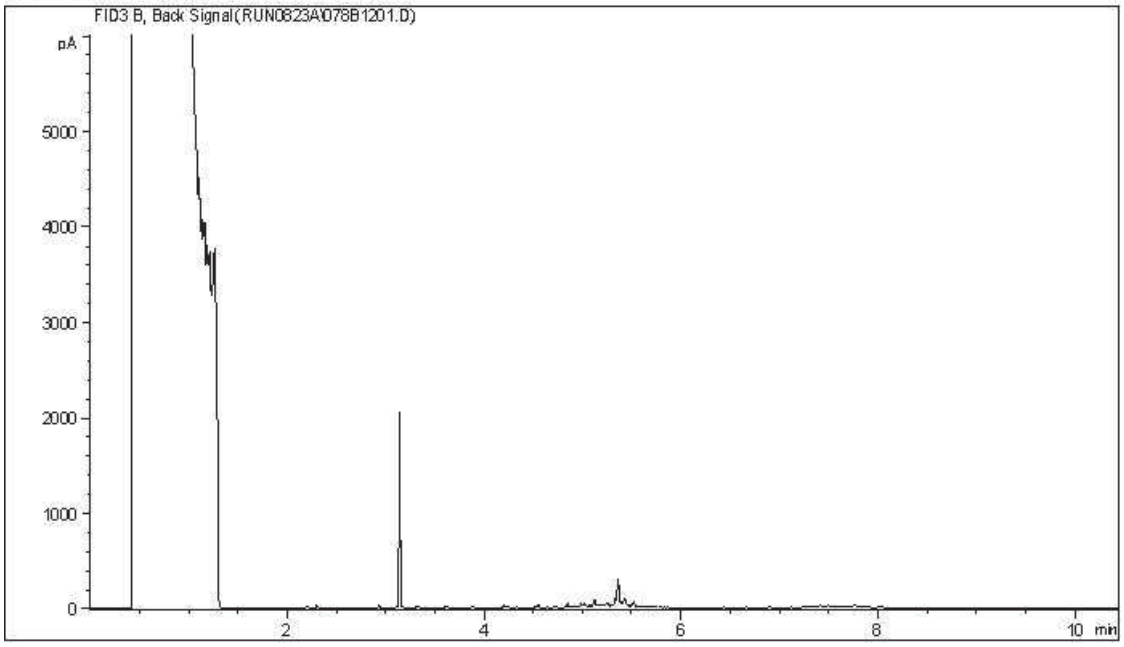
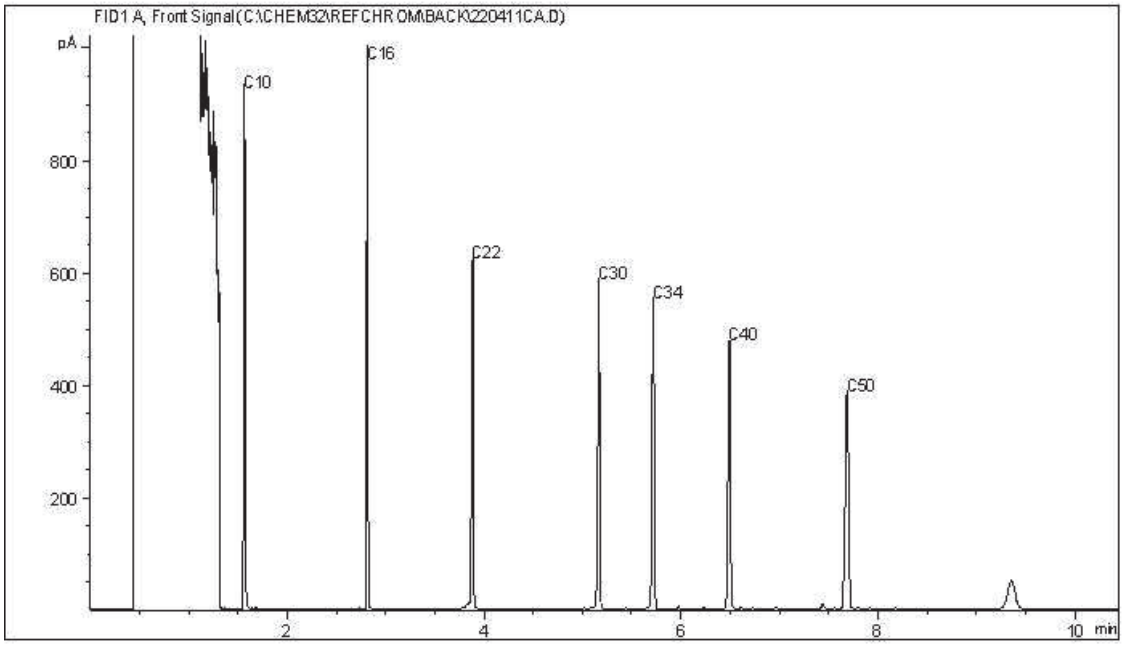
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC19



Carbon Range Distribution - Reference Chromatogram



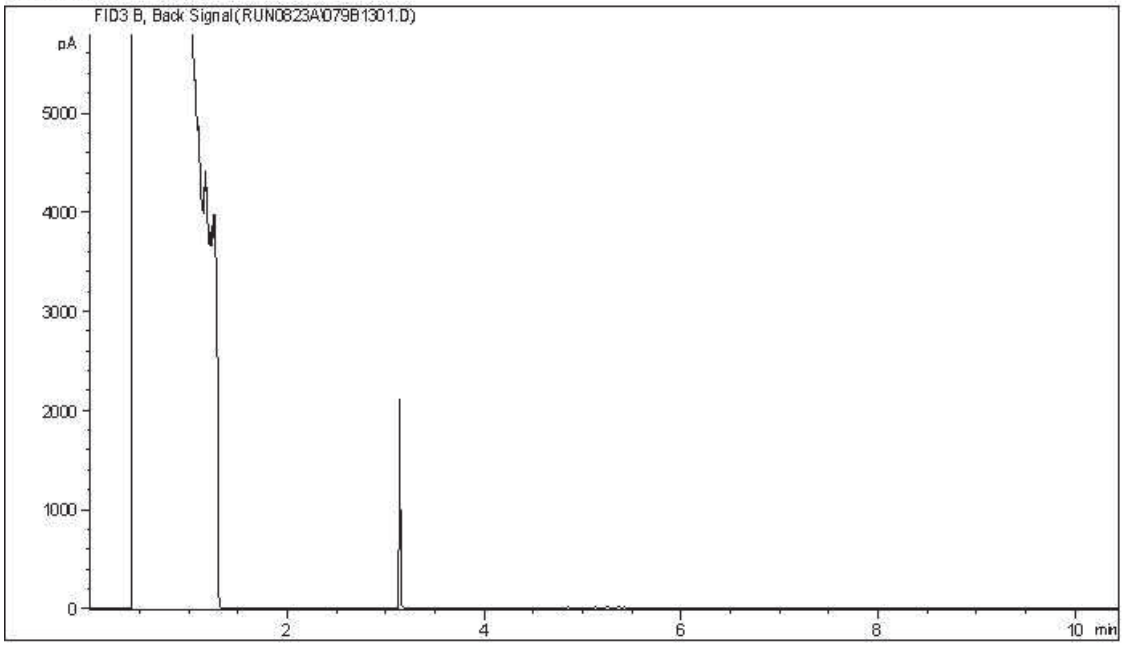
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

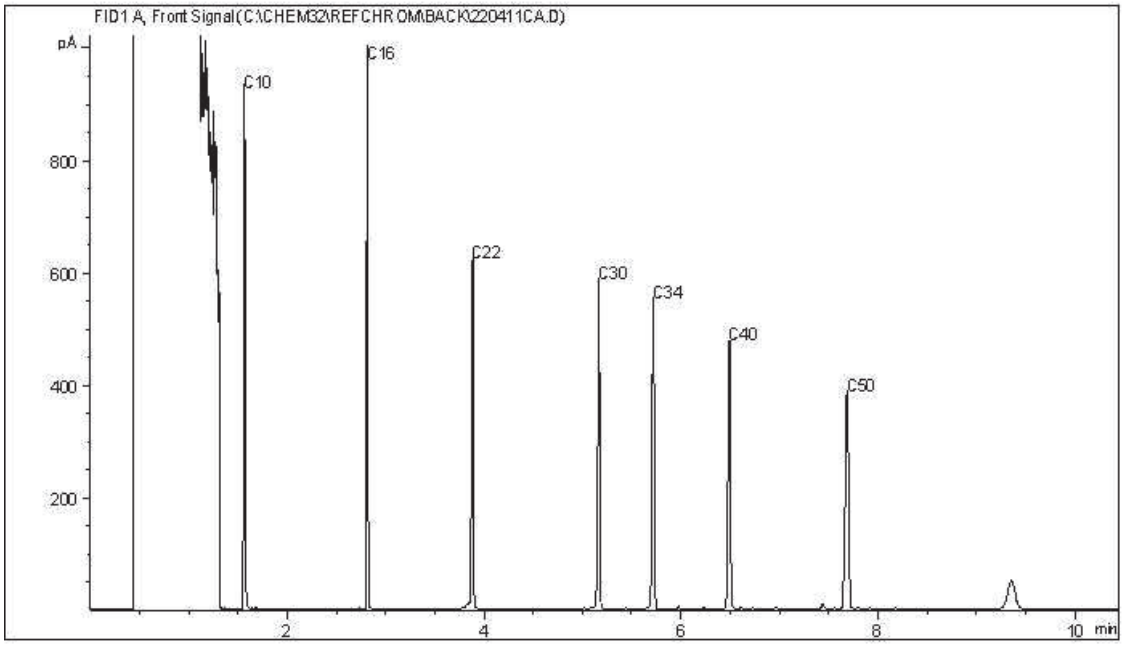
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC19



Carbon Range Distribution - Reference Chromatogram



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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

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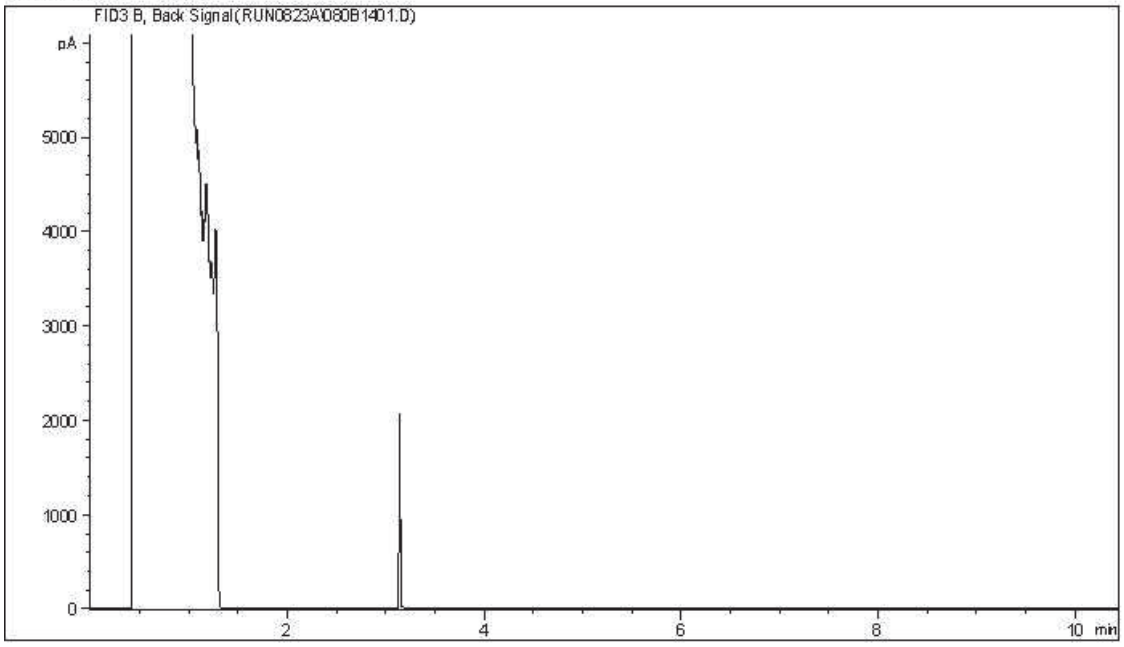
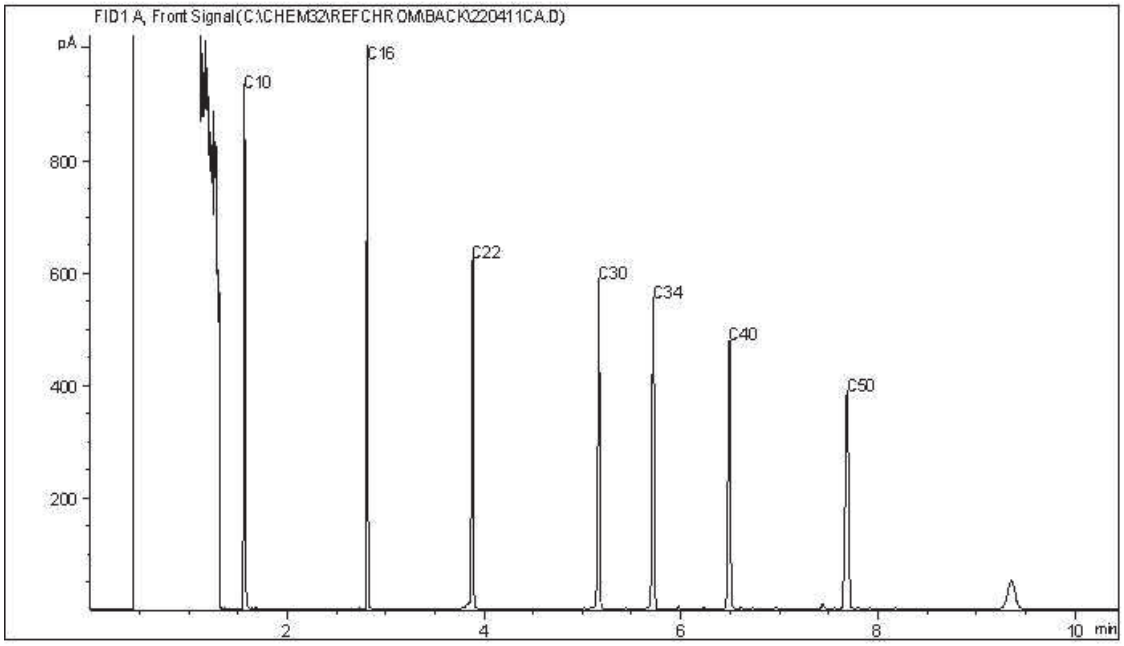


Carbon Range Distribution - Reference Chromatogram



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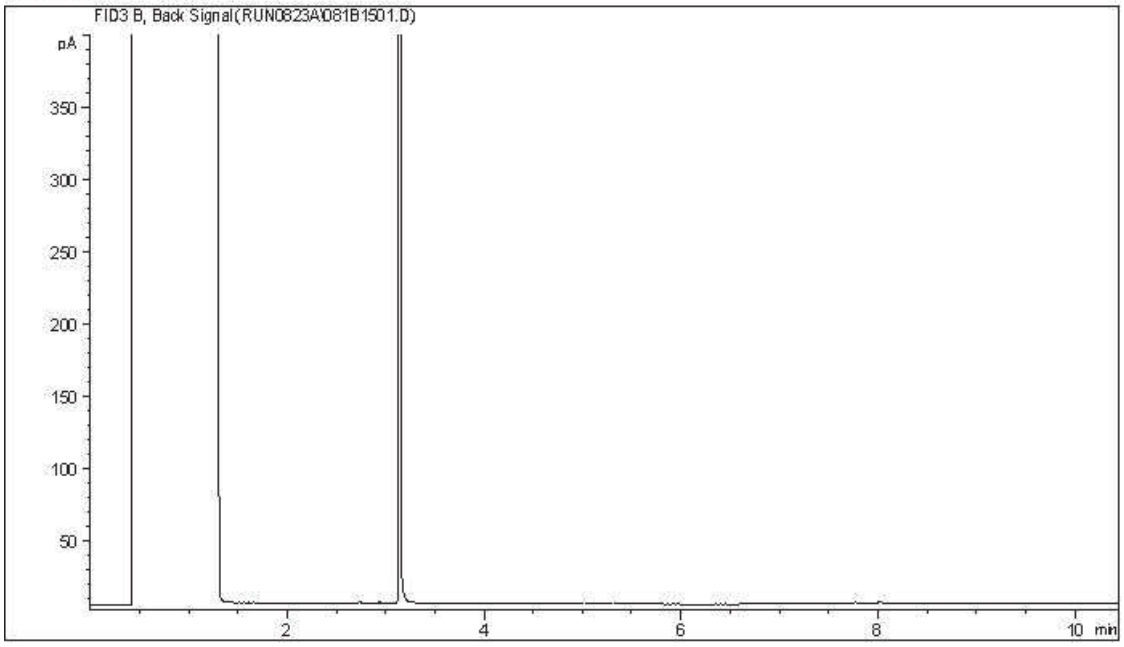
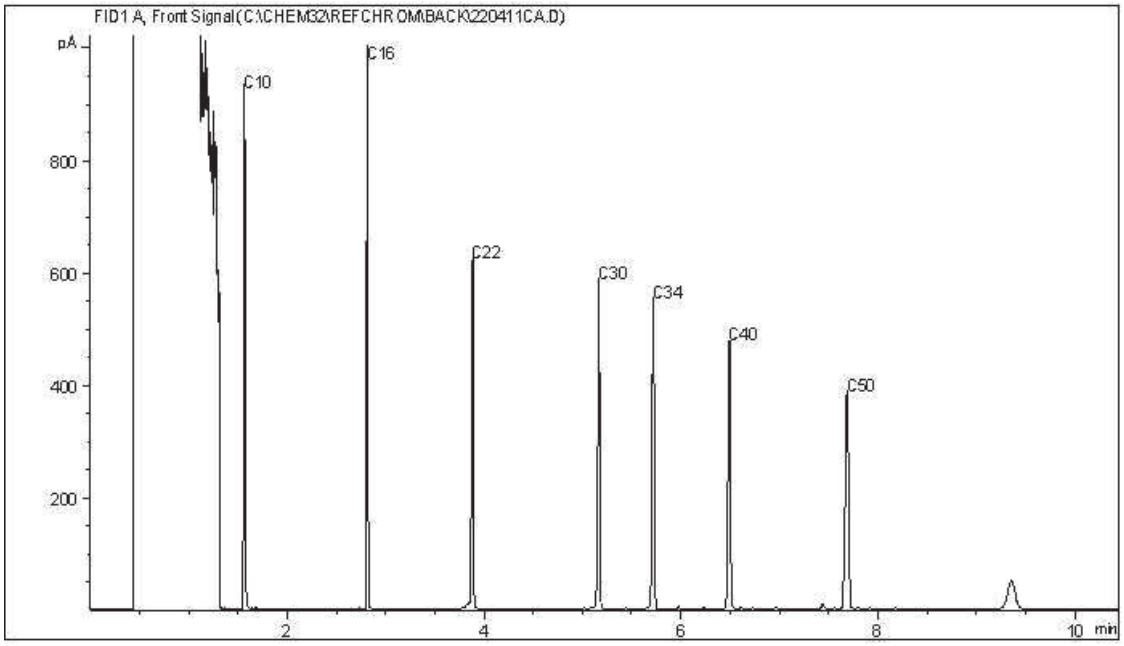
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC19



Carbon Range Distribution - Reference Chromatogram



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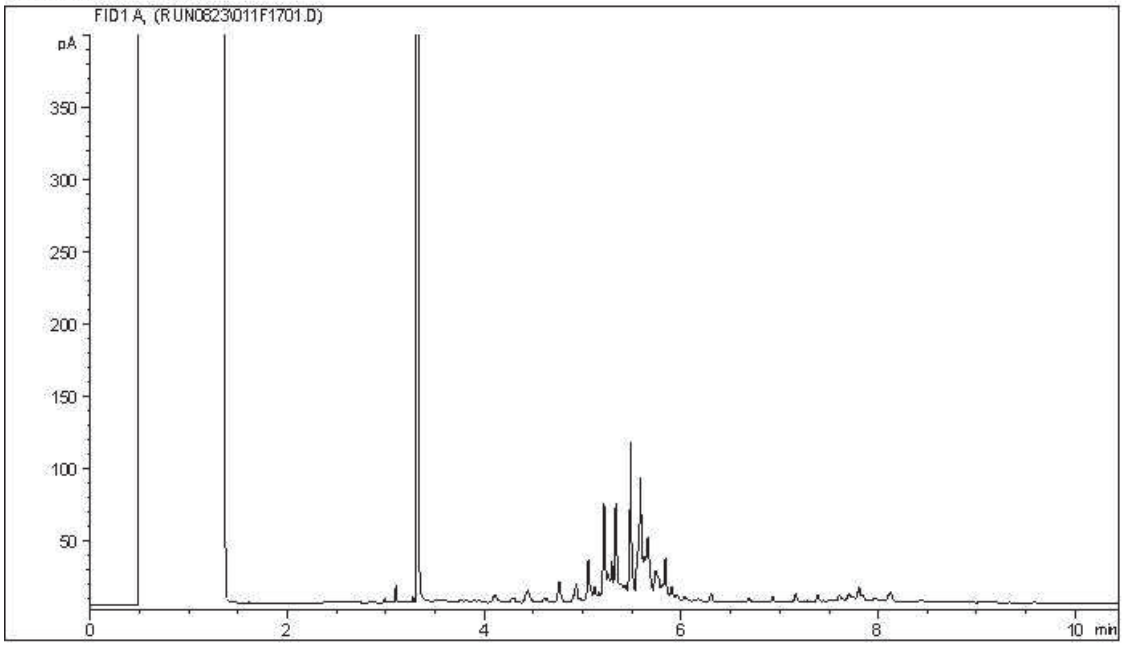
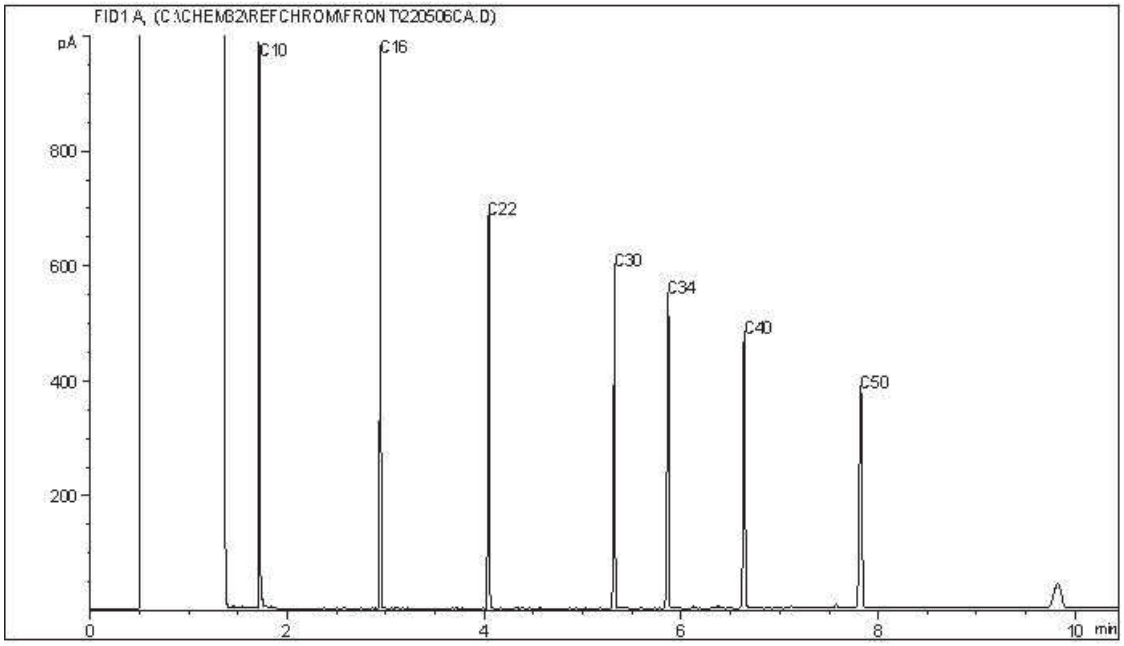
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



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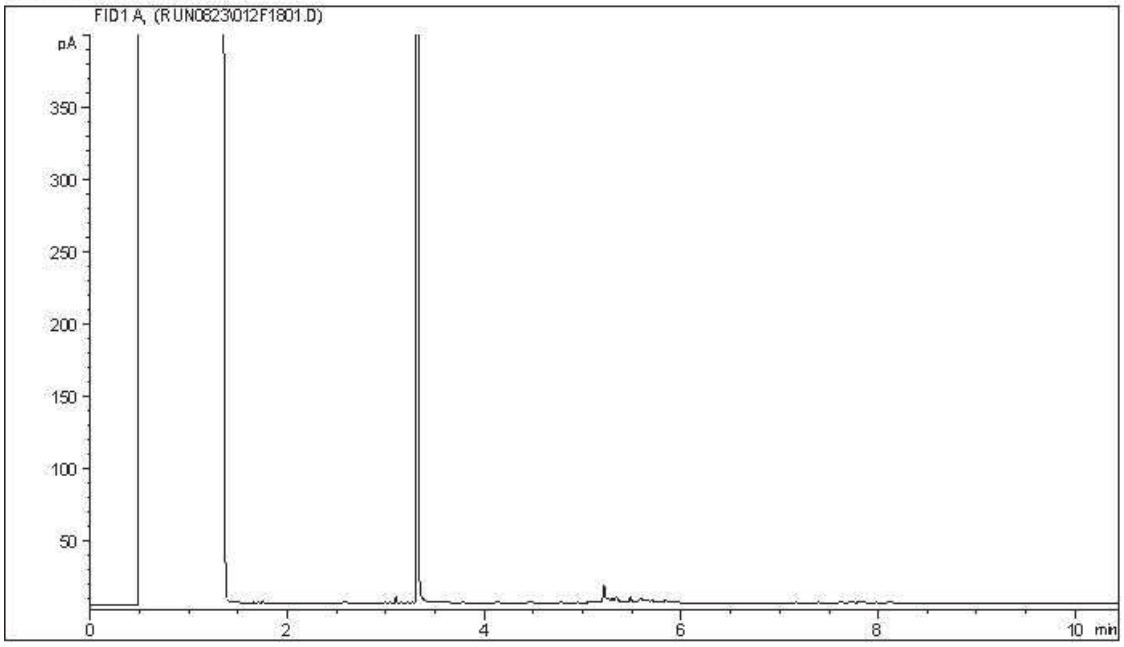
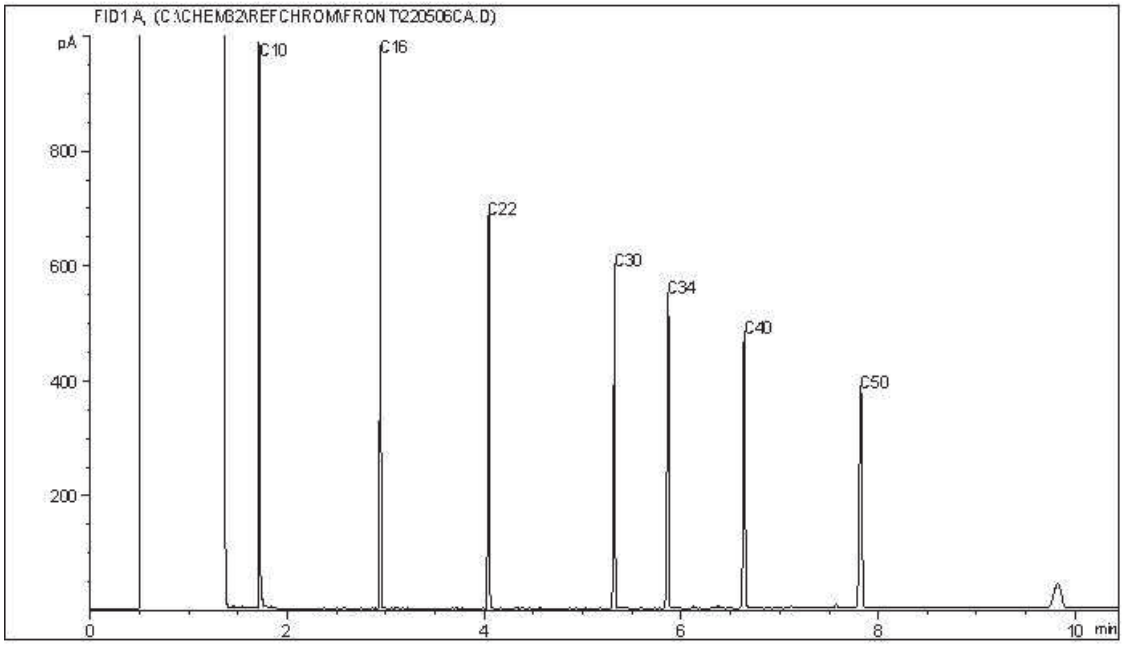
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



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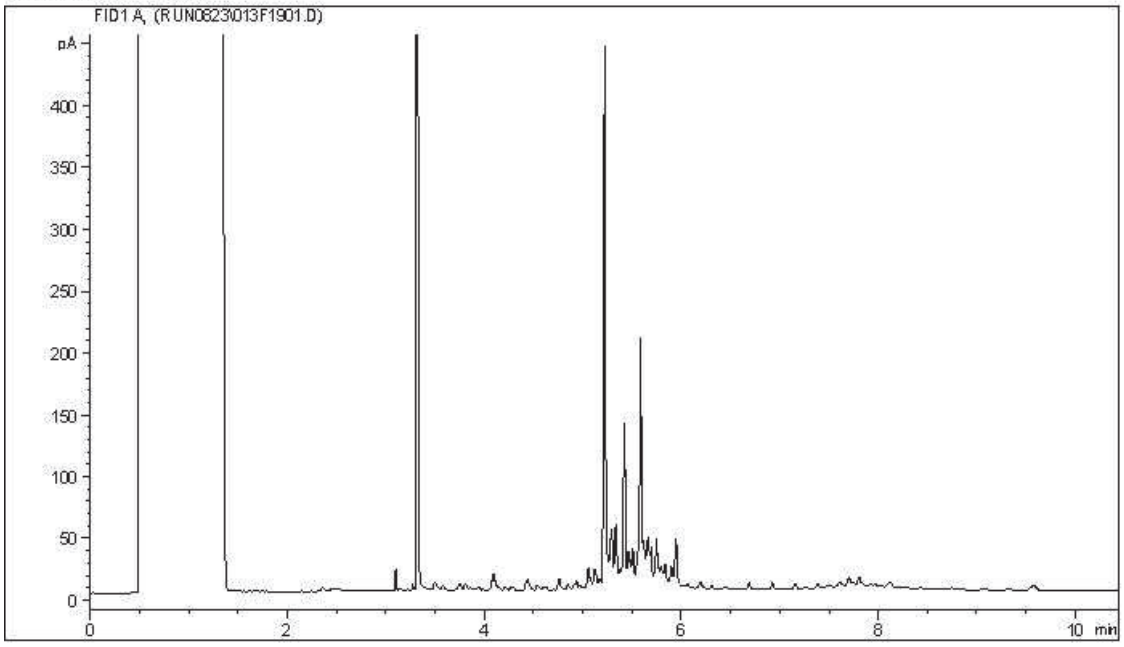
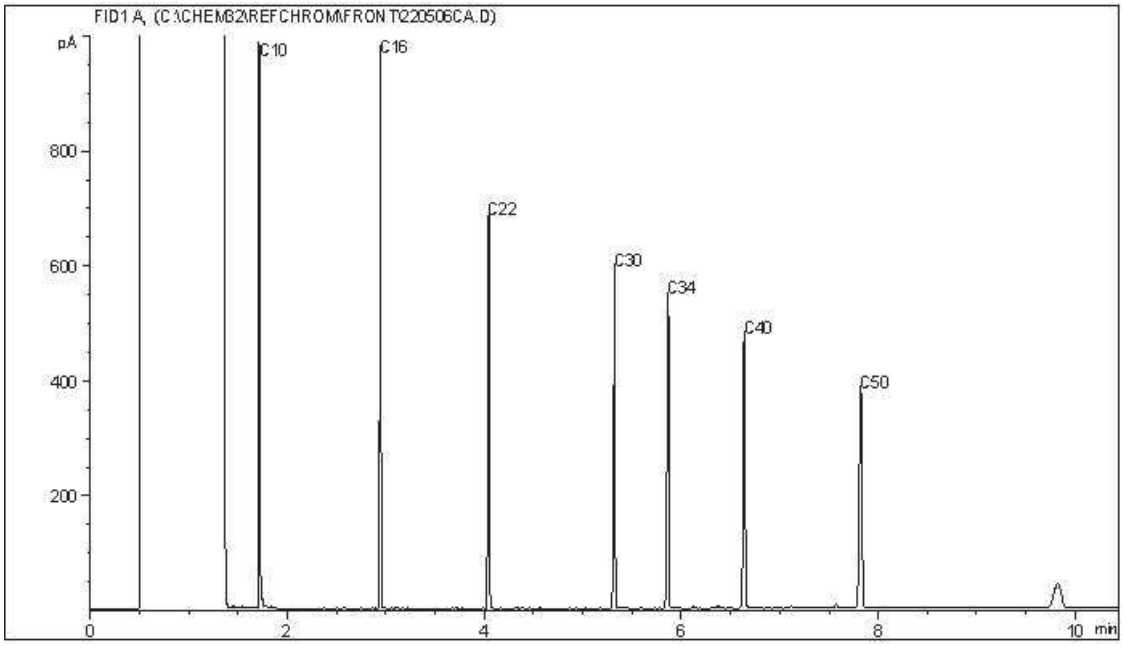
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



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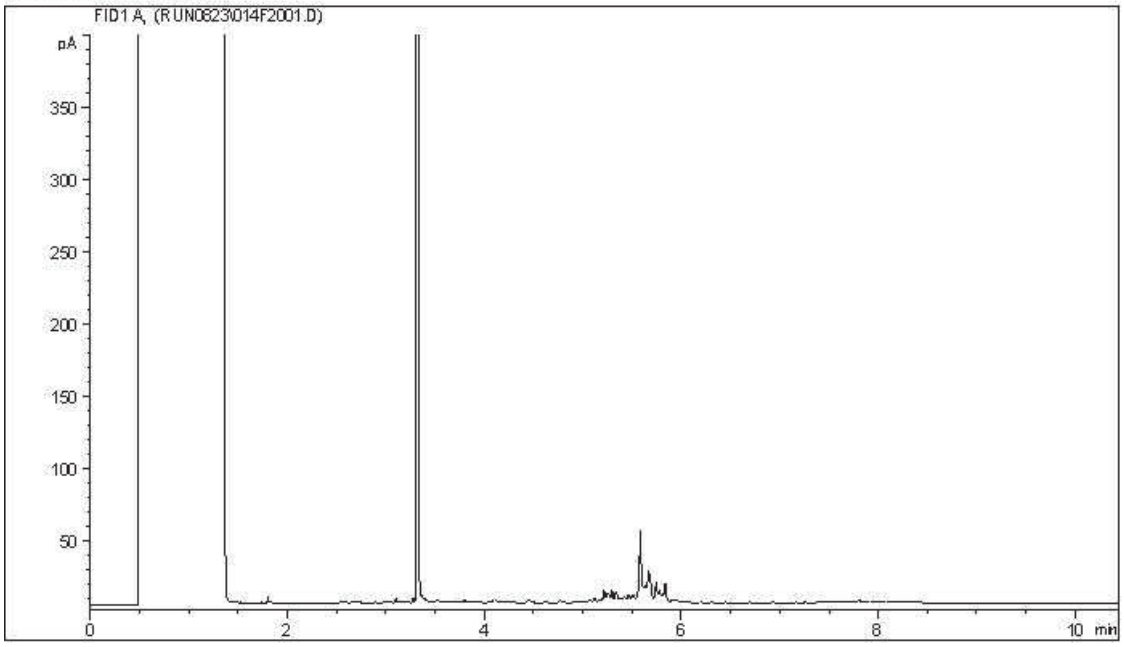
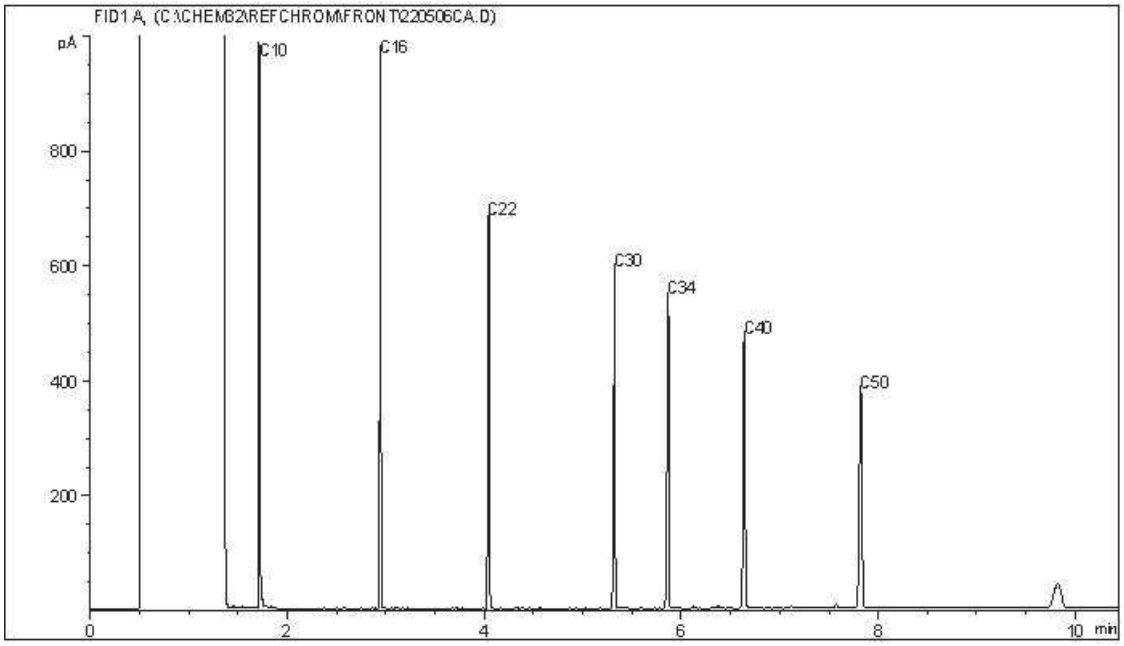
Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



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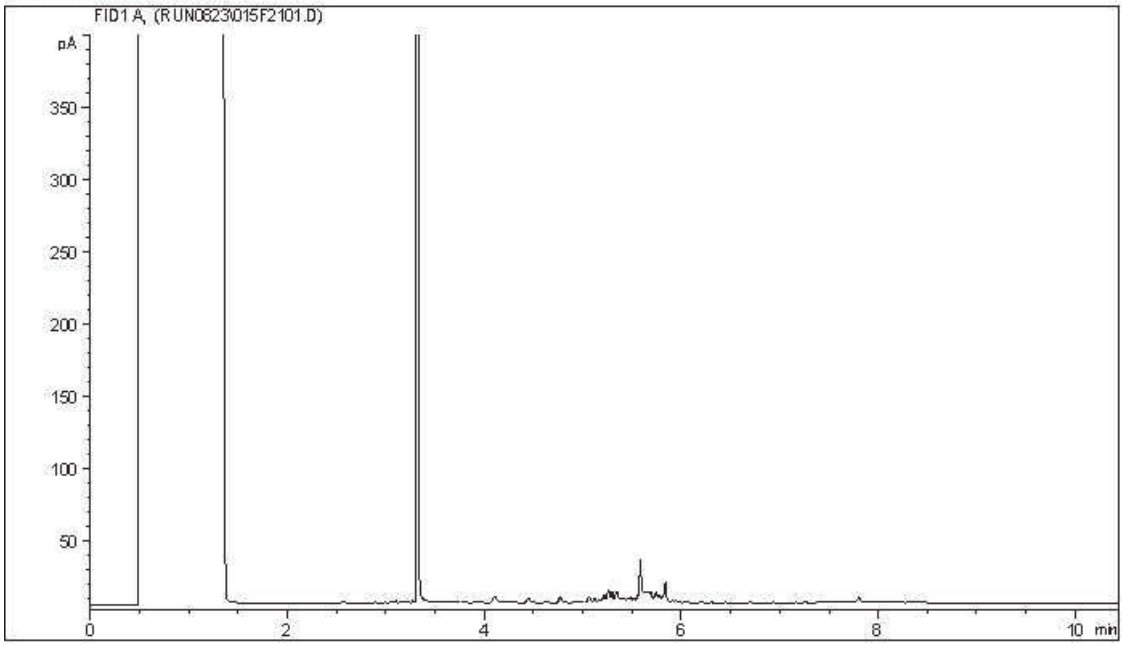
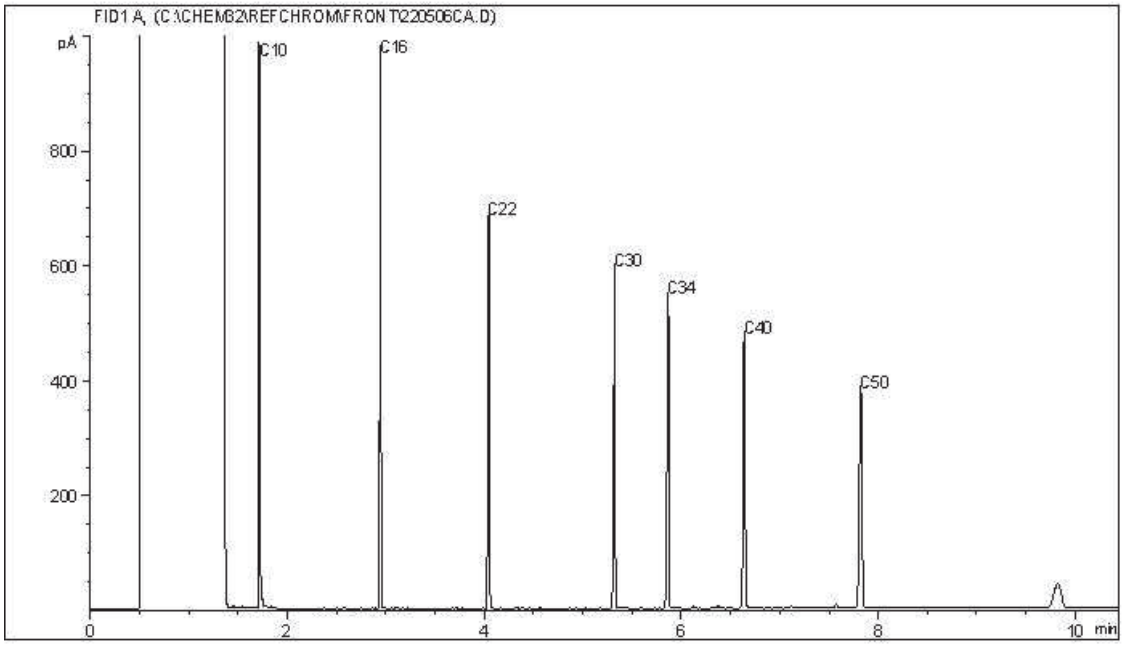
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



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

September 14, 2022

GOLDER ASSOCIATES LTD.
2800, 700 -2nd Street SW
CALGARY, AB, T2P 2W2

Attention: Aurelie Bellavance

Re: Biogenic Toluene Assessment of Camp Farewell, NT; Project 22525414-1000
Bureau Veritas Job No.: C262079

Bureau Veritas Environmental & Specialty Services Laboratories (BV Labs) was retained by Golder Associated Ltd. to provide an interpretation concerning the likely origin of toluene quantified within CCME Fraction 1 (nC6-nC10).

Analytical Method

Petroleum hydrocarbon analyses at BV Labs are conducted in accordance with the analytical specifications required by the prescriptive and performance-based (where appropriate) elements of the CCME Tier I protocols for hydrocarbon determination[1] in soil samples.

Biogenic Toluene

The sample extract is analyzed by volatile organic compound (VOC) analysis in selected ion monitoring (SIM) mode to determine the origin of the quantified toluene. The presence of specific marker compounds, both biogenic and petrogenic, along with a series of associated parameters are reviewed as part of this evaluation. Diagnostic parameters of primary interest and the ranges typically associated with biogenic toluene samples are listed below[2]:

- Moisture: typically ≥70%
- Absence of an Unresolved Complex Mixture (UCM) within CCME Fractions F2 or F3.
- Presence of a "Biogenic Cluster" within CCME Fraction 3 (F3Bc); specifically F3B, nC32-nC34
- Presence of biogenic monoterpene compound(s)[3]
- Toluene ratio (T_{ratio}): Ratio between Toluene and sum of all BTEX compounds; typically >0.7
- Cymene ratio (C_{ratio}): Ratio between p-Cymene and the sum of all three isomers; typically >0.8
- Additional diagnostic parameters may be included in the assessment if deemed beneficial (examples include: Carbon Preference Index (CPI), isoprenoid ratios, BIC, etc.)

[1] **Canadian Council of Ministers of the Environment: "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil – Tier I Method" 2001**

[2] **Bureau Veritas Laboratories Canada: threshold values derived internally (assessment of long-term data set)**

[3] **Target compounds: α/β-Pinene, Camphene, (+)-3-Carene, α-Terpinene, Limonene, o/m/p-Cymene, γ-Terpinene and α-Terpinolene (list may be amended from time-to-time without notice)**

Data Interpretation

Table 1. Data Summary – Biogenic Toluene Evaluation

Lab ID	Sample ID	Diagnostic Parameters[4]						Conclusion[5]
		Moist	UCM	F3B$_c$	Mono	T$_{ratio}$	C$_{ratio}$	
AZY348	BH22-14-02	M	No	Yes	No	1.0	NC	Inconclusive (neither)
AZY351	MW22-13-02	H	No	Yes	No	1.0	NC	Inconclusive (neither)
AZY358	BH22-12-01	H	No	Yes	No	1.0	NC	Inconclusive (neither)
AZY383	BH22-12-02	H	No	Yes	No	1.0	NC	Inconclusive (neither)

NC: Unable to Calculate (absence of Cymene isomers)

If you have any questions or require additional information, please do not hesitate to contact the undersigned.

Sincerely,
Bureau Veritas Environmental & Specialty Services Laboratories

Michael Sheppard, B.Sc., P.Bio, QP
Consulting Scientist
Environmental Services

Scott Cantwell, CET, B.Sc., P.Chem.
Director and General Manager – Western Canada
Environmental Services

Disclaimer

Biogenic Toluene
A detailed assessment of Selective Ion Monitoring (SIM) GC-MS, and associated project data was completed to provide further information relating to the biogenic and/or petrogenic origin of compounds or fractions quantified as part of the CCME Tier I protocol. All statements must be regarded as approximate and qualitative.

---

[4] **Diagnostic Parameters**
Moist: Moisture; H (≥70%), M (<70 & ≥20%), L (<20%)
UCM: Presence/Position of Unresolved Complex Mixture
F3Bc: Presence of a biogenic cluster within F3B
Mono: Biogenic monoterpenes (excluding cymenes)
T$_{ratio}$: Toluene Ratio (T/ΣBTEX)
C$_{ratio}$: Cymene Ratio (p-Cymene/ΣCymene isomers)

[5] **Conclusions**
Biogenic Toluene: Quantified toluene likely of biogenic origin
Petrogenic Toluene: Quantified toluene likely of petrogenic origin
Inconclusive (both): Presence of both biogenic and petrogenic diagnostic parameters (CSIA recommended)
Inconclusive (neither): Insufficient evidence to support Biogenic or Petrogenic origin (CSIA recommended)

Your P.O. #: 22525414-1100-1104
Your Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your C.O.C. #: 1 of 2, 2 of 2

Attention: AURELIE BELLAVANCE

GOLDER ASSOCIATES LTD
CALGARY - NATIONAL CONTRACT
2800, 700 -2nd Street SW
CALGARY, AB
CANADA T2P 2W2

Report Date: 2022/09/14
Report #: R3232205
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C266062
Received: 2022/08/30, 12:00

Sample Matrix: Soil
Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 by HS GC/MS/FID (MeOH extract) (1, 2)	13	N/A	2022/09/04	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX (1)	13	N/A	2022/09/08		Auto Calc
CCME Hydrocarbons (F2-F4 in soil) (1, 3)	3	2022/09/07	2022/09/08	AB SOP-00036	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in soil) (1, 3)	10	2022/09/07	2022/09/09	AB SOP-00036	CCME PHC-CWS m
Moisture (1)	13	N/A	2022/09/08	AB SOP-00002	CCME PHC-CWS m
Benzo[a]pyrene Equivalency (1)	9	N/A	2022/09/09		Auto Calc
PAH in Soil by GC/MS (1)	9	2022/09/07	2022/09/09	AB SOP-00036 / AB SOP-00003	EPA 3540C/8270E m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
(2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.
(3) All CCME results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the

Your P.O. #: 22525414-1100-1104
Your Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your C.O.C. #: 1 of 2, 2 of 2

Attention: AURELIE BELLAVANCE

GOLDER ASSOCIATES LTD
CALGARY - NATIONAL CONTRACT
2800, 700 -2nd Street SW
CALGARY, AB
CANADA T2P 2W2

Report Date: 2022/09/14
Report #: R3232205
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C266062

Received: 2022/08/30, 12:00

reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil, Validation of Performance-Based Alternative Methods September 2003. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
14 Sep 2022 16:45:11

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Cynny Hagen, Key Account Specialist
Email: Cynny.HAGEN@bureauveritas.com
Phone# (403)735-2273

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Job #: C266062
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1104
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW656	BAW656		BAW657	BAW658	BAW658	BAW659		
Sampling Date		2022/08/26 10:40	2022/08/26 10:40		2022/08/26 10:50	2022/08/26 11:00	2022/08/26 11:00	2022/08/26 11:30		
COC Number		1 of 2	1 of 2		1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	BH22-68-01	BH22-68-01 Lab-Dup	RDL	BH22-68-02	BH22-68-03	BH22-68-03 Lab-Dup	BH22-62-01	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	38 (1)	N/A	36	<10	<10	N/A	17	10	A707876
F3 (C16-C34 Hydrocarbons)	mg/kg	880 (1)	N/A	180	<50	<50	N/A	82	50	A707876
F4 (C34-C50 Hydrocarbons)	mg/kg	270 (1)	N/A	180	<50	<50	N/A	<50	50	A707876
Reached Baseline at C50	mg/kg	Yes	N/A	N/A	Yes	Yes	N/A	Yes	N/A	A707876
Physical Properties										
Moisture	%	73	N/A	0.30	13	18	18	N/A	0.30	A707826
Volatiles										
Xylenes (Total)	mg/kg	<0.13	N/A	0.13	<0.045	<0.045	N/A	<0.045	0.045	A701402
F1 (C6-C10) - BTEX	mg/kg	<13	N/A	13	<10	<10	N/A	<10	10	A701402
Field Preserved Volatiles										
Benzene	mg/kg	<0.020 (2)	<0.020	0.020	<0.0050	<0.0050	N/A	<0.0050	0.0050	A702776
Toluene	mg/kg	<0.060 (2)	<0.060	0.060	<0.050	<0.050	N/A	<0.050	0.050	A702776
Ethylbenzene	mg/kg	<0.046 (2)	<0.046	0.046	<0.010	<0.010	N/A	<0.010	0.010	A702776
m & p-Xylene	mg/kg	<0.10 (2)	<0.10	0.10	<0.040	<0.040	N/A	<0.040	0.040	A702776
o-Xylene	mg/kg	<0.079 (2)	<0.079	0.079	<0.020	<0.020	N/A	<0.020	0.020	A702776
F1 (C6-C10)	mg/kg	<13 (2)	<13	13	<10	<10	N/A	<10	10	A702776
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	95	97	N/A	96	95	N/A	96	N/A	A702776
4-Bromofluorobenzene (sur.)	%	97	96	N/A	98	99	N/A	98	N/A	A702776
D10-o-Xylene (sur.)	%	112	114	N/A	111	120	N/A	112	N/A	A702776
D4-1,2-Dichloroethane (sur.)	%	91	91	N/A	91	91	N/A	92	N/A	A702776
O-TERPHENYL (sur.)	%	97	N/A	N/A	96	95	N/A	92	N/A	A707876

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, sample contains => 50% moisture.
(2) Detection limit reported based on MDL and sample weight used for analysis.

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C266062
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1104
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW659		BAW660	BAW661	BAW662	BAW663		
Sampling Date		2022/08/26 11:30		2022/08/26 11:40	2022/08/26 11:50	2022/08/26 13:15	2022/08/26 13:30		
COC Number		1 of 2		1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	BH22-62-01 Lab-Dup	QC Batch	BH22-62-02	BH22-62-03	BH22-61-01	BH22-61-02	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	16	A707876	18	16	17	20	10	A707848
F3 (C16-C34 Hydrocarbons)	mg/kg	85	A707876	77	77	100	82	50	A707848
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	A707876	<50	<50	<50	<50	50	A707848
Reached Baseline at C50	mg/kg	Yes	A707876	Yes	Yes	Yes	Yes	N/A	A707848
Volatiles									
Xylenes (Total)	mg/kg	N/A	A701402	<0.045	<0.045	<0.045	<0.045	0.045	A701402
F1 (C6-C10) - BTEX	mg/kg	N/A	A701402	<10	<10	<10	16	10	A701402
Field Preserved Volatiles									
Benzene	mg/kg	N/A	A702776	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A702776
Toluene	mg/kg	N/A	A702776	<0.050	<0.050	<0.050	<0.050	0.050	A702776
Ethylbenzene	mg/kg	N/A	A702776	<0.010	<0.010	<0.010	<0.010	0.010	A702776
m & p-Xylene	mg/kg	N/A	A702776	<0.040	<0.040	<0.040	<0.040	0.040	A702776
o-Xylene	mg/kg	N/A	A702776	<0.020	<0.020	<0.020	<0.020	0.020	A702776
F1 (C6-C10)	mg/kg	N/A	A702776	<10	<10	<10	16	10	A702776
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	N/A	A702776	97	96	97	97	N/A	A702776
4-Bromofluorobenzene (sur.)	%	N/A	A702776	98	98	98	100	N/A	A702776
D10-o-Xylene (sur.)	%	N/A	A702776	119	121	113	111	N/A	A702776
D4-1,2-Dichloroethane (sur.)	%	N/A	A702776	91	91	93	89	N/A	A702776
O-TERPHENYL (sur.)	%	92	A707876	103	102	102	103	N/A	A707848

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C266062
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1104
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW664		BAW665	BAW666	BAW667	BAW668		
Sampling Date		2022/08/26 13:45		2022/08/26 14:00	2022/08/26 14:10	2022/08/26 14:20	2022/08/26 14:30		
COC Number		1 of 2		1 of 2	1 of 2	1 of 2	2 of 2		
	UNITS	BH22-61-03	QC Batch	BH22-61-04	BH22-60-01	BH22-60-02	BH22-60-03	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	A707848	17	16	51	59	10	A707876
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	A707848	93	71	120	130	50	A707876
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	A707848	<50	<50	<50	<50	50	A707876
Reached Baseline at C50	mg/kg	Yes	A707848	Yes	Yes	Yes	Yes	N/A	A707876
Physical Properties									
Moisture	%	N/A	N/A	N/A	N/A	N/A	33	0.30	A707826
Volatiles									
Xylenes (Total)	mg/kg	<0.045	A701402	<0.045	<0.045	<0.045	<0.045	0.045	A701402
F1 (C6-C10) - BTEX	mg/kg	<10	A701402	<10	<10	<10	<10	10	A701402
Field Preserved Volatiles									
Benzene	mg/kg	<0.0050	A702776	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A702776
Toluene	mg/kg	<0.050	A702776	<0.050	<0.050	<0.050	<0.050	0.050	A702776
Ethylbenzene	mg/kg	<0.010	A702776	<0.010	<0.010	<0.010	<0.010	0.010	A702776
m & p-Xylene	mg/kg	<0.040	A702776	<0.040	<0.040	<0.040	<0.040	0.040	A702776
o-Xylene	mg/kg	<0.020	A702776	<0.020	<0.020	<0.020	<0.020	0.020	A702776
F1 (C6-C10)	mg/kg	<10	A702776	<10	<10	<10	<10	10	A702776
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	94	A702776	95	94	95	96	N/A	A702776
4-Bromofluorobenzene (sur.)	%	98	A702776	100	98	98	98	N/A	A702776
D10-o-Xylene (sur.)	%	118	A702776	122	120	108	118	N/A	A702776
D4-1,2-Dichloroethane (sur.)	%	91	A702776	92	90	91	90	N/A	A702776
O-TERPHENYL (sur.)	%	101	A707848	96	92	91	94	N/A	A707876

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas Job #: C266062
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1104
Sampler Initials: JD

PHYSICAL TESTING (SOIL)

Bureau Veritas ID		BAW659	BAW660	BAW661	BAW662	BAW663	BAW664	BAW665		
Sampling Date		2022/08/26 11:30	2022/08/26 11:40	2022/08/26 11:50	2022/08/26 13:15	2022/08/26 13:30	2022/08/26 13:45	2022/08/26 14:00		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	BH22-62-01	BH22-62-02	BH22-62-03	BH22-61-01	BH22-61-02	BH22-61-03	BH22-61-04	RDL	QC Batch
Physical Properties										
Moisture	%	22	30	28	26	23	15	33	0.30	A707826
RDL = Reportable Detection Limit										

Bureau Veritas ID		BAW666	BAW667		
Sampling Date		2022/08/26 14:10	2022/08/26 14:20		
COC Number		1 of 2	1 of 2		
	UNITS	BH22-60-01	BH22-60-02	RDL	QC Batch
Physical Properties					
Moisture	%	25	23	0.30	A707826
RDL = Reportable Detection Limit					

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SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID		BAW659	BAW659		BAW660	BAW661	BAW662		
Sampling Date		2022/08/26 11:30	2022/08/26 11:30		2022/08/26 11:40	2022/08/26 11:50	2022/08/26 13:15		
COC Number		1 of 2	1 of 2		1 of 2	1 of 2	1 of 2		
	UNITS	BH22-62-01	BH22-62-01 Lab-Dup	QC Batch	BH22-62-02	BH22-62-03	BH22-61-01	RDL	QC Batch
Polycyclic Aromatics									
B[a]P TPE Total Potency Equivalents	mg/kg	0.0090	N/A	A707096	0.016	0.015	0.015	0.0071	A707096
Naphthalene	mg/kg	0.026	0.027	A707875	0.028	0.032	0.031	0.0050	A707845
Surrogate Recovery (%)									
D10-ANTHRACENE (sur.)	%	95	91	A707875	109	105	104	N/A	A707845
D8-ACENAPHTHYLENE (sur.)	%	82	81	A707875	93	92	89	N/A	A707845
D8-NAPHTHALENE (sur.)	%	89	85	A707875	94	94	92	N/A	A707845
TERPHENYL-D14 (sur.)	%	104	99	A707875	109	112	111	N/A	A707845

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas ID		BAW663	BAW664		BAW665	BAW666	BAW667		
Sampling Date		2022/08/26 13:30	2022/08/26 13:45		2022/08/26 14:00	2022/08/26 14:10	2022/08/26 14:20		
COC Number		1 of 2	1 of 2		1 of 2	1 of 2	1 of 2		
	UNITS	BH22-61-02	BH22-61-03	QC Batch	BH22-61-04	BH22-60-01	BH22-60-02	RDL	QC Batch
Polycyclic Aromatics									
B[a]P TPE Total Potency Equivalents	mg/kg	0.015	<0.0071	A707096	0.015	0.013	0.013	0.0071	A707096
Naphthalene	mg/kg	0.026	<0.0050	A707845	0.019	0.022	0.029	0.0050	A707875
Surrogate Recovery (%)									
D10-ANTHRACENE (sur.)	%	104	106	A707845	102	102	90	N/A	A707875
D8-ACENAPHTHYLENE (sur.)	%	92	91	A707845	92	92	80	N/A	A707875
D8-NAPHTHALENE (sur.)	%	93	93	A707845	99	96	83	N/A	A707875
TERPHENYL-D14 (sur.)	%	109	119	A707845	120	111	95	N/A	A707875

RDL = Reportable Detection Limit
N/A = Not Applicable

GENERAL COMMENTS

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

Package 1	4.7°C
Package 2	3.7°C
Package 3	8.7°C
Package 4	3.3°C
Package 5	4.7°C
Package 6	4.0°C
Package 7	4.7°C

Version #3: Report reissued with chromatogram reviewed on sample BAW656 (BH22-68-01) as per client request 20220912

Change Request: Report to include results for Naphthalene & B(a)TPE on below samples as per client request received 2022/09/07.
BH22-60-01/BAW666
BH22-60-02/BAW667
BH22-61-01/BAW662
BH22-61-02/BAW663
BH22-61-03/BAW664
BH22-61-04/BAW665
BH22-62-01/BAW659
BH22-62-02/BAW660
BH22-62-03/BAW661

HYDROCARBON RESEMBLANCE
The reported hydrocarbon resemblance was obtained by visual comparison of the sample chromatogram with a library of reference product chromatograms. Since variables such as the degree and type of weathering and the presence of non-petrogenic hydrocarbons cannot be duplicated in reference spectra, the resemblance information must be regarded as approximate and qualitative and as such, Bureau Veritas Laboratories can assume no liability for any conclusions drawn from these data.

Sample BAW656 [BH22-68-01] : The CCME F2-F4 chromatographic peak profile is consistent with biogenic organic material (e.g. peat). Chromatograms of biogenic organic material may contain peak patterns spanning the C10 to C50 range, but they are most commonly characterized by a profile of unevenly distributed sharp peaks between C28 and C34. The impacts are not consistent with a petroleum product or crude oil.

Results relate only to the items tested.

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C266062
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1104
Sampler Initials: JD

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A702776	WPK	Matrix Spike [BAW656-02]	1,4-Difluorobenzene (sur.)	2022/09/04		79	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		82	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		97	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		78	%	50 - 140
			Benzene	2022/09/04		84	%	50 - 140
			Toluene	2022/09/04		80	%	50 - 140
			Ethylbenzene	2022/09/04		80	%	50 - 140
			m & p-Xylene	2022/09/04		80	%	50 - 140
			o-Xylene	2022/09/04		82	%	50 - 140
			F1 (C6-C10)	2022/09/04		98	%	60 - 140
A702776	WPK	Spiked Blank	1,4-Difluorobenzene (sur.)	2022/09/04		97	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		96	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		118	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		90	%	50 - 140
			Benzene	2022/09/04		101	%	60 - 130
			Toluene	2022/09/04		97	%	60 - 130
			Ethylbenzene	2022/09/04		99	%	60 - 130
			m & p-Xylene	2022/09/04		97	%	60 - 130
			o-Xylene	2022/09/04		101	%	60 - 130
			F1 (C6-C10)	2022/09/04		105	%	60 - 140
A702776	WPK	Method Blank	1,4-Difluorobenzene (sur.)	2022/09/04		95	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		96	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		96	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		89	%	50 - 140
			Benzene	2022/09/04	<0.0050		mg/kg	
			Toluene	2022/09/04	<0.050		mg/kg	
			Ethylbenzene	2022/09/04	<0.010		mg/kg	
			m & p-Xylene	2022/09/04	<0.040		mg/kg	
			o-Xylene	2022/09/04	<0.020		mg/kg	
			F1 (C6-C10)	2022/09/04	<10		mg/kg	
A702776	WPK	RPD [BAW656-02]	Benzene	2022/09/04	NC		%	50
			Toluene	2022/09/04	NC		%	50
			Ethylbenzene	2022/09/04	NC		%	50
			m & p-Xylene	2022/09/04	NC		%	50
			o-Xylene	2022/09/04	NC		%	50
			F1 (C6-C10)	2022/09/04	NC		%	30
A707826	WLE	Method Blank	Moisture	2022/09/08	<0.30		%	
A707826	WLE	RPD [BAW658-01]	Moisture	2022/09/08	2.2		%	20
A707845	JU2	Matrix Spike	D10-ANTHRACENE (sur.)	2022/09/08		99	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/09/08		82	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/09/08		80	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/09/08		100	%	50 - 130
			Naphthalene	2022/09/08		77	%	50 - 130
A707845	JU2	Spiked Blank	D10-ANTHRACENE (sur.)	2022/09/08		111	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/09/08		93	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/09/08		100	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/09/08		123	%	50 - 130
			Naphthalene	2022/09/08		95	%	50 - 130
A707845	JU2	Method Blank	D10-ANTHRACENE (sur.)	2022/09/08		117	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/09/08		95	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/09/08		99	%	50 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			TERPHENYL-D14 (sur.)	2022/09/08		133 (1)	%	50 - 130
			Naphthalene	2022/09/08	<0.0050		mg/kg	
A707845	JU2	RPD	Naphthalene	2022/09/08	NC		%	50
A707848	CAU	Matrix Spike	O-TERPHENYL (sur.)	2022/09/09		99	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/09		94	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/09		97	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/09		93	%	60 - 140
A707848	CAU	Spiked Blank	O-TERPHENYL (sur.)	2022/09/09		100	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/09		96	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/09		98	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/09		95	%	60 - 140
A707848	CAU	Method Blank	O-TERPHENYL (sur.)	2022/09/09		111	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/09	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2022/09/09	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2022/09/09	<50		mg/kg	
A707848	CAU	RPD	F2 (C10-C16 Hydrocarbons)	2022/09/09	NC		%	40
			F3 (C16-C34 Hydrocarbons)	2022/09/09	5.4		%	40
			F4 (C34-C50 Hydrocarbons)	2022/09/09	NC		%	40
A707875	JU2	Matrix Spike [BAW659-01]	D10-ANTHRACENE (sur.)	2022/09/09		94	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/09/09		84	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/09/09		90	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/09/09		104	%	50 - 130
			Naphthalene	2022/09/09		94	%	50 - 130
A707875	JU2	Spiked Blank	D10-ANTHRACENE (sur.)	2022/09/09		101	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/09/09		90	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/09/09		95	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/09/09		110	%	50 - 130
			Naphthalene	2022/09/09		96	%	50 - 130
A707875	JU2	Method Blank	D10-ANTHRACENE (sur.)	2022/09/09		101	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/09/09		89	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/09/09		95	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/09/09		113	%	50 - 130
			Naphthalene	2022/09/09	<0.0050		mg/kg	
A707875	JU2	RPD [BAW659-01]	Naphthalene	2022/09/09	3.4		%	50
A707876	CAU	Matrix Spike [BAW659-01]	O-TERPHENYL (sur.)	2022/09/08		87	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08		86	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/08		85	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/08		84	%	60 - 140
A707876	CAU	Spiked Blank	O-TERPHENYL (sur.)	2022/09/08		92	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08		93	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/08		94	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/08		90	%	60 - 140
A707876	CAU	Method Blank	O-TERPHENYL (sur.)	2022/09/08		96	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2022/09/08	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2022/09/08	<50		mg/kg	
A707876	CAU	RPD [BAW659-01]	F2 (C10-C16 Hydrocarbons)	2022/09/08	5.5		%	40
			F3 (C16-C34 Hydrocarbons)	2022/09/08	3.1		%	40

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			F4 (C34-C50 Hydrocarbons)	2022/09/08	NC		%	40

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 (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

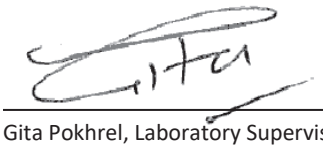
Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C266062
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1104
Sampler Initials: JD

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Gita Pokhrel, Laboratory Supervisor

Janet Gao, B.Sc., QP, Supervisor, Organics

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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BUREAU VERITAS

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

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COOLER OBSERVATIONS: 9

BV JOB#:

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP	1	2	3
INTACT						
ICE PRESENT						
Cooler 1			TEMP	0	0	1
Cooler 2			TEMP	0	0	1
Cooler 3			TEMP	4	3	3
Cooler 4			TEMP	0	0	0
Cooler 5			TEMP	3	3	3
Cooler 6			TEMP	2	1	0
Cooler 7			TEMP	-1	-2	-2
Cooler 8			TEMP	0	0	-2
Cooler 9			TEMP	-1	-2	-1
Cooler 10			TEMP			

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP	1	2	3
INTACT						
ICE PRESENT						

(Right-hand column of 10 cooler blocks, each with CUSTODY SEAL / PRESENT / INTACT / ICE PRESENT, YES / NO, COOLER ID, TEMP 1 2 3 — all blank.)

