Bureau Veritas Job #: C260016
Report Date: 2022/09/06

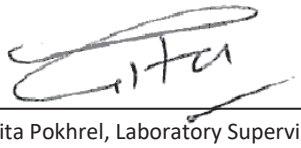
GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL,NT
Your P.O. #: 22525414-1100-1104
Sampler Initials: ML

VALIDATION SIGNATURE PAGE

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

Chantal Vincent, Customer Solutions Representative

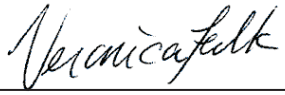
Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics



Gita Pokhrel, Laboratory Supervisor

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

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist



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

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
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638

CHAIN OF CUSTODY RECORD

ENV COC - 00013v3

12-Aug-22 09:00
Cynny Hagen
C260016
IKA INS-0001

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#:	22525414-3100-3104
Street Address:		Street Address:		Project #:	22525414-3000
City: Calgary Prov: AB Postal Code:		City: Calgary AB Postal Code:	T2P 4K3	Site #:	NA
Phone:		Phone:	403-299-5600	Site Location:	Camp Farewell ↳ ~~WEST CHANNEL~~, NT
Email:	Canada Account Payable	Email:	aurelie.bellavance@wsp.com	Site Location Province:	NT
Copies:		Copies:	peter.tan@wsp.com	Sampled By:	Melissa Lord, Harmanjeet Kaur

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

	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 Naphthalene	18	19	20 LIMITED SAMPLE	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE
1	BH22-29-03	22	08	09	13	30	Soil				X																	3	
2	DUP J	↓	↓	↓	13	10	Soil				X																	3	
3	BH22-29-02				13	10	Soil				X																	3	
4	BH22-29-01				13	00	Soil				X																	3	
5	BH22-25-03				15	20	Soil				X					X								X				5	
6	BH22-25-01				15	00	Soil				X					X								X				5	
7	BH22-25-02				15	10	Soil				X					X								X				5	
8	BH22-25-04				15	30	Soil				X					X								X				5	
9	BH22-25-05	↓	↓	↓	15	40	Soil				X					X								X				5	
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

Comments:
email report to:
gld.SHELLDOR@equis.com
gld.iol-equis@wsp.com
Upload to facility code
41259544

Received in Yellowknife
By: J. Mercure
@9:00
AUG 12 2022
ice-yes ics-yes
Temp: 2 1 5 15

*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				Temperature reading by:
Seal present	✓						
Seal intact	✓						
Cooling media present	✓		1 5.5	2 5.7	3		

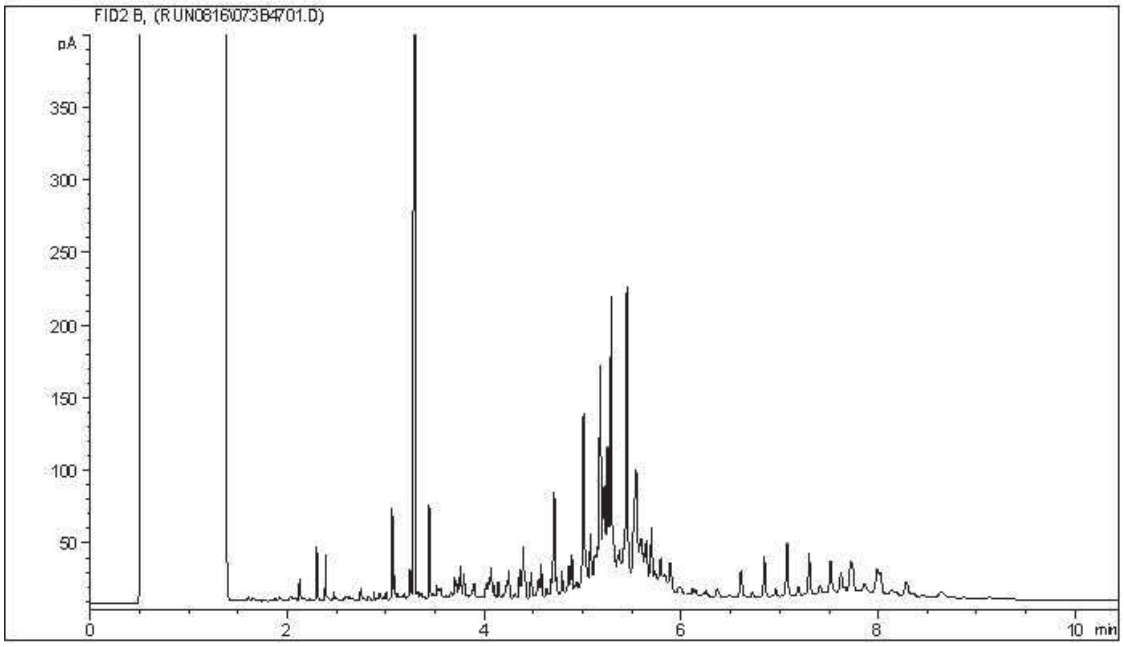
LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal intact						
Cooling media present						

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

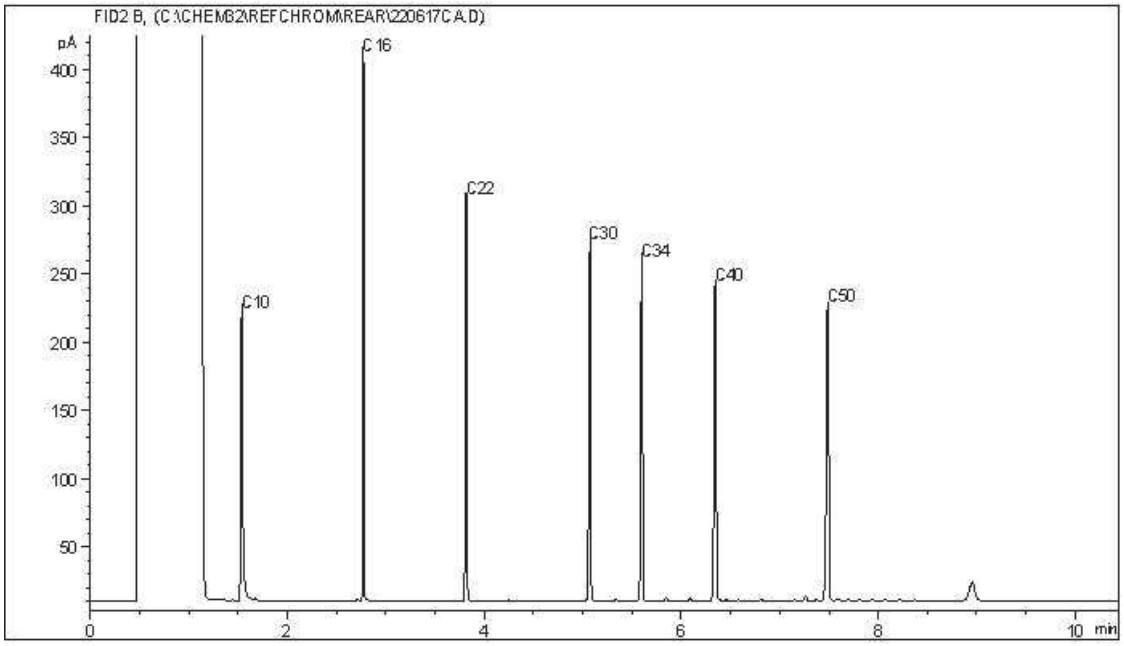
Relinquished by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Special Instructions
1 Melissa Lord	22	08	10	08	00	1 Sarah Doran	2022	08	13	15	03	
2						2						

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.

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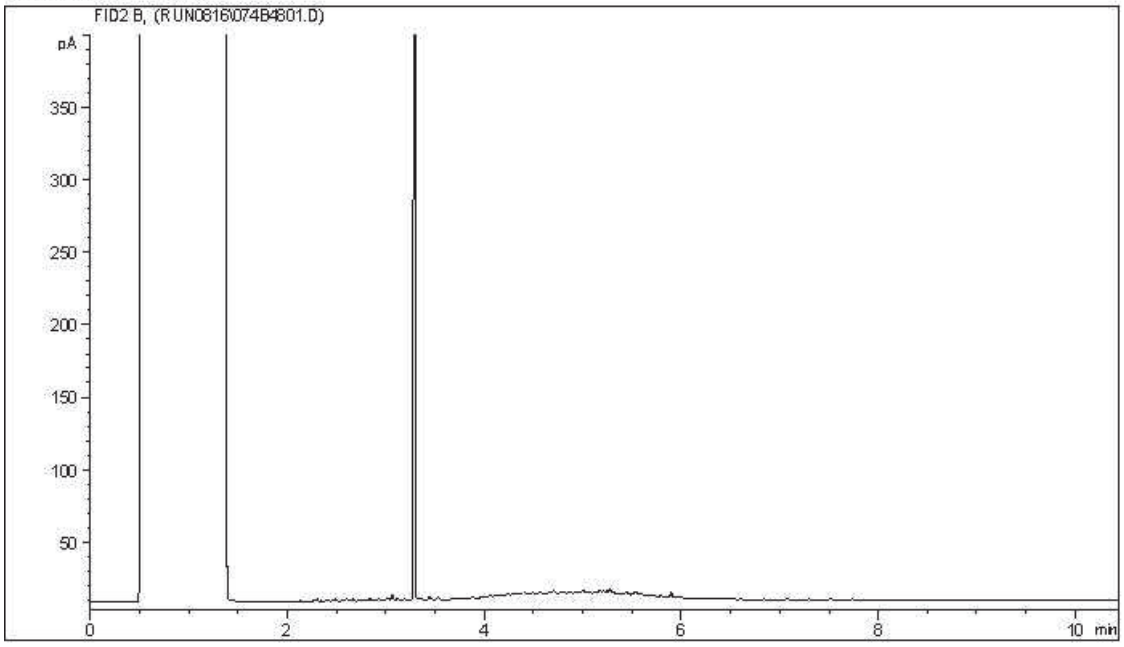

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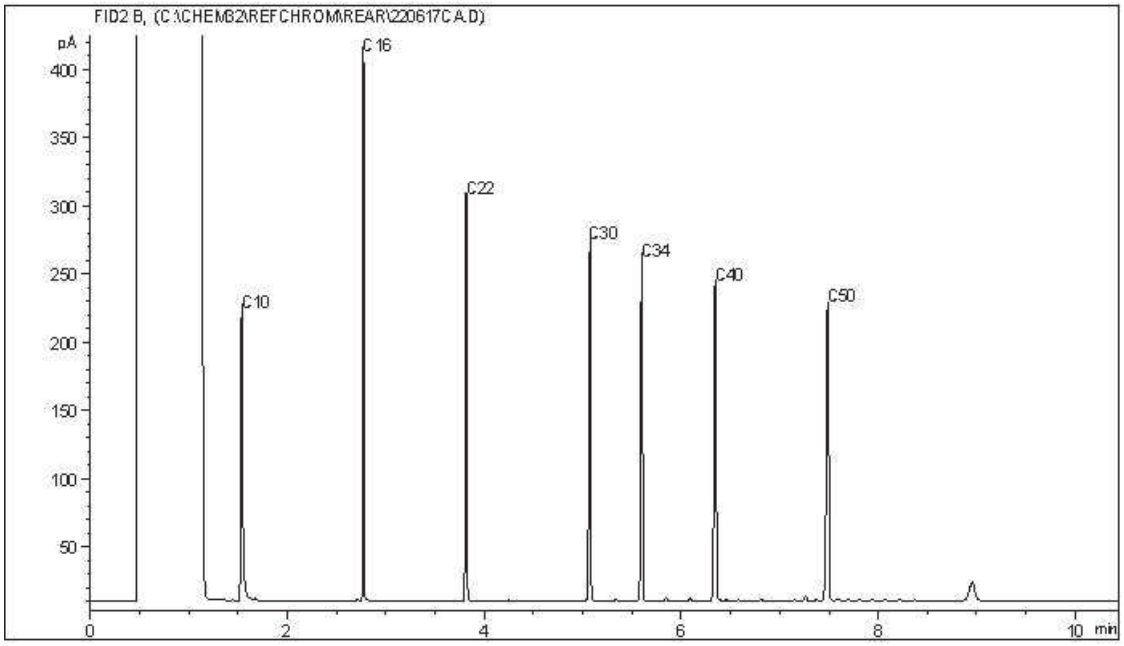

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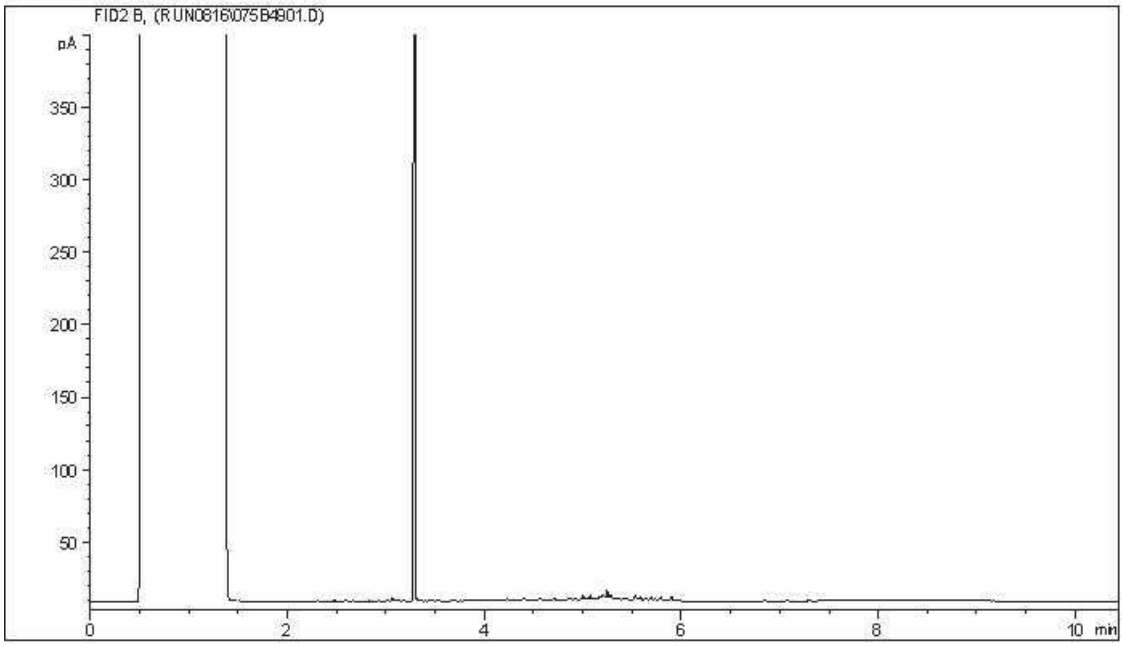

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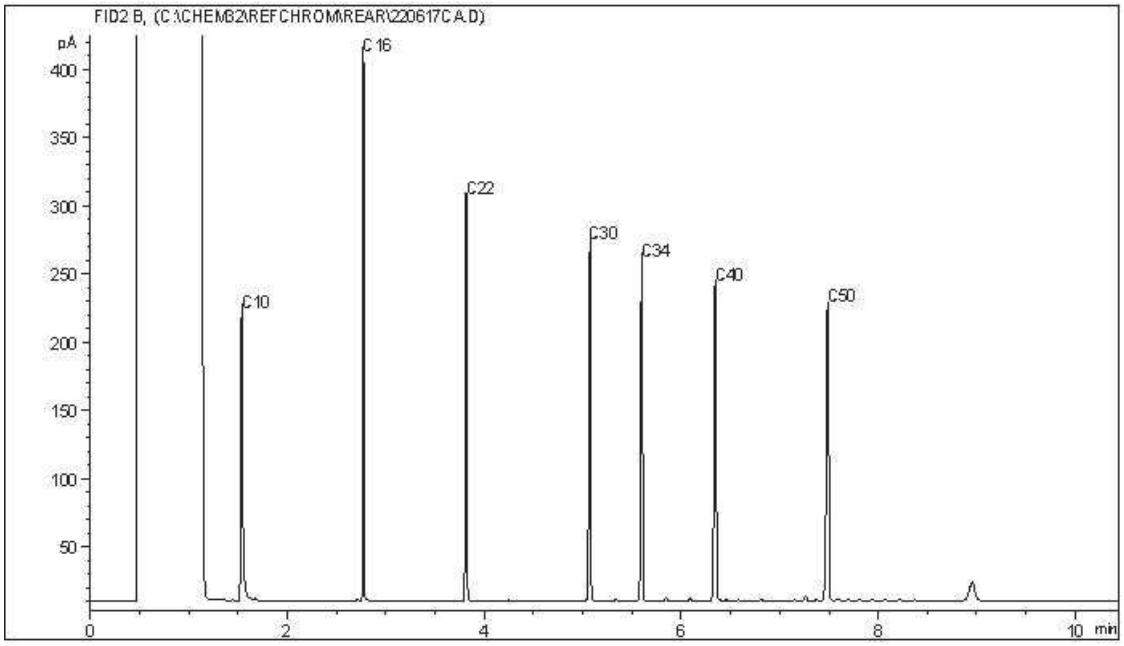

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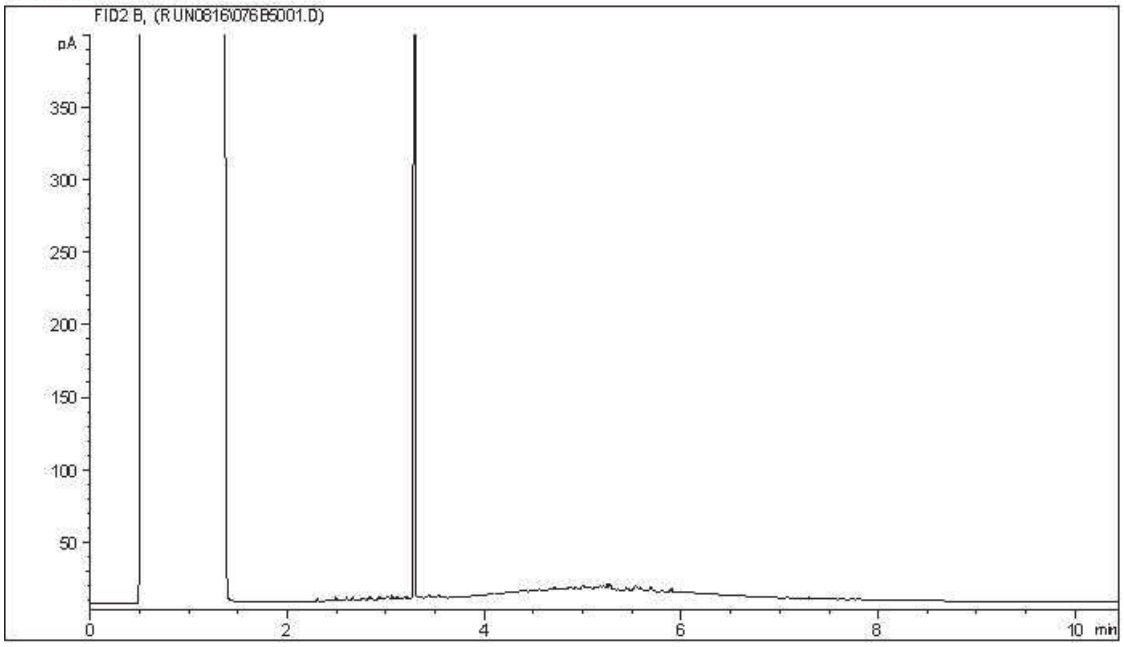

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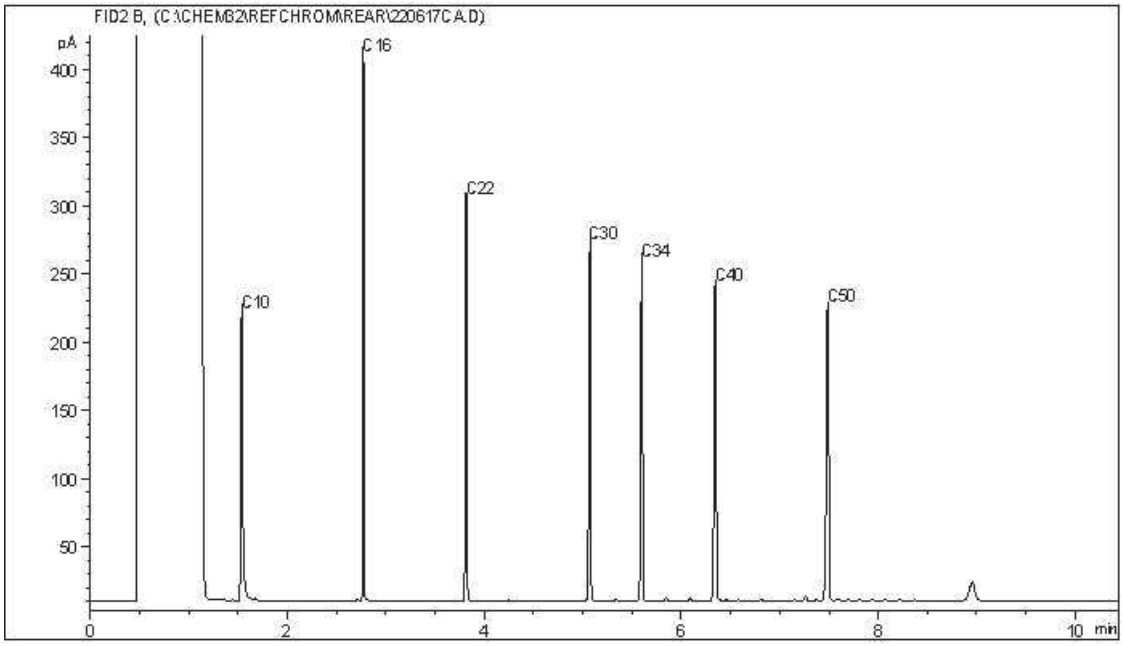

