

**DATE** November 21, 2017**NO.** 1780805-6960**TO** Imperial Oil Limited**FROM** Blair McDonald**EMAIL** bgmcdonald@golder.com**SUMMARY OF PIPE CLEANING ACTIVITIES, BURRARD  
PIPELINE REMOVAL PROJECT, 2225 IOCO ROAD, PORT  
MOODY, BC (SAP NO. 8006226)****THIS REPORT CONTAINS PROVISIONS  
LIMITING LIABILITY, THE SCOPE OF THE  
REPORT AND THIRD PARTY RELIANCE**

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## 1.0 INTRODUCTION

This memorandum summarizes the activities undertaken by Imperial Oil Limited (Imperial) to clean two pipelines that run beneath Burrard Inlet between the IOCO Terminal (located at 2225 Ioco Road, Port Moody, BC) and the Reed Point Marina (850 Barnet Highway, also in Port Moody) (Figure 1). A 12-inch pipeline (NPS12) carried crude oil northward to the former IOCO Refinery, and a 6 inch pipeline (NPS6) carried refined products southward from the former IOCO Refinery. Golder Associates Ltd. (Golder) is currently assisting Imperial to obtain the necessary permits and authorizations to remove a segment of each pipeline from the navigational channel on the southern side of Burrard Inlet. The purpose of this memorandum is to summarize the cleaning efforts completed by Imperial to provide a plain language summary to assist reviewers.

## 2.0 BACKGROUND

Imperial is currently developing a plan for removing the two pipelines between the IOCO Terminal and Reed Point Marina. In brief, the removal option involves flooding of each pipeline with seawater prior to making isolation cuts at the end of the segment to be removed. The ends of the pipe that will remain in place will be capped and reburied under clean armour rock. The ends of the segment to be removed will be left open. The water will drain from the pipe segment as it is lifted from the seabed to a barge for disposal. The purpose of the cleaning efforts is to minimize the potential risk to aquatic life from pipe-contact water to Burrard Inlet when the pipe is being removed.

## 3.0 CLEANING EVENTS

### 3.1 How Pipe Cleaning is Completed

Pipe cleaning is completed using devices called "pigs", examples of which are shown in Figure 1. A "pig" is a device that is inserted into a pipeline for cleaning or measurements. There are "cleaning pigs" with bristles or pads, "batch pigs" to separate different fluids that are run in sequence through the pipeline, and "smart pigs" that contain sensors to measure metal thickness or locate the pipe in XYZ coordinates. Pigs can be pushed using differential pressure or pulled on cables.



Figure 1: Illustrations of Different Pig Types (L-R: Purger, Foam, Multi-Disc, Porcupine)



### 3.2 Activities Completed in November 2012

The two pipelines had been previously drained and filled with nitrogen gas. A series of cleaning activities was conducted by Imperial in 2012 while using various in-line tools to inspect and locate the lines as part of the initial planning for the pipeline removal. These activities are described in Attachment A and included:

- An initial run of a “purger pig” to remove residual product and check for debris. The pig recovered approximately 0.25 litre (L) of debris<sup>1</sup> and no residual liquids from NPS12. The pig recovered approximately 14 L of residual product from NPS6 which was visually identified as a diesel or stove oil.
- Approximately 3,000 L of stove oil was then run through NPS12 to remove scale (i.e., the stove oil would act as a solvent with respect to deposits from the transport of crude oil in NPS12). All of the stove oil was recovered.
- Multiple tool pigs were pulled through each pipeline on a cable to remove the debris loosened by the stove oil. Each tool was described as clean at the end of the final run and no further debris was recovered.
- A pressure test was run for 24 hours and no decrease in pressure was identified. The pipes were re-pressurized with nitrogen after the inspection.

### 3.3 Activities Conducted in December 2015

The following cleaning activities were conducted in December 2015 on each line:

- A general purpose “coated foam cleaning pig” was pushed through the line, followed by;
- A slug of cleaning solution (10% Surfsweep CLW 3060; 200L for NPS6 and 500L for NPS12), followed by;
- A “porcupine pig” (i.e., a plastic pig with bristles used to remove scale), followed by;
- Two repeats of Steps 2 and 3 for a total of three sets of cleaning solution and porcupine pig passes, followed by;
- A “coated form multi-disc pig” to push residual liquids, followed by;
- A slug of rinse water (750L for NPS6, 2000L for NPS12), followed by;

<sup>1</sup> Debris consists of scale formed from rust, precipitation of sulphates and carbonates and calcification of product that naturally occurs in pipelines.

- Two repeats of Steps 5 and 6 for a total of three sets of rinse water and coated foam multi-disc passes. Samples of each of the three rinse water slugs were submitted for chemical analysis. Each sample was collected in duplicate.

A final coated foam multi-disc pig was used to remove residual rinse water

#### 4.0 EVALUATING THE SUCCESS OF THE CLEANING

The rinse water samples collected during the December 2015 cleaning event were sent to a laboratory and tested for parameters which would indicate how well the pipe cleaning went. The results of this testing are provided in Attachment B. To evaluate the results, Imperial compiled information from guidelines and regulations for the discharge of effluents from comparable activities. Based on that review:

- Imperial noted that BC did not have specific regulatory guidance with respect to the release of hydrostatic test water to aquatic receiving environments<sup>2</sup>, whereas that the National Energy Board has adopted a Code of Practice developed by the Government of Alberta (1999)<sup>3</sup> which specifically addressed discharges to aquatic receiving environment.
- Imperial also considered municipal guidelines for discharge to sewers, provincial regulations with respect to storm water discharges from petroleum sites (BC Reg. 254/2005) and the existing discharge permits in place for the IOCO facility to help identify substances of interest and limits.

From the review, Imperial compiled a list of parameters and proposed limits for evaluating the quality of the rinse water, and by extension contact water from the pipe that may discharge to Burrard Inlet during the pipe removal project. This information is summarized in Table 1.

**Table 1: Analytical Parameters and Acceptable Limits Selected by Imperial**

Analytical Parameters	Proposed Limit	Unit
TPH (Purgeable + Extractable)	100	ppm (mg/L)
Total Extractable Hydrocarbon	15	mg/L
Oil and Grease	no visible sheen	n/a
pH	6.5 to 8.5	pH units
Phenols	1.0	mg/L
Total PAH	0.05	mg/L
Total Lead	0.02	mg/L
Benzene	0.3	mg/L
Toluene	0.3	mg/L
Ethylbenzene	0.7	mg/L
Xylene	0.3	mg/L
Total BTEX	1.6	mg/L

**Notes:** BTEX – benzene, toluene, ethylbenzene, xylene; mg/L – milligrams per litre; n/a – not available; PAH – polycyclic aromatic hydrocarbons; ppm – parts per million; TPH – total petroleum hydrocarbon

<sup>2</sup> There are provincial guidelines with respect to the discharge of hydrostatic test water to land (Oil and Gas Waste Regulation, BC Reg. 254/2005).

<sup>3</sup> Government of Alberta. 1999. Code of practice for the release of hydrostatic test water from hydrostatic testing of petroleum liquid and gas pipelines. Available online: <http://www.qp.alberta.ca/documents/codes/RELEASE.PDF>.

Imperial concluded that the rinse water met the proposed limits, and therefore, the pipes had been adequately cleaned to allow for removal. Note that all liquids recovered from the pipes were collected and disposed at a registered disposal facility. All substances met the proposed limits except for total polycyclic aromatic hydrocarbons (PAHs) in the first batch of rinse water from NPS12 (i.e., FRS-NPS-START-A and -B). Total PAH concentrations in the two duplicate samples were 0.1 and 0.079 mg/L, respectively. Total PAH concentrations met the proposed limit in the four subsequent samples. One of the two duplicate samples from the middle batch of rinse water from NPS6 (FRS-NPS7-MID-A) exceeded the proposed limit for total lead, but this was not observed in the second duplicate or in the final batch of rinse water.

## 5.0 IMPLICATIONS FOR PIPELINE REMOVAL

Golder reviewed the available information about the 2012 and 2015 pipeline cleaning in November 2017. The purpose of the review was to determine if there were hazards to aquatic life associated with residual product in the two pipelines considering the selected removal option.

Legislation relevant to the potential discharge of water used to flood the pipe during removal includes the federal *Fisheries Act*, which contains a general prohibition against the deposit of a deleterious substance into waters frequented by fish, and the provincial *Environmental Management Act*, which contains a general prohibition against the introduction of a waste into the environment in such a manner or quality as to cause pollution. The minimum expected requirements for discharge to surface waters are:

- The discharged material will be non-acutely lethal at the point of discharge. Acutely lethal in this context is usually defined as a 96h LC50  $\geq$  100% using rainbow trout (i.e., the full-strength water causes mortality to no more than 50% of the test organisms).
- The discharge will not cause chronic or sublethal effects outside an initial dilution zone (IDZ) which is set on a site-by-site basis, taking into consideration water uses, aquatic life, and other discharges that may be present. Where long-term average water quality guidelines (WQGs) are met at the edge of the IDZ, chronic effects outside the IDZ would not be expected. WQGs are conservatively derived based on toxicity testing using sensitive species, and therefore it is assumed that where WQGs are met, sensitive species would be protected.

This additional review of the rinse water quality was conducted by comparing the chemistry provided by Imperial with WQGs for the protection of marine life, which is considered conservative. WQGs do not have legal standing and are not intended to be applied directly as discharge limits. Rather, they provide a generic indication of concentrations at which specific levels of protection may be achieved and include safety factors for broader application to water bodies across the province. Thus, an exceedance of a guideline does not necessarily indicate a hazard exists. Where WQGs exceedances were observed, further assessment of the potential for harm to aquatic organisms was undertaken.

A majority of the parameters were non-detectable and there were no exceedances of marine-specific WQGs for lead, methyl tert-butyl ether (MTBE), benzene, ethylbenzene, and most individual PAH parameters. Exceedances were observed for naphthalene and 2-methylnaphthalene in the three rinse batches from both pipelines, and exceedances of chrysene and benzo(a)pyrene in one or more of the rinse batches for NPS12. However, these exceedances do not necessarily indicate that there is a hazard to aquatic life because:

- The WQGs were developed to be protective against chronic effects and have a ten-fold safety factor applied to the most sensitive toxicity test results available<sup>4</sup>. The most sensitive toxicity data are also typically from longer-term, chronic tests. The guideline exceedances were generally near or less than ten times which indicates that pipe-contact water would neither be acutely lethal, nor would chronic WQGs be exceeded at 100 metres (m) from the discharge area because the discharged water would rapidly mix into the surrounding water column.
- All analyses were conducted on unfiltered samples. The specific goal of the cleaning process was to use successive runs of cleaning solution (a surfactant) and the porcupine pig to loosen the scale attached to the side of the pipe, and then to use successive multi-disc pigs with rinse batches to remove the particulates. The presence of particulate scale in the rinse water is expected and this scale will influence the measured concentrations in an unfiltered sample.
- There was a general pattern where concentrations decreased over the three batches of rinse water which indicates that scale was successfully dislodged and then rinsed from the pipe. Each slug of rinse water was sufficiently large to provide an effective rinse to push those dislodged particulates from the pipe.
- The final pig demonstrated that there were no further liquids left in the pipe, and therefore, no residual products (especially after a total of six batches of cleaning solution and rinse water) are expected to remain which could come in contact with seawater as the pipes are flooded. There are no plans to insert additional pigs into the line that would be expected to dislodge any remaining scale, and therefore, any further rinsing of scale particulates into Burrard Inlet during the pipeline extraction would be expected to be minimal.

It is further expected that there will be low hazard to aquatic life associated with residual product in the pipelines during removal because:

- Aquatic life are unlikely to enter the pipeline left in place because the pipe will be capped and buried under more than 1 m of rock shortly after the pipe is cut. The isolation cuts are being made outside the future dredging for the navigational channel, and over time, it is expected that the areas dredged in the safety zone will gradually infill with additional material.
- There is no expectation that an ongoing source of product could be released to water (i.e., the December 2015 program included multiple pig runs that would remove residual liquids) following removal of the pipes.

## 6.0 SUMMARY

This technical memorandum provides a summary of the pipeline cleaning conducted by Imperial in 2012 and 2015, as well as information about how Imperial evaluated the available information to confirm that the pipelines have been adequately cleaned in preparation for extraction of the segments within the navigational channel. The general level of effort has been described by Imperial as exceeding standard industry practices. Based on Golder's review of the available chemistry data provided by Imperial for the rinse water batches used in 2015, it is unlikely that there would be residual product left in the pipeline segments to be removed in light of the multiple batches of cleaning solution and pigs that were run through the pipelines. The presence of PAHs in the rinse water batches at concentrations that exceed ambient water quality guidelines is likely associated with suspended particulates

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<sup>4</sup> Nagpal NK. 1993. Ambient water quality criteria for polycyclic aromatic hydrocarbons (PAHs). Ministry of Environment, Lands and Parks. Available at: <https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/pahs-tech.pdf>.

(i.e., the scale that was scraped from the sides of the pipe during cleaning) that would not be likely to present a risk to aquatic life while segments of the pipe are lifted from the seabed to the barge.

## 7.0 CLOSURE

We trust the information provided herein meets your requirements. If you have any questions about the contents of the technical memorandum, please contact the undersigned.



Blair McDonald, MET, RPBio  
Associate, Senior Environmental Scientist



Barbara Wernick, MSc, RPBio  
Principal, Senior Environmental Scientist

Attachments: Statement of Limitations  
Attachment A: Burrard Inlet Cleaning Program  
Attachment B: December 2015 Laboratory Results

## STATEMENT OF LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by Golder Associates Ltd. for Imperial Oil Limited. It is intended for the sole and exclusive use of Imperial Oil Limited, its affiliated companies and partners and their respective insurers, agents, employees and advisors (collectively, Imperial Oil). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and Golder Associates Ltd. make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by Golder Associates Ltd. with respect to this report and any conclusions or recommendations made in this report reflect Golder Associates Ltd.'s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

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**ATTACHMENT A:  
BURRARD INLET CLEANING PROGRAM**

# *Burrard Inlet Cleaning Program*

*North Inlet Valve Station to South Inlet Valve Station*

*November 14 to 21/12*



**November 12 to 14/12** – WCMRC (*Western Canada Marine Response Corporation*) patrolled the Burrard Inlet prior to, during & completion of leak test activities to observe for any sheens or releases for the 6”NPS & 12”NPS pipeline crossings.



**November 13 to 14/12** – Performed leak test on 6”NPS & 12”NPS Pipelines, leak test pressures 1000KPA for 24 hours.



**November 14 to 21/12** – Performed cleaning runs, caliper & MFL/IMU runs.

**November 14/12** – Performed initial 12”NPS red batch pig run in the 12”NPS pipeline. Received approximately 1 cup full of debris from pipeline, no liquids.

Pressure differential during pig run was 45 PSI, no issues.



**November 15/12** – Performed initial 6”NPS red batch pig run in the 6”NPS pipeline. Received approximately 3 gallons of liquid (*Stove Oil*) from pipeline.

Pressure differential during pig run was 126 PSI, concerns with pressure differential, plan to perform caliper surveys before running aggressive pigs.



**November 15 to 17/12** – Inserted blue batch pig, 3.0m3 of stove oil and red batch pig in the 12”NPS pipeline.

Received 3.0m3 of stove oil, batch pigs clean.



**November 19/12** – Performed 6”NPS & 12”NPS Caliper Surveys

Wireline cable tow section to South Inlet Valve Station for 6”NPS & 12” NPS Caliper surveys, received very clean. No debris.



12”NPS & 6”NPS Caliper tools received, performed at 1.0 meter/per second, pipelines very clean, no debris on caliper tools.

Caliper tool results confirmed no issues for the MFL/IMU tool passages.



**November 19 to 21/2012** – Performed 2 – 6”NPS & 12”NPS MFL/IMU inspection surveys.

Wireline cable tow section ran for each individual MFL/IMU inspection survey run, total of 4 times, received clean.

2 - 12”NPS MFL/IMU Surveys. MFL/IMU tools received, very clean, no debris on tool.



2 - 6" NPS MFL/IMU Surveys. MFL/IMU tools received, very clean, no debris on tool.



### **Summary:**

Leak test results on the 6" NPS & 12" NPS pipelines, successful, no deviation of pressures on 24 hour test.

WCMRC (*Western Canada Marine Response Corporation*) patrolled the Burrard Inlet and indicated no sheens or issues (*Prior, During & After*) for the leak tests.

The 6" NPS & 12" NPS Burrard Inlet pipelines from the North Inlet to the South Inlet valve stations are clean & free of debris.

#### **6" NPS Pipeline pigged as per below:**

- Performed 6" NPS red batch pig run – Received approximate 3 gallons of liquids
- Performed 3 wireline tow sections through the 6" NPS pipeline – Received very clean
- Performed one 6" NPS caliper survey - Successful - Received very clean
- Performed 2 – 6" NPS MFL/IMU tool surveys – Received very clean.
- Total pig runs through the 6" NPS pipeline – 7 Runs

#### **12" NPS Pipeline pigged as per below:**

- Performed 12" NPS red batch pig run – Received approximate 1 cup of debris
- Performed a 3.0m<sup>3</sup> stove oil batch between a Blue & Red Batch pigs and received all stove oil.
- Performed 3 wireline tow sections through the 12" NPS pipeline – Received very clean
- Performed one 12" NPS caliper survey - Successful - Received very clean
- Performed 2 – 12" NPS MFL/IMU tool surveys – Received very clean.
- Total pig runs through the 12" NPS pipeline – 9 Runs

Baker Hughes noted all MFL/IMU data received from inspection tools as good quality.

**November 22/2012** – Restored the 6" NPS & 12" NPS pipelines, and pressurized lines back up to 350KPA of nitrogen pressure.

**ATTACHMENT B:  
DECEMBER 2015 LABORATORY RESULTS**

Your Project #: 1541624 / 6075 / 2001  
Your C.O.C. #: 483351-02-01, 483351-03-01

**Attention: Katherine McCann**

Golder Associates  
Suite 200 - 2920 Virtual Way  
Vancouver, BC  
Canada V5M 0C4

**Report Date: 2015/12/14**  
Report #: R2095831  
Version: 4 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B5B0010**

**Received: 2015/12/10, 17:10**

Sample Matrix: Water  
# Samples Received: 10

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Total BTEX (calc'd)	10	2015/12/10	2015/12/11	BBY8SOP-00010	EPA 8260c R3 m
BTEX/MTBE LH, VH, F1 SIM/MS	10	2015/12/11	2015/12/11	BBY8SOP-00010/11	EPA 8260c R3 m
EPH in Water when PAH required	10	2015/12/11	2015/12/11	BBY8SOP-00029	BCMOE EPH w 12/00 m
Elements by CRC ICPMS (total)	10	2015/12/11	2015/12/11	BBY7SOP-00002	EPA 6020A R1 m
PAH in Water by GC/MS (SIM)	10	2015/12/11	2015/12/11	BBY8SOP-00021	EPA 8270d R4 m
Total LMW, HMW, Total PAH Calc	10	N/A	2015/12/11	BBY WI-00033	Auto Calc
pH Manual Electrode-Water (1)	10	N/A	2015/12/11	BBY6SOP-00045	SM 22 4500-H+ B m
Phenols (4-AAP)	10	N/A	2015/12/11	BBY6SOP-00008	SM 22 5530 D m
TPH (C6-C32) Water Calculation	10	N/A	2015/12/12	BBY WI-00033	Auto Calc
Volatile HC-BTEX	10	N/A	2015/12/11	BBY WI-00033	Auto Calc

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Encryption Key  Letitia Prefontaine  
14 Dec 2015 10:35:19 -08:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Letitia Prefontaine, B.Sc., Senior Project Manager

Email: LPrefontaine@maxxam.ca

Phone# (604)639-2616

=====  
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

**RESULTS OF CHEMICAL ANALYSES OF WATER**

Maxxam ID		NU9411	NU9412	NU9413	NU9414		
Sampling Date		2015/12/10 10:20	2015/12/10 10:22	2015/12/10 10:34	2015/12/10 10:35		
COC Number		483351-02-01	483351-02-01	483351-02-01	483351-02-01		
	UNITS	BKG-NPS12-1/3-A	BKG-NPS12-1/3-B	BKG-NPS12-2/3-A	BKG-NPS12-2/3-B	RDL	QC Batch
<b>Misc. Organics</b>							
Phenols	mg/L	<0.10 (1)	<0.10 (1)	<0.10 (1)	<0.10 (1)	0.10	8141686
<b>Physical Properties</b>							
pH	pH	7.00	6.97	6.97	7.00		8142097
RDL = Reportable Detection Limit (1) RDL raised due to sample dilution.							

Maxxam ID		NU9415	NU9416	NU9417	NU9418		
Sampling Date		2015/12/10 13:40	2015/12/10 13:42	2015/12/10 13:51	2015/12/10 13:53		
COC Number		483351-02-01	483351-02-01	483351-02-01	483351-02-01		
	UNITS	FRS-NPS12-START-A	FRS-NPS12-START-B	FRS-NPS12-MID-A	FRS-NPS12-MID-B	RDL	QC Batch
<b>Misc. Organics</b>							
Phenols	mg/L	<0.10 (1)	<0.10 (1)	<0.10 (1)	<0.10 (1)	0.10	8141686
<b>Physical Properties</b>							
pH	pH	6.20	6.23	6.70	6.72		8142097
RDL = Reportable Detection Limit (1) RDL raised due to sample dilution.							

Maxxam ID		NU9419	NU9420		
Sampling Date		2015/12/10 14:05	2015/12/10 14:07		
COC Number		483351-02-01	483351-02-01		
	UNITS	FRS-NPS12-END-A	FRS-NPS12-END-B	RDL	QC Batch
<b>Misc. Organics</b>					
Phenols	mg/L	<0.10 (1)	<0.10 (1)	0.10	8141686
<b>Physical Properties</b>					
pH	pH	6.69	6.79		8142097
RDL = Reportable Detection Limit (1) RDL raised due to sample dilution.					

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

**ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)**

<b>Maxxam ID</b>		NU9411	NU9412	NU9413	NU9414		
<b>Sampling Date</b>		2015/12/10 10:20	2015/12/10 10:22	2015/12/10 10:34	2015/12/10 10:35		
<b>COC Number</b>		483351-02-01	483351-02-01	483351-02-01	483351-02-01		
	<b>UNITS</b>	<b>BKG-NPS12-1/3-A</b>	<b>BKG-NPS12-1/3-B</b>	<b>BKG-NPS12-2/3-A</b>	<b>BKG-NPS12-2/3-B</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Total Metals by ICPMS</b>							
Total Lead (Pb)	ug/L	0.27	0.26	0.60	0.38	0.20	8141370
RDL = Reportable Detection Limit							

<b>Maxxam ID</b>		NU9415	NU9416	NU9417	NU9418		
<b>Sampling Date</b>		2015/12/10 13:40	2015/12/10 13:42	2015/12/10 13:51	2015/12/10 13:53		
<b>COC Number</b>		483351-02-01	483351-02-01	483351-02-01	483351-02-01		
	<b>UNITS</b>	<b>FRS-NPS12-START-A</b>	<b>FRS-NPS12-START-B</b>	<b>FRS-NPS12-MID-A</b>	<b>FRS-NPS12-MID-B</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Total Metals by ICPMS</b>							
Total Lead (Pb)	ug/L	4.70	4.38	1.21	0.98	0.20	8141454
RDL = Reportable Detection Limit							

<b>Maxxam ID</b>		NU9419	NU9420		
<b>Sampling Date</b>		2015/12/10 14:05	2015/12/10 14:07		
<b>COC Number</b>		483351-02-01	483351-02-01		
	<b>UNITS</b>	<b>FRS-NPS12-END-A</b>	<b>FRS-NPS12-END-B</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Total Metals by ICPMS</b>					
Total Lead (Pb)	ug/L	2.44	2.68	0.20	8141454
RDL = Reportable Detection Limit					

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

**TOTAL PETROLEUM HYDROCARBONS (WATER)**

Maxxam ID		NU9411	NU9412	NU9413	NU9414		
Sampling Date		2015/12/10 10:20	2015/12/10 10:22	2015/12/10 10:34	2015/12/10 10:35		
COC Number		483351-02-01	483351-02-01	483351-02-01	483351-02-01		
	UNITS	BKG-NPS12-1/3-A	BKG-NPS12-1/3-B	BKG-NPS12-2/3-A	BKG-NPS12-2/3-B	RDL	QC Batch
<b>Ext. Pet. Hydrocarbon</b>							
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	8142020
EPH (C19-C32)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	8142020
<b>Hydrocarbons</b>							
Calculated Total Hydrocarbons C6-C32	mg/L	<0.30	<0.30	<0.30	<0.30	0.30	8142512
<b>Surrogate Recovery (%)</b>							
O-TERPHENYL (sur.)	%	95	94	93	93		8142020
RDL = Reportable Detection Limit							

Maxxam ID		NU9415	NU9416	NU9417	NU9418		
Sampling Date		2015/12/10 13:40	2015/12/10 13:42	2015/12/10 13:51	2015/12/10 13:53		
COC Number		483351-02-01	483351-02-01	483351-02-01	483351-02-01		
	UNITS	FRS-NPS12-START-A	FRS-NPS12-START-B	FRS-NPS12-MID-A	FRS-NPS12-MID-B	RDL	QC Batch
<b>Ext. Pet. Hydrocarbon</b>							
EPH (C10-C19)	mg/L	17	11	2.1	1.7	0.20	8142020
EPH (C19-C32)	mg/L	5.7	3.6	0.91	0.72	0.20	8142020
<b>Hydrocarbons</b>							
Calculated Total Hydrocarbons C6-C32	mg/L	22	15	3.0	2.4	0.30	8142512
<b>Surrogate Recovery (%)</b>							
O-TERPHENYL (sur.)	%	103	100	94	96		8142020
RDL = Reportable Detection Limit							

Maxxam ID		NU9419	NU9420		
Sampling Date		2015/12/10 14:05	2015/12/10 14:07		
COC Number		483351-02-01	483351-02-01		
	UNITS	FRS-NPS12-END-A	FRS-NPS12-END-B	RDL	QC Batch
<b>Ext. Pet. Hydrocarbon</b>					
EPH (C10-C19)	mg/L	5.2	2.8	0.20	8142020
EPH (C19-C32)	mg/L	1.7	1.2	0.20	8142020
<b>Hydrocarbons</b>					
Calculated Total Hydrocarbons C6-C32	mg/L	6.8	4.0	0.30	8142512
<b>Surrogate Recovery (%)</b>					
O-TERPHENYL (sur.)	%	96	96		8142020
RDL = Reportable Detection Limit					