RECEIVED BY (SIGN & PRINT)		DATE (YYYY/MM/DD)	TIME (HH:MM)
[signature]	JASON BIL	2022/08/31	15:10

YK

MaXXam
A Bureau Veritas Group Company

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY #	
Golder	
Page 1 of 1	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
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Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	

COOLER OBSERVATIONS:

MAXXAM JOB#:

Cooler	Custody Seal Present (YES/NO)	Custody Seal Intact (YES/NO)	Ice Present (YES/NO)	COOLER ID	TEMP 1	TEMP 2	TEMP 3
1	YES ✓	YES ✓	YES ✓		4	5	3
2	YES ✓	YES ✓	YES ✓		2	4	5
3	YES ✓	YES ✓	YES ✓		8	9	9
4	YES ✓	YES ✓	YES ✓		3	5	2
5	YES ✓	YES ✓	YES ✓		4	4	6
6	YES ✓	YES ✓	YES ✓		2	4	6
7	YES ✓	YES ✓	YES ✓		4	5	5
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME (HH:MM)
Jose Mercano [signature]	2022/05/30	12:00 pm

www.BVNA.com

Choose Location:
- ☐ Calgary, AB: 4000 19th St. NE, T2E 6P8 Toll Free (800) 386-7247
- ☐ Edmonton, AB: 9331-48 St. T6B 2R4 Toll Free (800) 386-7247
- ☐ Winnipeg, MB: D-675 Berry St. R3H 1A7 Toll Free (866) 800-6208

CHAIN OF CUSTODY RECORD

ENV COC - 00013v3

Invoice Information		Report Information (if differs from invoice)		Project Information	
Invoice to (requires report) ☐					
Company:	Client #254, Golder Associates	Company:	Golder Associates	Quotation #:	Shell
Contact Name:	237 - 4 Ave SW Suite 3300	Contact Name:	Aurelie Bellavance	P.O. #/ AFE#:	22525414-1100-1104
Street Address:		Street Address:		Project #:	22525414-1000
City: Calgary Prov: AB Postal Code:		City: Calgary AB Postal Code:	T2P 4K3	Site #:	NA
Phone:		Phone:	403-299-5600	Site Location:	Camp Farewell
Email:	Canada Account Payable	Email:	Aurelie.Bellavance@wsp.com	Site Location Province:	NT
Copies:		Copies:	Peter.Tan@wsp.com	Sampled By:	JD/HK

LAB USE ONLY - PLACE STICKER HERE

Rush Confirmation #:

Regulatory Criteria

☐ AT1 ☐ CCME ☐ Drinking Water - Canada ☐ Drinking Water - Manitoba
☐ Saskatchewan ☐ Drinking Water - Alberta ☑ Other AMSRP

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

Regular Turnaround Time (TAT)
☑ 5 to 7 Day ☐ 10 Day

Rush Turnaround Time (TAT) Surcharges apply
☐ Same Day ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 4 Day
Date Required: YY MM DD

	Sample Identification	Date Sampled YY	MM	DD	Time (24hr) HH	MM	Matrix	1 FIELD FILTERED	2 FIELD PRESERVED	3 LAB FILTRATION REQUIRED	4 BTEX F1-F4	5 PAHS	6 BTEX F1-F2	7 BARIUM TRUE TOTAL	8 Routine water	9 Regulated metals - total	10 Regulated metals - dissolved	11 Mercury - total	12 Mercury - dissolved	13 Salinity 4	14 Sieve (75 micron)	15 Texture (% sand, silt, clay)	16 Basic class II landfill	17	18	19	20 LIMITED SAMPLE	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE
1	BH22-68-01	22	08	26	10	40	Soil				X																		
2	BH22-68-02				10	50					X																		
3	BH22-68-03				11	00					X																		
4	BH22-62-01				11	30					X																		
5	BH22-62-02				11	40					X																		
6	BH22-62-03				11	50					X																		
7	BH22-61-01				13	15					X																		
8	BH22-61-02				13	30					X																		
9	BH22-61-03				13	45					X																		
10	BH22-61-04				14	00					X																		
11	BH22-60-01				14	10					X																		
12	BH22-60-02				14	20					X																		

Received in Yellowknife
By: J.mercer
@ 12:00
AUG 30 2022
Ice yes - cs-yes
Temp: 8 9 9

Comments: Also email report to gld.shell_clgr@wsp.com gld.iol.equis@wsp.com

*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal Intact						
Cooling media present						

ACTR

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal Intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal Intact						
Cooling media present						

Temperature reading by:

	Relinquished by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM
1	Jonathan Dorcher	22	08	27	16	00	1 JASON BIL	22	08	31	15	10
2							2					

Special Instructions:

www.BVNA.com

Choose Location:
☐ Calgary, AB: 4000 19th St. NE, T2E 6P8 Toll Free (800) 386-7247
☐ Edmonton, AB: 9331-48 St. T6B 2R4 Toll Free (800) 386-7247
☐ Winnipeg, MB: D-675 Berry St. R3H 1A7 Toll Free (866) 800-6208

CHAIN OF CUSTODY RECORD

ENV COC - 00013v3

Invoice Information	Invoice to (requires report) ☐	Report Information (if differs from invoice)		Project Information	
Company:	Client #254, Golder Associates	Company:	Golder Associates	Quotation #:	Shell
Contact Name:	237 - 4 Ave SW Suite 3300	Contact Name:	Aurelie Bellavance	P.O. #/ AFE#:	22525414-100-104
Street Address:		Street Address:		Project #:	22525414-1000
City:	Calgary Prov: AB Postal Code:	City:	Calgary AB Postal Code: T2P 4K3	Site #:	NA
Phone:		Phone:	403-299-5600	Site Location:	Lamp Farewell
Email:	Canada Account Payable	Email:	Aurelie.Bellavance@wsp.com	Site Location Province:	NT
Copies:		Copies:	Peter.Tan@wsp.com	Sampled By:	SY HK

LAB USE ONLY - PLACE STICKER HERE

Rush Confirmation #:

Regulatory Criteria

☐ AT1 ☐ CCME ☐ Drinking Water - Canada ☐ Drinking Water - Manitoba
☐ Saskatchewan ☐ Drinking Water - Alberta ☑ Other AMSRP

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☑ 5 to 7 Day ☐ 10 Day

Rush Turnaround Time (TAT) Surcharges apply
☐ Same Day ☐ 1 Day
☐ 2 Day ☐ 3 Day
☐ 4 Day

Date Required: YY MM DD

#	Sample Identification	Date Sampled YY	MM	DD	Time (24hr) HH	MM	Matrix	1 FIELD FILTERED	2 FIELD PRESERVED	3 LAB FILTRATION REQUIRED	4 BTEX F1-F4	5 PAHS	6 BTEX F1-F2	7 BARIUM TRUE TOTAL	8 Routine water	9 Regulated metals - total	10 Regulated metals - dissolved	11 Mercury - total	12 Mercury - dissolved	13 Salinity 4	14 Sieve (75 micron)	15 Texture (% sand, silt, clay)	16 Basic class II landfill	17	18	19	20 LIMITED SAMPLE	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE	Comments
1	BH22-60-03	22	08	26	14	30	Soil				X																	3		Also email report to
2																														gld.shelldqr@wsp.com
3																														gld.iol.equis@wsp.com
4																														
5																														
6																														
7																														
8																														
9																														
10																														
11																														
12																														

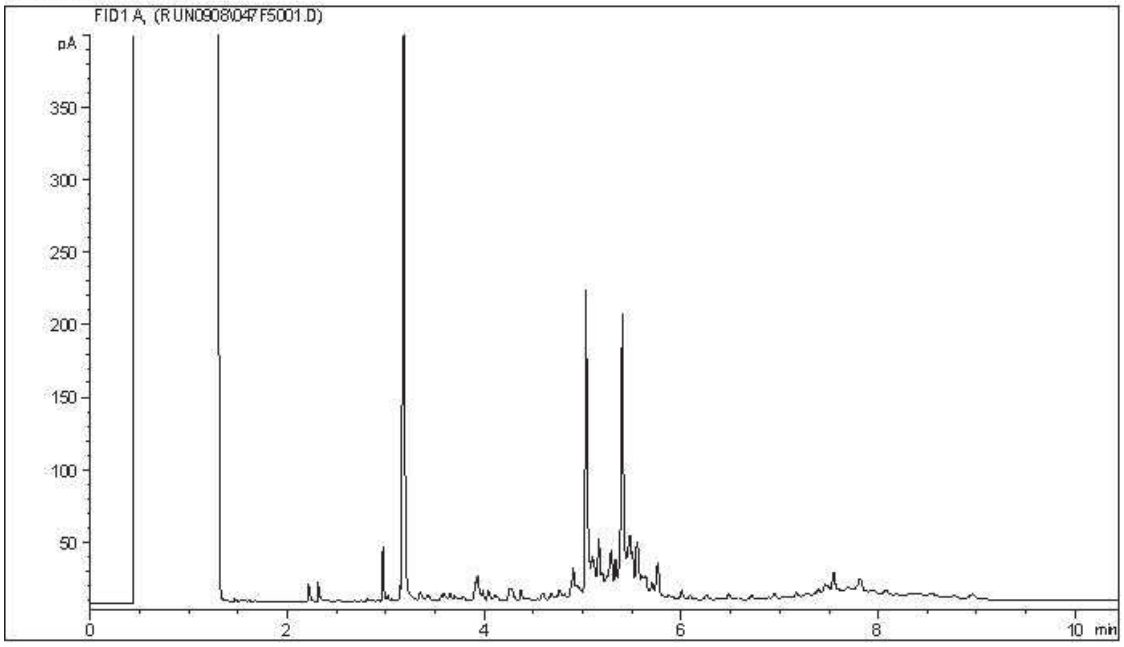
Received in Yellowknife
By: J. Mecca @12:00
AUG 30 2022
Temp: 8 / 9 / 9

LAB USE ONLY	Yes	No	°C	LAB USE ONLY	Yes	No	°C	LAB USE ONLY	Yes	No	°C	Temperature reading by:
Seal present			1 2 3	Seal present			1 2 3	Seal present			1 2 3	
Seal intact			ACTR	Seal intact				Seal intact				
Cooling media present				Cooling media present				Cooling media present				

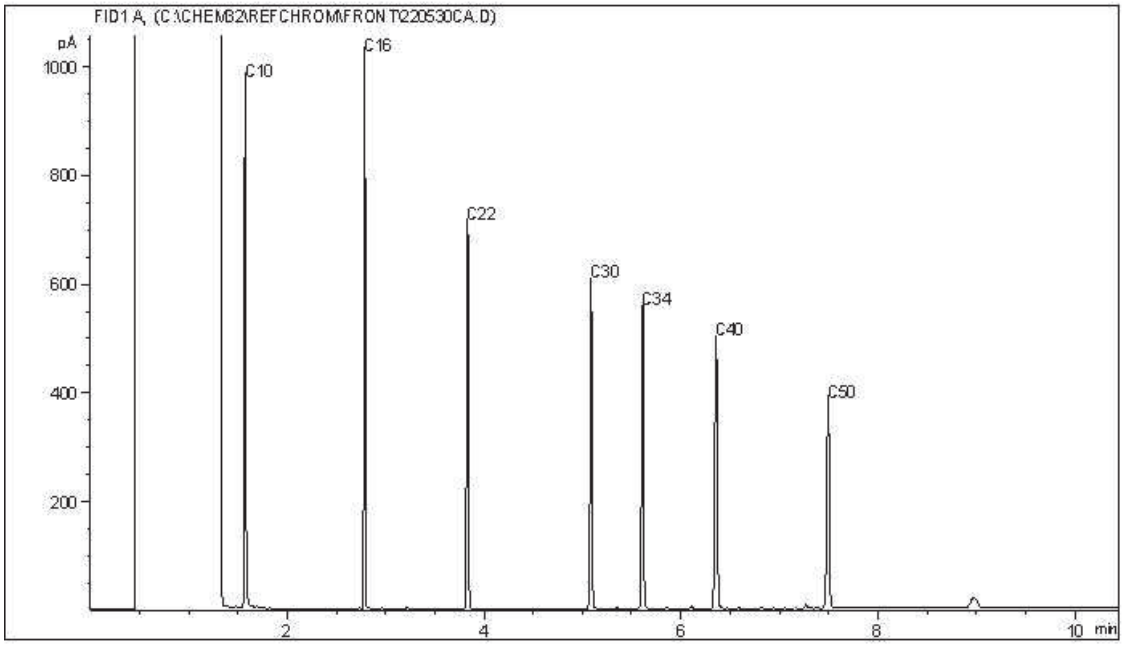
#	Relinquished by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	#	Received by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Special Instructions
1	Jonathan Dorclue	22	08	27	16	00	1	JASON BIL	22	08	31	15	10	
2							2							

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



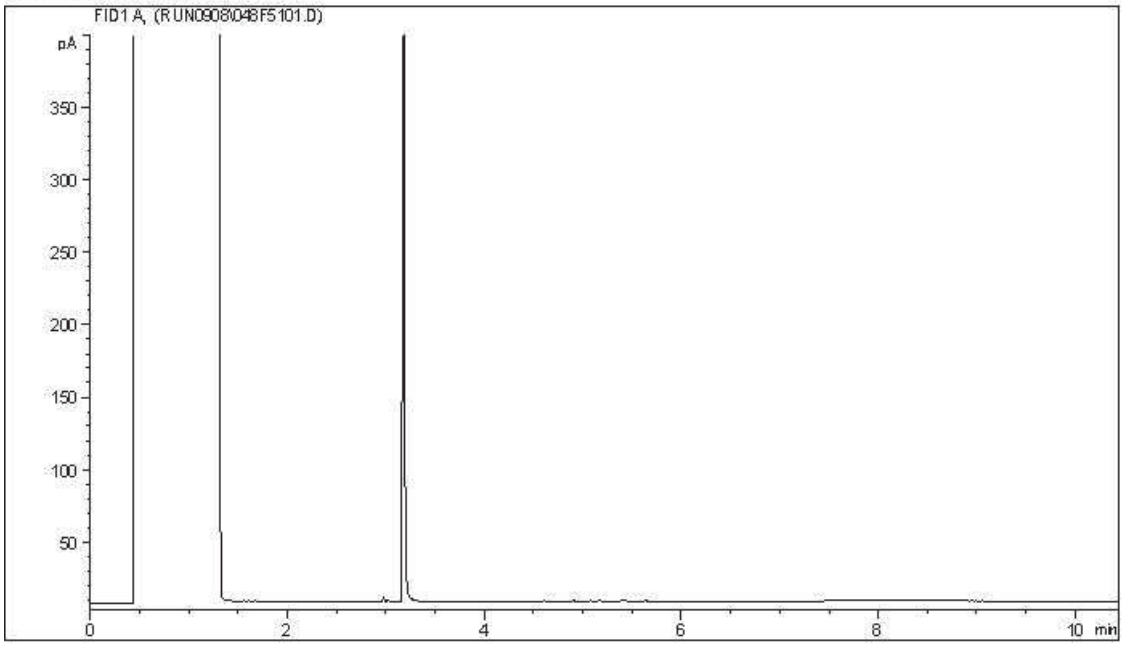
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

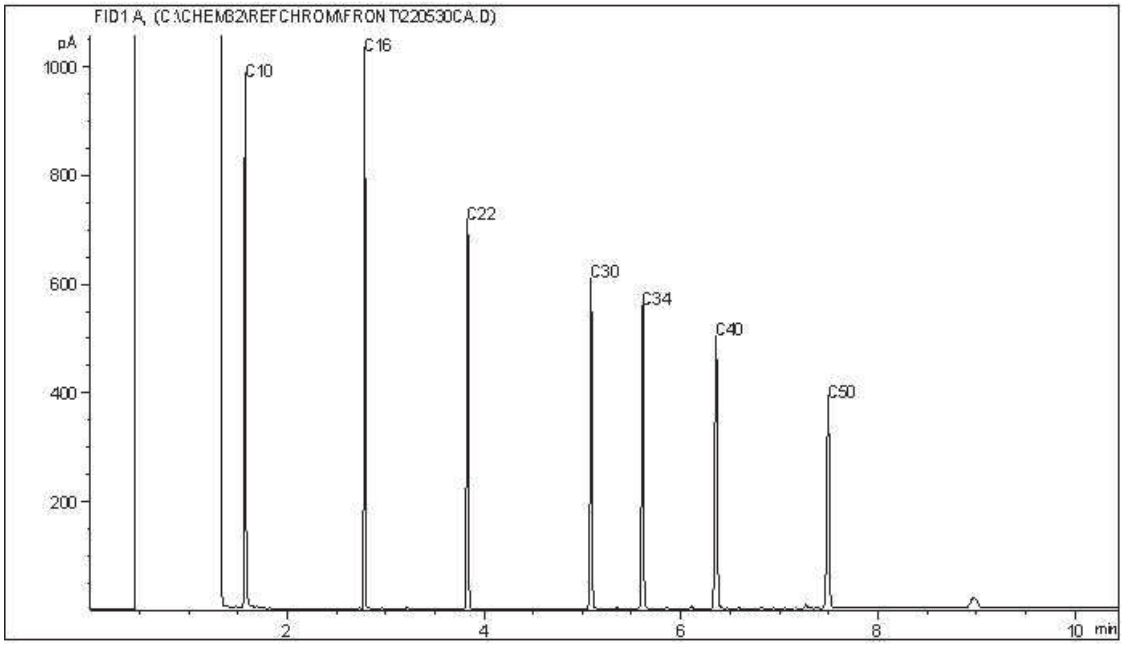
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



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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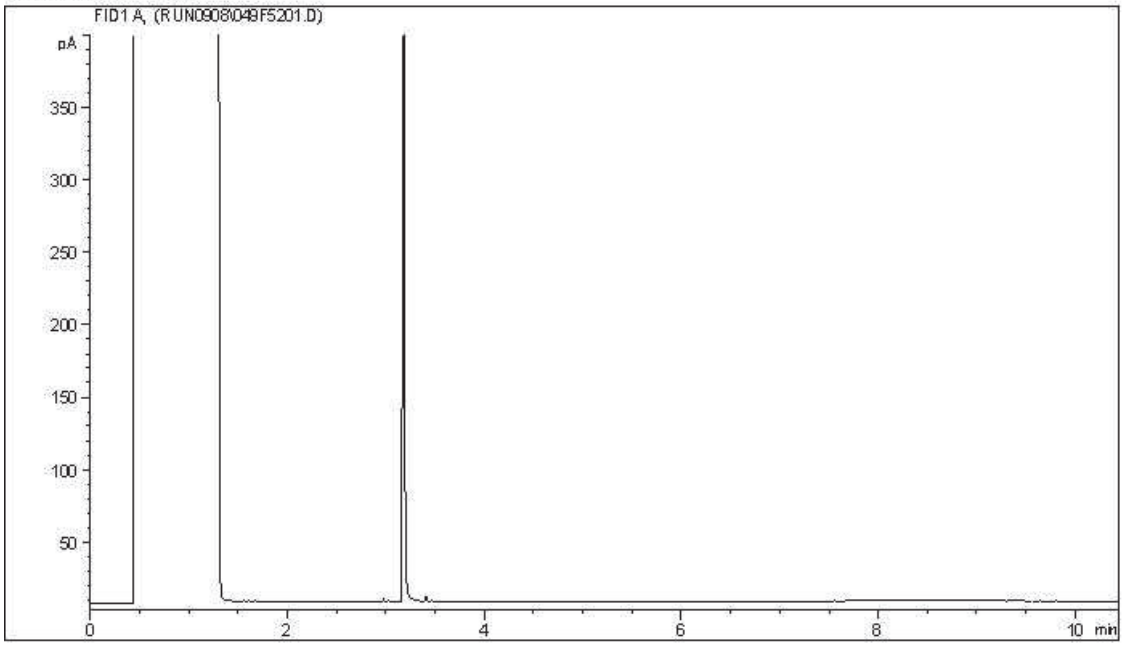
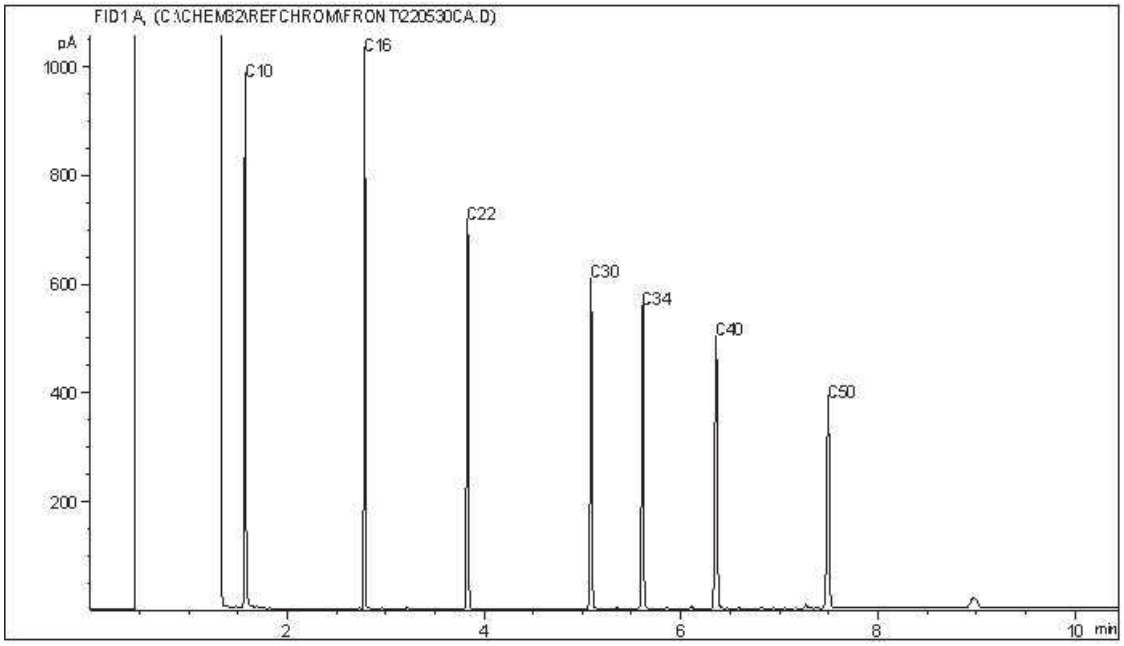
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
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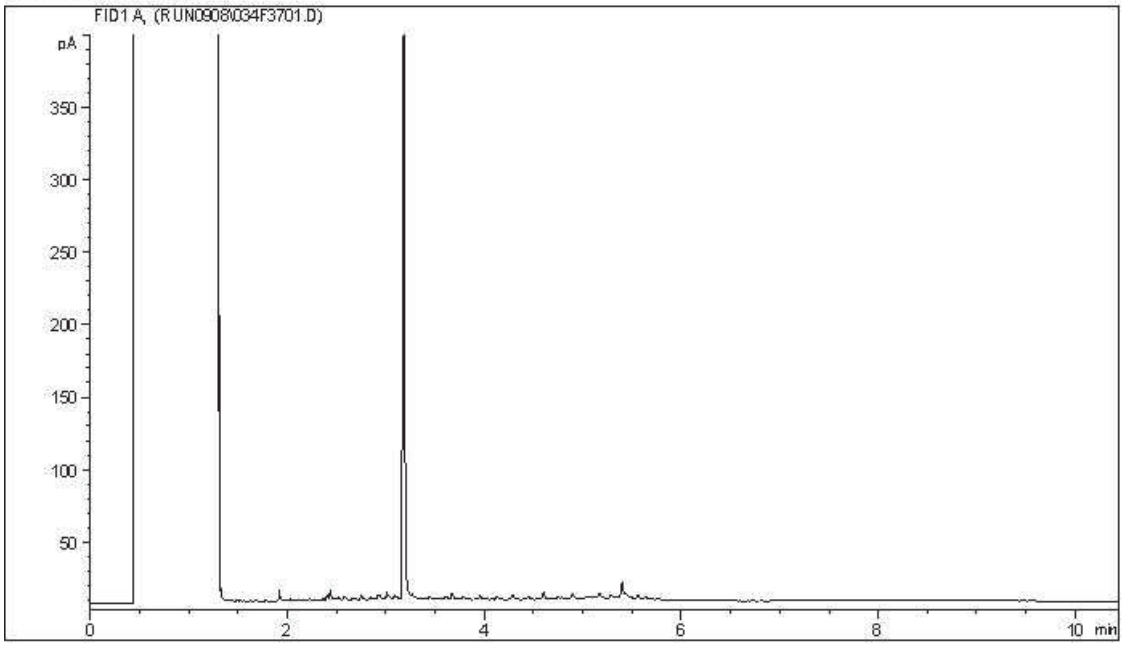
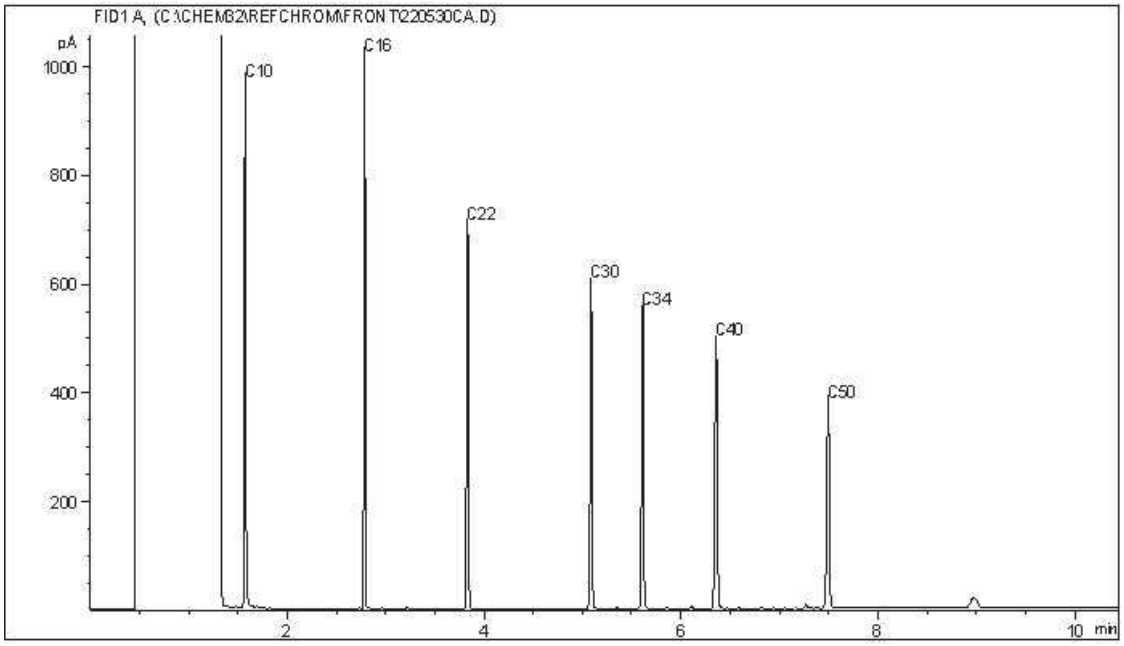
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



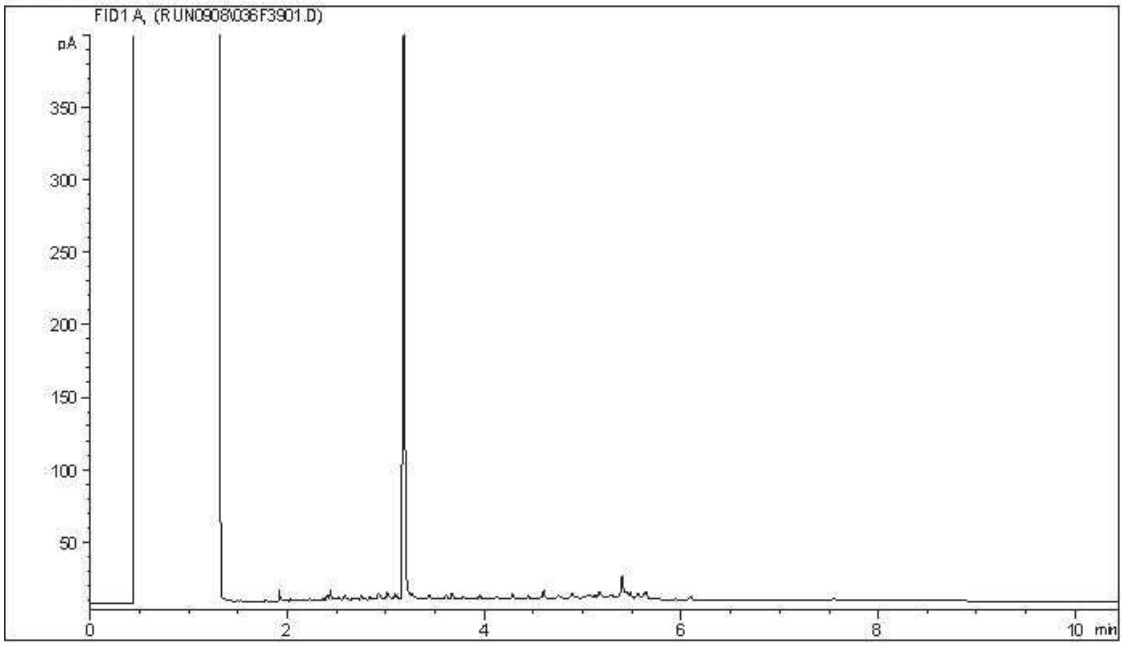
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

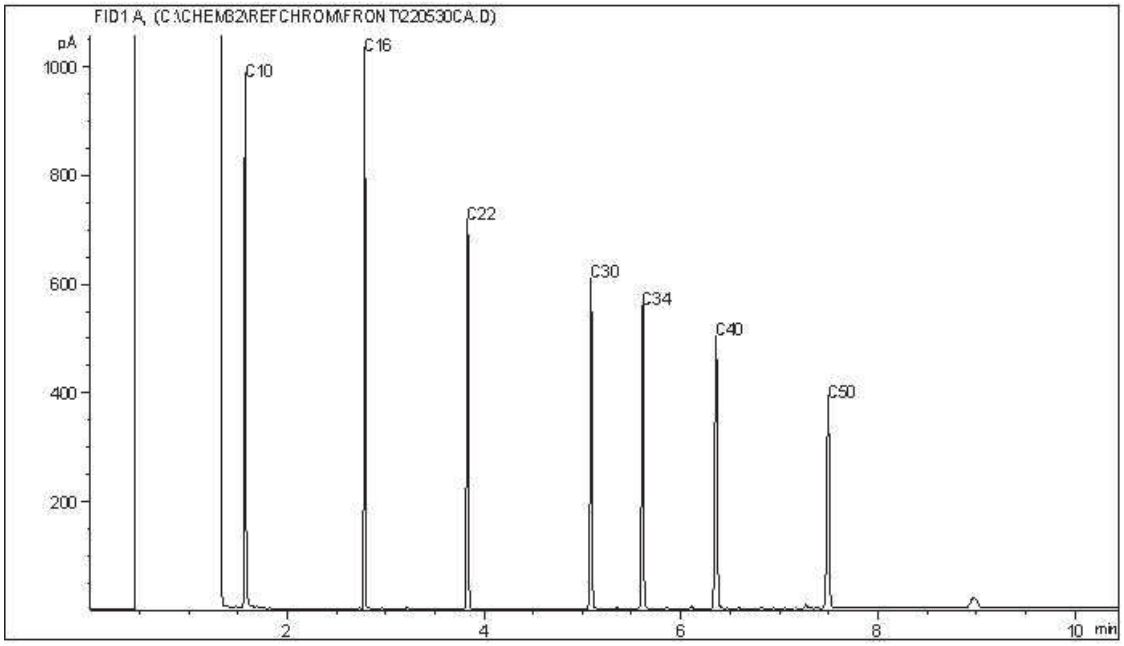
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



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Gasoline:	C4 - C12	Diesel:	C8 - C22
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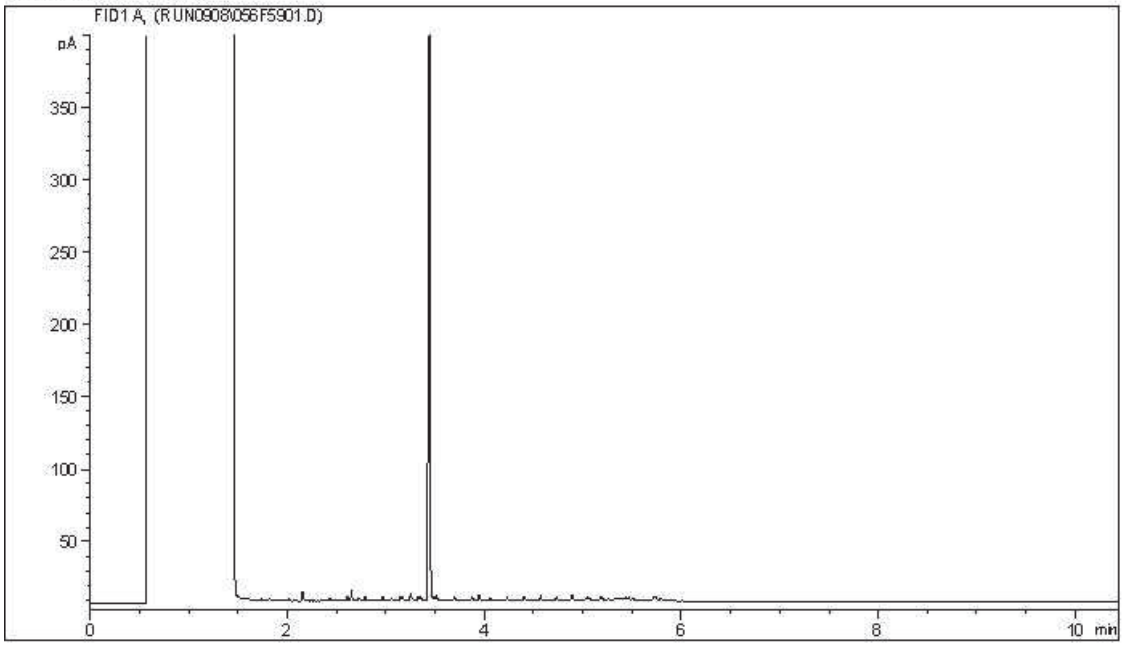
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

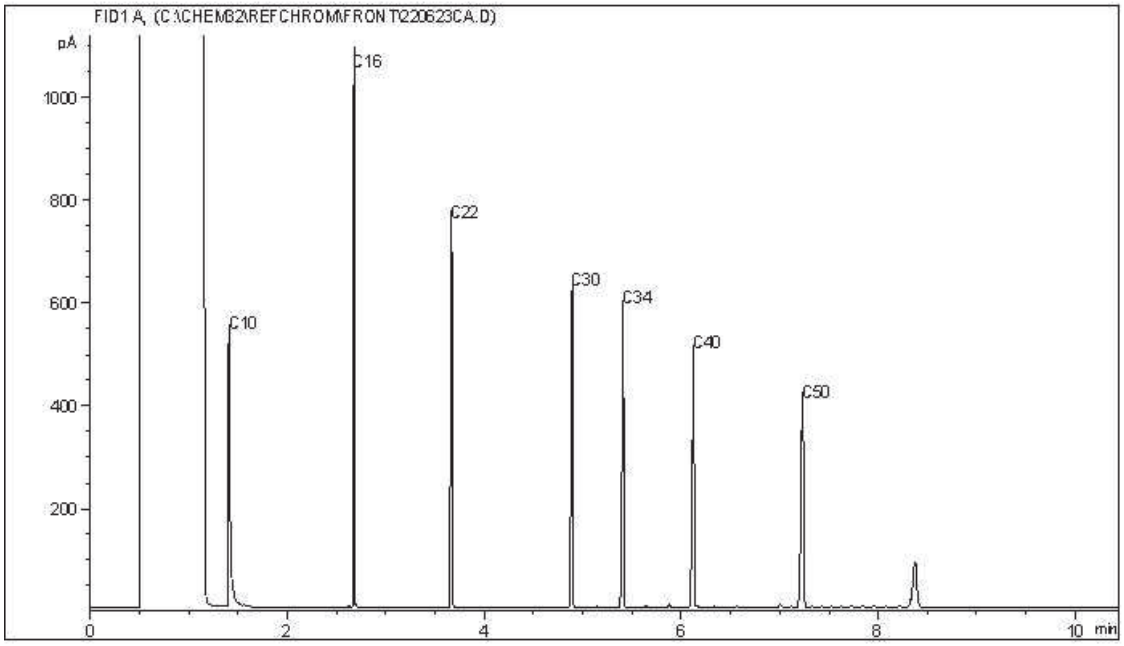
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



Carbon Range Distribution - Reference Chromatogram



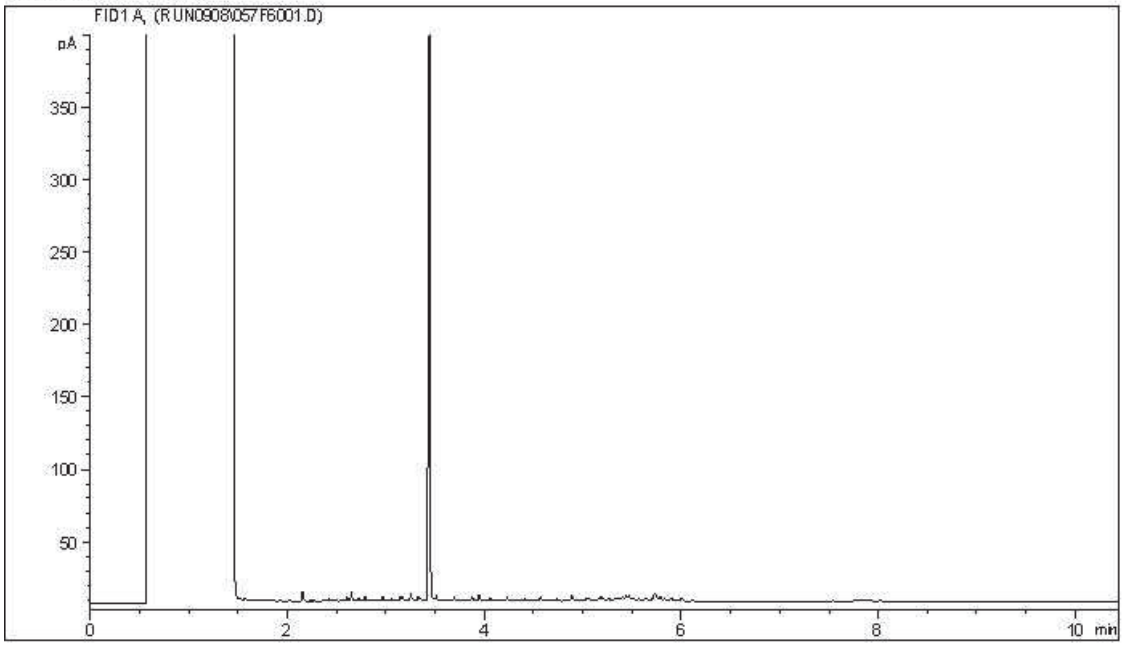
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

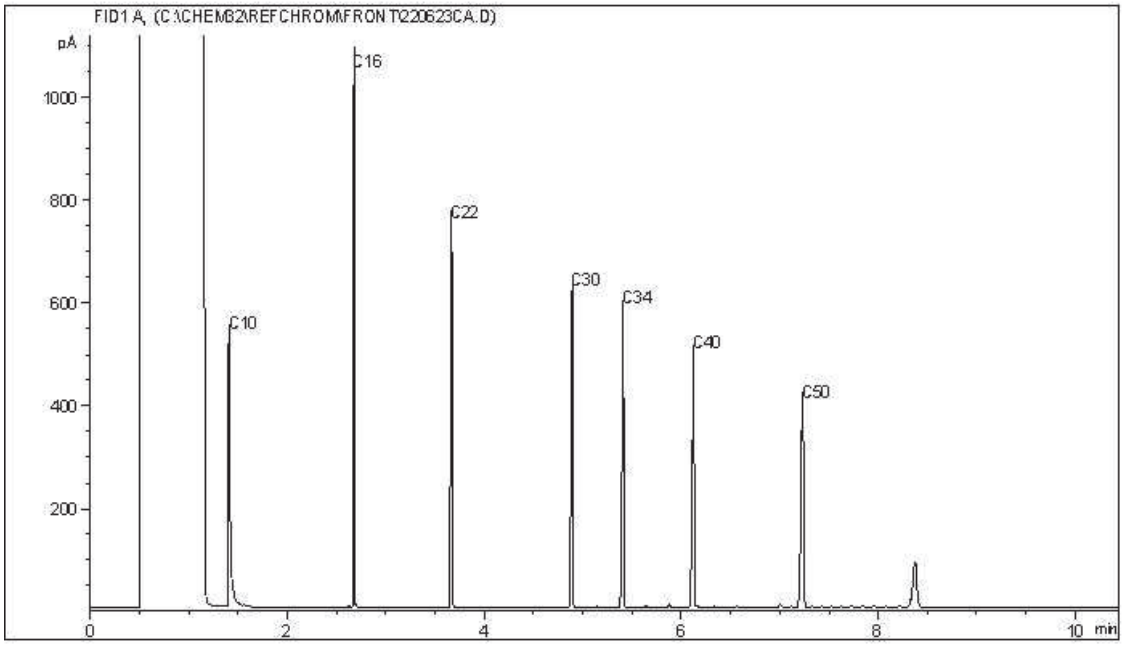
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



Carbon Range Distribution - Reference Chromatogram



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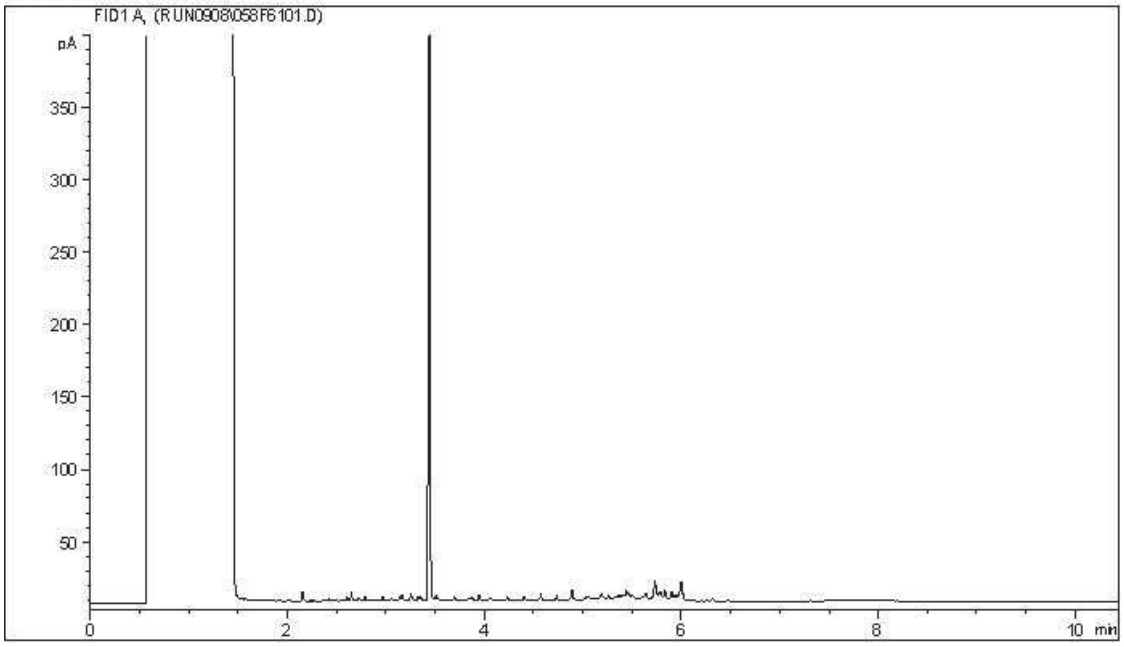
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

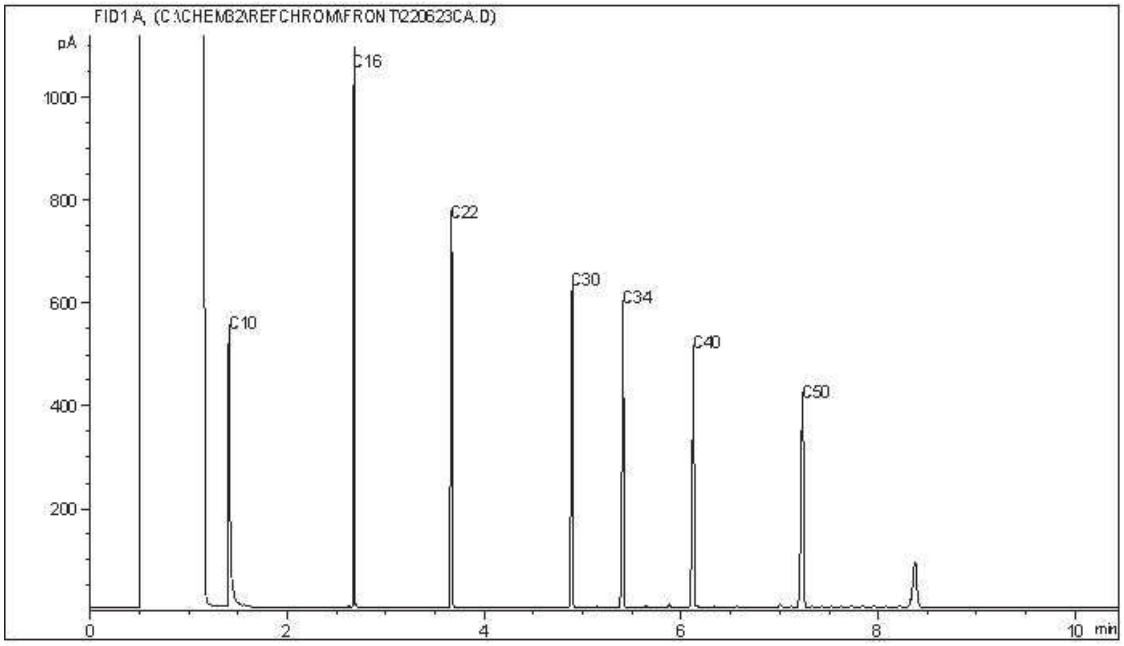
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



Carbon Range Distribution - Reference Chromatogram



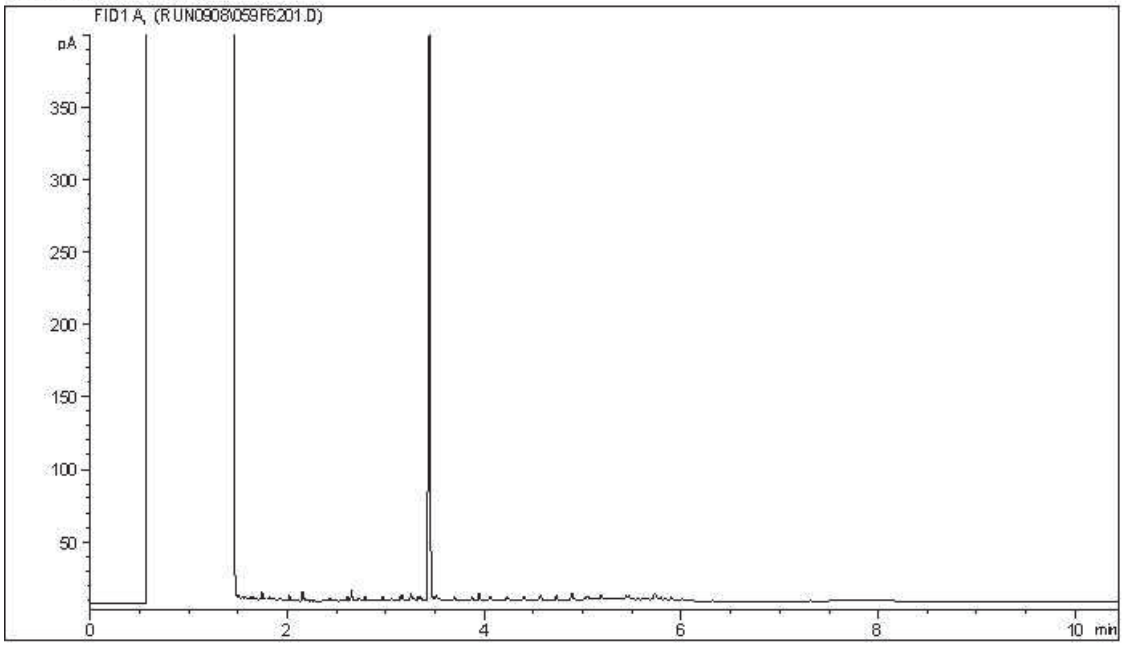
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

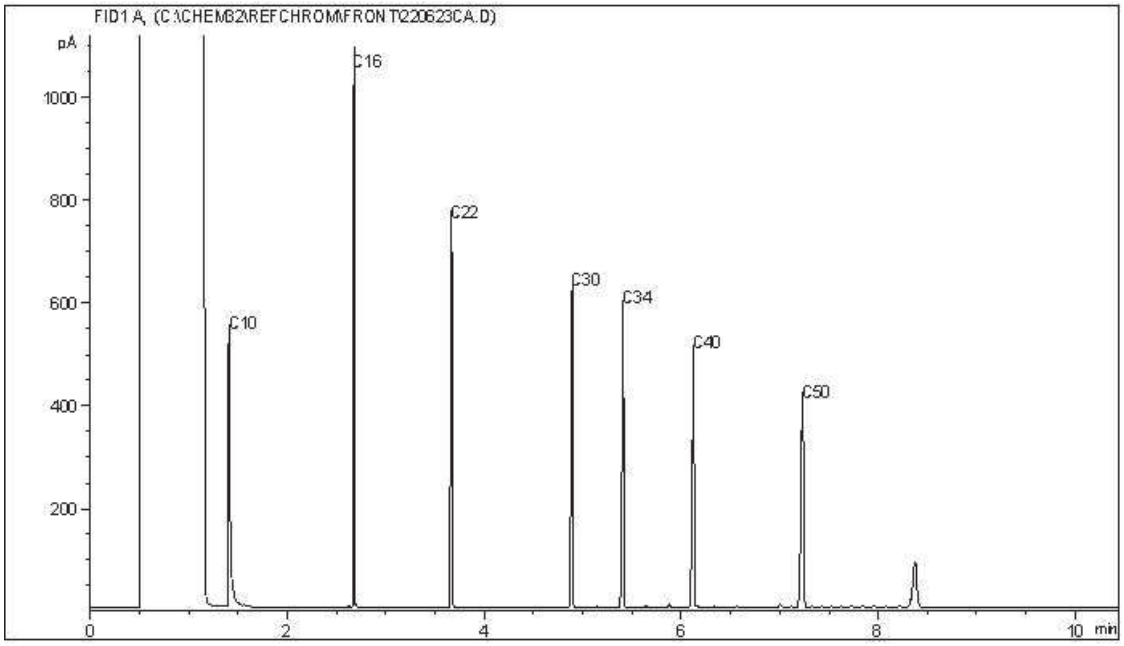
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



Carbon Range Distribution - Reference Chromatogram



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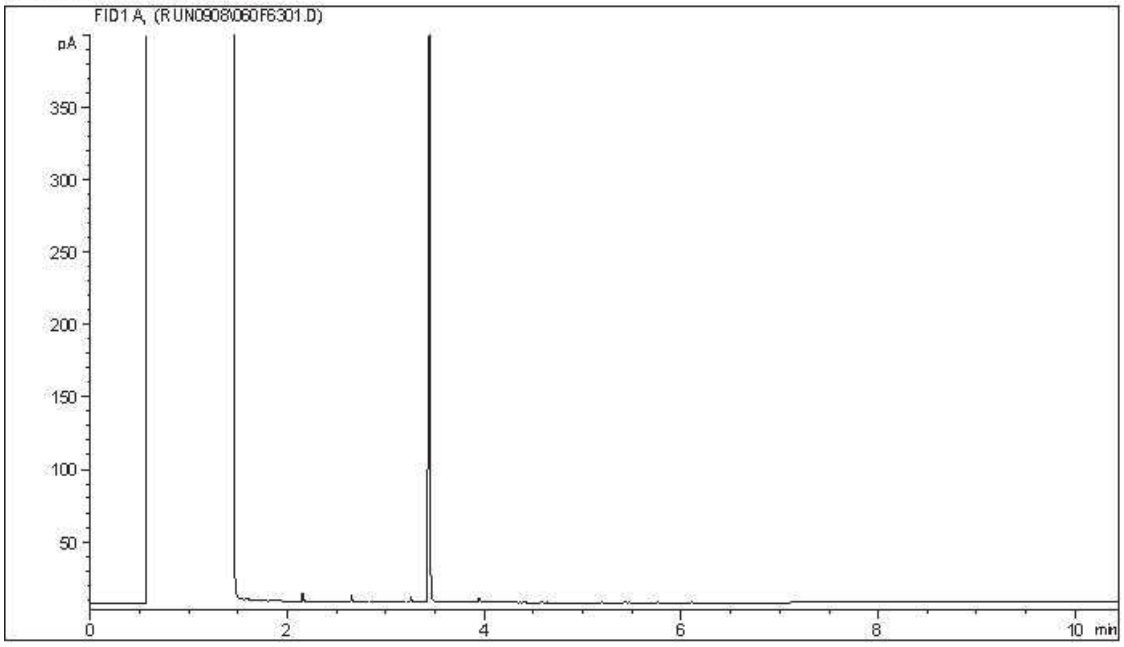
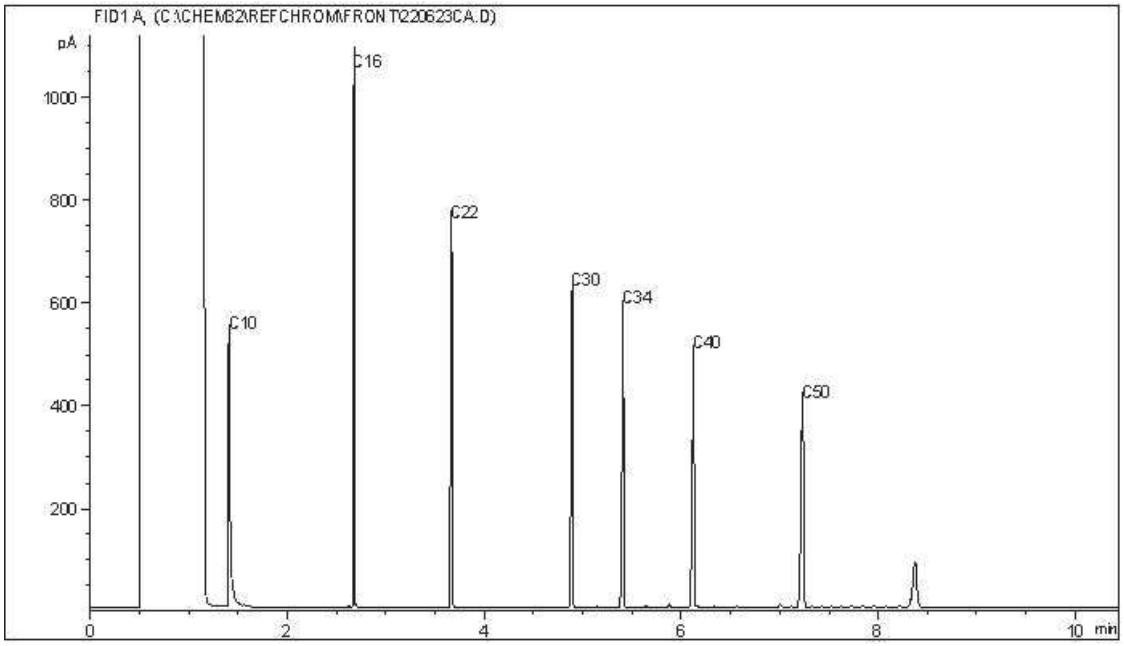
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



Carbon Range Distribution - Reference Chromatogram



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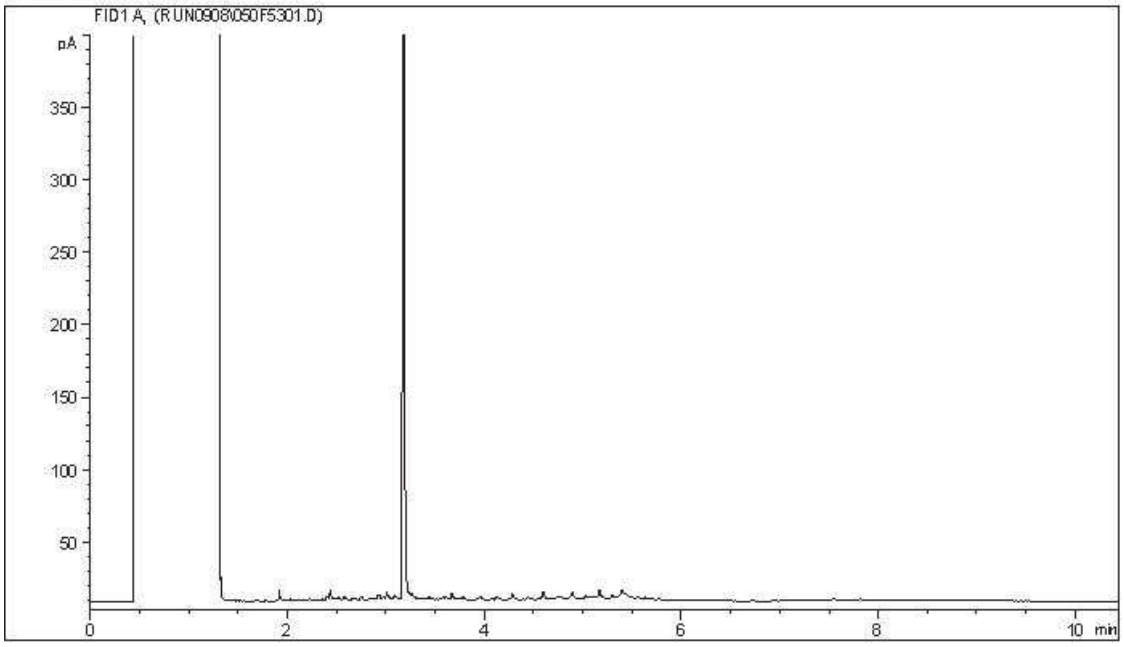
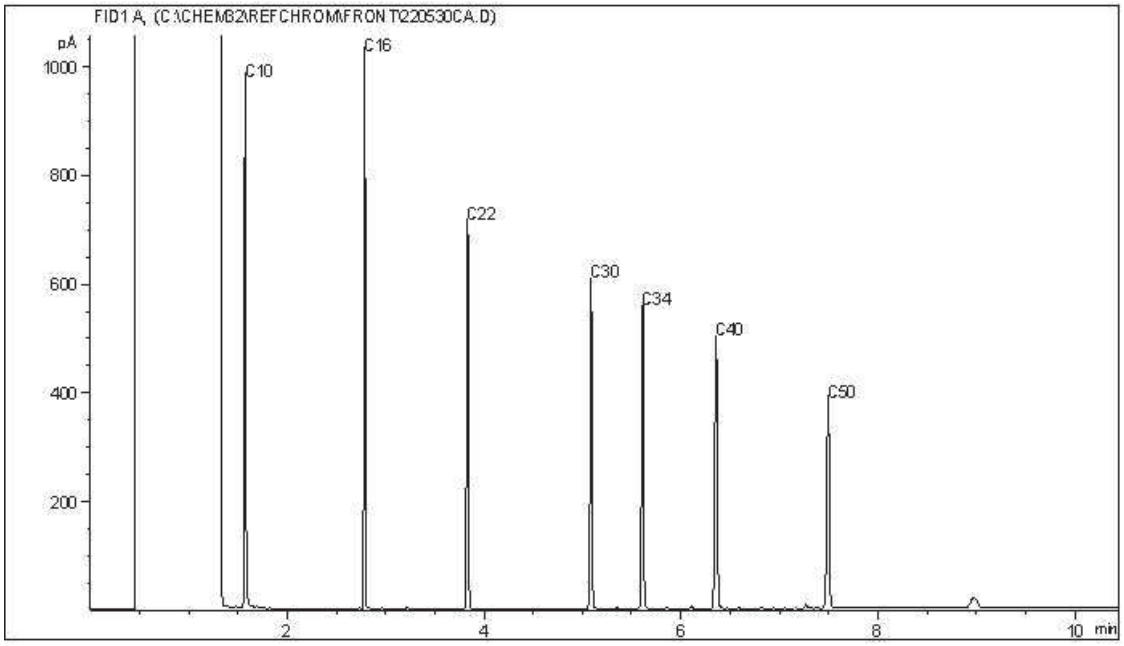
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



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Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

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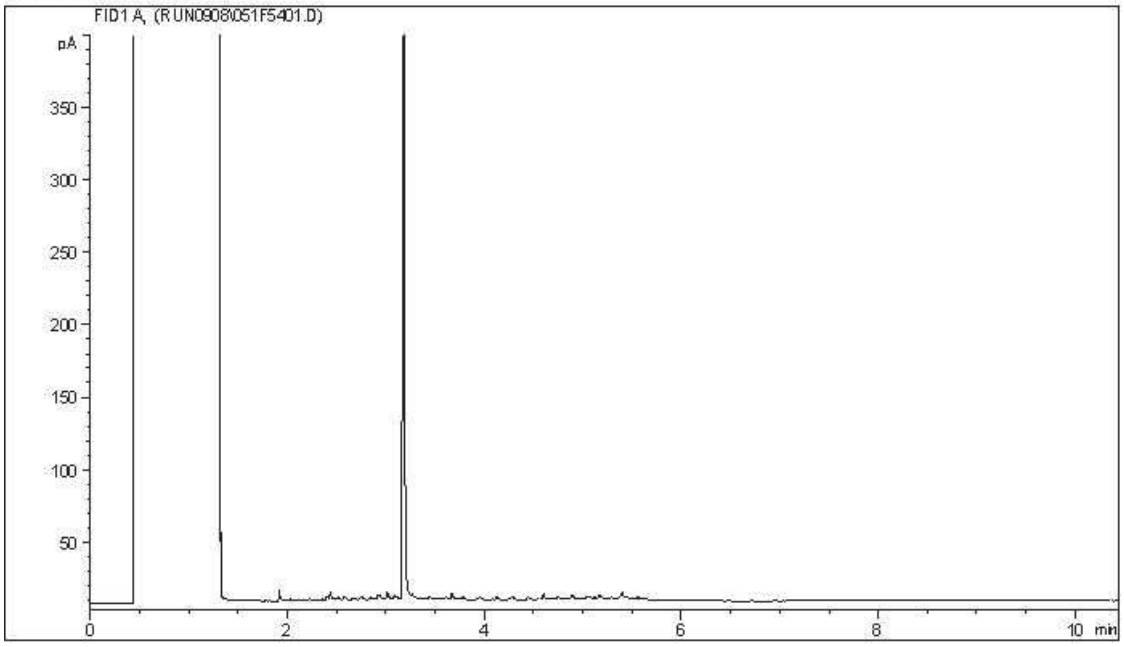
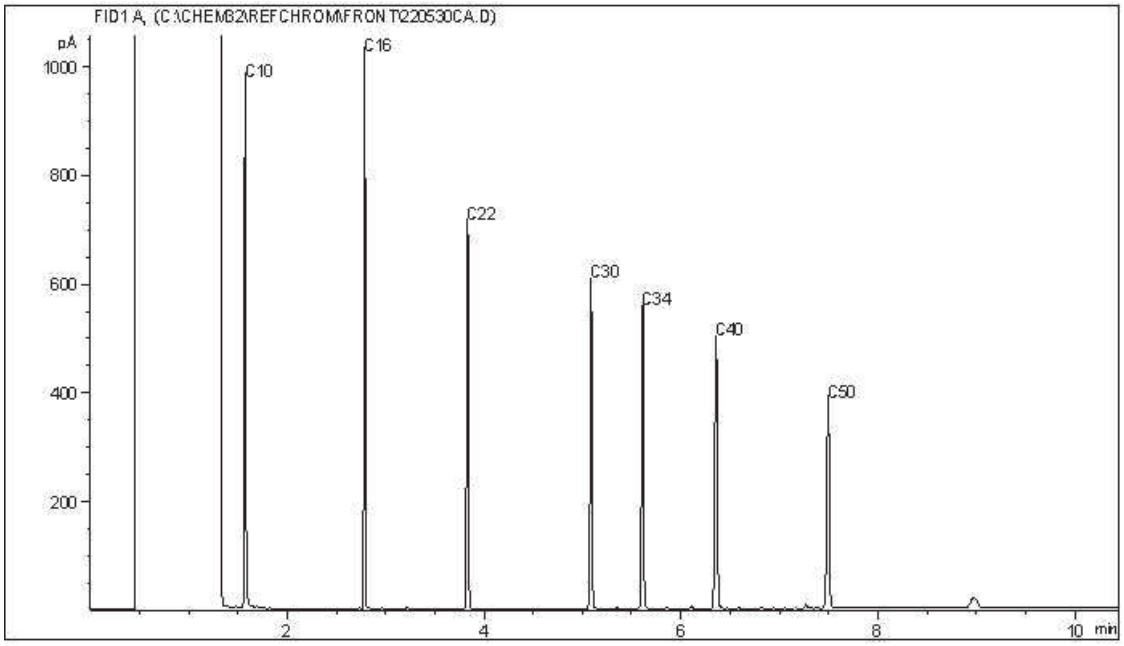
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



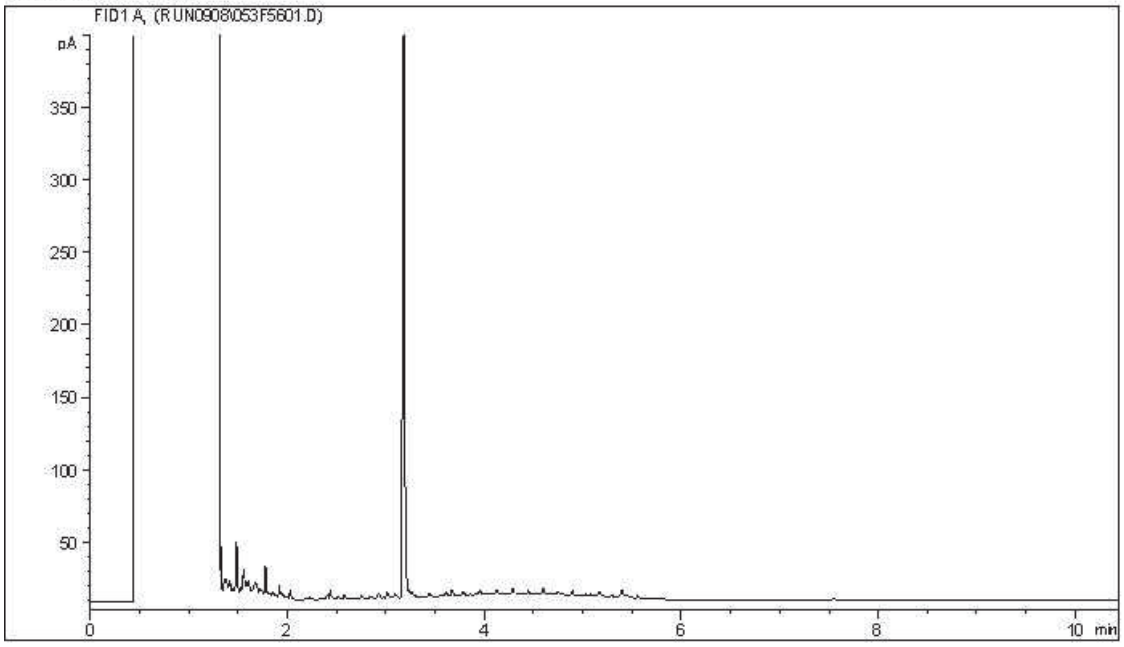
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

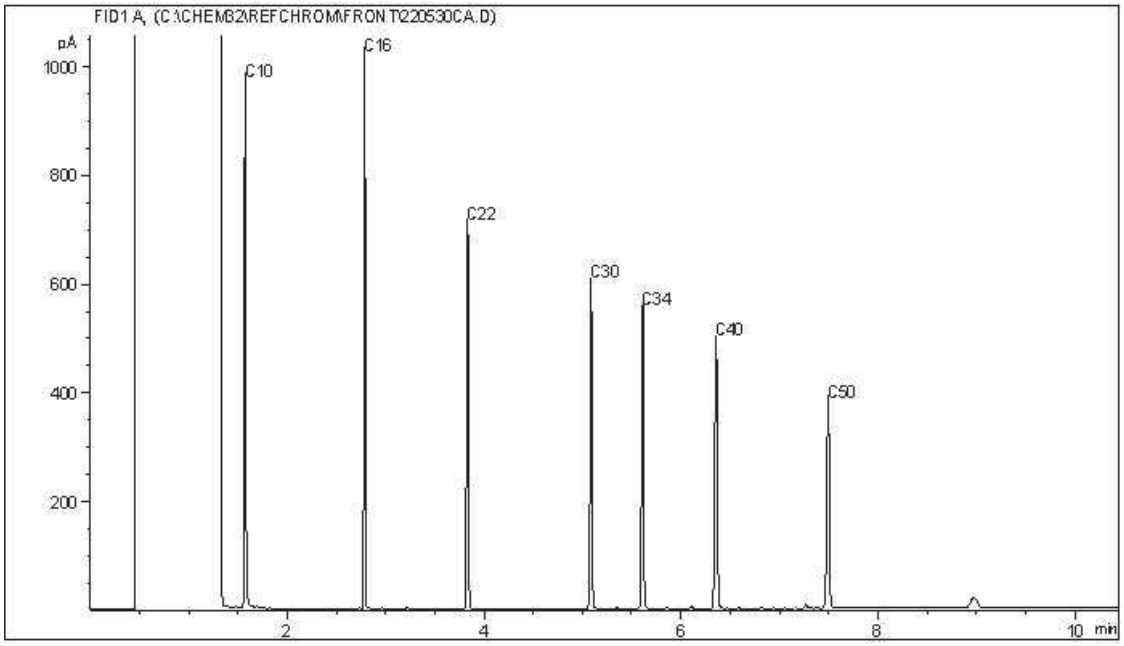
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



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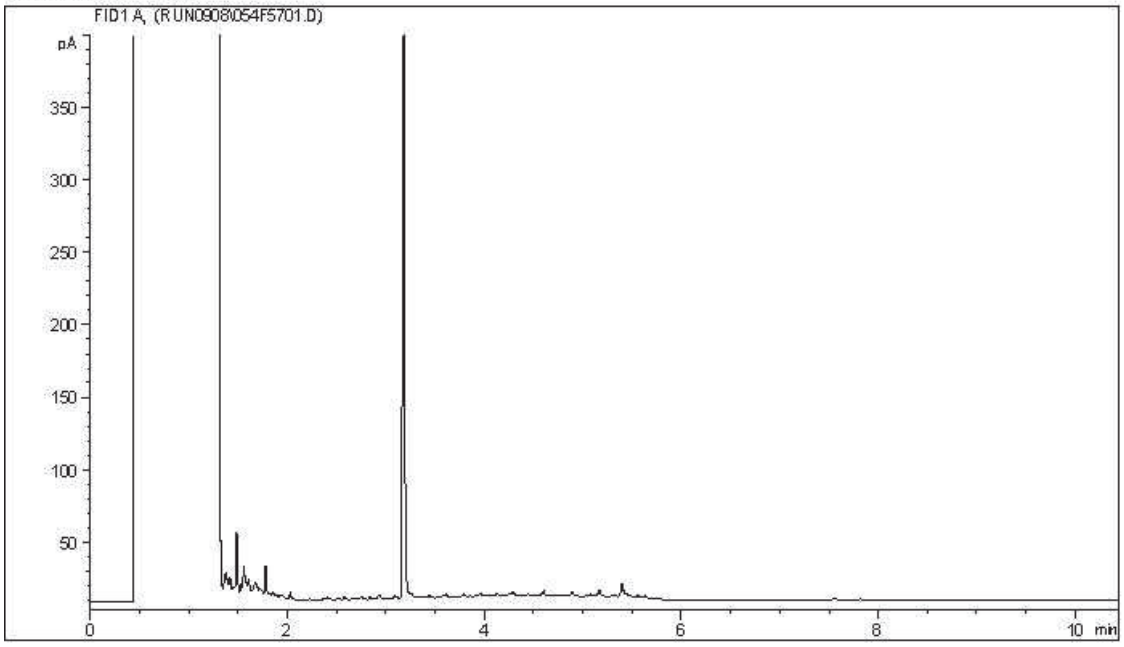
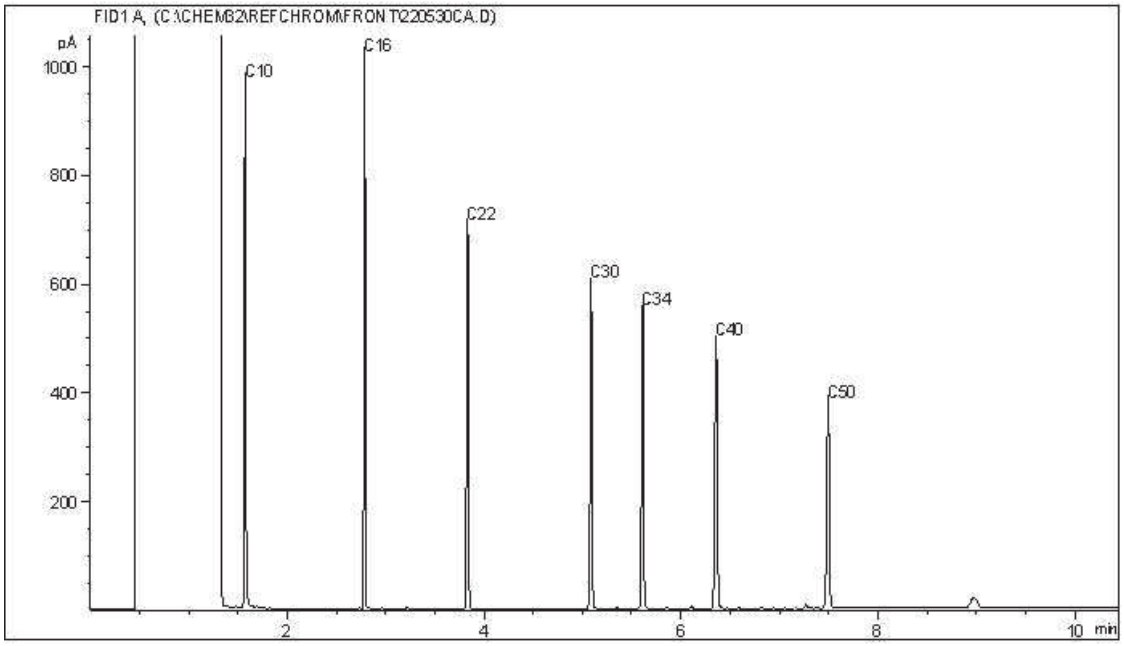
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

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

Cynny Hagen

From: MacLean, Colleen <Colleen_MacLean@golder.com>
Sent: Monday, September 12, 2022 10:05 AM
To: Cynny Hagen
Cc: Bellavance, Aurelie
Subject: RE: Additional Analysis request - Camp Farewell -Prj: 22525414-1000, PO 22525414-1100-1104

Yes, that sounds good.