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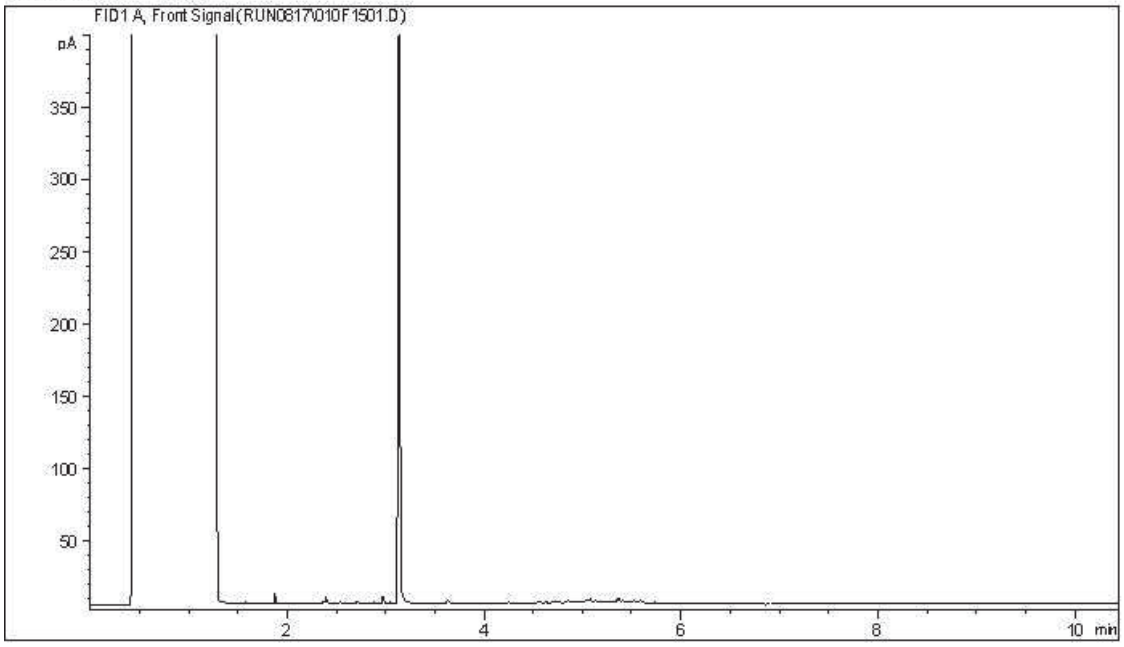
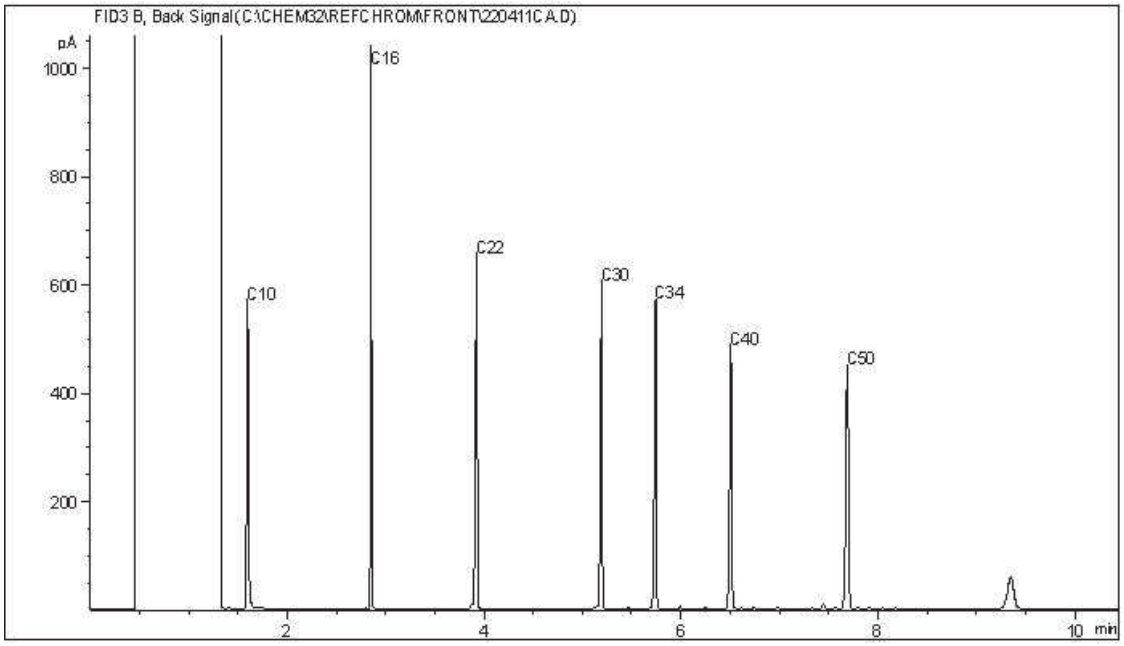
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC19



Carbon Range Distribution - Reference Chromatogram



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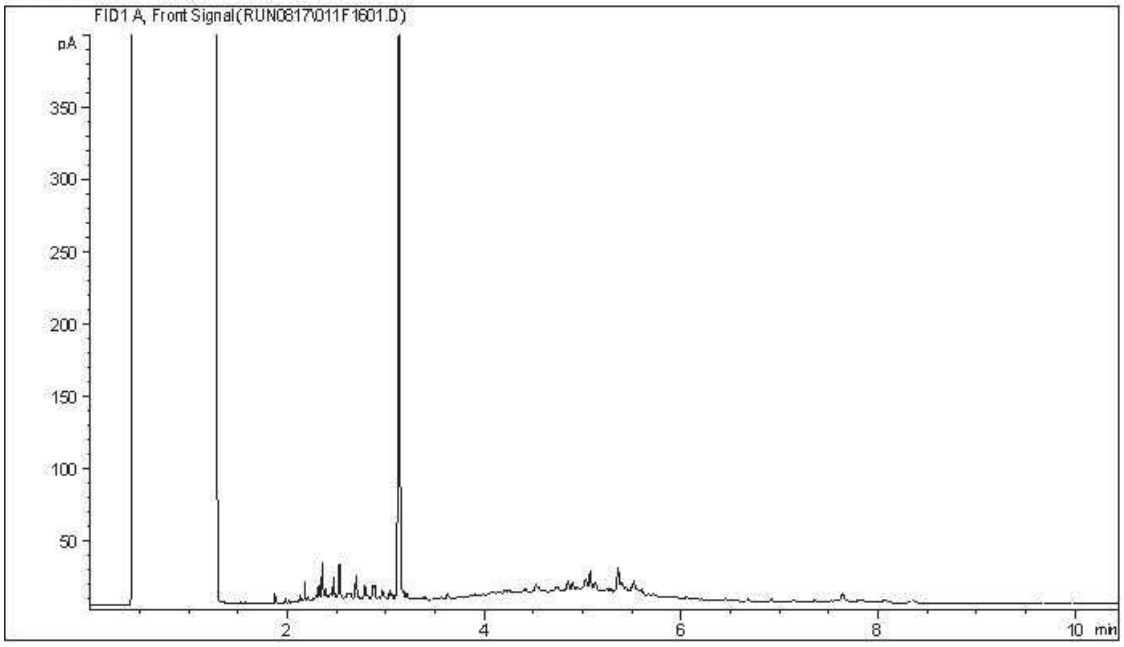

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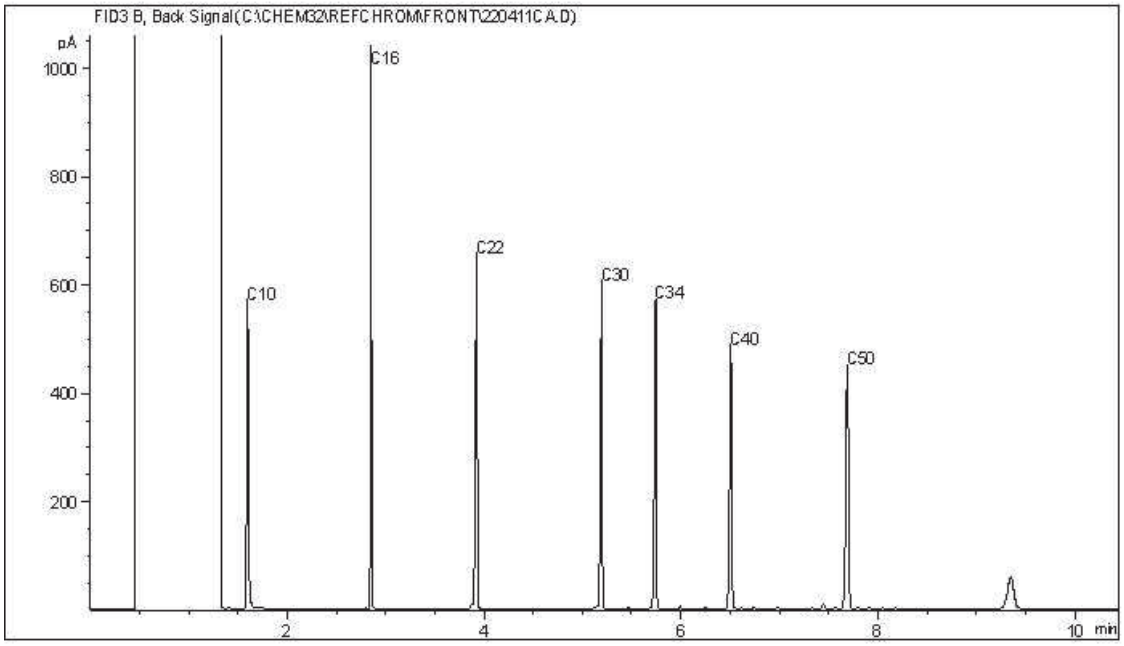

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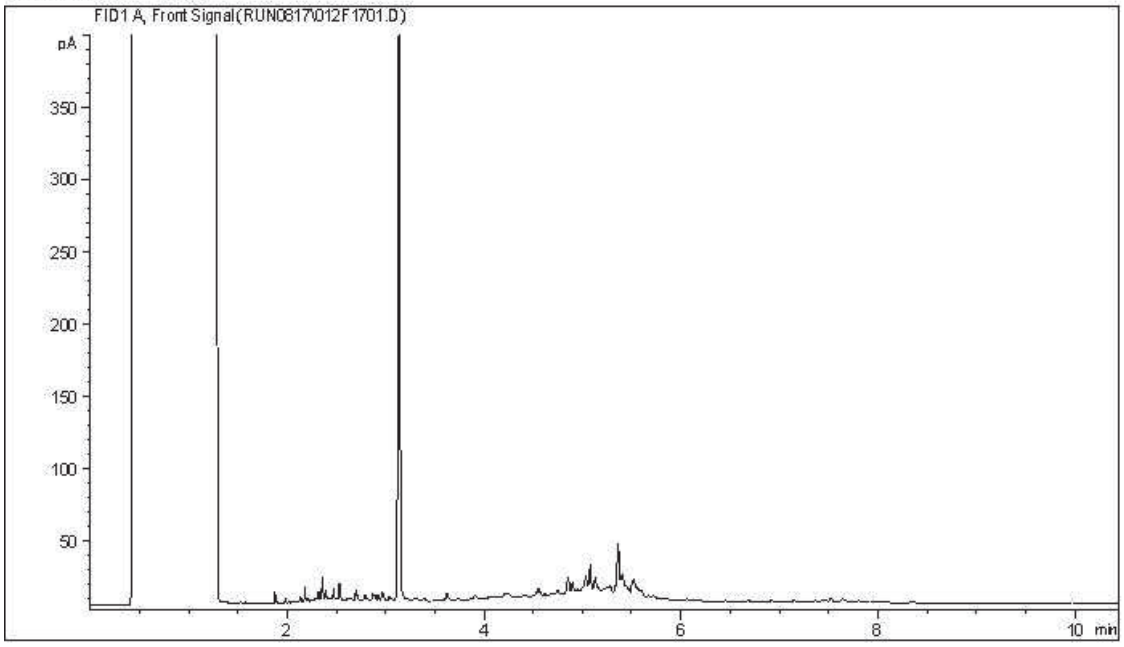

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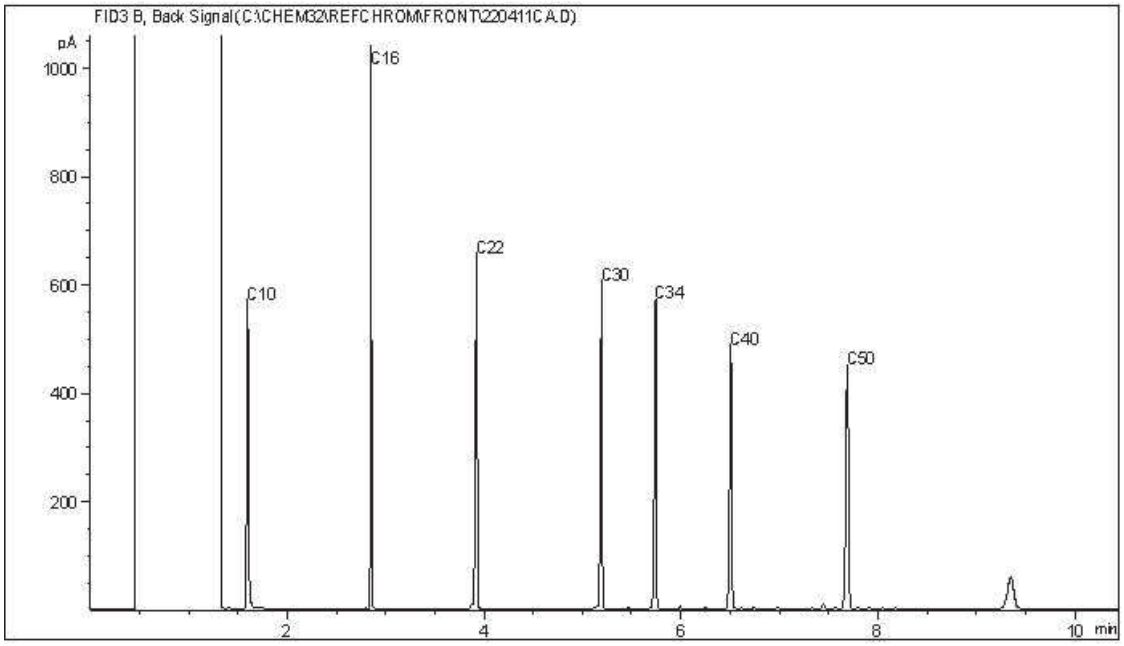

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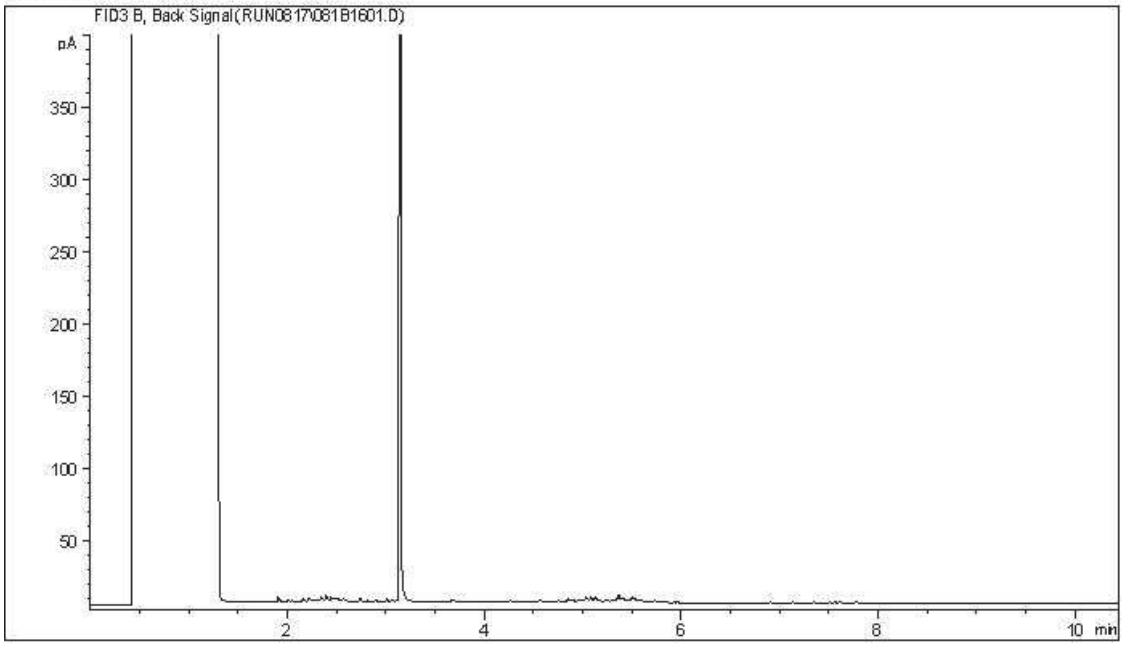

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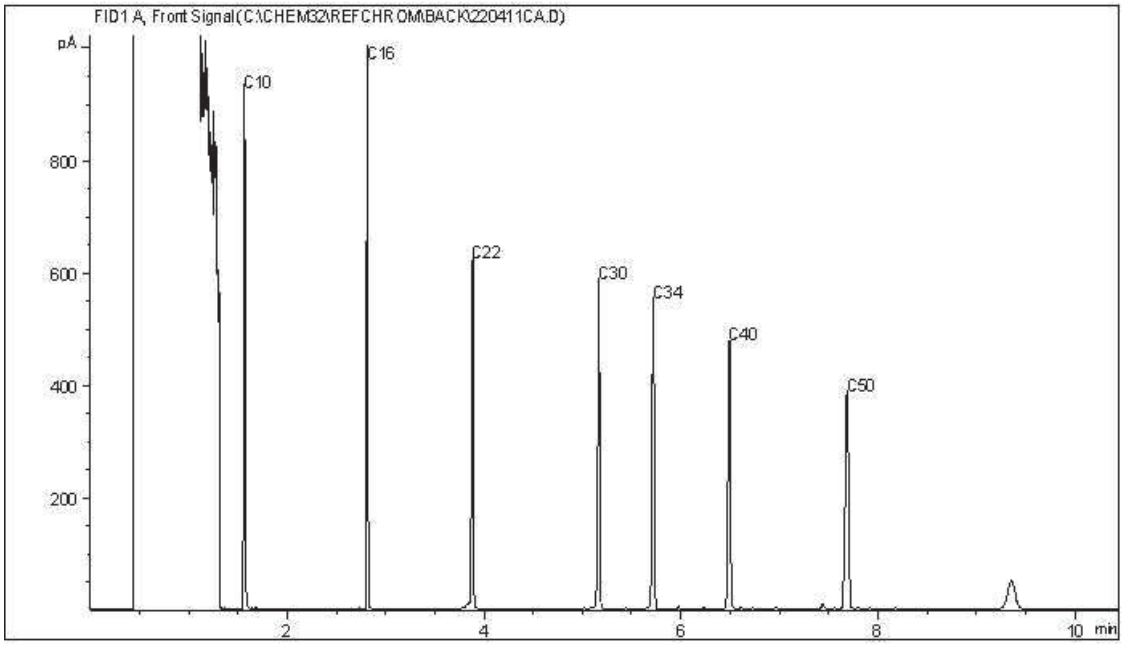

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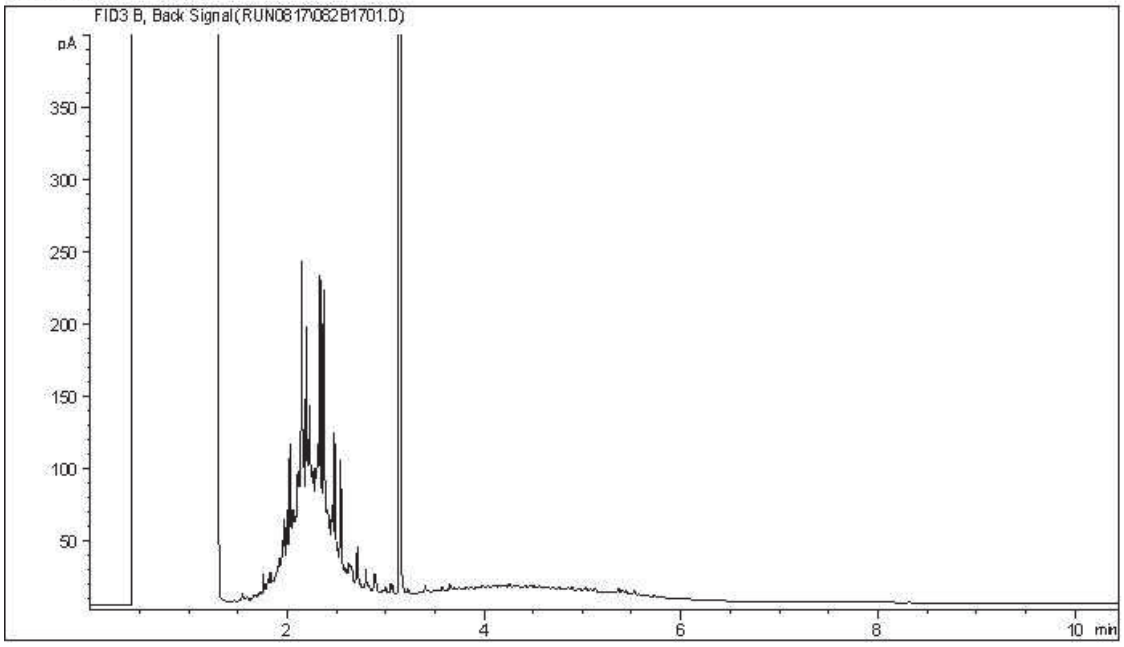

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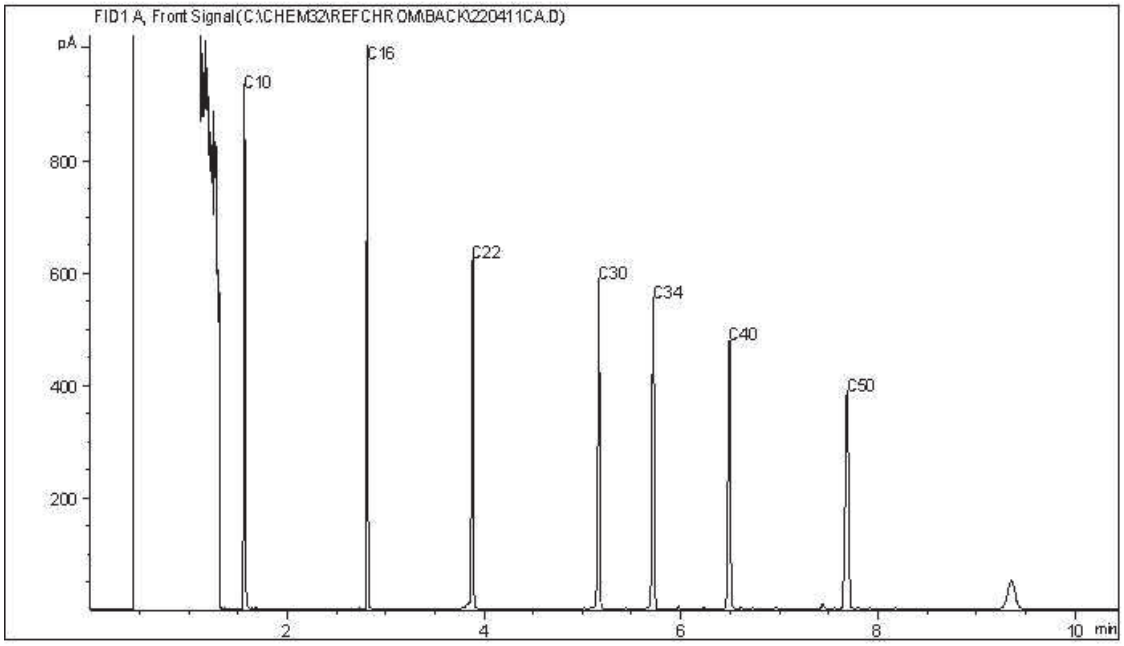

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August 19, 2022

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

Attention: Aurelie Bellavance

Re: Chromatogram Interpretation of CAMP FAREWELL, NT; Project 22525414-1000
Bureau Veritas Job No.: C260016

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
AZM175	BH22-29-03	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.
AZM183	BH22-25-5	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.

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.

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC
2021 - 41ST STREET NE
Calgary, AB T2E6P2
(403) 291-3077

ATTENTION TO: Cynny Hagen

PROJECT: C260016

AGAT WORK ORDER: 22C940433

SOIL ANALYSIS REVIEWED BY: Loan Nguyen, Senior Analyst

DATE REPORTED: Sep 06, 2022

PAGES (INCLUDING COVER): 7

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
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Certificate of Analysis

AGAT WORK ORDER: 22C940433

PROJECT: C260016

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Cynny Hagen

SAMPLING SITE:

SAMPLED BY:

Metals - Barium by Fusion ICP

DATE RECEIVED: 2022-09-01

DATE REPORTED: 2022-09-06

				AZM179-BH22-	AZM180-BH22-	AZM181-BH22-	AZM182-BH22-	AZM183-BH22-
			SAMPLE DESCRIPTION:	25-03	25-01	25-02	25-04	25-5
			SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
			DATE SAMPLED:	2022-09-01 15:20	2022-09-01 15:00	2022-09-01 15:10	2022-09-01 15:30	2022-09-01 15:40
Parameter	Unit	G / S	RDL	4266731	4266735	4266736	4266737	4266738
True Barium by Fusion ICP	mg/kg		50	3560	36400	9770	3770	1960

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4266731-4266738 Result is based on the dry weight of the sample.

