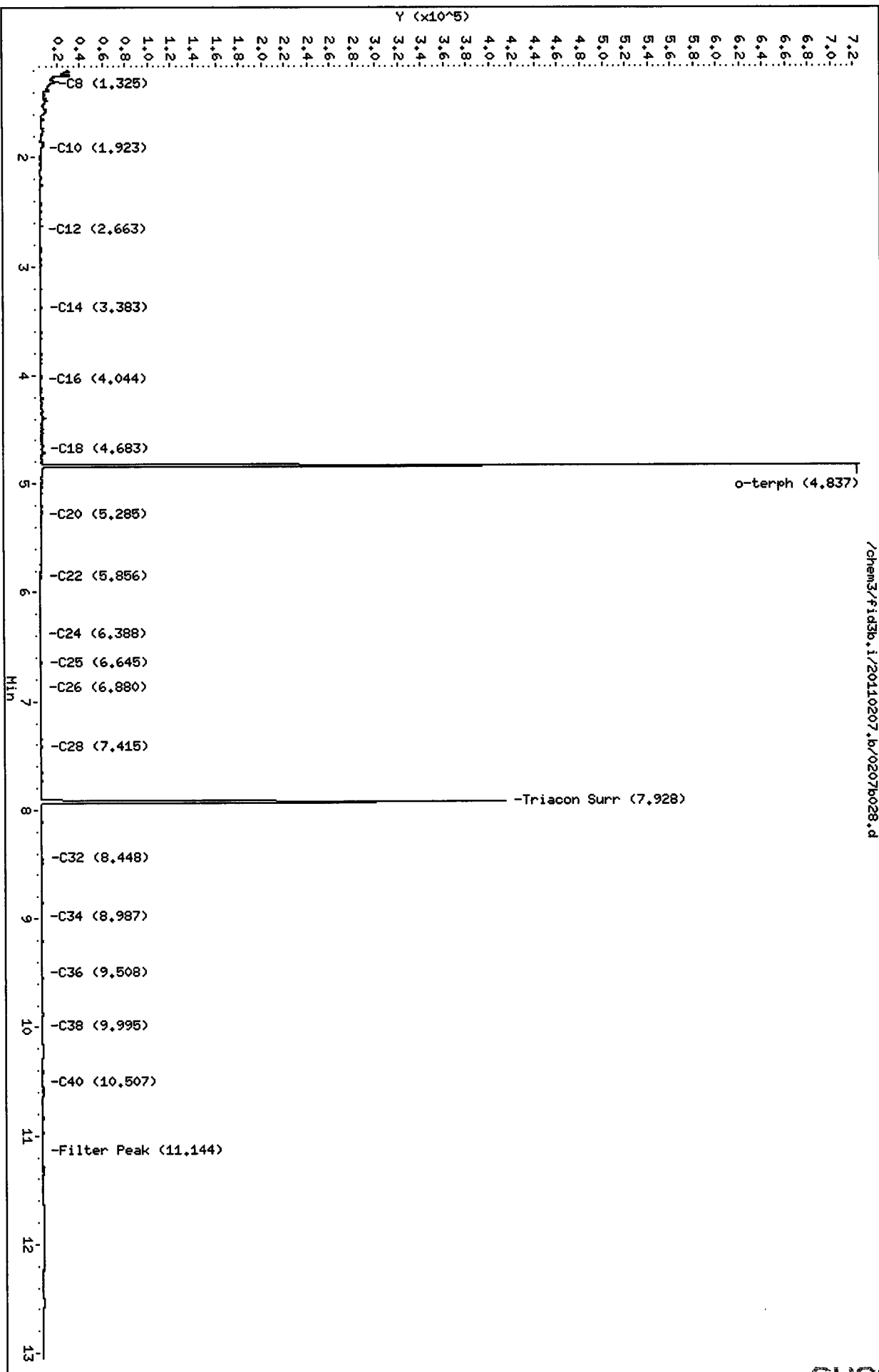
Instrument: fid3b.i

Sample Info: SH30J

Operator: HS

Column phase: RTX-1

Column diameter: 0.25



SH30 : 00128

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b032.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30L
Client ID:
Injection: 08-FEB-2011 15:51
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.243	-0.002	2465408	1101140	GAS (Tol-C12)	1624921	102
C8	1.320	-0.008	12859	15310	DIESEL (C12-C24)	7361156	762
C10	1.926	-0.001	3017	1360	M.OIL (C24-C38)	430433	74
C12	2.669	0.002	4566	3368	AK-102 (C10-C25)	7653542	708 M
C14	3.396	0.009	27658	26121	AK-103 (C25-C36)	351132	40
C16	4.051	0.003	52297	29283	OR.DIES (C10-C28)	7865251	310 M
C18	4.680	0.002	56500	24285	OR.MOIL (C28-C40)	162107	14
C20	5.281	0.000	52617	29710	MIN.OIL (C24-C38)	430433	67
C22	5.849	-0.001	21979	9377	STODDARD (C8-C12)	458347	17
C24	6.380	-0.001	8331	5082			
C25	6.638	0.003	7029	8633			
C26	6.885	-0.001	4354	1922			
C28	7.402	-0.001	2993	878			
C32	8.481	0.016	1346	1971			
C34	8.998	0.007	558	445	CREOSOT (C8-C22)	6997430	1094
Filter Peak	11.138	-0.002	303	93			
C36	9.506	0.003	404	213	BUNKERC (C10-C38)	8016592	941
o-terph	4.832	-0.010	694622	456102	JET-A (C10-C18)	4411675	855
Triacon Surr	7.925	-0.014	461830	428636	IT.MOIL (C24-C40)	869835	40

DRD Diesel 12-24-11

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	456102	47.7	106.0
Triacontane	428636	57.1	126.9

02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

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Date : 08-FEB-2011 15:51

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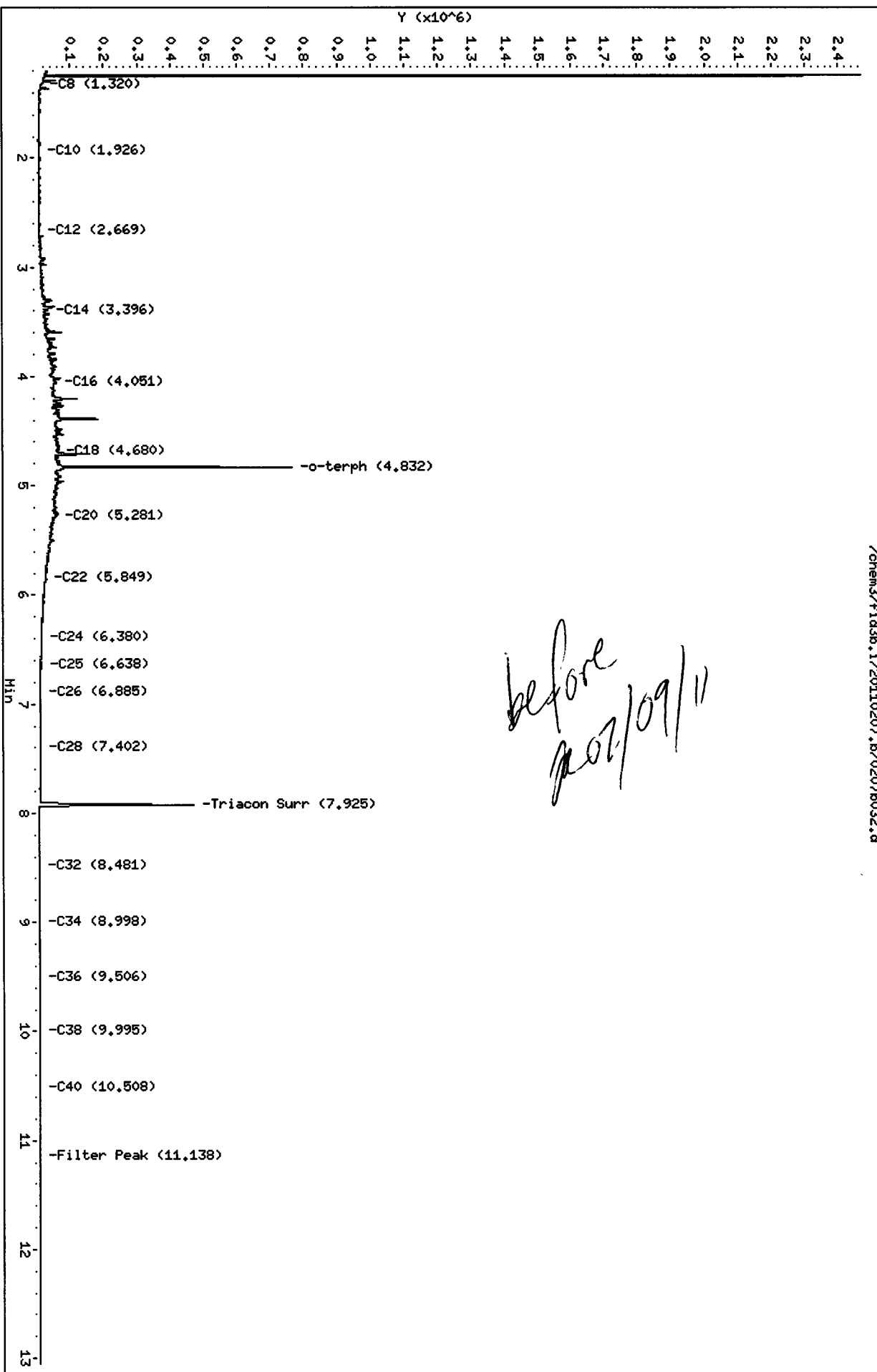
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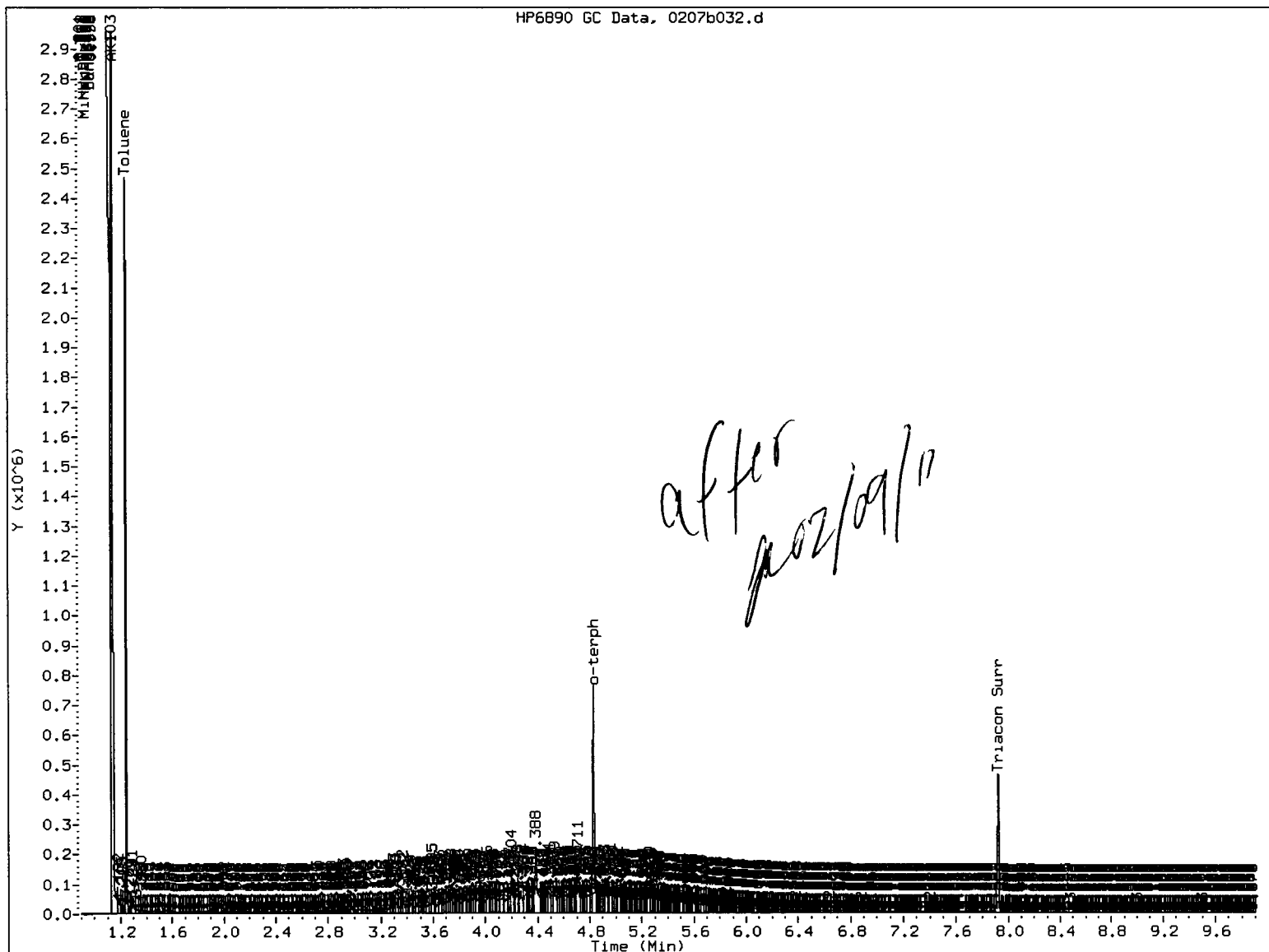
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Operator: HS

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MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other

skim surf

Analyst:

R

Date:

02/09/11

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b034.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30N
Client ID:
Injection: 08-FEB-2011 16:36
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.242	-0.003	27444	34176	GAS (Tol-C12)	369079	23
C8	1.342	0.014	7846	1251	DIESEL (C12-C24)	113008	12
C10	1.916	-0.010	3418	3795	M.OIL (C24-C38)	36248	6
C12	2.658	-0.009	1424	2047	AK-102 (C10-C25)	208751	19
C14	3.379	-0.008	1585	1442	AK-103 (C25-C36)	27528	3
C16	4.050	0.003	522	246	OR.DIES (C10-C28)	214909	8
C18	4.678	-0.001	314	103	OR.MOIL (C28-C40)	41648	4
C20	5.285	0.005	215	98	MIN.OIL (C24-C38)	36248	6
C22	5.852	0.002	160	125	STODDARD (C8-C12)	278329	10
C24	6.390	0.009	66	23			
C25	6.641	0.006	830	540			
C26	6.896	0.009	25	4			
C28	7.413	0.010	2187	1576			
C32	8.482	0.017	1561	1625			
C34	8.991	0.000	126	32	CREOSOT (C8-C22)	110748	17
Filter Peak	11.143	0.002	573	280			
C36	9.504	0.001	227	62	BUNKERC (C10-C38)	244319	29
o-terph	4.832	-0.011	738731	481835	JET-A (C10-C18)	193864	38
Triacon Surr	7.927	-0.012	458863	422636	IT.MOIL (C24-C40)	471123	22

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	481835	50.4	112.0
Triacontane	422636	56.3	125.1

R 02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b034.d

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Date : 08-FEB-2011 16:36

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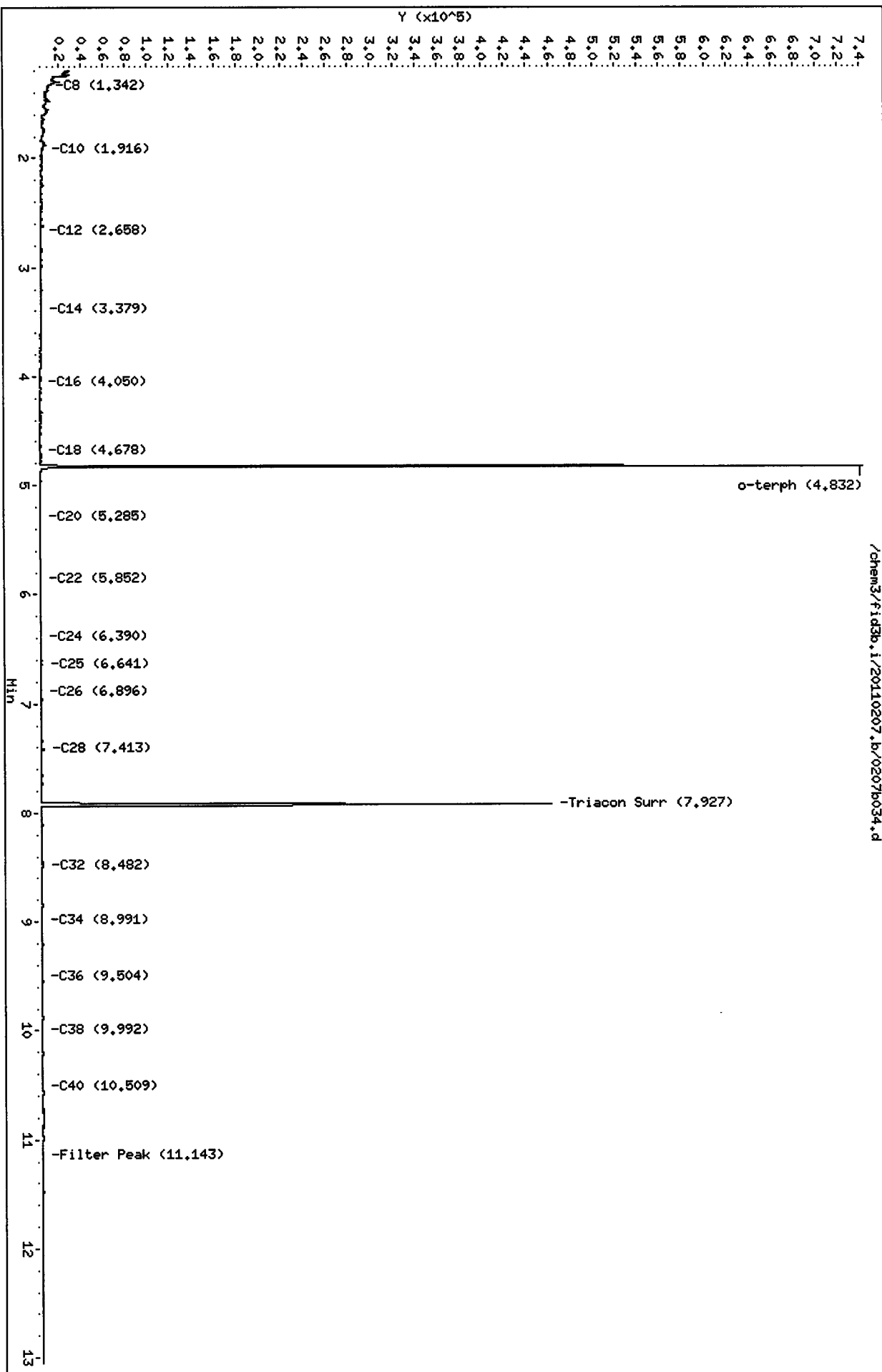
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Sample Info: SH30N

Operator: HS

Column phase: RTX-1

Column diameter: 0.25



SH30 : 00133

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b035.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH300
Client ID:
Injection: 08-FEB-2011 16:58
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.239	-0.006	27148	33269	GAS (Tol-C12)	334344	21
C8	1.339	0.011	7897	788	DIESEL (C12-C24)	71252	7
C10	1.917	-0.009	2535	3304	M.OIL (C24-C38)	26450	5
C12	2.672	0.006	812	711	AK-102 (C10-C25)	142347	13
C14	3.378	-0.008	1416	1221	AK-103 (C25-C36)	20574	2
C16	4.039	-0.008	1036	886	OR.DIES (C10-C28)	149632	6
C18	4.686	0.007	146	51	OR.MOIL (C28-C40)	28188	3
C20	5.267	-0.013	523	424	MIN.OIL (C24-C38)	26450	4
C22	5.847	-0.003	105	70	STODDARD (C8-C12)	236018	9
C24	6.385	0.004	75	38			
C25	6.640	0.005	1103	732			
C26	6.874	-0.013	1237	1077			
C28	7.411	0.008	1194	938			
C32	8.481	0.016	522	531			
C34	8.988	-0.004	59	33	CREOSOT (C8-C22)	68384	11
Filter Peak	11.141	0.000	382	188			
C36	9.505	0.002	135	42	BUNKERC (C10-C38)	168010	20
o-terph	4.830	-0.012	723505	471102	JET-A (C10-C18)	132292	26
Triacon Surr	7.924	-0.015	464790	413054	IT.MOIL (C24-C40)	449314	21

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	471102	49.3	109.5
Triacontane	413054	55.0	122.3

M 02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b035.d

Date : 08-FEB-2011 16:58

Client ID:

Sample Info: SH300

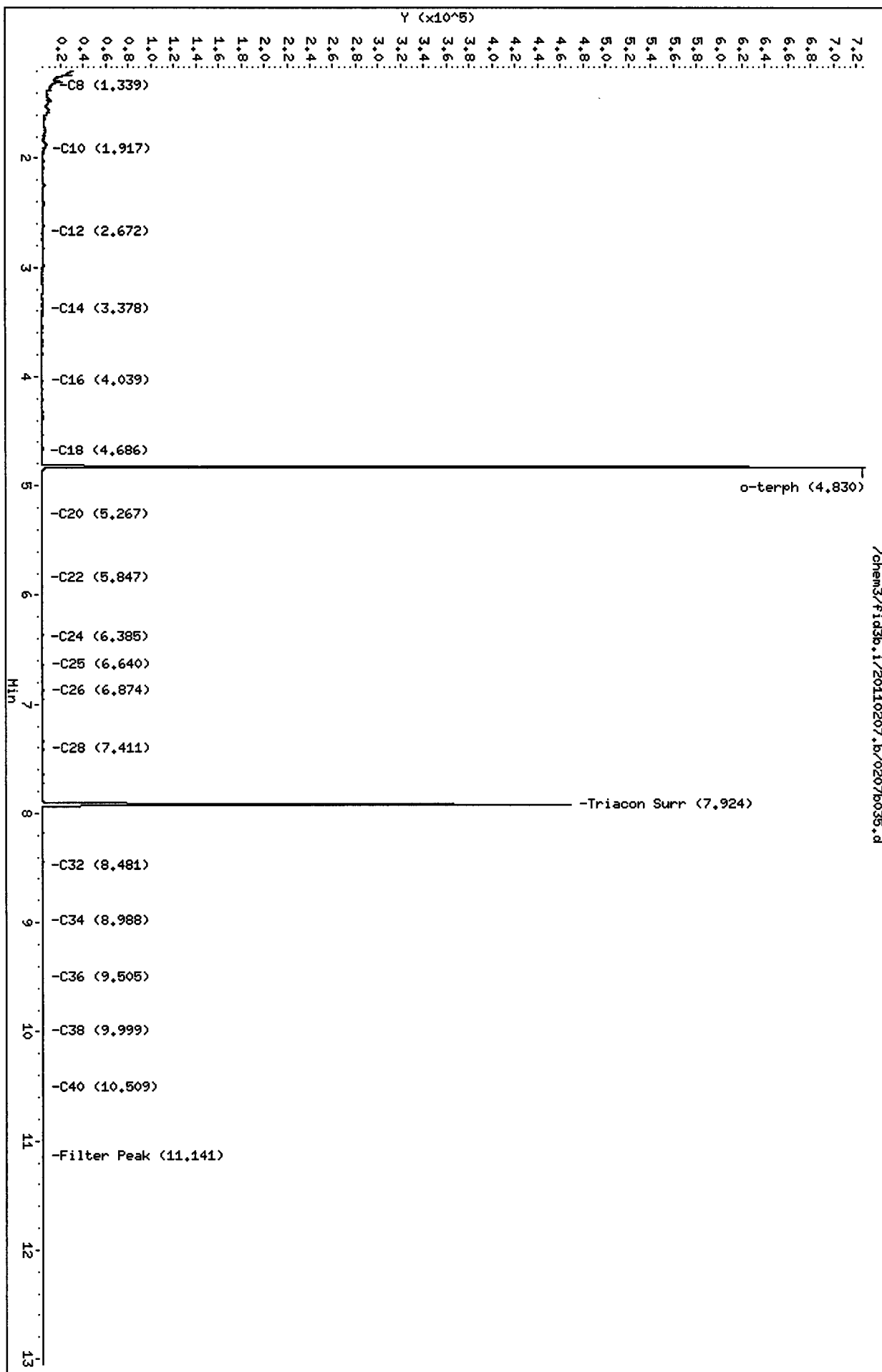
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Instrument: fid3b.i

Operator: HS

Column diameter: 0.25

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SH300 : 00135

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110208.b/0207b043.d
Method: /chem3/fid3b.i/20110208.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30P
Client ID:
Injection: 08-FEB-2011 19:56
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.237	-0.001	20377	19345	GAS (Tol-C12)	247476	15
C8	1.316	-0.003	7060	3089	DIESEL (C12-C24)	45580	5
C10	1.912	0.001	2242	2947	M.OIL (C24-C38)	33198	6
C12	2.645	-0.008	614	561	AK-102 (C10-C25)	90507	8
C14	3.377	0.003	553	518	AK-103 (C25-C36)	24629	3
C16	4.038	0.002	365	393	OR.DIES (C10-C28)	95342	4
C18	4.661	-0.004	322	261	OR.MOIL (C28-C40)	40510	4
C20	5.264	-0.002	239	258	MIN.OIL (C24-C38)	33198	5
C22	5.831	-0.003	195	130	STODDARD (C8-C12)	172944	6
C24	6.356	-0.007	346	317			
C25	6.612	-0.004	186	138			
C26	6.864	-0.003	184	171			
C28	7.377	-0.004	364	318			
C32	8.439	-0.003	879	931			
C34	8.965	0.000	266	264	CREOSOT (C8-C22)	43683	7
Filter Peak	11.139	0.006	512	207			
C36	9.477	0.003	366	581	BUNKERC (C10-C38)	123459	14
o-terph	4.827	-0.001	773112	497563	JET-A (C10-C18)	83473	16
Triacon Surr	7.920	0.001	481673	427733	IT.MOIL (C24-C40)	473324	22

Range Times: NW Diesel(2.703 - 6.413) NW Gas(1.188 - 2.703) NW M.Oil(6.413 - 10.015)
AK102(1.861 - 6.567) AK103(6.567 - 9.524) Jet A(1.861 - 4.715)

Surrogate	Area	Amount	%Rec
o-Terphenyl	497563	52.0	115.6
Triacontane	427733	57.0	126.6

g 02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110208.b/0207b043.d

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Date : 08-FEB-2011 19:56

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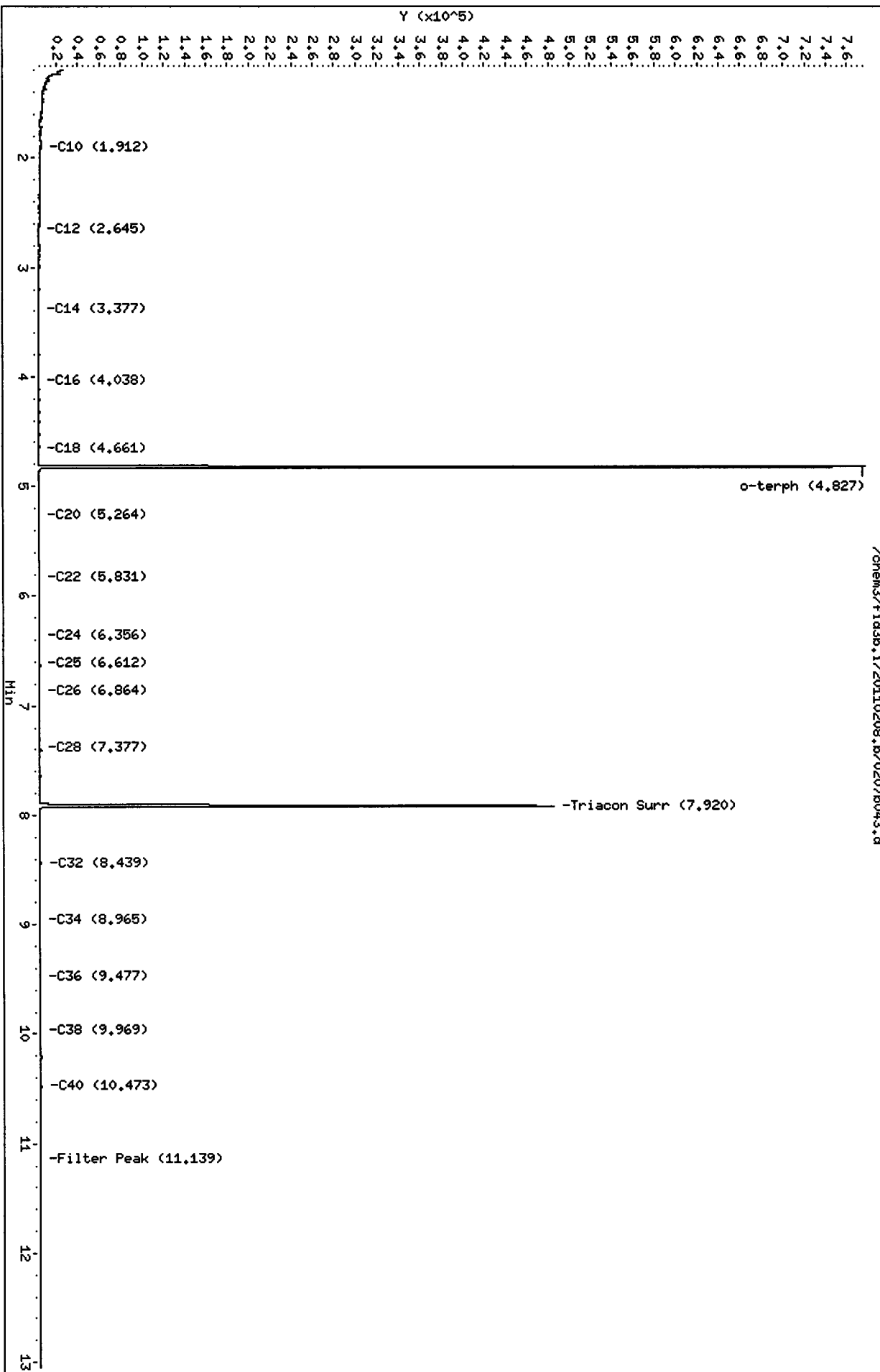
Instrument: fid3b.i

Sample Info: SH30P

Operator: HS

Column phase: RTX-1

Column diameter: 0.25



SH30 : 00137

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110208.b/0207b044.d
Method: /chem3/fid3b.i/20110208.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30Q
Client ID:
Injection: 08-FEB-2011 20:18
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.236	-0.003	25688	21795	GAS (Tol-C12)	265097	17
C8	1.326	0.006	8737	7949	DIESEL (C12-C24)	52679	5
C10	1.910	-0.001	2402	3128	M.OIL (C24-C38)	262233	45
C12	2.654	0.000	687	413	AK-102 (C10-C25)	105787	10
C14	3.378	0.003	631	522	AK-103 (C25-C36)	255627	29
C16	4.039	0.003	523	576	OR.DIES (C10-C28)	111601	4
C18	4.665	-0.001	372	356	OR.MOIL (C28-C40)	265493	24
C20	5.266	0.000	227	245	MIN.OIL (C24-C38)	262233	41
C22	5.831	-0.002	137	110	STODDARD (C8-C12)	185488	7
C24	6.356	-0.007	400	388			
C25	6.613	-0.004	169	112			
C26	6.869	0.002	1552	1144			
C28	7.376	-0.006	362	307			
C32	8.438	-0.004	747	465			
C34	8.960	-0.005	154	125	CREOSOT (C8-C22)	50953	8
Filter Peak	11.128	-0.006	466	202			
C36	9.472	-0.002	224	112	BUNKERC (C10-C38)	367854	43
o-terph	4.829	0.001	768357	482859	JET-A (C10-C18)	97855	19
Triacon Surr	7.917	-0.002	456416	178868	IT.MOIL (C24-C40)	450342	21

Range Times: NW Diesel(2.703 - 6.413) NW Gas(1.188 - 2.703) NW M.Oil(6.413 - 10.015)
AK102(1.861 - 6.567) AK103(6.567 - 9.524) Jet A(1.861 - 4.715)

Surrogate	Area	Amount	%Rec
o-Terphenyl	482859	50.5	112.2
Triacontane	178868	23.8	53.0

major

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

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Date : 08-FEB-2011 20:18

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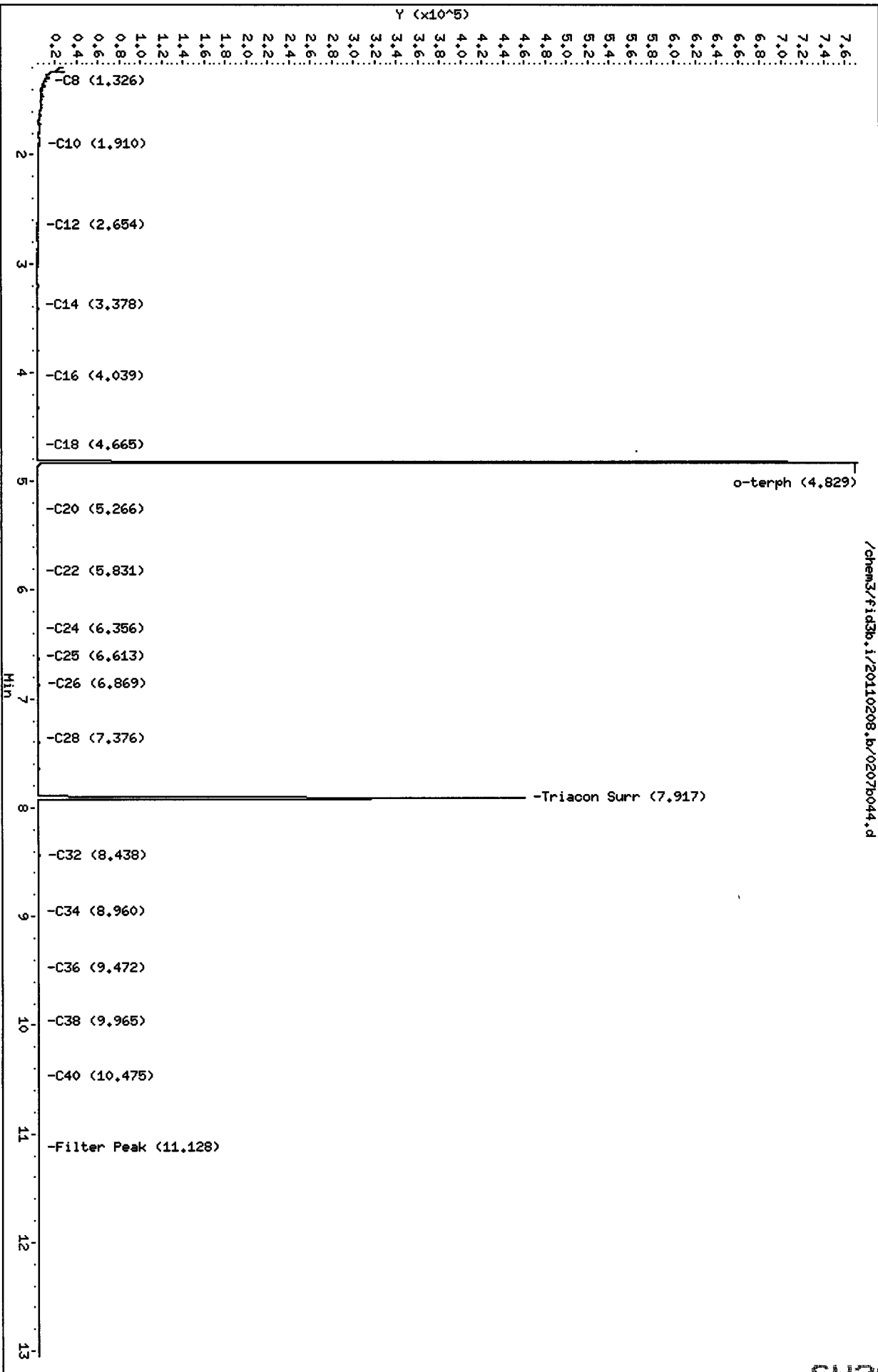
Sample Info: SH300

Column phase: RTX-1

Instrument: fid3b.i

Operator: HS

Column diameter: 0.25



Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110208.b/0207b045.d
Method: /chem3/fid3b.i/20110208.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30S
Client ID:
Injection: 08-FEB-2011 20:40
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.236	-0.003	1694206	723329	GAS (Tol-C12)	982895	62
C8	1.316	-0.003	9448	2817	DIESEL (C12-C24)	61293	6
C10	1.911	0.000	2188	2811	M.OIL (C24-C38)	27776	5
C12	2.647	-0.007	625	473	AK-102 (C10-C25)	112163	10
C14	3.377	0.003	622	613	AK-103 (C25-C36)	22106	3
C16	4.037	0.001	418	386	OR.DIES (C10-C28)	121603	5
C18	4.662	-0.004	379	351	OR.MOIL (C28-C40)	24440	2
C20	5.264	-0.002	396	404	MIN.OIL (C24-C38)	27776	4
C22	5.831	-0.003	226	192	STODDARD (C8-C12)	199213	7
C24	6.357	-0.006	563	635			
C25	6.614	-0.003	530	423			
C26	6.867	-0.001	647	702			
C28	7.377	-0.005	654	581			
C32	8.435	-0.007	806	764			
C34	8.961	-0.004	131	96	CREOSOT (C8-C22)	56587	9
Filter Peak	11.137	0.003	351	184			
C36	9.476	0.002	155	161	BUNKERC (C10-C38)	138845	16
o-terph	4.827	-0.001	732572	481672	JET-A (C10-C18)	95019	18
Triacon Surr	7.918	-0.001	444793	410730	IT.MOIL (C24-C40)	445705	21

Range Times: NW Diesel(2.703 - 6.413) NW Gas(1.188 - 2.703) NW M.Oil(6.413 - 10.015)
AK102(1.861 - 6.567) AK103(6.567 - 9.524) Jet A(1.861 - 4.715)

Surrogate	Area	Amount	%Rec
o-Terphenyl	481672	50.4	111.9
Triacontane	410730	54.7	121.6

02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

SH30:00140

Data File: /chem3/fid3b.i/20110208.b/0207b045.d

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Date : 08-FEB-2011 20:40

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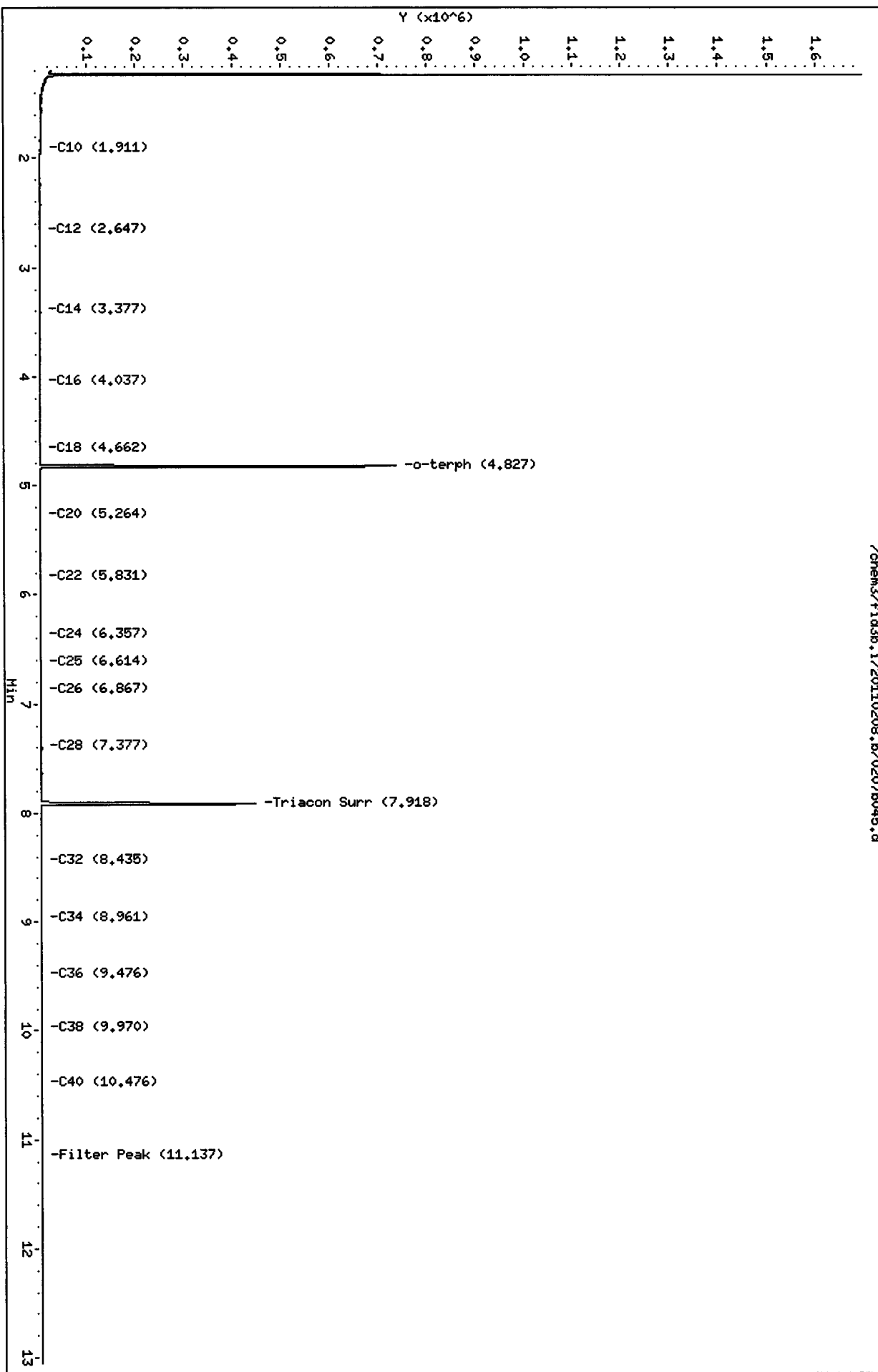
Sample Info: SH30S

Instrument: fid3b.i

Operator: HS

Column phase: RTX-1

Column diameter: 0.25



SH30 : 00141

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110208.b/0207b046.d
Method: /chem3/fid3b.i/20110208.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30T
Client ID:
Injection: 08-FEB-2011 21:02
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.234	-0.004	32845	34826	GAS (Tol-C12)	288597	18
C8	1.323	0.003	8933	8799	DIESEL (C12-C24)	56042	6
C10	1.910	-0.001	2395	3063	M.OIL (C24-C38)	22810	4
C12	2.651	-0.002	738	453	AK-102 (C10-C25)	112095	10
C14	3.377	0.003	660	670	AK-103 (C25-C36)	17010	2
C16	4.037	0.001	438	385	OR.DIES (C10-C28)	116765	5
C18	4.662	-0.003	333	321	OR.MOIL (C28-C40)	26426	2
C20	5.262	-0.004	211	162	MIN.OIL (C24-C38)	22810	4
C22	5.829	-0.005	164	132	STODDARD (C8-C12)	198372	7
C24	6.353	-0.010	420	399			
C25	6.610	-0.007	375	251			
C26	6.860	-0.007	347	301			
C28	7.374	-0.008	548	434			
C32	8.434	-0.008	786	811			
C34	8.957	-0.008	125	78	CREOSOT (C8-C22)	54023	8
Filter Peak	11.129	-0.005	405	244			
C36	9.470	-0.004	164	161	BUNKERC (C10-C38)	134368	16
o-terph	4.826	-0.001	733771	496350	JET-A (C10-C18)	102835	20
Triacon Surr	7.913	-0.005	437252	424975	IT.MOIL (C24-C40)	456608	21

Range Times: NW Diesel(2.703 - 6.413) NW Gas(1.188 - 2.703) NW M.Oil(6.413 - 10.015)
AK102(1.861 - 6.567) AK103(6.567 - 9.524) Jet A(1.861 - 4.715)

Surrogate	Area	Amount	%Rec
o-Terphenyl	496350	51.9	115.3
Triacontane	424975	56.6	125.8

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02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110208.b/0207b046.d

Date : 08-FEB-2011 21:02

Client ID:

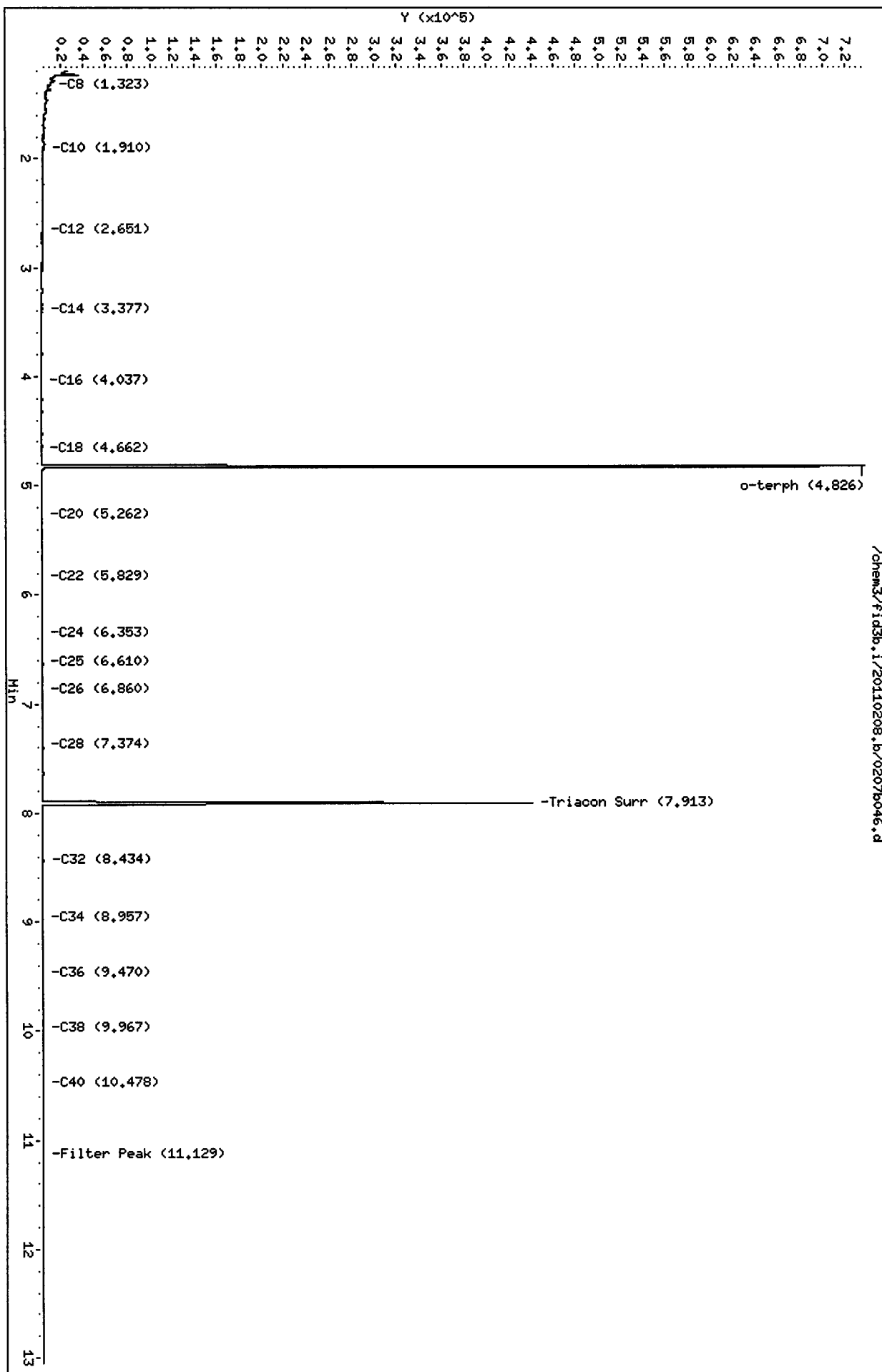
Sample Info: SH30T

Column phase: RTX-1

Instrument: fid3b.i

Operator: HS

Column diameter: 0.25



Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b031.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30K
Client ID:
Injection: 08-FEB-2011 15:28
Dilution Factor: 50

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.236	-0.008	21024	26509	GAS (Tol-C12)	1010516	63
C8	1.355	0.027	39957	27052	DIESEL (C12-C24)	12089116	1251
C10	1.925	-0.002	4952	2169	M.OIL (C24-C38)	1145671	196
C12	2.666	-0.001	16587	11215	AK-102 (C10-C25)	12927541	1196
C14	3.395	0.009	66078	59573	AK-103 (C25-C36)	970562	111 M
C16	4.049	0.002	85261	98704	OR.DIES (C10-C28)	13525457	532
C18	4.675	-0.003	76761	31651	OR.MOIL (C28-C40)	412237	37 M
C20	5.278	-0.002	73109	55616	MIN.OIL (C24-C38)	1145671	178 M
C22	5.850	0.000	39767	61075	STODDARD (C8-C12)	934038	34
C24	6.383	0.002	17688	11705			
C25	6.633	-0.002	15897	11404			
C26	6.890	0.003	11779	10116			
C28	7.402	-0.001	8698	7593			
C32	8.472	0.007	3529	6229			
C34	8.990	-0.002	1468	731	CREOSOT (C8-C22)	11435961	1788
Filter Peak	11.144	0.003	261	234			
C36	9.500	-0.003	953	652	BUNKERC (C10-C38)	13921023	1634
o-terph	----				JET-A (C10-C18)	8167578	1584
Triacon Surr	----				IT.MOIL (C24-C40)	1162342	54

DRG Diesel
AR 2/9/11
RRO

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacontane	0	0.0	0.0

D

1 02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b031.d

Date : 08-FEB-2011 15:28

Client ID:

Sample Info: SH30K,50

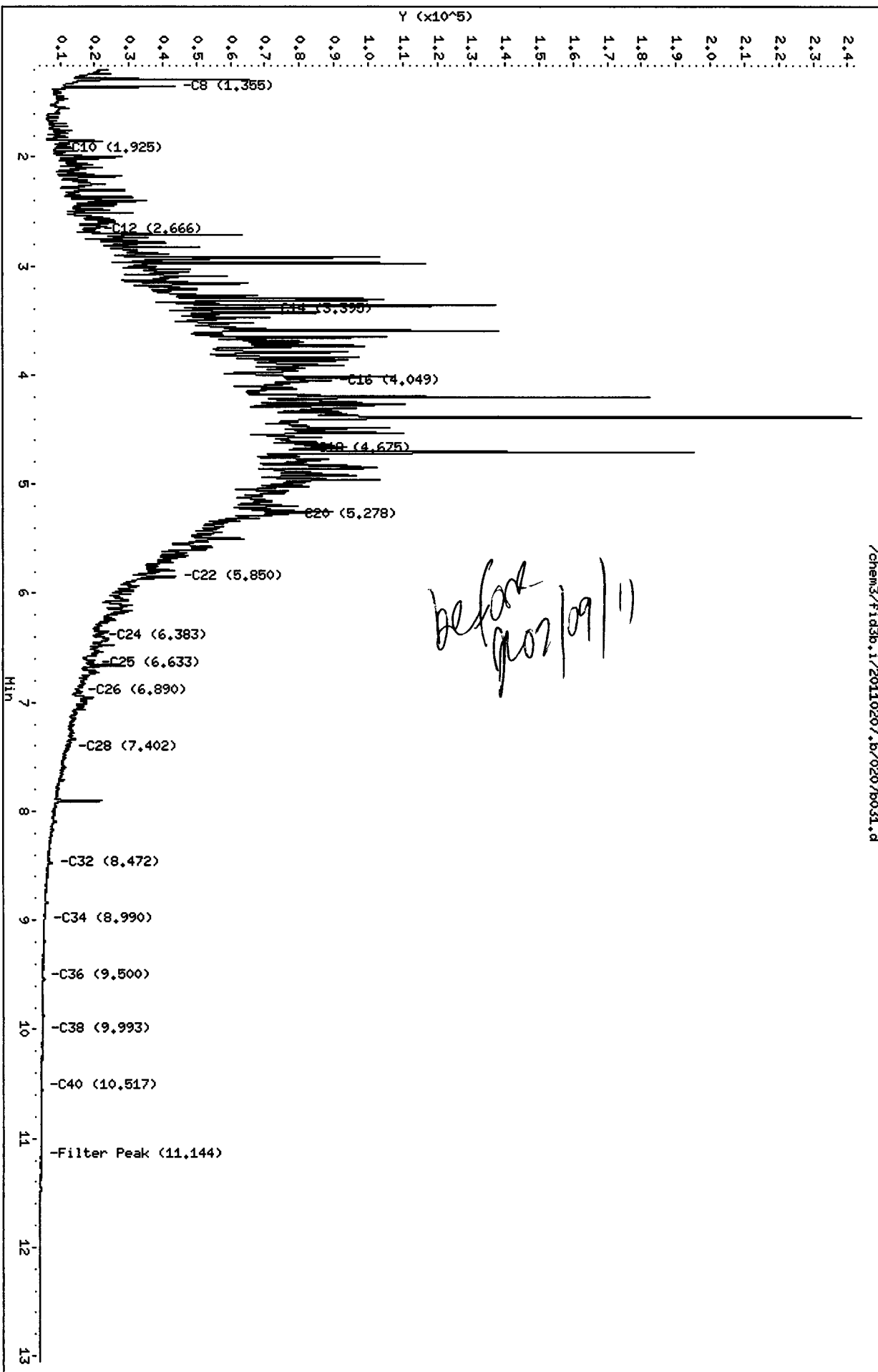
Column phase: RTX-1

Instrument: fid3b.i

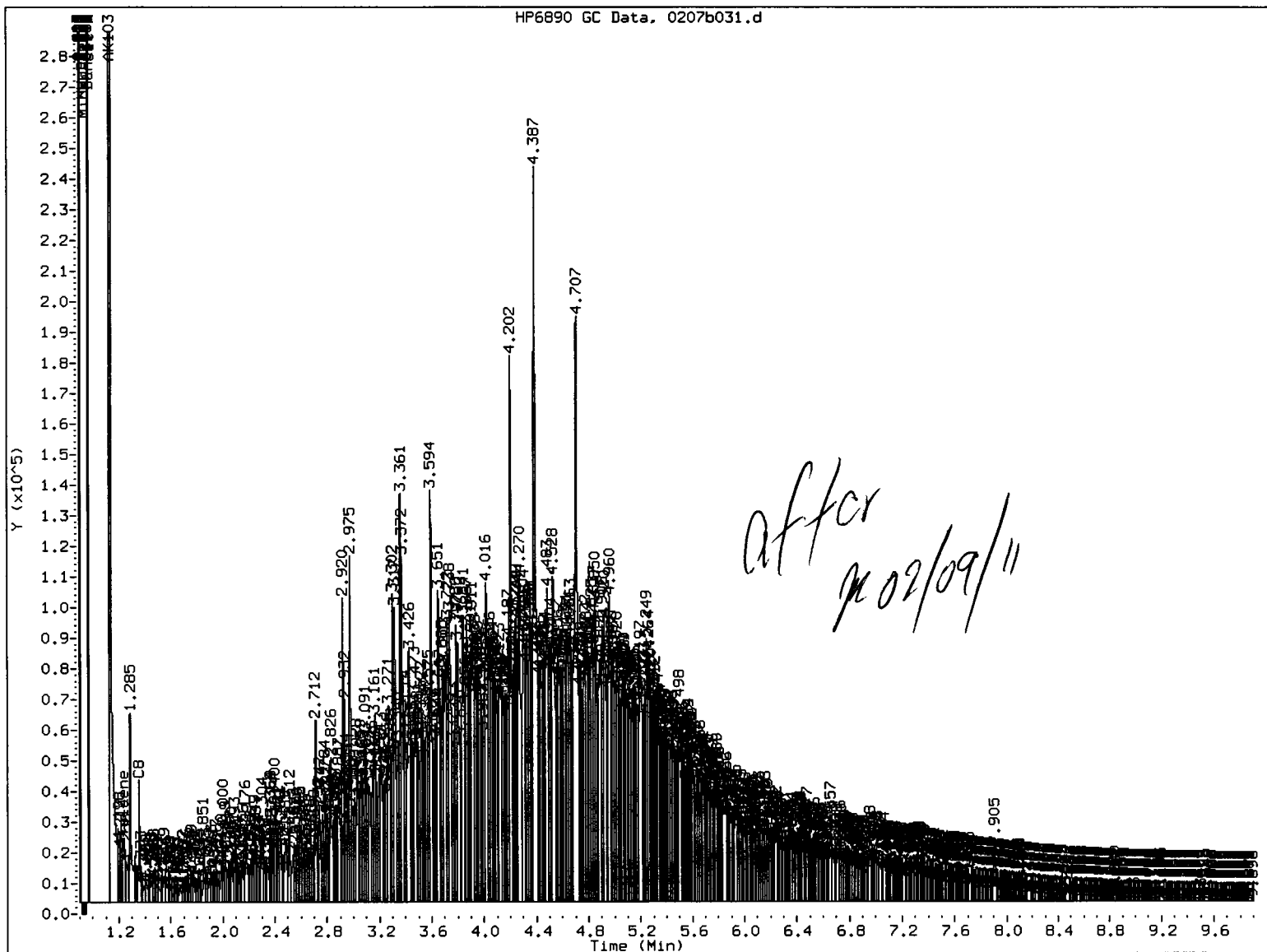
Operator: HS

Column diameter: 0.25

Page 1



SH30 : 00145



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other

Skim curr

Analyst:

M

Date:

02/09/11

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b033.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30M
Client ID:
Injection: 08-FEB-2011 16:13
Dilution Factor: 100

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.236	-0.009	21451	29033	GAS (Tol-C12)	1190374	75
C8	1.343	0.015	7628	4321	DIESEL (C12-C24)	13063634	1352
C10	1.924	-0.002	6118	2620	M.OIL (C24-C38)	902670	154
C12	2.667	0.000	17718	9297	AK-102 (C10-C25)	14013246	1297
C14	3.396	0.010	70238	60100	AK-103 (C25-C36)	765667	88
C16	4.052	0.004	87365	35664	OR.DIES (C10-C28)	14458095	569
C18	4.677	-0.002	83271	18084	OR.MOIL (C28-C40)	364961	32
C20	5.280	0.000	76410	57996	MIN.OIL (C24-C38)	902670	140
C22	5.849	-0.001	34345	26389	STODDARD (C8-C12)	1112584	40
C24	6.382	0.000	14761	4382			
C25	6.635	0.000	12828	13281			
C26	6.887	0.000	9005	2642			
C28	7.402	-0.001	6476	3238			
C32	8.465	0.000	2227	976			
C34	8.993	0.001	1358	345	CREOSOT (C8-C22)	12450515	1947
Filter Peak	11.144	0.004	302	178			
C36	9.505	0.002	991	288	BUNKERC (C10-C38)	14802898	1737
o-terph	----				JET-A (C10-C18)	9131354	1770
Triacon Surr	----				IT.MOIL (C24-C40)	922828	43

Diesel 2/21/11
AK102
AK103

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacontane	0	0.0	0.0

02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b033.d

Date : 08-FEB-2011 16:13

Client ID:

Sample Info: SH30M,100

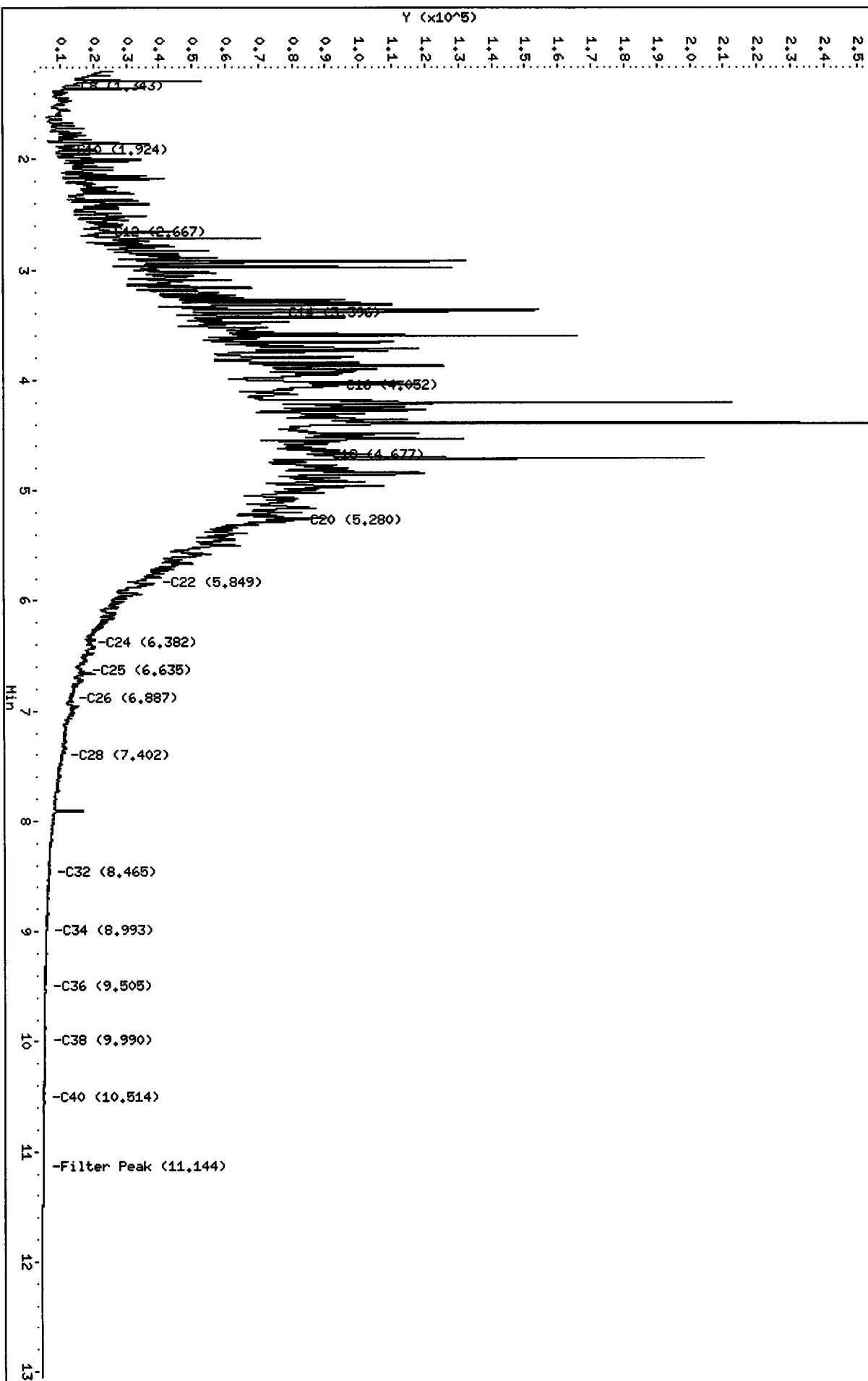
Column phase: RTX-1

Instrument: fid3b.i

Operator: HS

Column diameter: 0.25

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TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001

<u>Client ID</u>	<u>OTER</u>	<u>TOT OUT</u>
B11-12-20	90.5%	0
B11-12-25	95.3%	0
B11-12-30	101%	0
B11-12-35	102%	0
B11-13-15	99.4%	0
B11-13-20	102%	0
B11-13-23	102%	0
B11-13-30	112%	0
B11-14-09	D	0
020411MBS	104%	0
020411LCS	103%	0
B11-14-15	110%	0
B11-14-15 MS	101%	0
B11-14-15 MSD	105%	0
B11-14-20	D	0
B11-14-23	106%	0
B11-14-30	D	0
B11-15-15	112%	0
B11-15-20	110%	0
B11-15-25	116%	0
B11-15-30	112%	0
B11-16-15	112%	0
B11-16-20	115%	0

LCS/MB LIMITS

QC LIMITS

(OTER) = o-Terphenyl

(64-134)

(52-130)

Prep Method: SW3546
Log Number Range: 11-2230 to 11-2249

ORGANICS ANALYSIS DATA SHEET

NWTPHD by GC/FID

Page 1 of 1



Sample ID: B11-14-15

MS/MSD

Lab Sample ID: SH30J

LIMS ID: 11-2239

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/10/11

QC Report No: SH30-Pacific Groundwater Group

Project: Birds Eye-Soil

J11001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Extracted MS/MSD: 02/04/11

Sample Amount MS: 9.25 g-dry-wt

MSD: 9.31 g-dry-wt

Date Analyzed MS: 02/08/11 14:42

Final Extract Volume MS: 1.0 mL

MSD: 02/08/11 15:05

MSD: 1.0 mL

Instrument/Analyst MS: FID3B/AAR

Dilution Factor MS: 1.00

MSD: FID3B/AAR

MSD: 1.00

Percent Moisture: 7.9%

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Diesel	< 5.4 U	169	162	104%	171	161	106%	1.2%

TPHD Surrogate Recovery

	MS	MSD
o-Terphenyl	101 %	105 %

Results reported in mg/kg

RPD calculated using sample concentrations per SW846.

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b029.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30JMS
Client ID:
Injection: 08-FEB-2011 14:42
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.246	0.001	50288	35775	GAS (Tol-C12)	2038602	128
C8	1.326	-0.002	21760	14887	DIESEL (C12-C24)	15071604	1560
C10	1.931	0.004	14085	6112	M.OIL (C24-C38)	215038	37
C12	2.660	-0.006	144820	127152	AK-102 (C10-C25)	16489550	1526 M
C14	3.383	-0.004	295851	210138	AK-103 (C25-C36)	141870	16
C16	4.047	-0.001	552401	387168	OR.DIES (C10-C28)	16601253	654 M
C18	4.678	0.000	478192	400101	OR.MOIL (C28-C40)	44452	4
C20	5.276	-0.004	302916	254686	MIN.OIL (C24-C38)	215038	33
C22	5.859	0.009	26456	6827	STODDARD (C8-C12)	1942384	70
C24	6.371	-0.010	43638	41898			
C25	6.643	0.008	5957	5389			
C26	6.888	0.001	2367	1597			
C28	7.413	0.010	1898	1903			
C32	8.482	0.017	965	1032			
C34	8.994	0.003	42	20	CREOSOT (C8-C22)	14513694	2269
Filter Peak	11.136	-0.005	402	213			
C36	9.510	0.007	147	54	BUNKERC (C10-C38)	16636968	1952
o-terph	4.839	-0.004	649850	436503	JET-A (C10-C18)	11579202	2245
Triacon Surr	7.928	-0.012	440315	395663	IT.MOIL (C24-C40)	619438	29

AR 2/4/11
104.0% R

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	436503	45.6	101.4
Triacontane	395663	52.7	117.1

AR 02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b029.d

Date : 08-FEB-2011 14:42

Client ID:

Sample Info: SH30JHS

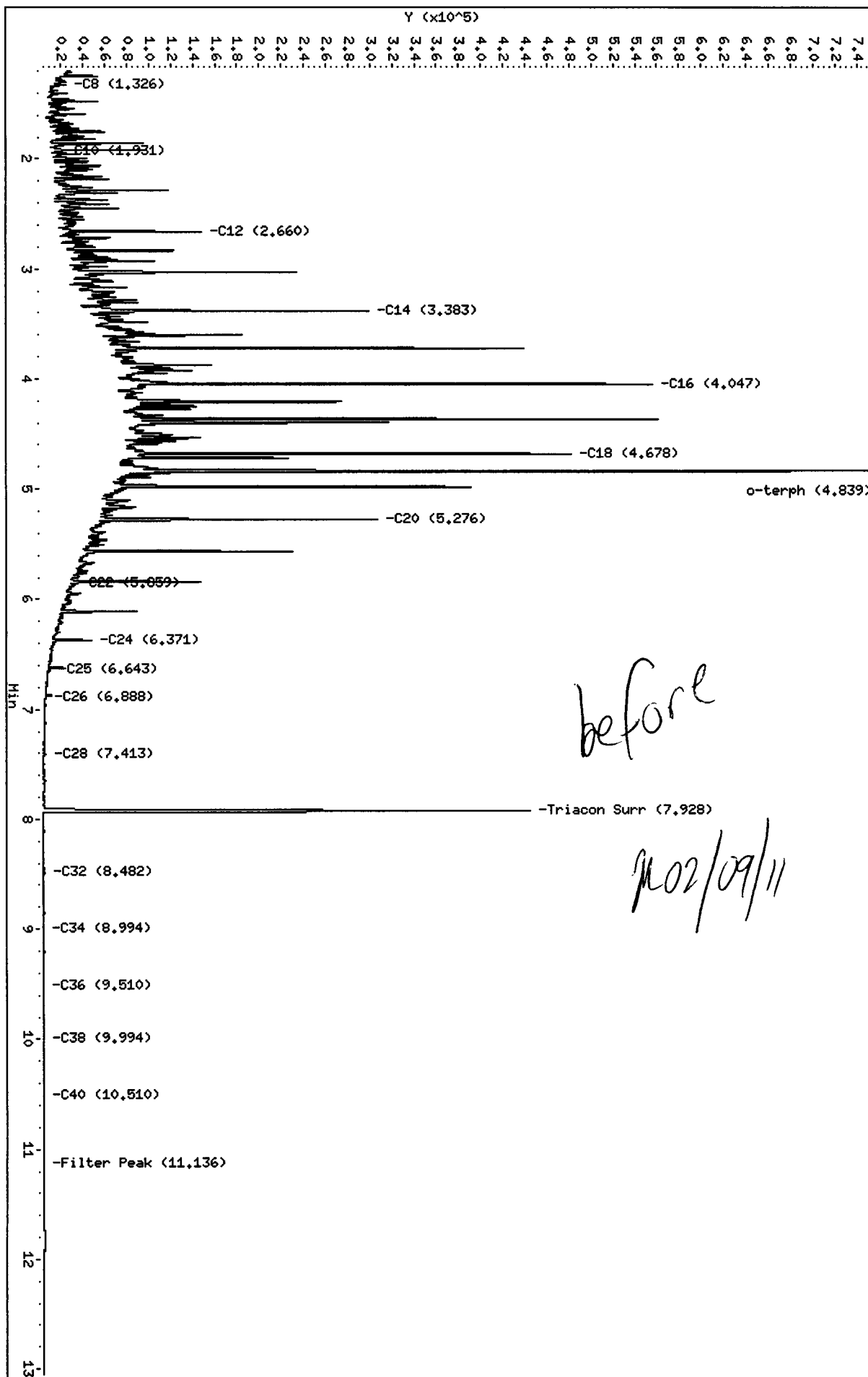
Column phase: RTX-1

Instrument: fid3b.i

Operator: MS

Column diameter: 0.25

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before

11/02/09



Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b030.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30JMSD
Client ID:
Injection: 08-FEB-2011 15:05
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.245	0.000	55462	37885	GAS (Tol-C12)	2183238	137
C8	1.324	-0.004	23111	15808	DIESEL (C12-C24)	15390559	1593
C10	1.927	0.000	14791	6559	M.OIL (C24-C38)	212877	36
C12	2.657	-0.009	152592	121542	AK-102 (C10-C25)	16912481	1565 M
C14	3.379	-0.007	293246	215182	AK-103 (C25-C36)	143135	16
C16	4.043	-0.005	575966	444211	OR.DIES (C10-C28)	17027658	670 M
C18	4.672	-0.006	491350	404041	OR.MOIL (C28-C40)	42161	4
C20	5.271	-0.009	320968	266076	MIN.OIL (C24-C38)	212877	33
C22	5.852	0.002	27300	5426	STODDARD (C8-C12)	2078764	75
C24	6.387	0.006	9806	2695			
C25	6.634	-0.001	5710	4404			
C26	6.887	0.001	2339	1295			
C28	7.408	0.005	1623	1925			
C32	8.477	0.012	886	946			
C34	8.988	-0.004	36	13	CREOSOT (C8-C22)	14813741	2316
Filter Peak	11.140	-0.001	351	173			
C36	9.506	0.003	142	30	BUNKERC (C10-C38)	17060261	2002
o-terph	4.833	-0.010	659339	450225	JET-A (C10-C18)	11832187	2294
Triacon Surr	7.920	-0.019	439728	411130	IT.MOIL (C24-C40)	633565	29

AR 2/6/11
106.2%R

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	450225	47.1	104.6
Triacontane	411130	54.8	121.7

AR 02/29/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b030.d

Date : 08-FEB-2011 15:05

Client ID:

Sample Info: SH30JHSD

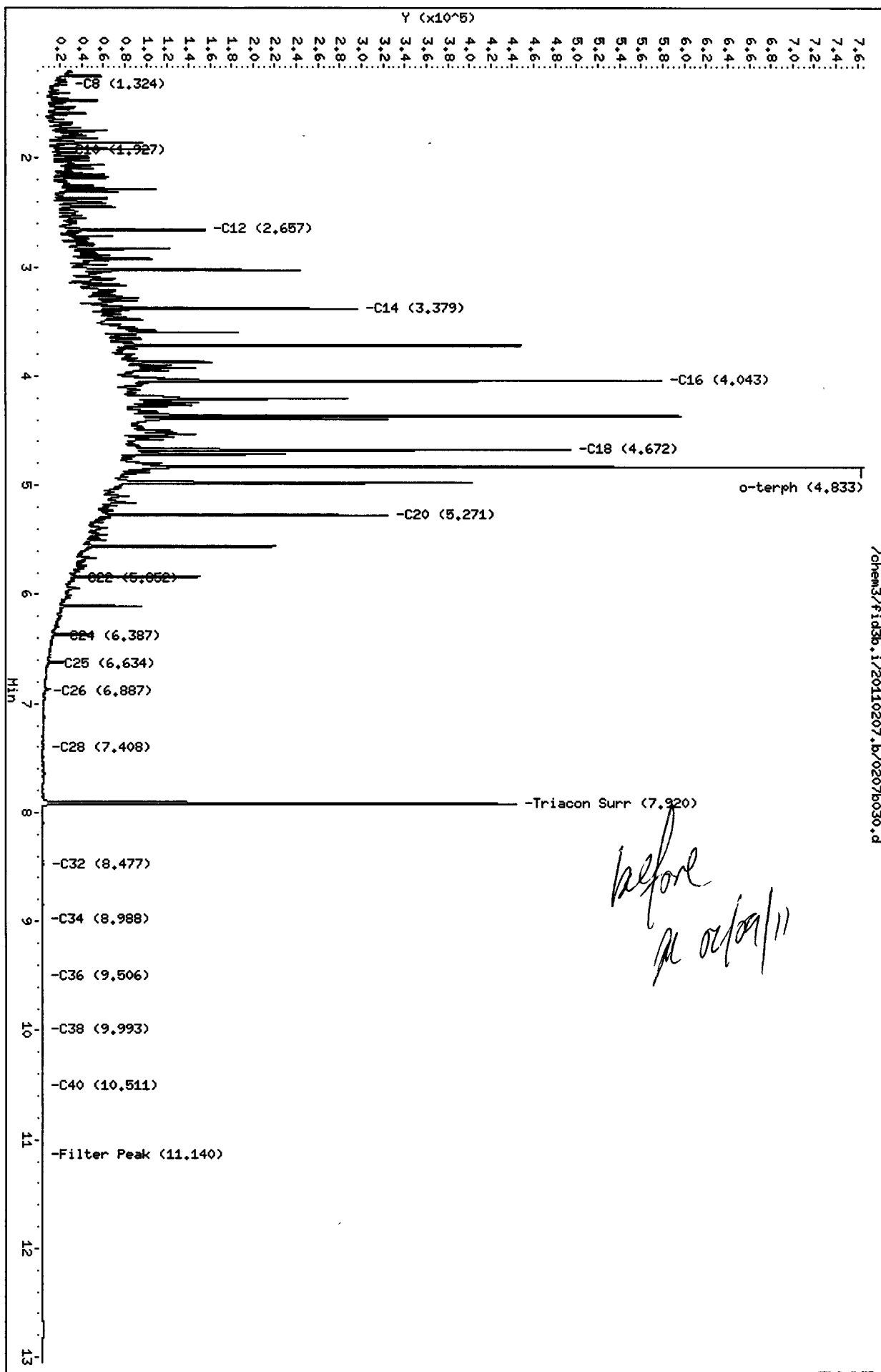
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Instrument: fid3b.i

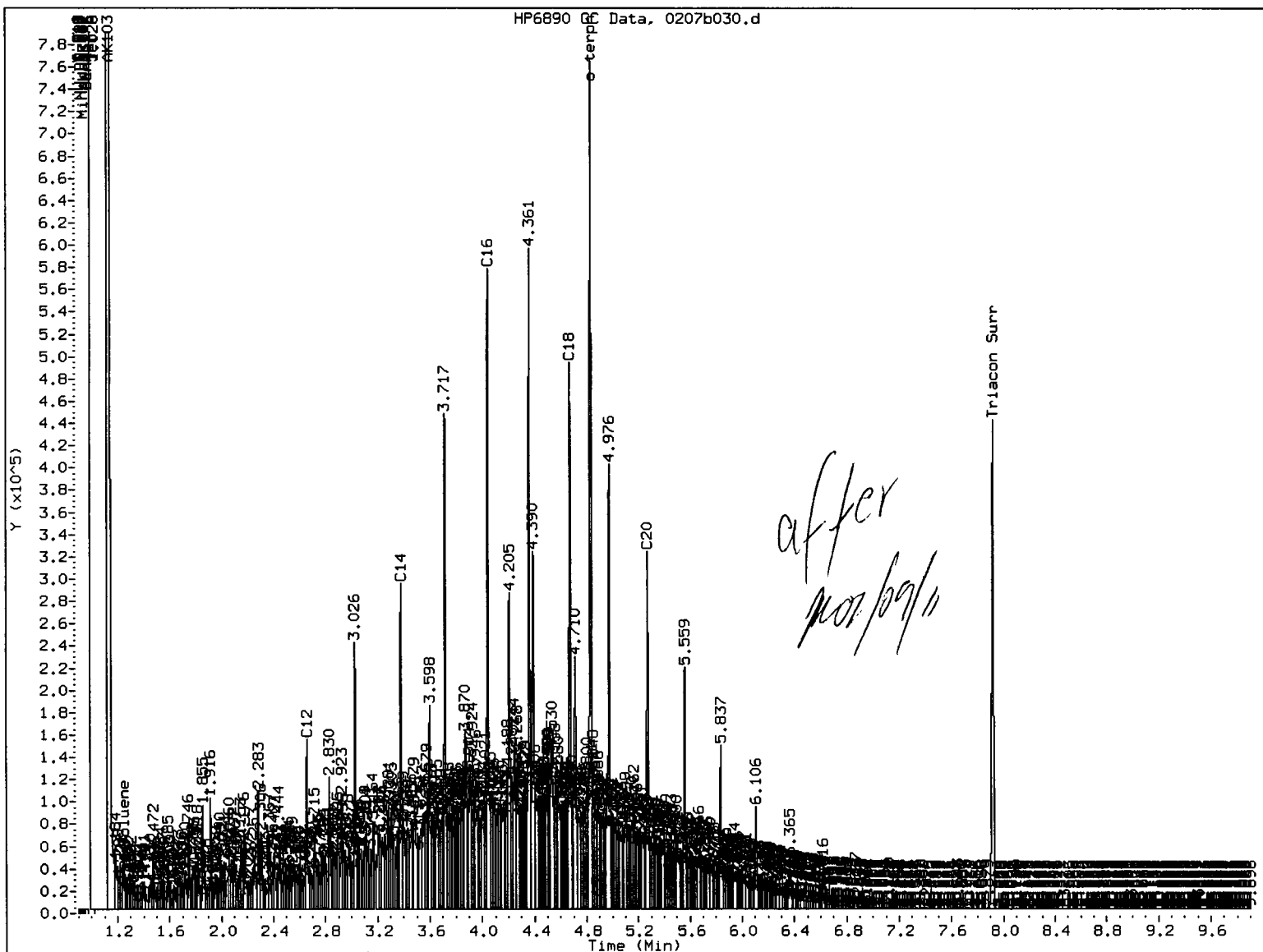
Operator: MS

Column diameter: 0.25

Page 1



SH30 : 00155



ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1



Sample ID: LCS-020411
LAB CONTROL

Lab Sample ID: LCS-020411
LIMS ID: 11-2239
Matrix: Soil
Data Release Authorized: *[Signature]*
Reported: 02/10/11

QC Report No: SH30-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001
Date Sampled: NA
Date Received: NA

Date Extracted: 02/04/11
Date Analyzed: 02/07/11 21:33
Instrument/Analyst: FID3B/AAR

Sample Amount: 10.0 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	152	150	101%

TPHD Surrogate Recovery

o-Terphenyl	103%
-------------	------

Results reported in mg/kg

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110207.b/0207b015.d
Method: /chem3/fid3b.i/20110207.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/09/2011
Macro: FID:3B020711

ARI ID: SH30LCSS1
Client ID:
Injection: 07-FEB-2011 21:33
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.244	-0.001	20511	6892	GAS (Tol-C12)	2044311	128
C8	1.333	0.005	21838	14610	DIESEL (C12-C24)	14703893	1522
C10	1.927	0.001	95924	48437	M.OIL (C24-C38)	206523	35
C12	2.666	0.000	153285	132657	AK-102 (C10-C25)	16125201	1492 M
C14	3.389	0.002	295531	208338	AK-103 (C25-C36)	129610	15
C16	4.053	0.005	537472	405719	OR.DIES (C10-C28)	16229641	639 M
C18	4.684	0.006	481658	394604	OR.MOIL (C28-C40)	46912	4
C20	5.283	0.003	300564	255563	MIN.OIL (C24-C38)	206523	32
C22	5.848	-0.002	143687	110707	STODDARD (C8-C12)	1957174	71
C24	6.377	-0.005	44379	36996			
C25	6.629	-0.006	19200	17479			
C26	6.880	-0.006	7360	7392			
C28	7.396	-0.007	1302	1517			
C32	8.460	-0.005	561	569			
C34	8.988	-0.004	94	56	CREOSOT (C8-C22)	14132309	2210
Filter Peak	11.122	-0.018	831	1166			
C36	9.500	-0.003	130	57	BUNKERC (C10-C38)	16266289	1909
o-terph	4.845	0.003	679383	441387	JET-A (C10-C18)	11332541	2197
Triacon Surr	7.937	-0.002	401730	353828	IT.MOIL (C24-C40)	570615	27

AR 2/4/11
101.5% R

Range Times: NW Diesel(2.716 - 6.431) NW Gas(1.195 - 2.716) NW M.Oil(6.431 - 10.045)
AK102(1.877 - 6.585) AK103(6.585 - 9.553) Jet A(1.877 - 4.728)

Surrogate	Area	Amount	%Rec
o-Terphenyl	441387	46.2	102.6
Triacontane	353828	47.1	104.8

02/09/11

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110207.b/0207b015.d

Date : 07-FEB-2011 21:33

Client ID:

Sample Info: SH30LCSS1

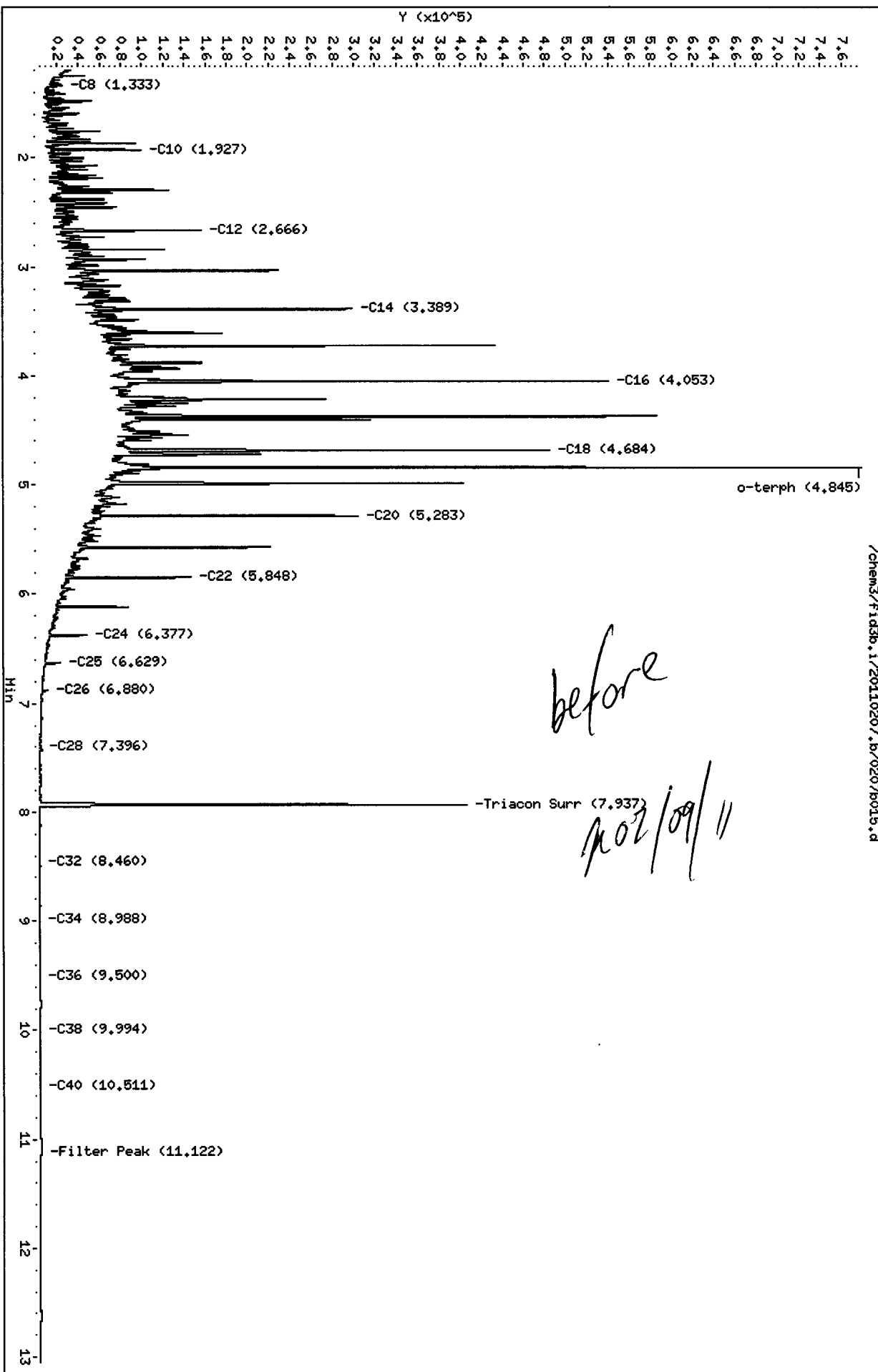
Column phase: RTX-1

Instrument: fid3b.i

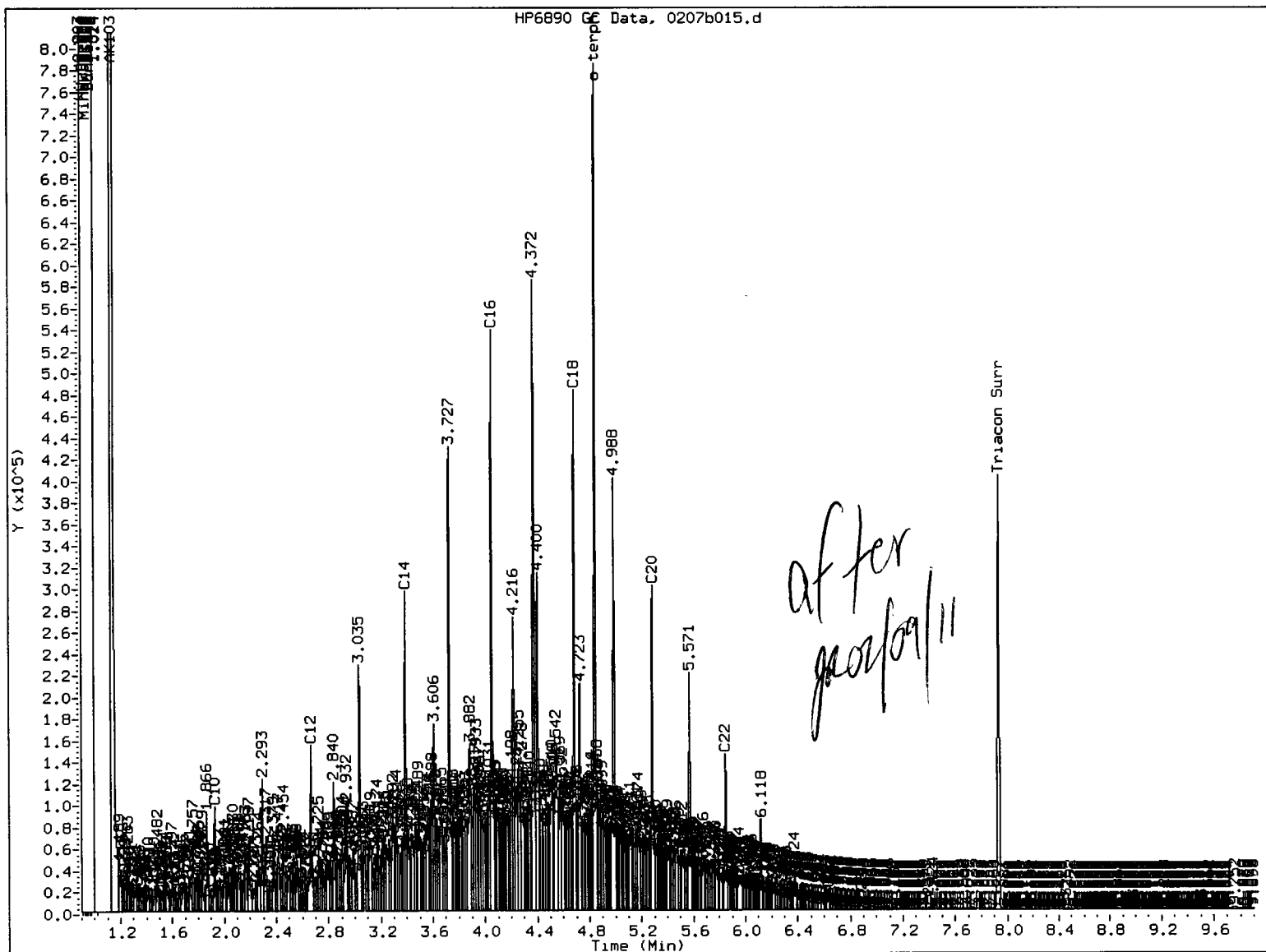
Operator: HS

Column diameter: 0.25

Page 1



SH30 : 00159



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other Skim Surr

Analyst: AK

Date: 02/09/11

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Soil
 Date Received: 02/02/11
 ARI Job: SH30
 Project: Birds Eye-Soil
 JI1001

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
11-2230-SH30A	B11-12-20	8.87 g	1.00 mL	D	02/04/11
11-2231-SH30B	B11-12-25	8.72 g	1.00 mL	D	02/04/11
11-2232-SH30C	B11-12-30	8.51 g	1.00 mL	D	02/04/11
11-2233-SH30D	B11-12-35	8.77 g	1.00 mL	D	02/04/11
11-2234-SH30E	B11-13-15	9.34 g	1.00 mL	D	02/04/11
11-2235-SH30F	B11-13-20	9.10 g	1.00 mL	D	02/04/11
11-2236-SH30G	B11-13-23	8.81 g	1.00 mL	D	02/04/11
11-2237-SH30H	B11-13-30	8.46 g	1.00 mL	D	02/04/11
11-2238-SH30I	B11-14-09	9.12 g	1.00 mL	D	02/04/11
11-2239-020411MB1	Method Blank	10.0 g	1.00 mL	-	02/04/11
11-2239-020411LCS1	Lab Control	10.0 g	1.00 mL	-	02/04/11
11-2239-SH30J	B11-14-15	9.22 g	1.00 mL	D	02/04/11
11-2239-SH30JMS	B11-14-15	9.25 g	1.00 mL	D	02/04/11
11-2239-SH30JMSD	B11-14-15	9.31 g	1.00 mL	D	02/04/11
11-2240-SH30K	B11-14-20	8.79 g	1.00 mL	D	02/04/11
11-2241-SH30L	B11-14-23	8.65 g	1.00 mL	D	02/04/11
11-2242-SH30M	B11-14-30	8.95 g	1.00 mL	D	02/04/11
11-2243-SH30N	B11-15-15	8.65 g	1.00 mL	D	02/04/11
11-2244-SH30O	B11-15-20	9.10 g	1.00 mL	D	02/04/11
11-2245-SH30P	B11-15-25	8.80 g	1.00 mL	D	02/04/11
11-2246-SH30Q	B11-15-30	9.33 g	1.00 mL	D	02/04/11
11-2248-SH30S	B11-16-15	9.09 g	1.00 mL	D	02/04/11
11-2249-SH30T	B11-16-20	8.74 g	1.00 mL	D	02/04/11

Basis: D=Dry Weight W=As Received
Diesel Extraction Report

SH30: 00161



Analytical Resources, Incorporated
Analytical Chemists and Consultants

February 21, 2011

Inger Jackson
Pacific Groundwater Group
2377 Eastlake Ave. East, Suite 200
Seattle, WA 98102

Project: Birds Eye Soil JI1001
ARI ID: SH31

Dear Ms. Jackson:

Please find enclosed the original Chain of Custody record, sample receipt documentation, and the final data for the samples from the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. Should you have any questions or concerns, please feel free to call me at your convenience.

Respectfully,
ANALYTICAL RESOURCES, INC.

Eric Branson
Project Manager
(206) 695-6213
eric@arilabs.com
www.arilabs.com



Case Narrative

- Sample Receipt & Analytical Details -

Sample Receipt

Analytical Resources, Inc. accepted seven soil samples and one Trip Blank intact on February 2, 2011. Select containers arrived at -1.6°C, but volume was noted to not be frozen. For further details regarding sample receipt please refer to the enclosed Cooler Receipt Form.

Selected samples were analyzed for the parameters listed below, as requested on the Chain of Custody.

Benzene by 8260C SIM was not originally requested, but was added to select required samples in order to meet reporting requirements, per client approval.

Benzene by EPA Method 8260C SIM (Selected Ion Monitoring)

There were no irregularities with this analysis.

Polynuclear Aromatic Hydrocarbons by EPA Method 8270D

There were no irregularities with this analysis.

Volatile Petroleum Hydrocarbons by WAVPH

NC10, associated with the C10 range, was out of control low in the closing continuing calibration by 0.3%. The calibration was not entirely passing due to this outage, but no further corrective action was taken.

There were no other irregularities with this analysis.

Extractable Petroleum Hydrocarbons by WAEPH

There were no irregularities with this analysis.

8021 BETX + Gasoline Range Organics by NWTPH-G

Benzene was out of control high in both the LCS and LCSD. The LCS and LCSD met overall acceptance criteria. Benzene was not detected in the samples.

The Bromobenzene surrogate associated with the NWTPH-G analysis of sample "B11-17-10" was out of control high. The corresponding surrogate was within control for the BETX analysis of the same sample. The sample had a high detection for GRO. The Trifluorotoluene surrogate was in control for both columns of the analysis. No further corrective action was taken.



Case Narrative

- Sample Receipt & Analytical Details -

There were no other irregularities with this analysis.

Diesel Range Organics (Extended) by NWTPH-Dx

The surrogate was listed as not recoverable for sample "B11-17-10" due to its coelution with another peak.

Diesel was recovered above the advisory control limit in the matrix spike duplicate. It was in control in the matrix spike. Corrective action is not performed for matrix QC.

There were no other irregularities with this analysis.



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 \geq the Reporting Limit
- N** Matrix Spike recovery not within established control limits
- NA** Not Applicable, analyte not spiked
- H** The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L** Analyte concentration is ≤ 5 times the Reporting Limit and the replicate control limit defaults to ± 1 RL instead of the normal 20% RPD

Organic Data

- U** Indicates that the target analyte was not detected at the reported concentration
- *** Flagged value is not within established control limits
- B** Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J** Estimated concentration when the value is less than ARI's established reporting limits
- D** The spiked compound was not detected due to sample extract dilution
- E** Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
- 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 $\geq 40\%$ 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

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	SH31	Turn-around Requested:	Standard	Page: 7	of
ARI Client Company:	Pacific Groundwater Group		Phone:	206 329 0144	Date: 2/2/11
Client Contact:	Vrazer Jackson			No. of Coolers:	Cooler Temps:

Client Project Name:	Birds Ex 800
Client Project #:	J11001
Samplers:	1. Jackson / 1. Parker

Sample ID	Date	Time	Matrix	No Containers	
B11-16-25	2/1/11	1505	Soil	1	
B11-16-30	2/1/11	1510	}	1	
B11-17-10	2/1/11	1515		4	
B11-17-15	2/1/11	1520		4	
B11-17-20	2/1/11	1525		4	
B11-17-25	2/1/11	1530		1	
B11-17-30	2/1/11	1540	}	5	
Comments/Special Instructions	Relinquished by <i>[Signature]</i>		Received by (Signature)		
	Printed Name <i>Shirley Jackson</i>		Printed Name <i>A. J.</i>		
	Company <i>PEG</i>		Company <i>API</i>		
	Date & Time <i>2/2/11 10:35</i>		Date & Time <i>2/2/11</i>		

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)
			
	Printed Name Peter Jacken	Printed Name A. Volgarden	
	Company PEG	Company APL	Company Company
	Date & Time 2/2/11 10:55	Date & Time 2/2/11 1535	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: F-2167

COC No(s): 5431 (NA)

Assigned ARI Job No: 5431

Project Name: Birds Eye Soil

Delivered by: Fed-Ex UPS Courier (Hand Delivered Other: NA)

Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES (NO)

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)..... 0.8 -1.6 1.6

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 70941679

Cooler Accepted by: AV Date: 2/2/11 Time: 1035

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: NA

Was sufficient ice used (if appropriate)? 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? YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI..... (NA) 2/25/11

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: AV Date: 2/3/11 Time: 0900

**** 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"

Cooler Temperature Compliance Form

[illegible]

Sample ID Cross Reference Report



ARI Job No: SH31
Client: Pacific Groundwater Group
Project Event: JI1001
Project Name: Birds Eye-Soil

Sample ID		ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	B11-16-25	SH31A	11-2250	Soil	02/01/11 15:05	02/02/11 10:35
2.	B11-16-30	SH31B	11-2251	Soil	02/01/11 15:10	02/02/11 10:35
3.	B11-17-10	SH31C	11-2252	Soil	02/01/11 15:15	02/02/11 10:35
4.	B11-17-15	SH31D	11-2253	Soil	02/01/11 15:20	02/02/11 10:35
5.	B11-17-20	SH31E	11-2254	Soil	02/01/11 15:25	02/02/11 10:35
6.	B11-17-25	SH31F	11-2255	Soil	02/01/11 15:30	02/02/11 10:35
7.	B11-17-30	SH31G	11-2256	Soil	02/01/11 15:40	02/02/11 10:35
8.	TRIP BLANKS	SH31H	11-2257	Water	01/31/11	02/02/11 10:35

Printed 02/03/11

SH31 : 00010


ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: B11-17-10
Page 1 of 1 **SAMPLE**

Lab Sample ID: SH31C

LIMS ID: 11-2252

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

J11001

Date Sampled: 02/01/11

Date Received: 02/02/11

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 23:40

Sample Amount: 17.0 mg-dry-wt

Purge Volume: 10.0 mL

Moisture: 12.2%

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	12	< 12	U

Reported in $\mu\text{g/kg}$ (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	88.8%
-----------------------	-------

SW8260-SIM SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH31-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001

<u>Client ID</u>	<u>DCE</u>	<u>TOT OUT</u>
MB-020911	116%	0
LCS-020911	102%	0
B11-17-10	88.8%	0

	<u>LCS/MB LIMITS</u>	<u>QC LIMITS</u>
(DCE) = d4-1,2-Dichloroethane	(30-160)	(30-160)

Prep Method: SW5030
Log Number Range: 11-2252 to 11-2252

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: LCS-020911


Page 1 of 1

LAB CONTROL SAMPLE

Lab Sample ID: LCS-020911

LIMS ID: 11-2252

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: NA

Date Received: NA

Instrument/Analyst LCS: NT7/PKC

Date Analyzed LCS: 02/09/11 14:33

Sample Amount LCS: 20.0 mg-dry-wt

Purge Volume LCS: 10.0 mL

Analyte	LCS	Spike Added	Recovery
Benzene	420	500	84.0%

Reported in µg/kg (ppb)

NA-No recovery due to high concentration of analyte in original sample,
calculated negative recovery, or undetected spike.

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: MB-020911

Page 1 of 1

METHOD BLANK

Lab Sample ID: MB-020911

LIMS ID: 11-2252

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/14/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: NA

Date Received: NA

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/09/11 15:24

Sample Amount: 20.0 mg-dry-wt

Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	10	< 10	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	116%
-----------------------	------

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1


Sample ID: B11-17-30

SAMPLE

Lab Sample ID: SH31G

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Date Analyzed: 02/09/11 18:17

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Alumina: No

Silica Gel: Yes

Sample Amount: 7.83 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 15.5%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	64	< 64 U
91-57-6	2-Methylnaphthalene	64	120
90-12-0	1-Methylnaphthalene	64	130
208-96-8	Acenaphthylene	64	< 64 U
83-32-9	Acenaphthene	64	< 64 U
86-73-7	Fluorene	64	72
85-01-8	Phenanthrene	64	190
120-12-7	Anthracene	64	< 64 U
206-44-0	Fluoranthene	64	< 64 U
129-00-0	Pyrene	64	< 64 U
56-55-3	Benzo(a)anthracene	64	< 64 U
218-01-9	Chrysene	64	< 64 U
50-32-8	Benzo(a)pyrene	64	< 64 U
193-39-5	Indeno(1,2,3-cd)pyrene	64	< 64 U
53-70-3	Dibenz(a,h)anthracene	64	< 64 U
191-24-2	Benzo(g,h,i)perylene	64	< 64 U
132-64-9	Dibenzofuran	64	< 64 U
TOTBFA	Total Benzofluoranthenes	64	< 64 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	75.2%
2-Fluorobiphenyl	65.6%

SW8270 PNA SURROGATE RECOVERY SUMMARY



Matrix: Soil

QC Report No: SH31-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001

Client ID	TER	FBP	TOT OUT
MB-020411	81.2%	66.0%	0
LCS-020411	84.8%	70.4%	0
B11-17-30	75.2%	65.6%	0
B11-17-30 MS	75.6%	71.2%	0
B11-17-30 MSD	76.8%	72.4%	0

LCS/MB LIMITS QC LIMITS

(TER) = d14-p-Terphenyl (30-160) (30-160)
(FBP) = 2-Fluorobiphenyl (30-160) (30-160)

Prep Method: SW3546
Log Number Range: 11-2256 to 11-2256

ORGANICS ANALYSIS DATA SHEET

PNA's by SW8270D GC/MS

Page 1 of 1

Sample ID: B11-17-30

MS/MSD

Lab Sample ID: SH31G

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/11/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted MS/MSD: 02/04/11

Sample Amount MS: 7.70 g-dry-wt

MSD: 7.79 g-dry-wt

Date Analyzed MS: 02/09/11 18:50

Final Extract Volume MS: 0.5 mL

MSD: 02/09/11 19:23

MSD: 0.5 mL

Instrument/Analyst MS: NT6/JZ

Dilution Factor MS: 1.00

MSD: NT6/JZ

MSD: 1.00

GPC Cleanup: No

Alumina Cleanup: No

Silica Gel Cleanup: Yes

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Naphthalene	< 63.9	1130	1620	69.8%	1170	1600	73.1%	3.5%
2-Methylnaphthalene	116	1150	1620	63.8%	1180	1600	66.5%	2.6%
1-Methylnaphthalene	128	1240	1620	68.6%	1290	1600	72.6%	4.0%
Acenaphthylene	< 63.9	1270	1620	78.4%	1320	1600	82.5%	3.9%
Acenaphthene	< 63.9	1240	1620	76.5%	1290	1600	80.6%	4.0%
Fluorene	71.5	1400	1620	82.0%	1450	1600	86.2%	3.5%
Phenanthrene	192	1540	1620	83.2%	1650	1600	91.1%	6.9%
Anthracene	< 63.9	1330	1620	82.1%	1370	1600	85.6%	3.0%
Fluoranthene	< 63.9	1480	1620	91.4%	1570	1600	98.1%	5.9%
Pyrene	< 63.9	1280	1620	79.0%	1340	1600	83.8%	4.6%
Benzo(a)anthracene	< 63.9	1380	1620	85.2%	1430	1600	89.4%	3.6%
Chrysene	< 63.9	1340	1620	82.7%	1430	1600	89.4%	6.5%
Benzo(a)pyrene	< 63.9	1230	1620	75.9%	1300	1600	81.2%	5.5%
Indeno(1,2,3-cd)pyrene	< 63.9	1260	1620	77.8%	1330	1600	83.1%	5.4%
Dibenz(a,h)anthracene	< 63.9	1280	1620	79.0%	1340	1600	83.8%	4.6%
Benzo(g,h,i)perylene	< 63.9	1200	1620	74.1%	1280	1600	80.0%	6.5%
Dibenzofuran	< 63.9	1290	1620	79.6%	1350	1600	84.4%	4.5%
Total Benzofluoranthenes	< 63.9	2750	3250	84.6%	2910	3210	90.7%	5.7%

Results reported in µg/kg

RPD calculated using sample concentrations per SW846.