Thanks!

Colleen MacLean, *She/her*
Environmental Technologist, B.A., Dipl. EVT.

T: +1 403 299 5600
D: +1 403 299 5667

WSP GOLDER

From: Cynny Hagen <cynny.hagen@bureauveritas.com>
Sent: September 12, 2022 10:01 AM
To: MacLean, Colleen <colleen.maclean@wsp.com>
Cc: Bellavance, Aurelie <aurelie.bellavance@wsp.com>
Subject: Re: Additional Analysis request - Camp Farewell -Prj: 22525414-1000, PO 22525414-1100-1104

Hi Colleen,

Absolutely I will add the analysis, for job C266077 would you like to have the additional report for both Bio-Toluene and Resemble for F2-F4 and the other jobs can be just add a comment in report. Please confirm.

Regards,

Cynny Hagen
Key Account Specialist
Environmental Laboratories & Specialty Services - Western Canada
Bureau Veritas
Cell: 403-312-9070

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Emergency/Spills 365/7/24: 1-844-BVSPILL, spills@bureauveritas.com
For urgent after-hours inquiries: 403 651 2436

On Mon, 12 Sep at 8:58 AM , MacLean, Colleen <colleen_maclean@golder.com> wrote:

Hello,

Could you please complete chromatogram analysis and biogenic toluene (select samples) assessment for the samples below?

C266077	BAW749	BH22-56-01	F1 to F4 and toluene
	BAW750	BH22-56-02	
	BAW752	BH22-57-01	F1 to F4
	BAW753	BH22-57-02	F1 to F4 and toluene
	BAW756	BH22-59-01	F1 to F4 and toluene
C266076	BAW742	BH22-63-01	F1 to F4
	BAW738	BH22-64-01	F1 to F4
	BAW746	BH22-67-02	F1 to F4
C266062	BAW656	BH22-68-01	F1 to F4
C266081	BAW784	BH22-70-01	F1 to F4

Please let me know if you have any questions.

Thanks!

Colleen MacLean, *She/her*
Environmental Technologist, B.A., Dipl. EVT.

T: +1 403 299 5600
D: +1 403 299 5667

237 – 4 Avenue SW, Suite 3300, Calgary, Alberta T2P 4K3, Canada
wsp.com | **golder.com**

WSP and Golder have joined together to form the premier environmental consultancy in the industry. Together we are 14,000 strong, Future Ready©, and delivering innovative solutions to our clients around the globe.

Your P.O. #: 22525414-1100-1004
Your Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your C.O.C. #: 1 of 2, 2 OF 2

Attention: Aurelie Bellavance

GOLDER ASSOCIATES LTD.
2800, 700 -2nd Street SW
CALGARY, AB
CANADA T2P 2W2

Report Date: 2022/09/14
Report #: R3232206
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C266076
Received: 2022/08/30, 12:00

Sample Matrix: Soil
Samples Received: 14

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 by HS GC/MS/FID (MeOH extract) (1, 2)	6	N/A	2022/09/02	AB SOP-00039	CCME CWS/EPA 8260d m
BTEX/F1 by HS GC/MS/FID (MeOH extract) (1, 2)	8	N/A	2022/09/04	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX (1)	14	N/A	2022/09/08		Auto Calc
CCME Hydrocarbons (F2-F4 in soil) (1, 3)	12	2022/09/07	2022/09/08	AB SOP-00036	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in soil) (1, 3)	2	2022/09/07	2022/09/09	AB SOP-00036	CCME PHC-CWS m
Moisture (1)	14	N/A	2022/09/07	AB SOP-00002	CCME PHC-CWS m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
(2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.
(3) All CCME results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil, Validation of Performance-Based Alternative Methods September 2003. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Your P.O. #: 22525414-1100-1004
Your Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your C.O.C. #: 1 of 2, 2 OF 2

Attention: Aurelie Bellavance

GOLDER ASSOCIATES LTD.
2800, 700 -2nd Street SW
CALGARY, AB
CANADA T2P 2W2

Report Date: 2022/09/14
Report #: R3232206
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C266076
Received: 2022/08/30, 12:00

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
14 Sep 2022 16:19:28

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Cynny Hagen, Key Account Specialist
Email: Cynny.HAGEN@bureauveritas.com
Phone# (403)735-2273

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C266076
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW735	BAW736	BAW737	BAW738		BAW739	BAW739		
Sampling Date		2022/08/24 15:10	2022/08/24 15:25	2022/08/24 15:40	2022/08/24 15:50		2022/08/24 16:00	2022/08/24 16:00		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2		1 of 2	1 of 2		
	UNITS	BH22-66-01	BH22-66-02	BH22-66-03	BH22-64-01	RDL	BH22-64-02	BH22-64-02 Lab-Dup	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	51	<10	<10	380	10	<10	N/A	10	A707307
F3 (C16-C34 Hydrocarbons)	mg/kg	76	<50	<50	<50	50	<50	N/A	50	A707307
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	<50	<50	<50	50	<50	N/A	50	A707307
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	N/A	Yes	N/A	N/A	A707307
Physical Properties										
Moisture	%	6.9	16	20	34	0.30	17	17	0.30	A707257
Volatiles										
Xylenes (Total)	mg/kg	<0.045	<0.045	<0.045	<0.045	0.045	<0.045	N/A	0.045	A701342
F1 (C6-C10) - BTEX	mg/kg	<10	<10	<10	53	10	<22	N/A	22	A701342
Field Preserved Volatiles										
Benzene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	N/A	0.0050	A702730
Toluene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	<0.050	N/A	0.050	A702730
Ethylbenzene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	<0.010	N/A	0.010	A702730
m & p-Xylene	mg/kg	<0.040	<0.040	<0.040	<0.040	0.040	<0.040	N/A	0.040	A702730
o-Xylene	mg/kg	<0.020	<0.020	<0.020	<0.020	0.020	<0.020	N/A	0.020	A702730
F1 (C6-C10)	mg/kg	<10	<10	<10	53	10	<22 (1)	N/A	22	A702730
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	103	105	105	103	N/A	107	N/A	N/A	A702730
4-Bromofluorobenzene (sur.)	%	91	89	97	98	N/A	95	N/A	N/A	A702730
D10-o-Xylene (sur.)	%	93	89	104	108	N/A	108	N/A	N/A	A702730
D4-1,2-Dichloroethane (sur.)	%	92	89	90	89	N/A	92	N/A	N/A	A702730
O-TERPHENYL (sur.)	%	107	104	107	103	N/A	105	N/A	N/A	A707307

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Detection limit raised due to interferent.

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C266076
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW740		BAW741	BAW741		BAW742		
Sampling Date		2022/08/24 16:15		2022/08/24 16:30	2022/08/24 16:30		2022/08/26 09:15		
COC Number		1 of 2		1 of 2	1 of 2		1 of 2		
	UNITS	BH22-64-03	QC Batch	BH22-64-04	BH22-64-04 Lab-Dup	RDL	BH22-63-01	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	A707563	<10	N/A	10	<29 (1)	29	A707307
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	A707563	<50	N/A	50	870 (1)	140	A707307
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	A707563	<50	N/A	50	240 (1)	140	A707307
Reached Baseline at C50	mg/kg	Yes	A707563	Yes	N/A	N/A	Yes	N/A	A707307
Physical Properties									
Moisture	%	19	A707257	16	N/A	0.30	65	0.30	A707257
Volatiles									
Xylenes (Total)	mg/kg	<0.045	A701342	<0.045	N/A	0.045	<0.11	0.11	A701342
F1 (C6-C10) - BTEX	mg/kg	<10	A701342	<10	N/A	10	<10	10	A701342
Field Preserved Volatiles									
Benzene	mg/kg	<0.0050	A702730	<0.0050	<0.0050	0.0050	<0.015 (2)	0.015	A702755
Toluene	mg/kg	<0.050	A702730	<0.050	<0.050	0.050	<0.050 (2)	0.050	A702755
Ethylbenzene	mg/kg	<0.010	A702730	<0.010	<0.010	0.010	<0.035 (2)	0.035	A702755
m & p-Xylene	mg/kg	<0.040	A702730	<0.040	<0.040	0.040	<0.080 (2)	0.080	A702755
o-Xylene	mg/kg	<0.020	A702730	<0.020	<0.020	0.020	<0.079 (3)	0.079	A702755
F1 (C6-C10)	mg/kg	<10	A702730	<10	<10	10	<10 (2)	10	A702755
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	109	A702730	98	100	N/A	98	N/A	A702755
4-Bromofluorobenzene (sur.)	%	94	A702730	95	97	N/A	96	N/A	A702755
D10-o-Xylene (sur.)	%	106	A702730	120	122	N/A	125	N/A	A702755
D4-1,2-Dichloroethane (sur.)	%	93	A702730	92	94	N/A	92	N/A	A702755
O-TERPHENYL (sur.)	%	102	A707563	104	N/A	N/A	98	N/A	A707307

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, sample contains => 50% moisture.
(2) Detection limit reported based on MDL and sample weight used for analysis.
(3) Detection limits raised based on sample weight used for analysis.

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C266076
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW743		BAW744	BAW745		BAW746		
Sampling Date		2022/08/26 09:30		2022/08/26 09:45	2022/08/26 10:00		2022/08/26 10:10		
COC Number		1 of 2		1 of 2	1 of 2		1 of 2		
	UNITS	BH22-63-02	QC Batch	BH22-63-03	BH22-67-01	RDL	BH22-67-02	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	A707307	<10	<10	10	51 (1)	25	A707307
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	A707307	<50	60	50	1000 (1)	130	A707307
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	A707307	<50	<50	50	360 (1)	130	A707307
Reached Baseline at C50	mg/kg	Yes	A707307	Yes	Yes	N/A	Yes	N/A	A707307
Physical Properties									
Moisture	%	17	A707257	18	10	0.30	60	0.30	A707257
Volatiles									
Xylenes (Total)	mg/kg	<0.045	A701342	<0.045	<0.045	0.045	<0.10	0.10	A701402
F1 (C6-C10) - BTEX	mg/kg	<10	A701342	<10	<10	10	<10	10	A701402
Field Preserved Volatiles									
Benzene	mg/kg	<0.0050	A702755	<0.0050	<0.0050	0.0050	<0.014 (2)	0.014	A702755
Toluene	mg/kg	<0.050	A702755	<0.050	<0.050	0.050	<0.050 (2)	0.050	A702755
Ethylbenzene	mg/kg	<0.010	A702755	<0.010	<0.010	0.010	<0.033 (2)	0.033	A702755
m & p-Xylene	mg/kg	<0.040	A702755	<0.040	<0.040	0.040	<0.074 (2)	0.074	A702755
o-Xylene	mg/kg	<0.020	A702755	<0.020	<0.020	0.020	<0.073 (3)	0.073	A702755
F1 (C6-C10)	mg/kg	<10	A702755	<10	<10	10	<10 (2)	10	A702755
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	99	A702755	96	98	N/A	97	N/A	A702755
4-Bromofluorobenzene (sur.)	%	96	A702755	99	94	N/A	98	N/A	A702755
D10-o-Xylene (sur.)	%	116	A702755	125	122	N/A	125	N/A	A702755
D4-1,2-Dichloroethane (sur.)	%	94	A702755	91	93	N/A	91	N/A	A702755
O-TERPHENYL (sur.)	%	102	A707307	107	107	N/A	105	N/A	A707307

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, sample contains => 50% moisture.
(2) Detection limit reported based on MDL and sample weight used for analysis.
(3) Detection limits raised based on sample weight used for analysis.

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW747	BAW748	BAW748		
Sampling Date		2022/08/26 10:20	2022/08/26 10:30	2022/08/26 10:30		
COC Number		2 OF 2	2 OF 2	2 OF 2		
	UNITS	BH22-67-03	BH22-67-04	BH22-67-04 Lab-Dup	RDL	QC Batch
Ext. Pet. Hydrocarbon						
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	<10	<10	10	A707307
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	<50	<50	50	A707307
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	<50	<50	50	A707307
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	N/A	A707307
Physical Properties						
Moisture	%	18	19	N/A	0.30	A707257
Volatiles						
Xylenes (Total)	mg/kg	<0.045	<0.045	N/A	0.045	A701402
F1 (C6-C10) - BTEX	mg/kg	<10	<10	N/A	10	A701402
Field Preserved Volatiles						
Benzene	mg/kg	<0.0050	<0.0050	N/A	0.0050	A702755
Toluene	mg/kg	<0.050	<0.050	N/A	0.050	A702755
Ethylbenzene	mg/kg	<0.010	<0.010	N/A	0.010	A702755
m & p-Xylene	mg/kg	<0.040	<0.040	N/A	0.040	A702755
o-Xylene	mg/kg	<0.020	<0.020	N/A	0.020	A702755
F1 (C6-C10)	mg/kg	<10	<10	N/A	10	A702755
Surrogate Recovery (%)						
1,4-Difluorobenzene (sur.)	%	97	97	N/A	N/A	A702755
4-Bromofluorobenzene (sur.)	%	97	96	N/A	N/A	A702755
D10-o-Xylene (sur.)	%	118	129	N/A	N/A	A702755
D4-1,2-Dichloroethane (sur.)	%	93	93	N/A	N/A	A702755
O-TERPHENYL (sur.)	%	106	108	107	N/A	A707307

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

GENERAL COMMENTS

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

Package 1	4.0°C
Package 2	3.7°C
Package 3	8.7°C
Package 4	3.3°C
Package 5	4.7°C
Package 6	4.0°C
Package 7	4.7°C

Version #2: Additional Chromatogram review have been added on samples BAW738 (BH22-64-01), BAW742 (BH22-63-01) & BAW746 (BH22-68-02)as per request from client 20220912

HYDROCARBON RESEMBLANCE
The reported hydrocarbon resemblance was obtained by visual comparison of the sample chromatogram with a library of reference product chromatograms. Since variables such as the degree and type of weathering and the presence of non-petrogenic hydrocarbons cannot be duplicated in reference spectra, the resemblance information must be regarded as approximate and qualitative and as such, Bureau Veritas Laboratories can assume no liability for any conclusions drawn from these data.

Sample BAW738 [BH22-64-01] : The CCME F2-F4 chromatographic peak profile is consistent with a weathered middle distillate petroleum product (e.g. Diesel #1/Kerosene). These are typically characterized by evenly distributed peaks between C10 and C24, representing the simple straight chain aliphatic compounds (n-alkanes). These peaks will decrease in height, relative to the unresolved complex mixture (UCM or “hump”) with increased weathering of the product material.

Sample BAW742 [BH22-63-01] : The CCME F2-F4 chromatographic peak profile is consistent with biogenic organic material (e.g. peat). Chromatograms of biogenic organic material may contain peak patterns spanning the C10 to C50 range, but they are most commonly characterized by a profile of unevenly distributed sharp peaks between C28 and C34. The impacts are not consistent with a petroleum product or crude oil.

Sample BAW746 [BH22-67-02] : The CCME F2-F4 chromatographic peak profile is consistent with biogenic organic material (e.g. peat). Chromatograms of biogenic organic material may contain peak patterns spanning the C10 to C50 range, but they are most commonly characterized by a profile of unevenly distributed sharp peaks between C28 and C34. The impacts are not consistent with a petroleum product or crude oil.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A702730	RSU	Matrix Spike	1,4-Difluorobenzene (sur.)	2022/09/02		107	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/02		97	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/02		109	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/02		92	%	50 - 140
			Benzene	2022/09/02		97	%	50 - 140
			Toluene	2022/09/02		85	%	50 - 140
			Ethylbenzene	2022/09/02		91	%	50 - 140
			m & p-Xylene	2022/09/02		89	%	50 - 140
			o-Xylene	2022/09/02		88	%	50 - 140
			F1 (C6-C10)	2022/09/02		80	%	60 - 140
A702730	RSU	Spiked Blank	1,4-Difluorobenzene (sur.)	2022/09/02		104	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/02		92	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/02		91	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/02		90	%	50 - 140
			Benzene	2022/09/02		93	%	60 - 130
			Toluene	2022/09/02		86	%	60 - 130
			Ethylbenzene	2022/09/02		86	%	60 - 130
			m & p-Xylene	2022/09/02		85	%	60 - 130
			o-Xylene	2022/09/02		87	%	60 - 130
			F1 (C6-C10)	2022/09/02		70	%	60 - 140
A702730	RSU	Method Blank	1,4-Difluorobenzene (sur.)	2022/09/02		111	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/02		97	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/02		78	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/02		97	%	50 - 140
			Benzene	2022/09/02	<0.0050		mg/kg	
			Toluene	2022/09/02	<0.050		mg/kg	
			Ethylbenzene	2022/09/02	<0.010		mg/kg	
			m & p-Xylene	2022/09/02	<0.040		mg/kg	
			o-Xylene	2022/09/02	<0.020		mg/kg	
			F1 (C6-C10)	2022/09/02	<10		mg/kg	
A702730	RSU	RPD	Benzene	2022/09/02	NC		%	50
			Toluene	2022/09/02	NC		%	50
			Ethylbenzene	2022/09/02	NC		%	50
			m & p-Xylene	2022/09/02	NC		%	50
			o-Xylene	2022/09/02	NC		%	50
			F1 (C6-C10)	2022/09/02	NC		%	30
A702755	WPK	Matrix Spike [BAW741-02]	1,4-Difluorobenzene (sur.)	2022/09/04		100	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		95	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		122	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		96	%	50 - 140
			Benzene	2022/09/04		104	%	50 - 140
			Toluene	2022/09/04		97	%	50 - 140
			Ethylbenzene	2022/09/04		97	%	50 - 140
			m & p-Xylene	2022/09/04		97	%	50 - 140
			o-Xylene	2022/09/04		98	%	50 - 140
			F1 (C6-C10)	2022/09/04		73	%	60 - 140
A702755	WPK	Spiked Blank	1,4-Difluorobenzene (sur.)	2022/09/04		98	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		99	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		110	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		93	%	50 - 140
			Benzene	2022/09/04		98	%	60 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Toluene	2022/09/04		95	%	60 - 130
			Ethylbenzene	2022/09/04		95	%	60 - 130
			m & p-Xylene	2022/09/04		96	%	60 - 130
			o-Xylene	2022/09/04		101	%	60 - 130
			F1 (C6-C10)	2022/09/04		108	%	60 - 140
A702755	WPK	Method Blank	1,4-Difluorobenzene (sur.)	2022/09/04		99	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		98	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		114	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		93	%	50 - 140
			Benzene	2022/09/04	<0.0050		mg/kg	
			Toluene	2022/09/04	<0.050		mg/kg	
			Ethylbenzene	2022/09/04	<0.010		mg/kg	
			m & p-Xylene	2022/09/04	<0.040		mg/kg	
			o-Xylene	2022/09/04	<0.020		mg/kg	
			F1 (C6-C10)	2022/09/04	<10		mg/kg	
A702755	WPK	RPD [BAW741-02]	Benzene	2022/09/04	NC		%	50
			Toluene	2022/09/04	NC		%	50
			Ethylbenzene	2022/09/04	NC		%	50
			m & p-Xylene	2022/09/04	NC		%	50
			o-Xylene	2022/09/04	NC		%	50
			F1 (C6-C10)	2022/09/04	NC		%	30
A707257	WLE	Method Blank	Moisture	2022/09/07	<0.30		%	
A707257	WLE	RPD [BAW739-01]	Moisture	2022/09/07	0.59		%	20
A707307	GG3	Matrix Spike [BAW748-01]	O-TERPHENYL (sur.)	2022/09/08		103	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08		97	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/08		95	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/08		92	%	60 - 140
A707307	GG3	Spiked Blank	O-TERPHENYL (sur.)	2022/09/08		101	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08		93	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/08		93	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/08		88	%	60 - 140
A707307	GG3	Method Blank	O-TERPHENYL (sur.)	2022/09/08		106	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2022/09/08	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2022/09/08	<50		mg/kg	
A707307	GG3	RPD [BAW748-01]	F2 (C10-C16 Hydrocarbons)	2022/09/08	NC		%	40
			F3 (C16-C34 Hydrocarbons)	2022/09/08	NC		%	40
			F4 (C34-C50 Hydrocarbons)	2022/09/08	NC		%	40
A707563	AAX	Matrix Spike	O-TERPHENYL (sur.)	2022/09/08		111	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08		96	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/08		99	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/08		100	%	60 - 140
A707563	AAX	Spiked Blank	O-TERPHENYL (sur.)	2022/09/08		112	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08		96	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/08		99	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/08		99	%	60 - 140
A707563	AAX	Method Blank	O-TERPHENYL (sur.)	2022/09/08		106	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2022/09/08	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2022/09/08	<50		mg/kg	
A707563	AAX	RPD	F2 (C10-C16 Hydrocarbons)	2022/09/08	NC		%	40

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			F3 (C16-C34 Hydrocarbons)	2022/09/08	NC		%	40
			F4 (C34-C50 Hydrocarbons)	2022/09/08	NC		%	40

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 (absolute difference <= 2x RDL).

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C266076
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Elizabeth Chacko, Senior Analyst, Organics

Gita Pokhrel, Laboratory Supervisor

Janet Gao, B.Sc., QP, Supervisor, Organics

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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YK

MaXXam
A Bureau Veritas Group Company

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY #	
Golder	
Page 1 of 1	
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COOLER OBSERVATIONS:

Custody Seal Present (YES/NO)	Custody Seal Intact (YES/NO)	Ice Present (YES/NO)	Cooler ID	Temp 1	Temp 2	Temp 3
YES ✓	YES ✓	YES ✓		4	5	3
YES ✓	YES ✓	YES ✓		2	4	5
YES ✓	YES ✓	YES ✓		8	9	9
YES ✓	YES ✓	YES ✓		3	5	2
YES ✓	YES ✓	YES ✓		4	4	6
YES ✓	YES ✓	YES ✓		2	4	6
YES ✓	YES ✓	YES ✓		4	5	5

MAXXAM JOB#:

Custody Seal Present (YES/NO)	Custody Seal Intact (YES/NO)	Ice Present (YES/NO)	Cooler ID	Temp 1	Temp 2	Temp 3

RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME (HH:MM)
Jose Mercano [signature]	2022/05/30	12:00 pm

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☐ Winnipeg, MB: D-675 Berry St. R3H 1A7 Toll Free (866) 800-6208

CHAIN OF CUSTODY RECORD

ENV COC - 00013v3

Invoice Information	Invoice to (requires report) ☐	Report Information (if differs from invoice)		Project Information	
Company:	Client #254, Golder Associates	Company:	Golder Associates	Quotation #:	Shell
Contact Name:	237 - 4 Ave SW Suite 3300	Contact Name:	Aurelie Bellavance	P.O. #/ AFE#:	22525414 1-00 1104
Street Address:		Street Address:		Project #:	22525414 1000
City:	Calgary Prov: AB Postal Code:	City:	Calgary AB Postal Code: T2P 4K3	Site #:	NA
Phone:		Phone:	403-299-5600	Site Location:	Camp Farewell
Email:	Canada Account Payable	Email:	Aurelie.Bellavance@wsp.com	Site Location Province:	NT
Copies:		Copies:	Peter.Tan@wsp.com	Sampled By:	JD / HK

LAB USE ONLY - PLACE STICKER HERE

Rush Confirmation #:

Regulatory Criteria

☐ AT1 ☐ CCME ☐ Drinking Water - Canada ☐ Drinking Water - Manitoba
☐ Saskatchewan ☐ Drinking Water - Alberta ☑ Other AMSRP

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

Regular Turnaround Time (TAT): ☑ 5 to 7 Day ☐ 10 Day

Rush Turnaround Time (TAT) Surcharges apply: ☐ Same Day ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 4 Day

Date Required: YY MM DD

#	Sample Identification	YY	MM	DD	HH	MM	Matrix	1 Field Filtered	2 Field Preserved	3 Lab Filtration Required	4 BTEX F1-F4	5 PAHs	6 BTEX F1-F2	7 Barium True Total	8 Routine water	9 Regulated metals - total	10 Regulated metals - dissolved	11 Mercury - total	12 Mercury - dissolved	13 Salinity 4	14 Sieve (75 micron)	15 Texture (% sand, silt, clay)	16 Basic class II landfill	17	18	19	20 Limited Sample	21 # of Containers Submitted	22 Hold - Do Not Analyze	Comments
1	BH22-67-03	22	08	26	10	20	Soil				X																			Also email report to
2	BH22-67-06	↓	↓	↓	10	30	↓				X																			gld.shelldgr@wsp.com
3																														gld.iol.eqis@wsp.com
4																														
5																														
6																														
7																														
8																														
9																														
10																														
11																														
12																														

Received in Yellowknife
By: J.Merson @ 12:05pm
AUG 30 2022
Ice-yes / Cos-y
Temp: 3/5/2

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present				ACTR		
Seal intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3	Temperature reading by:
Seal present							
Seal intact							
Cooling media present							

	Relinquished by: (Signature/ Print)	YY	MM	DD	HH	MM		Received by: (Signature/ Print)	YY	MM	DD	HH	MM	Special Instructions
1	[signature] / Jonathan Dorcher	22	08	27	16	00	1	[signature] Jason BL	22	08	31	15	10	
2							2							

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- ☐ Edmonton, AB: 9331-48 St. T6B 2R4 Toll Free (800) 386-7247
- ☐ Winnipeg, MB: D-675 Berry St. R3H 1A7 Toll Free (866) 800-6208

CHAIN OF CUSTODY RECORD

ENV COC - 00013v3

Invoice Information	Invoice to (requires report) ☐	Report Information (if differs from invoice)		Project Information		LAB USE ONLY - PLACE STICKER HERE
Company:	Client #254, Golder Associates	Company:	Golder Associates	Quotation #:	Shell	
Contact Name:	237 - 4 Ave SW Suite 3300	Contact Name:	Aurelie Bellavance	P.O. #/ AFE#:	22525414-1100-1004	
Street Address:		Street Address:		Project #:	22525414-1000	
City: Calgary Prov: AB Postal Code:		City: Calgary AB Postal Code:	T2P 4K3	Site #:	NA	
Phone:		Phone:	403-299-5600	Site Location:	Camp Sorsoll	Rush Confirmation #:
Email:	Canada Account Payable	Email:	Aurelie.Bellavance@wsp.com Peter.Tan@wsp.com	Site Location Province:	NT	
Copies:		Copies:		Sampled By:	DD/HK	

Regulatory Criteria

☐ AT1 ☐ CCME ☐ Drinking Water - Canada ☐ Drinking Water - Manitoba ☐ Saskatchewan ☐ Drinking Water - Alberta ☑ Other AMSRP

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

Regular Turnaround Time (TAT)
☑ 5 to 7 Day ☐ 10 Day

Rush Turnaround Time (TAT) Surcharges apply
☐ Same Day ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 4 Day

Date Required: YY MM DD

Comments

	Sample Identification	Date Sampled YY	MM	DD	Time (24hr) HH	MM	Matrix	1 FIELD FILTERED	2 FIELD PRESERVED	3 LAB FILTRATION REQUIRED	4 BTEX F1-F4	5 PAHS	6 BTEX F1-F2	7 BARIUM TRUE TOTAL	8 Routine water	9 Regulated metals - total	10 Regulated metals - dissolved	11 Mercury - total	12 Mercury - dissolved	13 Salinity 4	14 Sieve (75 micron)	15 Texture (% sand, silt, clay)	16 Basic class II landfill	17	18	19	20 LIMITED SAMPLE	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE	Comments
1	BH22-66-01	22	08	24	15	10	Soil				X																	3		Also email report to gld.shelldgr@wsp.com gld.101.equis@wsp.com
2	BH22-66-02				15	25					X																	3		
3	BH22-66-03				15	40					X																	3		
4	BH22-64-01				15	50					X																	3		
5	BH22-64-02				16	00					X																	3		
6	BH22-64-03				16	15					X																	3		
7	BH22-64-04				16	30					X																	3		
8	BH22-63-01	22	08	26	09	15					X																	3		
9	BH22-63-02				09	30					X																	3		
10	BH22-63-03				09	45					X																	3		
11	BH22-67-01				10	00					X																	3		
12	BH22-67-02				10	10					X																	3		

Received in Yellowknife
By: J. Mercier
@ 12:00 pm
AUG 30 2022
Ice - yes / no
Temp: 3 / 5 / 2

*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY.

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal Intact						
Cooling media present						

ACTR

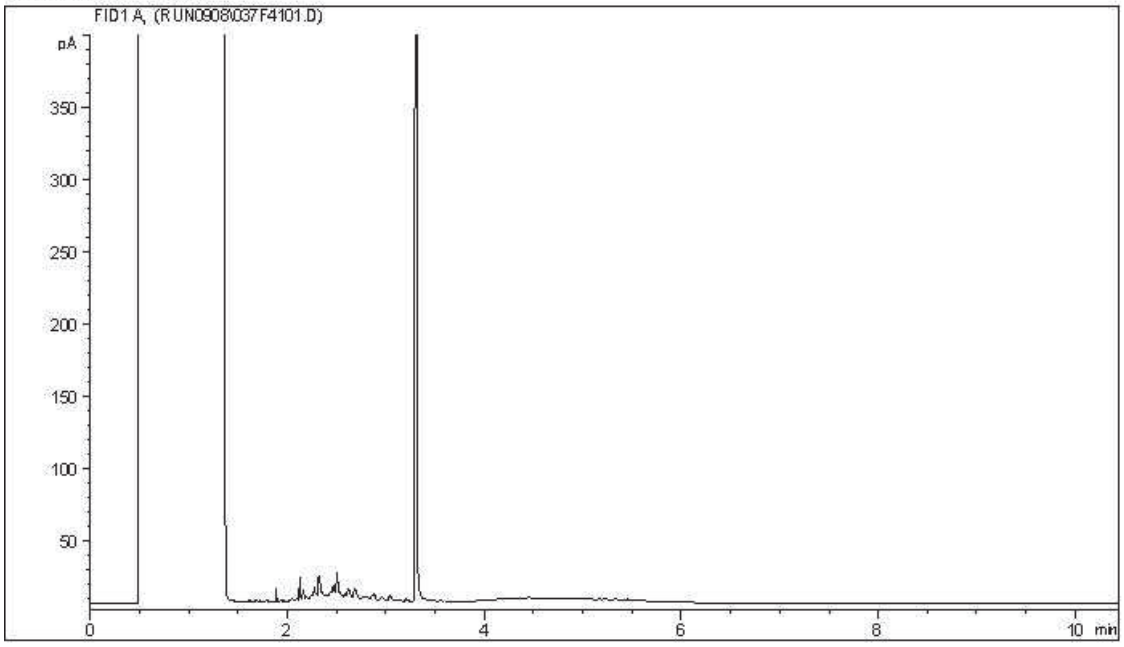
LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal Intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3	Temperature reading by:
Seal present							
Seal Intact							
Cooling media present							

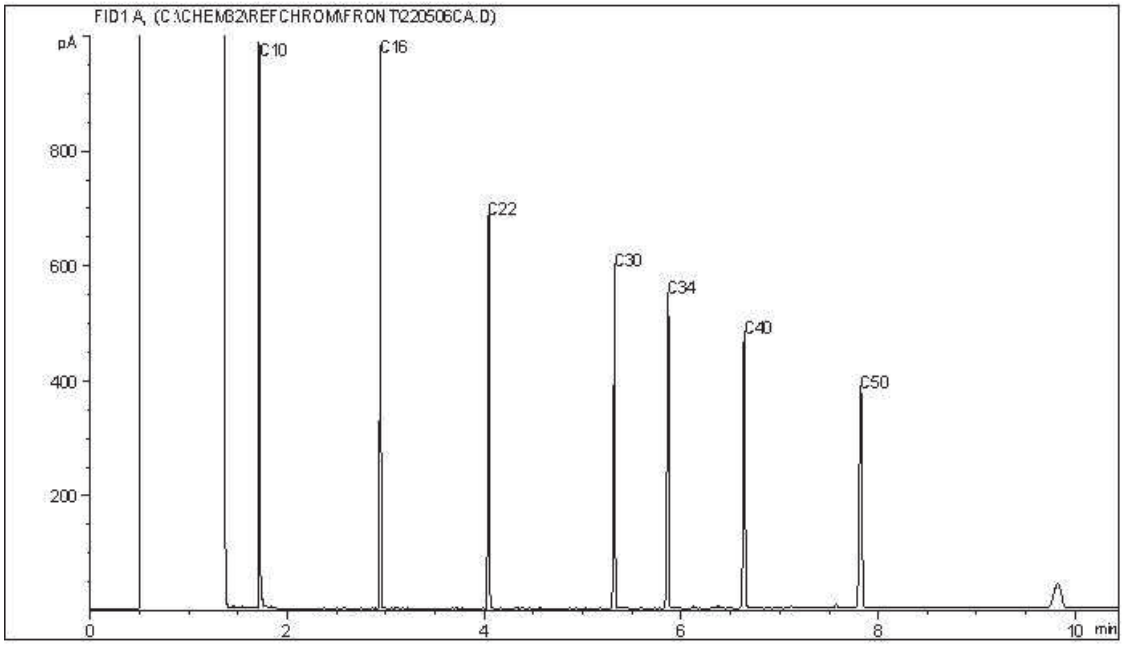
	Relinquished by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Special Instructions
1	Joshua Dondua	22	08	27	16	00	JASON BL	22	08	31	15	10	
2													

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



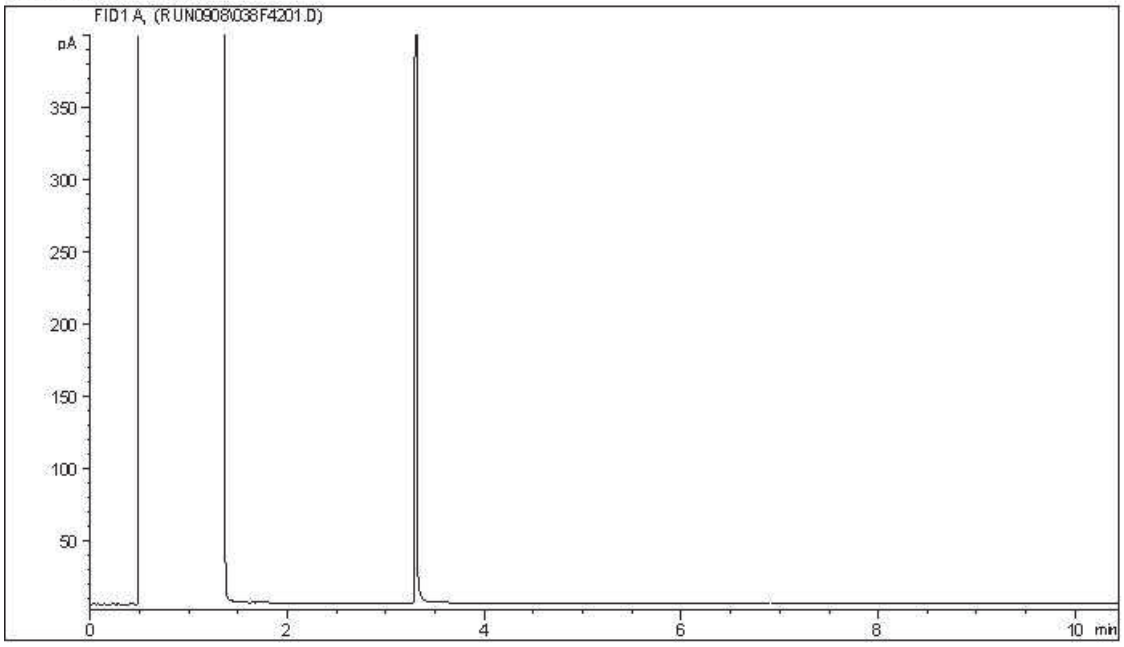
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

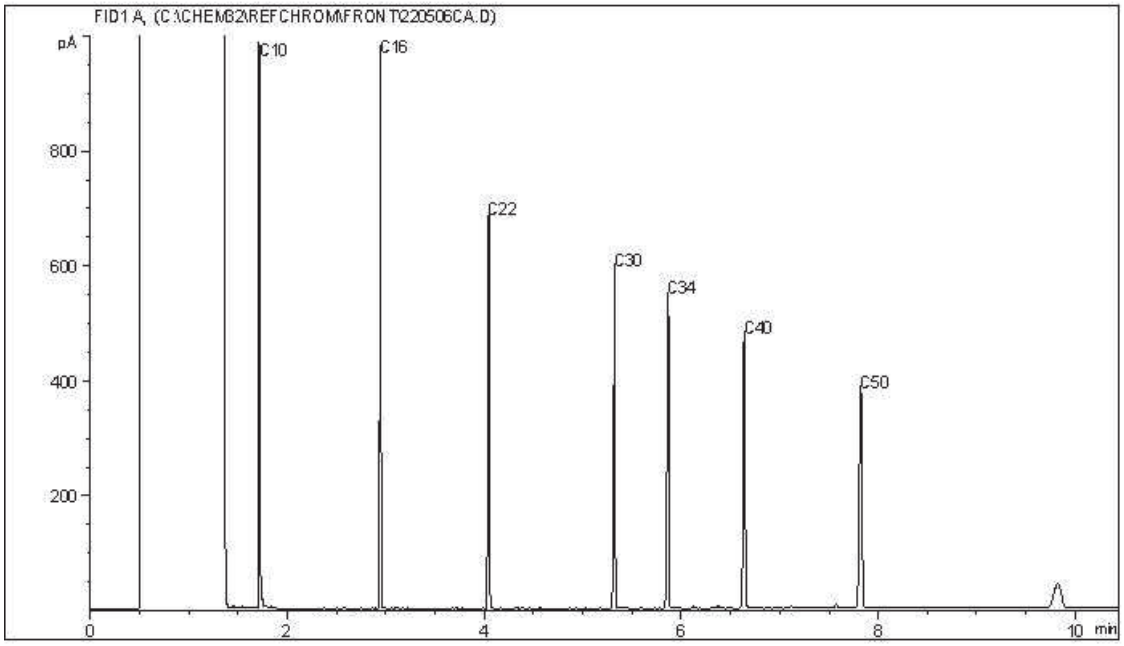
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



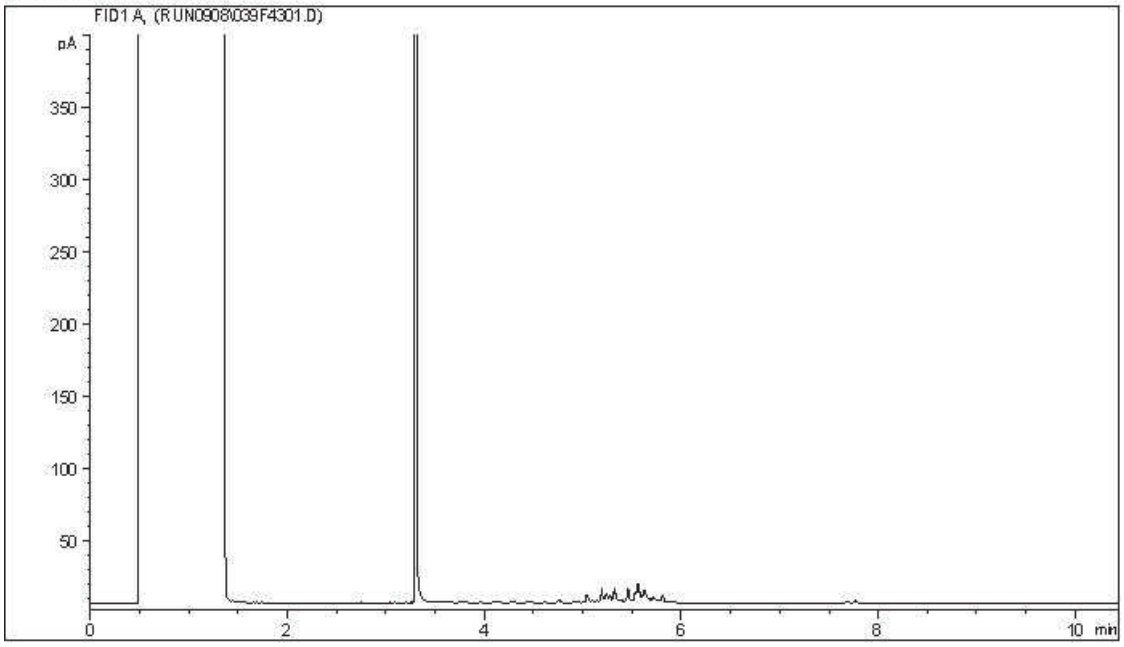
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

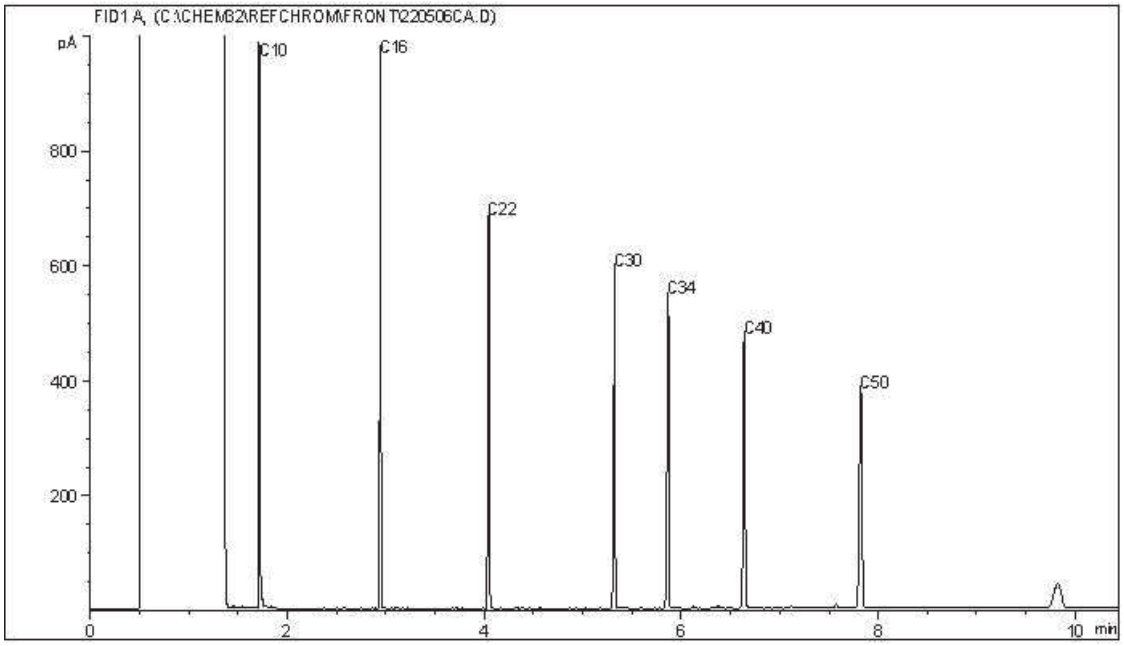
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



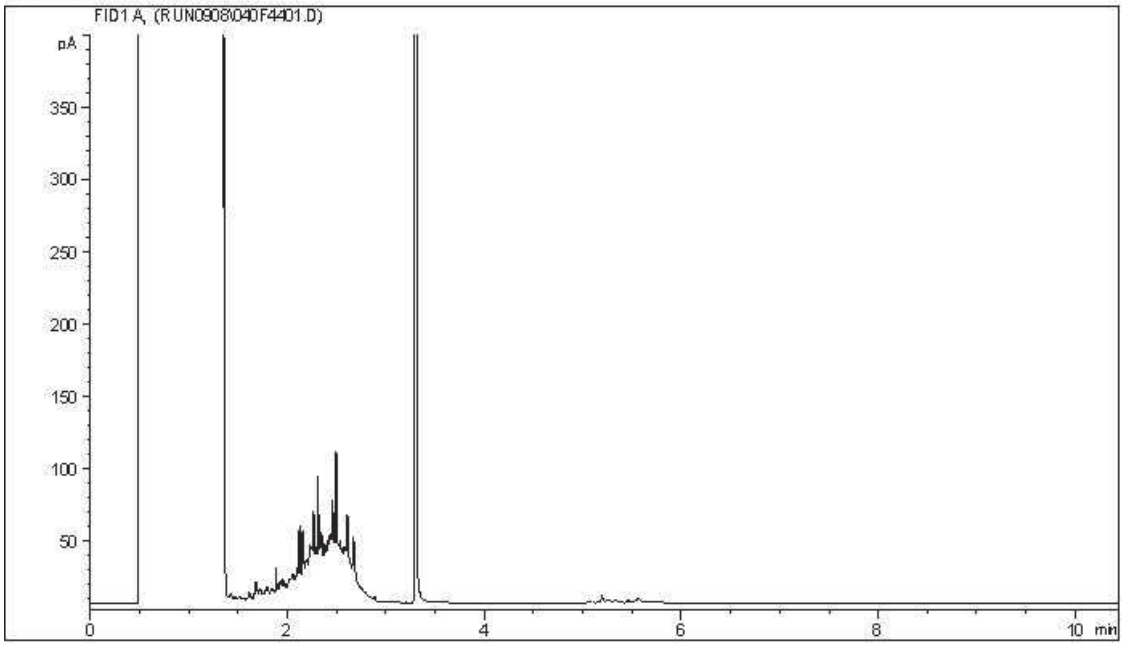
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

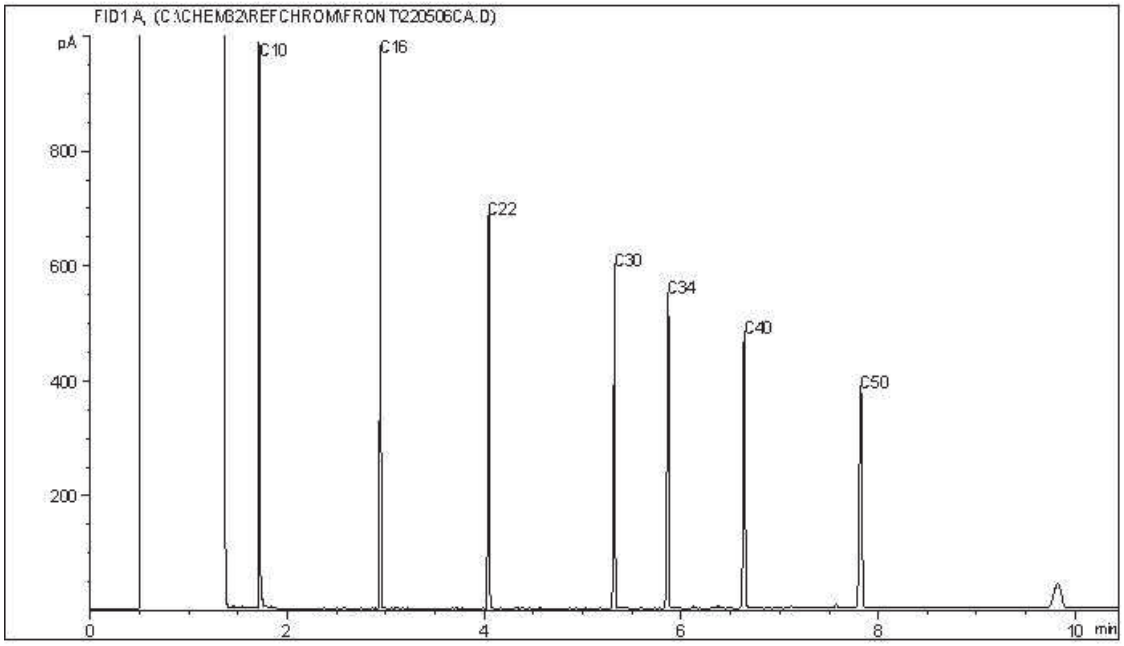
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



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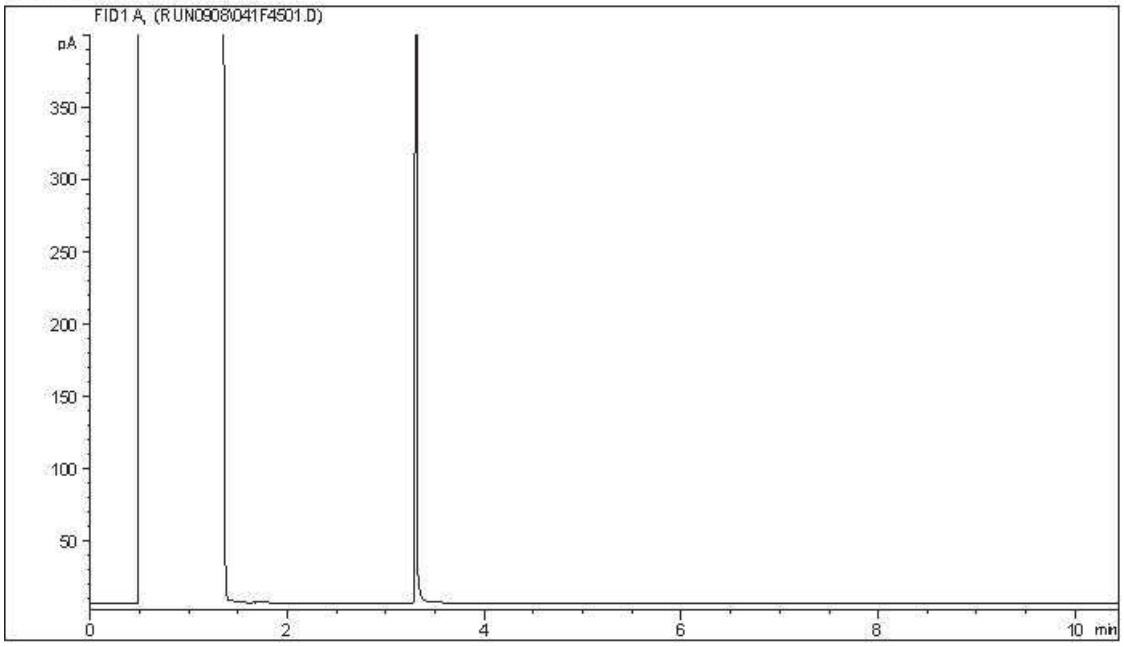
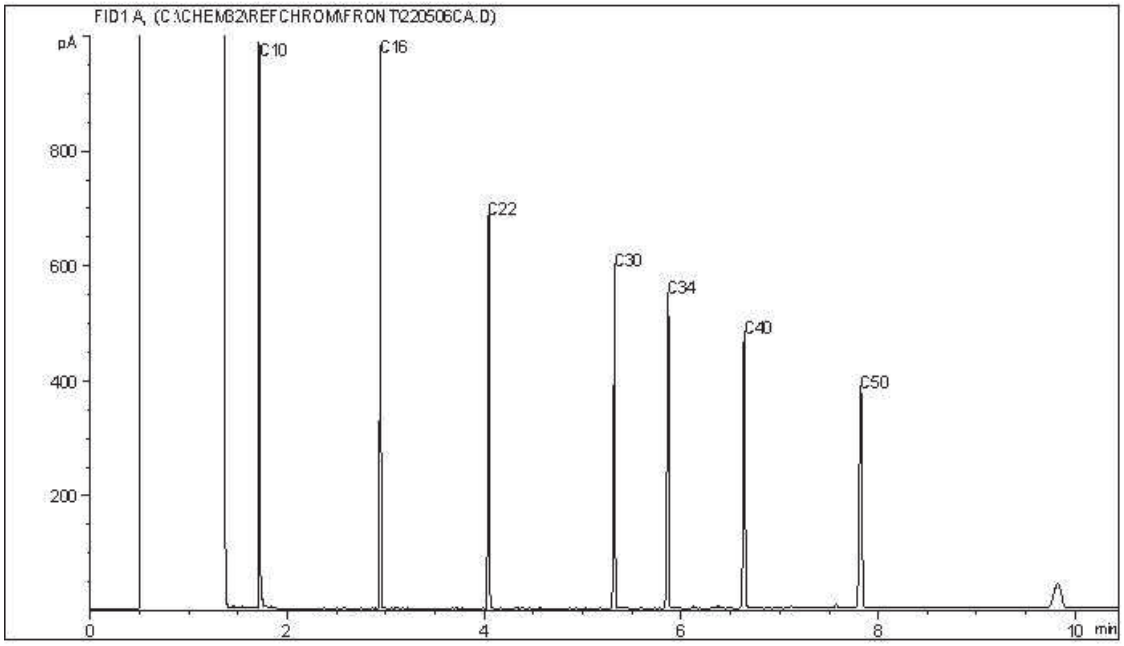
Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



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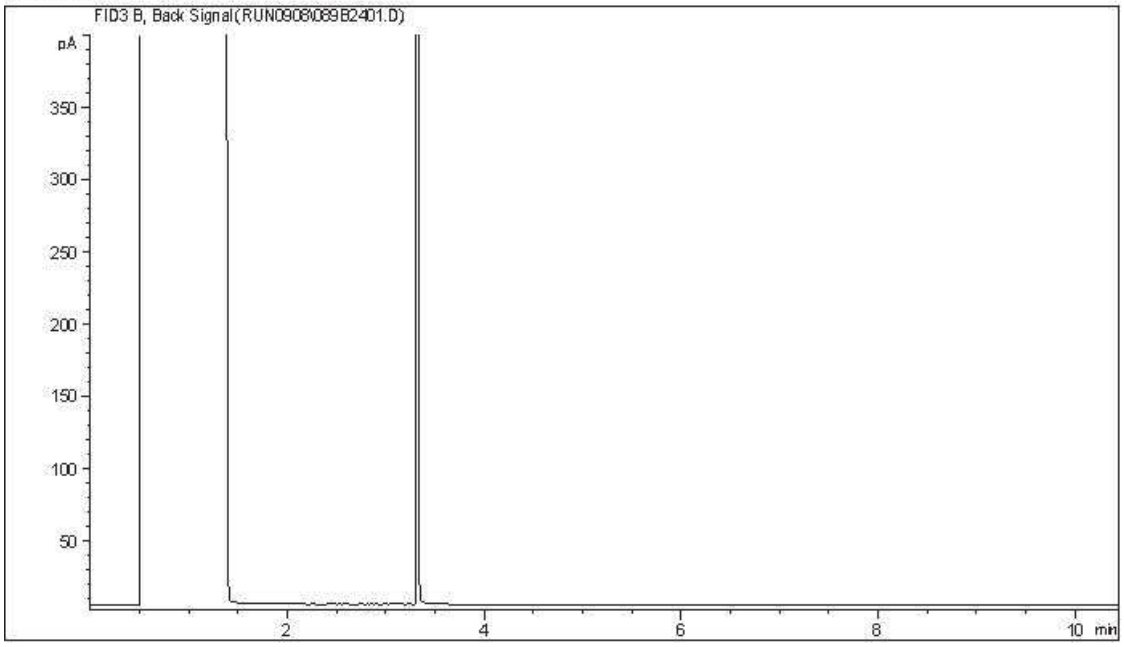
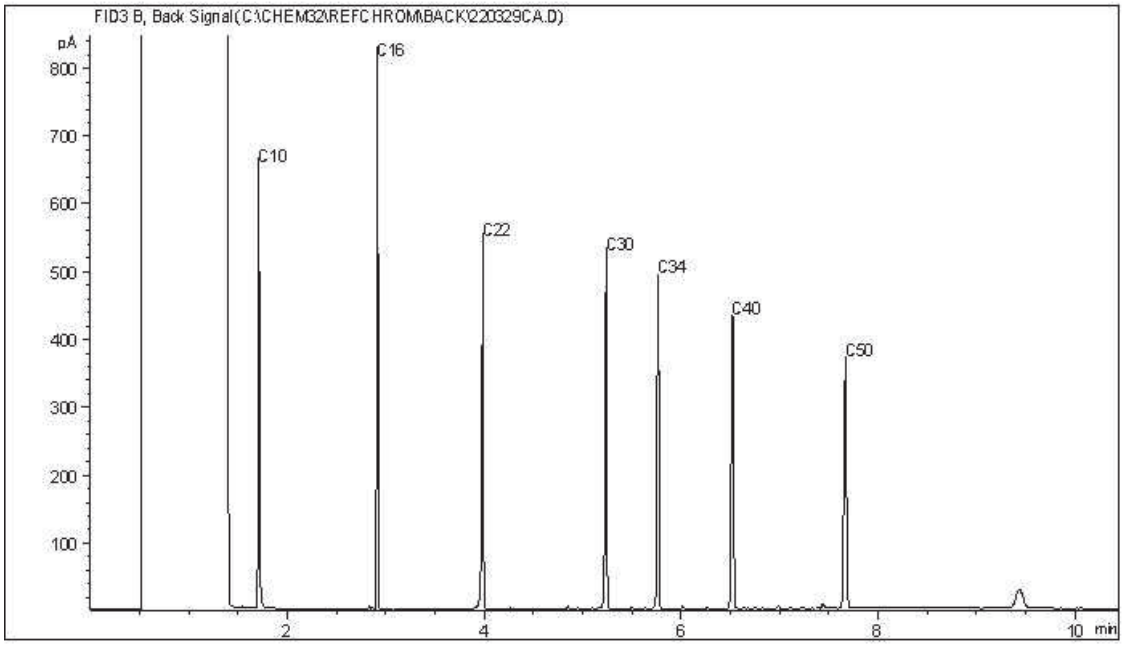
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