Analysis performed at AGAT Calgary (unless marked by *)

Certified By:

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 22C940433

PROJECT: C260016

ATTENTION TO: Cynny Hagen

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Sep 06, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Metals - Barium by Fusion ICP															
Barium by Fusion ICP-OES	4266587		976	977	0.0%	< 40	95%	70%	130%				NA	70%	130%

Comments: Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.
Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

Certified By:

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 22C940433

PROJECT: C260016

ATTENTION TO: Cynny Hagen

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
True Barium by Fusion ICP	SOIL- 0620, INST- 0140	ASTM D4503.08	ICP/OES

1-SEP '22 PM12:10

Sent To: **AGAT - Calgary**
2910 12th Street NE
Calgary, AB, T2E 7P7
Tel: (403) 735-2005

CHAIN OF CUSTODY RECORD FOR SUBCONTRACTED WORK

COC # C260016-CAGT-01-01

22C940433

REPORT INFORMATION	
Company:	Bureau Veritas
Address:	4000 19st N.E, Calgary, Alberta, T2E 6P8
Contact Name:	Cynny Hagen
Email:	Cynny.HAGEN@bureauveritas.com, Customersolutionswest@bureauveritas.co
Phone:	(403) 735-2273
Lab Project #:	C260016

#	SAMPLE ID	MATRIX	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	SAMPLER INITIALS	# CONT.	ANALYSIS REQUESTED: Barium on ICP using Fusion Extraction										ADDITIONAL SAMPLE INFORMATION
1	AZM179-BH22-25-03	SOIL	2022/08/09	15:20	ML	1	X										(P: 01)
2	AZM180-BH22-25-01	SOIL	2022/08/09	15:00	ML	1	X										(P: 01)
3	AZM181-BH22-25-02	SOIL	2022/08/09	15:10	ML	1	X										(P: 01)
4	AZM182-BH22-25-04	SOIL	2022/08/09	15:30	ML	1	X										(P: 01)
5	AZM183-BH22-25-5	SOIL	2022/08/09	13:40	ML	1	X										(P: 01)
6																	
7																	
8																	
9																	
10																	

REGULATORY CRITERIA

SPECIAL INSTRUCTIONS

Please inform Bureau Veritas immediately if:
- You are not accredited for the requested test(s)
- The hold time is approaching for the requested test(s).

Please return a copy of this form with the report.

TURNAROUND TIME

[X] Rush Required

2022/09/07

Date Required

Please inform us if rush charges will be incurred.

COOLER ID:	YES	NO	Temp: (°C)			
Custody Seal Present						
Custody Seal Intact						
Cooling Media Present						

COOLER ID:	YES	NO	Temp: (°C)			
Custody Seal Present						
Custody Seal Intact						
Cooling Media Present						

COOLER ID:	YES	NO	Temp: (°C)			
Custody Seal Present	—		NA			
Custody Seal Intact	—					
Cooling Media Present	—					

RELINQUISHED BY: (SIGN & PRINT)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (SIGN & PRINT)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
1. Robert McBratney	2022/09/01	09:30	1. Lanz Cruz	2022/09/01	12:10
2.			2.		

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: Bureau Veritas

Courier: Jazoo Prepaid Collect

Waybill#_____

Branch: EDM GP FN FM RD VAN LYD FSJ EST SASK Other:___

If multiple sites were submitted at once: (Yes) No

Custody Seal Intact: Yes No (NA)

TAT: <24hr 24-48hr 48-72hr Reg Other_____

Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes No

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Color , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry:_____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES NO Precaution Taken:_____

Legal Samples: Yes No

International Samples: Yes No

Tape Sealed: Yes No

Coolant Used: Icepack (Bagged Ice) Free Ice Free Water None

Temperature (Bottles/Jars only) (N/A) if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) NA Soil =___°C 2(Bottle/Jar)___+___+___=___°C

3 (Bottle/Jar)___+___+___=___°C 4 (Bottle/Jar)___+___+___=___°C

5 (Bottle/Jar)___+___+___=___°C 6 (Bottle/Jar)___+___+___=___°C

7 (Bottle/Jar)___+___+___=___°C 8 (Bottle/Jar)___+___+___=___°C

9 (Bottle/Jar)___+___+___=___°C 10 (Bottle/Jar)___+___+___=___°C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: _____

Samples Damaged: Yes No If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial_____

General Comments: _____

_____

_____

_____

_____

* Subcontracted Analysis (See CPM)

Date issued: March 11, 2020
Document ID: SR-9505.004

IN-CITY

JAZOO EXPRESS COURIER

www.jazoocourier.com

CLIENT USE ONLY

Sender Name:	Robel Mebrahtu	Receiver Name:	Sample Reception	Billed To:	Bureau Veritas
Date:	20221091101	Delivery From:	Bureau Veritas Calgary		
		Delivery To:	AGAT-Calgary 2910 12th street NE Calgary,AB, T2E 7P7		
Total # Items:	2	Item Description: envelope, sm/med/lg box, cooler, etc.	1 Large Cooler, 1 Medium Cooler		
			Job/PO/Reference #:		
Authorized Shipper Signature:					

DRIVER USE ONLY

P/U Driver Name:		P/U Time:	11:50 am	D/O Time:	am
# Items P/U:	2		pm		7:05 pm

# Of Overweight	# Of TDG	# Of Same Day	Surcharge

Additional Info: Done

Total # Items Dropped Off:	2	D/O Driver Name:	
Authorized Receiver Signature:			

HOTSHOT DETAILS

Total Km:		Or Total Charge ($):	

OFFICE USE ONLY

Verified By:		Invoiced By:	

To schedule a pickup please contact dispatch at the city nearest you:

Calgary	403-660-5504	**Fort McMurray**	587-645-6364
Edmonton	780-903-3628	**Grande Prairie**	587-297-8406

THANK YOU FOR SUPPORTING LOCAL AND CHOOSING JAZOO EXPRESS COURIER.

Your P.O. #: 22525414-1100-1104
Your Project #: 22525414-1000
Site Location: CAMP FAREWELL,NT
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: 2022/09/06
Report #: R3226629
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C260031
Received: 2022/08/12, 09:00

Sample Matrix: Soil
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Boron (Hot Water Soluble)	9	2022/08/16	2022/08/16	AB SOP-00034 / AB SOP-00042	EPA 6010d R5 m
BTEX/F1 by HS GC/MS/FID (MeOH extract) (2)	9	N/A	2022/08/16	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX	9	N/A	2022/08/16		Auto Calc
Hexavalent Chromium (3)	5	2022/08/16	2022/08/16	AB SOP-00063	SM 23 3500-Cr B m
Hexavalent Chromium (3)	4	2022/08/17	2022/08/17	AB SOP-00063	SM 23 3500-Cr B m
Barium on ICP using Fusion Extraction (1)	1	N/A	2022/09/06		
CCME Hydrocarbons (F2-F4 in soil) (4)	1	2022/08/15	2022/08/15	AB SOP-00036	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in soil) (4)	8	2022/08/15	2022/08/16	AB SOP-00036	CCME PHC-CWS m
Elements by ICPMS - Soils	9	2022/08/16	2022/08/17	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Moisture	9	N/A	2022/08/16	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.

Your P.O. #: 22525414-1100-1104
Your Project #: 22525414-1000
Site Location: CAMP FAREWELL,NT
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: 2022/09/06
Report #: R3226629
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C260031

Received: 2022/08/12, 09:00

(1) This test was performed by AGAT - Calgary, 2910 12th Street NE , Calgary, AB, T2E 7P7
(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) Some soil samples may react with the Cr(VI) spike reducing it to Cr(III). These samples are highly unlikely to contain native hexavalent chromium. Thus a failed spike recovery does not invalidate a negative result on the native sample.
(4) 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.

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
06 Sep 2022 17:28:05

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 #: C260031
Report Date: 2022/09/06

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

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		AZM277	AZM278	AZM279	AZM280	AZM281	AZM282		
Sampling Date		2022/08/08 13:30	2022/08/08 13:30	2022/08/08 13:40	2022/08/08 13:45	2022/08/08 13:50	2022/08/08 13:00		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**DUP E**	**BH22-20-04**	**BH22-20-03**	**BH22-20-02**	**BH22-20-01**	**BH22-18-01**	**RDL**	**QC Batch**
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	41	100	300	14	94	18	10	A681077
F3 (C16-C34 Hydrocarbons)	mg/kg	81	130	670	<50	400	310	50	A681077
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	<50	260	<50	160	140	50	A681077
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	Yes	Yes	N/A	A681077
Physical Properties									
Moisture	%	16	18	40	5.4	14	38	0.30	A681090
Volatiles									
Xylenes (Total)	mg/kg	<0.045	<0.045	<0.045	<0.045	0.16	<0.045	0.045	A679841
F1 (C6-C10) - BTEX	mg/kg	<10	<10	<10	<10	<10	<10	10	A679841
Field Preserved Volatiles									
Benzene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	0.022	<0.0050	0.0050	A680852
Toluene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.12	<0.050	0.050	A680852
Ethylbenzene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.026	<0.010	0.010	A680852
m & p-Xylene	mg/kg	<0.040	<0.040	<0.040	<0.040	0.13	<0.040	0.040	A680852
o-Xylene	mg/kg	<0.020	<0.020	<0.020	<0.020	0.032	<0.020	0.020	A680852
F1 (C6-C10)	mg/kg	<10	<10	<10	<10	<10	<10	10	A680852
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	98	97	97	98	97	97	N/A	A680852
4-Bromofluorobenzene (sur.)	%	100	100	100	100	99	101	N/A	A680852
D10-o-Xylene (sur.)	%	101	102	99	105	83	86	N/A	A680852
D4-1,2-Dichloroethane (sur.)	%	103	102	103	103	102	104	N/A	A680852
O-TERPHENYL (sur.)	%	96	98	108	98	101	104	N/A	A681077

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 #: C260031
Report Date: 2022/09/06

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

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		AZM283	AZM284	AZM284	AZM285		
Sampling Date		2022/08/08 13:10	2022/08/08 13:15	2022/08/08 13:15	2022/08/08 13:20		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	BH22-18-02	BH22-18-03	BH22-18-03 Lab-Dup	BH22-18-04	RDL	QC Batch
Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	<10	<10	<10	10	A681077
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	<50	<50	<50	50	A681077
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	<50	<50	<50	50	A681077
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	N/A	A681077
Physical Properties							
Moisture	%	20	15	N/A	17	0.30	A681090
Volatiles							
Xylenes (Total)	mg/kg	<0.045	<0.045	N/A	<0.045	0.045	A679841
F1 (C6-C10) - BTEX	mg/kg	<10	<10	N/A	<10	10	A679841
Field Preserved Volatiles							
Benzene	mg/kg	<0.0050	<0.0050	N/A	<0.0050	0.0050	A680852
Toluene	mg/kg	<0.050	<0.050	N/A	<0.050	0.050	A680852
Ethylbenzene	mg/kg	<0.010	0.025	N/A	<0.010	0.010	A680852
m & p-Xylene	mg/kg	<0.040	<0.040	N/A	<0.040	0.040	A680852
o-Xylene	mg/kg	<0.020	<0.020	N/A	<0.020	0.020	A680852
F1 (C6-C10)	mg/kg	<10	<10	N/A	<10	10	A680852
Surrogate Recovery (%)							
1,4-Difluorobenzene (sur.)	%	96	97	N/A	96	N/A	A680852
4-Bromofluorobenzene (sur.)	%	101	100	N/A	101	N/A	A680852
D10-o-Xylene (sur.)	%	108	107	N/A	103	N/A	A680852
D4-1,2-Dichloroethane (sur.)	%	105	104	N/A	106	N/A	A680852
O-TERPHENYL (sur.)	%	101	101	100	101	N/A	A681077

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
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 #: C260031
Report Date: 2022/09/06

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

CCME REGULATED METALS - SOILS (SOIL)

Bureau Veritas ID		AZM277	AZM278	AZM279		AZM280		AZM281		
Sampling Date		2022/08/08 13:30	2022/08/08 13:30	2022/08/08 13:40		2022/08/08 13:45		2022/08/08 13:50		
COC Number		1 of 1	1 of 1	1 of 1		1 of 1		1 of 1		
	UNITS	DUP E	BH22-20-04	BH22-20-03	QC Batch	BH22-20-02	QC Batch	BH22-20-01	RDL	QC Batch
Elements										
Soluble (Hot water) Boron (B)	mg/kg	0.20	<0.10	0.31	A683007	0.23	A683007	0.65	0.10	A683000
Hex. Chromium (Cr 6+)	mg/kg	<0.080	<0.080	<0.080	A683972	<0.080	A682697	<0.080	0.080	A683972
Total Antimony (Sb)	mg/kg	<0.50	<0.50	<0.50	A682611	<0.50	A682611	1.9	0.50	A683223
Total Arsenic (As)	mg/kg	7.3	6.8	5.3	A682611	4.7	A682611	4.7	1.0	A683223
Total Barium (Ba)	mg/kg	360	140	120	A682611	380	A682611	2200	1.0	A683223
Total Beryllium (Be)	mg/kg	<0.40	<0.40	<0.40	A682611	<0.40	A682611	<0.40	0.40	A683223
Total Cadmium (Cd)	mg/kg	0.12	0.10	0.24	A682611	0.091	A682611	0.25	0.050	A683223
Total Chromium (Cr)	mg/kg	21	8.7	10	A682611	42	A682611	12	1.0	A683223
Total Cobalt (Co)	mg/kg	4.7	4.8	12	A682611	2.5	A682611	2.8	0.50	A683223
Total Copper (Cu)	mg/kg	7.9	5.6	9.6	A682611	6.3	A682611	56	1.0	A683223
Total Lead (Pb)	mg/kg	7.8	4.2	5.2	A682611	9.0	A682611	110	0.50	A683223
Total Mercury (Hg)	mg/kg	<0.050	<0.050	0.051	A682611	<0.050	A682611	<0.050	0.050	A683223
Total Molybdenum (Mo)	mg/kg	1.7	0.93	0.74	A682611	1.6	A682611	1.6	0.40	A683223
Total Nickel (Ni)	mg/kg	17	13	32	A682611	21	A682611	9.1	1.0	A683223
Total Selenium (Se)	mg/kg	<0.50	<0.50	0.86	A682611	<0.50	A682611	<0.50	0.50	A683223
Total Silver (Ag)	mg/kg	<0.20	<0.20	<0.20	A682611	<0.20	A682611	<0.20	0.20	A683223
Total Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	A682611	<0.10	A682611	<0.10	0.10	A683223
Total Tin (Sn)	mg/kg	<1.0	<1.0	<1.0	A682611	<1.0	A682611	1.5	1.0	A683223
Total Uranium (U)	mg/kg	0.69	0.51	2.3	A682611	0.29	A682611	0.37	0.20	A683223
Total Vanadium (V)	mg/kg	18	17	21	A682611	15	A682611	13	1.0	A683223
Total Zinc (Zn)	mg/kg	32	32	28	A682611	22	A682611	73	10	A683223

RDL = Reportable Detection Limit

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

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

CCME REGULATED METALS - SOILS (SOIL)

Bureau Veritas ID		AZM282	AZM282	AZM283		AZM284		AZM285		
Sampling Date		2022/08/08 13:00	2022/08/08 13:00	2022/08/08 13:10		2022/08/08 13:15		2022/08/08 13:20		
COC Number		1 of 1	1 of 1	1 of 1		1 of 1		1 of 1		
	UNITS	BH22-18-01	BH22-18-01 Lab-Dup	BH22-18-02	QC Batch	BH22-18-03	QC Batch	BH22-18-04	RDL	QC Batch
Elements										
Soluble (Hot water) Boron (B)	mg/kg	2.1	2.2	0.17	A683007	<0.10	A683000	<0.10	0.10	A683007
Hex. Chromium (Cr 6+)	mg/kg	<0.080	N/A	<0.080	A682697	<0.080	A682697	<0.080	0.080	A682697
Total Antimony (Sb)	mg/kg	<0.50	N/A	<0.50	A682611	<0.50	A683223	<0.50	0.50	A682611
Total Arsenic (As)	mg/kg	5.6	N/A	6.9	A682611	5.2	A683223	5.2	1.0	A682611
Total Barium (Ba)	mg/kg	300	N/A	130	A682611	89	A683223	76	1.0	A682611
Total Beryllium (Be)	mg/kg	<0.40	N/A	<0.40	A682611	<0.40	A683223	<0.40	0.40	A682611
Total Cadmium (Cd)	mg/kg	0.086	N/A	0.055	A682611	0.078	A683223	0.056	0.050	A682611
Total Chromium (Cr)	mg/kg	20	N/A	7.7	A682611	4.8	A683223	6.4	1.0	A682611
Total Cobalt (Co)	mg/kg	3.1	N/A	3.9	A682611	2.8	A683223	3.1	0.50	A682611
Total Copper (Cu)	mg/kg	6.0	N/A	2.8	A682611	2.7	A683223	3.2	1.0	A682611
Total Lead (Pb)	mg/kg	6.2	N/A	3.7	A682611	3.2	A683223	2.7	0.50	A682611
Total Mercury (Hg)	mg/kg	0.064	N/A	<0.050	A682611	<0.050	A683223	<0.050	0.050	A682611
Total Molybdenum (Mo)	mg/kg	1.4	N/A	0.54	A682611	0.54	A683223	0.57	0.40	A682611
Total Nickel (Ni)	mg/kg	12	N/A	8.4	A682611	7.0	A683223	8.5	1.0	A682611
Total Selenium (Se)	mg/kg	0.56	N/A	<0.50	A682611	<0.50	A683223	<0.50	0.50	A682611
Total Silver (Ag)	mg/kg	<0.20	N/A	<0.20	A682611	<0.20	A683223	<0.20	0.20	A682611
Total Thallium (Tl)	mg/kg	<0.10	N/A	<0.10	A682611	<0.10	A683223	<0.10	0.10	A682611
Total Tin (Sn)	mg/kg	<1.0	N/A	<1.0	A682611	<1.0	A683223	<1.0	1.0	A682611
Total Uranium (U)	mg/kg	0.52	N/A	0.26	A682611	0.26	A683223	0.29	0.20	A682611
Total Vanadium (V)	mg/kg	21	N/A	16	A682611	9.7	A683223	13	1.0	A682611
Total Zinc (Zn)	mg/kg	19	N/A	23	A682611	20	A683223	22	10	A682611

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

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Bureau Veritas Job #: C260031
Report Date: 2022/09/06

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

RESULTS OF CHEMICAL ANALYSES OF SOIL

Bureau Veritas ID		AZM281	
Sampling Date		2022/08/08 13:50	
COC Number		1 of 1	
	UNITS	**BH22-20-01**	**QC Batch**
Parameter			
Subcontract Parameter	N/A	ATTACHED	A705741

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GENERAL COMMENTS

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

Package 1	4.0°C

Version 2: Report reissued to include Chromatogram analysis on sample AZM279/BH22-20-03as per client request received 2022/08/18.

Version 3: Report reissued to include results for Barium - True Total on sample BH22-20-01/AZM281 as per client request received 2022/08/24.

Sample AZM281 [BH22-20-01] : Please see attachment for Barium on ICP using Fusion Extraction results.