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

**VOLATILE ORGANICS BY GC-MS (WATER)**

Maxxam ID		NU9411	NU9412	NU9413	NU9414		
Sampling Date		2015/12/10 10:20	2015/12/10 10:22	2015/12/10 10:34	2015/12/10 10:35		
COC Number		483351-02-01	483351-02-01	483351-02-01	483351-02-01		
	UNITS	BKG-NPS12-1/3-A	BKG-NPS12-1/3-B	BKG-NPS12-2/3-A	BKG-NPS12-2/3-B	RDL	QC Batch
<b>Industrial</b>							
BTEX Total	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	8140864
RDL = Reportable Detection Limit							

Maxxam ID		NU9415	NU9416	NU9417	NU9418		
Sampling Date		2015/12/10 13:40	2015/12/10 13:42	2015/12/10 13:51	2015/12/10 13:53		
COC Number		483351-02-01	483351-02-01	483351-02-01	483351-02-01		
	UNITS	FRS-NPS12-START-A	FRS-NPS12-START-B	FRS-NPS12-MID-A	FRS-NPS12-MID-B	RDL	QC Batch
<b>Industrial</b>							
BTEX Total	ug/L	3.80	2.60	1.30	1.00	0.40	8140864
RDL = Reportable Detection Limit							

Maxxam ID		NU9419	NU9420		
Sampling Date		2015/12/10 14:05	2015/12/10 14:07		
COC Number		483351-02-01	483351-02-01		
	UNITS	FRS-NPS12-END-A	FRS-NPS12-END-B	RDL	QC Batch
<b>Industrial</b>					
BTEX Total	ug/L	1.30	1.30	0.40	8140864
RDL = Reportable Detection Limit					

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

**CSR BTEX/VPH IN WATER (WATER)**

Maxxam ID		NU9411	NU9412	NU9413	NU9414		
Sampling Date		2015/12/10 10:20	2015/12/10 10:22	2015/12/10 10:34	2015/12/10 10:35		
COC Number		483351-02-01	483351-02-01	483351-02-01	483351-02-01		
	UNITS	BKG-NPS12-1/3-A	BKG-NPS12-1/3-B	BKG-NPS12-2/3-A	BKG-NPS12-2/3-B	RDL	QC Batch
<b>Volatiles</b>							
VPH (VH6 to 10 - BTEX)	ug/L	<300	<300	<300	<300	300	8139887
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	<4.0	<4.0	4.0	8141177
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	8141177
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	8141177
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	8141177
m & p-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	8141177
o-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	8141177
Styrene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	8141177
Xylenes (Total)	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	8141177
VH C6-C10	ug/L	<300	<300	<300	<300	300	8141177
<b>Surrogate Recovery (%)</b>							
1,4-Difluorobenzene (sur.)	%	103	102	101	102		8141177
4-Bromofluorobenzene (sur.)	%	97	99	99	105		8141177
D4-1,2-Dichloroethane (sur.)	%	100	102	100	101		8141177
RDL = Reportable Detection Limit							

Maxxam ID		NU9415	NU9416	NU9417	NU9418		
Sampling Date		2015/12/10 13:40	2015/12/10 13:42	2015/12/10 13:51	2015/12/10 13:53		
COC Number		483351-02-01	483351-02-01	483351-02-01	483351-02-01		
	UNITS	FRS-NPS12-START-A	FRS-NPS12-START-B	FRS-NPS12-MID-A	FRS-NPS12-MID-B	RDL	QC Batch
<b>Volatiles</b>							
VPH (VH6 to 10 - BTEX)	ug/L	<300	<300	<300	<300	300	8139887
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	<4.0	<4.0	4.0	8141177
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	8141177
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	8141177
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	8141177
m & p-Xylene	ug/L	2.0	1.4	0.71	0.55	0.40	8141177
o-Xylene	ug/L	1.8	1.2	0.62	0.47	0.40	8141177
Styrene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	8141177
Xylenes (Total)	ug/L	3.8	2.6	1.3	1.0	0.40	8141177
VH C6-C10	ug/L	<300	<300	<300	<300	300	8141177
<b>Surrogate Recovery (%)</b>							
1,4-Difluorobenzene (sur.)	%	101	101	101	101		8141177
4-Bromofluorobenzene (sur.)	%	105	106	106	106		8141177
D4-1,2-Dichloroethane (sur.)	%	102	100	102	103		8141177
RDL = Reportable Detection Limit							

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

**CSR BTEX/VPH IN WATER (WATER)**

Maxxam ID		NU9419	NU9420		
Sampling Date		2015/12/10 14:05	2015/12/10 14:07		
COC Number		483351-02-01	483351-02-01		
	UNITS	FRS-NPS12-END-A	FRS-NPS12-END-B	RDL	QC Batch
<b>Volatiles</b>					
VPH (VH6 to 10 - BTEX)	ug/L	<300	<300	300	8139887
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	4.0	8141177
Benzene	ug/L	<0.40	<0.40	0.40	8141177
Toluene	ug/L	<0.40	<0.40	0.40	8141177
Ethylbenzene	ug/L	<0.40	<0.40	0.40	8141177
m & p-Xylene	ug/L	0.72	0.68	0.40	8141177
o-Xylene	ug/L	0.57	0.60	0.40	8141177
Styrene	ug/L	<0.40	<0.40	0.40	8141177
Xylenes (Total)	ug/L	1.3	1.3	0.40	8141177
VH C6-C10	ug/L	<300	<300	300	8141177
<b>Surrogate Recovery (%)</b>					
1,4-Difluorobenzene (sur.)	%	101	102		8141177
4-Bromofluorobenzene (sur.)	%	105	105		8141177
D4-1,2-Dichloroethane (sur.)	%	101	101		8141177
RDL = Reportable Detection Limit					

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

**CSR PAH IN WATER BY GC-MS (WATER)**

Maxxam ID		NU9411	NU9412	NU9413	NU9414		
Sampling Date		2015/12/10 10:20	2015/12/10 10:22	2015/12/10 10:34	2015/12/10 10:35		
COC Number		483351-02-01	483351-02-01	483351-02-01	483351-02-01		
	UNITS	BKG-NPS12-1/3-A	BKG-NPS12-1/3-B	BKG-NPS12-2/3-A	BKG-NPS12-2/3-B	RDL	QC Batch
<b>Polycyclic Aromatics</b>							
Low Molecular Weight PAH's	ug/L	<0.24	<0.24	<0.24	<0.24	0.24	8141075
High Molecular Weight PAH's	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8141075
Total PAH	ug/L	<0.24	<0.24	<0.24	<0.24	0.24	8141075
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8142008
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8142008
Quinoline	ug/L	<0.24	<0.24	<0.24	<0.24	0.24	8142008
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142008
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142008
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142008
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142008
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	8142008
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142008
Fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	8142008
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	8142008
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	8142008
Chrysene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142008
Benzo(b&j)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142008
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142008
Benzo(a)pyrene	ug/L	<0.0090	<0.0090	<0.0090	<0.0090	0.0090	8142008
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142008
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142008
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142008
<b>Surrogate Recovery (%)</b>							
D10-ANTHRACENE (sur.)	%	106	99	85	89		8142008
D8-ACENAPHTHYLENE (sur.)	%	113	106	99	101		8142008
D8-NAPHTHALENE (sur.)	%	105	93	89	92		8142008
D9-Acridine	%	106	104	99	103		8142008
TERPHENYL-D14 (sur.)	%	116	103	96	102		8142008
RDL = Reportable Detection Limit							

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

**CSR PAH IN WATER BY GC-MS (WATER)**

Maxxam ID		NU9415		NU9416		NU9417		
Sampling Date		2015/12/10 13:40		2015/12/10 13:42		2015/12/10 13:51		
COC Number		483351-02-01		483351-02-01		483351-02-01		
	UNITS	FRS-NPS12-START-A	RDL	FRS-NPS12-START-B	RDL	FRS-NPS12-MID-A	RDL	QC Batch
<b>Polycyclic Aromatics</b>								
Low Molecular Weight PAH`s	ug/L	97	1.0	77	1.0	23	0.50	8141075
High Molecular Weight PAH`s	ug/L	3.6	0.050	2.4	0.18	0.41	0.050	8141075
Total PAH	ug/L	100	1.0	79	1.0	24	0.50	8141075
Naphthalene	ug/L	31 (1)	1.0	25 (1)	1.0	9.7 (1)	0.50	8142008
2-Methylnaphthalene	ug/L	54 (1)	1.0	46 (1)	1.0	12 (1)	0.50	8142008
Quinoline	ug/L	<0.24	0.24	<0.24	0.24	<0.24	0.24	8142008
Acenaphthylene	ug/L	<0.18 (2)	0.18	<0.14 (2)	0.14	<0.050	0.050	8142008
Acenaphthene	ug/L	0.75	0.050	0.35	0.050	0.092	0.050	8142008
Fluorene	ug/L	3.6	0.050	1.8	0.050	0.40	0.050	8142008
Phenanthrene	ug/L	6.9	0.050	3.6	0.050	0.63	0.050	8142008
Anthracene	ug/L	<0.28 (2)	0.28	<0.15 (2)	0.15	<0.023 (2)	0.023	8142008
Acridine	ug/L	<0.28 (2)	0.28	0.75	0.050	0.20	0.050	8142008
Fluoranthene	ug/L	0.39	0.020	0.23	0.020	0.069	0.020	8142008
Pyrene	ug/L	1.1	0.020	0.71	0.020	0.13	0.020	8142008
Benzo(a)anthracene	ug/L	0.068	0.010	0.045	0.010	<0.010	0.010	8142008
Chrysene	ug/L	1.5	0.050	1.2	0.050	0.21	0.050	8142008
Benzo(b&j)fluoranthene	ug/L	0.23	0.050	<0.18	0.18	<0.050	0.050	8142008
Benzo(k)fluoranthene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142008
Benzo(a)pyrene	ug/L	0.042	0.0090	0.030	0.0090	<0.0090	0.0090	8142008
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142008
Dibenz(a,h)anthracene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142008
Benzo(g,h,i)perylene	ug/L	0.31	0.050	0.24	0.050	<0.050	0.050	8142008
<b>Surrogate Recovery (%)</b>								
D10-ANTHRACENE (sur.)	%	112		113		112		8142008
D8-ACENAPHTHYLENE (sur.)	%	129		119		108		8142008
D8-NAPHTHALENE (sur.)	%	108		100		88		8142008
D9-Acridine	%	108		102		102		8142008
TERPHENYL-D14 (sur.)	%	105		107		108		8142008
RDL = Reportable Detection Limit								
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.								
(2) Detection limits raised due to matrix interference.								

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

**CSR PAH IN WATER BY GC-MS (WATER)**

Maxxam ID		NU9418		NU9419		NU9420		
Sampling Date		2015/12/10 13:53		2015/12/10 14:05		2015/12/10 14:07		
COC Number		483351-02-01		483351-02-01		483351-02-01		
	UNITS	FRS-NPS12-MID-B	RDL	FRS-NPS12-END-A	RDL	FRS-NPS12-END-B	RDL	QC Batch
<b>Polycyclic Aromatics</b>								
Low Molecular Weight PAH's	ug/L	23	0.50	40	0.50	27	0.50	8141075
High Molecular Weight PAH's	ug/L	0.27	0.050	0.85	0.050	0.68	0.050	8141075
Total PAH	ug/L	23	0.50	41	0.50	28	0.50	8141075
Naphthalene	ug/L	9.8 (1)	0.50	14 (1)	0.50	10 (1)	0.50	8142008
2-Methylnaphthalene	ug/L	12 (1)	0.50	24 (1)	0.50	15 (1)	0.50	8142008
Quinoline	ug/L	<0.35 (2)	0.35	<0.48 (2)	0.48	<0.33 (2)	0.33	8142008
Acenaphthylene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142008
Acenaphthene	ug/L	0.084	0.050	0.23	0.050	0.13	0.050	8142008
Fluorene	ug/L	0.40	0.050	0.88	0.050	0.62	0.050	8142008
Phenanthrene	ug/L	0.52	0.050	1.3	0.050	0.88	0.050	8142008
Anthracene	ug/L	<0.019 (2)	0.019	<0.057 (2)	0.057	<0.053 (2)	0.053	8142008
Acridine	ug/L	<0.050	0.050	<0.073 (2)	0.073	<0.050	0.050	8142008
Fluoranthene	ug/L	0.046	0.020	0.12	0.020	0.077	0.020	8142008
Pyrene	ug/L	0.12	0.020	0.32	0.020	0.24	0.020	8142008
Benzo(a)anthracene	ug/L	<0.010	0.010	0.017	0.010	0.022	0.010	8142008
Chrysene	ug/L	0.097	0.050	0.21	0.050	0.19	0.050	8142008
Benzo(b&j)fluoranthene	ug/L	<0.050	0.050	0.072	0.050	0.062	0.050	8142008
Benzo(k)fluoranthene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142008
Benzo(a)pyrene	ug/L	<0.0090	0.0090	0.017	0.0090	0.014	0.0090	8142008
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142008
Dibenz(a,h)anthracene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142008
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	0.10	0.050	0.080	0.050	8142008
<b>Surrogate Recovery (%)</b>								
D10-ANTHRACENE (sur.)	%	114		108		111		8142008
D8-ACENAPHTHYLENE (sur.)	%	123		121		119		8142008
D8-NAPHTHALENE (sur.)	%	111		107		104		8142008
D9-Acridine	%	112		105		115		8142008
TERPHENYL-D14 (sur.)	%	126		126		124		8142008
RDL = Reportable Detection Limit								
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.								
(2) Detection limits raised due to matrix interference.								

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.0°C
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Report reissued with revised units for Total Hydrocarbons C6-C32.

**Results relate only to the items tested.**

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

**QUALITY ASSURANCE REPORT**

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8141177	JL4	Matrix Spike	1,4-Difluorobenzene (sur.)	2015/12/11	101	%	70 - 130		
			4-Bromofluorobenzene (sur.)	2015/12/11	96	%	70 - 130		
			D4-1,2-Dichloroethane (sur.)	2015/12/11	99	%	70 - 130		
			Methyl-tert-butylether (MTBE)	2015/12/11	95	%	70 - 130		
			Benzene	2015/12/11	102	%	70 - 130		
			Toluene	2015/12/11	98	%	70 - 130		
			Ethylbenzene	2015/12/11	105	%	70 - 130		
			m & p-Xylene	2015/12/11	99	%	70 - 130		
			o-Xylene	2015/12/11	98	%	70 - 130		
			Styrene	2015/12/11	109	%	70 - 130		
8141177	JL4	Spiked Blank	1,4-Difluorobenzene (sur.)	2015/12/11	100	%	70 - 130		
			4-Bromofluorobenzene (sur.)	2015/12/11	95	%	70 - 130		
			D4-1,2-Dichloroethane (sur.)	2015/12/11	95	%	70 - 130		
			Methyl-tert-butylether (MTBE)	2015/12/11	90	%	70 - 130		
			Benzene	2015/12/11	97	%	70 - 130		
			Toluene	2015/12/11	94	%	70 - 130		
			Ethylbenzene	2015/12/11	103	%	70 - 130		
			m & p-Xylene	2015/12/11	97	%	70 - 130		
			o-Xylene	2015/12/11	96	%	70 - 130		
			Styrene	2015/12/11	99	%	70 - 130		
8141177	JL4	Method Blank	VH C6-C10	2015/12/11	95	%	70 - 130		
			1,4-Difluorobenzene (sur.)	2015/12/11	104	%	70 - 130		
			4-Bromofluorobenzene (sur.)	2015/12/11	97	%	70 - 130		
			D4-1,2-Dichloroethane (sur.)	2015/12/11	100	%	70 - 130		
			Methyl-tert-butylether (MTBE)	2015/12/11	<4.0		ug/L		
			Benzene	2015/12/11	<0.40		ug/L		
			Toluene	2015/12/11	<0.40		ug/L		
			Ethylbenzene	2015/12/11	<0.40		ug/L		
			m & p-Xylene	2015/12/11	<0.40		ug/L		
			o-Xylene	2015/12/11	<0.40		ug/L		
8141177	JL4	RPD	Styrene	2015/12/11	<0.40		ug/L		
			Xylenes (Total)	2015/12/11	<0.40		ug/L		
			VH C6-C10	2015/12/11	<300		ug/L		
			Methyl-tert-butylether (MTBE)	2015/12/11	NC		%	30	
			Benzene	2015/12/11	NC		%	30	
			Toluene	2015/12/11	NC		%	30	
			Ethylbenzene	2015/12/11	NC		%	30	
			m & p-Xylene	2015/12/11	NC		%	30	
			o-Xylene	2015/12/11	NC		%	30	
			Styrene	2015/12/11	NC		%	30	
8141370	JT3	Matrix Spike	Total Lead (Pb)	2015/12/11		92	%	80 - 120	
			8141370	JT3	Spiked Blank	Total Lead (Pb)	2015/12/11	96	%
8141370	JT3	Method Blank	Total Lead (Pb)			2015/12/11	<0.20		ug/L
8141370			JT3	RPD	Total Lead (Pb)	2015/12/11	NC		%
8141454	JT3	Matrix Spike			Total Lead (Pb)	2015/12/11		100	%
8141454			JT3	Spiked Blank	Total Lead (Pb)	2015/12/11		94	%
8141454	JT3	Method Blank			Total Lead (Pb)	2015/12/11	<0.20		ug/L
8141454			JT3	RPD	Total Lead (Pb)	2015/12/11	0.76		%
8141686	TS1	Matrix Spike			Phenols	2015/12/11		92	%
8141686			TS1	Spiked Blank	Phenols	2015/12/11		94	%
8141686	TS1	Method Blank			Phenols	2015/12/11	<0.0010		mg/L
8141686			TS1	RPD	Phenols	2015/12/11	NC		%

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC				Date							
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits			
8142008	JP1	Matrix Spike [NU9412-01]	D10-ANTHRACENE (sur.)	2015/12/11		95	%	60 - 130			
			D8-ACENAPHTHYLENE (sur.)	2015/12/11		103	%	50 - 130			
			D8-NAPHTHALENE (sur.)	2015/12/11		92	%	50 - 130			
			D9-Acridine	2015/12/11		103	%	50 - 130			
			TERPHENYL-D14 (sur.)	2015/12/11		111	%	60 - 130			
			Naphthalene	2015/12/11		83	%	50 - 130			
			2-Methylnaphthalene	2015/12/11		96	%	50 - 130			
			Quinoline	2015/12/11		106	%	50 - 130			
			Acenaphthylene	2015/12/11		100	%	50 - 130			
			Acenaphthene	2015/12/11		100	%	50 - 130			
			Fluorene	2015/12/11		97	%	50 - 130			
			Phenanthrene	2015/12/11		95	%	60 - 130			
			Anthracene	2015/12/11		97	%	60 - 130			
			Acridine	2015/12/11		105	%	50 - 130			
			Fluoranthene	2015/12/11		104	%	60 - 130			
			Pyrene	2015/12/11		104	%	60 - 130			
			Benzo(a)anthracene	2015/12/11		96	%	60 - 130			
			Chrysene	2015/12/11		100	%	60 - 130			
			Benzo(b&j)fluoranthene	2015/12/11		109	%	60 - 130			
			Benzo(k)fluoranthene	2015/12/11		95	%	60 - 130			
			Benzo(a)pyrene	2015/12/11		107	%	60 - 130			
			Indeno(1,2,3-cd)pyrene	2015/12/11		97	%	60 - 130			
			Dibenz(a,h)anthracene	2015/12/11		91	%	60 - 130			
			Benzo(g,h,i)perylene	2015/12/11		92	%	60 - 130			
			8142008	JP1	Spiked Blank	D10-ANTHRACENE (sur.)	2015/12/11		110	%	60 - 130
						D8-ACENAPHTHYLENE (sur.)	2015/12/11		113	%	50 - 130
D8-NAPHTHALENE (sur.)	2015/12/11					99	%	50 - 130			
D9-Acridine	2015/12/11					111	%	50 - 130			
TERPHENYL-D14 (sur.)	2015/12/11					119	%	60 - 130			
Naphthalene	2015/12/11					88	%	50 - 130			
2-Methylnaphthalene	2015/12/11					100	%	50 - 130			
Quinoline	2015/12/11					103	%	50 - 130			
Acenaphthylene	2015/12/11					105	%	50 - 130			
Acenaphthene	2015/12/11					105	%	50 - 130			
Fluorene	2015/12/11					102	%	50 - 130			
Phenanthrene	2015/12/11					101	%	60 - 130			
Anthracene	2015/12/11					107	%	60 - 130			
Acridine	2015/12/11					109	%	50 - 130			
Fluoranthene	2015/12/11					107	%	60 - 130			
Pyrene	2015/12/11					108	%	60 - 130			
Benzo(a)anthracene	2015/12/11					102	%	60 - 130			
Chrysene	2015/12/11					104	%	60 - 130			
Benzo(b&j)fluoranthene	2015/12/11					112	%	60 - 130			
Benzo(k)fluoranthene	2015/12/11					103	%	60 - 130			
Benzo(a)pyrene	2015/12/11					112	%	60 - 130			
Indeno(1,2,3-cd)pyrene	2015/12/11					115	%	60 - 130			
Dibenz(a,h)anthracene	2015/12/11					117	%	60 - 130			
Benzo(g,h,i)perylene	2015/12/11					114	%	60 - 130			
8142008	JP1	Method Blank				D10-ANTHRACENE (sur.)	2015/12/11		123	%	60 - 130
						D8-ACENAPHTHYLENE (sur.)	2015/12/11		116	%	50 - 130
			D8-NAPHTHALENE (sur.)	2015/12/11		100	%	50 - 130			
			D9-Acridine	2015/12/11		115	%	50 - 130			
			TERPHENYL-D14 (sur.)	2015/12/11		115	%	60 - 130			
			Naphthalene	2015/12/11		<0.10		ug/L			

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			2-Methylnaphthalene	2015/12/11	<0.10		ug/L	
			Quinoline	2015/12/11	<0.24		ug/L	
			Acenaphthylene	2015/12/11	<0.050		ug/L	
			Acenaphthene	2015/12/11	<0.050		ug/L	
			Fluorene	2015/12/11	<0.050		ug/L	
			Phenanthrene	2015/12/11	<0.050		ug/L	
			Anthracene	2015/12/11	<0.010		ug/L	
			Acridine	2015/12/11	<0.050		ug/L	
			Fluoranthene	2015/12/11	<0.020		ug/L	
			Pyrene	2015/12/11	<0.020		ug/L	
			Benzo(a)anthracene	2015/12/11	<0.010		ug/L	
			Chrysene	2015/12/11	<0.050		ug/L	
			Benzo(b&j)fluoranthene	2015/12/11	<0.050		ug/L	
			Benzo(k)fluoranthene	2015/12/11	<0.050		ug/L	
			Benzo(a)pyrene	2015/12/11	<0.0090		ug/L	
			Indeno(1,2,3-cd)pyrene	2015/12/11	<0.050		ug/L	
			Dibenz(a,h)anthracene	2015/12/11	<0.050		ug/L	
			Benzo(g,h,i)perylene	2015/12/11	<0.050		ug/L	
8142008	JP1	RPD [NU9411-01]	Naphthalene	2015/12/11	NC		%	40
			2-Methylnaphthalene	2015/12/11	NC		%	40
			Quinoline	2015/12/11	NC		%	40
			Acenaphthylene	2015/12/11	NC		%	40
			Acenaphthene	2015/12/11	NC		%	40
			Fluorene	2015/12/11	NC		%	40
			Phenanthrene	2015/12/11	NC		%	40
			Anthracene	2015/12/11	NC		%	40
			Acridine	2015/12/11	NC		%	40
			Fluoranthene	2015/12/11	NC		%	40
			Pyrene	2015/12/11	NC		%	40
			Benzo(a)anthracene	2015/12/11	NC		%	40
			Chrysene	2015/12/11	NC		%	40
			Benzo(b&j)fluoranthene	2015/12/11	NC		%	40
			Benzo(k)fluoranthene	2015/12/11	NC		%	40
			Benzo(a)pyrene	2015/12/11	NC		%	40
			Indeno(1,2,3-cd)pyrene	2015/12/11	NC		%	40
			Dibenz(a,h)anthracene	2015/12/11	NC		%	40
			Benzo(g,h,i)perylene	2015/12/11	NC		%	40
8142020	IT1	Matrix Spike [NU9413-01]	O-TERPHENYL (sur.)	2015/12/11		99	%	50 - 130
			EPH (C10-C19)	2015/12/11		85	%	50 - 130
			EPH (C19-C32)	2015/12/11		102	%	50 - 130
8142020	IT1	Spiked Blank	O-TERPHENYL (sur.)	2015/12/11		100	%	50 - 130
			EPH (C10-C19)	2015/12/11		84	%	50 - 130
			EPH (C19-C32)	2015/12/11		100	%	50 - 130
8142020	IT1	Method Blank	O-TERPHENYL (sur.)	2015/12/11		101	%	50 - 130
			EPH (C10-C19)	2015/12/11	<0.20		mg/L	
			EPH (C19-C32)	2015/12/11	<0.20		mg/L	
8142020	IT1	RPD [NU9411-01]	EPH (C10-C19)	2015/12/11	NC		%	30
			EPH (C19-C32)	2015/12/11	NC		%	30
8142097	VT1	Spiked Blank	pH	2015/12/11		101	%	97 - 103

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC			Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
Batch	Init	QC Type						
8142097	VT1	RPD	pH	2015/12/11	0.14		%	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Job #: B5B0010  
Report Date: 2015/12/14

Golder Associates  
Client Project #: 1541624 / 6075 / 2001

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator



David Huang, BBY Scientific Specialist



Rob Reinert, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analyticals International Corporation aka Maxxam Analyticals  
 4000 Canada Way, Burnaby, British Columbia Canada V5G 1S5 Tel: (604) 734 7278 Fax: (604) 553-6398 Toll-Free: 800-553-6398

Report Information  
 Company Name: #33072 Golder Associates  
 Contact Name: Katherine McCann  
 Address: Suite 200 - 2920 Virtual Way  
 Vancouver BC V5M 0C4  
 Phone: (604) 296-4337 x  
 Email: Katherine\_McCann@golder.com

Project Information  
 Quotation #  
 P.O. #  
 Project #  
 Project Name  
 Site #  
 Sampled By: Owen Lewis

Maxxam Job #  
 B5B0010  
 Chain Of Custody Record  
 Project Manager  
 CHES351-02-01

Batch Order #  
 483351

Turnaround Time (TAT) Required:  
 Please provide advance notice for rush projects.  
 Regular (Standard) TAT:  
 (Will be applied / Rush TAT is not specified).  
 Standard TAT = 5-7 Working days for most tests.  
 Please note: Standard TAT for certain tests such as BOD and Dissolved Oxygen are > 6 days - contact your Project Manager for details.  
 Job Specific Rush TAT (if applies to entire submission)  
 1 DAY  2 Day  3 Day  5 Day  Date Required: \_\_\_\_\_  
 Rush Confirmation Number: \_\_\_\_\_  
 Comments: \_\_\_\_\_  
 # of Bottles: \_\_\_\_\_

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)  
 EPH & TEH in Water  
 PH Water  
 Phenols (4-AP)  
 PAH in Water  
 Total Lead  
 TPH (Purgeable & Extractable)

REGULATORY CRITERIA:  
 CSR  
 CCME  
 BC Water Quality  
 Other: Project Specific, provided to Maxxam

SPECIAL INSTRUCTIONS:  
 Please send a copy of all reports to tdobson@rbsonmervive.com.