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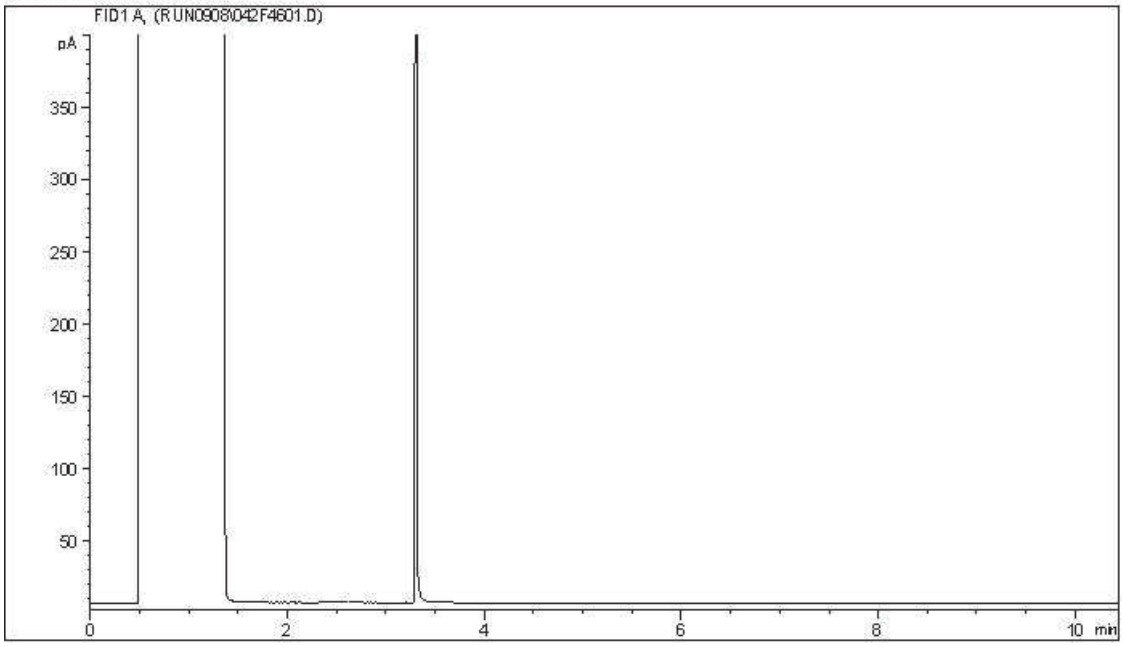
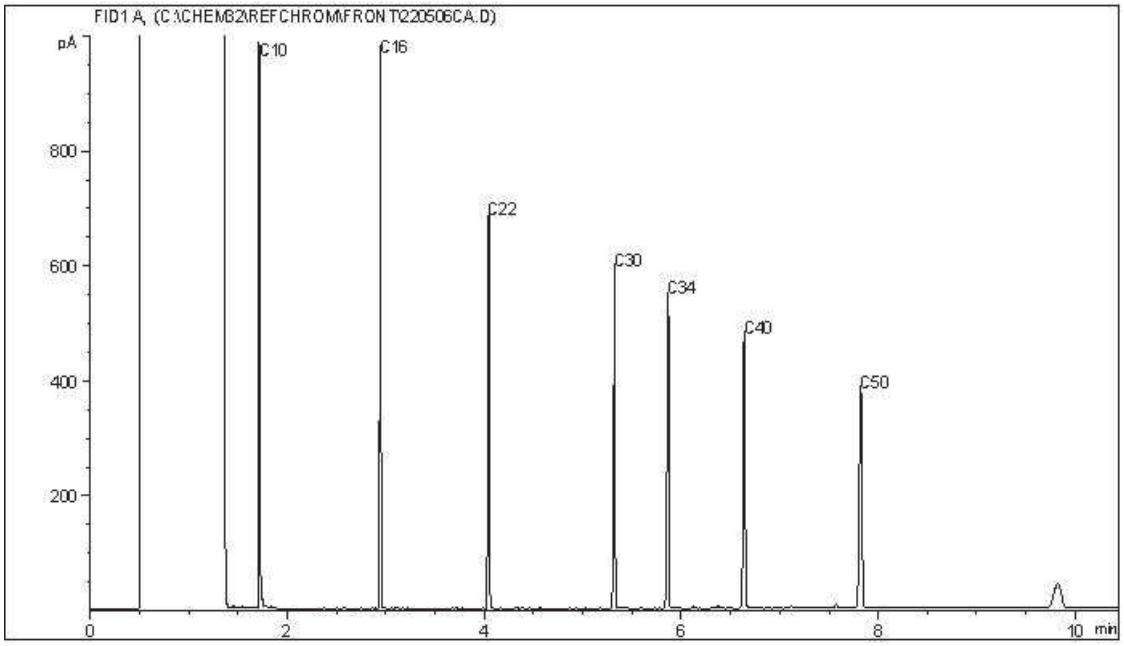
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



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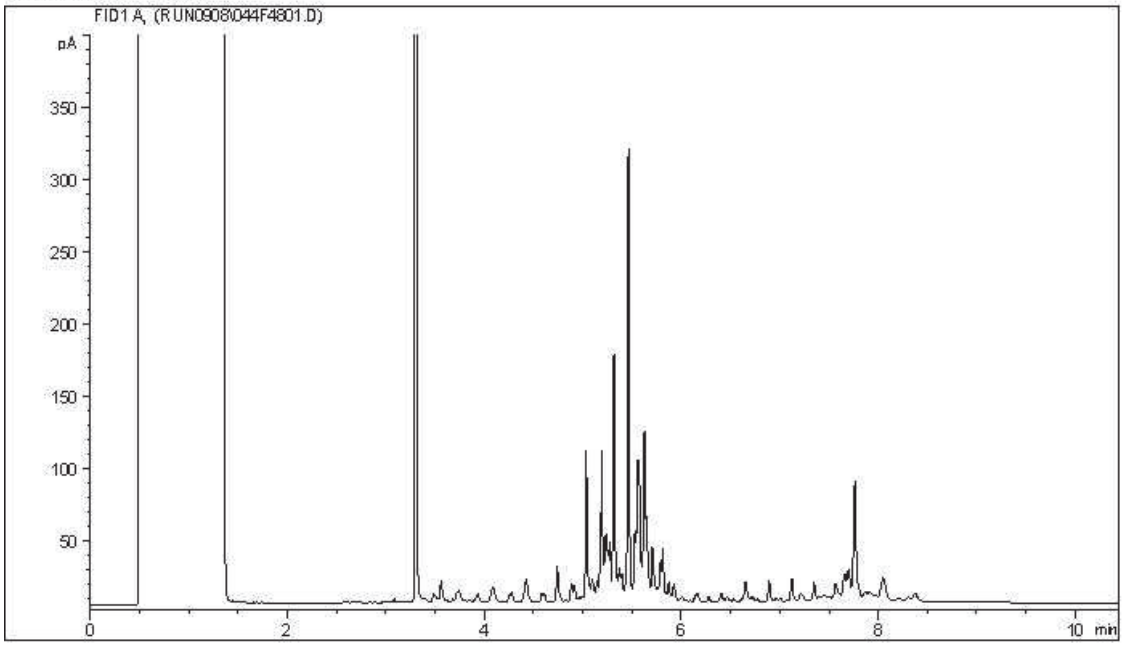
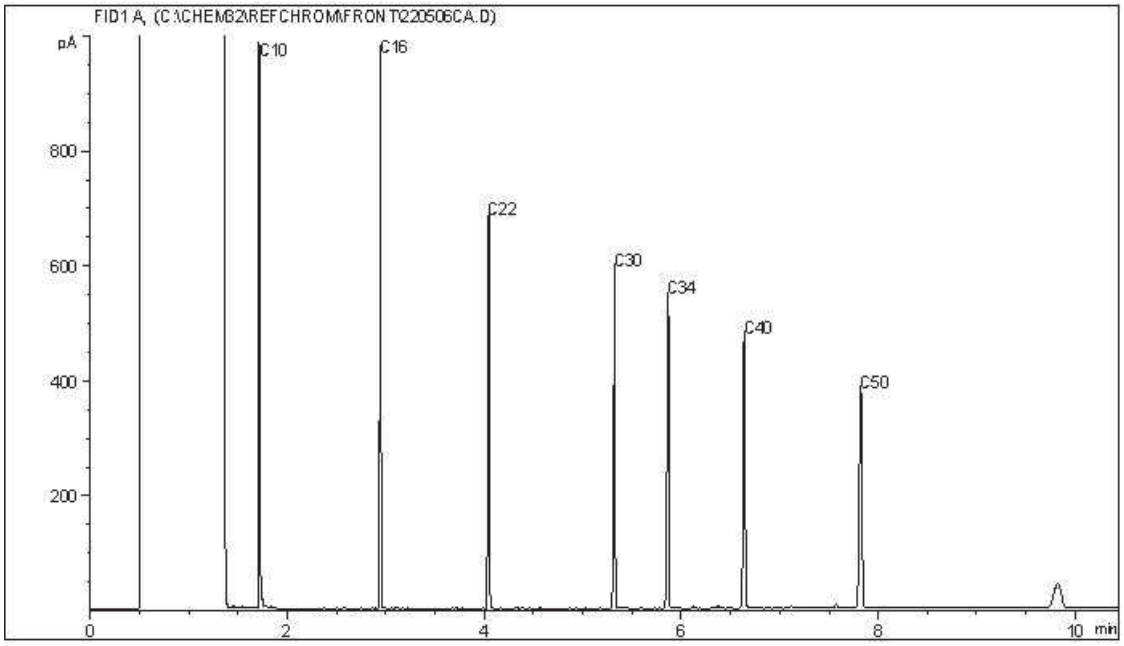


Carbon Range Distribution - Reference Chromatogram



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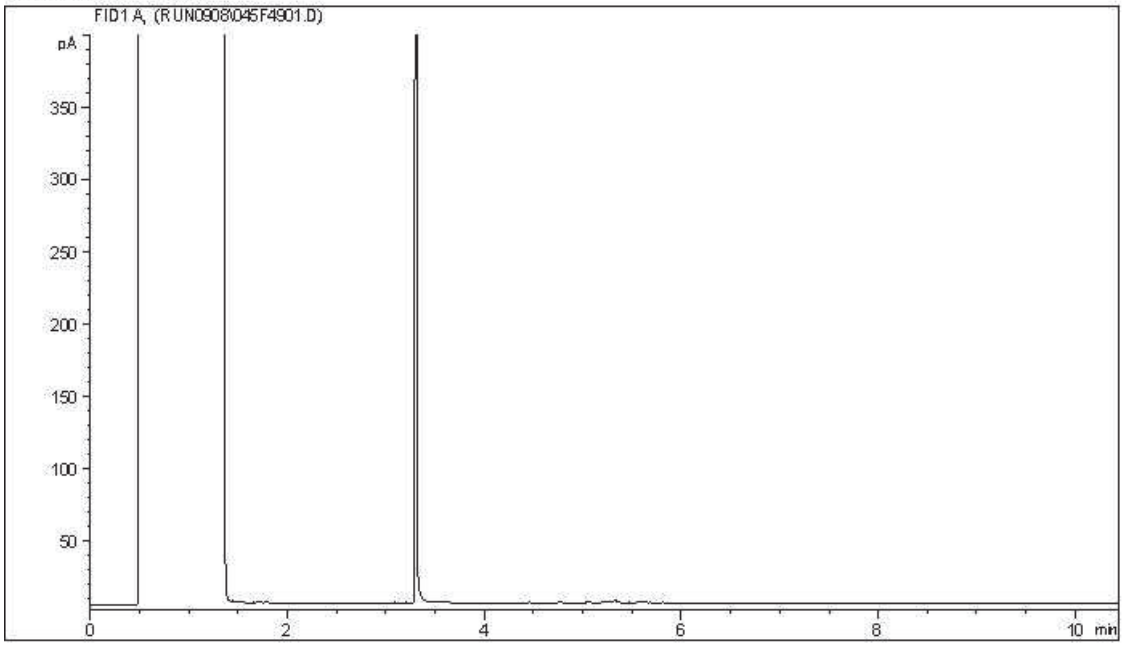
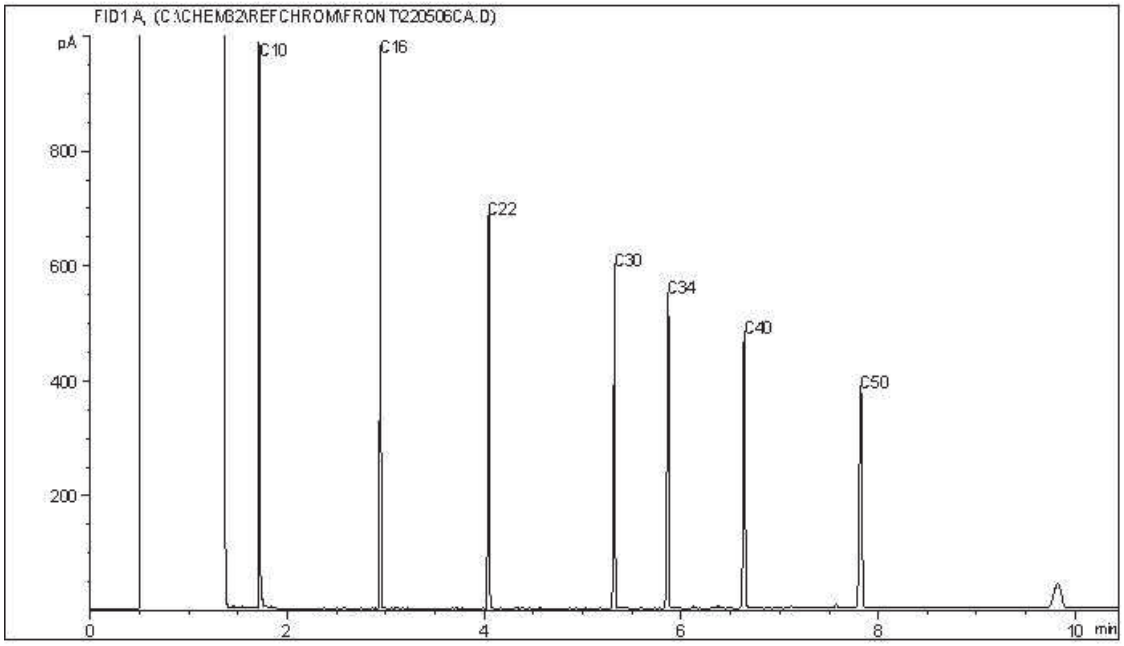


Carbon Range Distribution - Reference Chromatogram



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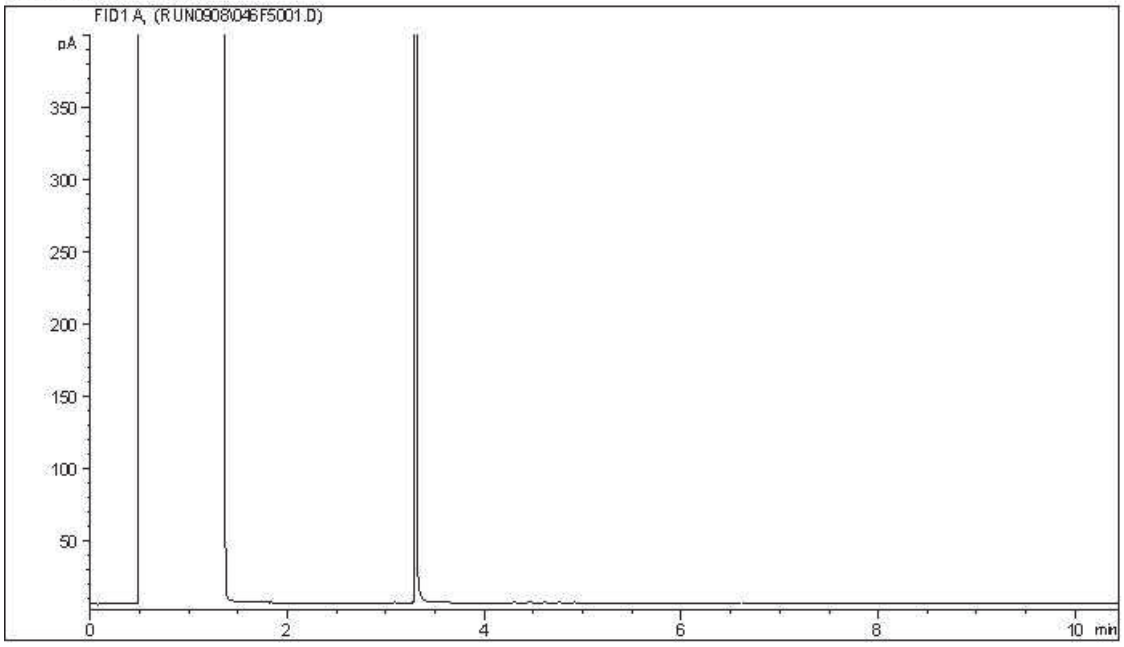
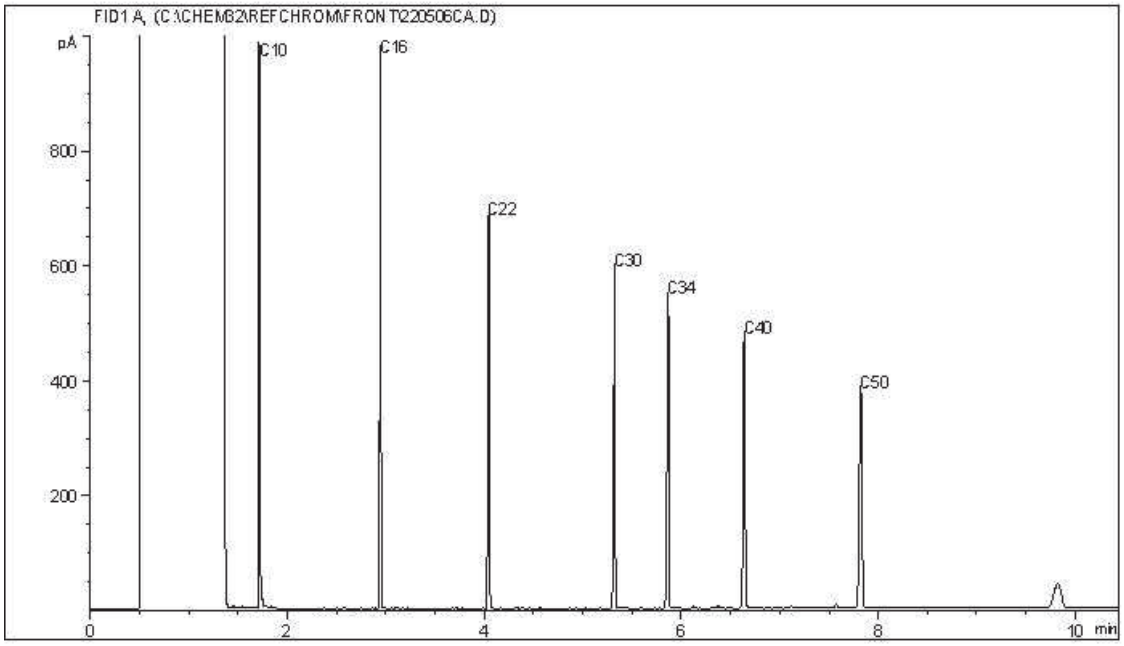


Carbon Range Distribution - Reference Chromatogram



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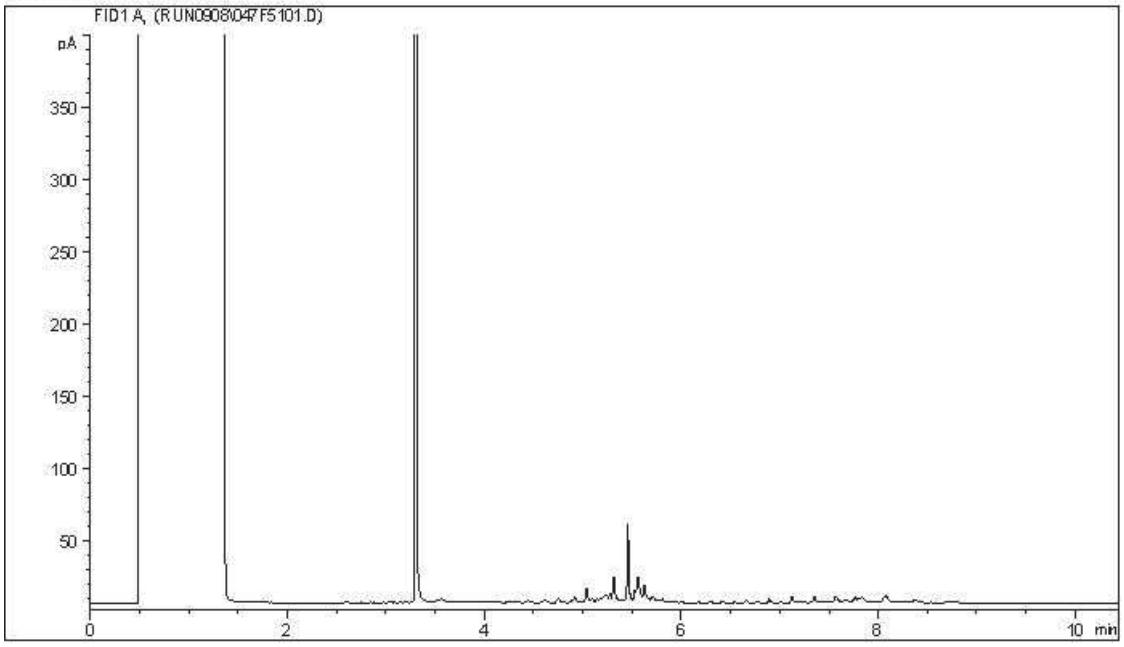
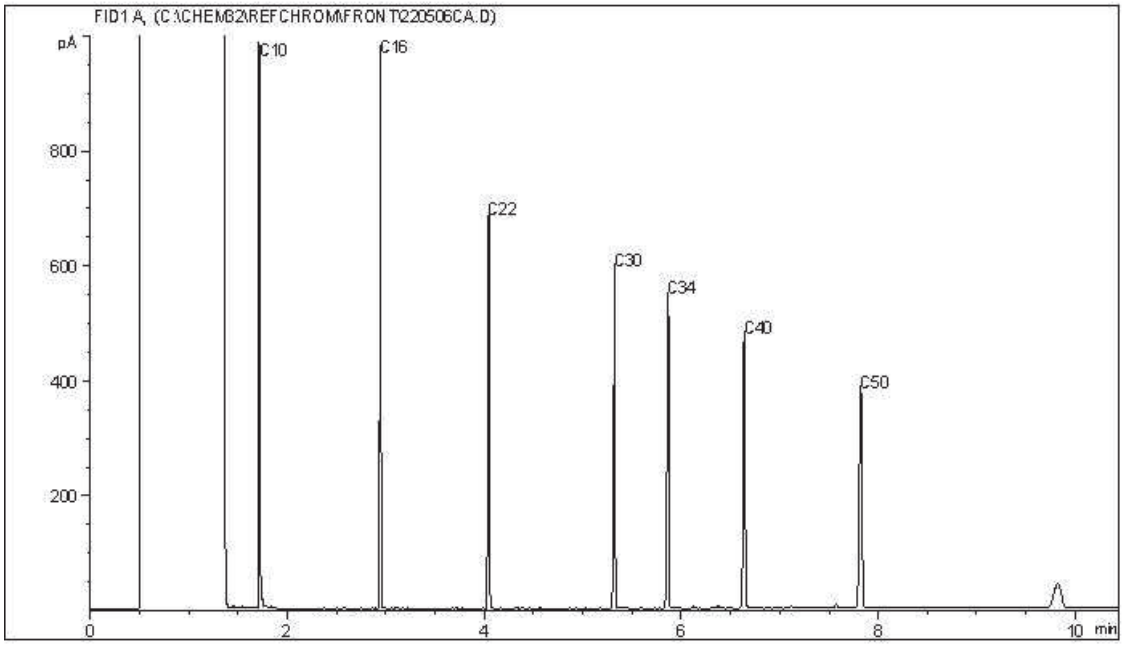


Carbon Range Distribution - Reference Chromatogram



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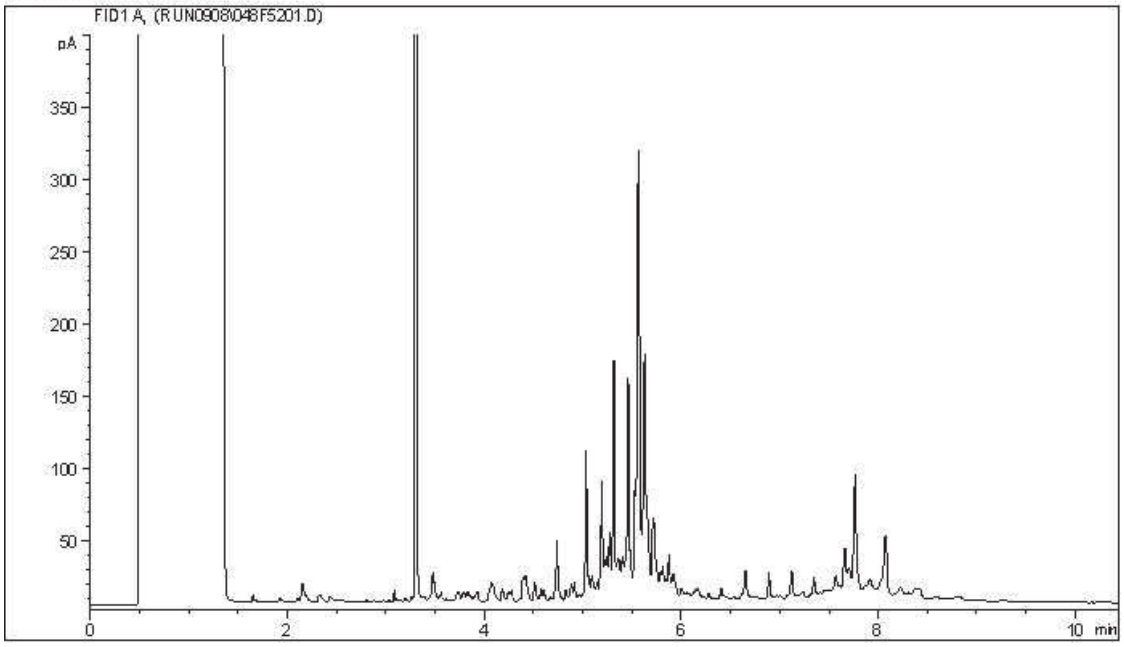

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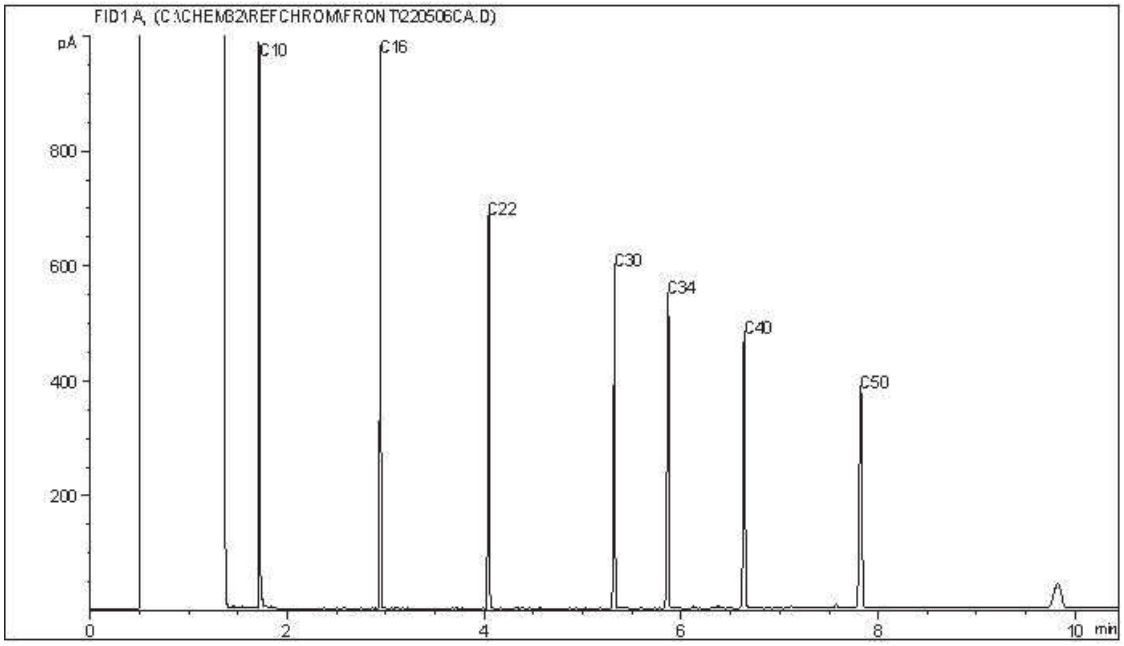

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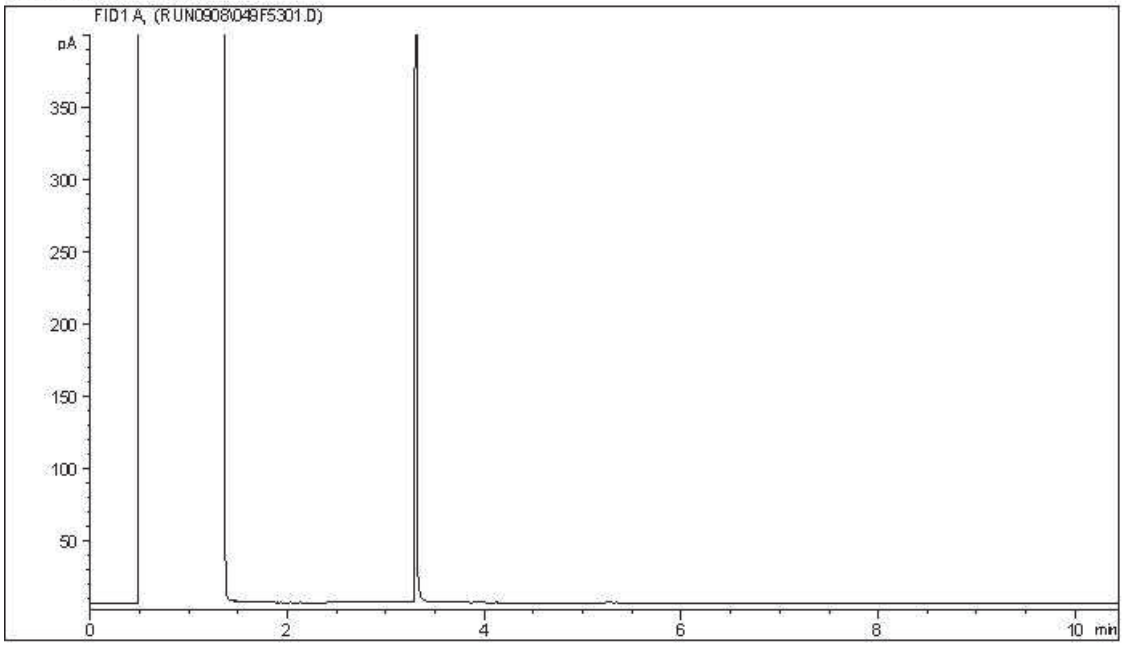

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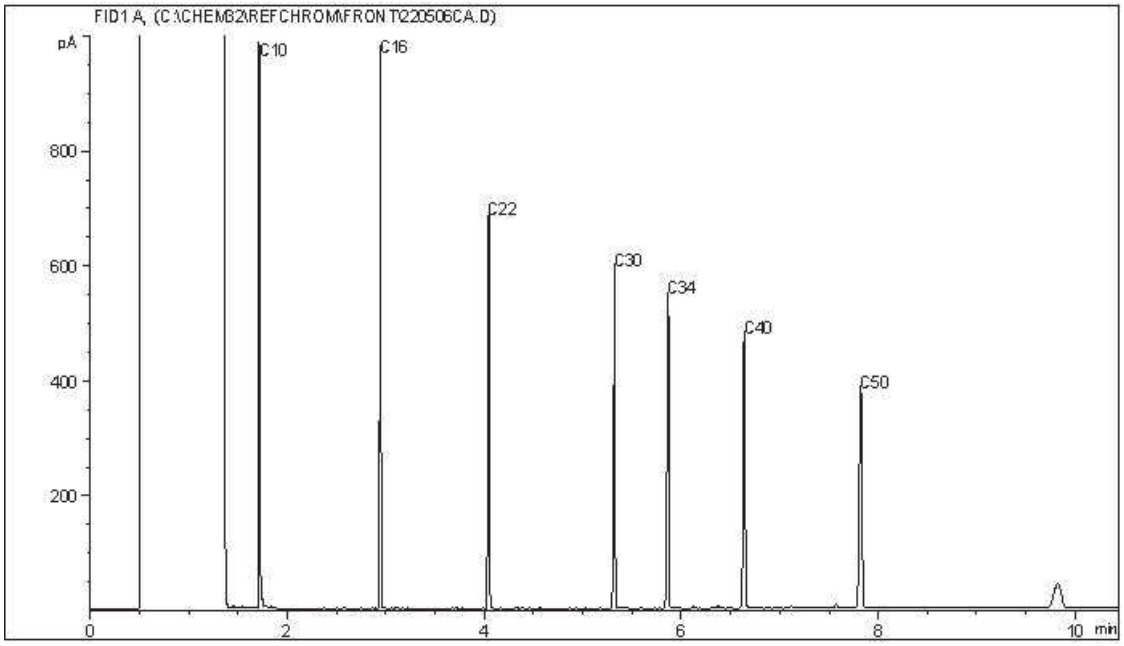

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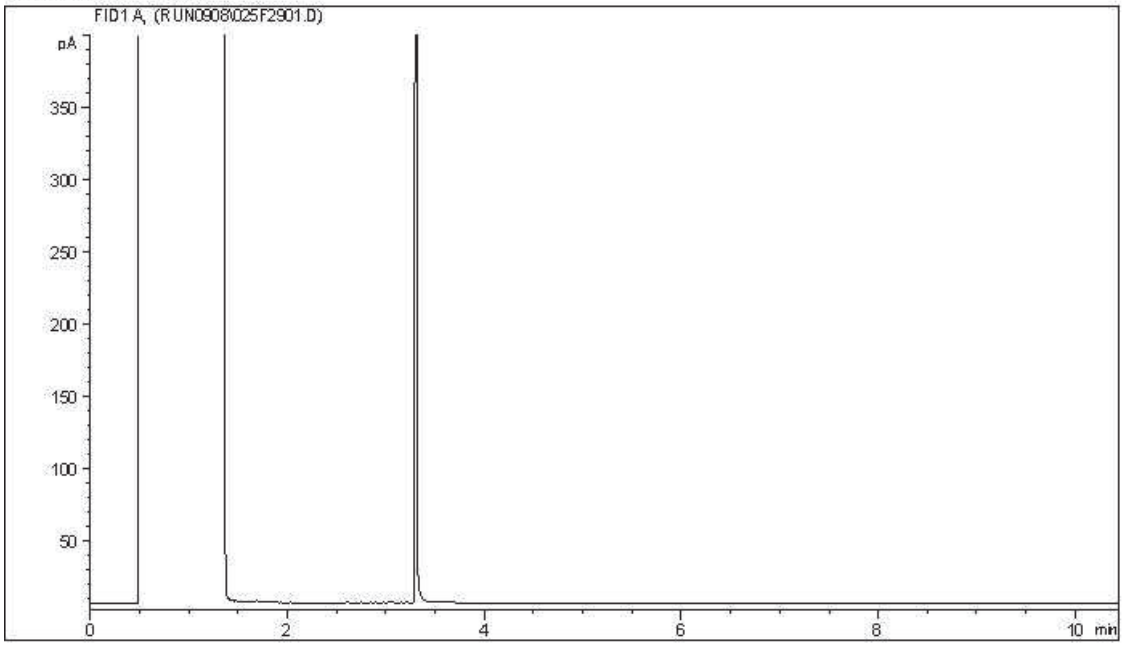

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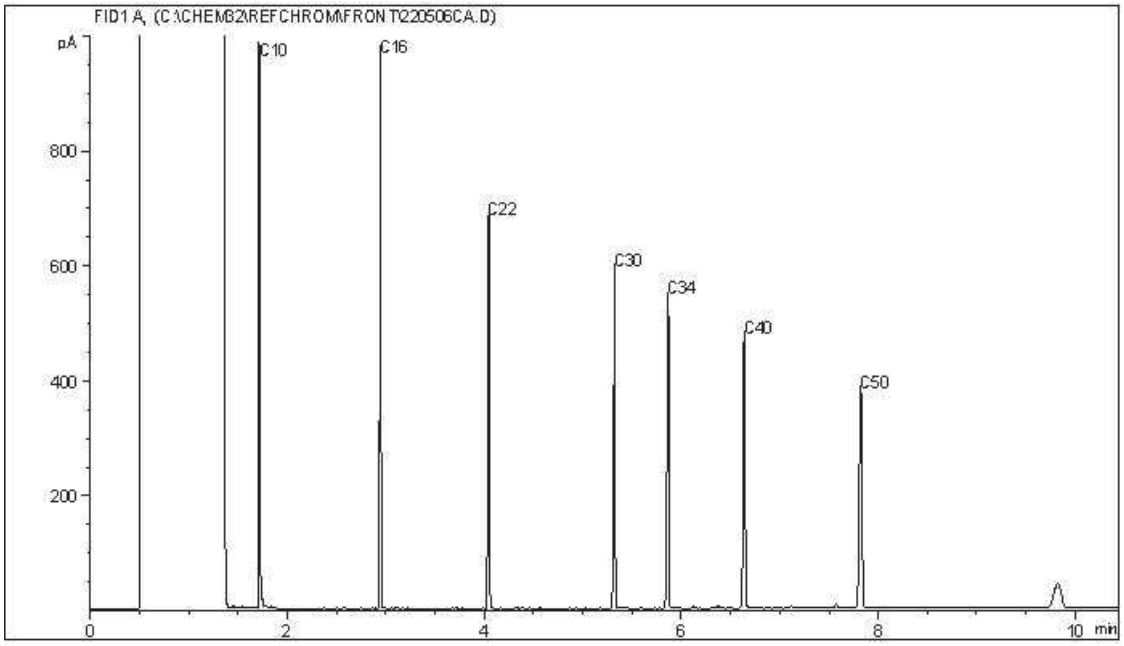

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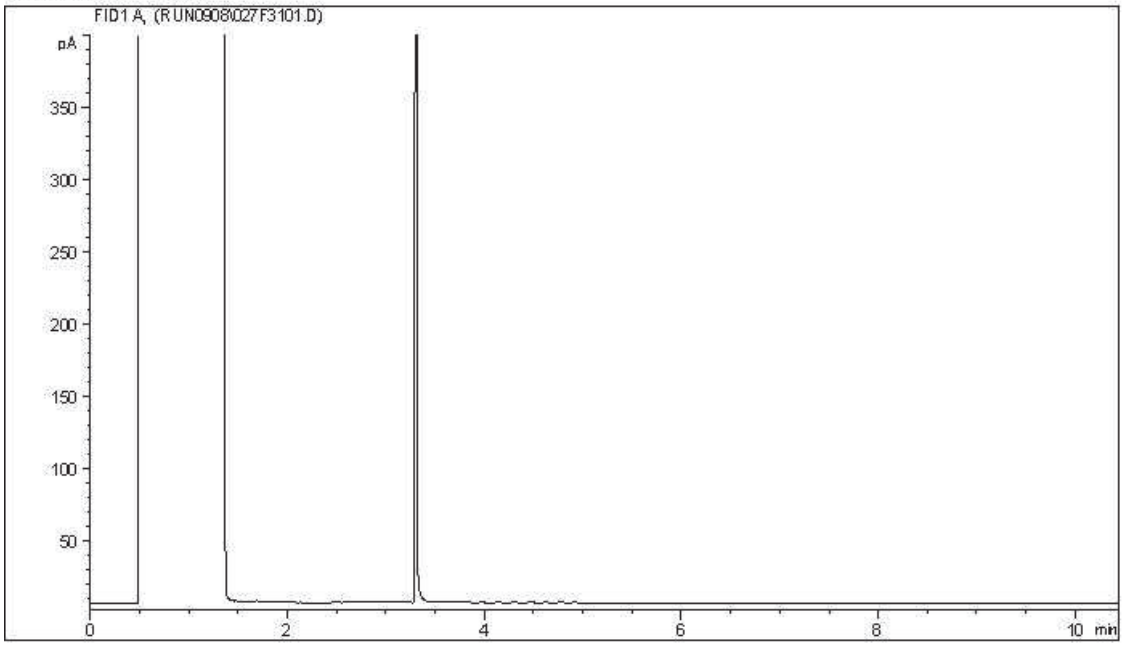

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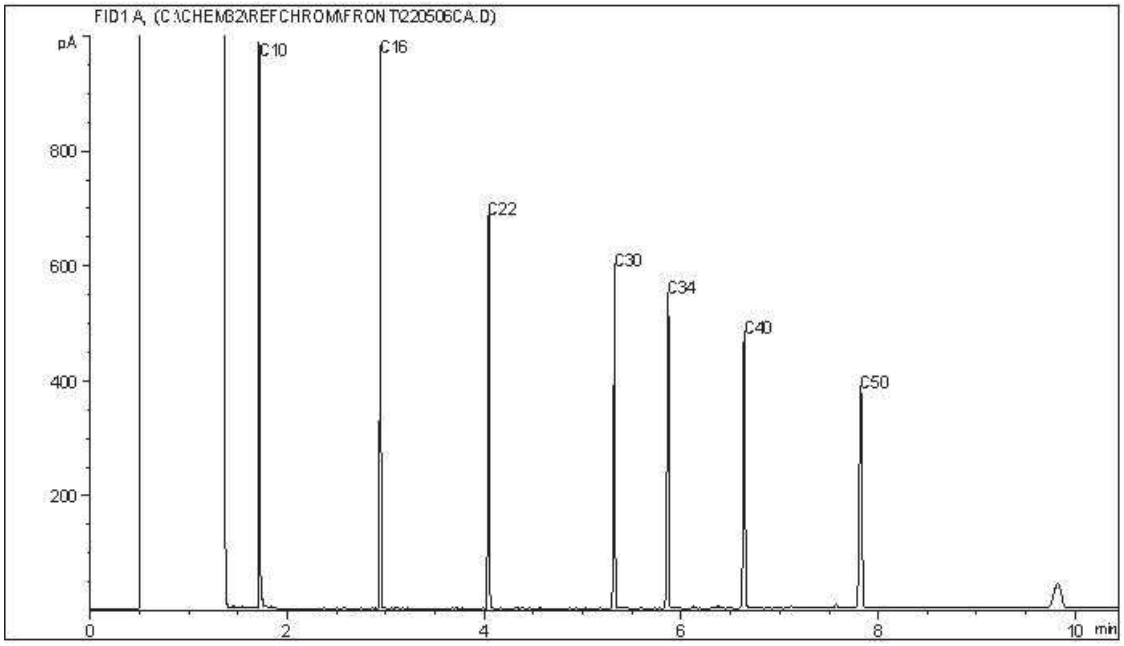

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Cynny Hagen

From: MacLean, Colleen <Colleen_MacLean@golder.com>
Sent: Monday, September 12, 2022 10:05 AM
To: Cynny Hagen
Cc: Bellavance, Aurelie
Subject: RE: Additional Analysis request - Camp Farewell -Prj: 22525414-1000, PO 22525414-1100-1104

Yes, that sounds good.

Thanks!

Colleen MacLean, *She/her*
Environmental Technologist, B.A., Dipl. EVT.

T: +1 403 299 5600
D: +1 403 299 5667

WSP GOLDER

From: Cynny Hagen <cynny.hagen@bureauveritas.com>
Sent: September 12, 2022 10:01 AM
To: MacLean, Colleen <colleen.maclean@wsp.com>
Cc: Bellavance, Aurelie <aurelie.bellavance@wsp.com>
Subject: Re: Additional Analysis request - Camp Farewell -Prj: 22525414-1000, PO 22525414-1100-1104

Hi Colleen,

Absolutely I will add the analysis, for job C266077 would you like to have the additional report for both Bio-Toluene and Resemble for F2-F4 and the other jobs can be just add a comment in report. Please confirm.

Regards,

Cynny Hagen
Key Account Specialist
Environmental Laboratories & Specialty Services - Western Canada
Bureau Veritas
Cell: 403-312-9070

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For urgent after-hours inquiries: 403 651 2436

On Mon, 12 Sep at 8:58 AM , MacLean, Colleen <colleen_maclean@golder.com> wrote:

Hello,

Could you please complete chromatogram analysis and biogenic toluene (select samples) assessment for the samples below?

C266077	BAW749	BH22-56-01	F1 to F4 and toluene
	BAW750	BH22-56-02	
	BAW752	BH22-57-01	F1 to F4
	BAW753	BH22-57-02	F1 to F4 and toluene
	BAW756	BH22-59-01	F1 to F4 and toluene
C266076	BAW742	BH22-63-01	F1 to F4
	BAW738	BH22-64-01	F1 to F4
	BAW746	BH22-67-02	F1 to F4
C266062	BAW656	BH22-68-01	F1 to F4
C266081	BAW784	BH22-70-01	F1 to F4

Please let me know if you have any questions.

Thanks!

Colleen MacLean, *She/her*
Environmental Technologist, B.A., Dipl. EVT.

T: +1 403 299 5600
D: +1 403 299 5667

237 – 4 Avenue SW, Suite 3300, Calgary, Alberta T2P 4K3, Canada
wsp.com | **golder.com**

WSP and Golder have joined together to form the premier environmental consultancy in the industry. Together we are 14,000 strong, Future Ready©, and delivering innovative solutions to our clients around the globe.

Your P.O. #: 22525414-1100-1004
Your Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your C.O.C. #: 1 of 2, 2 of 2

Attention: Aurelie Bellavance

GOLDER ASSOCIATES LTD.
2800, 700 -2nd Street SW
CALGARY, AB
CANADA T2P 2W2

Report Date: 2023/01/12
Report #: R3287448
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C266077
Received: 2022/08/30, 12:00

Sample Matrix: Soil
Samples Received: 15

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 by HS GC/MS/FID (MeOH extract) (1)	15	N/A	2022/09/04	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX	15	N/A	2022/09/08		Auto Calc
Toluene (13C/12C) CSIA	2	N/A	2023/01/10		See Attachment
CCME Hydrocarbons (F2-F4 in soil) (2)	15	2022/09/06	2022/09/07	AB SOP-00036	CCME PHC-CWS m
CCME Hydrocarbons (F4G in soil) (2)	2	2022/09/06	2022/09/08	AB SOP-00036 AB SOP-00040	CCME PHC-CWS m
Moisture	15	N/A	2022/09/07	AB SOP-00002	CCME PHC-CWS m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.
(2) All CCME results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil, Validation of Performance-Based Alternative Methods September 2003. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Your P.O. #: 22525414-1100-1004
Your Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your C.O.C. #: 1 of 2, 2 of 2

Attention: Aurelie Bellavance

GOLDER ASSOCIATES LTD.
2800, 700 -2nd Street SW
CALGARY, AB
CANADA T2P 2W2

Report Date: 2023/01/12
Report #: R3287448
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C266077
Received: 2022/08/30, 12:00

Encryption Key

Brody Andersen
Program Specialist-Emergency Spill Response
12 Jan 2023 14:40:16

Please direct all questions regarding this Certificate of Analysis to:
Cynny Hagen, Key Account Soecialist
Email: Cynny.HAGEN@bureauveritas.com
Phone# (403)735-2273

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Scott Cantwell, General Manager responsible for Alberta Environmental laboratory operations.

Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Bureau Veritas Job #: C266077
Report Date: 2023/01/12

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW749			BAW750	BAW750			BAW751		
Sampling Date		2022/08/24 09:45			2022/08/24 10:00	2022/08/24 10:00			2022/08/24 10:15		
COC Number		1 of 2			1 of 2	1 of 2			1 of 2		
	UNITS	BH22-56-01	RDL	QC Batch	BH22-56-02	BH22-56-02 Lab-Dup	RDL	QC Batch	BH22-56-03	RDL	QC Batch
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	88 (1)	29	A706375	49 (2)	71	16	A706375	<10	10	A706375
F3 (C16-C34 Hydrocarbons)	mg/kg	2600 (1)	150	A706375	1100 (3)	1400	70	A706375	<50	50	A706375
F4 (C34-C50 Hydrocarbons)	mg/kg	990 (1)	150	A706375	320 (3)	480	110	A706375	<50	50	A706375
Reached Baseline at C50	mg/kg	No	N/A	A706375	Yes	Yes	N/A	A706375	Yes	N/A	A706375
Physical Properties											
Moisture	%	66	0.30	A706397	86	N/A	0.30	A706313	18	0.30	A706397
Volatiles											
Xylenes (Total)	mg/kg	<0.14	0.14	A701342	<0.34	N/A	0.34	A701342	<0.045	0.045	A701342
F1 (C6-C10) - BTEX	mg/kg	<12	12	A701342	<33	N/A	33	A701342	<10	10	A701342
Field Preserved Volatiles											
Benzene	mg/kg	<0.018 (4)	0.018	A702755	<0.051 (4)	N/A	0.051	A702755	<0.0050	0.0050	A702755
Toluene	mg/kg	0.81 (4)	0.056	A702755	2.0 (5)	N/A	0.66	A702755	<0.050	0.050	A702755
Ethylbenzene	mg/kg	<0.043 (4)	0.043	A702755	<0.12 (4)	N/A	0.12	A702755	<0.010	0.010	A702755
m & p-Xylene	mg/kg	<0.097 (4)	0.097	A702755	<0.27 (4)	N/A	0.27	A702755	<0.040	0.040	A702755
o-Xylene	mg/kg	<0.096 (5)	0.096	A702755	<0.21 (4)	N/A	0.21	A702755	<0.020	0.020	A702755
F1 (C6-C10)	mg/kg	<12 (4)	12	A702755	<33 (4)	N/A	33	A702755	<10	10	A702755
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	100	N/A	A702755	98	N/A	N/A	A702755	98	N/A	A702755
4-Bromofluorobenzene (sur.)	%	96	N/A	A702755	96	N/A	N/A	A702755	96	N/A	A702755
D10-o-Xylene (sur.)	%	121	N/A	A702755	121	N/A	N/A	A702755	134	N/A	A702755
D4-1,2-Dichloroethane (sur.)	%	93	N/A	A702755	92	N/A	N/A	A702755	91	N/A	A702755
O-TERPHENYL (sur.)	%	90	N/A	A706375	86	81	N/A	A706375	85	N/A	A706375

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, sample contains => 50% moisture.
(2) Detection limits calculated based on method detection limits (MDLs) due to high moisture content, sample contains => 50% moisture. Uncertainty of values may be increased.
(3) Detection limits calculated based on method detection limits (MDLs) due to high moisture content, sample contains => 50% moisture. Uncertainty of values may be increased.
Matrix spike below acceptance limits due to probable matrix interference.
(4) Detection limit reported based on MDL and sample weight used for analysis.
(5) Detection limits raised based on sample weight used for analysis.

Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Bureau Veritas Job #: C266077
Report Date: 2023/01/12

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW751			BAW752		BAW753		BAW754		
Sampling Date		2022/08/24 10:15			2022/08/24 10:45		2022/08/24 10:55		2022/08/24 11:10		
COC Number		1 of 2			1 of 2		1 of 2		1 of 2		
	UNITS	BH22-56-03 Lab-Dup	RDL	QC Batch	BH22-57-01	RDL	BH22-57-02	RDL	BH22-57-03	RDL	QC Batch
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	N/A	10	A706375	<50 (1)	50	<56 (1)	56	<10	10	A706375
F3 (C16-C34 Hydrocarbons)	mg/kg	N/A	50	A706375	470 (1)	250	600 (1)	280	<50	50	A706375
F4 (C34-C50 Hydrocarbons)	mg/kg	N/A	50	A706375	<250 (1)	250	<280 (1)	280	<50	50	A706375
Reached Baseline at C50	mg/kg	N/A	N/A	A706375	Yes	N/A	Yes	N/A	Yes	N/A	A706375
Physical Properties											
Moisture	%	18	0.30	A706397	80	0.30	82	0.30	18	0.30	A706313
Volatiles											
Xylenes (Total)	mg/kg	N/A	0.045	A701342	<0.23	0.23	<0.26	0.26	<0.045	0.045	A701342
F1 (C6-C10) - BTEX	mg/kg	N/A	10	A701342	<23	23	47	26	<10	10	A701342
Field Preserved Volatiles											
Benzene	mg/kg	N/A	0.0050	A702755	<0.035 (2)	0.035	<0.039 (2)	0.039	<0.0050	0.0050	A702755
Toluene	mg/kg	N/A	0.050	A702755	<0.11 (2)	0.11	1.8 (3)	0.51	<0.050	0.050	A702755
Ethylbenzene	mg/kg	N/A	0.010	A702755	<0.081 (2)	0.081	<0.092 (2)	0.092	<0.010	0.010	A702755
m & p-Xylene	mg/kg	N/A	0.040	A702755	<0.18 (2)	0.18	<0.21 (2)	0.21	<0.040	0.040	A702755
o-Xylene	mg/kg	N/A	0.020	A702755	<0.14 (2)	0.14	<0.16 (2)	0.16	<0.020	0.020	A702755
F1 (C6-C10)	mg/kg	N/A	10	A702755	<23 (2)	23	49 (3)	26	<10	10	A702755
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	N/A	N/A	A702755	99	N/A	100	N/A	99	N/A	A702755
4-Bromofluorobenzene (sur.)	%	N/A	N/A	A702755	96	N/A	95	N/A	97	N/A	A702755
D10-o-Xylene (sur.)	%	N/A	N/A	A702755	133	N/A	125	N/A	134	N/A	A702755
D4-1,2-Dichloroethane (sur.)	%	N/A	N/A	A702755	93	N/A	95	N/A	93	N/A	A702755
O-TERPHENYL (sur.)	%	N/A	N/A	A706375	89	N/A	91	N/A	85	N/A	A706375

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, sample contains => 50% moisture.
(2) Detection limit reported based on MDL and sample weight used for analysis.
(3) Detection limits raised based on sample weight used for analysis.

Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Bureau Veritas Job #: C266077
Report Date: 2023/01/12

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW755	BAW755		BAW756		BAW757		BAW758		
Sampling Date		2022/08/24 11:25	2022/08/24 11:25		2022/08/24 13:15		2022/08/24 13:30		2022/08/24 13:45		
COC Number		1 of 2	1 of 2		1 of 2		1 of 2		1 of 2		
	UNITS	BH22-58-01	BH22-58-01 Lab-Dup	RDL	BH22-59-01	RDL	BH22-59-02	RDL	BH22-59-03	RDL	QC Batch
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	<23 (1)	N/A	23	60	10	<10	10	<10	10	A706375
F3 (C16-C34 Hydrocarbons)	mg/kg	300 (1)	N/A	110	1100	50	97	50	89	50	A706375
F4 (C34-C50 Hydrocarbons)	mg/kg	<110 (1)	N/A	110	400	50	<50	50	<50	50	A706375
Reached Baseline at C50	mg/kg	Yes	N/A	N/A	No	N/A	Yes	N/A	Yes	N/A	A706375
Physical Properties											
Moisture	%	56	55	0.30	43	0.30	27	0.30	30	0.30	A706313
Volatiles											
Xylenes (Total)	mg/kg	<0.10	N/A	0.10	<0.092	0.092	<0.097	0.097	<0.045	0.045	A701342
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	10	<21	21	<22	22	<10	10	A701342
Field Preserved Volatiles											
Benzene	mg/kg	<0.014 (2)	N/A	0.014	<0.0080 (2)	0.0080	<0.0080 (2)	0.0080	<0.0050	0.0050	A702755
Toluene	mg/kg	<0.050 (2)	N/A	0.050	0.86 (3)	0.10	<0.050 (2)	0.050	<0.050	0.050	A702755
Ethylbenzene	mg/kg	<0.033 (2)	N/A	0.033	<0.018 (2)	0.018	<0.020 (2)	0.020	<0.010	0.010	A702755
m & p-Xylene	mg/kg	<0.075 (2)	N/A	0.075	<0.082 (3)	0.082	<0.087 (3)	0.087	<0.040	0.040	A702755
o-Xylene	mg/kg	<0.073 (3)	N/A	0.073	<0.041 (3)	0.041	<0.043 (3)	0.043	<0.020	0.020	A702755
F1 (C6-C10)	mg/kg	<10 (2)	N/A	10	<21 (3)	21	<22 (3)	22	<10	10	A702755
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	100	N/A	N/A	97	N/A	99	N/A	99	N/A	A702755
4-Bromofluorobenzene (sur.)	%	97	N/A	N/A	97	N/A	98	N/A	99	N/A	A702755
D10-o-Xylene (sur.)	%	124	N/A	N/A	128	N/A	103	N/A	120	N/A	A702755
D4-1,2-Dichloroethane (sur.)	%	94	N/A	N/A	92	N/A	94	N/A	94	N/A	A702755
O-TERPHENYL (sur.)	%	67	N/A	N/A	70	N/A	85	N/A	88	N/A	A706375

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, sample contains => 50% moisture.
(2) Detection limit reported based on MDL and sample weight used for analysis.
(3) Detection limits raised based on sample weight used for analysis.

Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Bureau Veritas Job #: C266077
Report Date: 2023/01/12

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW759	BAW760		BAW761		BAW762		
Sampling Date		2022/08/24 14:00	2022/08/24 14:10		2022/08/24 14:20		2022/08/24 14:30		
COC Number		1 of 2	1 of 2		2 of 2		2 of 2		
	UNITS	BH22-59-04	BH22-65-01	QC Batch	BH22-65-02	QC Batch	BH22-65-03	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	<10	A706375	<10	A706375	<10	10	A706375
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	<50	A706375	<50	A706375	<50	50	A706375
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	<50	A706375	<50	A706375	<50	50	A706375
Reached Baseline at C50	mg/kg	Yes	Yes	A706375	Yes	A706375	Yes	N/A	A706375
Physical Properties									
Moisture	%	20	6.8	A706313	19	A706397	20	0.30	A706313
Volatiles									
Xylenes (Total)	mg/kg	<0.045	<0.045	A701342	<0.045	A701342	<0.045	0.045	A701342
F1 (C6-C10) - BTEX	mg/kg	<10	<10	A701342	<10	A701342	<10	10	A701342
Field Preserved Volatiles									
Benzene	mg/kg	<0.0050	<0.0050	A702755	<0.0050	A702776	<0.0050	0.0050	A702776
Toluene	mg/kg	<0.050	<0.050	A702755	<0.050	A702776	<0.050	0.050	A702776
Ethylbenzene	mg/kg	<0.010	<0.010	A702755	<0.010	A702776	<0.010	0.010	A702776
m & p-Xylene	mg/kg	<0.040	<0.040	A702755	<0.040	A702776	<0.040	0.040	A702776
o-Xylene	mg/kg	<0.020	<0.020	A702755	<0.020	A702776	<0.020	0.020	A702776
F1 (C6-C10)	mg/kg	<10	<10	A702755	<10	A702776	<10	10	A702776
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	99	99	A702755	95	A702776	97	N/A	A702776
4-Bromofluorobenzene (sur.)	%	97	98	A702755	101	A702776	98	N/A	A702776
D10-o-Xylene (sur.)	%	131	119	A702755	112	A702776	116	N/A	A702776
D4-1,2-Dichloroethane (sur.)	%	94	96	A702755	91	A702776	89	N/A	A702776
O-TERPHENYL (sur.)	%	88	83	A706375	86	A706375	91	N/A	A706375

RDL = Reportable Detection Limit
N/A = Not Applicable

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GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW763		
Sampling Date		2022/08/24 14:40		
COC Number		2 of 2		
	UNITS	BH22-65-04	RDL	QC Batch
Ext. Pet. Hydrocarbon				
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	10	A706375
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	50	A706375
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	50	A706375
Reached Baseline at C50	mg/kg	Yes	N/A	A706375
Physical Properties				
Moisture	%	18	0.30	A706397
Volatiles				
Xylenes (Total)	mg/kg	<0.045	0.045	A701342
F1 (C6-C10) - BTEX	mg/kg	<10	10	A701342
Field Preserved Volatiles				
Benzene	mg/kg	<0.0050	0.0050	A702776
Toluene	mg/kg	<0.050	0.050	A702776
Ethylbenzene	mg/kg	<0.010	0.010	A702776
m & p-Xylene	mg/kg	<0.040	0.040	A702776
o-Xylene	mg/kg	<0.020	0.020	A702776
F1 (C6-C10)	mg/kg	<10	10	A702776
Surrogate Recovery (%)				
1,4-Difluorobenzene (sur.)	%	95	N/A	A702776
4-Bromofluorobenzene (sur.)	%	96	N/A	A702776
D10-o-Xylene (sur.)	%	115	N/A	A702776
D4-1,2-Dichloroethane (sur.)	%	91	N/A	A702776
O-TERPHENYL (sur.)	%	86	N/A	A706375

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Bureau Veritas Job #: C266077
Report Date: 2023/01/12

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

RESULTS OF CHEMICAL ANALYSES OF SOIL

Bureau Veritas ID		BAW749	BAW750	
Sampling Date		2022/08/24 09:45	2022/08/24 10:00	
COC Number		1 of 2	1 of 2	
	UNITS	**BH22-56-01**	**BH22-56-02**	**QC Batch**
Parameter				
Subcontract Parameter	N/A	ATTACHED	ATTACHED	A849901

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GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

PETROLEUM HYDROCARBONS (CCME)

Bureau Veritas ID		BAW749		BAW756		
Sampling Date		2022/08/24 09:45		2022/08/24 13:15		
COC Number		1 of 2		1 of 2		
	UNITS	BH22-56-01	RDL	BH22-59-01	RDL	QC Batch
Ext. Pet. Hydrocarbon						
F4G-SG (Heavy Hydrocarbons-Grav.)	mg/kg	4700 (1)	1500	2200	500	A708702

RDL = Reportable Detection Limit
(1) Detection limits raised due to high moisture content, samples contain => 50% moisture.

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GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

GENERAL COMMENTS

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

Package 1	4.0°C
Package 2	3.7°C
Package 3	8.7°C
Package 4	3.3°C
Package 5	4.7°C
Package 6	4.0°C
Package 7	4.7°C

Version #4:Toluene Stage 3 Assessment has been done on sample BAW749 & BAW750 as per client request on 20221117. Report is attached to this job.

Version 3: Report reissued to include Stage 2 Toluene assessment on below samples as per client request received 2022/09/20.
BAW749/BH22-56-01
BAW750/BH22-56-02

Sample BAW749 [BH22-56-01] : Version #2: Additional analysis has been added as per request from client 20220912

Chromatogram and Toluene review on samples BAW749 (BH22-56-01), BAW750 (BH22-56-02), BAW753 (BH22-57-02) & BAW756 (BH22-59-01)
Chromatogram review on sample BAW752 (BH22-57-01)

Results relate only to the items tested.

Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A702755	WPK	Matrix Spike	1,4-Difluorobenzene (sur.)	2022/09/04		100	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		95	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		122	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		96	%	50 - 140
			Benzene	2022/09/04		104	%	50 - 140
			Toluene	2022/09/04		97	%	50 - 140
			Ethylbenzene	2022/09/04		97	%	50 - 140
			m & p-Xylene	2022/09/04		97	%	50 - 140
			o-Xylene	2022/09/04		98	%	50 - 140
			F1 (C6-C10)	2022/09/04		73	%	60 - 140
A702755	WPK	Spiked Blank	1,4-Difluorobenzene (sur.)	2022/09/04		98	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		99	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		110	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		93	%	50 - 140
			Benzene	2022/09/04		98	%	60 - 130
			Toluene	2022/09/04		95	%	60 - 130
			Ethylbenzene	2022/09/04		95	%	60 - 130
			m & p-Xylene	2022/09/04		96	%	60 - 130
			o-Xylene	2022/09/04		101	%	60 - 130
			F1 (C6-C10)	2022/09/04		108	%	60 - 140
A702755	WPK	Method Blank	1,4-Difluorobenzene (sur.)	2022/09/04		99	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		98	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		114	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		93	%	50 - 140
			Benzene	2022/09/04	<0.0050		mg/kg	
			Toluene	2022/09/04	<0.050		mg/kg	
			Ethylbenzene	2022/09/04	<0.010		mg/kg	
			m & p-Xylene	2022/09/04	<0.040		mg/kg	
			o-Xylene	2022/09/04	<0.020		mg/kg	
			F1 (C6-C10)	2022/09/04	<10		mg/kg	
A702755	WPK	RPD	Benzene	2022/09/04	NC		%	50
			Toluene	2022/09/04	NC		%	50
			Ethylbenzene	2022/09/04	NC		%	50
			m & p-Xylene	2022/09/04	NC		%	50
			o-Xylene	2022/09/04	NC		%	50
			F1 (C6-C10)	2022/09/04	NC		%	30
A702776	WPK	Matrix Spike	1,4-Difluorobenzene (sur.)	2022/09/04		79	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		82	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		97	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		78	%	50 - 140
			Benzene	2022/09/04		84	%	50 - 140
			Toluene	2022/09/04		80	%	50 - 140
			Ethylbenzene	2022/09/04		80	%	50 - 140
			m & p-Xylene	2022/09/04		80	%	50 - 140
			o-Xylene	2022/09/04		82	%	50 - 140
			F1 (C6-C10)	2022/09/04		98	%	60 - 140
A702776	WPK	Spiked Blank	1,4-Difluorobenzene (sur.)	2022/09/04		97	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		96	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		118	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		90	%	50 - 140
			Benzene	2022/09/04		101	%	60 - 130
			Toluene	2022/09/04		97	%	60 - 130

Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Ethylbenzene	2022/09/04		99	%	60 - 130
			m & p-Xylene	2022/09/04		97	%	60 - 130
			o-Xylene	2022/09/04		101	%	60 - 130
			F1 (C6-C10)	2022/09/04		105	%	60 - 140
A702776	WPK	Method Blank	1,4-Difluorobenzene (sur.)	2022/09/04		95	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		96	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		96	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		89	%	50 - 140
			Benzene	2022/09/04	<0.0050		mg/kg	
			Toluene	2022/09/04	<0.050		mg/kg	
			Ethylbenzene	2022/09/04	<0.010		mg/kg	
			m & p-Xylene	2022/09/04	<0.040		mg/kg	
			o-Xylene	2022/09/04	<0.020		mg/kg	
			F1 (C6-C10)	2022/09/04	<10		mg/kg	
A702776	WPK	RPD	Benzene	2022/09/04	NC		%	50
			Toluene	2022/09/04	NC		%	50
			Ethylbenzene	2022/09/04	NC		%	50
			m & p-Xylene	2022/09/04	NC		%	50
			o-Xylene	2022/09/04	NC		%	50
			F1 (C6-C10)	2022/09/04	NC		%	30
A706313	KLG	Method Blank	Moisture	2022/09/07	<0.30		%	
A706313	KLG	RPD [BAW755-01]	Moisture	2022/09/07	2.5		%	20
A706375	GG3	Matrix Spike [BAW750-01]	O-TERPHENYL (sur.)	2022/09/07		88	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/07		73	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/07		23 (1)	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/07		59 (1)	%	60 - 140
A706375	GG3	Spiked Blank	O-TERPHENYL (sur.)	2022/09/07		85	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/07		79	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/07		84	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/07		80	%	60 - 140
A706375	GG3	Method Blank	O-TERPHENYL (sur.)	2022/09/07		92	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/07	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2022/09/07	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2022/09/07	<50		mg/kg	
A706375	GG3	RPD [BAW750-01]	F2 (C10-C16 Hydrocarbons)	2022/09/07	38		%	40
			F3 (C16-C34 Hydrocarbons)	2022/09/07	28		%	40
			F4 (C34-C50 Hydrocarbons)	2022/09/07	39		%	40
A706397	MGL	Method Blank	Moisture	2022/09/07	<0.30		%	
A706397	MGL	RPD [BAW751-01]	Moisture	2022/09/07	0		%	20
A708702	JB9	Spiked Blank	F4G-SG (Heavy Hydrocarbons-Grav.)	2022/09/08		105	%	60 - 140

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A708702	JB9	Method Blank	F4G-SG (Heavy Hydrocarbons-Grav.)	2022/09/08	<500		mg/kg	

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 (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

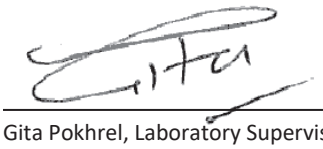
Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Bureau Veritas Job #: C266077
Report Date: 2023/01/12

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1004
Sampler Initials: JD

VALIDATION SIGNATURE PAGE

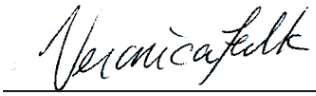
The analytical data and all QC contained in this report were reviewed and validated by:



Gita Pokhrel, Laboratory Supervisor

Janet Gao, B.Sc., QP, Supervisor, Organics

Nadeem Cheema, Project Solutions Representative



Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

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CAL

BUREAU VERITAS

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

9

CHAIN OF CUSTODY #	
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COOLER OBSERVATIONS:

BV JOB#:

CUSTODY SEAL PRESENT (YES/NO)	CUSTODY SEAL INTACT (YES/NO)	ICE PRESENT (YES/NO)	COOLER ID	TEMP 1	TEMP 2	TEMP 3
				0	0	1
				0	0	1
				4	3	3
				0	0	0
				3	3	3
				2	1	0
				-1	-2	-2
				0	0	-2
				-1	-2	-1

CUSTODY SEAL PRESENT (YES/NO)	CUSTODY SEAL INTACT (YES/NO)	ICE PRESENT (YES/NO)	COOLER ID	TEMP 1	TEMP 2	TEMP 3

RECEIVED BY (SIGN & PRINT)		DATE (YYYY/MM/DD)	TIME (HH:MM)
[signature]	JASON BIL	2022/08/31	1510

YK

MaxXam
A Bureau Veritas Group Company

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY #

CHAIN OF CUSTODY #	
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COOLER OBSERVATIONS:

Cooler	Custody seal present (YES/NO)	Custody seal intact (YES/NO)	Ice present (YES/NO)	COOLER ID	TEMP 1	TEMP 2	TEMP 3
1	✓ YES	✓ YES	✓ YES		4	8	3
2	✓ YES	✓ YES	✓ YES		2	4	5
3	✓ YES	✓ YES	✓ YES		8	9	9
4	✓ YES	✓ YES	✓ YES		3	5	2
5	✓ YES	✓ YES	✓ YES		4	4	6
6	✓ YES	✓ YES	✓ YES		2	4	6
7	✓ YES	✓ YES	✓ YES		4	5	5
8							
9							
10							

MAXXAM JOB#:

Cooler	Custody seal present (YES/NO)	Custody seal intact (YES/NO)	Ice present (YES/NO)	COOLER ID	TEMP 1	TEMP 2	TEMP 3
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

RECEIVED BY (SIGN & PRINT)		DATE (YYYY/MM/DD)	TIME (HH:MM)
Jose Mercano	[signature]	2022/05/30	12:00 pm

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☐ Winnipeg, MB: D-675 Berry St. R3H 1A7 Toll Free (866) 800-6208

CHAIN OF CUSTODY RECORD
ENV COC - 00013v3

C266077 Page 1 of 2

Invoice Information	Invoice to (requires report) ☐	Report Information (if differs from invoice)		Project Information	
Company:	Client #254, Golder Associates	Company:	Golder Associates	Quotation #:	Shell
Contact Name:	237 - 4 Ave SW Suite 3300	Contact Name:	Aurelie Bellavance	P.O. #/ AFE#:	22525414-[100-1004
Street Address:		Street Address:		Project #:	22525414-1000
City:	Calgary Prov: AB Postal Code:	City:	Calgary AB Postal Code: T2P 4K3	Site #:	NA
Phone:		Phone:	403-299-5600	Site Location:	Camp Farewell, NT
Email:	Canada Account Payable	Email:	Aurelie.Bellavance@wsp.com	Site Location Province:	NT
Copies:		Copies:	Peter.Tan@wsp.com	Sampled By:	JD/HK

LAB USE ONLY - PLACE STICKER HERE

Rush Confirmation #:

Regulatory Criteria

☐ AT1 ☐ CCME ☐ Drinking Water - Canada ☐ Drinking Water - Manitoba
☐ Saskatchewan ☐ Drinking Water - Alberta ☑ Other AMSRP

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

Regular Turnaround Time (TAT)
☑ 5 to 7 Day ☐ 10 Day

Rush Turnaround Time (TAT) Surcharges apply
☐ Same Day ☐ 1 Day
☐ 2 Day ☐ 3 Day
☐ 4 Day

Date Required: YY MM DD

#	Sample Identification	YY	MM	DD	HH	MM	Matrix	1 FIELD FILTERED	2 FIELD PRESERVED	3 LAB FILTRATION REQUIRED	4 BTEX F1-F4	5 PAHS	6 BTEX F1-F2	7 BARIUM TRUE TOTAL	8 Routine water	9 Regulated metals - total	10 Regulated metals - dissolved	11 Mercury - total	12 Mercury - dissolved	13 Salinity 4	14 Sieve (75 micron)	15 Texture (% sand, silt, clay)	16 Basic class II landfill	17	18	19	20 LIMITED SAMPLE	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE	Comments
1	BH22-56-01	22	08	24	09	45	Soil				X																	3		Also email report to
2	BH22-56-02				10	00					X																	3		gld.shelldgr@wsp.com
3	BH22-56-03				10	15					X																	3		gld.iol.equis@wsp.com
4	BH22-57-01				10	45					X																	3		
5	BH22-57-02				10	55					X																	3		
6	BH22-57-03				11	10					X																	3		
7	BH22-58-01				11	25					X																	3		
8	BH22-59-01				13	15					X																	3		
9	BH22-59-02				13	30					X																	3		
10	BH22-59-03				13	45					X																	3		
11	BH22-59-04				14	00					X																	3		
12	BH22-65-01				14	10					X																	3		

Received in Yellowknife
By: J. Merano @ 12:00
AUG 30 2022
Ice yes / Cust-4
Temp 4 / 5 / 5

*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY

LAB USE ONLY	Yes	No	°C	LAB USE ONLY	Yes	No	°C	LAB USE ONLY	Yes	No	°C	Temperature reading by:
Seal present			ACTR	Seal present				Seal present				
Seal intact				Seal intact				Seal intact				
Cooling media present			1 2 3	Cooling media present			1 2 3	Cooling media present			1 2 3	

	Relinquished by: (Signature/ Print)	YY	MM	DD	HH	MM		Received by: (Signature/ Print)	YY	MM	DD	HH	MM	Special Instructions
1	[signature] / Jonathan Dandar	22	08	25	16	00	1	[signature] JASONBIL	22	08	31	15	10	
2							2							

C266077

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CHAIN OF CUSTODY RECORD
ENV COC - 00013v3

Page 2 of 2

Invoice Information	Invoice to (requires report) ☐	Report Information (if differs from invoice)		Project Information	
Company:	Client #254, Golder Associates	Company:	Golder Associates	Quotation #:	Shell
Contact Name:	237 - 4 Ave SW Suite 3300	Contact Name:	Aurelie Bellavance	P.O. #/ AFE#:	22525414 / 100 / 104
Street Address:		Street Address:		Project #:	22525414-000
City:	Calgary Prov: AB Postal Code:	City:	Calgary AB Postal Code: T2P 4K3	Site #:	NA
Phone:		Phone:	403-299-5600	Site Location:	Camp Farewell, NT
Email:	Canada Account Payable	Email:	Aurelie.Bellavance@wsp.com	Site Location Province:	NT
Copies:		Copies:	Peter.Tan@wsp.com	Sampled By:	JD/HK

LAB USE ONLY - PLACE STICKER HERE

Rush Confirmation #:

Regulatory Criteria

☐ AT1 ☐ CCME ☐ Drinking Water - Canada ☐ Drinking Water - Manitoba
☐ Saskatchewan ☐ Drinking Water - Alberta ☑ Other AMSRP

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

Analyses: 1 FIELD FILTERED; 2 FIELD PRESERVED; 3 LAB FILTRATION REQUIRED; 4 BTEX F1-F4; 5 PAHS; 6 BTEX F1-F2; 7 BARIUM TRUE TOTAL; 8 Routine water; 9 Regulated metals - total; 10 Regulated metals - dissolved; 11 Mercury - total; 12 Mercury - dissolved; 13 Salinity 4; 14 Sieve (75 micron); 15 Texture (% sand, silt, clay); 16 Basic class II landfill; 17; 18; 19; 20 LIMITED SAMPLE; 21 # OF CONTAINERS SUBMITTED; 22 HOLD - DO NOT ANALYZE

#	Sample Identification	YY	MM	DD	HH	MM	Matrix	4 BTEX F1-F4	# of Containers Submitted	Comments
1	BH22-65-02	22	08	24	14	20	Soil	X	3	Also email report to
2	BH22-65-03	↓	↓	↓	14	30	↓	X	3	gld.shelldgr@wsp.com
3	BH22-65-04	↓	↓	↓	14	40	↓	X	3	gld.iol.equis@wsp.com
4										
5										
6										
7										
8										
9										
10										
11										
12										

Regular Turnaround Time (TAT): ☑ 5 to 7 Day ☐ 10 Day
Rush Turnaround Time (TAT) Surcharges apply: ☐ Same Day ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 4 Day
Date Required: YY MM DD

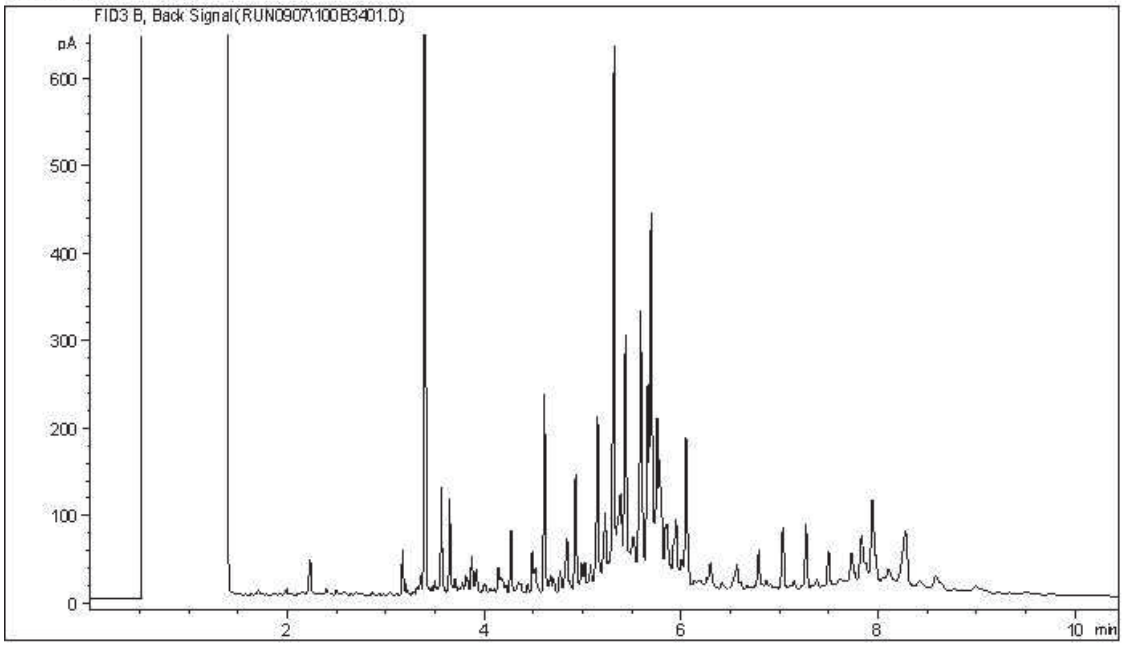
Received in Yellowknife
By: J. Merrim
@ 12:50
AUG 30 2022
(ce-yes / ce-NT)
Temp: 4 / 5 / 5

LAB USE ONLY	Yes	No	°C		LAB USE ONLY	Yes	No	°C		LAB USE ONLY	Yes	No	°C	Temperature reading by:
Seal present				AETR	Seal present					Seal present				
Seal intact					Seal intact					Seal intact				
Cooling media present			1 2 3		Cooling media present			1 2 3		Cooling media present			1 2 3	

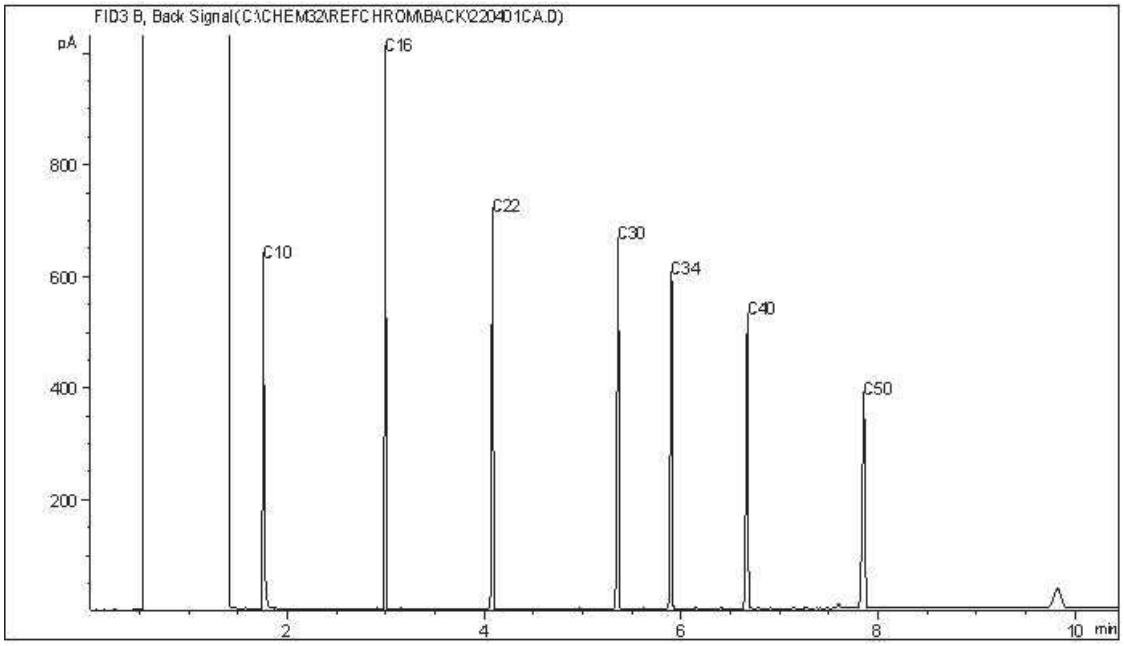
	Relinquished by: (Signature/ Print)	YY	MM	DD	HH	MM	Received by: (Signature/ Print)	YY	MM	DD	HH	MM	Special Instructions
1	Jordan Dorlue	22	08	25	16	00	JASON BIL	22	08	31	15	10	
2													

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC20



Carbon Range Distribution - Reference Chromatogram



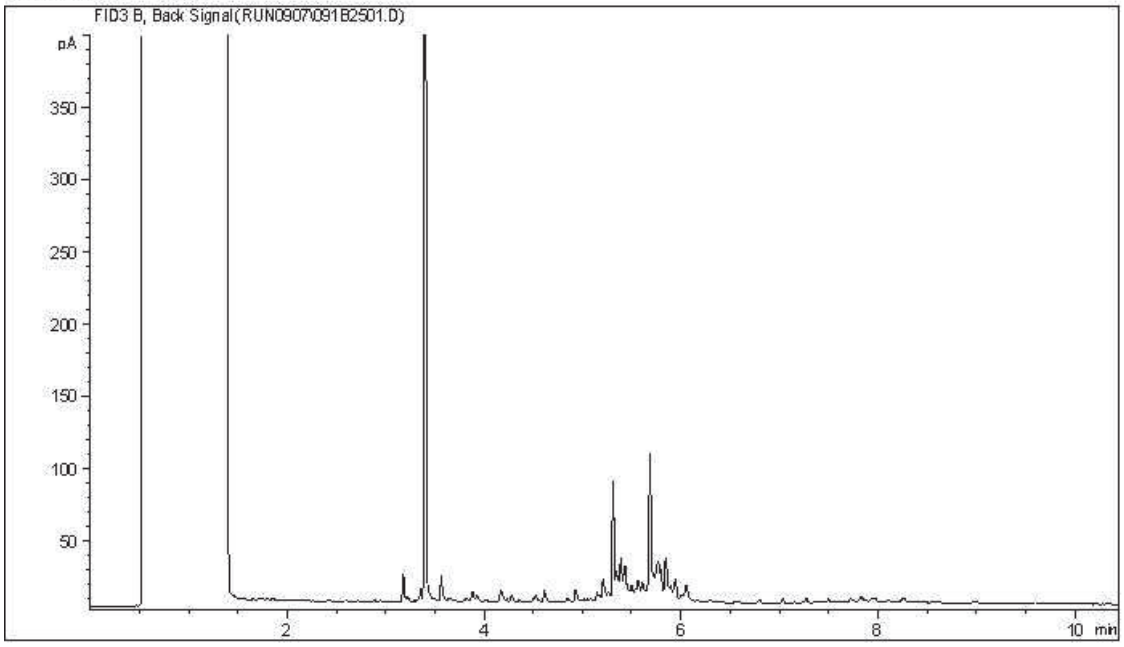
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

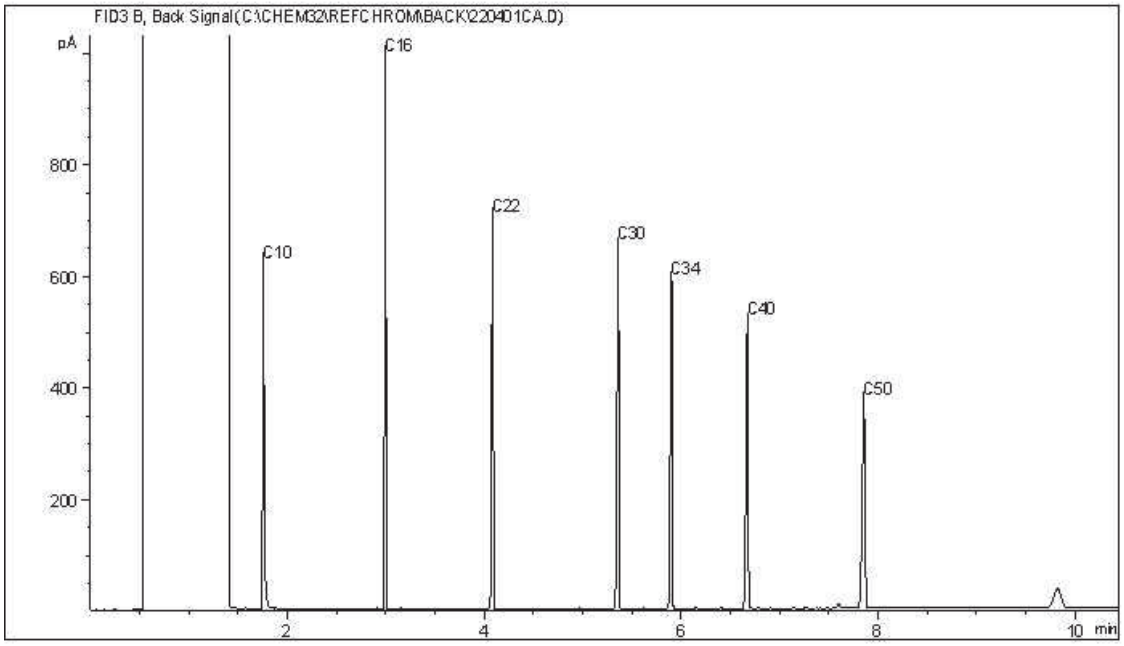
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC20



Carbon Range Distribution - Reference Chromatogram



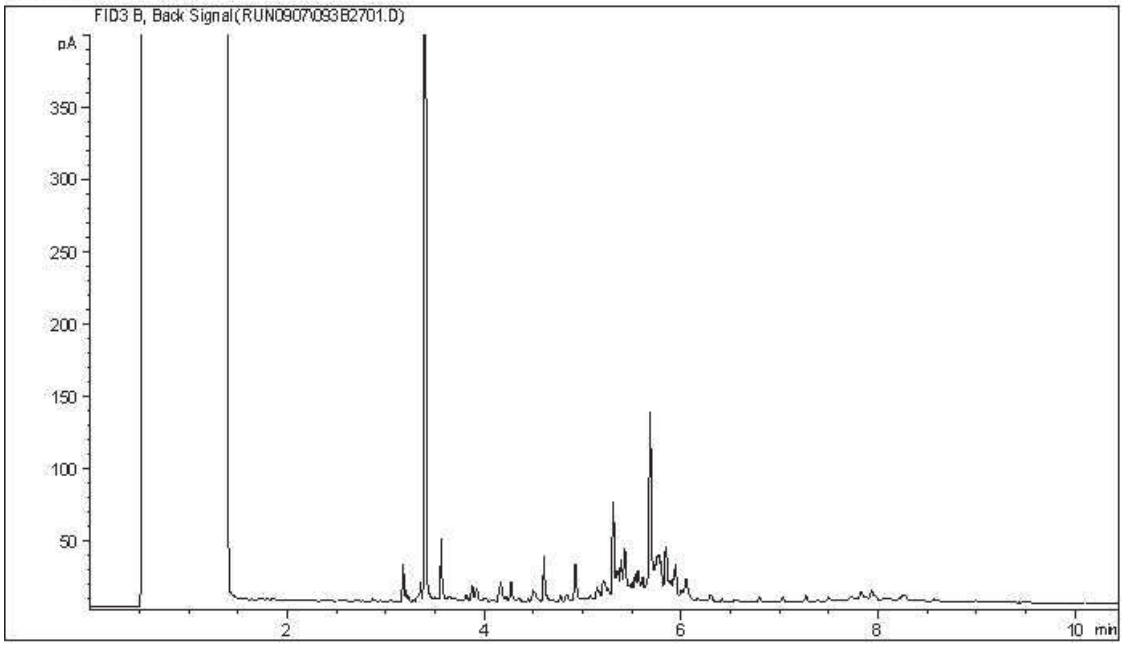
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

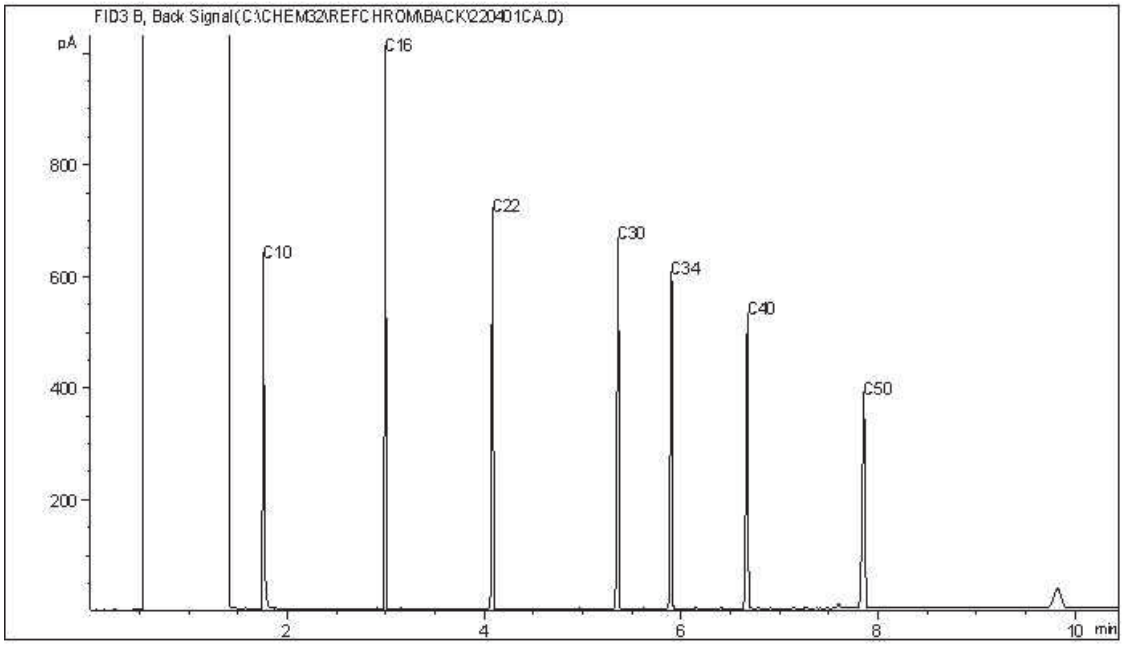
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC20



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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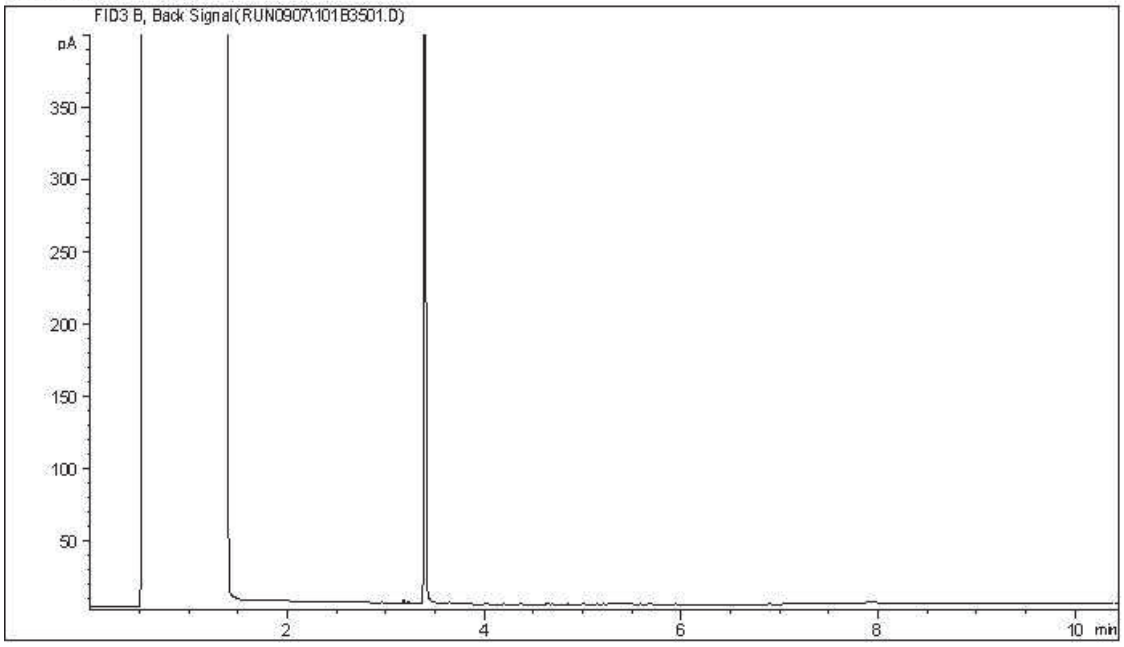
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

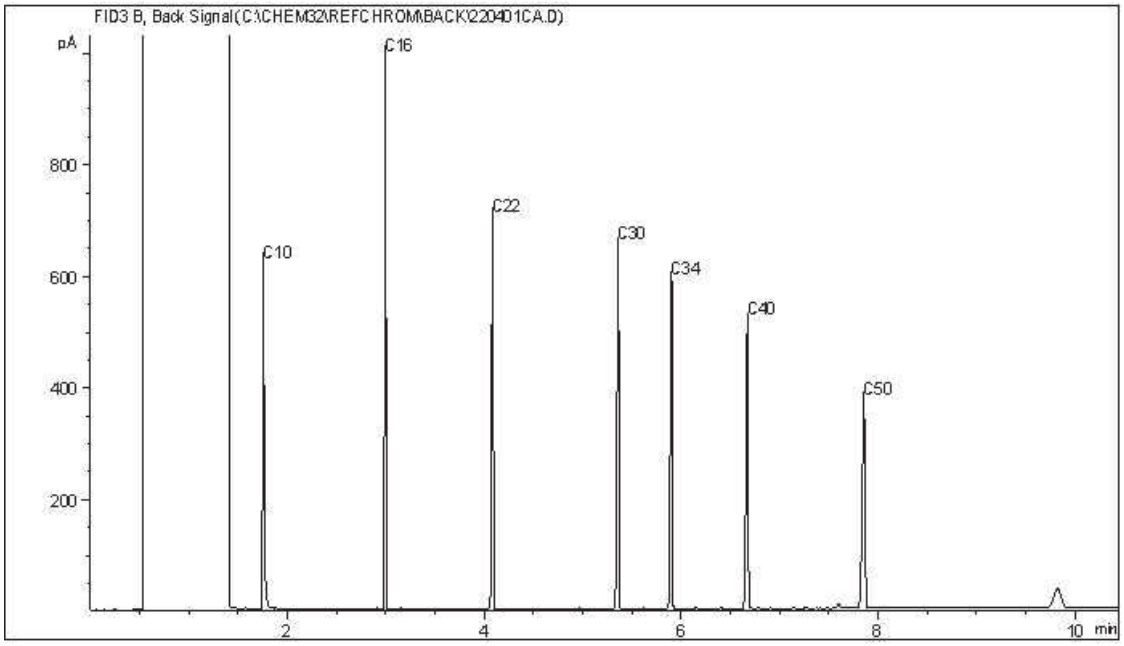
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC20



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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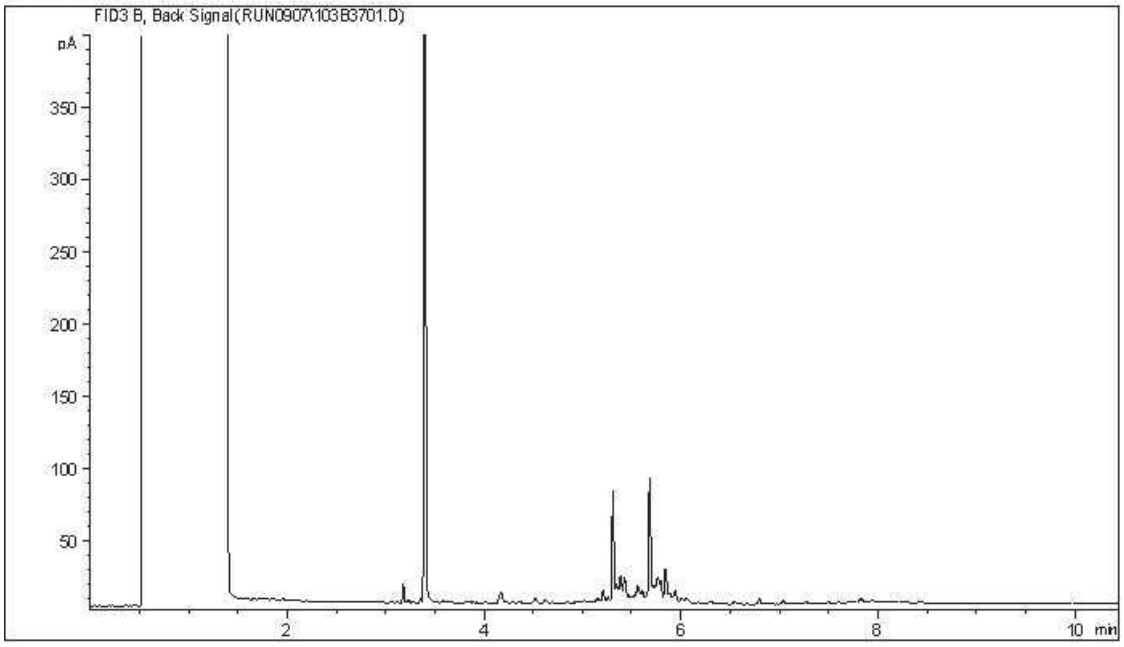
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

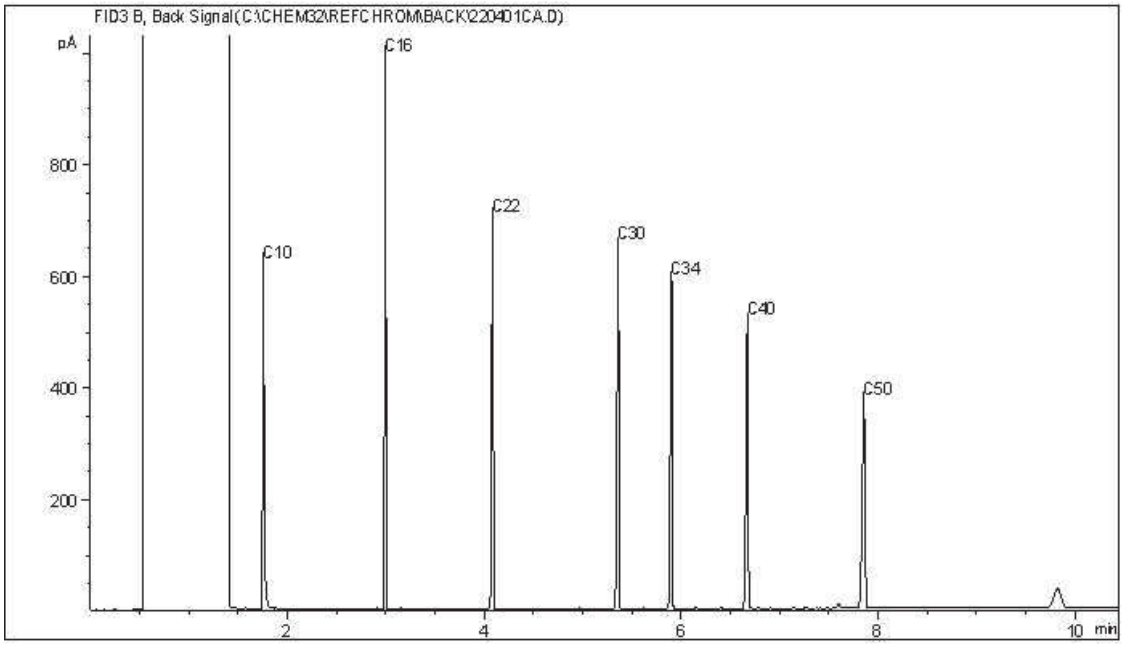
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC20



Carbon Range Distribution - Reference Chromatogram



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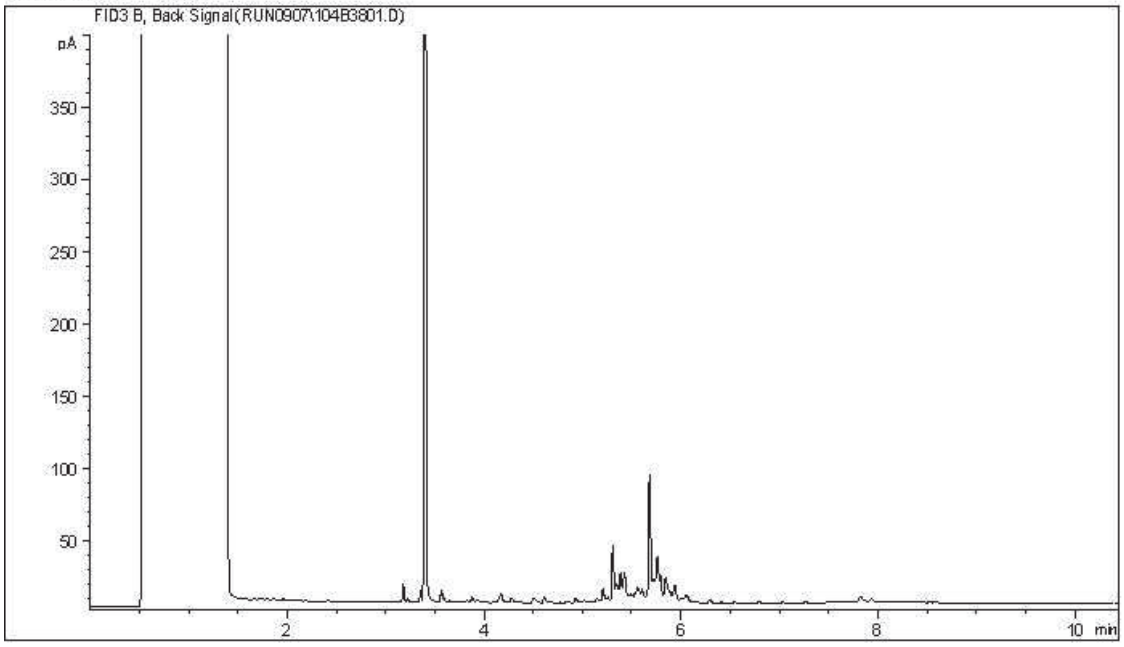
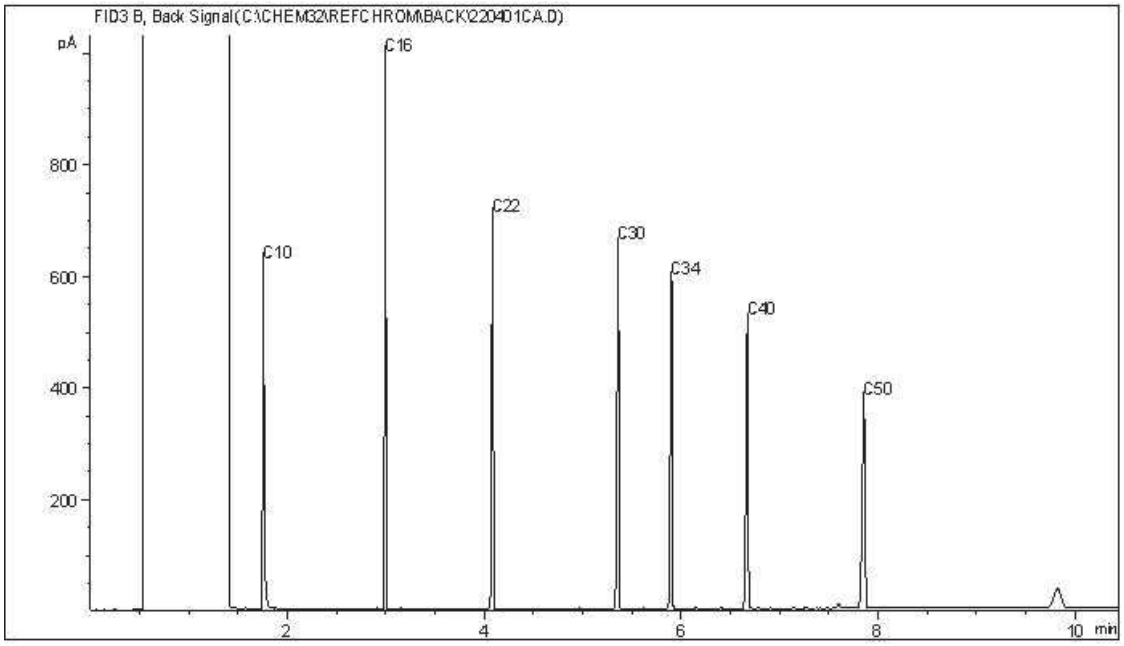
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC20



Carbon Range Distribution - Reference Chromatogram



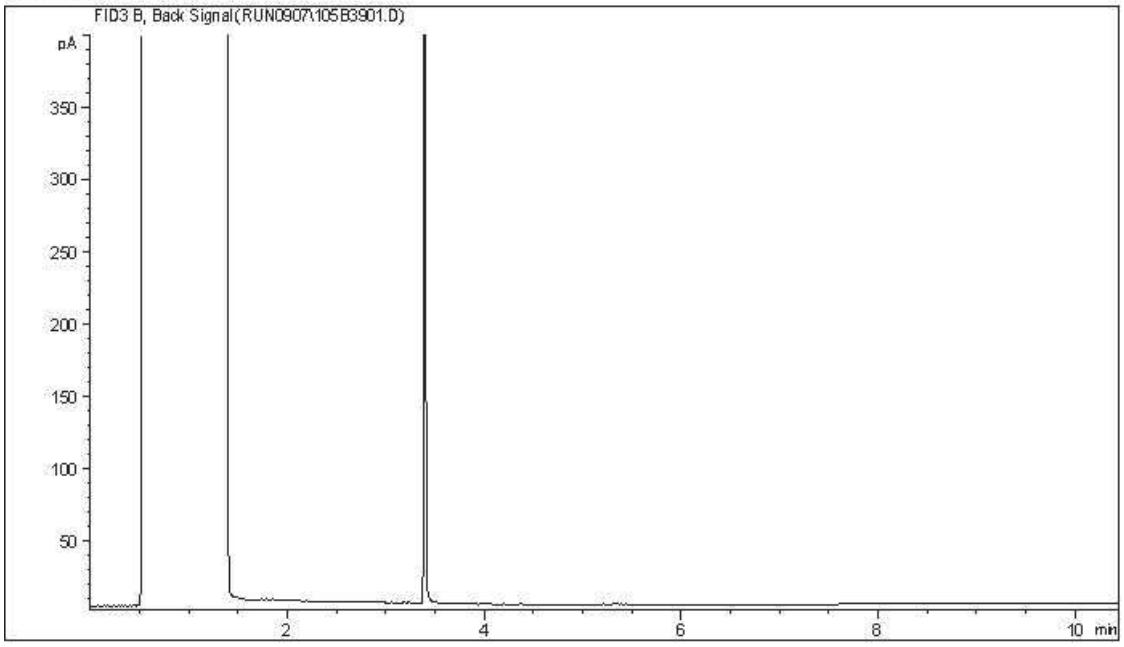
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

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

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC20



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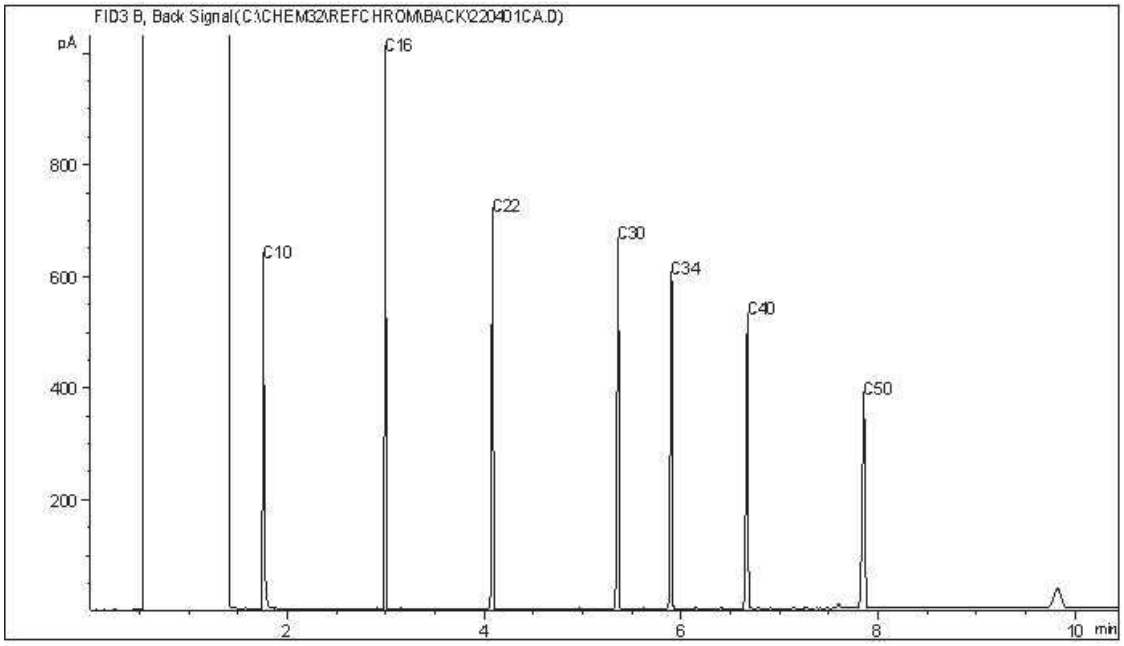

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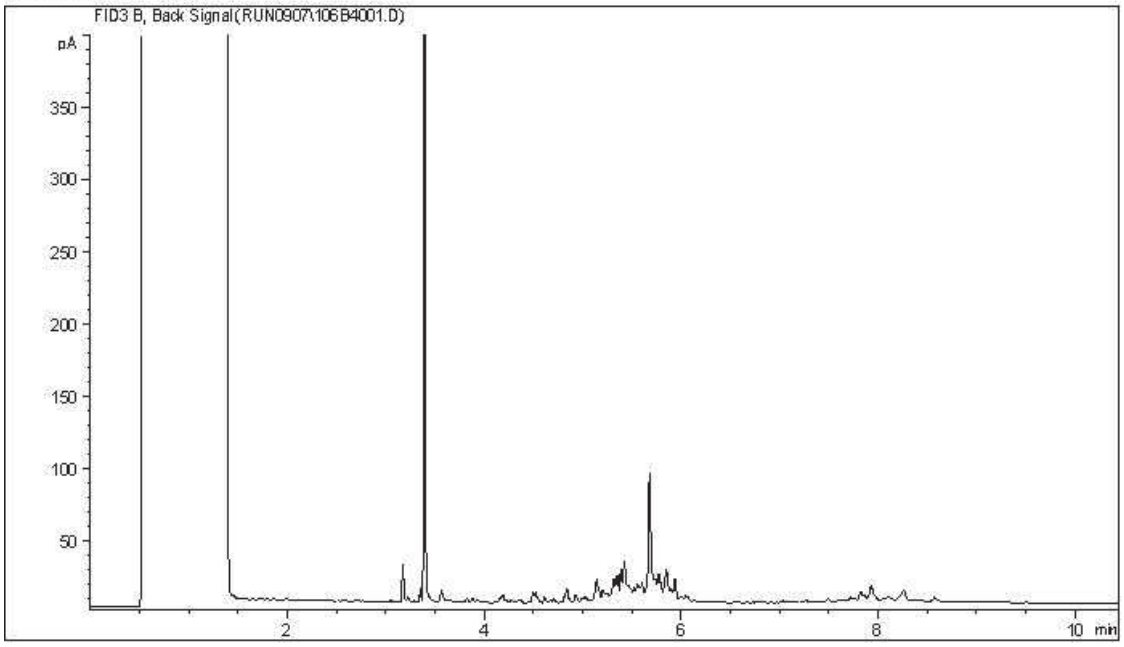

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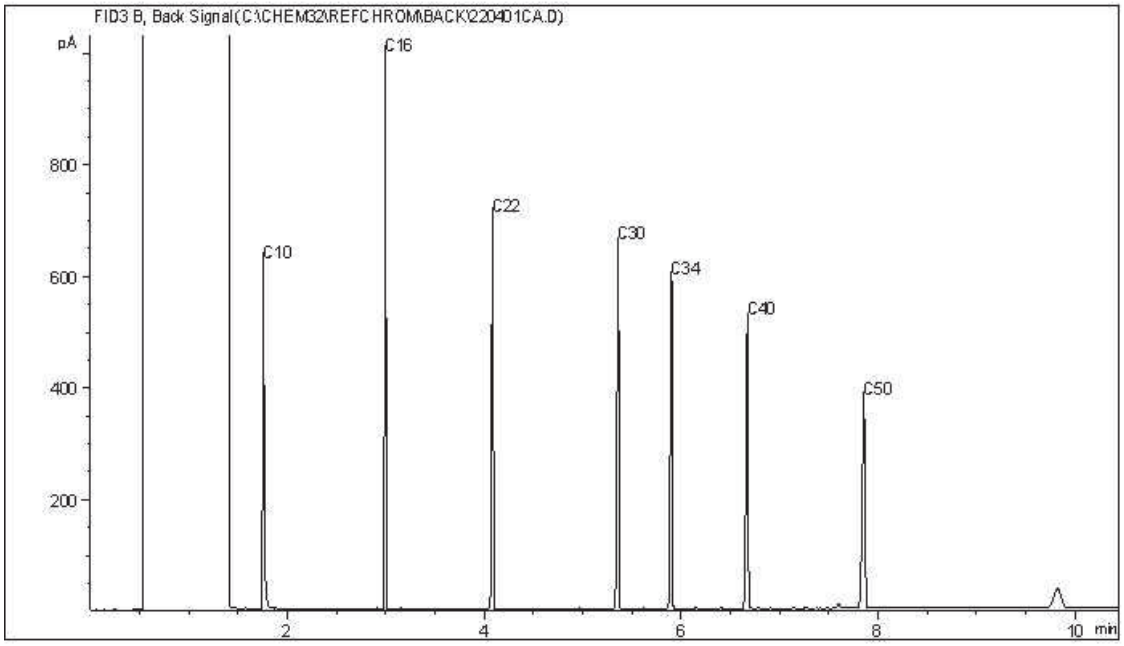

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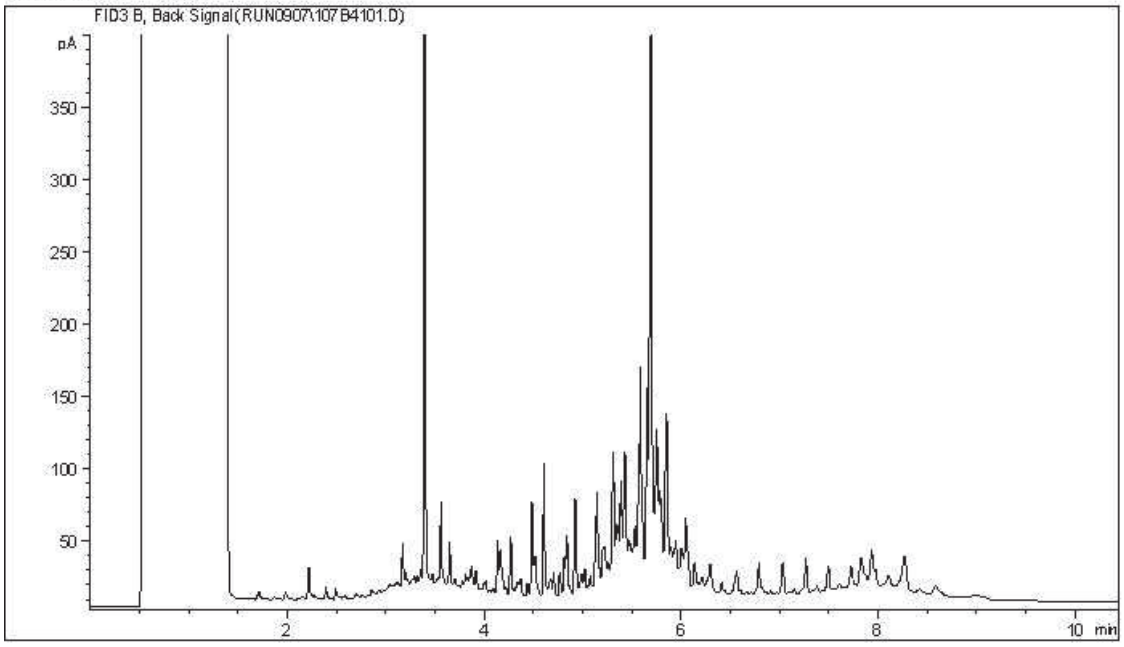

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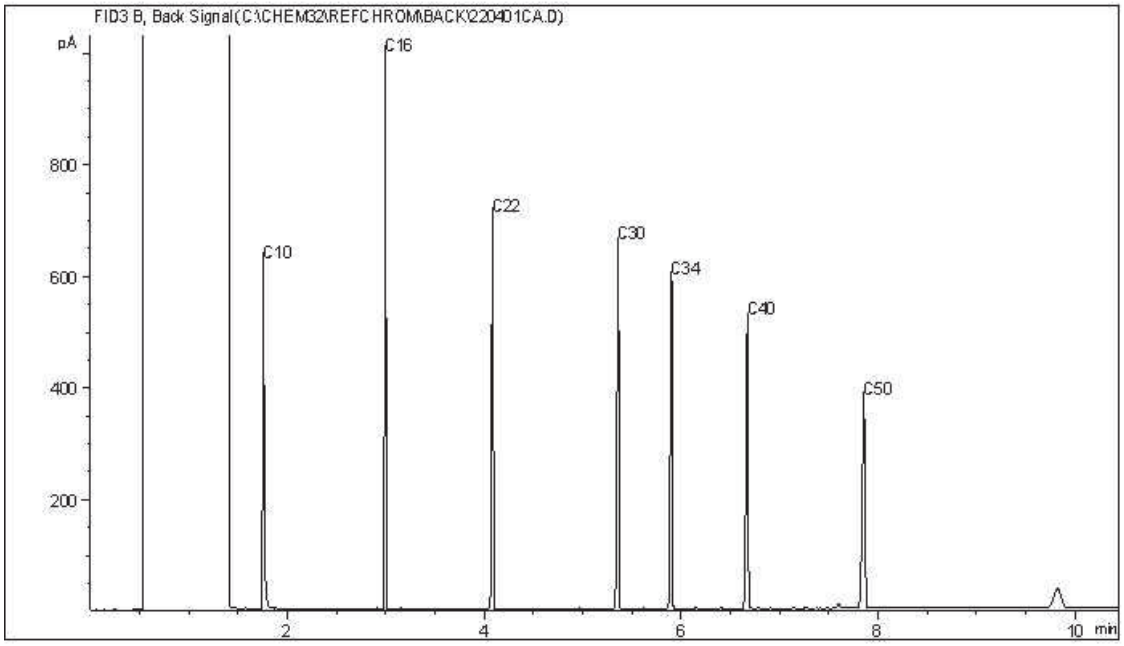

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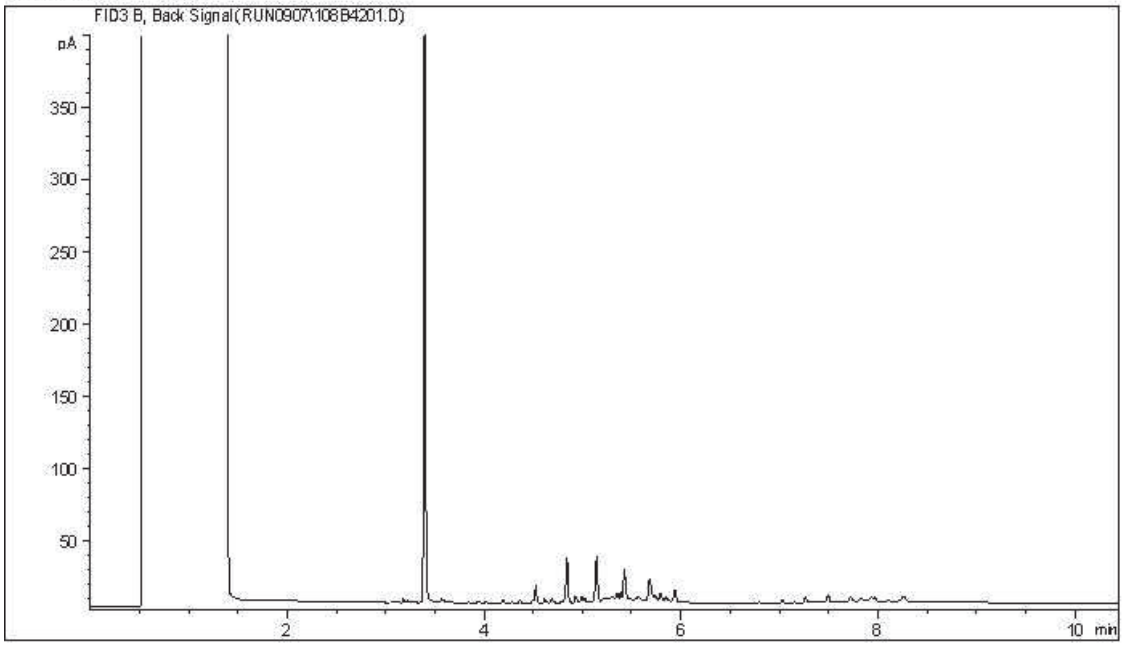

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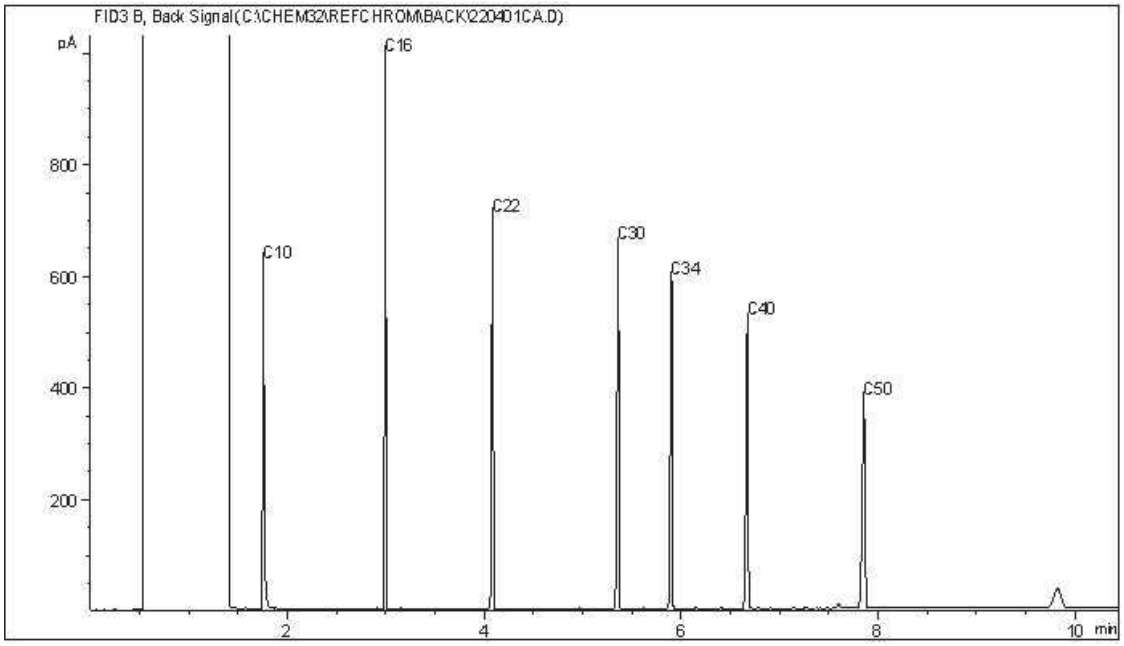

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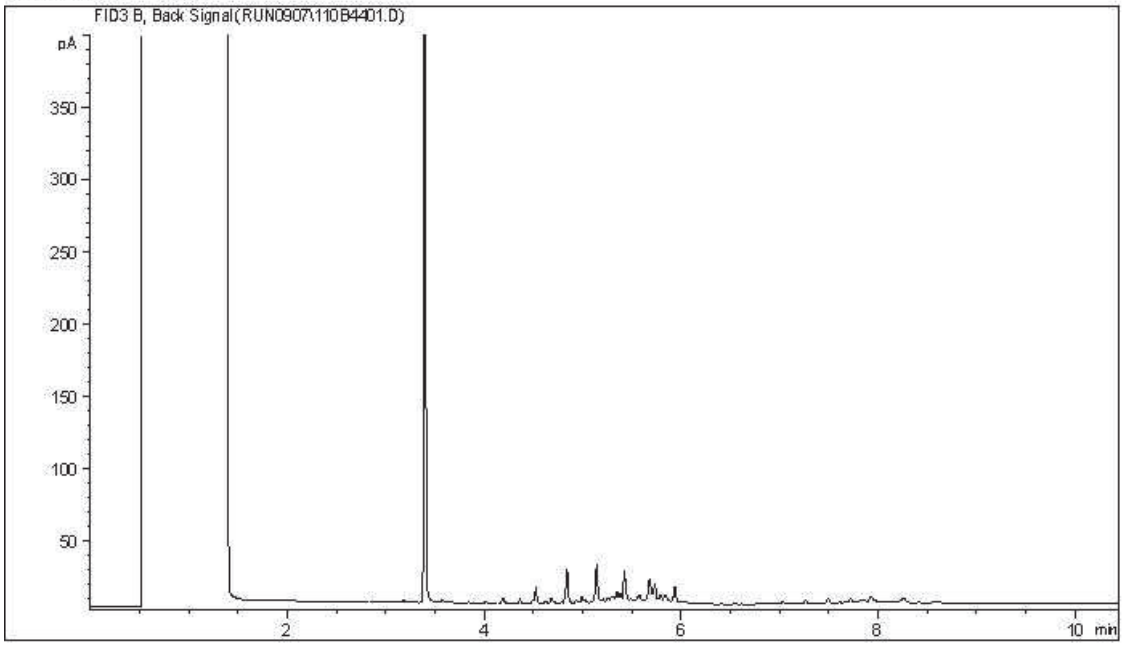

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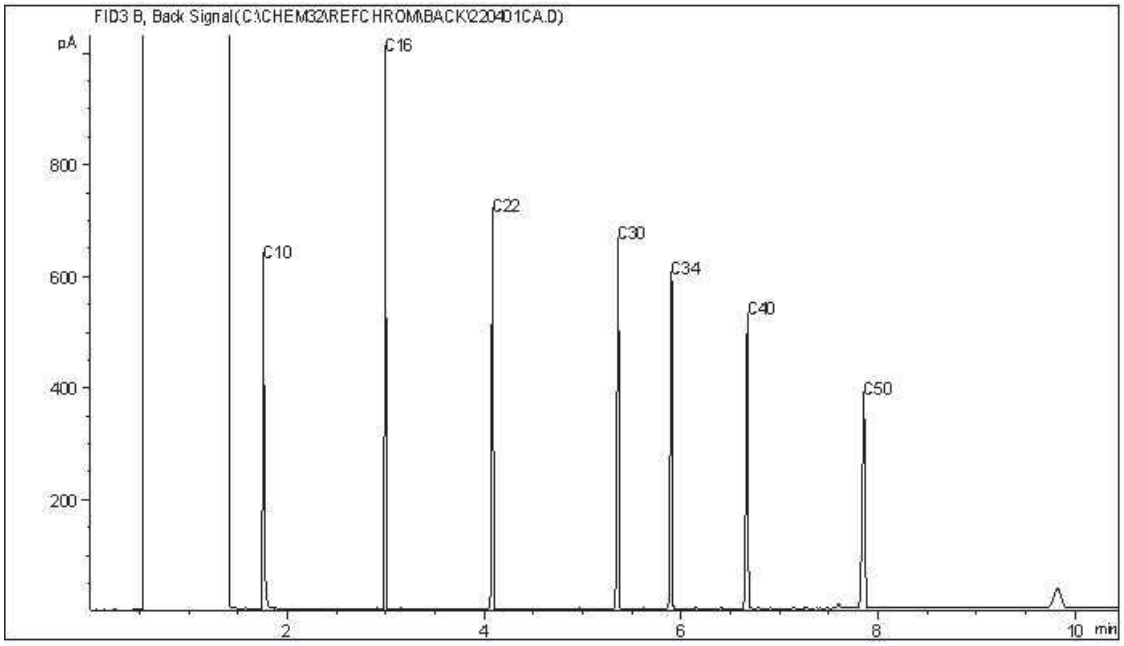

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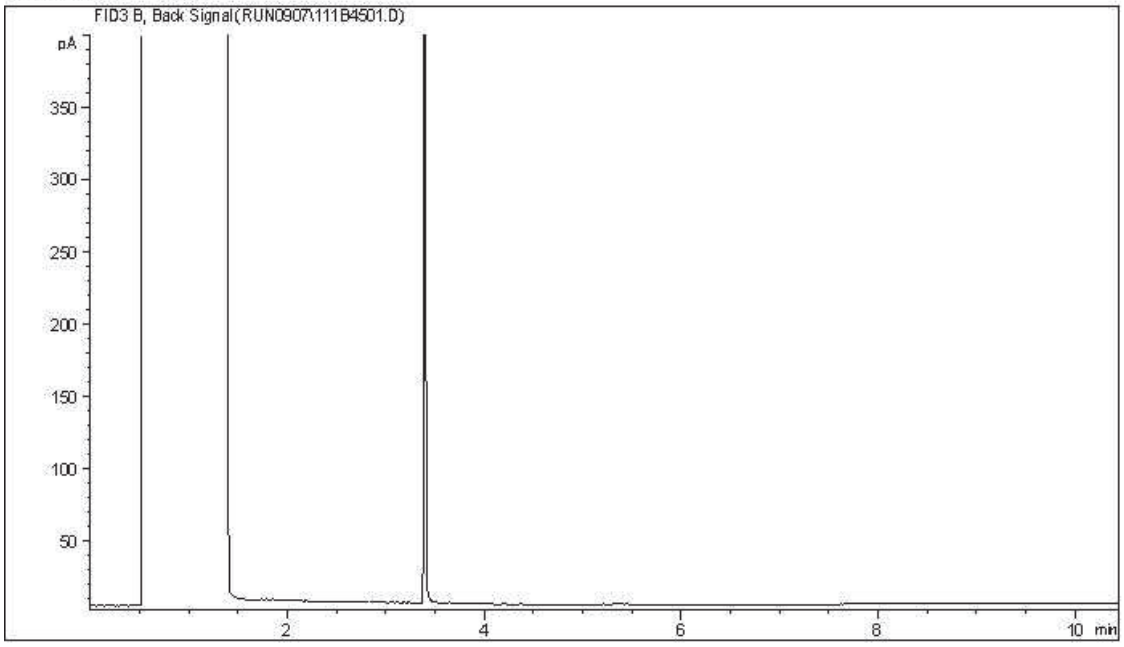

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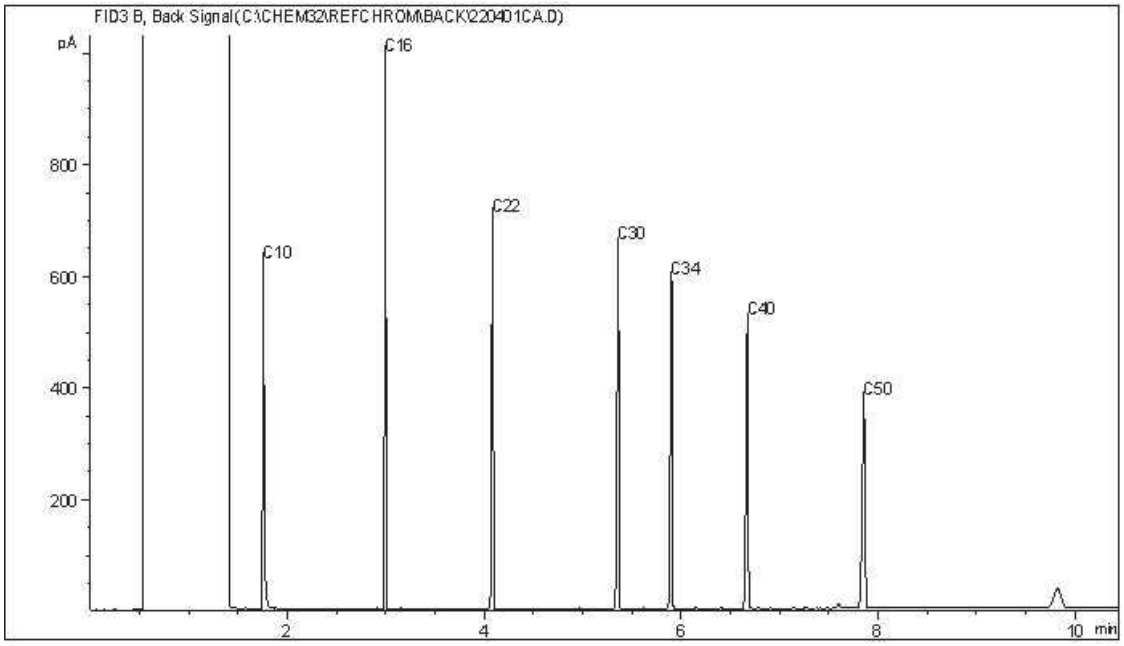