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

Bureau Veritas Job #: C260031
Report Date: 2022/09/06

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

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A680852	DO1	Matrix Spike	1,4-Difluorobenzene (sur.)	2022/08/16		91	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/16		102	%	50 - 140
			D10-o-Xylene (sur.)	2022/08/16		99	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/16		102	%	50 - 140
			Benzene	2022/08/16		91	%	50 - 140
			Toluene	2022/08/16		86	%	50 - 140
			Ethylbenzene	2022/08/16		89	%	50 - 140
			m & p-Xylene	2022/08/16		89	%	50 - 140
			o-Xylene	2022/08/16		92	%	50 - 140
			F1 (C6-C10)	2022/08/16		91	%	60 - 140
A680852	DO1	Spiked Blank	1,4-Difluorobenzene (sur.)	2022/08/16		93	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/16		102	%	50 - 140
			D10-o-Xylene (sur.)	2022/08/16		94	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/16		114	%	50 - 140
			Benzene	2022/08/16		98	%	60 - 130
			Toluene	2022/08/16		90	%	60 - 130
			Ethylbenzene	2022/08/16		89	%	60 - 130
			m & p-Xylene	2022/08/16		89	%	60 - 130
			o-Xylene	2022/08/16		92	%	60 - 130
			F1 (C6-C10)	2022/08/16		106	%	60 - 140
A680852	DO1	Method Blank	1,4-Difluorobenzene (sur.)	2022/08/16		96	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/16		101	%	50 - 140
			D10-o-Xylene (sur.)	2022/08/16		85	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/16		105	%	50 - 140
			Benzene	2022/08/16	<0.0050		mg/kg	
			Toluene	2022/08/16	<0.050		mg/kg	
			Ethylbenzene	2022/08/16	<0.010		mg/kg	
			m & p-Xylene	2022/08/16	<0.040		mg/kg	
			o-Xylene	2022/08/16	<0.020		mg/kg	
			F1 (C6-C10)	2022/08/16	<10		mg/kg	
A680852	DO1	RPD	Benzene	2022/08/16	NC		%	50
			Toluene	2022/08/16	NC		%	50
			Ethylbenzene	2022/08/16	NC		%	50
			m & p-Xylene	2022/08/16	NC		%	50
			o-Xylene	2022/08/16	NC		%	50
			F1 (C6-C10)	2022/08/16	NC		%	30
A681077	GG3	Matrix Spike [AZM284-02]	O-TERPHENYL (sur.)	2022/08/15		81	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/15		77	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/15		77	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/15		72	%	60 - 140
A681077	GG3	Spiked Blank	O-TERPHENYL (sur.)	2022/08/15		81	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/15		78	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/15		79	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/15		74	%	60 - 140
A681077	GG3	Method Blank	O-TERPHENYL (sur.)	2022/08/15		83	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/15	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2022/08/15	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2022/08/15	<50		mg/kg	
A681077	GG3	RPD [AZM284-02]	F2 (C10-C16 Hydrocarbons)	2022/08/15	NC		%	40
			F3 (C16-C34 Hydrocarbons)	2022/08/15	NC		%	40
			F4 (C34-C50 Hydrocarbons)	2022/08/15	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
A681090	A1H	Method Blank	Moisture	2022/08/16	<0.30		%	
A681090	A1H	RPD	Moisture	2022/08/16	2.1		%	20
A682611	MKJ	Matrix Spike	Total Antimony (Sb)	2022/08/17		101	%	75 - 125
			Total Arsenic (As)	2022/08/17		97	%	75 - 125
			Total Barium (Ba)	2022/08/17		NC	%	75 - 125
			Total Beryllium (Be)	2022/08/17		96	%	75 - 125
			Total Cadmium (Cd)	2022/08/17		98	%	75 - 125
			Total Chromium (Cr)	2022/08/17		113	%	75 - 125
			Total Cobalt (Co)	2022/08/17		99	%	75 - 125
			Total Copper (Cu)	2022/08/17		100	%	75 - 125
			Total Lead (Pb)	2022/08/17		99	%	75 - 125
			Total Mercury (Hg)	2022/08/17		96	%	75 - 125
			Total Molybdenum (Mo)	2022/08/17		101	%	75 - 125
			Total Nickel (Ni)	2022/08/17		104	%	75 - 125
			Total Selenium (Se)	2022/08/17		100	%	75 - 125
			Total Silver (Ag)	2022/08/17		99	%	75 - 125
			Total Thallium (Tl)	2022/08/17		98	%	75 - 125
			Total Tin (Sn)	2022/08/17		102	%	75 - 125
			Total Uranium (U)	2022/08/17		95	%	75 - 125
			Total Vanadium (V)	2022/08/17		140 (1)	%	75 - 125
			Total Zinc (Zn)	2022/08/17		102	%	75 - 125
A682611	MKJ	QC Standard	Total Antimony (Sb)	2022/08/17		109	%	15 - 182
			Total Arsenic (As)	2022/08/17		103	%	53 - 147
			Total Barium (Ba)	2022/08/17		103	%	80 - 119
			Total Cadmium (Cd)	2022/08/17		94	%	72 - 128
			Total Chromium (Cr)	2022/08/17		113	%	59 - 141
			Total Cobalt (Co)	2022/08/17		101	%	58 - 142
			Total Copper (Cu)	2022/08/17		103	%	83 - 117
			Total Lead (Pb)	2022/08/17		111	%	79 - 121
			Total Molybdenum (Mo)	2022/08/17		122	%	67 - 133
			Total Nickel (Ni)	2022/08/17		110	%	79 - 121
			Total Silver (Ag)	2022/08/17		89	%	47 - 153
			Total Tin (Sn)	2022/08/17		98	%	67 - 133
			Total Uranium (U)	2022/08/17		98	%	77 - 123
			Total Vanadium (V)	2022/08/17		111	%	79 - 121
			Total Zinc (Zn)	2022/08/17		103	%	79 - 121
A682611	MKJ	Spiked Blank	Total Antimony (Sb)	2022/08/17		102	%	80 - 120
			Total Arsenic (As)	2022/08/17		95	%	80 - 120
			Total Barium (Ba)	2022/08/17		96	%	80 - 120
			Total Beryllium (Be)	2022/08/17		92	%	80 - 120
			Total Cadmium (Cd)	2022/08/17		95	%	80 - 120
			Total Chromium (Cr)	2022/08/17		97	%	80 - 120
			Total Cobalt (Co)	2022/08/17		97	%	80 - 120
			Total Copper (Cu)	2022/08/17		97	%	80 - 120
			Total Lead (Pb)	2022/08/17		97	%	80 - 120
			Total Mercury (Hg)	2022/08/17		100	%	80 - 120
			Total Molybdenum (Mo)	2022/08/17		96	%	80 - 120
			Total Nickel (Ni)	2022/08/17		96	%	80 - 120
			Total Selenium (Se)	2022/08/17		99	%	80 - 120
			Total Silver (Ag)	2022/08/17		96	%	80 - 120
			Total Thallium (Tl)	2022/08/17		97	%	80 - 120
			Total Tin (Sn)	2022/08/17		96	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Uranium (U)	2022/08/17		97	%	80 - 120
			Total Vanadium (V)	2022/08/17		97	%	80 - 120
			Total Zinc (Zn)	2022/08/17		97	%	80 - 120
A682611	MKJ	Method Blank	Total Antimony (Sb)	2022/08/17	<0.50		mg/kg	
			Total Arsenic (As)	2022/08/17	<1.0		mg/kg	
			Total Barium (Ba)	2022/08/17	<1.0		mg/kg	
			Total Beryllium (Be)	2022/08/17	<0.40		mg/kg	
			Total Cadmium (Cd)	2022/08/17	<0.050		mg/kg	
			Total Chromium (Cr)	2022/08/17	<1.0		mg/kg	
			Total Cobalt (Co)	2022/08/17	<0.50		mg/kg	
			Total Copper (Cu)	2022/08/17	<1.0		mg/kg	
			Total Lead (Pb)	2022/08/17	<0.50		mg/kg	
			Total Mercury (Hg)	2022/08/17	<0.050		mg/kg	
			Total Molybdenum (Mo)	2022/08/17	<0.40		mg/kg	
			Total Nickel (Ni)	2022/08/17	<1.0		mg/kg	
			Total Selenium (Se)	2022/08/17	<0.50		mg/kg	
			Total Silver (Ag)	2022/08/17	<0.20		mg/kg	
			Total Thallium (Tl)	2022/08/17	<0.10		mg/kg	
			Total Tin (Sn)	2022/08/17	<1.0		mg/kg	
			Total Uranium (U)	2022/08/17	<0.20		mg/kg	
			Total Vanadium (V)	2022/08/17	<1.0		mg/kg	
			Total Zinc (Zn)	2022/08/17	<10		mg/kg	
A682611	MKJ	RPD	Total Chromium (Cr)	2022/08/17	1.9		%	30
			Total Nickel (Ni)	2022/08/17	5.2		%	30
A682697	FM0	Matrix Spike	Hex. Chromium (Cr 6+)	2022/08/16		97	%	75 - 125
A682697	FM0	Spiked Blank	Hex. Chromium (Cr 6+)	2022/08/16		98	%	80 - 120
A682697	FM0	Method Blank	Hex. Chromium (Cr 6+)	2022/08/16	<0.080		mg/kg	
A682697	FM0	RPD	Hex. Chromium (Cr 6+)	2022/08/16	NC		%	35
A683000	MPU	Matrix Spike	Soluble (Hot water) Boron (B)	2022/08/16		95	%	75 - 125
A683000	MPU	Spiked Blank	Soluble (Hot water) Boron (B)	2022/08/16		89	%	80 - 120
A683000	MPU	Method Blank	Soluble (Hot water) Boron (B)	2022/08/16	<0.10		mg/kg	
A683000	MPU	RPD	Soluble (Hot water) Boron (B)	2022/08/16	4.3		%	35
A683007	MPU	Matrix Spike [AZM282-01]	Soluble (Hot water) Boron (B)	2022/08/16		91	%	75 - 125
A683007	MPU	Spiked Blank	Soluble (Hot water) Boron (B)	2022/08/16		94	%	80 - 120
A683007	MPU	Method Blank	Soluble (Hot water) Boron (B)	2022/08/16	<0.10		mg/kg	
A683007	MPU	RPD [AZM282-01]	Soluble (Hot water) Boron (B)	2022/08/16	6.8		%	35
A683223	KH2	Matrix Spike	Total Antimony (Sb)	2022/08/17		104	%	75 - 125
			Total Arsenic (As)	2022/08/17		100	%	75 - 125
			Total Barium (Ba)	2022/08/17		NC	%	75 - 125
			Total Beryllium (Be)	2022/08/17		105	%	75 - 125
			Total Cadmium (Cd)	2022/08/17		101	%	75 - 125
			Total Chromium (Cr)	2022/08/17		113	%	75 - 125
			Total Cobalt (Co)	2022/08/17		102	%	75 - 125
			Total Copper (Cu)	2022/08/17		101	%	75 - 125
			Total Lead (Pb)	2022/08/17		103	%	75 - 125
			Total Mercury (Hg)	2022/08/17		101	%	75 - 125
			Total Molybdenum (Mo)	2022/08/17		106	%	75 - 125
			Total Nickel (Ni)	2022/08/17		106	%	75 - 125
			Total Selenium (Se)	2022/08/17		100	%	75 - 125
			Total Silver (Ag)	2022/08/17		104	%	75 - 125
			Total Thallium (Tl)	2022/08/17		102	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Tin (Sn)	2022/08/17		105	%	75 - 125
			Total Uranium (U)	2022/08/17		101	%	75 - 125
			Total Vanadium (V)	2022/08/17		131 (1)	%	75 - 125
			Total Zinc (Zn)	2022/08/17		113	%	75 - 125
A683223	KH2	QC Standard	Total Antimony (Sb)	2022/08/17		96	%	15 - 182
			Total Arsenic (As)	2022/08/17		73	%	53 - 147
			Total Barium (Ba)	2022/08/17		89	%	80 - 119
			Total Cadmium (Cd)	2022/08/17		85	%	72 - 128
			Total Chromium (Cr)	2022/08/17		78	%	59 - 141
			Total Cobalt (Co)	2022/08/17		73	%	58 - 142
			Total Copper (Cu)	2022/08/17		101	%	83 - 117
			Total Lead (Pb)	2022/08/17		98	%	79 - 121
			Total Molybdenum (Mo)	2022/08/17		112	%	67 - 133
			Total Nickel (Ni)	2022/08/17		81	%	79 - 121
			Total Silver (Ag)	2022/08/17		80	%	47 - 153
			Total Tin (Sn)	2022/08/17		86	%	67 - 133
			Total Uranium (U)	2022/08/17		81	%	77 - 123
			Total Vanadium (V)	2022/08/17		79	%	79 - 121
			Total Zinc (Zn)	2022/08/17		101	%	79 - 121
A683223	KH2	Spiked Blank	Total Antimony (Sb)	2022/08/17		101	%	80 - 120
			Total Arsenic (As)	2022/08/17		94	%	80 - 120
			Total Barium (Ba)	2022/08/17		97	%	80 - 120
			Total Beryllium (Be)	2022/08/17		98	%	80 - 120
			Total Cadmium (Cd)	2022/08/17		96	%	80 - 120
			Total Chromium (Cr)	2022/08/17		97	%	80 - 120
			Total Cobalt (Co)	2022/08/17		97	%	80 - 120
			Total Copper (Cu)	2022/08/17		97	%	80 - 120
			Total Lead (Pb)	2022/08/17		97	%	80 - 120
			Total Mercury (Hg)	2022/08/17		102	%	80 - 120
			Total Molybdenum (Mo)	2022/08/17		99	%	80 - 120
			Total Nickel (Ni)	2022/08/17		96	%	80 - 120
			Total Selenium (Se)	2022/08/17		96	%	80 - 120
			Total Silver (Ag)	2022/08/17		98	%	80 - 120
			Total Thallium (Tl)	2022/08/17		98	%	80 - 120
			Total Tin (Sn)	2022/08/17		97	%	80 - 120
			Total Uranium (U)	2022/08/17		98	%	80 - 120
			Total Vanadium (V)	2022/08/17		98	%	80 - 120
			Total Zinc (Zn)	2022/08/17		95	%	80 - 120
A683223	KH2	Method Blank	Total Antimony (Sb)	2022/08/17	<0.50		mg/kg	
			Total Arsenic (As)	2022/08/17	<1.0		mg/kg	
			Total Barium (Ba)	2022/08/17	<1.0		mg/kg	
			Total Beryllium (Be)	2022/08/17	<0.40		mg/kg	
			Total Cadmium (Cd)	2022/08/17	<0.050		mg/kg	
			Total Chromium (Cr)	2022/08/17	<1.0		mg/kg	
			Total Cobalt (Co)	2022/08/17	<0.50		mg/kg	
			Total Copper (Cu)	2022/08/17	<1.0		mg/kg	
			Total Lead (Pb)	2022/08/17	<0.50		mg/kg	
			Total Mercury (Hg)	2022/08/17	<0.050		mg/kg	
			Total Molybdenum (Mo)	2022/08/17	<0.40		mg/kg	
			Total Nickel (Ni)	2022/08/17	<1.0		mg/kg	
			Total Selenium (Se)	2022/08/17	<0.50		mg/kg	
			Total Silver (Ag)	2022/08/17	<0.20		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Thallium (Tl)	2022/08/17	<0.10		mg/kg	
			Total Tin (Sn)	2022/08/17	<1.0		mg/kg	
			Total Uranium (U)	2022/08/17	<0.20		mg/kg	
			Total Vanadium (V)	2022/08/17	<1.0		mg/kg	
			Total Zinc (Zn)	2022/08/17	<10		mg/kg	
A683223	KH2	RPD	Total Antimony (Sb)	2022/08/17	NC		%	30
			Total Arsenic (As)	2022/08/17	10		%	30
			Total Barium (Ba)	2022/08/17	14		%	35
			Total Beryllium (Be)	2022/08/17	NC		%	30
			Total Cadmium (Cd)	2022/08/17	0.64		%	30
			Total Chromium (Cr)	2022/08/17	7.9		%	30
			Total Cobalt (Co)	2022/08/17	7.9		%	30
			Total Copper (Cu)	2022/08/17	5.9		%	30
			Total Lead (Pb)	2022/08/17	3.3		%	35
			Total Mercury (Hg)	2022/08/17	NC		%	35
			Total Molybdenum (Mo)	2022/08/17	2.7		%	35
			Total Nickel (Ni)	2022/08/17	4.8		%	30
			Total Selenium (Se)	2022/08/17	NC		%	30
			Total Silver (Ag)	2022/08/17	NC		%	35
			Total Thallium (Tl)	2022/08/17	NC		%	30
			Total Tin (Sn)	2022/08/17	NC		%	35
			Total Uranium (U)	2022/08/17	5.0		%	30
			Total Vanadium (V)	2022/08/17	11		%	30
			Total Zinc (Zn)	2022/08/17	6.1		%	30
A683972	FM0	Matrix Spike	Hex. Chromium (Cr 6+)	2022/08/17		107	%	75 - 125
A683972	FM0	Spiked Blank	Hex. Chromium (Cr 6+)	2022/08/17		101	%	80 - 120
A683972	FM0	Method Blank	Hex. Chromium (Cr 6+)	2022/08/17	<0.080		mg/kg	
A683972	FM0	RPD	Hex. Chromium (Cr 6+)	2022/08/17	NC		%	35

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.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

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 (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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 #: C260031
Report Date: 2022/09/06

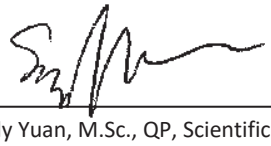
GOLDER ASSOCIATES LTD.
Client Project #: 22525414-1000
Site Location: CAMP FAREWELL,NT
Your P.O. #: 22525414-1100-1104
Sampler Initials: ML

VALIDATION SIGNATURE PAGE

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

Chantal Vincent, Customer Solutions Representative

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



Sandy Yuan, M.Sc., QP, Scientific Specialist

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

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

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636

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	C260031
Contact Name:	237 - 4 Ave SW Suite 3300	Contact Name:	Aurelie Bellavance	P.O. #/ AFE#:	22525414-8100-3104	
Street Address:		Street Address:		Project #:	22525414-3000	
City: Calgary Prov: AB Postal Code:		City: Calgary AB Postal Code:	T2P 4K3	Site #:	Camp Farewell NA	
Phone:		Phone:	403-299-5600	Site Location:	~~WEST CHANNEL~~, NT	Rush Confirmation #:
Email:	Canada Account Payable	Email:	aurelie.bellavance@wsp.com	Site Location Province:	NT	
Copies:		Copies:	peter.tan@wsp.com	Sampled By:	Melissa Lord, Harmanjeet Kaur	

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

	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 Headspace present	20 LIMITED SAMPLE	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE
1	DUP E	22	08	08	13	30	Soil				X					X										X	X	4	
2	BH22-20-04	22	08	08	13	30	Soil				X					X										X	X	4	
3	BH22-20-03	22	08	08	13	40	Soil				X					X										X	X	4	
4	BH22-20-02	22	08	08	13	45	Soil				X					X										X	X	4	
5	BH22-20-01	22	08	08	13	50	Soil				X					X										X	X	4	
6	BH22-18-01	22	08	08	13	00	Soil				X					X										X	X	4	
7	BH22-18-02	22	08	08	13	10	Soil				X					X										X	X	4	
8	BH22-18-03	22	08	08	13	15	Soil				X					X										X	X	4	
9	BH22-18-04	22	08	08	13	20	Soil				X					X										X	X	4	
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

Comments

email report to:
gld.SHELLDAREquis@com
gld.iol-equis@wsp.com
Upload to Facility code
4125954

Received in Yellowknife
By: J. Mercer
09:08
AUG 12 2022
Temp: 1 / 3 / 8

*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				Temperature reading by:
Seal present							
Seal intact							
Cooling media present			1 5	2 4	3 9		

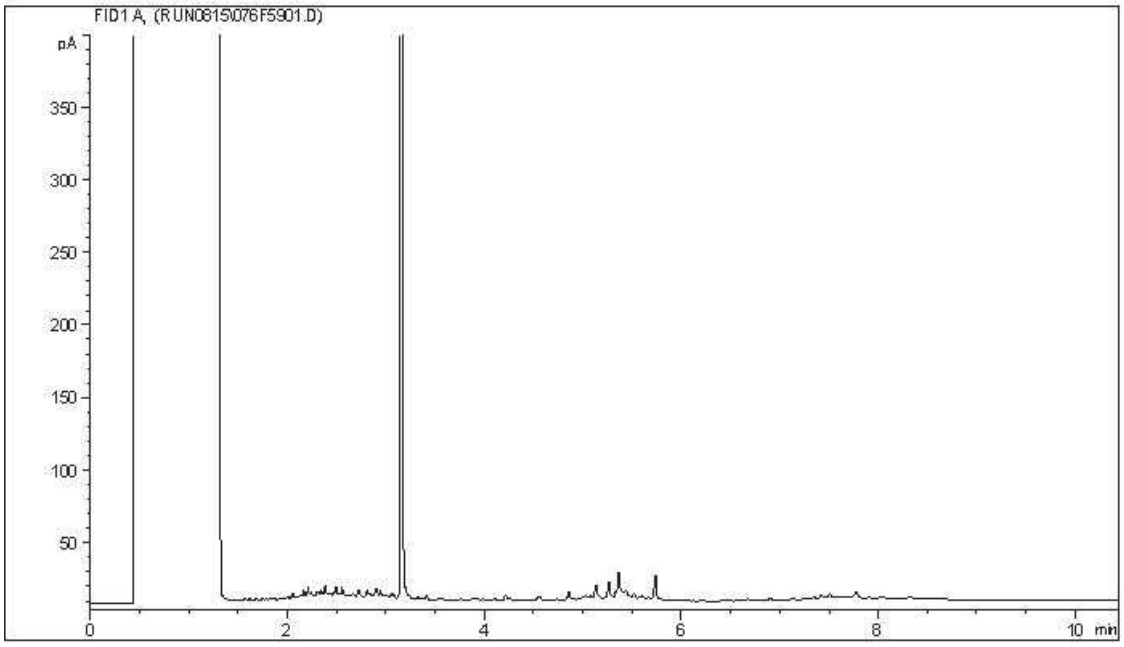
LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal intact						
Cooling media present						

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

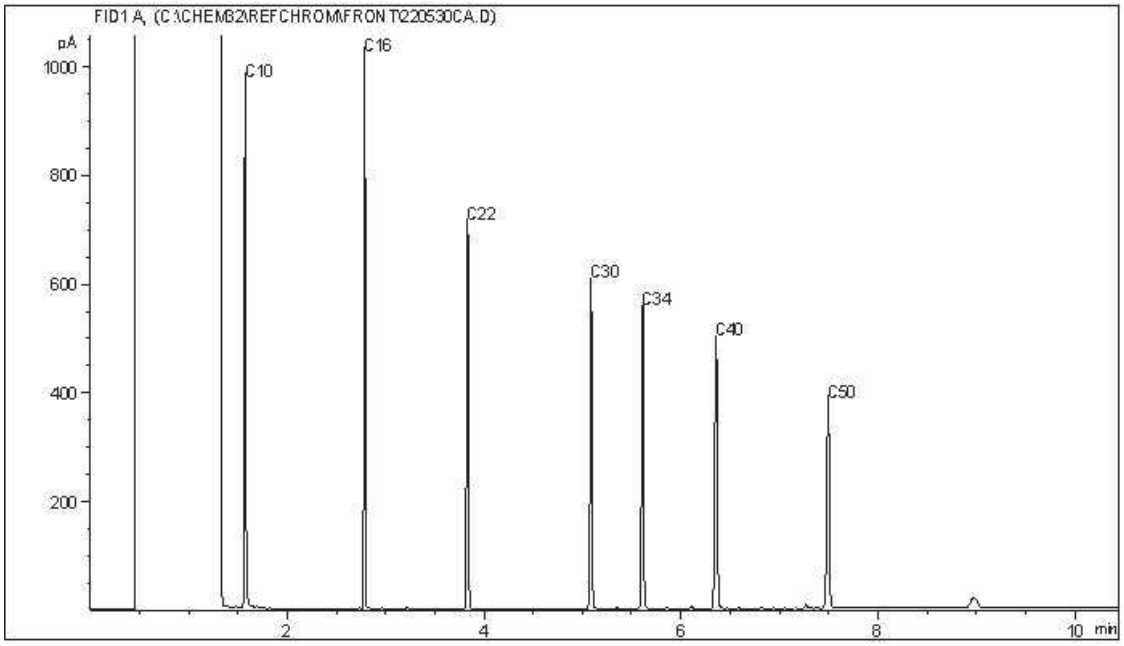
	Relinquished by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Special Instructions
1	Melissa Lord	22	08	09	08	00	Sarah Dolan	2022	08	13	15	03	
2													

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



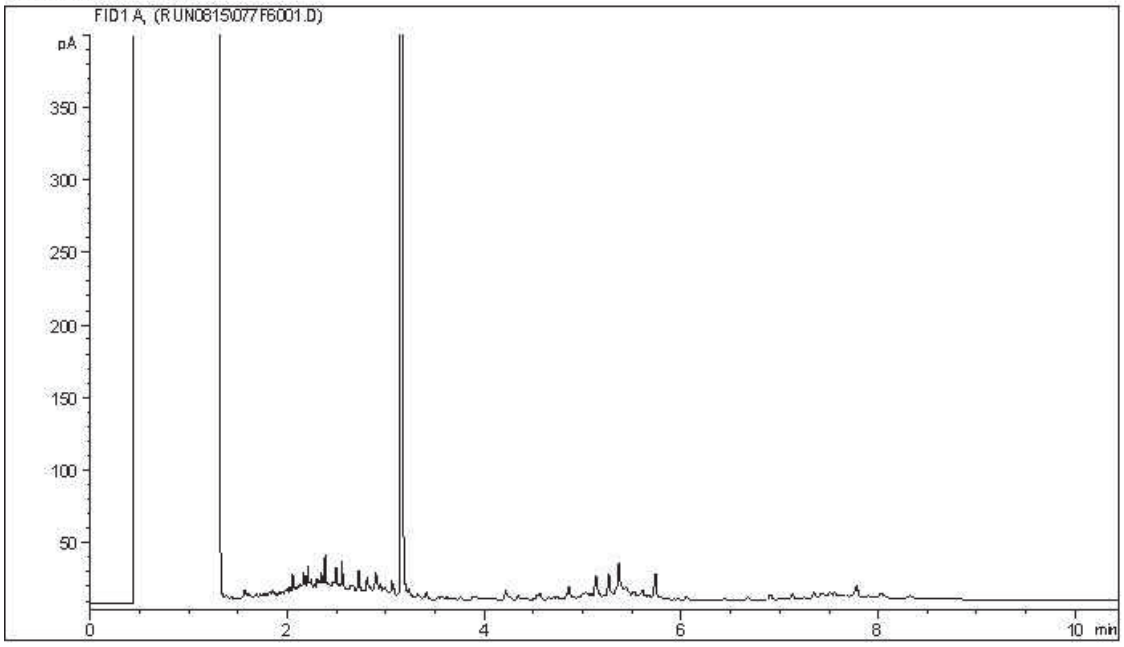
TYPICAL PRODUCT CARBON NUMBER RANGES

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



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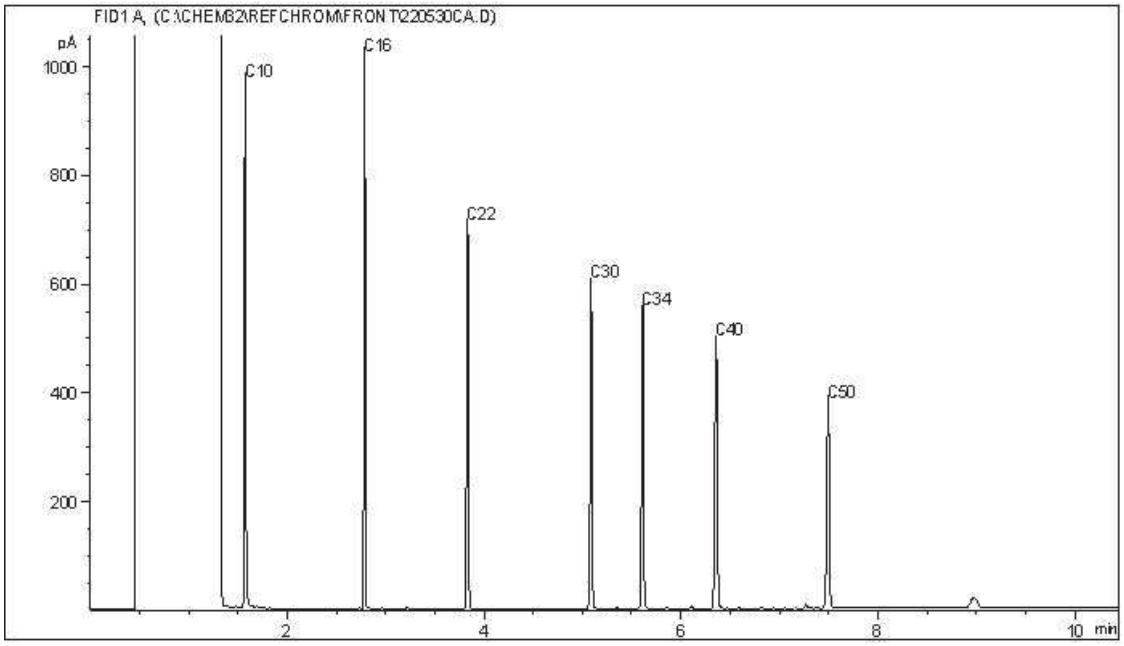