Company Name: #12180 Robert B Somerville  
 Contact Name: Troy Dobson  
 Address: 13176 Dufferin St.  
 King City ON L7B 1K5  
 Phone: (905) 833-3100 x  
 Email: tdobson@rbsomerville.com

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	MetaIs Field Filtered? (Y/N)	REX/VPH and Total BTEX in Water	PH Water	Phenols (4-AP)	PAH in Water	Total Lead	Time	# Jars used and not submitted	Date: (YYMMDD)	Signature/Print	RECEIVED BY: (Signature/Print)	Time	Temp. (C) on Receipt	Custody Seal Intact on Cooler?
1	111911	BKG-NPS12-1/3-A	10:20	Water	N								2015/12/10	19:40	N/A		6/17.5	<input type="checkbox"/>
2	111912	BKG-NPS12-1/3-B	10:22		N													<input type="checkbox"/>
3	111913	BKG-NPS12-2/3-A	10:34		N													<input type="checkbox"/>
4	111914	BKG-NPS12-2/3-B	10:36		N													<input type="checkbox"/>
5	111915	FRS-NPS12-Start-A	13:40		N													<input type="checkbox"/>
6	111916	FRS-NPS12-Start-B	13:42		N													<input type="checkbox"/>
7	111917	FRS-NPS12-Mid-A	13:51		N													<input type="checkbox"/>
8	111918	FRS-NPS12-Mid-B	13:53		N													<input type="checkbox"/>
9	111919	FRS-NPS12-END-A	14:05		N													<input type="checkbox"/>
10	111920	FRS-NPS12-END-B	14:07	Water	N													<input type="checkbox"/>

Relinquished By: (Signature/Print) Owen Lewis  
 Date: 2015/12/10 17:00  
 Signature: [Signature]  
 Date: 2015/12/10 19:40  
 Signature: AVANI  
 RECEIVED BY: AVANI  
 Temperature (C) on Receipt: 6/17.5  
 Custody Seal Intact on Cooler?  Yes  No  
 White Maxxam Yellow Client

\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.  
 Maxxam Analyticals International Corporation aka Maxxam Analyticals

**Chain of Custody Record**

Maxxam Analytics International Corporation of Maxxam Analytics  
 4505 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel: (604) 734 7276 Toll-Free: 800-563-6266 Fax: (604) 731 2986 www.maxxam.ca

Page 1 of 2

**INVOICE TO:**

Company Name: #12180 Robert B Somerville  
 Contact Name: Troy Dobson  
 Address: 13176 Dufferin St  
 King City ON L7B 1K5  
 Phone: (905) 833-3100 x  
 Email: tdobson@rbsomerville.com

Company Name: #33072 Golder Associates  
 Contact Name: Katherine McCann  
 Address: Suite 200 - 2920 Virtual Way  
 Vancouver BC V6M 0C4  
 Phone: (604) 298-4337 x  
 Email: Katherine\_McCann@golder.com

**Report Information**

Quotation #: 1541624 / 6075 / 2001  
 P.O. #: 1541624 / 6075 / 2001  
 Project #: 1541624 / 6075 / 2001  
 Project Name: **Aren Lewis**  
 Site #: **Aren Lewis**  
 Sampled By: **Aren Lewis**

**Laboratory Use Only**

Maxxam Job #: **BSB0010**  
 Bottle Order#: 483351  
 Chain Of Custody Record  
 Project Manager

Turnaround Time (TAT) Required: \_\_\_\_\_  
 Please provide advance notice for non projects

**Regulatory Chain:**

GSR  
 CCME  
 BC Water Quality  
 Other **Project specific; provided to Maxxam**

**Special Instructions:**

*Please send a copy of all reports to tdobson@rbsomerville.com*

**ANALYSIS REQUESTED (PLEASE BE SPECIFIC):**

BTEX/VPH and Total BTEX in Water  
 EPH & TEH in Water  
 PH Water  
 Phenols (4-MP)  
 PAH in Water  
 Total Lead  
 TPH (Purgeable & Extractable)  
 HOLD

**SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM**

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metal Field Filtered ? (Y/N)	PH Water	Phenols (4-MP)	PAH in Water	Total Lead	TPH (Purgeable & Extractable)	HOLD	# of Bottles	Comments (ask lab for #)
1	NR442	FRS-NPS12 - EXTRA	10/17/2015	13:58	Water	N						7	
2													
3													
4													
5													
6													
7													
8													
9													
10													

**RECEIVED BY: (Signature/Print)** *Aren Lewis* **DATE:** 2015/12/10 **TIME:** 17:00

**RECEIVED BY: (Signature/Print)** *Amani Patel* **DATE:** 2015/12/10 **TIME:** 19:10

**Lab Use Only**

Temperature (°C) on Receipt: **6/7/5**

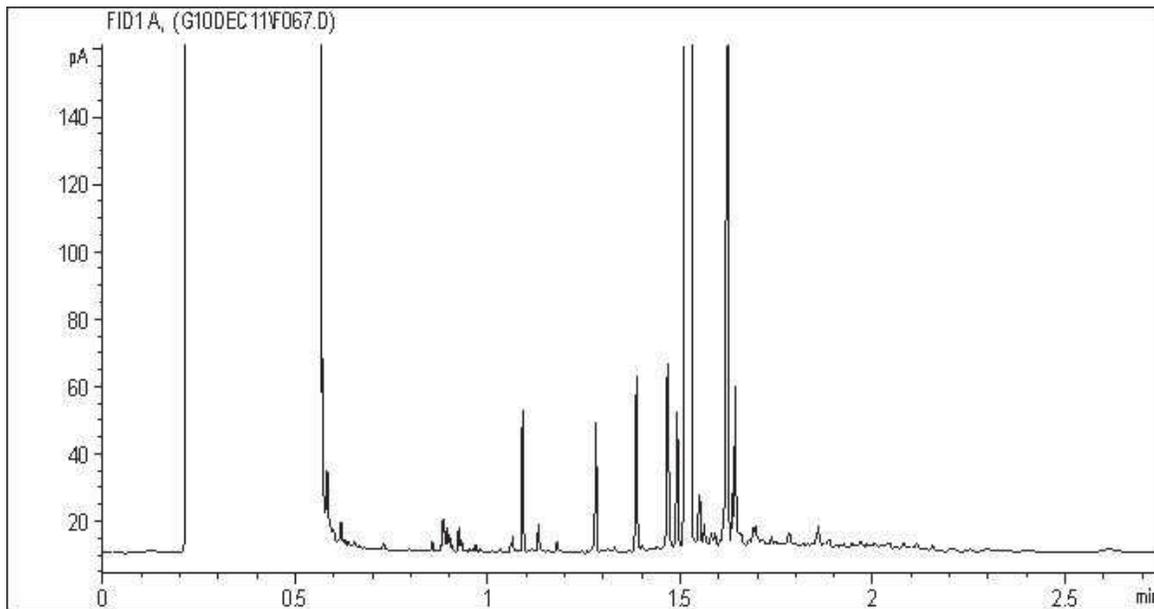
Custody Seal Intact on Cooler?  Yes  No

White Maxxam  Yellow Client

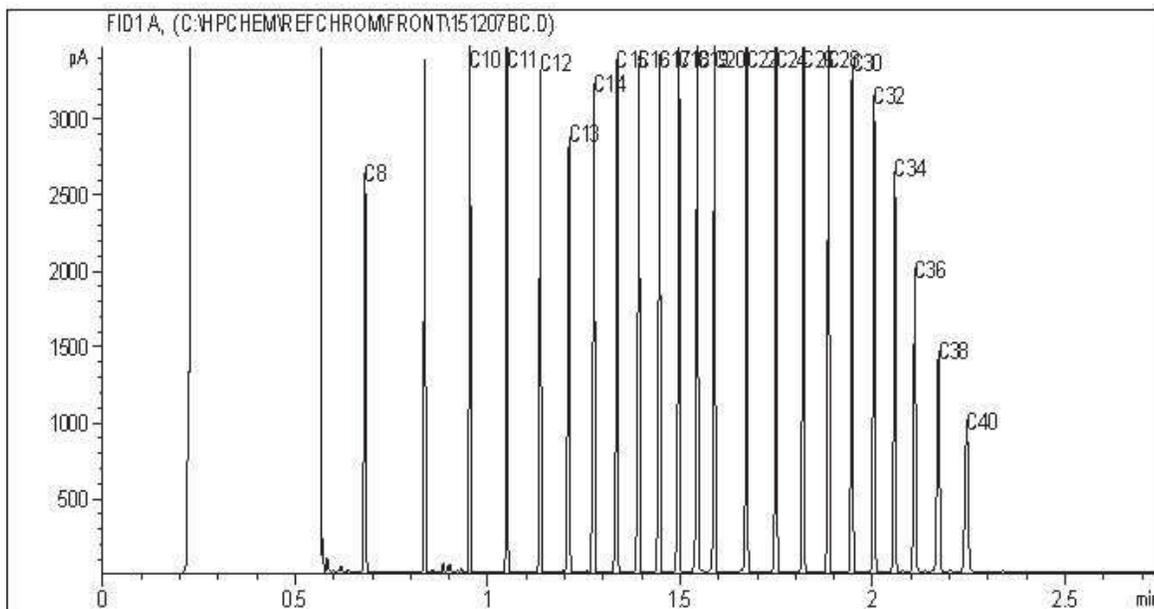
\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Maxxam Analytics International Corporation of Maxxam Analytics

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

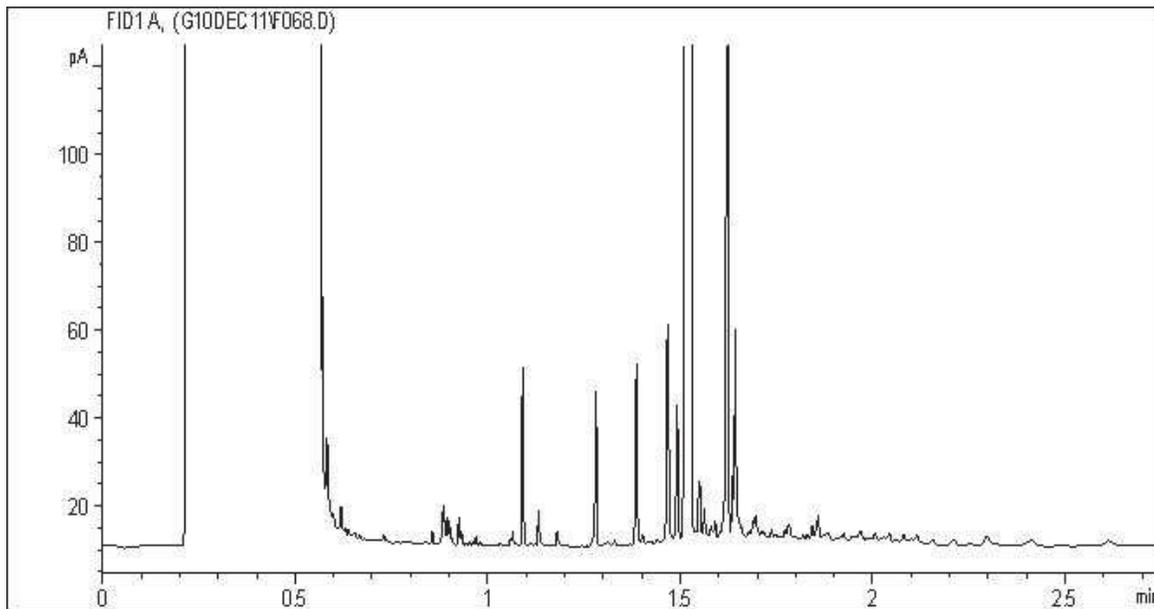


TYPICAL PRODUCT CARBON NUMBER RANGES

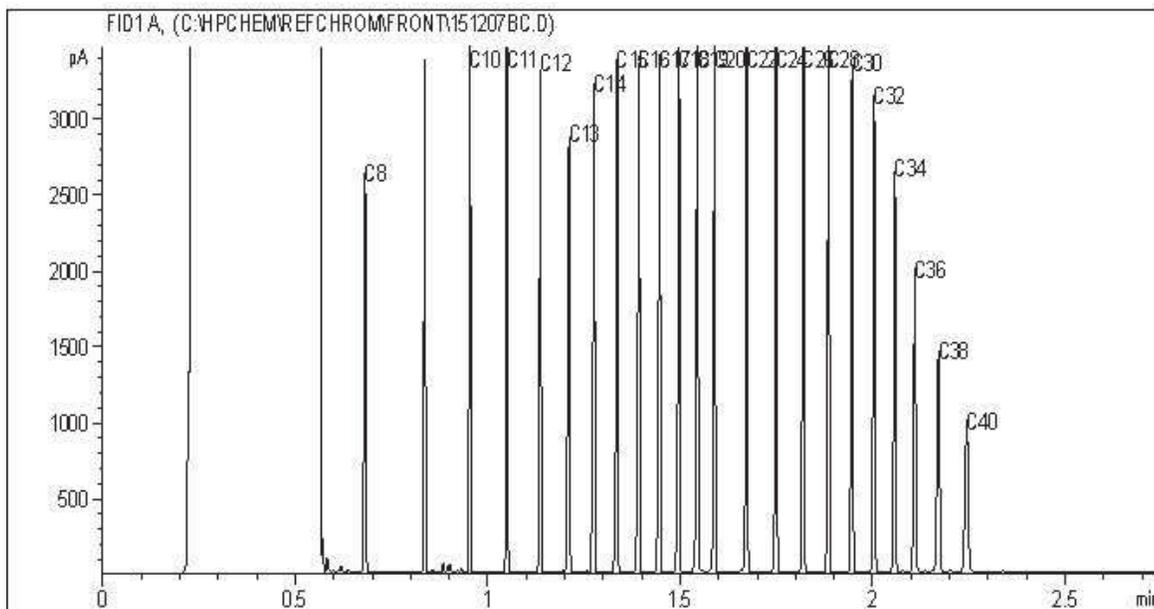
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

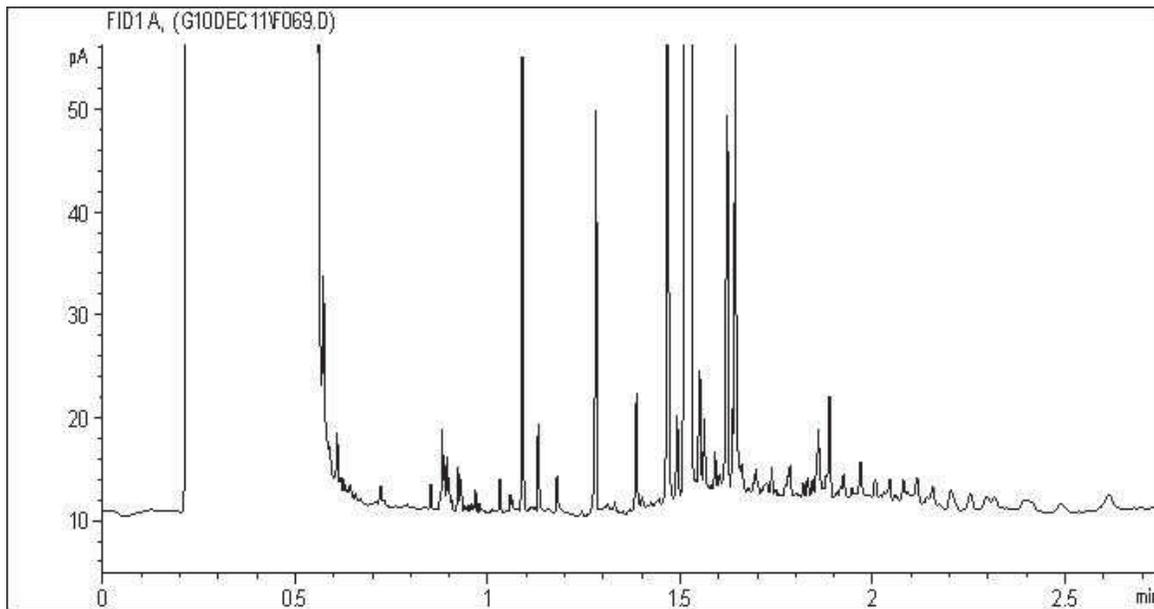


TYPICAL PRODUCT CARBON NUMBER RANGES

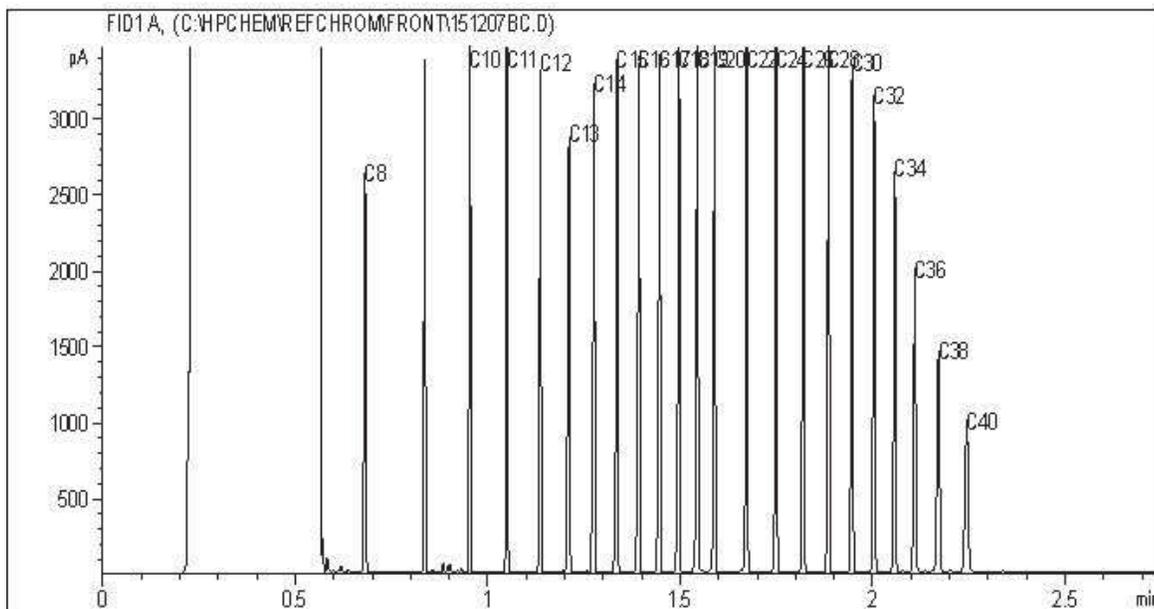
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

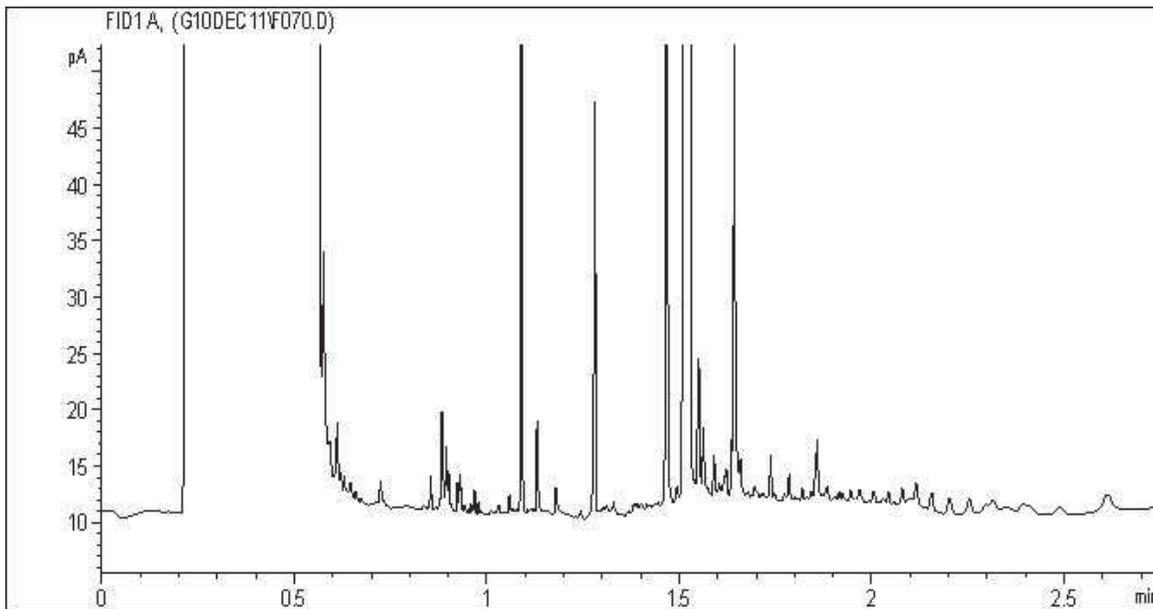


TYPICAL PRODUCT CARBON NUMBER RANGES

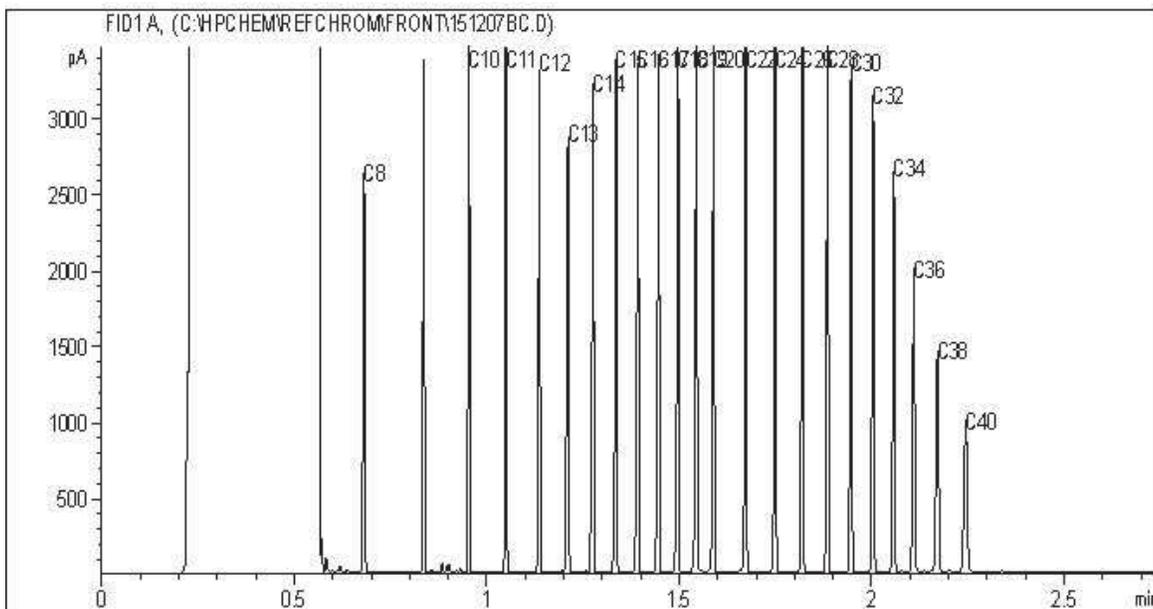
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

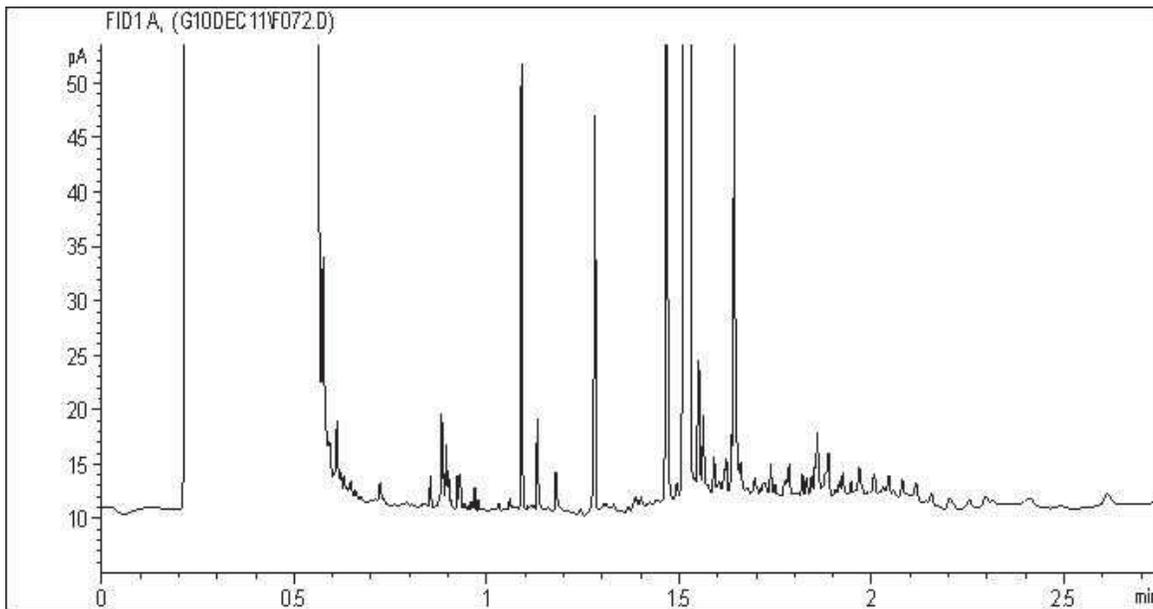


TYPICAL PRODUCT CARBON NUMBER RANGES

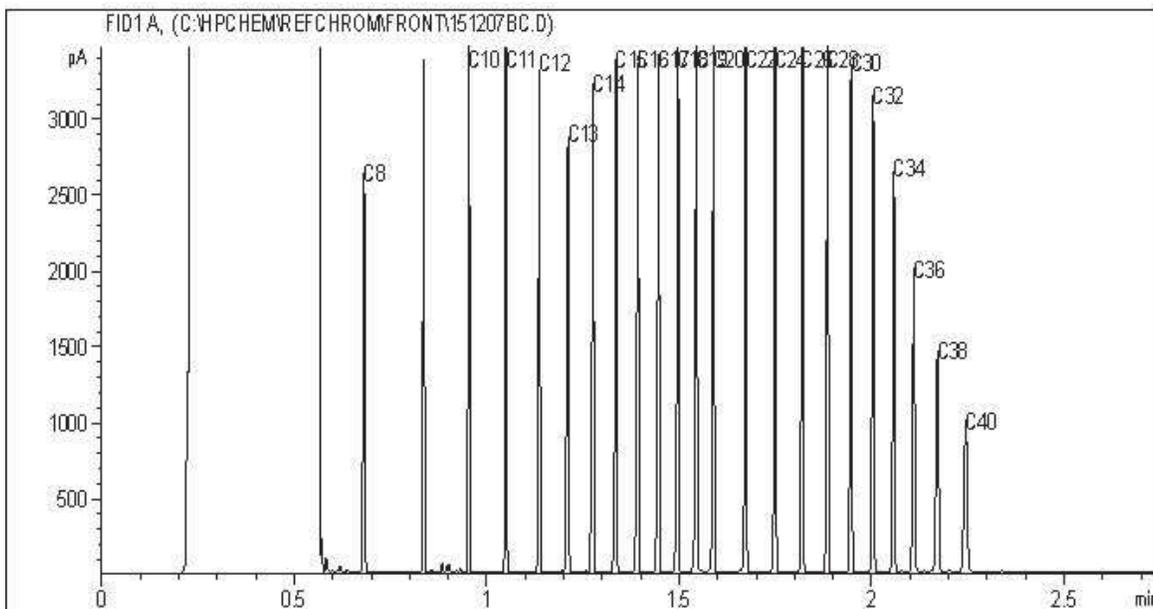
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