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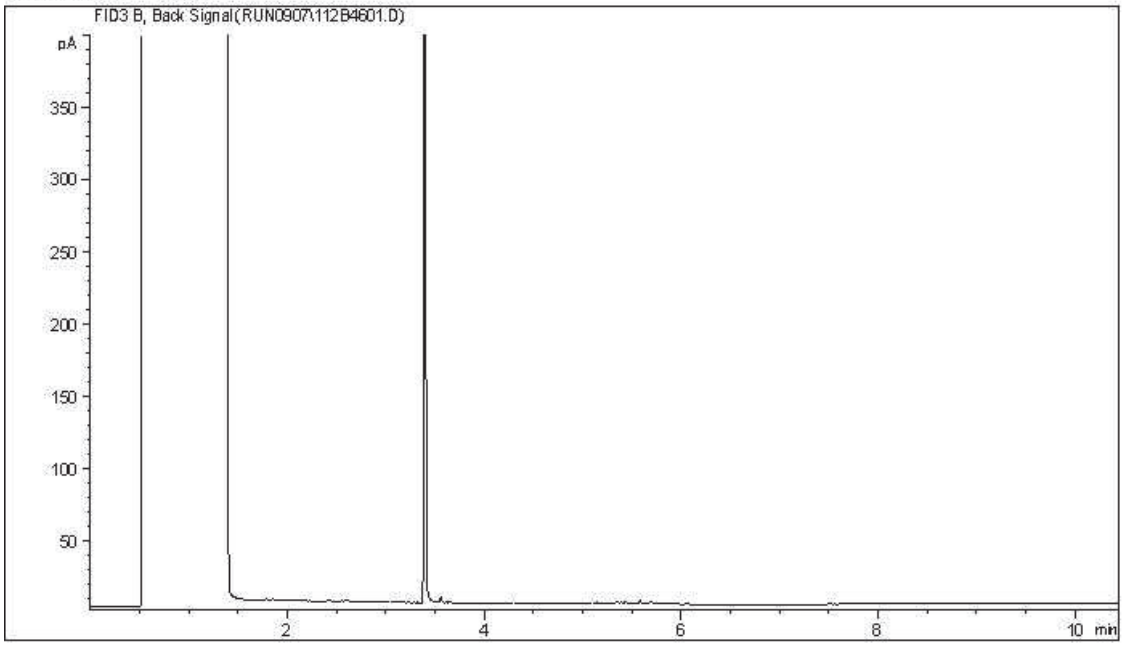

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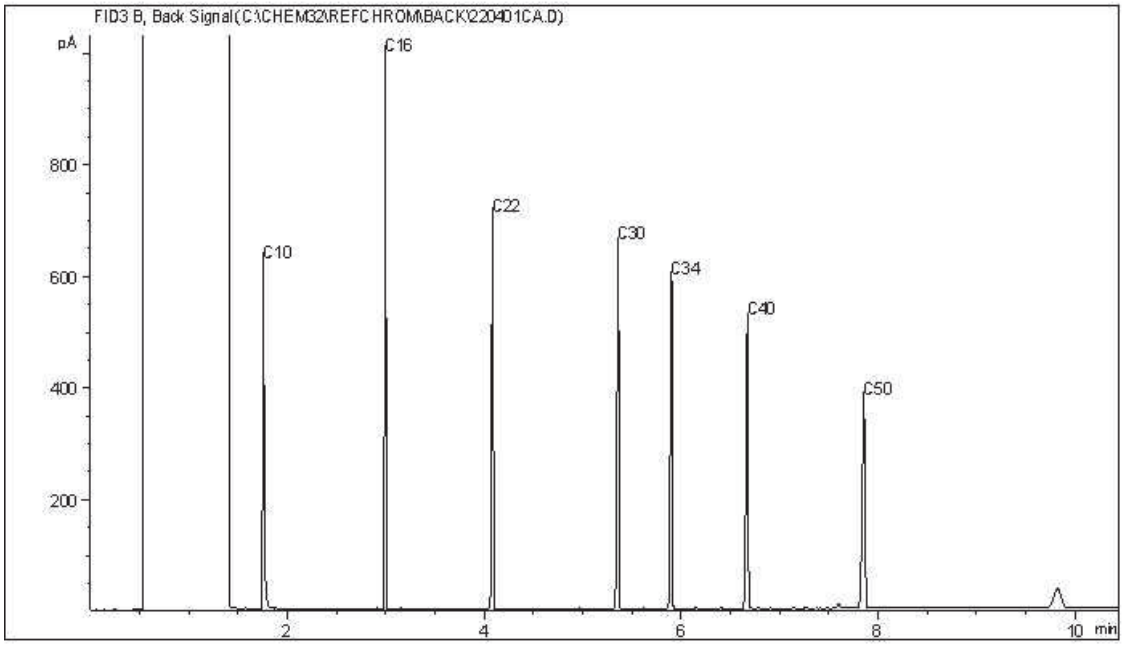

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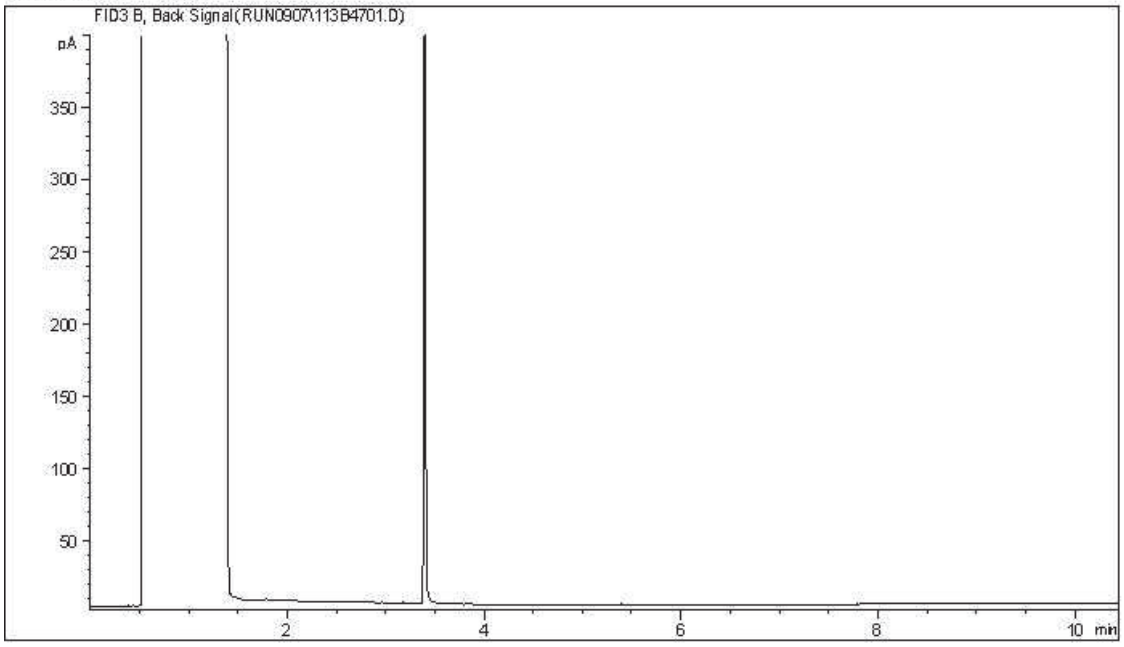

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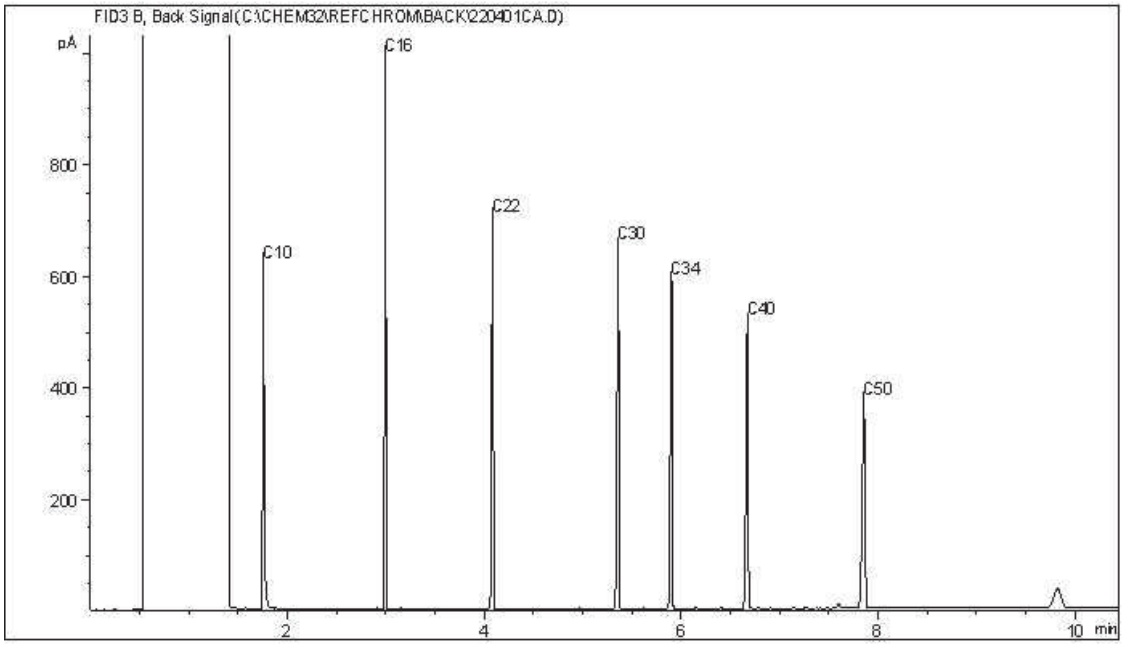

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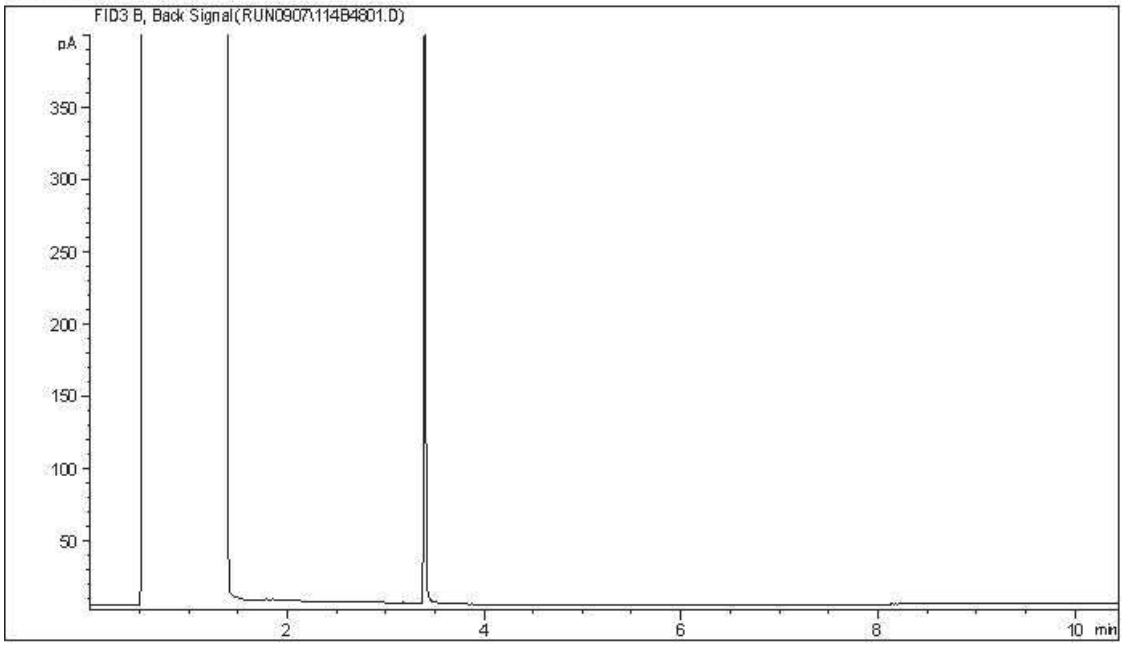

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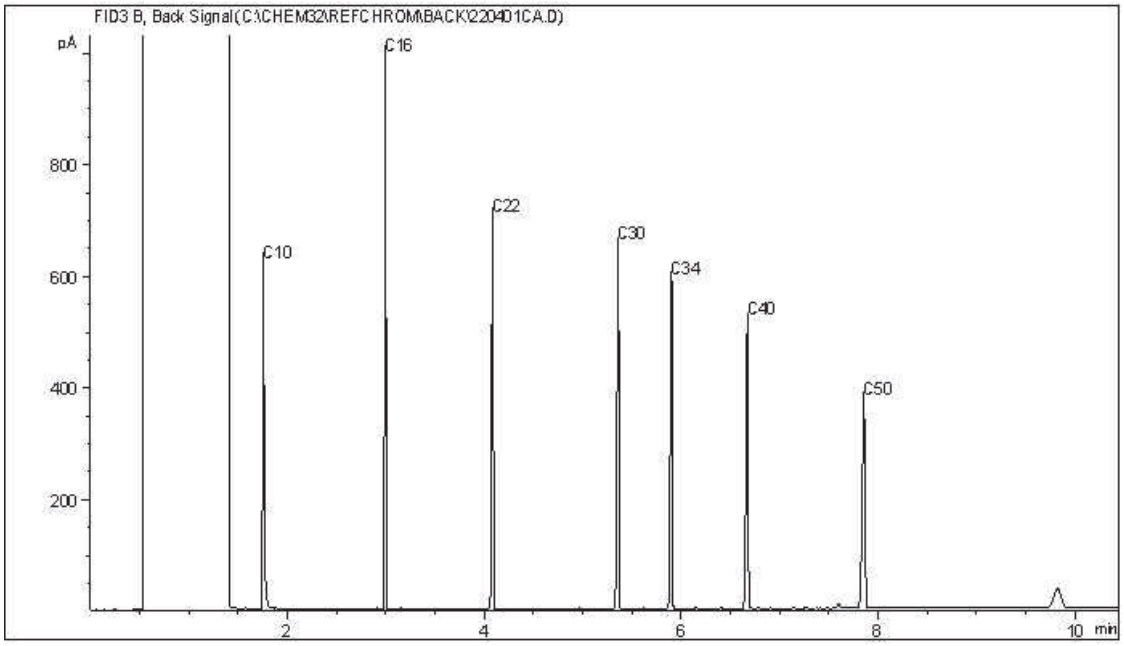

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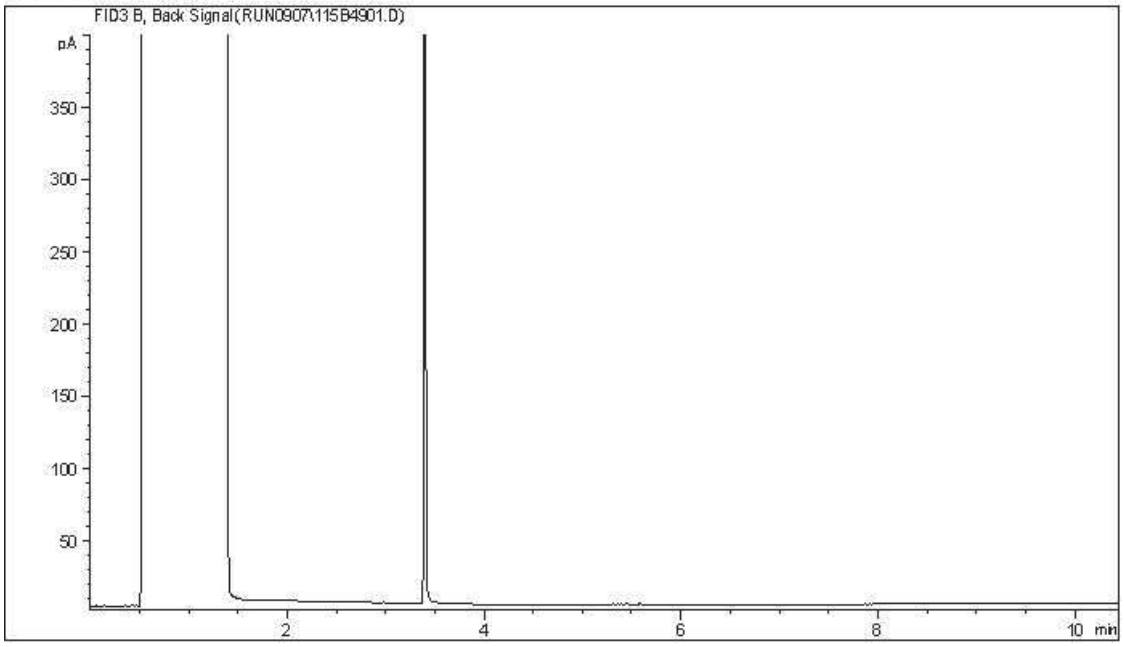

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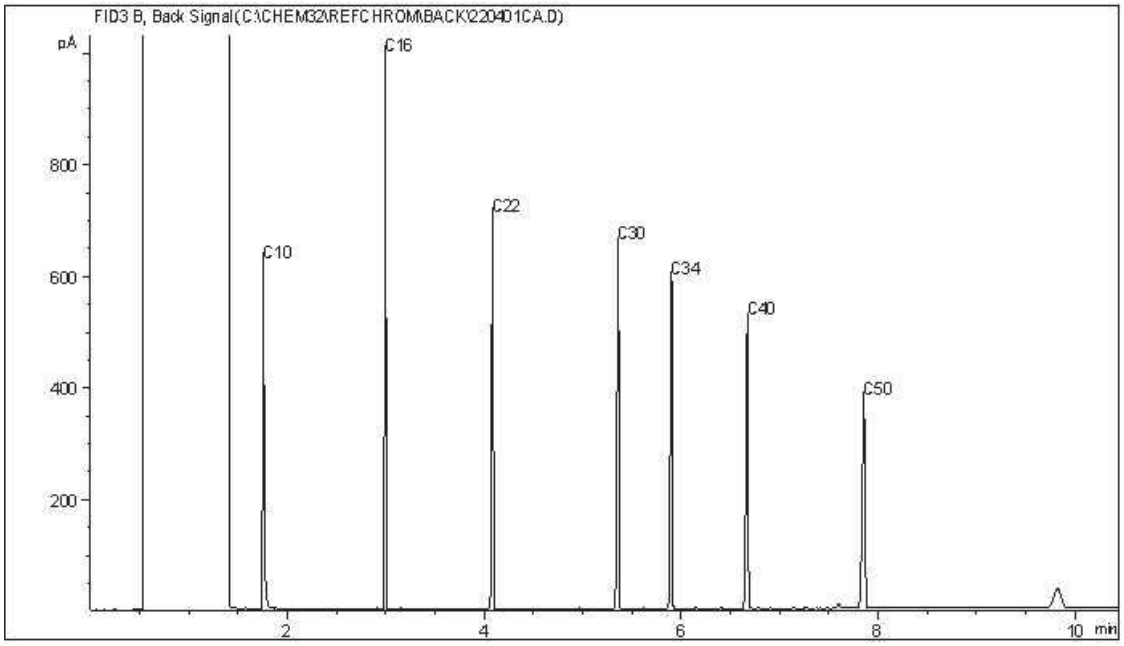

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Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Cynny Hagen

From: MacLean, Colleen <Colleen_MacLean@golder.com>
Sent: Monday, September 12, 2022 10:05 AM
To: Cynny Hagen
Cc: Bellavance, Aurelie
Subject: RE: Additional Analysis request - Camp Farewell -Prj: 22525414-1000, PO 22525414-1100-1104

Yes, that sounds good.

Thanks!

Colleen MacLean, *She/her*
Environmental Technologist, B.A., Dipl. EVT.

T: +1 403 299 5600
D: +1 403 299 5667

WSP GOLDER

From: Cynny Hagen <cynny.hagen@bureauveritas.com>
Sent: September 12, 2022 10:01 AM
To: MacLean, Colleen <colleen.maclean@wsp.com>
Cc: Bellavance, Aurelie <aurelie.bellavance@wsp.com>
Subject: Re: Additional Analysis request - Camp Farewell -Prj: 22525414-1000, PO 22525414-1100-1104

Hi Colleen,

Absolutely I will add the analysis, for job C266077 would you like to have the additional report for both Bio-Toluene and Resemble for F2-F4 and the other jobs can be just add a comment in report. Please confirm.

Regards,

Cynny Hagen
Key Account Specialist
Environmental Laboratories & Specialty Services - Western Canada
Bureau Veritas
Cell: 403-312-9070

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Emergency/Spills 365/7/24: 1-844-BVSPILL, spills@bureauveritas.com
For urgent after-hours inquiries: 403 651 2436

On Mon, 12 Sep at 8:58 AM , MacLean, Colleen <colleen_maclean@golder.com> wrote:

Hello,

Could you please complete chromatogram analysis and biogenic toluene (select samples) assessment for the samples below?

C266077	BAW749	BH22-56-01	F1 to F4 and toluene
	BAW750	BH22-56-02	
	BAW752	BH22-57-01	F1 to F4
	BAW753	BH22-57-02	F1 to F4 and toluene
	BAW756	BH22-59-01	F1 to F4 and toluene
C266076	BAW742	BH22-63-01	F1 to F4
	BAW738	BH22-64-01	F1 to F4
	BAW746	BH22-67-02	F1 to F4
C266062	BAW656	BH22-68-01	F1 to F4
C266081	BAW784	BH22-70-01	F1 to F4

Please let me know if you have any questions.

Thanks!

Colleen MacLean, *She/her*
Environmental Technologist, B.A., Dipl. EVT.

T: +1 403 299 5600
D: +1 403 299 5667

237 – 4 Avenue SW, Suite 3300, Calgary, Alberta T2P 4K3, Canada
wsp.com | **golder.com**

WSP and Golder have joined together to form the premier environmental consultancy in the industry. Together we are 14,000 strong, Future Ready©, and delivering innovative solutions to our clients around the globe.

September 14, 2022

GOLDER ASSOCIATES LTD.
2800, 700 -2nd Street SW
CALGARY, AB, T2P 2W2

Attention: Aurelie Bellavance

Re: Chromatogram Interpretation of CAMP FAREWELL; Project 22525414-1000
Bureau Veritas Job No.: C266077

Bureau Veritas was retained by Golder Associates Ltd. to provide hydrocarbon interpretations concerning the likely origin of hydrocarbons quantified within CCME fraction(s) F2, F3 and/or F4.

Analytical Method

Petroleum hydrocarbon analyses at Bureau Veritas are conducted in accordance with the analytical specifications required by the prescriptive and performance-based (where appropriate) elements of the CCME Tier I protocols for hydrocarbon determination[1] in soil samples.

Chromatogram Interpretation

A comprehensive qualitative assessment of the resultant gas chromatograms in the F2-F4 ranges was performed. The chromatograms were inspected for specific peak profiles that would indicate the possible origin of the hydrocarbons present in the sample. The presence and nature of specific aliphatic compounds (n-alkanes), the presence of characteristic unresolved complex mixtures (UCMs) or "humps" and the relative abundance (ratios) of specific compounds are reviewed as part of the evaluation.

[1] Canadian Council of Ministers of the Environment: "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil – Tier I Method" 2001

Data Interpretation

Table 1. Qualitative Data Summary – Chromatogram Interpretation

Lab ID	Sample ID	Chromatogram Interpretation
BAW749	BH22-56-01	The CCME F2-F4 chromatographic peak profile is consistent with biogenic organic material (e.g. peat). Chromatograms of biogenic organic material may contain peak patterns spanning the C10 to C50 range, but they are most commonly characterized by a profile of unevenly distributed sharp peaks between C28 and C34. The impacts are not consistent with a petroleum product or crude oil.
BAW750	BH22-56-02	
BAW752	BH22-57-01	
BAW753	BH22-57-02	
BAW756	BH22-59-01	

If you have any questions or require additional information, please do not hesitate to contact the undersigned.

Sincerely,
Bureau Veritas Laboratories

Michael Sheppard, B.Sc., P.Bio., QP
Consulting Scientist
Environmental Services

Scott Cantwell, CET, B.Sc., P.Chem.
Director and General Manager – Western Canada
Environmental Services

Disclaimer

Hydrocarbon Resemblance
Characterization by way of visual evaluation of the sample chromatogram may not be conclusive and is only indicative of substances that may be present. The resemblance information must be regarded as approximate and qualitative.

September 19, 2022

GOLDER ASSOCIATES LTD.
2800, 700 -2nd Street SW
CALGARY, AB, T2P 2W2

Attention: Aurelie Bellavance

Re: Biogenic Toluene Assessment of Camp Farewell; Project 22525414-1000
Bureau Veritas Job No.: C266077

Bureau Veritas Environmental & Specialty Services Laboratories (BV Labs) was retained by Golder Associated Ltd. to provide an interpretation concerning the likely origin of toluene quantified within CCME Fraction 1 (nC6-nC10).

Analytical Method

Petroleum hydrocarbon analyses at BV Labs are conducted in accordance with the analytical specifications required by the prescriptive and performance-based (where appropriate) elements of the CCME Tier I protocols for hydrocarbon determination[1] in soil samples.

Biogenic Toluene

The sample extract is analyzed by volatile organic compound (VOC) analysis in selected ion monitoring (SIM) mode to determine the origin of the quantified toluene. The presence of specific marker compounds, both biogenic and petrogenic, along with a series of associated parameters are reviewed as part of this evaluation. Diagnostic parameters of primary interest and the ranges typically associated with biogenic toluene samples are listed below[2]:

- Moisture: typically ≥70%
- Absence of an Unresolved Complex Mixture (UCM) within CCME Fractions F2 or F3.
- Presence of a "Biogenic Cluster" within CCME Fraction 3 (F3Bc); specifically F3B, nC32-nC34
- Presence of biogenic monoterpene compound(s)[3]
- Toluene ratio (T_{ratio}): Ratio between Toluene and sum of all BTEX compounds; typically >0.7
- Cymene ratio (C_{ratio}): Ratio between p-Cymene and the sum of all three isomers; typically >0.8
- Additional diagnostic parameters may be included in the assessment if deemed beneficial (examples include: Carbon Preference Index (CPI), isoprenoid ratios, BIC, etc.)

[1] **Canadian Council of Ministers of the Environment: "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil – Tier I Method" 2001**

[2] **Bureau Veritas Laboratories Canada: threshold values derived internally (assessment of long-term data set)**

[3] **Target compounds: α/β-Pinene, Camphene, (+)-3-Carene, α-Terpinene, Limonene, o/m/p-Cymene, γ-Terpinene and α-Terpinolene (list may be amended from time-to-time without notice)**

Data Interpretation

Table 1. Data Summary – Biogenic Toluene Evaluation

Lab ID	Sample ID	Diagnostic Parameters[4]						Conclusion[5]
		Moist	UCM	F3B$_c$	Mono	T$_{ratio}$	C$_{ratio}$	
BAW749	BH22-56-01	M	No	Yes	No	1.0	NC	Inconclusive (neither)
BAW750	BH22-56-02	H	No	Yes	No	1.0	NC	Inconclusive (neither)
BAW753	BH22-57-02	H	No	Yes	Yes	1.0	NC	Biogenic Toluene
BAW756	BH22-59-01	M	No	Yes	Yes	1.0	1.0	Biogenic Toluene

NC: Unable to Calculate

If you have any questions or require additional information, please do not hesitate to contact the undersigned.

Sincerely,
Bureau Veritas Environmental & Specialty Services Laboratories

Michael Sheppard, B.Sc., P.Bio, QP
Consulting Scientist
Environmental Services

Scott Cantwell, CET, B.Sc., P.Chem.
Director and General Manager – Western Canada
Environmental Services

Disclaimer

Biogenic Toluene
A detailed assessment of Selective Ion Monitoring (SIM) GC-MS, and associated project data was completed to provide further information relating to the biogenic and/or petrogenic origin of compounds or fractions quantified as part of the CCME Tier I protocol. All statements must be regarded as approximate and qualitative.

[4] **Diagnostic Parameters**
Moist: Moisture; H (≥70%), M (<70 & ≥20%), L (<20%)
UCM: Presence/Position of Unresolved Complex Mixture
F3Bc: Presence of a biogenic cluster within F3B
Mono: Biogenic monoterpenes (excluding cymenes)
T$_{ratio}$: Toluene Ratio (T/ΣBTEX)
C$_{ratio}$: Cymene Ratio (p-Cymene/ΣCymene isomers)

[5] **Conclusions**
Biogenic Toluene: Quantified toluene likely of biogenic origin
Petrogenic Toluene: Quantified toluene likely of petrogenic origin
Inconclusive (both): Presence of both biogenic and petrogenic diagnostic parameters (CSIA recommended)
Inconclusive (neither): Insufficient evidence to support Biogenic or Petrogenic origin (CSIA recommended)

10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

Client: Cynny Hagen
Bureau Veritas
2021 – 41 Avenue NE
Calgary, AB T2E 6P2
Canada

Phone: 4037352273

Fax:

Identifier: 106TK **Date Rec:** 11/28/2022 **Report Date:** 01/10/2023

Client Project #: 22525414-1100-1104 **Client Project Name:** 22525414-100, Camp Farewell, NT

Purchase Order #: C266077

Test results provided for: CSIA

Reviewed By:

Results relate only to the items tested and the sample(s) as received by the laboratory.

MICROBIAL INSIGHTS, INC.

10515 Research Dr., Knoxville, TN 37932
Tel. (865) 573-8188 Fax. (865) 573-8133

CSIA

Client: **Bureau Veritas**
Project: 22525414-100, Camp Farewell, NT

MI Project Number: **106TK**
Date Received: 11/28/2022

Sample Information

Client Sample ID:	**BAW749 (BH22-56-01)**	**BAW750 (BH22-56-01)**
Sample Date:	08/24/2022	08/24/2022
Analyst/Reviewer:	SB/MW	SB/MW

Carbon	**Units**		
$^{13}C/^{12}C$ Toluene (‰)	$\delta^{13}C$, VPDB (‰)	**NA**	**-28.5**

Legend:
NA= Not Analyzed NS=Not Sampled J= Estimated concentration below PQL but above LQL ND= Not Detected

Quality Assurance/Quality Control Data

Samples Received **11/23/2022**

Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control (‰ Std. Dev.)*	Blank
$^{13}C/^{12}C$ Toluene (‰)	11/23/2022	01/09/2023	2.3 °C	0.5	Pass

* $\delta^{13}C$ positive control values are within +- 0.5‰ of true value.

10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

Identifier: 106TK **Date Rec:** 11/28/2022 **Report Date:** 01/10/2023

Client Project #: 22525414-1100-1104 **Client Project Name:** 22525414-100, Camp Farewell, NT

Purchase Order #: C266077

Comments: An in-house screening method was used to estimate VOC concentrations. Compounds expected to be below the CSIA limit of detection after required dilutions were not analyzed (NA).

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Knoxville, TN 37932
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Fax: (865) 573-8133

Client: Cynny Hagen
Bureau Veritas
2021 – 41 Avenue NE
Calgary, AB T2E 6P2
Canada

Phone: 4037352273

Fax:

Identifier: 105TK **Date Rec:** 11/23/2022 **Report Date:** 01/10/2023

Client Project #: 22525414-1100-1104 **Client Project Name:** 22525414-100, Camp Farewell, NT

Purchase Order #: C262029

Test results provided for: CSIA

Reviewed By:

Results relate only to the items tested and the sample(s) as received by the laboratory.

MICROBIAL INSIGHTS, INC.

10515 Research Dr., Knoxville, TN 37932
Tel. (865) 573-8188 Fax. (865) 573-8133

CSIA

Client: **Bureau Veritas**
Project: 22525414-100, Camp Farewell, NT

MI Project Number: **105TK**
Date Received: 11/23/2022

Sample Information

Client Sample ID:	**AZY178 (BH22-49-02)**
Sample Date:	09/13/2022
Analyst/Reviewer:	SB/MW

Carbon	Units	
$^{13}C/^{12}C$ Toluene (‰)	$\delta^{13}C$, VPDB (‰)	**-29.8**

Legend:
NA= Not Analyzed NS=Not Sampled J= Estimated concentration below PQL but above LQL ND= Not Detected

Quality Assurance/Quality Control Data

Samples Received **11/23/2022**

Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control (‰ Std. Dev.)*	Blank
$^{13}C/^{12}C$ Toluene (‰)	11/23/2022	01/09/2023	2.3 °C	0.5	Pass

* $\delta^{13}C$ positive control values are within +- 0.5‰ of true value.

10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

Identifier: 105TK **Date Rec:** 11/23/2022 **Report Date:** 01/10/2023

Client Project #: 22525414-1100-1104 **Client Project Name:** 22525414-100, Camp Farewell, NT

Purchase Order #: C262029

Comments: An in-house screening method was used to estimate VOC concentrations.

January 12, 2023

GOLDER ASSOCIATES LTD.
2800, 700 -2nd Street SW
CALGARY, AB, T2P 2W2

Attention: Aurelie Bellavance

Re: Biogenic Toluene Assessment of Camp Farewell; Project 22525414-1000
Bureau Veritas Job No.: C266077

Bureau Veritas Environmental & Specialty Services Laboratories (BV Labs) was retained by Golder Associated Ltd. to provide an interpretation concerning the likely origin of toluene quantified within CCME Fraction 1 (nC6-nC10).

Analytical Method

Petroleum hydrocarbon analyses at BV Labs are conducted in accordance with the analytical specifications required by the prescriptive and performance-based elements of the CCME Tier I protocols for hydrocarbon determination[1] in soil samples. Compound Specific Isotope Analyses (CSIA) are conducted by Microbial Insights Inc. utilizing Isotope Ratio Mass Spectroscopy (IRMS).

Biogenic Toluene

The biogenic toluene evaluation involved the analysis of two extracts. A methanol extract was analyzed by GC/MS in selected ion monitoring (SIM) mode for specific diagnostic volatile organic compounds (VOCs). A second sample aliquot extracted in organic-free deionized water was submitted for CSIA. The CSIA was selected to provide an additional line of evidence concerning which of two origins the sample's toluene is deemed most likely (biogenic or petrogenic).

The diagnostic parameters of primary interest and the ranges typically associated with biogenic toluene samples listed below[2]:

- Moisture: typically ≥70%
- Absence of an Unresolved Complex Mixture (UCM) within CCME Fractions F2 or F3.
- Presence of a "Biogenic Cluster" within CCME Fraction 3 (F3Bc); specifically F3B, nC32-nC34
- Presence of biogenic monoterpene compound(s)[3]
- Toluene ratio (T_{ratio}): Ratio between Toluene and sum of all BTEX compounds; typically >0.7
- Cymene ratio (C_{ratio}): Ratio between p-Cymene and the sum of all three isomers; typically >0.8
- Additional diagnostic parameters may be included in the assessment if deemed beneficial (examples include: Carbon Preference Index (CPI), isoprenoid ratios, BIC, etc.)
- Toluene Compound Specific Isotope Analysis (CSIA): δ13C < -30‰

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[1] **Canadian Council of Ministers of the Environment: "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil – Tier I Method" 2001**

[2] **Bureau Veritas Laboratories Canada: threshold values derived internally (assessment of long-term data set)**

[3] **Target compounds: α/β-Pinene, Camphene, (+)-3-Carene, α-Terpinene, Limonene, o/m/p-Cymene, γ-Terpinene and α-Terpinolene (list may be amended from time-to-time without notice)**

Data Interpretation

Table 1. Data Summary – Biogenic Toluene Evaluation

Lab ID	Sample ID	Diagnostic Parameters[4]							Conclusion[5]
		Moist	UCM	$F3B_c$	Mono	T_{ratio}	C_{ratio}	CSIA	
BAW749	BH22-56-01	M	No	Yes	No	1.0	NC	NA	Inconclusive (neither)
BAW750	BH22-56-02	H	No	Yes	No	1.0	NC	-28.5	Inconclusive (neither)
BAW753	BH22-57-02	H	No	Yes	Yes	1.0	NC	NA	Biogenic Toluene
BAW756	BH22-59-01	M	No	Yes	Yes	1.0	1.0	NA	Biogenic Toluene

NA: Not Analyzed
NC: Unable to Calculate (absence of Cymene isomers)

If you have any questions or require additional information, please do not hesitate to contact the undersigned.

Sincerely,
Bureau Veritas Environmental & Specialty Services Laboratories

Michael Sheppard, B.Sc., P.Bio, QP
Consulting Scientist
Environmental Services

Scott Cantwell, CET, B.Sc., P.Chem.
Director and General Manager – Western Canada
Environmental Services

Disclaimer

Biogenic Toluene
A detailed assessment of Selective Ion Monitoring (SIM) GC-MS, and associated project data was completed to provide further information relating to the biogenic and/or petrogenic origin of compounds or fractions quantified as part of the CCME Tier I protocol. All statements must be regarded as approximate and qualitative.

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[4] **Diagnostic Parameters**
Moist: Moisture; H (≥70%), M (<70 & ≥20%), L (<20%)
UCM: Presence/Position of Unresolved Complex Mixture
F3Bc: Presence of a biogenic cluster within F3B
CSIA: Biogenic Toluene δ13C < -30‰; Petrogenic Toluene δ13C between -29.5‰ and -27.5‰
Reported value sourced from Microbial Insights Inc. report 106TK; dated 2023/01/10
Mono: Biogenic monoterpenes (excluding cymenes)
T_{ratio}: Toluene Ratio (T/ΣBTEX)
C_{ratio}: Cymene Ratio (p-Cymene/ΣCymene isomers)

[5] **Conclusions**
Biogenic Toluene: Quantified toluene likely of biogenic origin
Petrogenic Toluene: Quantified toluene likely of petrogenic origin
Inconclusive (both): Presence of both biogenic and petrogenic diagnostic parameters
Inconclusive (neither): Insufficient evidence to support Biogenic or Petrogenic origin

Your P.O. #: 22525414-1100-1104
Your Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your C.O.C. #: 1 of 1

Attention: Aurelie Bellavance

GOLDER ASSOCIATES LTD.
2800, 700 -2nd Street SW
CALGARY, AB
CANADA T2P 2W2

Report Date: 2022/09/14
Report #: R3232207
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C266081
Received: 2022/08/30, 12:00

Sample Matrix: Soil
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 by HS GC/MS/FID (MeOH extract) (1, 2)	7	N/A	2022/09/04	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX (1)	7	N/A	2022/09/08		Auto Calc
CCME Hydrocarbons (F2-F4 in soil) (1, 3)	5	2022/09/06	2022/09/07	AB SOP-00036	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in soil) (1, 3)	1	2022/09/07	2022/09/08	AB SOP-00036	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in soil) (1, 3)	1	2022/09/07	2022/09/09	AB SOP-00036	CCME PHC-CWS m
CCME Hydrocarbons (F4G in soil) (1, 3)	1	2022/09/06	2022/09/08	AB SOP-00036 AB SOP-00040	CCME PHC-CWS m
Moisture (1)	7	N/A	2022/09/07	AB SOP-00002	CCME PHC-CWS m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
(2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.
(3) All CCME results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil, Validation of Performance-Based Alternative Methods September 2003.

Your P.O. #: 22525414-1100-1104
Your Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your C.O.C. #: 1 of 1

Attention: Aurelie Bellavance

GOLDER ASSOCIATES LTD.
2800, 700 -2nd Street SW
CALGARY, AB
CANADA T2P 2W2

Report Date: 2022/09/14
Report #: R3232207
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C266081

Received: 2022/08/30, 12:00

Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Bureau Veritas
14 Sep 2022 16:59:50

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Cynny Hagen, Key Account Specialist
Email: Cynny.HAGEN@bureauveritas.com
Phone# (403)735-2273

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Job #: C266081
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1104
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW780		BAW781	BAW781		BAW782	BAW783		
Sampling Date		2022/08/26 14:10		2022/08/26 15:00	2022/08/26 15:00		2022/08/26 15:10	2022/08/26 15:20		
COC Number		1 of 1		1 of 1	1 of 1		1 of 1	1 of 1		
	UNITS	BH22-69-01	QC Batch	BH22-69-02	BH22-69-02 Lab-Dup	QC Batch	BH22-69-03	BH22-69-04	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	56	A706459	65	73	A707844	12	17	10	A706459
F3 (C16-C34 Hydrocarbons)	mg/kg	130	A706459	140	160	A707844	85	110	50	A706459
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	A706459	<50	<50	A707844	<50	<50	50	A706459
Reached Baseline at C50	mg/kg	Yes	A706459	Yes	Yes	A707844	Yes	Yes	N/A	A706459
Physical Properties										
Moisture	%	21	A706457	24	N/A	A707859	28	28	0.30	A706457
Volatiles										
Xylenes (Total)	mg/kg	<0.045	A701342	<0.045	N/A	A701342	<0.045	<0.045	0.045	A701342
F1 (C6-C10) - BTEX	mg/kg	<10	A701342	<10	N/A	A701342	<10	<10	10	A701342
Field Preserved Volatiles										
Benzene	mg/kg	<0.0050	A703344	<0.0050	N/A	A703344	<0.0050	<0.0050	0.0050	A703344
Toluene	mg/kg	<0.050	A703344	<0.050	N/A	A703344	<0.050	<0.050	0.050	A703344
Ethylbenzene	mg/kg	<0.010	A703344	<0.010	N/A	A703344	<0.010	<0.010	0.010	A703344
m & p-Xylene	mg/kg	<0.040	A703344	<0.040	N/A	A703344	<0.040	<0.040	0.040	A703344
o-Xylene	mg/kg	<0.020	A703344	<0.020	N/A	A703344	<0.020	<0.020	0.020	A703344
F1 (C6-C10)	mg/kg	<10	A703344	<10	N/A	A703344	<10	<10	10	A703344
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	96	A703344	98	N/A	A703344	98	99	N/A	A703344
4-Bromofluorobenzene (sur.)	%	104	A703344	106	N/A	A703344	109	112	N/A	A703344
D10-o-Xylene (sur.)	%	90	A703344	103	N/A	A703344	110	108	N/A	A703344
D4-1,2-Dichloroethane (sur.)	%	95	A703344	97	N/A	A703344	96	97	N/A	A703344
O-TERPHENYL (sur.)	%	97	A706459	112	118	A707844	101	102	N/A	A706459

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C266081
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1104
Sampler Initials: JD

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		BAW784		BAW785		BAW786		
Sampling Date		2022/08/26 15:50		2022/08/26 16:00		2022/08/26 16:10		
COC Number		1 of 1		1 of 1		1 of 1		
	UNITS	BH22-70-01	RDL	BH22-70-02	QC Batch	BH22-70-03	RDL	QC Batch
Ext. Pet. Hydrocarbon								
F2 (C10-C16 Hydrocarbons)	mg/kg	42	10	13	A706459	53	10	A707876
F3 (C16-C34 Hydrocarbons)	mg/kg	1200	50	84	A706459	61	50	A707876
F4 (C34-C50 Hydrocarbons)	mg/kg	490	50	<50	A706459	<50	50	A707876
Reached Baseline at C50	mg/kg	No	N/A	Yes	A706459	Yes	N/A	A707876
Physical Properties								
Moisture	%	44	0.30	16	A706457	10	0.30	A707859
Volatiles								
Xylenes (Total)	mg/kg	<0.096	0.096	<0.045	A701342	<0.045	0.045	A701342
F1 (C6-C10) - BTEX	mg/kg	<21	21	<10	A701342	<10	10	A701342
Field Preserved Volatiles								
Benzene	mg/kg	<0.0090 (1)	0.0090	<0.0050	A703344	<0.0050	0.0050	A703344
Toluene	mg/kg	0.52 (2)	0.11	<0.050	A703344	<0.050	0.050	A703344
Ethylbenzene	mg/kg	<0.017 (1)	0.017	<0.010	A703344	<0.010	0.010	A703344
m & p-Xylene	mg/kg	<0.086 (2)	0.086	<0.040	A703344	<0.040	0.040	A703344
o-Xylene	mg/kg	<0.043 (2)	0.043	<0.020	A703344	<0.020	0.020	A703344
F1 (C6-C10)	mg/kg	<21 (2)	21	<10	A703344	<10	10	A703344
Surrogate Recovery (%)								
1,4-Difluorobenzene (sur.)	%	97	N/A	98	A703344	97	N/A	A703344
4-Bromofluorobenzene (sur.)	%	107	N/A	107	A703344	108	N/A	A703344
D10-o-Xylene (sur.)	%	99	N/A	102	A703344	107	N/A	A703344
D4-1,2-Dichloroethane (sur.)	%	98	N/A	98	A703344	97	N/A	A703344
O-TERPHENYL (sur.)	%	104	N/A	84	A706459	104	N/A	A707876

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limit reported based on MDL and sample weight used for analysis.
(2) Detection limits raised based on sample weight used for analysis.

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1104
Sampler Initials: JD

PETROLEUM HYDROCARBONS (CCME)

Bureau Veritas ID		BAW784		
Sampling Date		2022/08/26 15:50		
COC Number		1 of 1		
	UNITS	**BH22-70-01**	**RDL**	**QC Batch**
Ext. Pet. Hydrocarbon				
F4G-SG (Heavy Hydrocarbons-Grav.)	mg/kg	1800	500	A708702
RDL = Reportable Detection Limit				

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

GENERAL COMMENTS

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

Package 1	4.0°C
Package 2	3.7°C
Package 3	8.7°C
Package 4	3.3°C
Package 5	4.7°C
Package 6	4.0°C
Package 7	4.7°C

Version #2: Additional chromatogram reviewed has been addon sample BAW784 (BH22-70-01) as per request from client 20220912

HYDROCARBON RESEMBLANCE
The reported hydrocarbon resemblance was obtained by visual comparison of the sample chromatogram with a library of reference product chromatograms. Since variables such as the degree and type of weathering and the presence of non-petrogenic hydrocarbons cannot be duplicated in reference spectra, the resemblance information must be regarded as approximate and qualitative and as such, Bureau Veritas Laboratories can assume no liability for any conclusions drawn from these data.

Sample BAW784 [BH22-70-01] : The CCME F2-F4 chromatographic peak profile is consistent with biogenic organic material (e.g. peat). Chromatograms of biogenic organic material may contain peak patterns spanning the C10 to C50 range, but they are most commonly characterized by a profile of unevenly distributed sharp peaks between C28 and C34. The impacts are not consistent with a petroleum product or crude oil.

Results relate only to the items tested.

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C266081
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1104
Sampler Initials: JD

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A703344	WPK	Matrix Spike	1,4-Difluorobenzene (sur.)	2022/09/04		84	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		118	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		142 (1)	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		113	%	50 - 140
			Benzene	2022/09/04		123	%	50 - 140
			Toluene	2022/09/04		122	%	50 - 140
			Ethylbenzene	2022/09/04		122	%	50 - 140
			m & p-Xylene	2022/09/04		130	%	50 - 140
			o-Xylene	2022/09/04		130	%	50 - 140
			F1 (C6-C10)	2022/09/04		90	%	60 - 140
A703344	WPK	Spiked Blank	1,4-Difluorobenzene (sur.)	2022/09/04		85	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		117	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		124	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		113	%	50 - 140
			Benzene	2022/09/04		125	%	60 - 130
			Toluene	2022/09/04		122	%	60 - 130
			Ethylbenzene	2022/09/04		122	%	60 - 130
			m & p-Xylene	2022/09/04		129	%	60 - 130
			o-Xylene	2022/09/04		130	%	60 - 130
			F1 (C6-C10)	2022/09/04		94	%	60 - 140
A703344	WPK	Method Blank	1,4-Difluorobenzene (sur.)	2022/09/04		93	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/09/04		112	%	50 - 140
			D10-o-Xylene (sur.)	2022/09/04		107	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/09/04		110	%	50 - 140
			Benzene	2022/09/04	<0.0050		mg/kg	
			Toluene	2022/09/04	<0.050		mg/kg	
			Ethylbenzene	2022/09/04	<0.010		mg/kg	
			m & p-Xylene	2022/09/04	<0.040		mg/kg	
			o-Xylene	2022/09/04	<0.020		mg/kg	
			F1 (C6-C10)	2022/09/04	<10		mg/kg	
A703344	WPK	RPD	Benzene	2022/09/04	NC		%	50
			Toluene	2022/09/04	NC		%	50
			Ethylbenzene	2022/09/04	NC		%	50
			m & p-Xylene	2022/09/04	NC		%	50
			o-Xylene	2022/09/04	NC		%	50
			F1 (C6-C10)	2022/09/04	NC		%	30
A706457	WLE	Method Blank	Moisture	2022/09/07	<0.30		%	
A706457	WLE	RPD	Moisture	2022/09/07	3.3		%	20
A706459	CAU	Matrix Spike	O-TERPHENYL (sur.)	2022/09/07		92	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/07		81	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/07		89	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/07		86	%	60 - 140
A706459	CAU	Spiked Blank	O-TERPHENYL (sur.)	2022/09/07		95	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/07		84	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/07		92	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/07		90	%	60 - 140
A706459	CAU	Method Blank	O-TERPHENYL (sur.)	2022/09/07		108	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/07	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2022/09/07	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2022/09/07	<50		mg/kg	
A706459	CAU	RPD	F2 (C10-C16 Hydrocarbons)	2022/09/07	NC		%	40
			F3 (C16-C34 Hydrocarbons)	2022/09/07	NC		%	40

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			F4 (C34-C50 Hydrocarbons)	2022/09/07	NC		%	40
A707844	GG3	Matrix Spike [BAW781-01]	O-TERPHENYL (sur.)	2022/09/08		121	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08		111	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/08		108	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/08		106	%	60 - 140
A707844	GG3	Spiked Blank	O-TERPHENYL (sur.)	2022/09/08		125	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08		120	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/08		115	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/08		110	%	60 - 140
A707844	GG3	Method Blank	O-TERPHENYL (sur.)	2022/09/08		131	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2022/09/08	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2022/09/08	<50		mg/kg	
A707844	GG3	RPD [BAW781-01]	F2 (C10-C16 Hydrocarbons)	2022/09/08	11		%	40
			F3 (C16-C34 Hydrocarbons)	2022/09/08	13		%	40
			F4 (C34-C50 Hydrocarbons)	2022/09/08	NC		%	40
A707859	ETS	Method Blank	Moisture	2022/09/07	<0.30		%	
A707859	ETS	RPD	Moisture	2022/09/07	0.65		%	20
A707876	CAU	Matrix Spike	O-TERPHENYL (sur.)	2022/09/08		87	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08		86	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/08		85	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/08		84	%	60 - 140
A707876	CAU	Spiked Blank	O-TERPHENYL (sur.)	2022/09/08		92	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08		93	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/09/08		94	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/09/08		90	%	60 - 140
A707876	CAU	Method Blank	O-TERPHENYL (sur.)	2022/09/08		96	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/09/08	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2022/09/08	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2022/09/08	<50		mg/kg	
A707876	CAU	RPD	F2 (C10-C16 Hydrocarbons)	2022/09/08	5.5		%	40
			F3 (C16-C34 Hydrocarbons)	2022/09/08	3.1		%	40
			F4 (C34-C50 Hydrocarbons)	2022/09/08	NC		%	40
A708702	JB9	Spiked Blank	F4G-SG (Heavy Hydrocarbons-Grav.)	2022/09/08		105	%	60 - 140
A708702	JB9	Method Blank	F4G-SG (Heavy Hydrocarbons-Grav.)	2022/09/08	<500		mg/kg	

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 (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C266081
Report Date: 2022/09/14

GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL
Your P.O. #: 22525414-1100-1104
Sampler Initials: JD

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Elizabeth Chacko, Senior Analyst, Organics

Gita Pokhrel, Laboratory Supervisor

Janet Gao, B.Sc., QP, Supervisor, Organics

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

MaXXam
A Bureau Veritas Group Company

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY #	
GOLDER	
Page 1 of 1	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
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Page ___ of ___	

COOLER OBSERVATIONS:

MAXXAM JOB#:

COOLER ID	CUSTODY SEAL PRESENT	CUSTODY SEAL INTACT	ICE PRESENT	TEMP 1	TEMP 2	TEMP 3
	YES ✓	YES ✓	YES ✓	4	5	3
	YES ✓	YES ✓	YES ✓	2	4	5
	YES ✓	YES ✓	YES ✓	8	9	9
	YES ✓	YES ✓	YES ✓	3	5	2
	YES ✓	YES ✓	YES ✓	4	4	6
	YES ✓	YES ✓	YES ✓	2	4	6
	YES ✓	YES ✓	YES ✓	4	5	5

RECEIVED BY (SIGN & PRINT)		DATE (YYYY/MM/DD)	TIME (HH:MM)
Jose Mercano	[signature]	2022/05/30	12:00 pm

www.BVNA.com

Choose Location:
- [ ] Calgary, AB: 4000 19th St. NE, T2E 6P8 Toll Free (800) 386-7247
- [ ] Edmonton, AB: 9331-48 St. T6B 2R4 Toll Free (800) 386-7247
- [ ] Winnipeg, MB: D-675 Berry St. R3H 1A7 Toll Free (866) 800-6208

CHAIN OF CUSTODY RECORD
ENV COC - 00013v3

Page 1 of 1

Invoice Information	Invoice to (requires report) ☐	Report Information (if differs from invoice)		Project Information	
Company:	Client #254, Golder Associates	Company:	Golder Associates	Quotation #:	Shell
Contact Name:	237 - 4 Ave SW Suite 3300	Contact Name:	Aurelie Bellavance	P.O. #/ AFE#:	22525414-100-104
Street Address:		Street Address:		Project #:	22525414-000
City:	Calgary Prov: AB Postal Code:	City:	Calgary AB Postal Code: T2P 4K3	Site #:	NA
Phone:		Phone:	403-299-5600	Site Location:	Camp Farewell
Email:	Canada Account Payable	Email:	Aurelie.Bellavance@wsp.com	Site Location Province:	NT
Copies:		Copies:	Peter.Tan@wsp.com	Sampled By:	JD/HK

LAB USE ONLY - PLACE STICKER HERE

C266081

Rush Confirmation #:

Regulatory Criteria

- [ ] AT1
- [ ] CCME
- [ ] Drinking Water - Canada
- [ ] Drinking Water - Manitoba
- [ ] Saskatchewan
- [ ] Drinking Water - Alberta
- [x] Other AMSRP

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

Analyses columns: 1 FIELD FILTERED; 2 FIELD PRESERVED; 3 LAB FILTRATION REQUIRED; 4 BTEX F1-F4; 5 PAHS; 6 BTEX F1-F2; 7 BARIUM TRUE TOTAL; 8 Routine water; 9 Regulated metals - total; 10 Regulated metals - dissolved; 11 Mercury - total; 12 Mercury - dissolved; 13 Salinity 4; 14 Sieve (75 micron); 15 Texture (% sand, silt, clay); 16 Basic class II landfill; 17; 18; 19; 20 LIMITED SAMPLE; 21 # OF CONTAINERS SUBMITTED; 22 HOLD - DO NOT ANALYZE

#	Sample Identification	YY	MM	DD	HH	MM	Matrix	BTEX F1-F4	# of Containers Submitted	Comments
1	BH22-69-01	22	08	26	14	50	Soil	X	3	Also email report to
2	BH22-69-02	↓	↓	↓	15	00	↓	X	3	gld.shelldgr@wsp.com
3	BH22-69-03				15	10		X	3	gld.iolequis@wsp.com
4	BH22-69-04				15	20		X	3	
5	BH22-70-01				15	50		X	3	
6	BH22-70-02				16	00		X	3	
7	BH22-70-03	↓	↓	↓	16	10	↓	X	3	
8										
9										
10										
11										
12										

Regular Turnaround Time (TAT): [x] 5 to 7 Day [ ] 10 Day

Rush Turnaround Time (TAT) Surcharges apply: [ ] Same Day [ ] 1 Day [ ] 2 Day [ ] 3 Day [ ] 4 Day

Date Required: YY MM DD

Received in Yellowknife
By: J. Alecano @ 12:20
AUG 30 2022
Ice - yes / no
Temp: 4 / 4 / 6

*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present				ACTR		
Seal Intact						
Cooling media present						

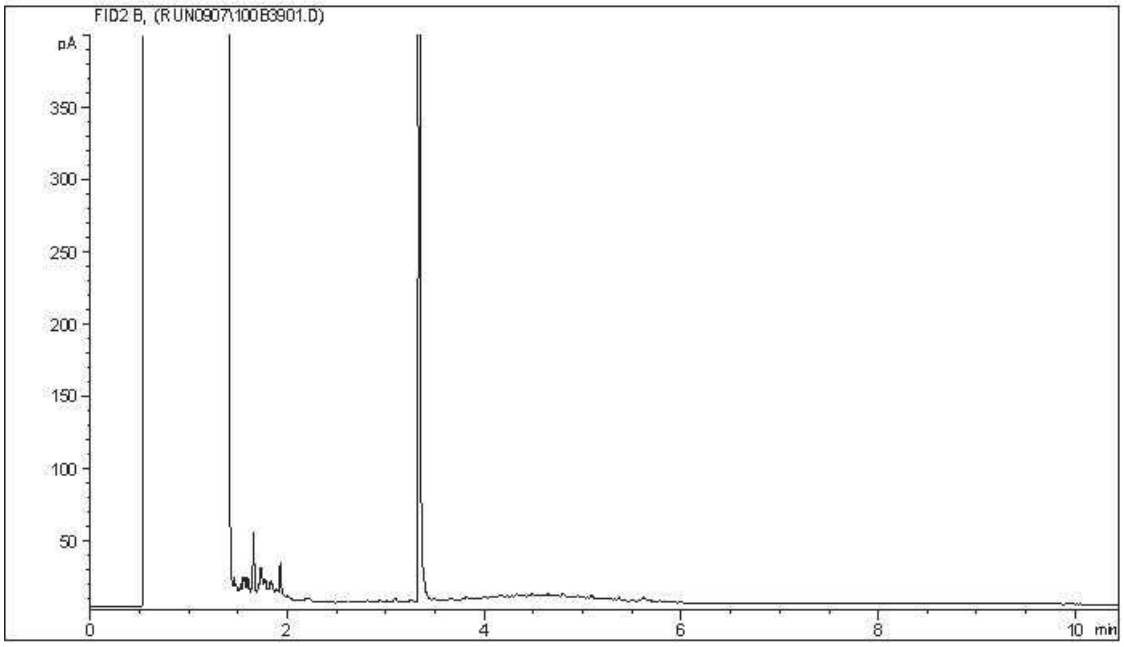
LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal Intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3	Temperature reading by:
Seal present							
Seal Intact							
Cooling media present							

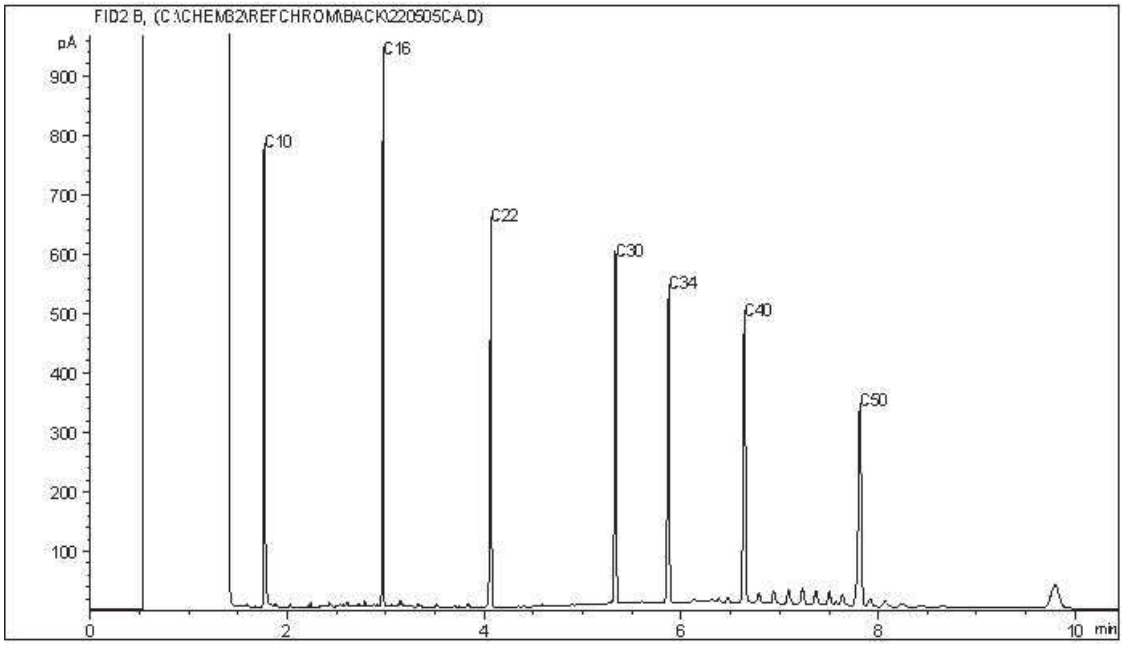
	Relinquished by: (Signature/ Print)	YY	MM	DD	HH	MM		Received by: (Signature/ Print)	YY	MM	DD	HH	MM	Special Instructions
1	Jonathan Donahue	22	08	27	16	00	1	JASON BIL	22	08	31	15	10	
2							2							

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



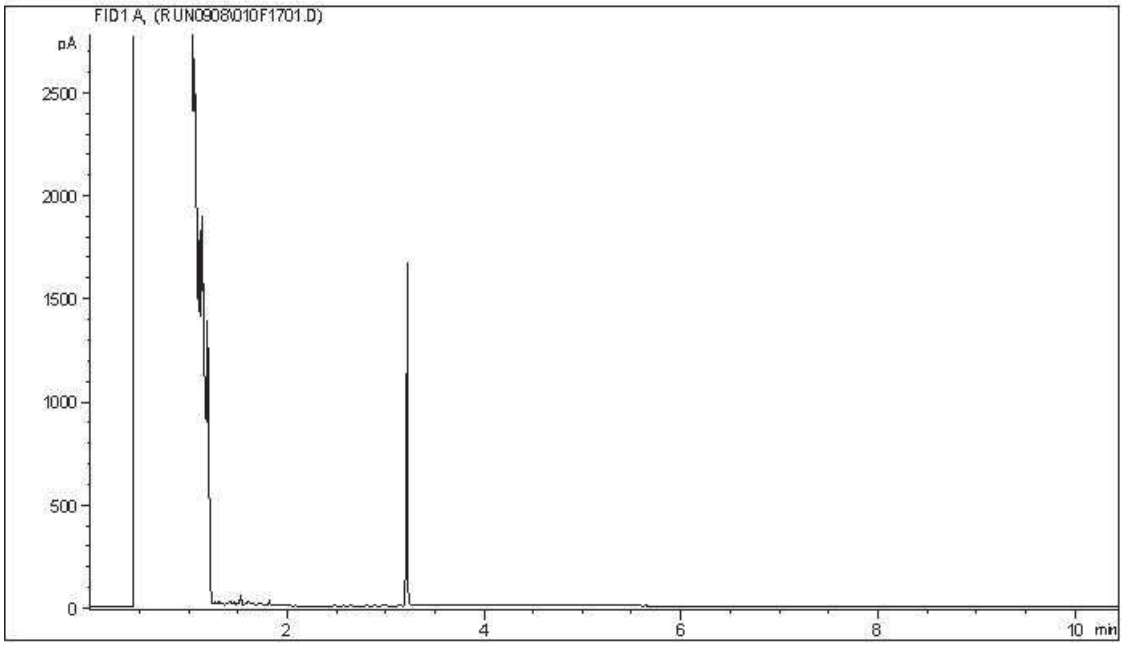
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

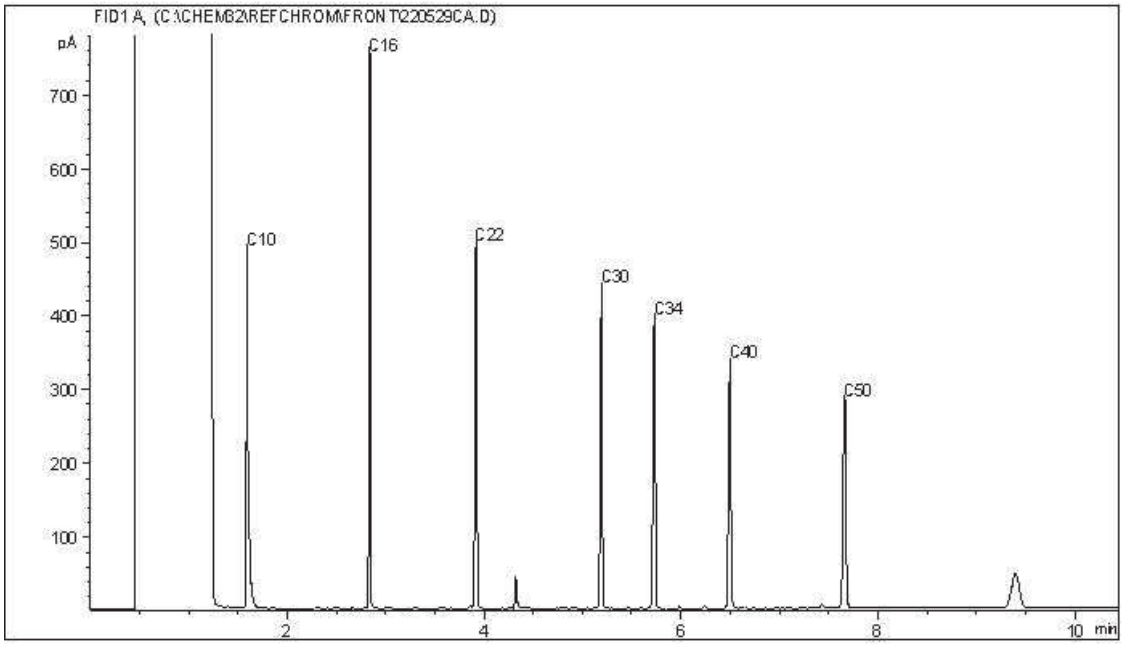
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC10



Carbon Range Distribution - Reference Chromatogram



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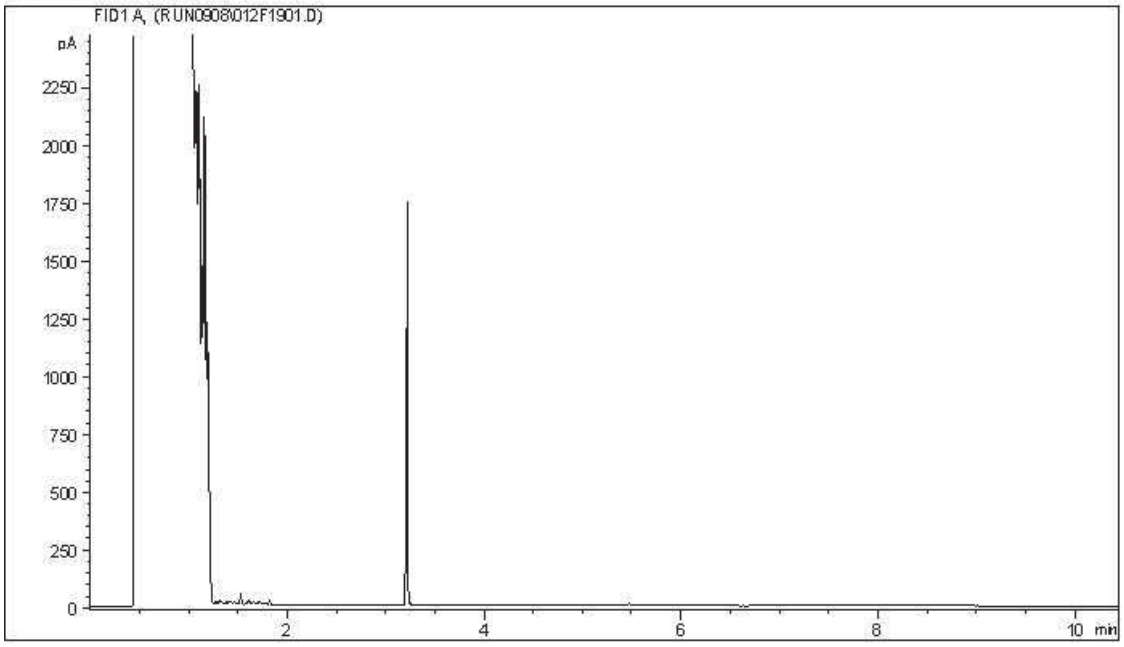
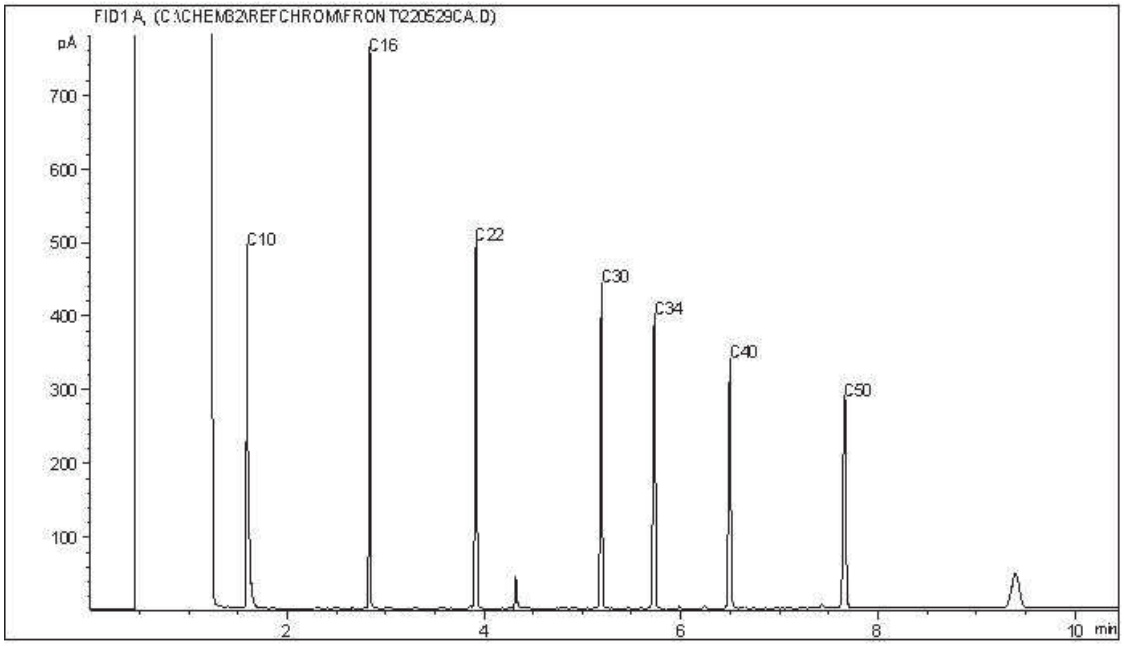
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC10