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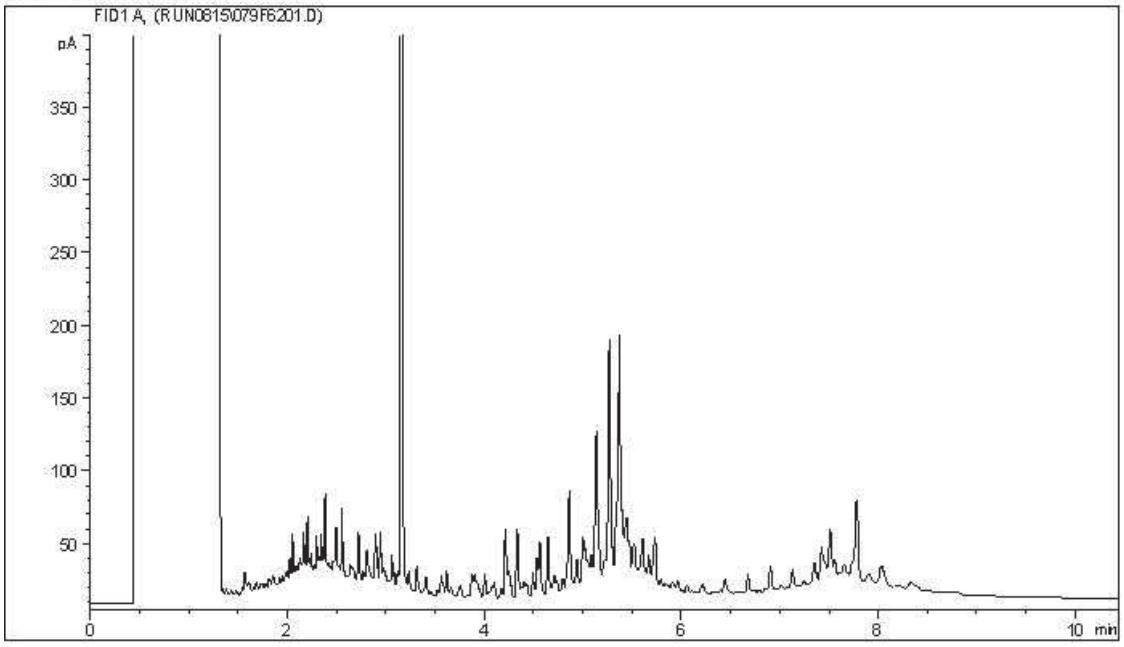

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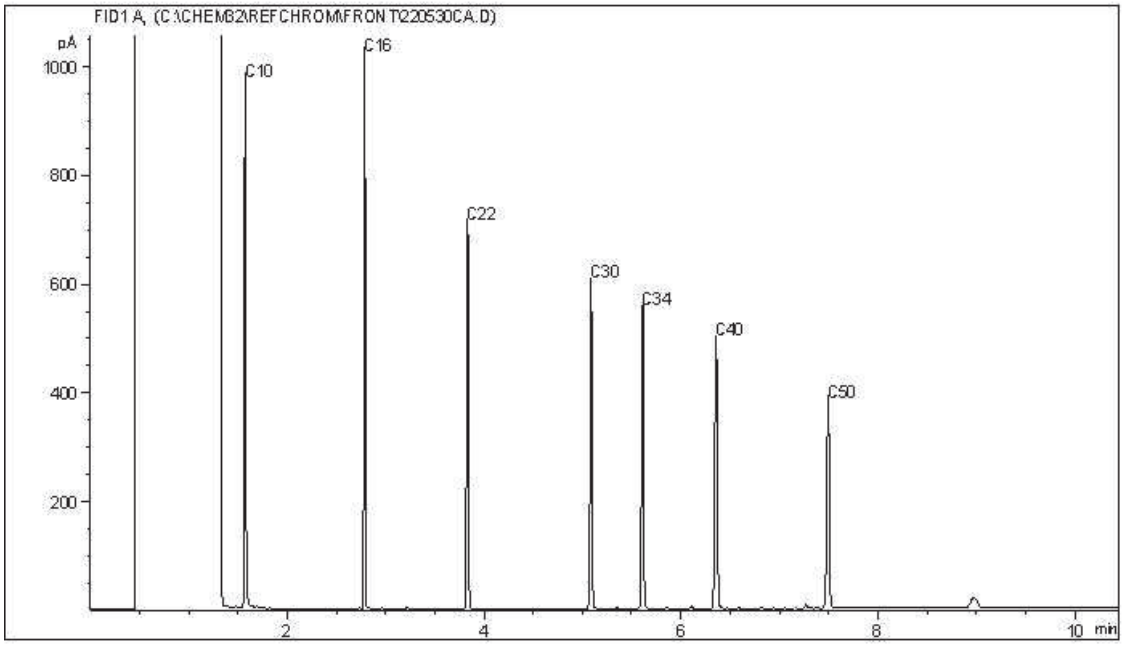

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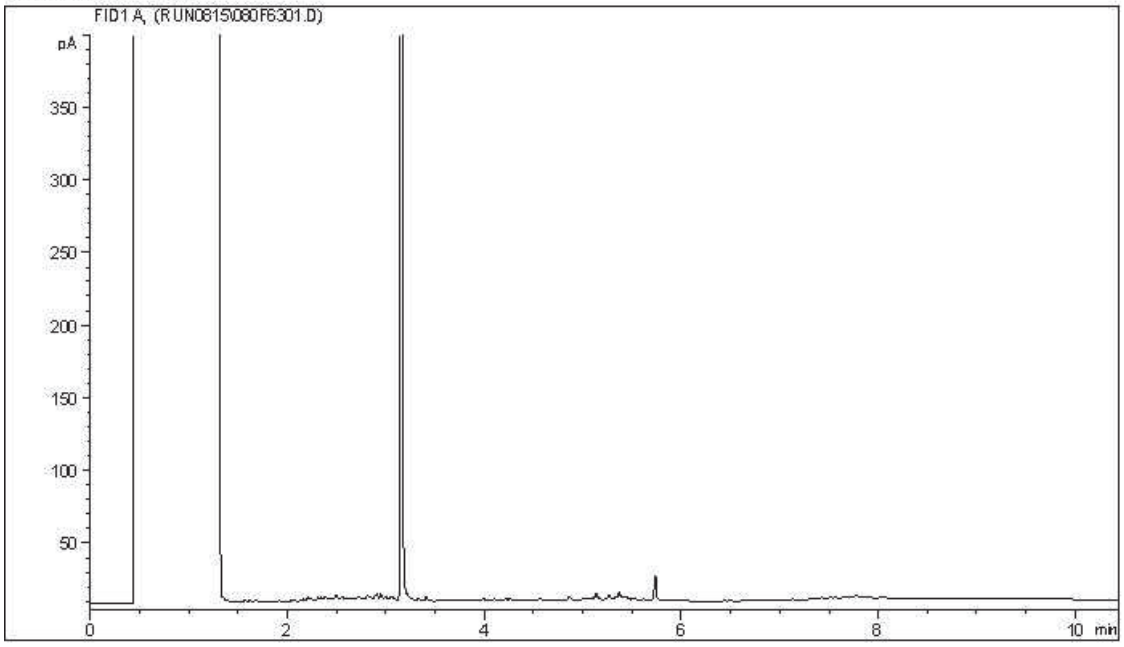
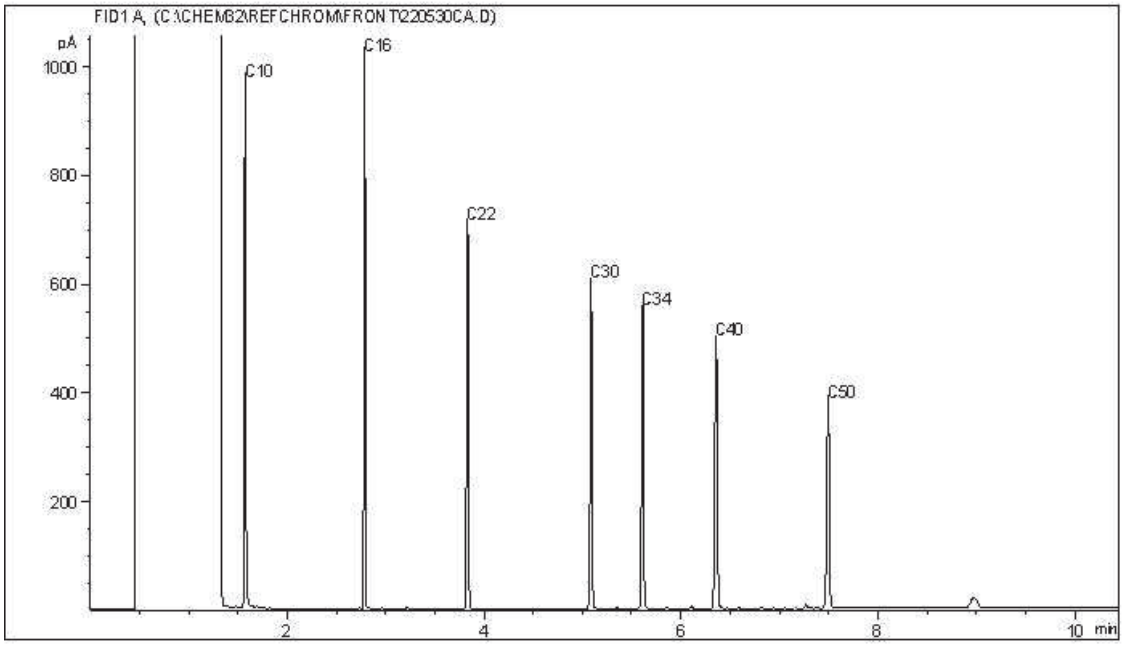


Carbon Range Distribution - Reference Chromatogram



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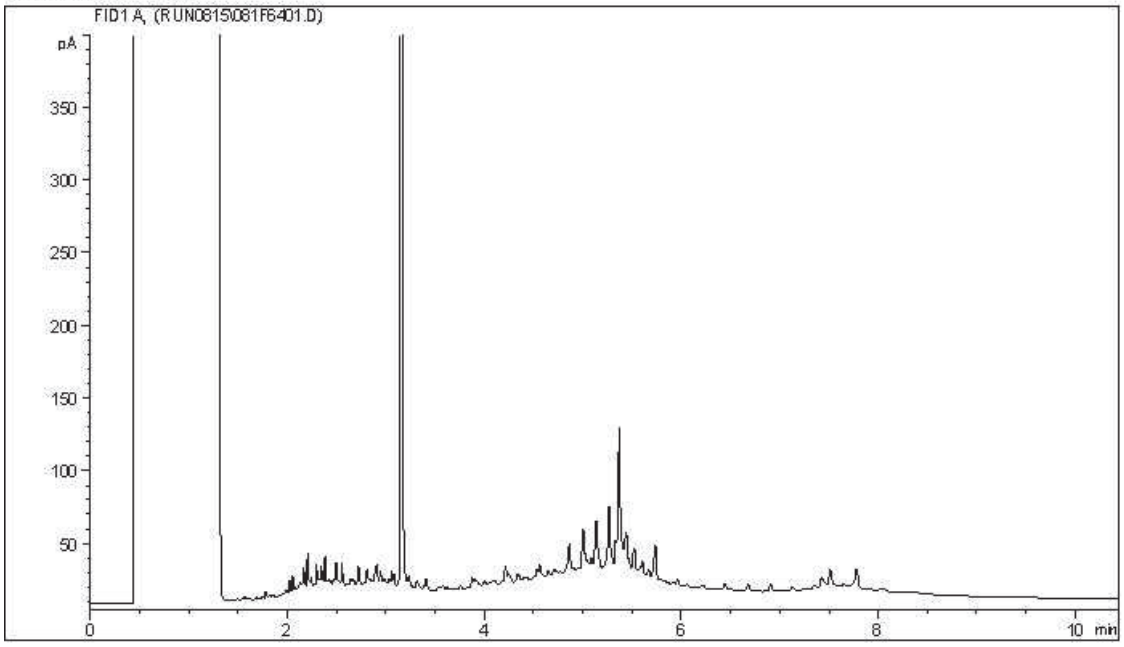
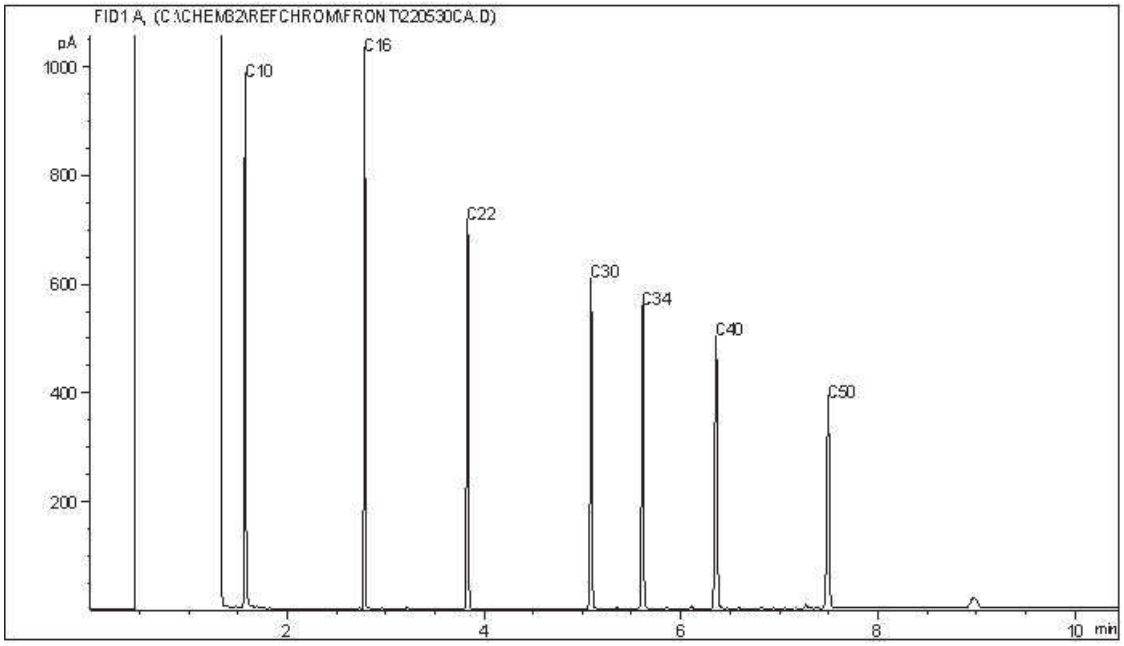
Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



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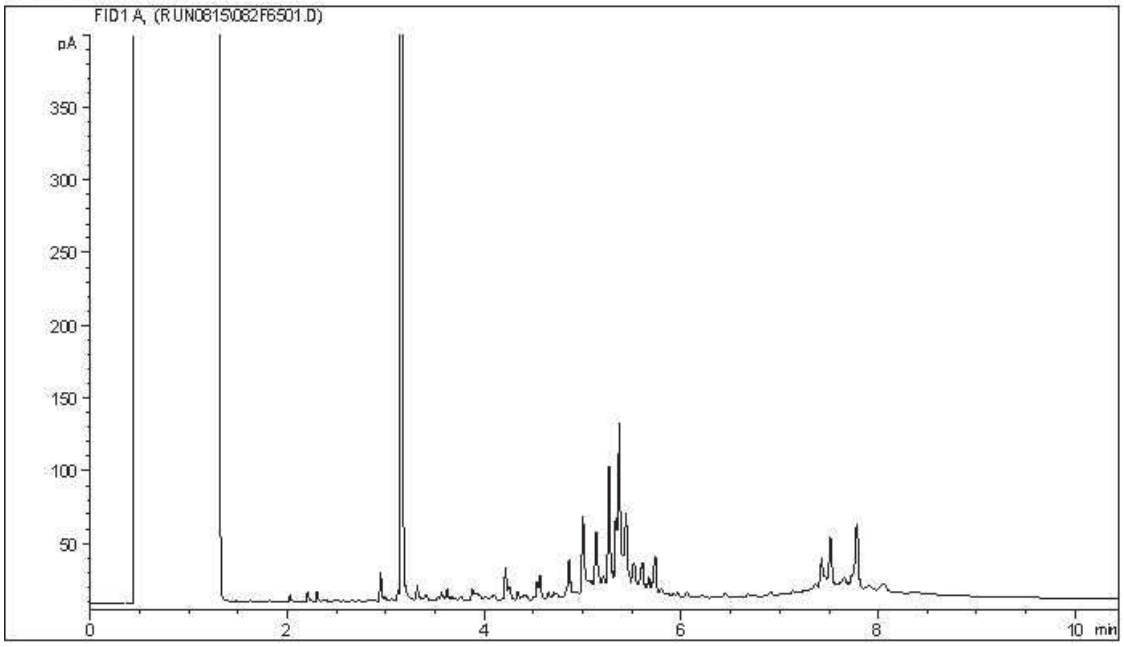

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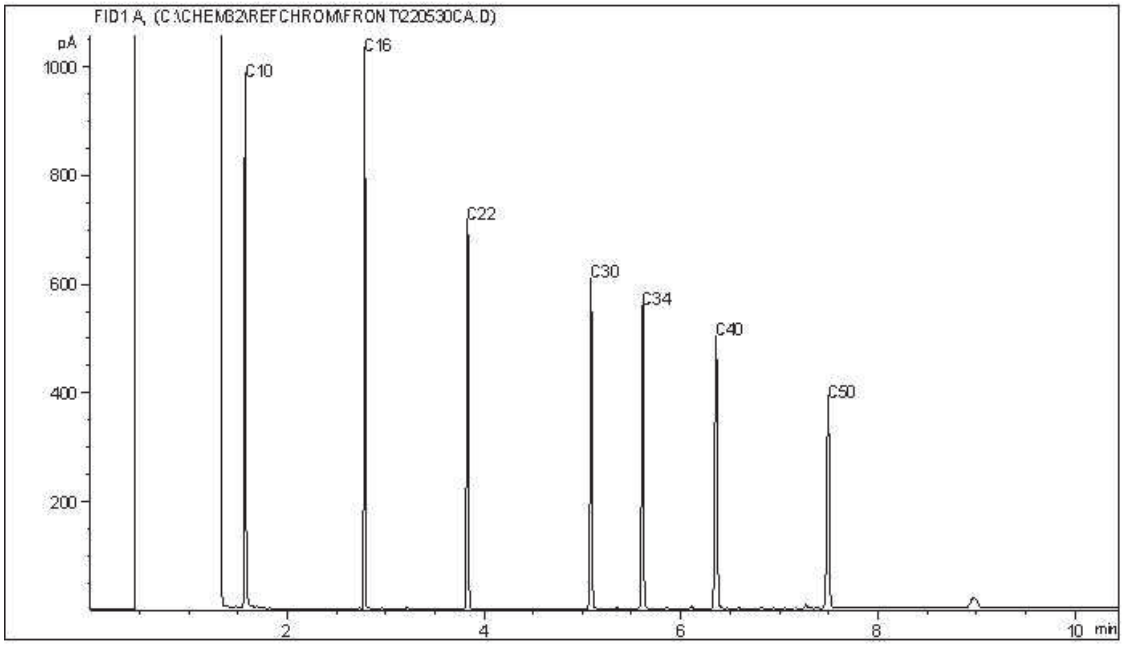

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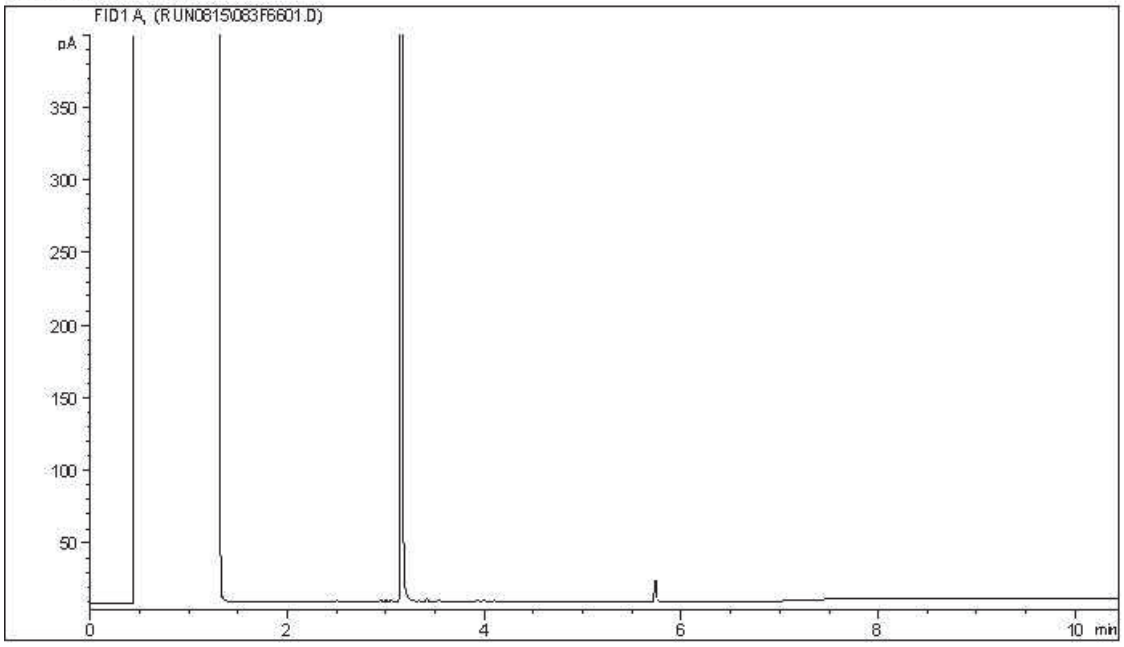

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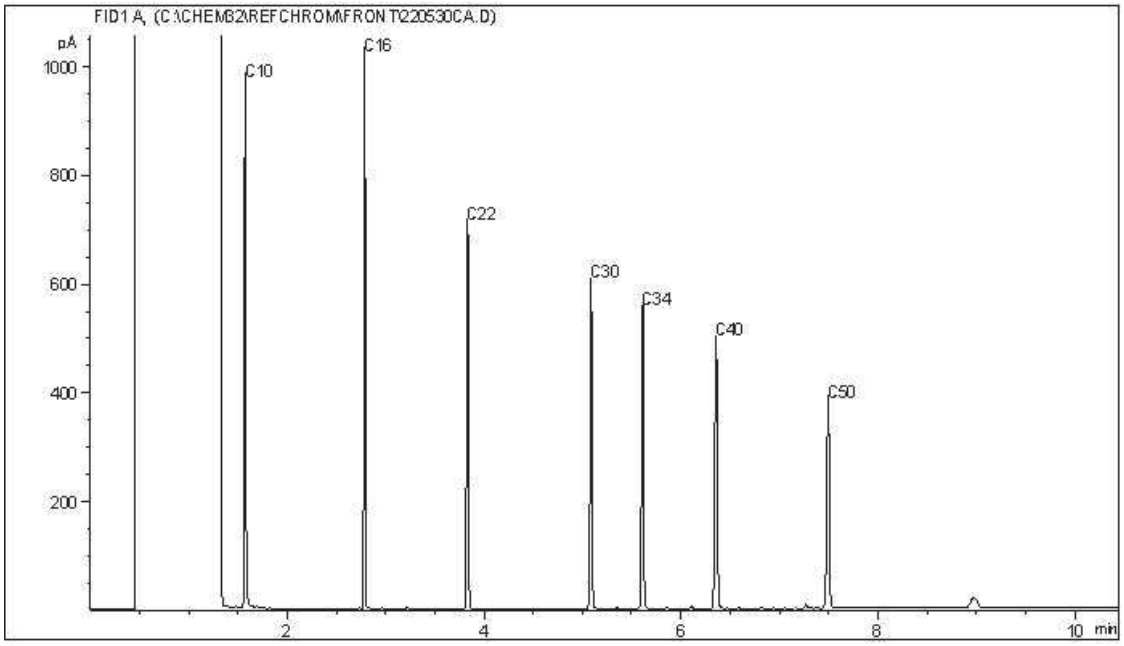