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1

ANALYTICAL
RESOURCES
INCORPORATED 


Sample ID: B11-17-30

MATRIX SPIKE

Lab Sample ID: SH31G

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Date Analyzed: 02/09/11 18:50

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Alumina: No

Silica Gel: Yes

Sample Amount: 7.70 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 15.5%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	65	---
91-57-6	2-Methylnaphthalene	65	---
90-12-0	1-Methylnaphthalene	65	---
208-96-8	Acenaphthylene	65	---
83-32-9	Acenaphthene	65	---
86-73-7	Fluorene	65	---
85-01-8	Phenanthrene	65	---
120-12-7	Anthracene	65	---
206-44-0	Fluoranthene	65	---
129-00-0	Pyrene	65	---
56-55-3	Benzo(a)anthracene	65	---
218-01-9	Chrysene	65	---
50-32-8	Benzo(a)pyrene	65	---
193-39-5	Indeno(1,2,3-cd)pyrene	65	---
53-70-3	Dibenz(a,h)anthracene	65	---
191-24-2	Benzo(g,h,i)perylene	65	---
132-64-9	Dibenzofuran	65	---
TOTBFA	Total Benzofluoranthenes	65	---

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	75.6%
2-Fluorobiphenyl	71.2%

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1


Sample ID: B11-17-30

MATRIX SPIKE DUPLICATE

Lab Sample ID: SH31G

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Date Analyzed: 02/09/11 19:23

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Alumina: No

Silica Gel: Yes

Sample Amount: 7.79 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 15.5%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	64	---
91-57-6	2-Methylnaphthalene	64	---
90-12-0	1-Methylnaphthalene	64	---
208-96-8	Acenaphthylene	64	---
83-32-9	Acenaphthene	64	---
86-73-7	Fluorene	64	---
85-01-8	Phenanthrene	64	---
120-12-7	Anthracene	64	---
206-44-0	Fluoranthene	64	---
129-00-0	Pyrene	64	---
56-55-3	Benzo(a)anthracene	64	---
218-01-9	Chrysene	64	---
50-32-8	Benzo(a)pyrene	64	---
193-39-5	Indeno(1,2,3-cd)pyrene	64	---
53-70-3	Dibenz(a,h)anthracene	64	---
191-24-2	Benzo(g,h,i)perylene	64	---
132-64-9	Dibenzofuran	64	---
TOTBFA	Total Benzofluoranthenes	64	---

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	76.8%
2-Fluorobiphenyl	72.4%

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1


Sample ID: LCS-020411

LAB CONTROL

Lab Sample ID: LCS-020411

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized: 

Reported: 02/11/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: NA

Date Received: 02/02/11

Date Extracted: 02/04/11

Date Analyzed: 02/09/11 17:45

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Silica Gel Cleanup: Yes

Sample Amount: 7.50 g-dry-wt

Final Extract Volume: 0.50 mL

Dilution Factor: 1.00

Alumina Cleanup: No

Analyte	Lab Control	Spike Added	Recovery
Naphthalene	1110	1670	66.5%
2-Methylnaphthalene	1040	1670	62.3%
1-Methylnaphthalene	1120	1670	67.1%
Acenaphthylene	1330	1670	79.6%
Acenaphthene	1250	1670	74.9%
Fluorene	1400	1670	83.8%
Phenanthrene	1480	1670	88.6%
Anthracene	1490	1670	89.2%
Fluoranthene	1680	1670	101%
Pyrene	1460	1670	87.4%
Benzo(a)anthracene	1550	1670	92.8%
Chrysene	1520	1670	91.0%
Benzo(a)pyrene	1380	1670	82.6%
Indeno(1,2,3-cd)pyrene	1350	1670	80.8%
Dibenz(a,h)anthracene	1360	1670	81.4%
Benzo(g,h,i)perylene	1300	1670	77.8%
Dibenzofuran	1320	1670	79.0%
Total Benzofluoranthenes	3070	3330	92.2%

Semivolatile Surrogate Recovery

d14-p-Terphenyl	84.8%
2-Fluorobiphenyl	70.4%

Results reported in µg/kg

ORGANICS ANALYSIS DATA SHEET

PNAs by SW8270D GC/MS

Page 1 of 1

Sample ID: MB-020411

METHOD BLANK

Lab Sample ID: MB-020411

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/11/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

J11001

Date Sampled: NA

Date Received: NA

Date Extracted: 02/04/11

Date Analyzed: 02/09/11 17:12

Instrument/Analyst: NT6/JZ

GPC Cleanup: No

Alumina: No

Silica Gel: Yes

Sample Amount: 7.50 g

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: NA

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	67	< 67 U
91-57-6	2-Methylnaphthalene	67	< 67 U
90-12-0	1-Methylnaphthalene	67	< 67 U
208-96-8	Acenaphthylene	67	< 67 U
83-32-9	Acenaphthene	67	< 67 U
86-73-7	Fluorene	67	< 67 U
85-01-8	Phenanthrene	67	< 67 U
120-12-7	Anthracene	67	< 67 U
206-44-0	Fluoranthene	67	< 67 U
129-00-0	Pyrene	67	< 67 U
56-55-3	Benzo(a)anthracene	67	< 67 U
218-01-9	Chrysene	67	< 67 U
50-32-8	Benzo(a)pyrene	67	< 67 U
193-39-5	Indeno(1,2,3-cd)pyrene	67	< 67 U
53-70-3	Dibenz(a,h)anthracene	67	< 67 U
191-24-2	Benzo(g,h,i)perylene	67	< 67 U
132-64-9	Dibenzofuran	67	< 67 U
TOTBFA	Total Benzofluoranthenes	67	< 67 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	81.2%
2-Fluorobiphenyl	66.0%

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1

Sample ID: B11-17-30

SAMPLE



Lab Sample ID: SH31G

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized: *MB*

Reported: 02/15/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 10:51

Instrument/Analyst: PID1/MH

Purge Volume: 10 mL

Sample Amount: 42.3 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1200	< 1,200 U
108-88-3	Toluene	1200	< 1,200 U
100-41-4	Ethylbenzene	1200	< 1,200 U
179601-23-1	m,p-Xylene	2400	< 2,400 U
95-47-6	o-Xylene	1200	< 1,200 U
1634-04-4	Methyl tert-Butyl Ether	1200	< 1,200 U
109-66-0	n-Pentane	1200	< 1,200 U
110-54-3	n-Hexane	1200	< 1,200 U
111-65-9	n-Octane	1200	< 1,200 U
124-18-5	n-Decane	1200	< 1,200 U
112-40-3	n-Dodecane	1200	< 1,200 U

Range	RL	Result
C8-C10 Aromatics	12,000	< 12,000 U
C10-C12 Aromatics	12,000	< 12,000 U
C12-C13 Aromatics	12,000	< 12,000 U
C5-C6 Aliphatics	12,000	< 12,000 U
C6-C8 Aliphatics	12,000	< 12,000 U
C8-C10 Aliphatics	12,000	< 12,000 U
C10-C12 Aliphatics	12,000	< 12,000 U

Values reported in µg/kg (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	98.8%
FID: 2,5-Dibromotoluene	95.8%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

FORM I

SH31:00022

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a008.d
Report Date: 14-Feb-2011 12:09

Page 1

MH
2/14/11

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a008.d
Lab Smp Id: SH31G
Inj Date : 04-FEB-2011 10:51
Operator : MH
Smp Info : SH31G
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 MtBE	5.080	5.097	-0.017	16	0.01084	0.0108
2 BENZENE	7.653	7.647	0.006	67	0.02033	0.0203
4 TOLUENE	9.970	9.960	0.010	32	0.01048	0.0105
5 ETHYLBENZENE	11.943	11.933	0.010	53	0.02025	0.0202
6 M/P-XYLENE	12.047	12.037	0.010	108	0.03511	0.0351
7 O-XYLENE	12.630	12.623	0.007	2026	0.74491	0.745
9 TRIMETHYLBEN	15.007	15.047	-0.040	1460	0.61499	0.615
10 NAPHTHALENE	18.283	18.270	0.013	830	0.38069	0.381
11 1-METHYLNAP	20.123	20.110	0.013	4456	4.01610	4.02 (M)
\$ 37 DIBROMOTOL	19.927	19.910	0.017	91122	49.3680	49.4

QC Flag Legend

M - Compound response manually integrated.

SH31 : 00023

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a008.d
Lab Smp Id: SH31G
Inj Date : 04-FEB-2011 10:51
Operator : MH
Smp Info : SH31G
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 nC5	3.887	3.850	0.037	110	0.25699	0.257
2 nC6	Compound Not Detected.					
4 nC8	9.653	9.640	0.013	113	0.26168	0.262
5 nC10	13.450	13.440	0.010	101	0.24126	0.241
7 nC12	16.583	16.573	0.010	308	0.72396	0.724
\$ 8 2,5-DBT	19.927	19.913	0.014	7622	47.9147	47.9 (M)

QC Flag Legend

M - Compound response manually integrated.

Data File: /chem3/pidl.i/vpcc0204-2.b/0204a008.d
Date : 04-FEB-2011 10:51

Client ID:

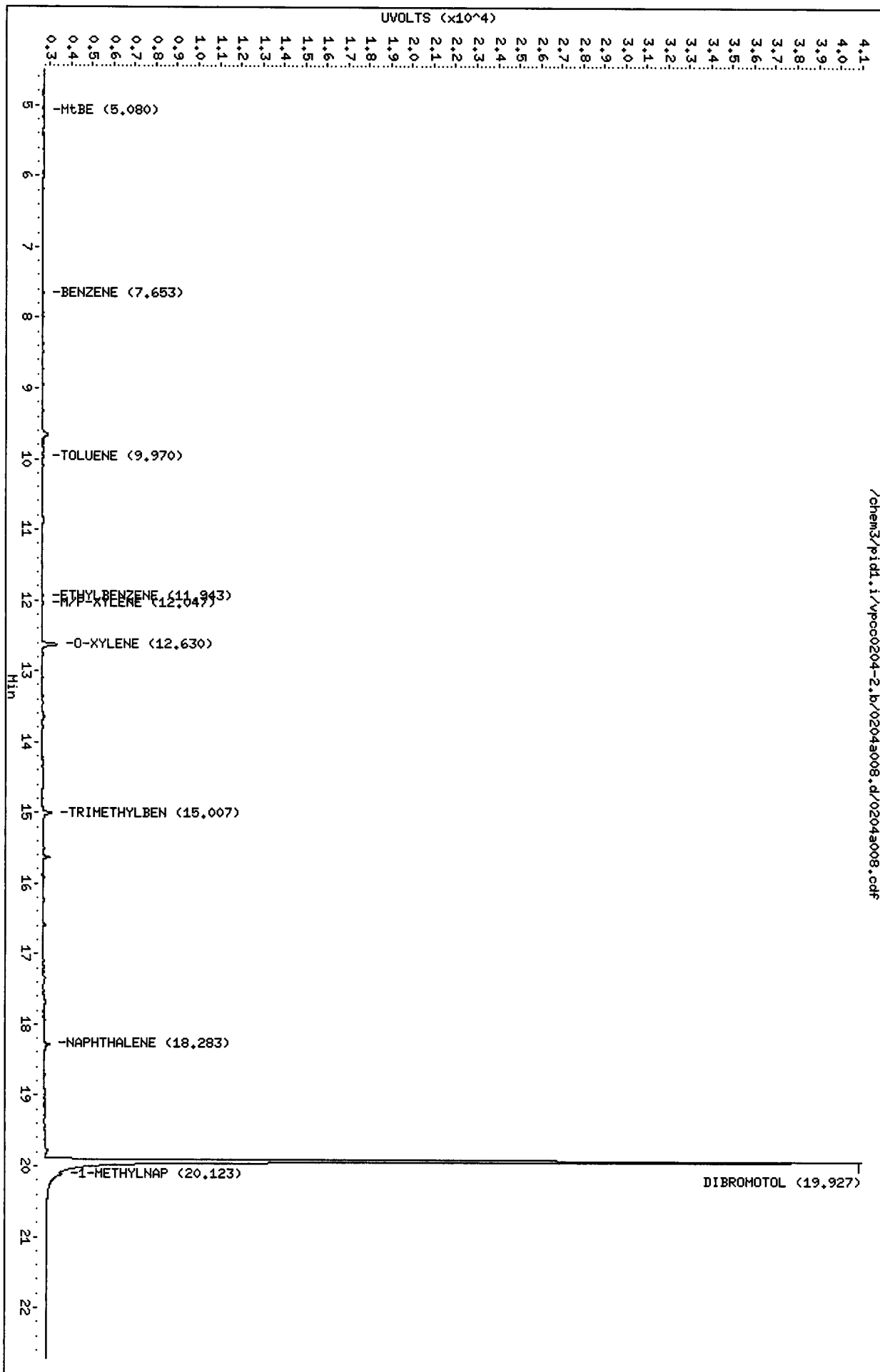
Sample Info: SH31G

Column Phase: RTX 502-2 ARD

Instrument: pidl.i

Operator: MH

Column diameter: 0.18



Data File: /chem3/pid1.i/vpcc0204-1.b/0204a008.d

Date : 04-FEB-2011 10:51

Client ID:

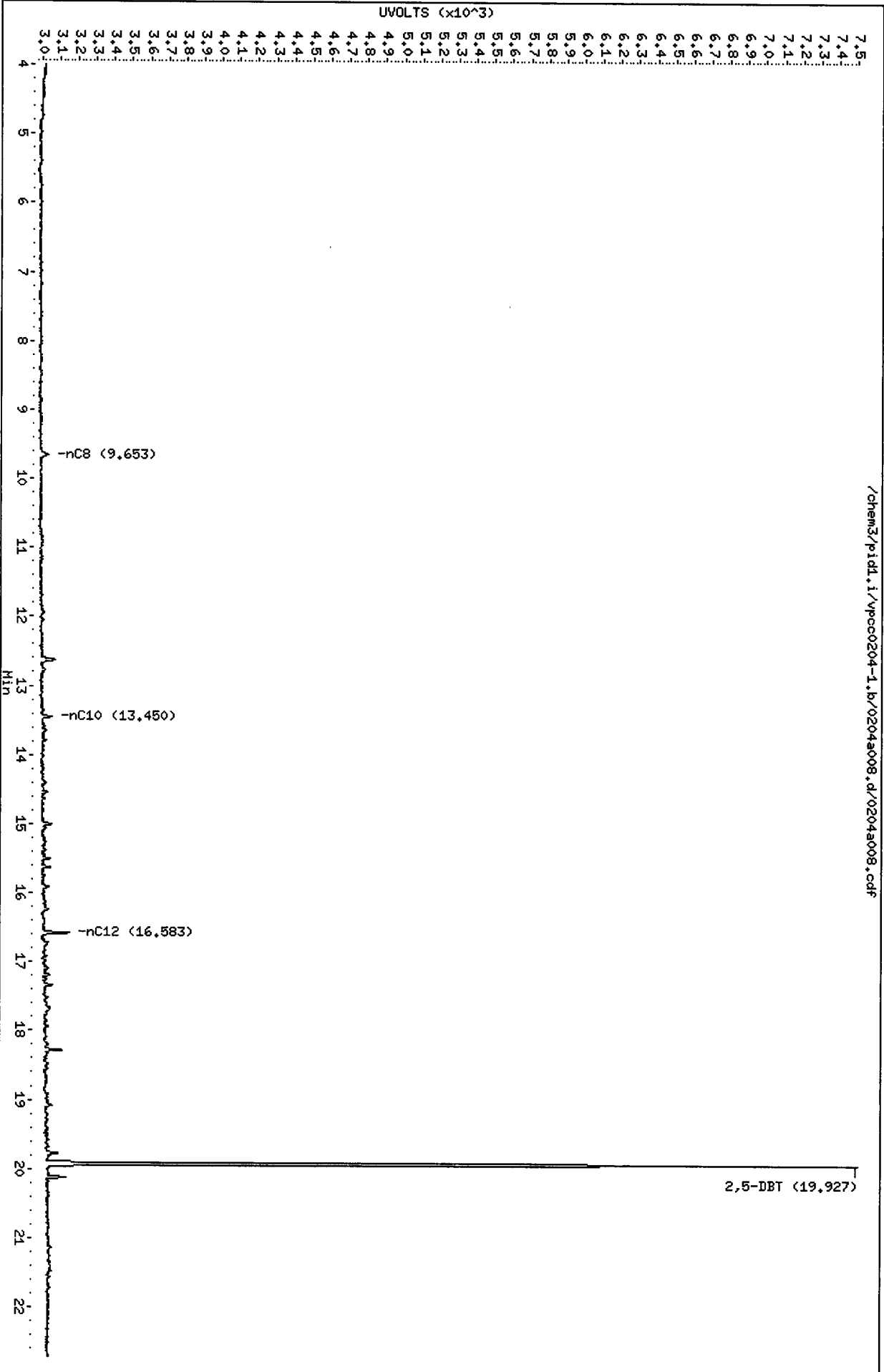
Sample Info: SH31C

Column phase: RTX502-2 ALI

Instrument: pid1.i

Operator: MH

Column diameter: 0.18



Analytical Resources Inc.
WAVPH Aromatics Report

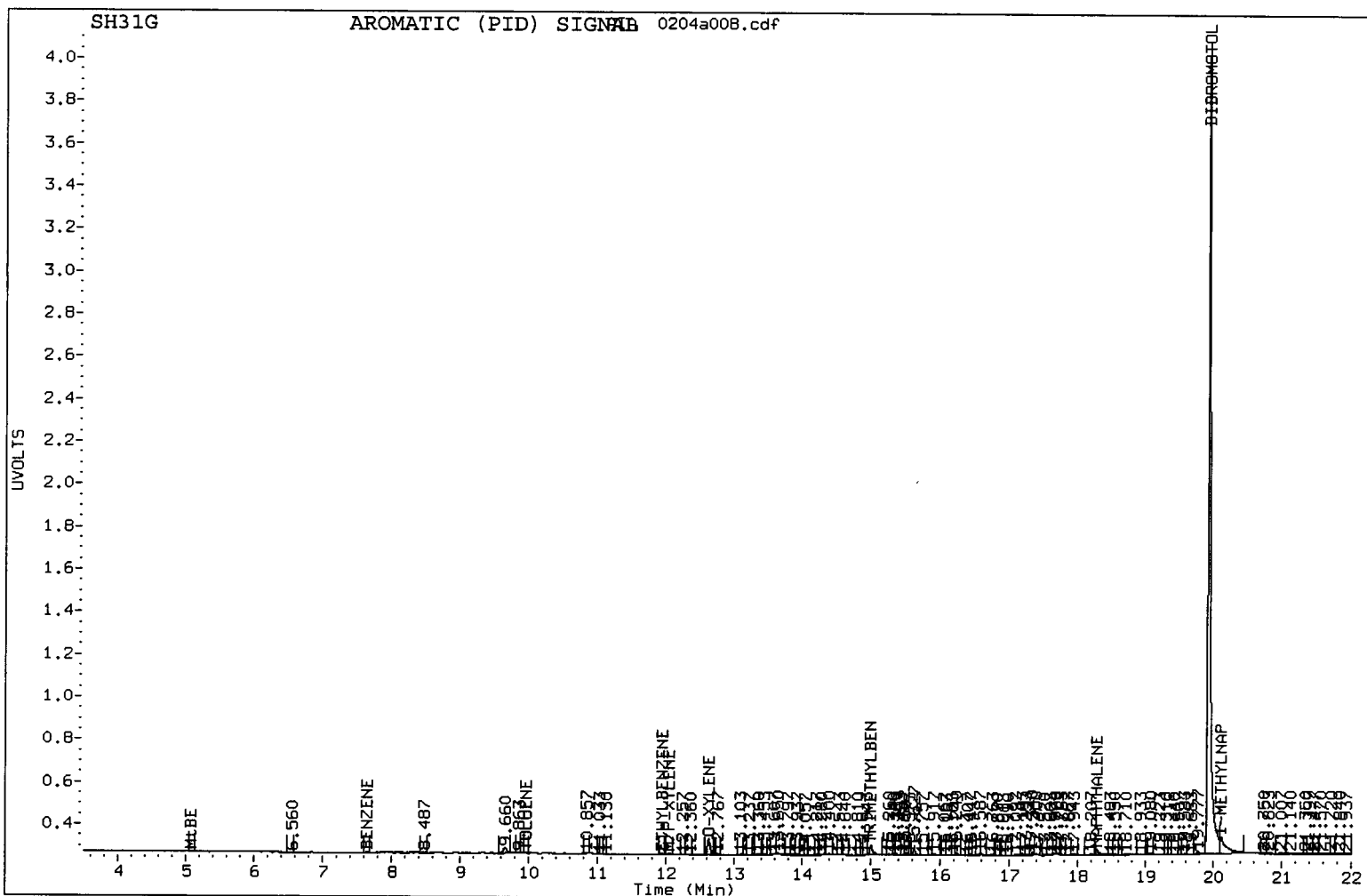
Data file: /chem3/pid1.i/vpcc0204-2.b/0204a008.d
Method: /chem3/pid1.i/vpcc0204-2.b/VPHAROM.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH31G
Client ID:
Injection: 04-FEB-2011 10:51
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.080	-0.017	6	0.0	C8-C10 Arom.	4673*	2.0
BENZENE	7.653	0.007	23	0.0	C10-C12 Arom.	4178	1.9
TOLUENE	9.970	0.010	19	0.0	C12-C13 Arom.	5733	5.2
ETHYLBENZENE	11.943	0.010	25	0.0			
M/P-XYLENE	12.047	0.010	46	0.0			
O-XYLENE	12.630	0.007	728	0.7			
TRIMETHYLBEN	15.007	-0.040	432	0.6			
NAPHTHALENE	18.283	0.013	265	0.4			
1-METHYLNAP	20.123	0.013	723	4.0			
DIBROMOTOL	19.927	0.017	38153	49.4	DBT Recovery:	98.7	

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0204-1.b/0204a008.d
Method: /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH31G
Client ID:
Injection: 04-FEB-2011 10:51
Matrix: WATER
Dilution Factor: 1

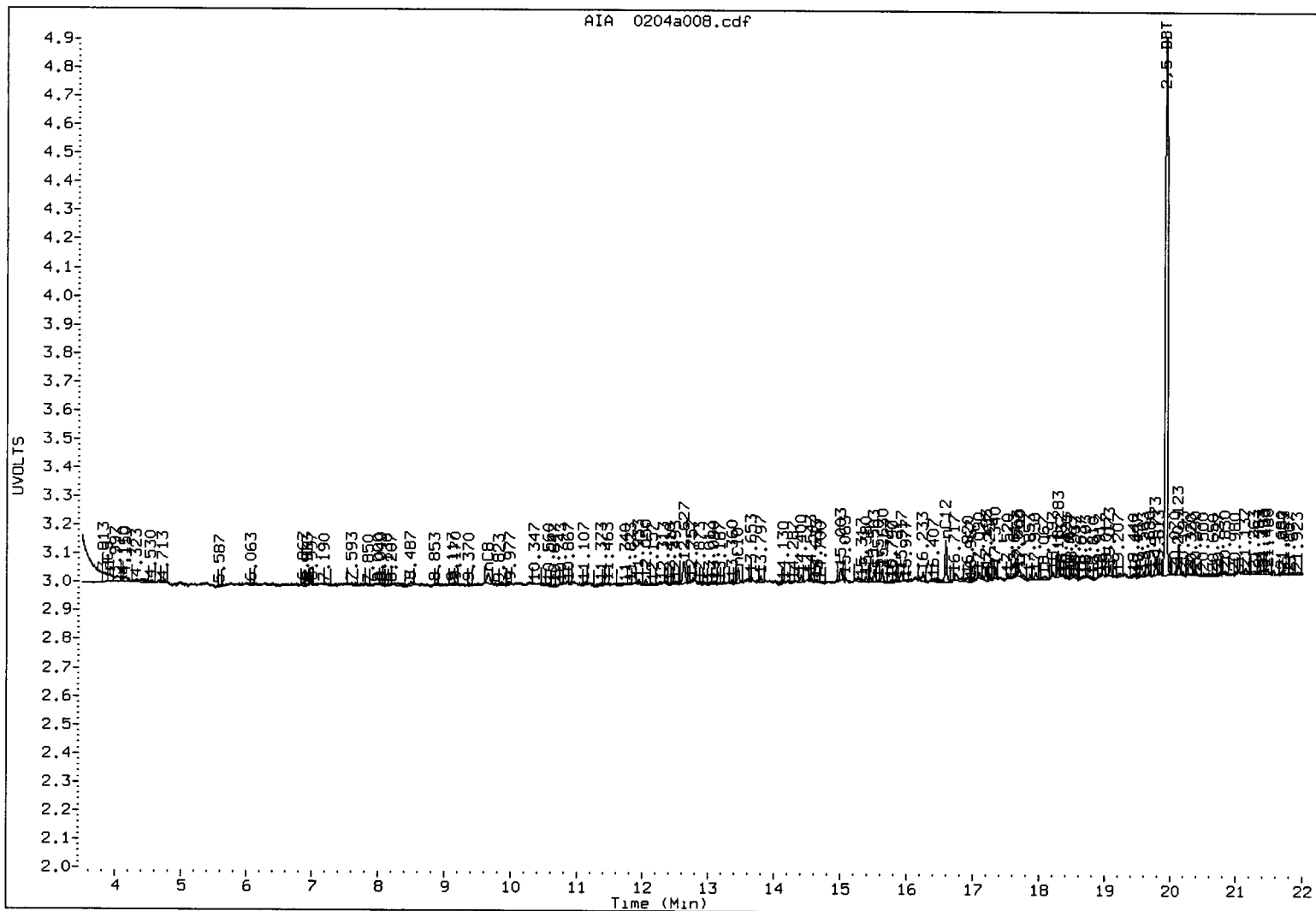
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.887	0.037	31	110	C5-C6 Aliph.	584	1.2
nC6	-----				C6-C8 Aliph.	522	1.2
nC8	9.653	0.013	38	113	C8-C10 Aliph.	879	2.1
nC10	13.450	0.010	53	101	C10-C12 Aliph.	1315*	3.1
nC12	16.583	0.010	148	308			

* Indicates surrogate area subtracted

SH31G

ALIPHATIC (FID) SIGNAL



ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1



Sample ID: TRIP BLANKS

SAMPLE

Lab Sample ID: SH31I

LIMS ID: 11-2318

Matrix: Water

Data Release Authorized: *AB*

Reported: 02/15/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 10:20

Instrument/Analyst: PID1/MH

Purge Volume: 10 mL

Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	5.0	< 5.0 U
108-88-3	Toluene	5.0	< 5.0 U
100-41-4	Ethylbenzene	5.0	< 5.0 U
179601-23-1	m,p-Xylene	10	< 10 U
95-47-6	o-Xylene	5.0	< 5.0 U
1634-04-4	Methyl tert-Butyl Ether	5.0	< 5.0 U
109-66-0	n-Pentane	5.0	< 5.0 U
110-54-3	n-Hexane	5.0	< 5.0 U
111-65-9	n-Octane	5.0	< 5.0 U
124-18-5	n-Decane	5.0	< 5.0 U
112-40-3	n-Dodecane	5.0	< 5.0 U

Range	RL	Result
C8-C10 Aromatics	50	< 50 U
C10-C12 Aromatics	50	< 50 U
C12-C13 Aromatics	50	< 50 U
C5-C6 Aliphatics	50	< 50 U
C6-C8 Aliphatics	50	< 50 U
C8-C10 Aliphatics	50	< 50 U
C10-C12 Aliphatics	50	< 50 U

Values reported in µg/L (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	91.6%
FID: 2,5-Dibromotoluene	83.4%

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a007a.d
Report Date: 15-Feb-2011 09:01

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MH
2/15/11

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a007a.d
Lab Smp Id: SH31I Client Smp ID: TRIP BLANKS
Inj Date : 04-FEB-2011 10:20
Operator : MH Inst ID: pid1.i
Smp Info : SH31I
Misc Info : 11-2257
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul Quant Type: ESTD
Cal Date : 20-DEC-2010 21:58 Cal File: 1220a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waarom.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable

Local Compound Variable

Compounds				RESPONSE	CONCENTRATIONS	
	RT	EXP RT	DLT RT		ON-COLUMN	FINAL
					(ug/ml)	(ug/L)
=====	==	=====	=====	=====	=====	=====
1 MtBE	Compound Not Detected.					
2 BENZENE	7.650	7.647	0.003	16	0.00486	0.00486
4 TOLUENE	9.970	9.960	0.010	35	0.01147	0.0115
5 ETHYLBENZENE	11.943	11.933	0.010	36	0.01376	0.0138
6 M/P-XYLENE	12.047	12.037	0.010	82	0.02666	0.0266
7 O-XYLENE	12.630	12.623	0.007	1606	0.59049	0.590
9 TRIMETHYLBEN	15.007	15.047	-0.040	1032	0.43471	0.435
10 NAPHTHALENE	18.287	18.270	0.017	261	0.11971	0.120
11 1-METHYLNAP	Compound Not Detected.					
\$ 37 DIBROMOTOL	19.927	19.910	0.017	84530	45.7966	45.8

SH31 : 00030

Data File: /chem3/pid1.i/vpcc0204-1.b/0204a007a.d
Report Date: 15-Feb-2011 09:01

Page 1

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a007a.d
Lab Smp Id: SH31I Client Smp ID: TRIP BLANKS
Inj Date : 04-FEB-2011 10:20
Operator : MH Inst ID: pid1.i
Smp Info : SH31I
Misc Info : 11-2257
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul Quant Type: ESTD
Cal Date : 20-DEC-2010 21:58 Cal File: 1220a014.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: waaliph.sub
Target Version: 3.50

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable

Local Compound Variable

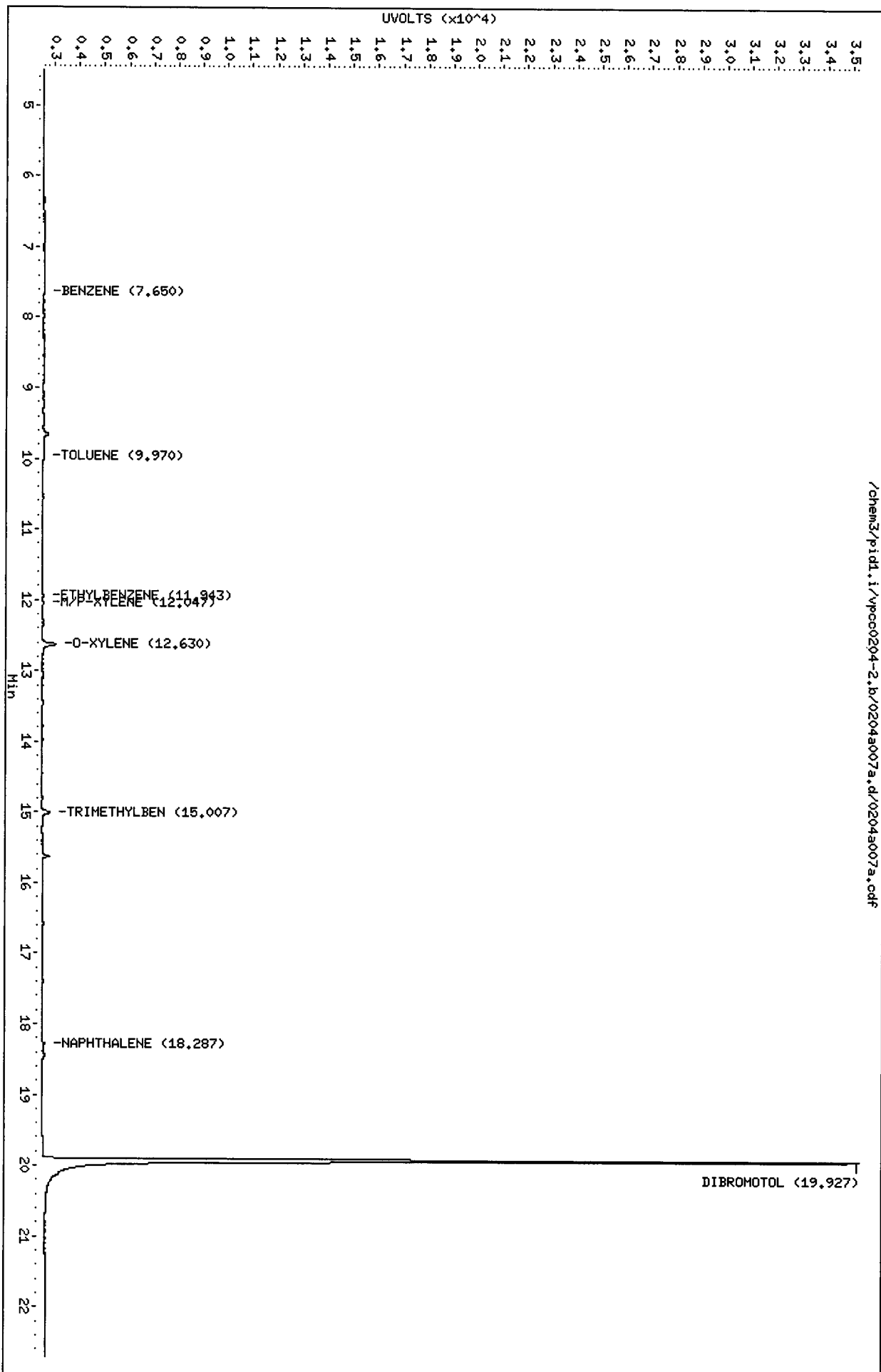
Compounds	RT	EXP RT	DLT RT	RESPONSE	CONCENTRATIONS	
					ON-COLUMN	FINAL
					(ng/mL)	(ug/L)
=====	==	=====	=====	=====	=====	=====
1 nC5	Compound Not Detected.					
2 nC6	5.357	5.393	-0.036	59	0.11661	0.117
4 nC8	9.650	9.640	0.010	119	0.27533	0.275
5 nC10	13.453	13.440	0.013	163	0.38706	0.387
7 nC12	16.587	16.573	0.014	249	0.58452	0.584
\$ 8 2,5-DBT	19.927	19.913	0.014	6641	41.7467	41.7

SH31 : 000031

Data File: /chem3/pidl.i/vpcc0204-2.b/0204s007a.d
Date : 04-FEB-2011 10:20
Client ID: TRIP BLANKS
Sample Info: SH311

Column phase: RTX 502-2 ARO

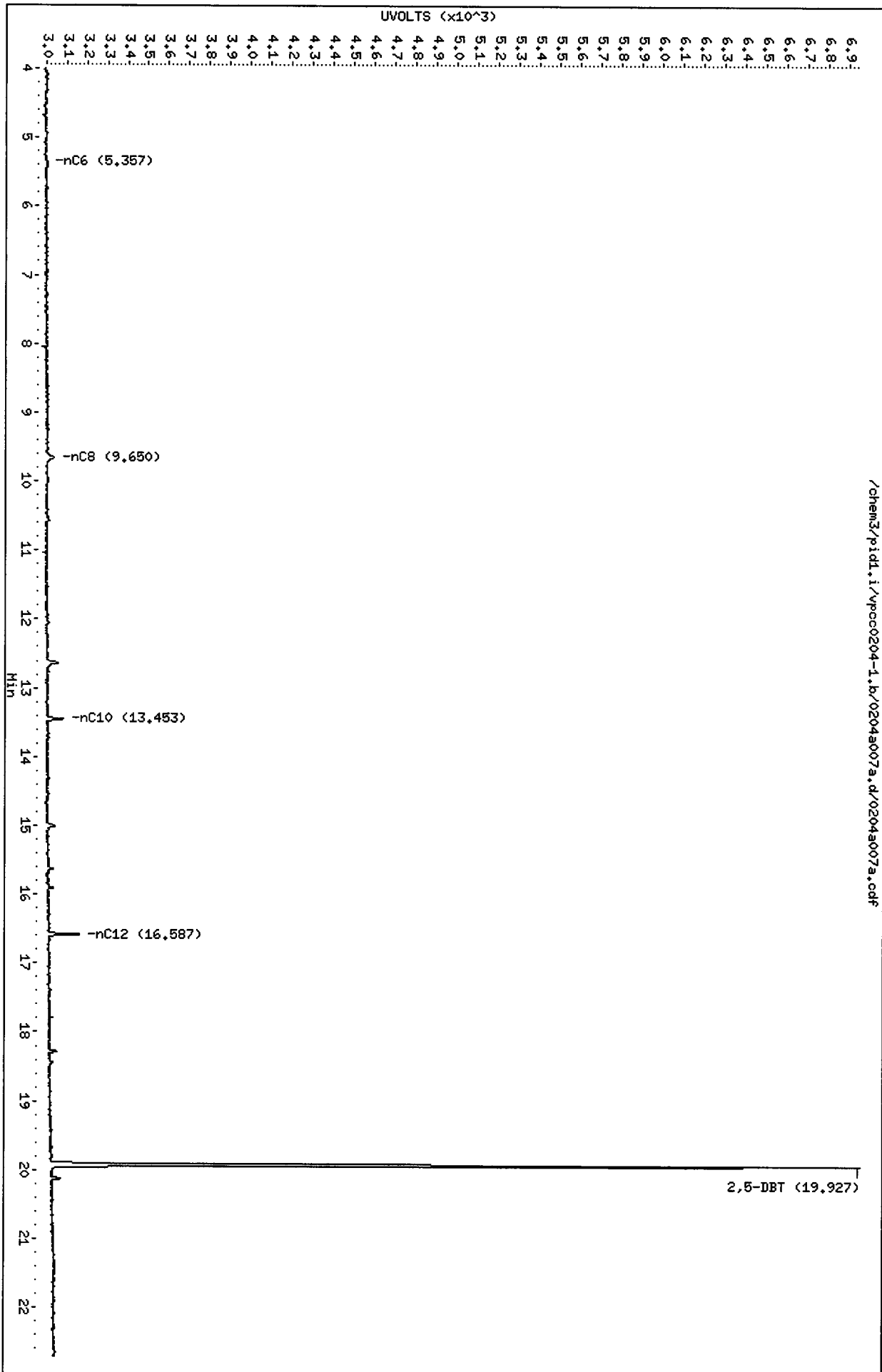
Instrument: pidl.i
Operator: MH
Column diameter: 0.18



Data File: /chem3/pid1.i/vpcc0204-1.b/0204a007a.d
Date : 04-FEB-2011 10:20
Client ID: TRIP BLANKS
Sample Info: SH311

Column phase: RTX502-2 ALI

Instrument: pid1.i
Operator: MH
Column diameter: 0.18



Analytical Resources Inc.
WAVPH Aromatics Report

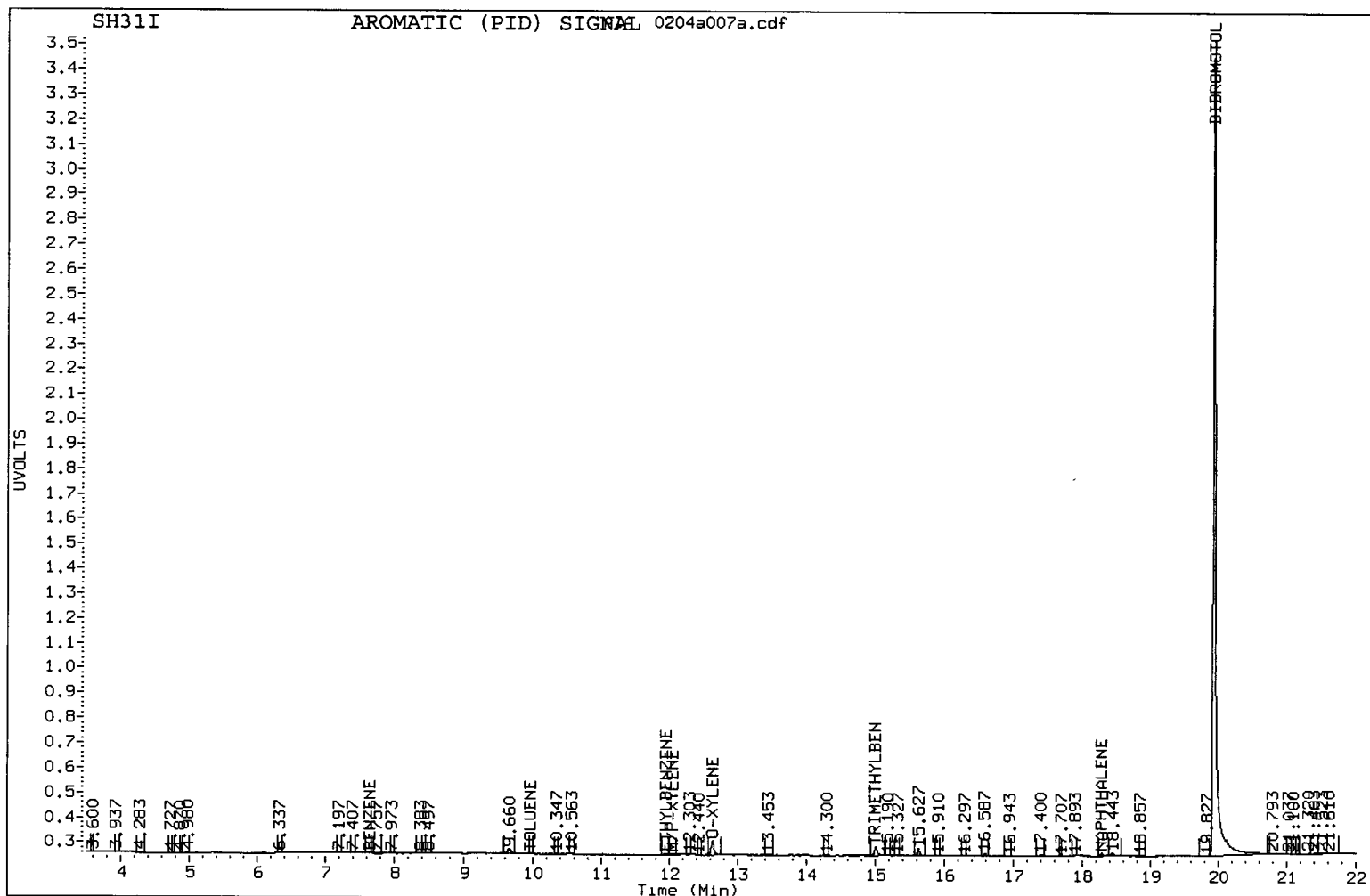
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Method: /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH31I
Client ID: TRIP BLANKS
Injection: 04-FEB-2011 10:20
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	----				C8-C10 Arom.	2976*	1.3
BENZENE	7.650	0.003	6	0.0	C10-C12 Arom.	1586	0.7
TOLUENE	9.970	0.010	18	0.0	C12-C13 Arom.	81	0.1
ETHYLBENZENE	11.943	0.010	19	0.0			
M/P-XYLENE	12.047	0.010	36	0.0			
O-XYLENE	12.630	0.007	550	0.6			
TRIMETHYLBEN	15.007	-0.040	329	0.4			
NAPHTHALENE	18.287	0.017	100	0.1			
1-METHYLNAP	----						
DIBROMOTOL	19.927	0.017	32677	45.8	DBT Recovery:	91.6	

* Indicates surrogate area subtracted



SH31 : 00034

Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0204-1.b/0204a007a.d
Method: /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH31I
Client ID: TRIP BLANKS
Injection: 04-FEB-2011 10:20
Matrix: WATER
Dilution Factor: 1

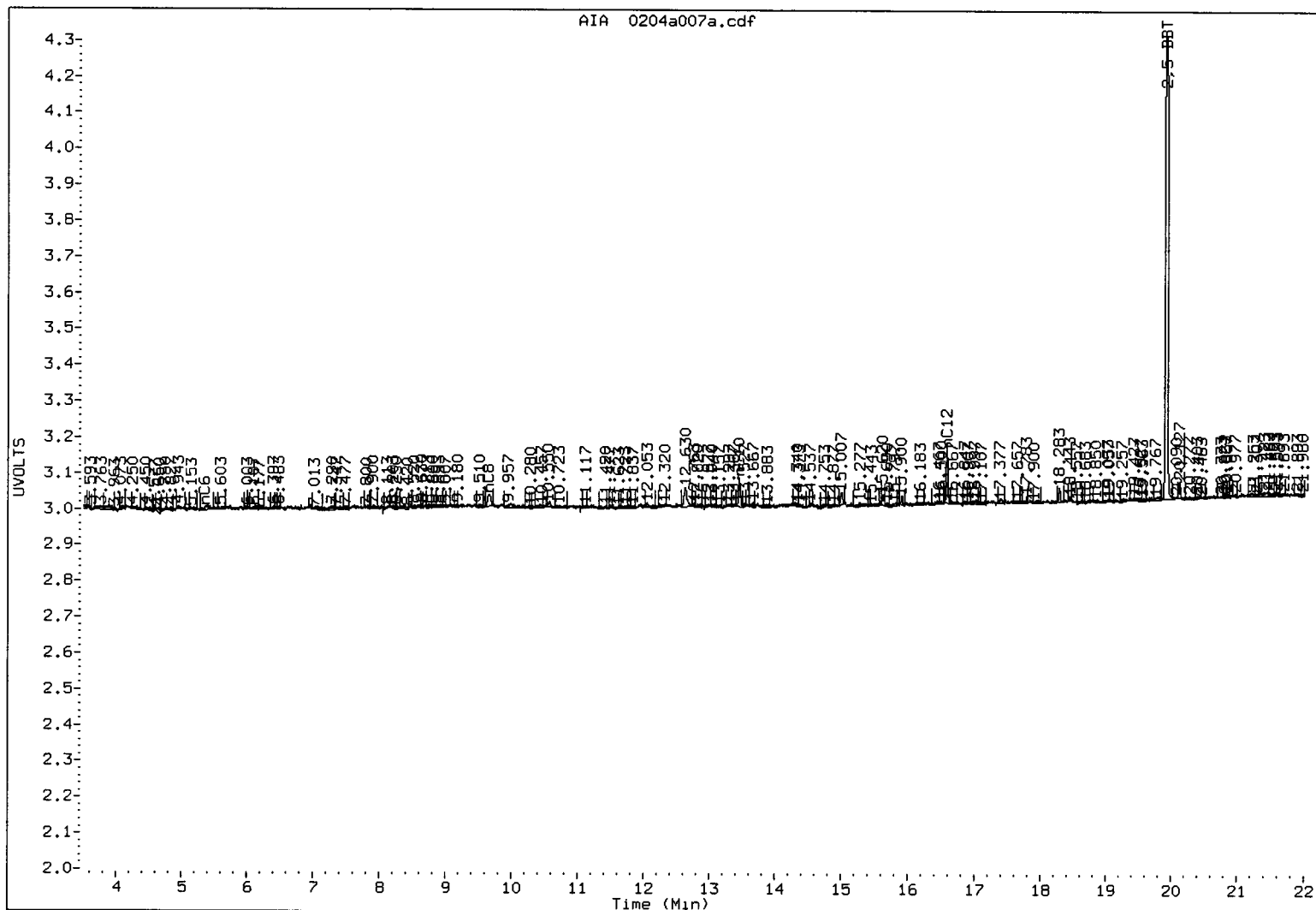
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	----				C5-C6 Aliph.	382	0.8
nC6	5.357	-0.037	8	59	C6-C8 Aliph.	699*	1.6
nC8	9.650	0.010	35	119	C8-C10 Aliph.	874	2.1
nC10	13.453	0.013	81	163	C10-C12 Aliph.	817*	1.9
nC12	16.587	0.013	151	249			

* Indicates surrogate area subtracted

SH31I

ALIPHATIC (FID) SIGNAL



SH31 00035

VPH SURROGATE RECOVERY SUMMARY



Matrix: Soil

QC Report No: SH31-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001

<u>Client ID</u>	<u>PDBT</u>	<u>FDBT</u>	<u>TOT</u>	<u>OUT</u>
MB-020411	85.6%	84.2%	0	
LCS-020411	99.0%	92.4%	0	
LCSD-020411	94.0%	88.8%	0	
B11-17-30	98.8%	95.8%	0	

	<u>LCS/MB LIMITS</u>	<u>QC LIMITS</u>
(PDBT) = 2,5-Dibromotoluene	(60-140)	(60-140)
(FDBT) = 2,5-Dibromotoluene	(60-140)	(60-140)

Prep Method: METHOD
Log Number Range: 11-2256 to 11-2256

VPH SURROGATE RECOVERY SUMMARY



Matrix: Water

QC Report No: SH31-Pacific Groundwater Group
Project: Birds Eye-Soil

ARI ID	Client ID	PDBT	FDBT	TOT	OUT
SH31I	TRIP BLANKS	91.6%	83.4%	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: 11-2318 to 11-2318

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1

Sample ID: LCS-020411

LCS/LCSD

Lab Sample ID: LCS-020411

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/15/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

JII1001

Date Sampled: NA

Date Received: NA

Date Analyzed LCS: 02/04/11 08:05

Date Analyzed LCSD: 02/04/11 08:35

Instrument/Analyst: PID1/MH

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	4650	4500	103%	4540	4500	101%	2.4%
Toluene	4720	4500	105%	4610	4500	102%	2.4%
Ethylbenzene	4860	4500	108%	4760	4500	106%	2.1%
m,p-Xylene	9720	9010	108%	9450	9010	105%	2.8%
o-Xylene	4720	4500	105%	4640	4500	103%	1.7%
Methyl tert-Butyl Ether	4220	4500	93.8%	4130	4500	91.8%	2.2%
Naphthalene	4370	4500	97.1%	4280	4500	95.1%	2.1%
1,2,3-Trimethylbenzene	5020	4500	112%	4910	4500	109%	2.2%
1-Methylnaphthalene	4440	4500	98.7%	4200	4500	93.3%	5.6%
n-Pentane	4260	4500	94.7%	4090	4500	90.9%	4.1%
n-Hexane	4190	4500	93.1%	4030	4500	89.6%	3.9%
n-Octane	4340	4500	96.4%	4150	4500	92.2%	4.5%
n-Decane	4470	4500	99.3%	4360	4500	96.9%	2.5%
n-Dodecane	4090	4500	90.9%	4050	4500	90.0%	1.0%

Values reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.

VPH Surrogate Recovery

	LCS	LCSD
PID: 2,5-Dibromotoluene	99.0%	94.0%
FID: 2,5-Dibromotoluene	92.4%	88.8%

MH
2/11/11

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a004.d
Report Date: 11-Feb-2011 08:55

Page 1

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a004.d
Lab Smp Id: LCS0204
Inj Date : 04-FEB-2011 08:05
Operator : MH
Smp Info : LCS0204
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 MtBE	5.103	5.097	0.006	69222	46.9123	46.9
2 BENZENE	7.653	7.647	0.006	170406	51.7097	51.7
4 TOLUENE	9.973	9.960	0.013	160158	52.4707	52.5
5 ETHYLBENZENE	11.947	11.933	0.014	141193	53.9591	54.0
6 M/P-XYLENE	12.050	12.037	0.013	331291	107.708	108
7 O-XYLENE	12.637	12.623	0.014	142606	52.4332	52.4
9 TRIMETHYLBEN	15.063	15.047	0.016	132505	55.8147	55.8
10 NAPHTHALENE	18.287	18.270	0.017	106064	48.6486	48.6
11 1-METHYLNAP	20.130	20.110	0.020	54716	49.3085	49.3
\$ 37 DIBROMOTOL	19.927	19.910	0.017	91347	49.4905	49.5

SHS1: 00033

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a004.d
Lab Smp Id: LCS0204
Inj Date : 04-FEB-2011 08:05
Operator : MH
Smp Info : LCS0204
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
1 nC5	3.853	3.850	0.003	20319	47.2998	47.3
2 nC6	5.400	5.393	0.007	23578	46.6032	46.6
4 nC8	9.653	9.640	0.013	20825	48.1829	48.2
5 nC10	13.453	13.440	0.013	20934	49.7114	49.7
7 nC12	16.587	16.573	0.014	19326	45.3679	45.4
\$ 8 2,5-DBT	19.927	19.913	0.014	7352	46.2193	46.2

Data File: /chem3/pidl.i/vpcc0204-2.b/0204a004.d

Date: 04-FEB-2011 08:05

Client ID:

Sample Info: LCS0204

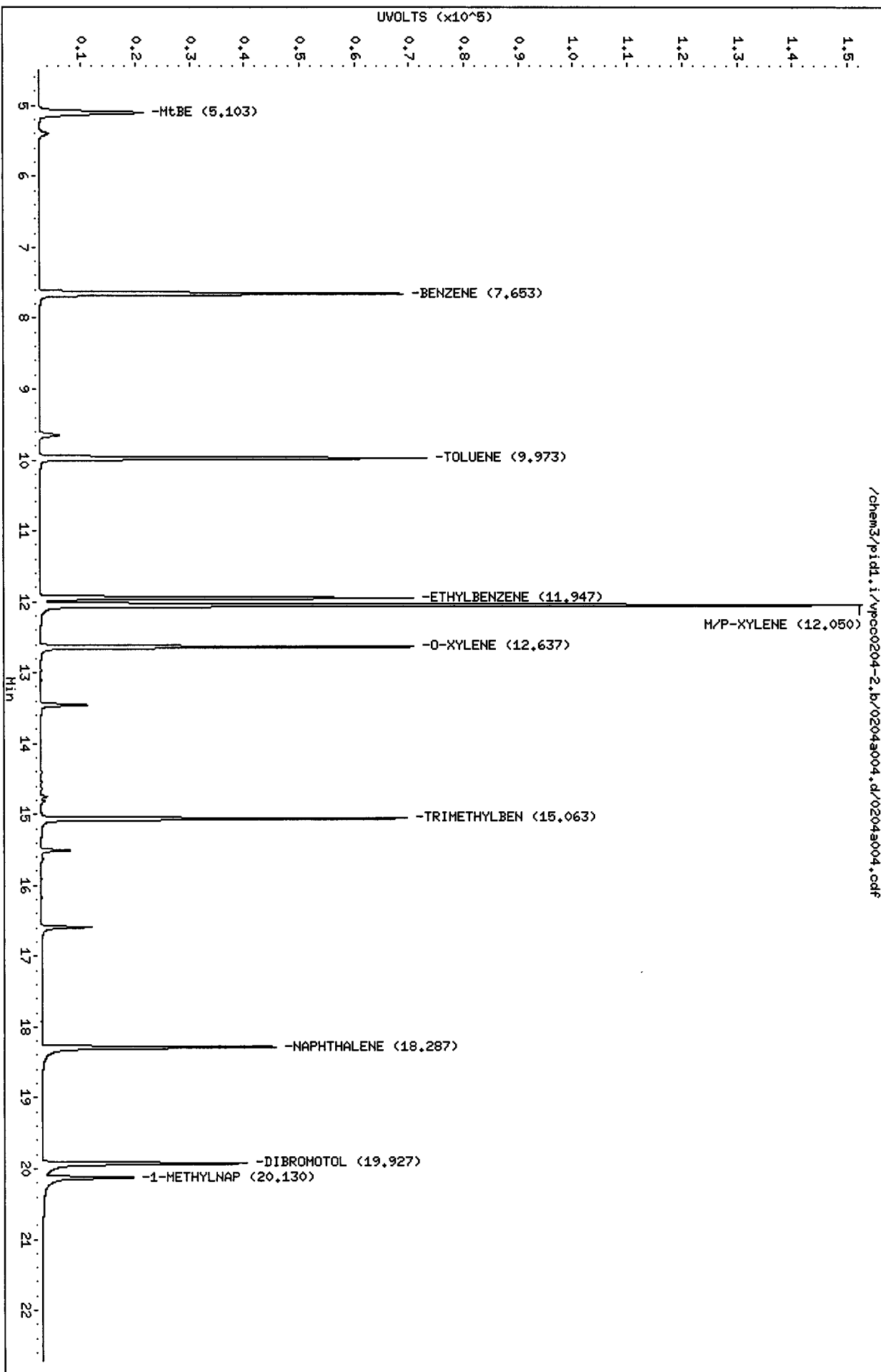
Column phase: RTX 502-2 AR0

Instrument: pidl.i

Operator: MH

Column diameter: 0.18

Page 2



14800 14915

Data File: /chem3/pidl.i/vpcc0204-1.b/0204a004.d

Date : 04-FEB-2011 08:05

Client ID:

Sample Info: LCS0204

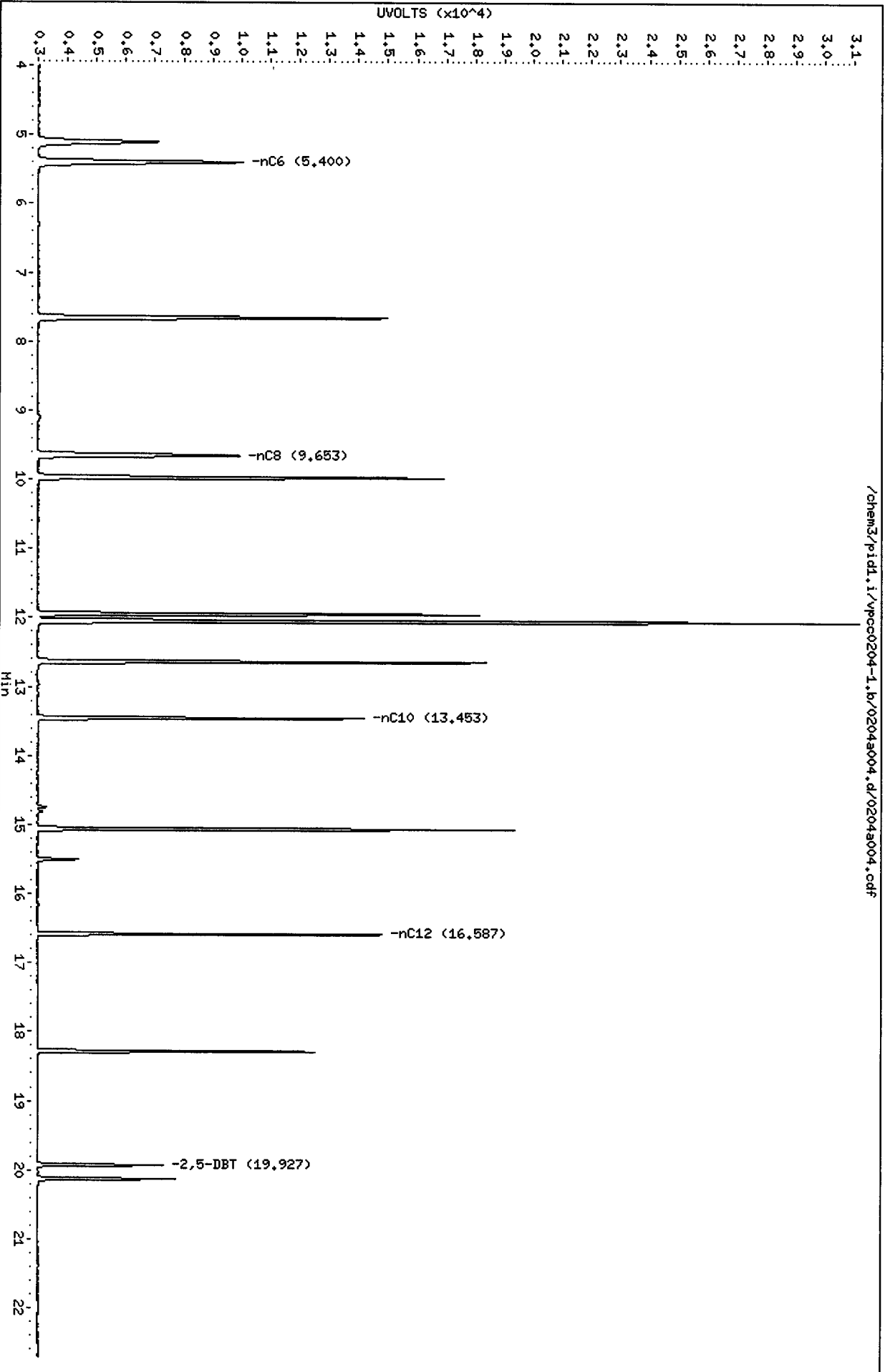
Column phase: RTX502-2 ALI

Page 2

Instrument: pidl.i

Operator: MH

Column diameter: 0.18



000042 : 010135

Analytical Resources Inc.
WAVPH Aromatics Report

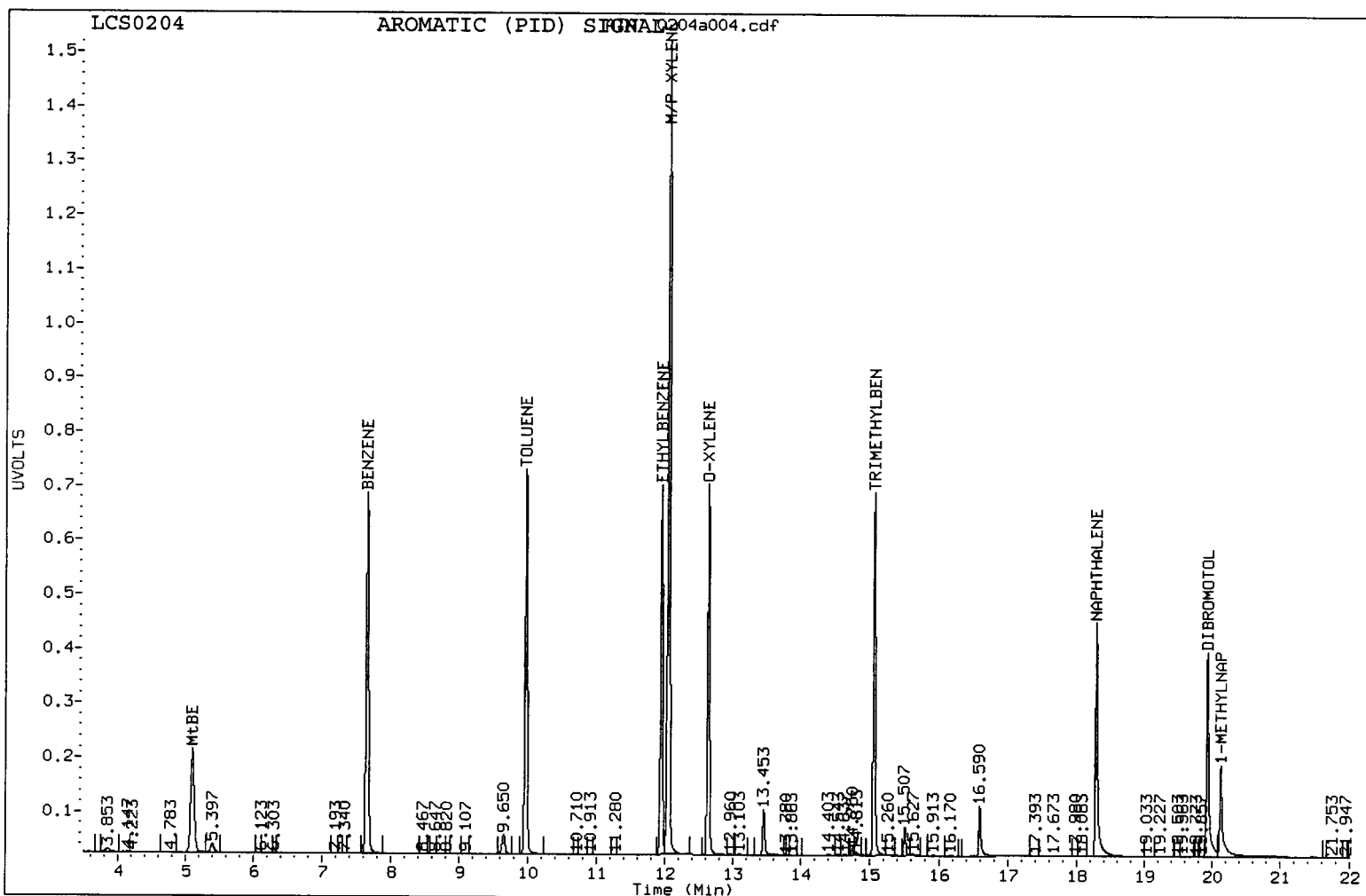
Data file: /chem3/pid1.i/vpcc0204-2.b/0204a004.d
Method: /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCS0204
Client ID:
Injection: 04-FEB-2011 08:05
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.103	0.007	19115	46.9	C8-C10 Arom.	769566*	324.2
BENZENE	7.653	0.007	66376	51.7	C10-C12 Arom.	139403	63.9
TOLUENE	9.973	0.013	70791	52.5	C12-C13 Arom.	55008	49.6
ETHYLBENZENE	11.947	0.013	68043	54.0			
M/P-XYLENE	12.050	0.013	149931	107.7			
O-XYLENE	12.637	0.013	68300	52.4			
TRIMETHYLBEN	15.063	0.017	66748	55.8			
NAPHTHALENE	18.287	0.017	42968	48.6			
1-METHYLNAP	20.130	0.020	16667	49.3			
DIBROMOTOL	19.927	0.017	37501	49.5	DBT Recovery: 99.0		

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0204-1.b/0204a004.d
Method: /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCS0204
Client ID:
Injection: 04-FEB-2011 08:05
Matrix: WATER
Dilution Factor: 1

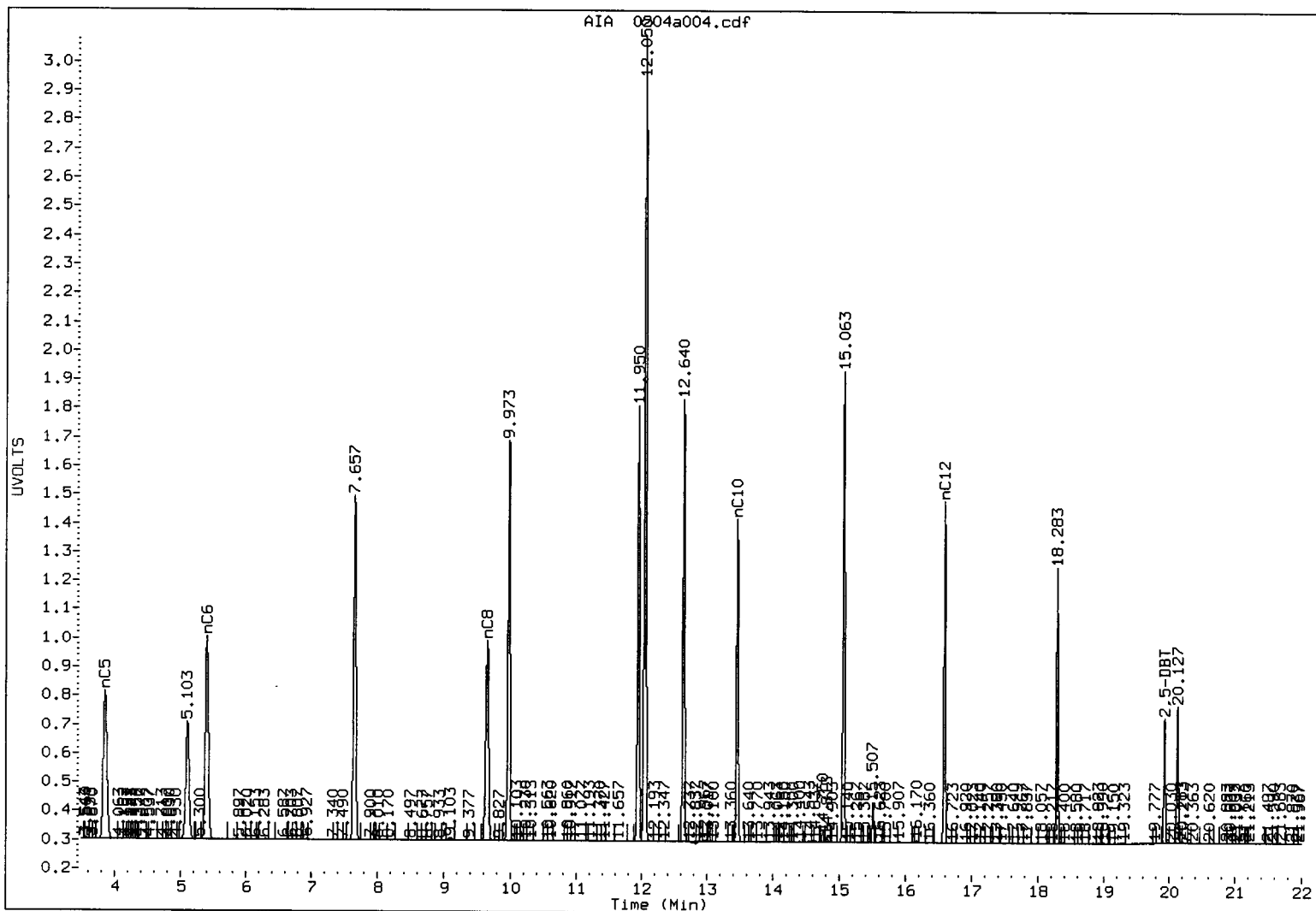
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.853	0.003	5140	20319	C5-C6 Aliph.	58995	126.1
nC6	5.400	0.007	7061	23578	C6-C8 Aliph.	51565*	119.3
nC8	9.653	0.013	6942	20825	C8-C10 Aliph.	170972	406.0
nC10	13.453	0.013	11202	20934	C10-C12 Aliph.	52664*	123.6
nC12	16.587	0.013	11830	19326			

* Indicates surrogate area subtracted

LCS0204

ALIPHATIC (FID) SIGNAL



SH31 : 00044

2/11/11
34

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a005.d
Report Date: 11-Feb-2011 08:55

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a005.d
Lab Smp Id: LCSD0204
Inj Date : 04-FEB-2011 08:35
Operator : MH
Smp Info : LCSD0204
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 MtBE	5.100	5.097	0.003	67757	45.9195	45.9
2 BENZENE	7.653	7.647	0.006	166564	50.5441	50.5
4 TOLUENE	9.973	9.960	0.013	156233	51.1847	51.2
5 ETHYLBENZENE	11.947	11.933	0.014	138317	52.8598	52.8
6 M/P-XYLENE	12.050	12.037	0.013	323752	105.257	105
7 O-XYLENE	12.637	12.623	0.014	140056	51.4956	51.5
9 TRIMETHYLBEN	15.063	15.047	0.016	129568	54.5777	54.6
10 NAPHTHALENE	18.287	18.270	0.017	103669	47.5502	47.6
11 1-METHYLNAP	20.127	20.110	0.017	51826	46.7039	46.7
\$ 37 DIBROMOTOL	19.927	19.910	0.017	86810	47.0321	47.0

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a005.d
Lab Smp Id: LCSD0204
Inj Date : 04-FEB-2011 08:35
Operator : MH
Smp Info : LCSD0204
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT	RT	ON-COLUMN	FINAL
					(ng/mL)	(ug/L)
=====	==	=====	=====	=====	=====	=====
1 nC5	3.850	3.850	0.000	19517	45.4327	45.4
2 nC6	5.397	5.393	0.004	22671	44.8099	44.8
4 nC8	9.653	9.640	0.013	19930	46.1124	46.1
5 nC10	13.453	13.440	0.013	20410	48.4669	48.5
7 nC12	16.587	16.573	0.014	19182	45.0308	45.0
\$ 8 2,5-DBT	19.923	19.913	0.010	7069	44.4390	44.4

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a005.d

Date: 04-FEB-2011 08:35

Client ID:

Sample Info: LCSD0204

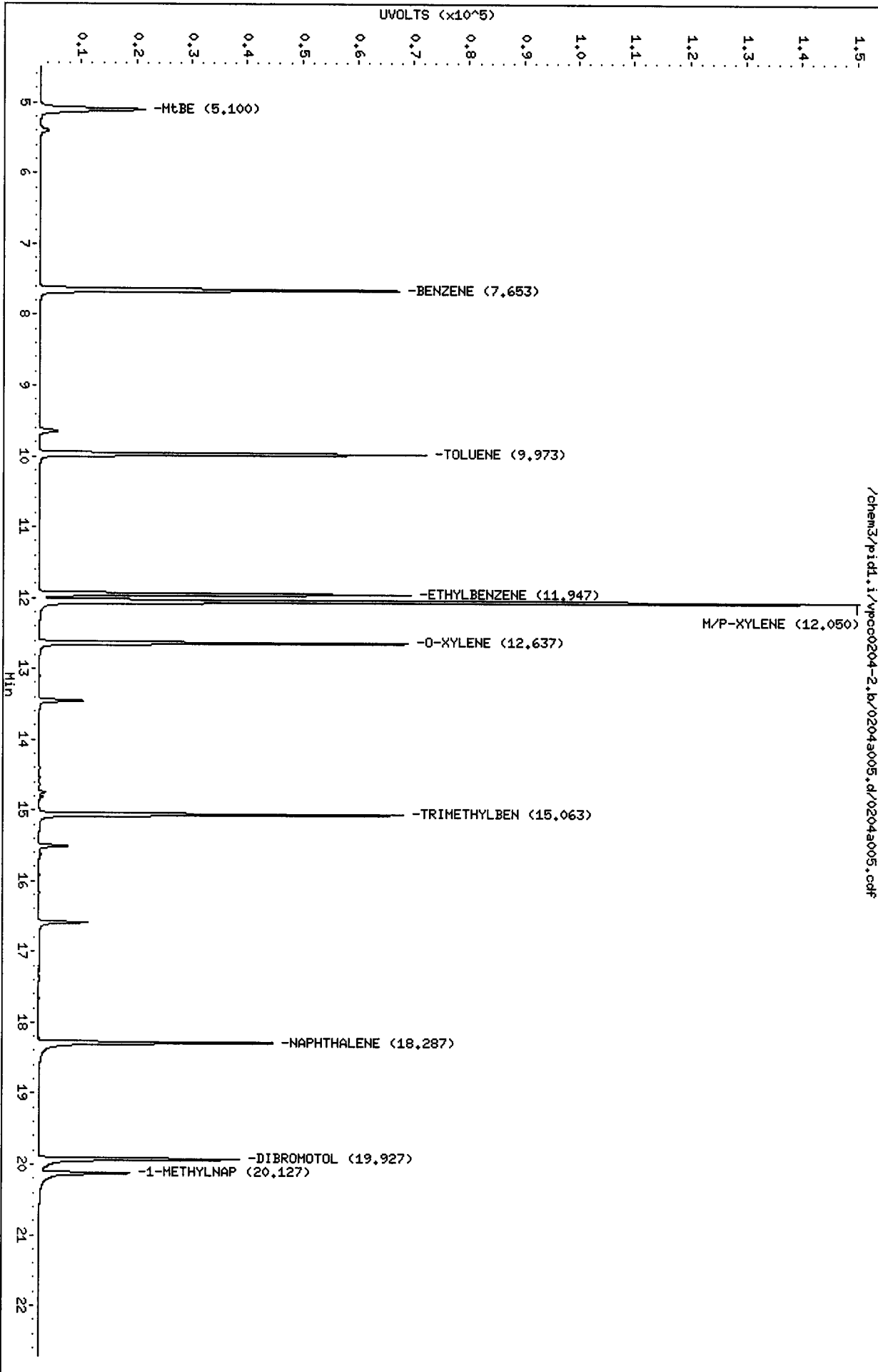
Column phase: RTX 502-2 AR0

Instrument: pid1.i

Operator: MH

Column diameter: 0.18

Page 2



SH31: 00047

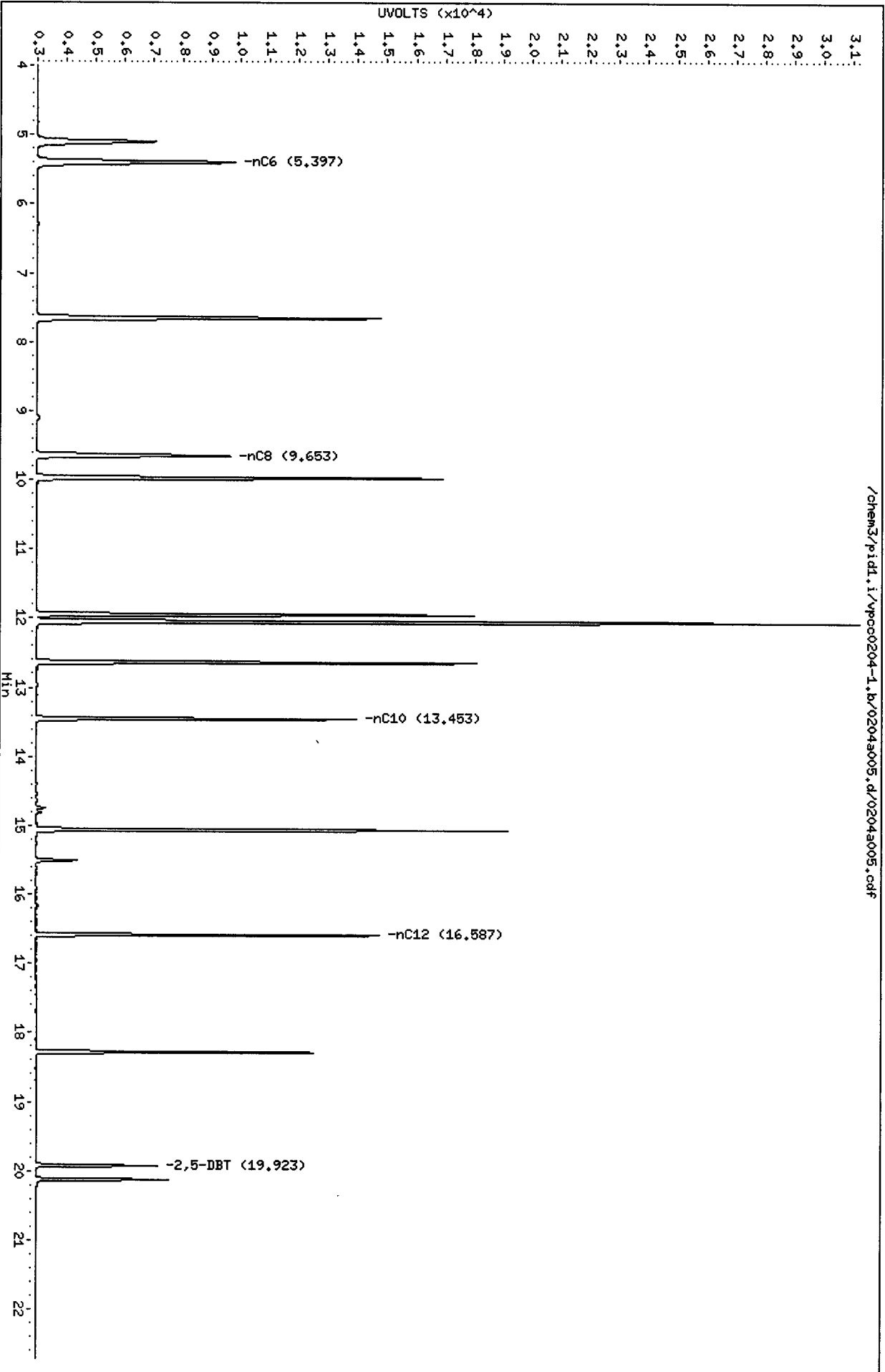
Page 2

Client ID:

Instrument: pid1.i

Operator: MH

Column diameter: 0.18



Analytical Resources Inc.
WAVPH Aromatics Report

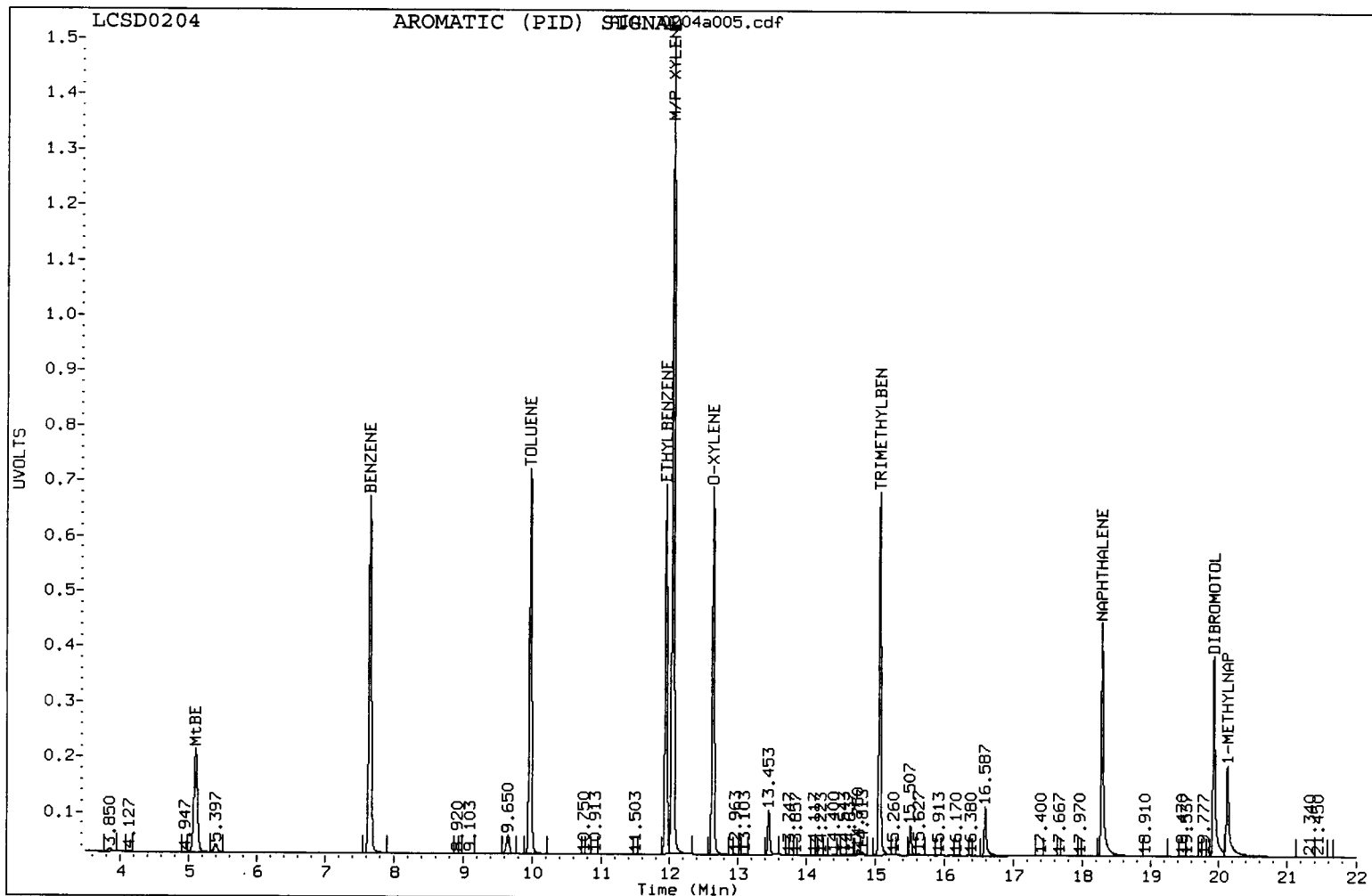
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Method: /chem3/pid1.i/vpcc0204-2.b/VPHAROM
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCSD0204
Client ID:
Injection: 04-FEB-2011 08:35
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.100	0.003	18701	45.9	C8-C10 Arom.	751993*	316.8
BENZENE	7.653	0.007	64624	50.5	C10-C12 Arom.	135589	62.2
TOLUENE	9.973	0.013	69640	51.2	C12-C13 Arom.	52049	46.9
ETHYLBENZENE	11.947	0.013	66833	52.9			
M/P-XYLENE	12.050	0.013	147731	105.3			
O-XYLENE	12.637	0.013	66517	51.5			
TRIMETHYLBEN	15.063	0.017	65627	54.6			
NAPHTHALENE	18.287	0.017	42279	47.6			
1-METHYLNAP	20.127	0.017	16283	46.7			
DIBROMOTOL	19.927	0.017	36168	47.0	DBT Recovery:	94.1	

* Indicates surrogate area subtracted



SH31: 00049

Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pid1.i/vpcc0204-1.b/0204a005.d
Method: /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: LCSD0204
Client ID:
Injection: 04-FEB-2011 08:35
Matrix: WATER
Dilution Factor: 1

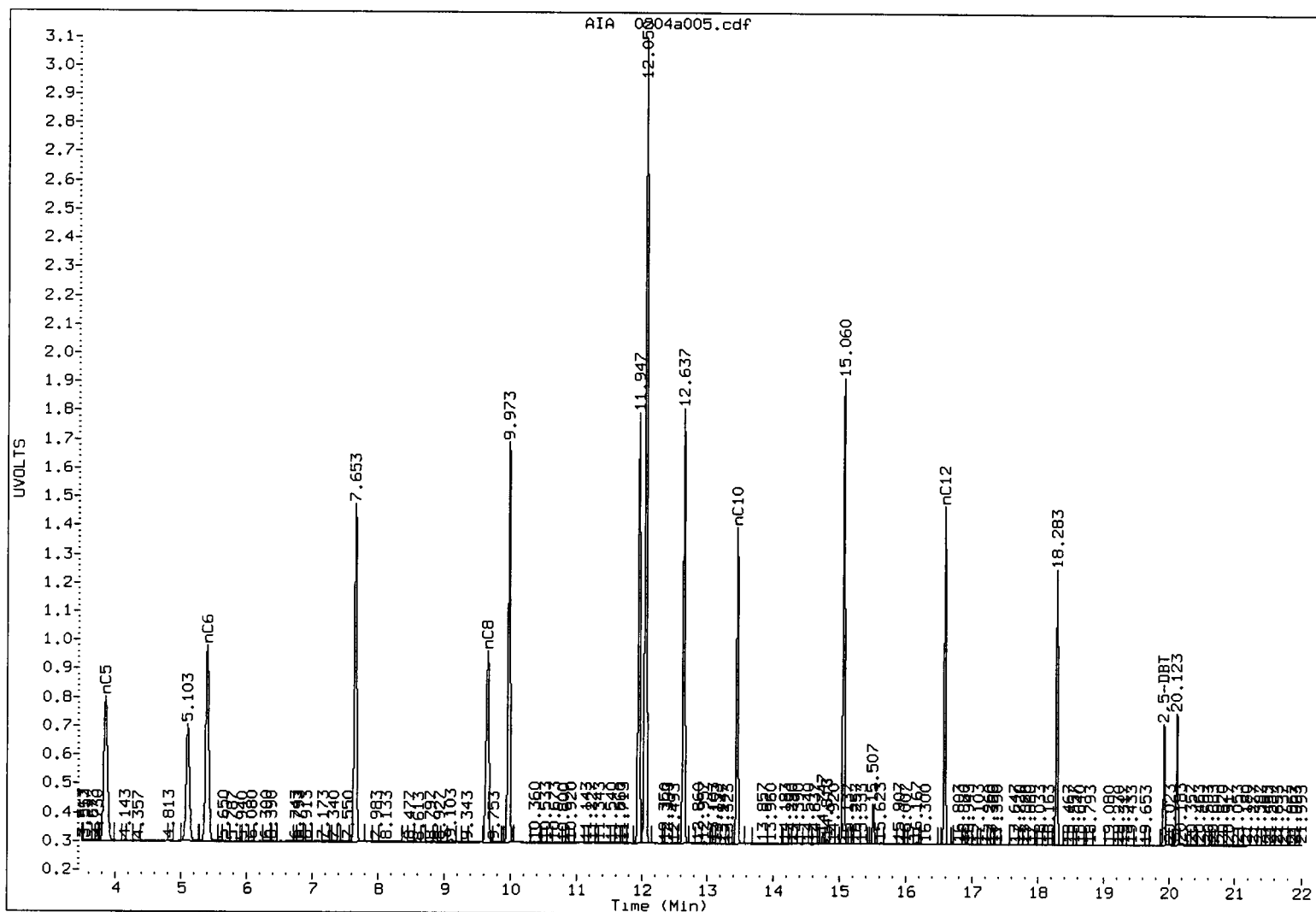
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.850	0.000	5005	19517	C5-C6 Aliph.	56773	121.4
nC6	5.397	0.003	6808	22671	C6-C8 Aliph.	50479*	116.8
nC8	9.653	0.013	6650	19930	C8-C10 Aliph.	168960	401.2
nC10	13.453	0.013	10993	20410	C10-C12 Aliph.	52300*	122.8
nC12	16.587	0.013	11758	19182			

* Indicates surrogate area subtracted

LCSD0204

ALIPHATIC (FID) SIGNAL



5431 : 00050

ORGANICS ANALYSIS DATA SHEET

VPH by Method WA VPH

Page 1 of 1

Sample ID: MB-020411

METHOD BLANK

Lab Sample ID: MB-020411

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized:

Reported: 02/15/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed: 02/04/11 09:36

Instrument/Analyst: PID1/MH

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	85.6%
FID: 2,5-Dibromotoluene	84.2%

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a007.d
Report Date: 11-Feb-2011 08:55

Page 1

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MH

Analytical Resources, Inc.

WAVPH-AROMATICS

Data file : /chem3/pid1.i/vpcc0204-2.b/0204a007.d
Lab Smp Id: MB0204
Inj Date : 04-FEB-2011 09:36
Operator : MH
Smp Info : MB0204
Misc Info :
Comment :
Method : /chem3/pid1.i/vpcc0204-2.b/VPHARO.m
Meth Date : 19-Jan-2011 05:53 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waarom.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/L)
=====	==	=====	=====	=====	=====	=====
1 MtBE	Compound Not Detected.					
2 BENZENE	7.650	7.647	0.003	43	0.01311	0.0131
4 TOLUENE	9.970	9.960	0.010	52	0.01717	0.0172
5 ETHYLBENZENE	11.943	11.933	0.010	49	0.01888	0.0189
6 M/P-XYLENE	12.047	12.037	0.010	95	0.03111	0.0311
7 O-XYLENE	12.630	12.623	0.007	684	0.25186	0.252
9 TRIMETHYLBEN	15.003	15.047	-0.044	410	0.17287	0.173
10 NAPHTHALENE	18.283	18.270	0.013	422	0.19393	0.194
11 1-METHYLNAP	20.123	20.110	0.013	3146	2.83522	2.84
\$ 37 DIBROMOTOL	19.927	19.910	0.017	79056	42.8315	42.8

SH31 : 00052

Analytical Resources, Inc.