Carbon Range Distribution - Reference Chromatogram



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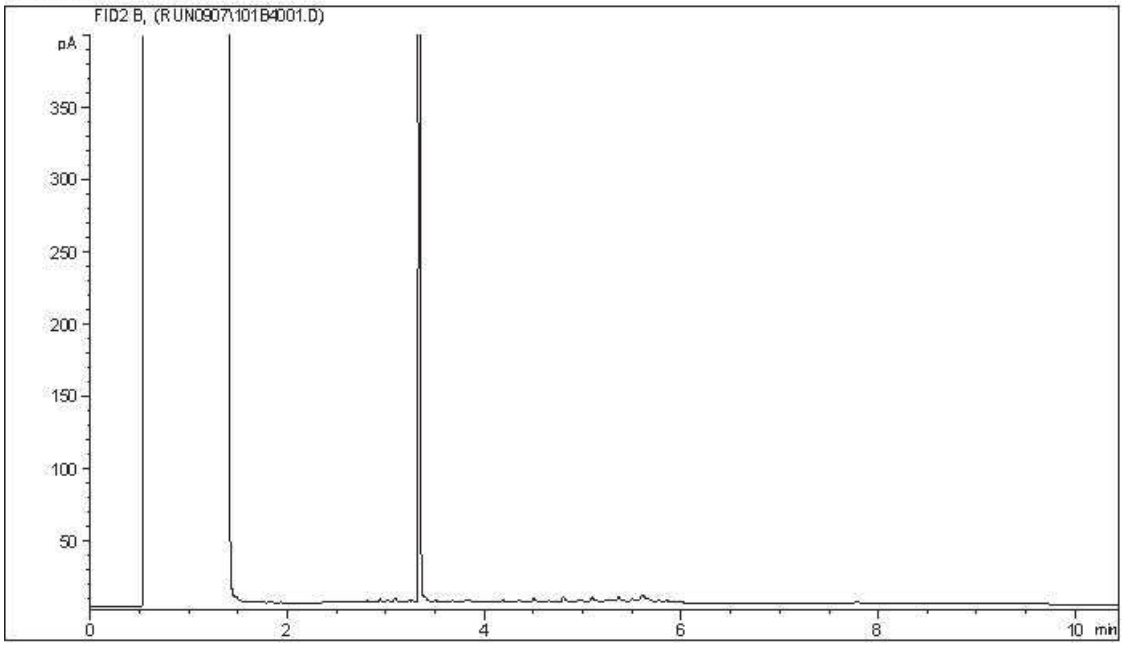
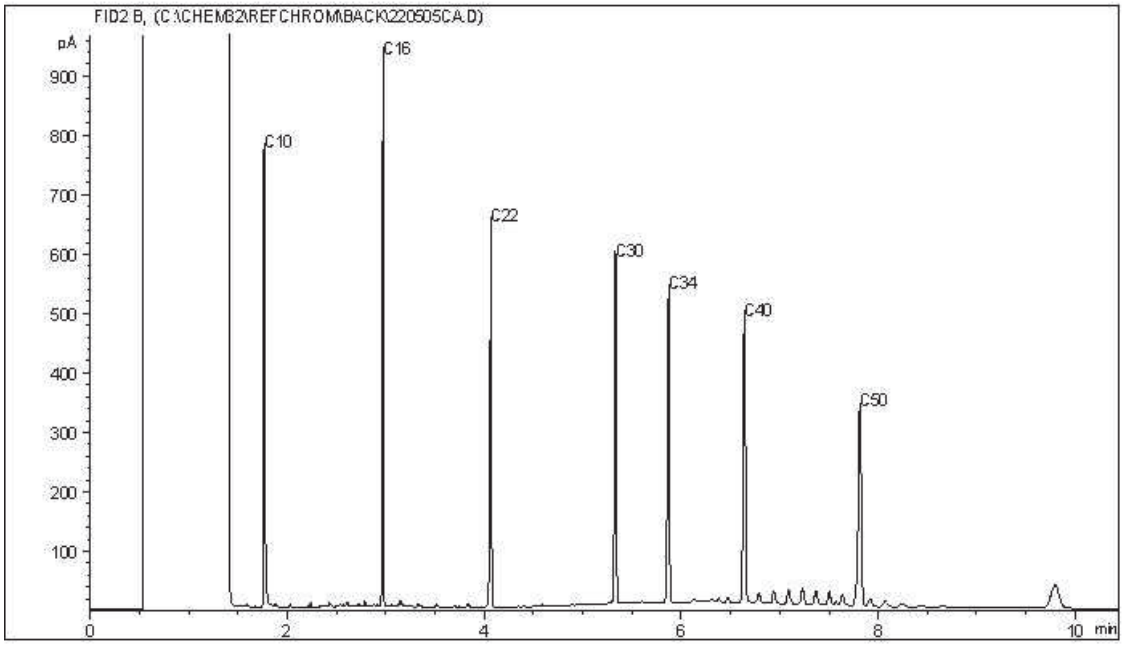
Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



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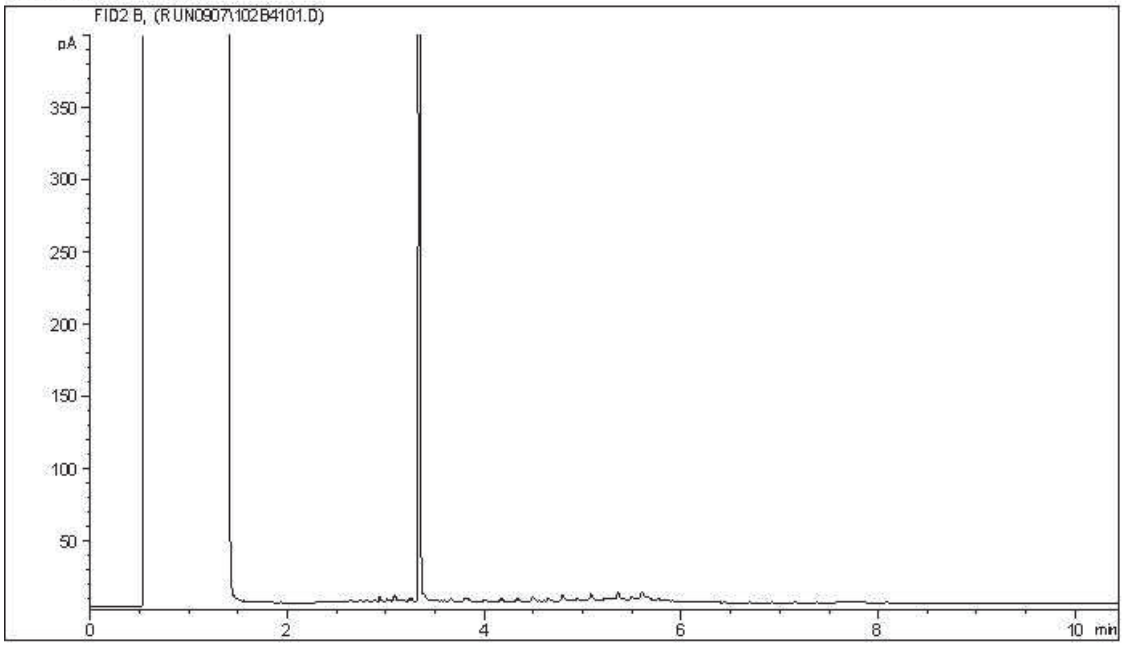
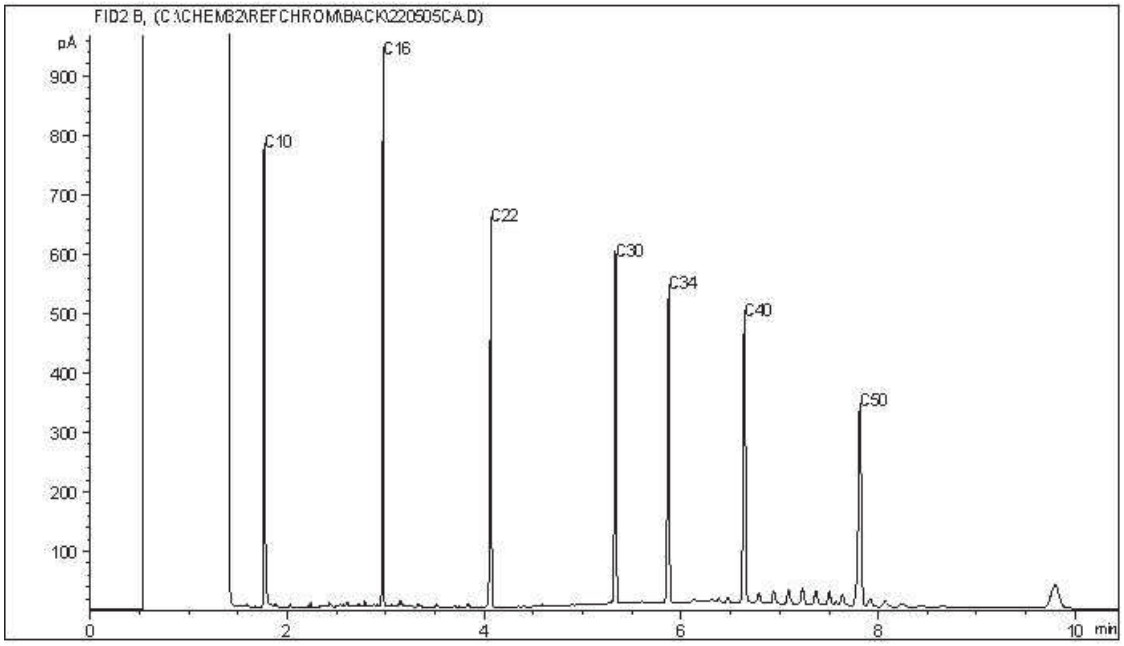
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



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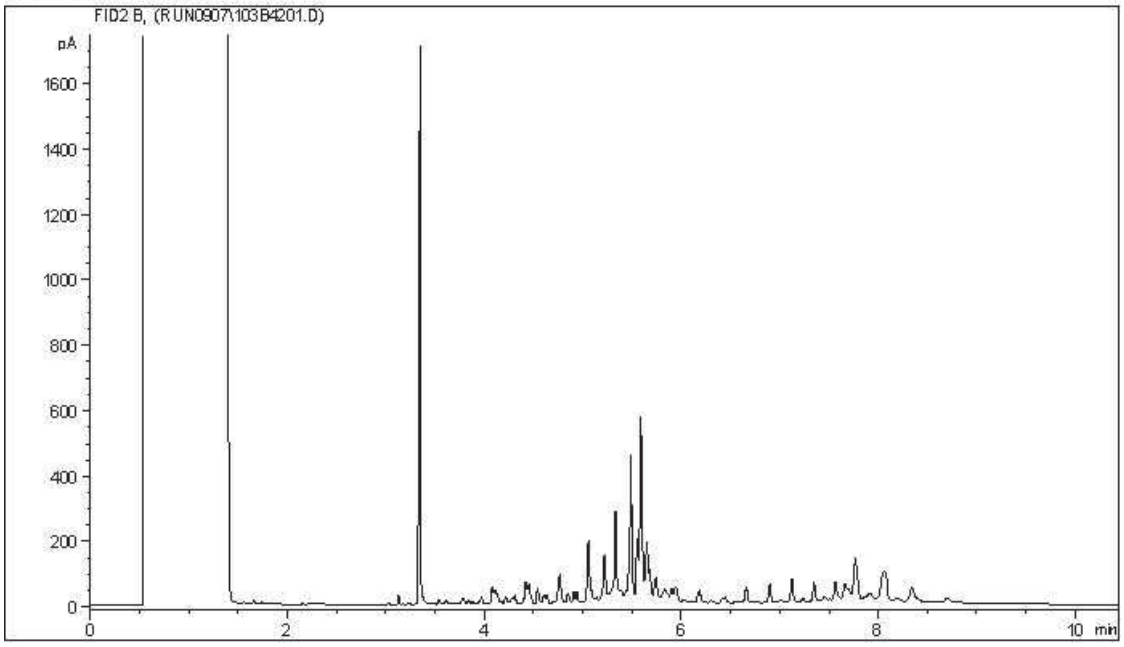
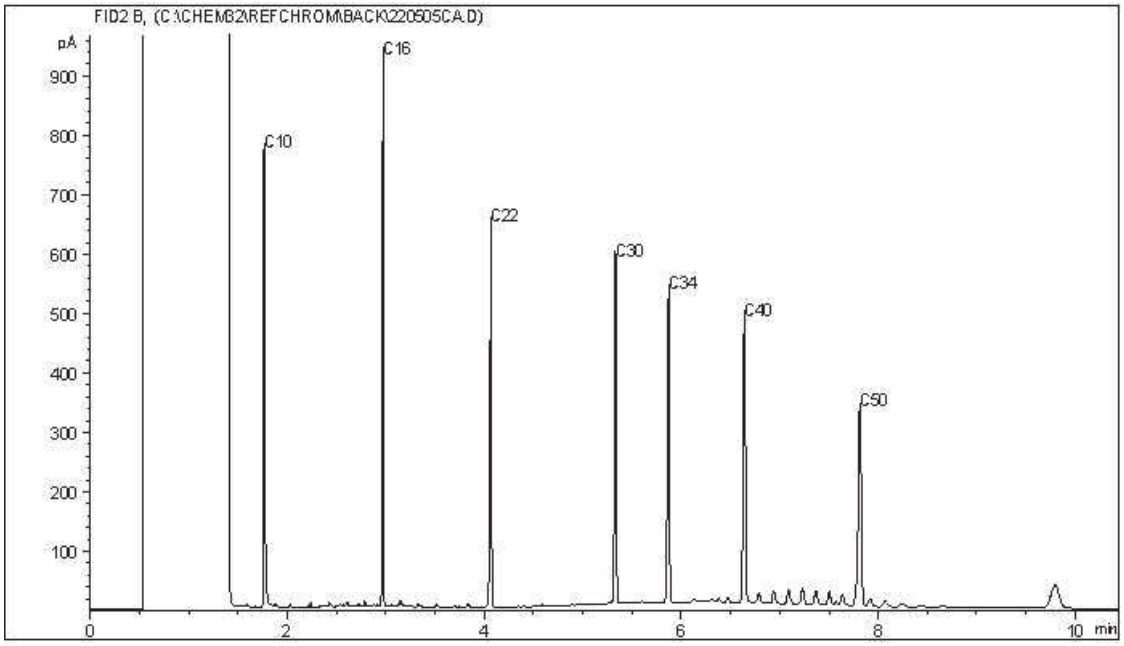
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



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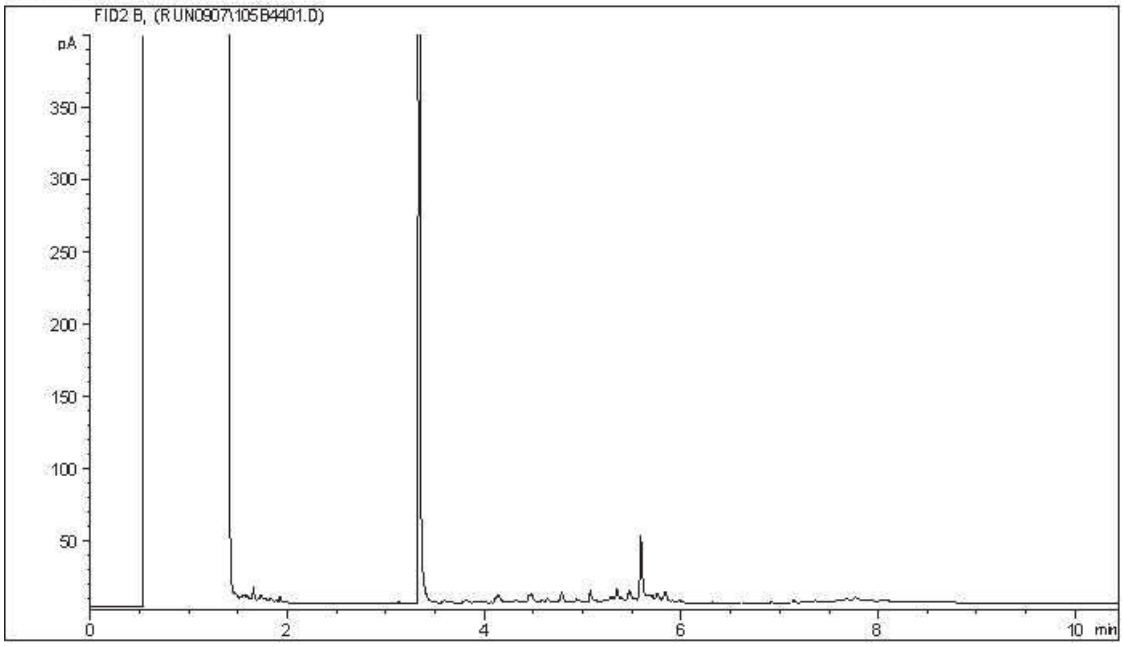
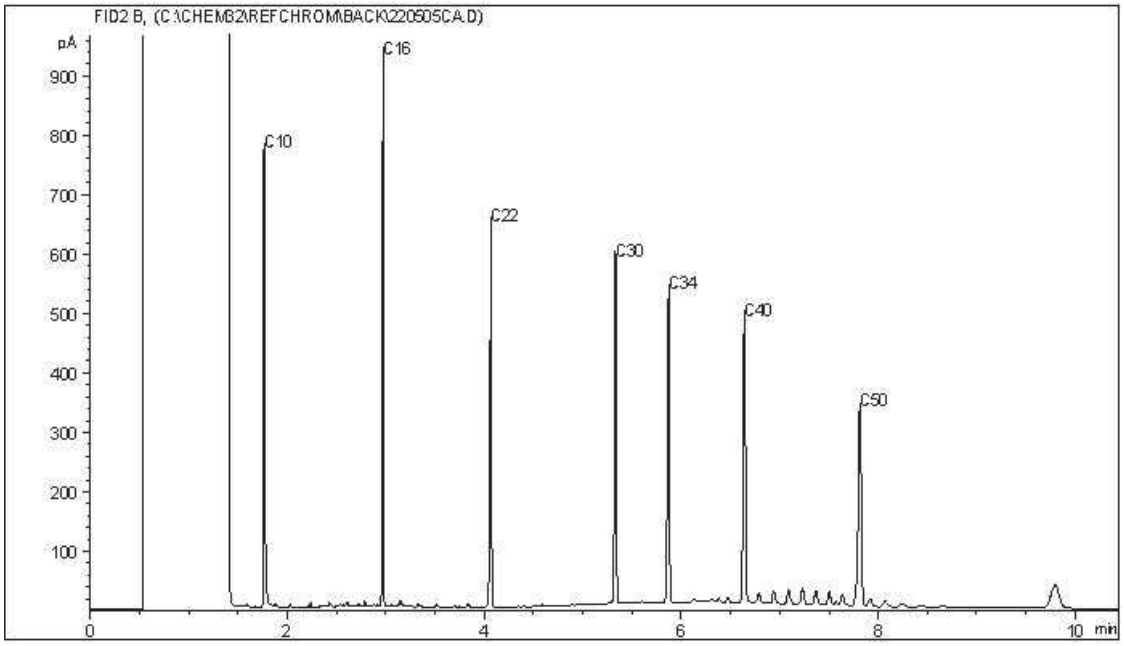
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



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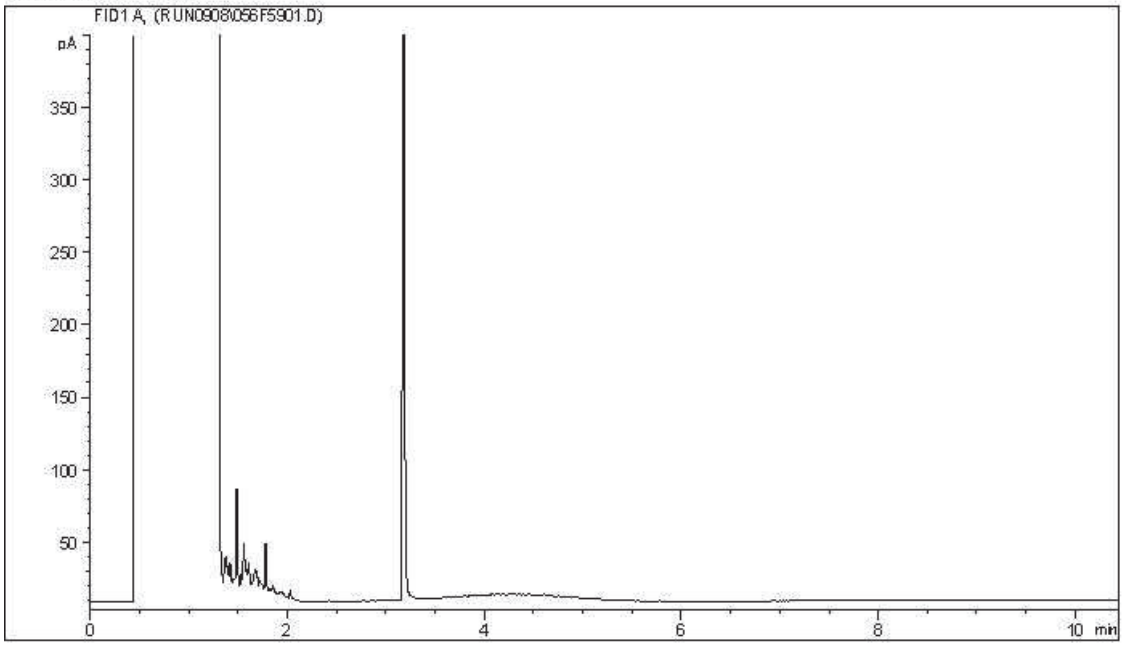
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

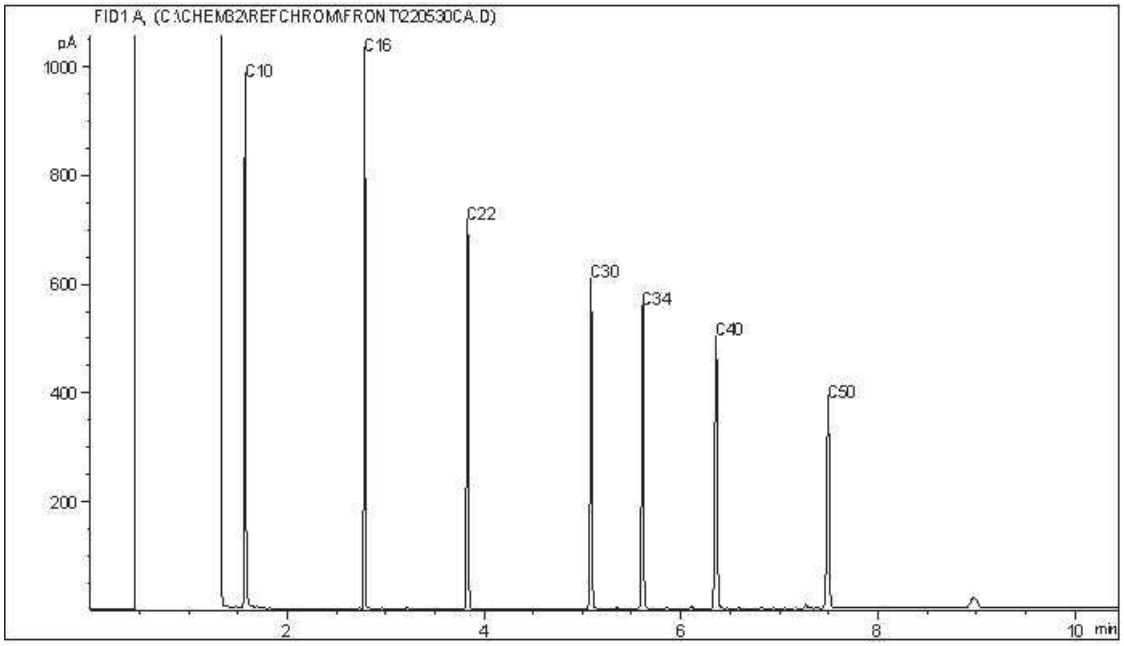
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

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

Cynny Hagen

From: MacLean, Colleen <Colleen_MacLean@golder.com>
Sent: Monday, September 12, 2022 10:05 AM
To: Cynny Hagen
Cc: Bellavance, Aurelie
Subject: RE: Additional Analysis request - Camp Farewell -Prj: 22525414-1000, PO 22525414-1100-1104

Yes, that sounds good.

Thanks!

Colleen MacLean, *She/her*
Environmental Technologist, B.A., Dipl. EVT.

T: +1 403 299 5600
D: +1 403 299 5667

WSP GOLDER

From: Cynny Hagen <cynny.hagen@bureauveritas.com>
Sent: September 12, 2022 10:01 AM
To: MacLean, Colleen <colleen.maclean@wsp.com>
Cc: Bellavance, Aurelie <aurelie.bellavance@wsp.com>
Subject: Re: Additional Analysis request - Camp Farewell -Prj: 22525414-1000, PO 22525414-1100-1104

Hi Colleen,

Absolutely I will add the analysis, for job C266077 would you like to have the additional report for both Bio-Toluene and Resemble for F2-F4 and the other jobs can be just add a comment in report. Please confirm.

Regards,

Cynny Hagen
Key Account Specialist
Environmental Laboratories & Specialty Services - Western Canada
Bureau Veritas
Cell: 403-312-9070

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Emergency/Spills 365/7/24: 1-844-BVSPILL, spills@bureauveritas.com
For urgent after-hours inquiries: 403 651 2436

On Mon, 12 Sep at 8:58 AM , MacLean, Colleen <colleen_maclean@golder.com> wrote:

Hello,

Could you please complete chromatogram analysis and biogenic toluene (select samples) assessment for the samples below?

C266077	BAW749	BH22-56-01	F1 to F4 and toluene
	BAW750	BH22-56-02	
	BAW752	BH22-57-01	F1 to F4
	BAW753	BH22-57-02	F1 to F4 and toluene
	BAW756	BH22-59-01	F1 to F4 and toluene
C266076	BAW742	BH22-63-01	F1 to F4
	BAW738	BH22-64-01	F1 to F4
	BAW746	BH22-67-02	F1 to F4
C266062	BAW656	BH22-68-01	F1 to F4
C266081	BAW784	BH22-70-01	F1 to F4

Please let me know if you have any questions.

Thanks!

Colleen MacLean, *She/her*
Environmental Technologist, B.A., Dipl. EVT.

T: +1 403 299 5600
D: +1 403 299 5667

237 – 4 Avenue SW, Suite 3300, Calgary, Alberta T2P 4K3, Canada
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WSP and Golder have joined together to form the premier environmental consultancy in the industry. Together we are 14,000 strong, Future Ready©, and delivering innovative solutions to our clients around the globe.

APPENDIX G

Habitat Assessment

TECHNICAL MEMORANDUM

DATE February 8, 2023 **Project No.** 22525414-1200

TO Shell Canada Limited

FROM Marc La Flèche, Corey De La Mare **EMAIL marc.lafleche@wsp.com, corey.delamare@wsp.com**

2022 HABITAT ASSESSMENT FOR CAMP FAREWELL

1.0 INTRODUCTION

WSP Canada Inc. (formerly Golder Associates Ltd. [Golder]) was retained by Shell Canada Limited (Shell) to conduct a habitat assessment at Camp Farewell (69°12'38.79"N 135° 6'7.14"W, approximately 125 kilometres north-west of Inuvik in the Mackenzie delta) in the Inuvialuit Settlement Region of the Northwest Territories (NWT) (the Site). The objective of this assessment is to close a data gap identified through the review of previous site assessment programs and through subsequent discussions with Shell, to support a Human Health and Ecological Risk Assessment.

2.0 METHODS

2.1 Desktop Review

Golder conducted searches of the natural heritage databases maintained by the NWT and Government of Canada to identify previously documented records of territorially significant features or species within the Site. This included queries to the Orientis Data Investigator v2.0 (ODI) (Canadian Wildlife Service 2022, internet site; Energy and Natural Resources – Northwest Territories 2021, internet site) and the online NWT Species and Habitat Viewer (NWT Species and Habitat Viewer 2022, internet site).

2.2 Field Assessment Methods

Four plots were surveyed at the Site on August 14, 2022. Three plots were within the exposure area (i.e., within the disturbed footprint of the camp) and one plot was in a reference area outside the disturbance. At each plot, habitats were assessed, and terrestrial and aquatic receptors were identified. Plant communities were assigned within the appropriate Level IV Ecoregion based on climate, vegetation, soil, water and fauna, as part of an ecologically-based landscape classification (Ecosystem Classification Group 2012). Dominant vegetation species were identified to genus, which, due to timing, wasn't always possible, and were recorded along with abundance. Noticeable plant health concerns were also documented, including observations of leaf burn, chlorosis, reduced leaf size, reduced plant growth and/or plant mortality, and a health score index of 1-5 was assigned with 5 being the healthiest in appearance. Incidental weed, listed plant and wildlife species observations were recorded as encountered, and special attention was paid to the potential presence of species of conservation concern flagged during desktop surveys. Notes were taken on topography and surrounding land use.

3.0 RESULTS

3.1 Habitat Summary

The Site is within the Southern Arctic Ecological Region, in the Tundra Plains Low Arctic north (L*An*) Ecoregion, specifically, in the Richards Island Coastal Plain L*An* Ecoregion (ecoregion label 2.4.1.2) (Ecosystem Classification Group 2012). The Site is very close to the border with the Mackenzie Delta L*An* Ecoregion. The Richards Island Coastal Plain L*An* Ecoregion is characterized by an undulating to hummocky landscape over glacial till and outwash deposits that is separated from the mainland by the main channel of the Mackenzie River and the Mackenzie Delta L*An* ecoregion. The region varies between till deposits in the west, marine plains in the central regions and sandy to gravelly outwash deposits to the east. Many lakes, ponds and pingos add to the topography of the ecoregion. Soils in the region include Turbic Cryosols comprised of weakly to moderately calcareous fine clayey and fine loamy glacial till (Kittigazuit soil association) and marine clays (Naparotalik soil association). Static Cryosols are also present within the region and are associated with sandy glaciofluvial materials (Tibjak soil association) (Ecosystem Classification Group 2012). The southern half of the region, where the Site is located, is dominated by low-shrub tundra cover in upland areas, and sedge – moss – low-shrub communities in the wetlands (Ecosystem Classification Group 2012).

3.2 Vegetation Surveys and Plant Health Assessment

Vegetation surveys were used to characterize the terrestrial habitat and assess vegetation health by recording vascular species present, percent cover of all strata (i.e., trees, shrubs, forbs, graminoids, bryophytes and lichens), the percent cover of surface substrate (e.g., surface water, litter, mineral soil, decaying wood and live ground cover) and the vigour of all species observed. Dominant vegetation species, habitat characteristics and plant vigour were evaluated and documented in the field and are included in Table 1 below. Photographic monitoring was also carried out. Vegetation surveys were carried out on August 14, 2022 at four plots (i.e., HAB-01, HAB-02, CF22-01 and CF22-02) near Camp Farewell.

All plots were on level to gently sloping open grassy areas, with HAB-01 and HAB-02 being near the margins of large water bodies, and CF22-01 and CF22-02 closer to the airstrip and camp pad. Vegetation communities in all the plots can be classified as Low-shrub Tundra (S2) due to the dominant presence of blueberry (*Vaccinium uliginosum*), cranberry (*Vaccinium vitis-idaea*), dwarf birch (*Betula glandulosa*), green alder (*Alnus* sp.), willows (*Salix* spp.), and a high percentage of moss and lichen ground cover.

Soils consisted mostly of silty to gravelly sand with some areas having a thin organic/peat layer. Vegetation plots had an average vegetation cover of 90% (ranging from 85% to 95%), an average moss and lichen cover of 39% (ranging from 15% to 50%) and had an average plant health score of 4 (Table 1 below). The surface substrate cover was on average 9% with only HAB-02 containing bare soil (5% cover). Blueberry, cranberry, alders and willows were the most observed species. Other common species included dwarf birch (*Betula glandulosa*), Arctic white heather (*Cassiope mertensiana*) and grasses. The plot CF22-01 was near the airstrip and former camp pad and, as such, a note was made that there was a significant presence of fireweed (*Chamaenerion angustifolium*) nearby. Vegetation appeared to be in mostly good health across all plots with a note that the plants at HAB-02 and CF22-01 were slightly shorter compared to the Site in general and compared to the other plots. A high abundance of berries, along with a high cover of lichen, suggests that these locations may provide good habitat to birds and caribou.

Table 1: Vegetation Information from the Four Plots Surveyed at Camp Farewell

Plot ID	Vegetation Type	Vegetation			Surface Substrate			Dominant Vegetation Species
		Total % Cover	Moss and Lichen % Cover	Plant Health	Total % Cover	% Bare Area	Litter Volume (lb/ac)	
HAB-01	Low-shrub Tundra	90	50	5	10	0	150	*Salix* spp., *Salix reticulata*, *Vaccinium uliginosum*, *Equisetum arvense, Vaccinium vitis-idaea, Alnus sp., Betula pumila, Arctous rubra, Cassiope mertensiana*
HAB-02	Low-shrub Tundra	85	15	3	10	5	200	*Salix* spp., *Salix reticulata*, *Vaccinium* sp., *Vaccinium vitis-idaea, Alnus sp., Cassiope mertensiana, Carex sp., Rubus chamaemorus,* grass species
CF22-01	Low-shrub Tundra	95	50	5	5	0	100	*Salix* spp., *Salix reticulata*, *Vaccinium uliginosum*, *Vaccinium vitis-idaea, Alnus sp., Betula pumila, Cassiope mertensiana,* grass species
CF22-02	Low-shrub Tundra	90	40	4	10	0	100	*Salix* spp., *Salix reticulata*, *Vaccinium uliginosum*, *Vaccinium vitis-idaea, Alnus sp., Betula pumila, Arctous rubra, Cassiope mertensiana, Pyrola grandifolia,* grass species
	Average	*90*	*39*	*4*	*9*	*1*	*138*	

Note: lbs/ac – pounds per acre

3.3 Potential for Suitable Habitat

There were a variety of incidental wildlife observations, including wildlife sign (i.e., browse, tracks, scat, den) or observations (i.e., visual and/or auditory observations). Sandhill crane (*Grus canadensis*) vocalizations were heard, and a small mammal ground dwelling was observed at HAB-01. At HAB-02, sandhill cranes, snow geese (*Anser caerulescens*), an unknown sparrow and a small rodent were observed directly, and moose tracks (*Alces alces*), bear scat, a wasp nest and a small mammal den were also observed around the area of this plot. At CF22-01, snow geese, willow ptarmigan (*Lagopus lagopus*), sandhill cranes, an unknown sparrow and a red-throated loon (*Gavia stellata*) were all directly observed, and grizzly bear (*Ursus arctos*) tracks were also present (listed as Sensitive by the NWT and of Special Concern under the *Species at Risk Act* [SARA]). Willow ptarmigan and sandhill cranes were also observed at CF22-02, along with fox scat (*Vulpes lagopus*). As vegetation can serve as cover and forage (many berries were present in the area) for a variety of wildlife species and the proximity to water can also attract wildlife species, it is likely that this area also has suitable habitat for other wildlife species that were not observed.

3.4 Potential for Aquatic Receptors

Two natural water bodies were visited during the habitat assessment: HAB-01 and HAB-02. HAB-01 is a healthy aquatic habitat consisting of a large lake with a high potential for aquatic receptors due to its connection to the Mackenzie delta and that it is unlikely to fully freeze in the winter months. Duck species and tundra swans (*Cygnus columbianus*) were observed on the lake, though aquatic vegetation was not observed as the water was deep and turbid on the day of the survey. HAB-02 was on the lake behind the Camp Farewell dock and was also deemed to be an overall healthy, albeit lower quality, aquatic habitat. Minnows were seen from the dock and an Arctic tern (*Sterna paradisaea*) was observed diving for fish. The lake is unlikely to freeze over winter and was deemed to be of lower quality habitat due to brown coloured algae in the benthic layer.

3.5 Species at Risk

According to the ODI search, the Site falls within the Kendall Island Migratory Bird sanctuary (Energy and Natural Resources – Northwest Territories 2021, internet site).

An online query to the NWT Species and Habitat Viewer database indicated that 14 wildlife ranges overlap with the Site (NWT Species and Habitat Viewer 2022, internet site). Table 2 below describes each species and their Territorial (Working Group on General Status of NWT Species 2016) and Federal status (COSEWIC 2022, internet site; *Species at Risk Act* Schedule 1, Government of Canada 2022, internet site). Absence of other listed species does not indicate that species are not present in this area, but may be an indication that few inventories/surveys have been conducted in the area.

Table 2: Species at Risk with Ranges that Overlap the Site, including Provincial and Federal Status

Species	Scientific Name	Territorial Status[a]	COSEWIC[b]	SARA Status[c]
Grizzly Bear	*Ursus arctos*	Sensitive	Special Concern	Special Concern
Polar Bear	*Ursus maritimus*	Sensitive	Special Concern	Special Concern
Wolverine	*Gulo gulo*	Sensitive	Special Concern	Special Concern
Bank Swallow	*Riparia riparia*	At Risk	Threatened	Threatened

Species	Scientific Name	Territorial Status[a]	COSEWIC[b]	SARA Status[c]
Barn Swallow	*Hirundo rustica*	Sensitive	Special Concern	Threatened
Harris's Sparrow	*Zonotrichia querula*	Sensitive	Special Concern	Under Consideration
Horned Grebe	*Podiceps auritus*	Sensitive	Special Concern	Special Concern
Hudsonian Godwit	*Limosa haemastica*	At Risk	Threatened	Under Consideration
Lesser Yellowlegs	*Tringa flavipes*	Sensitive	Threatened	Under Consideration
Peregrine Falcon (*anatum-tundrius* complex)	*Falco peregrinus anatum/tundrius*	Sensitive	Not at Risk	Special Concern
Red-necked Phalarope	*Phalaropus lobatus*	Sensitive	Special Concern	Special Concern
Rusty Blackbird	*Euphagus carolinus*	Sensitive	Special Concern	Special Concern
Short-eared Owl	*Asio flammeus*	At Risk	Threatened	Special Concern
Dolly Varden (Western Arctic population)	*Salvelinus malma malma*	Sensitive	Special Concern	Special Concern
Suckley's Cuckoo Bumble Bee	*Bombus suckleyi*	Undetermined	Threatened	Under Consideration

Notes:

[a] Working Group on General Status of NWT Species 2016

[b] COSEWIC 2022, internet site

[c] Government of Canada 2022, internet site

4.0 CONCLUSION

Camp Farewell and its surroundings appear to be providing suitable habitat for vegetation and animals. Vegetation in the area had a high cover of Ericaceous species and berry-producing species in addition to a high ground cover of terrestrial lichen. Several species of birds were observed on-site despite poor weather conditions, along with many signs of other wildlife using the area (e.g., bear tracks/scat, moose tracks and a den, among others).

CLOSURE

We trust that this information meets your expectations and projects requirements at this time. Should you require any additional information or clarifications, please do not hesitate to contact the undersigned.

Yours truly,

WSP Canada Inc.

Marc La Flèche, MSc., P.Biol.
Ecologist

Corey De La Mare, P.Biol.
Fellow, Terrestrial Ecologist

ML/CD/kdc

Attachment: References

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APPENDIX H

Quality Assurance / Quality Control

Quality Assurance/Quality Control

In conjunction with the field investigations completed to date, a quality assurance/quality control (QA/QC) program was implemented to ensure the integrity of the soil, groundwater and/or surface water sampling and analytical testing results.

1.0 FIELD PROGRAM

All sampling activities were completed in accordance with WSP Canada Inc.'s (formerly Golder Associates Ltd. [Golder]) Technical Field Procedures by trained Golder personnel. All field activities were documented in field notes and results were recorded on standard field forms. All reusable field equipment involved in the sampling and monitoring of soil, groundwater and surface water was decontaminated between sampling locations in accordance with Golder's Technical Procedures. Soil samples were collected using appropriate handling protocols and were placed in sample containers provided by Bureau Veritas Laboratories (BVL).

Soil samples are not directly contacted by hand. To help prevent cross-contamination, stainless steel sampling instruments and a new pair of clean nitrile gloves are used for the collection of each sample. Soil samples that were collected for field methanol preservation were collected using a dedicated, disposable Terra Core™ soil sampling device.

All soil, groundwater and surface water samples are placed in laboratory-supplied containers suitable for the analytes, and where applicable, the appropriate laboratory-supplied preservative is added to the samples, as outlined in the following table.

Analyte	Laboratory Containers	Preservative	Field Filtered
Soil Samples			
BTEX and PHC Fractions F1 to F4	1 x 120-mL jars 2 x 40-mL clear glass vials	No preservative Methanol	n/a
PAHs	2 x 125-mL jars	No preservative	n/a
Metals and salinity	2 x 250-mL jars or plastic bag	No preservative	n/a
VOCs	1 x 120-mL jars 2 x 40-mL clear glass vials	No preservative Methanol	n/a
Groundwater Samples			
BTEX and PHC Fraction F1	2 x 40-mL clear glass vials	Sodium bisulphate	No
PHC Fraction F2	2 x 100-mL amber glass	Sodium bisulphate	No
Routine potability parameters	500-mL HDPE 250-mL HDPE 125-mL HDPE	No preservative No preservative Nitric acid	No No Yes
Dissolved metals	125-mL HDPE	Nitric acid	Yes
PAHs	2 x 100-mL amber glass	Sodium bisulphate	No
Surface Water Samples			
BTEX and PHC Fraction F1	2 x 40-mL clear glass vials	Sodium bisulphate	No
PHC Fraction F2	2 x 100-mL amber glass	Sodium bisulphate	No

Analyte	Laboratory Containers	Preservative	Field Filtered
Routine potability parameters	500-mL HDPE 250-mL HDPE 125-mL HDPE	No preservative No preservative Nitric acid	No No Yes
Total metals	125-mL HDPE	No preservative	Yes
PAHs	2 x 100-mL amber glass	Sodium bisulphate	No

Notes:
BTEX – benzene, toluene, ethylbenzene, xylenes; HDPE – high density polyethylene; mL – millilitre; L – litre; n/a – not applicable; PAH – polycyclic aromatic hydrocarbon; PHC – petroleum hydrocarbon; VOC – volatile organic compound

Soil, groundwater and surface water samples were given unique identification numbers and the soil and groundwater sampling containers were preserved in ice-filled coolers to maintain temperatures below 10°C. Samples were logged onto formal chain-of-custody documents and transported to BVL for chemical analysis. BVL is accredited by the Standards Council of Canada.

Blind field duplicate soil samples are submitted for analysis. Submission of blind field duplicate QC samples was at an approximate rate of 10% of total samples.

2.0 LABORATORY PROGRAM

The laboratory QA/QC program included adherence to laboratory sampling and analysis protocols (e.g., hold times, sample containers, preservatives, detection limits and approved methodology) and the analysis of laboratory method blanks, laboratory control sample (blank spike), laboratory sample duplicates, surrogate recovery and matrix spikes.

Laboratory method blank samples are free of the target analytes and are analyzed through the same analytical method than the test samples. Method blank results are used to detect interferences or impurities introduced by the laboratory equipment, reagents, or solvents.

Laboratory control samples are fortified with a known concentration of the select target analytes and then analyzed through the same analytical method than the test samples. Laboratory control samples are used to monitor the analyte recovery and validate the calibration of the instrumentation.

For laboratory duplicate samples, a second aliquot from a randomly selected sample within an analytical batch is processed through the same analytical method. Laboratory duplicate sample results are used to evaluate the reproducibility of the analytical method.

Surrogate recovery is analyzed for organics parameters by spiking samples with known quantities of surrogate chemicals which have similar chemical properties to the parameters being analyzed. The reported recovery provides an indication of the analytical method accuracy for that sample.

Matrix spikes were conducted by adding known concentrations of the analyte of interest to a sample to evaluate the effects of the sample matrix on the analytical method.

3.0 DATA RECEPTION

Once laboratory analytical results were received, Golder completed a review of field and laboratory quality. This included review of laboratory QC performance to confirm results are within acceptance criteria, as well as evaluation of field duplicate and blank results to confirm they were within alert limits. Upon receipt of the analytical

results, relative percent difference (RPD) values between the original samples and their blind field duplicates were calculated as follows:

$$\text{RPD\%} = \frac{|\text{S} - \text{D}|}{\frac{1}{2}(\text{S} + \text{D})} \times 100$$

Where: RPD = relative percent difference
S = sample value
D = blind field duplicate or replicate value.

Since analytical error increases near the reportable detection limit (RDL), an RPD was only calculated where the concentrations of both the original and blind field duplicate samples were greater than five times the RDL. The calculated RPDs were then compared to parameter specific alert limits.

Exceedances of the QC acceptance or alert criteria were investigated with the laboratory and, if warranted, a corrective action report was requested from the laboratory.

4.0 DATA QUALITY REVIEW RESULTS

Results of the data quality review are summarized in Table H1. The RPD calculations and QC results are presented in Tables H2 to H5.

Eleven field duplicate soil samples were collected and submitted to the laboratory as part of the soil investigation.

Based on the data quality review, 57 data quality issues have been identified. No data quality issues resulted in the associated data being considered suspect.

All the data quality issues are discussed in detail in Table H1.

5.0 SUMMARY OF RESULTS

Based on the review of the laboratory and field QA/QC results, the data presented in this report are considered to be reliable.

Table H1
Summary of Quality Control Sample Results
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
C259075	Soil	AZF954	m & p-Xylene	Qualifying ion (m & p-Xylene) is outside of the acceptance criteria. Results are tentatively identified and potentially biased high.	This data quality issue may represent a potential high bias for this parameter in this sample. There is no applicable guideline for m & p-Xylene however total xylenes is the sum of m & p-Xylene and o-Xylene. The total xylenes result is below the regulatory guidelines, therefore indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the data reported can be considered reliable.
		AZF955, AZF956	Acridine	Qualifying ion (acridine) is outside of the acceptance criteria. Results are tentatively identified and potentially biased high.	This deviation may represent a potential high bias for this parameter in this sample. There is no applicable guideline for acridine therefore indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the acridine data reported can be considered reliable.
		AZF958	PAH	Surrogate recovery for Terphenyl-D14 (134%) exceeded the acceptance criteria (50-130%) for batch A673482.	This surrogate is similar to the target PAH analytes of benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene, benzo(e)pyrene, benzo(c)phenanthrene and chrysene in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for these PAH parameters in these samples. There are no applicable guidelines for benzo(b&j)fluoranthene, benzo(e)pyrene or benzo(c)phenanthrene indicating that there will not be a material effect on the interpretation of the results of these three parameters. All results for benzo(a)anthracene, benzo(k)fluoranthene and chrysene were below the RDLs and regulatory guidelines for these parameters, indicating that there will not be a material effect on the interpretation of the results of these parameter. Under these circumstances, the data reported can be considered reliable.
		AZF959	PAH	Surrogate recovery for Terphenyl-D14 (136%) exceeded the acceptance criteria (50-130%) for batch A674718.	This surrogate is similar to the target PAH analytes of benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene, benzo(e)pyrene, benzo(c)phenanthrene and chrysene in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for these PAH parameters in these samples. There are no applicable guidelines for benzo(b&j)fluoranthene, benzo(e)pyrene, or benzo(c)phenanthrene indicating that there will not be a material effect on the interpretation of the results of these three parameters. All results for benzo(a)anthracene, benzo(k)fluoranthene and chrysene were below the RDLs and/or the regulatory guidelines for these parameters, indicating that there will not be a material effect on the interpretation of the results of these parameter. Under these circumstances, the data reported can be considered reliable.
		AZF954, AZF955, AZF956, AZF957 and AZF958	PAH	Matrix spike recovery for Terphenyl-D14 (134%) exceeded the acceptance criteria (50-130%) for batch A673482.	This surrogate is similar to the target PAH analytes of benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene, benzo(e)pyrene, benzo(c)phenanthrene and chrysene in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for these PAH parameters in these samples. There are no applicable guidelines for benzo(b&j)fluoranthene, benzo(e)pyrene, or benzo(c)phenanthrene indicating that there will not be a material effect on the interpretation of the results of these three parameters. All results for benzo(a)anthracene, benzo(k)fluoranthene and chrysene were below the RDLs and regulatory guidelines for these parameters, indicating that there will not be a material effect on the interpretation of the results of these parameter. Under these circumstances, the data reported can be considered reliable.
		AZF954, AZF955, AZF956, AZF957, AZF958, AZF960 and AZF961	F2	Matrix spike recovery for F2 (141%) exceeded the acceptance criteria of (60-140%) for batch A676506.	This data quality issue may represent a potential high bias for these samples. The F2 concentrations in these samples were below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the F2 data reported can be considered reliable.

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
BVL - Bureau Veritas Laboratories
F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, and 4
n/a - not applicable
PAH - polycyclic aromatic hydrocarbon
PHC - petroleum hydrocarbon
RDL - reportable detection limit
RPD - relative percent difference
SAR - sodium adsorption ratio

Table H1
Summary of Quality Control Sample Results
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
C259075	Soil	AZF959	F2	Matrix spike recovery for F2 (141%) exceeded the acceptance criteria of (60-140%) for batch A676506.	This data quality issue may represent a potential high bias for this sample. The F2 concentration in this sample was just above the regulatory guideline; however, a chromatogram analysis reported that the F2 concentration was likely biogenic in origin, therefore indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the F2 data reported can be considered reliable.
		AZF954, AZF955, AZF956 and AZF957	Chromium	Matrix spike recovery for Chromium (128%) exceeded the acceptance criteria of (75-125%) for batch A676884.	This data quality issue may represent a potential high bias for this parameter in these samples. Chromium concentrations in these samples were below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the chromium data reported can be considered reliable.
C259077	Soil	AZF970	F2	Matrix spike recovery for F2 (141%) exceeded the acceptance criteria of (60-140%) due to matrix interference.	This data quality issue may represent a potential high bias for this sample. The F2 concentration in the sample was below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the F2 data reported can be considered reliable.
C260012	Soil	AZM154	o-Xylene	Qualifying ion (o-Xylene) is outside of the acceptance criteria. Results are tentatively identified and potentially biased high.	This data quality issue may represent a potential high bias for this parameter in this sample. There is no applicable guideline for o-Xylene however total xylenes is the sum of m & p-Xylene and o-Xylene. The total xylenes result is below the regulatory guidelines, therefore indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the data reported can be considered reliable.
		AZM156	PHC	Surrogate recovery for o-terphenyl (141%) exceeded the acceptance criteria (60-140%) for batch A681385.	This surrogate is similar to the target analytes of PHC Fractions F2 to F4 in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for the PHC Fractions F2 to F4 in this sample. However, the results were below the RDL, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the data reported can be considered reliable.
		AZM157	Vanadium	Matrix spike recovery for vanadium (131%) exceeded the acceptance criteria of (75-125%) for batch A683223.	This data quality issue may represent a potential high bias for this parameter in this sample. The vanadium concentration in the sample was below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.
C260013	Soil	AZM164	PHC	Surrogate recovery for D10-o-Xylene (155%) exceeded the acceptance criteria (50-140%) for batch A680671.	The d10-o-xylene surrogate is similar to the target analytes of xylenes in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for xylenes in this sample. However, the results were below the RDL, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the data reported can be considered reliable.
		AZM161	Vanadium	Matrix spike recovery for vanadium (151%) exceeded the acceptance criteria of (75-125%) for batch A682439.	This data quality issue may represent a potential high bias for this parameter in this sample. The vanadium concentration in the sample was below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.
		AZM158, AZM159 and AZM160	Vanadium	Matrix spike recovery for vanadium (131%) exceeded the acceptance criteria of (75-125%) for batch A683223.	This data quality issue may represent a potential high bias for this parameter in this sample. Vanadium concentrations in the samples were below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.

Notes:

BTEX - benzene, toluene, ethylbenzene, xylenes
BVL - Bureau Veritas Laboratories
F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, and 4
n/a - not applicable
PAH - polycyclic aromatic hydrocarbon
PHC - petroleum hydrocarbon
RDL - reportable detection limit
RPD - relative percent difference
SAR - sodium adsorption ratio

Table H1
Summary of Quality Control Sample Results
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
C260016	Soil	AZM180	Vanadium	Matrix spike recovery for vanadium (136%) exceeded the acceptance criteria of (75-125%) due to matrix interference.	This data quality issue may represent a potential high bias for this parameter in this sample. The vanadium concentration in the sample was below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.
		AZM179	Vanadium	Matrix spike recovery for vanadium (151%) exceeded the acceptance criteria of (75-125%) for batch A682439.	This data quality issue may represent a potential high bias for this parameter in this sample. The vanadium concentration in the sample was below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.
		AZM182	Vanadium	Matrix spike recovery for vanadium (140%) exceeded the acceptance criteria of (75-125%) for batch A682611.	This data quality issue may represent a potential high bias for this parameter in this sample. The vanadium concentration in the sample was below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.
		AZM183	Naphthalene	Qualifying ion (Naphthalene) is outside of the acceptance criteria. Results are tentatively identified and potentially biased high.	This data quality issue may represent a potential high bias for this parameter in this sample. The naphthalene concentration in the sample was below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the Naphthalene data reported can be considered reliable.
C260023	Soil	AZM222, AZM226 and AZM227	Vanadium	Matrix spike recovery for vanadium (131%) exceeded the acceptance criteria of (75-125%) for batch A683223.	This data quality issue may represent a potential high bias for this parameter in this sample. Vanadium concentrations in the samples were below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.
C260026	Soil	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C260028	Soil	AZM251	o-Xylene	Qualifying ion (o-Xylene) is outside of the acceptance criteria. Results are tentatively identified and potentially biased high.	This data quality issue may represent a potential high bias for this parameter in this sample. There is no applicable guideline for o-Xylene however total xylenes is the sum of m & p-Xylene and o-Xylene. The total xylenes result is below the regulatory guidelines, therefore indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the data reported can be considered reliable.
		AZM252	Vanadium	Matrix spike recovery for vanadium (140%) exceeded the acceptance criteria of (75-125%) for batch A682611.	This data quality issue may represent a potential high bias for this parameter in this sample. The vanadium concentration in the sample was below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.
		AZM253, AZM254 and AZM255	Vanadium	Matrix spike recovery for vanadium (131%) exceeded the acceptance criteria of (75-125%) for batch A683223.	This data quality issue may represent a potential high bias for this parameter in this sample. Vanadium concentrations in the samples were below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.
C260029	Soil	n/a	n/a	No data quality issues were identified.	The data are considered reliable.

Notes:

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n/a - not applicable
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PHC - petroleum hydrocarbon
RDL - reportable detection limit
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Table H1
Summary of Quality Control Sample Results
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
C260031	Soil	AZM277, AZM278, AZM279, AZM280, AZM282, AZM283 and AZM285	Vanadium	Matrix spike recovery for vanadium (140%) exceeded the acceptance criteria of (75-125%) for batch A682611.	This data quality issue may represent a potential high bias for this parameter in this sample. Vanadium concentrations in the samples were below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.
		AZM281 and AZM284	Vanadium	Matrix spike recovery for vanadium (131%) exceeded the acceptance criteria of (75-125%) for batch A683223.	This data quality issue may represent a potential high bias for this parameter in this sample. Vanadium concentrations in the samples were below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.
		AZM278 and AZM277	Barium and Chromium	Field duplicate samples BH22-20-04 and DUP E exceed the alert limits for barium (88%) and chromium (83%).	This data quality issue may potentially result in significantly different results for this parameter being reported at the same soil sample location, increasing the uncertainty associated with these results. A quality check of the data yielded similar results. The barium and chromium concentrations in both the sample and the field duplicate were below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the barium and chromium data reported can be considered reliable.
C262019	Soil	AZY122	Vanadium	Matrix spike recovery for vanadium (155%) exceeded the acceptance criteria of (75-125%) due to matrix interference.	This data quality issue may represent a potential high bias for this parameter in this sample. The vanadium concentration in the sample was below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.
		AZY121	PAH	Surrogate recovery for terphenyl-d14 (137%) exceeded the acceptance criteria (50-130%) for batch A692779.	This surrogate is similar to the target PAH analytes of benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene, benzo(e)pyrene, benzo(c)phenanthrene and chrysene in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for these PAH parameters in these samples. There are no applicable guidelines for benzo(b&j)fluoranthene, benzo(e)pyrene, or benzo(c)phenanthrene indicating that there will not be a material effect on the interpretation of the results of these three parameters. All results for benzo(a)anthracene, benzo(k)fluoranthene and chrysene were below the RDLs and regulatory guidelines for these parameters, indicating that there will not be a material effect on the interpretation of the results of these parameter. Under these circumstances, the data reported can be considered reliable.
		AZY121, AZY122, AZY123 and AZY124	PAH	Method blank recovery for terphenyl-d14 (138%) exceeded the acceptance criteria (50-130%) for batch A692779.	This surrogate is similar to the target PAH analytes of benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene, benzo(e)pyrene, benzo(c)phenanthrene and chrysene in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for these PAH parameters in these samples. There are no applicable guidelines for benzo(b&j)fluoranthene, benzo(e)pyrene, or benzo(c)phenanthrene indicating that there will not be a material effect on the interpretation of the results of these three parameters. All results for benzo(a)anthracene, benzo(k)fluoranthene and chrysene were below the RDLs and/or regulatory guidelines for these parameters, indicating that there will not be a material effect on the interpretation of the results of these parameter. Under these circumstances, the data reported can be considered reliable.

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Table H1
Summary of Quality Control Sample Results
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
C262020	Soil	AZY128, AZY129, AZY130, AZY131, AZY132 and AZY133	1-Methylnaphthalene and 2-Methylnaphthalene	Laboratory duplicate RPD for 1-Methylnaphthalene (54%) and 2-Methylnaphthalene (61%) exceed the acceptance criteria (50%) for batch A686416.	This may increase the uncertainty associated with these results. There is no applicable guideline for 1-Methylnaphthalene and 2-Methylnaphthalene therefore indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the 1-Methylnaphthalene and 2-Methylnaphthalene data reported can be considered reliable.
		AZY128, AZY129, AZY131, AZY132 and AZY133	Naphthalene	Laboratory duplicate RPD for naphthalene (51%) exceed the acceptance criteria (50%) for batch A686416.	This may increase the uncertainty associated with these results. The naphthalene concentrations were below the regulatory guideline in these samples, indicating that the data quality issue will not have a material effect on the interpretation of the results for this parameter. Under these circumstances, the naphthalene data reported can be considered reliable.
		AZY130	Naphthalene	Laboratory duplicate RPD for naphthalene (51%) exceed the acceptance criteria (50%) for batch A686416.	This may increase the uncertainty associated with these results. The naphthalene concentration was >5 times the RDL. Under these circumstances, the data can be considered reliable.
		AZY128, AZY129, AZY130, AZY131, AZY132, AZY133, AZY134, AZY135, AZY136 and AZY137	F3	Laboratory duplicate RPD for F3 (42%) exceed the acceptance criteria (40%) for batch A687951.	This may increase the uncertainty associated with these results. The F3 concentrations were below the regulatory guidelines in these samples, indicating that the data quality issue will not have a material effect on the interpretation of the results for this parameter. Under these circumstances, the F3 data reported can be considered reliable.
		AZY130 and AZY131	1-Methylnaphthalene and 2-Methylnaphthalene	Field duplicate samples MW22-22-03 and DUP K exceed the alert limits (100%) for 1-Methylnaphthalene (120%) and 2-Methylnaphthalene (119%).	This data quality issue may potentially result in significantly different results for this parameter being reported at the same soil sample location, increasing the uncertainty associated with these results. There are no guidelines for 1-methylnaphthalene and 2-methylnaphthalene, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the 1-methylnaphthalene and 2-methylnaphthalene data reported can be considered reliable.
			Naphthalene	Field duplicate samples MW22-23-02 and DUP K exceed the alert limit (100%) for naphthalene (111%).	This data quality issue may potentially result in significantly different results for this parameter being reported at the same soil sample location, increasing the uncertainty associated with these results. The naphthalene concentration observed in the parent sample exceeded the regulatory guideline, while the field duplicate result met the guideline. However, the naphthalene concentrations in both the parent and field duplicate samples were >5 times the RDL. Under these circumstances, the naphthalene data can be considered reliable. As a conservative measure, it has been interpreted that naphthalene for this sample exceeds the regulatory guideline.
		AZY128, AZY129, AZY130, AZY132, AZY133 and AZY137	Vanadium	Matrix spike recovery for vanadium (129%) exceeded the acceptance criteria of (75-125%) for batch A696156.	This data quality issue may represent a potential high bias for this parameter in these samples. The vanadium concentrations in the samples were below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.

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Table H1
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Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
C262029	Soil	AZY173	F3	Laboratory duplicate RPD for F3 (42%) exceeded the acceptance criteria of (40%) due to sample non homogeneity.	This may increase the uncertainty associated with these results. The F3 concentration in this sample was just above the regulatory guideline, however a chromatogram analysis reported that the F3 concentration was likely biogenic in origin, therefore indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the F2 data reported can be considered reliable.
		AZY176 and AZY177	F2 and F3	Field duplicate samples BH22-49-01 and DUP M exceed the alert limits for F2 (132%) and F3 (103%).	This data quality issue may potentially result in significantly different results for this parameter being reported at the same soil sample location, increasing the uncertainty associated with these results. A quality check of the data yielded similar results. The F2 and F3 concentrations in both the sample and the field duplicate were above the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the F2 and F3 data reported can be considered reliable.
			F4	Field duplicate samples BH22-49-01 and DUP M exceed the alert limit for F4 (84%).	This data quality issue may potentially result in significantly different results for this parameter being reported at the same soil sample location, increasing the uncertainty associated with these results. A quality check of the data yielded similar results. The F4 concentrations in both the sample and the field duplicate were below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the F4 data reported can be considered reliable.
C262079	Soil	AZY350	Dibenzo(a,h)anthracene	Qualifying ion (Dibenzo(a,h)anthracene) is outside of the acceptance criteria. Results are tentatively identified and potentially biased high.	This deviation may represent a potential high bias for this parameter in this sample. The dibenzo(a,h)anthracene concentration in the sample was below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the dibenzo(a,h)anthracene data reported can be considered reliable.
		AZY350 and AZY351	Soluble Calcium	Laboratory duplicate RPD for soluble calcium (66%) exceed the acceptance criteria (30%) for batch A692713.	This may increase the uncertainty associated with these results. There is no applicable guideline for soluble calcium, however this parameters is used in the calculation of SAR which does have a regulatory guideline. The SAR results for both of these samples was below the regulatory guideline value, therefore indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the soluble calcium data reported can be considered reliable.
C262125	Surface Water	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C264060	Groundwater	BAK847 and BAK848	Nitrate plus Nitrite	Matrix spike recovery for nitrate plus nitrite (123%) exceeded the acceptance criteria (80-120%) for batch A696225.	This data quality issue may represent a potential high bias for this parameter in these samples. There is no applicable guideline for nitrate plus nitrite, therefore indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the nitrate plus nitrite data reported can be considered reliable.
		BAK847 and BAK848	Nitrite (as nitrogen) and Nitrite plus Nitrate (as nitrogen)	Sample was analyzed past method specified hold time for nitrite (as nitrogen) and nitrite plus nitrate (as nitrogen)	This may increase the uncertainty of test results but does not necessarily imply that results are compromised. The data are considered reliable.

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Table H1
Summary of Quality Control Sample Results
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
C264060	Groundwater	BAK847 and BAK848	PAH	Surrogate recovery for terphenyl-d14 (154%,151% and 156%) exceeded the acceptance criteria (50-130%) for batch A695930, which included a laboratory duplicate.	This surrogate is similar to the target PAH analytes of benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene, benzo(e)pyrene, benzo(c)phenanthrene and chrysene in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for these PAH parameters in these samples. There are no applicable guidelines for benzo(e)pyrene or benzo(c)phenanthrene indicating that there will not be a material effect on the interpretation of the results of these three parameters. All results for benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene and chrysene were below the RDLs and regulatory guidelines for these parameters, indicating that there will not be a material effect on the interpretation of the results of these parameter. Under these circumstances, the data reported can be considered reliable.
				Spiked blank recovery for terphenyl-d14 (144%) exceeded the acceptance criteria (50-130%) for batch A695930.	This surrogate is similar to the target PAH analytes of benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene, benzo(e)pyrene, benzo(c)phenanthrene and chrysene in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for these PAH parameters in these samples. There are no applicable guidelines for benzo(e)pyrene or benzo(c)phenanthrene indicating that there will not be a material effect on the interpretation of the results of these three parameters. All results for benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene and chrysene were below the RDLs and regulatory guidelines for these parameters, indicating that there will not be a material effect on the interpretation of the results of these parameter. Under these circumstances, the data reported can be considered reliable.
				Method blank recovery for terphenyl-d14 (154%) exceeded the acceptance criteria (50-130%) for batch A695930.	This surrogate is similar to the target PAH analytes of benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene, benzo(e)pyrene, benzo(c)phenanthrene and chrysene in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for these PAH parameters in these samples. There are no applicable guidelines for benzo(e)pyrene or benzo(c)phenanthrene indicating that there will not be a material effect on the interpretation of the results of these three parameters. All results for benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene and chrysene were below the RDLs and regulatory guidelines for these parameters, indicating that there will not be a material effect on the interpretation of the results of these parameter. Under these circumstances, the data reported can be considered reliable.