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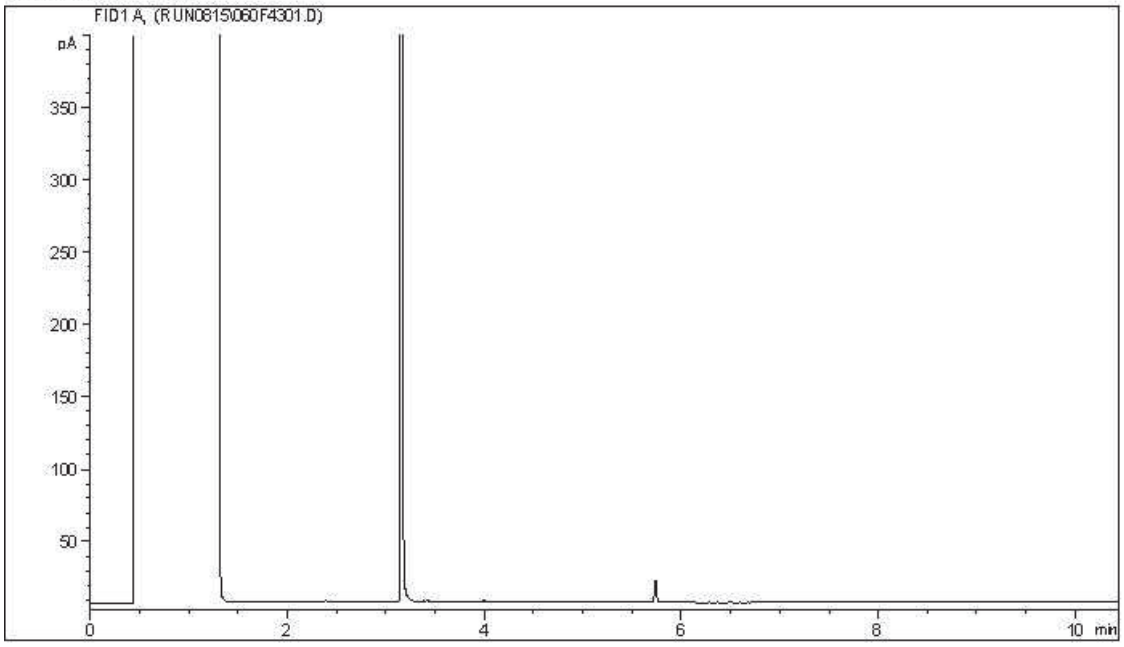
Instrument: GC7



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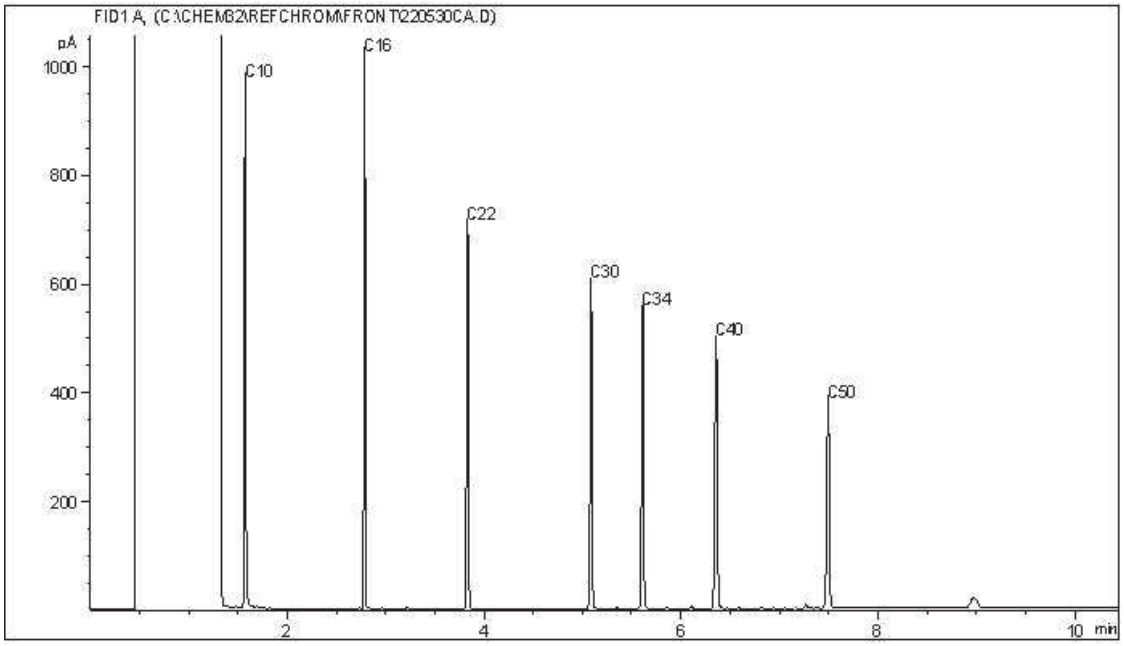

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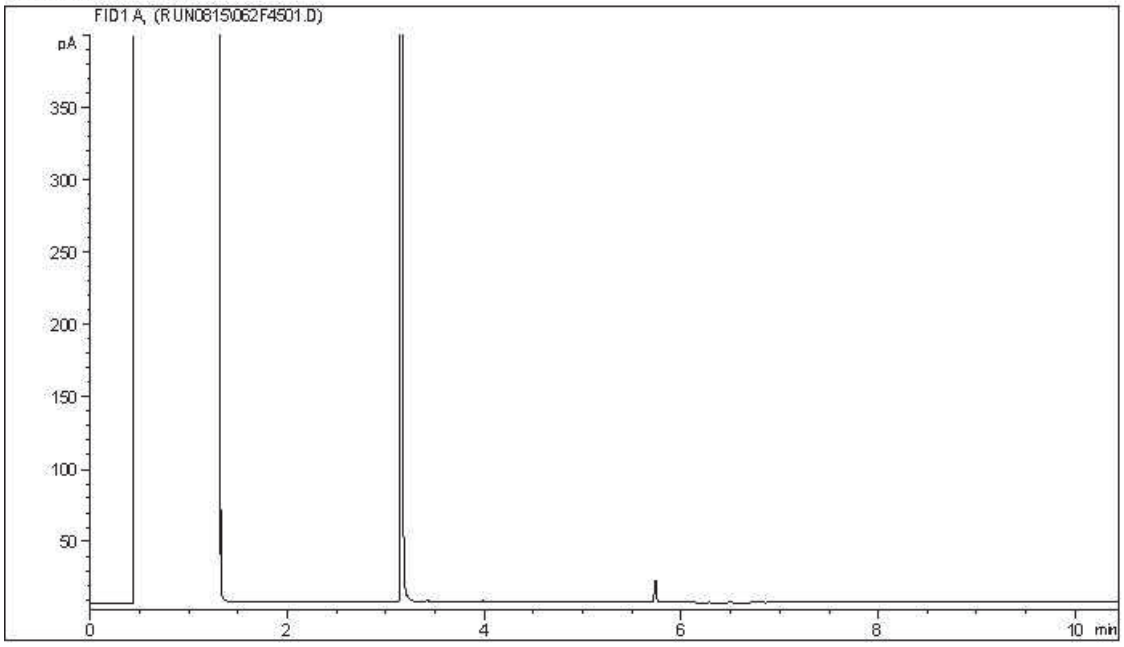

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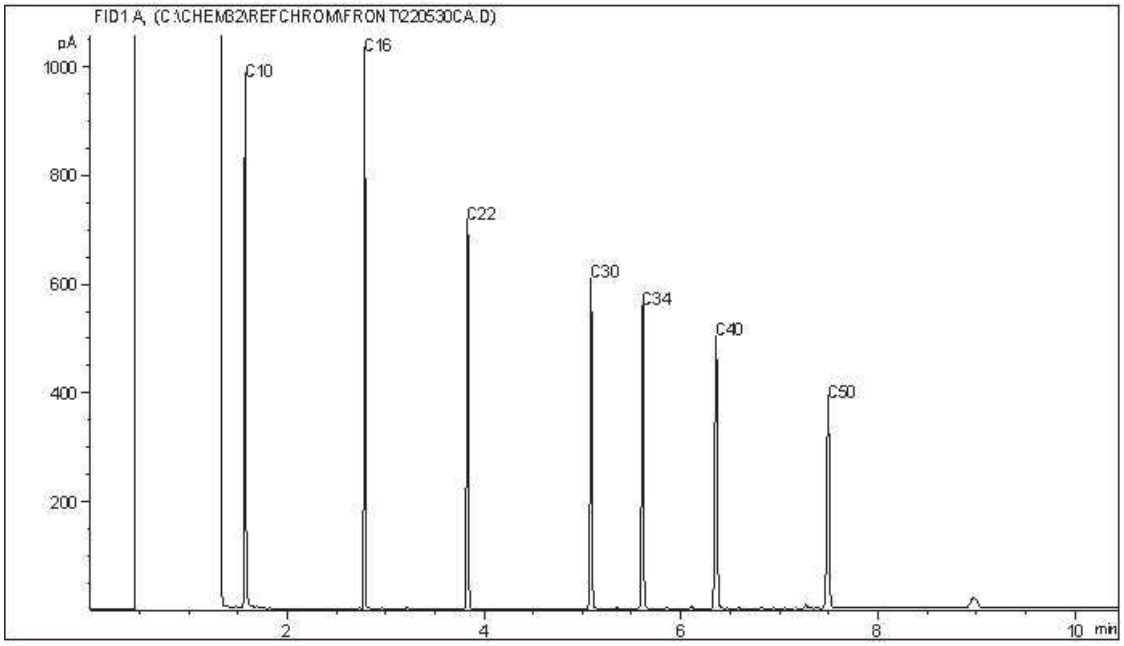

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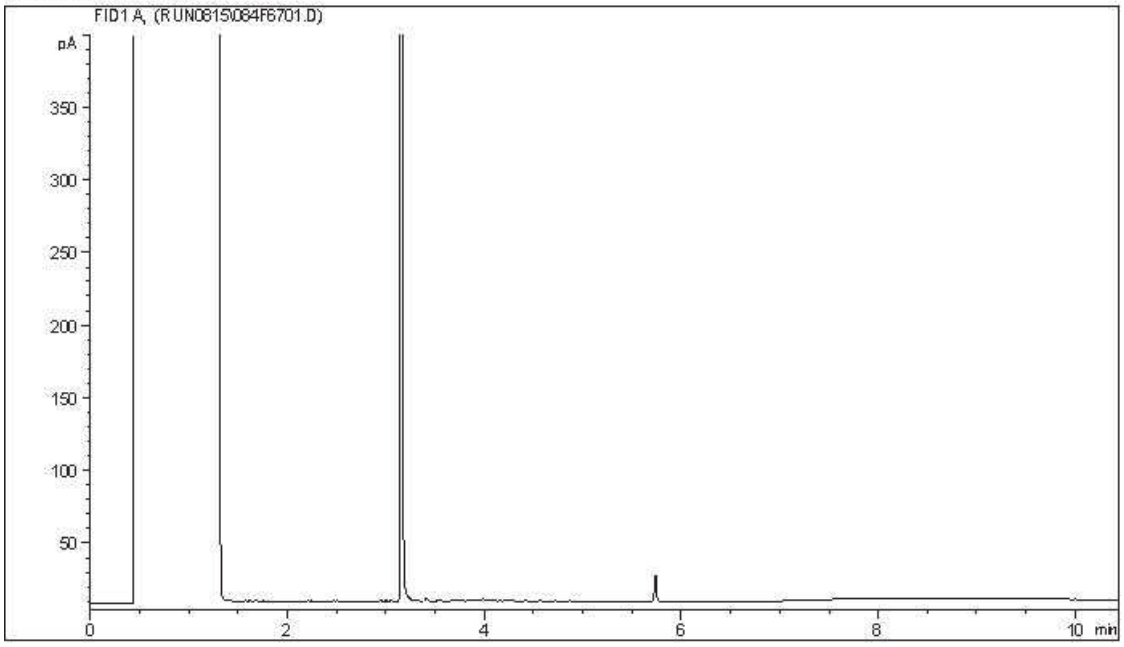

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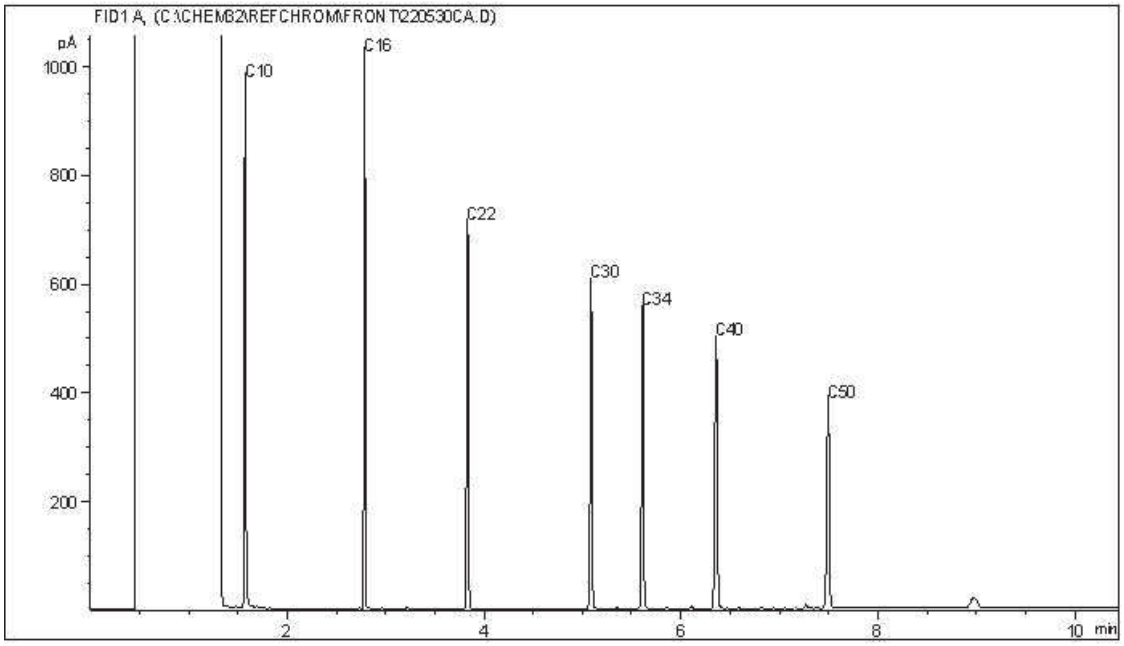

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August 19, 2022

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

Attention: Aurelie Bellavance

Re: Chromatogram Interpretation of CAMP FAREWELL, NT; Project 22525414-1000
Bureau Veritas Job No.: C260031

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
AZM279	BH22-20-03	The CCME F2-F4 chromatographic peak profile is consistent with a mixture of biogenic organic material (e.g. peat), and a weathered middle distillate petroleum product (e.g. Diesel #1, Kerosene). 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, whereas middle distillate products 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.

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.

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC
2021 - 41ST STREET NE
Calgary, AB T2E6P2
(403) 291-3077
ATTENTION TO: Cynny Hagen
PROJECT: C260031
AGAT WORK ORDER: 22C940500
SOIL ANALYSIS REVIEWED BY: Loan Nguyen, Senior Analyst
DATE REPORTED: Sep 06, 2022
PAGES (INCLUDING COVER): 7
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

AGAT Laboratories

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CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22C940500

PROJECT: C260031

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Cynny Hagen

SAMPLING SITE:

SAMPLED BY:

Metals - Barium by Fusion ICP

DATE RECEIVED: 2022-09-01

DATE REPORTED: 2022-09-06

			SAMPLE DESCRIPTION:	AZM281-BH22-20-01
			SAMPLE TYPE:	Soil
			DATE SAMPLED:	2022-08-08 13:50
Parameter	Unit	G / S	RDL	4267029
True Barium by Fusion ICP	mg/kg		50	3010

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4267029 Result is based on the dry weight of the sample.

Analysis performed at AGAT Calgary (unless marked by *)

Certified By:

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 22C940500

PROJECT: C260031

ATTENTION TO: Cynny Hagen

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Sep 06, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Metals - Barium by Fusion ICP															
Barium by Fusion ICP-OES	4266587		976	977	0.0%	< 40	95%	70%	130%				NA	70%	130%

Comments: Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.
Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

Certified By:

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 22C940500

PROJECT: C260031

ATTENTION TO: Cynny Hagen

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
True Barium by Fusion ICP	SOIL- 0620, INST- 0140	ASTM D4503.08	ICP/OES

1-SEP '22 PM12:09

Sent To: **AGAT - Calgary**
2910 12th Street NE
Calgary, AB, T2E 7P7
Tel: (403) 735-2005

CHAIN OF CUSTODY RECORD FOR SUBCONTRACTED WORK

COC # C260031-CAGT-01-01

22C940500

REPORT INFORMATION	
Company:	Bureau Veritas
Address:	4000 19st N.E, Calgary, Alberta, T2E 6P8
Contact Name:	Cynny Hagen
Email:	Cynny.HAGEN@bureauveritas.com, Customersolutionswest@bureauveritas.co
Phone:	(403) 735-2273
Lab Project #:	C260031

#	SAMPLE ID	MATRIX	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	SAMPLER INITIALS	# CONT.	ANALYSIS REQUESTED: Barium on ICP using Fusion Extraction	ADDITIONAL SAMPLE INFORMATION
1	AZM281-BH22-20-01	SOIL	2022/08/08	13:50	ML	1	X	(P: 01)
2								
3								
4								
5								
6								
7								
8								
9								
10								

REGULATORY CRITERIA

SPECIAL INSTRUCTIONS

Please inform Bureau Veritas immediately if:
- You are not accredited for the requested test(s)
- The hold time is approaching for the requested test(s).

Please return a copy of this form with the report.

TURNAROUND TIME

[X] Rush Required

2022/09/07

Date Required

Please inform us if rush charges will be incurred.

COOLER ID:	YES	NO	Temp: (°C)
Custody Seal Present			
Custody Seal Intact			
Cooling Media Present			

COOLER ID:	YES	NO	Temp: (°C)
Custody Seal Present			
Custody Seal Intact			
Cooling Media Present			

COOLER ID:	YES	NO	Temp: (°C)
Custody Seal Present	—		NA
Custody Seal Intact	—		
Cooling Media Present	—		

RELINQUISHED BY: (SIGN & PRINT)	**DATE:** (YYYY/MM/DD)	**TIME:** (HH:MM)	**RECEIVED BY:** (SIGN & PRINT)	**DATE:** (YYYY/MM/DD)	**TIME:** (HH:MM)
1. Robel Mebrahtu	2022/09/01	09:30	1. Lauz Cruz	2022/09/01	12:09
2.			2.		

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: Bureau Veritas

Courier: Jazoo Prepaid Collect

Waybill#_____

Branch: EDM GP FN FM RD VAN LYD FSJ EST SASK Other:___

If multiple sites were submitted at once: (Yes) No

Custody Seal Intact: Yes No (NA)

TAT: <24hr 24-48hr 48-72hr Reg Other_____

Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes No

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Color , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry:_____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES NO Precaution Taken:_____

Legal Samples: Yes No

International Samples: Yes No

Tape Sealed: Yes No

Coolant Used: Icepack (Bagged Ice) Free Ice Free Water None

Temperature (Bottles/Jars only) (N/A) if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) NA Soil =___°C 2(Bottle/Jar)___+___+___=___°C

3 (Bottle/Jar)___+___+___=___°C 4 (Bottle/Jar)___+___+___=___°C

5 (Bottle/Jar)___+___+___=___°C 6 (Bottle/Jar)___+___+___=___°C

7 (Bottle/Jar)___+___+___=___°C 8 (Bottle/Jar)___+___+___=___°C

9 (Bottle/Jar)___+___+___=___°C 10 (Bottle/Jar)___+___+___=___°C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: 22C940500

Samples Damaged: Yes No If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial_____

General Comments: _____

* Subcontracted Analysis (See CPM)

Date issued: March 11, 2020
Document ID: SR-9505.004

IN-CITY

JAZOO EXPRESS COURIER

www.jazoocourier.com

CLIENT USE ONLY

Sender Name:	Robel Mebrahtu	Receiver Name:	Sample Reception	Billed To:	Bureau Veritas
Date:	2022/09/01	Delivery From:	Bureau Veritas Calgary		
		Delivery To:	AGAT-Calgary 2910 12th street NE Calgary,AB, T2E 7P7		
Total # Items:	2	Item Description: envelope, sm/med/lg box, cooler, etc.	1 Large Cooler, 1 Medium Cooler		
			Job/PO/Reference #:		
Authorized Shipper Signature:					

DRIVER USE ONLY

P/U Driver Name:	BR	P/U Time:	11:50 am	D/O Time:	am
# Items P/U:	2		pm		12:05 pm

# Of Overweight	# Of TDG	# Of Same Day	Surcharge

Additional Info: Done

Total # Items Dropped Off:	2	D/O Driver Name:	
Authorized Receiver Signature:			

HOTSHOT DETAILS

Total Km:		Or Total Charge ($):	

OFFICE USE ONLY

Verified By:		Invoiced By:	

To schedule a pickup please contact dispatch at the city nearest you:

Calgary	403-660-5504	**Fort McMurray**	587-645-6364
Edmonton	780-903-3628	**Grande Prairie**	587-297-8406

THANK YOU FOR SUPPORTING LOCAL AND CHOOSING JAZOO EXPRESS COURIER.

Your P.O. #: 22525414-1100-1104
Your Project #: 22525414-1000
Site Location: CAMP FAIRWELL
Your C.O.C. #: 00013v3

Attention: Aurelie Bellavance

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

Report Date: 2022/08/25
Report #: R3221467
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C262019
Received: 2022/08/17, 12:45

Sample Matrix: Soil
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Boron (Hot Water Soluble) (1)	4	2022/08/20	2022/08/20	AB SOP-00034 / AB SOP-00042	EPA 6010d R5 m
BTEX/F1 by HS GC/MS/FID (MeOH extract) (1, 2)	7	N/A	2022/08/19	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX (1)	7	N/A	2022/08/20		Auto Calc
Cation/EC Ratio (1)	4	N/A	2022/08/20		Auto Calc
Chloride (Soluble) (1)	1	2022/08/20	2022/08/20	AB SOP-00033 / AB SOP-00020	SM 23-4500-Cl-E m
Chloride and Sulphate by IC (Soluble) (1)	3	2022/08/21	2022/08/21	AB SOP-00033 / AB SOP-00026	SM 23 4110 B m
Hexavalent Chromium (1, 3)	4	2022/08/19	2022/08/19	AB SOP-00063	SM 23 3500-Cr B m
Conductivity @25C (Soluble) (1)	4	2022/08/20	2022/08/20	AB SOP-00033 / AB SOP-00004	SM 23 2510 B m
CCME Hydrocarbons (F2-F4 in soil) (1, 4)	7	2022/08/19	2022/08/19	AB SOP-00036	CCME PHC-CWS m
Elements by ICPMS - Soils (1)	4	2022/08/20	2022/08/20	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Sum of Cations, Anions (1)	4	N/A	2022/08/20		Auto Calc
Moisture (1)	7	N/A	2022/08/20	AB SOP-00002	CCME PHC-CWS m
Index of Additive Cancer Risk (1, 5)	4	N/A	2022/08/25		Auto Calc
Benzo[a]pyrene Equivalency (1)	4	N/A	2022/08/25		Auto Calc
PAH in Soil by GC/MS (1)	4	2022/08/24	2022/08/24	AB SOP-00036 / AB SOP-00003	EPA 3540C/8270E m
pH @25C (1:2 Calcium Chloride Extract) (1)	4	2022/08/20	2022/08/20	AB SOP-00033 / AB SOP-00006	SM 23 4500 H+B m
Sodium Adsorption Ratio (1)	4	N/A	2022/08/20		Auto Calc
Soluble Ions (1)	4	2022/08/20	2022/08/20	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Paste (1)	4	2022/08/20	2022/08/20	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Ions Calculation (1)	4	N/A	2022/08/20		Auto Calc
Theoretical Gypsum Requirement (1, 6)	4	N/A	2022/08/20		Auto Calc

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.

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

Your P.O. #: 22525414-1100-1104
Your Project #: 22525414-1000
Site Location: CAMP FAIRWELL
Your C.O.C. #: 00013v3

Attention: Aurelie Bellavance

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

Report Date: 2022/08/25
Report #: R3221467
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C262019
Received: 2022/08/17, 12:45

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) Some soil samples may react with the Cr(VI) spike reducing it to Cr(III). These samples are highly unlikely to contain native hexavalent chromium. Thus a failed spike recovery does not invalidate a negative result on the native sample.
(4) 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.
(5) Index of Additive Cancer Risk, (C) denotes coarse, (F) denotes fine.
(6) TGR calculation is based on a theoretical SAR of 4. Salt Contamination and Assessment and remediation guideline 2001 recommended SAR is ranging 4-8. TGR is reported in tonnes/ha.