WAVPH-ALIPHATICS

Data file : /chem3/pid1.i/vpcc0204-1.b/0204a007.d
Lab Smp Id: MB0204
Inj Date : 04-FEB-2011 09:36
Operator : MH
Smp Info : MB0204
Misc Info : 10-
Comment :
Method : /chem3/pid1.i/vpcc0204-1.b/VPHALI.m
Meth Date : 18-Jan-2011 14:36 paul
Cal Date : 20-DEC-2010 21:58
Als bottle: 1
Dil Factor: 1.00000
Integrator: Falcon
Target Version: 3.50

Inst ID: pid1.i
Quant Type: ESTD
Cal File: 1220a014.d
Compound Sublist: waaliph.sub

Concentration Formula: Amt * DF * CpndVariable

Cpnd Variable Local Compound Variable

Compounds					CONCENTRATIONS	
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ng/mL)	FINAL (ug/L)
-----	--	-----	-----	-----	-----	-----
1 nC5	3.873	3.850	0.023	27	0.06332	0.0633
2 nC6	5.370	5.393	-0.023	19	0.03874	0.0387
4 nC8	9.660	9.640	0.020	83	0.19412	0.194
5 nC10	13.453	13.440	0.013	229	0.54521	0.545
7 nC12	16.583	16.573	0.010	408	0.96011	0.960
\$ 8 2,5-DBT	19.923	19.913	0.010	6705	42.1521	42.2

Data File: /chem3/pid1.i/vpcc0204-2.b/0204a007.d

Date : 04-FEB-2011 09:36

Client ID:

Sample Info: MB0204

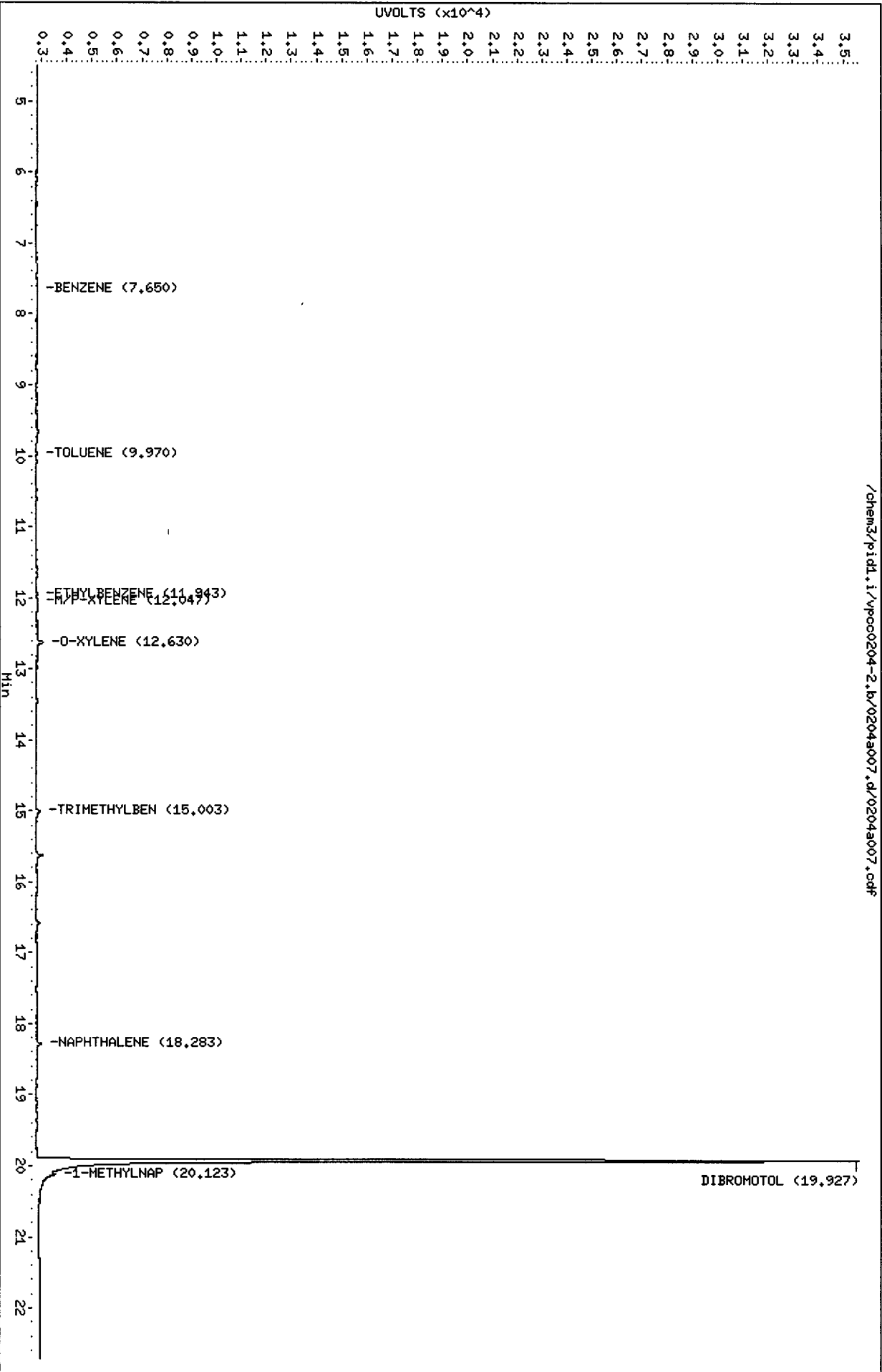
Column Phase: RTX 502-2 ARO

Instrument: pid1.i

Operator: MH

Column diameter: 0.18

Page 2



SH31 : 00054

Data File: /chem3/pid1.i/vpcc0204-1.b/0204a007.d

Date : 04-FEB-2011 09:36

Client ID:

Sample Info: HB0204

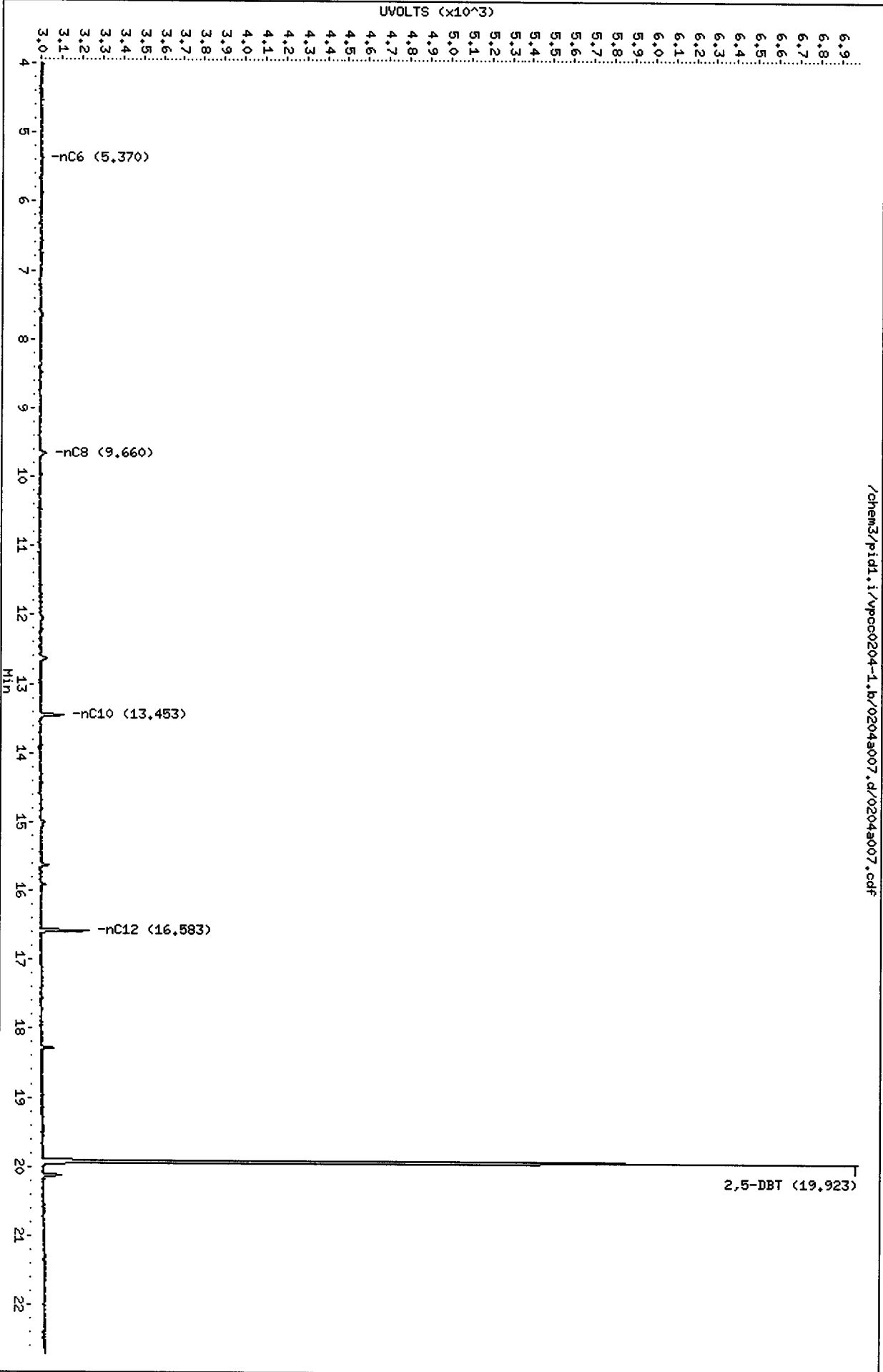
Column phase: RTX502-2 ALI

Instrument: pid1.i

Operator: MH

Column diameter: 0.18

Page 2



SH31 : 00055

Analytical Resources Inc.
WAVPH Aromatics Report

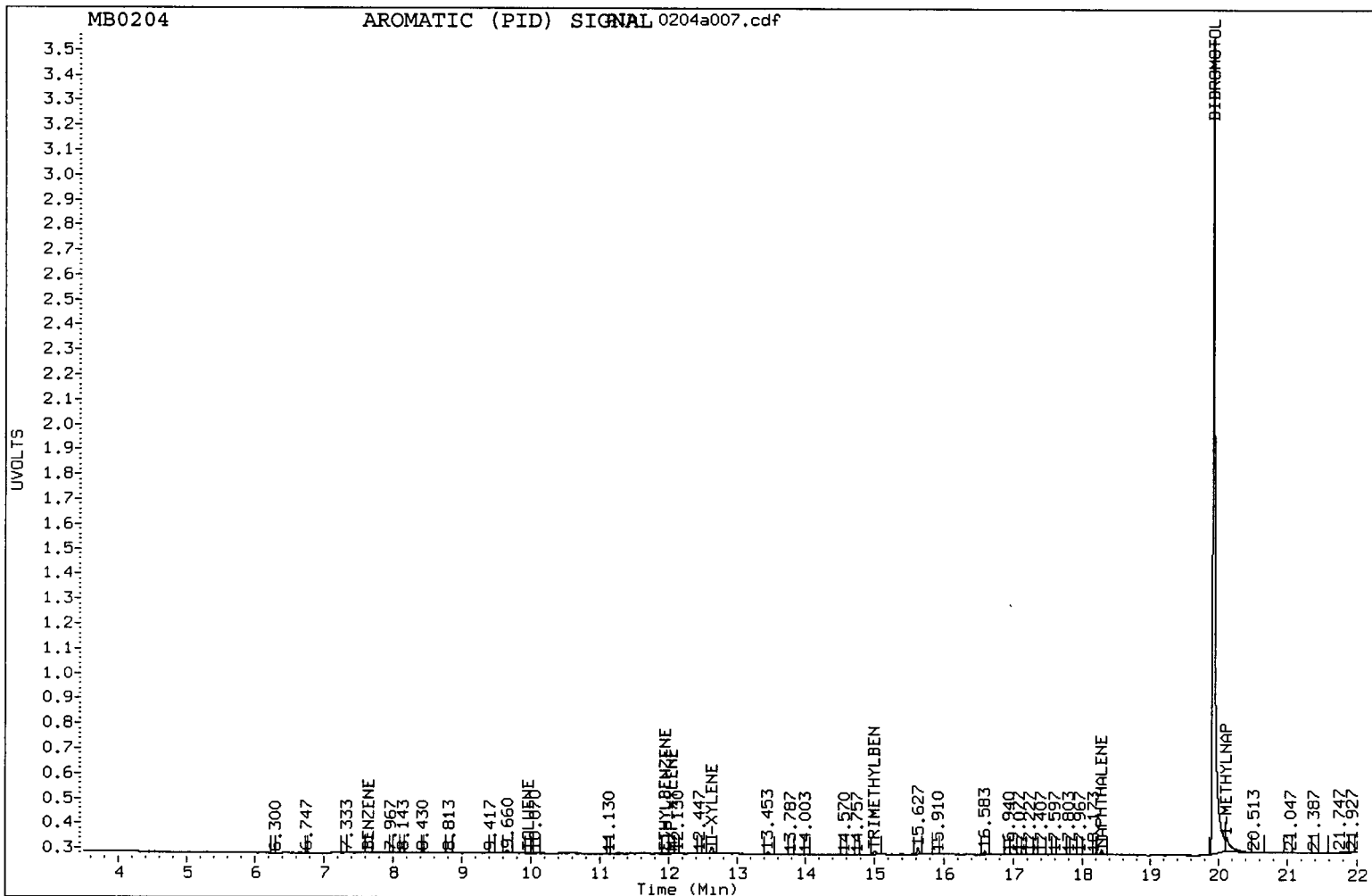
Data file: /chem3/pidl.i/vpcc0204-2.b/0204a007.d
Method: /chem3/pidl.i/vpcc0204-2.b/VPHARO.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: MB0204
Client ID:
Injection: 04-FEB-2011 09:36
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	----						
BENZENE	7.650	0.003	19	0.0	C8-C10 Arom.	1534*	0.6
TOLUENE	9.970	0.010	22	0.0	C10-C12 Arom.	1486	0.7
ETHYLBENZENE	11.943	0.010	17	0.0	C12-C13 Arom.	3147	2.8
M/P-XYLENE	12.047	0.010	43	0.0			
O-XYLENE	12.630	0.007	250	0.3			
TRIMETHYLBEN	15.003	-0.043	133	0.2			
NAPHTHALENE	18.283	0.013	181	0.2			
1-METHYLNAP	20.123	0.013	579	2.8			
DIBROMOTOL	19.927	0.017	32785	42.8	DBT Recovery:	85.7	

* Indicates surrogate area subtracted



Analytical Resources Inc.
WAVPH Aliphatics Report

Data file: /chem3/pidl.i/vpcc0204-1.b/0204a007.d
Method: /chem3/pidl.i/vpcc0204-1.b/VPHALI.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: MB0204
Client ID:
Injection: 04-FEB-2011 09:36
Matrix: WATER
Dilution Factor: 1

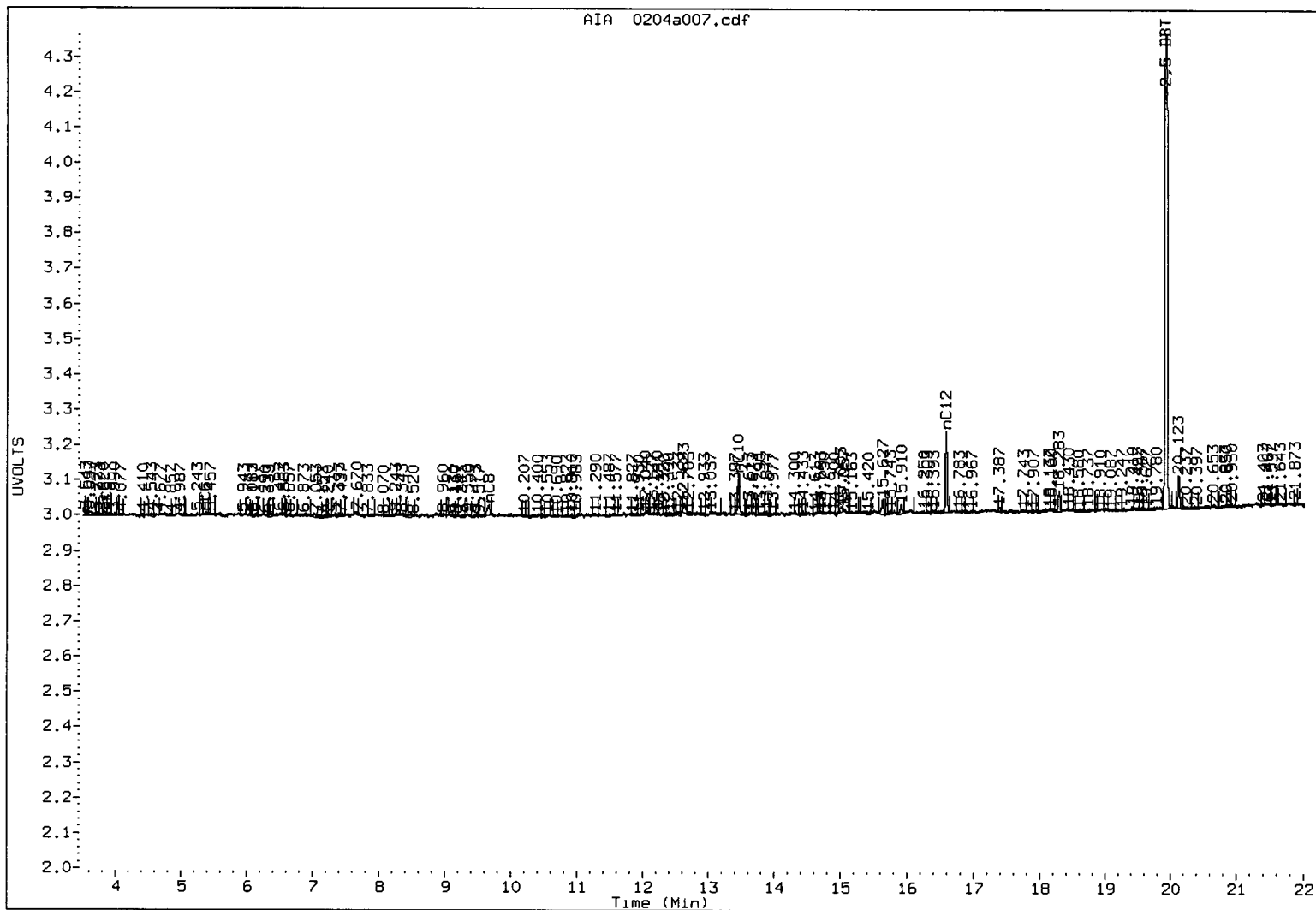
VPH-ALIPHATIC RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
nC5	3.873	0.023	11	27	C5-C6 Aliph.	276	0.6
nC6	5.370	-0.023	6	19	C6-C8 Aliph.	685*	1.6
nC8	9.660	0.020	31	83	C8-C10 Aliph.	802	1.9
nC10	13.453	0.013	114	229	C10-C12 Aliph.	934*	2.2
nC12	16.583	0.010	231	408			

* Indicates surrogate area subtracted

MB0204

ALIPHATIC (FID) SIGNAL



SH31:00057

ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1

Sample ID: B11-17-30

SAMPLE

Lab Sample ID: SH31G

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/14/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

JII1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted: 02/04/11

Percent Moisture: 15.5%

Sample Amount: 8.50 g-dry-wt

Final Extract Volume: 1.0 mL

Aliphatic

Date Analyzed: 02/10/11 19:59

Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Aromatic

Date Analyzed: 02/11/11 00:33

Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Range	RL	Result
C8-C10 Aliphatics	2,400	< 2,400 U
C10-C12 Aliphatics	2,400	2,900
C12-C16 Aliphatics	2,400	31,000
C16-C21 Aliphatics	2,400	53,000
C21-C34 Aliphatics	2,400	12,000
C8-C10 Aromatics	2,400	< 2,400 U
C10-C12 Aromatics	2,400	< 2,400 U
C12-C16 Aromatics	2,400	11,000
C16-C21 Aromatics	2,400	42,000
C21-C34 Aromatics	2,400	14,000

Reported in µg/kg (ppb)

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	70.6%
Aromatic	o-Terphenyl	68.7%

Analytical Resources Inc.
EPH Aromatics Report

Data file: /chem2/fid8.i/20110210AROM.b/0210A023.D
Method: /chem2/fid8.i/20110210AROM.b/EPHArOm.m
Instrument: fid8.i
Operator: MS
Report Date: 02/11/2011
Macro: AROM072710FID8

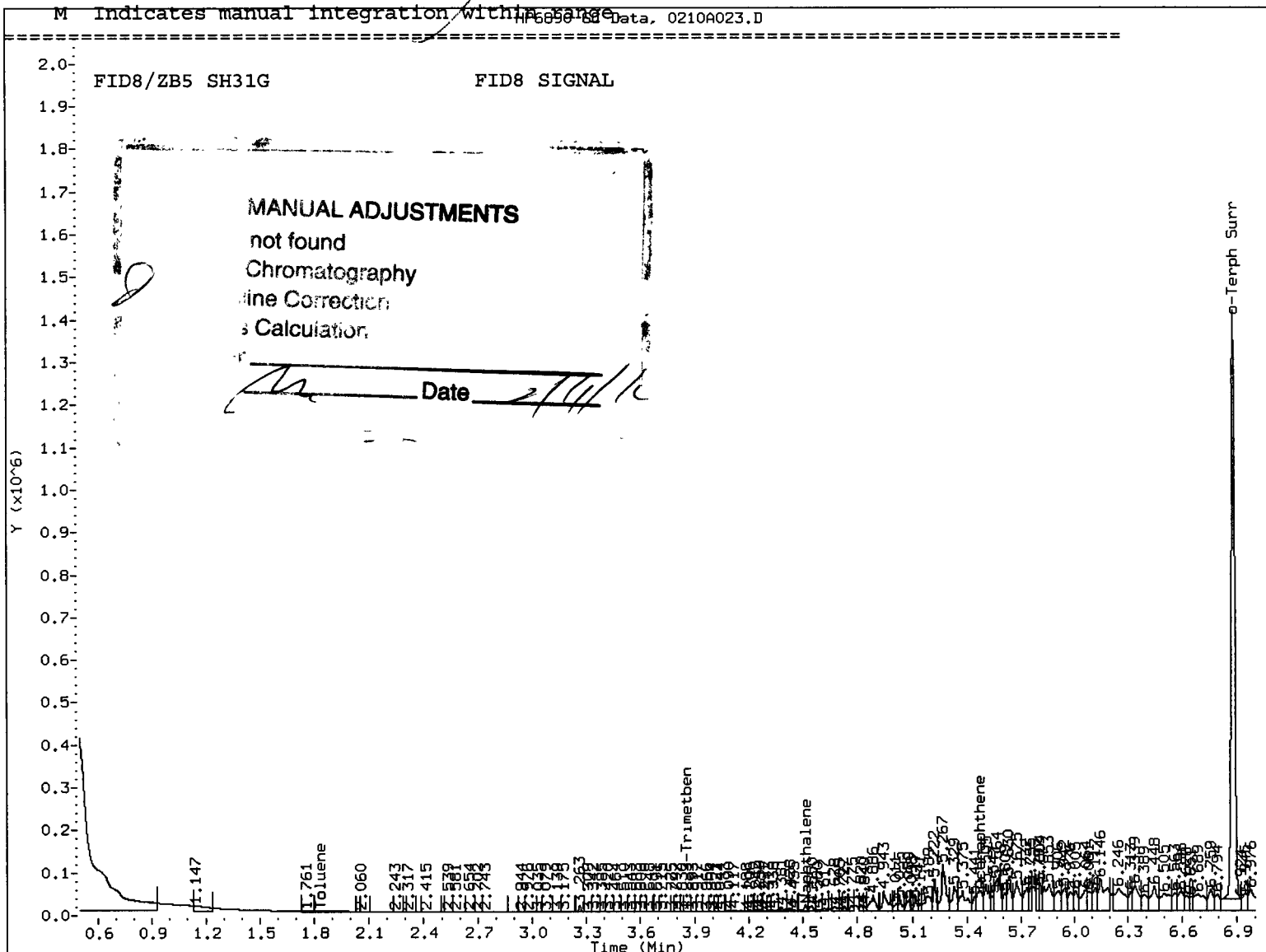
ARI ID: SH31G
Client ID: B11-17-30
Injection: 11-FEB-2011 00:33
Matrix: SOIL
Dilution Factor: 1

EPH-AROMATIC RESULTS

Quant Range	RF	Area	Conc	Time Range
C8-C10 Arom.	17167	46735	3	(1.730 - 3.956)
C10-C12 Arom.	16689	91758	5	(3.956 - 4.616)
C12-C16 Arom.	15441	1443901	94	(4.616 - 5.567)
C16-C21 Arom.	14112	5011132	355	(5.567 - 8.293) M
C21-C34 Arom.	12993	1577780	121	(8.293 - 12.503)

Surrogate Rec: 68.7%

M Indicates manual integration with a range of 0.650 to 6.9 Data, 0210A023.D



SH31 : 00059

Data File: /chem2/fid8.i/20110210AKRM.b/0210A023.D

Date : 11-FEB-2011 00:33

Client ID: B11-17-30

Sample Info: SH31G

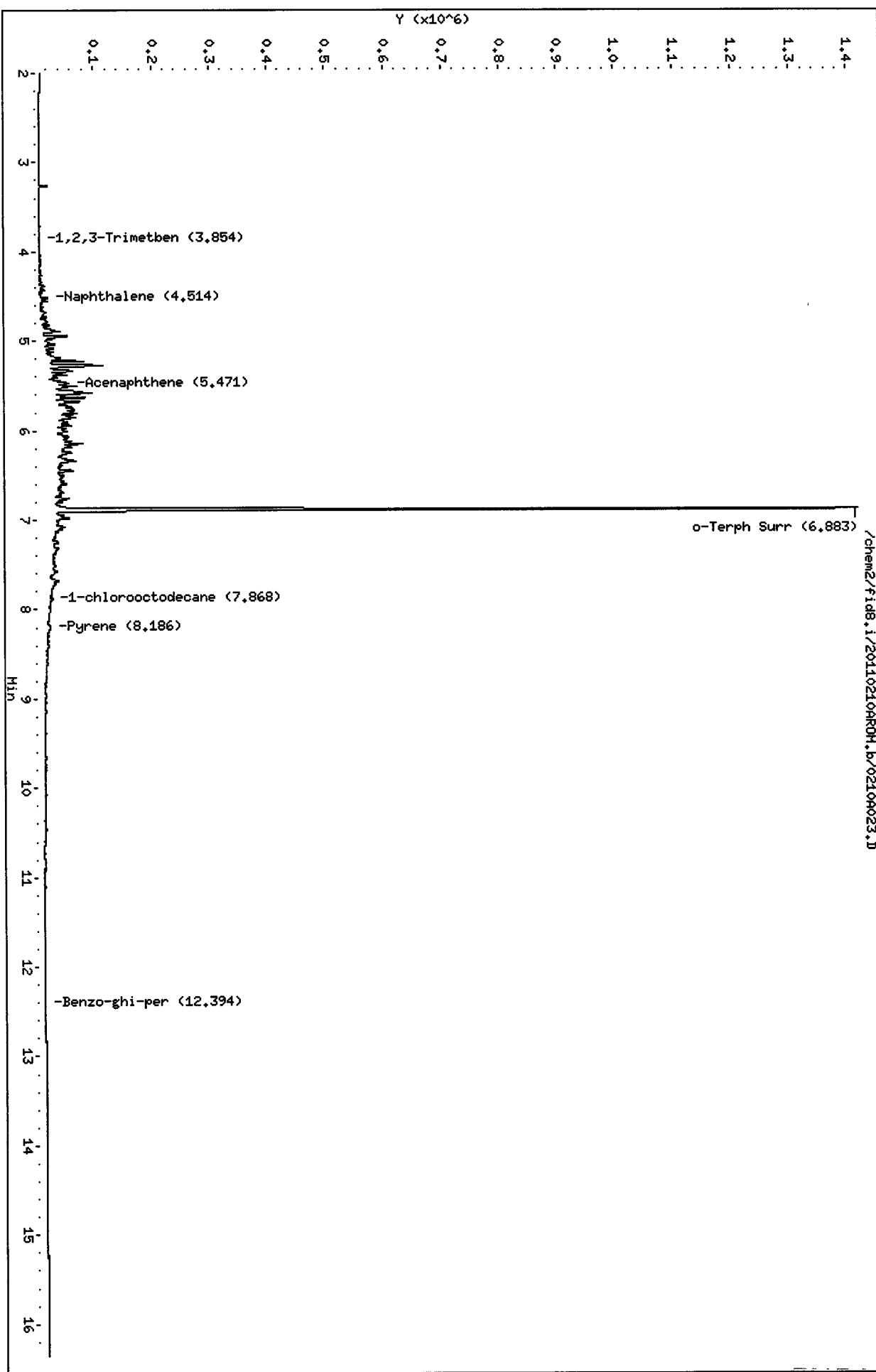
Column phase: ZB-5

Instrument: fid8.i

Operator: HS

Column diameter: 0.32

Page 1



SH31.00000

Analytical Resources Inc.
WA. EPH Aliphatics Report

Data file: /chem2/fid8.i/20110210ALIPH.b/0210A012.D
Method: /chem2/fid8.i/20110210ALIPH.b/EPHALiph.m
Instrument: fid8.i
Operator: MS
Macro: ALIPH090410FID8

ARI ID: SH31G
Client ID: B11-17-30
Injection: 10-FEB-2011 19:59
Matrix: SOIL
Dilution Factor: 1

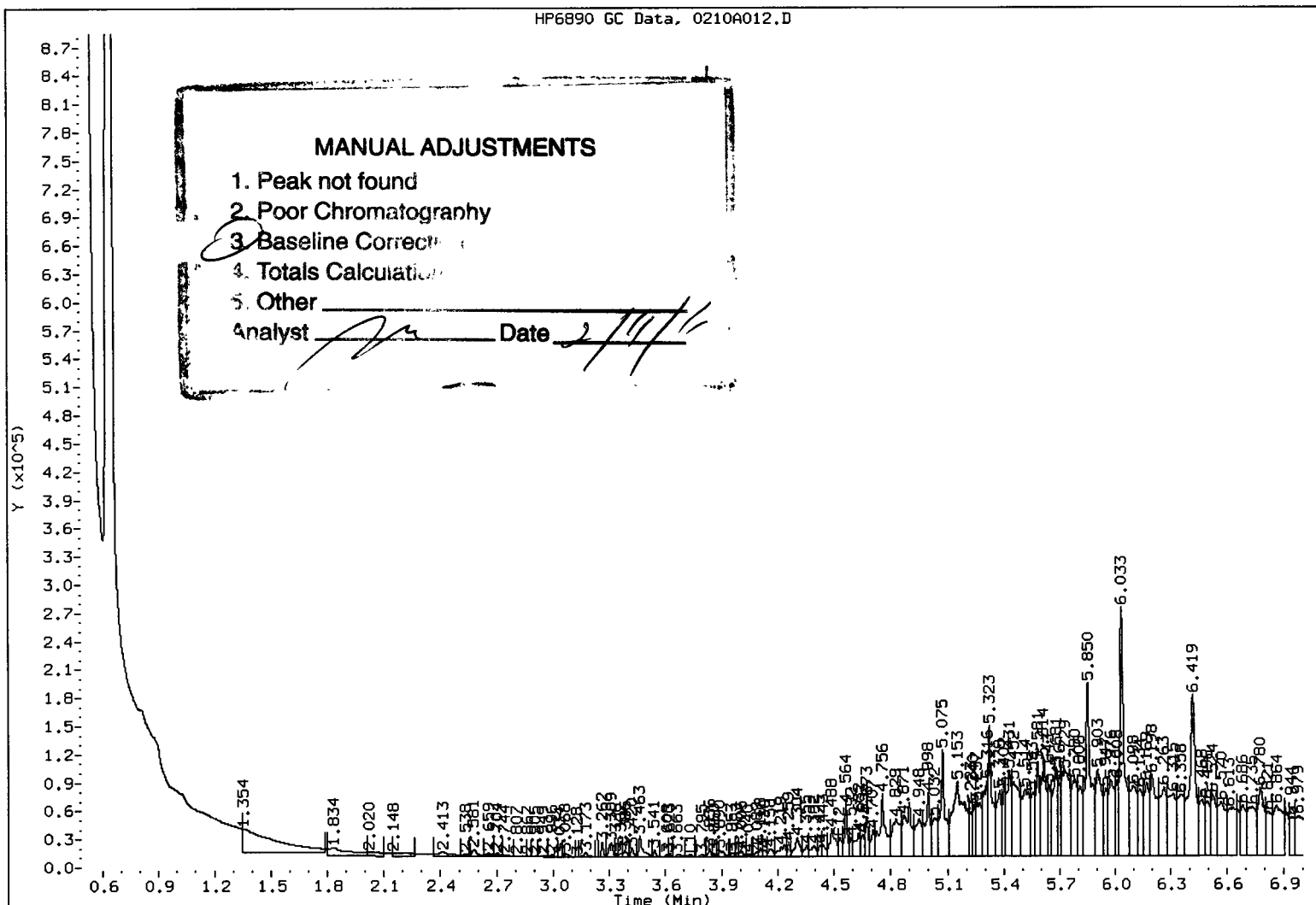
EPH-ALIPHATIC RESULTS

Quant Range	Area	Conc	Time Range
C8-C10 Aliph.	197916	11	(2.254 - 3.842)
C10-C12 Aliph.	399990	25	(3.842 - 4.624)
C12-C16 Aliph.	3931143	266	(4.624 - 5.801)
C16-C21 Aliph.	6265389	452	(5.801 - 8.031)
C21-C34 Aliph.	1177094	106	(8.031 - 12.757)

Surrogate Rec: 70.6%

FID-8A/ZB-5 SH31G

HP6890 GC Data, 0210A012.D



SH31: 00061

Data File: /chem2/fid8.i/20110210PLIPH.b/02100012.D

Date : 10-FEB-2011 19:59

Client ID: B11-17-30

Sample Info: SH31G

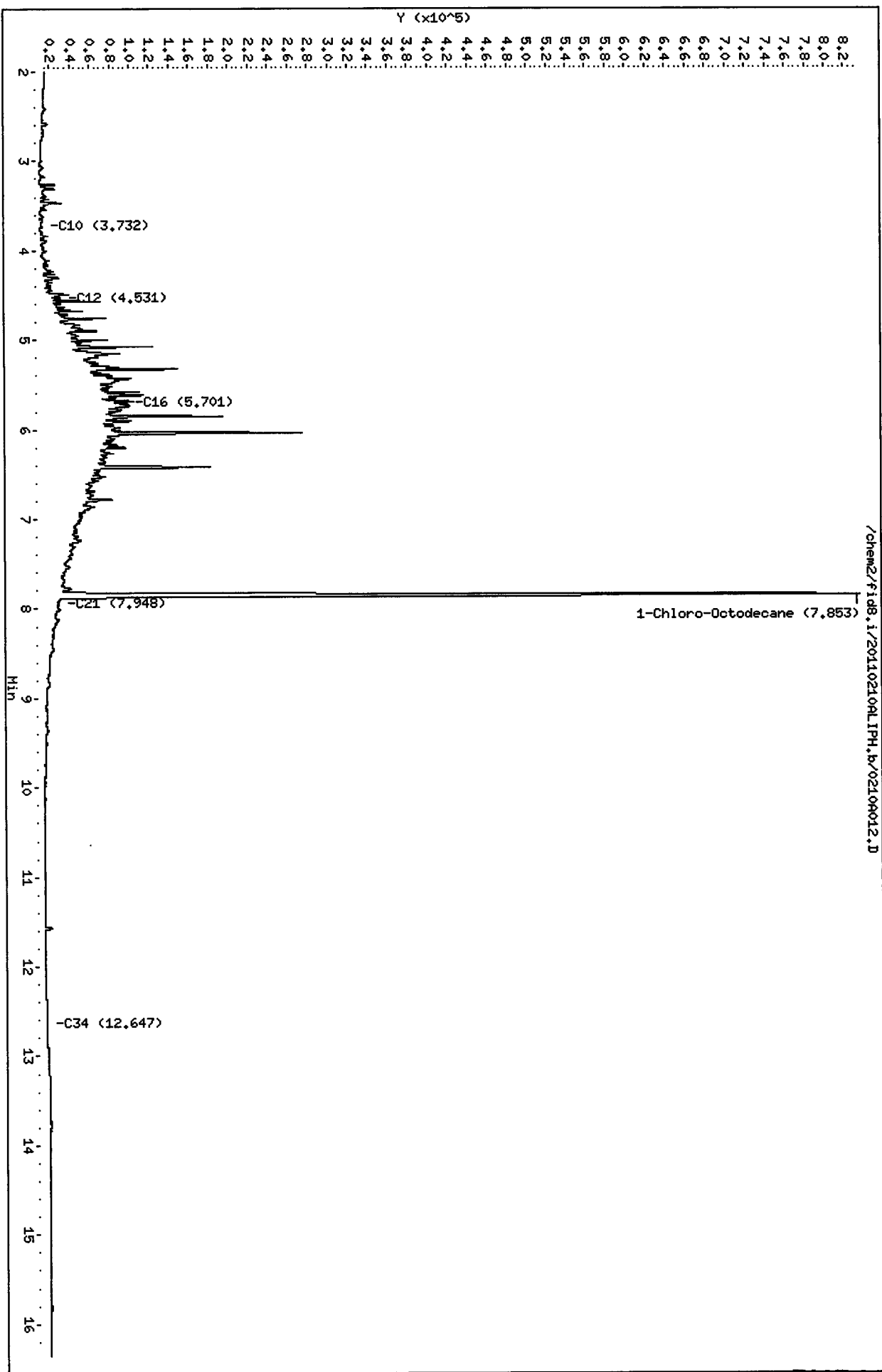
Column phase: ZB-5

Instrument: fid8.i

Operator: MS

Column diameter: 0.32

Page 1



SH31: 00002

AREPH SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH31-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001

Client ID	OTER	TOT OUT
MB-020411	73.0%	0
LCS-020411	90.7%	0
B11-17-30	68.7%	0

LCS/MB LIMITS QC LIMITS

(OTER) = o-Terphenyl

(34-133)

(10-143)

Prep Method: SW3510C
Log Number Range: 11-2256 to 11-2256

ALEPH SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH31-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001

<u>Client ID</u>	<u>COD</u>	<u>TOT OUT</u>
MB-020411	81.6%	0
LCS-020411	73.9%	0
B11-17-30	70.6%	0

	LCS/MB LIMITS	QC LIMITS
(COD) = 1-Chlorooctadecane	(27-128)	(39-131)

Prep Method: SW3510C
Log Number Range: 11-2256 to 11-2256

ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1

Sample ID: LCS-020411

LAB CONTROL

Lab Sample ID: LCS-020411

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized:

Reported: 02/14/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

J11001

Date Sampled: NA

Date Received: NA

Date Extracted: 02/04/11

Sample Amount: 10.0 g-as-rec

Final Extract Volume: 1.0 mL

Aliphatic

Date Analyzed: 02/10/11 20:24

Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Aromatic

Date Analyzed: 02/11/11 00:58

Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
C8-C10 Aliphatics	12000	15000	80.0%
C10-C12 Aliphatics	11000	15000	73.3%
C12-C16 Aliphatics	12000	15000	80.0%
C16-C21 Aliphatics	11000	15000	73.3%
C10-C12 Aromatics	9100	15000	60.7%
C12-C16 Aromatics	12300	15000	82.0%
C16-C21 Aromatics	29300	30000	97.7%
C21-C34 Aromatics	24900	30000	83.0%

Results reported in µg/kg

EPH Surrogate Recovery

Aliphatic	1-Chlorooctadecane	73.9%
Aromatic	o-Terphenyl	90.7%

Analytical Resources Inc.
EPH Aromatics Report

Data file: /chem2/fid8.i/20110210AROM.b/0210A024.D
Method: /chem2/fid8.i/20110210AROM.b/EPHArOm.m
Instrument: fid8.i
Operator: MS
Report Date: 02/11/2011
Macro: AROM072710FID8

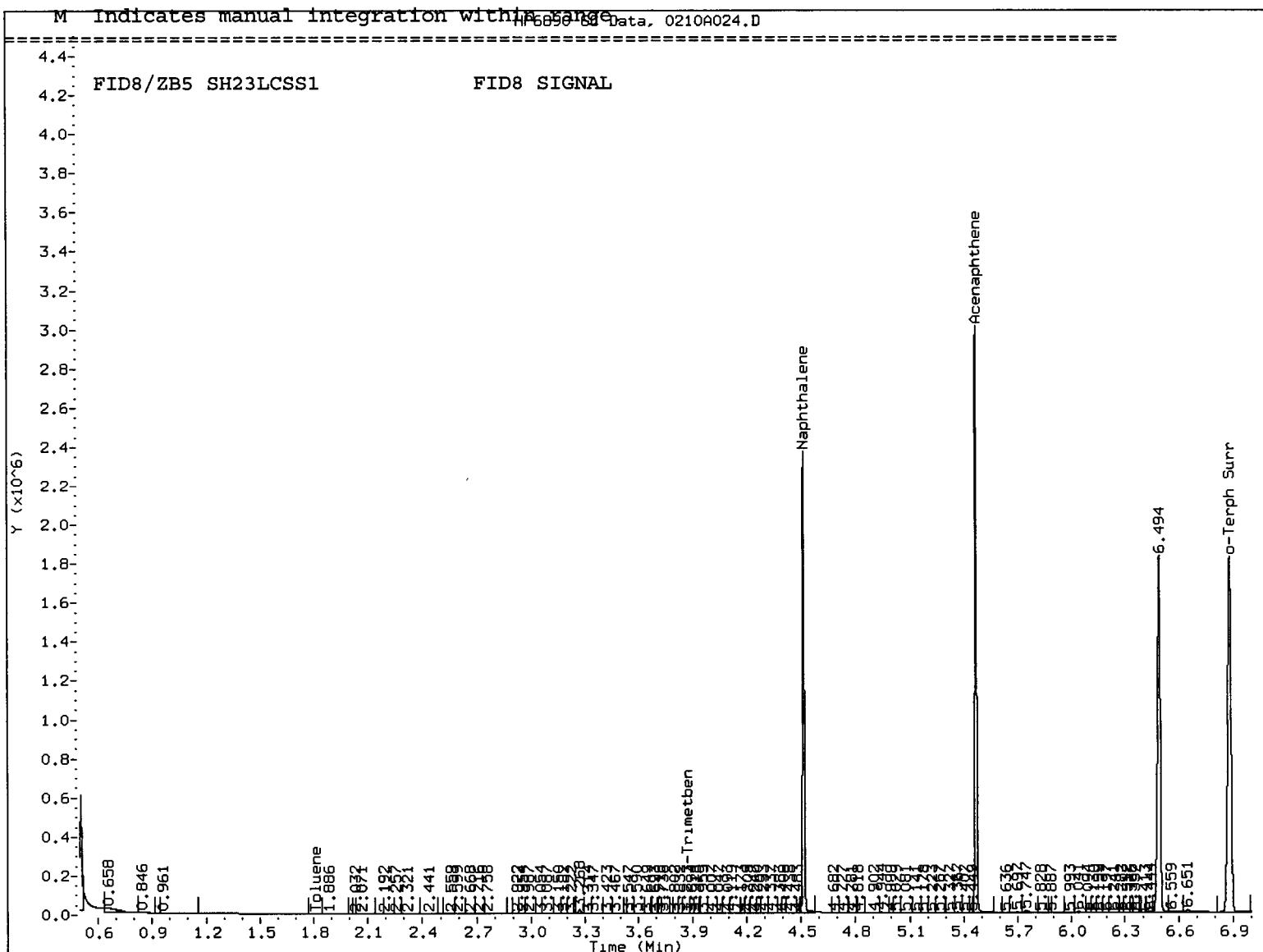
ARI ID: SH23LCSS1
Client ID: SH23LCSS1
Injection: 11-FEB-2011 00:58
Matrix: SOIL
Dilution Factor: 1

EPH-AROMATIC RESULTS

Quant Range	RF	Area	Conc	Time Range
C8-C10 Arom.	17167	34258	2	(1.730 - 3.956)
C10-C12 Arom.	16689	1512659	91	(3.956 - 4.616)
C12-C16 Arom.	15441	1891681	123	(4.616 - 5.567)
C16-C21 Arom.	14112	4132674	293	(5.567 - 8.293)
C21-C34 Arom.	12993	3238429	249	(8.293 - 12.503)

Surrogate Rec: 90.7%

ms/11



SH31: 00066

Data File: /chem2/fid8.i/20110210AROM,b/02109024.D

Page 1

Date : 11-FEB-2011 00:58

Client ID: SH23LCSS1

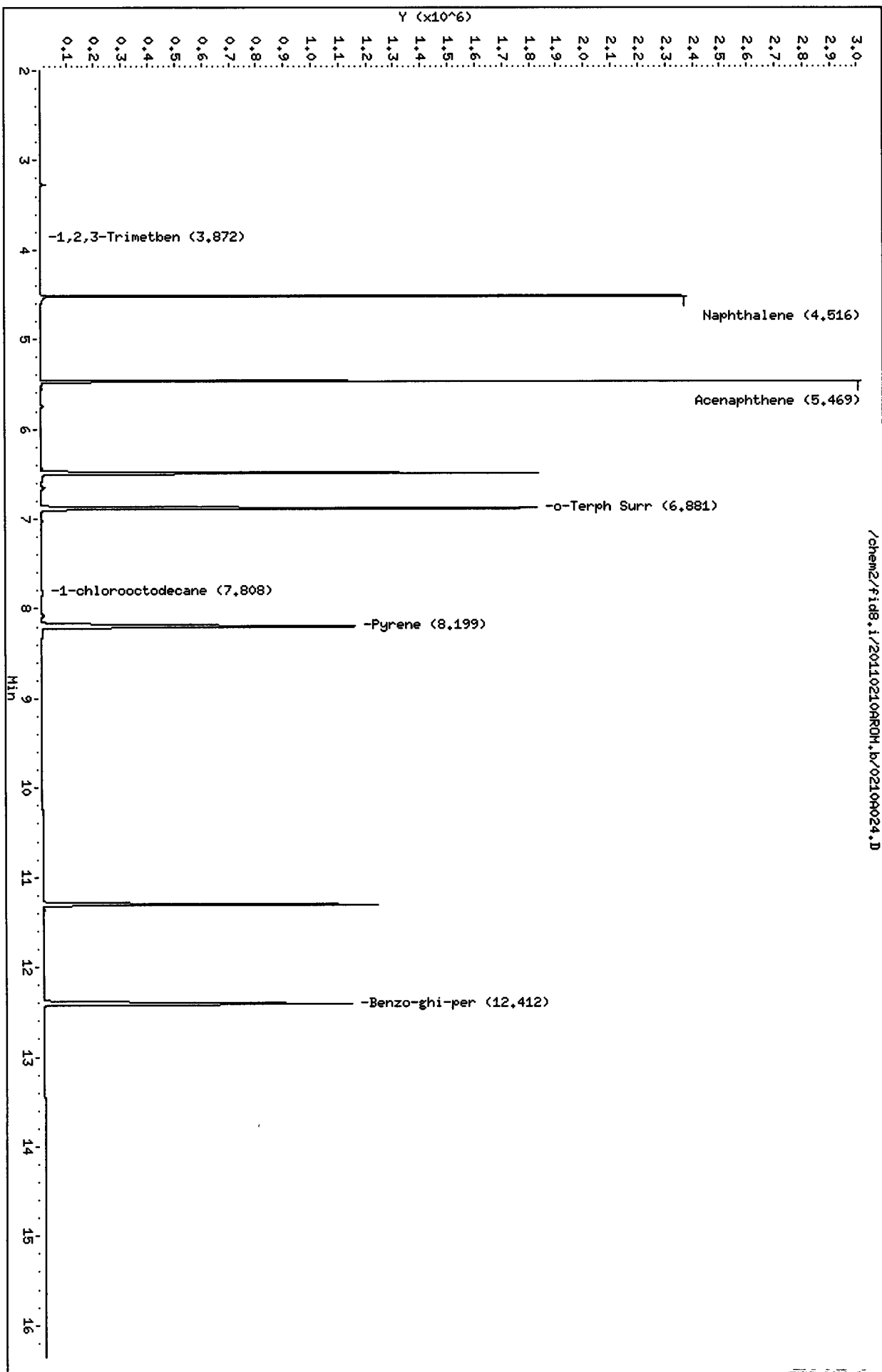
Instrument: fid8.i

Sample Info: SH23LCSS1

Operator: HS

Column phase: ZB-5

Column diameter: 0.32



Analytical Resources Inc.
WA. EPH Aliphatics Report

Data file: /chem2/fid8.i/20110210ALIPH.b/0210A013.D
Method: /chem2/fid8.i/20110210ALIPH.b/EPHALiph.m
Instrument: fid8.i
Operator: MS
Macro: ALIPH090410FID8

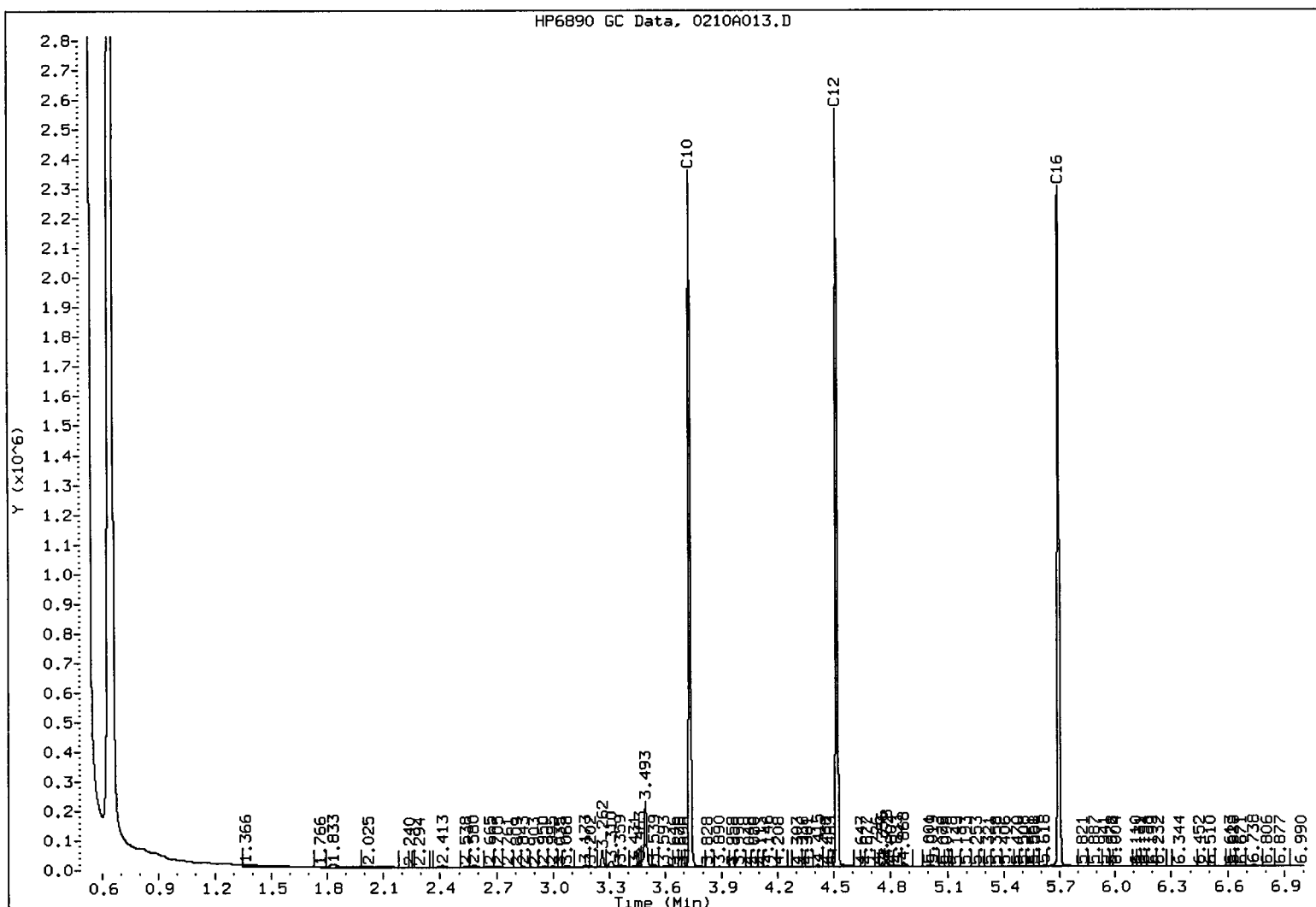
ARI ID: SH23LCSS1
Client ID: SH23LCSS1
Injection: 10-FEB-2011 20:24
Matrix: SOIL
Dilution Factor: 1

EPH-ALIPHATIC RESULTS

Quant Range	Area	Conc	Time Range
C8-C10 Aliph.	2123529	121	(2.254 - 3.842)
C10-C12 Aliph.	1721112	108	(3.842 - 4.624)
C12-C16 Aliph.	1718599	116	(4.624 - 5.801)
C16-C21 Aliph.	1562077	113	(5.801 - 8.031)
C21-C34 Aliph.	621615	56	(8.031 - 12.757)

Surrogate Rec: 73.9%

FID-8A/ZB-5 SH23LCSS1



SH31: 00066

Data File: /chem2/fid8.i/20110210ALIPH.b/02100013.D

Date : 10-FEB-2011 20:24

Client ID: SH23LCSS1

Sample Info: SH23LCSS1

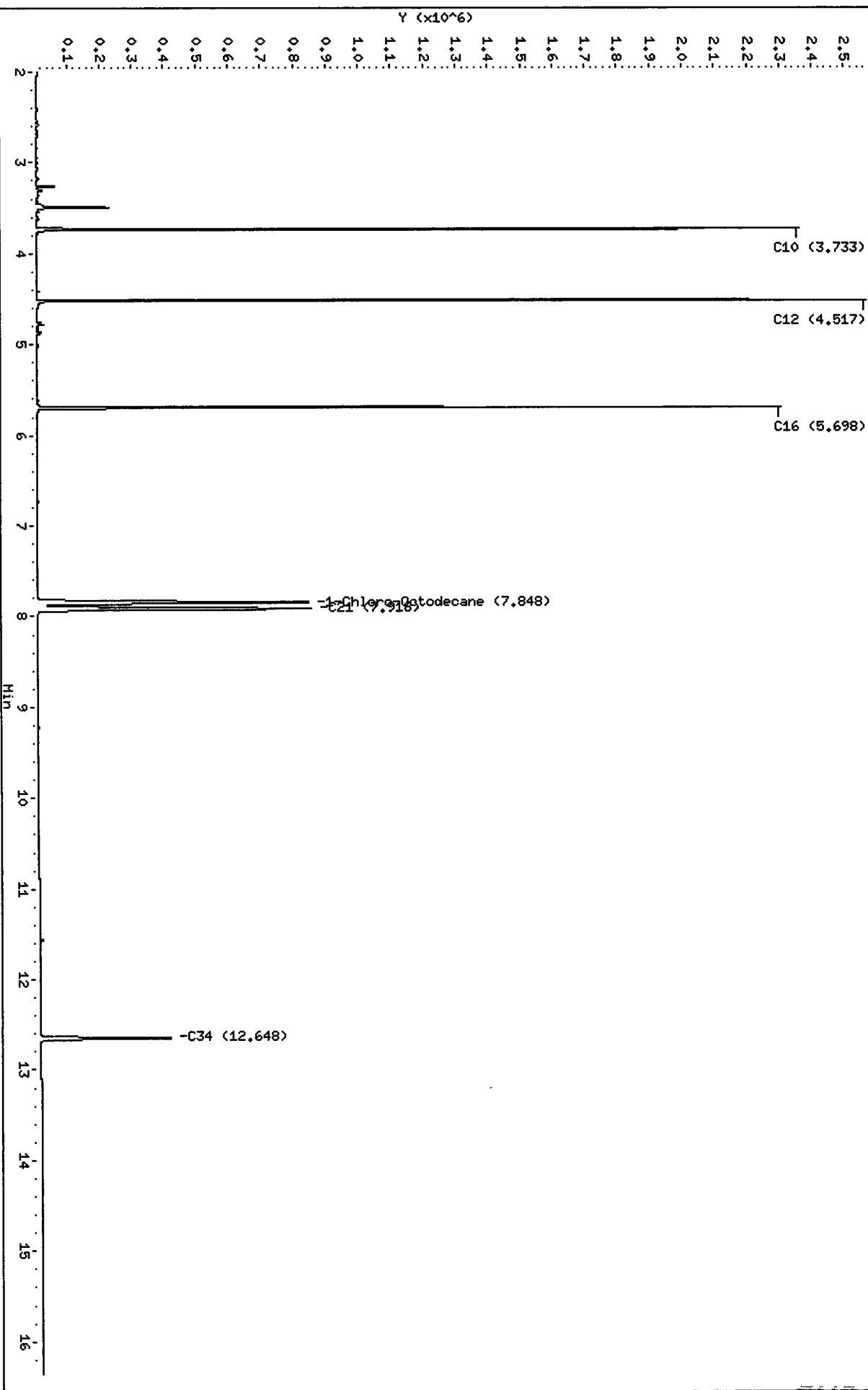
Instrument: fid8.i

Operator: HS

Column diameter: 0.32

Column phase: ZB-5

/chem2/fid8.i/20110210ALIPH.b/02100013.D



ORGANICS ANALYSIS DATA SHEET

Aliphatic/Aromatic GC-EPH

Page 1 of 1


Sample ID: MB-020411

METHOD BLANK

Lab Sample ID: MB-020411

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

J11001

Date Sampled: NA

Date Received: NA

Date Extracted: 02/04/11

Percent Moisture: NA

Sample Amount: 10.0 g-as-rec

Final Extract Volume: 1.0 mL

Aliphatic

Date Analyzed: 02/10/11 20:49

Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Aromatic

Date Analyzed: 02/11/11 01:23

Instrument/Analyst: FID8/MS

Dilution Factor: 1.00

Range	RL	Result
C8-C10 Aliphatics	2,000	< 2,000 U
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	81.6%
Aromatic	o-Terphenyl	73.0%

Analytical Resources Inc.
WA. EPH Aliphatics Report

Data file: /chem2/fid8.i/20110210ALIPH.b/0210A014.D
Method: /chem2/fid8.i/20110210ALIPH.b/EPHALiph.m
Instrument: fid8.i
Operator: MS
Macro: ALIPH090410FID8

ARI ID: SH23MBS1
Client ID: SH23MBS1
Injection: 10-FEB-2011 20:49
Matrix: SOIL
Dilution Factor: 1

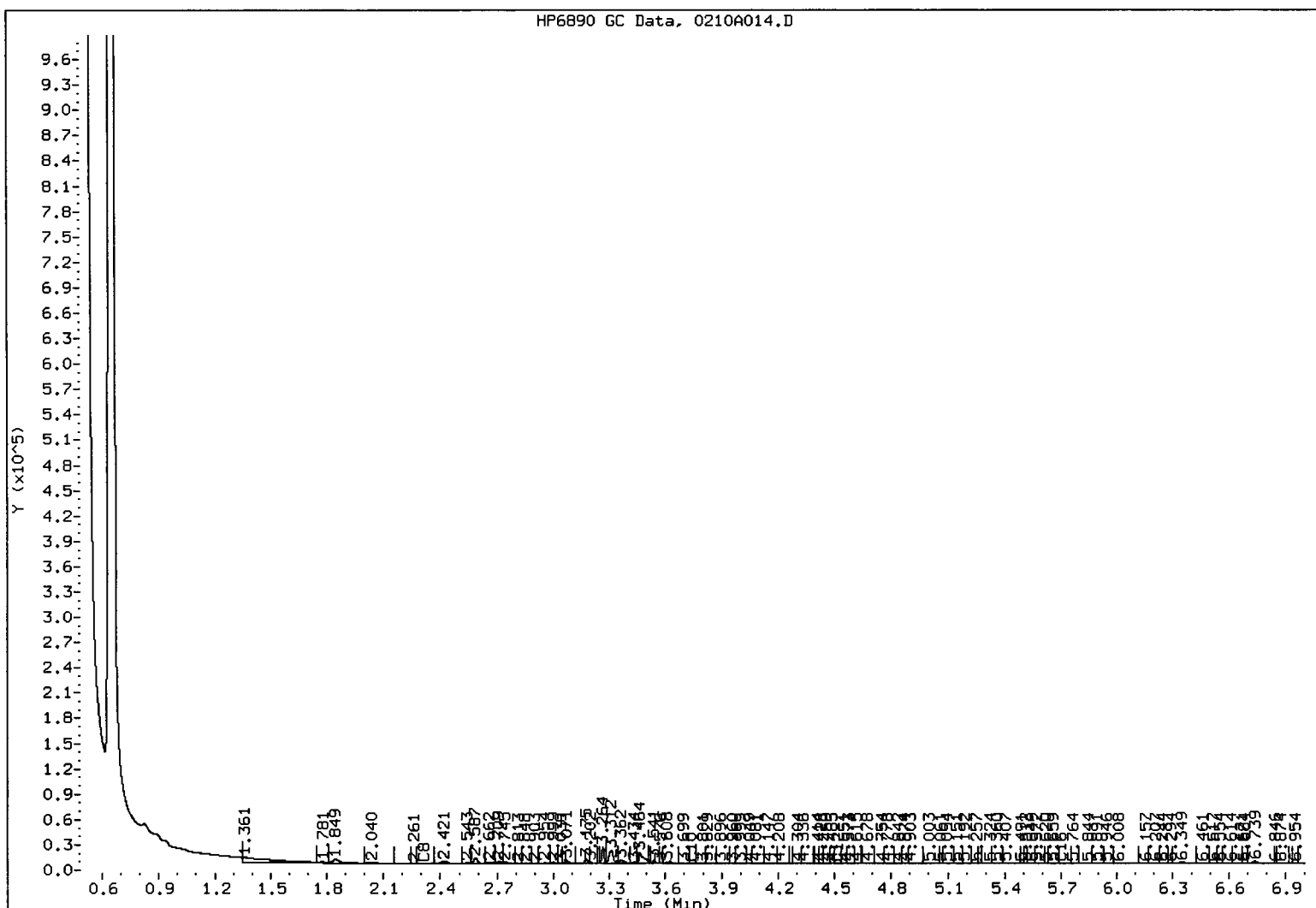
EPH-ALIPHATIC RESULTS

Quant Range	Area	Conc	Time Range
C8-C10 Aliph.	135226	8	(2.254 - 3.842)
C10-C12 Aliph.	7967	1	(3.842 - 4.624)
C12-C16 Aliph.	6046	0	(4.624 - 5.801)
C16-C21 Aliph.	21293	2	(5.801 - 8.031)
C21-C34 Aliph.	22039	2	(8.031 - 12.757)

Surrogate Rec: 81.6%

Handwritten signature

FID-8A/ZB-5 SH23MBS1



Data File: /chem2/fid8.i/20110210PLIPH.b/0210R014.D

Page 1

Date : 10-FEB-2011 20:49

Client ID: SH23MBS1

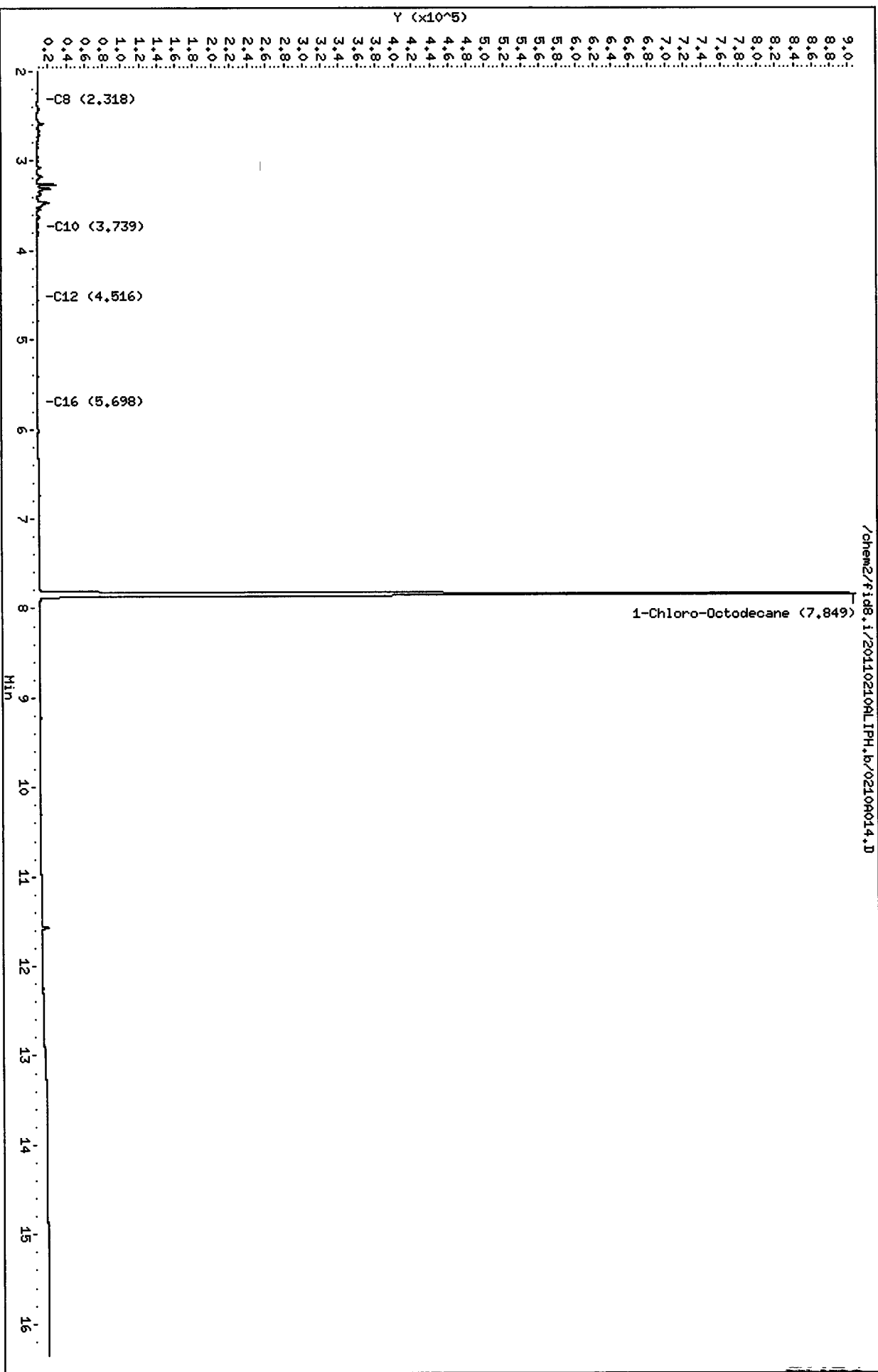
Instrument: fid8.i

Sample Info: SH23MBS1

Operator: MS

Column phase: ZB-5

Column diameter: 0.32



Analytical Resources Inc.
EPH Aromatics Report

Data file: /chem2/fid8.i/20110210AROM.b/0210A025.D
Method: /chem2/fid8.i/20110210AROM.b/EPHArOm.m
Instrument: fid8.i
Operator: MS
Report Date: 02/11/2011
Macro: AROM072710FID8

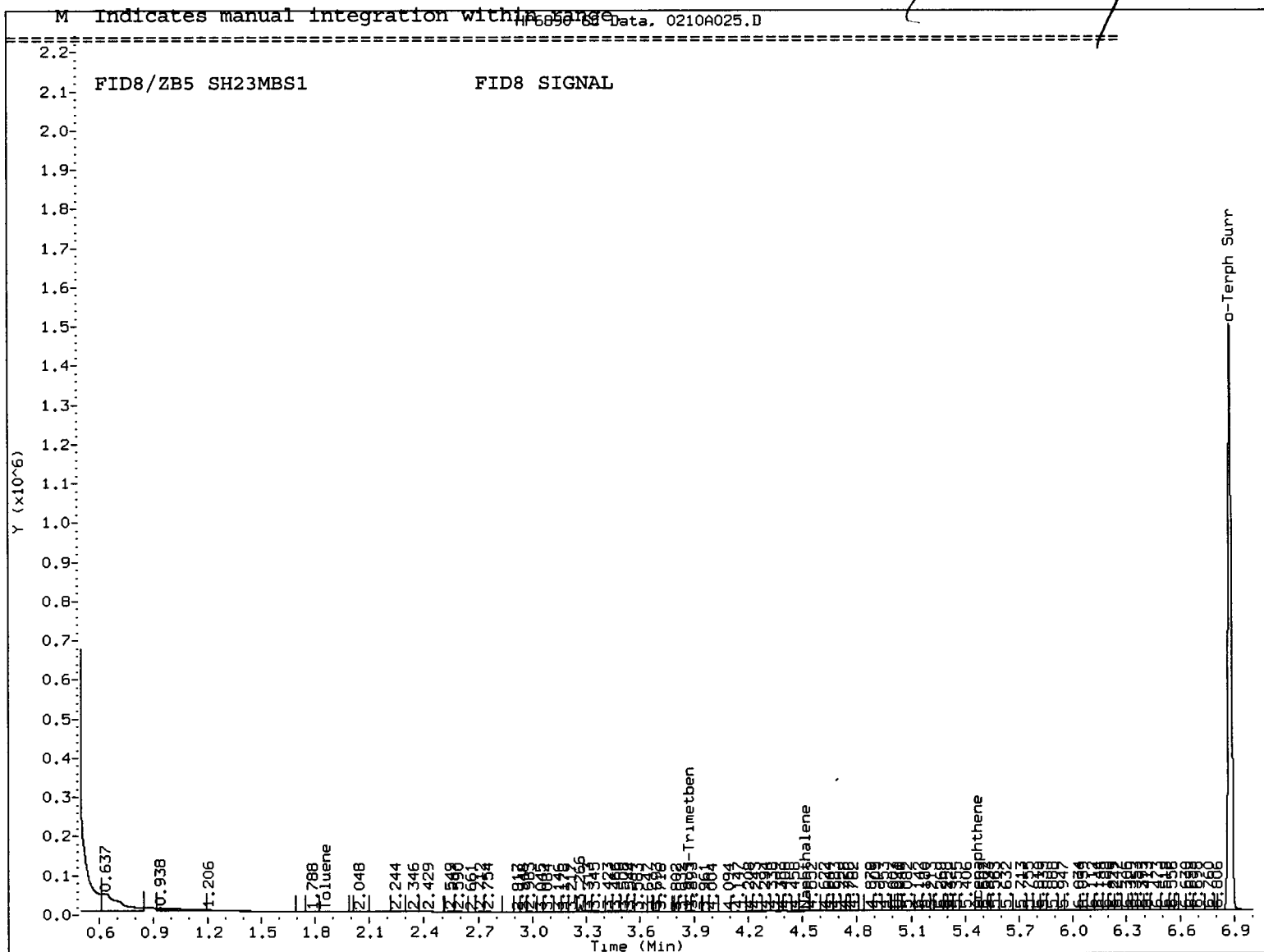
ARI ID: SH23MBS1
Client ID: SH23MBS1
Injection: 11-FEB-2011 01:23
Matrix: SOIL
Dilution Factor: 1

EPH-AROMATIC RESULTS

Quant Range	RF	Area	Conc	Time Range
C8-C10 Arom.	17167	28330	2	(1.730 - 3.956)
C10-C12 Arom.	16689	2125	0	(3.956 - 4.616)
C12-C16 Arom.	15441	2044	0	(4.616 - 5.567)
C16-C21 Arom.	14112	19047	1	(5.567 - 8.293)
C21-C34 Arom.	12993	6206	0	(8.293 - 12.503)

Surrogate Rec: 73.0%

M Indicates manual integration with a range of 0.637 to 6.956 Data, 0210A025.D



SH31: 00073

Data File: /chem2/fid8.i/20110210AR0H.b/0210A025.D

Page 1

Date : 11-FEB-2011 01:23

Client ID: SH23MBS1

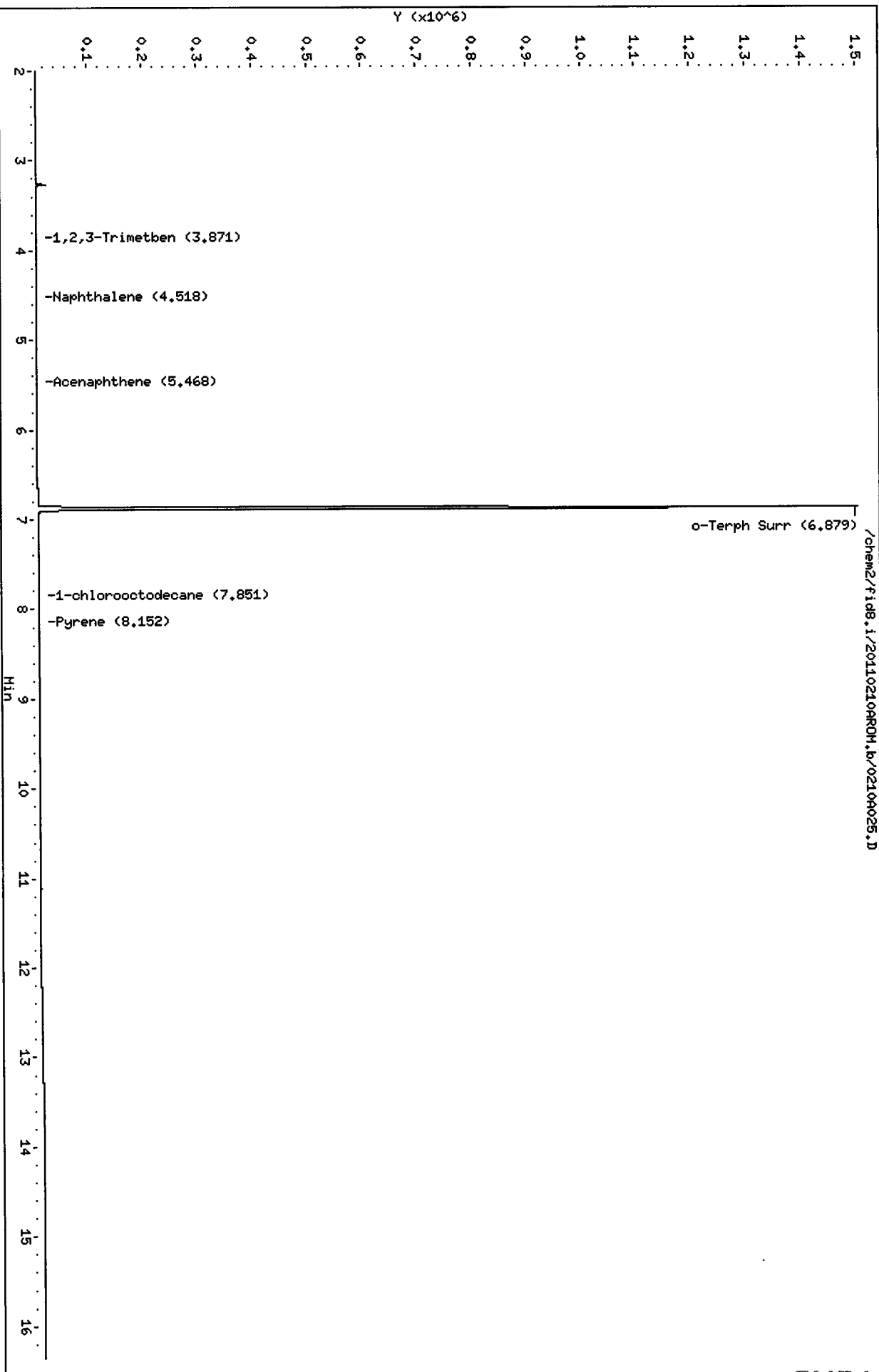
Sample Info: SH23MBS1

Instrument: fid8.i

Operator: HS

Column diameter: 0.32

Column phase: ZB-5



SH23MBS1


ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: B11-17-10
SAMPLE

Lab Sample ID: SH31C

LIMS ID: 11-2252

Matrix: Soil

Data Release Authorized: 

Reported: 02/14/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

Event: JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 15:11

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 8.3 mg-dry-wt

Percent Moisture: 12.2%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	150	< 150 U
108-88-3	Toluene	150	< 150 U
100-41-4	Ethylbenzene	150	1,000
179601-23-1	m,p-Xylene	300	< 300 U
95-47-6	o-Xylene	150	< 150 U

Gasoline Range Hydrocarbons

60

1,400

GAS ID
GRO

BETX Surrogate Recovery

Trifluorotoluene	102%
Bromobenzene	130%

Gasoline Surrogate Recovery

Trifluorotoluene	101%
Bromobenzene	243%

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
2/14/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a021.d ARI ID: SH31C
Data file 2: /chem3/pid2.i/020411-2.b/0204a021.d Client ID: B11-17-10
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 15:11
Instrument: pid2.i Matrix: SOIL
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.131	0.003	4080	52977	101.1	TFT(Surr)
14.763	0.010	6041	67358	242.6	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	1028480	2.235 M
8015B 2MP-TMB (4.81 to 15.47)	907748	765444	0.843 M
AK101 nC6-nC10 (5.25 to 14.35)	626837	344118	0.549 M
NWTPHG Tol-Nap (9.88 to 18.21)	481270	1163454	2.417 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
8.158	0.002	2468	102.2	TFT(Surr)
14.773	0.003	8652	130.4	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
12.540	-0.017	263	1.74N	Ethylbenzene
12.683	-0.010	40	0.25N	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

SH31 : 00070

Data File: /chem3/pid2.i/020411-1.b/0204a021.d

Date : 04-FEB-2011 15:11

Client ID: B11-17-10

Sample Info: SH31C

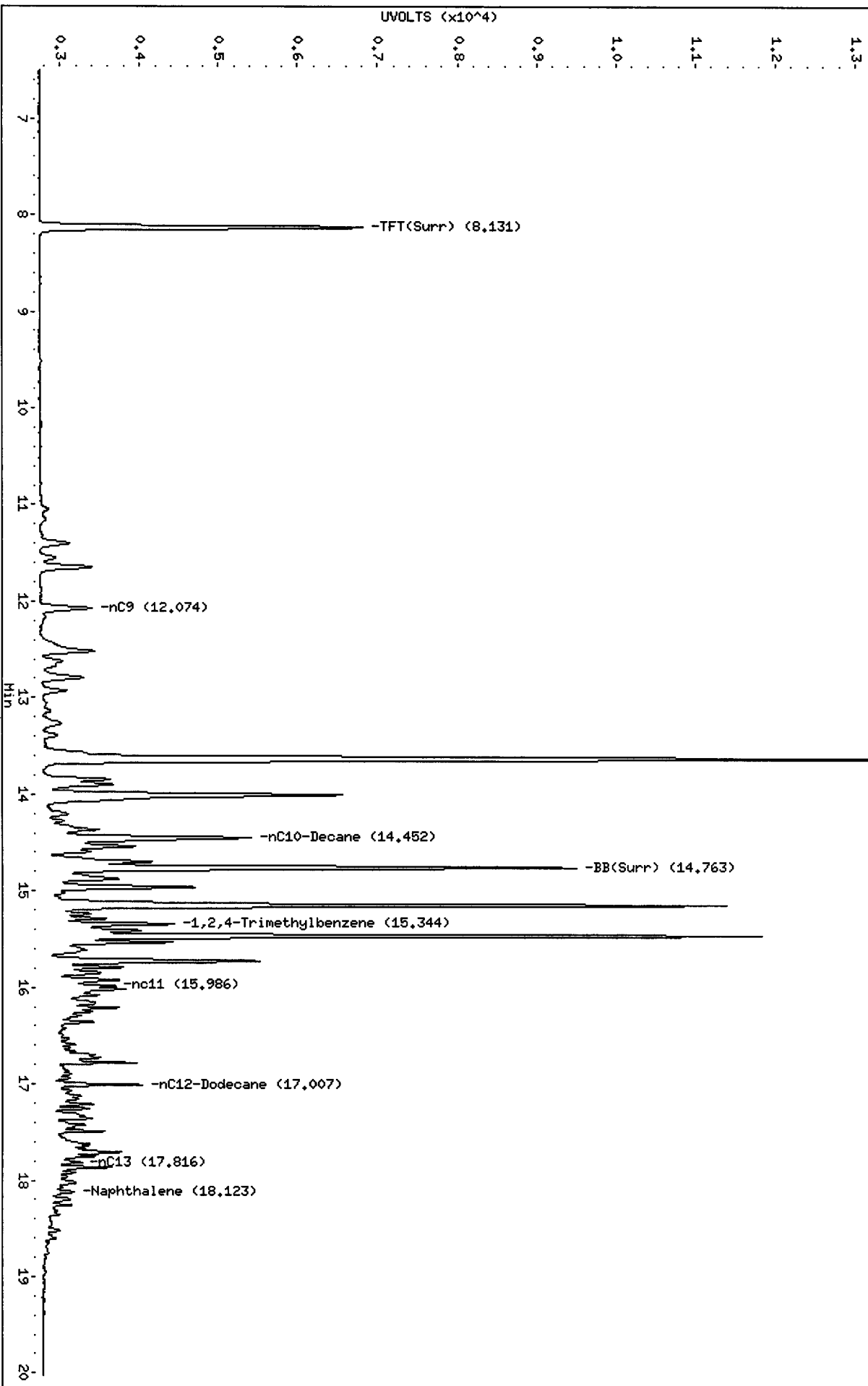
Instrument: pid2.i

Operator: HH

Column diameter: 0.18

Column phase: RTX 502-2 FID

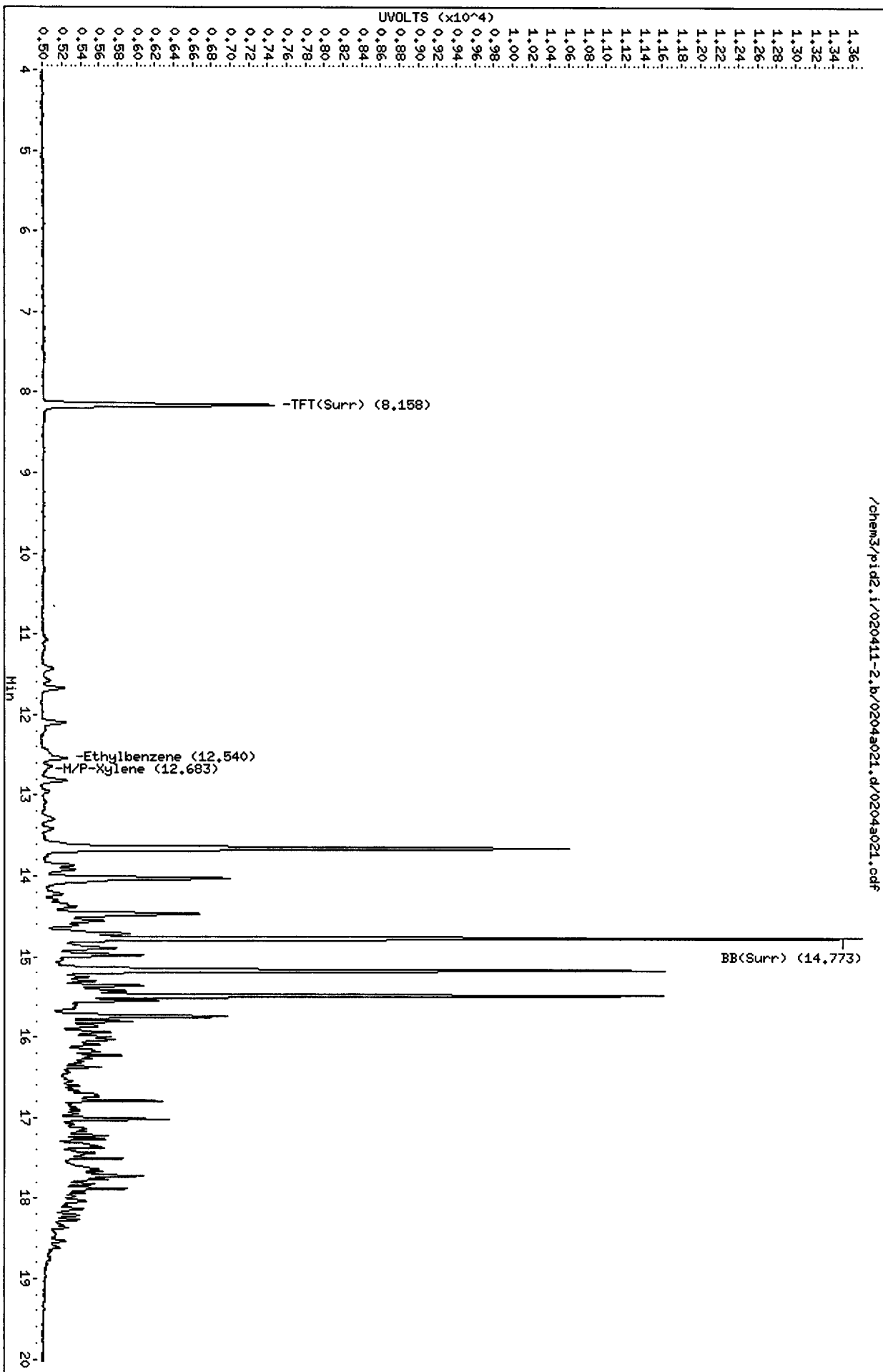
/chem3/pid2.i/020411-1.b/0204a021.d/0204a021.cdf



Data File: /chem3/pid2.i/020411-2.b/0204a021.d
Date : 04-FEB-2011 15:11
Client ID: B41-17-10
Sample Info: SH31C

Column Phase: RTX 502-2 PID

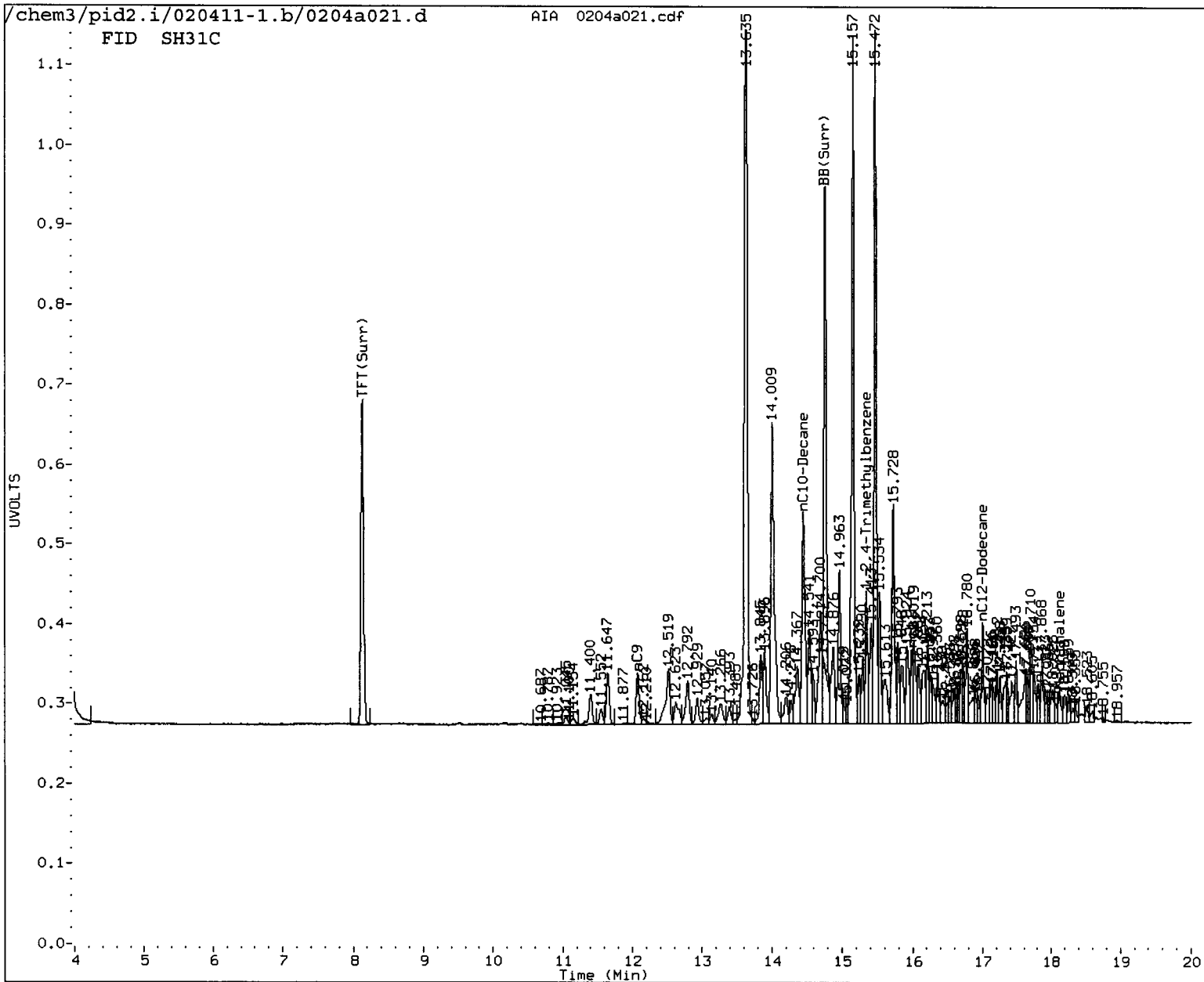
Instrument: pid2.i
Operator: MH
Column diameter: 0.18



AIA 0204a021.cdf: -0.106 to 20.300 min



FID SH31C



ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: B11-17-15

SAMPLE

Lab Sample ID: SH31D

LIMS ID: 11-2253

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/23/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

Event: JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 16:36

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 78 mg-dry-wt

Percent Moisture: 8.0%

CAS Number	Analyte	RL	Result
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	6.4	< 6.4 U	GAS ID ---
-----------------------------	-----	---------	---------------

BETX Surrogate Recovery

Trifluorotoluene	104%
Bromobenzene	102%

Gasoline Surrogate Recovery

Trifluorotoluene	102%
Bromobenzene	103%

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.

2/14/11 2H

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a024.d ARI ID: SH31D
Data file 2: /chem3/pid2.i/020411-2.b/0204a024.d Client ID: B11-17-15
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 16:36
Instrument: pid2.i Matrix: SOIL
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.131	0.003	4136	52521	102.5	TFT(Surr)
14.753	0.000	2561	22257	102.9	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	17433	0.038
8015B 2MP-TMB (4.81 to 15.47)	907748	9830	0.011
AK101 nC6-nC10 (5.25 to 14.35)	626837	3172	0.005
NWTPHG Tol-Nap (9.88 to 18.21)	481270	31558	0.066

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
8.159	0.002	2505	103.8	TFT(Surr)
14.770	0.000	6734	101.5	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

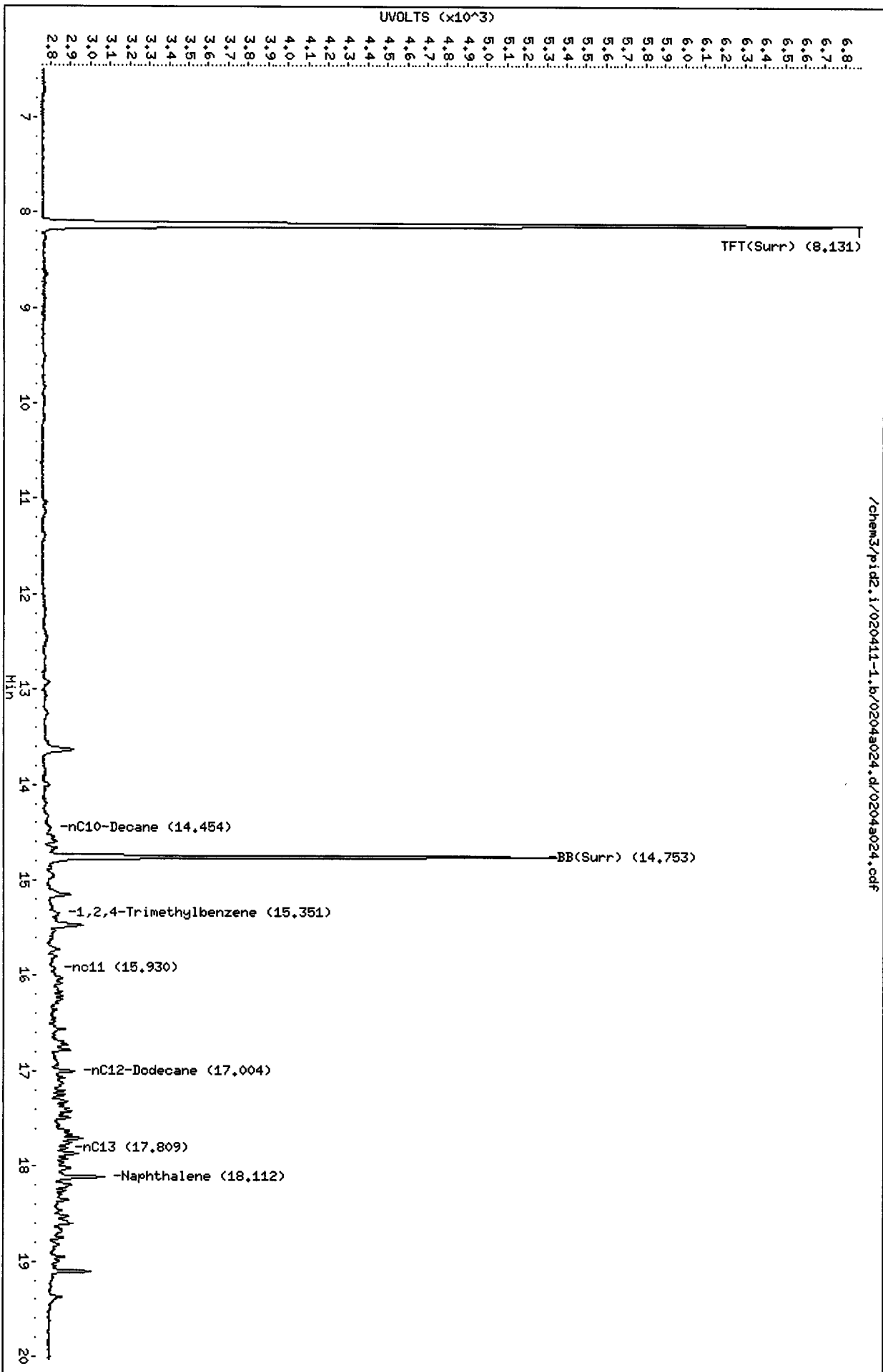
A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid2.i/020411-1.b/0204a024.d
Date : 04-FEB-2011 16:36
Client ID: B11-17-15
Sample Info: SH31D

Column phase: RTX 502-2 FID

Instrument: pid2.i
Operator: HH
Column diameter: 0.18

Page 1



SH31 . 000000

Data File: /chem3/pid2.i/020411-2.b/0204s024.d

Page 1

Date : 04-FEB-2011 16:36

Client ID: B11-17-15

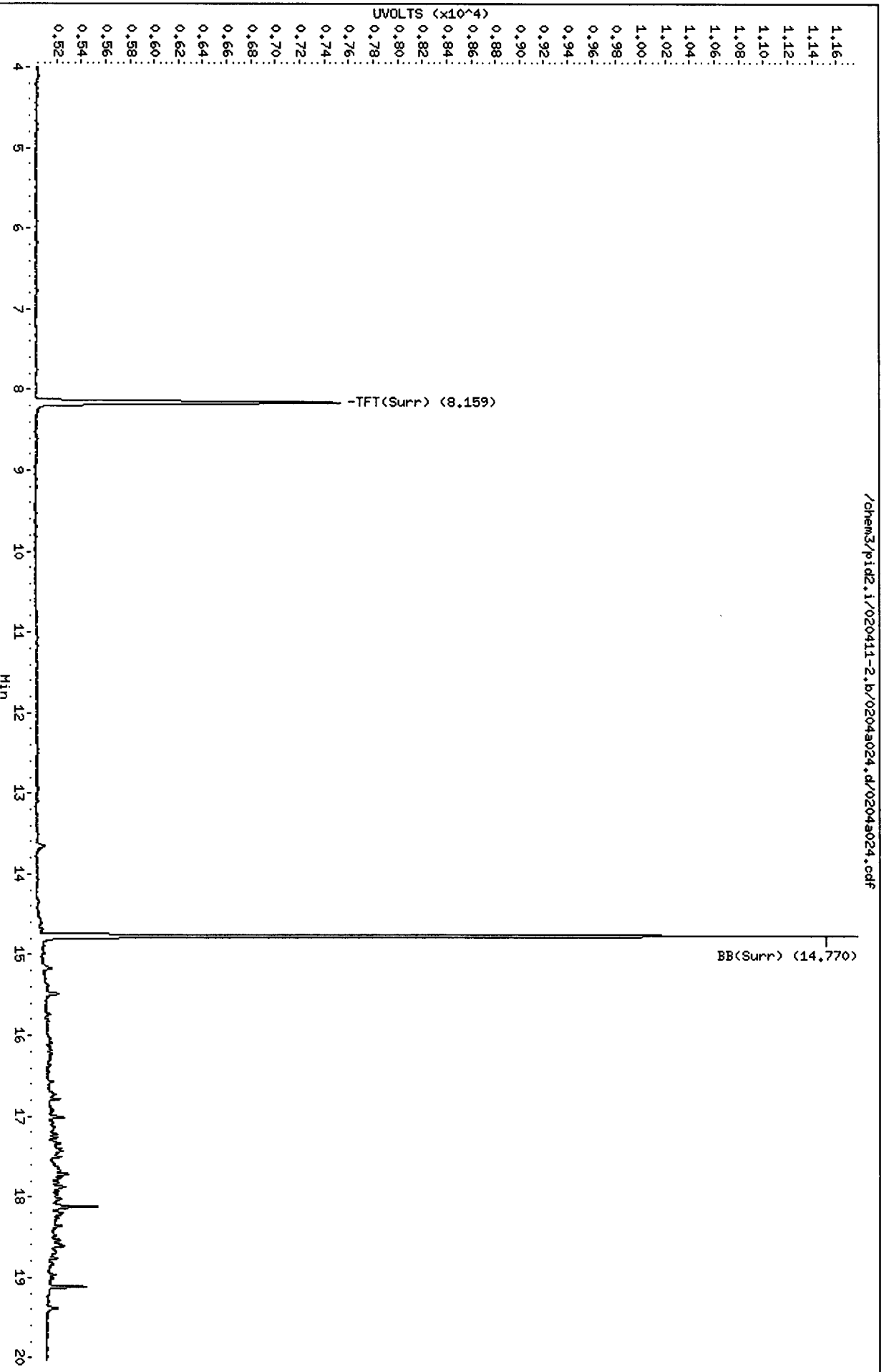
Sample Info: SH31D

Instrument: pid2.i

Operator: HH

Column diameter: 0.18

Column phase: RTX 502-2 PID



SH31 00004

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: B11-17-20
SAMPLE



Lab Sample ID: SH31E
LIMS ID: 11-2254
Matrix: Soil
Data Release Authorized: *[Signature]*
Reported: 02/14/11

QC Report No: SH31-Pacific Groundwater Group
Project: Birds Eye-Soil
Event: JI1001
Date Sampled: 02/01/11
Date Received: 02/02/11

Date Analyzed: 02/04/11 17:04
Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL
Sample Amount: 77 mg-dry-wt
Percent Moisture: 5.8%

CAS Number	Analyte	RL	Result
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	6.5	55	GAS ID GRO
-----------------------------	-----	----	---------------

BETX Surrogate Recovery

Trifluorotoluene	98.8%
Bromobenzene	93.2%

Gasoline Surrogate Recovery

Trifluorotoluene	100%
Bromobenzene	102%

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
2/14/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a025.d ARI ID: SH31E
Data file 2: /chem3/pid2.i/020411-2.b/0204a025.d Client ID: B11-17-20
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 17:04
Instrument: pid2.i Matrix: SOIL
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.128	0.000	4037	51178	100.1	TFT(Surr)
14.750	-0.003	2539	23788	102.0	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	238464	0.518 M
8015B 2MP-TMB (4.81 to 15.47)	907748	73980	0.081 M
AK101 nC6-nC10 (5.25 to 14.35)	626837	21362	0.034 M
NWTPHG Tol-Nap (9.88 to 18.21)	481270	412644	0.857 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
8.156	0.000	2386	98.8	TFT(Surr)
14.766	-0.004	6182	93.2	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
ND	---	---	---	Benzene
ND	---	---	---	Toluene
ND	---	---	---	Ethylbenzene
ND	---	---	---	M/P-Xylene
ND	---	---	---	O-Xylene
ND	---	---	---	MTBE

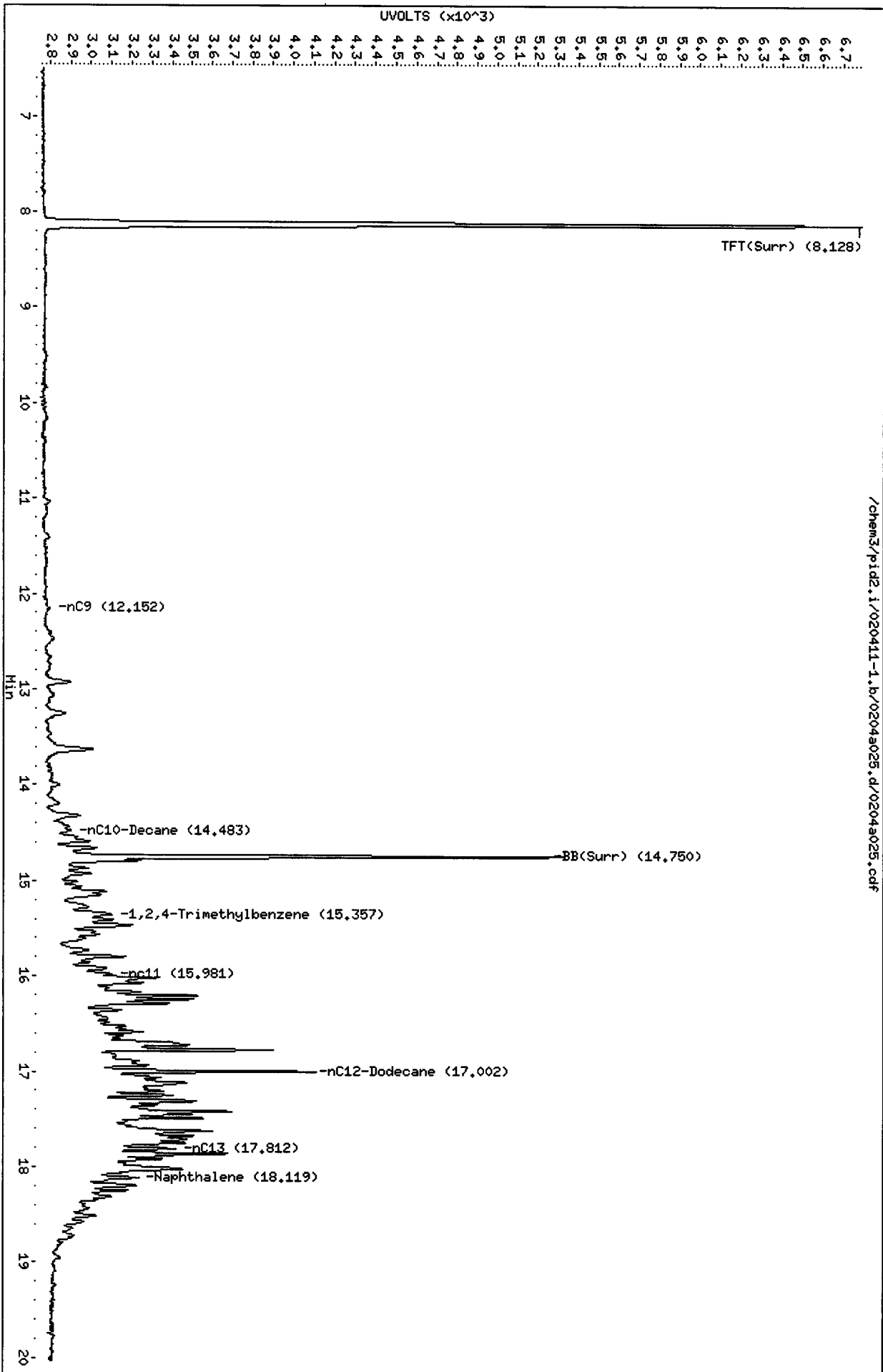
A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

SH31 : 000000

Data File: /chem3/pid2.i/020411-1.b/0204a025.d
Date : 04-FEB-2011 17:04
Client ID: B11-17-20
Sample Info: SH31E

Column phase: RTX 502-2 FID

Instrument: pid2.i
Operator: MH
Column diameter: 0.18



SH31 00001

Data File: /chem3/pid2.i/020411-2.b/0204a025.d

Page 1

Date : 04-FEB-2011 17:04

Client ID: B11-17-20

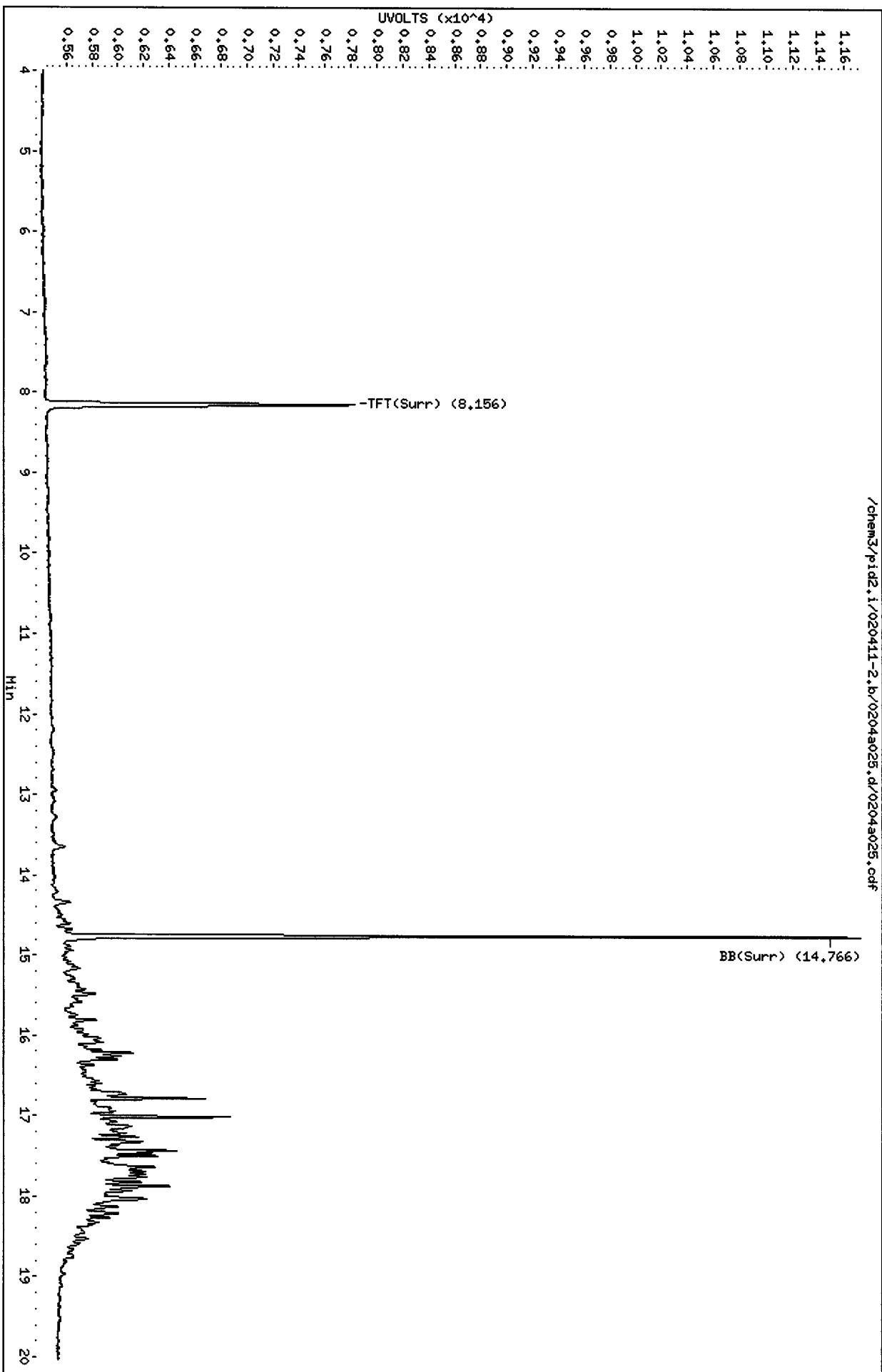
Sample Info: SH31E

Instrument: pid2.i

Operator: MH

Column diameter: 0.18

Column phase: RTX 502-2 PID

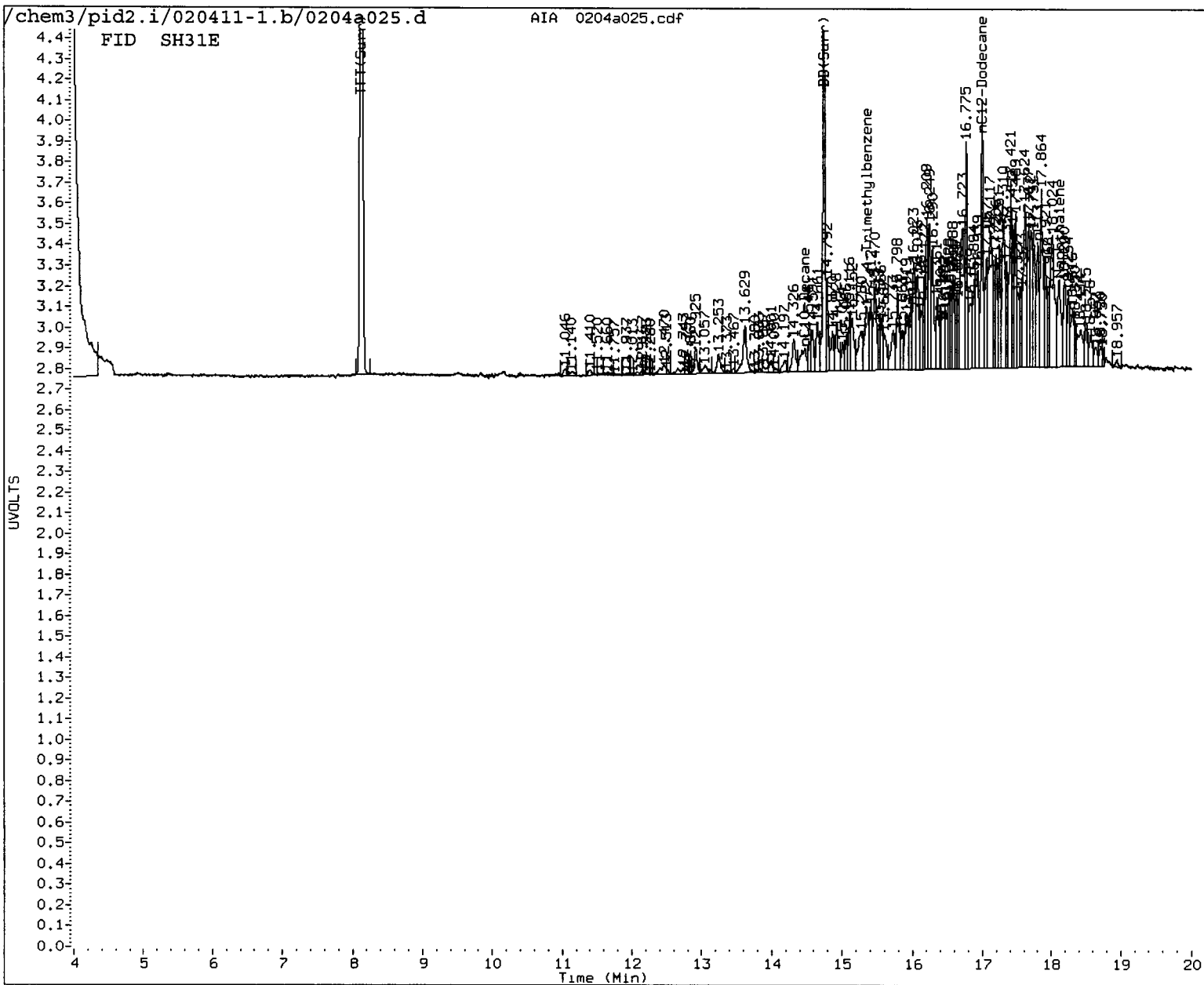


SH31.00000

```
AIA 0204a025.cdf: -0.030 to 19.847 Min
```



FID SH31E



MANUAL INTEGRATION

- ~~1.~~ Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: MH

Date: 2/14/11

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: TRIP BLANKS

SAMPLE

Lab Sample ID: SH31H

LIMS ID: 11-2257

Matrix: Water

Data Release Authorized: *AB*

Reported: 02/14/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

Event: JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 13:46

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
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	1.0	< 1.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

Gasoline Range Hydrocarbons	0.25	< 0.25 U	GAS ID ---
-----------------------------	------	----------	---------------

BETX Surrogate Recovery

Trifluorotoluene	102%
Bromobenzene	96.3%

Gasoline Surrogate Recovery

Trifluorotoluene	101%
Bromobenzene	95.5%

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.