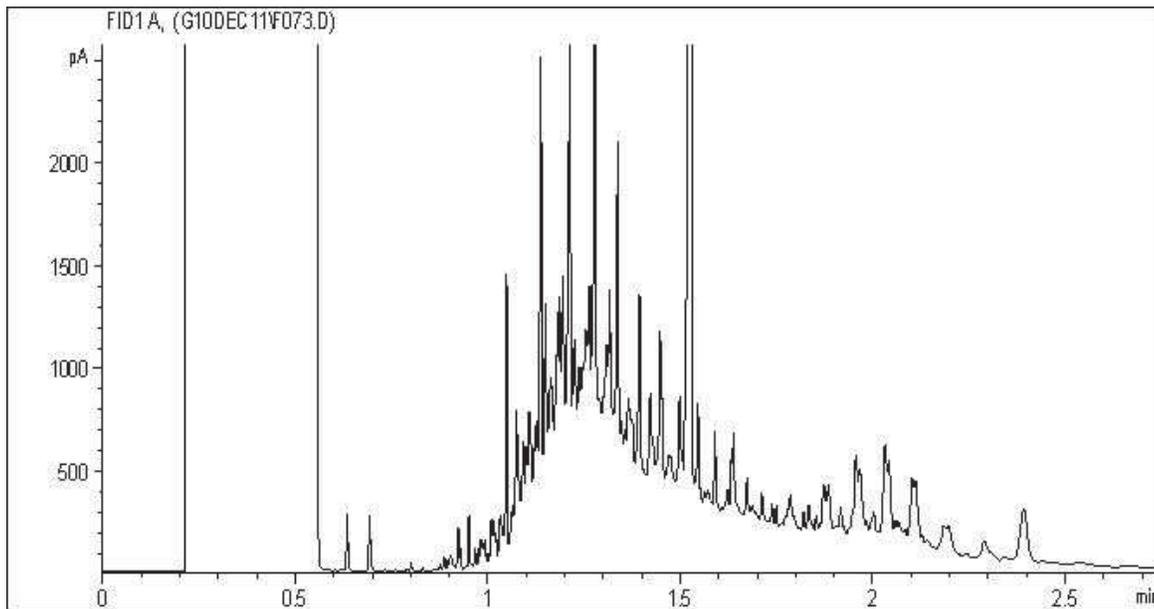


TYPICAL PRODUCT CARBON NUMBER RANGES

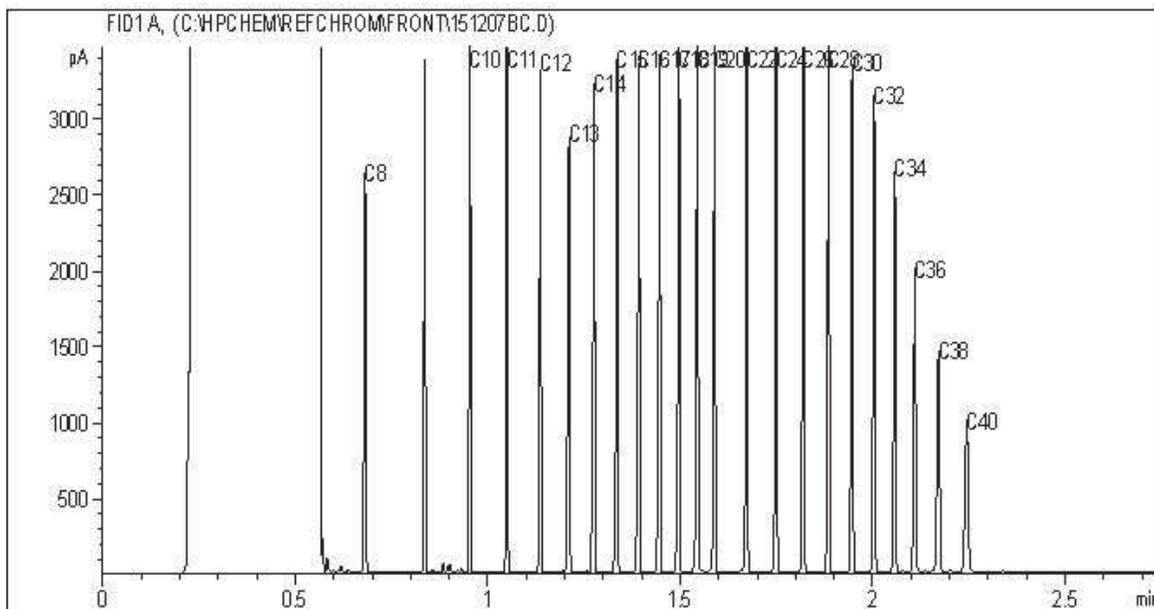
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

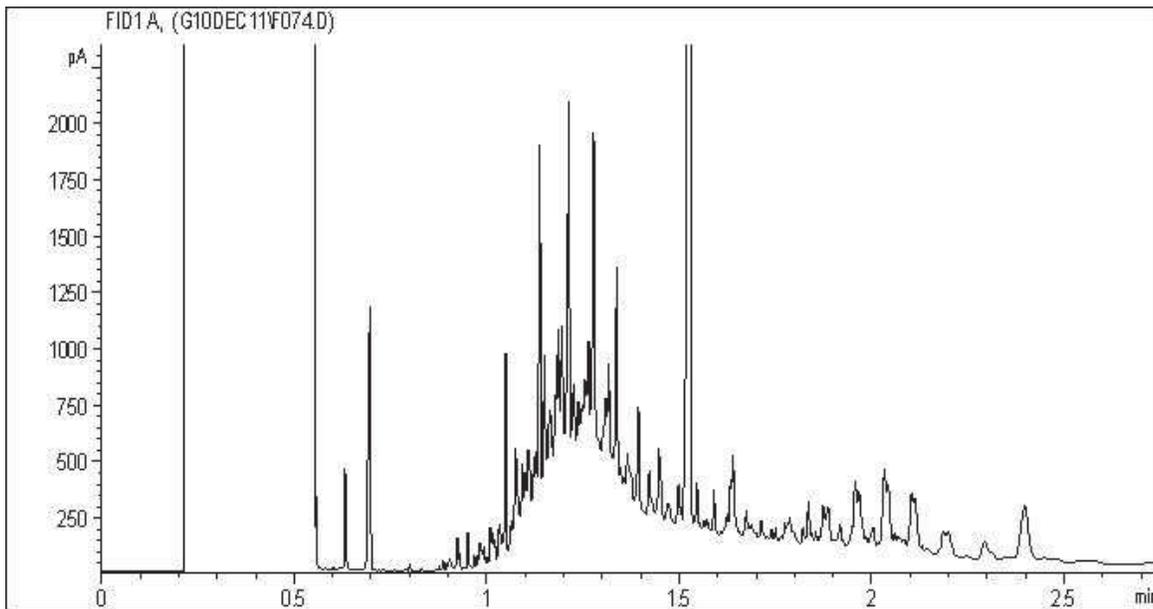


TYPICAL PRODUCT CARBON NUMBER RANGES

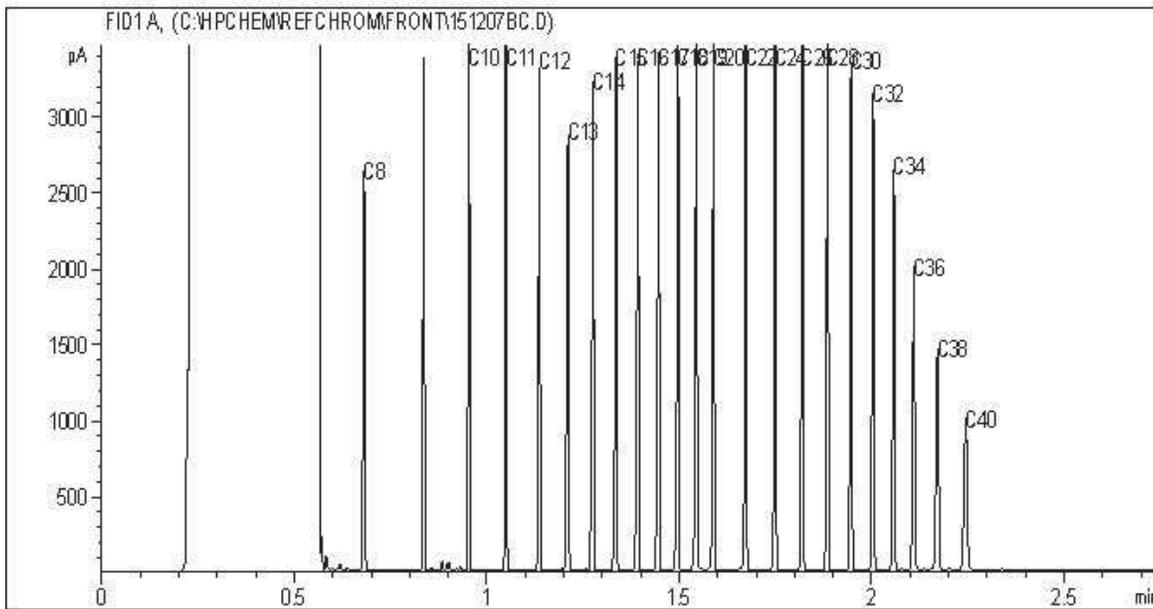
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

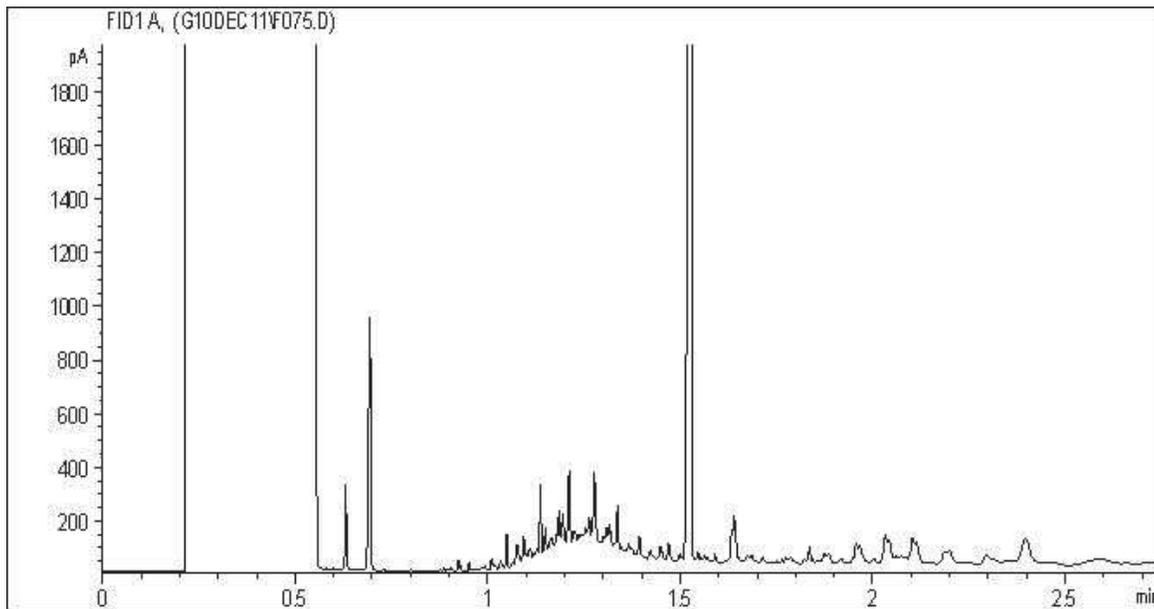


TYPICAL PRODUCT CARBON NUMBER RANGES

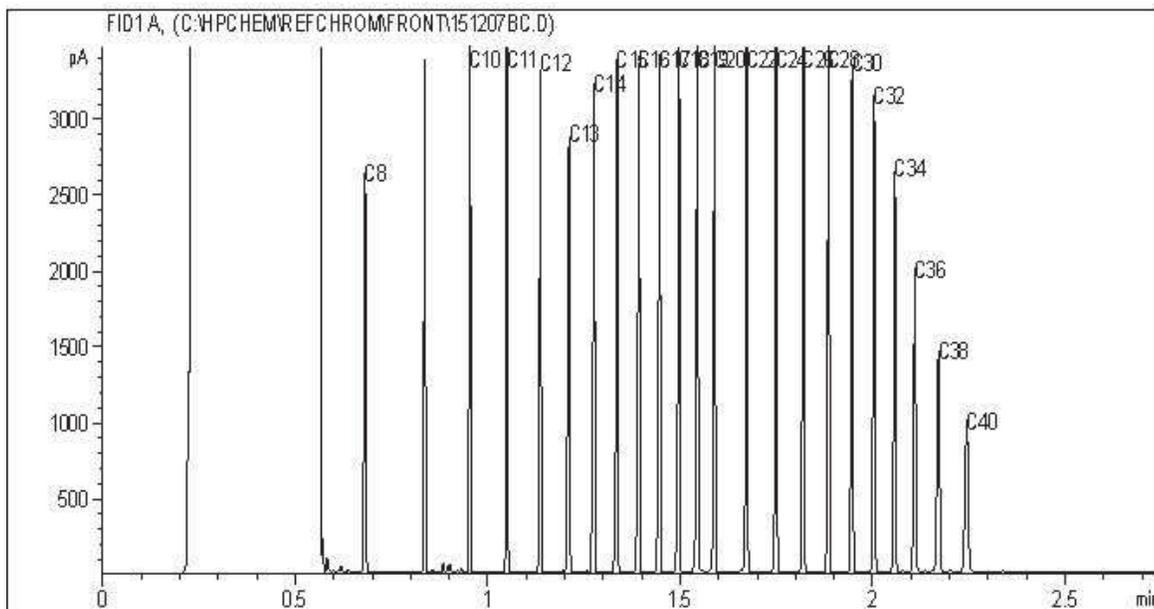
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

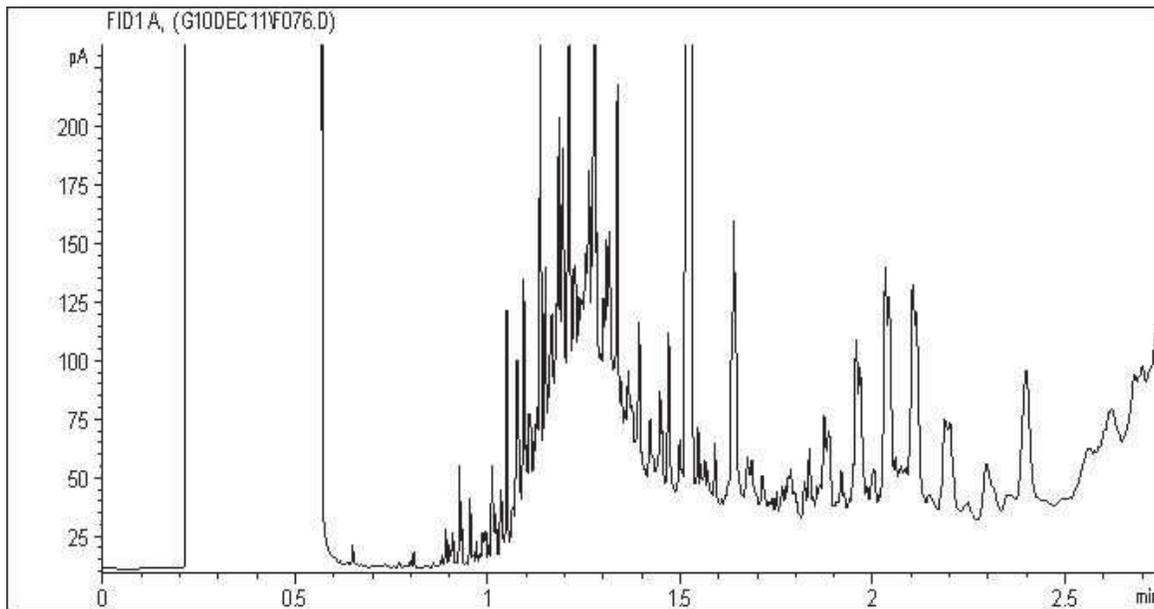


TYPICAL PRODUCT CARBON NUMBER RANGES

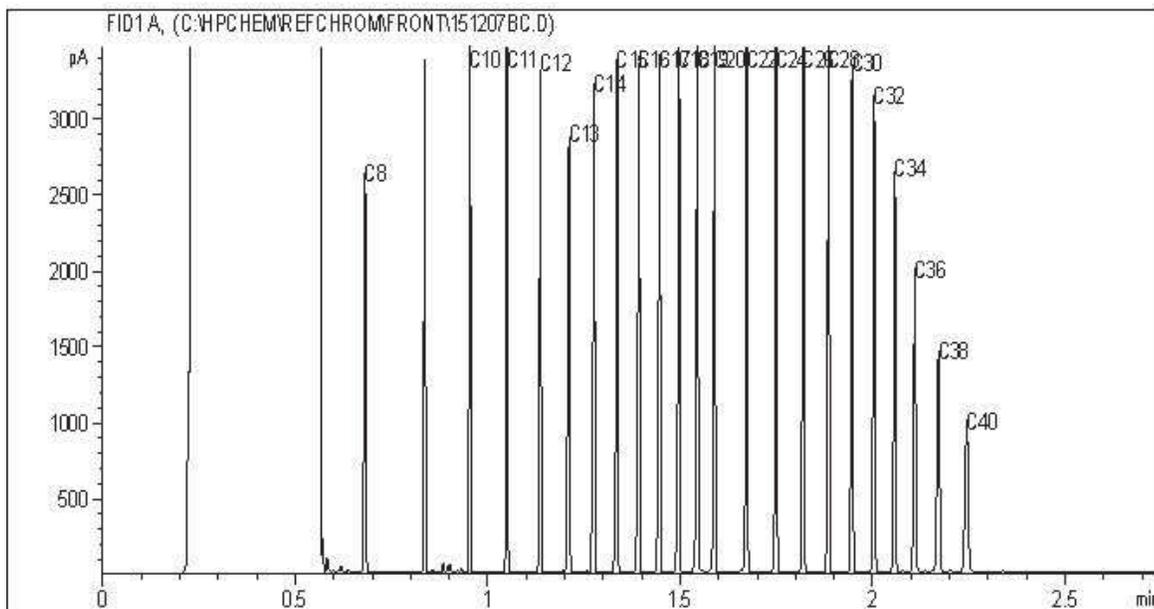
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

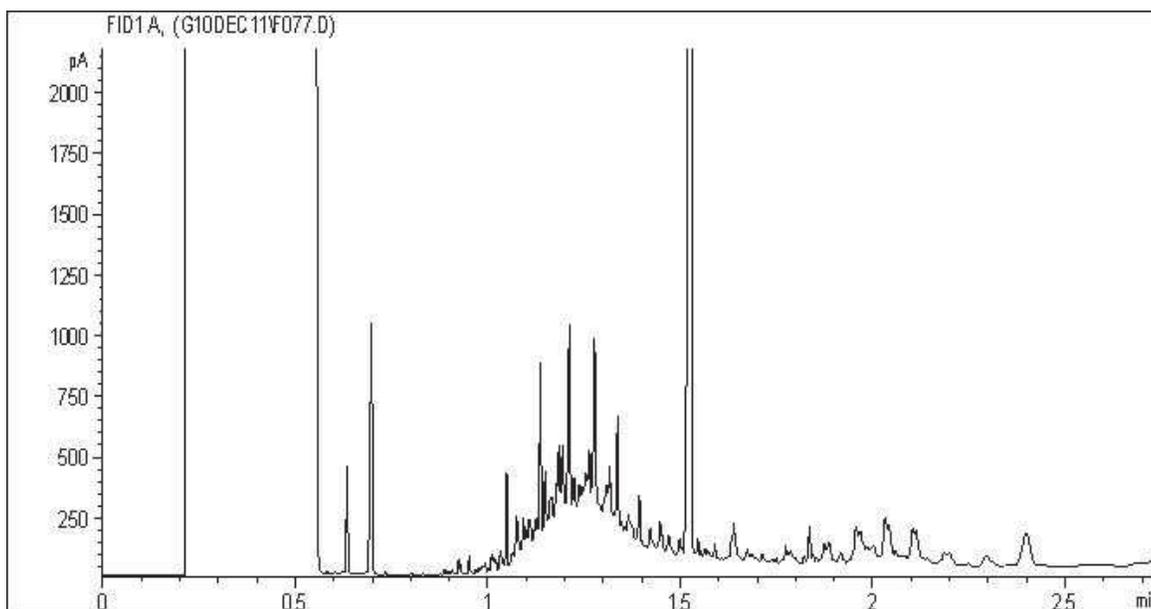


TYPICAL PRODUCT CARBON NUMBER RANGES

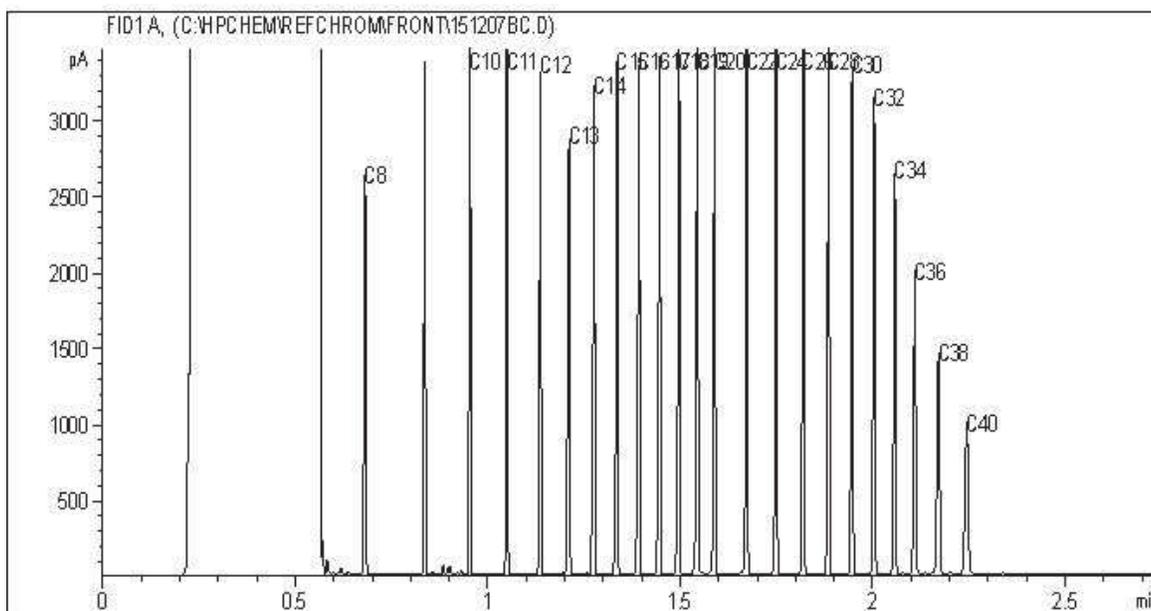
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

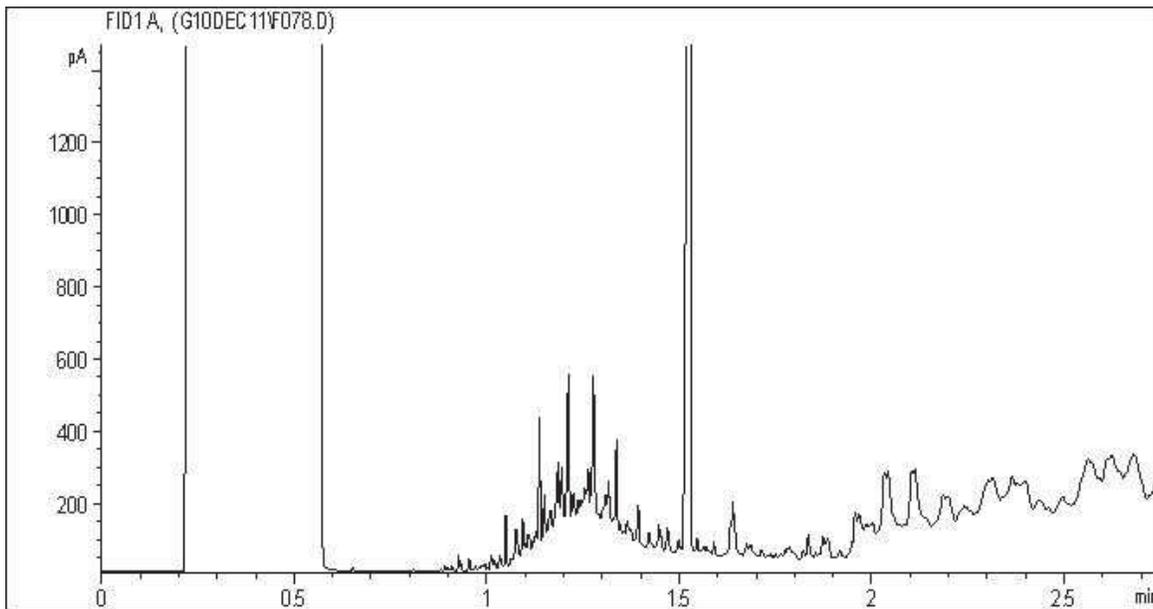


TYPICAL PRODUCT CARBON NUMBER RANGES

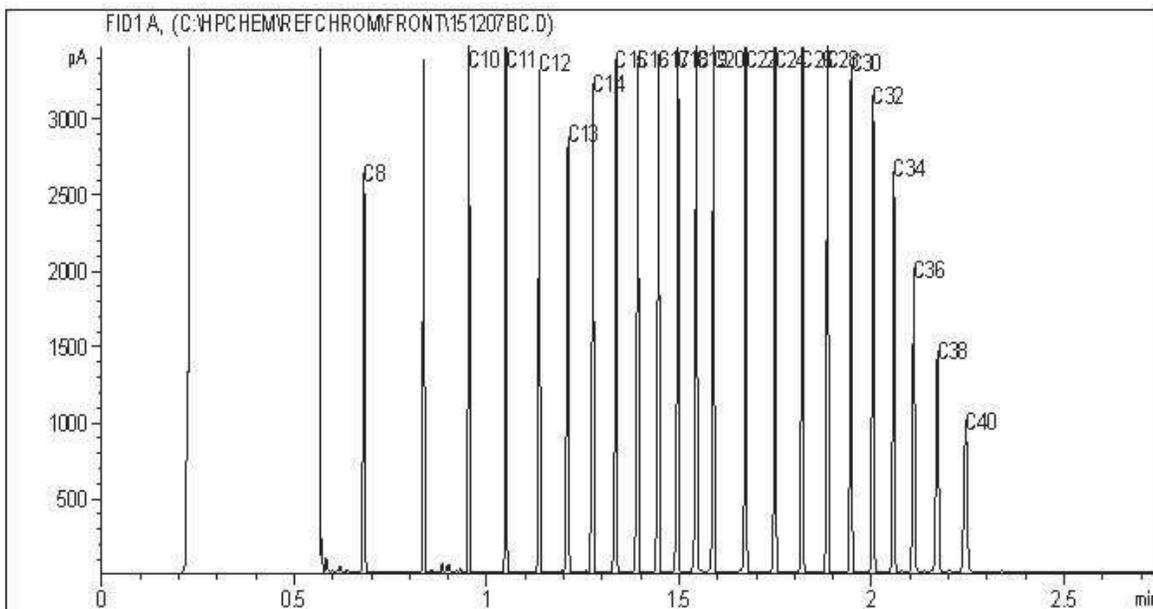
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Your Project #: 1541624 / 6075 / 2001  
Your C.O.C. #: 483351-01-01, 483351-02-01

