



BC MINISTRY OF ENVIRONMENT -
Compliance - Surrey
ATTN: Rusto Martinka
200-10470 152 Street
Surrey BC V3R 0Y3

Date Received: 22-FEB-20
Report Date: 24-FEB-20 17:04 (MT)
Version: FINAL

Client Phone: 604-582-5216

Certificate of Analysis

Lab Work Order #: L2419887
Project P.O. #: 50247698
Job Reference: MW19-1
C of C Numbers:
Legal Site Desc:

Other Information: Client: CL
EMS ID: E319171
Project: N/A

Dean Watt, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2419887-1	Water	21-FEB-20	10:45	E319171
Grouping	Analyte					
WATER						
Hydrocarbons	EPH10-19 (mg/L)	<0.050				
	EPH19-32 (mg/L)	0.197				
	LEPH (mg/L)	<0.050				
	HEPH (mg/L)	0.197				
	Surrogate: 2-Bromobenzotrifluoride (%)	118.2				
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)	0.000017				
	Acenaphthylene (mg/L)	<0.000010				
	Acridine (mg/L)	<0.000010				
	Anthracene (mg/L)	<0.000010				
	Benz(a)anthracene (mg/L)	<0.000010				
	Benzo(a)pyrene (mg/L)	<0.0000050				
	Benzo(b&j)fluoranthene (mg/L)	<0.000010				
	Benzo(b+j+k)fluoranthene (mg/L)	<0.000015				
	Benzo(g,h,i)perylene (mg/L)	<0.000010				
	Benzo(k)fluoranthene (mg/L)	<0.000010				
	Chrysene (mg/L)	<0.000010				
	Dibenz(a,h)anthracene (mg/L)	<0.0000050				
	Fluoranthene (mg/L)	0.000011				
	Fluorene (mg/L)	0.000010				
	Indeno(1,2,3-c,d)pyrene (mg/L)	<0.000010				
	1-Methylnaphthalene (mg/L)	<0.000050				
	2-Methylnaphthalene (mg/L)	<0.000050				
	Naphthalene (mg/L)	<0.000050				
	Phenanthrene (mg/L)	<0.000020				
	Pyrene (mg/L)	0.000023				
	Quinoline (mg/L)	<0.000050				
	Surrogate: Acridine d9 (%)	77.9				
	Surrogate: Chrysene d12 (%)	94.1				
	Surrogate: Naphthalene d8 (%)	85.6				
Surrogate: Phenanthrene d10 (%)	99.8					

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
EPH-L-ME-FID-VA	Water	EPH in Water (Low Level)	BC Lab Manual
EPH is extracted from water using a hexane micro-extraction technique, with analysis by GC-FID, as per the BC Lab Manual. EPH results include PAHs and are therefore not equivalent to LEPH or HEPH.			
LEPH/HEPH-CALC-VA	Water	LEPHs and HEPHs	BC MOE LEPH/HEPH
LEPHw and HEPHw are measures of Light and Heavy Extractable Petroleum Hydrocarbons in water. Results are calculated by subtraction of applicable PAH concentrations from EPH10-19 and EPH19-32, as per the BC Lab Manual LEPH/HEPH calculation procedure.			
LEPHw = EPH10-19 minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene.			
HEPHw = EPH19-32 minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.			
PAH-ME-MS-VA	Water	PAHs in Water	EPA 3511/8270D (mod)
PAHs are extracted from water using a hexane micro-extraction technique, with analysis by GC/MS. Because the two isomers cannot be readily separated chromatographically, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Additional Information:

Average Cooler Temperature (Deg Celsius): 3

Sampling Agency Code: 10

Project: N/A

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Quality Control Report

Workorder: L2419887

Report Date: 24-FEB-20

Page 1 of 3

Client: BC MINISTRY OF ENVIRONMENT - Compliance - Surrey
 200-10470 152 Street
 Surrey BC V3R 0Y3