2/4/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a018.d ARI ID: SH31H
Data file 2: /chem3/pid2.i/020411-2.b/0204a018.d Client ID: Trip Blank
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 13:46
Instrument: pid2.i Matrix: SOIL
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
8.130	0.002	4071	51674	100.9	TFT(Surr)
14.753	0.000	2379	20446	95.5	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	2487	0.005
8015B 2MP-TMB (4.81 to 15.47)	907748	3862	0.004
AK101 nC6-nC10 (5.25 to 14.35)	626837	3020	0.005
NWTPHG Tol-Nap (9.88 to 18.21)	481270	2487	0.005

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
8.158	0.002	2451	101.5	TFT(Surr)
14.770	0.000	6388	96.3	BB(Surr)

SW8021 (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

SH31 : 00032

Data File: /chem3/pid2.i/020411-1.b/0204a018.d

Page 1

Date : 04-FEB-2011 13:46

Client ID: TRIP BLANKS

Sample Info: SH31H

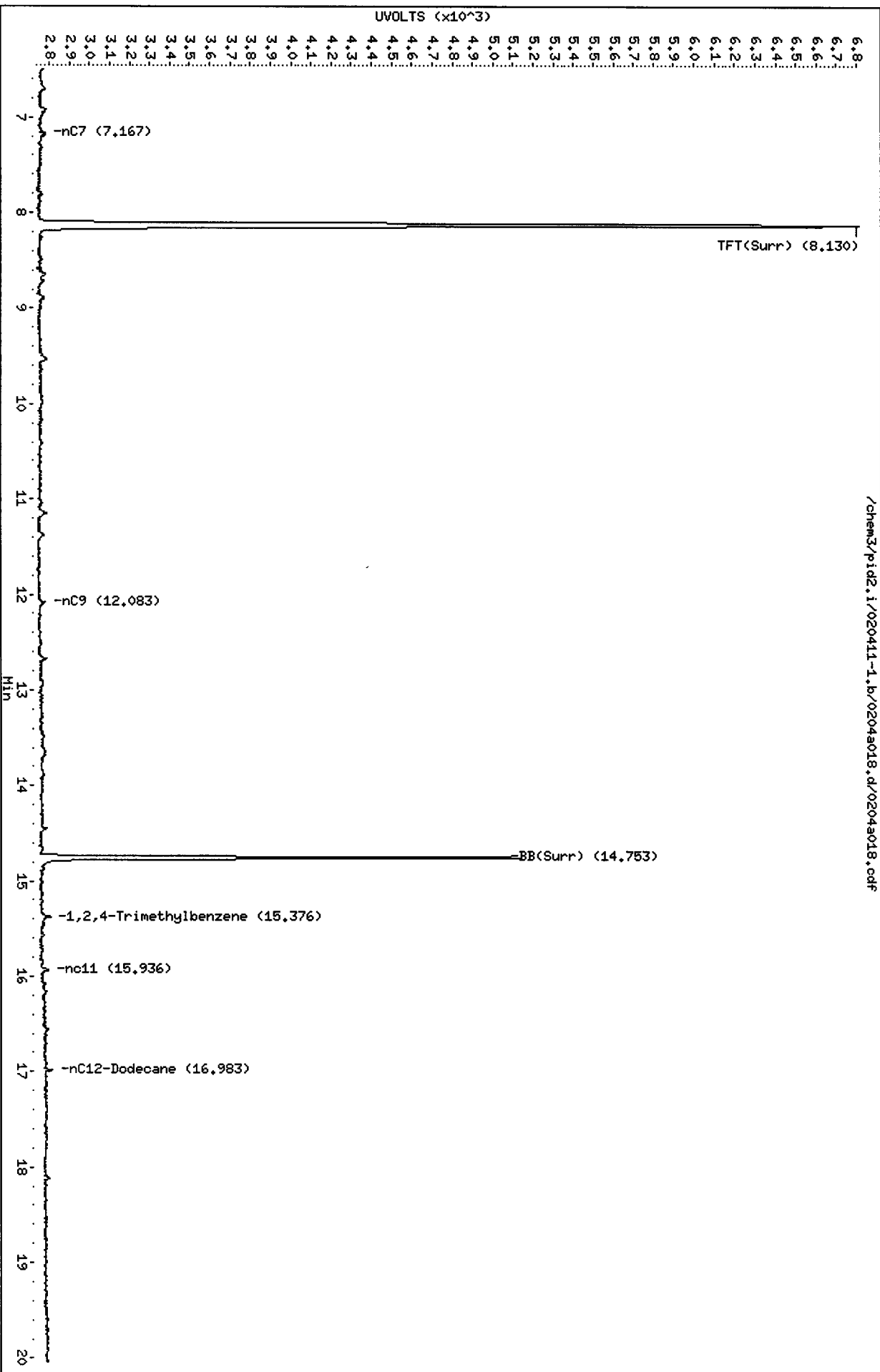
Instrument: pid2.i

Operator: HH

Column diameter: 0.18

Column phase: RTX 502-2 FID

/chem3/pid2.i/020411-1.b/0204a018.d/0204a018.cdf



SH31.00000

Data File: /chem3/pid2.i/020411-2.b/0204a018.d

Date : 04-FEB-2011 13:46

Client ID: Trip Blank

Sample Info: SH31H

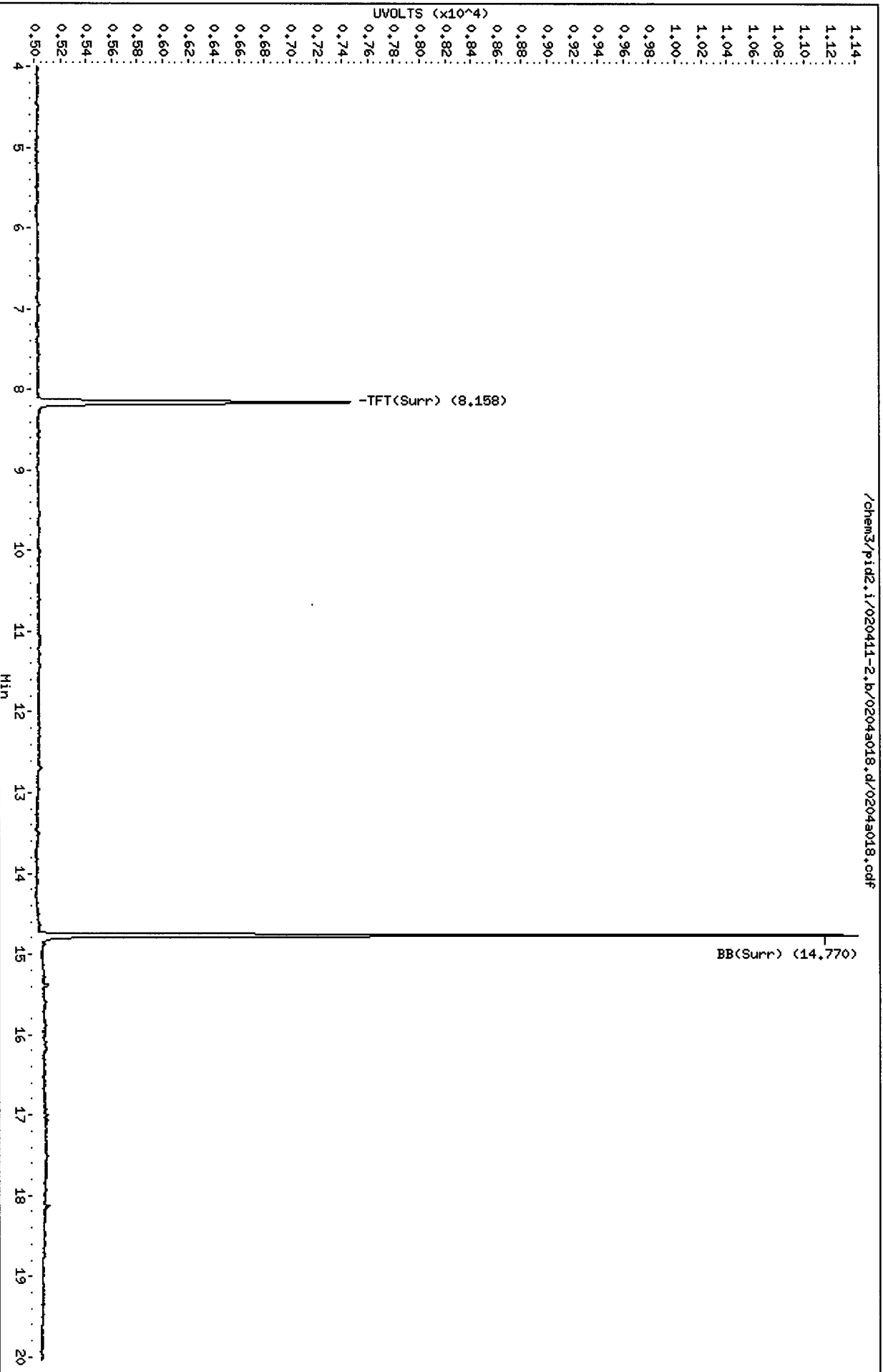
Column phase: RTX 502-2 PID

Instrument: pid2.i

Operator: HH

Column diameter: 0.18

Page 1



TPHG SOIL SURROGATE RECOVERY SUMMARY

ARI Job: SH31
Matrix: Soil

QC Report No: SH31-Pacific Groundwater Group
Project: Birds Eye-Soil
Event: JI1001

Client ID	BFB	TFT	BBZ	TOT	OUT
MB-020411	NA	97.5%	95.7%	0	
LCS-020411	NA	99.5%	98.6%	0	
LCSD-020411	NA	100%	99.9%	0	
B11-17-10	NA	101%	243%*	1	
B11-17-15	NA	102%	103%	0	
B11-17-20	NA	100%	102%	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: 11-2252 to 11-2254

FORM II TPHG

Page 1 for SH31

SH31 : 00095

BETX SOIL SURROGATE RECOVERY SUMMARY

ARI Job: SH31
Matrix: Soil

QC Report No: SH31-Pacific Groundwater Group
Project: Birds Eye-Soil
Event: JI1001

<u>Client ID</u>	<u>TFT</u>	<u>BBZ</u>	<u>TOT OUT</u>
MB-020411	99.1%	95.7%	0
LCS-020411	100%	96.6%	0
LCSD-020411	101%	98.6%	0
B11-17-10	102%	130%	0
B11-17-15	104%	102%	0
B11-17-20	98.8%	93.2%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(68-124)
(BBZ) = Bromobenzene	(77-120)	(62-134)

Log Number Range: 11-2252 to 11-2254

FORM II BETX

Page 1 for SH31

SH31 : 00096

TPHG WATER SURROGATE RECOVERY SUMMARY

ARI Job: SH31
Matrix: Water

QC Report No: SH31-Pacific Groundwater Group
Project: Birds Eye-Soil
Event: JI1001

<u>Client ID</u>	<u>TFT</u>	<u>BBZ</u>	<u>TOT OUT</u>
TRIP BLANKS	101%	95.5%	0

	<u>LCS/MB LIMITS</u>	<u>QC LIMITS</u>
(TFT) = Trifluorotoluene	(80-120)	(80-120)
(BBZ) = Bromobenzene	(80-120)	(80-120)

Log Number Range: 11-2257 to 11-2257

FORM II TPHG

Page 1 for SH31

SH31 : 00097

BETX WATER SURROGATE RECOVERY SUMMARY

ARI Job: SH31
Matrix: Water

QC Report No: SH31-Pacific Groundwater Group
Project: Birds Eye-Soil
Event: JI1001

<u>Client ID</u>	<u>TFT</u>	<u>BBZ</u>	<u>TOT OUT</u>
TRIP BLANKS	102%	96.3%	0

	<u>LCS/MB LIMITS</u>	<u>QC LIMITS</u>
(TFT) = Trifluorotoluene	(79-120)	(80-120)
(BBZ) = Bromobenzene	(79-120)	(80-120)

Log Number Range: 11-2257 to 11-2257

FORM II BETX

Page 1 for SH31

SH31 : 00096

ORGANICS ANALYSIS DATA SHEET

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: LCS-020411

LAB CONTROL SAMPLE

Lab Sample ID: LCS-020411

LIMS ID: 11-2252

Matrix: Soil

Data Release Authorized: *B*

Reported: 02/14/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

Event: JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed LCS: 02/04/11 06:55

Purge Volume: 5.0 mL

LCSD: 02/04/11 07:23

Instrument/Analyst LCS: PID2/MH

Sample Amount LCS: 100 mg-dry-wt

LCSD: PID2/MH

LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	51.6	50.0	103%	50.6	50.0	101%	2.0%

Reported in mg/kg (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	99.5%	100%
Bromobenzene	98.6%	99.9%

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

Page 1 of 1

Sample ID: LCS-020411

LAB CONTROL SAMPLE

Lab Sample ID: LCS-020411

LIMS ID: 11-2252

Matrix: Soil

Data Release Authorized: *B*

Reported: 02/14/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

Event: JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed LCS: 02/04/11 06:55

Purge Volume: 5.0 mL

LCSD: 02/04/11 07:23

Instrument/Analyst LCS: PID2/MH

Sample Amount LCS: 100 mg-dry-wt

LCSD: PID2/MH

LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	141	105	134%	139	105	132%	1.4%
Toluene	1510	1440	105%	1490	1440	103%	1.3%
Ethylbenzene	470	460	102%	465	460	101%	1.1%
m,p-Xylene	1760	1690	104%	1730	1690	102%	1.7%
o-Xylene	736	700	105%	730	700	104%	0.8%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	100%	101%
Bromobenzene	96.6%	98.6%

2/4/11
M4

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a004.d ARI ID: LCS0204
Data file 2: /chem3/pid2.i/020411-2.b/0204a004.d Client ID:
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 06:55
Instrument: pid2.i Matrix: WATER
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
--	----	-----	----	----	-----
8.126	-0.002	4016	52736	99.5	TFT(Surr)
14.751	-0.002	2455	21098	98.6	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
-----	----	-----	-----
WAGas Tol-C12 (9.88 to 17.08)	460088	471725	1.025 M
8015B 2MP-TMB (4.81 to 15.47)	907748	967800	1.066 M
AK101 nC6-nC10 (5.25 to 14.35)	626837	673274	1.074 M
NWTPHG Tol-Nap (9.88 to 18.21)	481270	496752	1.032 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
--	----	-----	----	-----
8.154	-0.002	2424	100.4	TFT(Surr)
14.768	-0.001	6410	96.6	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
--	----	-----	-----	-----
7.470	0.001	440	2.82	Benzene
10.009	-0.003	4878	30.21	Toluene
12.554	-0.003	1419	9.39	Ethylbenzene
12.694	0.000	5649	35.17	M/P-Xylene
13.506	-0.003	2146	14.71	O-Xylene
5.195	0.003	3903	95.09	MTBE

A Indicates Peak Area was used for quantitation instead of Height

N Indicates peak peak was manually integrated

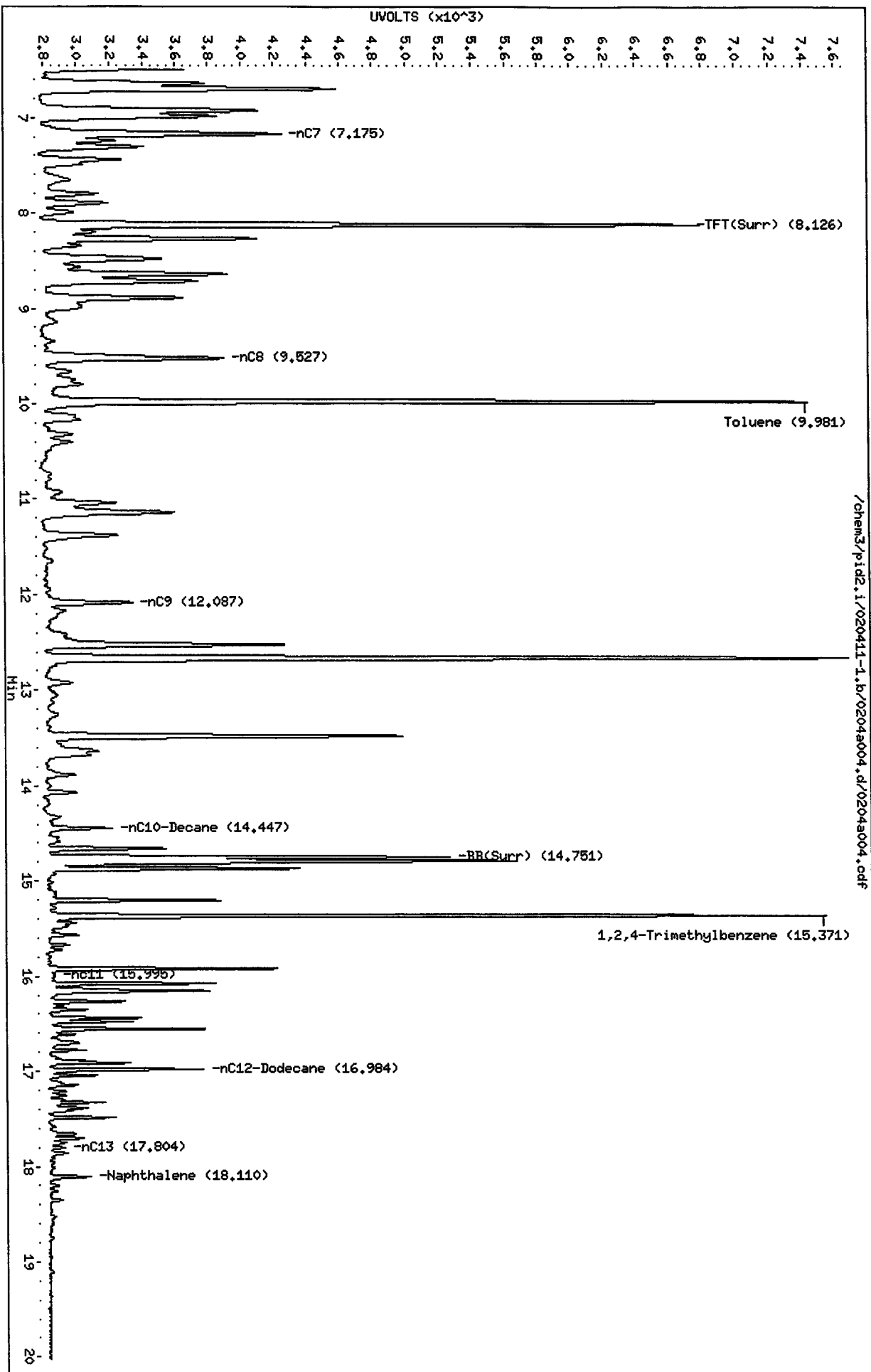
Page 1

Instrument: pid2.i

Operator: MH

Column diameter: 0.18

Column phase: RTX 502-2 FID



SECRET

Data File: /chem3/pid2.i/020411-2.b/0204a004.d

Date : 04-FEB-2011 06:55

Client ID:

Sample Info: LCS0204

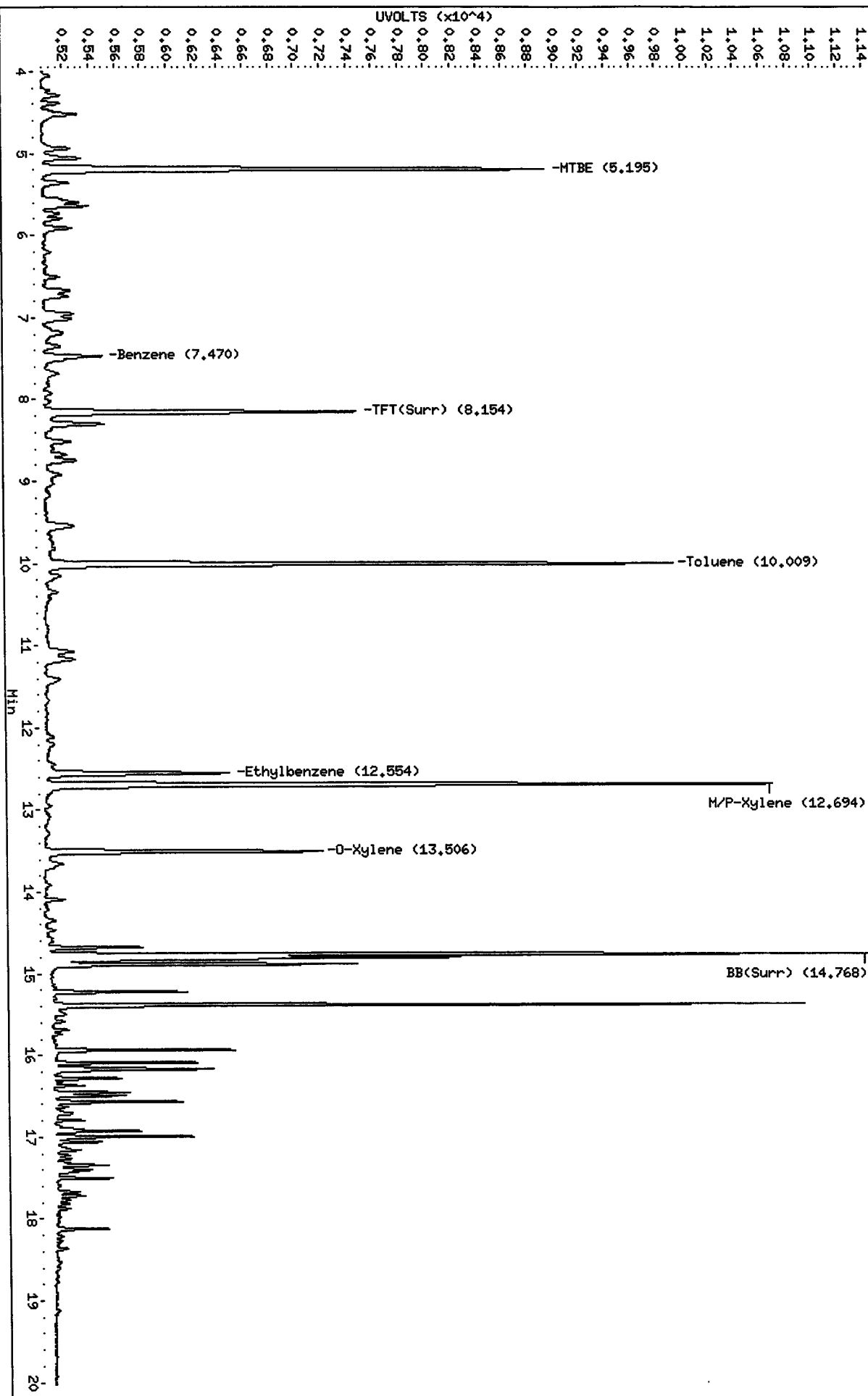
Instrument: pid2.i

Operator: MH

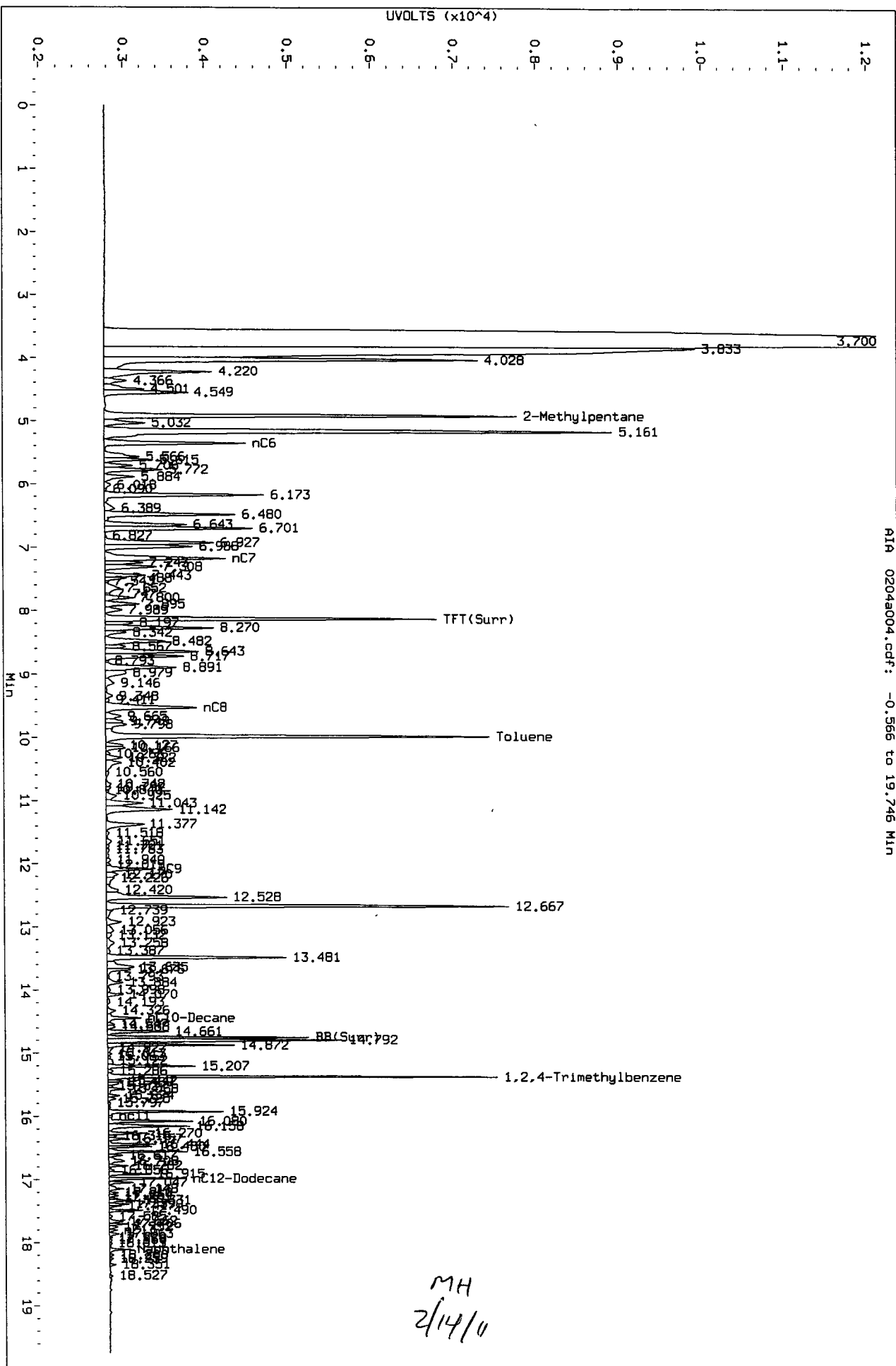
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Column phase: RTX 502-2 PID

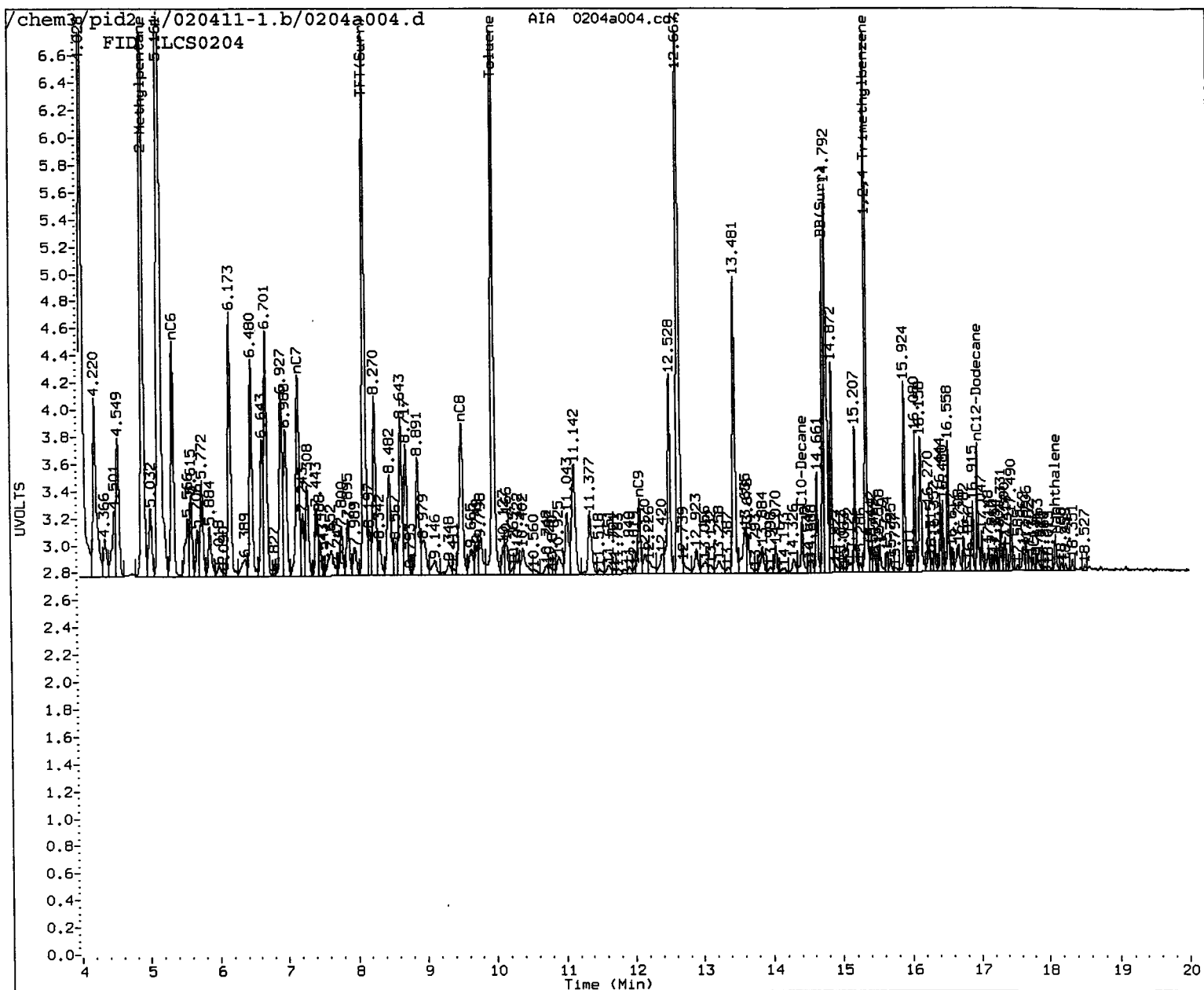
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Data File: /chem3/pid2.1/020411-1.b/0204a004.d/0204a004.cdf
Injection Date: 04-FEB-2011 06:55
Instrument: pid2.1
Client Sample ID:



SH31:00104



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: MT

Date: 2/14/0

144
2/4/11

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a005.d ARI ID: LCSD0204
Data file 2: /chem3/pid2.i/020411-2.b/0204a005.d Client ID:
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 07:23
Instrument: pid2.i Matrix: WATER
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
--	-----	-----	-----	-----	-----
8.127	-0.001	4056	53261	100.5	TFT(Surr)
14.752	-0.001	2488	21395	99.9	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
-----	----	-----	-----
WAGas Tol-C12 (9.88 to 17.08)	460088	460784	1.002 M
8015B 2MP-TMB (4.81 to 15.47)	907748	937024	1.032 M
AK101 nC6-nC10 (5.25 to 14.35)	626837	648183	1.034 M
NWTPHG Tol-Nap (9.88 to 18.21)	481270	486497	1.011 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
--	-----	-----	-----	-----
8.155	-0.002	2432	100.7	TFT(Surr)
14.769	-0.001	6541	98.6	BB(Surr)

SW8021 (PID)

RT	Shift	Response	Amount	Compound
--	-----	-----	-----	-----
7.470	0.002	434	2.78	Benzene
10.009	-0.002	4817	29.83	Toluene
12.555	-0.003	1405	9.30	Ethylbenzene
12.694	0.000	5569	34.67	M/P-Xylene
13.507	-0.002	2130	14.60	O-Xylene
5.194	0.003	3813	92.89	MTBE

A Indicates Peak Area was used for quantitation instead of Height
N Indicates peak peak was manually integrated

Data File: /chem3/pid2.i/020411-1.b/0204s005.d

Date : 04-FEB-2011 07:23

Client ID:

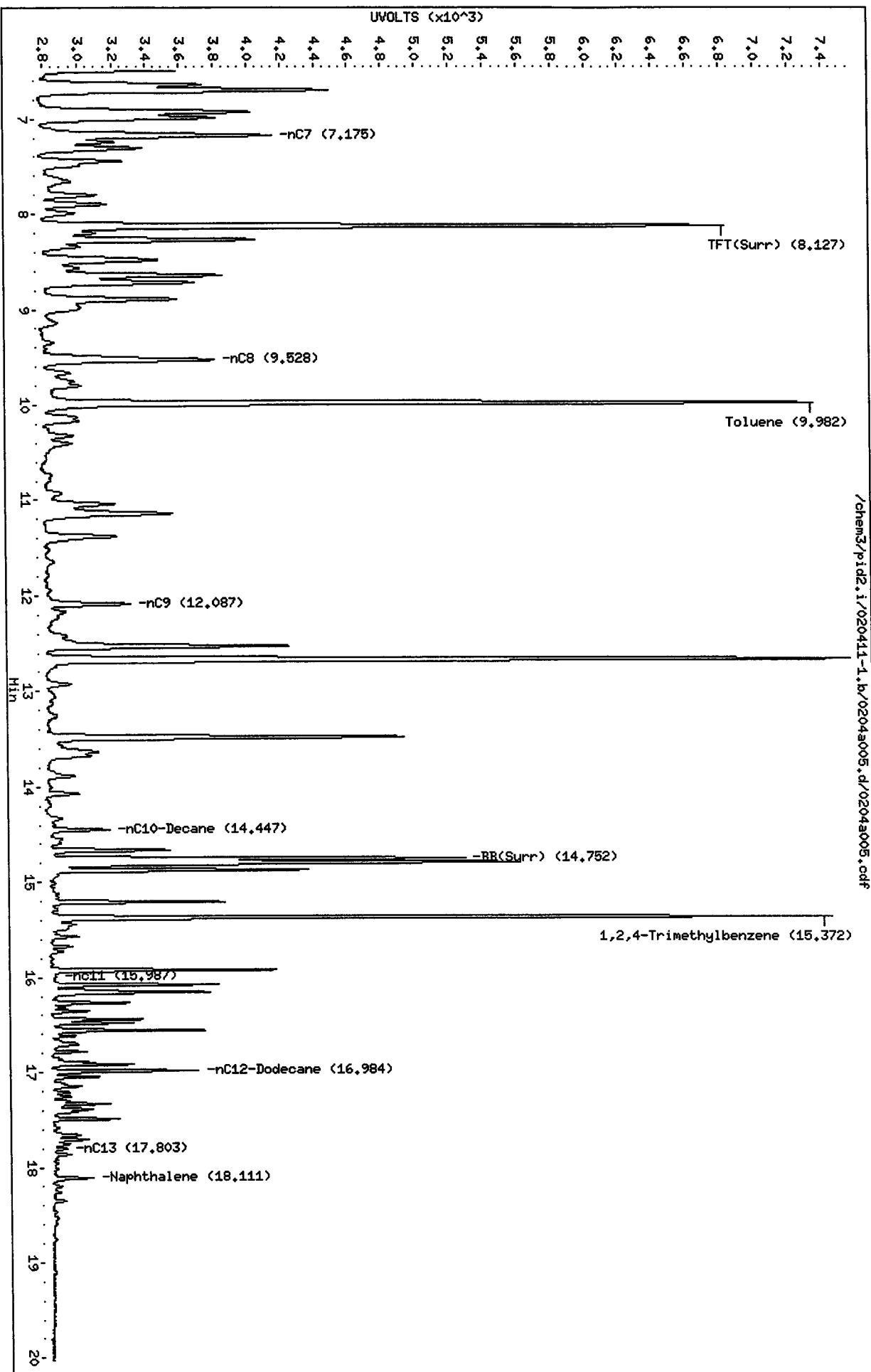
Sample Info: LCSD0204

Column phase: RTX 502-2 FID

Instrument: pid2.i

Operator: HH

Column diameter: 0.18



Data File: /chem3/pid2.i/020411-2.b/0204a005.d

Date : 04-FEB-2011 07:23

Client ID:

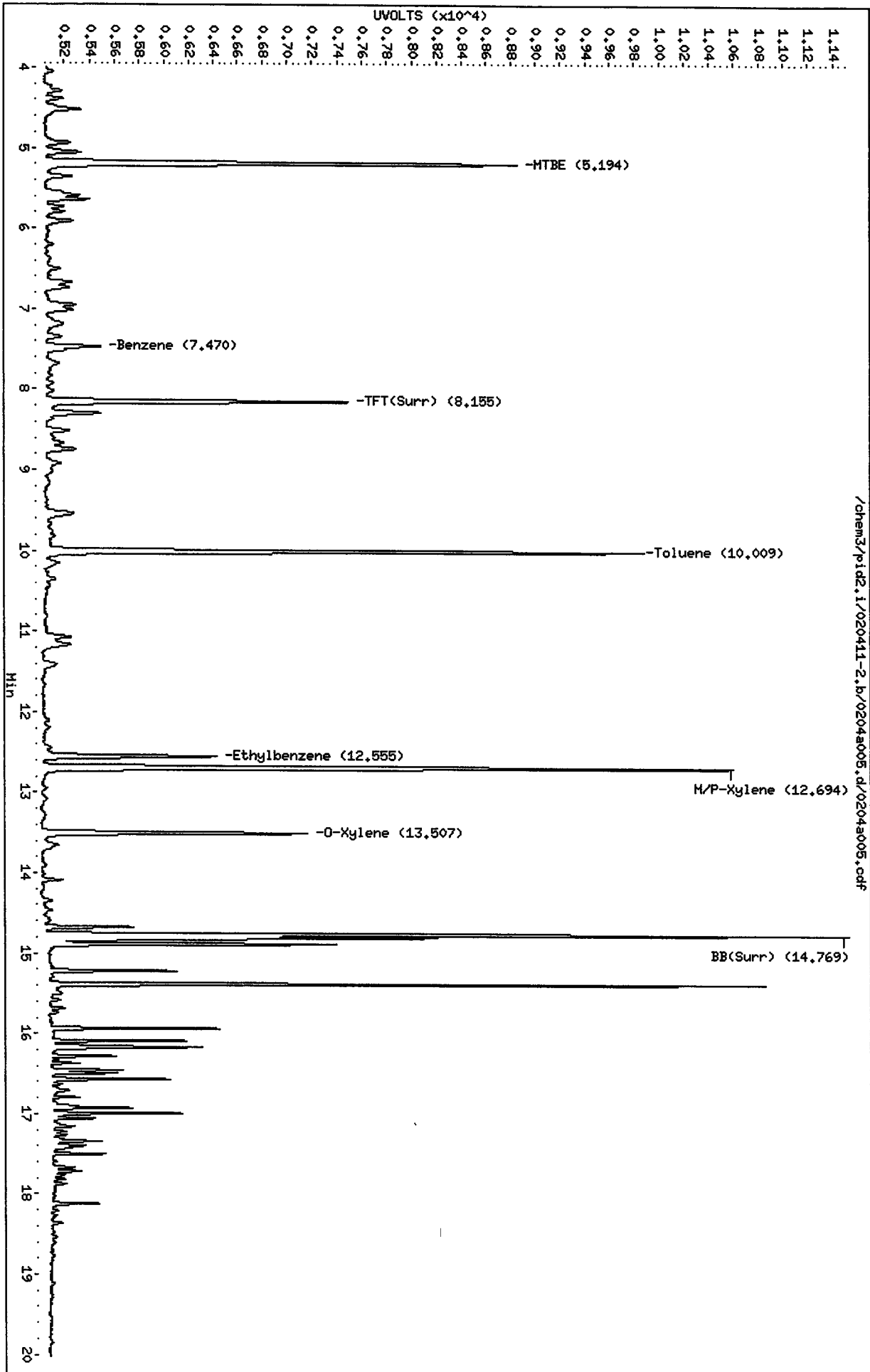
Sample Info: LCSD0204

Column phase: RTX 502-2 PID

Instrument: pid2.i

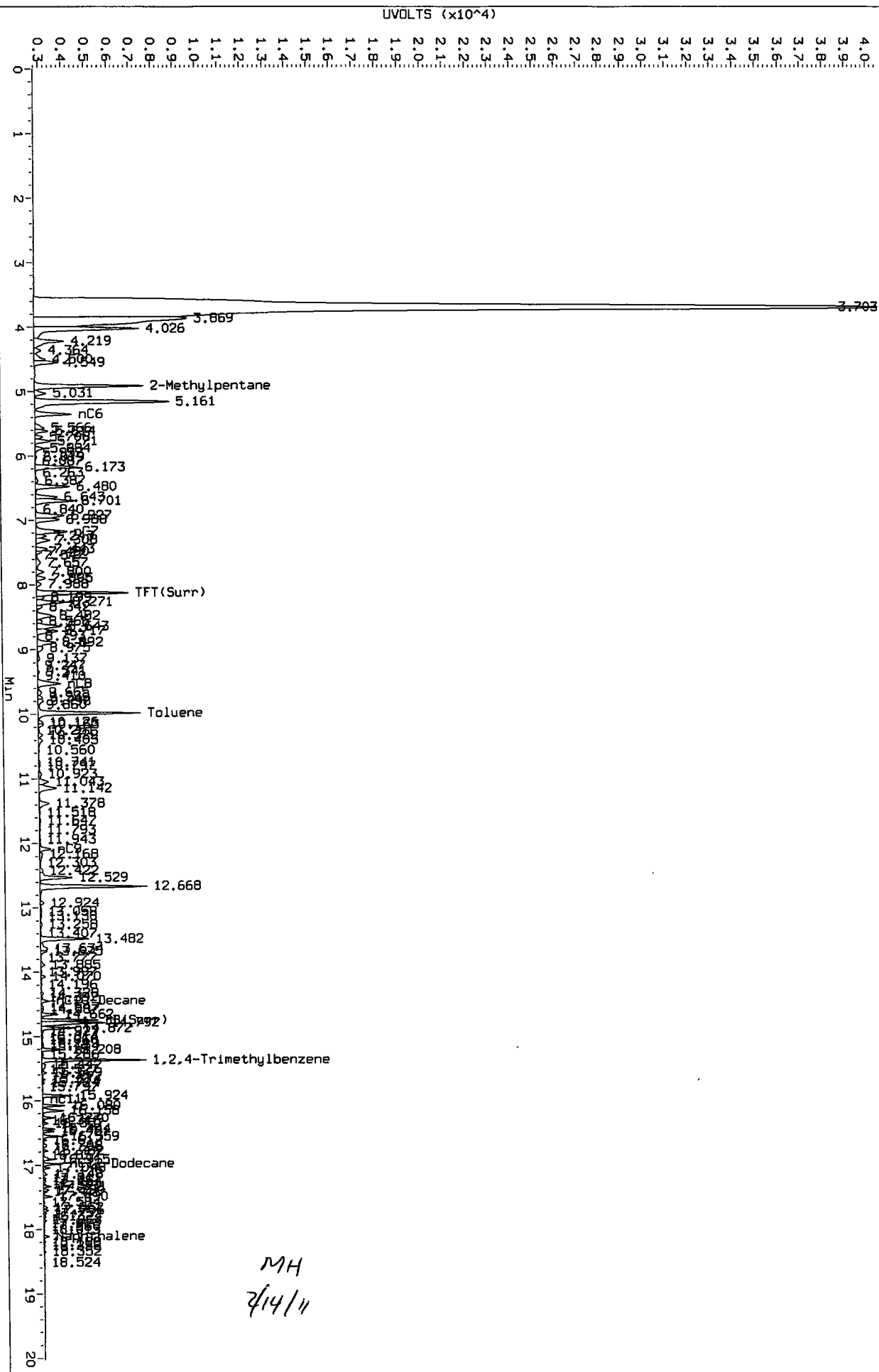
Operator: MH

Column diameter: 0.18



Data File: /chem3/pid2.1/020411-1.b/0204a005.d/0204a005.cdf
 Injection Date: 04-FEB-2011 07:23
 Instrument: pid2.1
 Client Sample ID:

AIA 0204a005.cdf: 0.000 to 20.023 Min



MH
 2/14/11

ORGANICS ANALYSIS DATA SHEET

BETX by Method SW8021BMod

TPHG by Method NWTPHG

Page 1 of 1

Sample ID: MB-020411

METHOD BLANK

Lab Sample ID: MB-020411

LIMS ID: 11-2252

Matrix: Soil

Data Release Authorized:

Reported: 02/14/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

Event: JI1001

Date Sampled: NA

Date Received: NA

Date Analyzed: 02/04/11 07:51

Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL

Sample Amount: 100 mg-dry-wt

CAS Number	Analyte	RL	Result
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	GAS ID ---
-----------------------------	-----	---------	---------------

BETX Surrogate Recovery

Trifluorotoluene	99.1%
Bromobenzene	95.7%

Gasoline Surrogate Recovery

Trifluorotoluene	97.5%
Bromobenzene	95.7%

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.

Analytical Resources Inc.
BETX/Gas Quantitation Report

Data file 1: /chem3/pid2.i/020411-1.b/0204a006.d ARI ID: MB0204
Data file 2: /chem3/pid2.i/020411-2.b/0204a006.d Client ID:
Method: /chem3/pid2.i/020411-2.b/PIDB.m Injection Date: 04-FEB-2011 07:51
Instrument: pid2.i Matrix: WATER
Gas Ical Date: 27-JAN-2011 Dilution Factor: 1.000
BETX Ical Date: 27-JAN-2011

FID Surrogates

RT	Shift	Height	Area	%Rec	Compound
--	----	-----	-----	-----	-----
8.126	-0.002	3935	50032	97.5	TFT(Surr)
14.751	-0.002	2383	19855	95.7	BB(Surr)

PETROLEUM HYDROCARBONS (FID)

Range	RF	Total Area*	Amount
WAGas Tol-C12 (9.88 to 17.08)	460088	902	0.002
8015B 2MP-TMB (4.81 to 15.47)	907748	504	0.001
AK101 nC6-nC10 (5.25 to 14.35)	626837	0	0.000
NWTPHG Tol-Nap (9.88 to 18.21)	481270	902	0.002

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
--	----	-----	-----	-----
8.154	-0.002	2393	99.1	TFT(Surr)
14.767	-0.002	6350	95.7	BB(Surr)

SW8021 (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/pid2.i/020411-1.b/0204s006.d

Date : 04-FEB-2011 07:51

Client ID:

Sample Info: MB0204

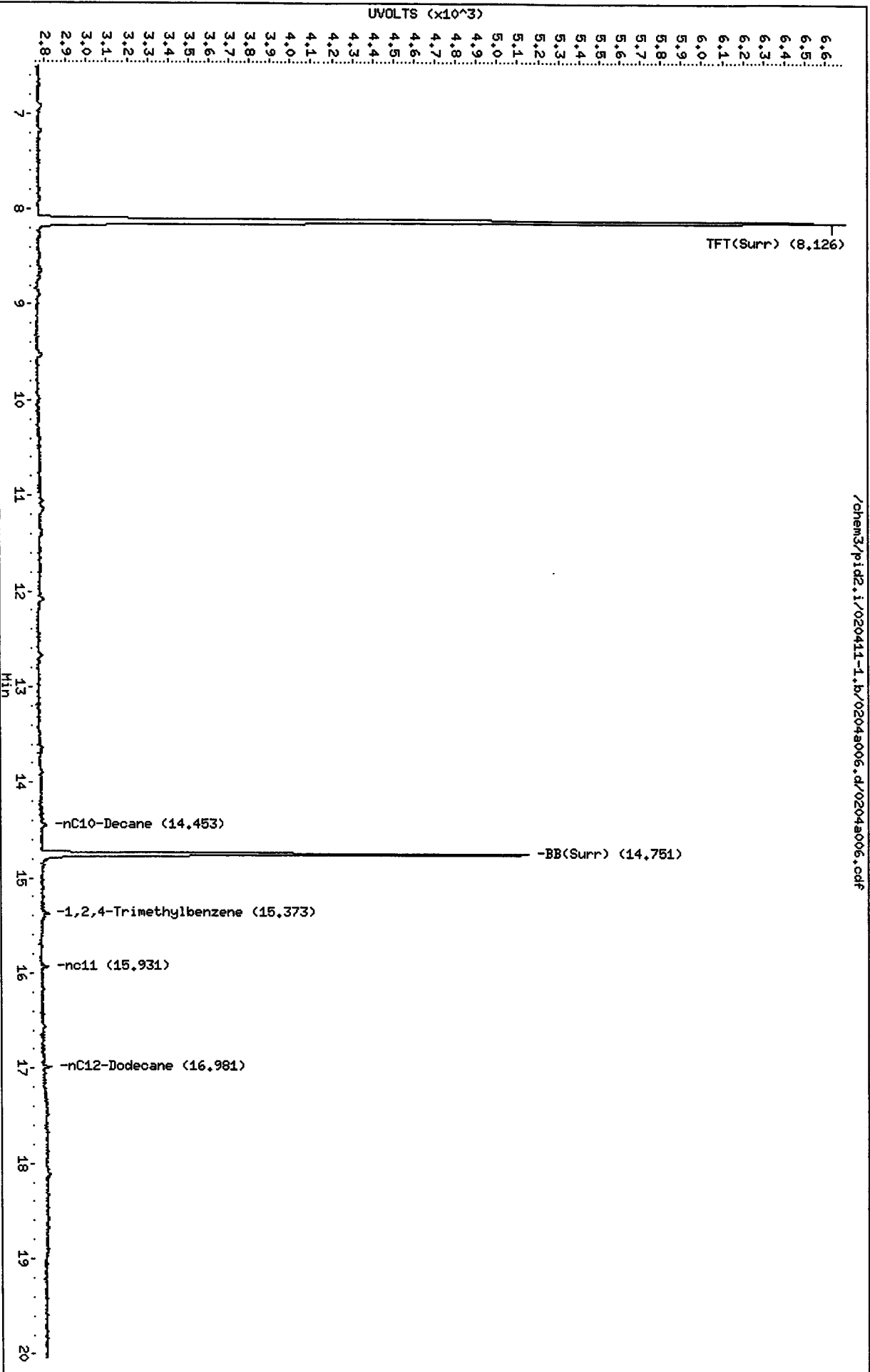
Column phase: RTX 502-2 FID

Instrument: pid2.i

Operator: MH

Column diameter: 0.18

Page 1



020411-00115

Data File: /chem3/pid2.i/020411-2.b/0204a006.d

Date : 04-FEB-2011 07:51

Client ID:

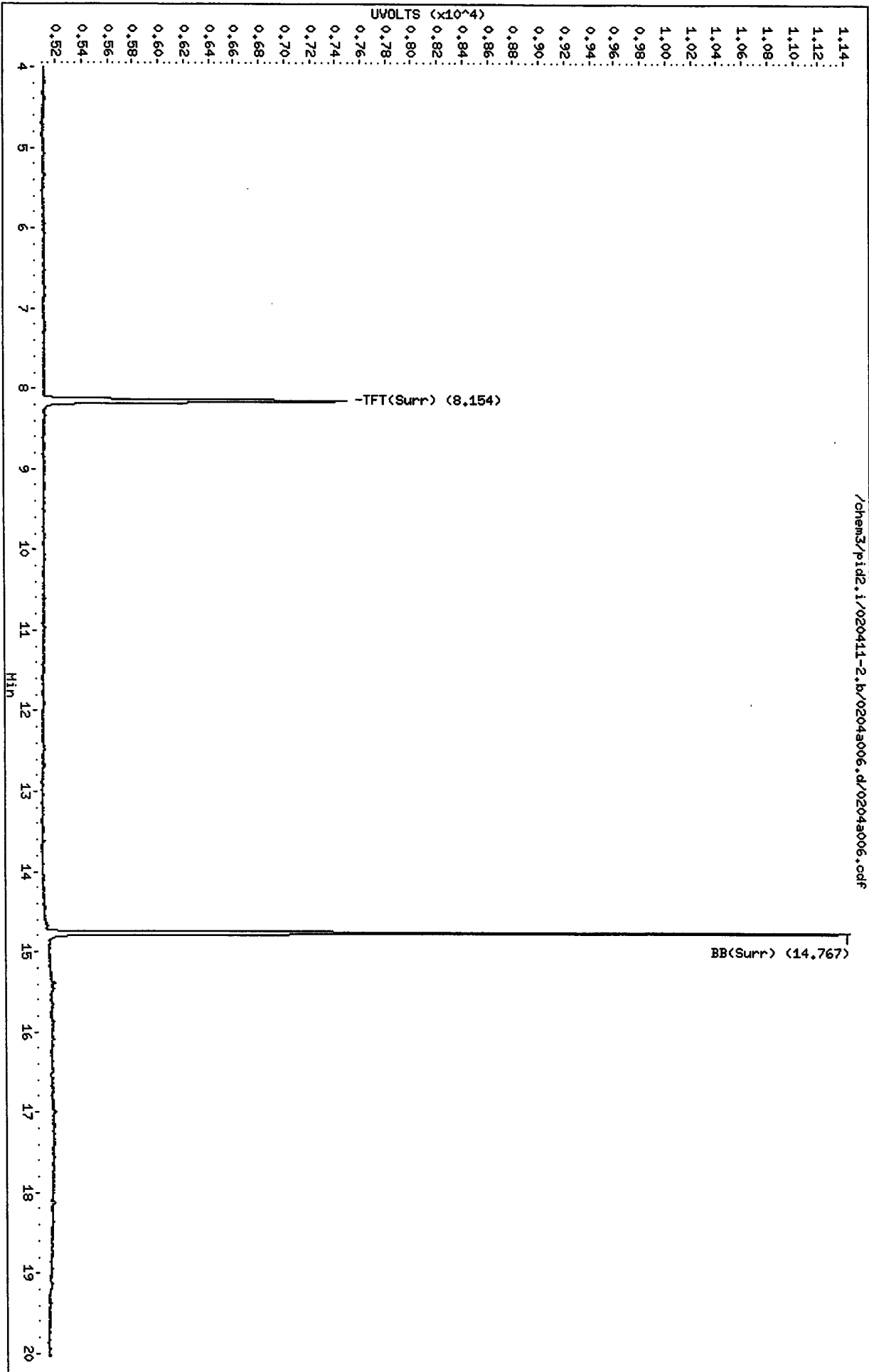
Sample Info: MB0204

Column phase: RTX 502-2 PID

Instrument: pid2.i

Operator: HH

Column diameter: 0.18



**ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS**

NWTPHD by GC/FID

Page 1 of 1

Matrix: Soil

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

J11001

Date Received: 02/02/11

Data Release Authorized:

Reported: 02/10/11

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
SH31A 11-2250	B11-16-25 HC ID: ---	02/03/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.6 11	< 5.6 U < 11 U 114%
SH31B 11-2251	B11-16-30 HC ID: ---	02/03/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.0 10	< 5.0 U < 10 U 116%
SH31C 11-2252	B11-17-10 HC ID: DIESEL/MOTOR OIL	02/03/11	02/09/11 FID3B	1.00 10	Diesel Motor Oil o-Terphenyl	56 110	2,500 120 NR
SH31D 11-2253	B11-17-15 HC ID: DIESEL	02/03/11	02/10/11 FID9	1.00 25	Diesel Motor Oil o-Terphenyl	130 260	2,000 < 260 U 85.0%
SH31E 11-2254	B11-17-20 HC ID: DIESEL	02/03/11	02/10/11 FID9	1.00 5.0	Diesel Motor Oil o-Terphenyl	26 53	440 < 53 U 105%
SH31F 11-2255	B11-17-25 HC ID: DIESEL	02/03/11	02/10/11 FID9	1.00 5.0	Diesel Motor Oil o-Terphenyl	29 57	270 < 57 U 101%
MB-020311 11-2256	Method Blank HC ID: ---	02/03/11	02/08/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.0 10	< 5.0 U < 10 U 111%
SH31G 11-2256	B11-17-30 HC ID: DIESEL/MOTOR OIL	02/03/11	02/09/11 FID3B	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.7 12	190 13 108%

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.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110208.b/0207b052.d
Method: /chem3/fid3b.i/20110208.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/10/2011
Macro: FID:3B020711

ARI ID: SH31A
Client ID: B11-16-25
Injection: 08-FEB-2011 23:16
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.233	-0.005	25516	29435	GAS (Tol-C12)	320232	20
C8	1.317	-0.003	8953	4588	DIESEL (C12-C24)	77639	8
C10	1.908	-0.003	2625	3409	M.OIL (C24-C38)	89235	15
C12	2.662	0.009	786	345	AK-102 (C10-C25)	156554	14
C14	3.373	-0.001	961	994	AK-103 (C25-C36)	76699	9
C16	4.035	-0.001	523	451	OR.DIES (C10-C28)	179557	7
C18	4.659	-0.006	373	362	OR.MOIL (C28-C40)	73313	7
C20	5.261	-0.005	246	199	MIN.OIL (C24-C38)	89235	14
C22	5.833	-0.001	131	23	STODDARD (C8-C12)	231314	8
C24	6.350	-0.013	606	796			
C25	6.607	-0.010	604	621			
C26	6.858	-0.009	694	1124			
C28	7.369	-0.013	1031	1642			
C32	8.426	-0.016	1236	1614			
C34	8.962	-0.003	391	274	CREOSOT (C8-C22)	72464	11
Filter Peak	11.135	0.001	316	190			
C36	9.478	0.004	321	68	BUNKERC (C10-C38)	243287	29
o-terph	4.823	-0.004	737154	490877	JET-A (C10-C18)	142176	28
Triacon Surr	7.909	-0.010	436839	414227	IT.MOIL (C24-C40)	513045	24

Range Times: NW Diesel(2.703 - 6.413) NW Gas(1.188 - 2.703) NW M.Oil(6.413 - 10.015)
AK102(1.861 - 6.567) AK103(6.567 - 9.524) Jet A(1.861 - 4.715)

Surrogate	Area	Amount	%Rec
o-Terphenyl	490877	51.3	114.1
Triacontane	414227	55.2	122.6

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

2/27/11

Data File: /chem3/fid3b.i/20110208.b/0207b052.d

Date : 08-FEB-2011 23:16

Client ID: B41-16-25

Sample Info: SH31A

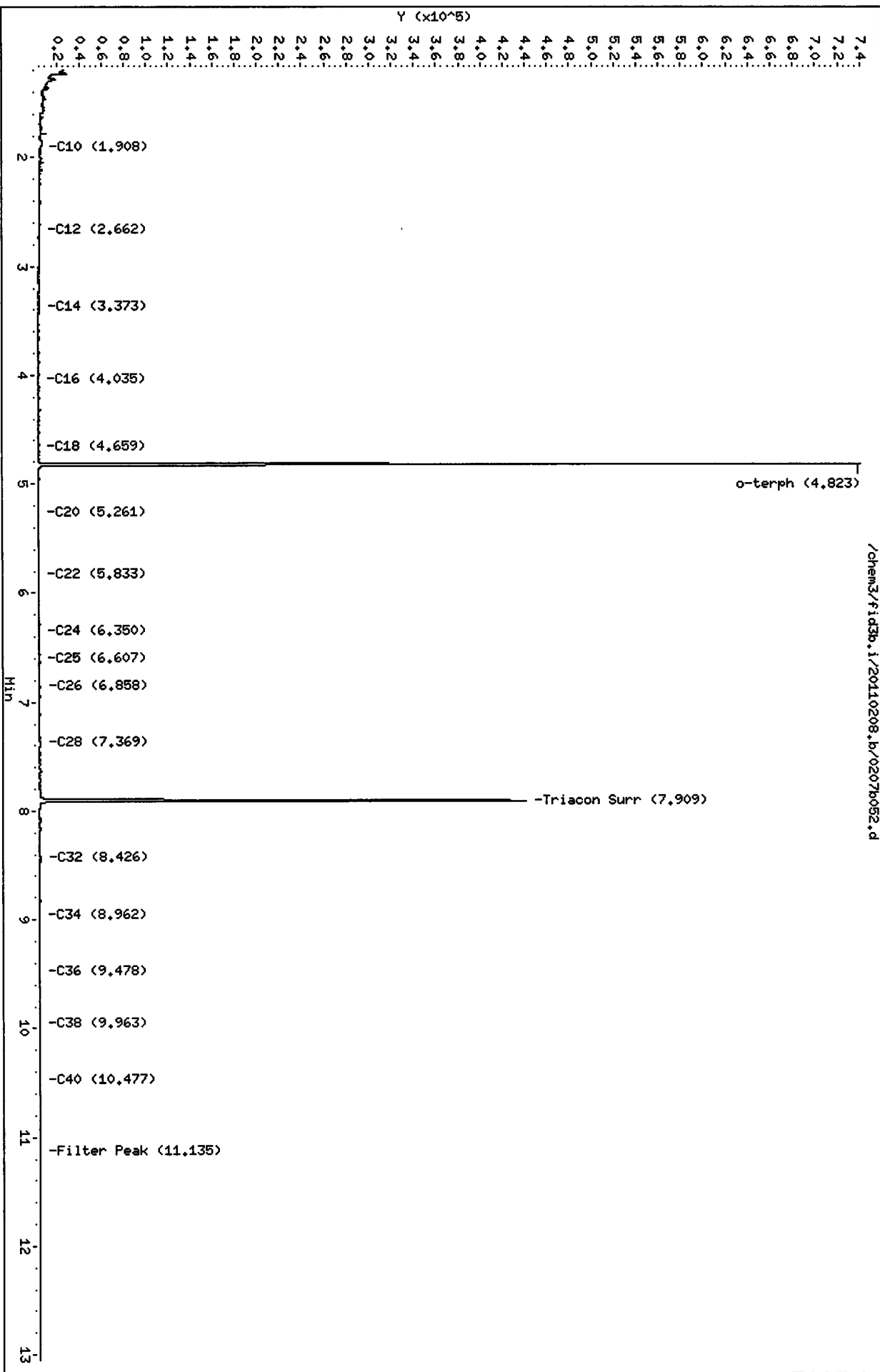
Column phase: RTX-1

Instrument: fid3b.i

Operator: HS

Column diameter: 0.25

Page 1



Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110208.b/0207b053.d
Method: /chem3/fid3b.i/20110208.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/10/2011
Macro: FID:3B020711

ARI ID: SH31B
Client ID: B11-16-30
Injection: 08-FEB-2011 23:38
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.234	-0.004	26857	31656	GAS (Tol-C12)	367442	23
C8	1.312	-0.007	9577	5711	DIESEL (C12-C24)	105843	11
C10	1.905	-0.006	3153	3010	M.OIL (C24-C38)	21368	4
C12	2.655	0.002	1016	161	AK-102 (C10-C25)	212311	20
C14	3.371	-0.004	1406	1447	AK-103 (C25-C36)	15018	2
C16	4.033	-0.002	650	585	OR.DIES (C10-C28)	216286	9
C18	4.659	-0.006	398	341	OR.MOIL (C28-C40)	25907	2
C20	5.261	-0.005	204	194	MIN.OIL (C24-C38)	21368	3
C22	5.828	-0.005	99	52	STODDARD (C8-C12)	275485	10
C24	6.375	0.012	34	17			
C25	6.606	-0.011	107	72			
C26	6.863	-0.004	356	312			
C28	7.395	0.013	2323	1750			
C32	8.425	-0.016	689	728			
C34	8.965	0.000	89	22	CREOSOT (C8-C22)	104426	16
Filter Peak	11.143	0.010	414	219			
C36	9.475	0.001	170	76	BUNKERC (C10-C38)	233283	27
o-terph	4.823	-0.004	734555	500957	JET-A (C10-C18)	202293	39
Triacon Surr	7.906	-0.012	443629	421134	IT.MOIL (C24-C40)	451412	21

Range Times: NW Diesel(2.703 - 6.413) NW Gas(1.188 - 2.703) NW M.Oil(6.413 - 10.015)
AK102(1.861 - 6.567) AK103(6.567 - 9.524) Jet A(1.861 - 4.715)

Surrogate	Area	Amount	%Rec
o-Terphenyl	500957	52.4	116.4
Triacontane	421134	56.1	124.7

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Handwritten signature/initials

Data File: /chem3/fid3b.i/20110208.b/0207b053.d

Page 1

Date : 08-FEB-2011 23:38

Client ID: B11-16-30

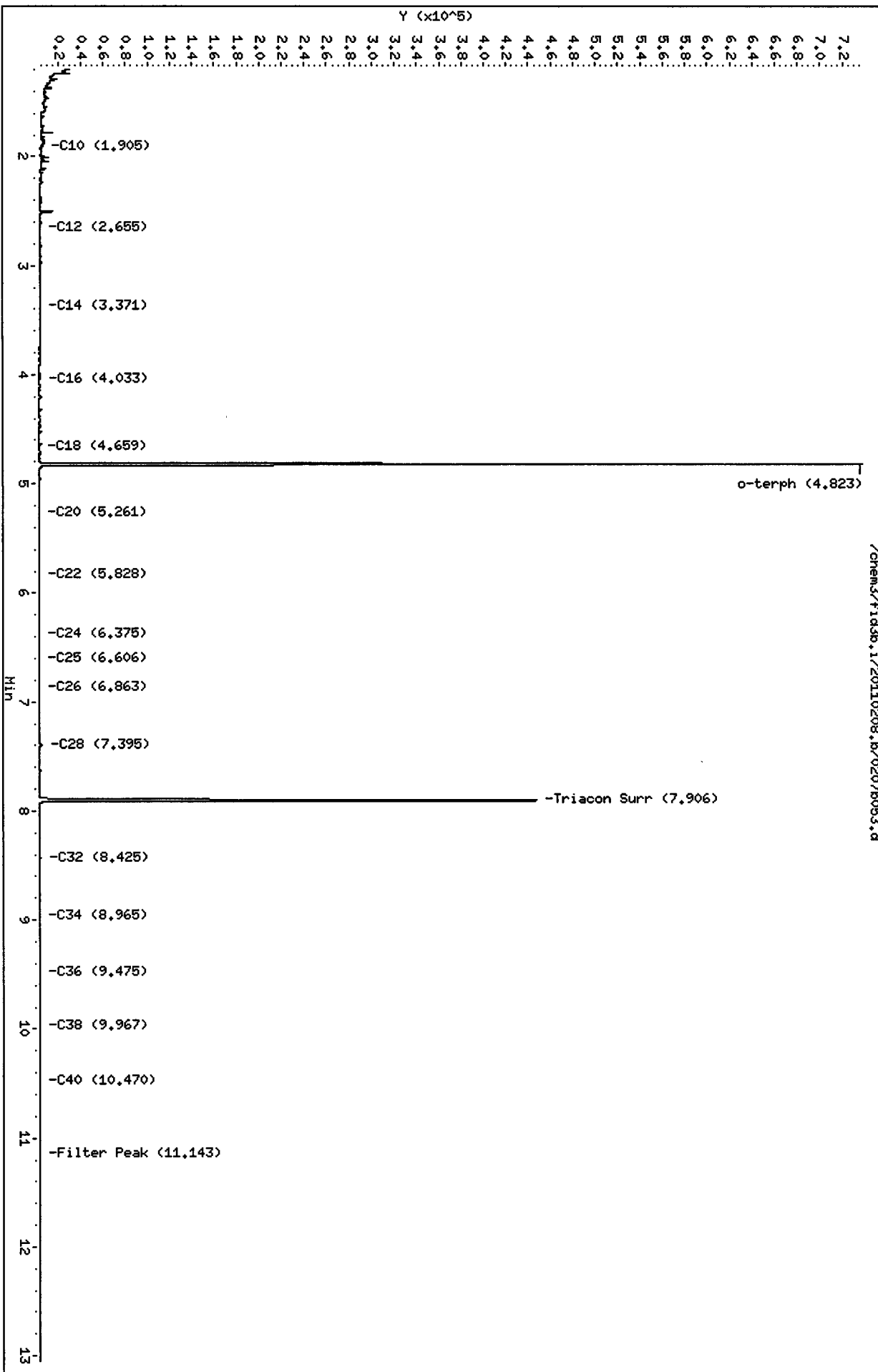
Sample Info: SH31B

Instrument: fid3b.i

Operator: HS

Column diameter: 0.25

Column phase: RTX-1



SH31-00110

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110208.b/0207b054.d
Method: /chem3/fid3b.i/20110208.b/ftp3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/10/2011
Macro: FID:3B020711

ARI ID: SH31C
Client ID: B11-17-10
Injection: 09-FEB-2011 00:00
Dilution Factor: 10

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.235	-0.003	19361	25261	GAS (Tol-C12)	4906654	307
C8	1.313	-0.007	9851	14008	DIESEL (C12-C24)	22001280	2277
C10	1.912	0.001	66682	37064	M.OIL (C24-C38)	632307	108
C12	2.657	0.003	31567	20149	AK-102 (C10-C25)	25931692	2400 M
C14	3.366	-0.009	118677	103178	AK-103 (C25-C36)	508942	58 M
C16	4.032	-0.003	151672	97496	OR.DIES (C10-C28)	26163155	1030 M
C18	4.661	-0.004	181456	166225	OR.MOIL (C28-C40)	324005	29 M
C20	5.261	-0.005	138825	113077	MIN.OIL (C24-C38)	632307	98 M
C22	5.831	-0.002	47194	12996	STODDARD (C8-C12)	4834050	175
C24	6.365	0.001	13342	4165			
C25	6.616	-0.001	8149	2383			
C26	6.867	0.000	4791	1988			
C28	7.385	0.003	3241	1339			
C32	8.426	-0.016	2741	4238			
C34	8.964	-0.001	2095	1350	CREOSOT (C8-C22)	21297336	3330
Filter Peak	11.133	-0.001	210	125			
C36	9.476	0.002	1308	353	BUNKERC (C10-C38)	26469971	3106
o-terph	----				JET-A (C10-C18)	17777319	3447
Triacon Surr	7.893	-0.026	52284	41239	IT.MOIL (C24-C40)	690734	32

Range Times: NW Diesel(2.703 - 6.413) NW Gas(1.188 - 2.703) NW M.Oil(6.413 - 10.015)
AK102(1.861 - 6.567) AK103(6.567 - 9.524) Jet A(1.861 - 4.715)

Surrogate	Area	Amount	%Rec
o-Terphenyl	0	0.0	0.0
Triacontane	41239	5.5	122.1

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110208.b/0207b054.d

Page 1

Date : 09-FEB-2011 00:00

Client ID: B11-17-10

Sample Info: SH31C,10

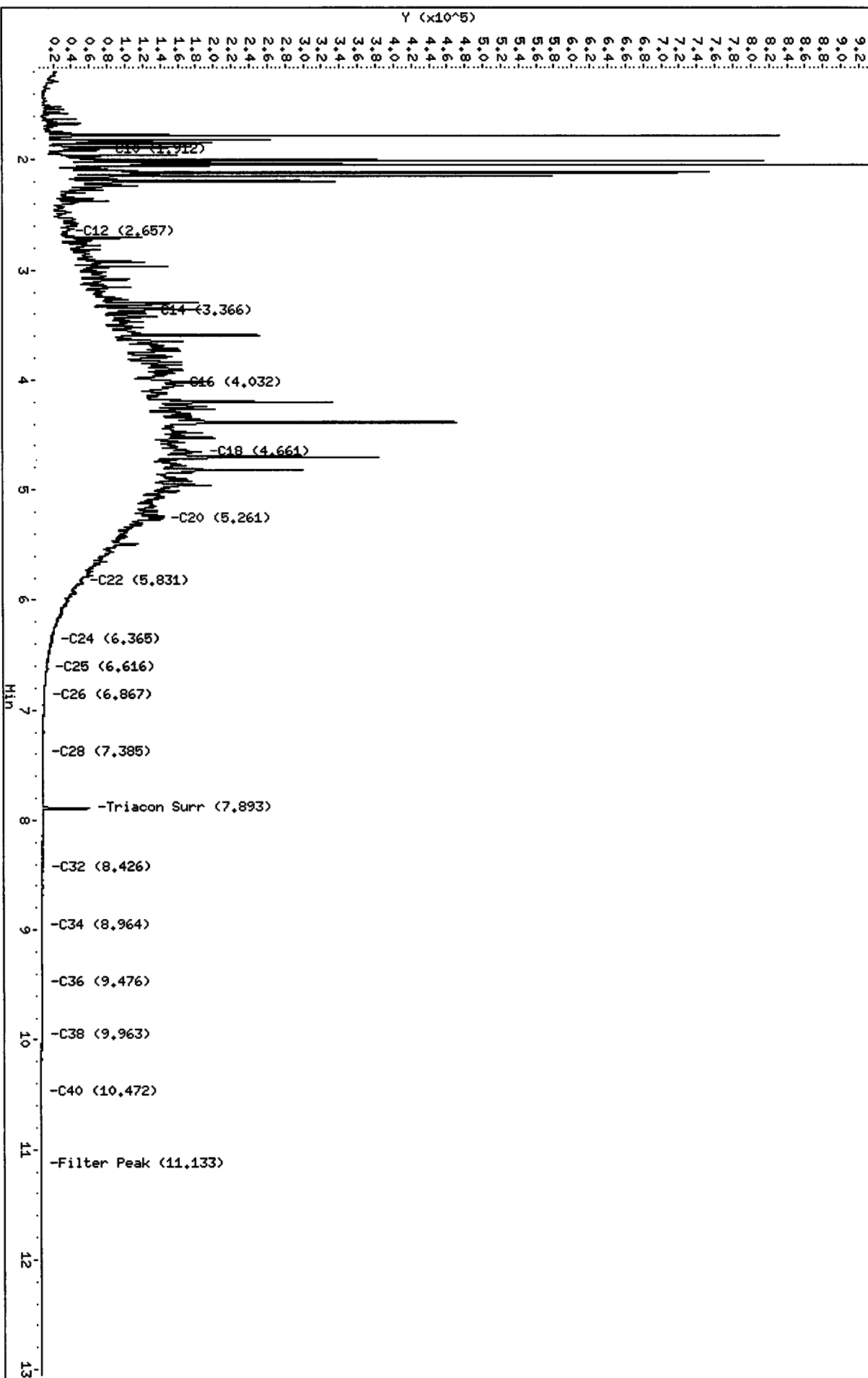
Instrument: fid3b.i

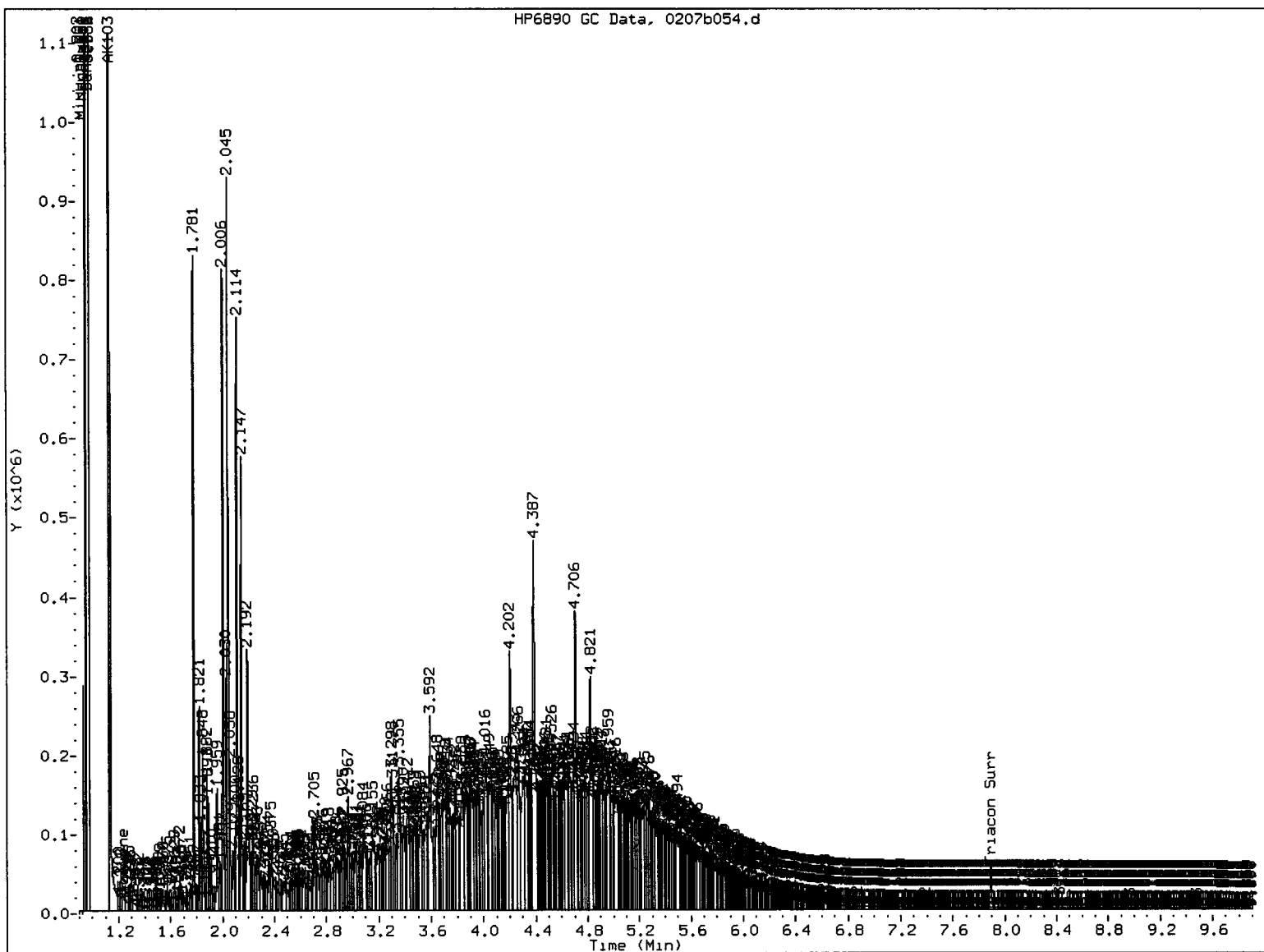
Column phase: RTX-1

Operator: HS

Column diameter: 0.25

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Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110209.B/0209A032.D
Method: /chem2/fid9.i/20110209.B/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 02/10/2011

ARI ID: SH31D
Client ID: B11-17-15
Injection: 10-FEB-2011 01:33
Dilution Factor: 25
Macro: 20-JAN-2011

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.356	-0.002	9212	12462	GAS (Tol-C12)	1016098	48
C8	1.336	0.032	3301	789	DIESEL (C12-C24)	17676705	780
C10	1.975	-0.010	5093	5851	M.OIL (C24-C38)	212477	16
C12	2.626	0.007	35939	18876	AK-102 (C10-C25)	18679012	732 M
C14	3.154	-0.001	207738	126150	AK-103 (C25-C36)	153837	18 M
C16	3.630	0.007	168123	65235			
C18	4.041	-0.001	202472	67561			
C20	4.436	0.007	175705	243477			
C22	4.818	0.000	45740	29068			
C24	5.320	0.006	9907	1938			
C25	5.534	-0.005	5366	1888			
C26	5.739	-0.001	3052	873			
C28	6.094	-0.003	1460	1068			
C32	6.690	-0.006	374	235	JP-4 (Tol-C14)	3953709	241
C34	6.977	0.013	216	61	BUNKERC (C10-C38)	18835276	2226 M
Filter Peak	----						
C36	7.228	0.007	132	103			
C38	7.473	0.007	53	41			
C40	7.732	-0.002	87	60			
o-terph	4.154	-0.007	96642	32671	JET-A (C10-C18)	12753836	923
Triacon Surr	6.401	-0.018	77126	40682	JP8 (Tol-C16)	8000361	455

M Indicates manual integration within range.

Range Times: NW Diesel(2.619 - 5.314) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.31 - 7.47) AK103(5.54 - 7.22) OR Diesel(1.99 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	32671	1.5	84.7
Triacontane	40682	2.3	128.2

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

Data File: /chem2/fid9.i/20110209.B/02094032.D

Date : 10-FEB-2011 01:33

Client ID: B11-17-15

Sample Info: SH31D/25

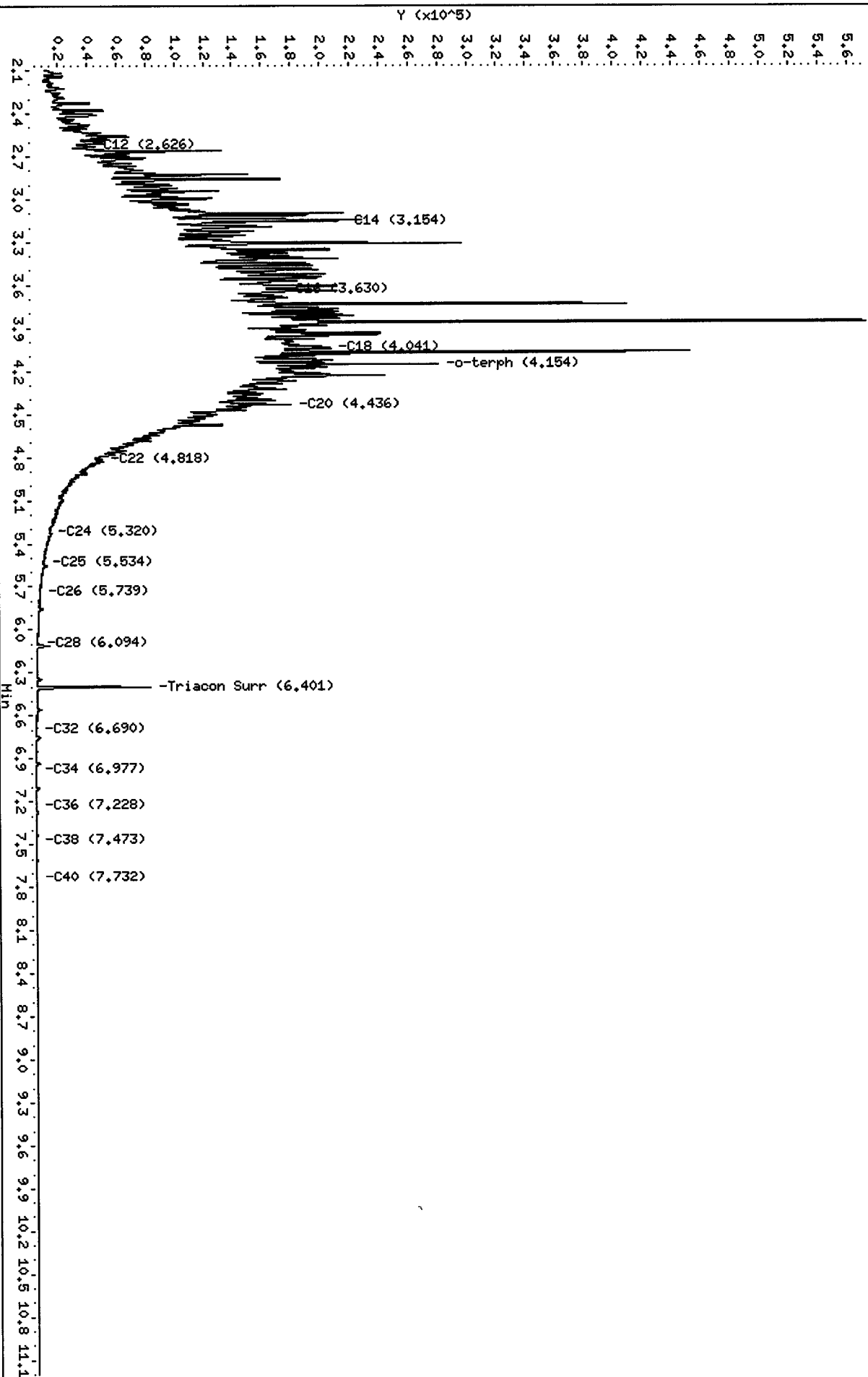
Column phase: RTX-1

Instrument: fid9.i

Operator: HS

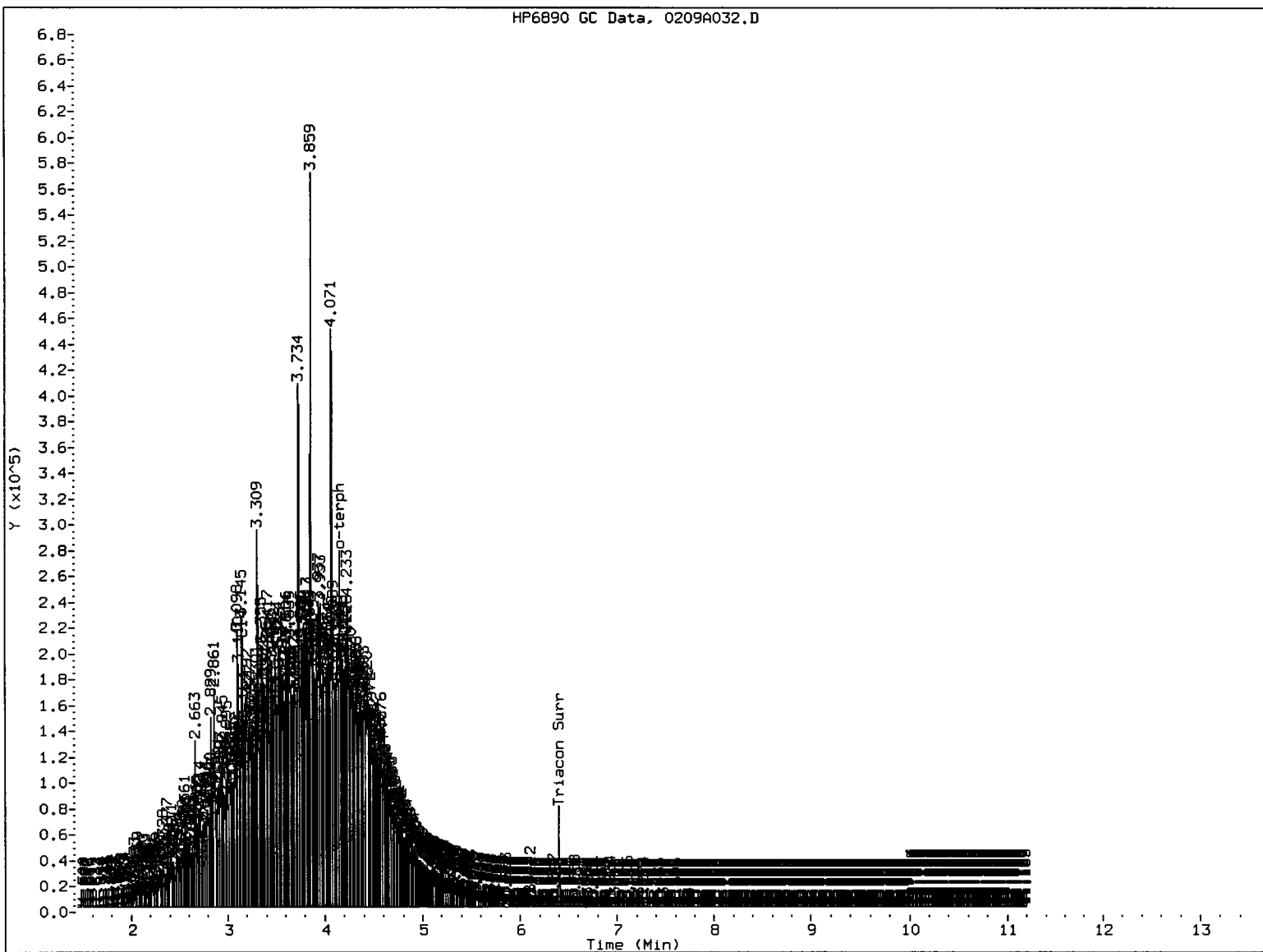
Column diameter: 0.25

/chem2/fid9.i/20110209.B/02094032.D



SH31 00124

HP6890 GC Data, 0209A032.D



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst:

Date:

Analytical Resources Inc.
NWTPH Quantitation Report

Data file: /chem2/fid9.i/20110209.B/0209A033.D
Method: /chem2/fid9.i/20110209.B/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 02/10/2011

ARI ID: SH31E
Client ID: B11-17-20
Injection: 10-FEB-2011 01:54
Dilution Factor: 5
Macro: 20-JAN-2011

FID:9 RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.358	0.000	8077	6509	GAS (Tol-C12)	576386	27
C8	1.350	0.046	6061	3869	DIESEL (C12-C24)	18778527	829
C10	1.982	-0.003	1290	1387	M.OIL (C24-C38)	311251	23
C12	2.625	0.006	25631	14359	AK-102 (C10-C25)	19368101	759 M
C14	3.152	-0.003	172423	76799	AK-103 (C25-C36)	241286	28 M
C16	3.627	0.004	170938	33676			
C18	4.041	-0.001	240917	330369			
C20	4.428	0.000	187366	130542			
C22	4.822	0.004	51568	13153			
C24	5.310	-0.005	12769	7121			
C25	5.537	-0.002	6745	1588			
C26	5.734	-0.006	4284	3745			
C28	6.092	-0.005	2894	2329			
C32	6.700	0.004	999	604	JP-4 (Tol-C14)	3148715	192
C34	6.969	0.005	695	278	BUNKERC (C10-C38)	19615469	2319 M
Filter Peak	----						
C36	7.221	0.000	451	431			
C38	7.459	-0.007	259	213			
C40	7.740	0.006	66	38			
o-terph	4.156	-0.005	456039	202861	JET-A (C10-C18)	12596271	912
Triacon Surr	6.403	-0.016	352487	191952	JP8 (Tol-C16)	7366898	419

M Indicates manual integration within range.

Range Times: NW Diesel(2.619 - 5.314) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.31 - 7.47) AK103(5.54 - 7.22) OR Diesel(1.99 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	202861	9.5	105.2
Triacontane	191952	10.9	121.0

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

Data File: /chem2/fid9.i/20110209.B/02090033.D

Date : 10-FEB-2011 01:54

Client ID: B11-17-20

Sample Info: SH31E,5

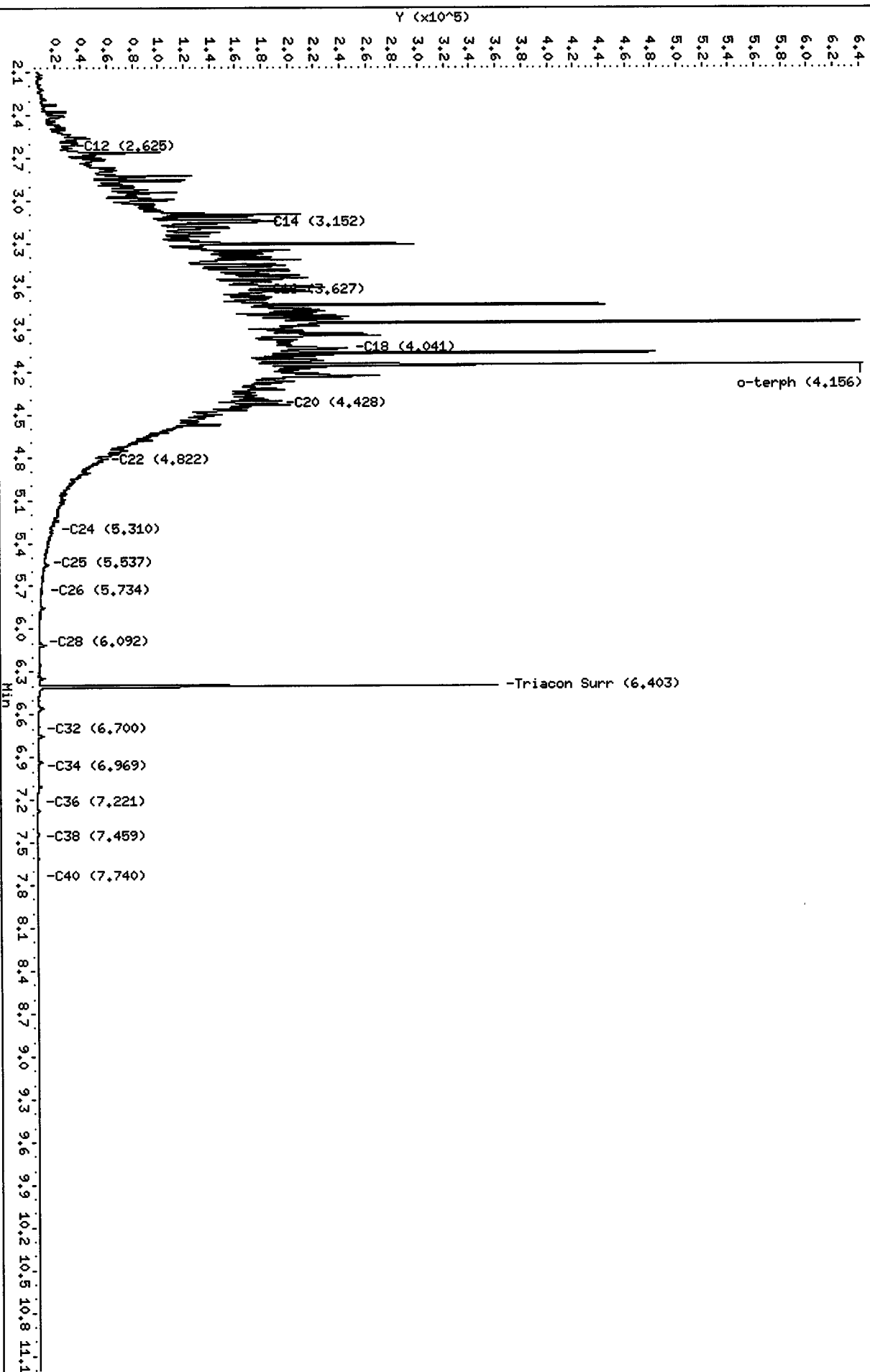
Column phase: RTX-1

Instrument: fid9.i

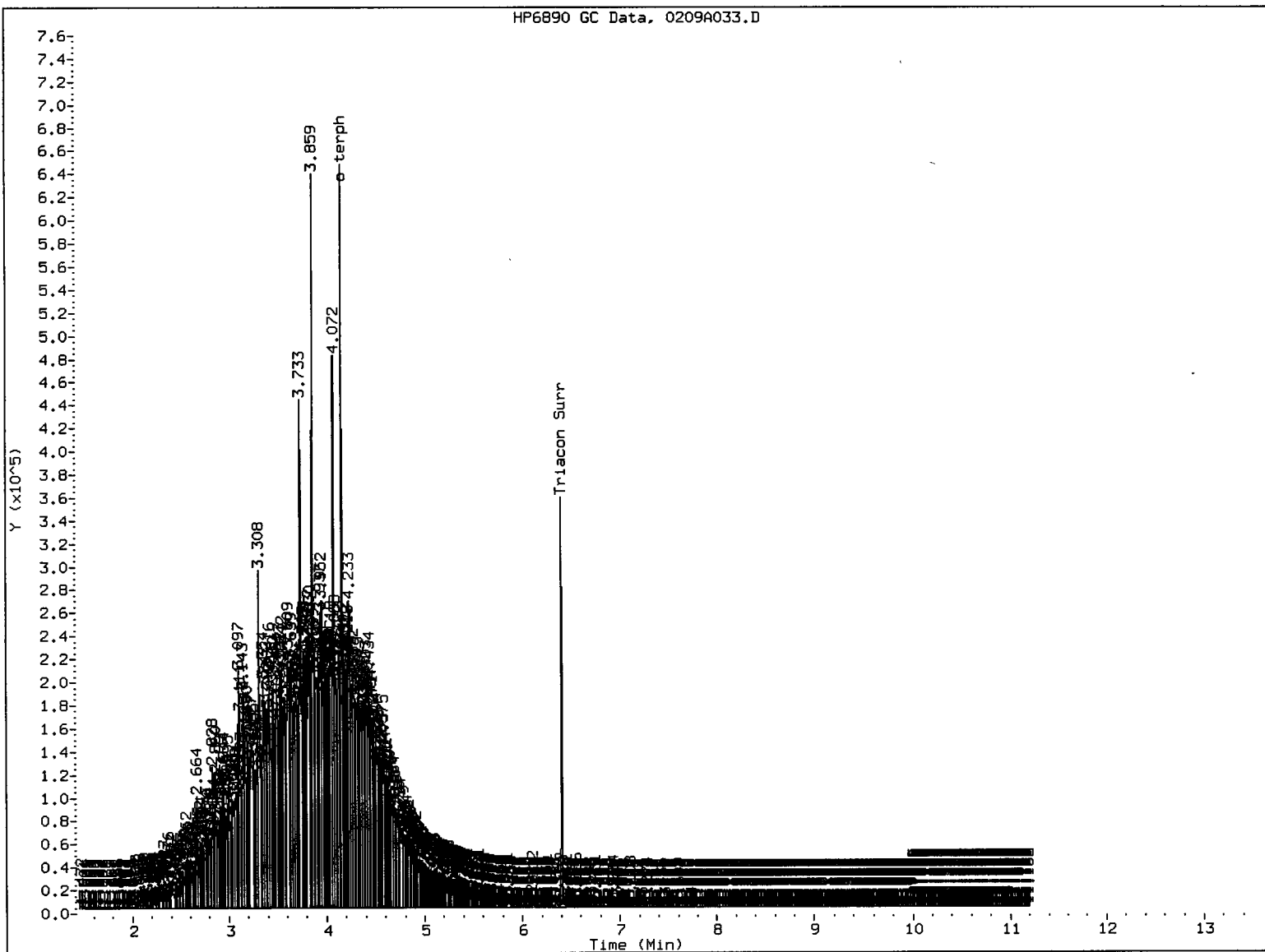
Operator: HS

Column diameter: 0.25

/chem2/fid9.i/20110209.B/02090033.D



HP6890 GC Data, 0209A033.D



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: AKDate: 2/12/86

Analytical Resources Inc.
NWT PH Quantitation Report

Data file: /chem2/fid9.i/20110209.B/0209A034.D
Method: /chem2/fid9.i/20110209.B/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 02/10/2011

ARI ID: SH31F
Client ID: B11-17-25
Injection: 10-FEB-2011 02:16
Dilution Factor: 5
Macro: 20-JAN-2011

FID:9 RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.359	0.002	11497	10717	GAS (Tol-C12)	392365	19
C8	1.335	0.031	3469	1840	DIESEL (C12-C24)	10853415	479
C10	1.985	-0.001	3642	3486	M.OIL (C24-C38)	370164	28
C12	2.615	-0.004	15343	13505	AK-102 (C10-C25)	11233245	440 M
C14	3.153	-0.002	60236	42645	AK-103 (C25-C36)	303680	36 M
C16	3.621	-0.001	113529	53741			
C18	4.043	0.001	130098	28288			
C20	4.433	0.005	110002	101420			
C22	4.819	0.001	33727	10588			
C24	5.310	-0.004	10213	9008			
C25	5.537	-0.002	6840	3023			
C26	5.740	0.000	5204	1725			
C28	6.095	-0.002	4447	2756			
C32	6.709	0.013	1214	309	JP-4 (Tol-C14)	1627886	99
C34	6.970	0.006	616	142	BUNKERC (C10-C38)	11539311	1364 M
Filter Peak	----						
C36	7.225	0.005	324	176			
C38	7.465	-0.001	84	42			
C40	7.734	0.000	41	23			
o-terph	4.155	-0.005	468128	194846	JET-A (C10-C18)	6971740	505
Triacon Surr	6.404	-0.015	367490	190847	JP8 (Tol-C16)	4017510	228

M Indicates manual integration within range.