**Attention: Katherine McCann**

Golder Associates  
Suite 200 - 2920 Virtual Way  
Vancouver, BC  
Canada V5M 0C4

**Report Date: 2015/12/12**  
Report #: R2095191  
Version: 2 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5B0422**

**Received: 2015/12/11, 16:00**

Sample Matrix: Water  
# Samples Received: 12

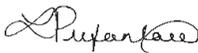
Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Total BTEX (calc'd)	12	2015/12/11	2015/12/12	BBY8SOP-00010	EPA 8260c R3 m
BTEX/MTBE LH, VH, F1 SIM/MS	2	2015/12/11	2015/12/11	BBY8SOP-00010/11	EPA 8260c R3 m
BTEX/MTBE LH, VH, F1 SIM/MS	10	2015/12/11	2015/12/12	BBY8SOP-00010/11	EPA 8260c R3 m
EPH in Water when PAH required	12	2015/12/11	2015/12/11	BBY8SOP-00029	BCMOE EPH w 12/00 m
Elements by CRC ICPMS (total)	12	2015/12/12	2015/12/12	BBY7SOP-00002	EPA 6020A R1 m
PAH in Water by GC/MS (SIM)	12	2015/12/11	2015/12/12	BBY8SOP-00021	EPA 8270d R4 m
Total LMW, HMW, Total PAH Calc	12	N/A	2015/12/12	BBY WI-00033	Auto Calc
pH Manual Electrode-Water (1)	12	N/A	2015/12/12	BBY6SOP-00045	SM 22 4500-H+ B m
Phenols (4-AAP)	12	N/A	2015/12/12	BBY6SOP-00008	SM 22 5530 D m
EPH less PAH in Water by GC/FID	12	N/A	2015/12/12	BBY WI-00033	Auto Calc
TPH (C6-C32) Water Calc	12	N/A	2015/12/12	BBY WI-00033	Auto Calc
Volatile HC-BTEX	12	N/A	2015/12/12	BBY WI-00033	Auto Calc

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Encryption Key



Letitia Prefontaine

12 Dec 2015 16:37:45 -08:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Letitia Prefontaine, B.Sc., Senior Project Manager

Email: LPrefontaine@maxxam.ca

Phone# (604)639-2616

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**RESULTS OF CHEMICAL ANALYSES OF WATER**

<b>Maxxam ID</b>		NV1692	NV1693	NV1694	NV1695	NV1696		
<b>Sampling Date</b>		2015/12/11 11:41	2015/12/11 11:42	2015/12/11 11:50	2015/12/11 11:51	2015/12/11 12:35		
<b>COC Number</b>		483351-01-01	483351-01-01	483351-01-01	483351-01-01	483351-01-01		
	<b>UNITS</b>	<b>BKG-NPS6-1/3-A</b>	<b>BKG-NPS6-1/3-B</b>	<b>BKG-NPS6-2/3-A</b>	<b>BKG-NPS6-2/3-B</b>	<b>FRS-NPS6-START-A</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Misc. Organics</b>								
Phenols	mg/L	<0.10 (1)	<0.10 (1)	<0.10 (1)	<0.10 (1)	0.33 (1)	0.10	8142296
<b>Physical Properties</b>								
pH	pH	6.89	6.92	6.88	6.89	7.21		8142332
RDL = Reportable Detection Limit (1) RDL raised due to sample dilution.								

<b>Maxxam ID</b>		NV1697	NV1698	NV1699	NV1700	NV1701		
<b>Sampling Date</b>		2015/12/11 12:36	2015/12/11 12:44	2015/12/11 12:45	2015/12/11 12:48	2015/12/11 12:49		
<b>COC Number</b>		483351-01-01	483351-01-01	483351-01-01	483351-01-01	483351-01-01		
	<b>UNITS</b>	<b>FRS-NPS6-START-B</b>	<b>FRS-NPS6-MID-A</b>	<b>FRS-NPS6-MID-B</b>	<b>FRS-NPS6-END-A</b>	<b>FRS-NPS6-END-B</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Misc. Organics</b>								
Phenols	mg/L	<0.10 (1)	0.15 (1)	0.15 (1)	0.12 (1)	0.12 (1)	0.10	8142296
<b>Physical Properties</b>								
pH	pH	7.18	7.51	7.56	7.50	7.40		8142332
RDL = Reportable Detection Limit (1) RDL raised due to sample dilution.								

<b>Maxxam ID</b>		NV1703	NV1704		
<b>Sampling Date</b>		2015/12/11 13:00	2015/12/11 13:10		
<b>COC Number</b>		483351-02-01	483351-02-01		
	<b>UNITS</b>	<b>FIELD-BLANK</b>	<b>TRIP-BLANK</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Misc. Organics</b>					
Phenols	mg/L	<0.0010	<0.0010	0.0010	8142296
<b>Physical Properties</b>					
pH	pH	5.56	5.38		8142332
RDL = Reportable Detection Limit					

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)**

<b>Maxxam ID</b>		NV1692	NV1693	NV1694	NV1695	NV1696		
<b>Sampling Date</b>		2015/12/11 11:41	2015/12/11 11:42	2015/12/11 11:50	2015/12/11 11:51	2015/12/11 12:35		
<b>COC Number</b>		483351-01-01	483351-01-01	483351-01-01	483351-01-01	483351-01-01		
	<b>UNITS</b>	<b>BKG-NPS6-1/3-A</b>	<b>BKG-NPS6-1/3-B</b>	<b>BKG-NPS6-2/3-A</b>	<b>BKG-NPS6-2/3-B</b>	<b>FRS-NPS6-START-A</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Total Metals by ICPMS</b>								
Total Lead (Pb)	ug/L	0.98	1.44	1.18	1.05	11.7	0.20	8142274
RDL = Reportable Detection Limit								

<b>Maxxam ID</b>		NV1697	NV1698	NV1699	NV1700	NV1701		
<b>Sampling Date</b>		2015/12/11 12:36	2015/12/11 12:44	2015/12/11 12:45	2015/12/11 12:48	2015/12/11 12:49		
<b>COC Number</b>		483351-01-01	483351-01-01	483351-01-01	483351-01-01	483351-01-01		
	<b>UNITS</b>	<b>FRS-NPS6-START-B</b>	<b>FRS-NPS6-MID-A</b>	<b>FRS-NPS6-MID-B</b>	<b>FRS-NPS6-END-A</b>	<b>FRS-NPS6-END-B</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Total Metals by ICPMS</b>								
Total Lead (Pb)	ug/L	12.1	33.7	12.3	12.9	18.2	0.20	8142274
RDL = Reportable Detection Limit								

<b>Maxxam ID</b>		NV1703	NV1704		
<b>Sampling Date</b>		2015/12/11 13:00	2015/12/11 13:10		
<b>COC Number</b>		483351-02-01	483351-02-01		
	<b>UNITS</b>	<b>FIELD-BLANK</b>	<b>TRIP-BLANK</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Total Metals by ICPMS</b>					
Total Lead (Pb)	ug/L	<0.20	<0.20	0.20	8142267
RDL = Reportable Detection Limit					

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**TOTAL PETROLEUM HYDROCARBONS (WATER)**

<b>Maxxam ID</b>		NV1692	NV1693	NV1694	NV1695		
<b>Sampling Date</b>		2015/12/11 11:41	2015/12/11 11:42	2015/12/11 11:50	2015/12/11 11:51		
<b>COC Number</b>		483351-01-01	483351-01-01	483351-01-01	483351-01-01		
	<b>UNITS</b>	<b>BKG-NPS6-1/3-A</b>	<b>BKG-NPS6-1/3-B</b>	<b>BKG-NPS6-2/3-A</b>	<b>BKG-NPS6-2/3-B</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Hydrocarbons</b>							
Calculated Total Hydrocarbons C6-C32	mg/L	<0.30	<0.30	<0.30	<0.30	0.30	8142512
RDL = Reportable Detection Limit							

<b>Maxxam ID</b>		NV1696	NV1697	NV1698	NV1699		
<b>Sampling Date</b>		2015/12/11 12:35	2015/12/11 12:36	2015/12/11 12:44	2015/12/11 12:45		
<b>COC Number</b>		483351-01-01	483351-01-01	483351-01-01	483351-01-01		
	<b>UNITS</b>	<b>FRS-NPS6-START-A</b>	<b>FRS-NPS6-START-B</b>	<b>FRS-NPS6-MID-A</b>	<b>FRS-NPS6-MID-B</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Hydrocarbons</b>							
Calculated Total Hydrocarbons C6-C32	mg/L	10	4.2	4.0	3.2	0.30	8142512
RDL = Reportable Detection Limit							

<b>Maxxam ID</b>		NV1700	NV1701	NV1703	NV1704		
<b>Sampling Date</b>		2015/12/11 12:48	2015/12/11 12:49	2015/12/11 13:00	2015/12/11 13:10		
<b>COC Number</b>		483351-01-01	483351-01-01	483351-02-01	483351-02-01		
	<b>UNITS</b>	<b>FRS-NPS6-END-A</b>	<b>FRS-NPS6-END-B</b>	<b>FIELD-BLANK</b>	<b>TRIP-BLANK</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Hydrocarbons</b>							
Calculated Total Hydrocarbons C6-C32	mg/L	10	4.6	<0.30	<0.30	0.30	8142512
RDL = Reportable Detection Limit							

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**VOLATILE ORGANICS BY GC-MS (WATER)**

Maxxam ID		NV1692	NV1693	NV1694	NV1695	NV1696		
Sampling Date		2015/12/11 11:41	2015/12/11 11:42	2015/12/11 11:50	2015/12/11 11:51	2015/12/11 12:35		
COC Number		483351-01-01	483351-01-01	483351-01-01	483351-01-01	483351-01-01		
	UNITS	BKG-NPS6-1/3-A	BKG-NPS6-1/3-B	BKG-NPS6-2/3-A	BKG-NPS6-2/3-B	FRS-NPS6-START-A	RDL	QC Batch

Industrial								
BTEX Total	ug/L	<0.40	<0.40	<0.40	<0.40	1.70	0.40	8142158
RDL = Reportable Detection Limit								

Maxxam ID		NV1697	NV1698	NV1699	NV1700	NV1701		
Sampling Date		2015/12/11 12:36	2015/12/11 12:44	2015/12/11 12:45	2015/12/11 12:48	2015/12/11 12:49		
COC Number		483351-01-01	483351-01-01	483351-01-01	483351-01-01	483351-01-01		
	UNITS	FRS-NPS6-START-B	FRS-NPS6-MID-A	FRS-NPS6-MID-B	FRS-NPS6-END-A	FRS-NPS6-END-B	RDL	QC Batch

Industrial								
BTEX Total	ug/L	1.30	1.20	1.00	1.70	2.40	0.40	8142158
RDL = Reportable Detection Limit								

Maxxam ID		NV1703	NV1704		
Sampling Date		2015/12/11 13:00	2015/12/11 13:10		
COC Number		483351-02-01	483351-02-01		
	UNITS	FIELD-BLANK	TRIP-BLANK	RDL	QC Batch

Industrial					
BTEX Total	ug/L	<0.40	<0.40	0.40	8142158
RDL = Reportable Detection Limit					

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**CSR BTEX/VPH IN WATER (WATER)**

Maxxam ID		NV1692	NV1693	NV1694	NV1695	NV1696		
Sampling Date		2015/12/11 11:41	2015/12/11 11:42	2015/12/11 11:50	2015/12/11 11:51	2015/12/11 12:35		
COC Number		483351-01-01	483351-01-01	483351-01-01	483351-01-01	483351-01-01		
	UNITS	BKG-NPS6-1/3-A	BKG-NPS6-1/3-B	BKG-NPS6-2/3-A	BKG-NPS6-2/3-B	FRS-NPS6-START-A	RDL	QC Batch
<b>Volatiles</b>								
VPH (VH6 to 10 - BTEX)	ug/L	<300	<300	<300	<300	<300	300	8141077
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	8142146
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	8142146
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	8142146
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	8142146
m & p-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.82	0.40	8142146
o-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.86	0.40	8142146
Styrene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	8142146
Xylenes (Total)	ug/L	<0.40	<0.40	<0.40	<0.40	1.7	0.40	8142146
VH C6-C10	ug/L	<300	<300	<300	<300	<300	300	8142146
<b>Surrogate Recovery (%)</b>								
1,4-Difluorobenzene (sur.)	%	96	96	96	97	96		8142146
4-Bromofluorobenzene (sur.)	%	108	106	106	106	107		8142146
D4-1,2-Dichloroethane (sur.)	%	109	106	108	106	106		8142146
RDL = Reportable Detection Limit								

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**CSR BTEX/VPH IN WATER (WATER)**

Maxxam ID		NV1697	NV1698	NV1699	NV1700	NV1701		
Sampling Date		2015/12/11 12:36	2015/12/11 12:44	2015/12/11 12:45	2015/12/11 12:48	2015/12/11 12:49		
COC Number		483351-01-01	483351-01-01	483351-01-01	483351-01-01	483351-01-01		
	UNITS	FRS-NPS6-START-B	FRS-NPS6-MID-A	FRS-NPS6-MID-B	FRS-NPS6-END-A	FRS-NPS6-END-B	RDL	QC Batch
<b>Volatiles</b>								
VPH (VH6 to 10 - BTEX)	ug/L	<300	<300	<300	<300	<300	300	8141077
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	8142146
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	8142146
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	0.41	0.40	8142146
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	8142146
m & p-Xylene	ug/L	0.67	0.56	0.53	0.84	1.0	0.40	8142146
o-Xylene	ug/L	0.65	0.67	0.49	0.83	1.0	0.40	8142146
Styrene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	8142146
Xylenes (Total)	ug/L	1.3	1.2	1.0	1.7	2.0	0.40	8142146
VH C6-C10	ug/L	<300	<300	<300	<300	<300	300	8142146
<b>Surrogate Recovery (%)</b>								
1,4-Difluorobenzene (sur.)	%	97	96	96	96	96		8142146
4-Bromofluorobenzene (sur.)	%	107	106	106	107	107		8142146
D4-1,2-Dichloroethane (sur.)	%	106	106	107	107	107		8142146
RDL = Reportable Detection Limit								

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**CSR BTEX/VPH IN WATER (WATER)**

Maxxam ID		NV1703	NV1704		
Sampling Date		2015/12/11 13:00	2015/12/11 13:10		
COC Number		483351-02-01	483351-02-01		
	UNITS	FIELD-BLANK	TRIP-BLANK	RDL	QC Batch
<b>Volatiles</b>					
VPH (VH6 to 10 - BTEX)	ug/L	<300	<300	300	8141077
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	4.0	8142146
Benzene	ug/L	<0.40	<0.40	0.40	8142146
Toluene	ug/L	<0.40	<0.40	0.40	8142146
Ethylbenzene	ug/L	<0.40	<0.40	0.40	8142146
m & p-Xylene	ug/L	<0.40	<0.40	0.40	8142146
o-Xylene	ug/L	<0.40	<0.40	0.40	8142146
Styrene	ug/L	<0.40	<0.40	0.40	8142146
Xylenes (Total)	ug/L	<0.40	<0.40	0.40	8142146
VH C6-C10	ug/L	<300	<300	300	8142146
<b>Surrogate Recovery (%)</b>					
1,4-Difluorobenzene (sur.)	%	98	96		8142146
4-Bromofluorobenzene (sur.)	%	106	106		8142146
D4-1,2-Dichloroethane (sur.)	%	106	108		8142146
RDL = Reportable Detection Limit					

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Maxxam ID		NV1692	NV1693	NV1694	NV1695		
Sampling Date		2015/12/11 11:41	2015/12/11 11:42	2015/12/11 11:50	2015/12/11 11:51		
COC Number		483351-01-01	483351-01-01	483351-01-01	483351-01-01		
	UNITS	BKG-NPS6-1/3-A	BKG-NPS6-1/3-B	BKG-NPS6-2/3-A	BKG-NPS6-2/3-B	RDL	QC Batch
<b>Polycyclic Aromatics</b>							
Low Molecular Weight PAH's	ug/L	<0.24	<0.24	<0.24	<0.24	0.24	8141075
High Molecular Weight PAH's	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8141075
Total PAH	ug/L	<0.24	<0.24	<0.24	<0.24	0.24	8141075
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8142147
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8142147
Quinoline	ug/L	<0.24	<0.24	<0.24	<0.24	0.24	8142147
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142147
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142147
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142147
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142147
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	8142147
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142147
Fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	8142147
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	8142147
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	8142147
Chrysene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142147
Benzo(b&j)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142147
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142147
Benzo(a)pyrene	ug/L	<0.0090	<0.0090	<0.0090	<0.0090	0.0090	8142147
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142147
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142147
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8142147
<b>Calculated Parameters</b>							
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	8141076
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	8141076
<b>Ext. Pet. Hydrocarbon</b>							
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	8142151
EPH (C19-C32)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	8142151
<b>Surrogate Recovery (%)</b>							
O-TERPHENYL (sur.)	%	96	94	95	94		8142151
D10-ANTHRACENE (sur.)	%	101	99	102	99		8142147
D8-ACENAPHTHYLENE (sur.)	%	101	103	104	102		8142147
D8-NAPHTHALENE (sur.)	%	88	92	92	92		8142147
D9-Acridine	%	99	101	101	100		8142147
TERPHENYL-D14 (sur.)	%	97	97	100	98		8142147
RDL = Reportable Detection Limit							

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Maxxam ID		NV1696		NV1697		NV1698		
Sampling Date		2015/12/11 12:35		2015/12/11 12:36		2015/12/11 12:44		
COC Number		483351-01-01		483351-01-01		483351-01-01		
	UNITS	FRS-NPS6-START-A	RDL	FRS-NPS6-START-B	RDL	FRS-NPS6-MID-A	RDL	QC Batch
<b>Polycyclic Aromatics</b>								
Low Molecular Weight PAH's	ug/L	30	0.50	20	0.50	19	0.50	8141075
High Molecular Weight PAH's	ug/L	2.5	0.050	0.75	0.050	0.71	0.050	8141075
Total PAH	ug/L	32	0.50	20	0.50	19	0.50	8141075
Naphthalene	ug/L	14 (1)	0.50	11 (1)	0.50	9.8 (1)	0.50	8142147
2-Methylnaphthalene	ug/L	13 (1)	0.50	7.7	0.10	7.7	0.10	8142147
Quinoline	ug/L	<0.46 (2)	0.46	<0.24	0.24	<0.24	0.24	8142147
Acenaphthylene	ug/L	<0.084 (2)	0.084	<0.050	0.050	<0.050	0.050	8142147
Acenaphthene	ug/L	<0.097 (2)	0.097	<0.050	0.050	<0.050	0.050	8142147
Fluorene	ug/L	1.1	0.050	0.49	0.050	0.43	0.050	8142147
Phenanthrene	ug/L	2.2	0.050	0.66	0.050	0.72	0.050	8142147
Anthracene	ug/L	<0.12 (2)	0.12	<0.038 (2)	0.038	<0.028 (2)	0.028	8142147
Acridine	ug/L	<0.37 (2)	0.37	<0.29 (2)	0.29	<0.32 (2)	0.32	8142147
Fluoranthene	ug/L	0.57	0.020	0.20	0.020	0.18	0.020	8142147
Pyrene	ug/L	1.9	0.020	0.56	0.020	0.53	0.020	8142147
Benzo(a)anthracene	ug/L	<0.010	0.010	<0.010	0.010	<0.010	0.010	8142147
Chrysene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142147
Benzo(b&j)fluoranthene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142147
Benzo(k)fluoranthene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142147
Benzo(a)pyrene	ug/L	<0.0090	0.0090	<0.0090	0.0090	<0.0090	0.0090	8142147
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142147
Dibenz(a,h)anthracene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142147
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142147
<b>Calculated Parameters</b>								
LEPH (C10-C19 less PAH)	mg/L	5.9	0.20	2.6	0.20	2.4	0.20	8141076
HEPH (C19-C32 less PAH)	mg/L	4.4	0.20	1.6	0.20	1.6	0.20	8141076
<b>Ext. Pet. Hydrocarbon</b>								
EPH (C10-C19)	mg/L	5.9	0.20	2.6	0.20	2.4	0.20	8142151
EPH (C19-C32)	mg/L	4.4	0.20	1.6	0.20	1.6	0.20	8142151
<b>Surrogate Recovery (%)</b>								
O-TERPHENYL (sur.)	%	99		95		98		8142151
D10-ANTHRACENE (sur.)	%	94		100		100		8142147
D8-ACENAPHTHYLENE (sur.)	%	123		124		118		8142147
D8-NAPHTHALENE (sur.)	%	100		95		97		8142147
D9-Acridine	%	117		109		112		8142147
RDL = Reportable Detection Limit								
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.								
(2) Detection limits raised due to matrix interference.								

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Maxxam ID		NV1696		NV1697		NV1698		
Sampling Date		2015/12/11 12:35		2015/12/11 12:36		2015/12/11 12:44		
COC Number		483351-01-01		483351-01-01		483351-01-01		
	UNITS	FRS-NPS6-START-A	RDL	FRS-NPS6-START-B	RDL	FRS-NPS6-MID-A	RDL	QC Batch
TERPHENYL-D14 (sur.)	%	106		104		106		8142147
RDL = Reportable Detection Limit								

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Maxxam ID		NV1699		NV1700		NV1701		NV1703		
Sampling Date		2015/12/11 12:45		2015/12/11 12:48		2015/12/11 12:49		2015/12/11 13:00		
COC Number		483351-01-01		483351-01-01		483351-01-01		483351-02-01		
	UNITS	FRS-NPS6-MID-B	RDL	FRS-NPS6-END-A	RDL	FRS-NPS6-END-B	RDL	FIELD-BLANK	RDL	QC Batch

Polycyclic Aromatics										
Low Molecular Weight PAH's	ug/L	17	0.50	27	0.53	18	0.30	<0.24	0.24	8141075
High Molecular Weight PAH's	ug/L	0.43	0.050	2.2	0.050	0.77	0.050	<0.050	0.050	8141075
Total PAH	ug/L	17	0.50	29	0.53	19	0.30	<0.24	0.24	8141075
Naphthalene	ug/L	9.3 (1)	0.50	12 (1)	0.50	8.8	0.10	<0.10	0.10	8142147
2-Methylnaphthalene	ug/L	6.7	0.10	12 (1)	0.50	7.8	0.10	<0.10	0.10	8142147
Quinoline	ug/L	<0.24	0.24	<0.24	0.24	<0.24	0.24	<0.24	0.24	8142147
Acenaphthylene	ug/L	<0.050	0.050	<0.093 (2)	0.093	<0.050	0.050	<0.050	0.050	8142147
Acenaphthene	ug/L	<0.050	0.050	<0.072 (2)	0.072	<0.050	0.050	<0.050	0.050	8142147
Fluorene	ug/L	0.33	0.050	1.1	0.050	0.46	0.050	<0.050	0.050	8142147
Phenanthrene	ug/L	0.48	0.050	2.4	0.050	0.84	0.050	<0.050	0.050	8142147
Anthracene	ug/L	<0.026 (2)	0.026	<0.10 (2)	0.10	<0.049 (2)	0.049	<0.010	0.010	8142147
Acridine	ug/L	<0.21 (2)	0.21	<0.53 (2)	0.53	<0.30 (2)	0.30	<0.050	0.050	8142147
Fluoranthene	ug/L	0.11	0.020	0.49	0.020	0.18	0.020	<0.020	0.020	8142147
Pyrene	ug/L	0.32	0.020	1.7	0.020	0.59	0.020	<0.020	0.020	8142147
Benzo(a)anthracene	ug/L	<0.010	0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	8142147
Chrysene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142147
Benzo(b&j)fluoranthene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142147
Benzo(k)fluoranthene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142147
Benzo(a)pyrene	ug/L	<0.0090	0.0090	<0.0090	0.0090	<0.0090	0.0090	<0.0090	0.0090	8142147
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142147
Dibenz(a,h)anthracene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142147
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	8142147

Calculated Parameters										
LEPH (C10-C19 less PAH)	mg/L	2.0	0.20	6.1	0.20	2.8	0.20	<0.20	0.20	8141076
HEPH (C19-C32 less PAH)	mg/L	1.2	0.20	3.9	0.20	1.8	0.20	<0.20	0.20	8141076

Ext. Pet. Hydrocarbon										
EPH (C10-C19)	mg/L	2.0	0.20	6.1	0.20	2.9	0.20	<0.20	0.20	8142151
EPH (C19-C32)	mg/L	1.2	0.20	3.9	0.20	1.8	0.20	<0.20	0.20	8142151

Surrogate Recovery (%)										
O-TERPHENYL (sur.)	%	97		103		99		95		8142151
D10-ANTHRACENE (sur.)	%	102		98		103		102		8142147
D8-ACENAPHTHYLENE (sur.)	%	113		119		117		105		8142147
D8-NAPHTHALENE (sur.)	%	90		99		92		92		8142147
D9-Acridine	%	108		120		113		102		8142147

RDL = Reportable Detection Limit  
 (1) Detection limits raised due to dilution to bring analyte within the calibrated range.  
 (2) Detection limits raised due to matrix interference.