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Table H1
Summary of Quality Control Sample Results
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
C264060	Surface Water	BAK849	PAH	Surrogate recovery for terphenyl-d14 (153%) exceeded the acceptance criteria (50-130%) for batch A695930.	This surrogate is similar to the target PAH analytes of benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene, benzo(e)pyrene, benzo(c)phenanthrene and chrysene in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for these PAH parameters in these samples. There are no applicable guidelines for benzo(e)pyrene or benzo(c)phenanthrene indicating that there will not be a material effect on the interpretation of the results of these three parameters. All results for benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene and chrysene were below the RDLs and regulatory guidelines for these parameters, indicating that there will not be a material effect on the interpretation of the results of these parameter. Under these circumstances, the data reported can be considered reliable.
				Spiked blank recovery for terphenyl-d14 (144%) exceeded the acceptance criteria (50-130%) for batch A695930.	This surrogate is similar to the target PAH analytes of benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene, benzo(e)pyrene, benzo(c)phenanthrene and chrysene in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for these PAH parameters in these samples. There are no applicable guidelines for benzo(e)pyrene or benzo(c)phenanthrene indicating that there will not be a material effect on the interpretation of the results of these three parameters. All results for benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene and chrysene were below the RDLs and regulatory guidelines for these parameters, indicating that there will not be a material effect on the interpretation of the results of these parameter. Under these circumstances, the data reported can be considered reliable.
				Method blank recovery for terphenyl-d14 (154%) exceeded the acceptance criteria (50-130%) for batch A695930.	This surrogate is similar to the target PAH analytes of benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene, benzo(e)pyrene, benzo(c)phenanthrene and chrysene in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for these PAH parameters in these samples. There are no applicable guidelines for benzo(e)pyrene or benzo(c)phenanthrene indicating that there will not be a material effect on the interpretation of the results of these three parameters. All results for benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene and chrysene were below the RDLs and regulatory guidelines for these parameters, indicating that there will not be a material effect on the interpretation of the results of these parameter. Under these circumstances, the data reported can be considered reliable.
C264062	Soil	BAK857, BAK858, BAK859 and BAK860	Acridine	Matrix spike recovery for acridine (37%) below the acceptance criteria of (50-130%) for batch A697044.	This data quality issue may represent a potential low bias for this parameter in this sample. There is no applicable guideline for acridine therefore indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the acridine data reported can be considered reliable.

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Table H1
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Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
C264065	Soil	BAK866	Acridine	Matrix spike recovery for acridine (37%) below the acceptance criteria of (50-130%) due to matrix interference.	This data quality issue may represent a potential low bias for this parameter in this sample. There is no applicable guideline for acridine, therefore indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the acridine data reported can be considered reliable.
		BAK864 and BAK866	Vanadium	Matrix spike recovery for vanadium (134%) exceeded the acceptance criteria of (75-125%) for batch A703446.	This data quality issue may represent a potential high bias for this parameter these samples. The vanadium concentrations in the samples were below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vanadium data reported can be considered reliable.
			Chromium	Laboratory duplicate RPD for chromium (41%) exceeded the acceptance criteria of (30%) for batch A703446.	This may increase the uncertainty associated with these results. The chromium concentrations in the samples were below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the chromium data reported can be considered reliable.
C266062	Soil	BAW660, BAW661, BAW662, BAW663 and BAW664	PAH	Method blank recovery for terphenyl-d14 (133%) exceeded the acceptance criteria of (50-130%) for batch A707845.	This surrogate is similar to the target PAH analytes of benzo(a)anthracene, benzo(b&j)fluoranthene, benzo(k)fluoranthene, benzo(e)pyrene, benzo(c)phenanthrene and chrysene in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for these PAH parameters in these samples. These samples were not assessed for these parameters, indicating that there will not be a material effect on the interpretation of the results of these parameter. Under these circumstances, the data reported can be considered reliable.
C266076	Soil	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C266077	Soil	BAW750	F3	Matrix spike recovery for F3 (23%) below the acceptance criteria of (60-140%) due to matrix interference.	This data quality issue may represent a potential low bias for this parameter in this sample. The F3 concentration in the sample was above the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the F3 data reported can be considered reliable.
			F4	Matrix spike recovery for F4 (59%) below the acceptance criteria of (60-140%) due to matrix interference.	This data quality issue may represent a potential low bias for this parameter in this sample. The F4 concentration in the sample was more than eight times lower below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the F4 data reported can be considered reliable.
C266081	Soil	BAW780, BAW781, BAW782, BAW783, BAW784, BAW785 and BAW786	PHC	Matrix spike recovery for D10-o-Xylene (142%) exceeded the acceptance criteria of (50-140%) for batch A703344.	The d10-o-xylene surrogate is similar to the target analytes of xylenes in chemical composition and behaviour in the analytical process, but is not normally found in environmental samples. This data quality issue may represent a potential high bias for xylenes in this sample. However, since the results were below the reportable detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the data reported can be considered reliable.

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Table H2
Summary of Field Duplicate Sample Results - Soil Petroleum Hydrocarbons
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

Sample Location	Units	Alert Limit	RDL	BH22-41-01	DUP A	RPD %	BH22-01-01	DUP B	RPD %	BH22-27-05	DUP C	RPD %
Sample Depth (mbgs)				0.00 - 0.46	0.00 - 0.46		0.0 - 0.42	0.0 - 0.42		1.50 - 1.90	1.50 - 1.90	
Sample Collection Date				6-Aug-2022	6-Aug-2022		7-Aug-2022	7-Aug-2022		8-Aug-2022	8-Aug-2022	
BVL Sample ID				AZF960	AZF961		AZF963	AZF964		AZM162	AZM163	
Benzene	mg/kg	>100%	0.005	<0.016	<0.013	n/c	<0.028	<0.028	n/c	<0.0050	<0.0050	n/c
Toluene	mg/kg	>100%	0.05	<0.050	<0.050	n/c	<0.050	<0.050	n/c	<0.050	<0.050	n/c
Ethylbenzene	mg/kg	>100%	0.01	<0.031	<0.026	n/c	<0.056	<0.057	n/c	<0.010	<0.010	n/c
Xylenes (Total)	mg/kg	>100%	0.045	<0.14	<0.12	n/c	<0.25	<0.25	n/c	<0.045	<0.045	n/c
F1 (C_6-C_{10}) - BTEX	mg/kg	>60%	10	<24	<24	n/c	<35	<36	n/c	<10	<10	n/c
F2 (C_{10}-C_{16})	mg/kg	>60%	10	<21	29	n/c	<31	<33	n/c	22	25	n/c
F3 (C_{16}-C_{34})	mg/kg	>60%	50	360	410	n/c	290	310	n/c	88	140	n/c
F4 (C_{34}-C_{50})	mg/kg	>60%	50	120	93	n/c	<150	<170	n/c	<50	54	n/c

Sample Location	Units	Alert Limit	RDL	BH22-24-07	DUP D	RPD %	BH22-20-04	DUP E	RPD %	BH22-40-03	DUP G	RPD %
Sample Depth (mbgs)				2.50 - 3.15	2.50 - 3.15		1.50 - 1.70	1.50 - 1.70		1.00 - 1.50	1.00 - 1.50	
Sample Collection Date				8-Aug-2022	8-Aug-2022		8-Aug-2022	8-Aug-2022		9-Aug-2022	9-Aug-2022	
BVL Sample ID				AZM226	AZM227		AZM278	AZM277		AZM249	AZM251	
Benzene	mg/kg	>100%	0.005	<0.0090	<0.010	n/c	<0.0050	<0.0050	n/c	0.016	0.022	n/c
Toluene	mg/kg	>100%	0.05	<0.050	<0.050	n/c	<0.050	<0.050	n/c	<0.050	<0.050	n/c
Ethylbenzene	mg/kg	>100%	0.01	<0.014	<0.015	n/c	<0.010	<0.010	n/c	0.025	0.02	n/c
Xylenes (Total)	mg/kg	>100%	0.045	<0.092	<0.10	n/c	<0.045	<0.045	n/c	<0.045	<0.045	n/c
F1 (C_6-C_{10}) - BTEX	mg/kg	>60%	10	<21	<23	n/c	<10	<10	n/c	<10	<10	n/c
F2 (C_{10}-C_{16})	mg/kg	>60%	10	<10	<10	n/c	100	41	n/c	<10	<10	n/c
F3 (C_{16}-C_{34})	mg/kg	>60%	50	<50	<50	n/c	130	81	n/c	<50	<50	n/c
F4 (C_{34}-C_{50})	mg/kg	>60%	50	<50	<50	n/c	<50	<50	n/c	<50	<50	n/c

Notes:

Bold/Underlined - RPD exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table H2
Summary of Field Duplicate Sample Results - Soil Petroleum Hydrocarbons
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

Sample Location	Units	Alert Limit	RDL	BH22-29-02	DUP J	RPD %	MW22-22-03	DUP K	RPD %	BH22-15-03	DUP L	RPD %
Sample Depth (mbgs)				0.15 - 0.80	0.15 - 0.80		1.50 - 2.00	1.50 - 2.00		0.70 - 1.10	0.70 - 1.10	
Sample Collection Date				9-Aug-2022	9-Aug-2022		12-Aug-2022	12-Aug-2022		12-Aug-2022	12-Aug-2022	
BVL Sample ID				AZM177	AZM176		AZY130	AZY131		AZY354	AZY355	
Benzene	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c	2.3	1.7	30	<0.0050	<0.0050	n/c
Toluene	mg/kg	>100%	0.05	<0.050	<0.050	n/c	<0.050	<0.050	n/c	<0.050	<0.050	n/c
Ethylbenzene	mg/kg	>100%	0.01	<0.010	<0.010	n/c	0.022	<0.010	n/c	<0.010	<0.010	n/c
Xylenes (Total)	mg/kg	>100%	0.045	<0.045	<0.045	n/c	<0.045	<0.045	n/c	<0.045	<0.045	n/c
F1 (C_6-C_{10}) - BTEX	mg/kg	>60%	10	<10	<10	n/c	<10	<10	n/c	<10	<10	n/c
F2 (C_{10}-C_{16})	mg/kg	>60%	10	<10	<10	n/c	91	31	n/c	<10	<10	n/c
F3 (C_{16}-C_{34})	mg/kg	>60%	50	<50	100	n/c	130	84	n/c	<50	<50	n/c
F4 (C_{34}-C_{50})	mg/kg	>60%	50	<50	<50	n/c	<50	<50	n/c	<50	<50	n/c

Sample Location	Units	Alert Limit	RDL	BH22-49-01	DUP M	RPD %	MW22-23-02	DUP N	RPD %
Sample Depth (mbgs)				0.00 - 0.50	0.00 - 0.50		1.50 - 2.40	1.50 - 2.40	
Sample Collection Date				13-Aug-2022	13-Aug-2022		13-Aug-2022	13-Aug-2022	
BVL Sample ID				AZY176	AZY177		AZY122	AZY123	
Benzene	mg/kg	>100%	0.005	<0.023	0.06	n/c	<0.0050	<0.0050	n/c
Toluene	mg/kg	>100%	0.05	0.36	48	n/c	<0.050	<0.050	n/c
Ethylbenzene	mg/kg	>100%	0.01	<0.047	0.27	n/c	<0.010	<0.010	n/c
Xylenes (Total)	mg/kg	>100%	0.045	<0.21	1.2	n/c	<0.045	<0.045	n/c
F1 (C_6-C_{10}) - BTEX	mg/kg	>60%	10	<24	<44	n/c	<10	<10	n/c
F2 (C_{10}-C_{16})	mg/kg	>60%	10	930	190	**132**	<10	<10	n/c
F3 (C_{16}-C_{34})	mg/kg	>60%	50	8,700	2,800	**103**	100	87	n/c
F4 (C_{34}-C_{50})	mg/kg	>60%	50	2,700	1,100	**84**	<50	<50	n/c
F4G-SG (Heavy Hydrocarbons-Grav.)	mg/kg	>60%	1,400	16,000	5,000	n/c	-	-	-

Notes:
Bold/Underlined - RPD exceeds alert limit
BTEX - benzene, toluene, ethylbenzene, xylenes
BVL - Bureau Veritas Laboratories
F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4
mbgs - metres below ground surface
mg/kg - milligrams per kilogram
n/c - not calculated
RDL - reportable detection limit
RPD - relative percent difference
> - greater than
< - less than
- not available
RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table H3
Summary of Field Duplicate Sample Results - Soil Polycyclic Aromatic Hydrocarbons
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

Sample Location	Units	Alert Limit	RDL	BH22-24-07	DUP D	RPD %	MW22-22-03	DUP K	RPD %
Sample Depth (mbgs)				2.50 - 3.15	2.50 - 3.15		1.50 - 2.00	1.50 - 2.00	
Sample Collection Date				8-Aug-2022	8-Aug-2022		12-Aug-22	12-Aug-22	
BVL Sample ID				AZM226	AZM227		AZY130	AZY131	
Acenaphthene	mg/kg	>100%	0.005	-	-	-	0.012	<0.0050	n/c
Acenaphthylene	mg/kg	>100%	0.005	-	-	-	0.0072	<0.0050	n/c
Acridine	mg/kg	>100%	0.01	-	-	-	<0.010	<0.010	n/c
Anthracene	mg/kg	>100%	0.004	-	-	-	<0.0040	<0.0040	n/c
Benzo(a)anthracene	mg/kg	>100%	0.005	-	-	-	<0.0050	<0.0050	n/c
Benzo(b&j)fluoranthene	mg/kg	>100%	0.005	-	-	-	0.02	0.018	n/c
Benzo(k)fluoranthene	mg/kg	>100%	0.005	-	-	-	<0.0050	<0.0050	n/c
Benzo(g,h,i)perylene	mg/kg	>100%	0.005	-	-	-	0.028	0.026	7
Benzo(c)phenanthrene	mg/kg	>100%	0.005	-	-	-	<0.0050	<0.0050	n/c
B(a)P	mg/kg	>100%	0.005	-	-	-	<0.0050	<0.0050	n/c
Benzo[e]pyrene	mg/kg	>100%	0.005	-	-	-	0.026	0.025	4
Chrysene	mg/kg	>100%	0.005	-	-	-	0.01	0.012	n/c
Dibenz(a,h)anthracene	mg/kg	>100%	0.005	-	-	-	<0.0050	<0.0050	n/c
Fluoranthene	mg/kg	>100%	0.005	-	-	-	0.0081	0.0082	n/c
Fluorene	mg/kg	>100%	0.005	-	-	-	0.021	0.0086	n/c
Indeno(1,2,3-cd)pyrene	mg/kg	>100%	0.005	-	-	-	<0.0050	<0.0050	n/c
1-Methylnaphthalene	mg/kg	>100%	0.005	-	-	-	0.88	0.22	**120**
2-Methylnaphthalene	mg/kg	>100%	0.005	-	-	-	1.3	0.33	**119**
Naphthalene	mg/kg	>100%	0.05	<0.0050	<0.0050	n/c	1.3	0.37	**111**
Phenanthrene	mg/kg	>100%	0.005	-	-	-	0.038	0.036	5
Perylene	mg/kg	>100%	0.005	-	-	-	0.067	0.069	3
Pyrene	mg/kg	>100%	0.005	-	-	-	0.016	0.015	n/c
Quinoline	mg/kg	>100%	0.01	-	-	-	<0.010	<0.010	n/c
B(a)P TPE	mg/kg	>100%	0.0071	<0.0071	<0.0071	n/c	0.008	0.008	n/c

Notes:
Bold/Underlined - RPD exceeds alert limit
B(a)P - benzo(a)pyrene
BVL - Bureau Veritas Laboratories
mbgs - metres below ground surface
mg/kg - milligrams per kilogram
n/c - not calculated
RDL - reportable detection limit
RPD - relative percent difference
TPE - total potency equivalents
> - greater than
< - less than
- not available
RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table H3
Summary of Field Duplicate Sample Results - Soil Polycyclic Aromatic Hydrocarbons
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

Sample Location	Units	Alert Limit	RDL	MW22-23-02	DUP N	RPD %
Sample Depth (mbgs)				1.50 - 2.40	1.50 - 2.40	
Sample Collection Date				13-Aug-2022	13-Aug-2022	
BVL Sample ID				AZY122	AZY123	
Acenaphthene	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c
Acenaphthylene	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c
Acridine	mg/kg	>100%	0.01	<0.010	<0.010	n/c
Anthracene	mg/kg	>100%	0.004	<0.0040	<0.0040	n/c
Benzo(a)anthracene	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c
Benzo(b&j)fluoranthene	mg/kg	>100%	0.005	0.0061	<0.0050	n/c
Benzo(k)fluoranthene	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c
Benzo(g,h,i)perylene	mg/kg	>100%	0.005	0.0081	<0.0050	n/c
Benzo(c)phenanthrene	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c
B(a)P	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c
Benzo[e]pyrene	mg/kg	>100%	0.005	0.0067	<0.0050	n/c
Chrysene	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c
Dibenz(a,h)anthracene	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c
Fluoranthene	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c
Fluorene	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c
Indeno(1,2,3-cd)pyrene	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c
1-Methylnaphthalene	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c
2-Methylnaphthalene	mg/kg	>100%	0.005	0.0063	<0.0050	n/c
Naphthalene	mg/kg	>100%	0.05	<0.0050	<0.0050	n/c
Phenanthrene	mg/kg	>100%	0.005	0.0087	0.0063	n/c
Perylene	mg/kg	>100%	0.005	0.028	0.023	n/c
Pyrene	mg/kg	>100%	0.005	<0.0050	<0.0050	n/c
Quinoline	mg/kg	>100%	0.01	<0.010	<0.010	n/c
B(a)P TPE	mg/kg	>100%	0.0071	<0.0071	<0.0071	n/c

Notes:
Bold/Underlined - RPD exceeds alert limit
B(a)P - benzo(a)pyrene
BVL - Bureau Veritas Laboratories
mbgs - metres below ground surface
mg/kg - milligrams per kilogram
n/c - not calculated
RDL - reportable detection limit
RPD - relative percent difference
TPE - total potency equivalents
> - greater than
< - less than
- not available
RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table H4
Summary of Field Duplicate Sample Results - Soil Salinity
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

Sample Location	Units	Alert Limit	RDL	MW22-23-02	DUP N	RPD %
Sample Depth (mbgs)				1.50 - 2.40	1.50 - 2.40	
Sample Collection Date				13-Aug-2022	13-Aug-2022	
BVL Sample ID				AZY122	AZY123	
pH	pH units	+ or - 0.6	n/a	7.57	7.64	1
Soluble Conductivity	dS/m	>40%	0.02	0.69	0.7	1
Sodium Adsorption Ratio	n/a	>100%	0.1	2.8	2.5	11
Calcium (Ca)	mg/kg	>60%	0.49	19	19	0
Chloride (Cl)	mg/kg	>60%	1.6	13	13	0
Magnesium (Mg)	mg/kg	>60%	0.33	3.9	4.2	7
Sodium (Na)	mg/kg	>80%	0.82	17	17	0
Potassium (K)	mg/kg	>80%	0.43	2.8	2.8	0
Sulphate (SO_4)	mg/kg	>60%	1.6	32	32	0

Notes:

Bold/Underlined - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

dS/m - deciSiemens per metre

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/a - not applicable

RDL - reportable detection limit

RPD - relative percent difference

> - greater than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table H5
Summary of Field Duplicate Sample Results - Soil Metals
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

Sample Location	Units	Alert Limit	RDL	BH22-24-07	DUP D	RPD %	BH22-20-04	DUP E	RPD %
Sample Depth (mbgs)				2.50 - 3.15	2.50 - 3.15		1.50 - 1.70	1.50 - 1.70	
Sample Collection Date				8-Aug-2022	8-Aug-2022		08-Aug-22	08-Aug-22	
BVL Sample ID				AZM226	AZM227		AZM278	AZM277	
Antimony (Sb)	mg/kg	>60%	0.5	<0.50	<0.50	n/c	<0.50	<0.50	n/c
Arsenic (As)	mg/kg	>60%	1	3.9	3.9	n/c	6.8	7.3	7
Barium (Ba)	mg/kg	>80%	1	89	100	12	140	360	**88**
Beryllium (Be)	mg/kg	>60%	0.4	<0.40	<0.40	n/c	<0.40	<0.40	n/c
Boron (B) (Hot Water Soluble)	mg/kg	>80%	0.1	<0.10	<0.10	n/c	<0.10	0.2	n/c
Cadmium (Cd)	mg/kg	>60%	0.05	0.068	0.073	n/c	0.1	0.12	n/c
Chromium, Hexavalent (Cr 6+)	mg/kg	>70%	0.08	<0.080	<0.080	n/c	8.7	21	**83**
Total Chromium (Cr)	mg/kg	>70%	1	15	17	13	<0.080	<0.080	n/c
Cobalt (Co)	mg/kg	>60%	0.5	2.8	2.9	4	4.8	4.7	2
Copper (Cu)	mg/kg	>60%	1	3.3	3.4	n/c	5.6	7.9	34
Lead (Pb)	mg/kg	>80%	0.5	3.1	3.8	20	4.2	7.8	60
Mercury (Hg)	mg/kg	>80%	0.05	<0.050	<0.050	n/c	<0.050	<0.050	n/c
Molybdenum (Mo)	mg/kg	>80%	0.4	0.61	0.6	n/c	0.93	1.7	n/c
Nickel (Ni)	mg/kg	>60%	1	7.5	8.1	8	13	17	27
Selenium (Se)	mg/kg	>60%	0.5	<0.50	<0.50	n/c	<0.50	<0.50	n/c
Silver (Ag)	mg/kg	>80%	0.2	<0.20	<0.20	n/c	<0.20	<0.20	n/c
Thallium (Tl)	mg/kg	>60%	0.1	<0.10	<0.10	n/c	<0.10	<0.10	n/c
Tin (Sn)	mg/kg	>80%	1	<1.0	<1.0	n/c	<1.0	<1.0	n/c
Uranium (U)	mg/kg	>60%	0.2	0.33	0.34	n/c	0.51	0.69	n/c
Vanadium (V)	mg/kg	>60%	1	9.1	9.1	0	17	18	6
Zinc (Zn)	mg/kg	>60%	10	19	19	n/c	32	32	n/c

Notes:

Bold/Underlined - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

> - greater than

< - less than

- not available

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table H5
Summary of Field Duplicate Sample Results - Soil Metals
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

Sample Location	Units	Alert Limit	RDL	BH22-32-03	DUP F	RPD %	BH22-39-02	DUP H	RPD %
Sample Depth (mbgs)				1.00 - 1.50	1.00 - 1.50		0.20 - 0.80	0.20 - 0.80	
Sample Collection Date				8-Aug-2022	8-Aug-2022		09-Aug-22	09-Aug-22	
BVL Sample ID				AZM243	AZM244		AZM268	AZM269	
Antimony (Sb)	mg/kg	>60%	0.5	-	-	-	-	-	-
Arsenic (As)	mg/kg	>60%	1	-	-	-	-	-	-
Barium (Ba)	mg/kg	>80%	1	-	-	-	-	-	-
Beryllium (Be)	mg/kg	>60%	0.4	-	-	-	-	-	-
Boron (B) (Hot Water Soluble)	mg/kg	>80%	0.1	-	-	-	-	-	-
Cadmium (Cd)	mg/kg	>60%	0.05	-	-	-	-	-	-
Chromium, Hexavalent (Cr 6+)	mg/kg	>70%	0.08	-	-	-	-	-	-
Total Chromium (Cr)	mg/kg	>70%	1	6.9	8.9	25	7	5	32
Cobalt (Co)	mg/kg	>60%	0.5	-	-	-	-	-	-
Copper (Cu)	mg/kg	>60%	1	-	-	-	-	-	-
Lead (Pb)	mg/kg	>80%	0.5	-	-	-	-	-	-
Mercury (Hg)	mg/kg	>80%	0.05	-	-	-	-	-	-
Molybdenum (Mo)	mg/kg	>80%	0.4	-	-	-	-	-	-
Nickel (Ni)	mg/kg	>60%	1	8.8	8.3	6	-	-	-
Selenium (Se)	mg/kg	>60%	0.5	-	-	-	-	-	-
Silver (Ag)	mg/kg	>80%	0.2	-	-	-	-	-	-
Thallium (Tl)	mg/kg	>60%	0.1	-	-	-	-	-	-
Tin (Sn)	mg/kg	>80%	1	-	-	-	-	-	-
Uranium (U)	mg/kg	>60%	0.2	-	-	-	-	-	-
Vanadium (V)	mg/kg	>60%	1	-	-	-	-	-	-
Zinc (Zn)	mg/kg	>60%	10	-	-	-	-	-	-

Notes:

Bold/Underlined - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

> - greater than

< - less than

- not available

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table H5
Summary of Field Duplicate Sample Results - Soil Metals
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

Sample Location	Units	Alert Limit	RDL	BH22-31-03	DUP I	RPD %	MW22-22-03	DUP K	RPD %
Sample Depth (mbgs)				0.50 - 1.00	0.50 - 1.00		1.50 - 2.00	1.50 - 2.00	
Sample Collection Date				9-Aug-2022	9-Aug-2022		12-Aug-2022	12-Aug-2022	
BVL Sample ID				AZM258	AZM260		AZY130	AZY131	
Antimony (Sb)	mg/kg	>60%	0.5	-	-	-	<0.50	1	n/c
Arsenic (As)	mg/kg	>60%	1	-	-	-	8	8	1
Barium (Ba)	mg/kg	>80%	1	-	-	-	390	370	5
Barium True Total Fusion (Ba-TT)	mg/kg	>80%	40	580	680	16	-	-	-
Beryllium (Be)	mg/kg	>60%	0.4	-	-	-	1	1	n/c
Boron (B) (Hot Water Soluble)	mg/kg	>80%	0.1	-	-	-	0	0	n/c
Cadmium (Cd)	mg/kg	>60%	0.05	-	-	-	1	1	2
Chromium, Hexavalent (Cr 6+)	mg/kg	>70%	0.08	-	-	-	17	17	0
Total Chromium (Cr)	mg/kg	>70%	1	-	-	-	<0.080	<0.080	n/c
Cobalt (Co)	mg/kg	>60%	0.5	-	-	-	9	9	2
Copper (Cu)	mg/kg	>60%	1	-	-	-	20	20	0
Lead (Pb)	mg/kg	>80%	0.5	-	-	-	10	10	1
Mercury (Hg)	mg/kg	>80%	0.05	-	-	-	0	0	n/c
Molybdenum (Mo)	mg/kg	>80%	0.4	-	-	-	2	2	n/c
Nickel (Ni)	mg/kg	>60%	1	-	-	-	26	27	4
Selenium (Se)	mg/kg	>60%	0.5	-	-	-	1	1	n/c
Silver (Ag)	mg/kg	>80%	0.2	-	-	-	<0.20	<0.20	n/c
Thallium (Tl)	mg/kg	>60%	0.1	-	-	-	0	0	n/c
Tin (Sn)	mg/kg	>80%	1	-	-	-	<1.0	<1.0	n/c
Uranium (U)	mg/kg	>60%	0.2	-	-	-	1	1	n/c
Vanadium (V)	mg/kg	>60%	1	-	-	-	29	29	0
Zinc (Zn)	mg/kg	>60%	10	-	-	-	95	89	7

Notes:

Bold/Underlined - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

> - greater than

< - less than

- not available

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table H5
Summary of Field Duplicate Sample Results - Soil Metals
Camp Farewell, Inuvialuit Settlement Region, Northwest Territories
Shell Canada Limited

Sample Location	Units	Alert Limit	RDL	MW22-23-02	DUP N	RPD %
Sample Depth (mbgs)				1.50 - 2.40	1.50 - 2.40	
Sample Collection Date				13-Aug-2022	13-Aug-2022	
BVL Sample ID				AZY122	AZY123	
Antimony (Sb)	mg/kg	>60%	0.5	<0.50	<0.50	n/c
Arsenic (As)	mg/kg	>60%	1	6	6.5	8
Barium (Ba)	mg/kg	>80%	1	180	200	11
Barium True Total Fusion (Ba-TT)	mg/kg	>80%	40	-	-	-
Beryllium (Be)	mg/kg	>60%	0.4	<0.40	0.42	n/c
Boron (B) (Hot Water Soluble)	mg/kg	>80%	0.1	0.36	0.35	n/c
Cadmium (Cd)	mg/kg	>60%	0.05	0.25	0.3	n/c
Chromium, Hexavalent (Cr 6+)	mg/kg	>70%	0.08	12	13	8
Total Chromium (Cr)	mg/kg	>70%	1	<0.080	<0.080	n/c
Cobalt (Co)	mg/kg	>60%	0.5	5.9	6.5	10
Copper (Cu)	mg/kg	>60%	1	11	13	17
Lead (Pb)	mg/kg	>80%	0.5	6	6.7	11
Mercury (Hg)	mg/kg	>80%	0.05	<0.050	<0.050	n/c
Molybdenum (Mo)	mg/kg	>80%	0.4	1.1	1.2	n/c
Nickel (Ni)	mg/kg	>60%	1	18	20	11
Selenium (Se)	mg/kg	>60%	0.5	<0.50	<0.50	n/c
Silver (Ag)	mg/kg	>80%	0.2	<0.20	<0.20	n/c
Thallium (Tl)	mg/kg	>60%	0.1	<0.10	0.11	n/c
Tin (Sn)	mg/kg	>80%	1	<1.0	<1.0	n/c
Uranium (U)	mg/kg	>60%	0.2	0.57	0.65	n/c
Vanadium (V)	mg/kg	>60%	1	20	23	14
Zinc (Zn)	mg/kg	>60%	10	53	60	12

Notes:

Bold/Underlined - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

> - greater than

< - less than

- not available

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

wsp.com

APPENDIX B

Inuvialuit Water Board Licence

INUVIALUIT SIVUNNIUQPAIT IMAKKUN

INUVIALUIT WATER BOARD

July 13, 2017

David A. Brown
Staff Environmental Engineer
Shell Canada Energy
150 N. Dairy Ashford Road
Houston, Texas 77079

Dear Mr. Brown:

Re: N7L1-1834 – Shell Canada Energy, Camp Farewell – Term Amendment of Type "B" Water Licence

The Inuvialuit Water Board (IWB) is pleased to approve a term amendment of Water Licence N7L1-1834 for closure and remediation and post monitoring activities. In this regard, all terms and conditions for N7L1-1834 will remain as originally issued with the exception of:

1. the extension of the expiry date to July 17, 2029;
2. Part B: General Conditions, Item 12; and
3. Part D: Conditions Applying to Waste Disposal, Item 16.

Each of these are detailed in the attached licence amendment.

A copy of the amended Terms and Conditions and all documentation associated with the term amendment of the licence has been filed in the Public Register. Copies are available at the IWB office and on the IWB Electronic Register located on the IWB website: www.inuvwb.ca.

The IWB appreciates the cooperation of Shell Canada Energy in complying with the Terms and Conditions of the Water Licence. Should you have any questions or concerns, please contact Mardy Semmler, Executive Director, at (867) 678-2942.

Sincerely,

Roger Connelly
Chairperson

Attachments

Copied to: Lloyd Gruben, ENR Water Resources Officer - Inuvik Region

INUVIALUIT SIVUNNIUQPAIT IMAKKUN

INUVIALUIT WATER BOARD

INUVIALUIT WATER BOARD
LICENCE AMENDMENT

Licensee	Shell Canada Energy
Licence Number	N7L1-1834
Effective Date of Amendment	July 18, 2017

Pursuant to the *Waters Act* and Waters Regulations the Inuvialuit Water Board hereby grants the following Licence Amendment.

Term of Water Licence

The current expiry date has been extended to July 17, 2029 to ensure consistency with the Closure and Reclamation Plan that includes an eight (8) year monitoring, maintenance, and reporting program following the completion of the permanent closure activities.

Part B: General Conditions

12. Consultation records, including a summary, with the Hunters and Trappers Committee (HTC) of Tuktoyaktuk must be submitted to the IWB at least thirty (30) days prior to conducting any activities at the site.

Part D: Conditions Applying to Waste Disposal

16. A barge waste management and disposal plan must be submitted to the IWB at least thirty (30) days prior to mobilization of the barge to the site.

This Licence is amended and recorded at Inuvik, Northwest Territories.

INUVIALUIT WATER BOARD

Chairperson

July 13, 2017
Date

PART A: SCOPE AND DEFINITIONS

1. Scope

a) This Licence entitles Shell Canada Energy to use water and dispose of Waste as an industrial undertaking associated with oil and gas exploration and development in the Mackenzie Delta at Farewell Camp and Stockpile Site (Camp Farewell) located at Latitude 69°12'30" North, and Longitude 135°06'04" West, Northwest Territories;

b) This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of Waste of any type in any Waters or in any place under any conditions where such Waste or any other Waste that results from the deposits of such Waste may enter any Waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the *Northwest Territories Waters Act*, or other statutes imposing more stringent conditions relating to the quantity or type of Waste that may be so deposited or under which any such Waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be automatically amended to conforming to such Regulations; and

c) Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial and Municipal legislation.

d) This Licence is issued subject to the conditions contained herein with respect to the use of Waters as prescribed in Section 8 of the *Act* and the deposit of Waste to any Waters as prescribed in Section 9 of the *Act*.

2. Definitions

In this Licence: **N7L1-1834**

"Act" means the *Northwest Territories Waters Act*;

"Analyst" means an Analyst designated by the Minister under Section 35(1) of the *Northwest Territories Waters Act*;

"**Average Concentration**" means the discrete average of up to four (4) consecutive analytical results submitted to the Board in accordance with the sampling and analysis requirements specified in the "Surveillance Network Program";

"**Board**" means the Northwest Territories Water Board established under Section 10 of the *Northwest Territories Waters Act*;

"**Freeboard**" means the vertical distance between water line and the lowest elevation of the effective water containment crest on a dam or dyke's upstream slope;

"**Geotechnical Engineer**" means a professional engineer registered with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists whose principal field of specialization is the design and construction of earthworks in a permafrost environment;

"**Greywater**" means all liquid Wastes from showers, baths, sinks, kitchens and domestic washing facilities, but does not include toilet Waste;

"**Inspector**" means an Inspector designated by the Minister under Section 35(1) of the *Northwest Territories Waters Act*;

"**Licensee**" means the holder of this Licence;

"**Minister**" means the Minister of Aboriginal Affairs and Northern Development Canada (AANDC);

"**Modification**" means an alteration to a physical work that introduces a new structure or replaces an existing structure and does not alter the purpose or function of the work, but does not include an expansion;

"**Regulations**" mean Regulations proclaimed pursuant to Section 33 of the *Northwest Territories Waters Act;*

"**Sewage**" means all toilet Wastes and Greywater;

"**Sewage Treatment Facilities**" comprises the area and engineered structures designed to contain Sewage as identified in the project description and also include a Sump constructed of impervious material and/or with an impervious liner;

"**Sump**" means an excavation for the purpose of catching or storing water and/or Waste;

"**Waste**" means Waste as defined by Section 2 of the *Northwest Territories Waters Act*;

"Waste Disposal Facilities" mean all facilities designated for the disposal of Waste and include the Sewage disposal facilities, solid Waste disposal facilities, and bagged toilet Wastes disposal facilities;

"Water Supply Facilities" mean all facilities designed to collect, treat and supply water for industrial purposes; and

"Waters" mean Waters as defined by Section 2 of the *Northwest Territories Waters Act*;

PART B: GENERAL CONDITIONS

1. The Licensee shall file an Annual Report with the Board not later than March 31st of the year following the calendar year reported which shall contain the following information:

    a) the monthly and annual quantities in cubic metres of fresh water obtained from all sources;

    b) the monthly and annual quantities in cubic metres of each and all Waste discharged;

    c) the location and direction of flow of all Waste discharged to the water or the land;

    d) a summary of the monthly and annual quantities of Waste stored on site and transported off site;

    e) the results of sampling carried out under the "Surveillance Network Program";

    f) a summary of any Modifications carried out on the Water Supply Facilities and Sewage Treatment Facilities, including all associated structures;

    g) a list of any spills and unauthorized discharges;

    h) details on the restoration of any Sumps;

    i) a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;

j) a summary of any studies requested by the Board that relate to Waste disposal, water use, or reclamation, and a brief description of any future studies planned;

k) notation of updates and/or revisions to the approved Spill Contingency Plan, Waste Disposal Facilities operations and maintenance plan, and sewage treatment plan;

l) an outline of any spill training and communications exercises carried out; and

m) any other details on water use or Waste disposal requested by the Board within forty-five (45) days before the annual report is due.

2. The Licensee shall comply with the "Surveillance Network Program" annexed to this Licence, and any amendment to the said "Surveillance Network Program" as may be made from time to time, pursuant to the conditions of this Licence.

3. The "Surveillance Network Program" and compliance dates specified in the Licence may be modified at the discretion of the Board.

4. The Licensee shall, within thirty (30) days of the issuance of this Licence, submit to the Board for approval a map or drawing indicating the location of all Surveillance Network Program sampling stations.

5. The Licensee shall, within thirty (30) days of the issuance of this Licence, post the necessary signs to identify the stations of the "Surveillance Network Program". All postings shall be located and maintained to the satisfaction of an Inspector.

6. Any meters, devices or other such methods used for measuring the volumes of water used or Waste disposed and discharged shall be installed, operated and maintained by the Licensee to the satisfaction of an Inspector.

7. The Licensee shall immediately report to the 24 Hour Spill Report Line (**867-920-8130**) any spills which are reported to, or observed by, the Licensee within the project boundaries.

8. All monitoring data shall be submitted in printed form and electronically in spreadsheet format on a diskette or other electronic forms acceptable to the Board.

9. All reports shall be submitted to the Board in printed format accompanied by an electronic copy in a common word processing format on diskette or other electronic forms acceptable to the Board.

10. Within thirty (30) days of issuance of this Licence, the Licensee shall have posted and shall maintain a security deposit in the amount of Two Million ($2,000,000.00) Dollars pursuant to Section 17 of the *Act* and Section 12 of the Regulations, in a form suitable to the Minister. The security deposit shall be maintained until such time as it is fully or in part refunded by the Minister pursuant to Section 17 of the *Act*.

11. The Licensee shall ensure a copy of this Licence is maintained at the site of operation at all times.

PART C: CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain water from the Middle Channel of the Mackenzie River in winter or the unnamed lake north of the camp in summer as described in the project description, or as otherwise approved by an Inspector.

2. The daily quantity of water used for all purposes shall not exceed 150 cubic metres.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall within thirty (30) days of the issuance of this Licence, submit to the Board for approval an updated operation and maintenance plan for the Waste Disposal Facilities. This plan shall include but not necessarily be limited to details on the design, operational capacity, management and maintenance, and disposal of sludges.

2. All Sewage shall be directed to the onsite Sewage Treatment Facilities as approved by an Inspector.

3. The Sewage Treatment Facilities shall be maintained and operated in such a manner as to prevent structural failure to the satisfaction of the Inspector.

4. All Waste discharged from the onsite Sewage lagoon shall be directed to the channel of the Mackenzie River at a location approved by an Inspector.

5. There should be no discharge of floating solids, garbage, grease, free oil or foam.

6. All effluent discharged by the Licensee from the Sewage lagoon at "Surveillance Network Program" Station Number 1834-1 shall meet the following effluent quality requirements:

Sample Parameter	Average Concentration
BOD_5	70.0 mg/L
Total Suspended Solids	70.0 mg/L
Faecal Coliforms	1 X 10^4 CFU/dL
Oil and Grease	5.0 mg/L
Total Residual Chlorine (TRC)	0.1 mg/L

7. The effluent discharged shall have a pH between six (6) and nine (9) and no visible sheen of oil and grease.

8. Introduction of water to Waste for the purpose of achieving effluent quality requirements in Part D, Item 7 is prohibited.

9. A Freeboard limit of 1.0 metre shall be maintained at all times in the Sewage lagoon, or as recommended by a qualified Geotechnical Engineer and/or as approved by the Board.

10. The Licensee shall advise an Inspector at least five (5) days prior to initiating and decant of the Sewage lagoon.

11. All analyses shall be conducted in accordance with methods prescribed in the current edition of "Standard Methods for the Examination of water and Wastewater" or by such other methods as may be approved by an Analyst.

12. The Licensee shall contain all contaminated soil or contaminated snow in such a manner as to minimize the potential for migration of contaminants into any Waters, to the satisfaction of an Inspector.

13. The Licensee shall store, segregate and dispose of all solid and hazardous Wastes in a manner acceptable to the Inspector.

14. Unless authorized by this Licence, the Licensee shall ensure that any Wastes associated with this undertaking do not enter any water body.

15. The Licensee shall submit to the Board a copy of each agreement(s) between third parties to store, transport or dispose of Wastes. The copy submitted to the Board shall include, at a minimum, the following:

a. type of Waste;

b. quantities of Waste;

c. disposal location(s), and

d. proof of acceptance from third parties.

PART E: CONDITIONS APPLYING TO MODIFICATIONS

1. The Licensee may, without written approval from the Board, carry out Modifications to the planned undertakings provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:

    a) the Licensee has notified an Inspector in writing of such proposed Modifications at least five (5) days prior to beginning the Modifications;

    b) such Modifications do not place the Licensee in contravention of either the Licence or the *Act*;

    c) an Inspector has not, during the five (5) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than five (5) days; and

    d) an Inspector has not rejected the proposed Modifications.

2. Modifications for which all of the conditions referred to in Part F, Item 1 have not been met may be carried out only with written approval from an Inspector.

3. The Licensee shall provide to the Board as-built plans and drawings of the Modifications referred to in this Licence within ninety (90) days of completion of the Modifications.

PART F: CONDITIONS APPLYING TO CONTINGENCY PLANNING

1. The Licensee shall submit to the Board for approval within thirty (30) days of issuance of this Licence an updated Emergency Response & Spill Contingency Plan in accordance, for example, with the *Guidelines for Spill Contingency Planning, April 2007,* developed by AANDC-Water Resources Division.

2. The Licensee will maintain a copy of the approved Emergency Response & Spill Contingency Plan onsite in a readily available location, to the satisfaction of an Inspector.

3. The Licensee shall ensure that petroleum products, hazardous material and other Wastes associated with the project do not enter any Waters.

4. The Licensee shall ensure that all containment berms are constructed of an impermeable material, to the satisfaction of an Inspector.

5. The Licensee shall ensure that fuel stored in each tank within the tank farm be no greater than 85% of the tank's capacity to allow for expansion and avoid overflows.

6. If, during the period of this Licence, an unauthorised discharge of Waste occurs, or if such a discharge is foreseeable, the Licensee shall:

    a) report the incident immediately via the 24 Hour Spill Reporting Line (867) 920-8130; and

    b) submit to an Inspector a detailed report on each occurrence not later than thirty (30) days after initially reporting the event.

PART G: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1. The Licensee shall submit to the Board for approval within one (1) year of issuance of this Licence, an updated Interim Abandonment and Restoration Plan including plans for the abandonment and restoration of the Sewage lagoon and a complete Phase II environmental site assessment of Camp Farewell. This assessment will include the full delineation of contamination (soil and water) associated with Camp Farewell operations, located both on and off the gravel base pad.

2. The Licensee shall implement this Plan as and when approved by the Board.

3. Following approval of the Plan, the Licensee shall review the Abandonment and Restoration Plan every two (2) years and shall modify the Plan as necessary to reflect changes in operations and technology. All proposed Modifications to the Plan shall be submitted to the Board for approval.

NORTHWEST TERRITORIES WATER BOARD

Chairman

Witness

Kyle Schepanow

June 6, 2019

IEG Consultants Ltd.

500 – 2618 Hopewell Place NE

Calgary, AB T1Y 7J7

Dear Mr. Schepanow:

Inuvialuit Water Board License N7L1 – 1834 – Shell Canada Energy Camp Farewell

Proposed Amendment to existing Water License Part C, Item 1.

I am writing you regarding Water License N7L1 – 1834. Mr. Kyle Schepanow, representing IEG Consultants representing Shell Canada Energy regarding Water License N7L1 – 1834, requesting an amendment to the water license. Right now the current water license Part C, Item 1 states that

1. The licensee shall obtain water from the Middle Channel of the Mackenzir River in the winter or the unnamed lake north of the camp in summer as described in the project description, or as otherwise approved by an inspector.

The amendment requested would be to withdraw water directly from the Middle Channel of the Mackenzie River during summer activities. The water will be used as a potable water source in the Wurmlinger barge camp at the Site. Activities at the Site will be from approximately June 26 through August 31. 2019, **has been approved dated this 6th Day of June 2019**.

If you require more information regarding this letter, please call me at the number below.

Sincerely,

Lloyd Gruben

Water Resources Officer

Environment and Natural Resources

P.O. Box 2749

Inuvik , NT X0E 0T0

Ph: 867 – 678 - 6676

APPENDIX C

Waste Documentation

TOWN OF INUVIK
Northwest Territories

TOWN OF INUVIK
2 FIRTH ST, PO BOX 1160
INUVIK NT X0E 0T0

P 867.777.8600
F 867.777.8601
WWW.INUVIK.CA

May 30, 2022

WSP Golder
201 Brownlow Avenue
Suite 26
Dartmouth, NS B3B 1W2

Attention: Ms. Stephanie Villeneuve

Re: Use of Sewage and Solid Waste Dumping Facilities for Camp Farewell Water License (N7L1-1834)

Ms. Villeneuve:

Please be advised that the Town of Inuvik acknowledges that Golder Associates may use the above-mentioned facilities in conjunction with the Camp Farewell Water License (N7L1-1834). As part of this approval Golder Associates or any contractor working on their behalf has acknowledged that there will be a fee for use of these facilities. In addition, they shall inform the Town of Inuvik Director of Public Services when they are to make use of the sewage dumping facility and report the volume of sewage brought in from this project.

The Town will accept in principle the above-mentioned products provided they follow the guidelines and fees as set out in the various Town of Inuvik by-laws. All the waste must be domestic use type only. None of it shall contain any drilling or industrial type waste.

We are required as part of our water license to account for these types of additional wastes entering our sewage lagoon and solid waste site, respectively.

If you have any questions or concerns, please do not hesitate to contact me. Thank-you in advance for your cooperation.

Regards

Town of Inuvik

Grant Hood
Senior Administrative Officer

CC: Rick Campbell – Town of Inuvik – Director of Public Services

DUMPING FEES BILL

Date: Aug 26, 2022 43928

Bill to: Northwind
Town of Inuvik

Please check one:

Dumping Fees: Load Type	Category and Fees	
	Garbage	Out of Town Garbage
Extra Large Loads (End dump and any tractor trailer combinations)	❒ $325.00 per load	❒ $1,000.00 per load
Large Loads (Dump truck and any straight truck combinations)	❒ $125.00 per load	❒ $800.00 per load
Medium Loads (1 ton units, pick-up and trailer combinations)	☒ $65.00 per load	❒ $600.00 per load
Small Loads (1/2 ton up to 1 ton loads)	❒ $35.00 per load	❒ $400.00 per load

Driver: _____
Print

_____
Signature

Hauled by: _____

GST: $ _____

Total: $ _____

Town of Inuvik

Solid Waste Facility
Box 1160, #2 Firth Street, Inuvik, NT X0E 0T0
Ph: (867) 777-8600 • Fax: (867) 777-8601

Northwind Industries Ltd.
Box 1130, 146 Navy Road
Inuvik, NT X0E 0T0
Tel: (867) 777-2426 Fax: (867) 777-3203
Email: northwind@northwestel.net

TICKET 196699

Client: EGT NW ~~FATHOM~~

Project & Location: Farewell.

Date: Aug (Month) / 2 (Day) / 2022 (Year)

Equipment: 195 (Unit #) / (Description)

Loads (circle): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Operator (print): Curtis Groh

Work Description:
Haul Shit

Time From: 8

To: 2

Total Hours: 6

Operator Signature: C Groh

Client Rep: (Print) / (Signature)

OFFICE USE ONLY
Billing Units:
Rates per Unit: $

Northwind Industries Ltd.
Box 1130, 146 Navy Road
Inuvik, NT X0E 0T0
Tel: (867) 777-2426 Fax: (867) 777-3203
Email: northwind@northwestel.net

TICKET 202326

Client: FATHOM MARINE

Project & Location:

Date: 09 (Month) / 01 (Day) / 2022 (Year)

Equipment: #183 (Unit #) / (Description)

Loads (circle): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Operator (print): Tim BAH

Work Description:
(6) loads of sewage

Time From: 8AM

To: 2PM

Total Hours: 6

Operator Signature: C Bah

Client Rep: (Print) / (Signature)

OFFICE USE ONLY
Billing Units:
Rates per Unit: $

Northwind Industries Ltd.
Box 1130, 146 Navy Road
Inuvik, NT X0E 0T0
Tel: (867) 777-2426 Fax: (867) 777-3203
Email: northwind@northwestel.net

TICKET 202326

Client: FATHOM MARINE

Project & Location:

Date: 09 (Month) / 01 (Day) / 2022 (Year)

Equipment: #183 (Unit #) / (Description)

Loads (circle): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Operator (print): Tim BAH

Work Description:
(6) loads of sewage

Time From: 8AM

To: 2PM

Total Hours: 6

Operator Signature: C Bah

Client Rep: (Print) / (Signature)

OFFICE USE ONLY
Billing Units:
Rates per Unit: $

MOVEMENT DOCUMENT / MANIFEST
DOCUMENT DE MOUVEMENT / MANIFESTE

NT19014-9

This Movement document/manifest conforms to all federal and provincial environmental legislation.
Ce document de mouvement/manifeste est conforme aux législations fédérale et provinciale sur l'environnement.

Camp Farewell

Movement Document / Manifest Reference No.
N° de référence du document de mouvement/manifeste

A Generator / consignor / Producteur / expéditeur

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial: NTG000408

Company name / Nom de l'entreprise: Shell Canada Limited

Mailing address / Adresse postale: 400 - 4th Ave | City / Ville: Calgary | Province: AB | Postal code / Code postal: T2P0J4

E-mail / Courrier électronique: Kyle.Trampson@shell.com | Tel. No. / N° de tél.:

Shipping site address / Adresse du lieu de l'expédition: Lot 65 EGT Northwinds Marine Yard

City / Ville: Inuvik | Province: NT | Postal code / Code postal: X0E

Intended Receiver / consignee / Réceptionnaire / destinataire prévu: KBL Environmental | Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial: NTR000123

Mailing address / Adresse postale: PO Box 1895 | City / Ville: YK | Province: NT | Postal code / Code postal: X1A3P4

E-mail / Courrier électronique: | Tel. No. / N° de tél.: 8678735263

Receiving site address / Adresse du lieu de destination: 17 Cameron Road

City / Ville: Yellowknife | Province: NT | Postal code / Code postal: X1A3P4

B Carrier / Transporteur

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial: NTC000035

Company name / Nom de l'entreprise: Montaulin Transport

Mailing address / Adresse postale: 1 Airport Rd | City / Ville: Inuvik | Province: NT | Postal code / Code postal: X0E0T0

E-mail / Courrier électronique: | Tel. No. / N° de tél.: 8678873

Vehicle / Véhicule — Trailer - Rail car No. 1 / 1re remorque - wagon: 819332P | Prov.: NT

Trailer - Rail car No. 2 / 2e remorque - wagon:

Port of entry / Point d'entrée: International use only | Port of exit / Point de sortie: International use only

Carrier Certification: *I certify that I have received waste or recyclable material from the generator / consignor for delivery to the receiver / consignee as set out in Part A and that the information contained in Part B is complete and correct.*
Attestation du transporteur: *J'atteste avoir reçu les déchets ou matières recyclables du producteur / expéditeur en vue de leur livraison au réceptionnaire / destinataire, tels qu'ils figurent à la partie A et que les renseignements inscrits à la partie B sont exacts et complets.*

Name of authorized person (print) / Nom de l'agent autorisé (caractères d'imprimerie): BethAnn Cleary | Tel. No. / N° de tél.: 867 873-3591

Year / Année: 22 | Month / Mois: 1 | Day / Jour: 22 | Signature: BACleary

C Receiver / consignee / Réceptionnaire / destinataire

Reference Nos. of other movement document(s)/manifest(s) used / N° de référence des autres documents de mouvement/manifestes utilisés: 22573530

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial: NTR000123

Receiver / consignee information same as in Part A / Les renseignements du réceptionnaire / destinataire sont les mêmes qu'à la Partie A: ☒ Yes / Oui ☐ No, complete the box below / Non, remplir la case ci-dessous

Company name / Nom de l'entreprise:

Mailing address / Adresse postale:

City / Ville: | Province: | Postal code / Code postal:

E-mail / Courrier électronique: | Tel. No. / N° de tél.: ( )

Receiving site address / Adresse du lieu de destination:

Date received / Date de réception — Year / Année: 23 | Month / Mois: 02 | Day / Jour: 22 | Time / Heure: ☐ A.M. ☐ P.M.

If waste or recyclable material to be transferred, specify intended company name / Si les déchets ou matières recyclables doivent être transférés, préciser le nom du destinataire: various.

Registration No. / Provincial ID No. / N° d'immatriculation / d'id provincial:

Prov. code / Code prov.	Shipping name / Appellation réglementaire	Class / Classe Sub. class(es) / Classe(s) sub.	UN No. / N° NU	Packing / Réalt gr. / Gr. d'emballage / de risque	Quantity shipped / Quantité expédiée	Units / L or / ou Kg / Unités	Packaging / Conditionnement No. / N°	Type	Phys. state / État phys.
(i) UN1993	FLAMMABLE LIQUIDS, N.O.S. (JET A FUEL)	3	WNA1993	III	200	L	1	01	L
(ii)									
(iii)									
(iv)									

Quantity received / Quantité reçue	Units / L or / ou kg / Unités	Comments / Commentaires	Handling Code / Code de manutention	Shipment / Envoi Accepted / Accepté	Shipment / Envoi Refused / Refusé	Decont. Pack. Cont.	Decont. Veh.
200	L			✓			

Notice No. / N° de notification	Notice Line No. / N° de ligne de la notification	Shipment / Envoi	Of / De	D or R code / Code D ou R	C code / Code C	Basel Annex VIII or OECD Code / Annexe VIII de Bâle ou Code OCDE	H code / Code H	Y code / Code Y	National code in country of / Code du pays: Export / Exportation	Import / Importation	Customs code(s) / Code(s) de douanes
(i)											
(ii)											
(iii)											
(iv)											

International use only

If handling code "Other" (specify) / Si code de manutention « autre » (spécifier):

Receiver / consignee certification: *I certify that the information contained in Part C is correct and complete.* / **Attestation du réceptionnaire / destinataire:** *J'atteste que tous les renseignements à la partie C sont exacts et complets.*

Name of authorized person (print) / Nom de l'agent autorisé (caractère d'imprimerie): Stacey Walker

Signature: | Tel. No. / N° de tél.: 8678735263

Special handling / Manutention spéciale: ☐ Attached / Ci-joint ☐ As follows / Ci-contre:

Generator / consignor certification: *I certify that the information contained in Part A is correct and complete. I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.*
Attestation du producteur / expéditeur: *J'atteste que tous les renseignements à la partie A sont exacts et complets. Je déclare que le contenu de ce chargement est décrit ci-dessus de façon complète et exacte par la désignation officielle de transport et qu'il est convenablement classé, emballé, marqué, étiqueté, muni de plaques-étiquettes et à tous égards bien conditionné pour être transporté conformément aux réglementations internationales et nationales applicables.*

Name of authorized person (print) / Nom de l'agent autorisé (caractère d'imprimerie): Keaton Newell | Tel. No. / N° de tél.: 867 765 8478

Signature:

Date shipped / Date d'expédition — Year / Année: 22 | Month / Mois: 12 | Day / Jour: 22 | Time / Heure: ☐ A.M. ☐ P.M.

Scheduled arrival date / Date d'arrivée prévue — Year / Année: 23 | Month / Mois: 02 | Day / Jour: 22

Instructions on reverse
Instructions au verso

Copy / Copie 3 (yellow / jaune)

MOVEMENT DOCUMENT / MANIFEST
DOCUMENT DE MOUVEMENT / MANIFESTE

This Movement document/manifest conforms to all federal and provincial environmental legislation.
Ce document de mouvement/manifeste est conforme aux législations fédérale et provinciale sur l'environnement.

Movement Document / Manifest Reference No. / N° de référence du document de mouvement/manifeste: **NT19010-7**

A — Generator / consignor / Producteur / expéditeur

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial	NTG408
Company name / Nom de l'entreprise	Shell Canada Limited
Mailing address / Adresse postale	400 - 4 Avenue SW
City / Ville	Calgary
Province	AB
Postal code / Code postal	T2P 0J4
E-mail / Courrier électronique	Kyle.Thompson@shell.com
Tel. No. / N° de tél.	( )
Shipping site address / Adresse du lieu de l'expédition	Lot 65 - EGT Northwinds Marine Yard
City / Ville	Inuvik
Province	NT
Postal code / Code postal	X0E

Intended Receiver / consignee / Réceptionnaire / destinataire prévu

Company	KBL Environmental Ltd.
Registration No. / Provincial ID No.	NTR000123
Mailing address / Adresse postale	PO 1890 [illegible]
City / Ville	YK
Province	NT
Postal code / Code postal	X1A 2PA
E-mail / Courrier électronique	
Tel. No. / N° de tél.	[illegible] 873-5263
Receiving site address / Adresse du lieu de destination	17 [illegible] Road
City / Ville	Yellowknife
Province	NT
Postal code / Code postal	X1A 2P1

B — Carrier / Transporteur

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial	NTC000035
Company name / Nom de l'entreprise	Manitoulin Transport
Mailing address / Adresse postale	1 Airport Road
City / Ville	Inuvik
Province	NT
Postal code / Code postal	X0E0T0
E-mail / Courrier électronique	
Tel. No. / N° de tél.	( ) 873-5263

Vehicle / Véhicule	Registration No. / N° d'immatriculation	Prov.
Trailer - Rail car No. 1 / 1er remorque - wagon	81922P	NT
Trailer - Rail car No. 2 / 2e remorque - wagon		NT

Port of entry / Point d'entrée: International use only
Port of exit / Point de sortie: International use only

Carrier Certification: I certify that I have received waste or recyclable material from the generator / consignor for delivery to the receiver / consignee as set out in Part A and that the information contained in Part B is complete and correct.
Attestation du transporteur: J'atteste avoir reçu les déchets ou matières recyclables du producteur / expéditeur en vue de leur livraison au réceptionnaire / destinataire, tels qu'ils figurent à la partie A et que les renseignements inscrits à la partie B sont exacts et complets.

Name of authorized person (print) / Nom de l'agent autorisé (caractères d'imprimerie): Beth Ann Cleary
Tel. No. / N° de tél.: ( ) 265-1485
Year / Année: 22 Month / Mois: 12 Day / Jour: 22
Signature: BAcleary

C — Receiver / consignee / Réceptionnaire / destinataire

Reference Nos. of other movement document(s)/manifest(s) used / N° de référence des autres documents de mouvement/manifestes utilisés: 22554570-1000-1002

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial: NTR000123

Receiver / consignee information same as in Part A / Les renseignements du réceptionnaire / destinataire sont les mêmes qu'à la Partie A
☑ Yes / Oui ☐ No, complete the box below / Non, remplir la case ci-dessous

Company name / Nom de l'entreprise:
Mailing address / Adresse postale:
City / Ville: Province: Postal code / Code postal:
E-mail / Courrier électronique: Tel. No. / N° de tél. ( )
Receiving site address / Adresse du lieu de destination:

Date received / Date de réception — Year / Année: 23 Month / Mois: 02 Day / Jour: 22
Time / Heure: ☐ A.M. ☐ P.M.

If waste or recyclable material to be transferred, specify intended company name / Si les déchets ou matières recyclables doivent être transférés, préciser le nom du destinataire: Various.
Registration No./Provincial ID No. / N° d'immatriculation/d'id provincial:

Shipment details

	Prov. code / Code prov.	Shipping name / Appellation réglementaire	Class / Classe Sub. class(es) / Classe(s) sub.	UN No. / N°NU	Packing / risk gr. / Gr. d'emballage/de risque	Quantity shipped / Quantité expédiée	Units L or / ou Kg / Unités	Packaging/Containers No. / N°	Codes Int.–ext.	Phys. state / État phys.	Quantity received / Quantité reçue	Units L or / ou Kg / Unités	Comments / Commentaires	Handling Code / Code de manutention	Shipment / Envoi Accepted / Accepté	Refused / Refusé	Decont. Pack. Cont.	Veh. / Véh.
(i)		[illegible]	3	UN1993	III	200	L	1	01	L	200	L			✓			
(ii)																		
(iii)																		
(iv)																		

If handling code "Other" (specify) / Si code de manutention « autre » (spécifier):

International use only

	Notice No. / N° de notification	Notice Line No / N° de ligne de la notification	Shipment / Envoi	Of / De	D or R code / Code D ou R	C code / Code C	Basel Annex VIII or OECD Code / Annexe VIII de Bâle ou Code OCDE	H code / Code H	Y code / Code Y	National code in country of / Code du pays: Export / Exportation	Import / Importation	Customs code(s) / Code(s) de douanes
(i)												
(ii)												
(iii)												
(iv)												

Receiver / consignee certification: I certify that the information contained in Part C is correct and complete. / Attestation du réceptionnaire / destinataire: J'atteste que tous les renseignements à la partie C sont exacts et complets.

Name of authorized person (print) / Nom de l'agent autorisé (caractères d'imprimerie): Stacey Walker
Signature: SW
Tel. No. / N° de tél.: 8678735263

Special handling / Manutention spéciale: ☐ Attached / Ci-joint ☐ As follows / Ci-contre:

Generator / consignor certification: I certify that the information contained in Part A is correct and complete. I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.
Attestation du producteur / expéditeur: J'atteste que tous les renseignements à la partie A sont exacts et complets. Je déclare que le contenu de ce chargement est décrit ci-dessus de façon complète et exacte par la désignation officielle de transport et qu'il est convenablement classé, emballé, marqué, étiqueté, muni de plaques-étiquettes et à tous égards bien conditionné pour être transporté conformément aux réglementations internationales et nationales applicables.

Name of authorized person (print) / Nom de l'agent autorisé (caractères d'imprimerie): Meagnan Newell
Signature: [illegible]
Tel. No. / N° de tél.: 867 765 0478

Date shipped / Date d'expédition — Year / Année: 22 Month / Mois: 12 Day / Jour: 22
Time / Heure: ☐ A.M. ☐ P.M.
Scheduled arrival date / Date d'arrivée prévue — Year / Année: 23 Month / Mois: 02 Day / Jour: 22

Instructions on reverse
Instructions au verso

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APPENDIX D

Spill Investigation Reports

iSMS: New Incident Created via Public Form

- **System ID#**: 578424
- **Date/Time**: 8/5/2022 4:00:00 PM UTC
- **Event Type(s)**: Loss or Damage
- **Location**: Yellowknife
- **Location Desc**: Camp Farwell, Northwest Territories
- **Work Area**: WSP → Canada → E&E | STE → Remediation Program Management | Gestion de programmes de réhabilitation → Golder
- **Work Agreement**: Golder Employees | Employés de Golder
- **Reported** @ 10/14/2022 9:03:00 PM UTC

Short Description

_|Oil and Gas|Canada|Shell|Soil

Event Description

During refueling of the helicopter approximately 2L of Jet A-1 was released. Approximately <1L contacted the ground, the rest was on the side of the helicopter and skids.

Immediate Actions Taken

The spill was reported immediately, spill pads were used to clean up the fuel on the helicopter and fuel that contacted the ground was cleaned using a shovel and bucket Re-discussed the requirement and importance of using a drip tray during all refueling activities and having spill pads immediately available. A drip tray was used during the next refueling of the helicopter and no incident occurred.
Waste generated during the spill cleanup was contained in an oily waste barrel and disposed of off-site at an approved facility, as reported within Section 3.3.2 of the 2022 IWB Annual Report.

iSMS: New Incident Created via Public Form

- System ID#: 578428
- Date/Time: 8/11/2022 4:00:00 PM UTC
- Event Type(s): Loss or Damage
- Location: Yellowknife
- Location Desc: Camp Farwell, Northwest Territories
- Work Area: WSP → Canada → E&E | STE → Remediation Program Management | Gestion de programmes de réhabilitation → Golder
- Work Agreement: Golder Employees | Employés de Golder
- Reported @ 10/14/2022 9:38:55 PM UTC

Short Description

_|Oil and Gas|Canada|Shell|Soil

Event Description

A minor drip leak from the PTO flange bolts was identified by the helicopter fuel technician during their final inspection of the Jet A-1 fuel truck after refueling the helicopter before ending the day. Less than 1L of Jet A-1 hit the ground as it was a small drip every 30 seconds.

Immediate Actions Taken

A drip tray with spill pads was placed underneath the leak immediately and the site supervisor was notified. The site supervisor picked up the mechanic who brought their service truck to the Jet A-1 truck. The bolts were tightened and the leak stopped. The released Jet A-1 fuel was cleaned up and stored in the oily waste drum. To test the tightened bolts, the truck was turned on as was the pump which circulates the fuel through the PTO. No further leakage was observed, however, the spill pad was left in place overnight and was reassessed the following morning to ensure no further maintenance was required.Waste generated during the spill cleanup was contained in an oily waste barrel and disposed of off-site at an approved facility, as reported within Section 3.3.2 of the 2022 IWB Annual Report.

APPENDIX E

Drills Documentation

Fire Response Drill

iSMS: New Journal Created via Public Form

- **System ID**: 38828
- **Date/Time**: 7/14/2022 4:00:00 AM UTC
- **Event Type(s)**: Training Event
- **Location**: Yellowknife
- **Location Desc**: West Channel, Northwest Territories
- **Work Area**: WSP → Canada → E&E | STE → Remediation Program Management | Gestion de programmes de réhabilitation → Golder
- **Work Agreement**: Golder Employees | Employés de Golder
- **Reported** @ 10/14/2022 8:37:08 PM UTC

Comment

Fire response drill completed at remote barge camp. All personnel mustered within 1m and were calm during the evacuation. Designated personnel completed sweeps of the barge prior to evacuating to ensure all personnel were off-board (no one asleep in rooms). Learning included having closed toed shoes/warm clothes easily accessible to put on quickly as during an actual fire response people may be outside for an extended time period.

Spill Response Drill

iSMS: New Journal Created via Public Form

- **System ID**: 38823
- **Date/Time**: 7/16/2022 4:00:00 AM UTC
- **Event Type(s)**: Training Event
- **Location**: Yellowknife
- **Location Desc**: West Channel, Northwest Territories
- **Work Area**: WSP → Canada → E&E | STE → Remediation Program Management | Gestion de programmes de réhabilitation → Golder
- **Work Agreement**: Golder Employees | Employés de Golder
- **Reported** @ 10/14/2022 8:14:24 PM UTC

Comment

Spill response drill conducted at rig while in the bush away from permanent stationed spill kits (i.e. at barge, at fuel truck). Driller had spill pads, shovel and bucket available on-hand within 15 seconds of site supervisor saying there was a spill at the back of the rig. All work shut down, verifiied it was a drill and notified 1st office contact of spill response drill. Learnings included: designated spill tray used for placing under the rig when its unattended for long periods of time (i.e. lunch/overnight) was at the previous location as it wasn't required for active drilling. Will carry spill tray to each location as additional spill containment method going forward.

wsp.com