Contact: Rusto Martinka

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EPH-L-ME-FID-VA		Water						
Batch	R4996148							
WG3280144-2	LCS							
EPH10-19			120.0		%		70-130	24-FEB-20
EPH19-32			113.7		%		70-130	24-FEB-20
WG3280144-1	MB							
EPH10-19			<0.050		mg/L		0.05	24-FEB-20
EPH19-32			<0.050		mg/L		0.05	24-FEB-20
Surrogate: 2-Bromobenzotrifluoride			93.4		%		60-140	24-FEB-20
PAH-ME-MS-VA		Water						
Batch	R4998608							
WG3280144-2	LCS							
Acenaphthene			100.4		%		60-130	24-FEB-20
Acenaphthylene			107.2		%		60-130	24-FEB-20
Acridine			106.2		%		60-130	24-FEB-20
Anthracene			107.4		%		60-130	24-FEB-20
Benz(a)anthracene			110.5		%		60-130	24-FEB-20
Benzo(a)pyrene			82.6		%		60-130	24-FEB-20
Benzo(b&j)fluoranthene			73.6		%		60-130	24-FEB-20
Benzo(g,h,i)perylene			108.6		%		60-130	24-FEB-20
Benzo(k)fluoranthene			83.4		%		60-130	24-FEB-20
Chrysene			103.9		%		60-130	24-FEB-20
Dibenz(a,h)anthracene			104.5		%		60-130	24-FEB-20
Fluoranthene			108.5		%		60-130	24-FEB-20
Fluorene			111.8		%		60-130	24-FEB-20
Indeno(1,2,3-c,d)pyrene			120.6		%		60-130	24-FEB-20
1-Methylnaphthalene			97.8		%		60-130	24-FEB-20
2-Methylnaphthalene			95.9		%		60-130	24-FEB-20
Naphthalene			92.5		%		50-130	24-FEB-20
Phenanthrene			110.2		%		60-130	24-FEB-20
Pyrene			110.5		%		60-130	24-FEB-20
Quinoline			111.7		%		60-130	24-FEB-20
WG3280144-1	MB							
Acenaphthene			<0.000010		mg/L		0.00001	24-FEB-20
Acenaphthylene			<0.000010		mg/L		0.00001	24-FEB-20
Acridine			<0.000010		mg/L		0.00001	24-FEB-20
Anthracene			<0.000010		mg/L		0.00001	24-FEB-20
Benz(a)anthracene			<0.000010		mg/L		0.00001	24-FEB-20



Quality Control Report

Workorder: L2419887

Report Date: 24-FEB-20

Page 2 of 3

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-ME-MS-VA		Water						
Batch	R4998608							
WG3280144-1	MB							
Benzo(a)pyrene			<0.0000050		mg/L		0.000005	24-FEB-20
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	24-FEB-20
Benzo(g,h,i)perylene			<0.000010		mg/L		0.00001	24-FEB-20
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	24-FEB-20
Chrysene			<0.000010		mg/L		0.00001	24-FEB-20
Dibenz(a,h)anthracene			<0.0000050		mg/L		0.000005	24-FEB-20
Fluoranthene			<0.000010		mg/L		0.00001	24-FEB-20
Fluorene			<0.000010		mg/L		0.00001	24-FEB-20
Indeno(1,2,3-c,d)pyrene			<0.000010		mg/L		0.00001	24-FEB-20
1-Methylnaphthalene			<0.000050		mg/L		0.00005	24-FEB-20
2-Methylnaphthalene			<0.000050		mg/L		0.00005	24-FEB-20
Naphthalene			<0.000050		mg/L		0.00005	24-FEB-20
Phenanthrene			<0.000020		mg/L		0.00002	24-FEB-20
Pyrene			<0.000010		mg/L		0.00001	24-FEB-20
Quinoline			<0.000050		mg/L		0.00005	24-FEB-20
Surrogate: Acridine d9			96.5		%		60-130	24-FEB-20
Surrogate: Chrysene d12			91.3		%		60-130	24-FEB-20
Surrogate: Naphthalene d8			85.3		%		50-130	24-FEB-20
Surrogate: Phenanthrene d10			101.3		%		60-130	24-FEB-20