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Maxxam ID		NV1699		NV1700		NV1701		NV1703		
Sampling Date		2015/12/11 12:45		2015/12/11 12:48		2015/12/11 12:49		2015/12/11 13:00		
COC Number		483351-01-01		483351-01-01		483351-01-01		483351-02-01		
	UNITS	FRS-NPS6-MID-B	RDL	FRS-NPS6-END-A	RDL	FRS-NPS6-END-B	RDL	FIELD-BLANK	RDL	QC Batch
TERPHENYL-D14 (sur.)	%	103		109		107		100		8142147
RDL = Reportable Detection Limit										

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)**

Maxxam ID		NV1704		
Sampling Date		2015/12/11 13:10		
COC Number		483351-02-01		
	UNITS	TRIP-BLANK	RDL	QC Batch
<b>Polycyclic Aromatics</b>				
Low Molecular Weight PAH's	ug/L	<0.24	0.24	8141075
High Molecular Weight PAH's	ug/L	<0.050	0.050	8141075
Total PAH	ug/L	<0.24	0.24	8141075
Naphthalene	ug/L	<0.10	0.10	8142147
2-Methylnaphthalene	ug/L	<0.10	0.10	8142147
Quinoline	ug/L	<0.24	0.24	8142147
Acenaphthylene	ug/L	<0.050	0.050	8142147
Acenaphthene	ug/L	<0.050	0.050	8142147
Fluorene	ug/L	<0.050	0.050	8142147
Phenanthrene	ug/L	<0.050	0.050	8142147
Anthracene	ug/L	<0.010	0.010	8142147
Acridine	ug/L	<0.050	0.050	8142147
Fluoranthene	ug/L	<0.020	0.020	8142147
Pyrene	ug/L	<0.020	0.020	8142147
Benzo(a)anthracene	ug/L	<0.010	0.010	8142147
Chrysene	ug/L	<0.050	0.050	8142147
Benzo(b&j)fluoranthene	ug/L	<0.050	0.050	8142147
Benzo(k)fluoranthene	ug/L	<0.050	0.050	8142147
Benzo(a)pyrene	ug/L	<0.0090	0.0090	8142147
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	8142147
Dibenz(a,h)anthracene	ug/L	<0.050	0.050	8142147
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	8142147
<b>Calculated Parameters</b>				
LEPH (C10-C19 less PAH)	mg/L	<0.20	0.20	8141076
HEPH (C19-C32 less PAH)	mg/L	<0.20	0.20	8141076
<b>Ext. Pet. Hydrocarbon</b>				
EPH (C10-C19)	mg/L	<0.20	0.20	8142151
EPH (C19-C32)	mg/L	<0.20	0.20	8142151
<b>Surrogate Recovery (%)</b>				
O-TERPHENYL (sur.)	%	94		8142151
D10-ANTHRACENE (sur.)	%	111		8142147
D8-ACENAPHTHYLENE (sur.)	%	109		8142147
D8-NAPHTHALENE (sur.)	%	100		8142147
D9-Acridine	%	109		8142147
TERPHENYL-D14 (sur.)	%	107		8142147
RDL = Reportable Detection Limit				

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.7°C
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**Results relate only to the items tested.**

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**QUALITY ASSURANCE REPORT**

QA/QC				Date				
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
8142146	MM5	Matrix Spike [NV1693-05]	1,4-Difluorobenzene (sur.)	2015/12/12		95	%	70 - 130
			4-Bromofluorobenzene (sur.)	2015/12/12		106	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2015/12/12		106	%	70 - 130
			Methyl-tert-butylether (MTBE)	2015/12/12		104	%	70 - 130
			Benzene	2015/12/12		116	%	70 - 130
			Toluene	2015/12/12		109	%	70 - 130
			Ethylbenzene	2015/12/12		115	%	70 - 130
			m & p-Xylene	2015/12/12		111	%	70 - 130
			o-Xylene	2015/12/12		111	%	70 - 130
			Styrene	2015/12/12		114	%	70 - 130
			8142146	MM5	Spiked Blank	1,4-Difluorobenzene (sur.)	2015/12/11	
4-Bromofluorobenzene (sur.)	2015/12/11					106	%	70 - 130
D4-1,2-Dichloroethane (sur.)	2015/12/11					104	%	70 - 130
Methyl-tert-butylether (MTBE)	2015/12/11					101	%	70 - 130
Benzene	2015/12/11					113	%	70 - 130
Toluene	2015/12/11					106	%	70 - 130
Ethylbenzene	2015/12/11					112	%	70 - 130
m & p-Xylene	2015/12/11					108	%	70 - 130
o-Xylene	2015/12/11					109	%	70 - 130
Styrene	2015/12/11					111	%	70 - 130
8142146	MM5	Method Blank				VH C6-C10	2015/12/11	
			1,4-Difluorobenzene (sur.)	2015/12/11		97	%	70 - 130
			4-Bromofluorobenzene (sur.)	2015/12/11		107	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2015/12/11		107	%	70 - 130
			Methyl-tert-butylether (MTBE)	2015/12/11	<4.0		ug/L	
			Benzene	2015/12/11	<0.40		ug/L	
			Toluene	2015/12/11	<0.40		ug/L	
			Ethylbenzene	2015/12/11	<0.40		ug/L	
			m & p-Xylene	2015/12/11	<0.40		ug/L	
			o-Xylene	2015/12/11	<0.40		ug/L	
			Styrene	2015/12/11	<0.40		ug/L	
8142146	MM5	RPD [NV1692-05]	Xylenes (Total)	2015/12/11	<0.40		ug/L	
			VH C6-C10	2015/12/11	<300		ug/L	
			Methyl-tert-butylether (MTBE)	2015/12/11	NC		%	30
			Benzene	2015/12/11	NC		%	30
			Toluene	2015/12/11	NC		%	30
			Ethylbenzene	2015/12/11	NC		%	30
			m & p-Xylene	2015/12/11	NC		%	30
			o-Xylene	2015/12/11	NC		%	30
			Styrene	2015/12/11	NC		%	30
			Xylenes (Total)	2015/12/11	NC		%	30
			VH C6-C10	2015/12/11	NC		%	30
8142147	JP1	Matrix Spike [NV1693-01]	D10-ANTHRACENE (sur.)	2015/12/11		106	%	60 - 130
			D8-ACENAPHTHYLENE (sur.)	2015/12/11		104	%	50 - 130
			D8-NAPHTHALENE (sur.)	2015/12/11		89	%	50 - 130
			D9-Acridine	2015/12/11		103	%	50 - 130
			TERPHENYL-D14 (sur.)	2015/12/11		101	%	60 - 130
			Naphthalene	2015/12/11		91	%	50 - 130
			2-Methylnaphthalene	2015/12/11		100	%	50 - 130
			Quinoline	2015/12/11		114	%	50 - 130
			Acenaphthylene	2015/12/11		107	%	50 - 130
			Acenaphthene	2015/12/11		103	%	50 - 130
			Fluorene	2015/12/11		98	%	50 - 130

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC			Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
Batch	Init	QC Type						
			Phenanthrene	2015/12/11		96	%	60 - 130
			Anthracene	2015/12/11		111	%	60 - 130
			Acridine	2015/12/11		104	%	50 - 130
			Fluoranthene	2015/12/11		102	%	60 - 130
			Pyrene	2015/12/11		103	%	60 - 130
			Benzo(a)anthracene	2015/12/11		97	%	60 - 130
			Chrysene	2015/12/11		99	%	60 - 130
			Benzo(b&j)fluoranthene	2015/12/11		98	%	60 - 130
			Benzo(k)fluoranthene	2015/12/11		93	%	60 - 130
			Benzo(a)pyrene	2015/12/11		101	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2015/12/11		102	%	60 - 130
			Dibenz(a,h)anthracene	2015/12/11		102	%	60 - 130
			Benzo(g,h,i)perylene	2015/12/11		99	%	60 - 130
8142147	JP1	Spiked Blank	D10-ANTHRACENE (sur.)	2015/12/11		109	%	60 - 130
			D8-ACENAPHTHYLENE (sur.)	2015/12/11		107	%	50 - 130
			D8-NAPHTHALENE (sur.)	2015/12/11		92	%	50 - 130
			D9-Acridine	2015/12/11		105	%	50 - 130
			TERPHENYL-D14 (sur.)	2015/12/11		102	%	60 - 130
			Naphthalene	2015/12/11		91	%	50 - 130
			2-Methylnaphthalene	2015/12/11		100	%	50 - 130
			Quinoline	2015/12/11		113	%	50 - 130
			Acenaphthylene	2015/12/11		107	%	50 - 130
			Acenaphthene	2015/12/11		103	%	50 - 130
			Fluorene	2015/12/11		98	%	50 - 130
			Phenanthrene	2015/12/11		98	%	60 - 130
			Anthracene	2015/12/11		114	%	60 - 130
			Acridine	2015/12/11		105	%	50 - 130
			Fluoranthene	2015/12/11		100	%	60 - 130
			Pyrene	2015/12/11		102	%	60 - 130
			Benzo(a)anthracene	2015/12/11		98	%	60 - 130
			Chrysene	2015/12/11		100	%	60 - 130
			Benzo(b&j)fluoranthene	2015/12/11		101	%	60 - 130
			Benzo(k)fluoranthene	2015/12/11		100	%	60 - 130
			Benzo(a)pyrene	2015/12/11		102	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2015/12/11		105	%	60 - 130
			Dibenz(a,h)anthracene	2015/12/11		104	%	60 - 130
			Benzo(g,h,i)perylene	2015/12/11		102	%	60 - 130
8142147	JP1	Method Blank	D10-ANTHRACENE (sur.)	2015/12/12		102	%	60 - 130
			D8-ACENAPHTHYLENE (sur.)	2015/12/12		101	%	50 - 130
			D8-NAPHTHALENE (sur.)	2015/12/12		88	%	50 - 130
			D9-Acridine	2015/12/12		99	%	50 - 130
			TERPHENYL-D14 (sur.)	2015/12/12		96	%	60 - 130
			Naphthalene	2015/12/12	<0.10		ug/L	
			2-Methylnaphthalene	2015/12/12	<0.10		ug/L	
			Quinoline	2015/12/12	<0.24		ug/L	
			Acenaphthylene	2015/12/12	<0.050		ug/L	
			Acenaphthene	2015/12/12	<0.050		ug/L	
			Fluorene	2015/12/12	<0.050		ug/L	
			Phenanthrene	2015/12/12	<0.050		ug/L	
			Anthracene	2015/12/12	<0.010		ug/L	
			Acridine	2015/12/12	<0.050		ug/L	
			Fluoranthene	2015/12/12	<0.020		ug/L	
			Pyrene	2015/12/12	<0.020		ug/L	

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC			Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
Batch	Init	QC Type						
			Benzo(a)anthracene	2015/12/12	<0.010		ug/L	
			Chrysene	2015/12/12	<0.050		ug/L	
			Benzo(b&j)fluoranthene	2015/12/12	<0.050		ug/L	
			Benzo(k)fluoranthene	2015/12/12	<0.050		ug/L	
			Benzo(a)pyrene	2015/12/12	<0.0090		ug/L	
			Indeno(1,2,3-cd)pyrene	2015/12/12	<0.050		ug/L	
			Dibenz(a,h)anthracene	2015/12/12	<0.050		ug/L	
			Benzo(g,h,i)perylene	2015/12/12	<0.050		ug/L	
8142147	JP1	RPD [NV1692-01]	Naphthalene	2015/12/12	NC		%	40
			2-Methylnaphthalene	2015/12/12	NC		%	40
			Quinoline	2015/12/12	NC		%	40
			Acenaphthylene	2015/12/12	NC		%	40
			Acenaphthene	2015/12/12	NC		%	40
			Fluorene	2015/12/12	NC		%	40
			Phenanthrene	2015/12/12	NC		%	40
			Anthracene	2015/12/12	NC		%	40
			Acridine	2015/12/12	NC		%	40
			Fluoranthene	2015/12/12	NC		%	40
			Pyrene	2015/12/12	NC		%	40
			Benzo(a)anthracene	2015/12/12	NC		%	40
			Chrysene	2015/12/12	NC		%	40
			Benzo(b&j)fluoranthene	2015/12/12	NC		%	40
			Benzo(k)fluoranthene	2015/12/12	NC		%	40
			Benzo(a)pyrene	2015/12/12	NC		%	40
			Indeno(1,2,3-cd)pyrene	2015/12/12	NC		%	40
			Dibenz(a,h)anthracene	2015/12/12	NC		%	40
			Benzo(g,h,i)perylene	2015/12/12	NC		%	40
8142151	IT1	Matrix Spike [NV1694-01]	O-TERPHENYL (sur.)	2015/12/11		98	%	50 - 130
			EPH (C10-C19)	2015/12/11		88	%	50 - 130
			EPH (C19-C32)	2015/12/11		98	%	50 - 130
8142151	IT1	Spiked Blank	O-TERPHENYL (sur.)	2015/12/11		99	%	50 - 130
			EPH (C10-C19)	2015/12/11		95	%	50 - 130
			EPH (C19-C32)	2015/12/11		103	%	50 - 130
8142151	IT1	Method Blank	O-TERPHENYL (sur.)	2015/12/11		94	%	50 - 130
			EPH (C10-C19)	2015/12/11	<0.20		mg/L	
			EPH (C19-C32)	2015/12/11	<0.20		mg/L	
8142151	IT1	RPD [NV1692-01]	EPH (C10-C19)	2015/12/11	NC		%	30
			EPH (C19-C32)	2015/12/11	NC		%	30
8142267	AA1	Matrix Spike	Total Lead (Pb)	2015/12/12		93	%	80 - 120
8142267	AA1	Spiked Blank	Total Lead (Pb)	2015/12/12		95	%	80 - 120
8142267	AA1	Method Blank	Total Lead (Pb)	2015/12/12	<0.20		ug/L	
8142274	AA1	Matrix Spike [NV1692-03]	Total Lead (Pb)	2015/12/12		103	%	80 - 120
8142274	AA1	Spiked Blank	Total Lead (Pb)	2015/12/12		100	%	80 - 120
8142274	AA1	Method Blank	Total Lead (Pb)	2015/12/12	<0.20		ug/L	
8142274	AA1	RPD [NV1692-03]	Total Lead (Pb)	2015/12/12	NC		%	20
8142296	WAY	Matrix Spike	Phenols	2015/12/12		105	%	80 - 120
8142296	WAY	Spiked Blank	Phenols	2015/12/12		101	%	80 - 120
8142296	WAY	Method Blank	Phenols	2015/12/12	<0.0010		mg/L	
8142296	WAY	RPD	Phenols	2015/12/12	16		%	20
8142332	VT1	Spiked Blank	pH	2015/12/12		100	%	97 - 103

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC				Date				
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
8142332	VT1	RPD [NV1692-02]	pH	2015/12/12	1.2		%	N/A
<p>N/A = Not Applicable</p> <p>Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.</p> <p>Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.</p> <p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples &lt; 5x RDL).</p>								

Maxxam Job #: B5B0422  
Report Date: 2015/12/12

Golder Associates  
Client Project #: 1541624 / 6075 / 2001  
Sampler Initials: OL

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator



David Huang, BBY Scientific Specialist

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Chain of Custody Record

Page 1 of 2

Maxxim Analytica International Corporation via Maxxim Analytics  
 4500 Canada Way, Burnaby, British Columbia Canada V6G 1K6 Tel: (604) 734 7275 Toll-Free: 800-663-6266 Fax: (604) 731 2386 www.maxxim.ca

INVOICE TO: #12180, Robert B Somerville  
 Company Name: Troy Dobson  
 Contact Name: 13176 Dufferin St  
 Address: King City ON L7B 1K5  
 Phone: (905) 833-3100 x (905) 833-3111 x  
 Email: tddobson@bosmerveille.com

Report Information: #33072, Golder Associates  
 Company Name: Katherine McCann  
 Contact Name: Suite 200 - 2920 Virtual Way  
 Address: Vancouver BC V5M 0C4  
 Phone: (604) 298-4337 x  
 Email: Katherine\_McCann@golder.com

Project Information: 1541624 / 6075 / 2001  
 Quotation #  
 P.O.#  
 Project #  
 Project Name  
 Site #  
 Sampled By: Owen Lewis

Laboratory Use Only: Maxxim Job # B5B0422  
 Bottle Order #  
 Chain of Custody Record  
 Project Manager

ANALYSIS REQUESTED (PLEASE BE SPECIFIC):  
 BTEX/PH and Total BTEX in Water  
 pH Water  
 Phenols (4-AP)  
 PAH in Water  
 Total Lead  
 TPH (Purgeable + Extractable)  
 LIQUID SAMPLE

Turnaround Time (TAT) Required:  
 Regular (Standard) TAT:   
 (will be applied if Rush TAT is not specified)  
 Standard TAT = 5-7 Working days for most tests.  
 Please note: Standard TAT for certain tests such as BOD and Dissolved Phos are x 6 more - contact your Project Manager for details.  
 Job Specific Rush TAT (if applies to entire submission):  
 1 DAY  2 Day  3 Day  Data Required:   
 Rush Confirmation Number: \_\_\_\_\_  
 # of Bottles: \_\_\_\_\_  
 Comments: \_\_\_\_\_

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXIM

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metal Field Filtered? (Y/N)	BTEX/PH and Total BTEX in Water	pH Water	Phenols (4-AP)	PAH in Water	Total Lead	TPH (Purgeable + Extractable)	LIQUID SAMPLE	# Bots used and not submitted	Time	Date: (YY/MM/DD)	Signature/Print
1 NV 1692	BK67-NPS6-1/3-A	Dec 11 2015	11:41	Water	N										2015/12/11	16:00
2 NV 1693	BK67-NPS6-1/3-B		11:42													
3 NV 1694	BK67-NPS6-2/3-A		11:50													
4 NV 1695	BK67-NPS6-2/3-B		11:51													
5 NV 1696	FRS-NPS6-START-A		12:35													
6 NV 1697	FRS-NPS6-START-B		12:36													
7 NV 1698	FRS-NPS6-START-A		12:44													
8 NV 1699	FRS-NPS6-MID-B		12:45													
9 NV 1700	FRS-NPS6-END-A		12:48													
10 NV 1701	FRS-NPS6-END-B	Dec 11 2015	12:49	Water	N											

Regulatory Criteria:  
 CSR  
 OCME  
 EC Water Quality  
 Other: **Protect Specific**

Special Instructions:  
 Please email a copy of all reports to tddobson@bosmerveille.com

RECEIVED BY: (Signature/Print) Owen Lewis  
 Date: (YY/MM/DD) 2015/12/11 16:00

Temperature (°C) on Receipt: 9107 JS  
 Chain of Custody Seal Intact on Cooler?  Yes  No

Maxxim Analytica International Corporation via Maxxim Analytics

\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Maxxim Analytica International Corporation via Maxxim Analytics



Maxxam Analytical International Corporation c/o Maxxam Analytics  
 4626 Canada Way, Burnaby, British Columbia, Canada V5G 1K5 Tel: (604) 734-7276 Toll-Free: 800-353-8266 Fax: (604) 731-2386 www.maxxam.ca

INVOICE TO:

Company Name: #12180 Robert B Somerville  
 Contact Name: Troy Dobson  
 Address: 13176 Dufferin St.  
 King City ON L7B 1K5  
 Phone: (905) 833-3100 X Fax: (905) 833-3111 X  
 Email: tdobson@rbsomerville.com

Report Information

Company Name: #33072 Golder Associates  
 Contact Name: Katherine McCann  
 Address: Suite 200 - 2820 Vivaldi Way  
 Vancouver BC V5M 0C4  
 Phone: (604) 295-4337 X Fax:  
 Email: Katherine.McCann@golder.com

Project Information

Publication #: 1541624 / 6075 / 2001  
 P.O. #: B5B0422  
 Project #: Chain of Custody Record  
 Project Name: Owen Lewis  
 Site #: C05551-02-01  
 Submitted by: Owen Lewis

Laboratory Use Only

Maxxam Job #: B5B0422  
 Bottle Order #: 48335  
 Chain of Custody Record  
 Project Manager

Regulatory Criteria:  
 DSR  
 CCME  
 90% Water Quality  
 Other: **Protect Specific**

Special Instructions: ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required: \_\_\_\_\_  
 Please provide advance notice for rush projects

Regular (Standard) TAT:   
 (Will be applied if Rush TAT is not specified)  
 Standard TAT = 5-7 Working days for most tests.  
 Please Note: Standard TAT for certain tests such as BOD and Dissolved Oxygen are > 5 days - Advise Your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission):  
 1 Day  3 Day  Date Required: \_\_\_\_\_  
 Rush Confirmation Number: \_\_\_\_\_  
 # of Batches: \_\_\_\_\_ (row into for #) \_\_\_\_\_  
 Comments: \_\_\_\_\_

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM			
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled
1 NV1702	FRS - NPS6 - EXTRA	Dec 11 2015	12:51
2 NV1703	FIELD - BLANK	Dec 11 2015	13:00
3 NV1704	TRAP - BLANK	Dec 11 2015	13:10
4			
5			
6			
7			
8			
9			
10			

RECEIVED BY: (Signature/Print)	Date: (YYMMDD)	Time	RECEIVED BY: (Signature/Print)	Date: (YYMMDD)	Time
<i>[Signature]</i>	2015/12/11	16:00	<i>[Signature]</i>	2015/12/11	16:00
Owen Lewis	2015/12/11	16:00	M. L. Lewis	2015/12/11	16:00

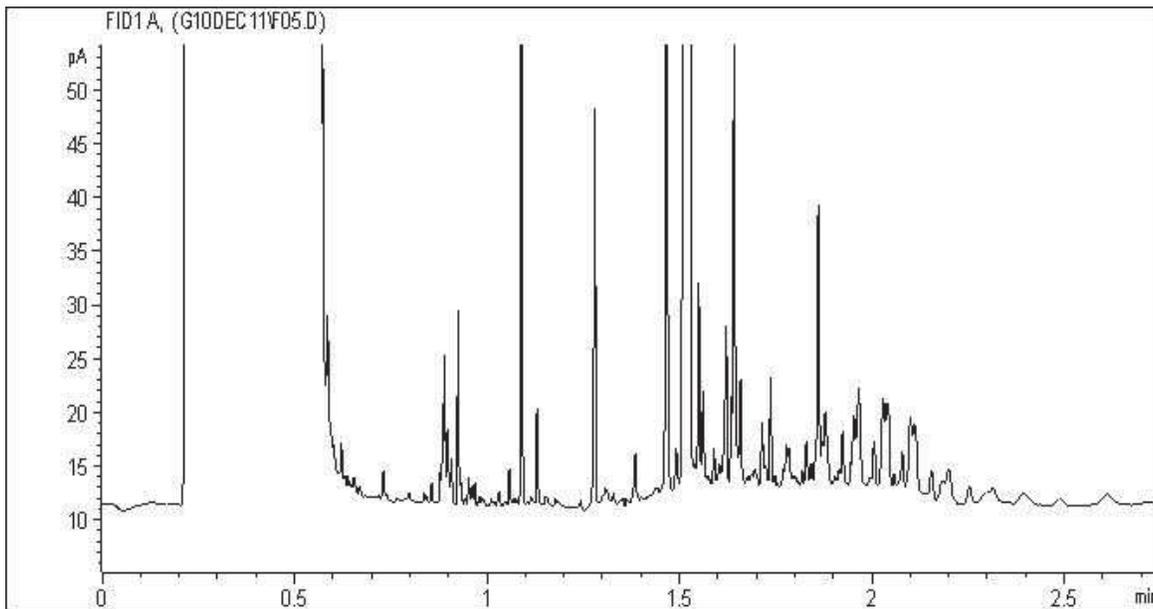
Time Sampled:  Time Analyzed:  Time Used and not submitted: N/A

Temperature (°C) on Receipt: 910.7 JS

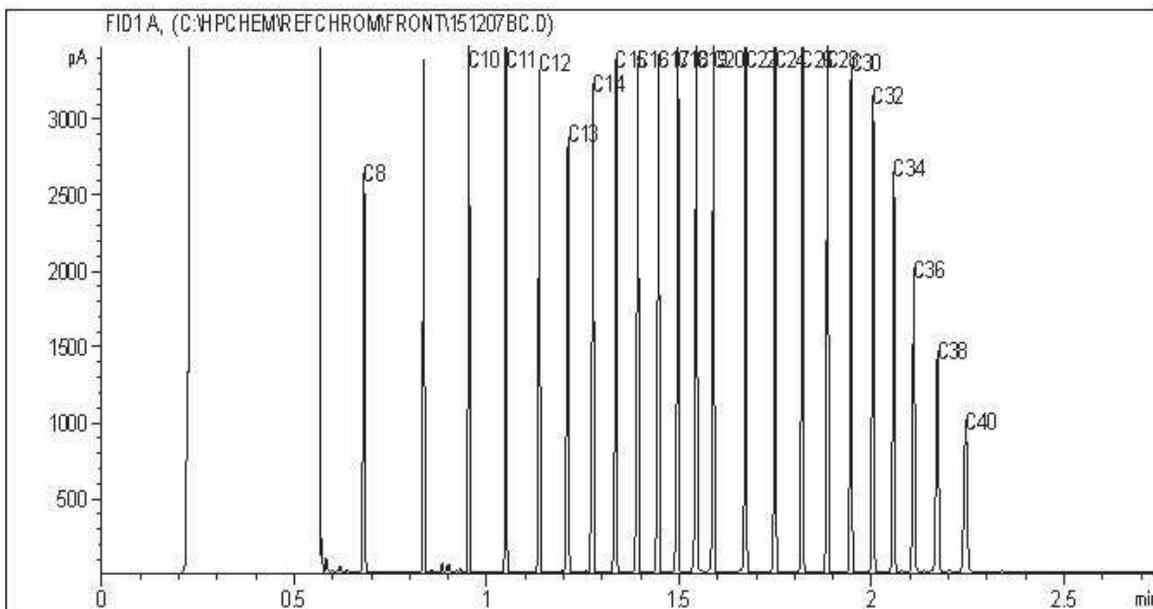
Custom Seal Intact on Cooler?  Yes  No

White Maxxam Yellow Clart

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

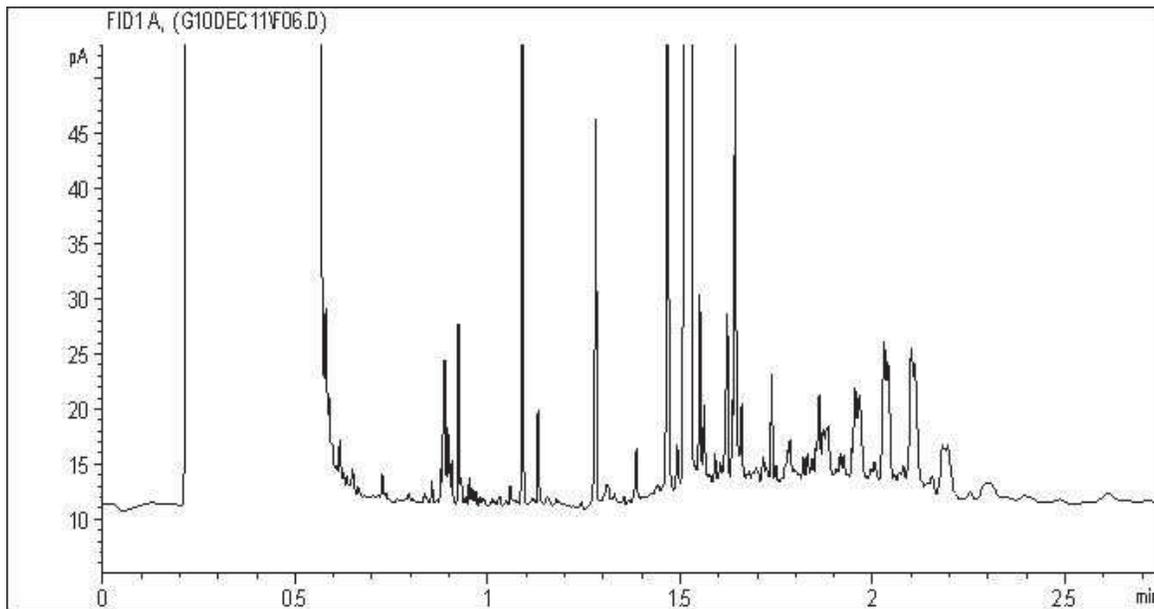


TYPICAL PRODUCT CARBON NUMBER RANGES

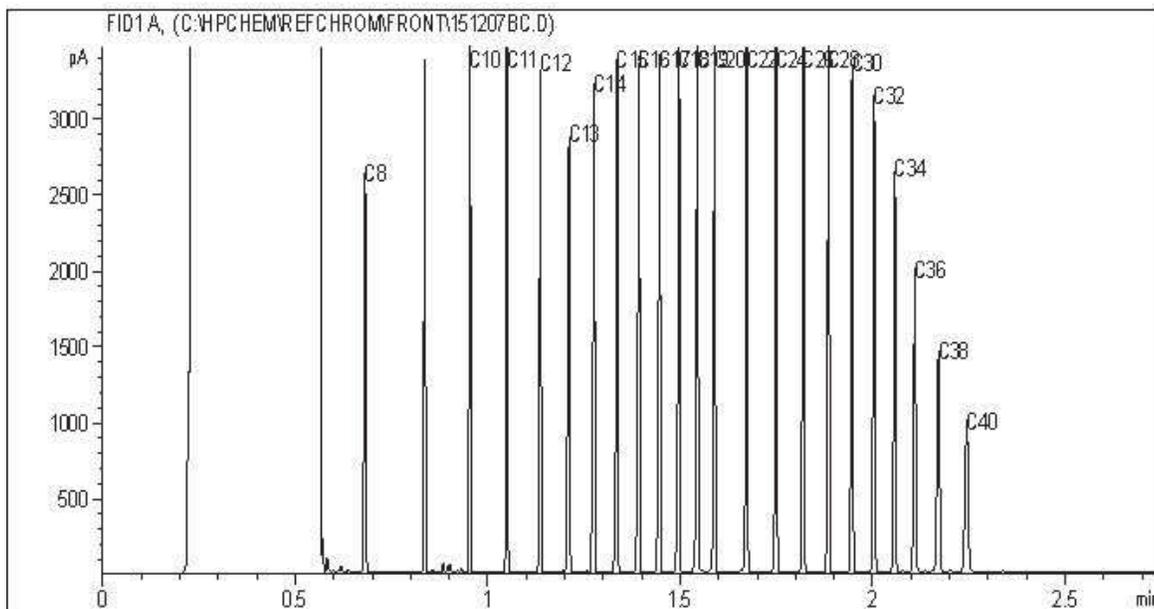
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