Range Times: NW Diesel(2.619 - 5.314) AK102(1.99 - 5.54) Jet A(1.99 - 4.04)
NW M.Oil(5.31 - 7.47) AK103(5.54 - 7.22) OR Diesel(1.99 - 6.10)

Surrogate	Area	Amount	%Rec
o-Terphenyl	194846	9.1	101.1
Triacontane	190847	10.8	120.3

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	8460.3	18-SEPT-2010
JP-8	17594.0	25-MAY-2010

Data File: /chem2/fid9.i/20110209.B/0209A034.D

Date : 10-FEB-2011 02:16

Client ID: B11-17-25

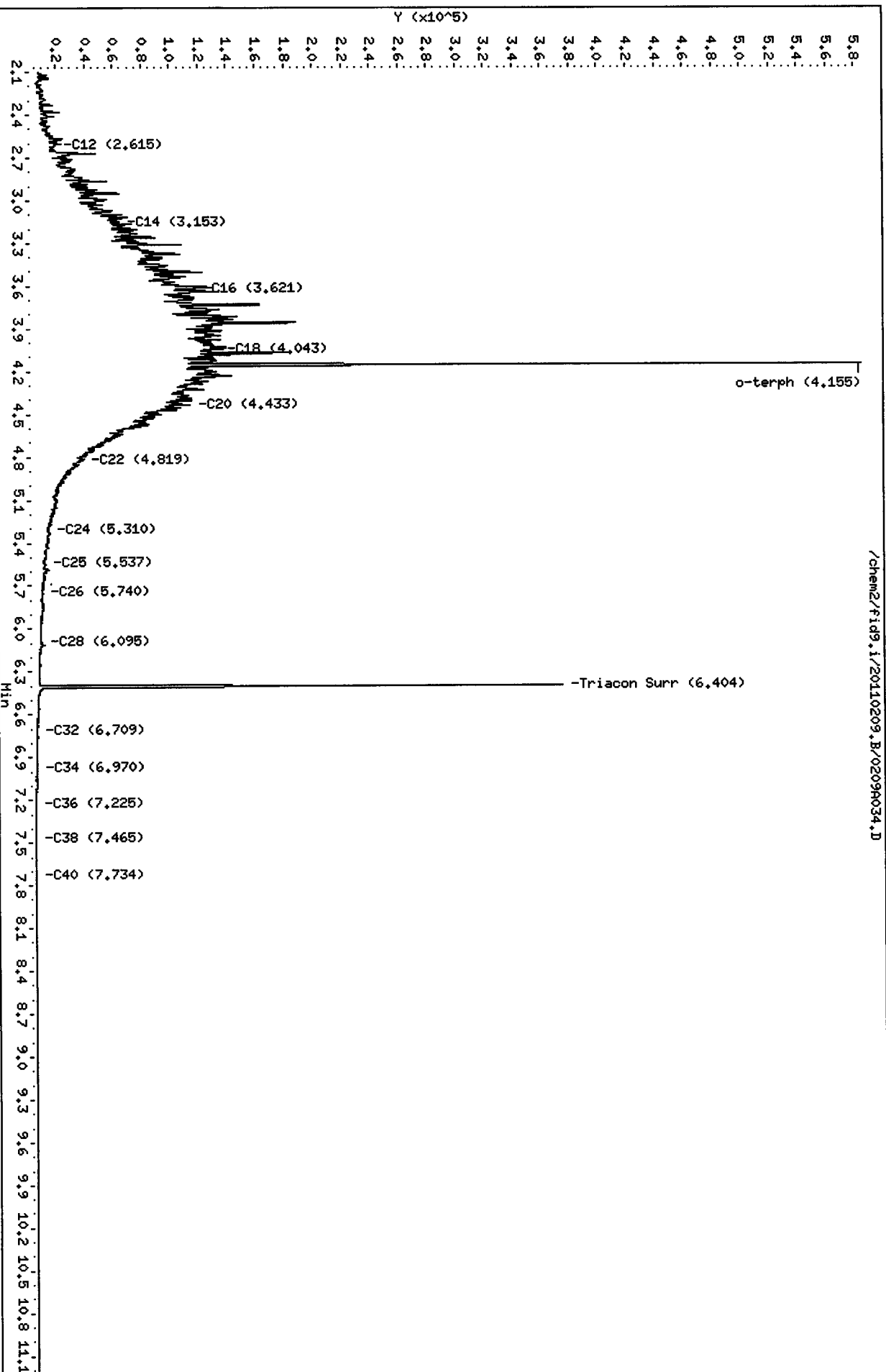
Sample Info: SH31F,5

Column phase: RTX-1

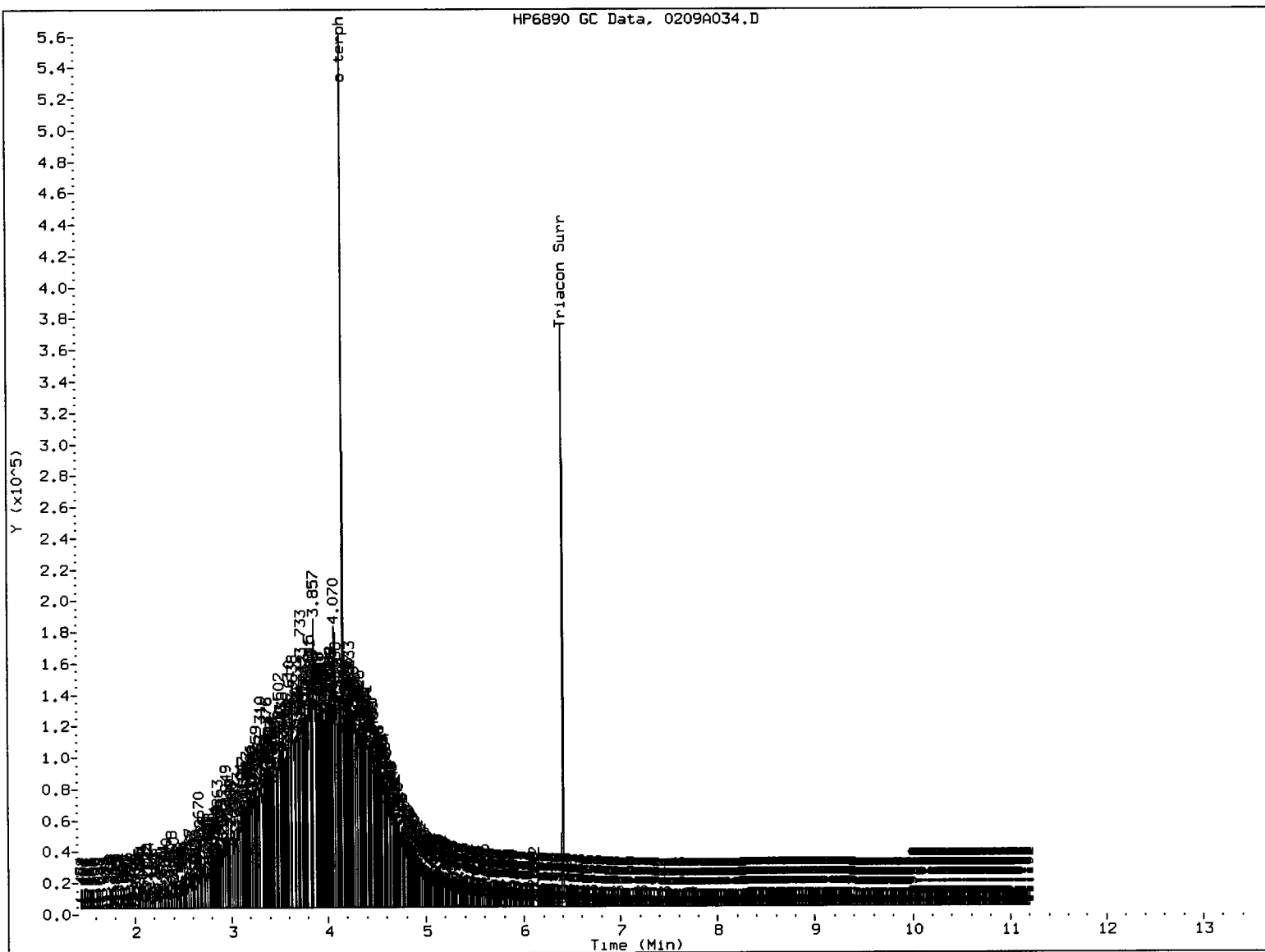
Instrument: fid9.i

Operator: HS

Column diameter: 0.25



FID: 9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Other

Analyst:

Date:

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110208.b/0207b049.d
Method: /chem3/fid3b.i/20110208.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/10/2011
Macro: FID:3B020711

ARI ID: SH31MBS1
Client ID: SH31MBS1
Injection: 08-FEB-2011 22:09
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.239	0.000	23704	21597	GAS (Tol-C12)	310868	19
C8	1.325	0.006	9188	8738	DIESEL (C12-C24)	57675	6
C10	1.910	-0.001	2593	3425	M.OIL (C24-C38)	29556	5
C12	2.654	0.001	730	144	AK-102 (C10-C25)	121217	11
C14	3.375	0.000	599	391	AK-103 (C25-C36)	21015	2
C16	4.037	0.001	364	305	OR.DIES (C10-C28)	124364	5
C18	4.660	-0.005	201	169	OR.MOIL (C28-C40)	37815	3
C20	5.265	-0.001	99	76	MIN.OIL (C24-C38)	29556	5
C22	5.828	-0.006	55	32	STODDARD (C8-C12)	224821	8
C24	6.354	-0.009	296	228			
C25	6.618	0.001	30	5			
C26	6.868	0.001	37	8			
C28	7.373	-0.009	284	240			
C32	8.432	-0.010	690	819			
C34	8.961	-0.004	210	124	CREOSOT (C8-C22)	56524	9
Filter Peak	11.141	0.007	499	206			
C36	9.472	-0.002	309	166	BUNKERC (C10-C38)	150632	18
o-terph	4.825	-0.003	722247	478223	JET-A (C10-C18)	115613	22
Triacon Surr	7.911	-0.008	425618	399857	IT.MOIL (C24-C40)	440959	21

Range Times: NW Diesel(2.703 - 6.413) NW Gas(1.188 - 2.703) NW M.Oil(6.413 - 10.015)
AK102(1.861 - 6.567) AK103(6.567 - 9.524) Jet A(1.861 - 4.715)

Surrogate	Area	Amount	%Rec
o-Terphenyl	478223	50.0	111.1
Triacontane	399857	53.3	118.4

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Handwritten signature/initials
2/10/11

Data File: /chem3/fid3b.i/20110208.b/0207b049.d

Date : 08-FEB-2011 22:09

Client ID: SH31HBS1

Sample Info: SH31HBS1

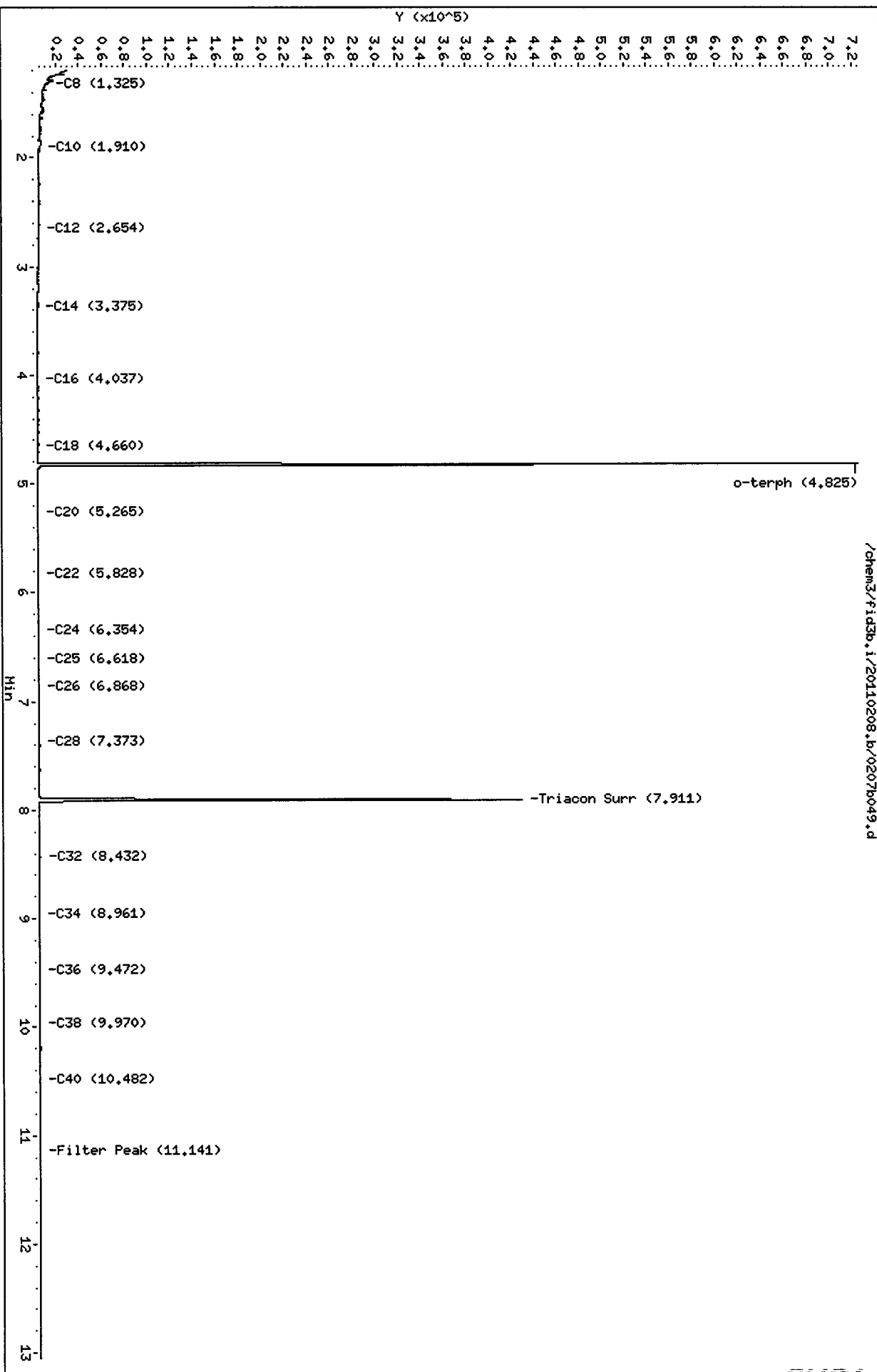
Column phase: RTX-1

Instrument: fid3b.i

Operator: HS

Column diameter: 0.25

Page 1



SH31 00100

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110208.b/0207b058.d
Method: /chem3/fid3b.i/20110208.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/10/2011
Macro: FID:3B020711

ARI ID: SH31G
Client ID: B11-17-30
Injection: 09-FEB-2011 01:29
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.233	-0.005	24559	30475	GAS (Tol-C12)	678316	42
C8	1.338	0.019	8252	5454	DIESEL (C12-C24)	16152976	1671
C10	1.913	0.002	3360	1500	M.OIL (C24-C38)	669185	114
C12	2.655	0.002	13154	9346	AK-102 (C10-C25)	16679988	1544 M
C14	3.387	0.012	79391	77198	AK-103 (C25-C36)	541666	62 M
C16	4.036	0.001	101739	16146	OR.DIES (C10-C28)	17002898	669 M
C18	4.660	-0.005	131773	109697	OR.MOIL (C28-C40)	249175	22 M
C20	5.261	-0.005	110669	89574	MIN.OIL (C24-C38)	669185	104 M
C22	5.838	0.005	40605	26706	STODDARD (C8-C12)	596639	22
C24	6.362	-0.001	14218	8821			
C25	6.619	0.002	9985	3491			
C26	6.864	-0.003	7486	6322			
C28	7.387	0.005	4397	1796			
C32	8.451	0.010	1374	454			
C34	8.965	0.000	1022	766	CREOSOT (C8-C22)	15503215	2424
Filter Peak	11.128	-0.005	273	72			
C36	9.472	-0.001	695	502	BUNKERC (C10-C38)	17237583	2023
o-terph	4.826	-0.001	675204	464057	JET-A (C10-C18)	10238998	1985
Triacon Surr	4.826	-3.092	675204	464057	IT.MOIL (C24-C40)	1147732	53

Range Times: NW Diesel(2.703 - 6.413) NW Gas(1.188 - 2.703) NW M.Oil(6.413 - 10.015)
AK102(1.861 - 6.567) AK103(6.567 - 9.524) Jet A(1.861 - 4.715)

Surrogate	Area	Amount	%Rec
o-Terphenyl	464057	48.5	107.8
Triacontane	464057	61.8	137.4

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

SH31 : 00134

Data File: /chem3/fid3b.i/20110208.b/0207b058.d

Date : 09-FEB-2011 01:29

Client ID: B11-17-30

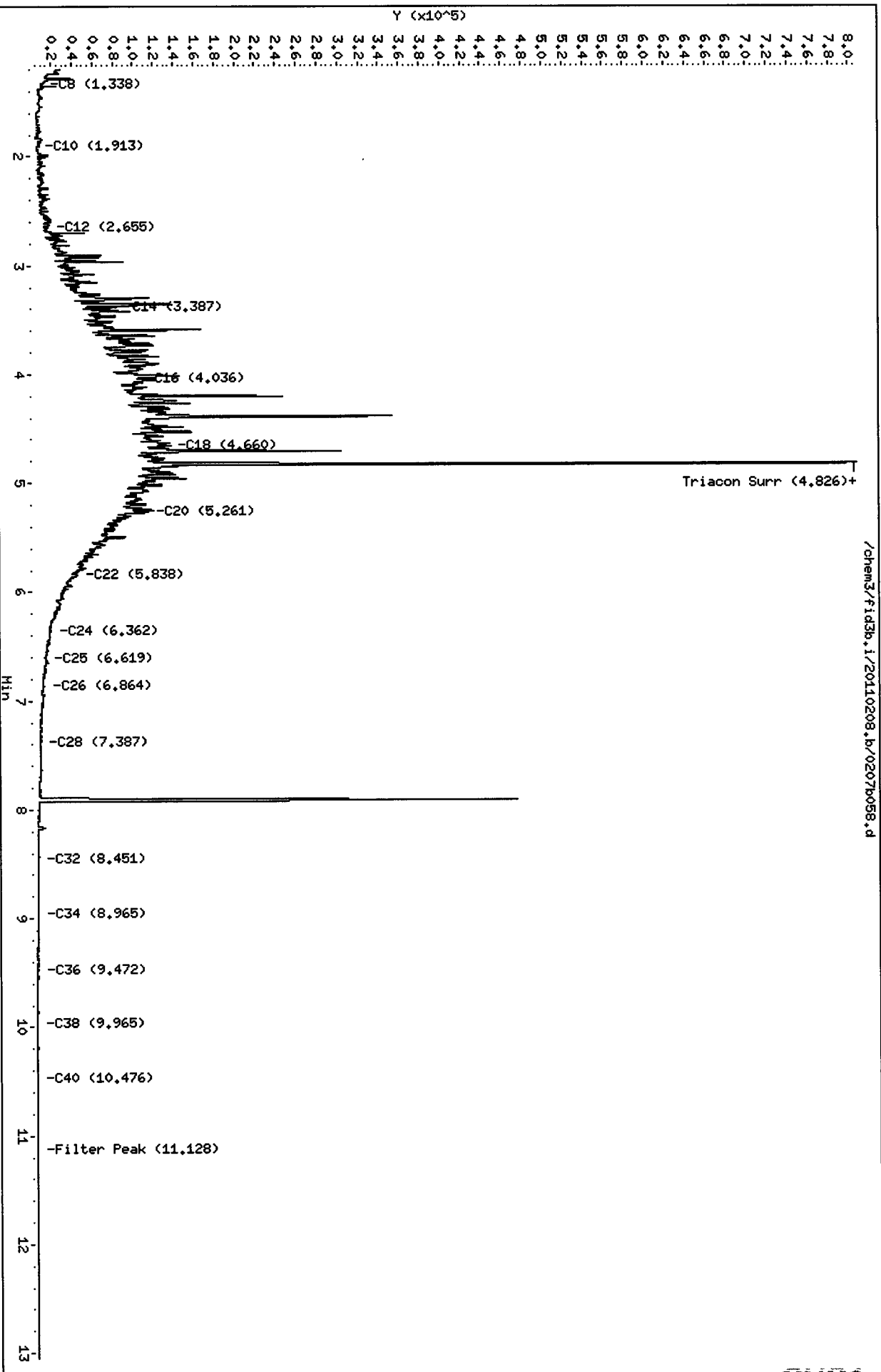
Sample Info: SH31C

Column phase: RTX-1

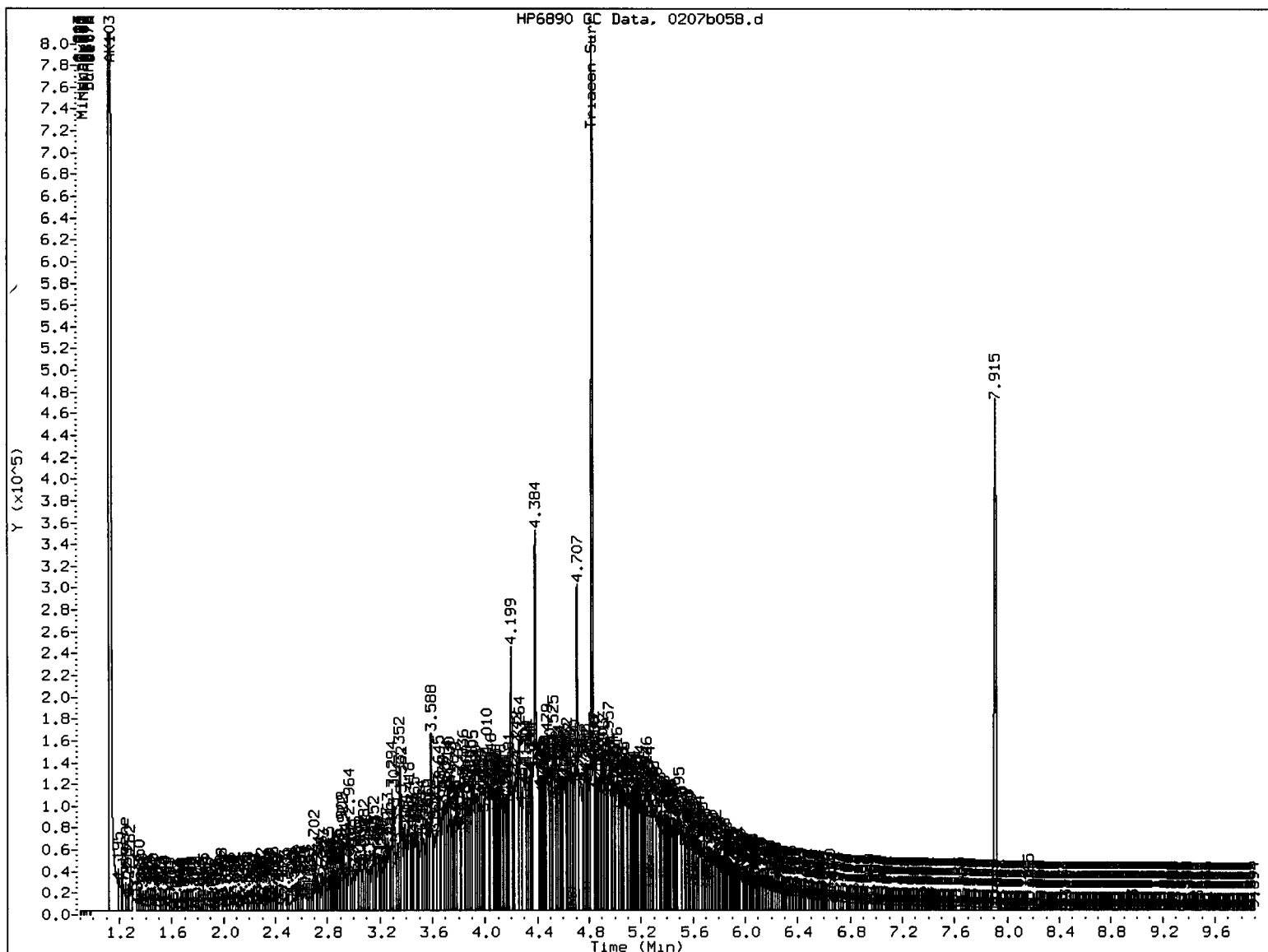
Instrument: fid3b.i

Operator: HS

Column diameter: 0.25



SH31C 001105



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: Date: 2/10/4

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SH31-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001

<u>Client ID</u>	<u>OTER</u>	<u>TOT OUT</u>
B11-16-25	114%	0
B11-16-30	116%	0
B11-17-10	NR	0
B11-17-15	85.0%	0
B11-17-20	105%	0
B11-17-25	101%	0
020311MBS	111%	0
020311LCS	107%	0
B11-17-30	108%	0
B11-17-30 MS	105%	0
B11-17-30 MSD	105%	0

LCS/MB LIMITS

QC LIMITS

(OTER) = o-Terphenyl

(64-134)

(52-130)

Prep Method: SW3546
Log Number Range: 11-2250 to 11-2256

ORGANICS ANALYSIS DATA SHEET

NWTPHD by GC/FID

Page 1 of 1



Sample ID: B11-17-30

MS/MSD

Lab Sample ID: SH31G

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized: *[Signature]*

Reported: 02/10/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Extracted MS/MSD: 02/03/11

Sample Amount MS: 8.47 g-dry-wt

MSD: 8.86 g-dry-wt

Date Analyzed MS: 02/09/11 01:52

Final Extract Volume MS: 1.0 mL

MSD: 02/09/11 02:14

MSD: 1.0 mL

Instrument/Analyst MS: FID3B/MS

Dilution Factor MS: 1.00

MSD: FID3B/MS

MSD: 1.00

Percent Moisture: 15.5%

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Diesel	192	380	177	106%	401	169	124%	5.4%

TPHD Surrogate Recovery

	MS	MSD
o-Terphenyl	105 %	105 %

Results reported in mg/kg

RPD calculated using sample concentrations per SW846.

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110208.b/0207b059.d
Method: /chem3/fid3b.i/20110208.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/10/2011
Macro: FID:3B020711

ARI ID: SH31GMS
Client ID: B11-17-30 MS
Injection: 09-FEB-2011 01:52
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.232	-0.006	51368	35079	GAS (Tol-C12)	2552292	160
C8	1.322	0.003	15784	9136	DIESEL (C12-C24)	31113940	3220
C10	1.911	0.000	16515	6658	M.OIL (C24-C38)	837685	143
C12	2.643	-0.010	165400	150594	AK-102 (C10-C25)	33092034	3063 M
C14	3.369	-0.005	369165	322484	AK-103 (C25-C36)	649102	74 M
C16	4.038	0.002	632689	643027	OR.DIES (C10-C28)	33523471	1320 M
C18	4.670	0.005	581815	620560	OR.MOIL (C28-C40)	246969	22 M
C20	5.267	0.001	435842	461893	MIN.OIL (C24-C38)	837685	130 M
C22	5.829	-0.005	193816	201821	STODDARD (C8-C12)	2438459	88
C24	6.371	0.008	22442	4911			
C25	6.607	-0.009	32343	34880			
C26	6.875	0.008	8790	4235			
C28	7.394	0.012	5515	5841			
C32	8.425	-0.016	2356	3565			
C34	8.965	0.000	982	668	CREOSOT (C8-C22)	29863923	4669
Filter Peak	11.137	0.004	239	120			
C36	9.469	-0.005	708	648	BUNKERC (C10-C38)	33756153	3961
o-terph	4.829	0.001	674969	450112	JET-A (C10-C18)	21870367	4240
Triacon Surr	7.911	-0.008	489344	466101	IT.MOIL (C24-C40)	1318072	61

Range Times: NW Diesel(2.703 - 6.413) NW Gas(1.188 - 2.703) NW M.Oil(6.413 - 10.015)
AK102(1.861 - 6.567) AK103(6.567 - 9.524) Jet A(1.861 - 4.715)

Surrogate	Area	Amount	%Rec
o-Terphenyl	450112	47.1	104.6
Triacontane	466101	62.1	138.0

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR.M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

SH31:00133

Data File: /chem3/fid3b.i/20110208.b/0207b059.d

Date : 09-FEB-2011 01:52

Client ID: B11-17-30 HS

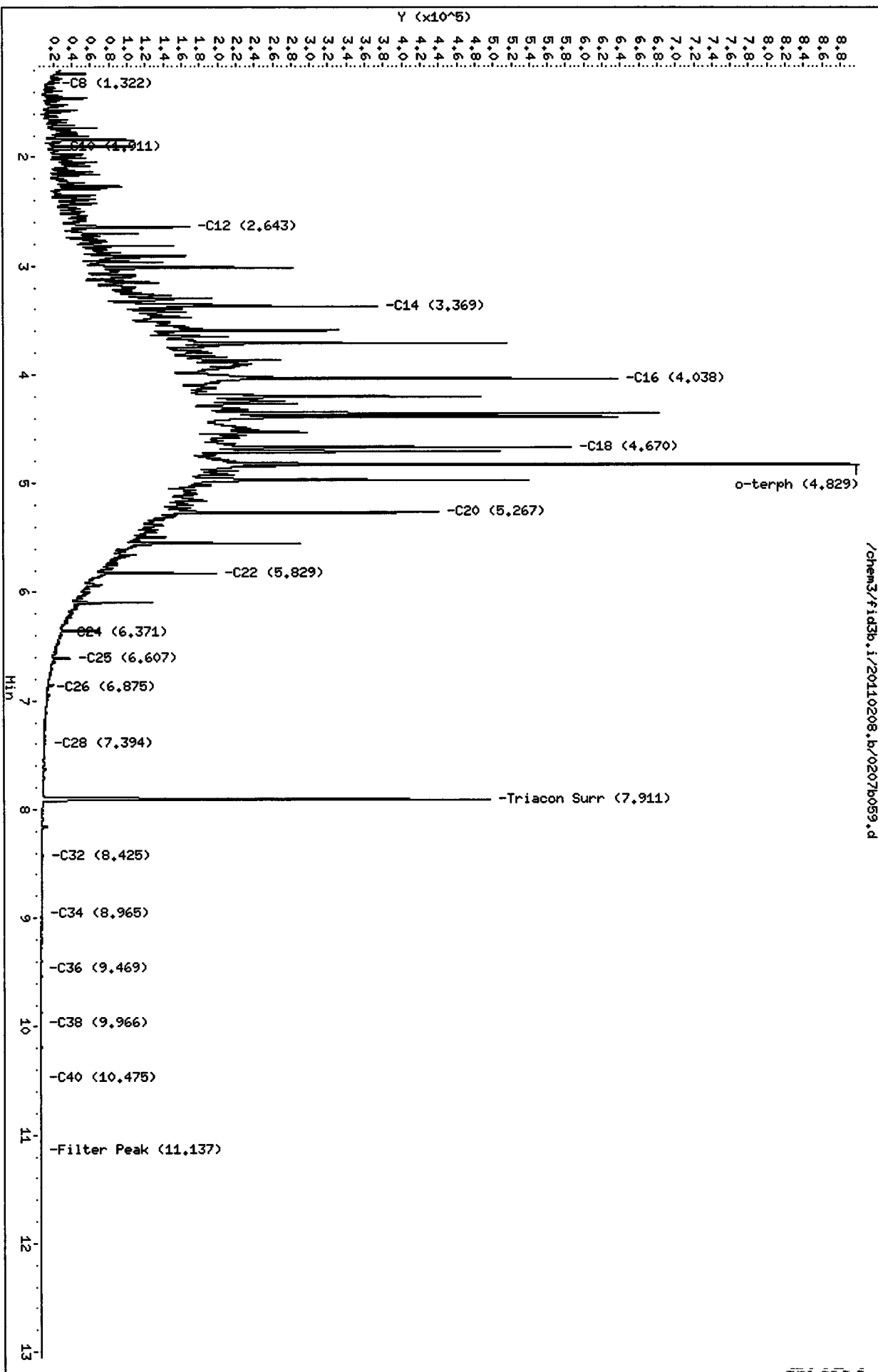
Sample Info: SH31GHS

Column phase: RTX-1

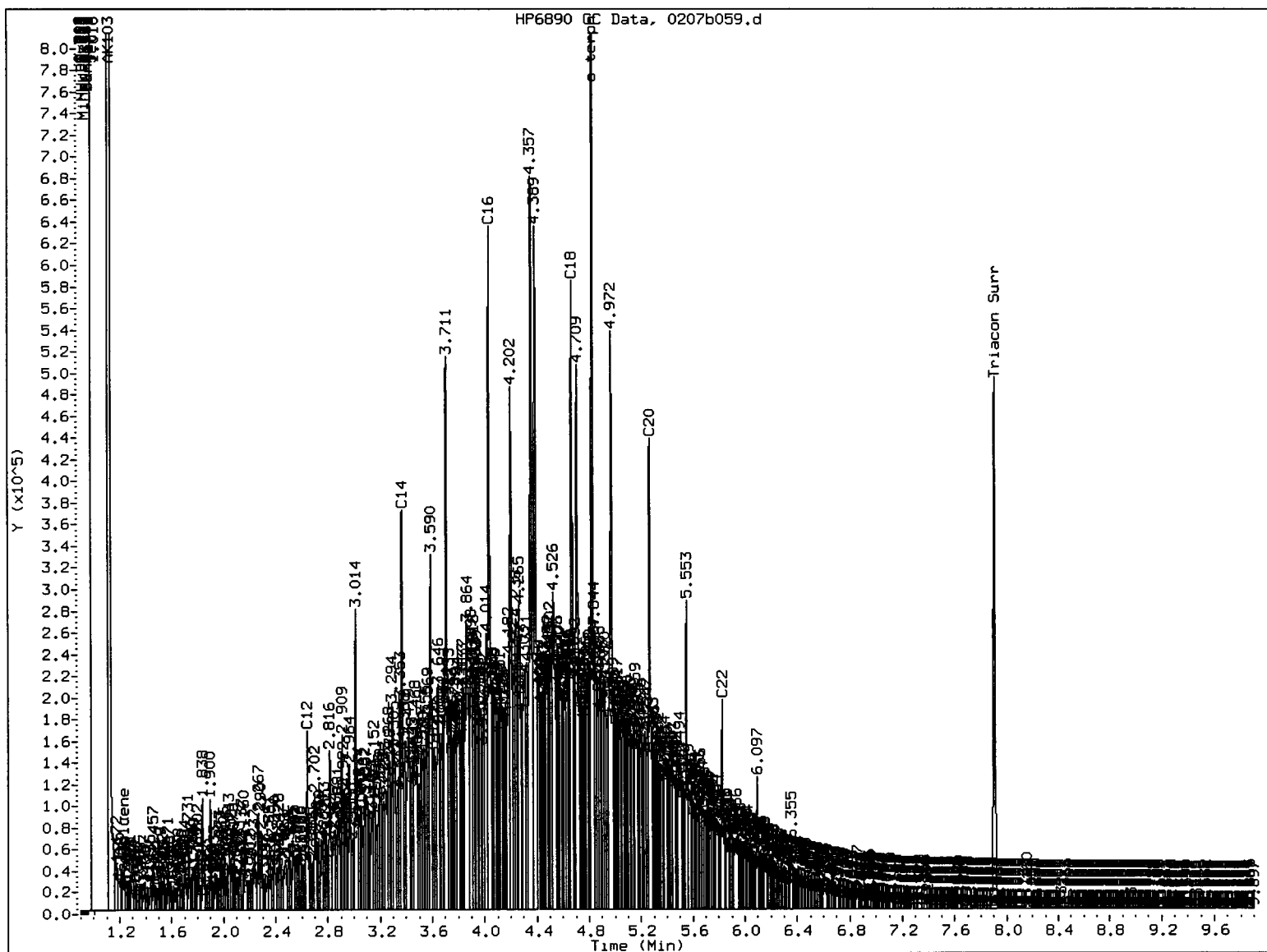
Instrument: fid3b.i

Operator: HS

Column diameter: 0.25



SH31.00140



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: *AS*

Date: *2/10/11*

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110208.b/0207b060.d
Method: /chem3/fid3b.i/20110208.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/10/2011
Macro: FID:3B020711

ARI ID: SH31GMSD
Client ID: B11-17-30 MSD
Injection: 09-FEB-2011 02:14
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.243	0.005	17051	12907	GAS (Tol-C12)	2649520	166
C8	1.322	0.003	15614	9171	DIESEL (C12-C24)	34302884	3550
C10	1.919	0.008	14987	7898	M.OIL (C24-C38)	960071	164
C12	2.641	-0.012	164685	156103	AK-102 (C10-C25)	36363466	3365 M
C14	3.368	-0.007	375619	344761	AK-103 (C25-C36)	755744	87
C16	4.036	0.001	634251	638216	OR.DIES (C10-C28)	36864360	1451 M
C18	4.667	0.002	600620	619660	OR.MOIL (C28-C40)	289886	26
C20	5.265	-0.001	469104	378966	MIN.OIL (C24-C38)	960071	149
C22	5.828	-0.005	204707	190933	STODDARD (C8-C12)	2519150	91
C24	6.355	-0.008	65753	66088			
C25	6.626	0.009	17457	12458			
C26	6.870	0.003	9920	2751			
C28	7.379	-0.002	5640	2315			
C32	8.447	0.005	1706	567			
C34	8.969	0.005	1165	946	CREOSOT (C8-C22)	32957778	5153
Filter Peak	11.136	0.002	282	81			
C36	9.473	-0.001	866	382	BUNKERC (C10-C38)	37138665	4358
o-terph	4.828	0.000	669455	451728	JET-A (C10-C18)	24028123	4659
Triacon Surr	7.911	-0.008	505252	480233	IT.MOIL (C24-C40)	1455885	68

Range Times: NW Diesel(2.703 - 6.413) NW Gas(1.188 - 2.703) NW M.Oil(6.413 - 10.015)
AK102(1.861 - 6.567) AK103(6.567 - 9.524) Jet A(1.861 - 4.715)

Surrogate	Area	Amount	%Rec
o-Terphenyl	451728	47.2	105.0
Triacontane	480233	64.0	142.2

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110208.b/0207b060.d

Date : 09-FEB-2011 02:14

Client ID: B11-17-30 HSD

Sample Info: SH31GHSB

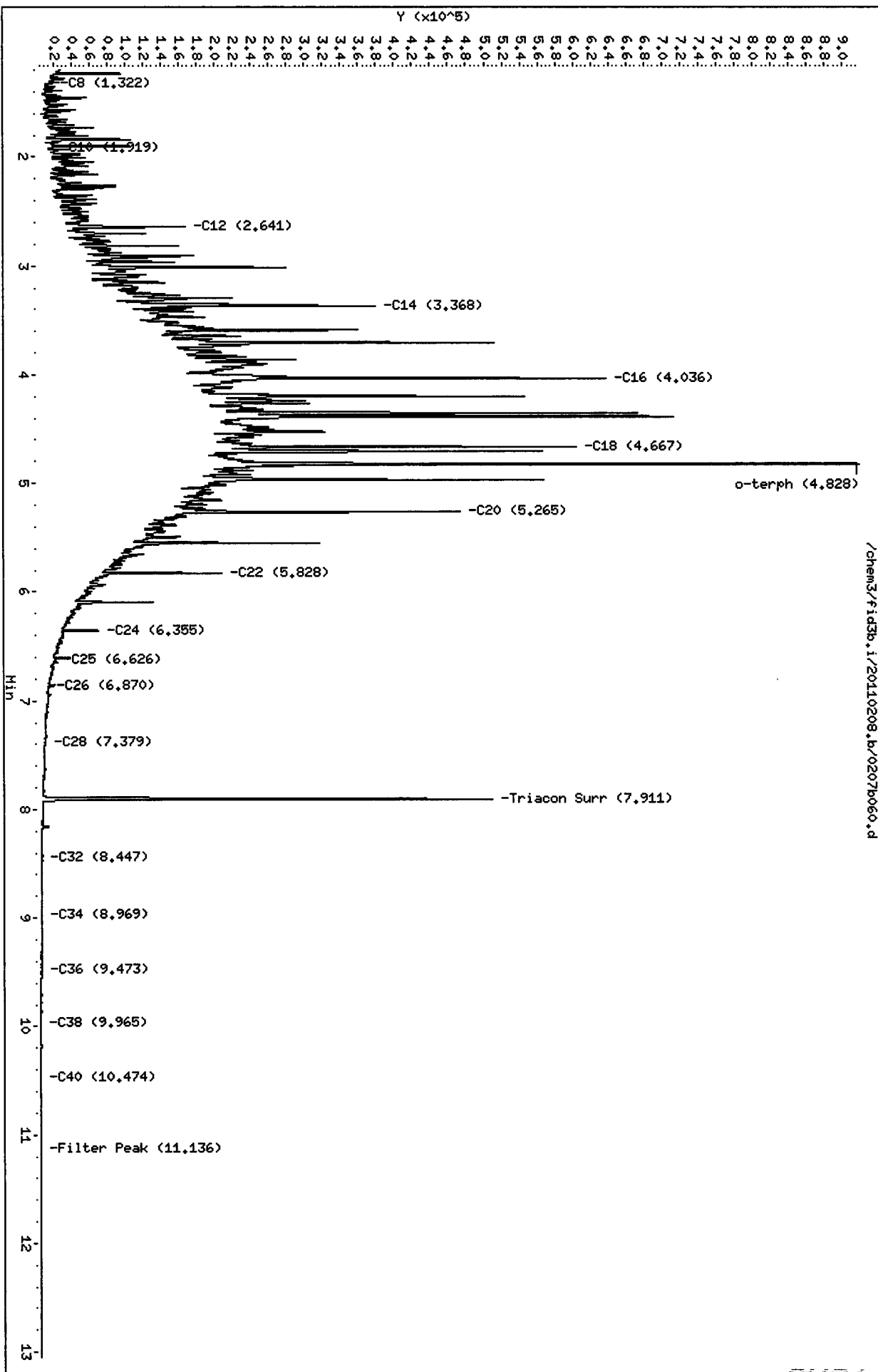
Column phase: RTX-1

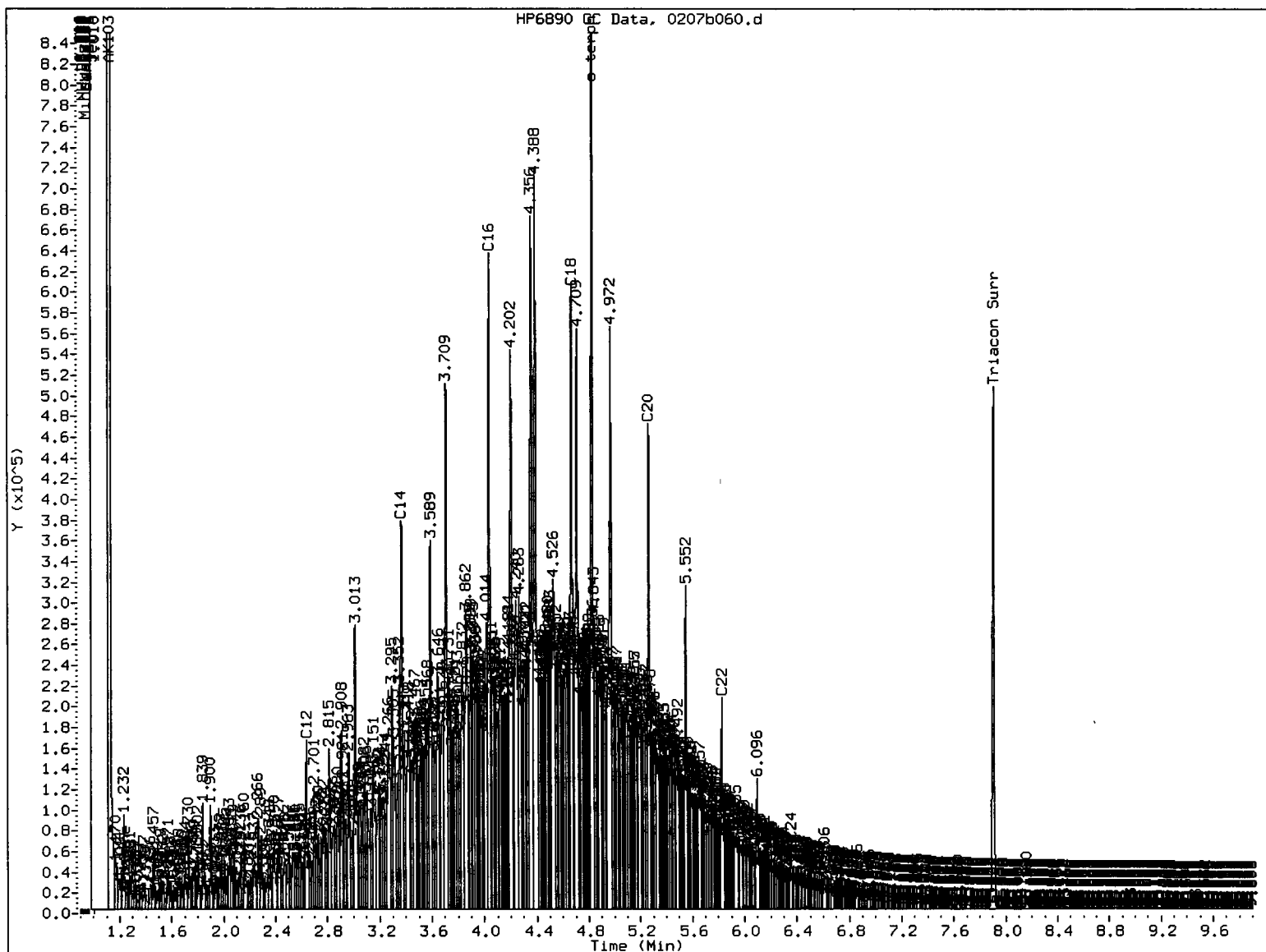
Instrument: fid3b.i

Operator: HS

Column diameter: 0.25

Page 1





MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: *[Signature]*

Date: *2/10/6*

ORGANICS ANALYSIS DATA SHEET

NWTPHD by GC/FID

Page 1 of 1




Sample ID: LCS-020311

LAB CONTROL

Lab Sample ID: LCS-020311

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized: 

Reported: 02/10/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: NA

Date Received: NA

Date Extracted: 02/03/11

Date Analyzed: 02/08/11 22:31

Instrument/Analyst: FID3B/MS

Sample Amount: 10.0 g

Final Extract Volume: 1.0 mL

Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	161	150	107%

TPHD Surrogate Recovery

o-Terphenyl	107%
-------------	------

Results reported in mg/kg

Analytical Resources Inc.
407S TPH Quantitation Report

Data file: /chem3/fid3b.i/20110208.b/0207b050.d
Method: /chem3/fid3b.i/20110208.b/ftphfid3b.m
Instrument: fid3b.i
Operator: MS
Report Date: 02/10/2011
Macro: FID:3B020711

ARI ID: SH31LCSS1
Client ID: SH31LCSS1
Injection: 08-FEB-2011 22:31
Dilution Factor: 1

FID:3B RESULTS							
Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.240	0.002	46366	26853	GAS (Tol-C12)	2074964	130
C8	1.319	-0.001	22246	14431	DIESEL (C12-C24)	15553313	1609
C10	1.906	-0.005	98283	50549	M.OIL (C24-C38)	211231	36
C12	2.647	-0.006	161129	124141	AK-102 (C10-C25)	16994457	1573 M
C14	3.372	-0.003	316578	215476	AK-103 (C25-C36)	137376	16
C16	4.037	0.001	578938	457142	OR.DIES (C10-C28)	17107583	674 M
C18	4.666	0.001	500164	403542	OR.MOIL (C28-C40)	35628	3
C20	5.264	-0.002	303835	274730	MIN.OIL (C24-C38)	211231	33
C22	5.828	-0.006	147996	120082	STODDARD (C8-C12)	1979625	72
C24	6.355	-0.008	46333	40113			
C25	6.607	-0.010	20470	21656			
C26	6.877	0.010	2308	2185			
C28	7.370	-0.012	1410	1623			
C32	8.429	-0.013	697	702			
C34	8.965	0.000	47	9	CREOSOT (C8-C22)	14950966	2338
Filter Peak	11.134	0.000	347	247			
C36	9.472	-0.002	101	20	BUNKERC (C10-C38)	17136399	2011
o-terph	4.827	-0.001	706855	461705	JET-A (C10-C18)	11883711	2304
Triacon Surr	7.909	-0.010	447719	422053	IT.MOIL (C24-C40)	640096	30

Range Times: NW Diesel(2.703 - 6.413) NW Gas(1.188 - 2.703) NW M.Oil(6.413 - 10.015)
AK102(1.861 - 6.567) AK103(6.567 - 9.524) Jet A(1.861 - 4.715)

Surrogate	Area	Amount	%Rec
o-Terphenyl	461705	48.3	107.3
Triacontane	422053	56.2	125.0

Analyte	RF	Curve Date
o-Terph Surr	9563.8	07-FEB-2011
Triacon Surr	7505.7	13-JAN-2011
Gas	15975.0	20-OCT-2010
Diesel	9663.9	07-FEB-2011
Motor Oil	5851.3	13-JAN-2011
AK102	10805.4	07-FEB-2011
AK103	8727.5	29-SEPT-2010
JetA	5157.9	13-JAN-2011
Min Oil	6438.5	20-JAN-2011
OR Diesel	25401.0	
OR M.Oil	11274.0	
IT M.Oil	21488.2	
Bunker C	8522.1	20-SEP-2010
Creosote	6396.0	17-JAN-2009

Data File: /chem3/fid3b.i/20110208.b/0207b050.d

Page 1

Date : 08-FEB-2011 22:31

Client ID: SH31LCSS1

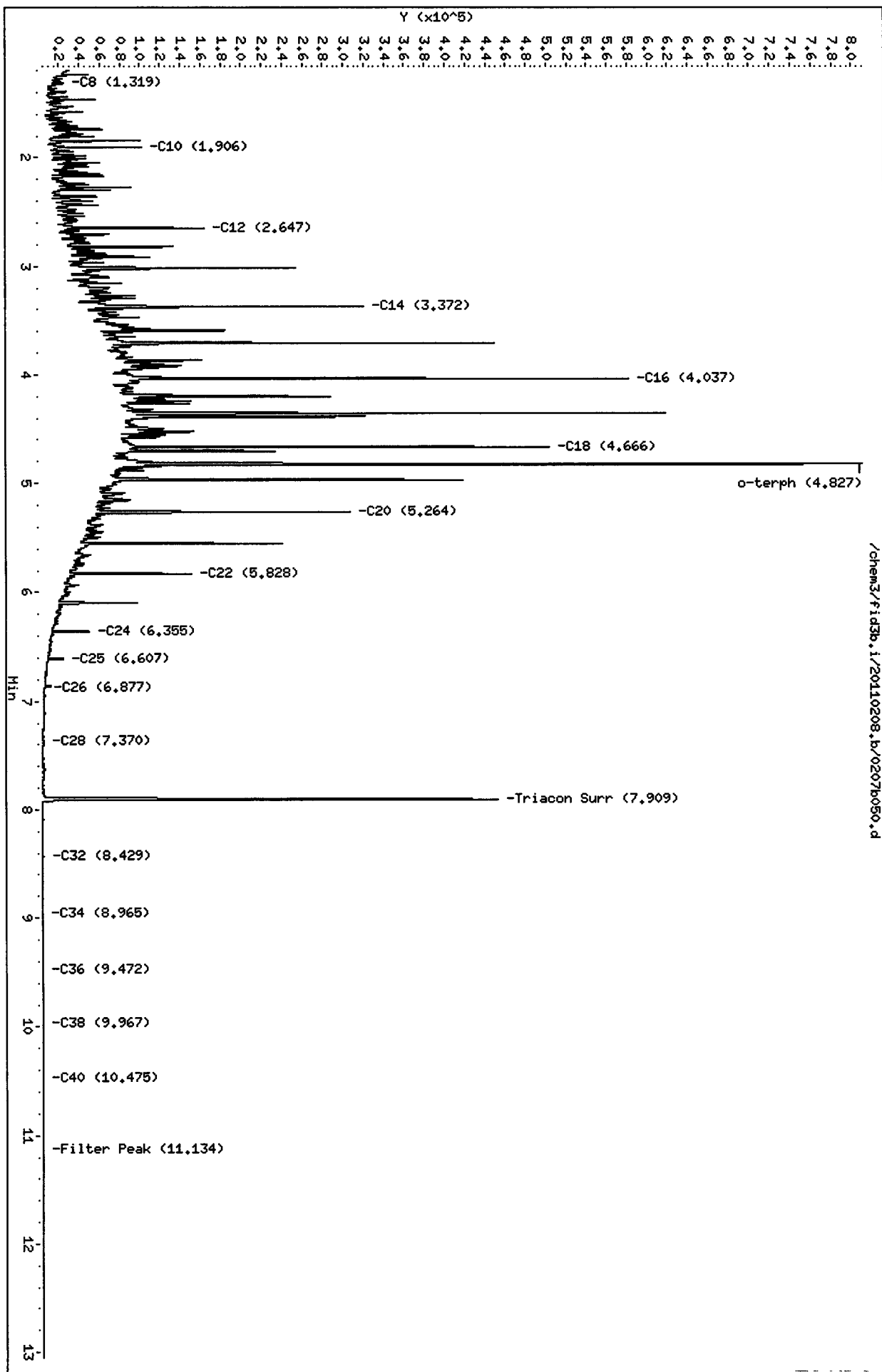
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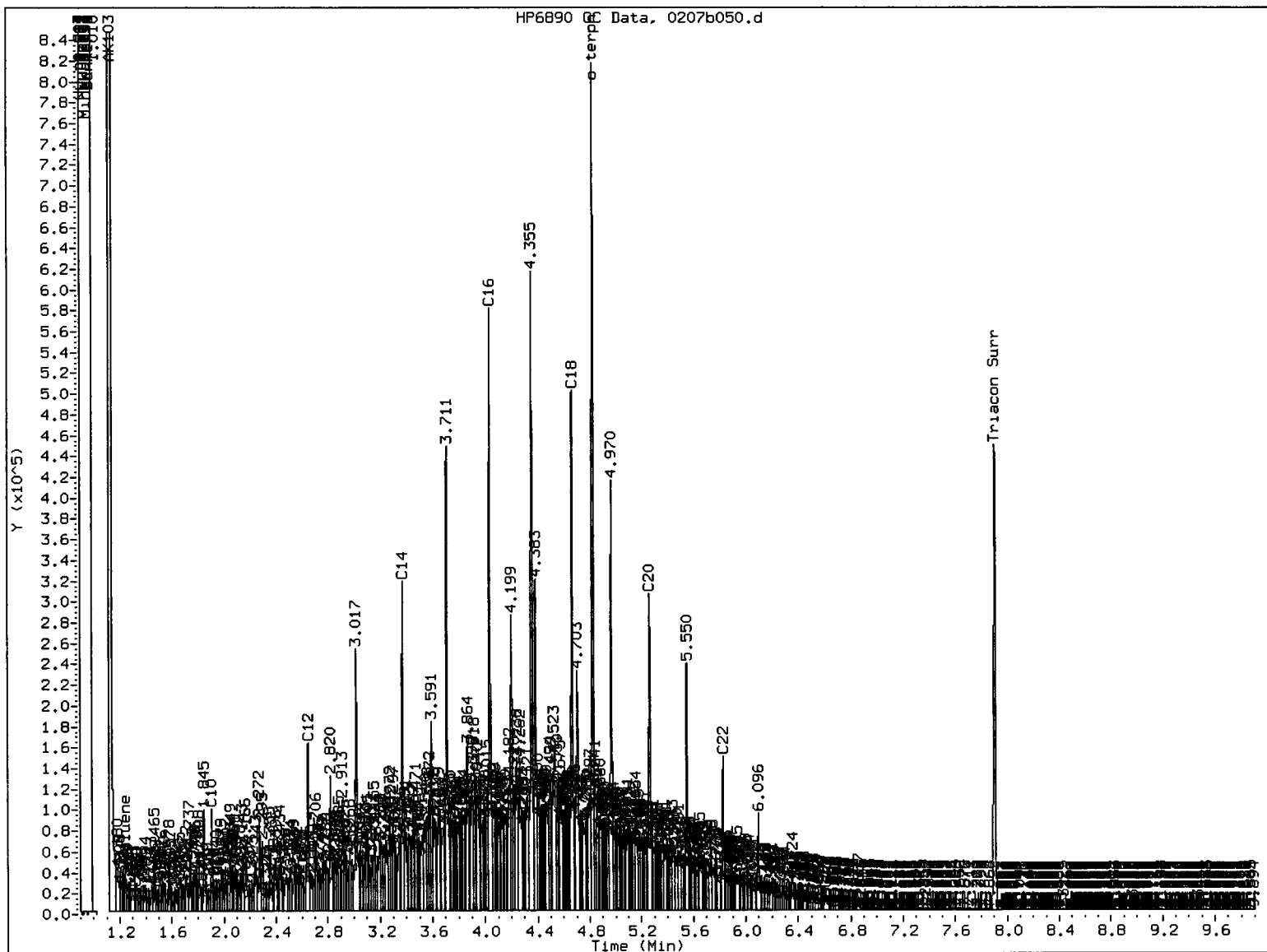
Instrument: fid3b.i

Column phase: RTX-1

Operator: HS

Column diameter: 0.25





MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: AK

Date: 2/10/11

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Soil
Date Received: 02/02/11

ARI Job: SH31
Project: Birds Eye-Soil
JI1001

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
11-2250-SH31A	B11-16-25	8.98 g	1.00 mL	D	02/03/11
11-2251-SH31B	B11-16-30	10.1 g	1.00 mL	D	02/03/11
11-2252-SH31C	B11-17-10	9.00 g	1.00 mL	D	02/03/11
11-2253-SH31D	B11-17-15	9.55 g	1.00 mL	D	02/03/11
11-2254-SH31E	B11-17-20	9.46 g	1.00 mL	D	02/03/11
11-2255-SH31F	B11-17-25	8.73 g	1.00 mL	D	02/03/11
11-2256-020311MB1	Method Blank	10.0 g	1.00 mL	-	02/03/11
11-2256-020311LCS1	Lab Control	10.0 g	1.00 mL	-	02/03/11
11-2256-SH31G	B11-17-30	8.72 g	1.00 mL	D	02/03/11
11-2256-SH31GMS	B11-17-30	8.47 g	1.00 mL	D	02/03/11
11-2256-SH31GMSD	B11-17-30	8.86 g	1.00 mL	D	02/03/11

Basis: D=Dry Weight W=As Received
Diesel Extraction Report

SH31 : 00149



Analytical Resources, Incorporated
Analytical Chemists and Consultants

March 1, 2011

Inger Jackson
Pacific Groundwater Group
2377 Eastlake Ave. East, Suite 200
Seattle, WA 98102

Project: Birds Eye Soil JI1001
ARI ID: SK46

Dear Ms. Jackson:

Please find enclosed the original Chain of Custody record, sample receipt documentation, and the final data for the samples from the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. Should you have any questions or concerns, please feel free to call me at your convenience.

Respectfully,
ANALYTICAL RESOURCES, INC.

Eric Branson
Project Manager
(206) 695-6213
eric@arilabs.com
www.arilabs.com



Case Narrative

- Sample Receipt & Analytical Details -

Sample Receipt

Analytical Resources, Inc. accepted these soil samples intact on February 2, 2011 under ARI sample delivery groups (SDGs) SH30 and SH31. For further details regarding sample receipt please refer to the enclosed Cooler Receipt Forms.

Benzene by 8260 SIM was not originally requested on the Chain of Custody for these samples, but was added, per client request, on 02/22/11. The request has been processed under new ARI SDG SK46.

Both samples were analyzed outside of holding time. The analysis of sample "B11-14-30" was performed on a methanol preserved vial, per 5035 protocol. Due to the lack of remaining unused vials for sample "B11-17-30," the analysis was performed on non-5035 (unpreserved) volume.

Benzene by EPA Method 8260C SIM (Selected Ion Monitoring)

There were no irregularities with this analysis.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: SH30	Turnaround Requested: Standard	Page: 6 of 6
ARI Client Company: Pacific Groundwater Grp	Phone: 206 329 0141	Date: 2/2/11 Ice Present? Y
Client Contact: Inger Jackson		No. of Coolers: 3 Cooler Temps:

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					Notes/Comments
					NUTPH-D	NUTPH-G	Total Solids	VPH	EPH	
B11-14-20	1/31/11	1320	Sand	1	1					
B11-14-23	1/31/11	1325		1	1					
B11-14-30	1/31/11	1330		5	1			2	1	
B11-15-15	2/1/11	1347		1	1					
B11-15-20	2/1/11	1350		1	1					
B11-15-25	2/1/11	1355		1	1					
B11-15-30	2/1/11	1400		1	1					
B11-16-12	2/1/11	1500		3		2	1			
B11-16-15	2/1/11	1450		1	1					
B11-16-20	2/1/11	1500		1	1					

Comments/Special Instructions	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>
	Printed Name: <i>Inger Jackson</i>	Printed Name: <i>A. Vagstad</i>
	Company: <i>ARI</i>	Company: <i>ARI</i>
	Date & Time: <i>2/2/11 1035</i>	Date & Time: <i>2/2/11 1035</i>

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.

SH30 : 00000
SK46 : 00000



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: PC14

Project Name: Birds Eye Soil

COC No(s): _____ (NA)

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: SH30

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES (NO)

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)..... 0.8 -1.6 1.6

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90941619

Cooler Accepted by: AV Date: 2/2/11 Time: 1035

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: mm Date: 2/3/11 Time: 0900

**** 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"

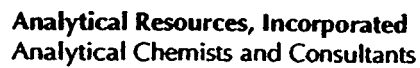
0016F
3/2/10

Cooler Receipt Form

Revision 014

SH30 : 00009

SK46 : 00004



Cooler Temperature Compliance Form

Completed by: CNN Date: 2/3/11 Time: 0900

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	SH31	Turn-around Requested:	Standard
ARI Client Company:	Pacific Grandwater Group		
Client Contact:	Inger Jackson		
Client Project Name:	Birds Ex Soil		
Client Project #:	J11001	Samplers:	1. Jackson / 1. Parker

Sample ID	Date	Time	Matrix	No Containers
B11-16-25	2/1/11	1505	S&D	1
B11-16-30	2/1/11	1510	}	1
B11-17-10	2/1/11	1515		4
B11-17-15	2/1/11	1520		4
B11-17-20	2/1/11	1525		4
B11-17-25	2/1/11	1530		1
B11-17-30	2/1/11	1540		5

Comments/Special Instructions						Relinquished by (Signature)		Received by (Signature)	
						Printed Name		Printed Name	
						Company		Company	
						Date & Time		Date & Time	
							Peter Jackson		A.J.
						PEG			APL
						11/2/11 10:35			2/2/11

Page: 7	of	
Date: 2/2/11	Ice	Present?
No. of Coolers: Cooler temps:		

Analysis Requested					Notes/Comments
NOTPH-DX	NOTPH-G/ BTX	Total Solids	VPH	EPH	PNCs
-					
-					
-	2	1			
-	2	1			
-	2	1			
-					
1			2	1	1
<div> <div>Relinquished by (Signature)</div> <div>Received by (Signature)</div> </div>					
<div> <div>Printed Name</div> <div>Printed Name</div> </div>					
<div> <div>Company</div> <div>Company</div> </div>					
<div> <div>Date & Time</div> <div>Date & Time</div> </div>					

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: 1-216

Project Name: Birds Eye Soil

COC No(s): SH31 (NA)

Delivered by: Fed-Ex UPS Courier (Hand Delivered Other: NA)

Assigned ARI Job No: SH31

Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES (NO)

Were custody papers included with the cooler? (YES) NO

Were custody papers properly filled out (ink, signed, etc.) (YES) NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)..... 0.8 -1.6 1.6

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 70941619

Cooler Accepted by: AV Date: 2/2/11 Time: 1035

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: NA

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 2/2/11


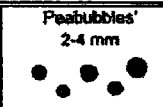

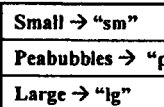
Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: mm Date: 2/3/11 Time: 0900

** 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 → "sm"	
Peabubbles → "pb"	
Large → "lg"	
Headspace → "hs"	

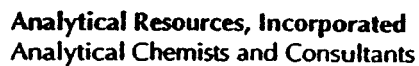
0016F
3/2/10

Cooler Receipt Form

Revision 014

SH31 : 00008

SK46 : 00007



Cooler Temperature Compliance Form

Completed by: Date: 2/3/11 Time: 0900

Sample ID Cross Reference Report



ARI Job No: SK46
Client: Pacific Groundwater Group
Project Event: JI1001
Project Name: Birds Eye-Soil

Sample ID		ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	B11-14-30	SK46A	11-3989	Soil	01/31/11 13:30	02/02/11 10:35
2.	B11-17-30	SK46B	11-3990	Soil	02/01/11 15:40	02/02/11 10:35

Printed 02/24/11

SK46 : 00003


ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: B11-14-30
Page 1 of 1 **SAMPLE**

Lab Sample ID: SK46A

LIMS ID: 11-3989

Matrix: Soil

Data Release Authorized: 

Reported: 02/25/11

QC Report No: SK46-Pacific Groundwater Group

Project: Birds Eye-Soil

JI1001

Date Sampled: 01/31/11

Date Received: 02/02/11

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/25/11 10:31

Sample Amount: 17.8 mg-dry-wt

Purge Volume: 10.0 mL

Moisture: 10.8%

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	11	16	

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	106%
-----------------------	------

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: B11-17-30
Page 1 of 1 **SAMPLE**

Lab Sample ID: SK46B

LIMS ID: 11-3990

Matrix: Soil

Data Release Authorized: *AB*

Reported: 02/25/11

QC Report No: SK46-Pacific Groundwater Group

Project: Birds Eye-Soil

JII1001

Date Sampled: 02/01/11

Date Received: 02/02/11

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/25/11 10:56

Sample Amount: 16.3 mg-dry-wt

Purge Volume: 10.0 mL

Moisture: 15.5%

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	12	< 12	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	107%
-----------------------	------

SW8260-SIM SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: SK46-Pacific Groundwater Group
Project: Birds Eye-Soil
JI1001

<u>Client ID</u>	<u>DCE</u>	<u>TOT OUT</u>
MB-022511	110%	0
LCS-022511	99.2%	0
LCSD-022511	98.3%	0
B11-14-30	106%	0
B11-17-30	107%	0

LCS/MB LIMITS QC LIMITS

(DCE) = d4-1,2-Dichloroethane (30-160) (30-160)

Prep Method: SW5030
Log Number Range: 11-3989 to 11-3990

FORM-II SW8260-SIM

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: LCS-022511


Page 1 of 1

LAB CONTROL SAMPLE

Lab Sample ID: LCS-022511

LIMS ID: 11-3989

Matrix: Soil

Data Release Authorized: 

Reported: 02/25/11

QC Report No: SK46-Pacific Groundwater Group

Project: Birds Eye-Soil

J11001

Date Sampled: NA

Date Received: NA

Instrument/Analyst LCS: NT7/PKC

LCSD: NT7/PKC

Date Analyzed LCS: 02/25/11 09:09

LCSD: 02/25/11 09:35

Sample Amount LCS: 20.0 mg-dry-wt

LCSD: 20.0 mg-dry-wt

Purge Volume LCS: 10.0 mL

LCSD: 10.0 mL

Analyte	LCS	Spike	LCS	LCSD	Spike	LCSD	RPD
		Added-LCS	Recovery		Added-LCSD	Recovery	
Benzene	532	500	106%	540	500	108%	1.5%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: MB-022511


Page 1 of 1

METHOD BLANK

Lab Sample ID: MB-022511

LIMS ID: 11-3989

Matrix: Soil

Data Release Authorized: 

Reported: 02/25/11

QC Report No: SK46-Pacific Groundwater Group

Project: Birds Eye-Soil

JII1001

Date Sampled: NA

Date Received: NA

Instrument/Analyst: NT7/PKC

Date Analyzed: 02/25/11 10:00

Sample Amount: 20.0 mg-dry-wt

Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
71-43-2	Benzene	10	< 10	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	110%
-----------------------	------

APPENDIX A2-2
SUMMARY OF JULY 2011 SOIL INVESTIGATION
BIRDS EYE FOODS SITE, TACOMA

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	SUMMARY OF FINDINGS	1
2.0	SUMMARY OF FIELD INVESTIGATION AND SOIL SAMPLING	2
3.0	SUMMARY OF ANALYTICAL RESULTS	3

ATTACHMENT

Attachment A: Boring Logs

Attachment B: Lab Analytical Reports (digital copy only)

1.0 INTRODUCTION

This appendix summarizes the analytical results of soil investigations performed in July 2011 at the former Nalley's Fine Foods site (Nalley's) in Tacoma, Washington. This work was authorized by Birds Eye Foods on July 5, 2011.

In late 1990, petroleum-contaminated soil was identified at the site following removal of two fuel underground storage tanks (USTs) located near the boiler room (Figure 3 of the main RI/FS body). The objectives of the July 2011 were to delineate the eastern extent and depth of petroleum-contaminated soil confirmed in the January/February 2011 Soil Investigation. The July 2011 phase of investigation supplements the earlier 2011 soil investigation, which characterized the nature and extent of soil contamination with access limitations to the east and with depth.

Groundwater monitoring for petroleum compounds has been ongoing since 1992 with reporting to the Washington State Department of Ecology (Ecology) and Tacoma Pierce County Health Department (TPCHD).

Pacific Groundwater Group's professional services were performed, our findings obtained, and this memo prepared in accordance with hydrogeologic and environmental practices generally accepted at this time and in this area for the exclusive use of Birds Eye Foods and their agents, for specific application to the former Nalley's Fine Foods site. This warranty is in lieu of all other warranties, express or implied.

1.1 SUMMARY OF FINDINGS

The July 2011 Soil Investigation supplements the extent of petroleum-contaminated soil characterized during the January/February 2011 Soil Investigation. The "Main Area" of petroleum-contaminated soil defined during the January/February 2011 Investigation surrounds the former boiler room USTs. The extent of this contamination was further delineated during this phase of investigation.

- The Main Area of petroleum-contaminated soil likely extends under the Potato Warehouse, Boiler Room building, and above ground storage tanks (ASTs) north of the Boiler Room.
- Soil samples collected beneath the Potato Warehouse, approximately 17.5 feet east of the entrance to the warehouse, did not contain detectable concentrations of petroleum hydrocarbons.
- Soil samples collected from a borehole approximately 15 feet northeast of the ASTs did not contain detectable concentrations of petroleum hydrocarbons.
- Based on a site visit with local drillers, it is not likely that drilling inside the Boiler Room could achieve depths greater than about 10 to 15 feet with the current equipment and building configuration, depending on nature of soil encountered.

- The depth of petroleum-contaminated soil in the Main Area does not extend deeper than approximately 40 or 45 feet below ground.

2.0 SUMMARY OF FIELD INVESTIGATION AND SOIL SAMPLING

A hollow-stem drilling rig was used to advance six boreholes and collect soil samples at the Birds Eye site on July 19-22, 2011 by a Washington State licensed driller with Cascade Drilling. The approximate locations of boreholes B11-18 through B11-23 are presented in Figure 3 of the main RI/FS body. The drilling locations were adjusted from those proposed based on underground utilities (Figure 3 of the main RI/FS body) and observations made in the field. Note that the locations of utilities and boreholes presented on Figure 3 of the main RI/FS body are approximate; they have not been surveyed. Site hydrogeology is summarized in the main RI/FS report and is not repeated in this appendix.

The boreholes were advanced to approximately 55 feet below ground, with the following exceptions:

- Heaving sands were encountered during drilling of multiple boreholes. The first borehole drilled, B11-18 was terminated at approximately 52-feet below ground because the driller was not confident samples deeper than 52 feet would be representative of the formation due to the heave. Drilling techniques and materials were used on subsequently drilled boreholes to facilitate representative sample collection in heaving conditions.
- Field observations during drilling B11-20 indicated the borehole was outside the extent of petroleum-contamination. Therefore, drilling was terminated at 38 feet.
- Viscous Non-Aqueous Phase Liquid (NAPL) was encountered during drilling B11-22 at approximately 25 to 30 feet. Field observations indicated the sample at 38 feet did not contain NAPL so drilling was terminated.

Geologic logs are presented in Attachment A. During drilling, sheen tests and a photoionization detector (PID) were used as screening tools to assess the presence of petroleum compounds. Non-aqueous phase liquid (NAPL) was observed during drilling of B11-18, B11-19, and B11-22 at depths of approximately 25 to 30 feet below ground.

Soil and petroleum contamination in the upper 30 feet in the vicinity of boreholes B11-18, B11-19, B11-20, and B11-22 were characterized during the January/February 2011 Investigation. Therefore, soil samples from these boreholes were collected for lab analyses when field observations indicated the boreholes had been advanced into “clean” soil below the petroleum contamination. The shallowest and deepest soil samples collected for lab analyses from these boreholes ranged from 32-feet (B11-20) to 55-feet (B11-19) below ground.

Soil samples from the boreholes east of the former Boiler Room USTs, B11-21 and B11-23, were collected at depths ranging from approximately 15 to 55 feet below ground.

Soil samples for lab analyses were collected from split-spoon samplers driven into undisturbed soil in advance of the auger flights. Soil samples for diesel and oil analyses were collected from

the split spoons using decontaminated stainless steel spoons to fill laboratory-prepared containers. Soil samples for gasoline and benzene, ethylbenzene, toluene, and xylenes (BTEX) analyses were collected using laboratory-provided plastic syringes to add approximately 4 to 4.5 mL of soil from the split spoon samplers to laboratory-prepared vials. Whenever possible, soil for lab analyses was not collected that was in direct contact with the sides of the split spoon samplers.

Samples were analyzed by Friedman and Bruya, a Washington-state certified laboratory, by the following methods:

- Diesel-range and heavy oil-range hydrocarbons by Method NWTPH-Dx
- Gasoline-range hydrocarbons and BTEX by EPA Methods 8021F

3.0 SUMMARY OF ANALYTICAL RESULTS

In Washington, cleanup levels are established for numerous toxic substances in different media (soil, groundwater, etc.) under the Model Toxics Control Act (MTCA, Washington State Administrative Code 173-340), which is regulated by the Washington State Department of Ecology (Ecology). MTCA Method A (Method A) cleanup levels may be applied to sites that have few hazardous substances.

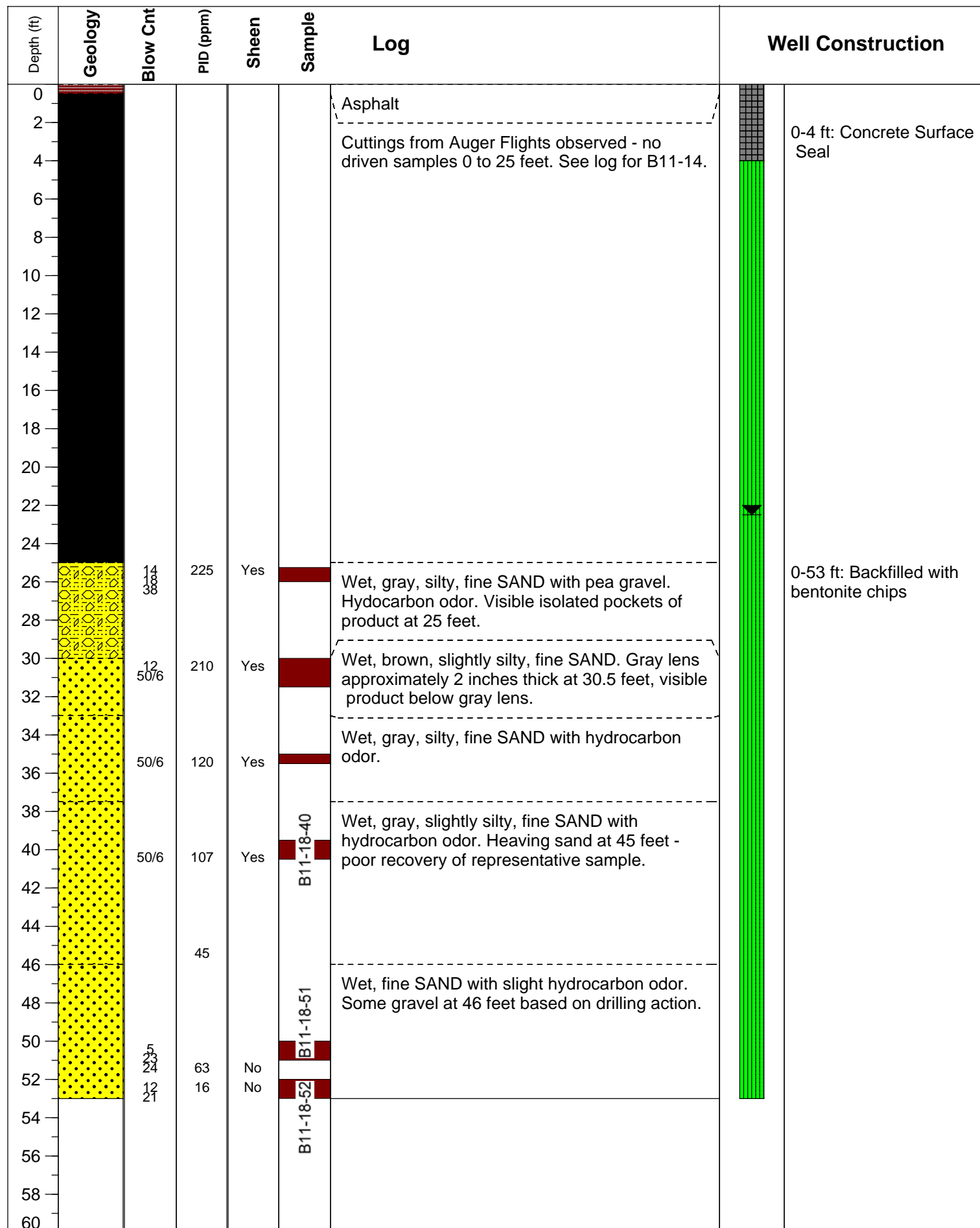
There are Method A **soil** cleanup levels for unrestricted land use and for industrial site use¹. An industrial use means properties that are or have been characterized by, or are to be committed to, traditional industrial uses such as processing or manufacturing of materials; marine terminal and transportation areas and facilities; fabrication, assembly, treatment, or distribution of manufactured products; or storage of bulk materials that are zoned industrial. The Nalley's site would likely qualify as an industrial property.

The analytical data indicate that concentrations of petroleum compounds in the July 2011 soil samples do not exceed Method A Industrial cleanup levels (Tables 7-8 of the main RI/FS report body).

Based on these results and field observations, petroleum-contaminated soil does not extend as far east as boreholes B11-21 and B11-23 (Figure 3 of the main RI/FS body). In addition the depth of contamination in the south end near B11-22 is shallower than 38 feet, and in the west/central area near B11-18 and north area near B11-19 is shallower than 40- and 45-feet respectively.

¹ The former Nalley's site Method A cleanup levels have been applied to groundwater investigations performed at the former Nalley's site since the 1992 Remedial Investigations.

ATTACHMENT A BORING LOGS



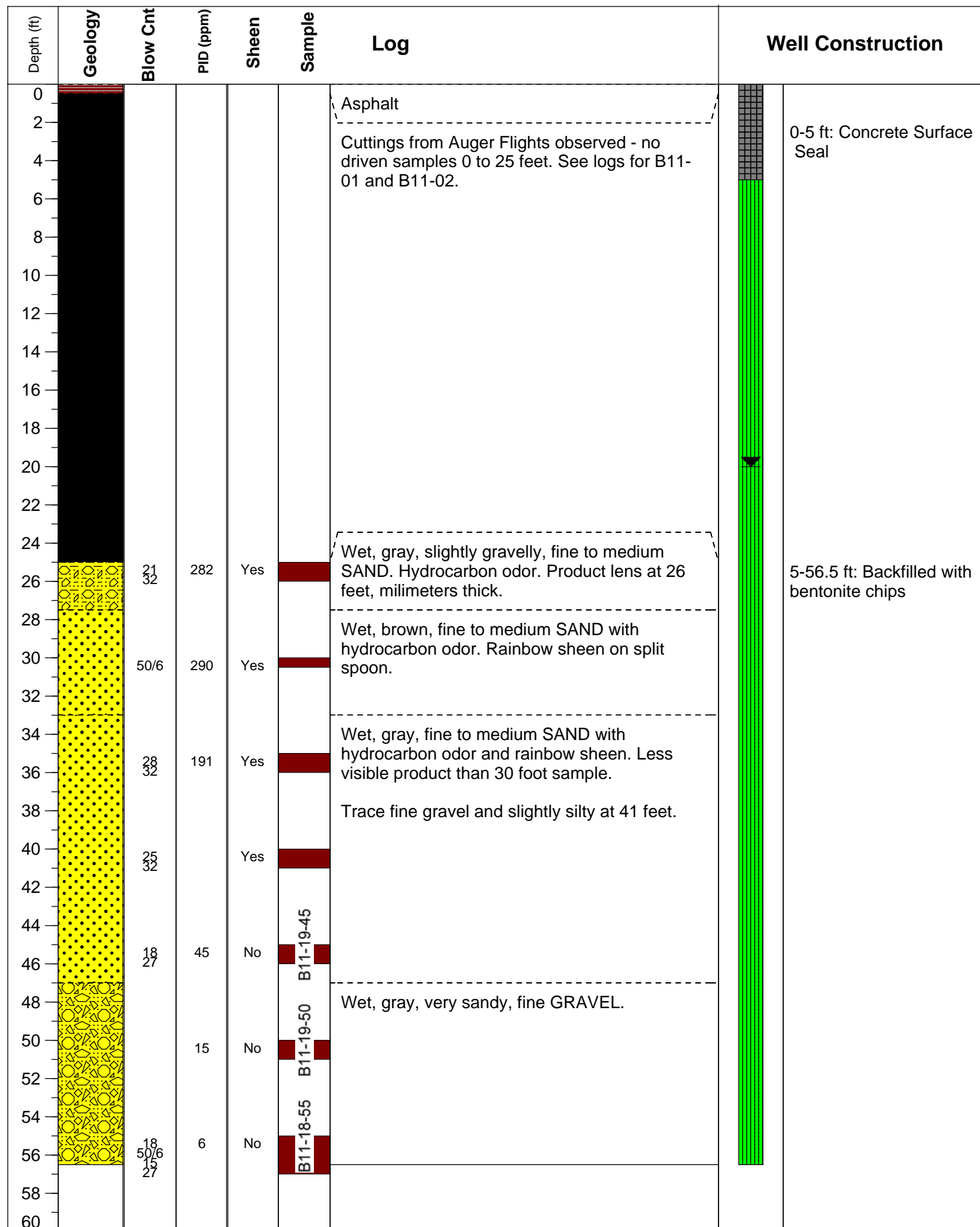
Project Name: BEF 2011 Soil Investigation II
 Drilling Method: Hollow Stem Auger
 Driller: Jeremiah Jenkins
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: I. Jackson

Borehole Name: B11-18
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 7/19/2011
 DTW:

FIGURE 1 GEOLOGIC LOG AND AS-BUILT FOR BOREHOLE B11-18

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





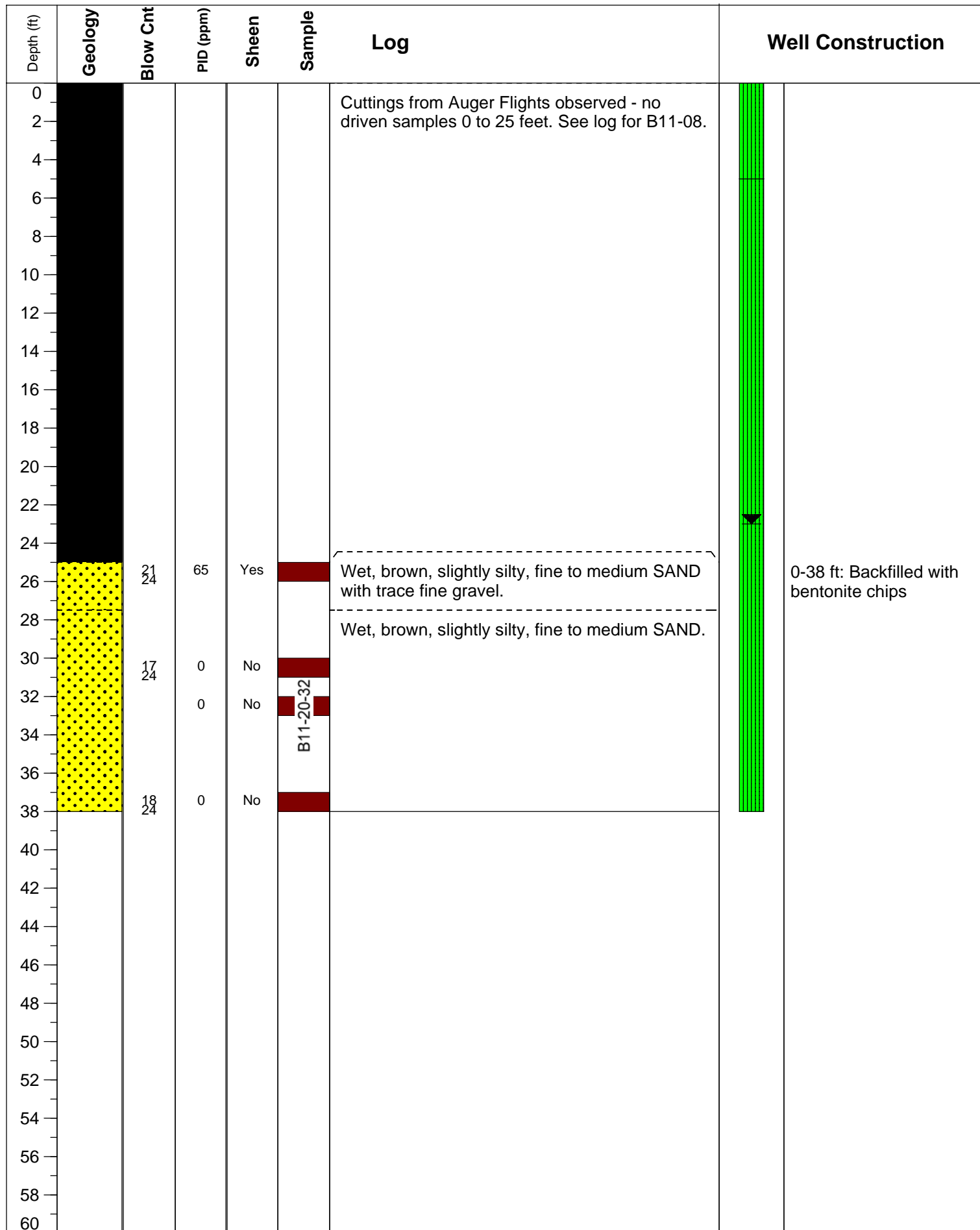
Project Name: BEF 2011 Soil Investigation II
 Drilling Method: Hollow Stem Auger
 Driller: Jeremiah Jenkins
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: I. Jackson

Borehole Name: B11-19
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 7/20/2011
 DTW:

FIGURE 2 GEOLOGIC LOG AND AS-BUILT FOR BOREHOLE B11-19

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.02, 2/2011





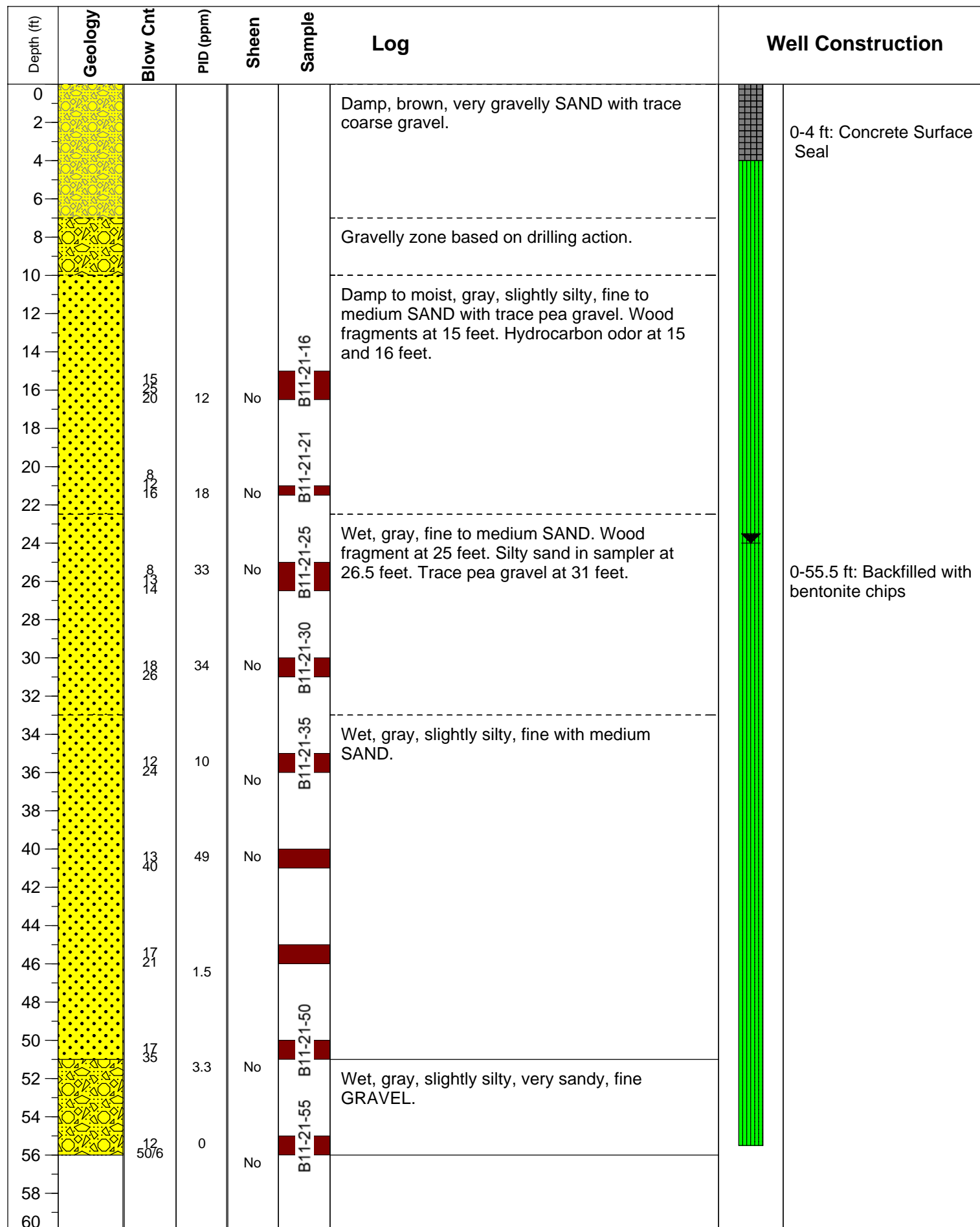
Project Name: BEF 2011 Soil Investigation II
 Drilling Method: Hollow Stem Auger
 Driller: Jeremiah Jenkins
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: I. Jackson

Borehole Name: B11-20
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 7/20/2011
 DTW:

FIGURE 3
GEOLOGIC LOG AND AS-BUILT
FOR BOREHOLE B11-20

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.03, 7/2011





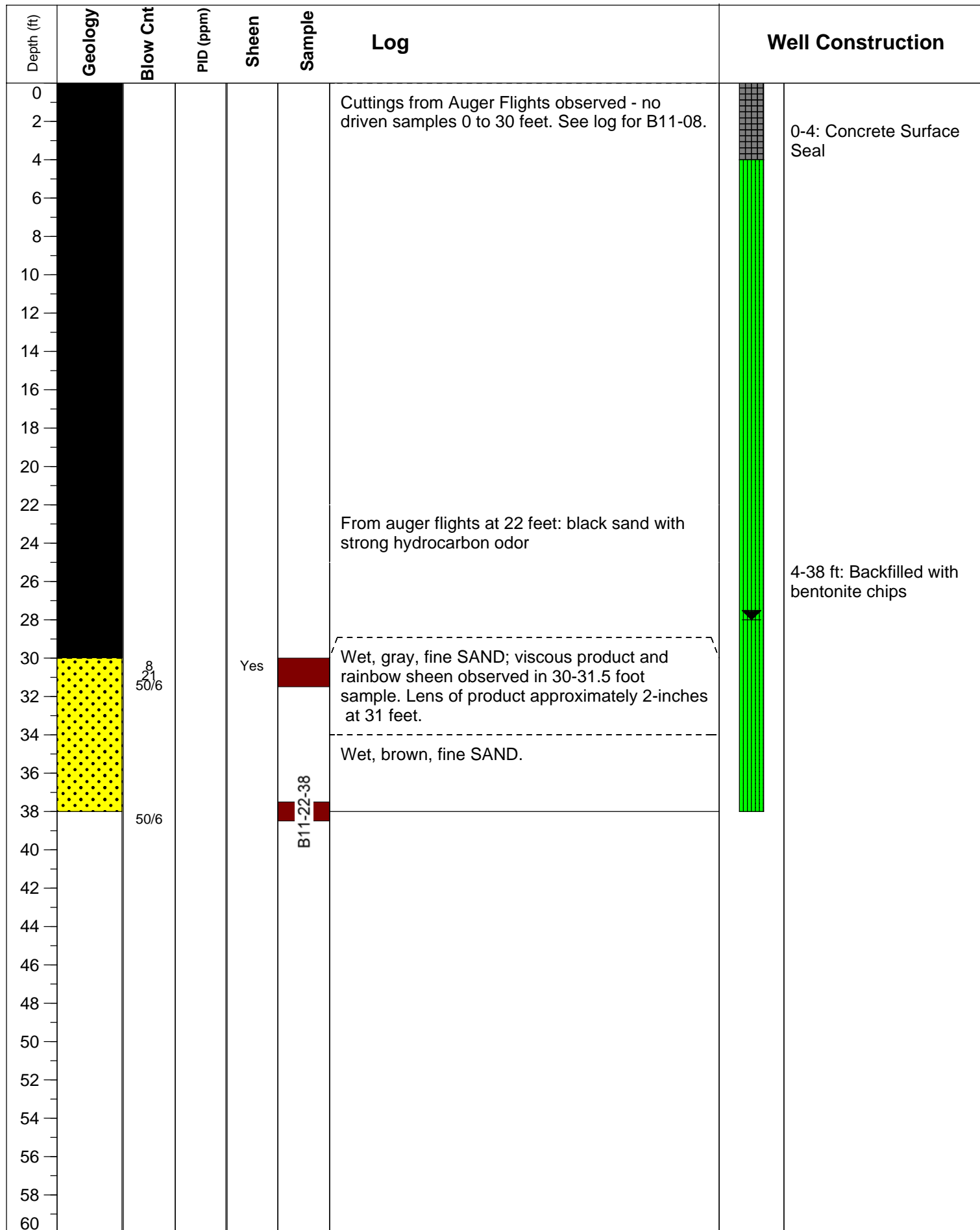
Project Name: BEF 2011 Soil Investigation II
 Drilling Method: Hollow Stem Auger
 Driller: Jeremiah Jenkins
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: I. Jackson

Borehole Name: B11-21
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 7/21/2011
 DTW:

FIGURE 4 GEOLOGIC LOG AND AS-BUILT FOR BOREHOLE B11-21

Birds Eye Foods Site
 Tacoma, Washington
 J11001.03, 7/2011





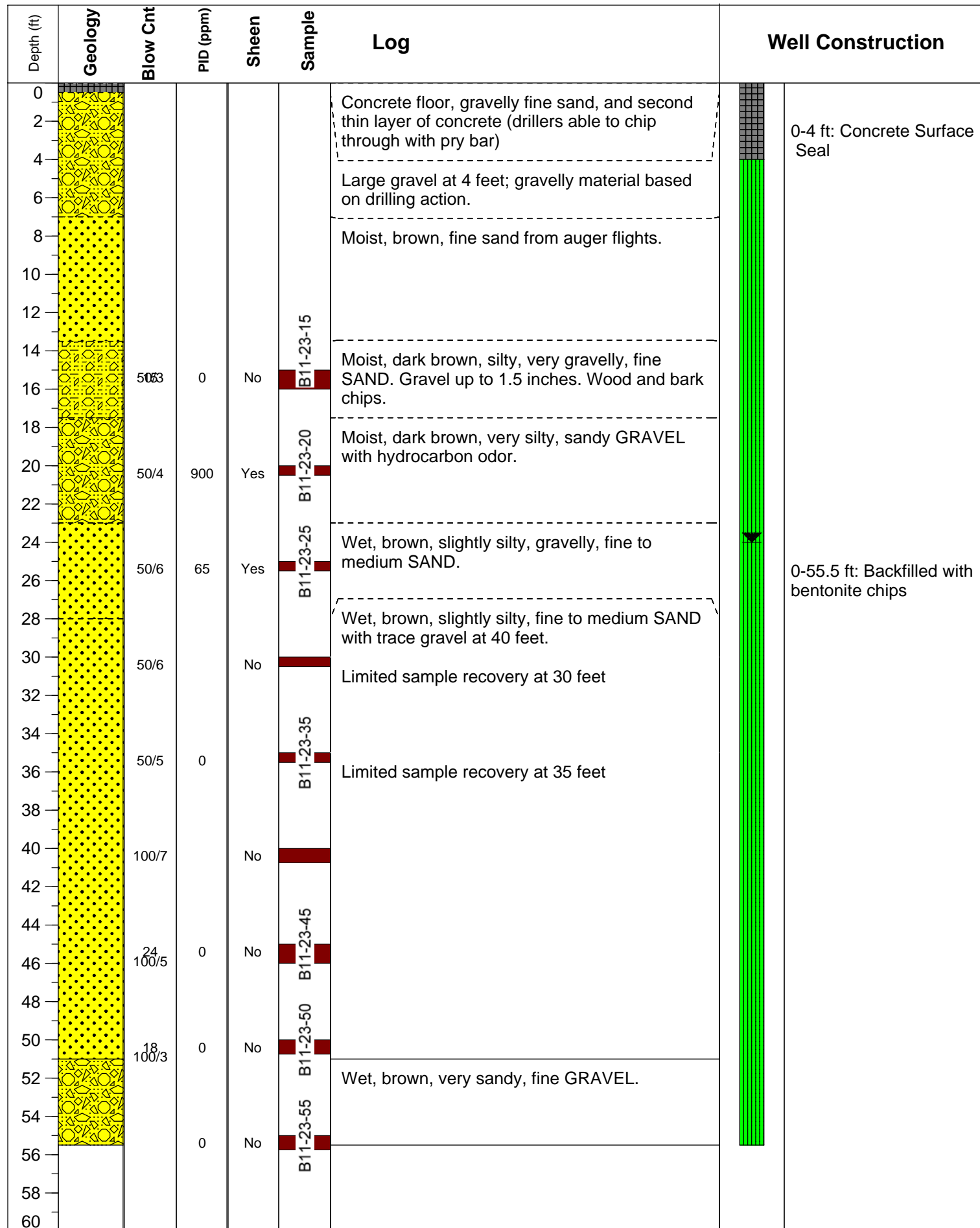
Project Name: BEF 2011 Soil Investigation II
 Drilling Method: Hollow Stem Auger
 Driller: Jeremiah Jenkins
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: I. Jackson

Borehole Name: B11-22
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 7/21/2011
 DTW:

FIGURE 4
GEOLOGIC LOG AND AS-BUILT
FOR BOREHOLE B11-22

Birds Eye Foods Site
 Tacoma, Washington
 JI1001.03, 7/2011





Project Name: BEF 2011 Soil Investigation II
 Drilling Method: Hollow Stem Auger
 Driller: Jeremiah Jenkins
 Firm: Cascade Drilling
 Consulting Firm: Pacific Groundwater Group
 Logged by: I. Jackson

Borehole Name: B11-23
 Ecology ID: NA
 MP Elevation:
 Datum:
 Drilled: 7/22/2011
 DTW:

FIGURE 5 GEOLOGIC LOG AND AS-BUILT FOR BOREHOLE B11-23

Birds Eye Foods Site
 Tacoma, Washington
 J11001.03, 7/2011



**ATTACHMENT B
LAB ANALYTICAL REPORTS**

(SEE DIGITAL COPY OF BIRDS EYE FOODS 2011 RI/FS)

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

July 26, 2011

Inger Jackson, Project Manger
Pacific Groundwater Group
2377 Eastlake Ave East
Seattle, WA 98102

Dear Ms. Jackson:

Included are the results from the testing of material submitted on July 20, 2011 from the Pinnacle RI JI1001.03, F&BI 107260 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
PGG0726R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 20, 2011 by Friedman & Bruya, Inc. from the Pacific Groundwater Group Pinnacle RI JI1001.03, F&BI 107260 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Pacific Groundwater Group</u>
107260-01	B11-18-40
107260-02	B11-18-51
107260-03	B11-18-52
107260-04	B11-19-45
107260-05	B11-19-50
107260-06	B11-19-55
107260-07	B11-20-32

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/26/11
 Date Received: 07/20/11
 Project: Pinnacle RI JI1001.03, F&BI 107260
 Date Extracted: 07/22/11
 Date Analyzed: 07/22/11

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
 FOR BENZENE, TOLUENE, ETHYLBENZENE,
 XYLENES AND TPH AS GASOLINE
 USING EPA METHOD 8021B AND NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 50-150)
B11-18-40 107260-01	<0.02	<0.02	0.037	0.11	14	108
B11-18-51 107260-02	<0.02	<0.02	<0.02	<0.06	<2	105
B11-18-52 107260-03	<0.02	<0.02	<0.02	<0.06	<2	108
B11-19-45 107260-04	<0.02	<0.02	<0.02	<0.06	<2	109
B11-19-50 107260-05	<0.02	<0.02	<0.02	<0.06	<2	105
B11-19-55 107260-06	<0.02	<0.02	<0.02	<0.06	<2	105
B11-20-32 107260-07	<0.02	<0.02	<0.02	<0.06	<2	106
Method Blank 01-1313 MB	<0.02	<0.02	<0.02	<0.06	<2	101

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/26/11

Date Received: 07/20/11

Project: Pinnacle RI JI1001.03, F&BI 107260

Date Extracted: 07/22/11

Date Analyzed: 07/22/11

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> (% Recovery) (Limit 50-150)
B11-18-40 107260-01	270	<250	120
B11-18-51 107260-02	<50	<250	115
B11-18-52 107260-03	<50	<250	117
B11-19-45 107260-04	<50	<250	121
B11-19-50 107260-05	<50	<250	115
B11-19-55 107260-06	<50	<250	118
B11-20-32 107260-07	<50	<250	117
Method Blank 01-1309 MB	<50	<250	110

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/26/11

Date Received: 07/20/11

Project: Pinnacle RI JI1001.03, F&BI 107260

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES, AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 107260-06 (Duplicate)

Analyte	Reporting Units	(Wet Wt) Sample Result	(Wet Wt) Duplicate Result	Relative Percent Difference (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Toluene	mg/kg (ppm)	<0.02	<0.02	nm
Ethylbenzene	mg/kg (ppm)	<0.02	<0.02	nm
Xylenes	mg/kg (ppm)	<0.06	<0.06	nm
Gasoline	mg/kg (ppm)	<2	<2	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	103	69-120
Toluene	mg/kg (ppm)	0.5	95	70-117
Ethylbenzene	mg/kg (ppm)	0.5	99	65-123
Xylenes	mg/kg (ppm)	1.5	98	66-120
Gasoline	mg/kg (ppm)	20	105	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/26/11

Date Received: 07/20/11

Project: Pinnacle RI JI1001.03, F&BI 107260

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL
SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 107260-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	(Wet wt) Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	96	95	73-135	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	94	74-139

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 - More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr - The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - 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.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

107260

SAMPLE CHAIN OF CUSTODY

ME

7/20/11

1303/153

Send report to Inger Jackson

Company Pacific Groundwater Group

Address 2377 Eastlake Ave E

City, State, ZIP Seattle, WA 98102

Phone # 206 339 0141 Fax # 206 339 6968

SAMPLERS (signature) PO#

J11601.03

PROJECT NAME/NO.

Pinned RT

J11601.03

TURNAROUND TIME
Standard (2 Weeks)
Rush charges authorized byREMARKS
Please provide EDD in RGS format.
Please include in Case Narr. or cover letter.SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

opinion about MUTH-DX (2 peds found) and gas is: weathered product.

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Direct	TPH-Gasoline	BTEX by 802HB	VOCs by 8260	SVOCs by 8270	HFCS	TPH-DX	BTEX-G	Notes
B11-18-40	01	7/19/11	1002	Soil	5							1	4	
B11-18-51	02	7/19/11	1133	Soil	5							1	4	
B11-18-52	03	7/19/11	1206	Soil	5							1	4	
B11-19-45	04	7/19/11	919	Soil	5							1	4	
B11-19-50	05	7/20/11	930	Soil	5							1	4	
B11-19-55	06	7/20/11	935	Soil	5							1	4	
B11-20-32	07	7/20/11	1330	Soil	5							1	4	

Friedman & Briva, Inc.

3012 16th Avenue West

Seattle, WA 98119-2029

Ph. (206) 285-8282

Fax (206) 283-5044

FORMS/COC/COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
<i>Inger Jackson</i>	Inger Jackson	Pacific Groundwater Group	7/20/11	1749
<i>Yelena Aravkina</i>	Yelena Aravkina	RTB, Inc.	07/20/11	1750
Received by:		Samples received at	5:00	

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

July 28, 2011

Inger Jackson, Project Manger
Pacific Groundwater Group
2377 Eastlake Ave East
Seattle, WA 98102

Dear Ms. Jackson:

Included are the results from the testing of material submitted on July 22, 2011 from the JI1001.03 Pinnacle RI, F&BI 107315 project. There are 8 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
PGG0728R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 22, 2011 by Friedman & Bruya, Inc. from the Pacific Groundwater Group JI1001.03 Pinnacle RI, F&BI 107315 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Pacific Groundwater Group</u>
107315-01	B11-21-16
107315-02	B11-21-21
107315-03	B11-21-25
107315-04	B11-21-30
107315-05	B11-21-35
107315-06	B11-21-50
107315-07	B11-21-55
107315-08	B11-22-38
107315-09	B11-23-15
107315-10	B11-23-20
107315-11	B11-23-25
107315-12	B11-23-35
107315-13	B11-23-40
107315-14	B11-23-45
107315-15	B11-23-50
107315-16	B11-23-55

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/28/11

Date Received: 07/22/11

Project: JI1001.03 Pinnacle RI, F&BI 107315

Date Extracted: 07/25/11

Date Analyzed: 07/25/11 and 07/26/11

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 50-132)
B11-21-16 107315-01	<0.02	<0.02	<0.02	<0.06	<2	102
B11-21-21 107315-02	<0.02	<0.02	<0.02	<0.06	<2	105
B11-21-25 107315-03	<0.02	<0.02	<0.02	<0.06	<2	106
B11-21-30 107315-04	<0.02	<0.02	<0.02	<0.06	<2	106
B11-21-35 107315-05	<0.02	<0.02	<0.02	<0.06	<2	102
B11-21-50 107315-06	<0.02	<0.02	<0.02	<0.06	<2	106
B11-21-55 107315-07	<0.02	<0.02	<0.02	<0.06	<2	105
B11-22-38 107315-08	<0.02	<0.02	<0.02	<0.06	<2	103
B11-23-15 107315-09	<0.02	<0.02	<0.02	<0.06	<2	105
B11-23-20 107315-10	<0.02	<0.02	<0.02	<0.06	<2	106
B11-23-25 107315-11	<0.02	<0.02	<0.02	<0.06	<2	106

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/28/11

Date Received: 07/22/11

Project: JI1001.03 Pinnacle RI, F&BI 107315

Date Extracted: 07/25/11

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**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 50-132)
B11-23-35 107315-12	<0.02	<0.02	<0.02	<0.06	<2	104
B11-23-40 107315-13	<0.02	<0.02	<0.02	<0.06	<2	103
B11-23-45 107315-14	<0.02	<0.02	<0.02	<0.06	<2	104
B11-23-50 107315-15	<0.02	<0.02	<0.02	<0.06	<2	103
B11-23-55 107315-16	<0.02	<0.02	<0.02	<0.06	<2	103
Method Blank 01-1320 MB	<0.02	<0.02	<0.02	<0.06	<2	105

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/28/11

Date Received: 07/22/11

Project: JI1001.03 Pinnacle RI, F&BI 107315

Date Extracted: 07/25/11

Date Analyzed: 07/25/11

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-150)
B11-21-16 107315-01	<50	<250	96
B11-21-21 107315-02	<50	<250	96
B11-21-25 107315-03	<50	<250	94
B11-21-30 107315-04	<50	<250	98
B11-21-35 107315-05	<50	<250	98
B11-21-50 107315-06	<50	<250	96
B11-21-55 107315-07	<50	<250	96
B11-22-38 107315-08	<50	<250	99
B11-23-15 107315-09	<50	<250	101
B11-23-20 107315-10	<50	<250	101
B11-23-25 107315-11	<50	<250	101
B11-23-35 107315-12	<50	<250	99

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/28/11

Date Received: 07/22/11

Project: JI1001.03 Pinnacle RI, F&BI 107315

Date Extracted: 07/25/11

Date Analyzed: 07/25/11

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> (% Recovery) (Limit 50-150)
B11-23-40 107315-13	<50	<250	101
B11-23-45 107315-14	<50	<250	98
B11-23-50 107315-15	<50	<250	99
B11-23-55 107315-16	<50	<250	108
Method Blank 01-1318 MB	<50	<250	102

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/28/11

Date Received: 07/22/11

Project: JI1001.03 Pinnacle RI, F&BI 107315

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES, AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 107313-07 (Duplicate)

Analyte	Reporting Units	(Wet Wt) Sample Result	(Wet Wt) Duplicate Result	Relative Percent Difference (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Toluene	mg/kg (ppm)	<0.02	<0.02	nm
Ethylbenzene	mg/kg (ppm)	<0.02	<0.02	nm
Xylenes	mg/kg (ppm)	<0.06	<0.06	nm
Gasoline	mg/kg (ppm)	<2	<2	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	103	66-121
Toluene	mg/kg (ppm)	0.5	105	72-128
Ethylbenzene	mg/kg (ppm)	0.5	114	69-132
Xylenes	mg/kg (ppm)	1.5	112	69-131
Gasoline	mg/kg (ppm)	20	95	61-153

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/28/11

Date Received: 07/22/11

Project: JI1001.03 Pinnacle RI, F&BI 107315

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL
SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 107315-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	(Wet wt) Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	87	88	63-146	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	90	79-144

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 - More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr - The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - 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.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

107315

SAMPLE CHAIN OF CUSTODY

ME 07/22/11

US3/B03

Page # _____ of _____

Send Report To Inger JacksonCompany Pacific Groundwater GroupAddress 2377 Eastlake Ave ECity, State, ZIP Seattle, WA 98102Phone # 206 329 0141 Fax # 206 329

SAMPLERS (signature) _____

PROJECT NAME/NO. JI1001.03 Pinnacle RT

PO# _____

REMARKS

SAMPLE DISPOSAL

- ☒ Standard (2 Weeks)
☐ RUSH
 Rush charges authorized by _____
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	BTEX+G	nwTPH-DX	Notes
B1-21-16	01	7/21/11	813	Soil	5							4	1	
B1-21-21	02	7/21/11	824	Soil	5							4	1	
B1-21-25	03	7/21/11	830	Soil	5							4	1	
B1-21-30	04	7/21/11	836	Soil	5							4	1	
B1-21-35	05	7/21/11	848	Soil	5							4	1	
B1-21-50	06	7/21/11	912	Soil	5							4	1	
B1-21-55	07	7/21/11	920	Soil	5							4	1	
B1-22-38	08	7/21/11	1330	Soil	5							4	1	
B1-23-15	09	7/24/11	1004	Soil	5							4	1	
B1-23-20	10	7/22/11	1020	Soil	5							4	1	

SIGNATURE

PRINT NAME

COMPANY

DATE

TIME

Relinquished by:

Inger Jackson

RSG

7/22/11

1832

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029

Ph. (206) 285-8282

Fax (206) 283-5044

FORMS/COC/COC.DOC

Received by:

Valerie Arora Varney

TIFB, Inc.