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
25 Aug 2022 11:40:19

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 Job #: C262019
Report Date: 2022/08/25

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

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		AZY121	AZY121	AZY122	AZY122	AZY123	AZY124		
Sampling Date		2022/08/13 11:00	2022/08/13 11:00	2022/08/13 11:15	2022/08/13 11:15	2022/08/13 11:15	2022/08/13 11:30		
COC Number		00013v3	00013v3	00013v3	00013v3	00013v3	00013v3		
	UNITS	MW22-23-01	MW22-23-01 Lab-Dup	MW22-23-02	MW22-23-02 Lab-Dup	DUP N	MW22-23-03	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	<10	<10	<10	23	10	A687729
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	N/A	100	100	87	260	50	A687729
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	N/A	<50	<50	<50	87	50	A687729
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	Yes	Yes	Yes	N/A	A687729
Physical Properties									
Moisture	%	13	N/A	21	N/A	17	35	0.30	A688093
Volatiles									
Xylenes (Total)	mg/kg	<0.045	N/A	<0.045	N/A	<0.045	<0.045	0.045	A687229
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	<10	<10	10	A687229
Field Preserved Volatiles									
Benzene	mg/kg	<0.0050	<0.0050	<0.0050	N/A	<0.0050	<0.0050	0.0050	A687757
Toluene	mg/kg	<0.050	<0.050	<0.050	N/A	<0.050	<0.050	0.050	A687757
Ethylbenzene	mg/kg	<0.010	<0.010	<0.010	N/A	<0.010	<0.010	0.010	A687757
m & p-Xylene	mg/kg	<0.040	<0.040	<0.040	N/A	<0.040	<0.040	0.040	A687757
o-Xylene	mg/kg	<0.020	<0.020	<0.020	N/A	<0.020	<0.020	0.020	A687757
F1 (C6-C10)	mg/kg	<10	<10	<10	N/A	<10	<10	10	A687757
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	99	101	103	N/A	100	99	N/A	A687757
4-Bromofluorobenzene (sur.)	%	100	100	100	N/A	101	98	N/A	A687757
D10-o-Xylene (sur.)	%	113	104	112	N/A	103	105	N/A	A687757
D4-1,2-Dichloroethane (sur.)	%	104	107	110	N/A	107	104	N/A	A687757
O-TERPHENYL (sur.)	%	128	N/A	111	139	118	133	N/A	A687729

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 #: C262019
Report Date: 2022/08/25

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

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		AZY125	AZY125	AZY126	AZY127		
Sampling Date		2022/08/13 12:00	2022/08/13 12:00	2022/08/13 12:15	2022/08/13 12:30		
COC Number		00013v3	00013v3	00013v3	00013v3		
	UNITS	MW22-50-01	MW22-50-01 Lab-Dup	MW22-50-02	MW22-50-03	RDL	QC Batch
Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/kg	22	N/A	<10	<10	10	A687729
F3 (C16-C34 Hydrocarbons)	mg/kg	900	N/A	74	110	50	A687729
F4 (C34-C50 Hydrocarbons)	mg/kg	290	N/A	<50	<50	50	A687729
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	Yes	N/A	A687729
Physical Properties							
Moisture	%	37	33	16	16	0.30	A688093
Volatiles							
Xylenes (Total)	mg/kg	<0.045	N/A	<0.045	<0.045	0.045	A687229
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	<10	10	A687229
Field Preserved Volatiles							
Benzene	mg/kg	<0.0050	N/A	<0.0050	<0.0050	0.0050	A687757
Toluene	mg/kg	0.098	N/A	0.083	<0.050	0.050	A687757
Ethylbenzene	mg/kg	0.022	N/A	<0.010	<0.010	0.010	A687757
m & p-Xylene	mg/kg	<0.040	N/A	<0.040	<0.040	0.040	A687757
o-Xylene	mg/kg	<0.020	N/A	<0.020	<0.020	0.020	A687757
F1 (C6-C10)	mg/kg	<10	N/A	<10	<10	10	A687757
Surrogate Recovery (%)							
1,4-Difluorobenzene (sur.)	%	101	N/A	97	98	N/A	A687757
4-Bromofluorobenzene (sur.)	%	100	N/A	99	98	N/A	A687757
D10-o-Xylene (sur.)	%	108	N/A	110	100	N/A	A687757
D4-1,2-Dichloroethane (sur.)	%	110	N/A	104	105	N/A	A687757
O-TERPHENYL (sur.)	%	119	N/A	108	127	N/A	A687729

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 #: C262019
Report Date: 2022/08/25

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

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		AZY121		AZY122	AZY123		AZY124		
Sampling Date		2022/08/13 11:00		2022/08/13 11:15	2022/08/13 11:15		2022/08/13 11:30		
COC Number		00013v3		00013v3	00013v3		00013v3		
	UNITS	MW22-23-01	RDL	MW22-23-02	DUP N	RDL	MW22-23-03	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	5.0	N/A	3.1	3.2	N/A	3.3	N/A	A686906
Cation Sum	meq/L	5.4	N/A	6.4	6.4	N/A	7.6	N/A	A686906
Cation/EC Ratio	N/A	9.9	0.10	9.4	9.2	0.10	9.5	0.10	A686905
Calculated Calcium (Ca)	mg/kg	16	0.57	19	19	0.49	37	0.75	A687232
Calculated Magnesium (Mg)	mg/kg	4.8	0.38	3.9	4.2	0.33	9.1	0.50	A687232
Calculated Sodium (Na)	mg/kg	19	0.95	17	17	0.82	24	1.3	A687232
Calculated Potassium (K)	mg/kg	2.3	0.49	2.8	2.8	0.43	6.0	0.65	A687232
Calculated Chloride (Cl)	mg/kg	16	3.8	13	13	1.6	26	2.5	A687232
Calculated Sulphate (SO4)	mg/kg	69	1.9	32	32	1.6	44	2.5	A687232
Soluble Parameters									
Soluble Chloride (Cl)	mg/L	44	10	N/A	N/A	N/A	N/A	N/A	A688403
Soluble Conductivity	dS/m	0.55	0.020	0.69	0.70	0.020	0.80	0.020	A688405
Soluble (CaCl2) pH	pH	7.63	N/A	7.57	7.64	N/A	7.62	N/A	A688203
Sodium Adsorption Ratio	N/A	1.7	0.10	1.6	1.6	0.10	1.3	0.10	A687227
Soluble Calcium (Ca)	mg/L	42	1.5	59	58	1.5	74	1.5	A688421
Soluble Magnesium (Mg)	mg/L	13	1.0	12	13	1.0	18	1.0	A688421
Soluble Sodium (Na)	mg/L	50	2.5	53	51	2.5	48	2.5	A688421
Soluble Potassium (K)	mg/L	6.2	1.3	8.6	8.6	1.3	12	1.3	A688421
Saturation %	%	38	N/A	33	33	N/A	50	N/A	A688202
Soluble Sulphate (SO4)	mg/L	180	5.0	N/A	N/A	N/A	N/A	N/A	A688421
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	<0.20	<0.20	0.20	<0.20	0.20	A686909

RDL = Reportable Detection Limit
N/A = Not Applicable

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 FAIRWELL
Your P.O. #: 22525414-1100-1104
Sampler Initials: JP

CCME REGULATED METALS - SOILS (SOIL)

Bureau Veritas ID		AZY121		AZY122	AZY122	AZY123		AZY124		
Sampling Date		2022/08/13 11:00		2022/08/13 11:15	2022/08/13 11:15	2022/08/13 11:15		2022/08/13 11:30		
COC Number		00013v3		00013v3	00013v3	00013v3		00013v3		
	UNITS	MW22-23-01	QC Batch	MW22-23-02	MW22-23-02 Lab-Dup	DUP N	QC Batch	MW22-23-03	RDL	QC Batch
Elements										
Soluble (Hot water) Boron (B)	mg/kg	<0.10	A688283	0.36	0.37	0.35	A688283	0.45	0.10	A688283
Hex. Chromium (Cr 6+)	mg/kg	<0.080	A688032	<0.080	<0.080	<0.080	A688035	<0.080	0.080	A688032
Total Antimony (Sb)	mg/kg	<0.50	A688249	<0.50	<0.50	<0.50	A688249	0.56	0.50	A688249
Total Arsenic (As)	mg/kg	6.9	A688249	6.0	5.9	6.5	A688249	7.5	1.0	A688249
Total Barium (Ba)	mg/kg	300	A688249	180	180	200	A688249	260	1.0	A688249
Total Beryllium (Be)	mg/kg	0.44	A688249	<0.40	<0.40	0.42	A688249	0.55	0.40	A688249
Total Cadmium (Cd)	mg/kg	0.38	A688249	0.25	0.24	0.30	A688249	0.46	0.050	A688249
Total Chromium (Cr)	mg/kg	17	A688249	12	13	13	A688249	19	1.0	A688249
Total Cobalt (Co)	mg/kg	7.9	A688249	5.9	5.9	6.5	A688249	8.7	0.50	A688249
Total Copper (Cu)	mg/kg	16	A688249	11	11	13	A688249	20	1.0	A688249
Total Lead (Pb)	mg/kg	8.2	A688249	6.0	5.9	6.7	A688249	9.5	0.50	A688249
Total Mercury (Hg)	mg/kg	<0.050	A688249	<0.050	<0.050	<0.050	A688249	<0.050	0.050	A688249
Total Molybdenum (Mo)	mg/kg	1.4	A688249	1.1	1.3	1.2	A688249	1.5	0.40	A688249
Total Nickel (Ni)	mg/kg	24	A688249	18	18	20	A688249	27	1.0	A688249
Total Selenium (Se)	mg/kg	0.57	A688249	<0.50	<0.50	<0.50	A688249	0.75	0.50	A688249
Total Silver (Ag)	mg/kg	<0.20	A688249	<0.20	<0.20	<0.20	A688249	<0.20	0.20	A688249
Total Thallium (Tl)	mg/kg	0.14	A688249	<0.10	<0.10	0.11	A688249	0.17	0.10	A688249
Total Tin (Sn)	mg/kg	<1.0	A688249	<1.0	<1.0	<1.0	A688249	<1.0	1.0	A688249
Total Uranium (U)	mg/kg	0.71	A688249	0.57	0.61	0.65	A688249	0.81	0.20	A688249
Total Vanadium (V)	mg/kg	26	A688249	20 (1)	21	23	A688249	31	1.0	A688249
Total Zinc (Zn)	mg/kg	76	A688249	53	53	60	A688249	89	10	A688249

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
(1) Matrix spike exceeds acceptance limits due to probable matrix interference.

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Bureau Veritas Job #: C262019
Report Date: 2022/08/25

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

RESULTS OF CHEMICAL ANALYSES OF SOIL

Bureau Veritas ID		AZY122	AZY122	AZY123	AZY124		
Sampling Date		2022/08/13 11:15	2022/08/13 11:15	2022/08/13 11:15	2022/08/13 11:30		
COC Number		00013v3	00013v3	00013v3	00013v3		
	UNITS	MW22-23-02	MW22-23-02 Lab-Dup	DUP N	MW22-23-03	RDL	QC Batch
Soluble Parameters							
Soluble Chloride (Cl)	mg/L	40	38	40	52	5.0	A688566
Soluble Sulphate (SO4)	mg/L	96	93	98	88	5.0	A688566

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

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

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID		AZY121	AZY122	AZY123	AZY124		
Sampling Date		2022/08/13 11:00	2022/08/13 11:15	2022/08/13 11:15	2022/08/13 11:30		
COC Number		00013v3	00013v3	00013v3	00013v3		
	UNITS	MW22-23-01	MW22-23-02	DUP N	MW22-23-03	RDL	QC Batch
Polycyclic Aromatics							
Index of Additive Cancer Risk (C)	N/A	<0.10	<0.10	<0.10	<0.10	0.10	A692086
Acenaphthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A692779
B[a]P TPE Total Potency Equivalents	mg/kg	<0.0071	<0.0071	<0.0071	0.0090	0.0071	A692087
Index of Additive Cancer Risk (F)	N/A	<0.10	<0.10	<0.10	<0.10	0.10	A692086
Acenaphthylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A692779
Acridine	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	A692779
Anthracene	mg/kg	<0.0040	<0.0040	<0.0040	<0.0040	0.0040	A692779
Benzo(a)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A692779
Benzo(b&j)fluoranthene	mg/kg	<0.0050	0.0061	<0.0050	0.024	0.0050	A692779
Benzo(k)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A692779
Benzo(g,h,i)perylene	mg/kg	<0.0050	0.0081	<0.0050	0.034	0.0050	A692779
Benzo(c)phenanthrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A692779
Benzo(a)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A692779
Benzo(e)pyrene	mg/kg	<0.0050	0.0067	<0.0050	0.030	0.0050	A692779
Chrysene	mg/kg	<0.0050	<0.0050	<0.0050	0.012	0.0050	A692779
Dibenz(a,h)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A692779
Fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	0.011	0.0050	A692779
Fluorene	mg/kg	<0.0050	<0.0050	<0.0050	0.0096	0.0050	A692779
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	0.0083	0.0050	A692779
1-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	0.025	0.0050	A692779
2-Methylnaphthalene	mg/kg	<0.0050	0.0063	<0.0050	0.037	0.0050	A692779
Naphthalene	mg/kg	<0.0050	<0.0050	<0.0050	0.016	0.0050	A692779
Phenanthrene	mg/kg	<0.0050	0.0087	0.0063	0.039	0.0050	A692779
Perylene	mg/kg	0.0091	0.028	0.023	0.091	0.0050	A692779
Pyrene	mg/kg	<0.0050	<0.0050	<0.0050	0.018	0.0050	A692779
Quinoline	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	A692779
Surrogate Recovery (%)							
D10-ANTHRACENE (sur.)	%	102	108	109	110	N/A	A692779
D8-ACENAPHTHYLENE (sur.)	%	97	101	103	108	N/A	A692779
D8-NAPHTHALENE (sur.)	%	91	91	92	97	N/A	A692779

RDL = Reportable Detection Limit
N/A = Not Applicable

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Bureau Veritas Job #: C262019
Report Date: 2022/08/25

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

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID		AZY121	AZY122	AZY123	AZY124		
Sampling Date		2022/08/13 11:00	2022/08/13 11:15	2022/08/13 11:15	2022/08/13 11:30		
COC Number		00013v3	00013v3	00013v3	00013v3		
	UNITS	**MW22-23-01**	**MW22-23-02**	**DUP N**	**MW22-23-03**	**RDL**	**QC Batch**
TERPHENYL-D14 (sur.)	%	137 (1)	123	126	123	N/A	A692779

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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GENERAL COMMENTS

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

Package 1	7.0°C

Version #3: Additional PAHs analysis and Chromatorgram review on sample AZY125 (MW22-50-01) have been added as per request from client 20220823