Quality Control Report

Workorder: L2419887

Report Date: 24-FEB-20

Page 3 of 3

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

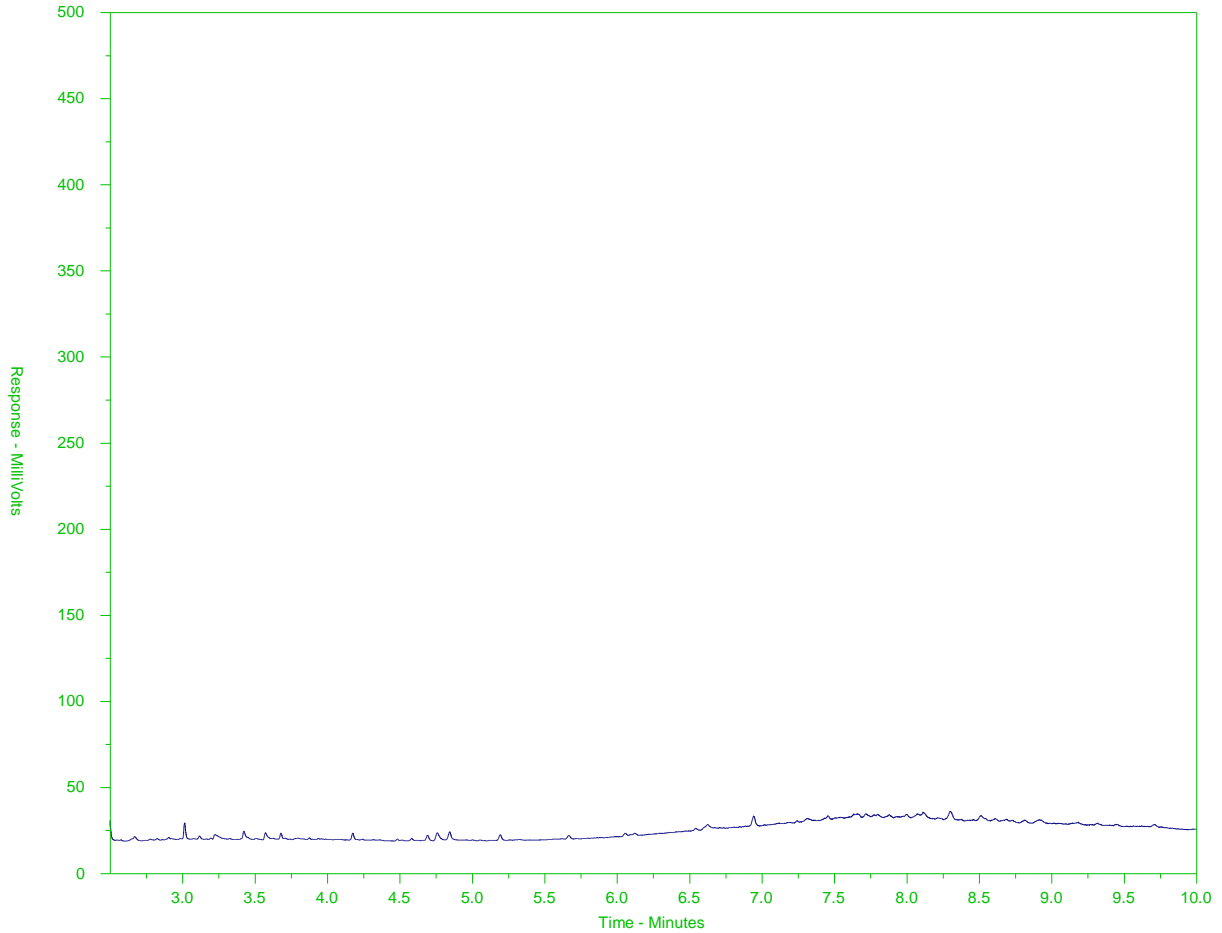
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

BC EPH HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2419887-L-1
 Client Sample ID: E319171



← EPH10-19 →		← EPH19-32 →	
nC10	nC19	nC32	
174°C	330°C	467°C	
346°F	626°F	873°F	
← Gasoline →		← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →			

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

Province Of British Columbia
Ministry of Environment

Req # 50247698

Urgent? <input type="checkbox"/>	Csr No. _____	Office 10 _____	Client CL _____
Study _____	Project N/A		
Lab	ALS Global		
Ministry Contact	RMARTINK Rusto, Martinka		
Sampler	Rusto Martinka		
Signature _____			
EMS Id	E319171	Well Plate # _____	
Location	MW19-1		

Sampling Agency	Code 10	Name VAN ISLAND - Nanaimo
Address	2080 A - LABEUX ROAD	
City	NANAIMO	
Postal Code	V9T6J9	Phone 250-751-3100
Number of Containers		

Instructions To Lab

State <input type="checkbox"/>	Descriptor <input type="checkbox"/>	Collection Method <input type="checkbox"/>						
No.	Class	Collection Start	Collection End	Depth	Upper	Lower	Tide	Comment
		YYYY-MM-DD HH:MI	YYYY-MM-DD HH:MI					
1		2020-02-21						GW sample
2		10:45						very turbid
3								> 2,000 NTU
4								
5								
6								

GENERAL (250 mL PLASTIC)

- Acidity pH 8.3
- Alkalinity Titration Curve
- Alkalinity: Total: pH 4.5
- Alkalinity: Phenolphthalein
- (500 mL Plastic) Biochemical Oxygen Demand (BOD)
- Bromide
- (500 mL Plastic) Carb. Biochem. Oxygen Demand (CBOD)
- Carbon: TIC
- Chloride
- Colour: True
- Fluoride
- Nitrogen: Nitrate and Nitrite
- Nitrogen: Nitrate
- Nitrogen: Nitrite
- pH
- Phosphorus: Diss. ortho-phosphate
- (500 mL Plastic) Residue: Filterable (TDS)
- (500 mL Plastic) Residue: Nonfilterable (TSS) Subsample 3 mg/L LOR
- (500 mL Plastic) Residue: Nonfilterable, Fixed
- (500 mL Plastic) Residue: Total (TS)
- Specific Conductance
- Turbidity
- Sulphate