07/24/11

1835

Samples received at 4 °C

VS3/B03

Page # _____ of _____

TURNAROUND TIME

☒ Standard (2 Weeks)

☐ RUSH _____

Rush charges authorized by _____



SAMPLE DISPOSAL

☐ Dispose after 30 days

☐ Return samples

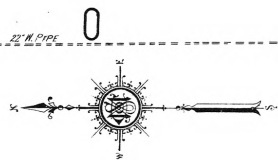
☐ Will call with instructions

[illegible]

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
	Inger Jackson	PG	7/29/11	1832
Received by: 	Yelena Travkins	At B, Inc.	07/29/11	1835
Relinquished by:				
Received by:		Samples received at	4 °C	

APPENDIX B

SANBORN FIRE INSURANCE MAPS



"BURN ST. SHED"
CITY WATER WORKS
PUMPING STATION F.
ON BURN ST. STATION
1000 G.P.S. WATER SERVICE #
CENTRIFUGAL PUMP

2627

2645

2673

2646

2674

2647

2675

2648

192

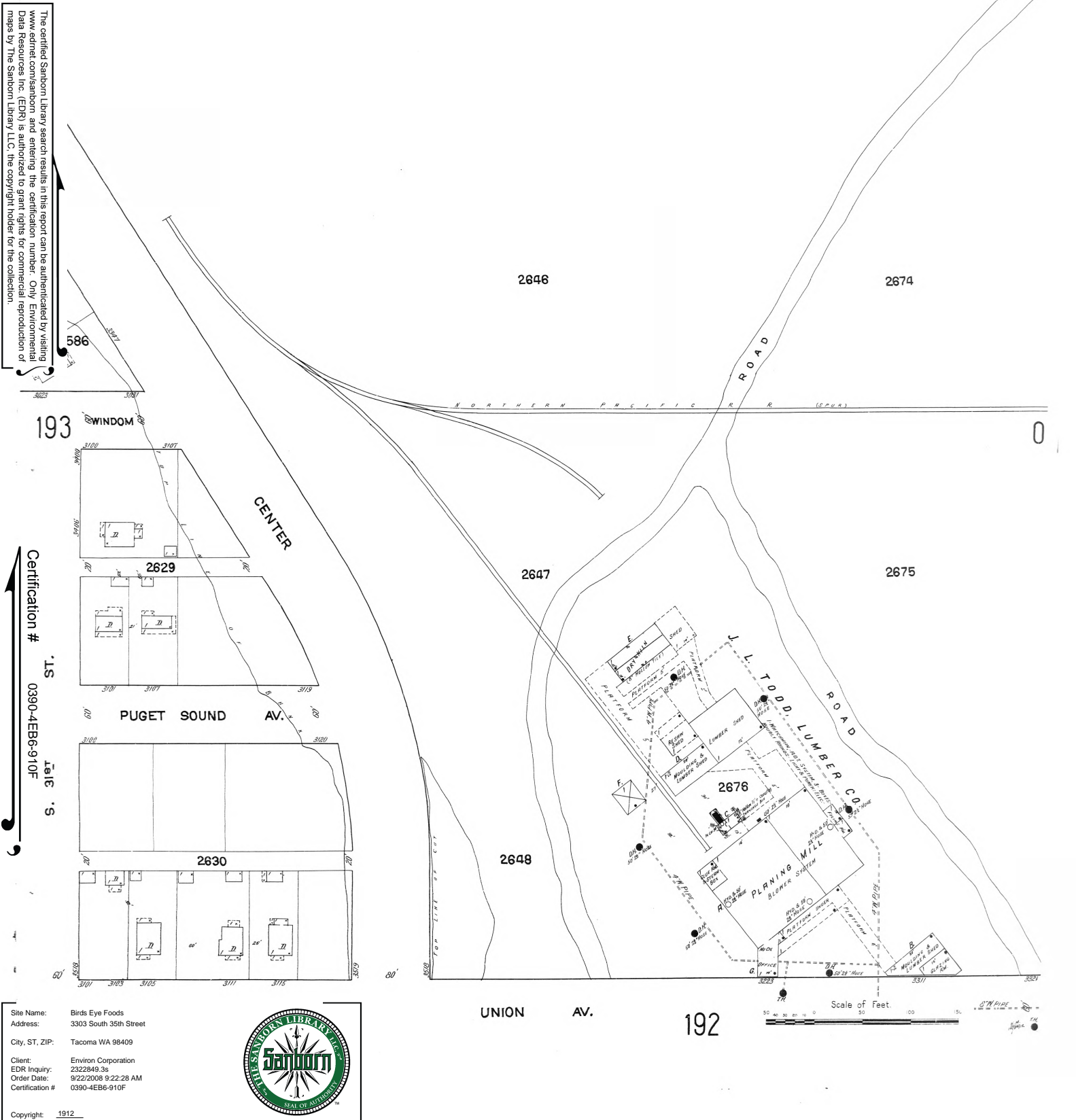
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maps by The Sanborn Library LLC, the copyright holder for the collection.

Certification # 0390-4EB6-910F

Site Name: Birds Eye Foods
Address: 3303 South 35th Street
City, ST, ZIP: Tacoma WA 98409
Client: Environ Corporation
EDR Inquiry: 2322849.3s
Order Date: 9/22/2008 9:22:28 AM
Certification #: 0390-4EB6-910F



Copyright: 1912



PENNSYLVANIA SALT MFG. CO. & WYPENN OIL CO.
DETACHMENTS FORMERLY SHOWN ON THIS SHEET
NOW SHOWN ON SHEET NO. 240 VOL. 2A.

193

(P. 2000)
TACOMA, WASH. VOL. 2
194
(234)
DEC. 1948

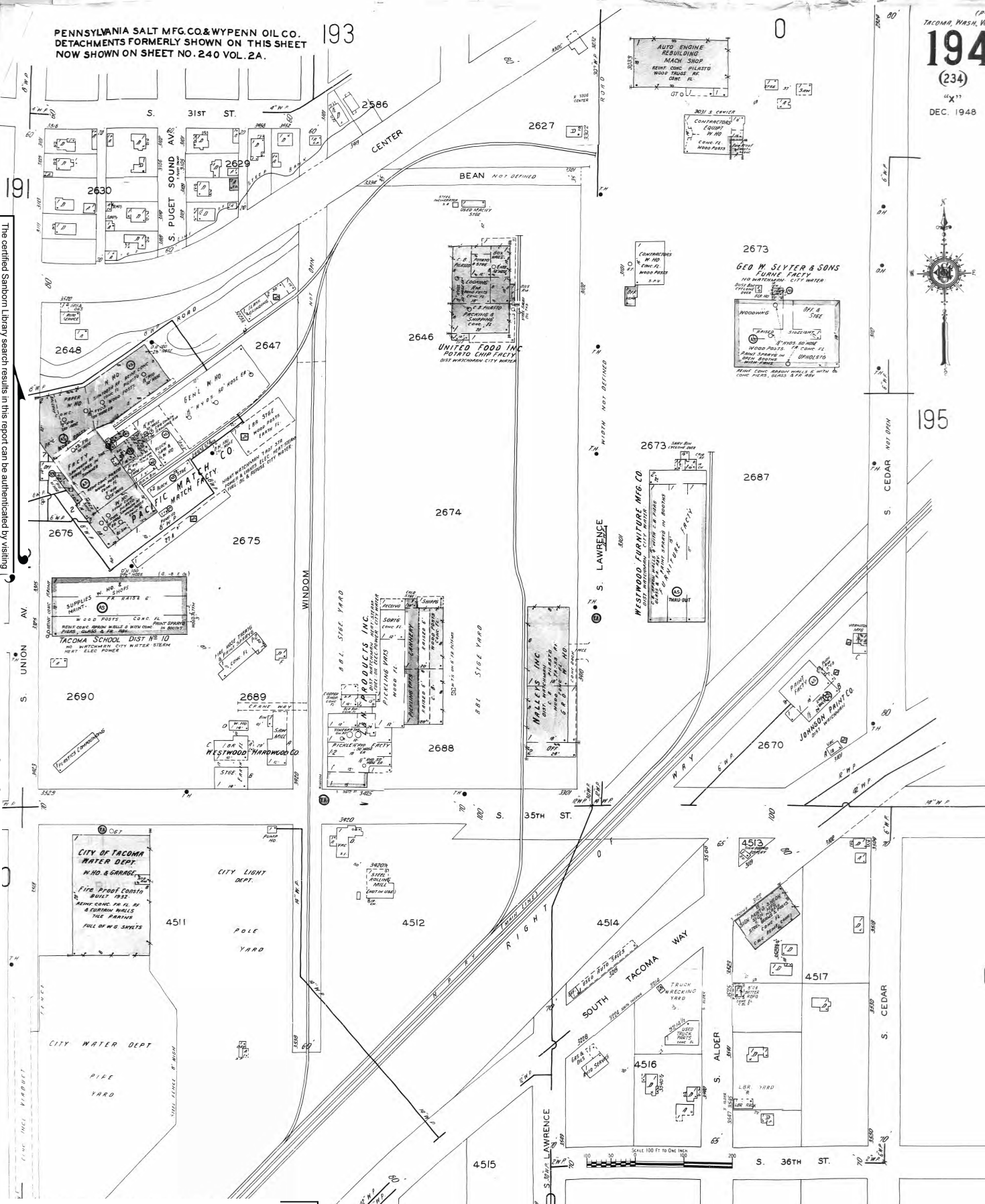
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Certification # 0390-4EB6-910F



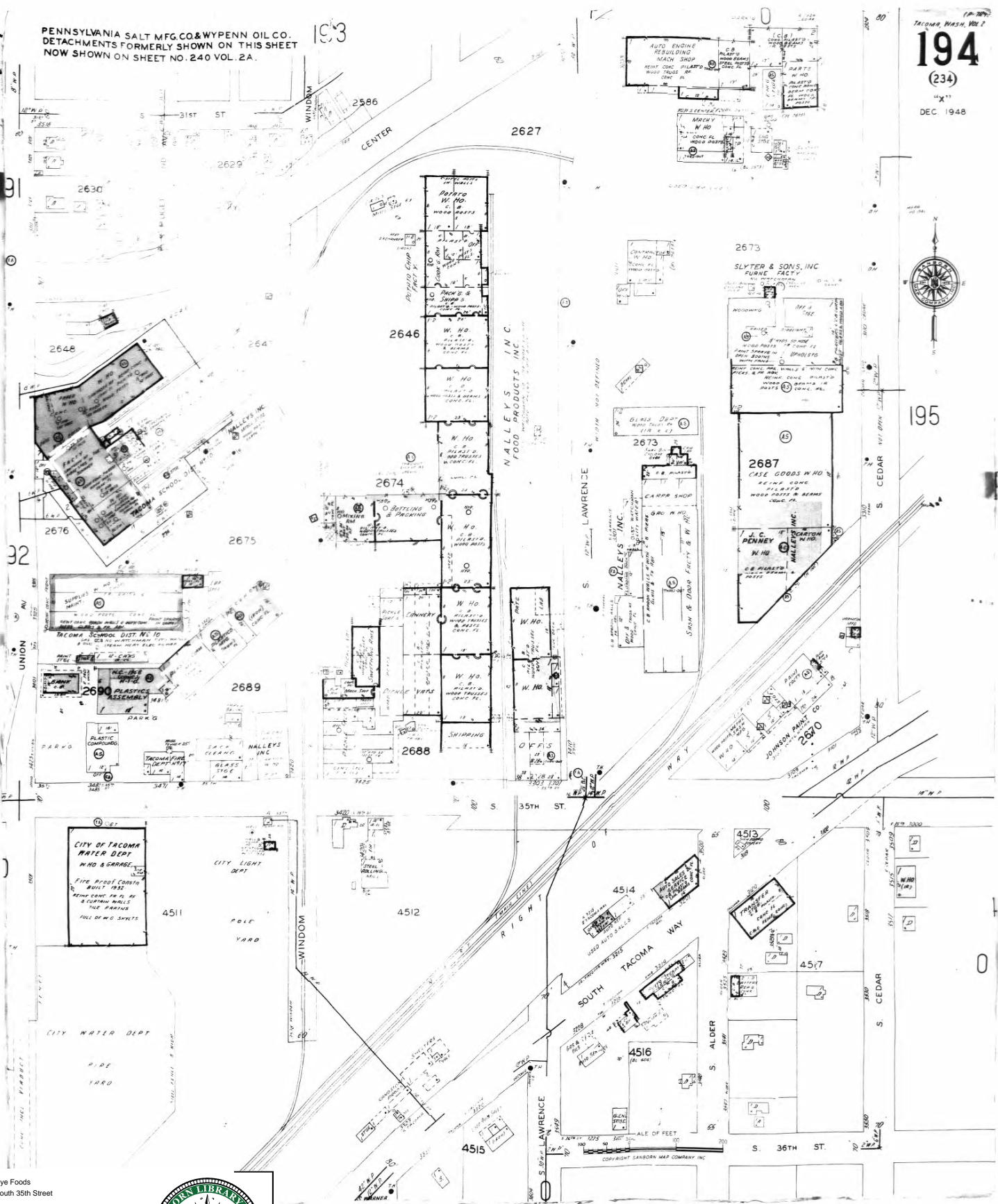
Site Name: Birds Eye Foods
Address: 3303 South 35th Street
City, ST, ZIP: Tacoma WA 98409
Client: Environ Corporation
EDR Inquiry: 2322849.3s
Order Date: 9/22/2008 9:22:28 AM
Certification #: 0390-4EB6-910F

Copyright: 1950



PENNSYLVANIA SALT MFG.CO.&WYPENN OIL CO.
DETACHMENTS FORMERLY SHOWN ON THIS SHEET
NOW SHOWN ON SHEET NO. 240 VOL. 2A.

TACOMA, WASH., VOL. 2
194
(234)
DEC 1948



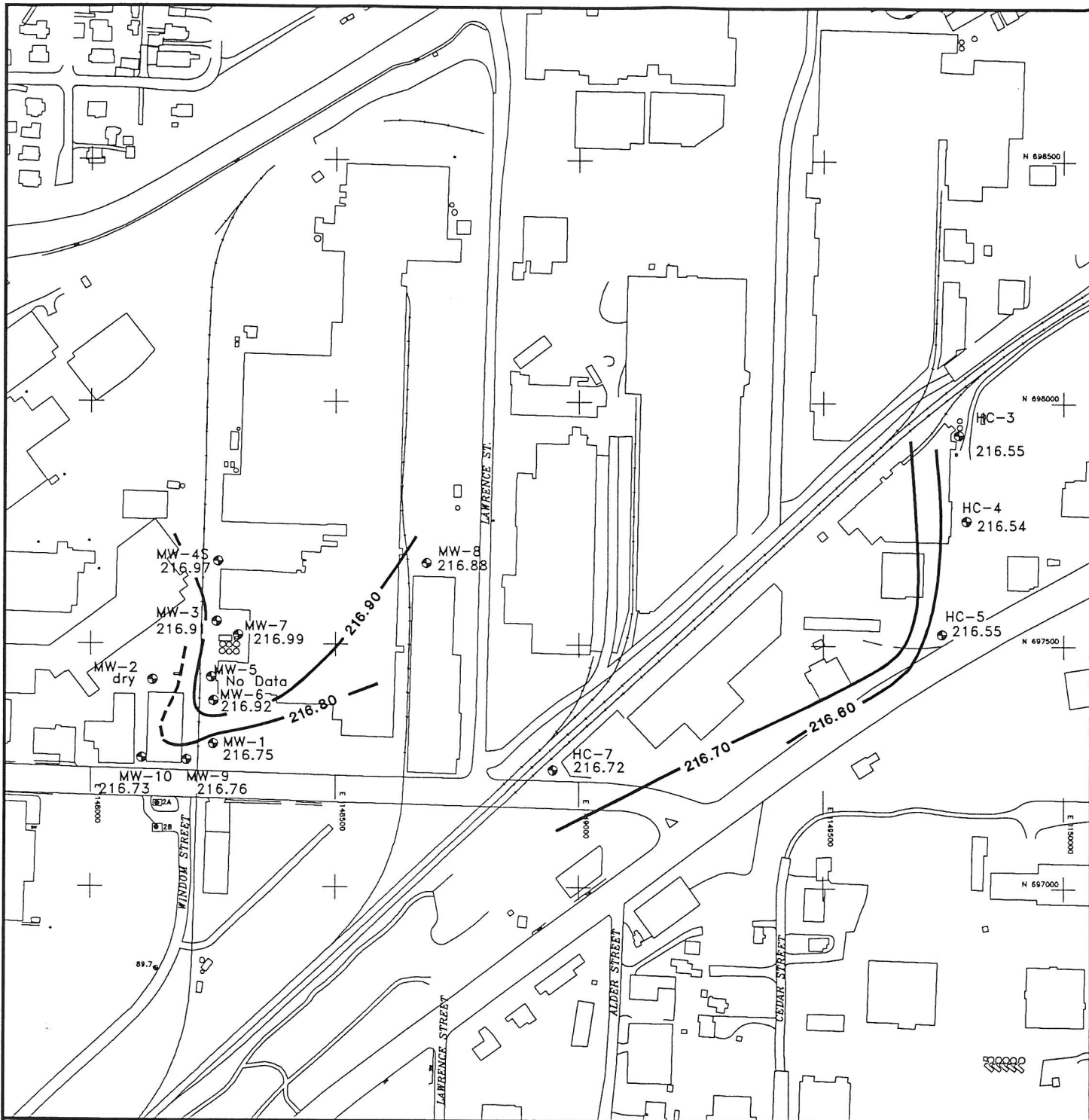
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Certification # 0390-4EB6-910F

Site Name: Birds Eye Foods
Address: 3303 South 35th Street
City, ST, ZIP: Tacoma WA 98409
Client: Environ Corporation
EDR Inquiry: 2322849.3s
Order Date: 9/22/2008 9:22:28 AM
Certification #: 0390-4EB6-910F



APPENDIX C
BIRDS EYE GROUNDWATER CONTOUR MAPS 1991 - 1999



MW-8 Nalley's Monitoring Well

2B City of Tacoma Production Well

89.7 City of Tacoma Monitoring Well

-216.88- Groundwater Contour (contour interval 0.1 feet)

0 75 150 300 600
SCALE IN FEET

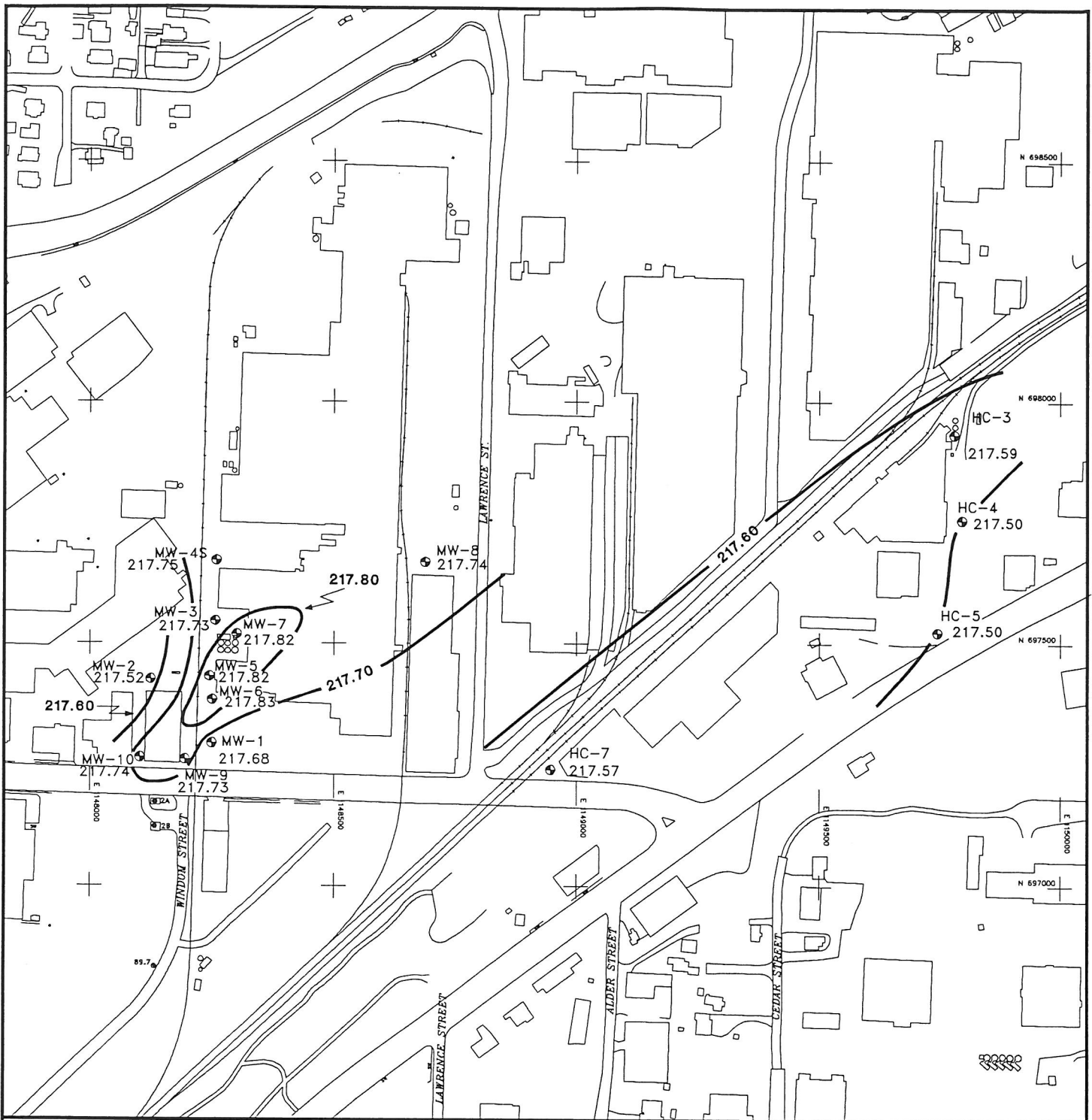


FIGURE 5

WATER TABLE ELEVATION
CONTOUR MAP - 11/05/91

NALLEY'S FINE FOODS

 Pacific
Groundwater
Group



MW-8 Nalley's Monitoring Well

2B City of Tacoma Production Well

89.7 City of Tacoma Monitoring Well

-216.88- Groundwater Contour (contour interval 0.1 feet)

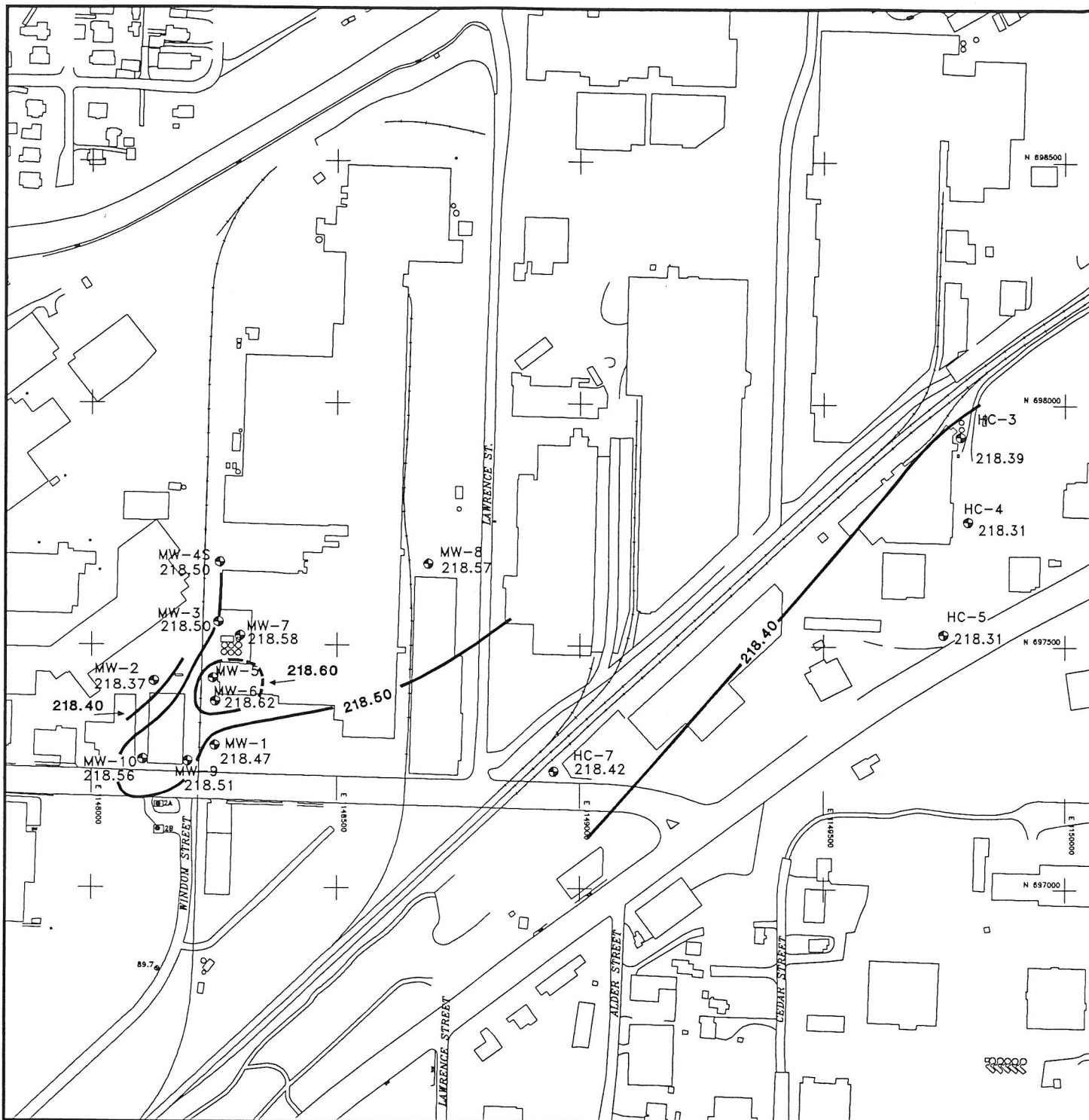
0 75 150 300 600
SCALE IN FEET

FIGURE 6

WATER TABLE ELEVATION
CONTOUR MAP - 12/03/91

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



MW-8 Nalley's Monitoring Well

2B City of Tacoma Production Well

89.7 City of Tacoma Monitoring Well

-216.88- Groundwater Contour (contour interval 0.1 feet)

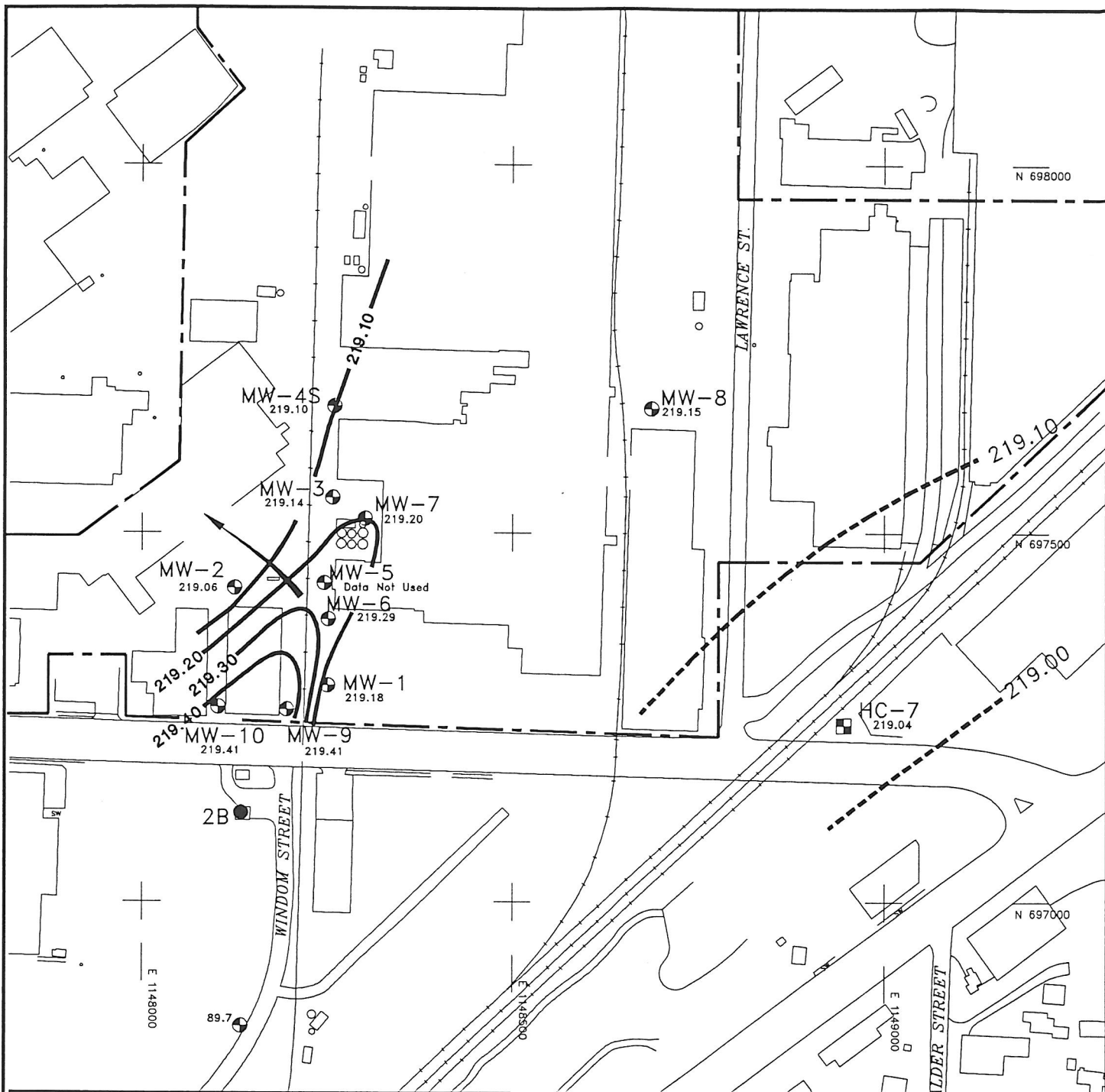
0 75 150 300 600
SCALE IN FEET

FIGURE 7

WATER TABLE ELEVATION
CONTOUR MAP - 01/03/92

NALLEY'S FINE FOODS

 Pacific
Groundwater
Group



LEGEND

- | | | | |
|--|---|------|-----------------------------------|
| MW-8
220.71 | Nalley's
Monitoring Well
with Water Level | 2B | City of Tacoma
Production Well |
| HC-7 | Monitoring Well
by Others | 89.7 | City of Tacoma
Monitoring Well |
| Groundwater Contour with
Elevation in Feet | | | |
| Groundwater Flow Direction in
Vicinity of Removed Tanks | | | |
| Approximate
Property Line | | | |



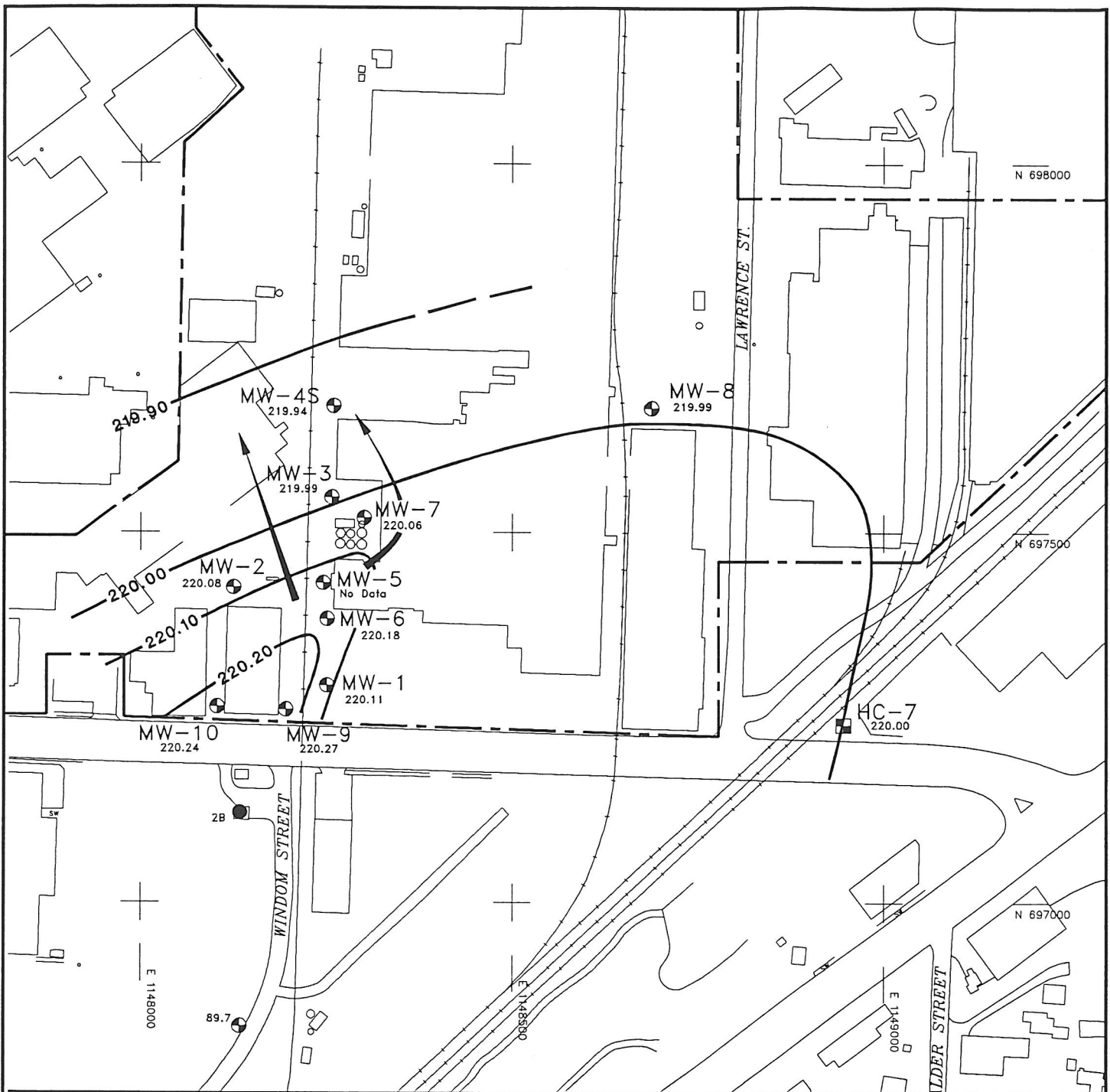
0 50 100 200 400
SCALE IN FEET

FIGURE 8

WATER TABLE ELEVATION CONTOUR MAP - 2/5/92

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

- | | | | |
|----------------|--|------|-----------------------------------|
| MW-8
220.71 | Nalley's
Monitoring Well
with Water Level | 2B | City of Tacoma
Production Well |
| HC-7 | Monitoring Well
by Others | 89.7 | City of Tacoma
Monitoring Well |
| 220.00 | Groundwater Contour with
Elevation in Feet | | |
| → | Groundwater Flow Direction in
Vicinity of Removed Tanks | | |
| - - - | Approximate
Property Line | | |

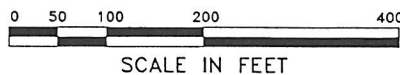


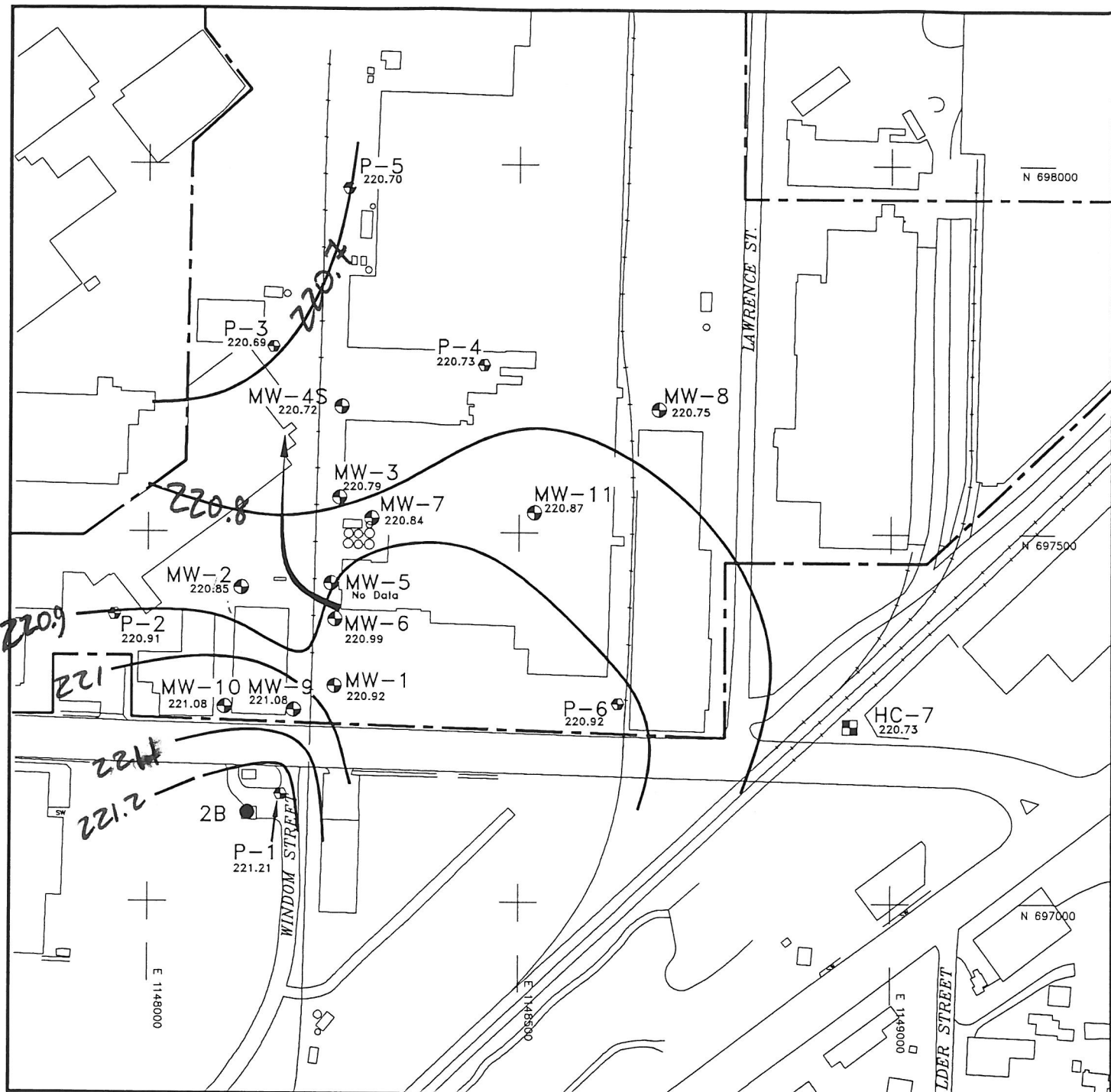
FIGURE 9

WATER TABLE ELEVATION CONTOUR MAP - 4/6/92

NALLEY'S FINE FOODS







LEGEND

- | | | | |
|----------------|--|------|-----------------------------------|
| MW-8
220.71 | Nalley's
Monitoring Well
with Water Level | 2B | City of Tacoma
Production Well |
| P-6
220.83 | Nalley's
Piezometer
with Water Level | 89.7 | City of Tacoma
Monitoring Well |
| 220.00 | Groundwater Contour with
Elevation in Feet | HC-7 | Monitoring Well
by Others |
| ← | Groundwater Flow Direction in
Vicinity of Removed Tanks | | |
| --- | Approximate
Property Line | | |

0 50 100 200 400
SCALE IN FEET

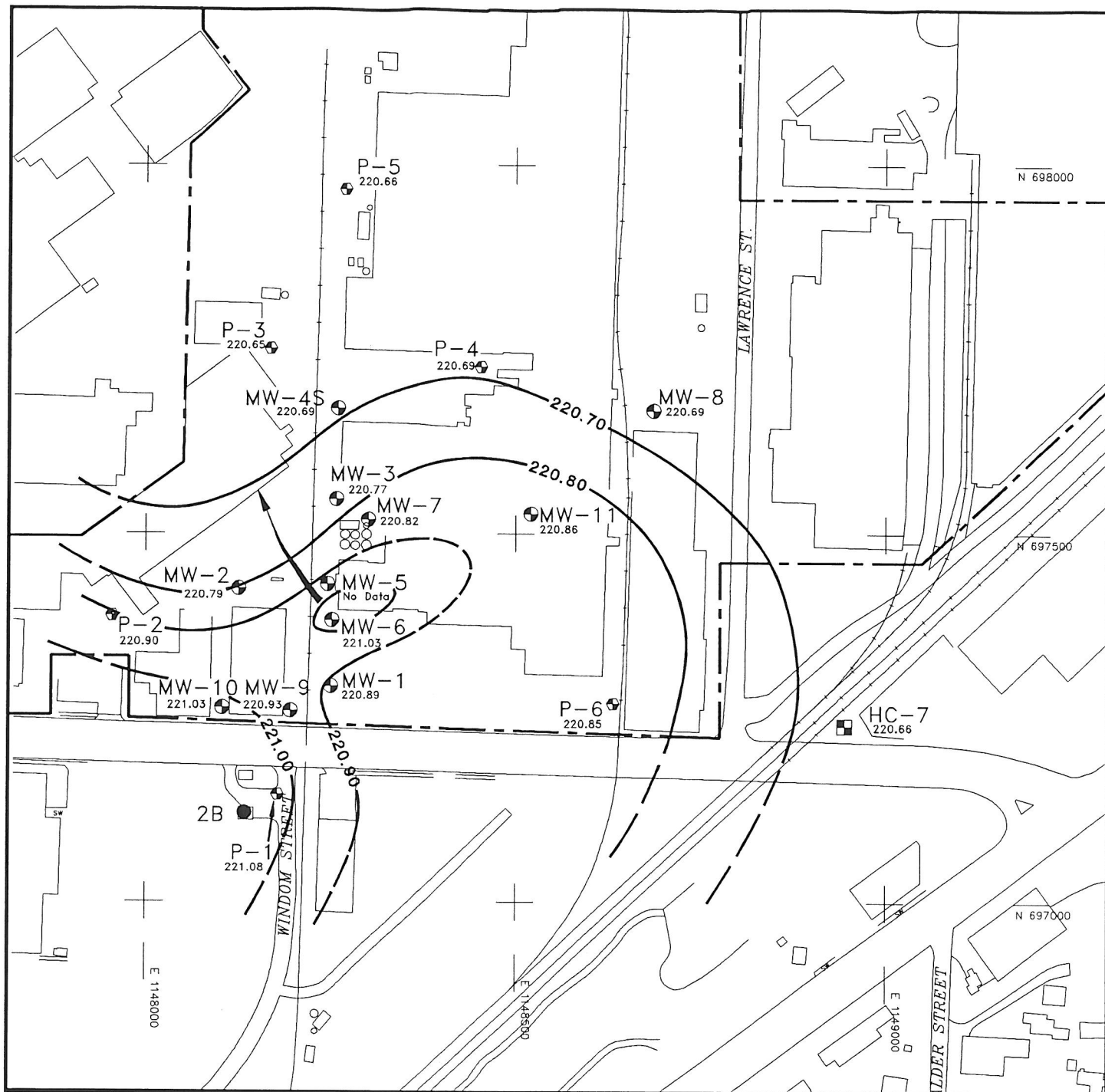


FIGURE 11

WATER TABLE ELEVATION CONTOUR MAP - 6/5/92

NALLEY'S FINE FOODS





LEGEND

- | | | | |
|--------|---|------|--------------------------------|
| MW-8 | Nalley's Monitoring Well with Water Level | 2B | City of Tacoma Production Well |
| P-6 | Nalley's Piezometer with Water Level | 89.7 | City of Tacoma Monitoring Well |
| 220.90 | Groundwater Contour with Elevation in Feet | HC-7 | Monitoring Well by Others |
| → | Groundwater Flow Direction in Vicinity of Removed Tanks | | |
| - - - | Approximate Property Line | | |

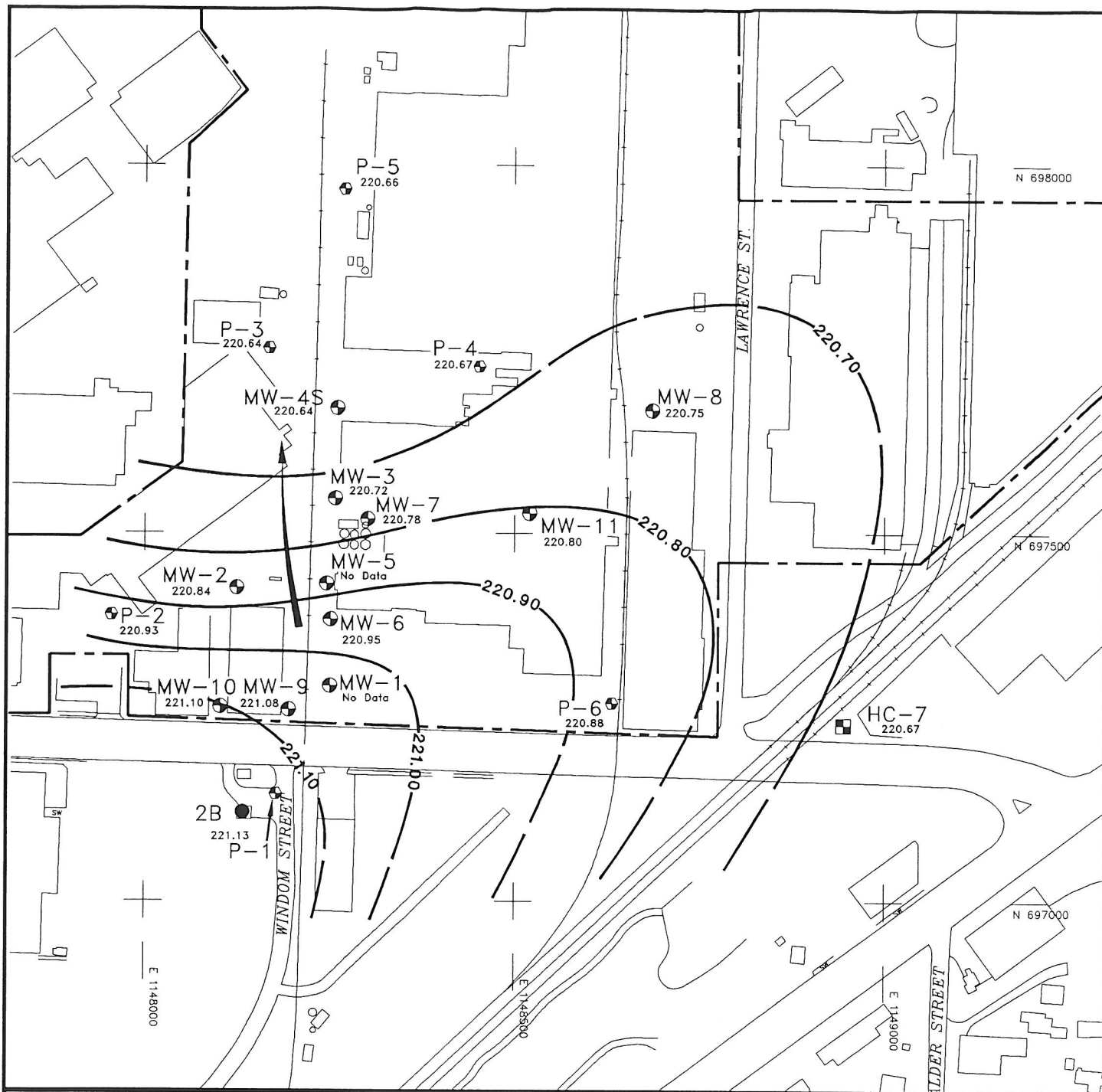
0 50 100 200 400
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION CONTOUR MAP - 7/9/92

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

- | | | | |
|--------|--|------|--------------------------------|
| MW-8 | Nalley's Monitoring Well with Water Level | 2B | City of Tacoma Production Well |
| P-6 | Nalley's Piezometer with Water Level | 89.7 | City of Tacoma Monitoring Well |
| 220.90 | Groundwater Contour with Elevation in Feet | HC-7 | Monitoring Well by Others |

Groundwater Flow Direction in Vicinity of Removed Tanks

Approximate Property Line

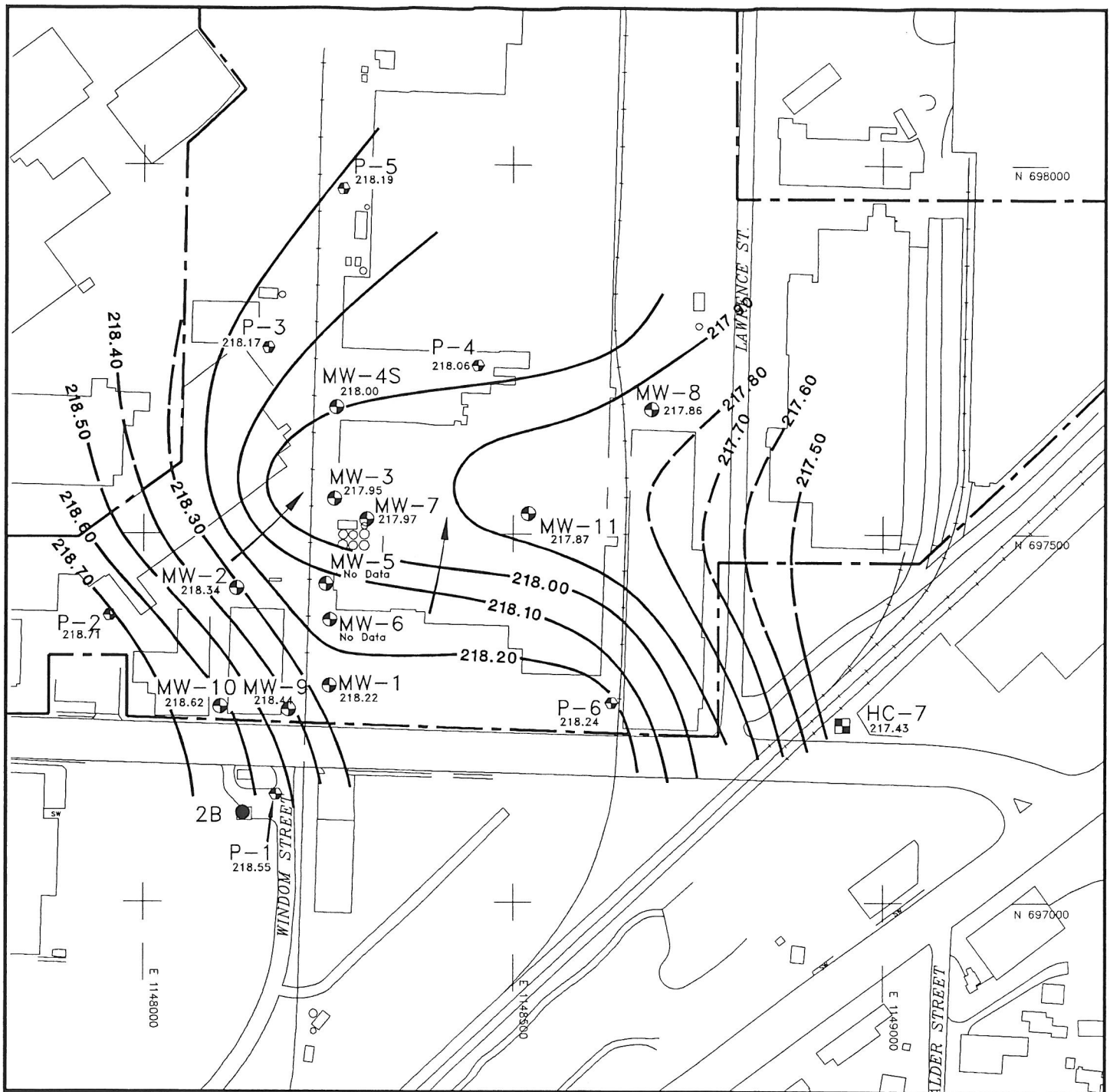
0 50 100 200 400
SCALE IN FEET

FIGURE 2

WATER TABLE ELEVATION CONTOUR MAP - 8/5/92

NALLEY'S FINE FOODS

Pacific Groundwater Group



LEGEND

- | | | | |
|----------------|--|------|-----------------------------------|
| MW-8
217.86 | Nalley's
Monitoring Well
with Water Level | 2B | City of Tacoma
Production Well |
| P-6
218.24 | Nalley's
Piezometer
with Water Level | 89.7 | City of Tacoma
Monitoring Well |
| 220.90 | Groundwater Contour with
Elevation in Feet | HC-7 | Monitoring Well
by Others |
| | Groundwater Flow Direction in
Vicinity of Removed Tanks | | |
| | Approximate
Property Line | | |



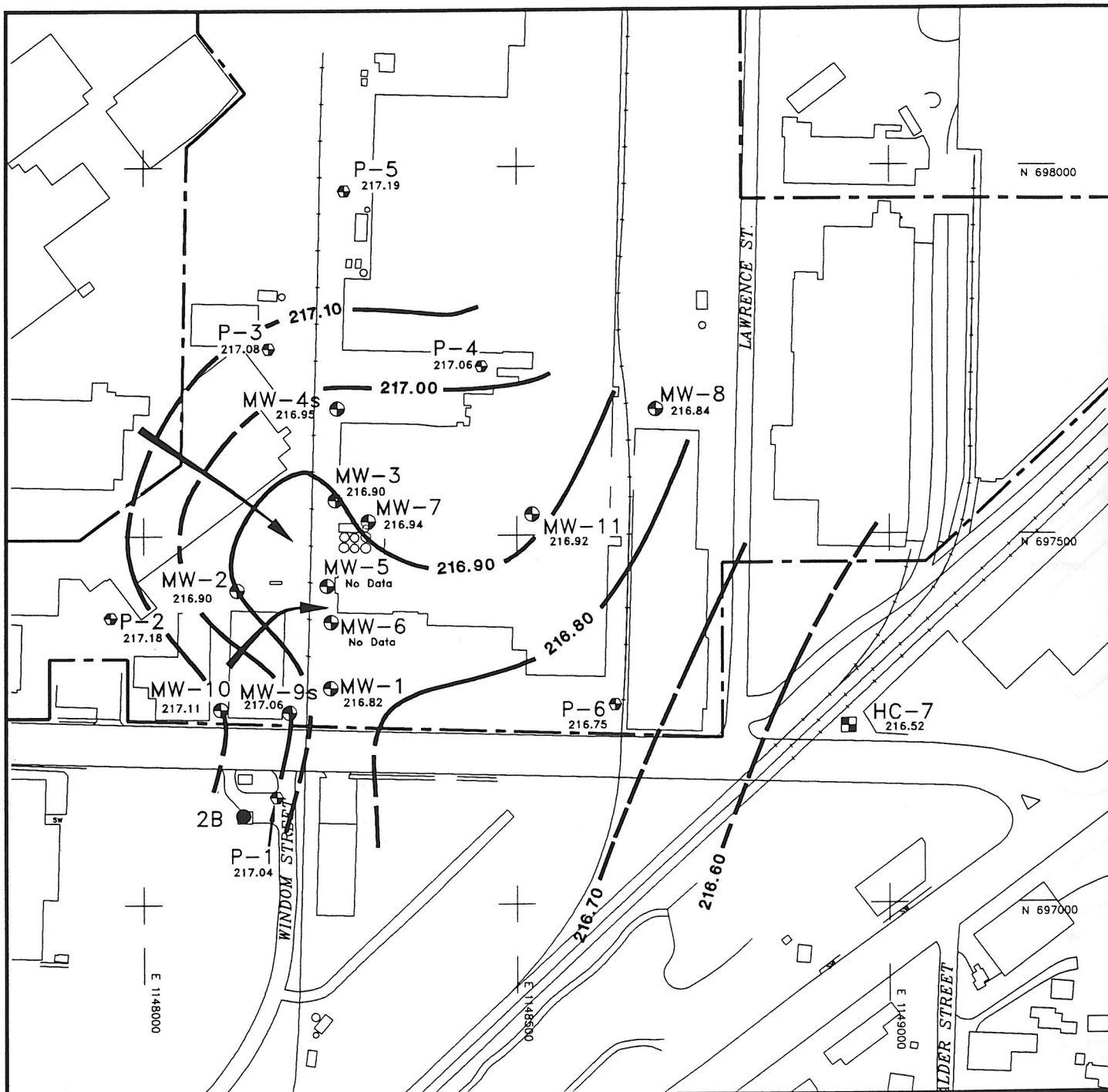
0 50 100 200 400
SCALE IN FEET

FIGURE 3

WATER TABLE ELEVATION CONTOUR MAP - 9/11/92

NALLEY'S FINE FOODS





LEGEND

- | | | | |
|--------|---|------|--------------------------------|
| MW-8 | Nalley's Monitoring Well with Water Level | 2B | City of Tacoma Production Well |
| P-6 | Nalley's Piezometer with Water Level | 89.7 | City of Tacoma Monitoring Well |
| 220.90 | Groundwater Contour with Elevation in Feet | HC-7 | Monitoring Well by Others |
| → | Groundwater Flow Direction in Vicinity of Removed Tanks | | |
| - - - | Approximate Property Line | | |



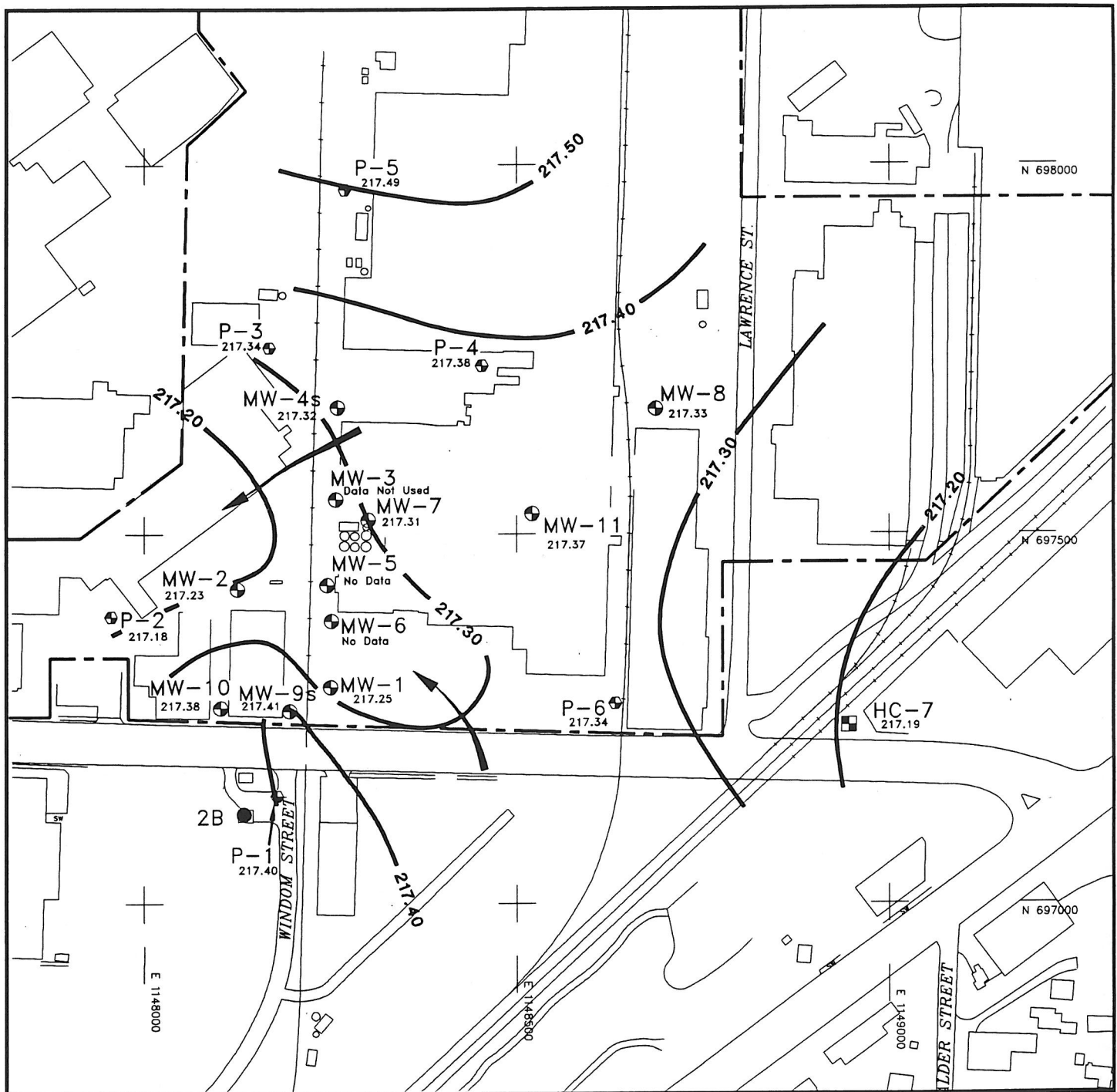
0 50 100 200 400
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION CONTOUR MAP - 10/5/92

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

- | | | | |
|--------|---|------|--------------------------------|
| MW-8 | Nalley's Monitoring Well with Water Level | 2B | City of Tacoma Production Well |
| P-6 | Nalley's Piezometer with Water Level | 89.7 | City of Tacoma Monitoring Well |
| 220.90 | Groundwater Contour with Elevation in Feet | HC-7 | Monitoring Well by Others |
| | Groundwater Flow Direction in Vicinity of Removed Tanks | | |
| | Approximate Property Line | | |

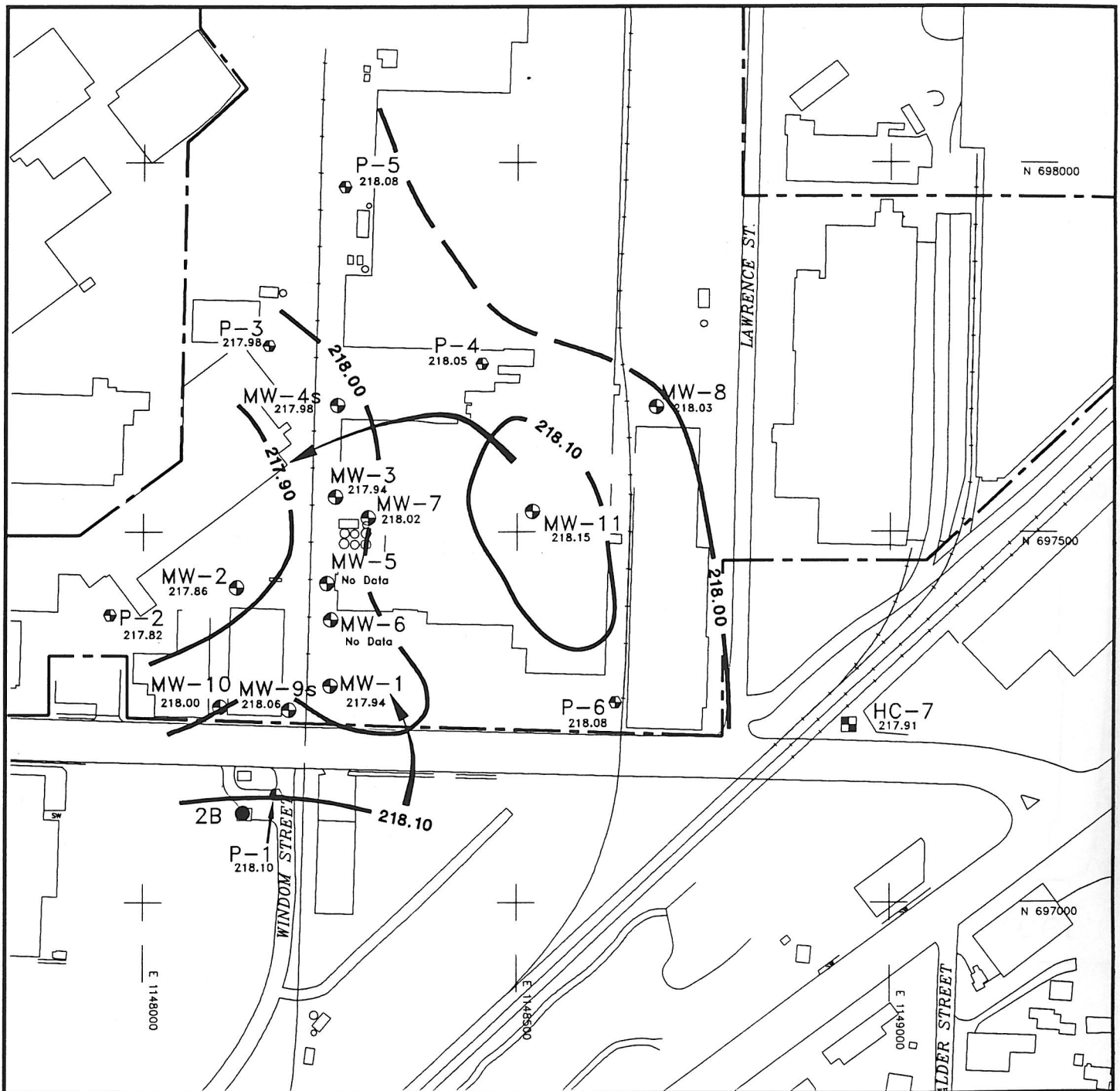
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SCALE IN FEET

FIGURE 2

WATER TABLE ELEVATION CONTOUR MAP - 11/2/92

NALLEY'S FINE FOODS

Pacific Groundwater Group



LEGEND

- | | | | |
|--------|---|------|--------------------------------|
| MW-8 | Nalley's Monitoring Well with Water Level | 2B | City of Tacoma Production Well |
| P-6 | Nalley's Piezometer with Water Level | 89.7 | City of Tacoma Monitoring Well |
| 220.90 | Groundwater Contour with Elevation in Feet | HC-7 | Monitoring Well by Others |
| | Groundwater Flow Direction in Vicinity of Removed Tanks | | |
| | Approximate Property Line | | |

0 50 100 200 400
SCALE IN FEET

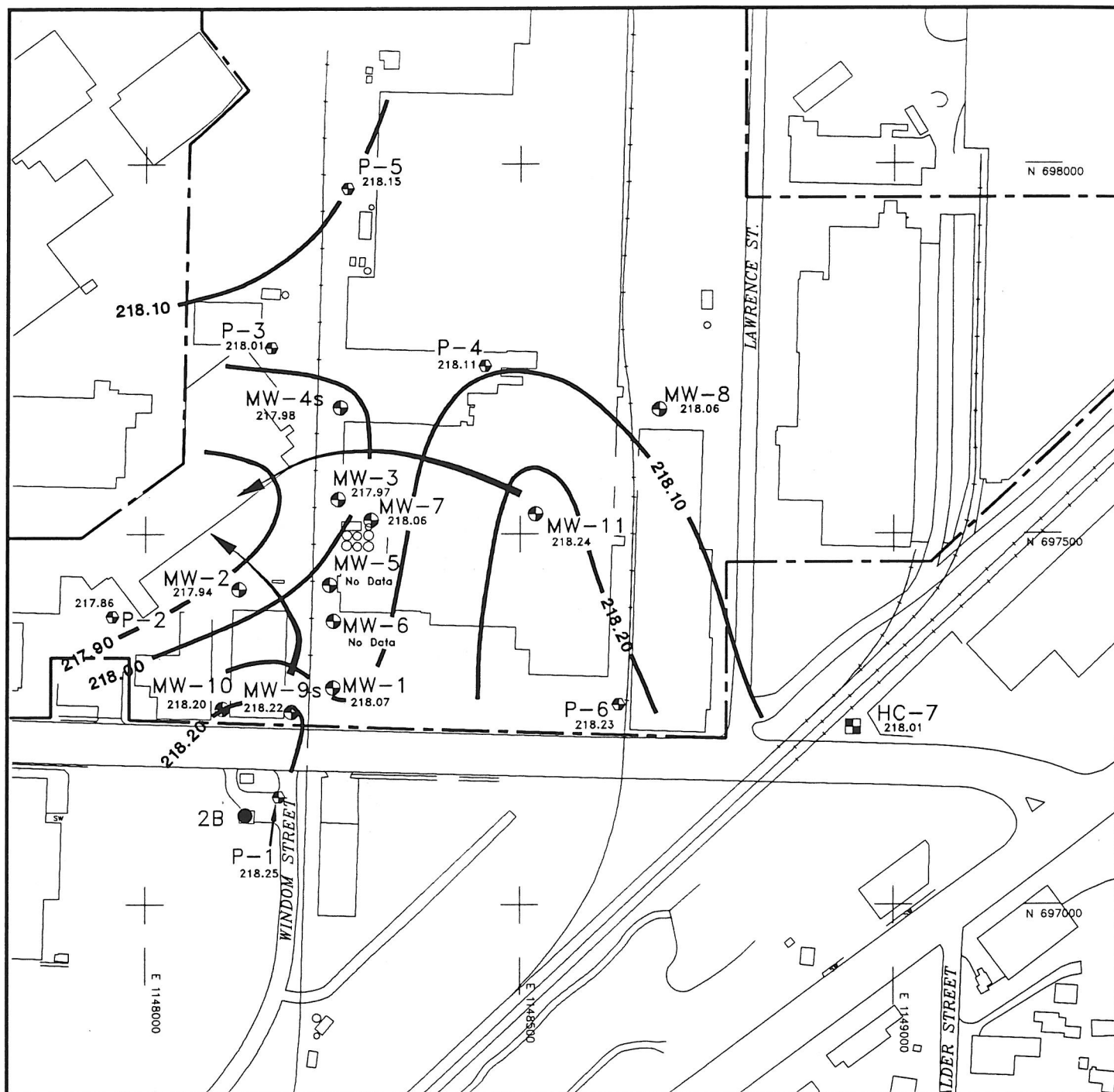


FIGURE 3


WATER TABLE ELEVATION CONTOUR MAP - 12/11/92

NALLEY'S FINE FOODS

Pacific Groundwater Group



LEGEND

mw-1 
218.07

Nalley's
Monitoring Well
with Water Level

P-6
218 23

Nalley's
Piezometer
with Water Level

220.90

Groundwater Contour with
Elevation in Feet

Groundwater Flow Direction in Vicinity of Removed Tanks

Approximate
Property Line

2B.

City of Tacoma
Production Well

89.7

City of Tacoma
Monitoring Well

HC-7

Monitoring Well by Others



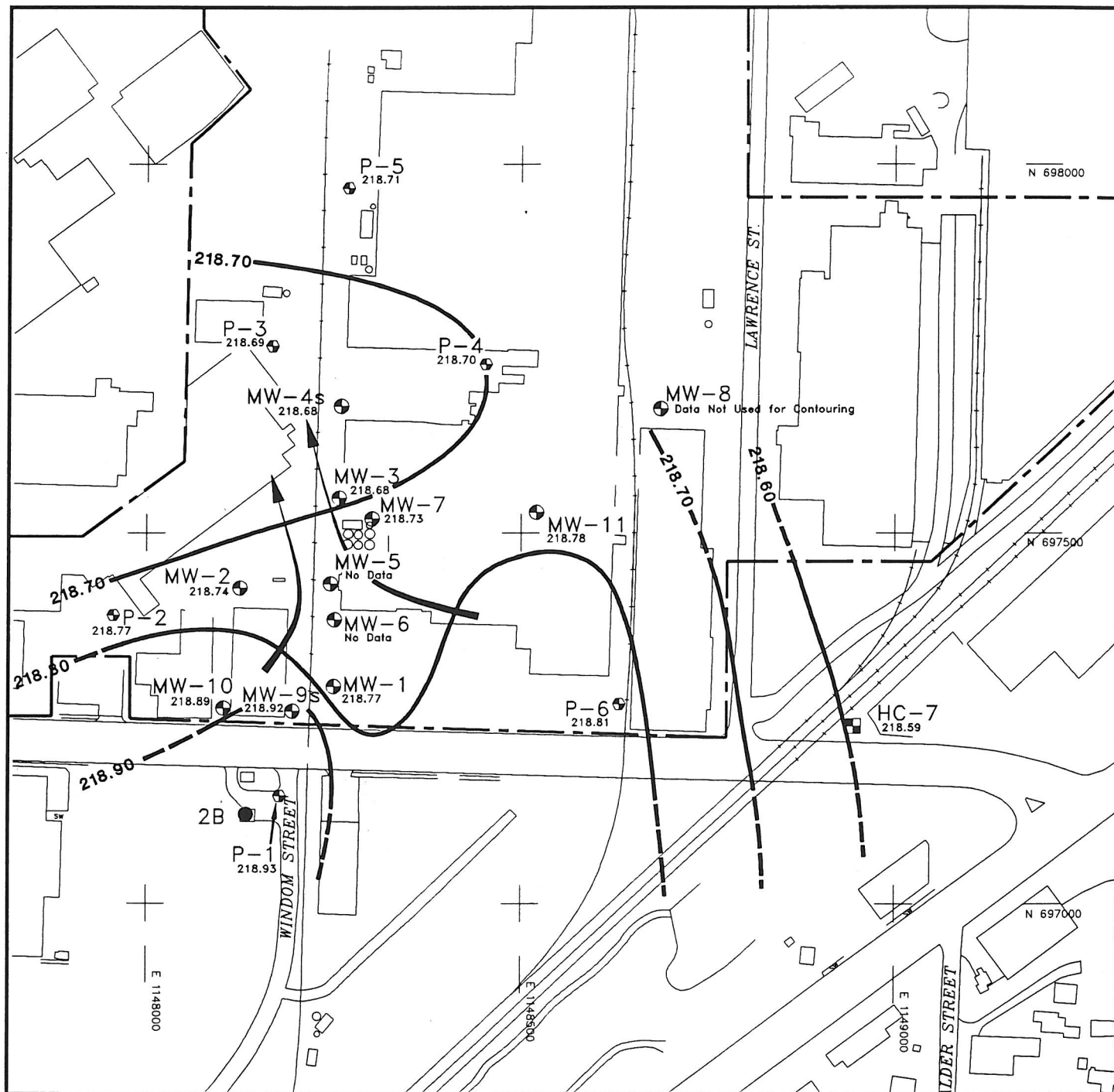
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - 1/5/93

NALLEY'S FINE FOODS





LEGEND

- | | | | |
|----------------|--|------|-----------------------------------|
| MW-7
218.73 | Nalley's
Monitoring Well
with Water Level | 2B | City of Tacoma
Production Well |
| P-6
218.81 | Nalley's
Piezometer
with Water Level | 89.7 | City of Tacoma
Monitoring Well |
| 218.80 | Groundwater Contour with
Elevation in Feet | HC-7 | Monitoring Well
by Others |
| | Groundwater Flow Direction in
Vicinity of Removed Tanks | | |
| | Approximate
Property Line | | |

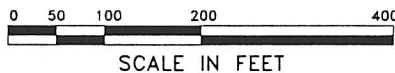
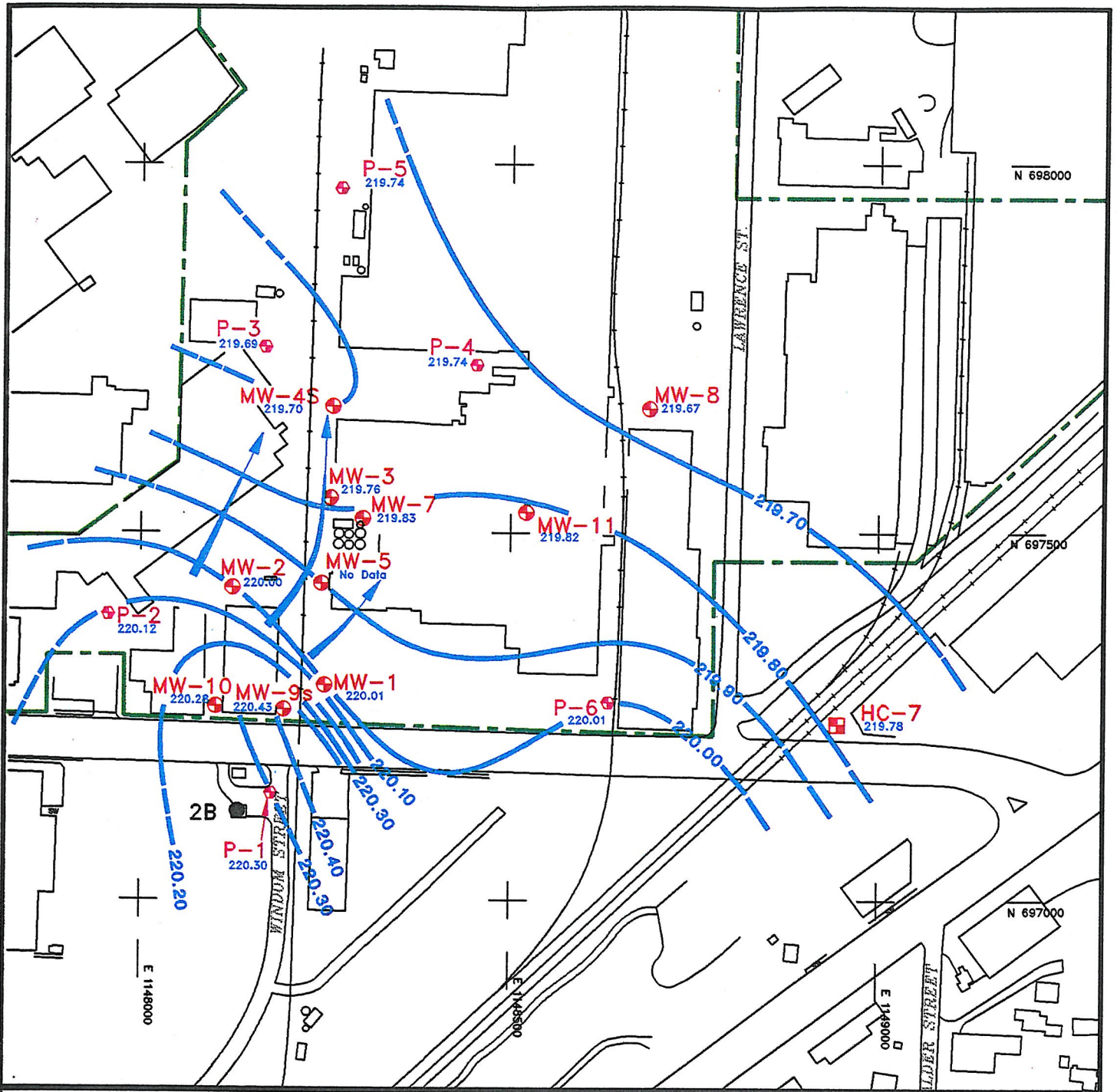


FIGURE 2

WATER TABLE ELEVATION CONTOUR MAP - 2/9/93

NALLEY'S FINE FOODS





LEGEND

- MW-8 ● Nailey's Monitoring Well with Water Level
- P-6 ● Nailey's Piezometer with Water Level
- 220.90 — Groundwater Contour with Elevation in Feet
- Groundwater Flow Direction in Vicinity of Removed Tanks
- Approximate Property Line
- 2B ● City of Tacoma Production Well
- HC-7 ■ Monitoring Well by Others



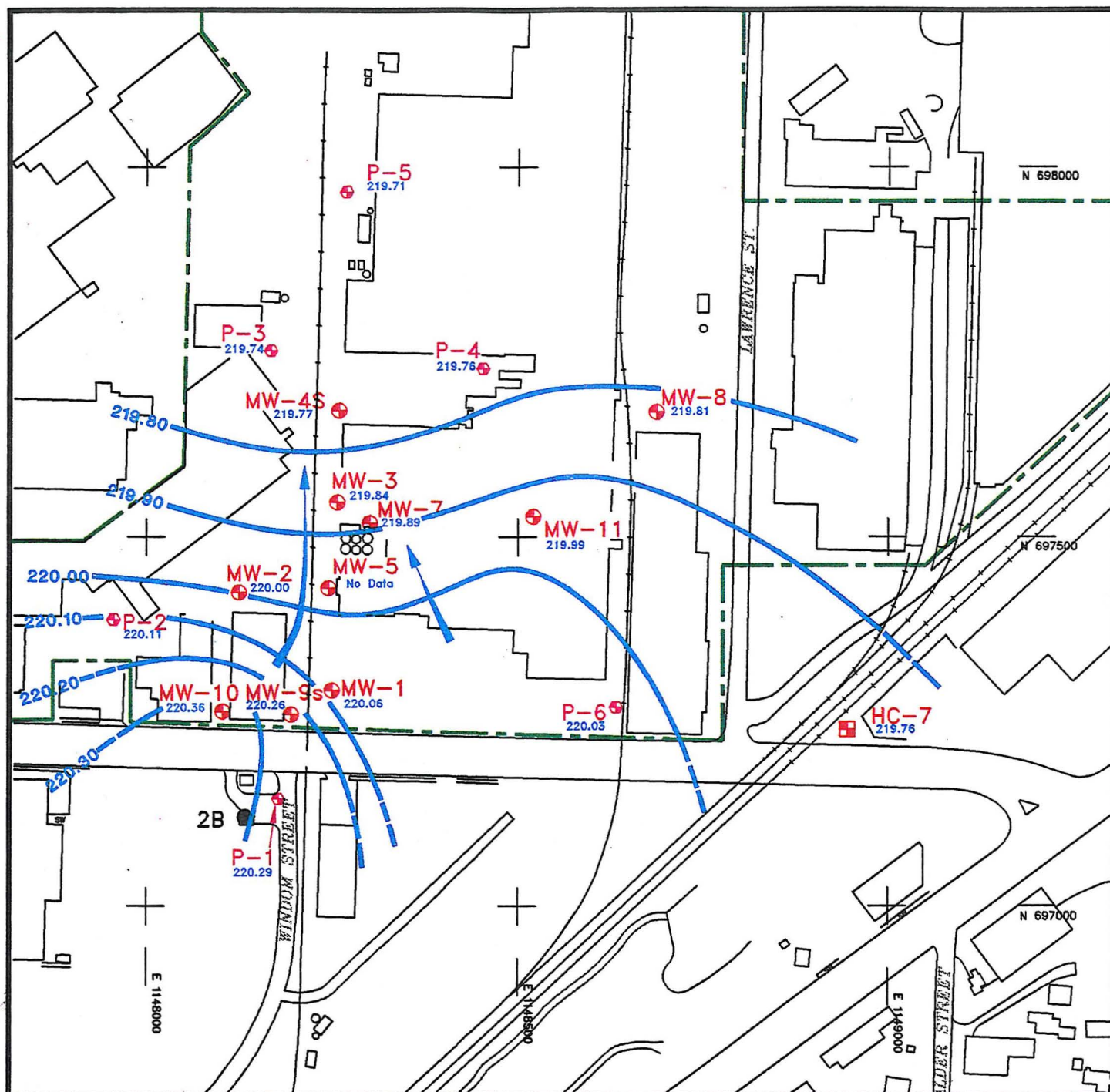
0 50 100 200 400
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION CONTOUR MAP - 7-2-93

NALLEY'S FINE FOODS





LEGEND

MW-8

Nalley's
Monitoring Well
with Water Level

P-6

Nalley's
Piezometer
with Water Level

220.90

Groundwater Contour with
Elevation in Feet



Groundwater Flow Direction in
Vicinity of Removed Tanks

Approximate
Property Line

2B

City of Tacoma
Production Well

HC-7

Monitoring Well
by Others



0 50 100 200 400

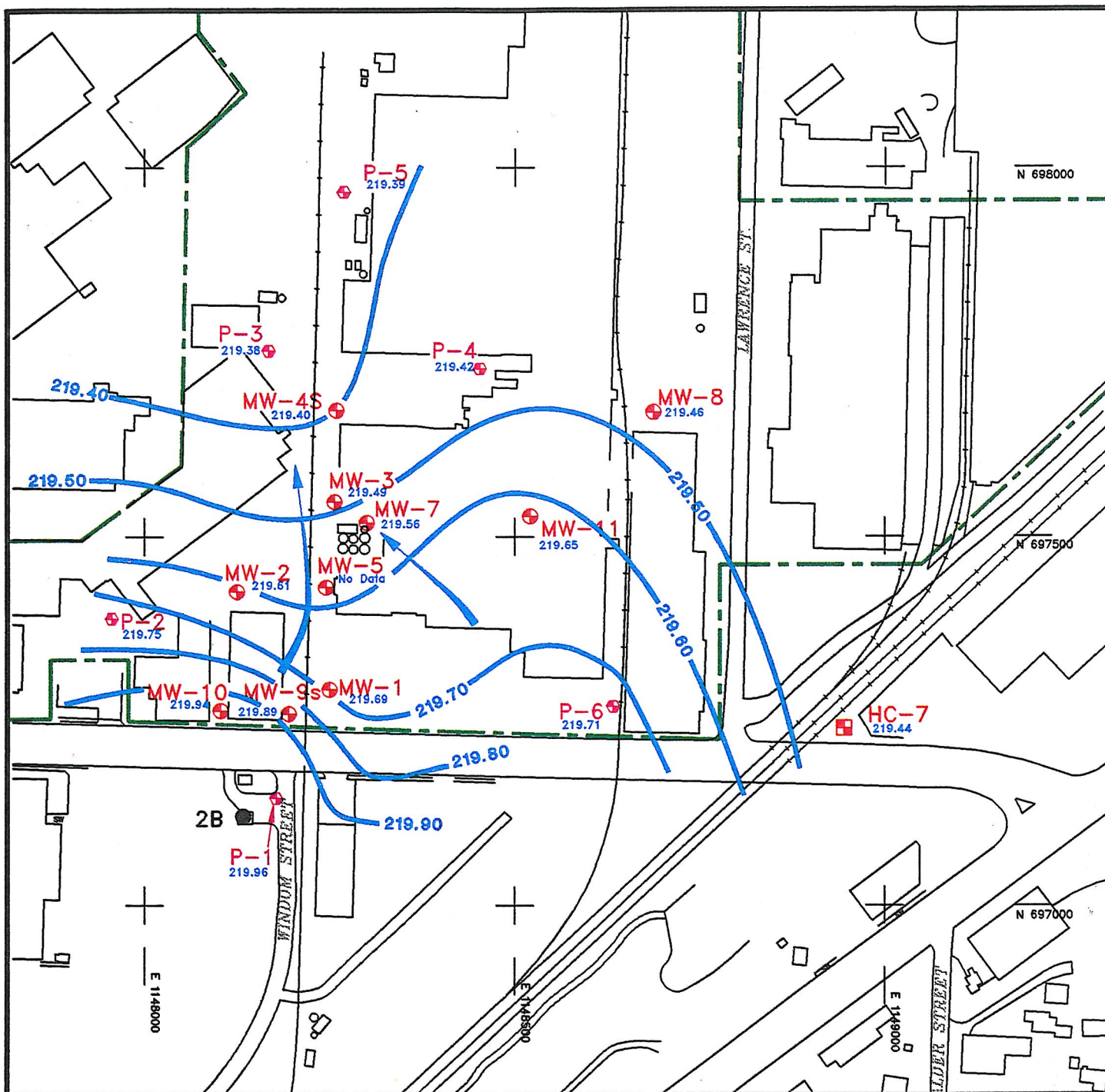
SCALE IN FEET

FIGURE 2

WATER TABLE ELEVATION
CONTOUR MAP - 8-4-92 1993

NALLEY'S FINE FOODS





LEGEND

- MW-8 ● Nalley's Monitoring Well with Water Level
- P-6 ● Nalley's Piezometer with Water Level
- 2B ● City of Tacoma Production Well
- HC-7 ● Monitoring Well by Others
- 220.90 — Groundwater Contour with Elevation in Feet
- Groundwater Flow Direction in Vicinity of Removed Tanks
- Approximate Property Line

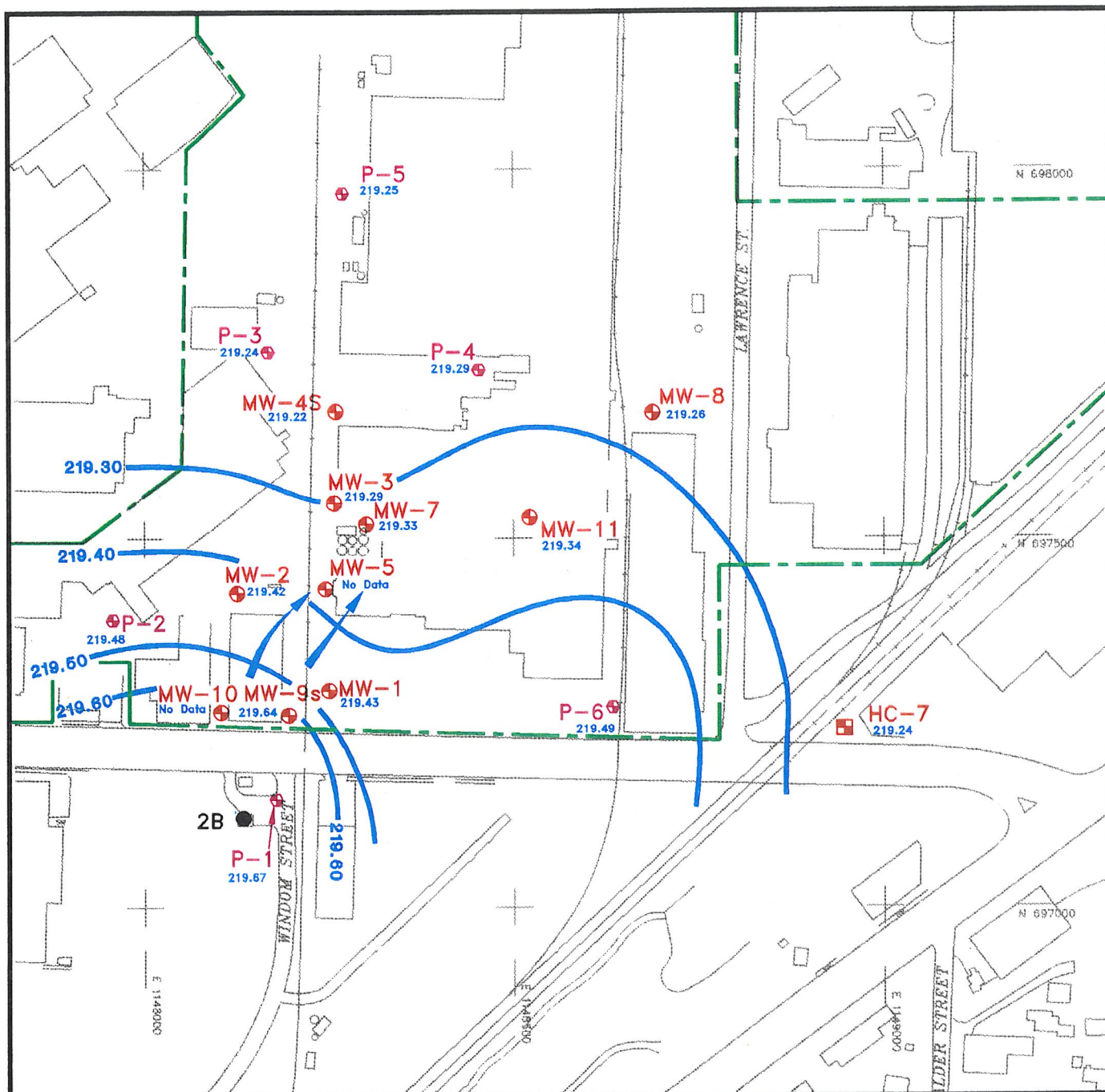
0 50 100 200 400
SCALE IN FEET

FIGURE 3

WATER TABLE ELEVATION CONTOUR MAP - 9-10-93

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

MW-8 Nalley's Monitoring Well with Water Level

P-6 Nalley's Piezometer with Water Level

220.90 Groundwater Contour with Elevation in Feet

Groundwater Flow Direction in Vicinity of Removed Tanks

Approximate Property Line

2B City of Tacoma Production Well

HC-7 Monitoring Well by Others



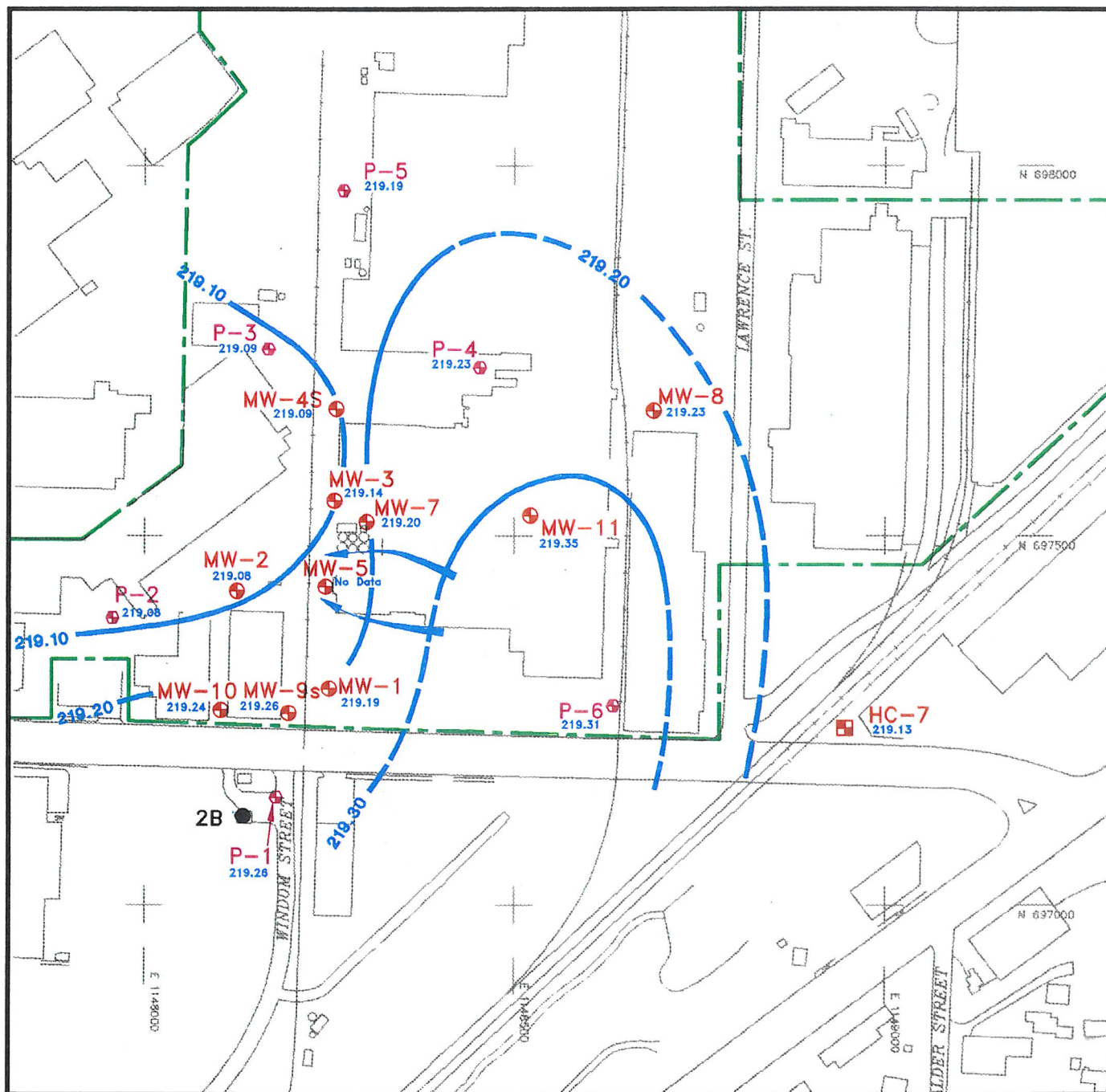
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SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION CONTOUR MAP - 10-11-93

NALLEY'S FINE FOODS

Pacific Groundwater Group



LEGEND

MW-8

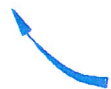
Nalley's
Monitoring Well
with Water Level

P-6

Nalley's
Piezometer
with Water Level

220.90

Groundwater Contour with
Elevation in Feet



Groundwater Flow Direction in
Vicinity of Removed Tanks



Approximate
Property Line

2B

City of Tacoma
Production Well

HC-7

Monitoring Well
by Others



0 50 100 200 400

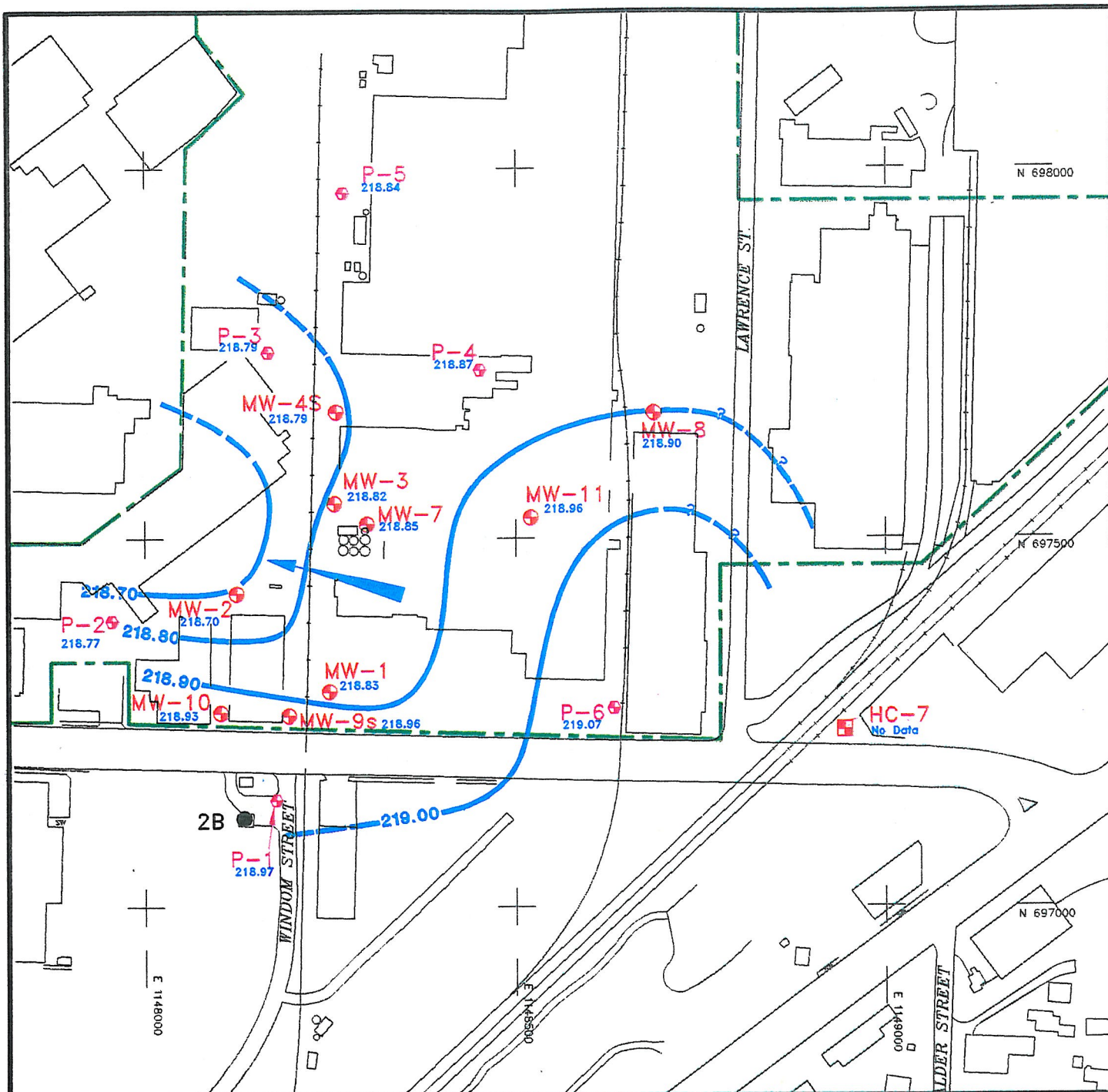
SCALE IN FEET

FIGURE 2

WATER TABLE ELEVATION CONTOUR MAP - 12-8-93

NALLEY'S FINE FOODS





LEGEND

MW-8
218.83

Nalley's
Monitoring Well
with Water Level

P-6
219.07

Nalley's
Piezometer
with Water Level

220.90

Groundwater Contour with
Elevation in Feet

Groundwater Flow Direction in
Vicinity of Removed Tanks

Approximate
Property Line

2B

City of Tacoma
Production Well
Monitoring Well
by Others

HC-7



0 50 100 200 400

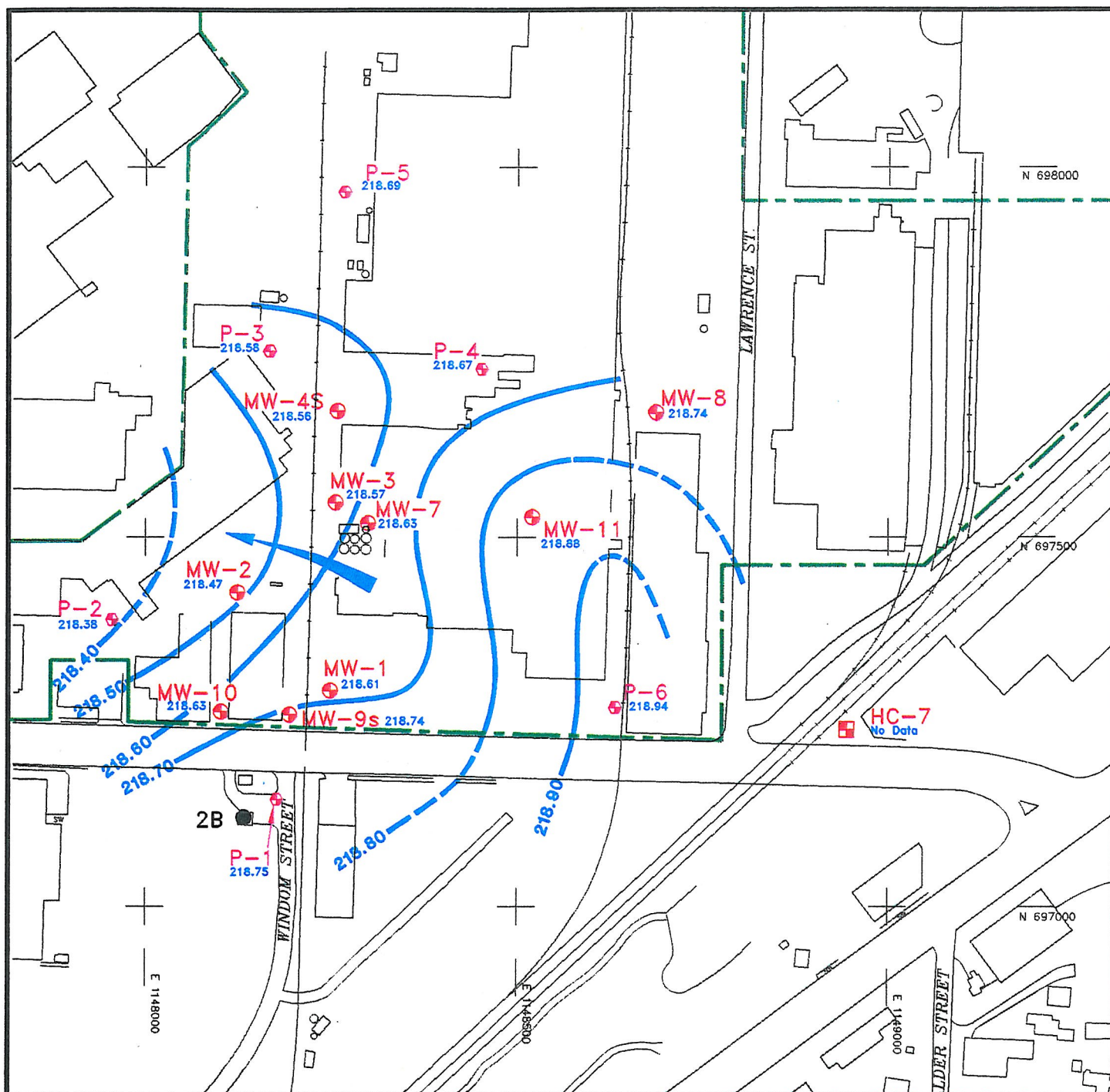
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION CONTOUR MAP - 1-7-94

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

- MW-8** ● Nalley's Monitoring Well with Water Level
- P-6** ● Nalley's Piezometer with Water Level
- 220.90** — Groundwater Contour with Elevation in Feet
- Groundwater Flow Direction in Vicinity of Removed Tanks
- Approximate Property Line
- 2B** ● City of Tacoma Production Well
- HC-7** ● Monitoring Well by Others