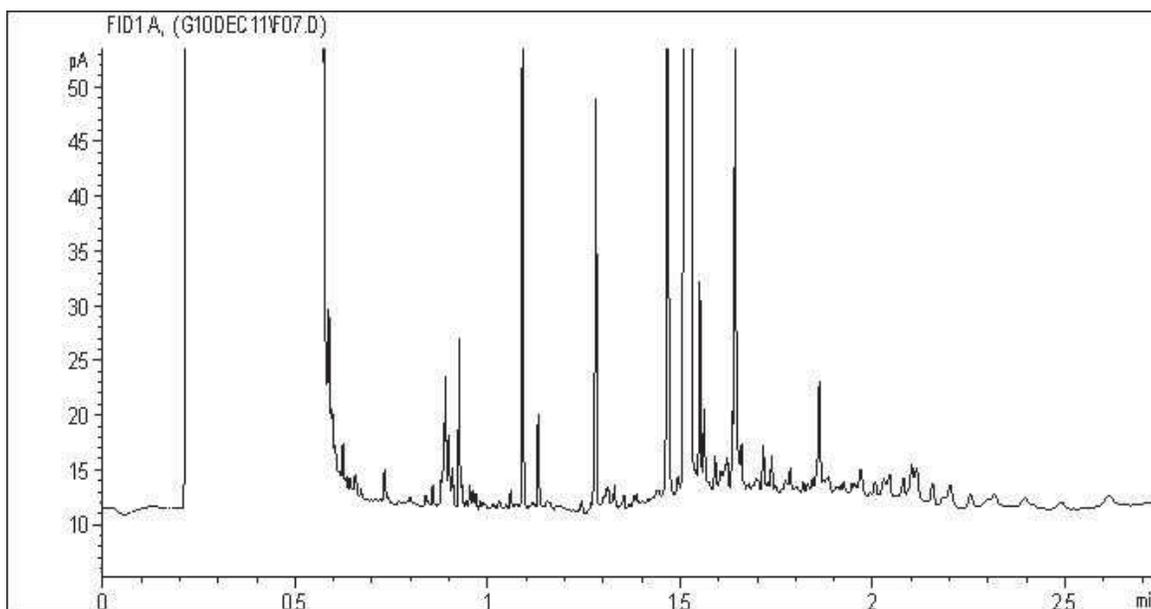


TYPICAL PRODUCT CARBON NUMBER RANGES

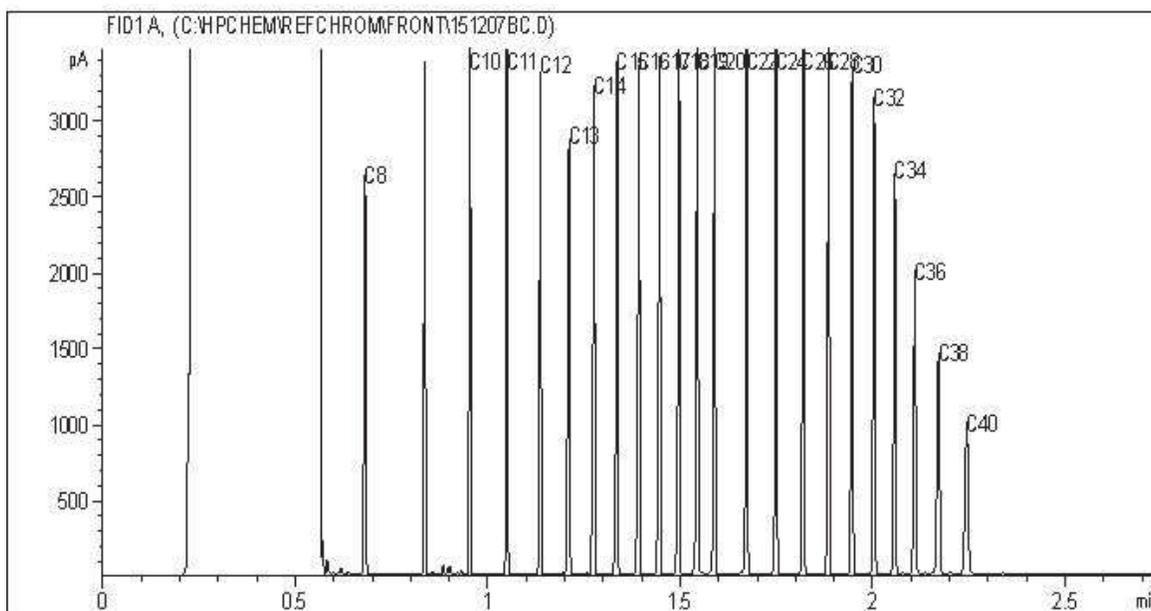
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

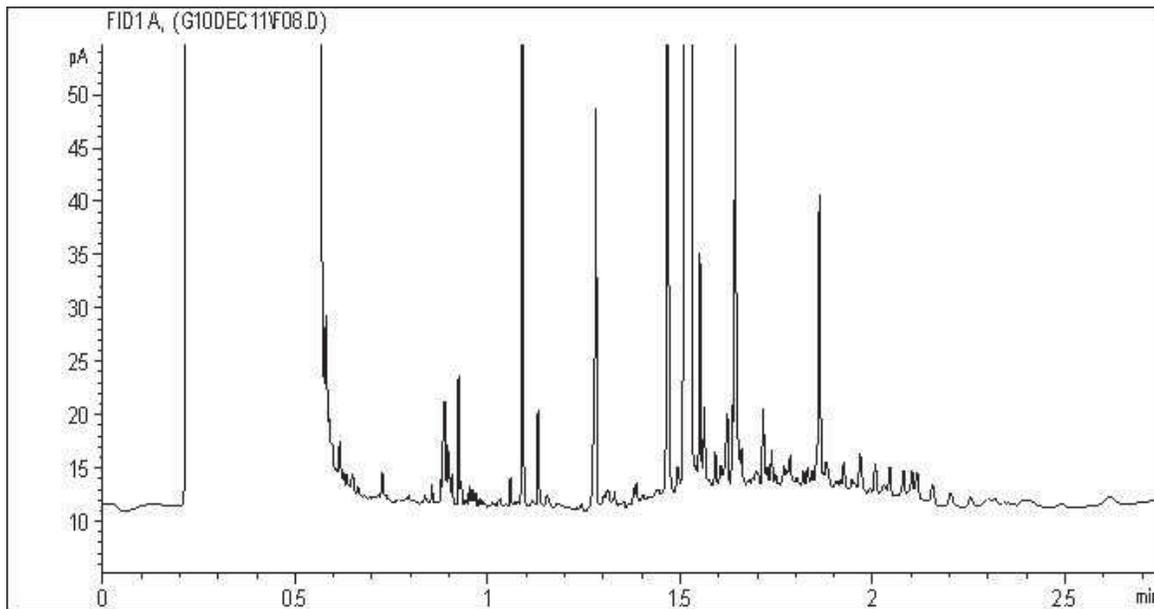


TYPICAL PRODUCT CARBON NUMBER RANGES

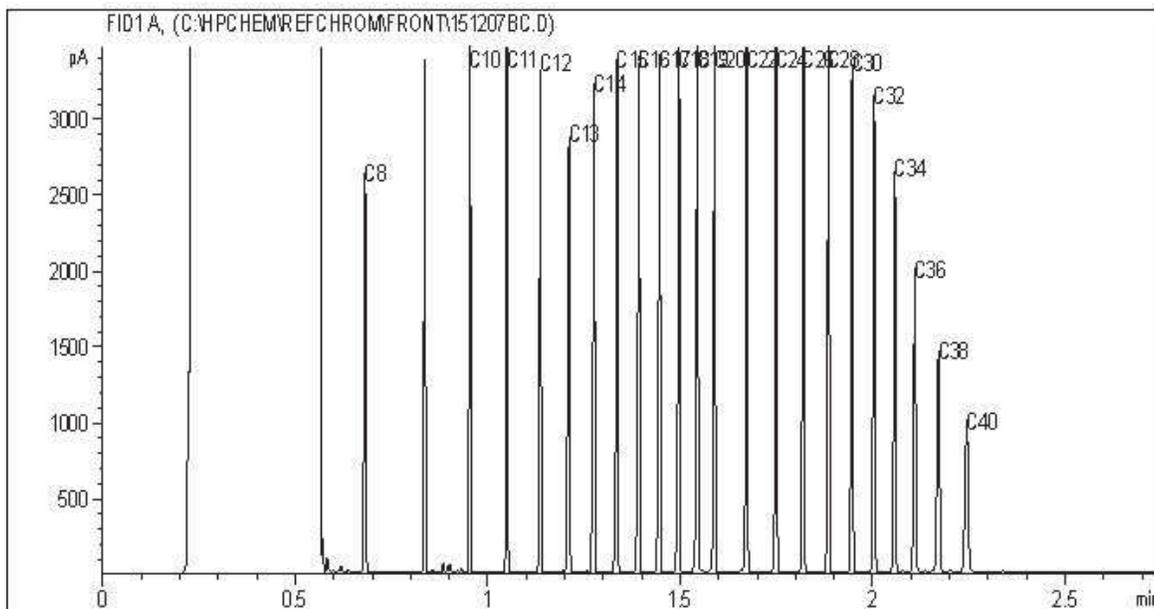
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

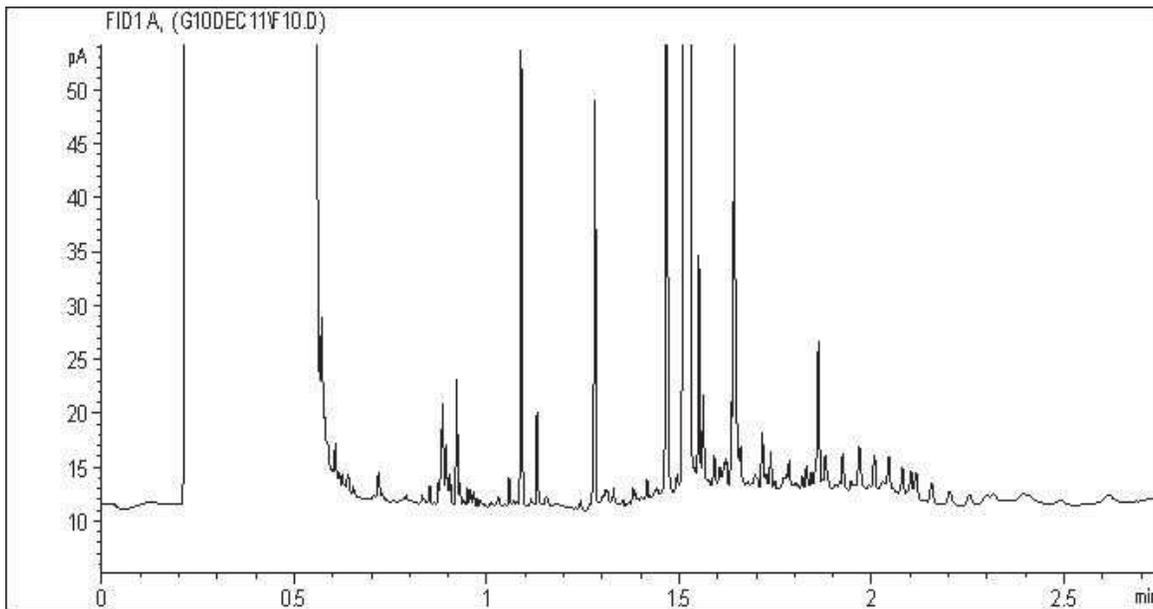


TYPICAL PRODUCT CARBON NUMBER RANGES

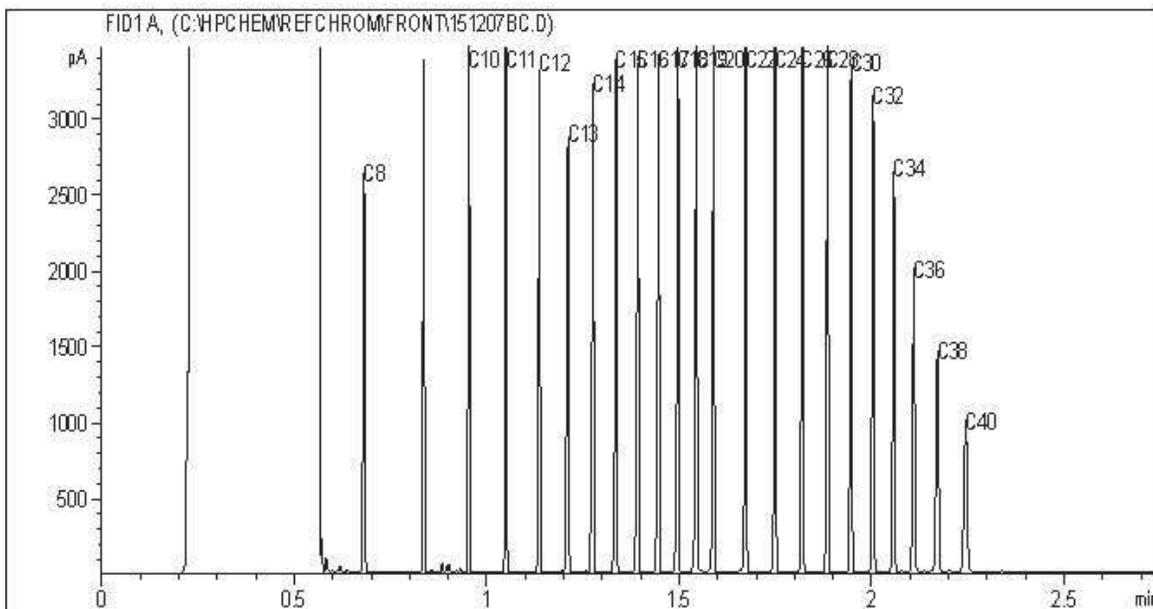
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

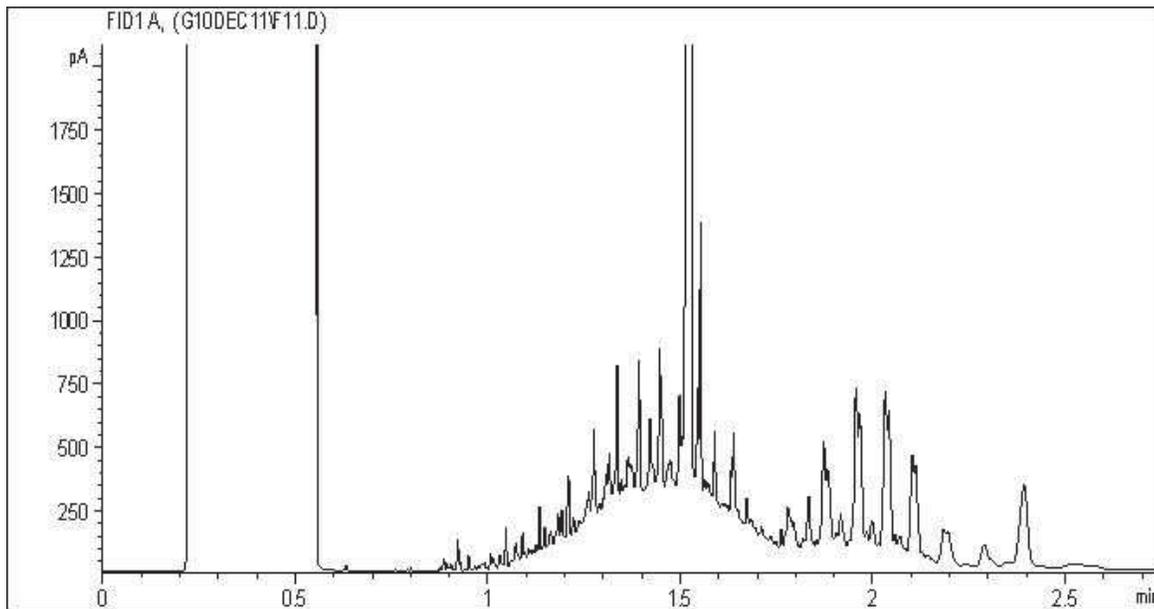


TYPICAL PRODUCT CARBON NUMBER RANGES

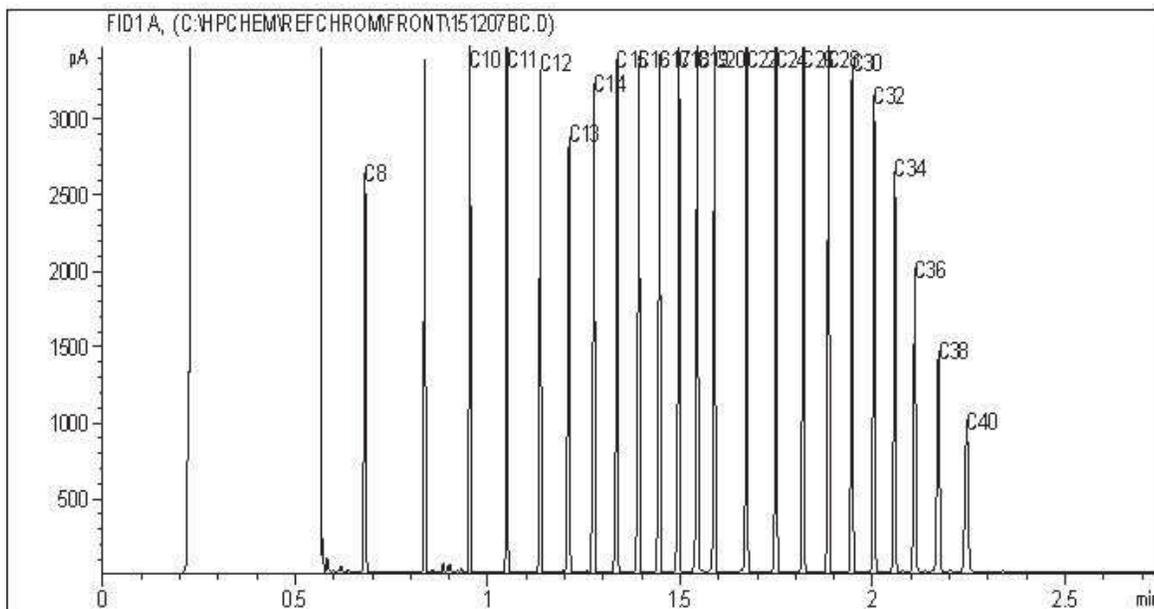
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

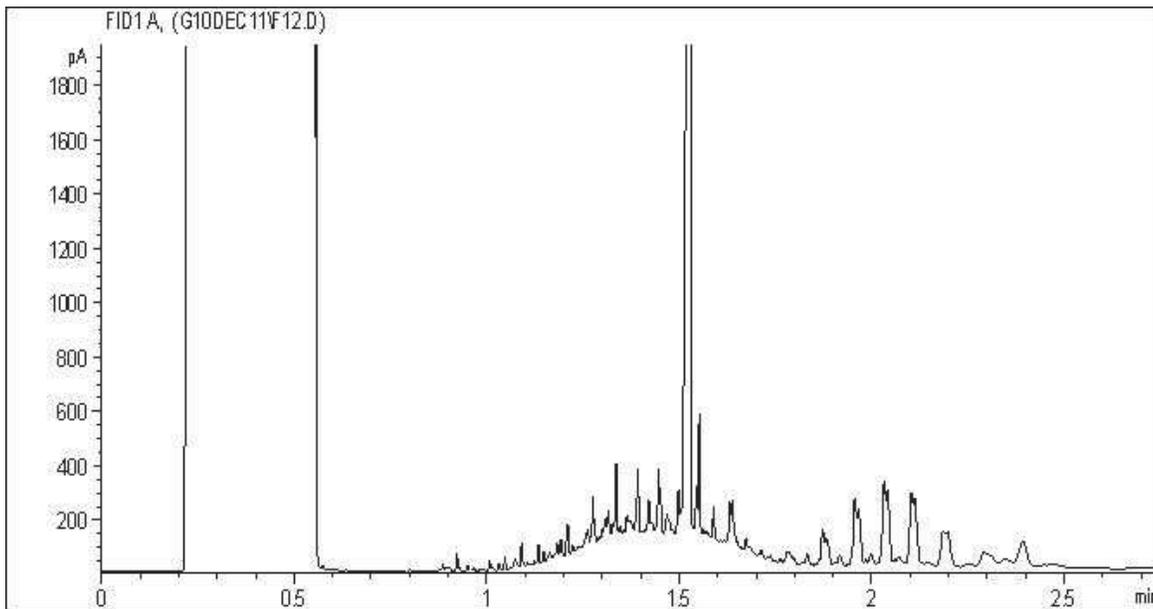


TYPICAL PRODUCT CARBON NUMBER RANGES

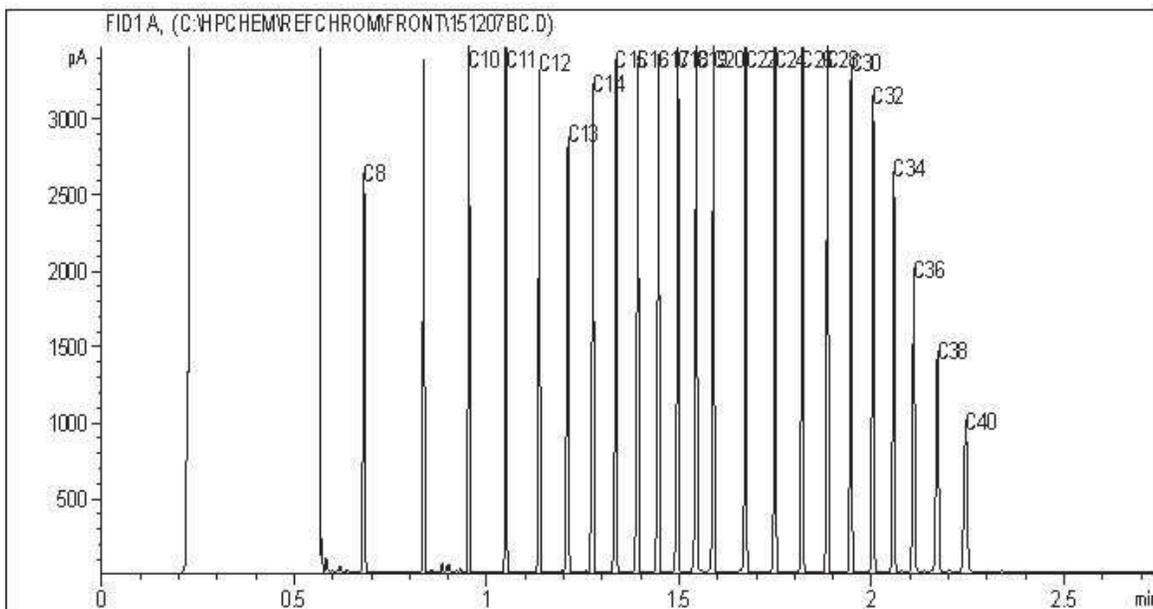
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