SPECIFIC Tests

- Obs Well Package
- Cyanide: SAD (60 mL Plastic + NaOH)
- Cyanide: WAD (60 mL Plastic + NaOH)
- Sulphide: Total (125 mL Plastic, ZnAc & NaOH)
- Residue: Nonfilterable (TSS) -Whole Bottle - 1 mg/L LOR (150 mL Plastic)
- Chlorophyll a (250 mL Brown Plastic Bottle or Filter) Vol:
- Phaeophytin (250 mL Brown Plastic Bottle or Filter) Vol:

ORGANICS

- BTEX (2 X 40 mL glass vials, NaHSO4 or Na2S2O3, No headspace)
- VOC Full List (2 X 40 mL glass vials, NaHSO4 or Na2S2O3, No headspace)
- Volatile Hydrocarbons (VH) (2X40 mL glass vials, NaHSO4 or Na2S2O3, No headspace)
- Trihalomethanes (THM) (2 X 40 mL glass vials, NaHSO4 or Na2S2O3, No headspace)
- VPH (2 X 40 mL glass vials, NaHSO4 or Na2S2O3, No headspace)
- EPH (2 X 100 mL Amber Glass, NaHSO4)
- PAH (2 X 100 mL Amber Glass, NaHSO4)
- LEPH/HEPH (Calc) (2 X 100 mL Amber Glass, NaHSO4)
- Oil & Grease (2 X 250 mL Amber Glass, 2 mL 1:1 HCl or 1:1 H2SO4)
- Mineral Oil & Grease (2 x 250 mL Amber Glass, 2 mL 1:1 HCl or 1:1 H2SO4)
- Organochlorine Pesticides (OCP) (2 X 500 mL Amber Glass)
- Organophosphorus Pesticides (OPP) (2 X 500 mL Amber Glass)
- Polychlorinated Biphenyls (PCBs) (2 X 500 mL Amber Glass)
- Chlorophenols (Tri, Tetra & Penta) (2 X 500 mL Amber Glass, C6H8O6 & NaHSO4)
- Phenolics, Chlorinated (2 X 500 mL Amber Glass, C6H8O6 & NaHSO4)
- Phenolics, Non-Chlorinated (2 X 500 mL Amber Glass, C6H8O6 & NaHSO4)
- Phenols, Colorimetric (125 mL Amber Glass, H2SO4)
- Acid Extractable Herbicides (2 X 1 L Amber Glass, NaHSO4)
- Resin Acids (2 X 500 mL Amber Glass, C6H8O6 & NaHSO4)
- Fatty Acids (2 X 500 mL Amber Glass, C6H8O6 & NaHSO4)

GENERAL NUTRIENTS (125 mL AMBER GLASS) - H2SO4

- Carbon: TOC
- Chemical Oxygen Demand (COD)
- Nitrogen: Ammonia
- Nitrogen: Total
- Nitrogen: Total Kjeldahl (Calc)
- Nitrogen: Total Organic
- Phosphorus: Total

BACTERIOLOGY

- E. coli - MF
- Enterococci - MF
- Fecal coliform - MF
- Fecal coliform - MPN
- Fecal streptoc - MF
- Total coliform - MF
- Total coliform - MPN

GENERAL (125 mL AMBER GLASS) - FIELD FILTER, H2SO4

- Carbon: DIC (Field Filter)
- Carbon: DOC (FF, H2SO4)
- Nitrogen: Dissolved Kjeldahl (Calc) (FF, H2SO4)
- Nitrogen: Total Dissolved (FF, H2SO4)
- Phosphorus: Total Dissolved (FF, H2SO4)

METALS: TOTAL

High	Low	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Metal Pkg. (ICPMS) - HIGH (60 mL Plastic) - HNO3
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Metal Pkg. (ICPMS) - LOW (60 mL Plastic) - HNO3
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mercury - 40mL Glass, HCl
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hardness (60 mL Plastic) - HNO3

OTHER Tests

Smpl No.	FIELD TEST Details	Method Results	Units
----------	--------------------	----------------	-------

METALS: DISSOLVED

High	Low	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Metal Pkg (ICPMS) - HIGH (60 mL Plastic)-Field Filter, HNO3
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Metal Pkg. (ICPMS) - LOW (60 mL Plastic)-Field Filter, HNO3
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mercury - 40mL Glass, Field Filter, HCl
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hardness (60 mL Plastic) - Field Filter, HNO3



SEND RESULTS TO:
RUSTO.MARTINKA@GOV.BC.CA

Rush analysis RESULTS REQUIRED BY END OF DAY MONDAY FEB 24