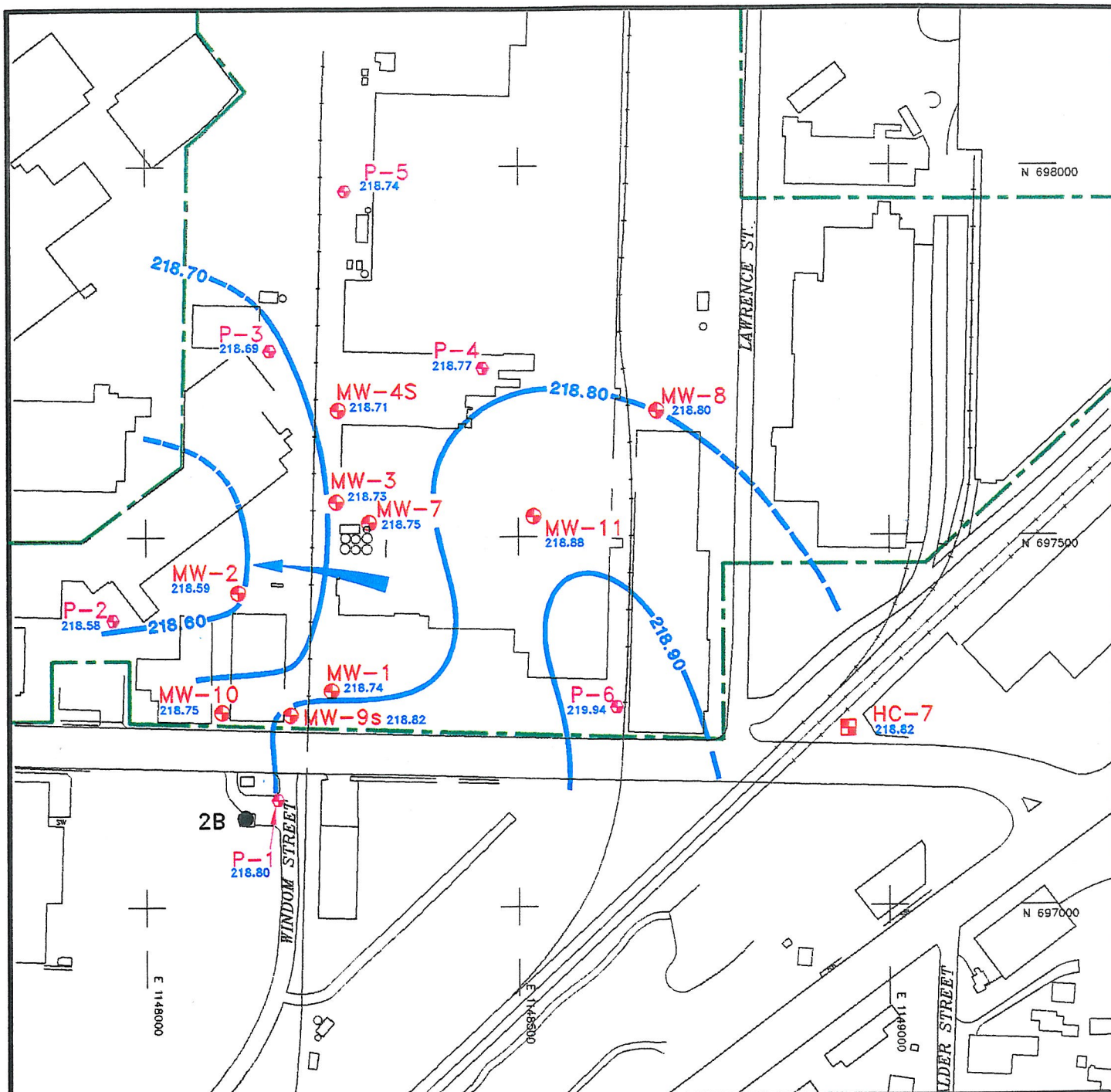
0 50 100 200 400
SCALE IN FEET

FIGURE 2

WATER TABLE ELEVATION CONTOUR MAP - 2-8-94

NALLEY'S FINE FOODS





LEGEND

MW-8
218.80

Nalley's
Monitoring Well
with Water Level

P-6
219.94

Nalley's
Piezometer
with Water Level

220.90

Groundwater Contour with
Elevation in Feet

Groundwater Flow Direction in
Vicinity of Removed Tanks

Approximate
Property Line

2B

City of Tacoma
Production Well

HC-7

Monitoring Well
by Others



0 50 100 200 400

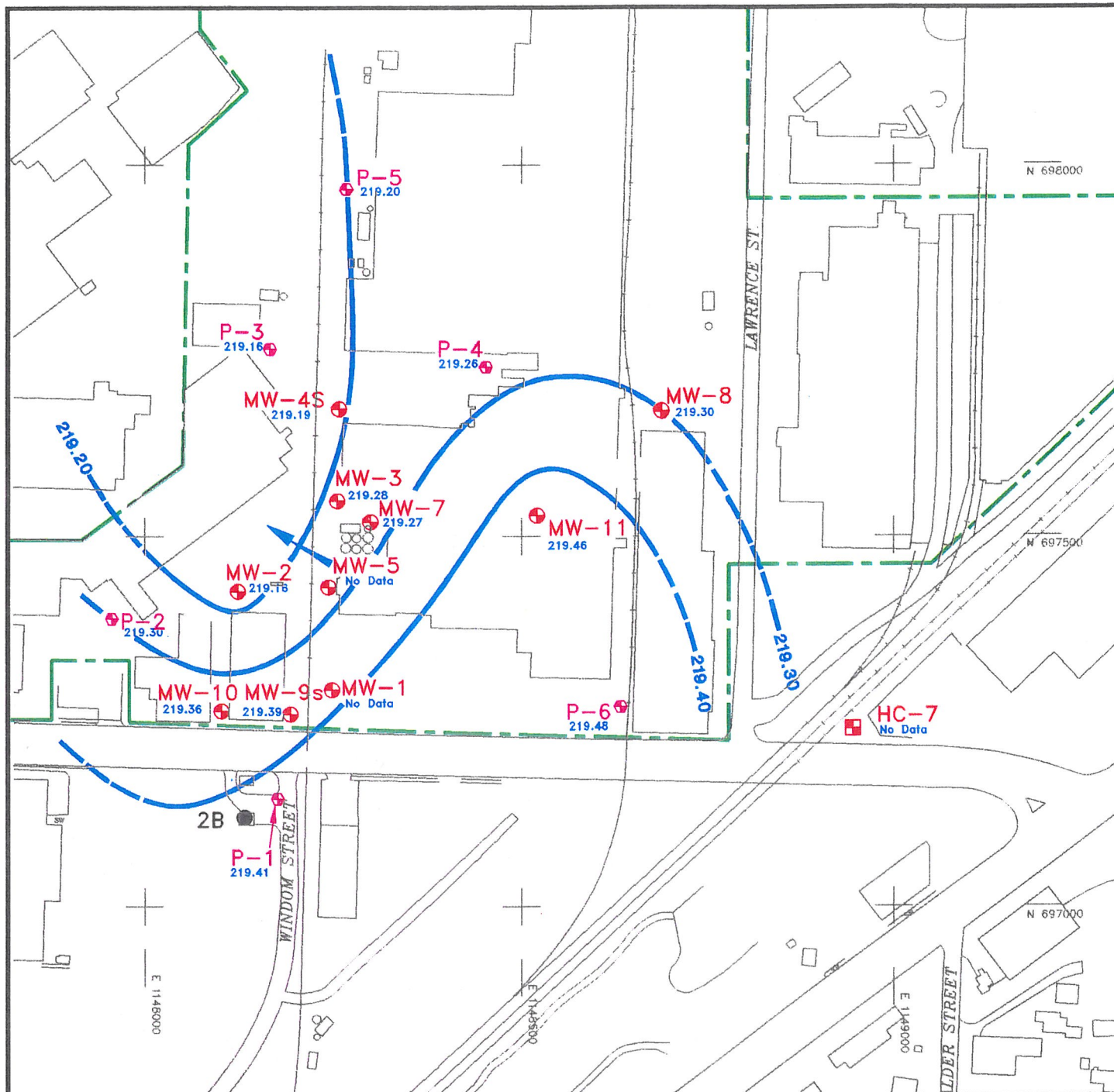
SCALE IN FEET

FIGURE 3

WATER TABLE ELEVATION CONTOUR MAP - 2-28-94

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

- | | | | |
|-------------------|---|------|--------------------------------|
| MW-8 | Nalley's Monitoring Well with Water Level | 2B | City of Tacoma Production Well |
| P-6 | Nalley's Piezometer with Water Level | HC-7 | Monitoring Well by Others |
| 220.90 | Groundwater Contour with Elevation in Feet | | |
| Blue Arrow | Groundwater Flow Direction in Vicinity of Removed Tanks | | |
| Dashed Green Line | Approximate Property Line | | |



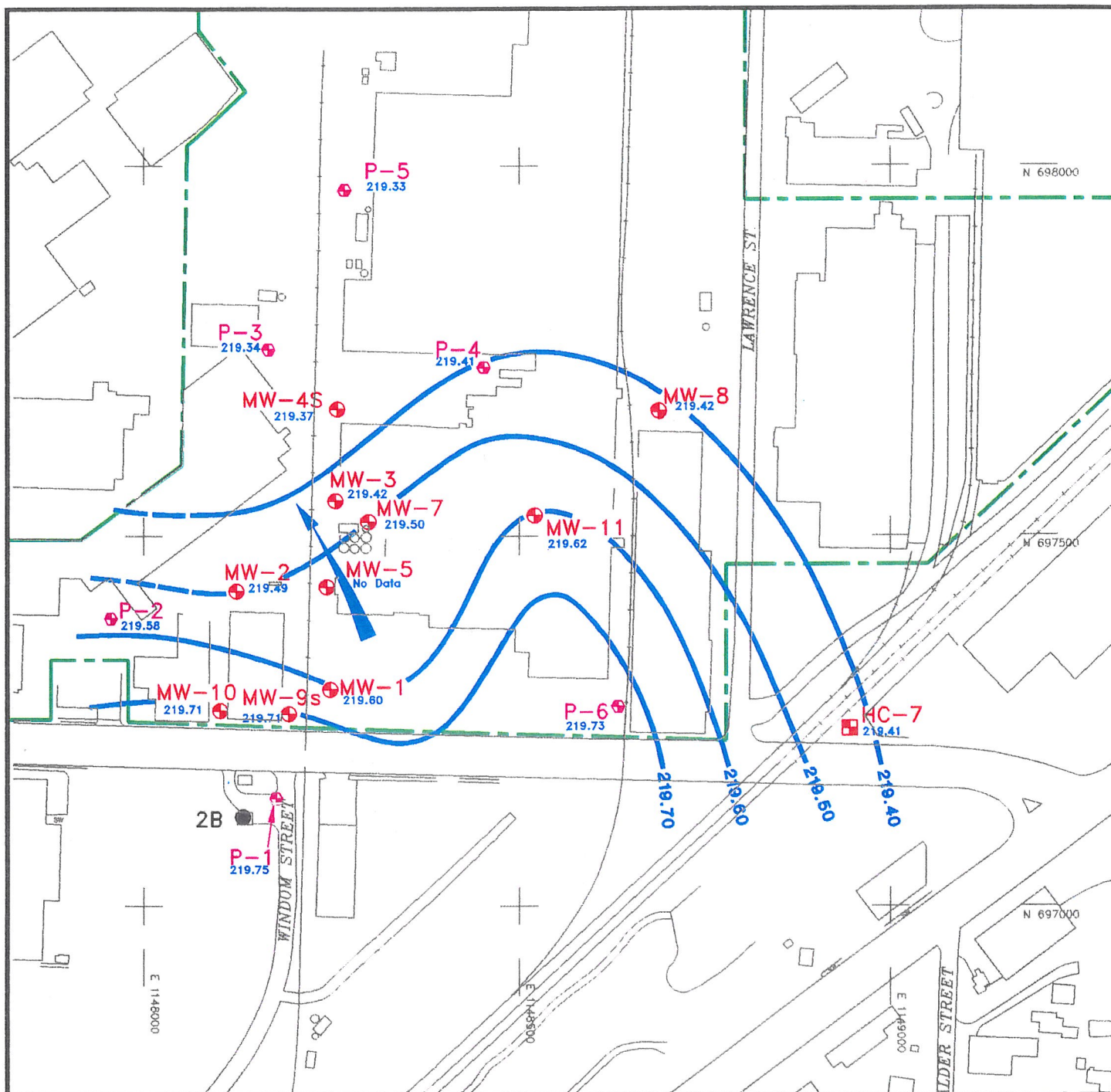
0 50 100 200 400
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION CONTOUR MAP - 4-5-94

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

- MW-8** ● Nalley's Monitoring Well with Water Level
- P-6** ● Nalley's Piezometer with Water Level
- 220.80** — Groundwater Contour with Elevation in Feet
- Groundwater Flow Direction in Vicinity of Removed Tanks
- Approximate Property Line
- 2B** ● City of Tacoma Production Well
- HC-7** ■ Monitoring Well by Others



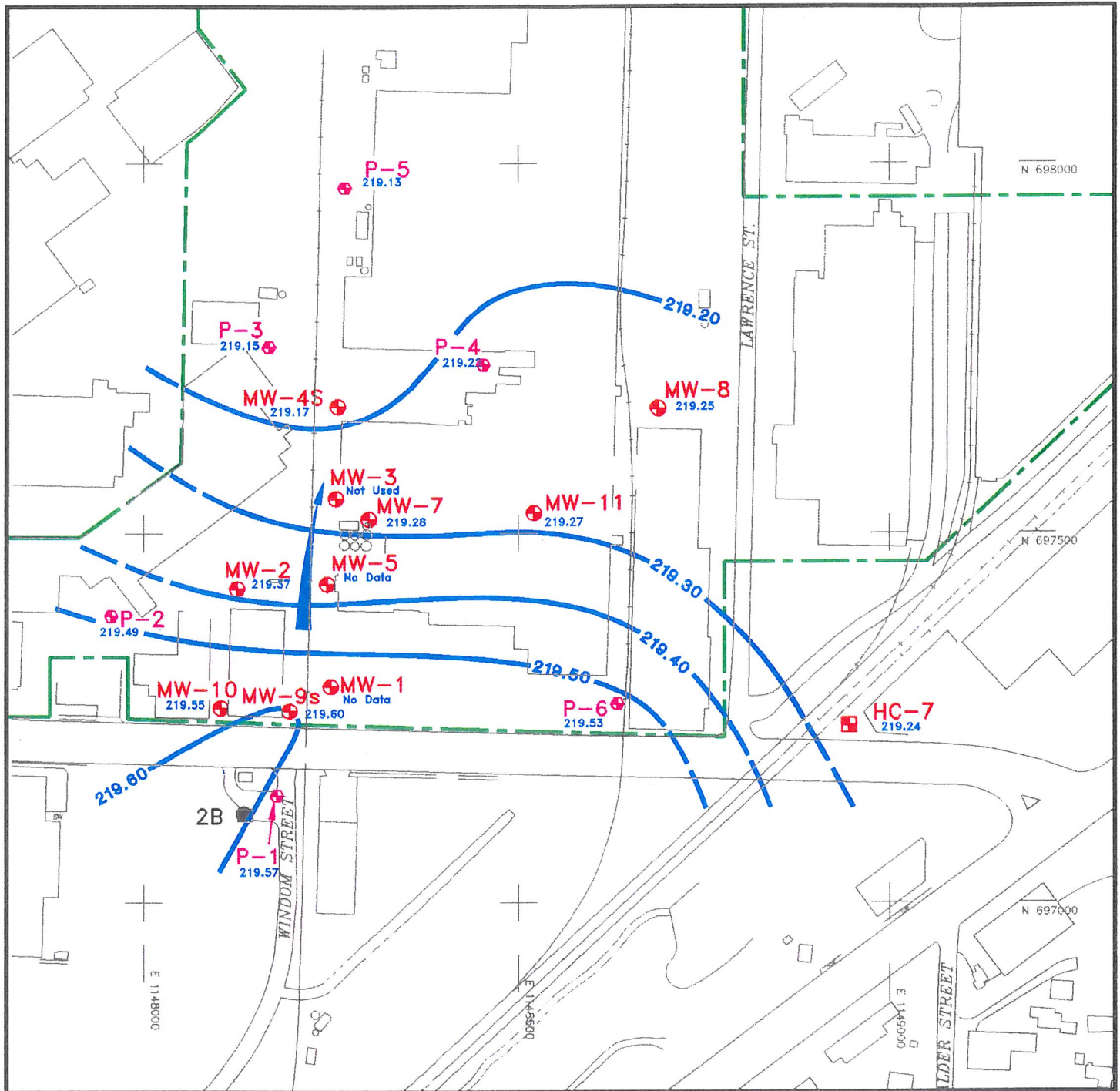
0 50 100 200 400
SCALE IN FEET

FIGURE 2

WATER TABLE ELEVATION CONTOUR MAP - 5-18-94

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

MW-8 ● Nalley's Monitoring Well with Water Level

P-6 ● Nalley's Piezometer with Water Level

2B ● City of Tacoma Production Well

HC-7 ■ Monitoring Well by Others

220.90 — Groundwater Contour with Elevation in Feet

→ Groundwater Flow Direction in Vicinity of Removed Tanks

— Approximate Property Line

0 50 100 200 400
SCALE IN FEET

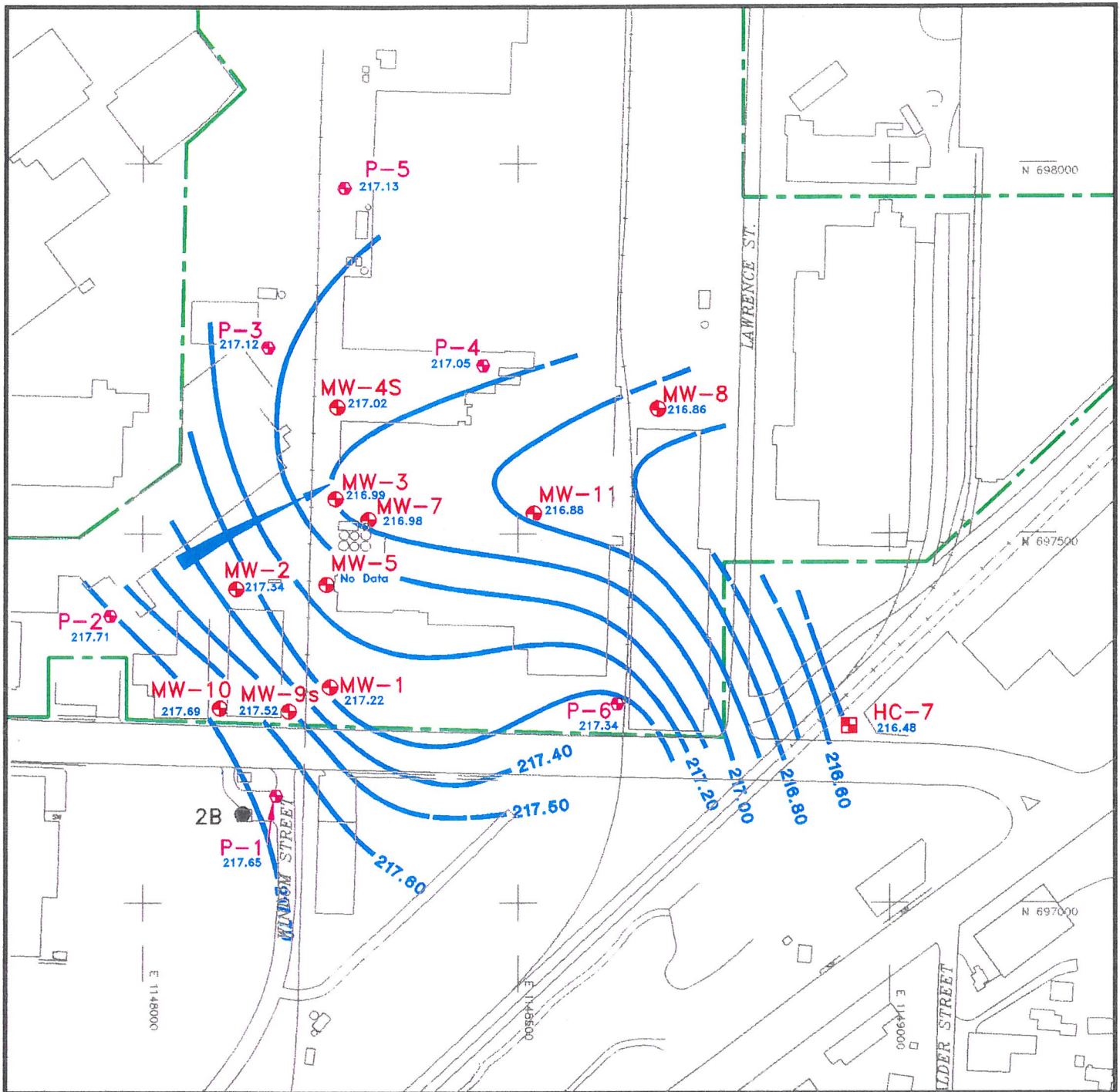


FIGURE 1

WATER TABLE ELEVATION CONTOUR MAP - 7-6-94

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

MW-8 ● Nalley's Monitoring Well with Water Level

P-6 ● Nalley's Piezometer with Water Level

2B ● City of Tacoma Production Well

HC-7 ■ Monitoring Well by Others

220.90 — Groundwater Contour with Elevation in Feet

→ Groundwater Flow Direction in Vicinity of Removed Tanks

— Approximate Property Line

0 50 100 200 400

SCALE IN FEET

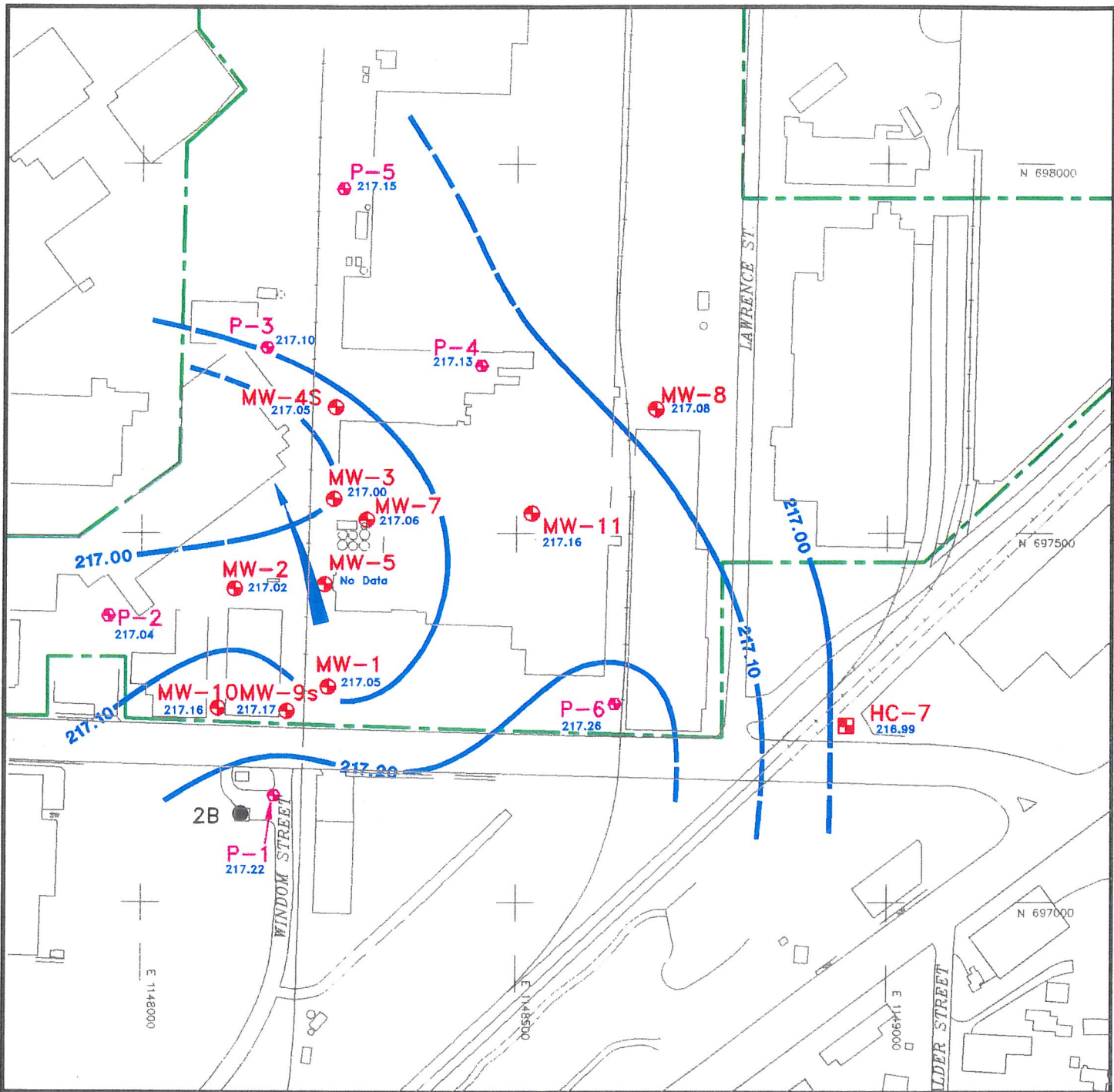


FIGURE 2

WATER TABLE ELEVATION CONTOUR MAP - 8-8-94

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

MW-8 ● Nalley's Monitoring Well with Water Level
P-6 ● Nalley's Piezometer with Water Level

2B ● City of Tacoma Production Well
HC-7 ■ Monitoring Well by Others

220.90 — Groundwater Contour with Elevation in Feet

→ Groundwater Flow Direction in Vicinity of Removed Tanks

— Approximate Property Line

0 50 100 200 400
SCALE IN FEET

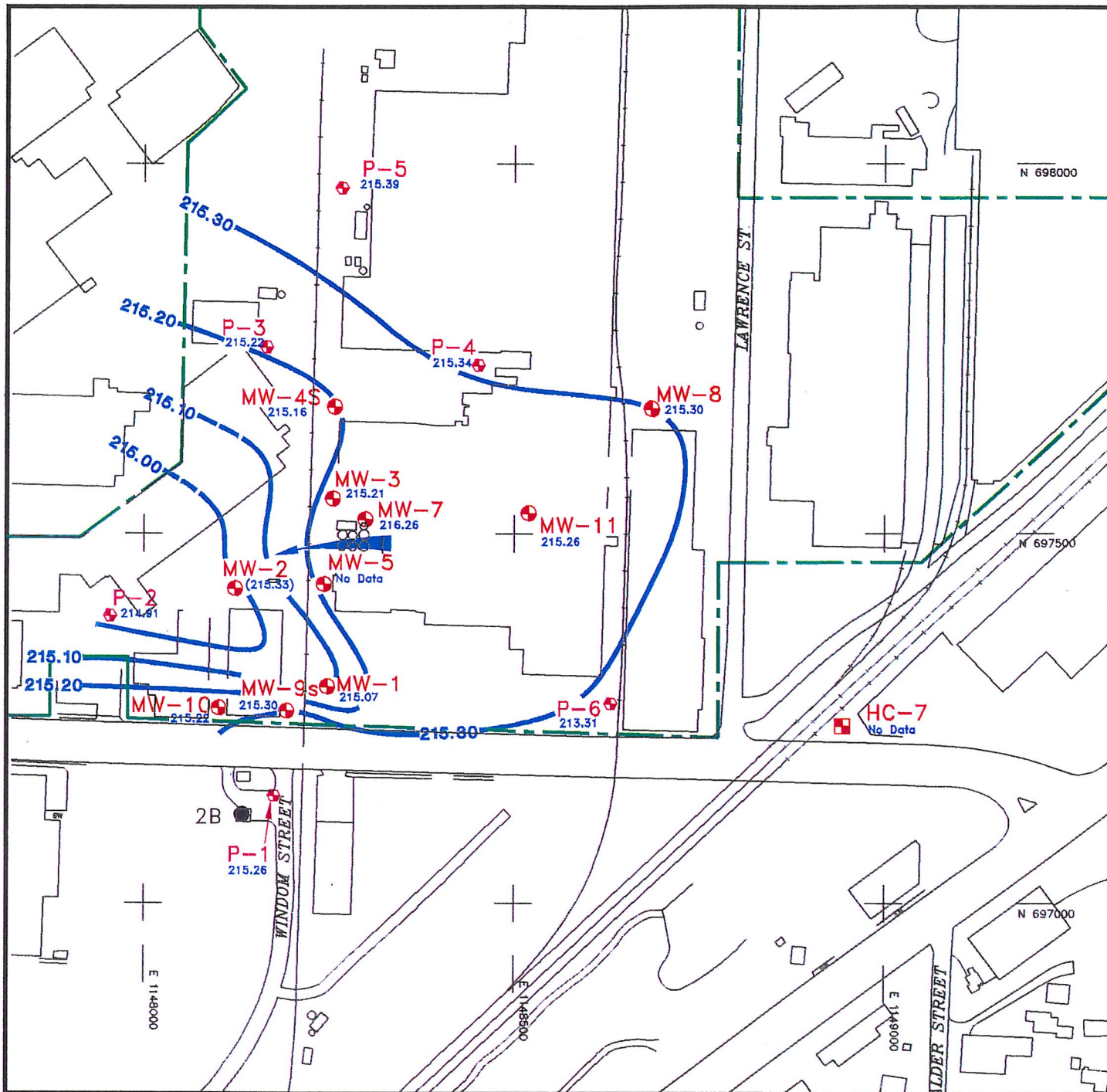


FIGURE 3

WATER TABLE ELEVATION CONTOUR MAP - 9-8-94

NALLEY'S FINE FOODS

Pacific Groundwater Group



LEGEND

MW-8

Nalley's Monitoring Well with Water Level

P-6

Nalley's Piezometer with Water Level

220.90

Groundwater Contour with Elevation in Feet



Groundwater Flow Direction in Vicinity of Removed Tanks

Approximate Property Line

2B

City of Tacoma Production Well

HC-7

Monitoring Well by Others



0 50 100 200 400

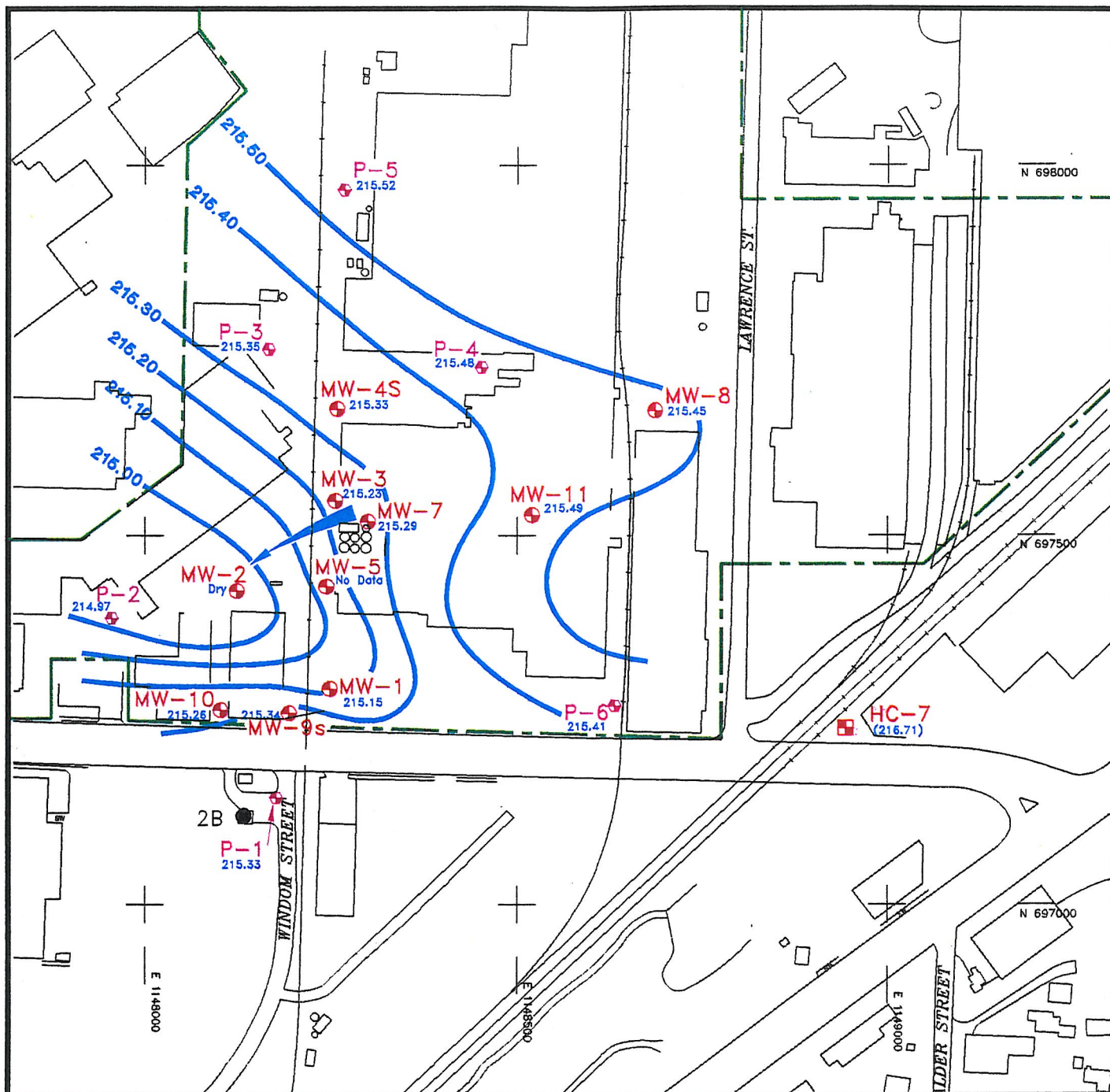
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION CONTOUR MAP 11-2-94

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

MW-8
215.45

Nalley's
Monitoring Well
with Water Level

P-6
215.41

Nalley's
Piezometer
with Water Level

220.90

Groundwater Contour with
Elevation in Feet

Groundwater Flow Direction in
Vicinity of Removed Tanks

Approximate
Property Line

2B

City of Tacoma
Production Well

HC-7

Monitoring Well
by Others



0 50 100 200 400

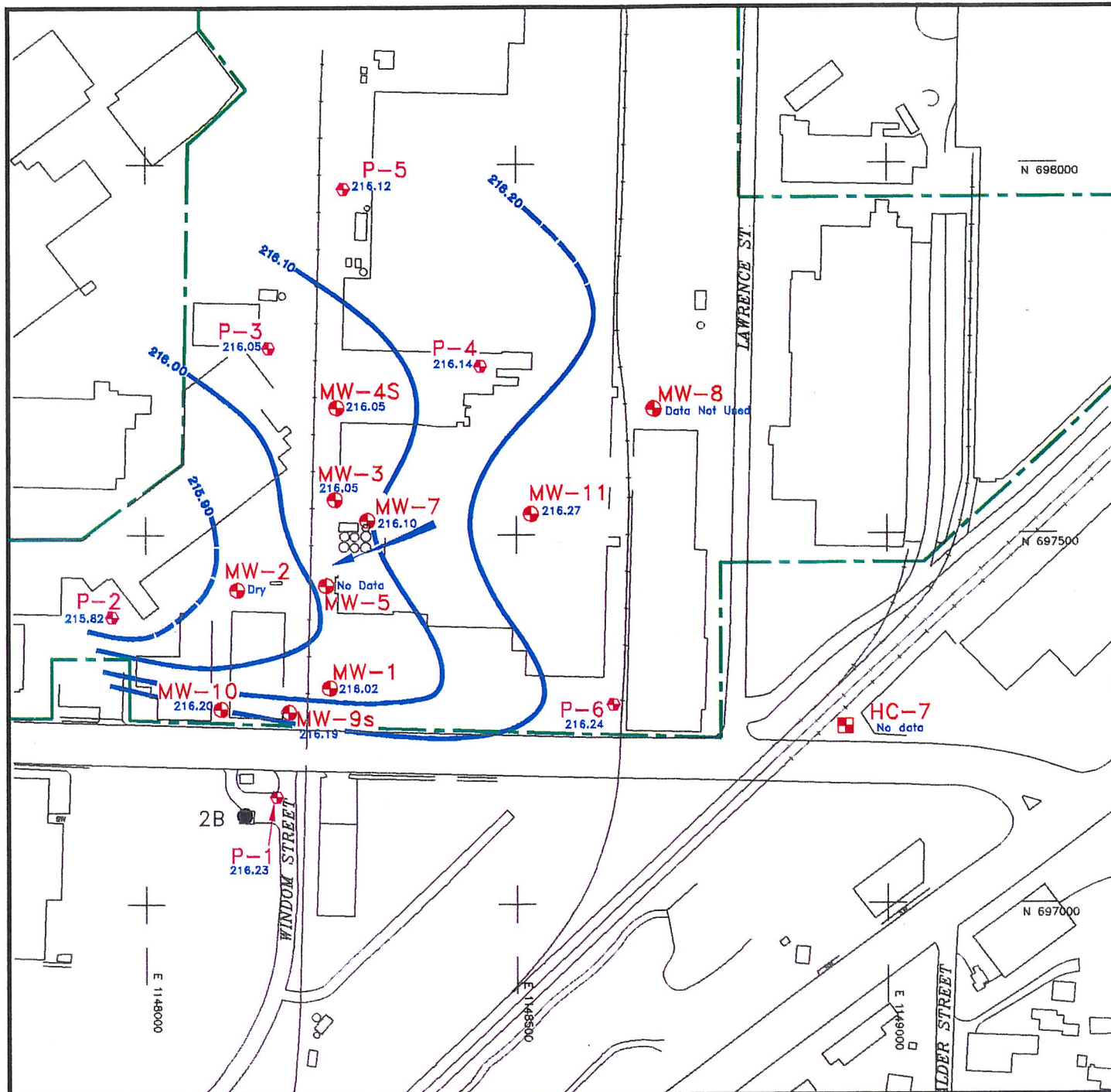
SCALE IN FEET

FIGURE 2

WATER TABLE ELEVATION CONTOUR MAP 12-1-94

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

- | | | | |
|--------|---|------|--------------------------------|
| MW-8 | Nalley's Monitoring Well with Water Level | 2B | City of Tacoma Production Well |
| P-6 | Nalley's Piezometer with Water Level | HC-7 | Monitoring Well by Others |
| 220.90 | Groundwater Contour with Elevation in Feet | | |
| → | Groundwater Flow Direction in Vicinity of Removed Tanks | | |
| - - - | Approximate Property Line | | |

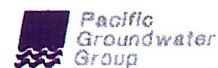


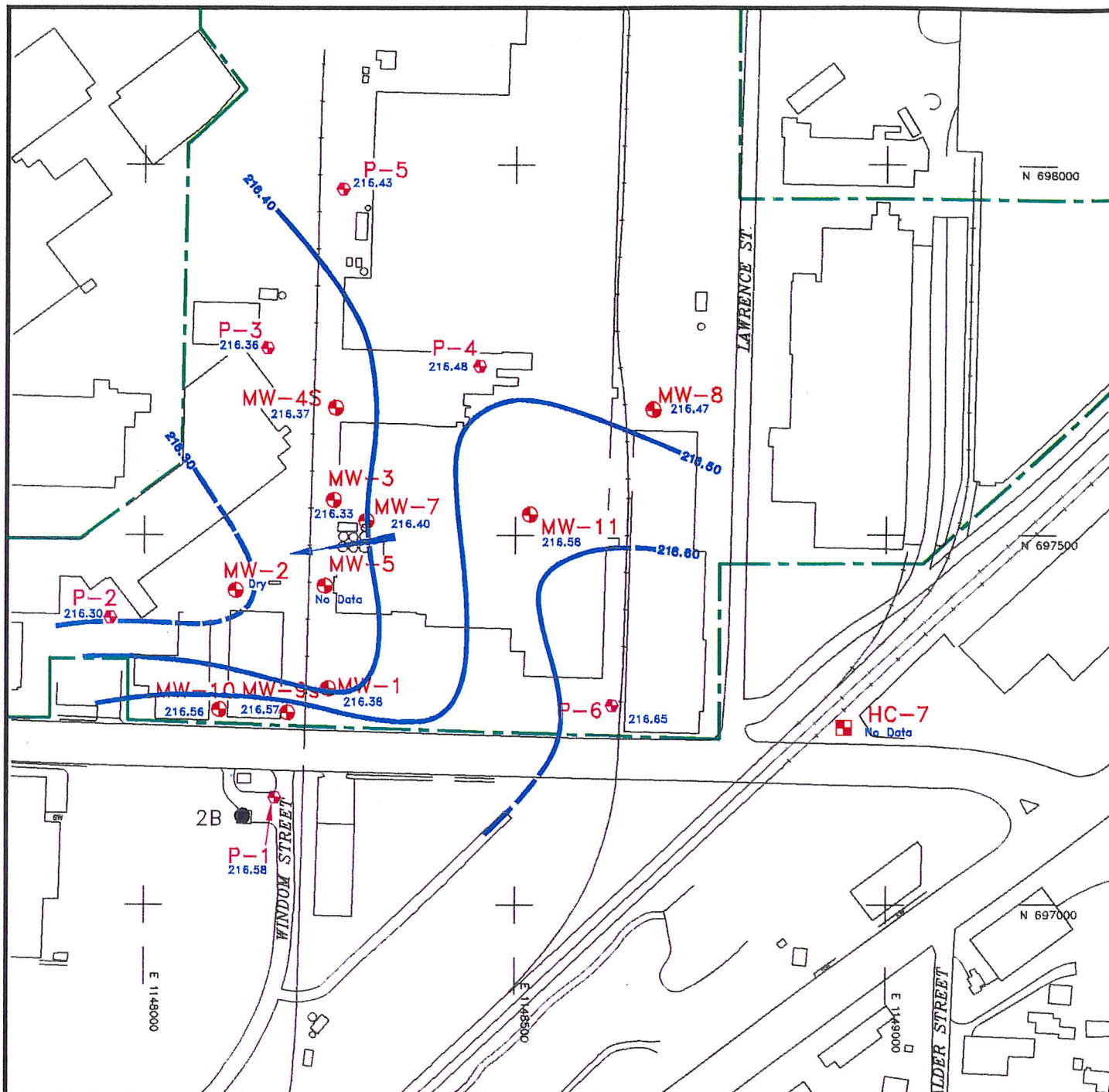
0 50 100 200 400
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION CONTOUR MAP - JANUARY, 1995

NALLEY'S FINE FOODS





LEGEND

MW-8

Nalley's
Monitoring Well
with Water Level

P-6

Nalley's
Piezometer
with Water Level

220.90

Groundwater Contour with
Elevation in Feet

Groundwater Flow Direction in
Vicinity of Removed Tanks

Approximate
Property Line

2B

City of Tacoma
Production Well

HC-7

Monitoring Well
by Others



0 50 100 200 400

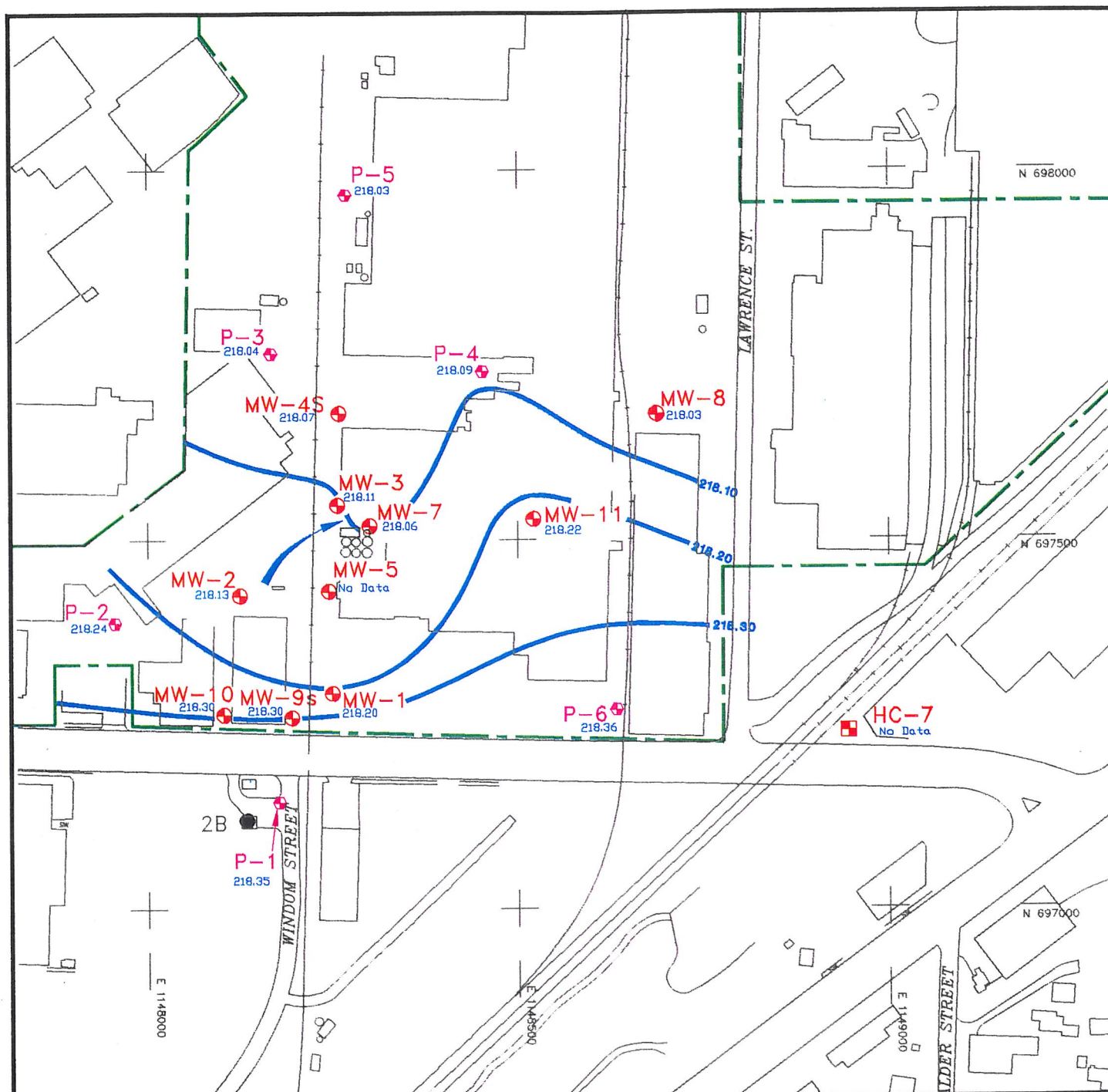
SCALE IN FEET

FIGURE 2

WATER TABLE ELEVATION
CONTOUR MAP - FEBRUARY, 1995

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

- MW-8 ● Nalley's Monitoring Well with Water Level
- P-6 ● Nalley's Piezometer with Water Level
- 220.90 — Groundwater Contour with Elevation in Feet
- Groundwater Flow Direction in Vicinity of Removed Tanks
- Approximate Property Line
- 2B ● City of Tacoma Production Well
- HC-7 ■ Monitoring Well by Others



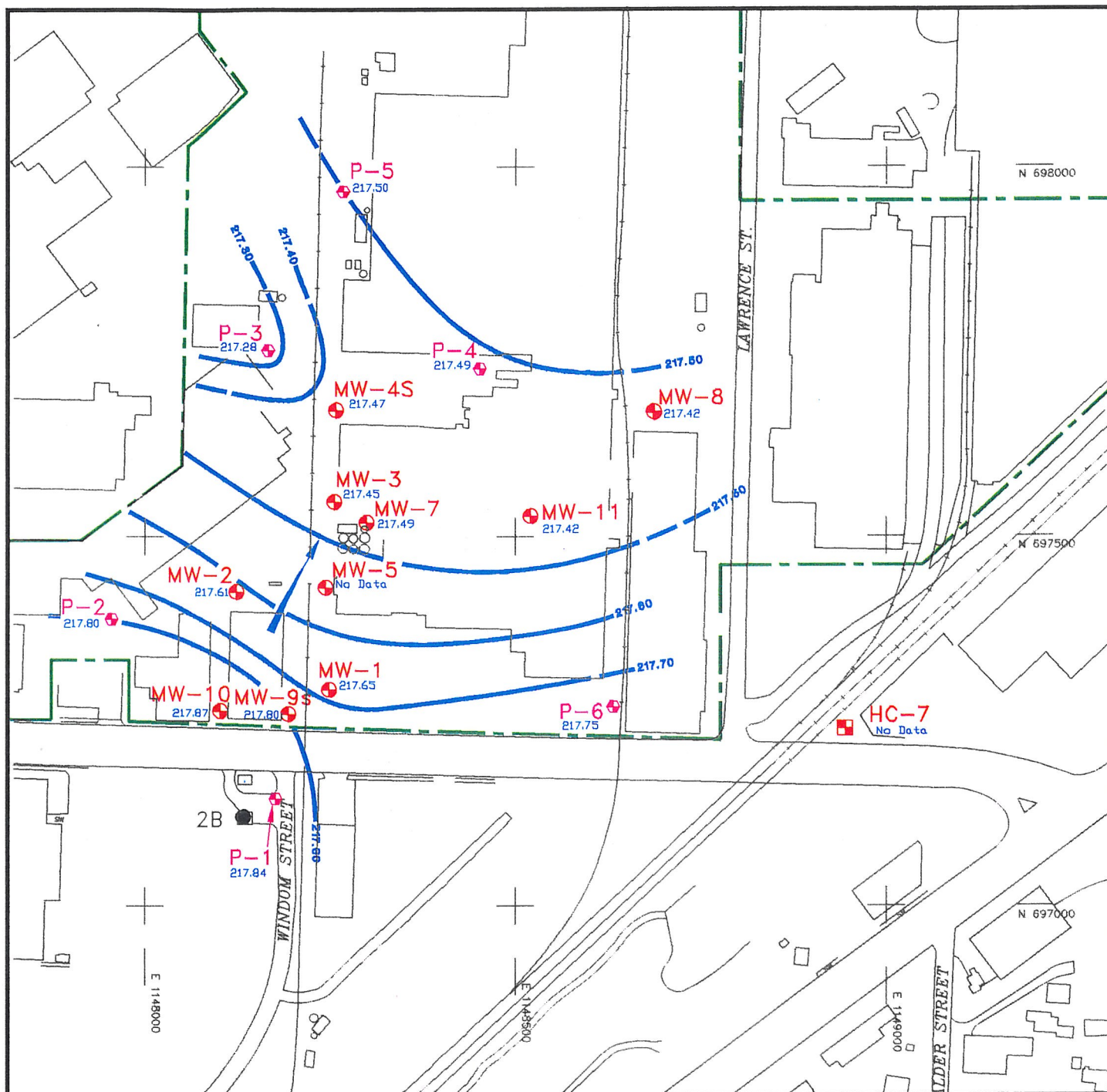
0 50 100 200 400
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION CONTOUR MAP - 5/10/95

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

MW-8

Nalley's
Monitoring Well
with Water Level

P-6

Nalley's
Piezometer
with Water Level

220.90

Groundwater Contour with
Elevation in Feet



Groundwater Flow Direction in
Vicinity of Removed Tanks

Approximate
Property Line

2B

City of Tacoma
Production Well

HC-7

Monitoring Well
by Others



0 50 100 200 400

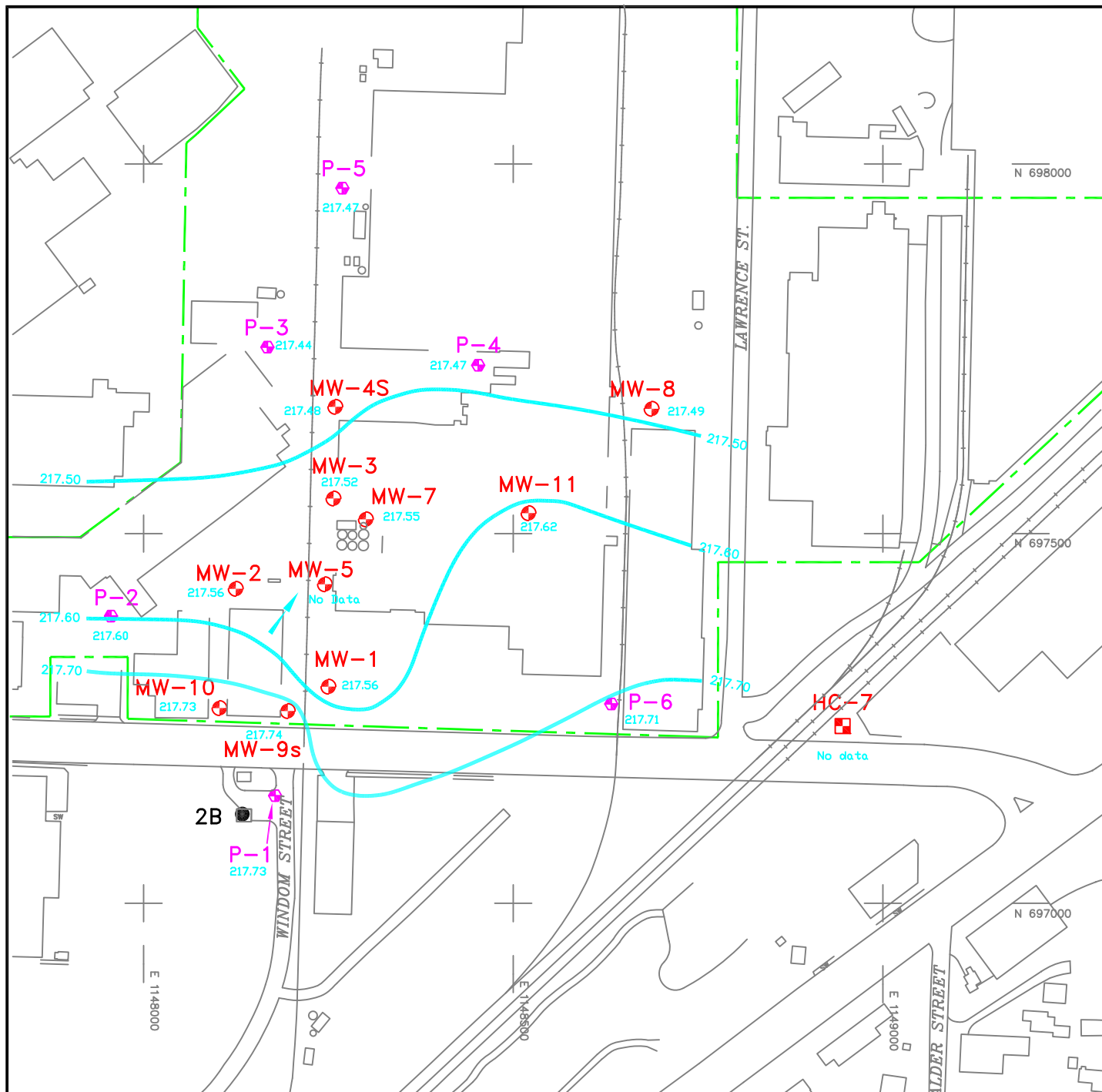
SCALE IN FEET

FIGURE 2

WATER TABLE ELEVATION CONTOUR MAP - 6/8/95

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

MW-8

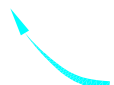
Nalley's
Monitoring Well
with Water Level

P-6

Nalley's
Piezometer
with Water Level

220.90

Groundwater Contour with
Elevation in Feet



Groundwater Flow Direction in
Vicinity of Removed Tanks



Approximate
Property Line

2B

City of Tacoma
Production Well

HC-7

Monitoring Well
by Others



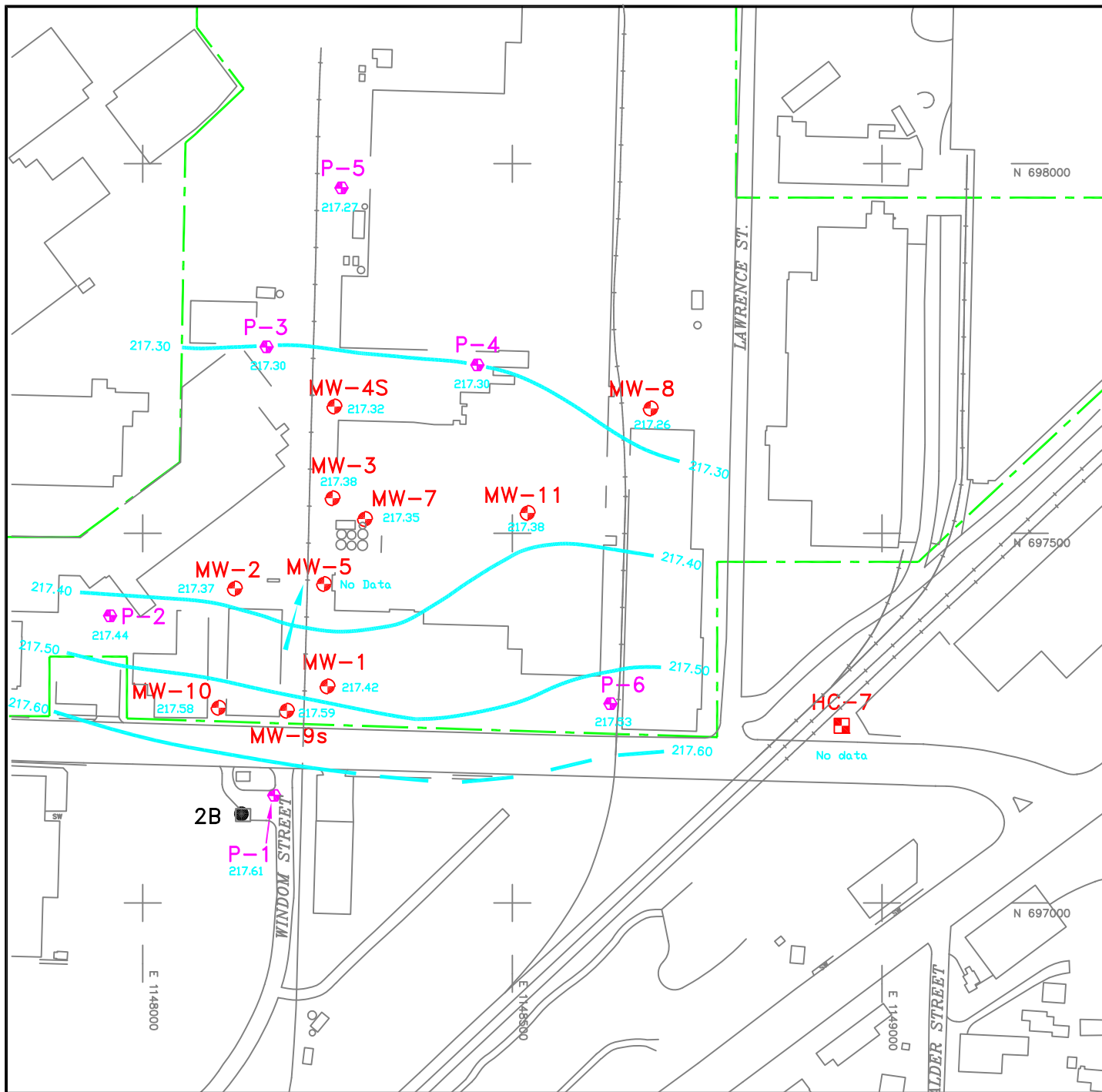
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - 7/7/95

NALLEY'S FINE FOODS





LEGEND

MW-8

Nalley's
Monitoring Well
with Water Level

P-6

Nalley's
Piezometer
with Water Level

220.90

Groundwater Contour with
Elevation in Feet

Groundwater Flow Direction in
Vicinity of Removed Tanks

Approximate
Property Line

2B

City of Tacoma
Production Well

HC-7

Monitoring Well
by Others



0 50 100 200 400

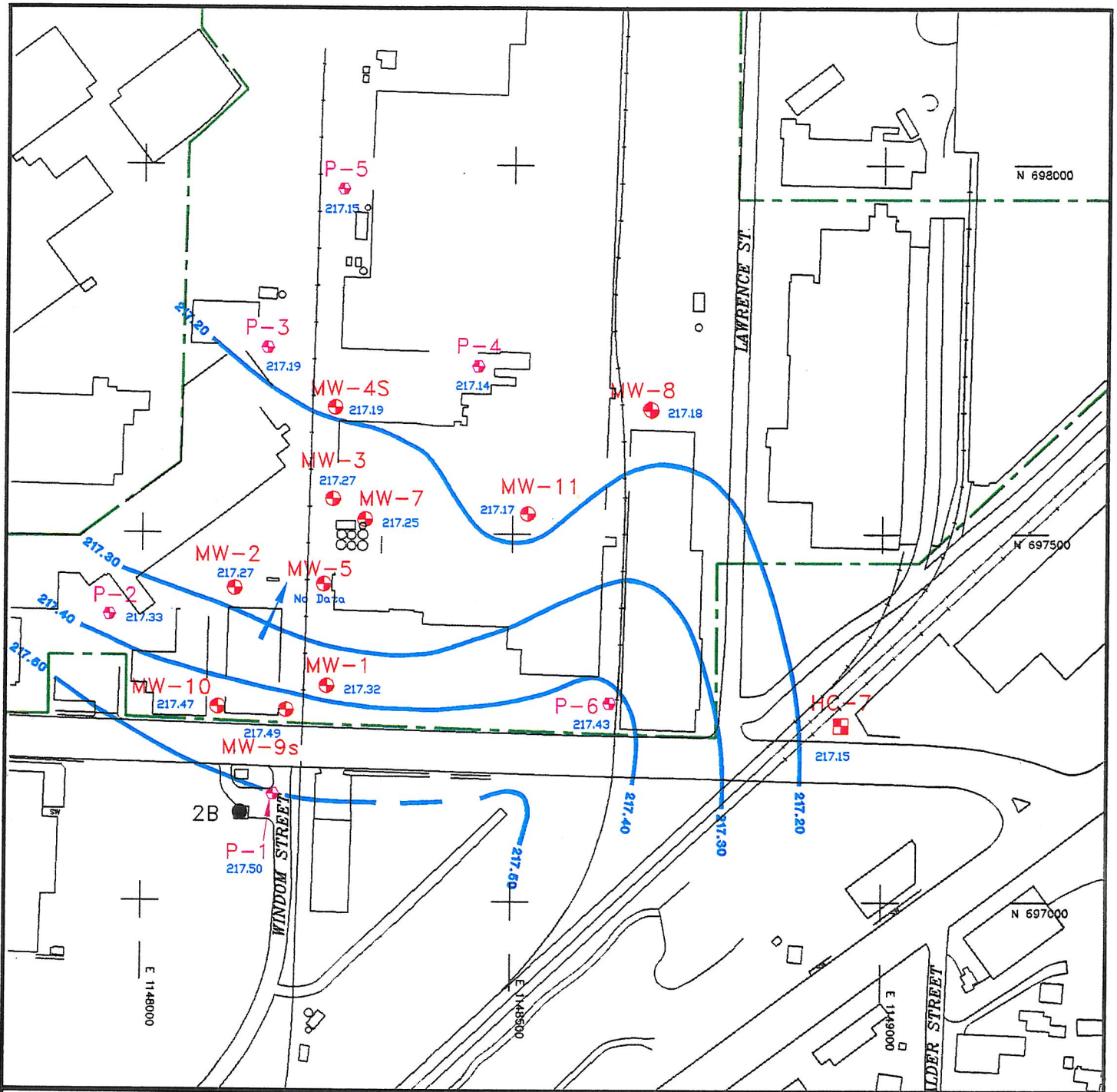
SCALE IN FEET

FIGURE 2

WATER TABLE ELEVATION
CONTOUR MAP - 8/16/95

NALLEY'S FINE FOODS





LEGEND

- | | | | |
|-------------------|---|------|--------------------------------|
| MW-8 | Nalley's Monitoring Well with Water Level | 2B | City of Tacoma Production Well |
| P-6 | Nalley's Piezometer with Water Level | HC-7 | Monitoring Well by Others |
| 220.90 | Groundwater Contour with Elevation in Feet | | |
| Blue Arrow | Groundwater Flow Direction in Vicinity of Removed Tanks | | |
| Dashed Green Line | Approximate Property Line | | |

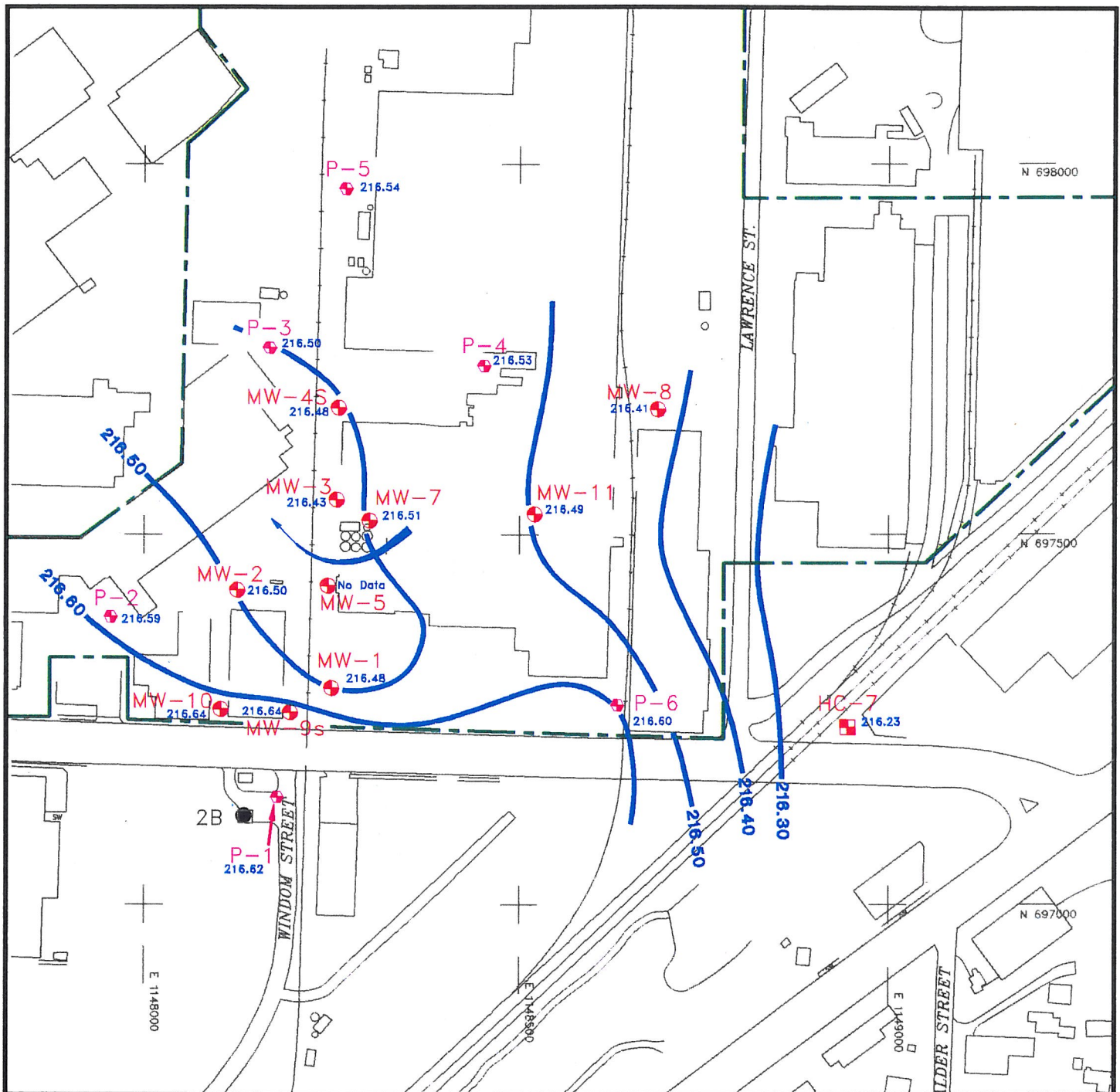
0 50 100 200 400
SCALE IN FEET

FIGURE 3

WATER TABLE ELEVATION CONTOUR MAP - 9/12/95

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

- MW-8 ● Nalley's Monitoring Well with Water Level
- P-6 ● Nalley's Piezometer with Water Level
- 220.90 — Groundwater Contour with Elevation in Feet
- Groundwater Flow Direction in Vicinity of Removed Tanks
- Approximate Property Line
- 2B ● City of Tacoma Production Well
- HC-7 ● Monitoring Well by Others



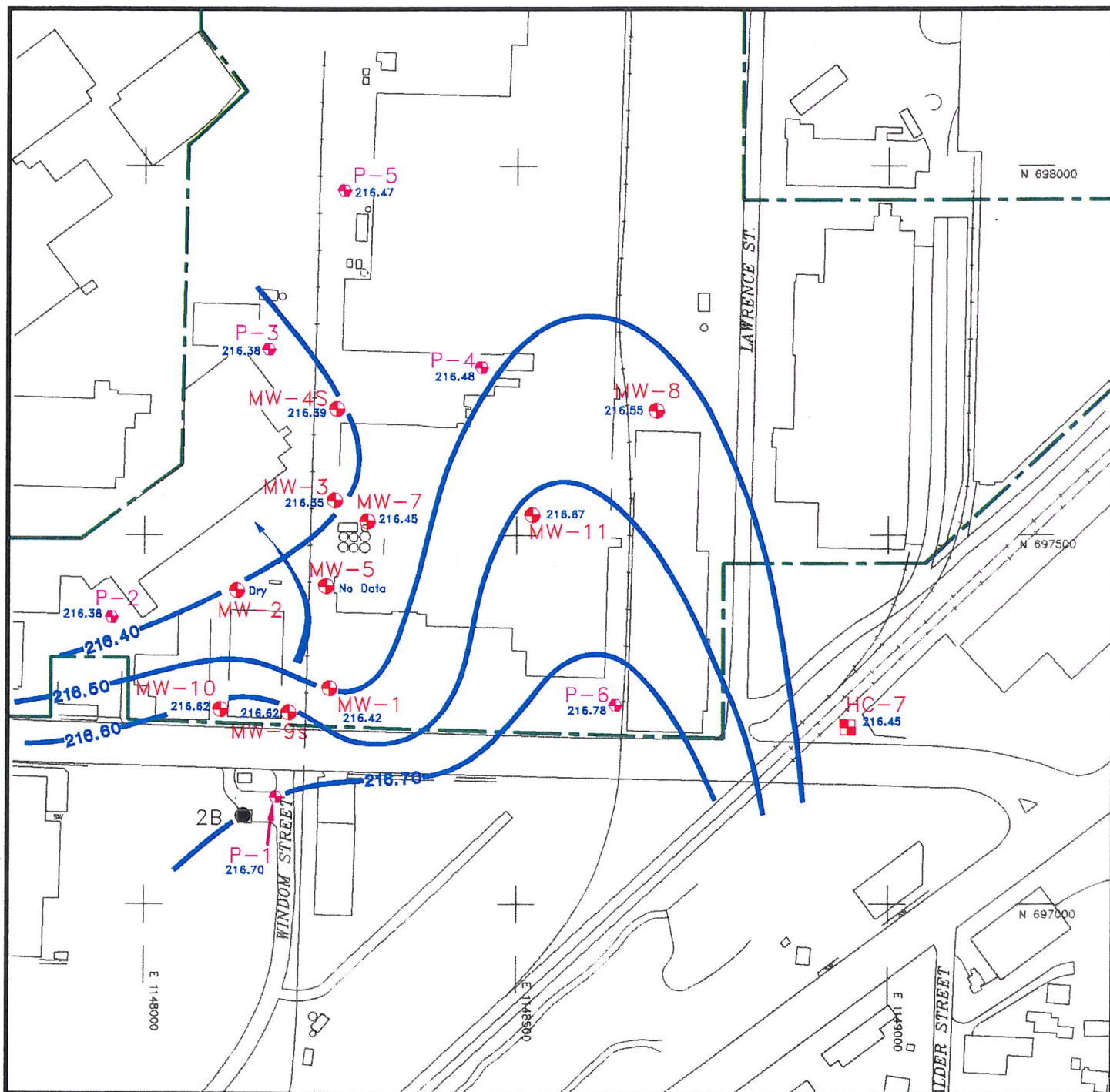
0 50 100 200 400
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION CONTOUR MAP - 10-6-95

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

MW-8

Nalley's
Monitoring Well
with Water Level

P-6

Nalley's
Piezometer
with Water Level

220.90

Groundwater Contour with
Elevation in Feet

Groundwater Flow Direction in
Vicinity of Removed Tanks

Approximate
Property Line

2B

City of Tacoma
Production Well

HC-7

Monitoring Well
by Others



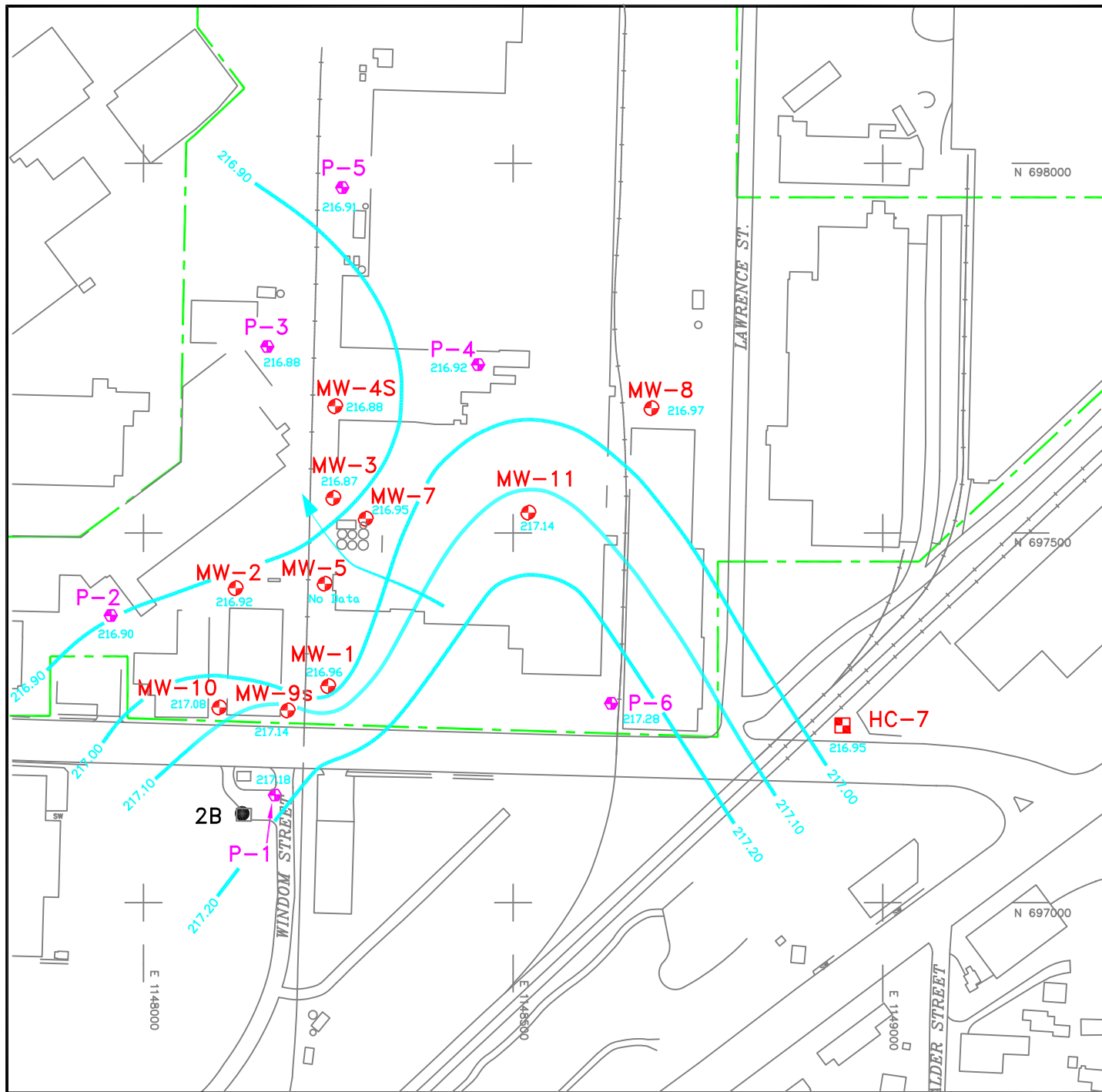
0 50 100 200 400
SCALE IN FEET

FIGURE 2

WATER TABLE ELEVATION CONTOUR MAP - 12-8-95

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

MW-8

Nalley's
Monitoring Well
with Water Level

P-6

Nalley's
Piezometer
with Water Level

220.90

Groundwater Contour with
Elevation in Feet



Groundwater Flow Direction in
Vicinity of Removed Tanks

Approximate
Property Line

2B

City of Tacoma
Production Well
Monitoring Well
by Others

HC-7



0 50 100 200 400

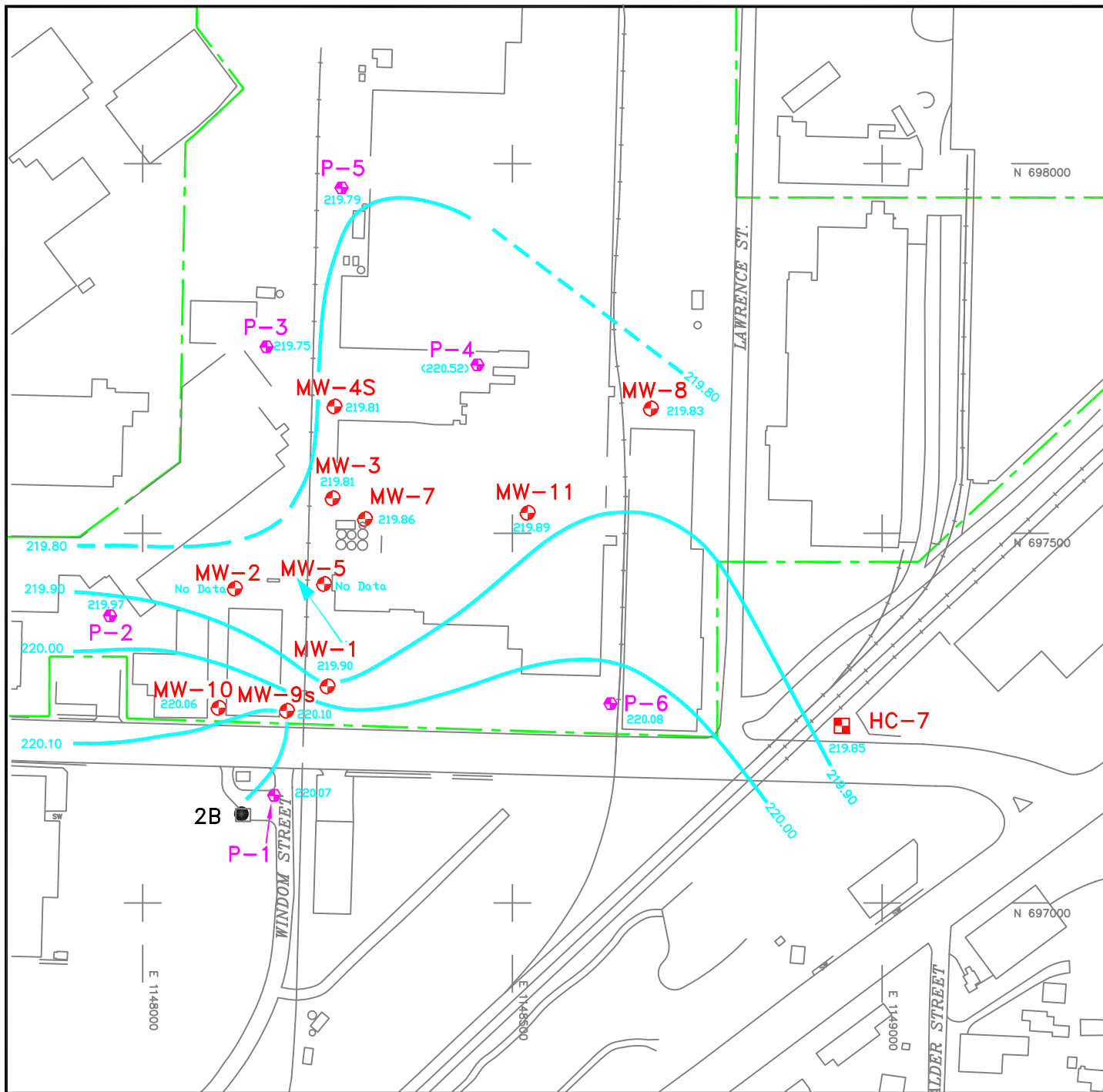
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - 1/10/96

NALLEY'S FINE FOODS





LEGEND

- | | | | |
|--------------|---|-------------|--------------------------------|
| MW-8 | Nalley's Monitoring Well with Water Level | 2B | City of Tacoma Production Well |
| P-6 | Nalley's Piezometer with Water Level | HC-7 | Monitoring Well by Others |
| (220) | Data not used | | |
| | Groundwater Contour with Elevation in Feet | | |
| | Groundwater Flow Direction in Vicinity of Removed Tanks | | |
| | Approximate Property Line | | |

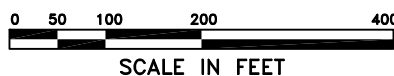
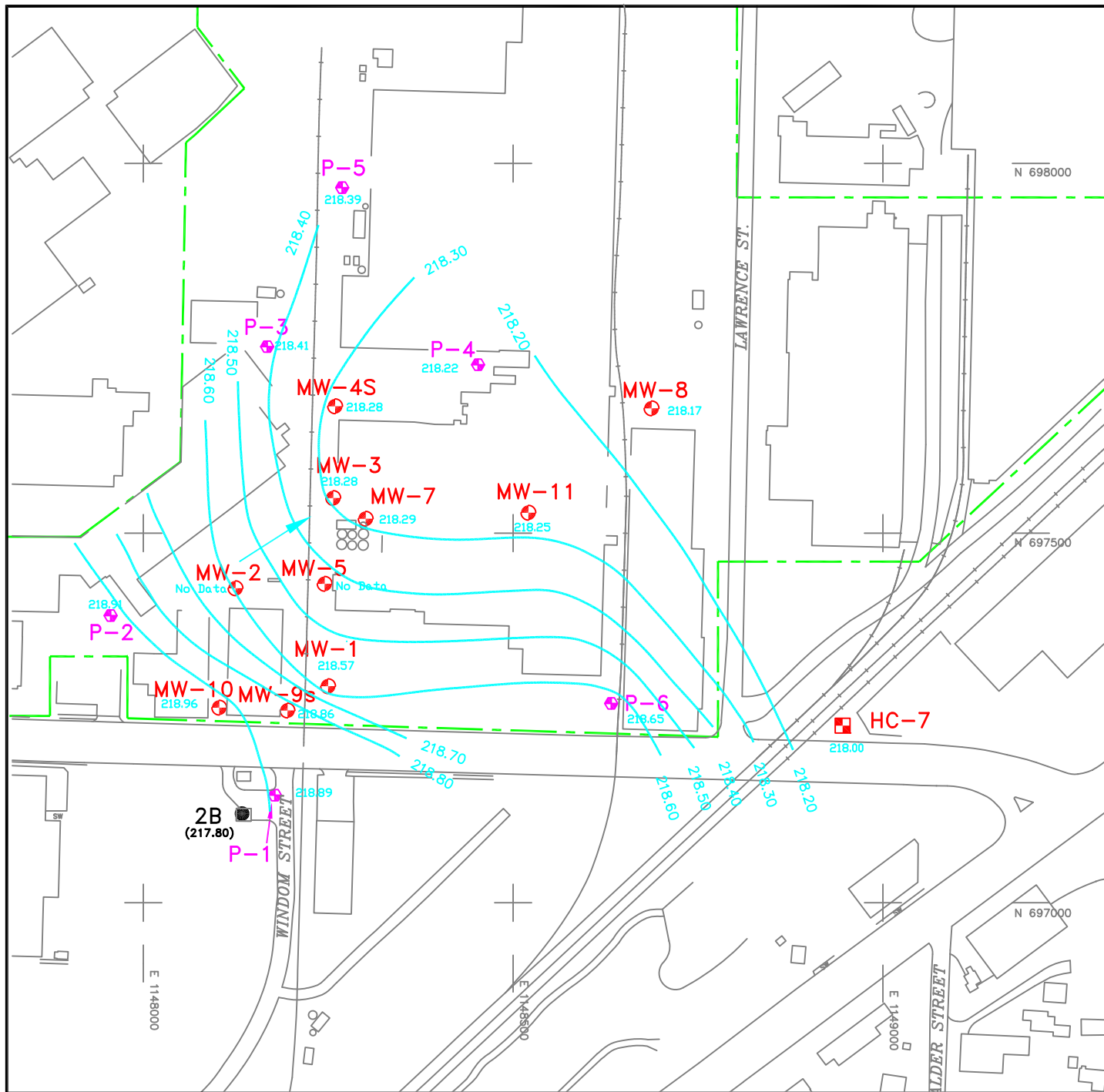


FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - 5/14/96

NALLEY'S FINE FOODS





LEGEND








- | | | | |
|---|---|---|--------------------------------|
| MW-8  | Nalley's Monitoring Well with Water Level | 2B  | City of Tacoma Production Well |
| P-6  | Nalley's Piezometer with Water Level | HC-7  | Monitoring Well by Others |
| 220.90  | Groundwater Contour with Elevation in Feet | (220) | Data not used |
|  | Groundwater Flow Direction in Vicinity of Removed Tanks | | |
|  | Approximate Property Line | | |

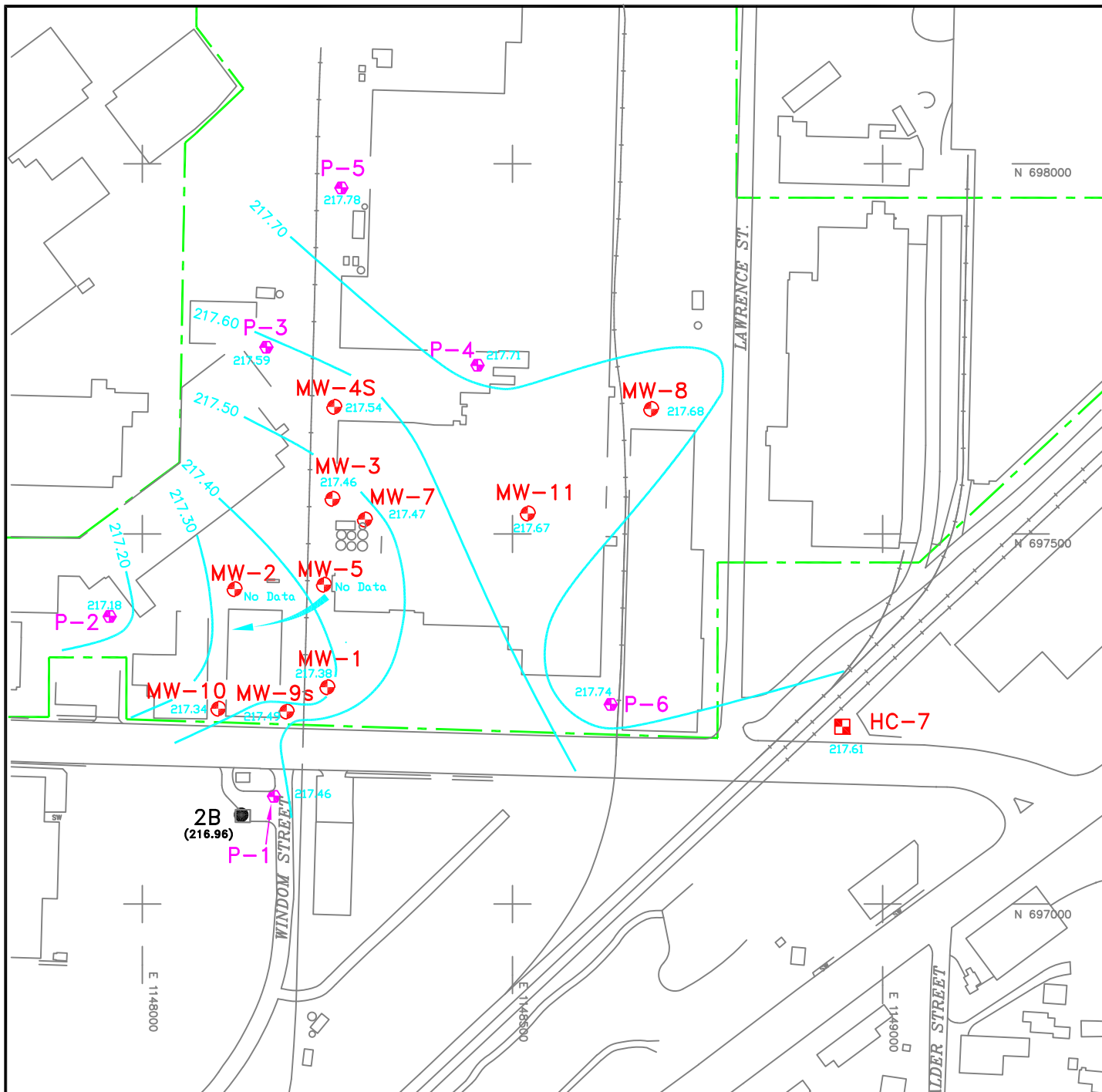


FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - 8/1/96

NALLEY'S FINE FOODS





LEGEND

- | | | | |
|-------------|---|--------------|--------------------------------|
| MW-8 | Nalley's Monitoring Well with Water Level | 2B | City of Tacoma Production Well |
| P-6 | Nalley's Piezometer with Water Level | HC-7 | Monitoring Well by Others |
| | Groundwater Contour with Elevation in Feet | (220) | Data not used |
| | Groundwater Flow Direction in Vicinity of Removed Tanks | | |
| | Approximate Property Line | | |

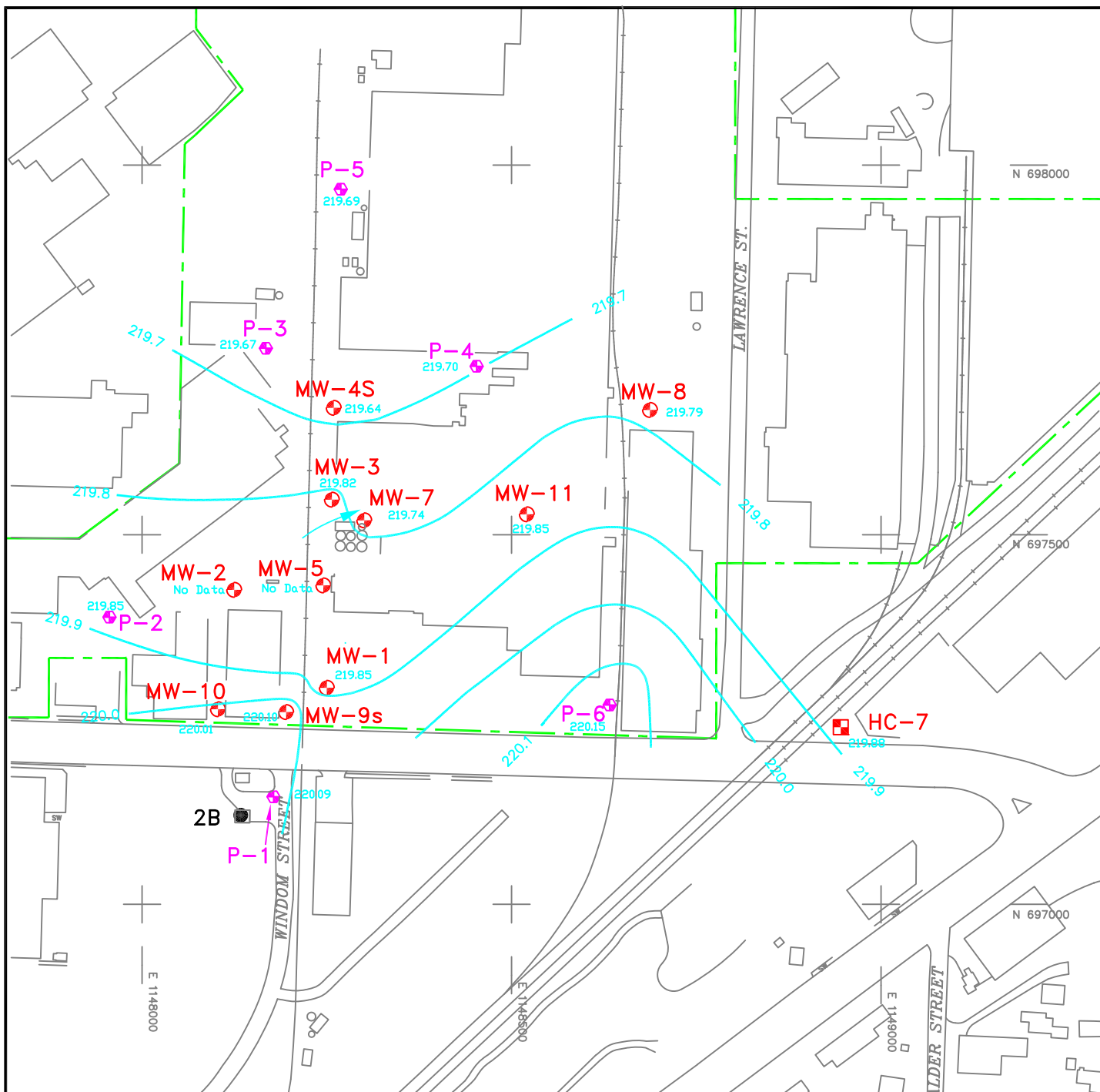
0 50 100 200 400
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - 11/15/96

NALLEY'S FINE FOODS





LEGEND

MW-8

Nalley's
Monitoring Well
with Water Level

2B

City of Tacoma
Production Well

P-6

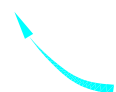
Nalley's
Piezometer
with Water Level

HC-7

Monitoring Well
by Others

220.90

Groundwater Contour with
Elevation in Feet



Groundwater Flow Direction in
Vicinity of Removed Tanks

Approximate
Property Line

0 50 100 200 400

SCALE IN FEET

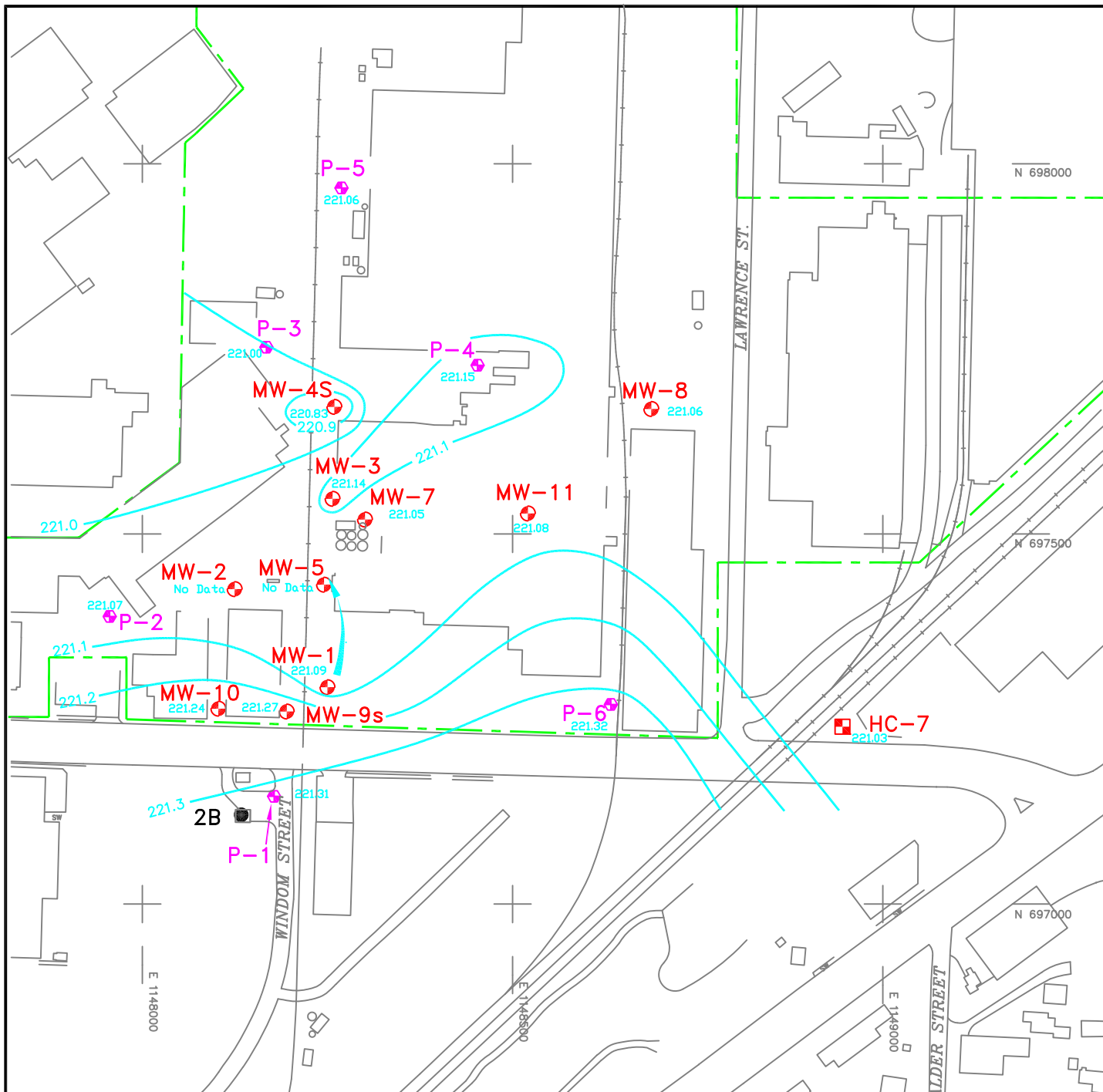


FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - 02/07/97

NALLEY'S FINE FOODS





LEGEND

MW-8

Nalley's Monitoring Well with Water Level

2B

City of Tacoma Production Well

P-6

Nalley's Piezometer with Water Level

HC-7

Monitoring Well by Others

220.90

Groundwater Contour with Elevation in Feet



Groundwater Flow Direction in Vicinity of Removed Tanks

Approximate Property Line

0 50 100 200 400

SCALE IN FEET



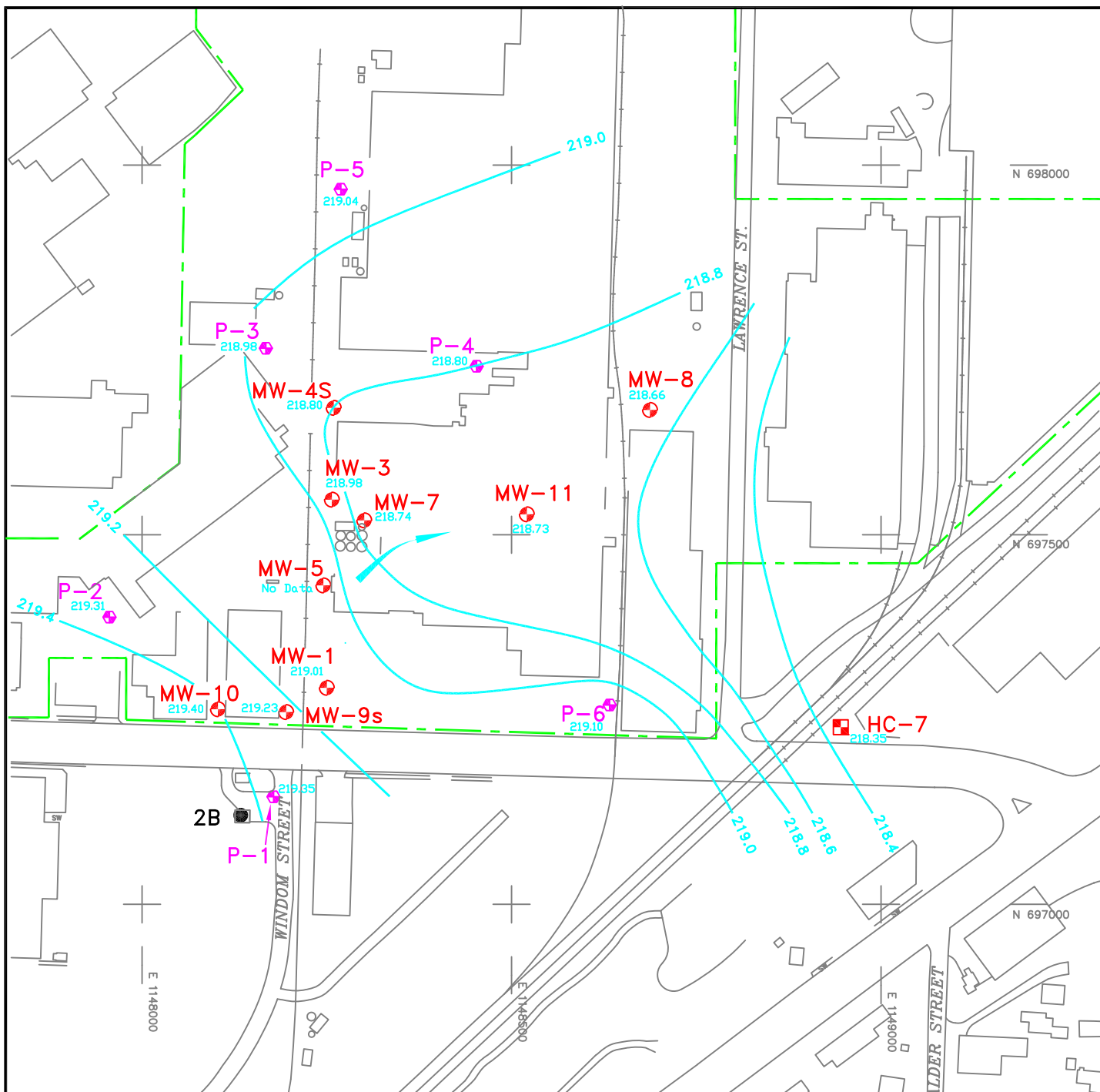
FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - 05/23/97*

* Water levels measured May 21, 22, 23, 1997.
Majority of measurements taken May 23, 1997.