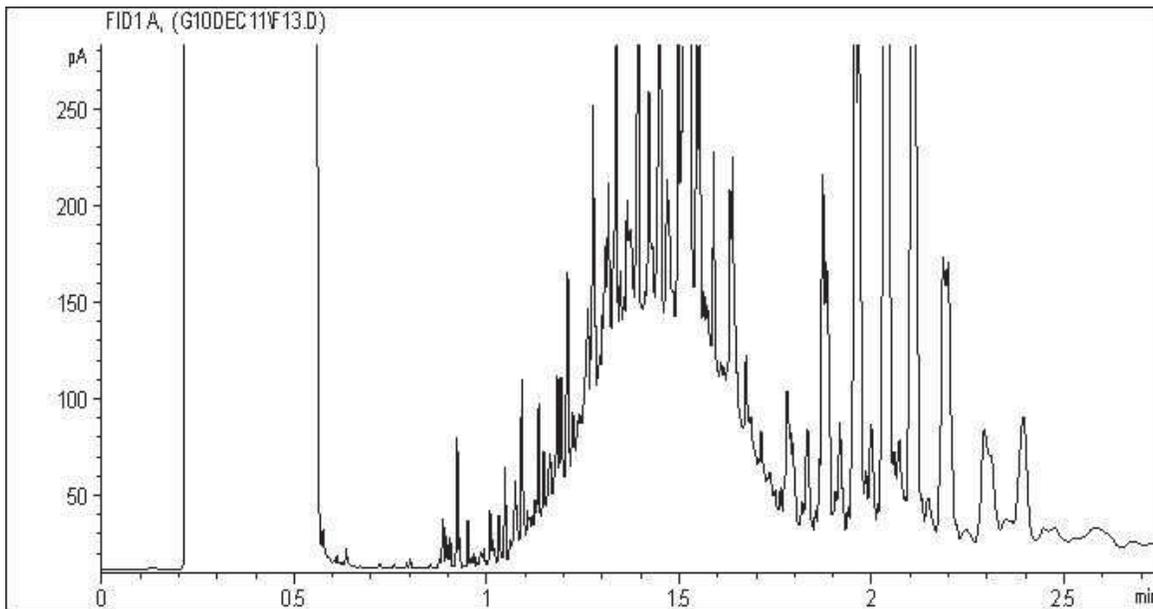


TYPICAL PRODUCT CARBON NUMBER RANGES

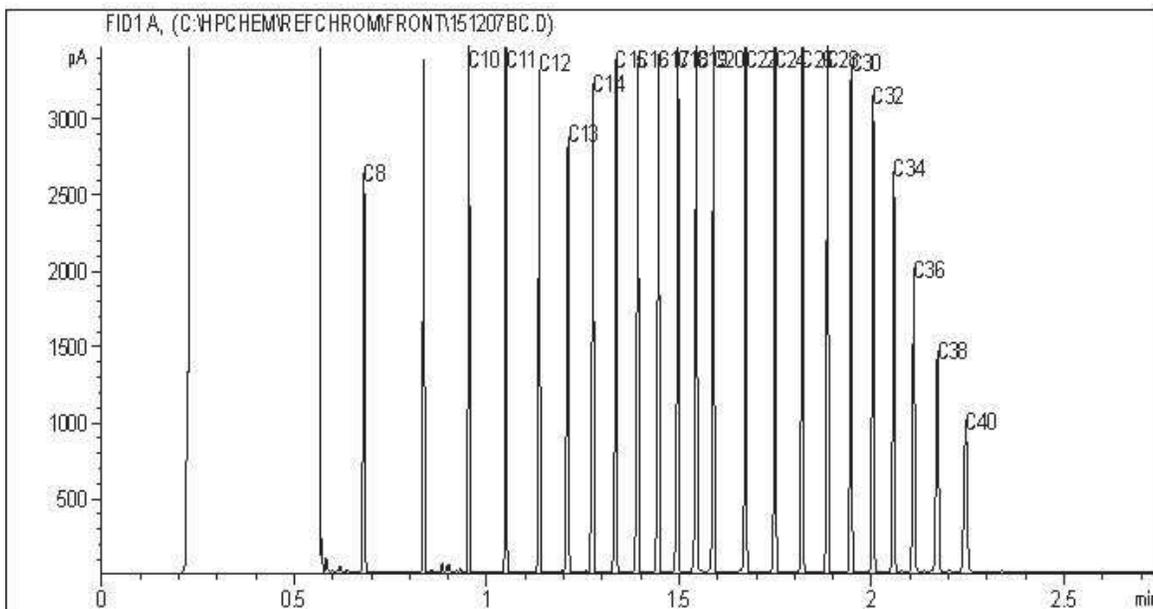
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

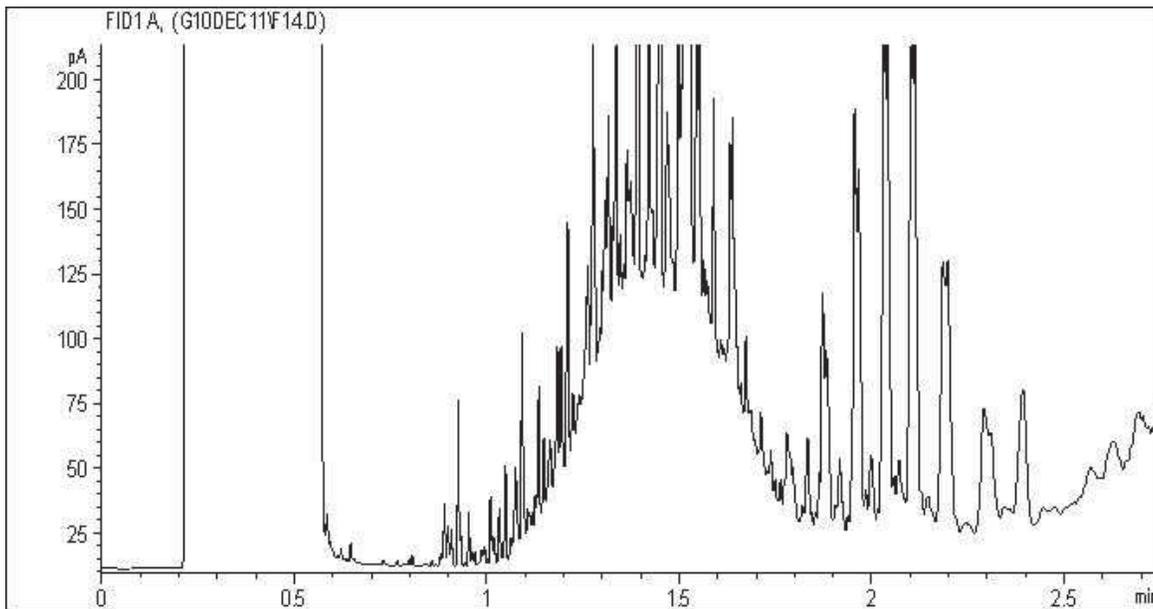


TYPICAL PRODUCT CARBON NUMBER RANGES

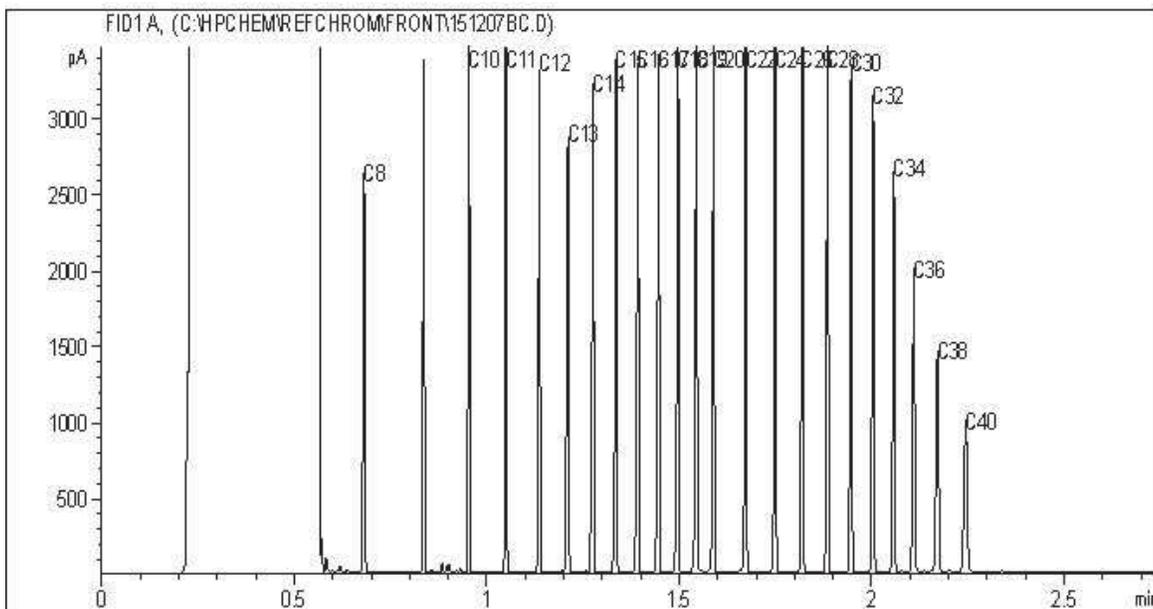
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

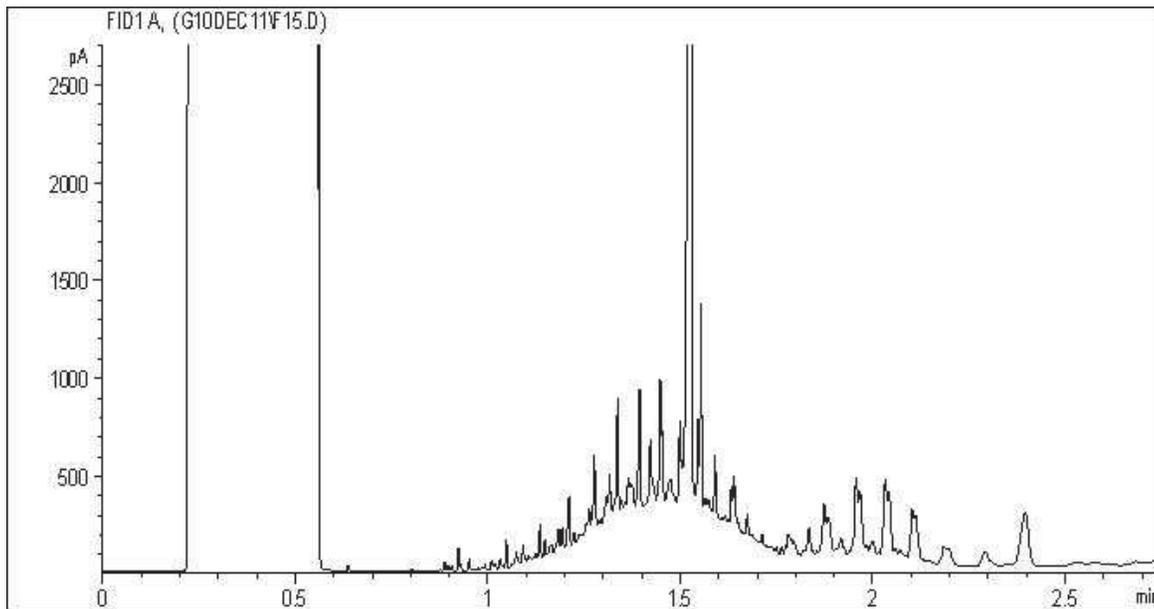


TYPICAL PRODUCT CARBON NUMBER RANGES

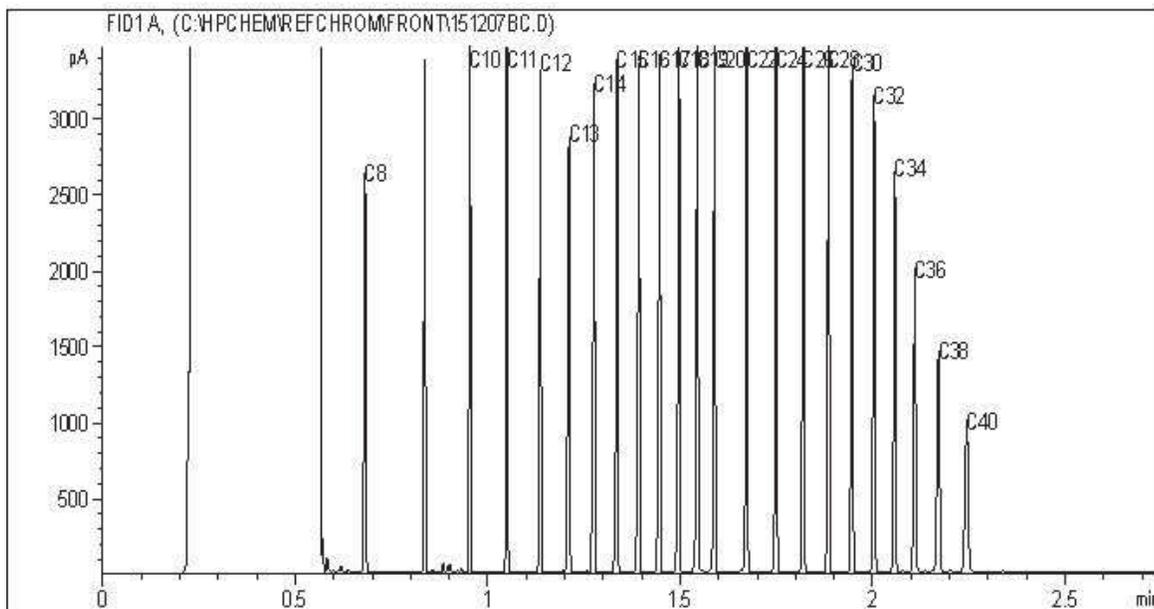
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

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Carbon Range Distribution - Reference Chromatogram

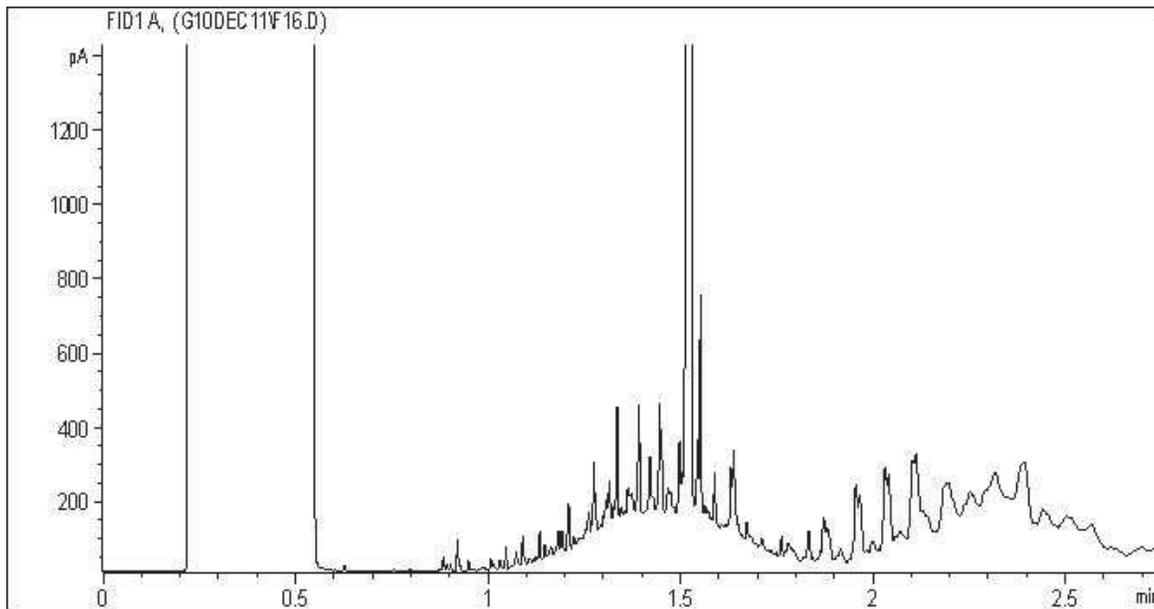


TYPICAL PRODUCT CARBON NUMBER RANGES

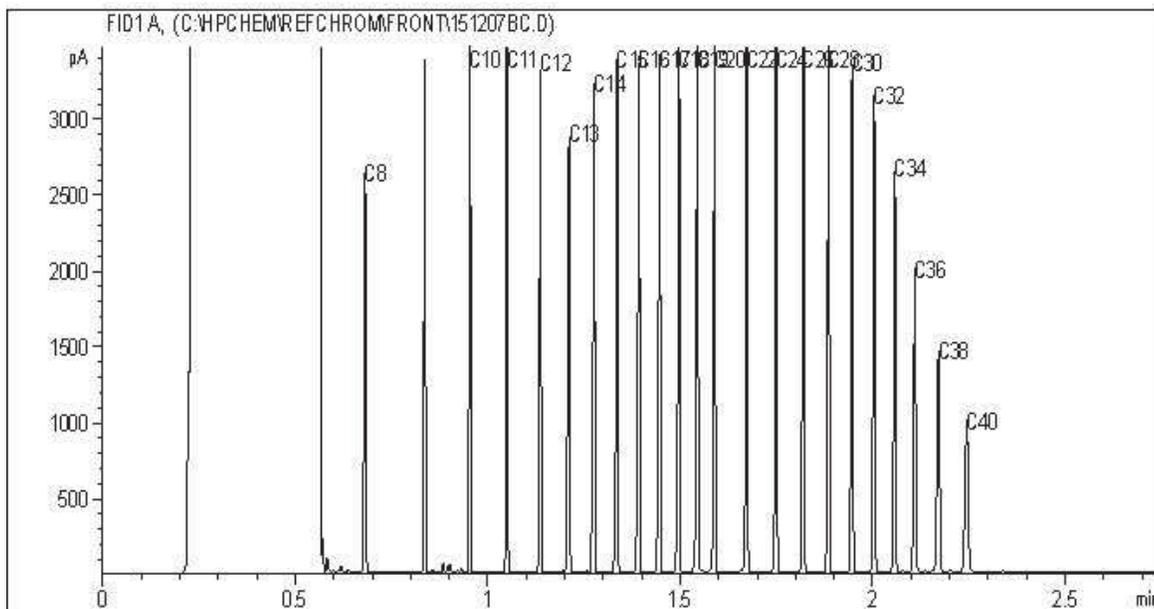
Gasoline:	C4 - C12	Diesel:	C8 - C22
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EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

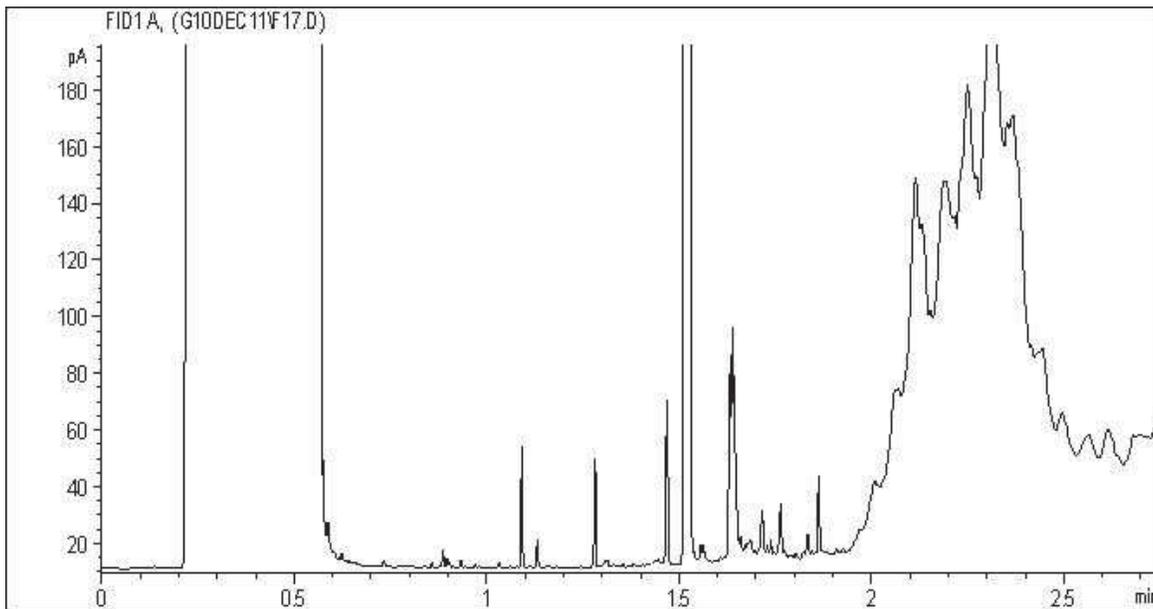


TYPICAL PRODUCT CARBON NUMBER RANGES

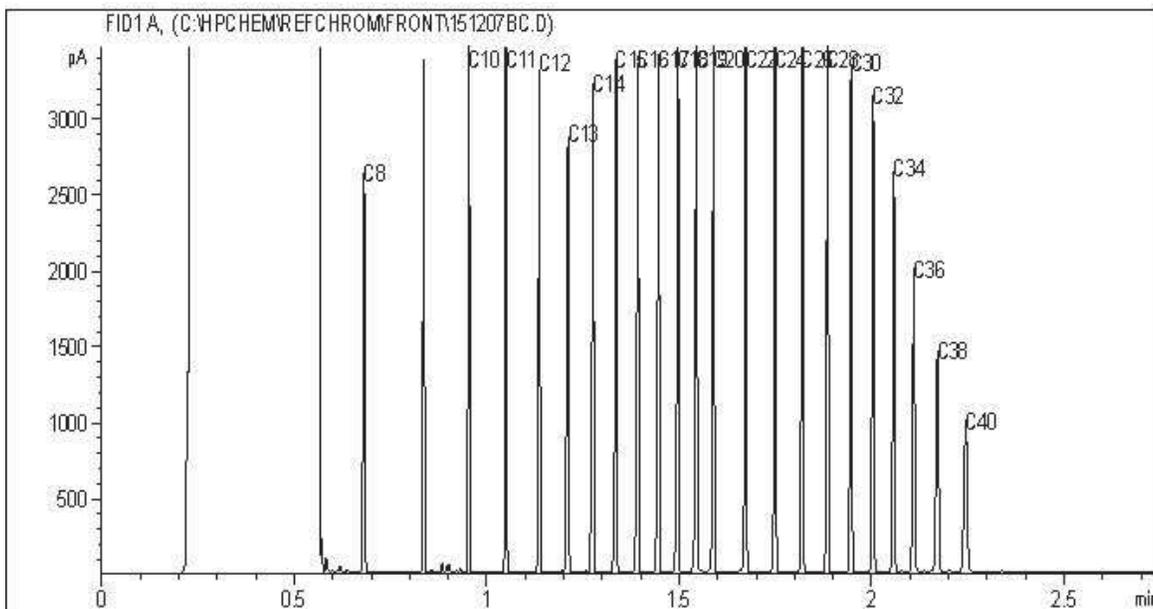
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

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EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

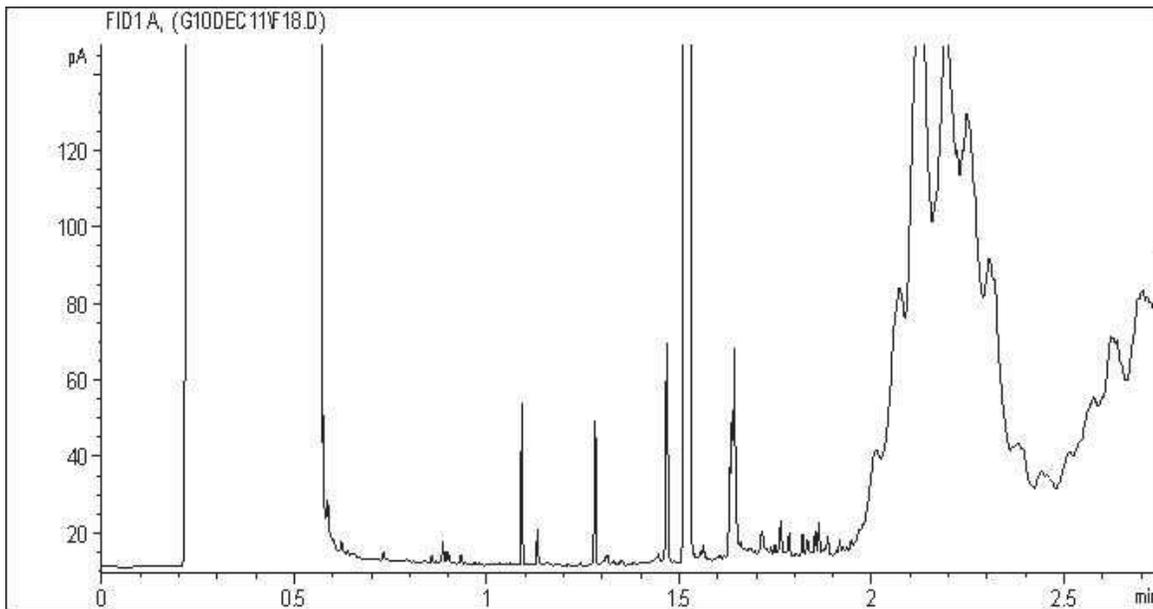


TYPICAL PRODUCT CARBON NUMBER RANGES

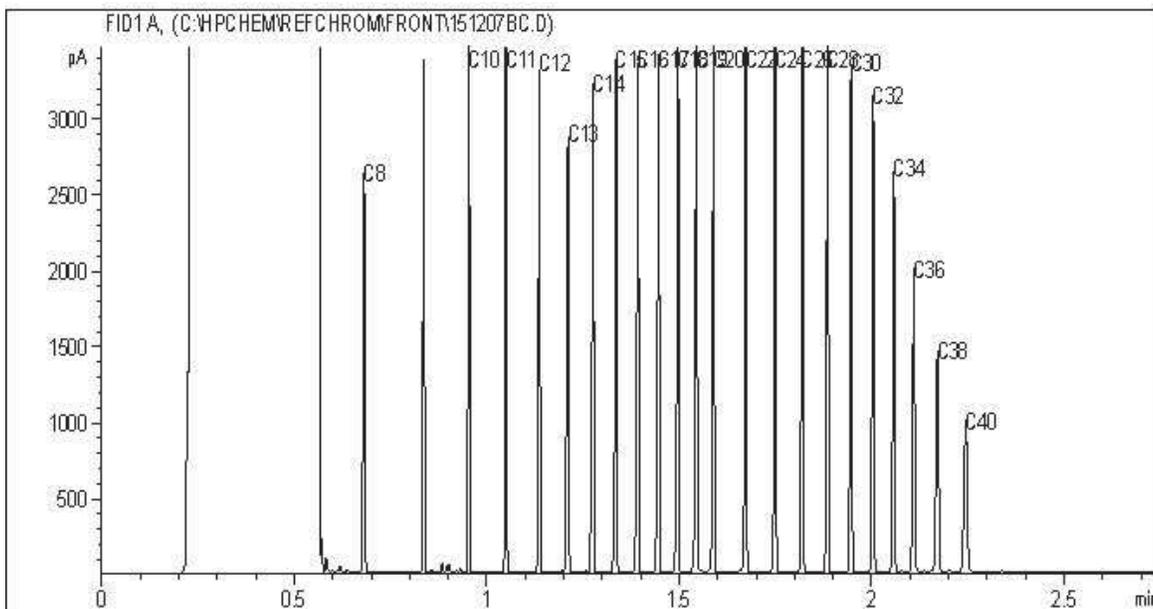
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

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