NALLEY'S FINE FOODS

Pacific Groundwater Group



LEGEND

MW-8

Nalley's
Monitoring Well
with Water Level

2B

City of Tacoma
Production Well

P-6
216.31

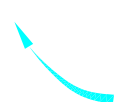
Nalley's
Piezometer
with Water Level

HC-7

Monitoring Well
by Others

220.90

Groundwater Contour with
Elevation in Feet



Groundwater Flow Direction in
Vicinity of Removed Tanks

Approximate
Property Line

0 50 100 200 400

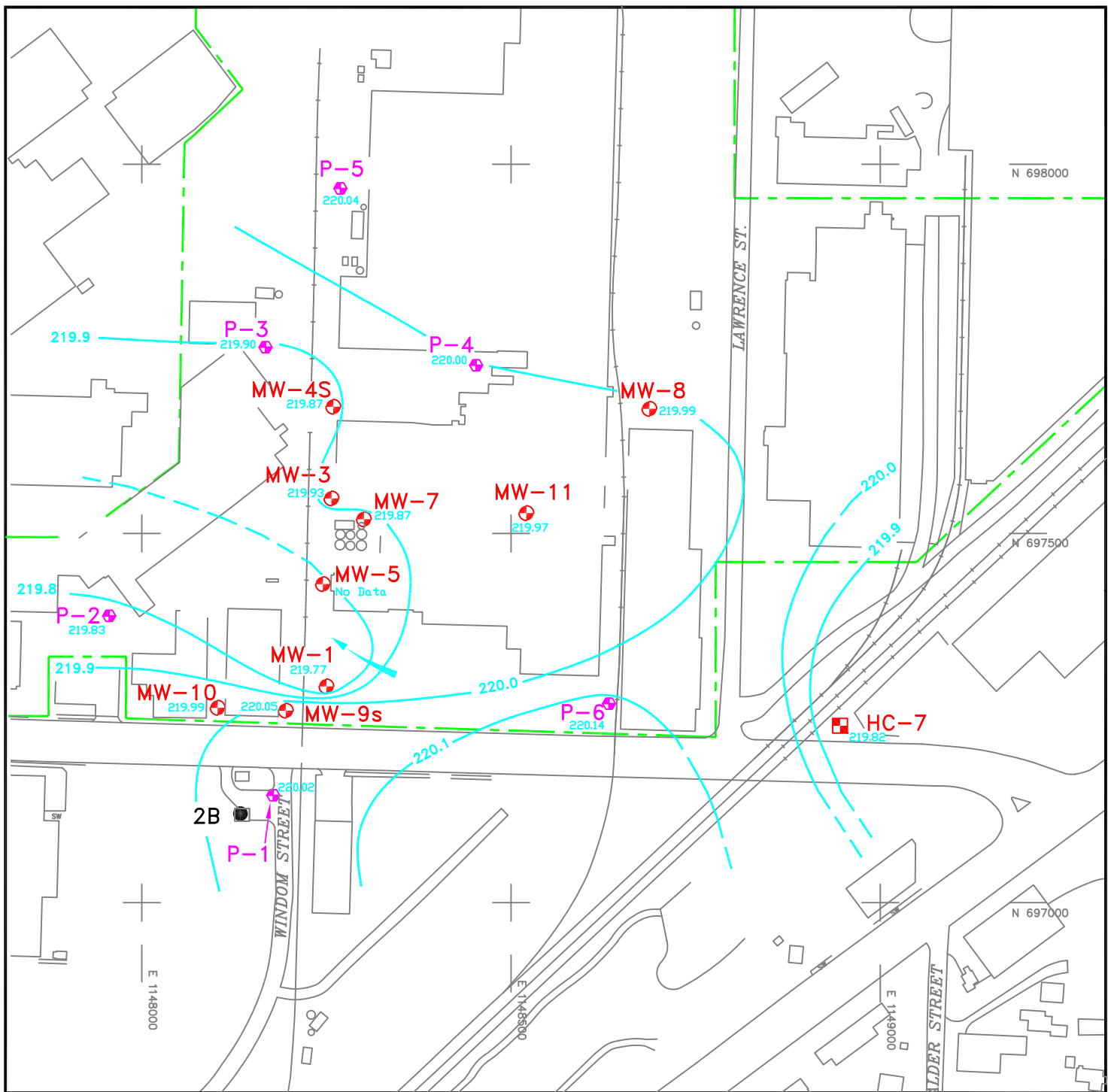
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - 08/20-21/97

NALLEY'S FINE FOODS





LEGEND

MW-8

Nalley's
Monitoring Well
with Water Level

2B

City of Tacoma
Production Well

P-6

Nalley's
Piezometer
with Water Level

HC-7

Monitoring Well
by Others

220.90

Groundwater Contour with
Elevation in Feet

Groundwater Flow Direction in
Vicinity of Removed Tanks

Approximate
Property Line

0 50 100 200 400

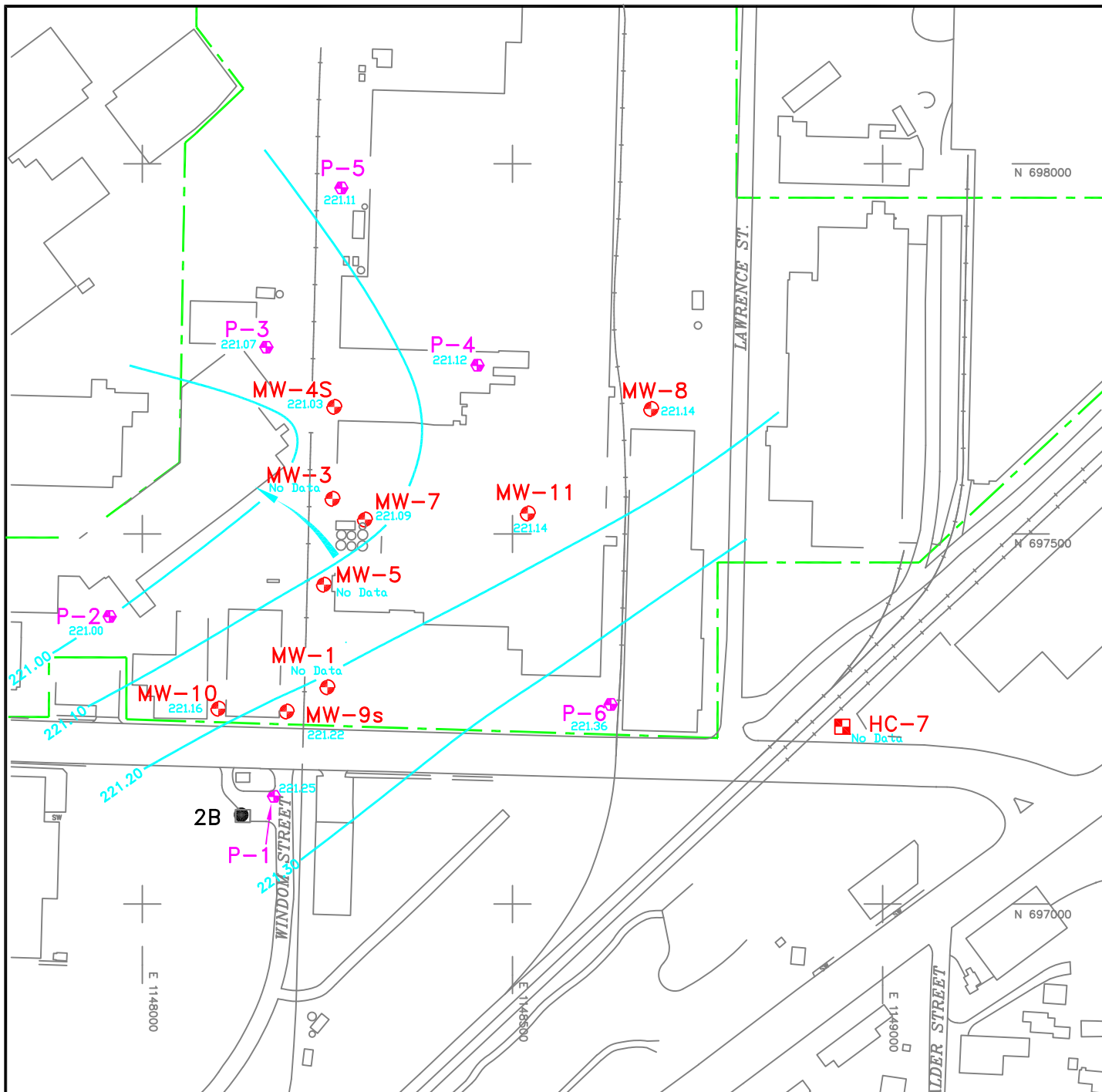
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - 11/26/97

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

MW-8

Nalley's
Monitoring Well
with Water Level

2B

City of Tacoma
Production Well

P-6

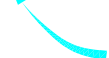
Nalley's
Piezometer
with Water Level

HC-7

Monitoring Well
by Others

220.90

Groundwater Contour with
Elevation in Feet



Groundwater Flow Direction in
Vicinity of Removed Tanks

Approximate
Property Line

0 50 100 200 400

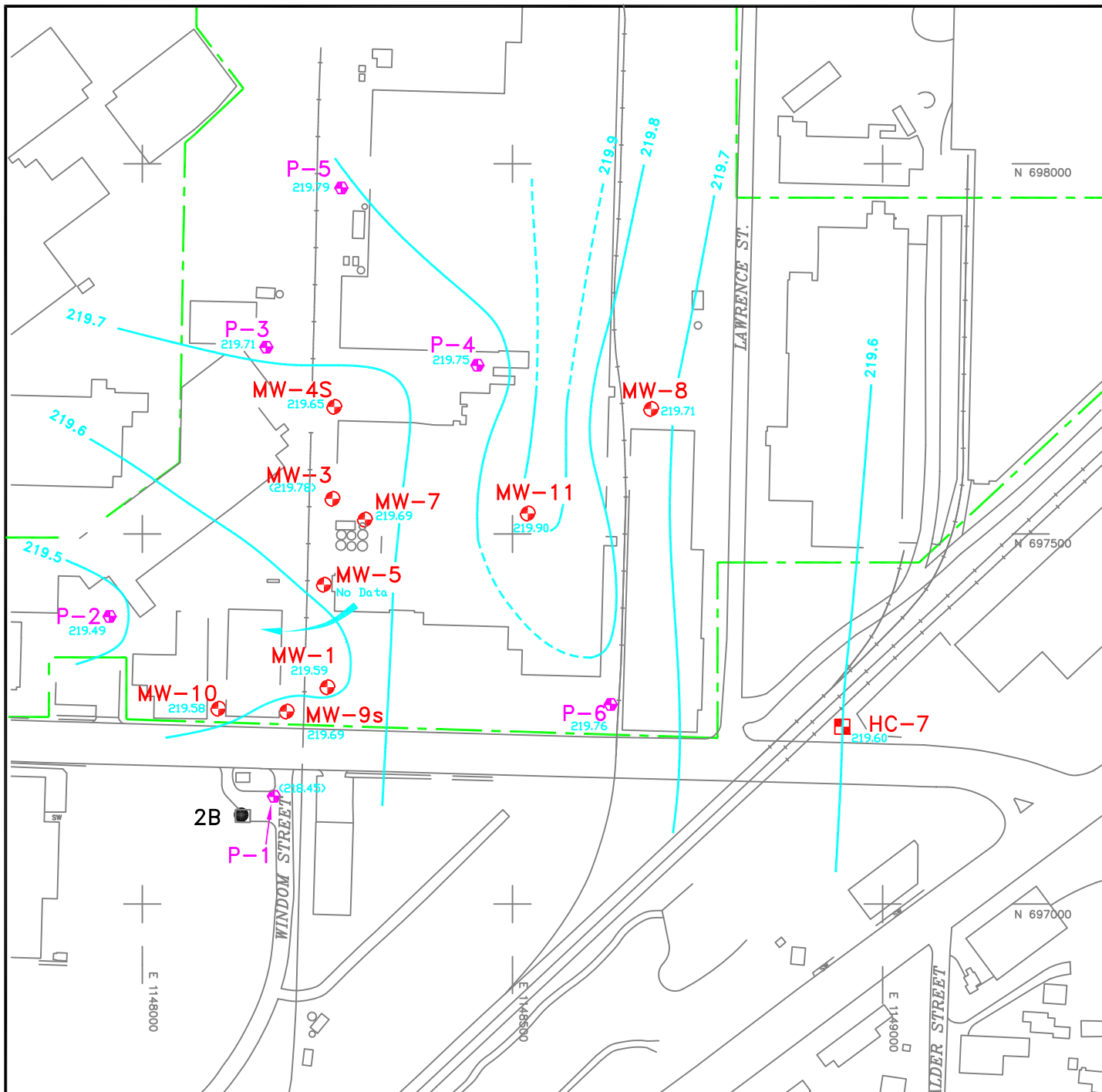
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - 2/23/98

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

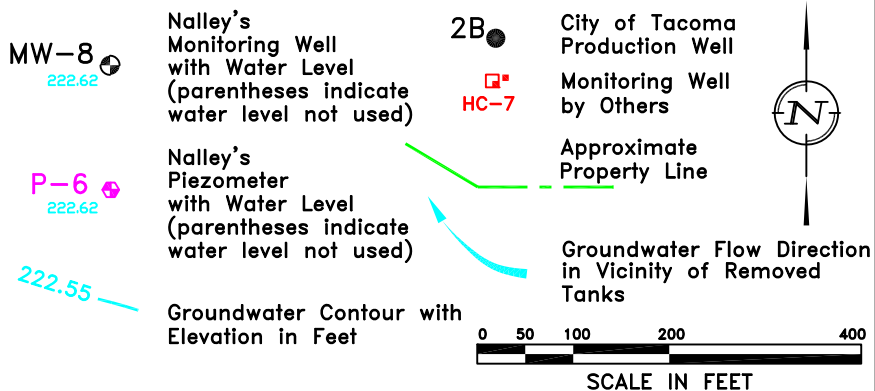


FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - October 9, 1998

NALLEY'S FINE FOODS



LEGEND

MW-8 
222.62

Nalley's
Monitoring Well
with Water Level
(parentheses indicate
water level not used)

2B.

City of Tacoma
Production Well
Monitoring Well
by Others

P-6 
222.62

Nalley's
Piezometer
with Water Level
(parentheses indicate
water level not used)

222.55 —

Groundwater Contour with
Elevation in Feet

Approximate
Property Line

Groundwater Flow Direction in Vicinity of Removed Tanks

0 50 100 200 400

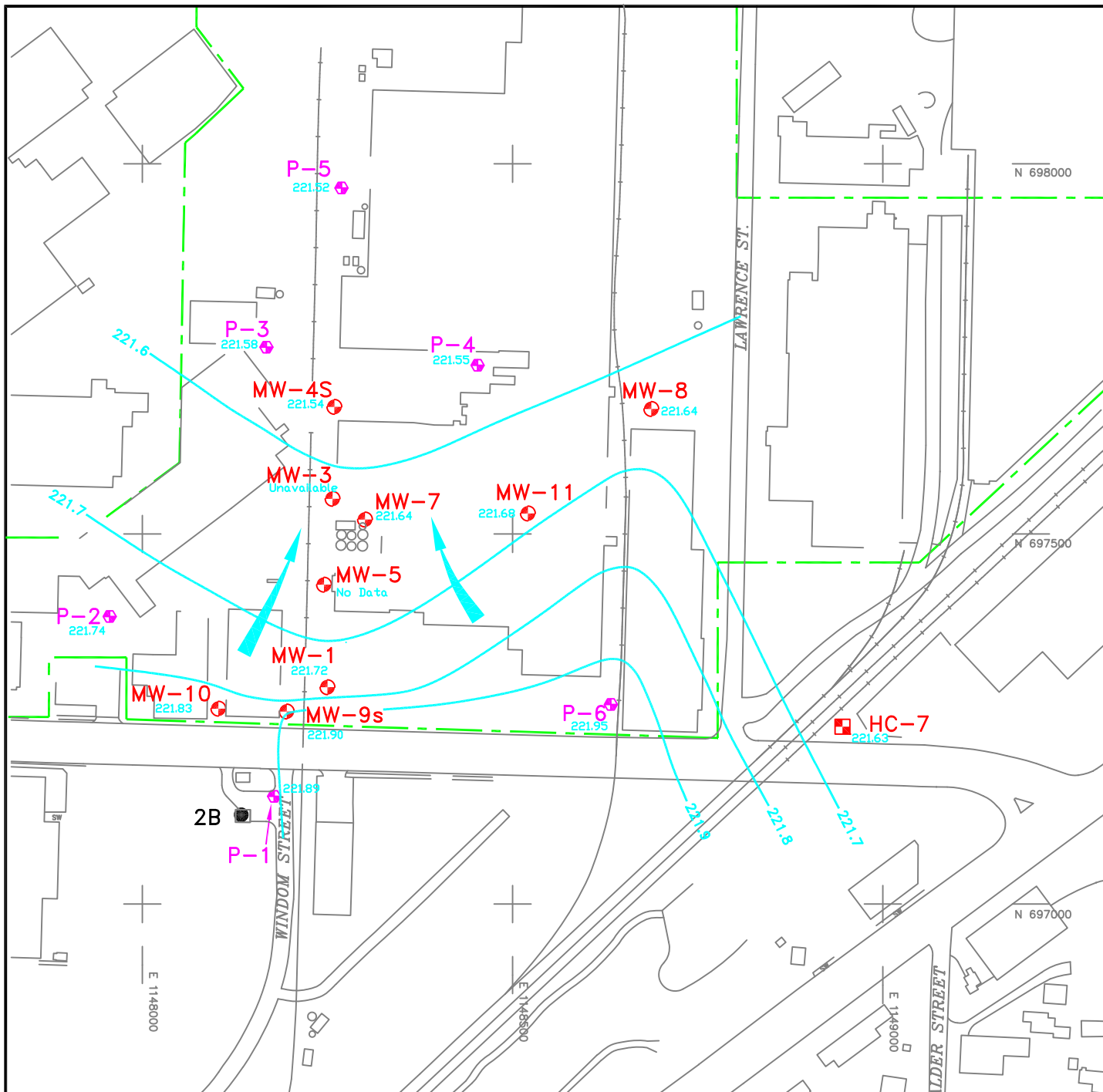
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - December 4, 1998

NALLEY'S FINE FOODS





LEGEND

MW-8
222.62

Nalley's
Monitoring Well
with Water Level

2B
HC-7

City of Tacoma
Production Well
Monitoring Well
by Others

P-6
222.62

Nalley's
Piezometer
with Water Level

Approximate
Property Line

222.55

Groundwater Contour with
Elevation in Feet

Groundwater Flow Direction
in Vicinity of Removed
Tanks

0 50 100 200 400

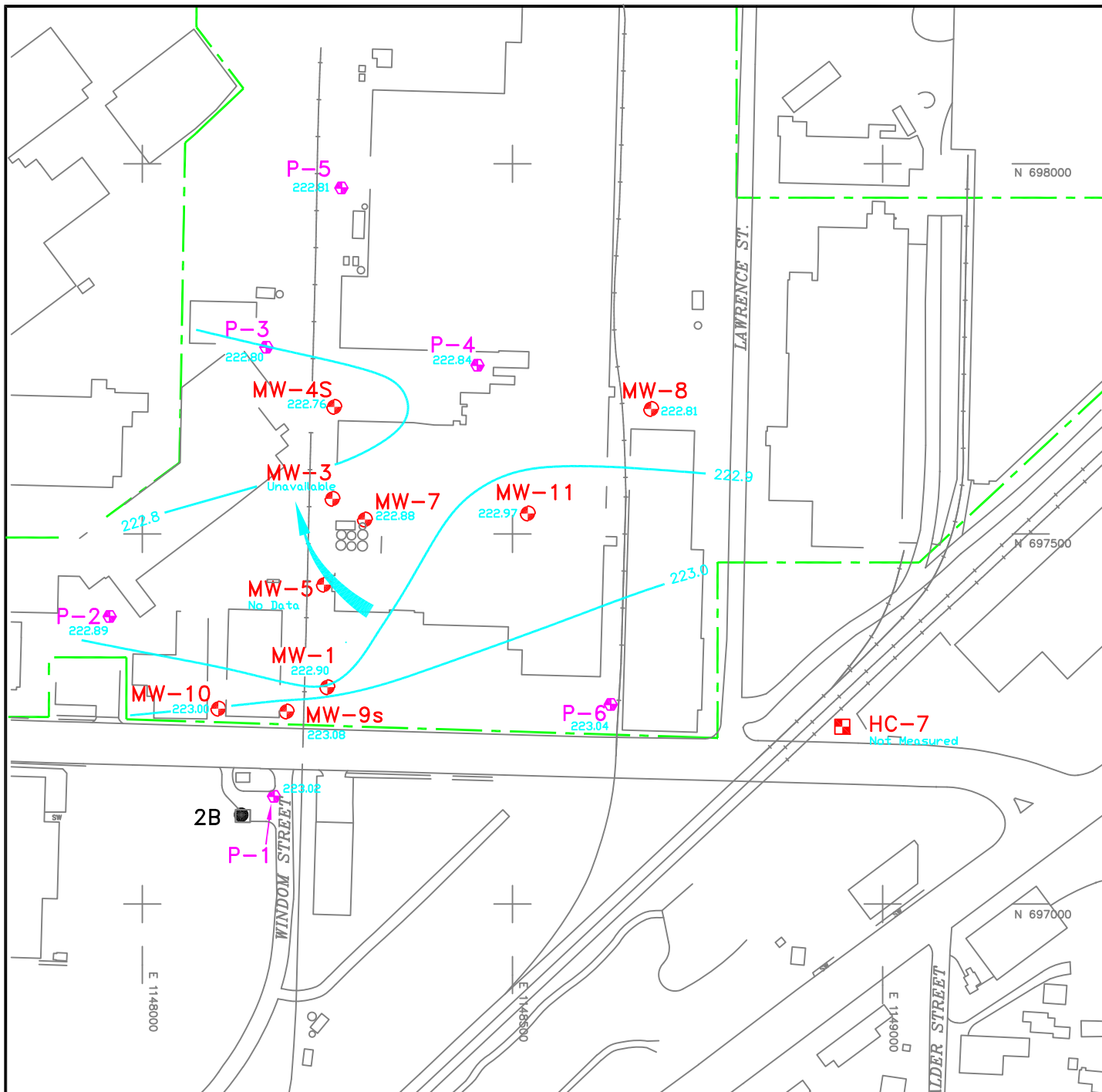
SCALE IN FEET

FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - February 26, 1999

NALLEY'S FINE FOODS

Pacific
Groundwater
Group



LEGEND

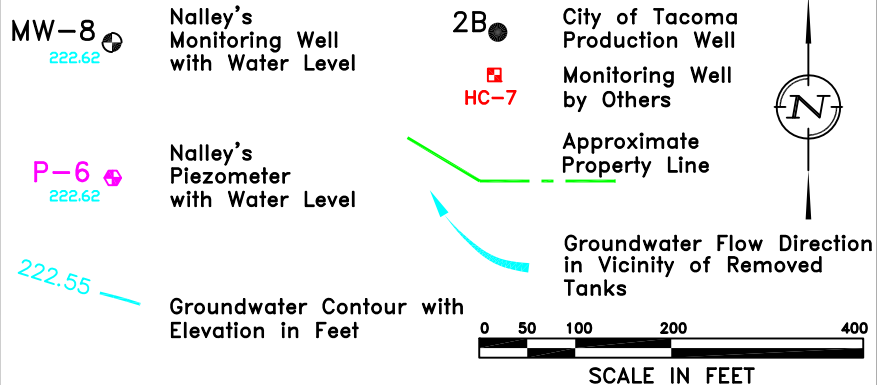
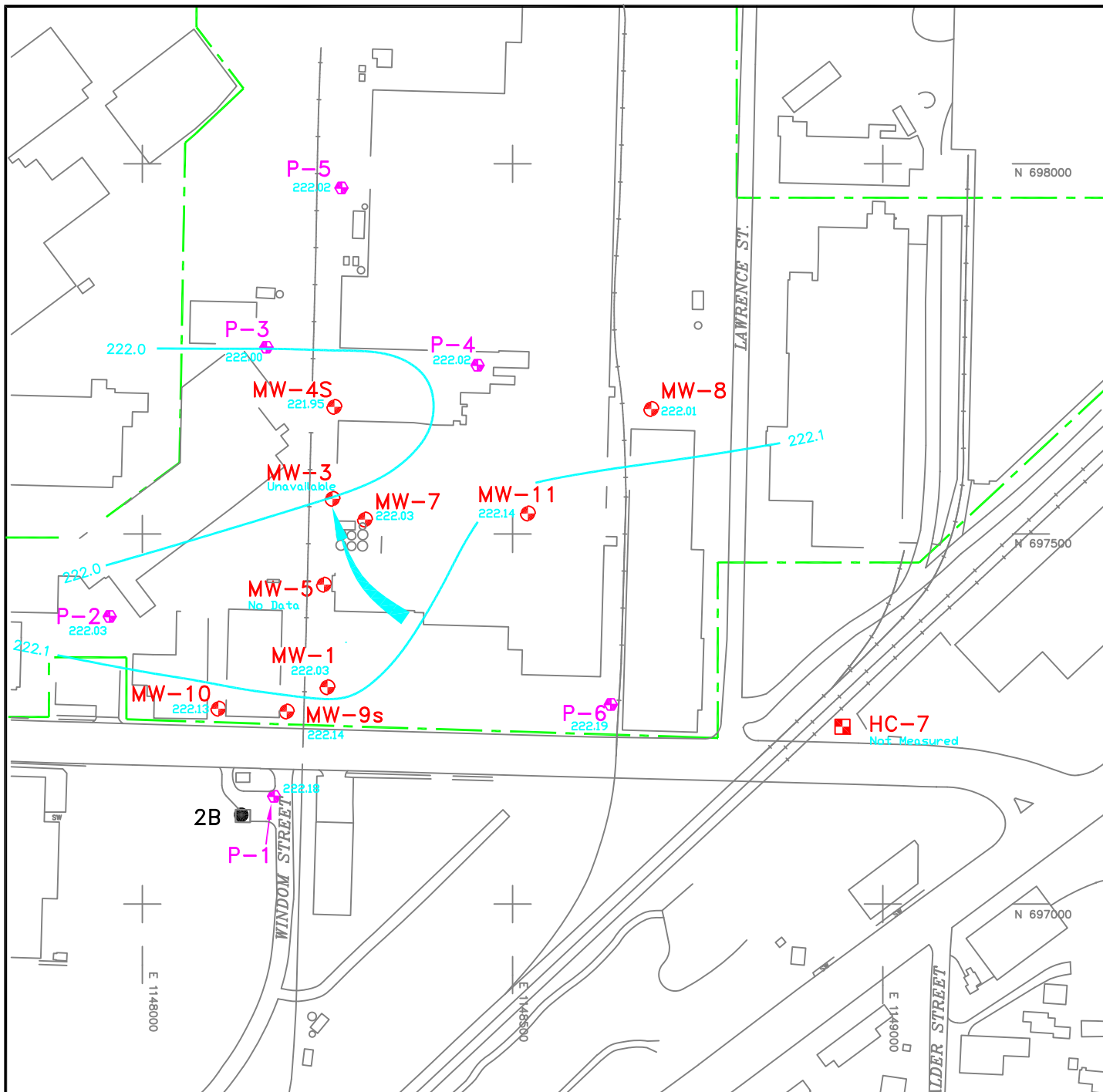


FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - May 19, 1999

NALLEY'S FINE FOODS





LEGEND

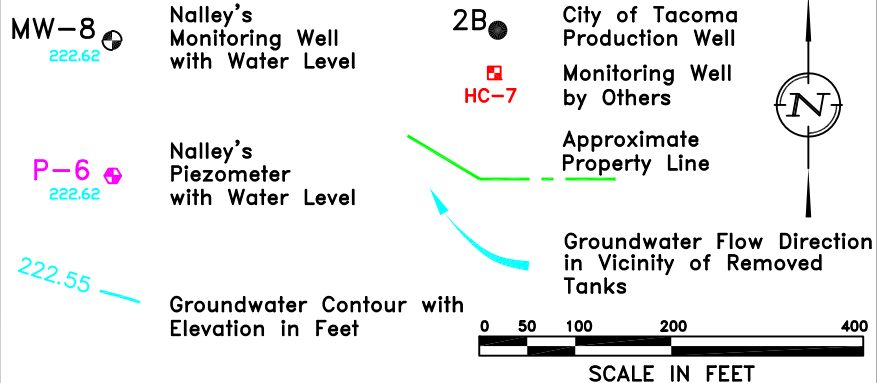


FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP - August 20, 1999

NALLEY'S FINE FOODS



LEGEND

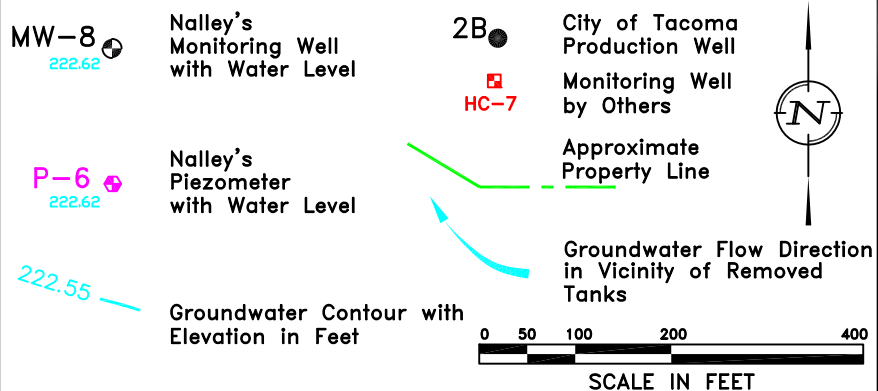


FIGURE 1

WATER TABLE ELEVATION
CONTOUR MAP –
NOVEMBER 29, 1999

APPENDIX D
MTCA TERRESTIRAL ECOLOGICAL EVALUATION WORKSHEETS

Terrestrial Ecological Evaluation Process- Simplified or Site-Specific Evaluation?

Documentation Form

	Terrestrial Concern	Response (Circle One)
*1	Is the site is located on or directly adjacent to an area where management or land use plans will maintain or restore native or semi-native vegetation?	Yes / <input checked="" type="radio"/> No
*2a	Is the site used by a threatened or endangered species ?	Yes / <input checked="" type="radio"/> No
*2b	Is the site used by a wildlife species classified by the state department of fish and wildlife as a "priority species" or "species of concern" under Title 77 RCW?	Yes / <input checked="" type="radio"/> No
*2c	Is the site used by a a plant species classified by the Washington state department of Natural Resources natural heritage program as "endangered," "threatened," or "sensitive" under Title 79 RCW.	Yes / <input checked="" type="radio"/> No
*3	Is the site (area where the contamination is located) located on a property that contains at least ten acres of native vegetation within 500 feet of the area where the contamination is located?	Yes / <input checked="" type="radio"/> No
4	Has the department determined that the site may present a risk to significant wildlife populations?	Yes / <input checked="" type="radio"/> No

*1 This includes for example, green-belts, protected wetlands, forestlands, locally designated environmentally sensitive areas, open space areas managed for wildlife, and some parks or outdoor recreation areas. This does not include park areas used for intensive sport activities such as baseball or football.

*2a [What are the threatened or endangered species in Washington state?](#)

*2b [Which plant species are classified as threatened, endangered, or sensitive? Where can I find out more information about this topic?](#)

*2c For plants, "used" means that a plant species grows at the site or has been found growing at the site. For animals, "used" means that individuals of a species have been observed to live, feed or breed at the site.

*3 For this analysis, do not include native vegetation beyond the property boundary.

The following sources shall be used in making this determination: Natural Vegetation of Oregon and Washington, J.F. Franklin and C.T. Dyrness, Oregon State University Press, 1988, and L.C. Hitchcock, C.L. Hitchcock, J.W. Thompson and A. Cronquist, 1955-1969, Vascular Plants of the Pacific Northwest(5 volumes). Areas planted with native species for ornamental or landscaping purposes shall not be considered to be native vegetation. [WAC 173-340-7491(2)(c)(i)]

(Here's a link to the [Seattle Public Library](#) and the [Washington State Library](#) to borrow a copy of Natural Vegetation of Oregon and Washington, J.F. Franklin and C.T. Dyrness, Oregon State University Press, 1988, or you may purchase it through your favorite bookseller. Here's an additional link to a useful online [Field Guide to Selected Rare Plants of Washington](#) developed by the Washington State Department of Natural Resources' Natural Heritage Program (WNHP) and the Spokane District of the U.S.D.I. Bureau of Land Management (BLM) which contains fact sheets for 139 vascular plant species and one lichen species. [Here is an aid to calculating area](#) and an [aerial photo depicting a site](#), its 500 foot boundary and several labeled circles identifying various areas for reference in judging the area of native vegetation within the 500 foot radius.

[\[Exclusions Main\]](#) [\[TEE Definitions\]](#) [\[Simplified or Site-Specific?\]](#) [\[Simplified Ecological Evaluation\]](#) [\[Site-Specific Ecological Evaluation\]](#) [\[WAC 173-340-7493\]](#)
[\[Index of Tables\]](#)
[\[TEE Home\]](#)

Table 749-1

Simplified Terrestrial Ecological Evaluation-Exposure Analysis Procedure

Estimate the area of contiguous (connected) undeveloped land on the site or within 500 feet of any area of the site to the nearest 1/2 acre (1/4 acre if the area is less than 0.5 acre).																						
1) From the table below, find the number of points corresponding to the area and enter this number in the field to the right.																						
	<table border="1"> <thead> <tr> <th>Area (acres)</th> <th>Points</th> </tr> </thead> <tbody> <tr> <td>0.25 or less</td> <td>4</td> </tr> <tr> <td>0.5</td> <td>5</td> </tr> <tr> <td>1.0</td> <td>6</td> </tr> <tr> <td>1.5</td> <td>7</td> </tr> <tr> <td>2.0</td> <td>8</td> </tr> <tr> <td>2.5</td> <td>9</td> </tr> <tr> <td>3.0</td> <td>10</td> </tr> <tr> <td>3.5</td> <td>11</td> </tr> <tr> <td>4.0 or more</td> <td>12</td> </tr> </tbody> </table>	Area (acres)	Points	0.25 or less	4	0.5	5	1.0	6	1.5	7	2.0	8	2.5	9	3.0	10	3.5	11	4.0 or more	12	4
Area (acres)	Points																					
0.25 or less	4																					
0.5	5																					
1.0	6																					
1.5	7																					
2.0	8																					
2.5	9																					
3.0	10																					
3.5	11																					
4.0 or more	12																					
2) Is this an industrial or commercial property? If yes, enter a score of 3. If no, enter a score of 1		3																				
3) ^a Enter a score in the box to the right for the habitat quality of the site, using the following rating system ^b . High=1, Intermediate=2, Low=3		1																				
4) Is the undeveloped land likely to attract wildlife? If yes, enter a score of 1 in the box to the right. If no, enter a score of 2. ^c		1																				
5) Are there any of the following soil contaminants present: Chlorinated dioxins/furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, pentachlorobenzene? If yes, enter a score of 1 in the box to the right. If no, enter a score of 4.		4																				
6) Add the numbers in the boxes on lines 2-5 and enter this number in the box to the right. If this number is larger than the number in the box on line 1, the simplified evaluation may be ended.		9																				

Notes for Table 749-1

^a It is expected that this habitat evaluation will be undertaken by an experienced field biologist. If this is not the case, enter a conservative score of (1) for questions 3 and 4.

^b **Habitat rating system.** Rate the quality of the habitat as high, intermediate or low based on your professional judgment as a field biologist. The following are suggested factors to consider in making this evaluation:

Low: Early [successional](#) vegetative stands; vegetation predominantly noxious, nonnative, exotic plant species or weeds. Areas severely disturbed by human activity, including intensively cultivated croplands. Areas isolated from other habitat used by wildlife.

High: Area is ecologically significant for one or more of the following reasons: Late-[successional](#) native plant communities present; relatively high species diversity; used by an uncommon or rare species; [priority habitat](#) (as defined by the Washington Department of fish and Wildlife); part of a larger area of habitat where size or fragmentation may be important for the retention of some species.

Intermediate: Area does not rate as either high or low.

^c Indicate "yes" if the area attracts wildlife or is likely to do so. Examples: Birds frequently visit the area to feed; evidence of high use b mammals (tracks, scat, etc.); habitat "island" in an industrial area; unusual features of an area that make it important for feeding animals; heavy use during seasonal migrations.

[\[Area Calculation Aid\]](#) [\[Aerial Photo with Area Designations\]](#) [TEE Table 749-1] [\[Index of Tables\]](#)

[\[Exclusions Main\]](#) [\[TEE Definitions\]](#) [\[Simplified or Site-Specific?\]](#) [\[Simplified Ecological Evaluation\]](#) [\[Site-Specific Ecological Evaluation\]](#) [\[WAC 173-340-7493\]](#)

[\[TEE Home\]](#)

APPENDIX E
ARI BIRDS EYE SOIL SH31 - ADDENDUM



Analytical Resources, Incorporated
Analytical Chemists and Consultants

October 14, 2011

Inger Jackson
Pacific Groundwater Group
2377 Eastlake Ave. East, Suite 200
Seattle, WA 98102

Project: Birds Eye Soil JI1001
ARI ID: SH31 – Addendum

Dear Ms. Jackson:

Sample **B11-17-30** was not requested for NWTPH-G analysis at the time of sample processing. After data review, the client inquired as to whether any information might be ascertained regarding the presence or absence of gasoline based on runs that were performed (EPH, VPH, and NWTPH-Dx).

The analyst who performed the NWTPH-Dx analysis noted that the instrument is not sensitive enough for gasoline analysis, but that the chromatogram did not have the appearance of gasoline – only diesel #2.

The analyst who performed the EPH analysis noted that the chromatogram did not have the appearance of gasoline. The reporting limit for EPH is significantly higher than for NWTPH-G.

The analyst who performed the VPH analysis noted that the chromatogram did not have the appearance of gasoline. The reporting limit for VPH is significantly higher than for NWTPH-G.

A gasoline low point standard was analyzed on the VPH instrument on 10/5/11 for comparison to the results of the sample. Pertinent comparison ranges from the gasoline standard and the VPH sample results are Aromatic ranges – reported as C8-C10, C10-C12, and C12-C13. Gasoline does have components that exist below C8 and above C13. The concentrations for reported Aromatic ranges were higher for the gasoline standard than the sample in all three instances. Amounts for individual constituents ranging from MTBE to 1-Methylnaphthalene were all higher in the gasoline standard as well, with the exception of Trimethylbenzene. Dibromotoluene is the surrogate for the analysis.

VPH results are likely the most valuable for this assessment due to the fact that it is also a purge and trap analysis, while the EPH and NWTPH-Dx analyses show loss of gasoline range organics during processing. The gasoline standard was run a significant duration after the sample's analysis on 2/4/11. A direct comparison is not recommended due to possible fluctuations in instrument sensitivity. Pertinent chromatograms from the gasoline test and the sample have been included with this letter.

It is not possible for ARI to report any actual numbers or make any assumptions about the presence of gasoline based on the information provided from these three analyses. The NWTPH-G analysis most effectively targets GRO and gasoline, and reports down to 5 mg/kg in instances of ideal percent solids. The VPH analysis of this sample had no detections for any C ranges or individual constituents down to 12 mg/kg. This information is being provided to the client for their assessment and inference only.

Respectfully,

ANALYTICAL RESOURCES, INC.

Eric Branson
Project Manager
(206) 695-6213
eric@arilabs.com
www.arilabs.com

Sample ID: B11-17-30
SAMPLE

Lab Sample ID: SH31G

LIMS ID: 11-2256

Matrix: Soil

Data Release Authorized: *JB*

Reported: 02/15/11

QC Report No: SH31-Pacific Groundwater Group

Project: Birds Eye-Soil

J11001

Date Sampled: 02/01/11

Date Received: 02/02/11

Date Analyzed: 02/04/11 10:51

Instrument/Analyst: PID1/MH

Purge Volume: 10 mL

Sample Amount: 42.3 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1200	< 1,200 U
108-88-3	Toluene	1200	< 1,200 U
100-41-4	Ethylbenzene	1200	< 1,200 U
179601-23-1	m,p-Xylene	2400	< 2,400 U
95-47-6	o-Xylene	1200	< 1,200 U
1634-04-4	Methyl tert-Butyl Ether	1200	< 1,200 U
109-66-0	n-Pentane	1200	< 1,200 U
110-54-3	n-Hexane	1200	< 1,200 U
111-65-9	n-Octane	1200	< 1,200 U
124-18-5	n-Decane	1200	< 1,200 U
112-40-3	n-Dodecane	1200	< 1,200 U

Range	RL	Result
C8-C10 Aromatics	12,000	< 12,000 U
C10-C12 Aromatics	12,000	< 12,000 U
C12-C13 Aromatics	12,000	< 12,000 U
C5-C6 Aliphatics	12,000	< 12,000 U
C6-C8 Aliphatics	12,000	< 12,000 U
C8-C10 Aliphatics	12,000	< 12,000 U
C10-C12 Aliphatics	12,000	< 12,000 U

Values reported in µg/kg (ppb)

VPH Surrogate Recovery

PID: 2,5-Dibromotoluene	98.8%
FID: 2,5-Dibromotoluene	95.8%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

FORM I

SH31A: 00002

SH31: 00022 ED

Analytical Resources Inc.
WAVPH Aromatics Report

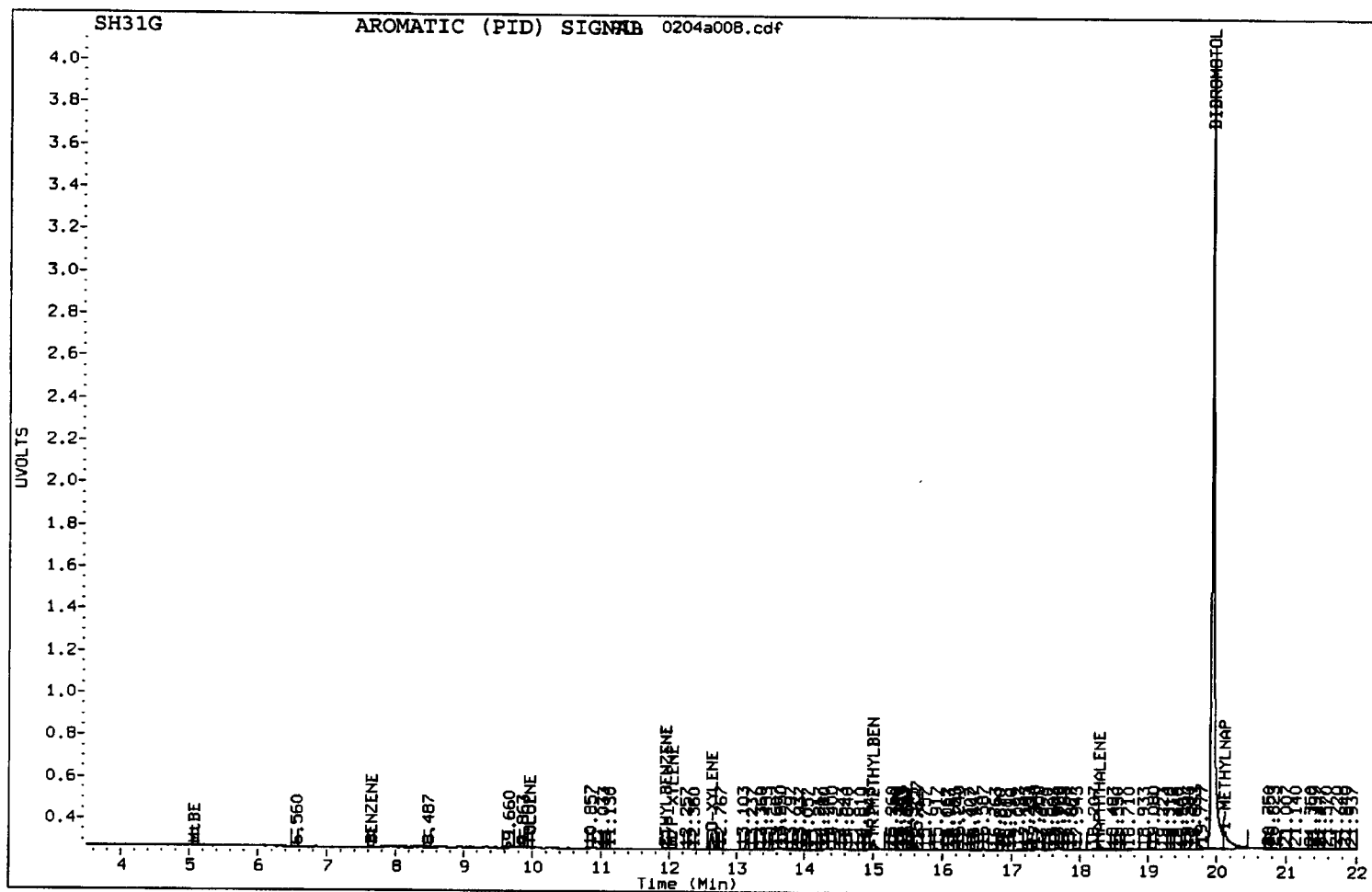
Data file: /chem3/pidl.i/vpcc0204-2.b/0204a008.d
Method: /chem3/pidl.i/vpcc0204-2.b/VPHARO.m
Instrument: pidl.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: SH31G
Client ID:
Injection: 04-FEB-2011 10:51
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.080	-0.017	6	0.0	C8-C10 Arom.	4673*	2.0
BENZENE	7.653	0.007	23	0.0	C10-C12 Arom.	4178	1.9
TOLUENE	9.970	0.010	19	0.0	C12-C13 Arom.	5733	5.2
ETHYLBENZENE	11.943	0.010	25	0.0			
M/P-XYLENE	12.047	0.010	46	0.0			
O-XYLENE	12.630	0.007	728	0.7			
TRIMETHYLBEN	15.007	-0.040	432	0.6			
NAPHTHALENE	18.283	0.013	265	0.4			
1-METHYLNAP	20.123	0.013	723	4.0			
DIBROMOTOL	19.927	0.017	38153	49.4	DBT Recovery:	98.7	

* Indicates surrogate area subtracted



SH31: 00027 F₅

SH31A: 00003

Analytical Resources Inc.
WAVPH Aromatics Report

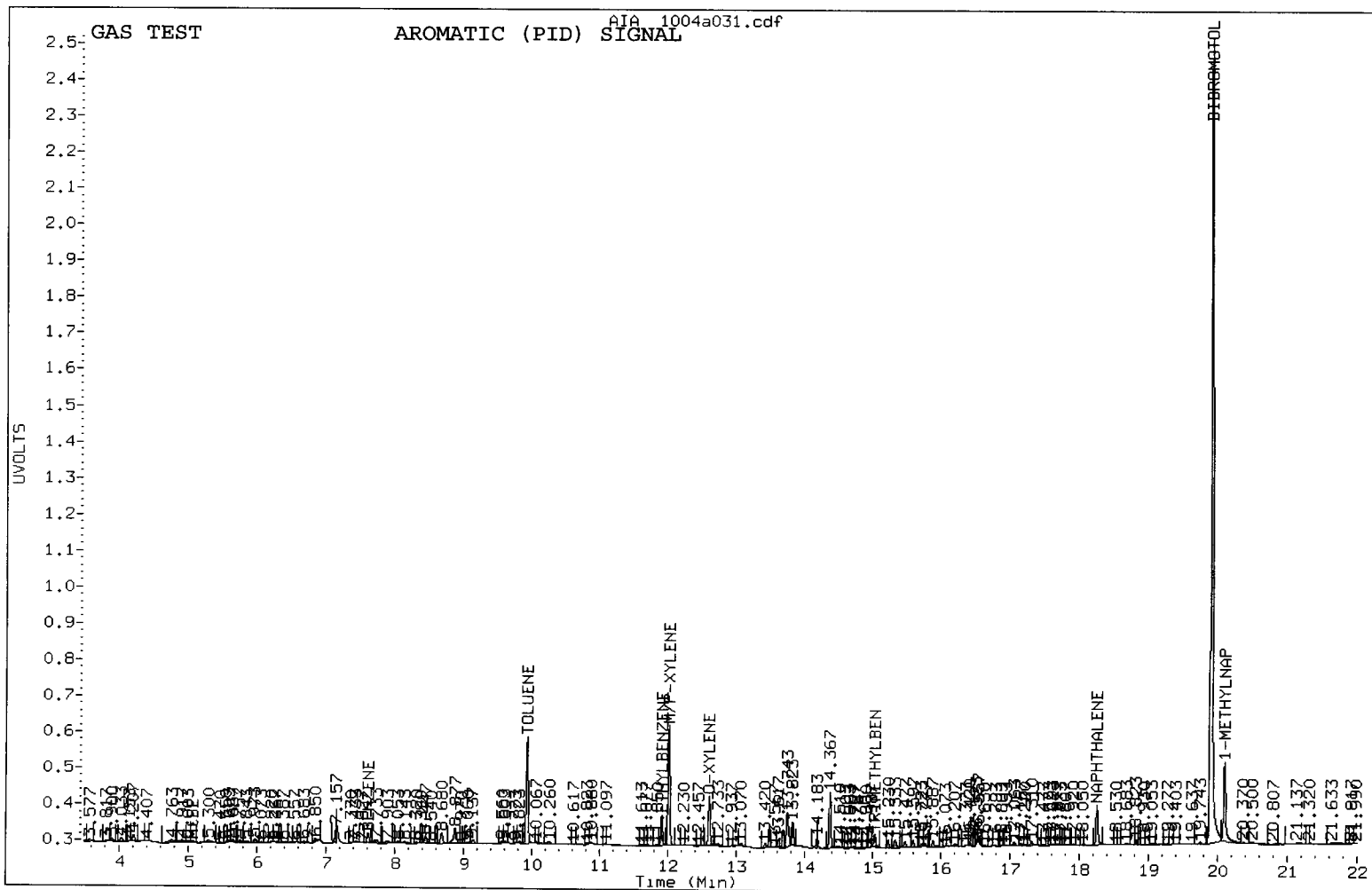
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Instrument: pid1.i
Operator: MH
Macro: 20-MAR-2004

ARI ID: GAS TEST
Client ID:
Injection: 05-OCT-2011 00:08
Matrix: WATER
Dilution Factor: 1

VPH-AROMATIC RESULTS

Compound	RT	Shift	Height	Amount	Range	Total Area	Conc
MtBE	5.060	-0.027	28	0.1	C8-C10 Arom.	19088*	14.4
BENZENE	7.610	0.000	257	0.4	C10-C12 Arom.	6030	6.3
TOLUENE	9.930	0.000	2904	3.7	C12-C13 Arom.	5526	9.7
ETHYLBENZENE	11.910	-0.003	820	1.1			
M/P-XYLENE	12.010	-0.010	3285	3.8			
O-XYLENE	12.600	-0.003	1336	1.7			
TRIMETHYLBEN	15.030	0.000	368	0.5			
NAPHTHALENE	18.253	0.003	1077	2.2			
1-METHYLNAP	20.097	0.003	2131	8.8			
DIBROMOTOL	19.893	0.000	22108	47.6	DBT Recovery:	95.2	

* Indicates surrogate area subtracted



SH31A: 00004

APPENDIX F
ECOLOGY PLUME STABILITY SPREADSHEET MODEL OUTPUT

Module1: Mann-Kendall Trend Test for Plume Stability (Non-parametric Statistical Test)Site Name: *Birds Eye Foods*Site Address: *3303 South 35th Street, Tacoma WA*Additional Description: *Monitoring Wells with > 50% Detections*Analyte? **Diesel Range Organics**Level of Confidence (Decision Criteria)? **85%****1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.**

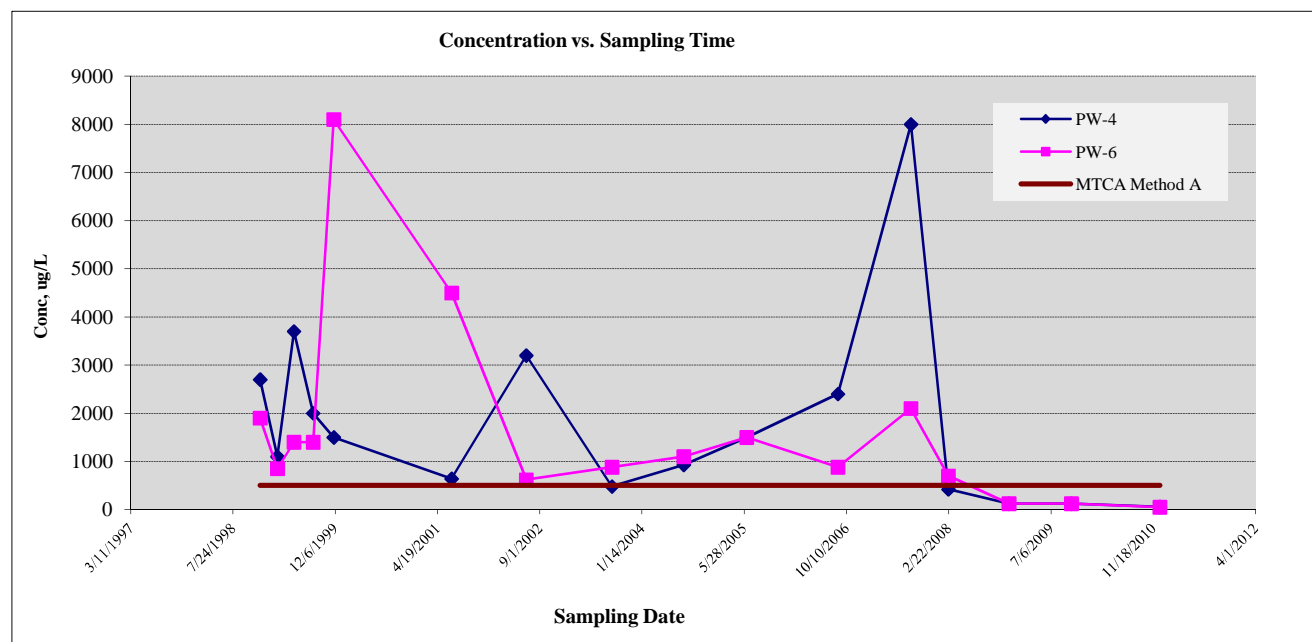
		Hazardous Substances (unit is ug/L)				
Sampling Event	Date Sampled	PW-4	PW-6			MTCA Method A
#1	12/4/1998	2700	1900			500
#2	2/26/1999	1100	850			500
#3	5/18/1999	3700	1400			500
#4	8/20/1999	2000	1400			500
#5	11/29/1999	1500	8100			500
#6	6/27/2001	640	4500			500
#7	6/27/2002	3200	620			500
#8	8/20/2003	480	880			500
#9	8/5/2004	930	1100			500
#10	6/9/2005	1500	1500			500
#11	8/29/2006	2400	880			500
#12	8/21/2007	8000	2100			500
#13	2/20/2008	420	700			500
#14	12/12/2008	125	125			500
#15	10/13/2009	125	125			500
#16	12/20/2010	55	50			500

2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	PW-4	PW-6				MTCA Method A
Confidence Level Calculated?	99.00%	98.70%	NA	NA		
Plume Stability?	Shrinking	Shrinking	NA	NA		
Coefficient of Variation?			n<4	n<4		
Mann-Kendall Statistic "S" value?	-52	-51	0	0		
Number of Sampling Rounds?	16	16	0	0		
Average Concentration?	1804.69	1639.38	NA	NA		
Standard Deviation?	2004.91	2023.84	NA	NA		
Coefficient of Variation?	1.11	1.23	NA	NA		
Blank if No Errors found			n<4	n<4		n<4

Values shaded in grey were non-detect, orange = J

Value shown = 1/2 Method Reporting Limit

3. Temporal Trend: Plot of Concentration vs. Sampling Time

APPENDIX G
CRETE ENGINEERING EXCAVATION REMEDIATION

TO: Janet Knox, Inger Jackson – Pacific Groundwater Group

FROM: Mike Byers, PE and Grant Hainsworth, PE – CRETE Consulting Inc.

PROJECT: Birds Eye Foods Tacoma

SUBJECT: Excavation Input for Feasibility Study

DATE: October 27, 2011

CC:

Birds Eye owns a former food processing facility located in the Nalley Valley or South Tacoma Channel of Tacoma, Washington. The facility is located approximately 3 miles southwest of downtown Tacoma and the southernmost tip of Commencement Bay (Figure 1). The facility address is 3303 South 35th Street, Tacoma, Washington.

The property is paved or occupied by buildings with the exceptions of a gravel truck parking area in the northern portion of the property that is outside the facility fence, small landscaped areas along the northern and eastern perimeter of the site along public thoroughfares, and a gravel area between and adjacent to the tracks of the western rail spur. Approximately the southern 350 feet of these tracks are underlain by crushed rock and gravel between the rails and approximately 5 feet east of the rails. East of the tracks and south of the boiler room, there are also gravel-covered areas that total approximately 1,250 square feet.

CRETE Consulting Inc (CRETE) was contracted to provide input into a Remedial Investigation and Feasibility (RI/FS) Study report to address subsurface contamination on a portion of the property referred to as the Boiler Room Site. Our work was to provide input for a full removal alternative and a partial removal alternative and included text details and costs that were suitable for a feasibility level study. Our work was approved in a Subcontractor Agreement dated September 8, 2011. Our understanding of the project and subsurface conditions were taken from information provided by Pacific Groundwater Group and visual observations of the site during a brief site visit at the start of our work. No subsurface explorations or observations were made to complete our scope of work and the site and subsurface descriptions included herein were supplied by Pacific Groundwater Group.

The subject site of the overall RI/FS is a portion of the Birds Eye facility, referred to as the "Former Boiler Room UST Site" or "Boiler Room Site" (Figure 1). The Boiler Room Site is located in the south-western portion of the Birds Eye facility in a north-south transit/utility corridor through the Birds Eye property that is divided into west and east halves by a railroad spur and overhead power lines. Three buildings are located in the vicinity of the Boiler Room Site, the potato storage warehouse (currently vacant), the Boiler Room building, and the former Pallet Room building (see Figure 1).

In 1990, as part of a property-wide program, two underground storage tanks (USTs) were removed from an area immediately west of the Boiler Room and petroleum-contamination was observed in the field:

- Tank B or North Tank - 10,000 gallon capacity, removed October 2-3, 1990; contents reported as Bunker C oil and some records report diesel.
- Tank A or South Tank - 20,000 gallon capacity, removed November 26-27, 1990; contents reported as residual oil and Bunker C oil.

The location of the release is approximated by a point between the two tanks, estimated to be at latitude 47 degrees, 13 minutes, 43.61 seconds north and longitude 122 degrees, 28 minutes, 52 seconds west.

Tank removal was performed by Boston's Contractors and observed by Nowicki & Associates consultants. Representatives of the Tacoma-Pierce County Health Department were periodically onsite during removal of Tank B (North Tank); documentation of regulators onsite during removal of Tank A (South Tank) has not been identified.

Following removal of the Tank B, no rust was evident nor were areas of rupture (Nowicki & Associates; October 30, 1990). Soil in an area surrounding the fill pipe near the south-east corner of the tank appeared to be contaminated with petroleum and was removed to 2-feet below ground and 10-feet long. "Petroleum product" was observed on the excavation walls in seams of loose sand at 8- and 10-feet below ground. The product was observed in the south excavation wall, in the west excavation wall (southern 22 feet of the west wall only), and in the east excavation wall (southern 10 feet of the east wall only). Analysis by EPA Method 418.1 confirmed the presence of petroleum ranging from 2,078 to 25,698 ppm. Excavation of soil around the former Tank B was halted when structural risk to the rail tracks and Boiler Room was identified.

Tank A was removed on November 26 and 27, 1990. The tank was uniformly scaled to a one-quarter inch depth and two small holes, reportedly less than one-quarter inch, were observed. Soil under the storage tank was found to be uniformly contaminated with residual oil from 15 feet to at least 19 feet below ground. The lateral limits of contamination were not delineated. Excavation was halted at 19 feet due to limitations in the equipment and safety concerns regarding the stability of the sidewalls. Field observations indicated the north end of the excavation was more heavily impacted by product. Analysis by EPA Method 418.1 of soil samples collected from the north, west, and east sidewalls and the bottom of the excavation confirmed the presence of petroleum ranging from 15,370 to 61,600 ppm.

The following description of utilities in the vicinity of the Boiler Room Site is based on information provided by Puget Sound Energy, private and City of Tacoma underground utility locators, and facility maps provided by Birds Eye Foods.

A 6-inch Puget Sound Energy (PSE) high pressure natural gas line runs north-south under the Birds Eye facility to service the community of Fircrest located to the northwest. PSE reports that their lines are typically 3 to 4 feet below ground surface. The 6-inch line pre-dates natural gas service to the Birds Eye

facility, which began in 1956. A high pressure gas service line (4-inch, steel-wrapped pipe) supplies Birds Eye; it tees off the 6-inch line, then parallels the 6-inch line for approximately 50 feet before heading east to the meter. The depth of the 4-inch line is likely 3 to 4 feet below ground except where it crosses under the tracks, where it is approximately 10 feet below ground. The section under the track was replaced in the mid-2000s in response to a natural gas leak. PSE intends to replace the existing 4-inch line east and west of the tracks in 2011 and to tie the new line into the 6-inch further to the north of the current tie, such that the portion of the service line that parallels the 6-inch will no longer be necessary. The service line under the tracks will not be replaced (Potter, 2011).

A City of Tacoma gravity storm line also runs north-south through the Boiler Room Site west of the rail tracks. According to the City's online map viewer, the storm line is 21 inches in diameter. Based on field observations, at a manhole approximately 50 feet south of the Pickle Plant, the depth of the storm line is approximately 7 to 10 feet below ground. Birds Eye facility storm water lines are 8-inches in diameter and tie into the City of Tacoma storm line approximately 50 feet north of the Boiler Room Site. The facility storm water lines parallel the City storm line to the west. Facility storm lines also cross under the tracks outside the Boiler Room and run west toward the former Pickle Plant operation (Birds Eye Storm Water Line maps).

In the 1992 RI/FS, a sanitary sewer was depicted in the Site Plan in the approximate location of the City of Tacoma storm line; however, based on the facility maps and the City's online map viewer, the sanitary sewer lines are located in the vicinity of the Pickle Plant and are outside the Boiler Room Site.

The facility water lines, oriented north-south, also cross the Boiler Room Site between the rail spur and the Boiler Room and potato storage warehouse. The lines run east into the warehouse and extend to South 35th Street. In the 1991 Groundwater RI, the water lines were identified as "fire lines." During excavation of the north Boiler Room UST, the fire line was ruptured.

The two excavation alternatives that were considered include a full excavation alternative where all impacted soil above MTCA Method A Industrial is removed from the area (alternative 1), and a partial removal alternative where the upper 15 feet of soil containing impacts is removed (alternative 2).

Full Excavation Alternative (Alternative 1)

This alternative includes full removal of all impacted soil above MTCA Method A Industrial cleanup levels. The total excavation volume is estimated to be 15,100 cy with 9,100 cy of contaminated soil requiring off-site disposal in a Subtitle D landfill. This includes the Main Area of deeper impacts down to around 40 feet below the ground surface (bgs) and the North (gasoline- and diesel-range organics) and West (gasoline-range organics) Shallow Areas where the impacts are limited to around 15 feet bgs.

Excavation down to 15 feet bgs is intended to satisfy direct contact criteria without relying on engineering and institutional controls to prevent exposure. Excavation below 15 feet bgs is based on soil protection of groundwater to default MTCA Method A Industrial criteria. Cleanup criteria are based on protection of groundwater for the following criteria: gasoline-range organics, benzene, benzo(a)pyrene, and naphthalene. In addition, the cleanup criteria for diesel-range organics and heavy oils are based on preventing the accumulation of free product on groundwater. Application of Method B or C soil CULs for non-TPH compounds may facilitate empirical demonstration that soil is protective of groundwater under WAC173-340-747(3)(f) and (g).

The full excavation alternative includes a number of complexities which limit the practicability of this approach. The complexities associated with this alternative include:

- The potato storage warehouse and the Boiler Room building are both located over the footprint of the excavation area. While it is not known for certain, it is assumed that both of these buildings are founded on shallow spread footings. The potato storage warehouse is wood framed and relatively flexible but it shares a wall with the adjacent Boiler Room building. The Boiler Room building has concrete block walls and will be much more brittle. The general alternatives to deal with the structures include:
 - Demolish structures, remove impacts, and rebuild structures.
 - Underpin structures to allow removal – this alternative will be difficult for the boiler building given that the walls are concrete block and more complex underpinning is required and the risk of structure failure is more significant. It was determined that this alternative was not viable given the difficulties of supporting over one-half of the buildings to allow 40 feet of soil to be removed below the buildings.
 - Move the structures, remove the impacts, rebuild the foundations and replace the buildings.

Since demolishing and replacing the structures appeared to be the least costly of the two remaining viable alternatives, it was used for costing.

- The Pallet Room building will require shoring of the northeast corner to facilitate excavation
- There is a pole support for an electrical transmission line in the middle of the planned removal area. This pole will be removed along with the impacted soil. It may be possible to install new pole(s) to span over the planned removal or to otherwise bypass the removal areas to allow removal of the pole. This approach was utilized in the costing, but discussions with the electrical utility should occur if this alternative is considered further.
- The gas line extends through the deep removal area and will need to be relocated to facilitate this excavation work.
- Local storm drains and water lines will need to be relocated to facilitate the work.
- A rail line that runs through the middle of the excavation area will need to be removed and replaced

- Excavation dewatering and shoring of the excavation sidewalls will be required to facilitate excavation to the required depth. The general approach considered consisted of a combination of deep well and wellpoint dewatering and soil nailing or interior bracing for shoring.

The estimated cost of the full excavation alternative is \$6,190,000 or \$680 per cubic yard. The costs for Alternative 1 are included in Table 1. As a point of reference, a typical petroleum-impacted soil excavation and disposal remedy, without the complexities of this alternative, would be about \$150 per cubic yard.

Partial Excavation Alternative (Alternative 2)

This alternative includes removal of all impacted soil above MTCA Method A Industrial cleanup levels located within the upper 15 feet of the site (approximately 2,100 cubic yards). This includes the North (gasoline- and diesel-range organics) and West (gasoline-range organics) Shallow Areas where the impacts are limited to around 15 feet bgs.

Excavation down to 15 feet bgs is intended to satisfy direct contact criteria and soil protection of groundwater criteria without relying on engineering and institutional controls. Although impacts to groundwater have not been detected, the compounds addressed by the partial excavation are the most leachable and the most likely to impact groundwater. As noted under the Full Excavation alternative, application of Method B or C soil CULs for non-TPH compounds may facilitate empirical demonstration that soil is protective of groundwater under WAC173-340-747(3)(f) and (g). Using this approach, the Partial Excavation alternative may satisfy cleanup standards and thereby qualify as a permanent alternative.

The footprint to facilitate this partial excavation alternative is different from the full excavation alternative and does not appear to impact the potato storage warehouse, the Boiler Room building, the overhead power transmission line poles, or the rail line. The potential obstructions to completing this removal include the Pallet Room building, the gas line, the rail line, and local water and storm drainage.

The complexities associated with this alternative include:

- The Pallet Room building will require shoring of the northeast corner to facilitate excavation
- The gas line extends through the deep removal area and will need to be relocated to facilitate this excavation work.
- Local storm drains and water lines will need to be relocated to facilitate the work.

While these complexities are not as significant as the full excavation alternative, they are still substantial and they impact the practicability of the alternative. In addition, the Shallow areas are impacted by gasoline- and diesel-range organics, compounds that could be effectively addressed using in situ treatment techniques and in situ treatment would provide increased MTCA permanence, effectiveness over the long-term, and management of short-term risks .

The estimated cost of the partial excavation alternative is \$738,400 or \$390 per cubic yard. The costs for alternative 2 are shown on Table 2. As a point of reference, a typical petroleum-impacted soil excavation and disposal remedy, without the complexities of this alternative, would cost about \$150 per cubic yard.

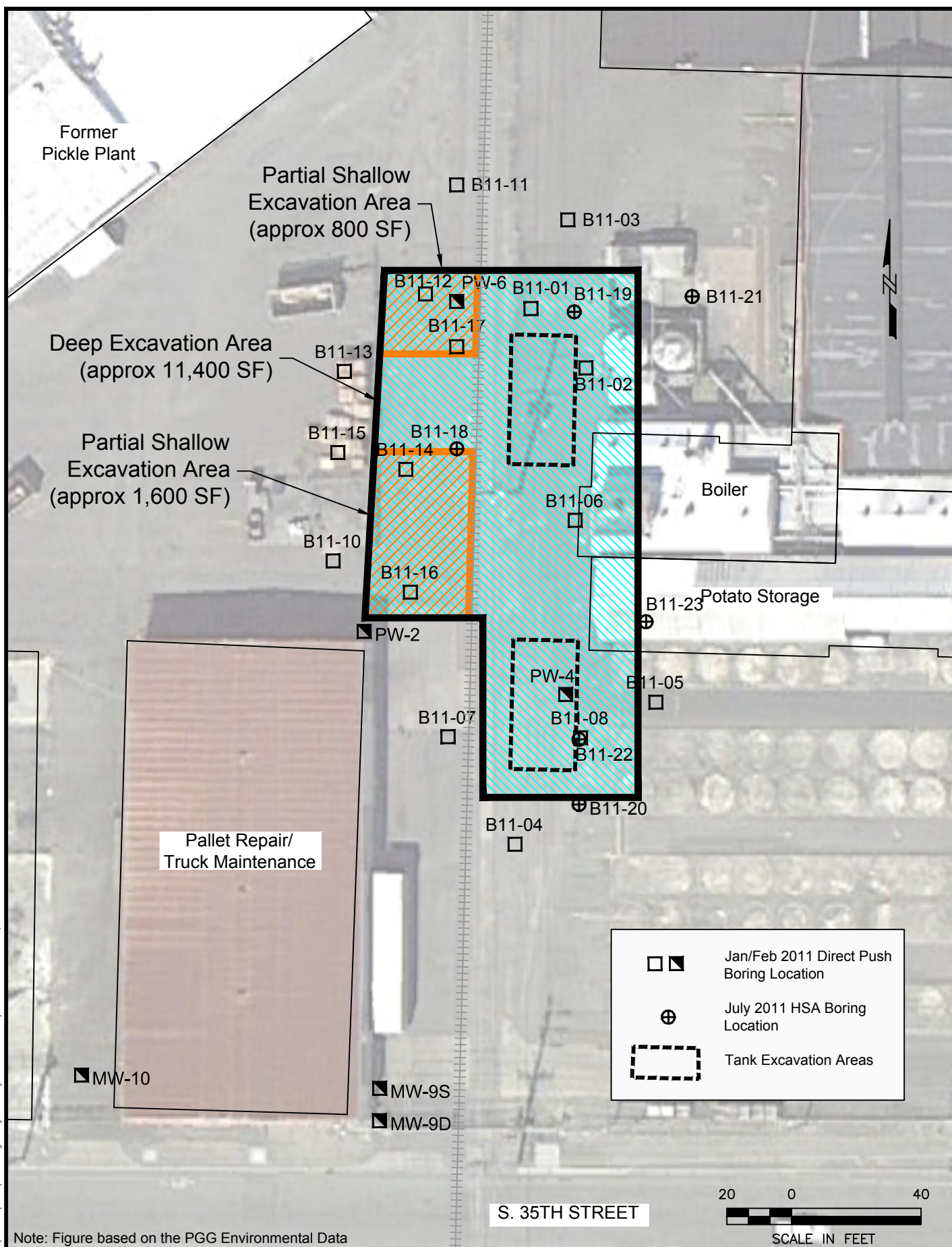
Attachments:

Figure 1 - Excavation Alternatives Evaluated

Table 1 - Alternative 1 Full Removal

Table 2 – Alternative 2 Partial Removal

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**Pacific Groundwater Group
Pinnacle Foods - Tacoma, WA
Alternative 1**

Draft - Privileged Attorney-Consultant Communication Prepared In Anticipation of Litigation

** total cost rounded to the nearest \$100

**Pacific Groundwater Group
Pinnacle Foods - Tacoma, WA
Alternative 2**

Draft - Privileged Attorney-Consultant Communication Prepared In Anticipation of Litigation

** total costs rounded to the nearest \$100

APPENDIX H

TERRATHERM THERMAL REMEDIATION

**Summary of Preliminary
Conceptual Design Parameters
and
Preliminary Costs for
Two Treatment Scenarios:
ISTD and SEE
Confidential Site
Western Washington State
Prepared for
Pacific Groundwater Group**



October 4, 2011

**Confidential Site, Western WA State
Preliminary Conceptual Design Summary**

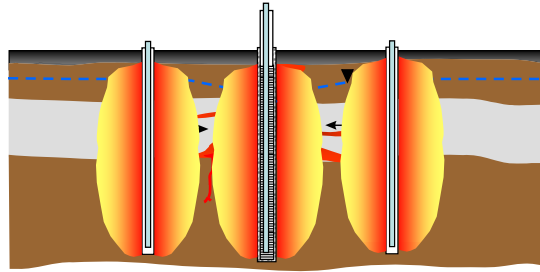
Technology Overview:

Effectiveness of thermal remediation relates to the ability to mobilize subsurface contamination in vapor and/or liquid phases through the application of heat to the subsurface. Three in-situ thermal technologies are currently offered by TerraTherm including Thermal Conductive Heating (TCH) in the form of the patented In Situ Thermal Desorption (ISTD) family of technologies (one possible scenario proposed for the Site), steam remediation utilizing the patented Steam Enhanced Extraction (SEE) method (second scenario proposed for the Site), and the Electro Thermal Dynamic Stripping Process (ET-DSP™) form of electrical resistive heating (ERH) through a partnership with McMillan-McGee Corporation.



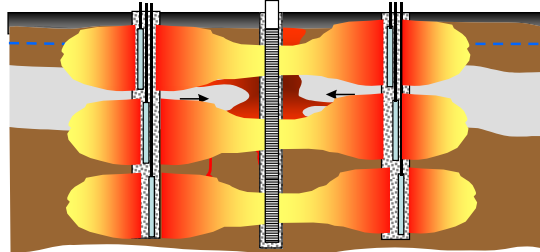
ISTR Technologies

TCH/ISTD - Heating governed
by **thermal conductivity**



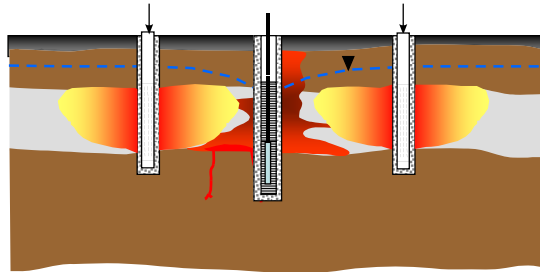
ET-DSP/ERH - Heating
governed by **electrical conductivity**

(max temp = boiling point)



SEE - Heating governed by
hydraulic conductivity

(max temp = boiling point)



TERRATHERM®

Confidential Site, Western WA State Preliminary Conceptual Design Summary

- Two preliminary treatment concepts are provided for this site including steam enhanced extraction (SEE) and n-situ thermal desorption (ISTD), although ISTD has some limitations.
- SEE is proposed at a treatment temperature of 100°C. This should be confirmed by a treatability study. The SEE goal is to reduce COC viscosity to mobilize the liquid mass to the extraction points. It is suspected that this method would be effective in removing all NAPL; however, groundwater may need a significant period of biopolishing following thermal treatment.
- ISTD is also proposed in a second scenario at a treatment temperature of 325°C. The ISTD goal is to mobilize COC mass and extract either in the vapor phase or the liquid phase. This will remove NAPL as well as sorbed concentrations and significantly reduce groundwater concentrations following heating. This approach required a groundwater cut off wall. There are some limitations for this approach that might make this not possible.



TERRATHERM®

Confidential Site, Western WA State Preliminary Conceptual Design Summary

- The primary contaminants of concern include diesel, residual oil, gasoline, BTEX, PAHs
- Site Remedial Action Objectives (RAOs) include the following:

Pacific Groundwater Group Thermal Inquiry, Cleanup Criteria		
	Soil	Groundwater
Gasoline Range Organics	30 mg/kg	800 ug/L
Diesel Range Organics	2,000 mg/kg	500 ug/L
Heavy Oil Range Organics	2,000 mg/kg	500 ug/L
Benzene	30 ug/kg	5 ug/L
Ethylbenzene	6,000 ug/kg	700 ug/L
Toluene	7,000 ug/kg	1,000 ug/L
Xylenes, Total	9,000 ug/kg	1,000 ug/L
Benzo(a)pyrene	2,000 ug/kg	0.1 ug/L
Naphthalene	5,000 ug/kg	160 ug/L
Carcinogenic PAHs as Ecology Toxic Equivalency Approach		

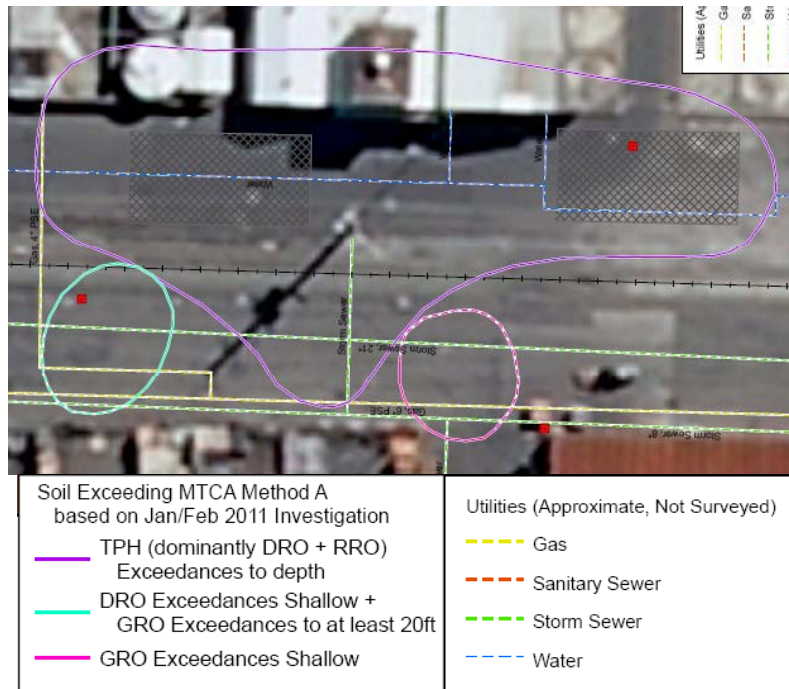


Confidential Site, Western WA State Preliminary Conceptual Design Summary

- The preliminary concept includes turn-key services from design to demobilization.
- All effluents generated by the heating operations are captured and treated.
 - Granular Activated Carbon (GAC) is included for vapor treatment using an assumed mass of 5000 lbs in the source area. If the mass increases significantly, the vapor treatment could change to thermal oxidation.
 - Liquid GAC is included for the liquid treatment.
- Hydraulic and pneumatic control of the treatment volume is accomplished via the SVE and MPE extraction systems for ISTD and SEE approaches, respectively. The screened interval assumes sufficient permeability exists in the surrounding geology to extract vapors.
- During operations, monitoring data is collected daily by TerraTherm on-site staff ensuring that contaminants continue to be directed to the extraction points ensuring a controlled system at all times.



**Confidential Site, Western WA State
Preliminary Conceptual Design Summary
Site Map**

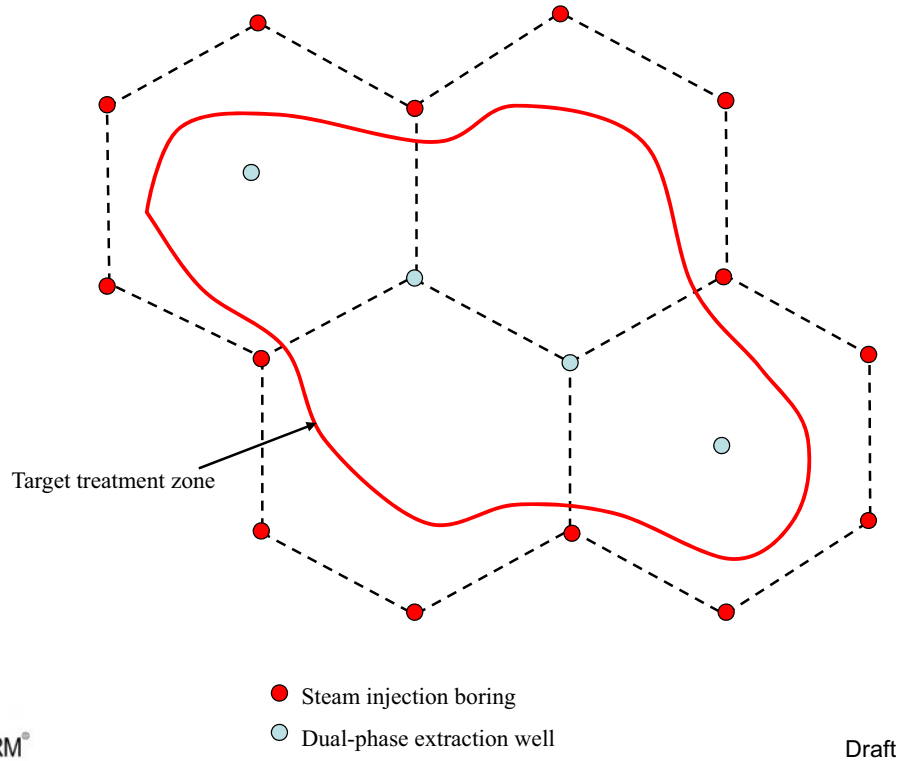


**Confidential Site
Western WA State
Preliminary Conceptual Design Summary**

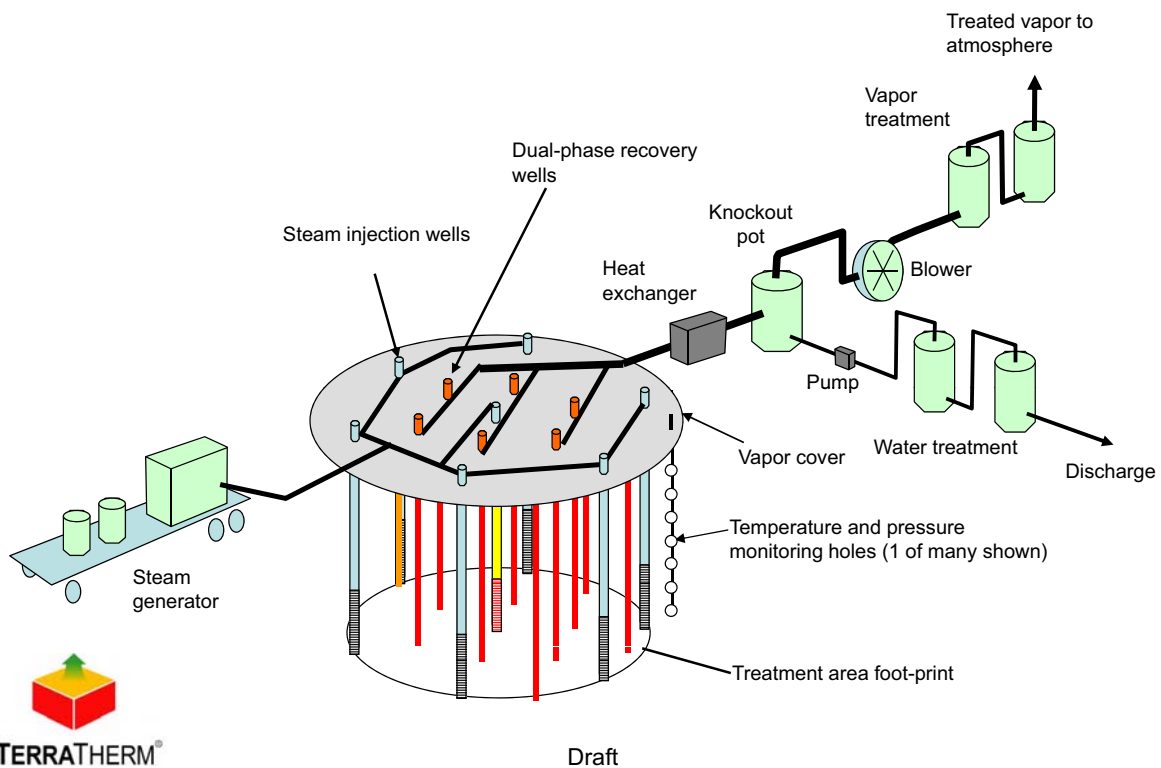
SEE Approach



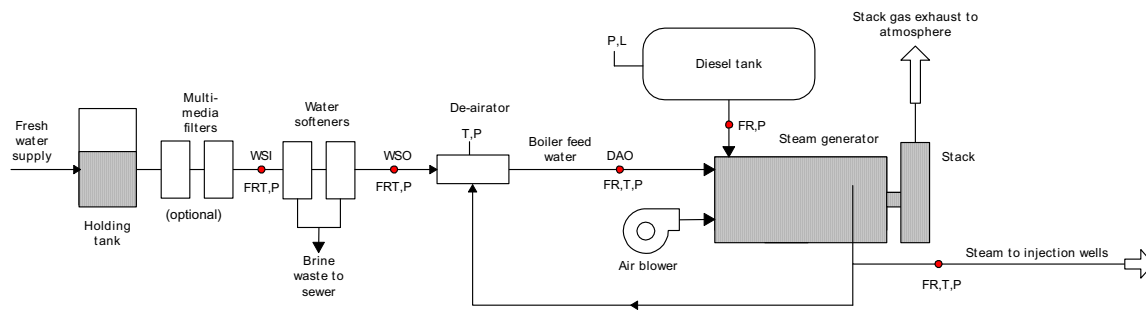
Typical SEE Well-Field Layout



Typical SEE Layout



Typical Steam Generator Process System (optional if steam available at site)



Draft

Typical Steam Injection Well Head



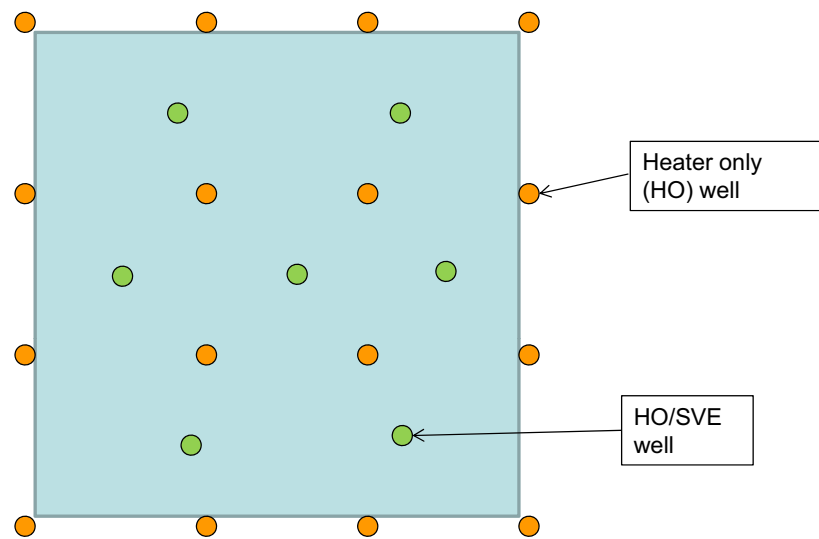
Draft

Confidential Site Western WA State Preliminary Conceptual Design Summary

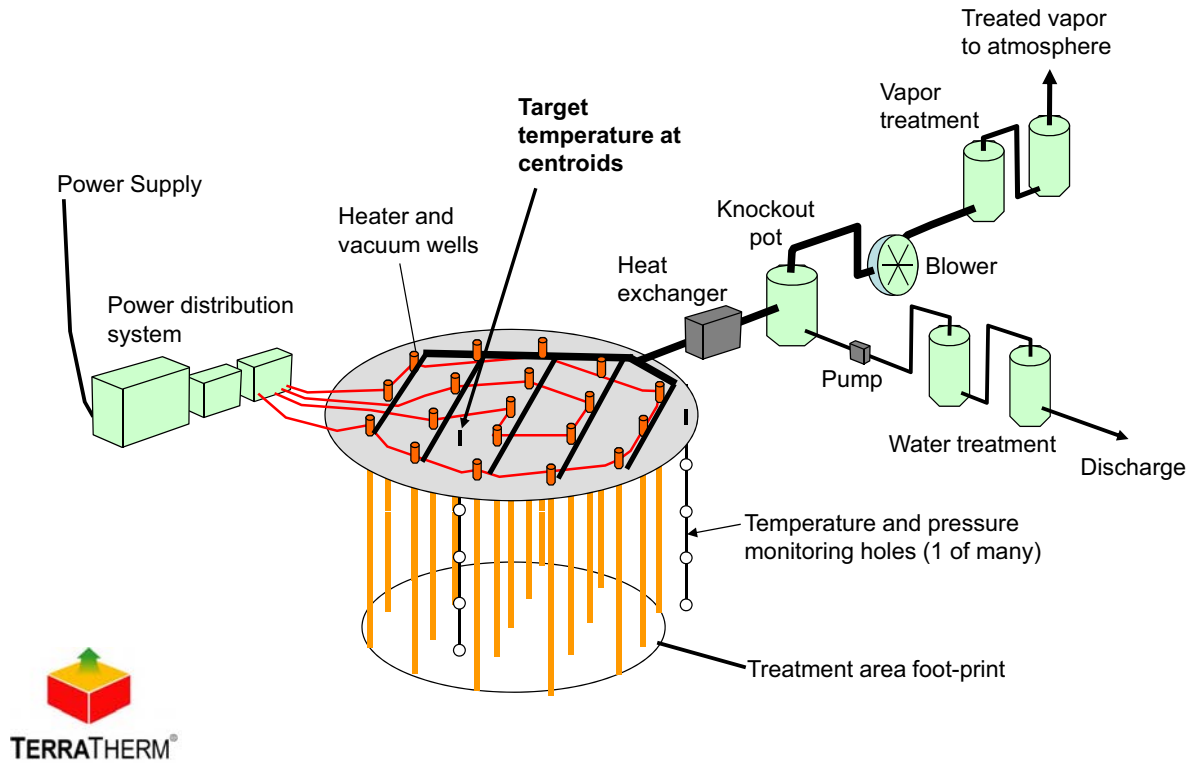
ISTD Approach



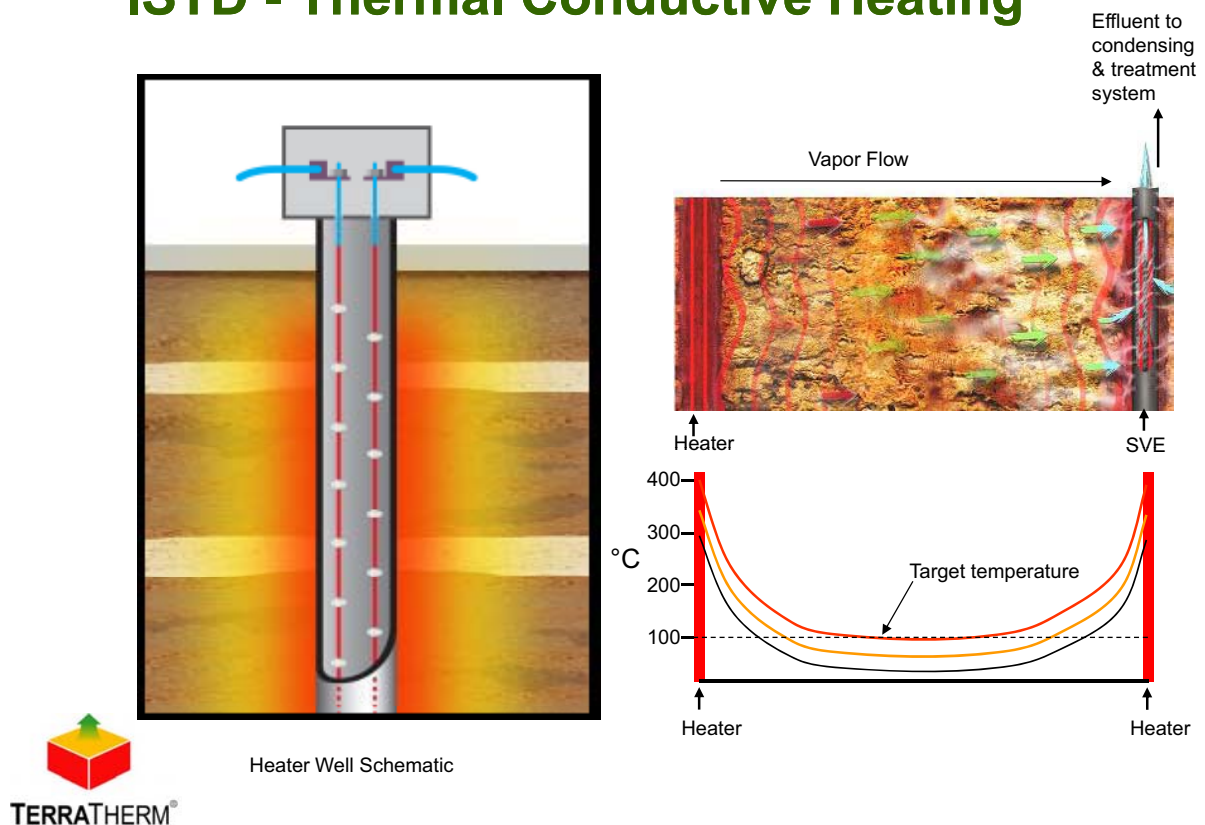
Typical High Temperature ISTD Well-Field Layout



Typical ISTD Layout



ISTD - Thermal Conductive Heating



Thermal Conduction Heaters



TERRATHERM®

U.S. Patent Nos. include 5,190,405, 5,318,116, 6,485,232 and 6,632,047. Protected by International Patents Issued and Pending.

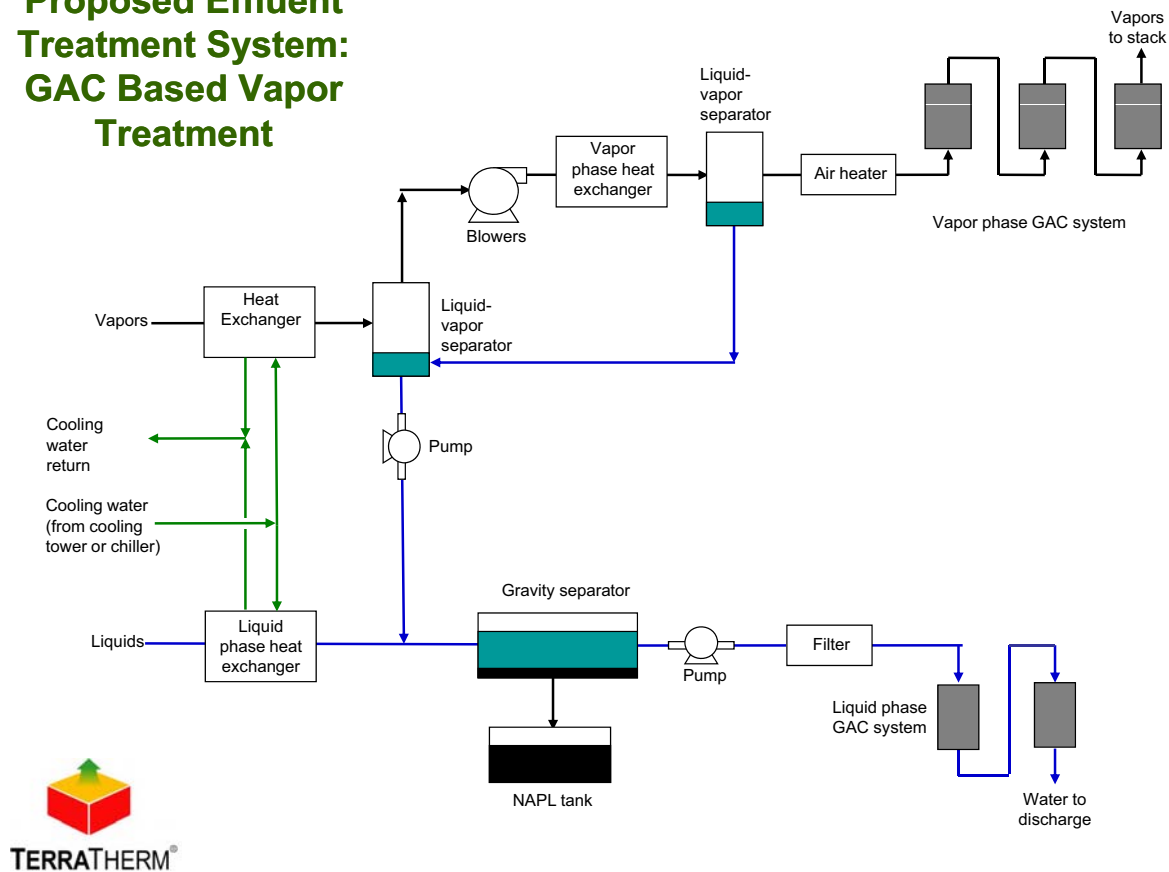
Confidential Site Western WA State Preliminary Conceptual Design Summary

Vapor – Liquid Treatment ISTD and SEE Approaches



TERRATHERM®

Proposed Effluent Treatment System: GAC Based Vapor Treatment



Confidential Site Western WA State Preliminary Conceptual Design Summary

Preliminary Conceptual Design Parameters ISTD and SEE Approaches



Confidential Site, Western WA State Preliminary Conceptual Design Summary

Confidential W. WA State	Pacific Groundwater Group	
<i>Volume and heat capacity</i>	<i>Fill</i>	<i>Unit</i>
Treatment area	9,506	ft ²
Upper depth of treatment	20	ft bgs
Lower depth of treatment	40	ft bgs
Volume, TTZ	7,041	yd ³
Solids volume	4,577	yd ³
Porosity	0.35	-
Porosity volume	2,465	yd ³
Initial saturation	100	percent
Soil weight	20,437,551	lbs soil
Water weight	4,158,527	lbs water
Soil heat capacity	5,109,388	BTU/F
Water heat capacity	4,158,527	BTU/F
Total heat capacity, whole TTZ	9,267,915	BTU/F



Confidential Site, Western WA State Preliminary Conceptual Design Summary, continued

Confidential W. WA State	Pacific Groundwater Group	
<i>Energy balance</i>	<i>Upper Sand - SEE</i>	<i>Upper Sand - ISTD Unit</i>
Steam injection rate	4,600	- lbs/hr
TCH power input rate	-	1,782 kW
Water extraction rate during heatup	17.8	- gpm
Average extracted water temperature	190	190 F
Percent of injected steam extracted as steam	15	30 %
Steam extracted, average	690	1,878 lbs/hr
Energy flux into treatment volume	4,466,600	6,079,138 BTU/hr
Energy flux in extracted groundwater	1,248,459	- BTU/hr
Energy flux in extracted steam	669,990	1,823,741 BTU/hr
Net energy flux into treatment volume	2,548,151	4,255,397 BTU/hr
Heating per day	6.6	11.0 F/day
Start temperature	50	50 F
Target temperature	212	617 F
Estimated heat loss, worst case	43	77 %
Operating time		
Shake-down	7	7 days
Heating to boiling point	35	26 days
Boiling and drying	120	91 days
Heating to target temperature	0	25 days
Sampling/analysis phase	10	10 days
Post treatment vapor extraction	14	14 days
Total operating time	186	173 days



Confidential Site, Western WA State
Preliminary Conceptual Design Summary, continued

Confidential W. WA State	Pacific Groundwater Group	
<i>Numbers of wells</i>	<i>Upper Sand - SEE</i>	<i>Upper Sand - ISTD</i>
HO borings, high temperature application	-	153
HV wells, high temperature application	-	63
Vertical SVE well, regular application	13	-
Multiphase extraction well, pumping	13	-
Steam injection wells	23	-
Temperature monitoring holes	11	25
Pressure monitoring wells	5	8



Confidential Site, Western WA State
Preliminary Conceptual Design Summary, continued

Confidential W. WA State	Pacific Groundwater Group		
<i>Process equipment</i>	<i>Upper Sand - SEE</i>	<i>Upper Sand - ISTD</i>	<i>Unit</i>
ISTD power supply	0	1780	kW
ET-DSP power supply	0	0	kW
Treatment system power supply	120	490	kW
Total power need to site	150	2840	kW
Estimated total electric load	200	3600	kVA
Water softener feed rate	9.2	-	gpm
Steam generator capacity	4,600.0	-	lbs/hr
Vapor extraction rate, total	510	2240	scfm
Non-condensable vapor	260	1570	scfm
Estimated steam extraction	250	670	scfm
Liquid extraction rate	17.8	-	gpm
Condensed liquid rate	1.4	4	gpm
Water treatment rate	19.2	4	gpm
Vapor treatment type	GAC w/ gas conditioning	GAC w/ gas conditioning	-
Dominant contaminant of concern	MGP	MGP	-
Estimated COC mass	5,000	5,000	lbs
Estimated COC mass treated by vapor system	2,500	4,500	lbs
Estimated maximum mass removal rate	60	70	lbs/day



Confidential Site, Western WA State
Preliminary Conceptual Design Summary, continued

Confidential W. WA State		Pacific Groundwater Group	
<i>Utility estimates</i>	<i>Upper Sand - SEE</i>	<i>Upper Sand - ISTD</i>	<i>Unit</i>
Steam usage, total	11,076,000	-	lbs
Power usage, total	537,000	8,656,000	kWh
Gas usage, total	13,840	-	MM BTU
Discharge water, total	5,150,957	938,981	gallons
Discharge vapor, total	70	391	mill scf
NAPL disposal, total	333	67	gallons



Confidential Site
Western WA State

Preliminary Conceptual Design Costs
ISTD and SEE Approaches



**Confidential Site, Western WA State
Preliminary Conceptual Design Cost Summary**

Pacific Groundwater Group Confidential W. WA State		
	Upper Sand - SEE	Upper Sand - ISTD
Design and Procurement	233,709	334,426
Construction and Operation	2,072,000	3,657,000
Utilities, paid by client	313,000	1,039,000
Total	2,618,709	5,030,426



**Confidential Site
Western WA State**

Treatability Study Cost Discussion



**Confidential Site, Western WA State
Treatability Study Cost Range**

Typical Treatability Study costs range from \$15,000 to \$45,000 depending on the goals of the study and the number of samples tested.



General Assumptions

ISTD and SEE Treatment

**Confidential Site
Western WA State**



Confidential Site, Western WA State Preliminary Conceptual Design General Assumptions

Confidential W. WA State Pacific Groundwater Group General Assumptions	
1	Two turn-key preliminary treatment concepts and costs are presented for In-Situ Thermal Desorption (ISTD) and Steam Enhanced Extraction (SEE) including design to final report, conditional on assumptions presented; task sharing can occur and is typically discussed at a later time; scheduling is based on TerraTherm availability. Basis of contracting is cost plus fixed fee unless otherwise agreed.
2	The ISTD and SEE are powered by traditional utilities with a treatment temperature of 325°C and 100°C, respectively treating for diesel, residual oil, gasoline, BTEX, and PAHs to the levels stated in slide #5 for soils. Groundwater goals included in slide #5 will be achieved by the ISTD approach presented but additional polishing will be required following the SEE. ISTD heater wells are spaced at 8 ft for the high temperature approach and installed at a rate of 120 ft/day; and SEE wells are spaced at 30 ft apart and installed at a rate of 120 ft/day.
3	Vertical and horizontal soil vapor extraction (SVE) wells are proposed for pneumatic / hydraulic site control and contaminant extraction, powered by traditional utilities, for the ISTD concept. Vertical SVE and multi-phase extraction (MPE) wells are proposed for pneumatic / hydraulic site control and contaminant extraction, powered by traditional utilities, for the ET-DSP™ concept. The targeted treatment verticals for SVE application is conducive to effectively operating an SVE system to remove vapor generated during treatment.
4	Granular Activated Carbon (GAC) is proposed for the vapor treatment; GAC waste handled by client.
5	Liquid GAC is proposed for the liquid treatment; GAC waste handled by client.
6	NAPL extracted will be containerized for client disposal.
7	Discharge/disposal of treated effluents, drill cuttings and any GAC or NAPL produced during operation is excluded from the costs.



Confidential Site, Western WA State Preliminary Conceptual Design General Assumptions, continued

Confidential W. WA State Pacific Groundwater Group General Assumptions	
8	All utilities are paid directly by client and are included "at cost" in the preliminary conceptual costs presented.
9	The proposed ISTD system includes the following in ground construction: 153 heater wells, 63 combined heater - SVE wells, 25 temperature monitoring borings and 8 pressure borings are proposed.
10	The proposed SEE system includes the following in ground construction: 23 steam wells, 13 MPE wells, 13 SVE wells, 11 temperature monitoring borings and 5 pressure borings are proposed.
11	All data provided as a basis for this preliminary concept is considered a good faith representation of the current site conditions.
12	Power and other utilities are assumed to be available to the site with service available in a reasonable timeframe.
13	Permitting fees are excluded; details to apply for permitting are included in costs.
14	It is assumed that the site is free of any existing infrastructure not compatible with treatment temperatures or which would interfere with treatment application. This preliminary concept does not consider specific design requirements to accommodate the regional and facility high pressure gas lines, the storm water lines, etc. It is also assumed that the railroad tracks do not present a problem for this preliminary design. Additional accommodations can be made during the next phase of work.
15	It is assumed that sufficient space is provided for unencumbered site construction and thermal operations.
16	It is assumed that the saturated TTZ is unaffected by cooling groundwater influxes to the TTZ or around the TTZ by a ground water cut-off wall for the high temperature ISTD approach and by the steam perimeter generated at the edge of the TTZ by the SEE approach.



**Confidential Site, Western WA State
Preliminary Conceptual Design
General Assumptions, continued**

Confidential W. WA State Pacific Groundwater Group General Assumptions	
17	It is assumed that there are no major site cooling effects present in the subsurface, i.e. utility or other conduits. The site is not in a flood zone.
18	Vertical treatment interval is 20 - 40 ft bgs in the saturated zone for the SEE approach and in the dewatered zone for the ISTD approach.
19	The treatment area is 9,506 sf.
20	Targeted volume is 7,041 cy.
21	Assumed contaminant mass in the source area, i.e., TTZ, is 5,000 lbs. No other non-native organic compounds are present in the TTZ other than diesel, residual oil, gasoline, BTEX, and PAHs. If other organics are suspected, estimated mass will be provided as data is available. Analytical data will be provided with raw data tentatively identified compounds
22	Estimated porosity is 0.35; estimated hydraulic conductivity is 0.01 cm/s; hydraulic gradient is estimated to be 0.0005 ft/ft; it is assumed that 2 gpm will be entering the TTZ from the bottom for the SEE approach. There has been no assumption made for the flow of groundwater entering the bottom of the TTZ for the ISTD approach as the site needs to be completely free of water influxes to the treatment zone. During design the feasibility of the high temperature ISTD approach will be determined.



**Confidential Site, Western WA State
Preliminary Conceptual Design
General Assumptions, continued**

Confidential W. WA State Pacific Groundwater Group General Assumptions	
23	Estimated initial saturation is 100%.
24	An insulating vapor cover is excluded and assumed to not be needed as the 0-20 ft vertical interval is assumed to be a sufficient insulating barrier.
25	24-hr staffed site security is not included.
26	Unit gas costs are included at \$18/mm BTU.
27	Unit power costs are included at \$0.12/kWh.
28	GAC costs with disposal are included at \$2.50/lb.
29	NAPL disposal costs are included at \$9.0/lb.
30	1 man is proposed to be on site during drilling.
31	1 drill rig is proposed.
32	2 men are included for operations period.
33	Power drop and transformer are excluded.
34	Removal of wells are excluded.
35	Site restoration is excluded.



P 206.329.0141 | F 206.329.6968

2377 Eastlake Avenue East | Seattle, WA 98102

P 206.842.3202 | F 206.842.5041

8150 West Port Madison NE | Bainbridge, WA 98110

P 360.570.8244 | F 360.570.0064

1627 Linwood Avenue SW | Tumwater, WA 98512

www.pgwg.com