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 AZY125 [MW22-50-01] : 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.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A687729	GG3	Matrix Spike [AZY122-02]	O-TERPHENYL (sur.)	2022/08/19		113	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/19		113	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/19		116	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/19		116	%	60 - 140
A687729	GG3	Spiked Blank	O-TERPHENYL (sur.)	2022/08/19		123	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/19		122	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/19		125	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/19		124	%	60 - 140
A687729	GG3	Method Blank	O-TERPHENYL (sur.)	2022/08/19		138	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/19	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2022/08/19	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2022/08/19	<50		mg/kg	
A687729	GG3	RPD [AZY122-02]	F2 (C10-C16 Hydrocarbons)	2022/08/19	NC		%	40
			F3 (C16-C34 Hydrocarbons)	2022/08/19	3.3		%	40
			F4 (C34-C50 Hydrocarbons)	2022/08/19	NC		%	40
A687757	DO1	Matrix Spike [AZY121-03]	1,4-Difluorobenzene (sur.)	2022/08/19		102	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/19		99	%	50 - 140
			D10-o-Xylene (sur.)	2022/08/19		106	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/19		108	%	50 - 140
			Benzene	2022/08/19		110	%	50 - 140
			Toluene	2022/08/19		108	%	50 - 140
			Ethylbenzene	2022/08/19		106	%	50 - 140
			m & p-Xylene	2022/08/19		106	%	50 - 140
			o-Xylene	2022/08/19		100	%	50 - 140
			F1 (C6-C10)	2022/08/19		93	%	60 - 140
A687757	DO1	Spiked Blank	1,4-Difluorobenzene (sur.)	2022/08/19		103	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/19		100	%	50 - 140
			D10-o-Xylene (sur.)	2022/08/19		94	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/19		109	%	50 - 140
			Benzene	2022/08/19		92	%	60 - 130
			Toluene	2022/08/19		92	%	60 - 130
			Ethylbenzene	2022/08/19		91	%	60 - 130
			m & p-Xylene	2022/08/19		92	%	60 - 130
			o-Xylene	2022/08/19		89	%	60 - 130
			F1 (C6-C10)	2022/08/19		84	%	60 - 140
A687757	DO1	Method Blank	1,4-Difluorobenzene (sur.)	2022/08/19		99	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/19		100	%	50 - 140
			D10-o-Xylene (sur.)	2022/08/19		93	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/19		105	%	50 - 140
			Benzene	2022/08/19	<0.0050		mg/kg	
			Toluene	2022/08/19	<0.050		mg/kg	
			Ethylbenzene	2022/08/19	<0.010		mg/kg	
			m & p-Xylene	2022/08/19	<0.040		mg/kg	
			o-Xylene	2022/08/19	<0.020		mg/kg	
			F1 (C6-C10)	2022/08/19	<10		mg/kg	
A687757	DO1	RPD [AZY121-03]	Benzene	2022/08/19	NC		%	50
			Toluene	2022/08/19	NC		%	50
			Ethylbenzene	2022/08/19	NC		%	50
			m & p-Xylene	2022/08/19	NC		%	50
			o-Xylene	2022/08/19	NC		%	50
			F1 (C6-C10)	2022/08/19	NC		%	30
A688032	SKM	Matrix Spike	Hex. Chromium (Cr 6+)	2022/08/19		94	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A688032	SKM	Spiked Blank	Hex. Chromium (Cr 6+)	2022/08/19		102	%	80 - 120
A688032	SKM	Method Blank	Hex. Chromium (Cr 6+)	2022/08/19	<0.080		mg/kg	
A688032	SKM	RPD	Hex. Chromium (Cr 6+)	2022/08/19	NC		%	35
A688035	SKM	Matrix Spike [AZY122-01]	Hex. Chromium (Cr 6+)	2022/08/19		90	%	75 - 125
A688035	SKM	Spiked Blank	Hex. Chromium (Cr 6+)	2022/08/19		101	%	80 - 120
A688035	SKM	Method Blank	Hex. Chromium (Cr 6+)	2022/08/19	<0.080		mg/kg	
A688035	SKM	RPD [AZY122-01]	Hex. Chromium (Cr 6+)	2022/08/19	NC		%	35
A688093	A1H	Method Blank	Moisture	2022/08/20	<0.30		%	
A688093	A1H	RPD [AZY125-01]	Moisture	2022/08/20	8.9		%	20
A688202	BMH	QC Standard	Saturation %	2022/08/20		97	%	75 - 125
A688202	BMH	RPD	Saturation %	2022/08/20	10		%	12
A688203	AL7	QC Standard	Soluble (CaCl2) pH	2022/08/20		101	%	97 - 103
A688203	AL7	Spiked Blank	Soluble (CaCl2) pH	2022/08/20		100	%	97 - 103
A688203	AL7	RPD	Soluble (CaCl2) pH	2022/08/20	0.39		%	N/A
A688249	KGR	Matrix Spike [AZY122-01]	Total Antimony (Sb)	2022/08/20		106	%	75 - 125
			Total Arsenic (As)	2022/08/20		103	%	75 - 125
			Total Barium (Ba)	2022/08/20		NC	%	75 - 125
			Total Beryllium (Be)	2022/08/20		105	%	75 - 125
			Total Cadmium (Cd)	2022/08/20		104	%	75 - 125
			Total Chromium (Cr)	2022/08/20		121	%	75 - 125
			Total Cobalt (Co)	2022/08/20		101	%	75 - 125
			Total Copper (Cu)	2022/08/20		102	%	75 - 125
			Total Lead (Pb)	2022/08/20		102	%	75 - 125
			Total Mercury (Hg)	2022/08/20		104	%	75 - 125
			Total Molybdenum (Mo)	2022/08/20		106	%	75 - 125
			Total Nickel (Ni)	2022/08/20		103	%	75 - 125
			Total Selenium (Se)	2022/08/20		106	%	75 - 125
			Total Silver (Ag)	2022/08/20		105	%	75 - 125
			Total Thallium (Tl)	2022/08/20		101	%	75 - 125
			Total Tin (Sn)	2022/08/20		106	%	75 - 125
			Total Uranium (U)	2022/08/20		98	%	75 - 125
			Total Vanadium (V)	2022/08/20		155 (1)	%	75 - 125
			Total Zinc (Zn)	2022/08/20		NC	%	75 - 125
A688249	KGR	QC Standard	Total Antimony (Sb)	2022/08/20		130	%	15 - 182
			Total Arsenic (As)	2022/08/20		102	%	53 - 147
			Total Barium (Ba)	2022/08/20		100	%	80 - 119
			Total Cadmium (Cd)	2022/08/20		100	%	72 - 128
			Total Chromium (Cr)	2022/08/20		101	%	59 - 141
			Total Cobalt (Co)	2022/08/20		96	%	58 - 142
			Total Copper (Cu)	2022/08/20		105	%	83 - 117
			Total Lead (Pb)	2022/08/20		114	%	79 - 121
			Total Molybdenum (Mo)	2022/08/20		102	%	67 - 133
			Total Nickel (Ni)	2022/08/20		105	%	79 - 121
			Total Silver (Ag)	2022/08/20		85	%	47 - 153
			Total Tin (Sn)	2022/08/20		114	%	67 - 133
			Total Uranium (U)	2022/08/20		93	%	77 - 123
			Total Vanadium (V)	2022/08/20		103	%	79 - 121
			Total Zinc (Zn)	2022/08/20		105	%	79 - 121
A688249	KGR	Spiked Blank	Total Antimony (Sb)	2022/08/20		105	%	80 - 120
			Total Arsenic (As)	2022/08/20		96	%	80 - 120
			Total Barium (Ba)	2022/08/20		99	%	80 - 120
			Total Beryllium (Be)	2022/08/20		98	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Cadmium (Cd)	2022/08/20		99	%	80 - 120
			Total Chromium (Cr)	2022/08/20		98	%	80 - 120
			Total Cobalt (Co)	2022/08/20		97	%	80 - 120
			Total Copper (Cu)	2022/08/20		98	%	80 - 120
			Total Lead (Pb)	2022/08/20		98	%	80 - 120
			Total Mercury (Hg)	2022/08/20		107	%	80 - 120
			Total Molybdenum (Mo)	2022/08/20		100	%	80 - 120
			Total Nickel (Ni)	2022/08/20		97	%	80 - 120
			Total Selenium (Se)	2022/08/20		102	%	80 - 120
			Total Silver (Ag)	2022/08/20		99	%	80 - 120
			Total Thallium (Tl)	2022/08/20		98	%	80 - 120
			Total Tin (Sn)	2022/08/20		98	%	80 - 120
			Total Uranium (U)	2022/08/20		98	%	80 - 120
			Total Vanadium (V)	2022/08/20		98	%	80 - 120
			Total Zinc (Zn)	2022/08/20		97	%	80 - 120
A688249	KGR	Method Blank	Total Antimony (Sb)	2022/08/20	<0.50		mg/kg	
			Total Arsenic (As)	2022/08/20	<1.0		mg/kg	
			Total Barium (Ba)	2022/08/20	<1.0		mg/kg	
			Total Beryllium (Be)	2022/08/20	<0.40		mg/kg	
			Total Cadmium (Cd)	2022/08/20	<0.050		mg/kg	
			Total Chromium (Cr)	2022/08/20	<1.0		mg/kg	
			Total Cobalt (Co)	2022/08/20	<0.50		mg/kg	
			Total Copper (Cu)	2022/08/20	<1.0		mg/kg	
			Total Lead (Pb)	2022/08/20	<0.50		mg/kg	
			Total Mercury (Hg)	2022/08/20	<0.050		mg/kg	
			Total Molybdenum (Mo)	2022/08/20	<0.40		mg/kg	
			Total Nickel (Ni)	2022/08/20	<1.0		mg/kg	
			Total Selenium (Se)	2022/08/20	<0.50		mg/kg	
			Total Silver (Ag)	2022/08/20	<0.20		mg/kg	
			Total Thallium (Tl)	2022/08/20	<0.10		mg/kg	
			Total Tin (Sn)	2022/08/20	<1.0		mg/kg	
			Total Uranium (U)	2022/08/20	<0.20		mg/kg	
			Total Vanadium (V)	2022/08/20	<1.0		mg/kg	
			Total Zinc (Zn)	2022/08/20	<10		mg/kg	
A688249	KGR	RPD [AZY122-01]	Total Antimony (Sb)	2022/08/20	NC		%	30
			Total Arsenic (As)	2022/08/20	1.8		%	30
			Total Barium (Ba)	2022/08/20	0.097		%	35
			Total Beryllium (Be)	2022/08/20	NC		%	30
			Total Cadmium (Cd)	2022/08/20	3.9		%	30
			Total Chromium (Cr)	2022/08/20	3.7		%	30
			Total Cobalt (Co)	2022/08/20	0.33		%	30
			Total Copper (Cu)	2022/08/20	3.1		%	30
			Total Lead (Pb)	2022/08/20	0.42		%	35
			Total Mercury (Hg)	2022/08/20	NC		%	35
			Total Molybdenum (Mo)	2022/08/20	21		%	35
			Total Nickel (Ni)	2022/08/20	0.24		%	30
			Total Selenium (Se)	2022/08/20	NC		%	30
			Total Silver (Ag)	2022/08/20	NC		%	35
			Total Thallium (Tl)	2022/08/20	NC		%	30
			Total Tin (Sn)	2022/08/20	NC		%	35
			Total Uranium (U)	2022/08/20	6.6		%	30
			Total Vanadium (V)	2022/08/20	2.5		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Zinc (Zn)	2022/08/20	0.079		%	30
A688283	JAB	Matrix Spike [AZY122-01]	Soluble (Hot water) Boron (B)	2022/08/20		104	%	75 - 125
A688283	JAB	Spiked Blank	Soluble (Hot water) Boron (B)	2022/08/20		97	%	80 - 120
A688283	JAB	Method Blank	Soluble (Hot water) Boron (B)	2022/08/20	<0.10		mg/kg	
A688283	JAB	RPD [AZY122-01]	Soluble (Hot water) Boron (B)	2022/08/20	1.9		%	35
A688403	CTU	Matrix Spike	Soluble Chloride (Cl)	2022/08/20		110	%	75 - 125
A688403	CTU	QC Standard	Soluble Chloride (Cl)	2022/08/20		100	%	75 - 125
A688403	CTU	Spiked Blank	Soluble Chloride (Cl)	2022/08/20		109	%	80 - 120
A688403	CTU	Method Blank	Soluble Chloride (Cl)	2022/08/20	<10		mg/L	
A688403	CTU	RPD	Soluble Chloride (Cl)	2022/08/20	18		%	30
A688405	ZI	QC Standard	Soluble Conductivity	2022/08/20		99	%	75 - 125
A688405	ZI	Spiked Blank	Soluble Conductivity	2022/08/20		100	%	90 - 110
A688405	ZI	Method Blank	Soluble Conductivity	2022/08/20	<0.020		dS/m	
A688405	ZI	RPD	Soluble Conductivity	2022/08/20	11		%	20
A688421	JAB	Matrix Spike [AZY124-01]	Soluble Calcium (Ca)	2022/08/20		103	%	75 - 125
			Soluble Magnesium (Mg)	2022/08/20		105	%	75 - 125
			Soluble Sodium (Na)	2022/08/20		100	%	75 - 125
			Soluble Potassium (K)	2022/08/20		100	%	75 - 125
A688421	JAB	QC Standard	Soluble Calcium (Ca)	2022/08/20		101	%	75 - 125
			Soluble Magnesium (Mg)	2022/08/20		99	%	75 - 125
			Soluble Sodium (Na)	2022/08/20		99	%	75 - 125
			Soluble Potassium (K)	2022/08/20		113	%	75 - 125
			Soluble Sulphate (SO4)	2022/08/20		106	%	75 - 125
A688421	JAB	Spiked Blank	Soluble Calcium (Ca)	2022/08/20		104	%	80 - 120
			Soluble Magnesium (Mg)	2022/08/20		106	%	80 - 120
			Soluble Sodium (Na)	2022/08/20		103	%	80 - 120
			Soluble Potassium (K)	2022/08/20		102	%	80 - 120
A688421	JAB	Method Blank	Soluble Calcium (Ca)	2022/08/20	<1.5		mg/L	
			Soluble Magnesium (Mg)	2022/08/20	<1.0		mg/L	
			Soluble Sodium (Na)	2022/08/20	<2.5		mg/L	
			Soluble Potassium (K)	2022/08/20	<1.3		mg/L	
			Soluble Sulphate (SO4)	2022/08/20	<5.0		mg/L	
A688421	JAB	RPD	Soluble Calcium (Ca)	2022/08/20	9.1		%	30
			Soluble Magnesium (Mg)	2022/08/20	12		%	30
			Soluble Sodium (Na)	2022/08/20	15		%	30
			Soluble Potassium (K)	2022/08/20	3.9		%	30
			Soluble Sulphate (SO4)	2022/08/20	10		%	30
A688566	KDB	Matrix Spike [AZY122-01]	Soluble Chloride (Cl)	2022/08/21		106	%	75 - 125
			Soluble Sulphate (SO4)	2022/08/21		101	%	75 - 125
A688566	KDB	QC Standard	Soluble Chloride (Cl)	2022/08/21		93	%	75 - 125
			Soluble Sulphate (SO4)	2022/08/21		99	%	75 - 125
A688566	KDB	Spiked Blank	Soluble Chloride (Cl)	2022/08/21		100	%	80 - 120
			Soluble Sulphate (SO4)	2022/08/21		96	%	80 - 120
A688566	KDB	Method Blank	Soluble Chloride (Cl)	2022/08/21	<5.0		mg/L	
			Soluble Sulphate (SO4)	2022/08/21	<5.0		mg/L	
A688566	KDB	RPD [AZY122-01]	Soluble Chloride (Cl)	2022/08/21	4.2		%	30
			Soluble Sulphate (SO4)	2022/08/21	3.4		%	30
A692779	JU2	Matrix Spike	D10-ANTHRACENE (sur.)	2022/08/24		95	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/08/24		94	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/24		90	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/08/24		122	%	50 - 130
			Acenaphthene	2022/08/24		87	%	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
			Acenaphthylene	2022/08/24		88	%	50 - 130
			Acridine	2022/08/24		51	%	50 - 130
			Anthracene	2022/08/24		93	%	50 - 130
			Benzo(a)anthracene	2022/08/24		110	%	50 - 130
			Benzo(b&j)fluoranthene	2022/08/24		105	%	50 - 130
			Benzo(k)fluoranthene	2022/08/24		98	%	50 - 130
			Benzo(g,h,i)perylene	2022/08/24		102	%	50 - 130
			Benzo(c)phenanthrene	2022/08/24		113	%	50 - 130
			Benzo(a)pyrene	2022/08/24		106	%	50 - 130
			Benzo(e)pyrene	2022/08/24		97	%	50 - 130
			Chrysene	2022/08/24		104	%	50 - 130
			Dibenz(a,h)anthracene	2022/08/24		102	%	50 - 130
			Fluoranthene	2022/08/24		96	%	50 - 130
			Fluorene	2022/08/24		95	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2022/08/24		104	%	50 - 130
			1-Methylnaphthalene	2022/08/24		69	%	50 - 130
			2-Methylnaphthalene	2022/08/24		89	%	50 - 130
			Naphthalene	2022/08/24		87	%	50 - 130
			Phenanthrene	2022/08/24		92	%	50 - 130
			Perylene	2022/08/24		83	%	50 - 130
			Pyrene	2022/08/24		93	%	50 - 130
			Quinoline	2022/08/24		77	%	50 - 130
A692779	JU2	Spiked Blank	D10-ANTHRACENE (sur.)	2022/08/24		95	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/08/24		91	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/24		93	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/08/24		130	%	50 - 130
			Acenaphthene	2022/08/24		92	%	50 - 130
			Acenaphthylene	2022/08/24		88	%	50 - 130
			Acridine	2022/08/24		72	%	50 - 130
			Anthracene	2022/08/24		99	%	50 - 130
			Benzo(a)anthracene	2022/08/24		118	%	50 - 130
			Benzo(b&j)fluoranthene	2022/08/24		110	%	50 - 130
			Benzo(k)fluoranthene	2022/08/24		117	%	50 - 130
			Benzo(g,h,i)perylene	2022/08/24		108	%	50 - 130
			Benzo(c)phenanthrene	2022/08/24		123	%	50 - 130
			Benzo(a)pyrene	2022/08/24		93	%	50 - 130
			Benzo(e)pyrene	2022/08/24		103	%	50 - 130
			Chrysene	2022/08/24		114	%	50 - 130
			Dibenz(a,h)anthracene	2022/08/24		109	%	50 - 130
			Fluoranthene	2022/08/24		99	%	50 - 130
			Fluorene	2022/08/24		98	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2022/08/24		98	%	50 - 130
			1-Methylnaphthalene	2022/08/24		79	%	50 - 130
			2-Methylnaphthalene	2022/08/24		104	%	50 - 130
			Naphthalene	2022/08/24		93	%	50 - 130
			Phenanthrene	2022/08/24		99	%	50 - 130
			Perylene	2022/08/24		90	%	50 - 130
			Pyrene	2022/08/24		99	%	50 - 130
			Quinoline	2022/08/24		91	%	50 - 130
A692779	JU2	Method Blank	D10-ANTHRACENE (sur.)	2022/08/24		106	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/08/24		96	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/24		95	%	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.)	2022/08/24		138 (1)	%	50 - 130
			Acenaphthene	2022/08/24	<0.0050		mg/kg	
			Acenaphthylene	2022/08/24	<0.0050		mg/kg	
			Acridine	2022/08/24	<0.010		mg/kg	
			Anthracene	2022/08/24	<0.0040		mg/kg	
			Benzo(a)anthracene	2022/08/24	<0.0050		mg/kg	
			Benzo(b&j)fluoranthene	2022/08/24	<0.0050		mg/kg	
			Benzo(k)fluoranthene	2022/08/24	<0.0050		mg/kg	
			Benzo(g,h,i)perylene	2022/08/24	<0.0050		mg/kg	
			Benzo(c)phenanthrene	2022/08/24	<0.0050		mg/kg	
			Benzo(a)pyrene	2022/08/24	<0.0050		mg/kg	
			Benzo(e)pyrene	2022/08/24	<0.0050		mg/kg	
			Chrysene	2022/08/24	<0.0050		mg/kg	
			Dibenz(a,h)anthracene	2022/08/24	<0.0050		mg/kg	
			Fluoranthene	2022/08/24	<0.0050		mg/kg	
			Fluorene	2022/08/24	<0.0050		mg/kg	
			Indeno(1,2,3-cd)pyrene	2022/08/24	<0.0050		mg/kg	
			1-Methylnaphthalene	2022/08/24	<0.0050		mg/kg	
			2-Methylnaphthalene	2022/08/24	<0.0050		mg/kg	
			Naphthalene	2022/08/24	<0.0050		mg/kg	
			Phenanthrene	2022/08/24	<0.0050		mg/kg	
			Perylene	2022/08/24	<0.0050		mg/kg	
			Pyrene	2022/08/24	<0.0050		mg/kg	
			Quinoline	2022/08/24	<0.010		mg/kg	
A692779	JU2	RPD	Acenaphthene	2022/08/24	23		%	50
			Acenaphthylene	2022/08/24	21		%	50
			Acridine	2022/08/24	19		%	50
			Anthracene	2022/08/24	NC		%	50
			Benzo(a)anthracene	2022/08/24	NC		%	50
			Benzo(b&j)fluoranthene	2022/08/24	NC		%	50
			Benzo(k)fluoranthene	2022/08/24	NC		%	50
			Benzo(g,h,i)perylene	2022/08/24	NC		%	50
			Benzo(c)phenanthrene	2022/08/24	NC		%	50
			Benzo(a)pyrene	2022/08/24	NC		%	50
			Benzo(e)pyrene	2022/08/24	NC		%	50
			Chrysene	2022/08/24	NC		%	50
			Dibenz(a,h)anthracene	2022/08/24	NC		%	50
			Fluoranthene	2022/08/24	NC		%	50
			Fluorene	2022/08/24	19		%	50
			Indeno(1,2,3-cd)pyrene	2022/08/24	NC		%	50
			1-Methylnaphthalene	2022/08/24	29		%	50
			2-Methylnaphthalene	2022/08/24	29		%	50
			Naphthalene	2022/08/24	15		%	50
			Phenanthrene	2022/08/24	21		%	50
			Perylene	2022/08/24	NC		%	50
			Pyrene	2022/08/24	NC		%	50

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Quinoline	2022/08/24	NC		%	50

N/A = Not Applicable

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

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

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 (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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.

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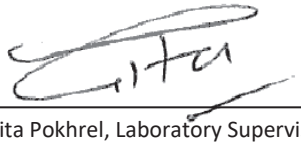
Bureau Veritas Job #: C262019
Report Date: 2022/08/25

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

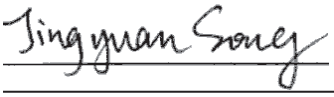
VALIDATION SIGNATURE PAGE

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

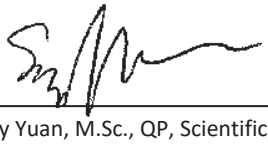
Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics



Gita Pokhrel, Laboratory Supervisor



Jingyuan Song, QP, Organics – Senior Analyst



Sandy Yuan, M.Sc., QP, Scientific Specialist

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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.

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918 MCAL

BUREAU VERITAS

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY #	
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COOLER OBSERVATIONS:

CUSTODY SEAL	YES	NO	COOLER ID	TEMP 1	TEMP 2	TEMP 3
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			6	8	9
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			5	4	4
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			7	8	7
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			5	3	6
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			5	4	5
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			2	3	4
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			3	3	1
PRESENT / INTACT / ICE PRESENT						
PRESENT / INTACT / ICE PRESENT						
PRESENT / INTACT / ICE PRESENT						

BV JOB#:

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

RECEIVED BY (SIGN & PRINT)		DATE (YYYY/MM/DD)	TIME (HH:MM)
[signature]	JASON BIL	2022/08/18	~~1310~~ 1510

IR

Choose Location:
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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#:	22525414-3100-3104
Street Address:		Street Address:		Project #:	22525414-3000
City:	Calgary Prov: AB Postal Code:	City:	Calgary AB Postal Code: T2P 4K3	Site #:	Camp Fairwell NA
Phone:		Phone:	403-299-5600	Site Location:	~~WEST CHANNEL,~~ NT
Email:	Canada Account Payable	Email:	aurelie.bellavance@wsp.com	Site Location Province:	NT
Copies:		Copies:	Peter.Tan@wsp.com	Sampled By:	D. MacPhail / J. Pascal

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	Mw 22-23-01	2022	08	13	11	00	Soil				X					X				X							X	4		also email report to
2	Mw 22-23-02	↓	↓	↓	11	15	↓				X					X				X							X	4		gld.shelldqr@wsp.com
3	Dup N	↓	↓	↓	11	15	↓				X					X				X							X	4		gld.iol-equis@wsp.com
4	MW 22-23-03	↓	↓	↓	11	30	↓				X					X				X							X	4		Upload to Facility code
5	MW 22-50-01	↓	↓	↓	12	00	↓				X																	3		41259544
6	MW 22-50-02	↓	↓	↓	12	15	↓				X																	3		Samples may contain
7	MW 22-50-03	↓	↓	↓	12	30	↓				X																	3		headspace
8																														
9																														
10																														
11																														
12																														

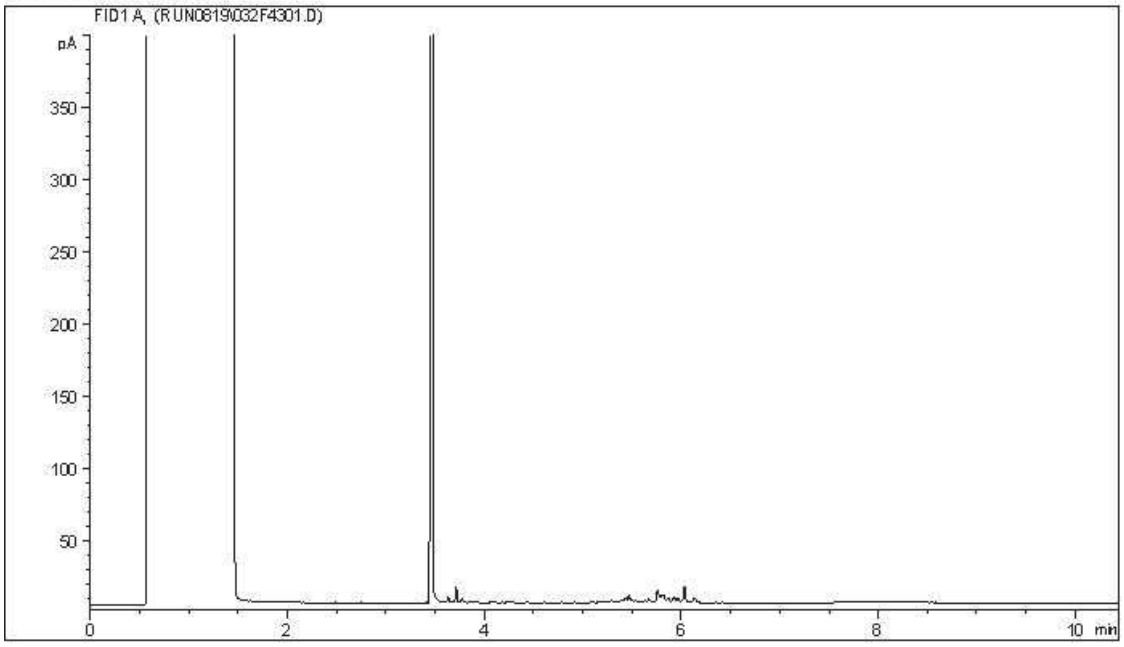
Received in Yellowknife By: [signature] @ 12:45 AUG 17 2022
Ice type: Ice pk
Temp: 10 / 8 / 3

LAB USE ONLY	Yes	No	°C	ACTR	LAB USE ONLY	Yes	No	°C		LAB USE ONLY	Yes	No	°C	Temperature reading by:
Seal present					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	

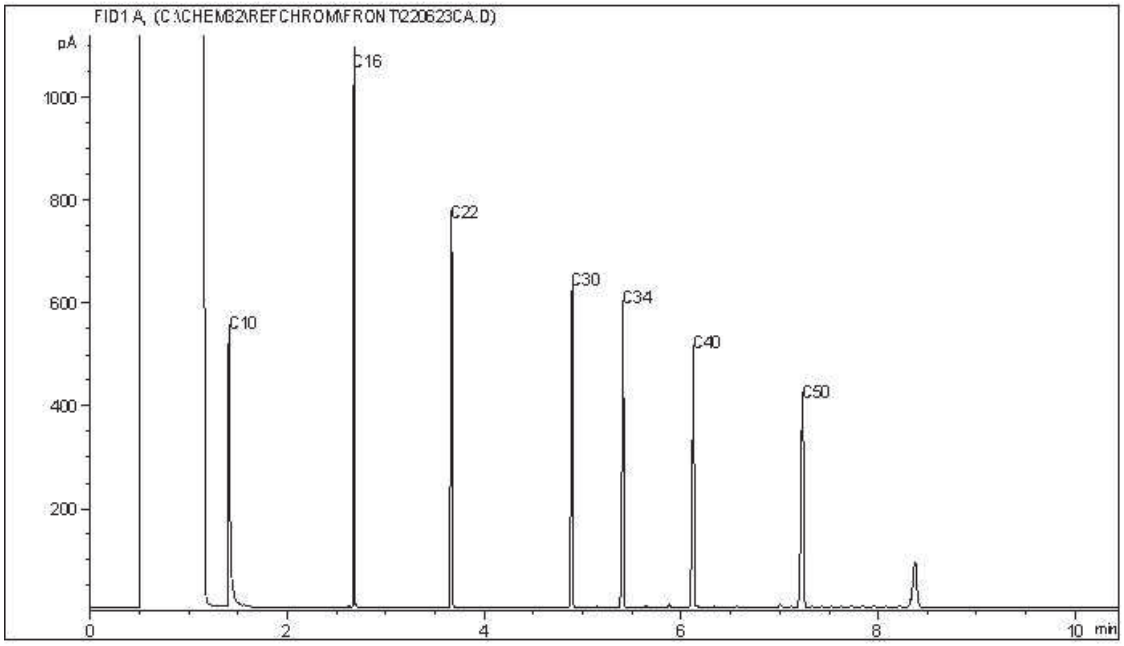
	Relinquished by: (Signature/ Print)	YY	MM	DD	HH	MM	Received by: (Signature/ Print)	YY	MM	DD	HH	MM	Special instructions
1	[signature] D. MacPhail	2022	08	14	09	15	[signature] JASON BU	22	08	18	15	10	C262019
2													

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



Carbon Range Distribution - Reference Chromatogram



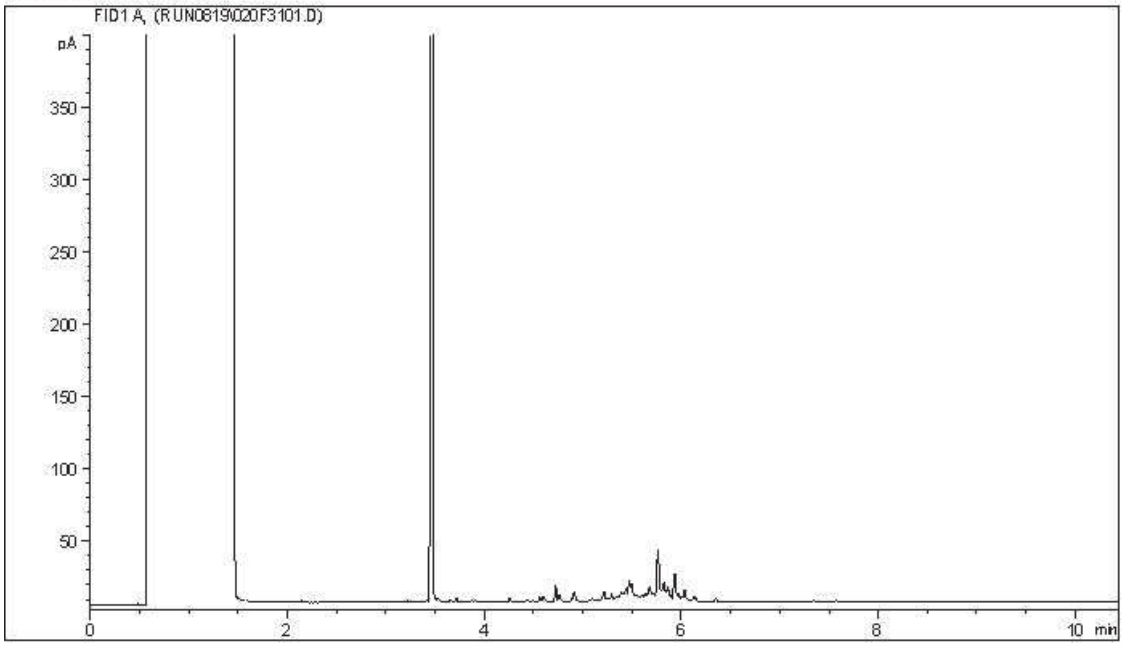
TYPICAL PRODUCT CARBON NUMBER RANGES

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

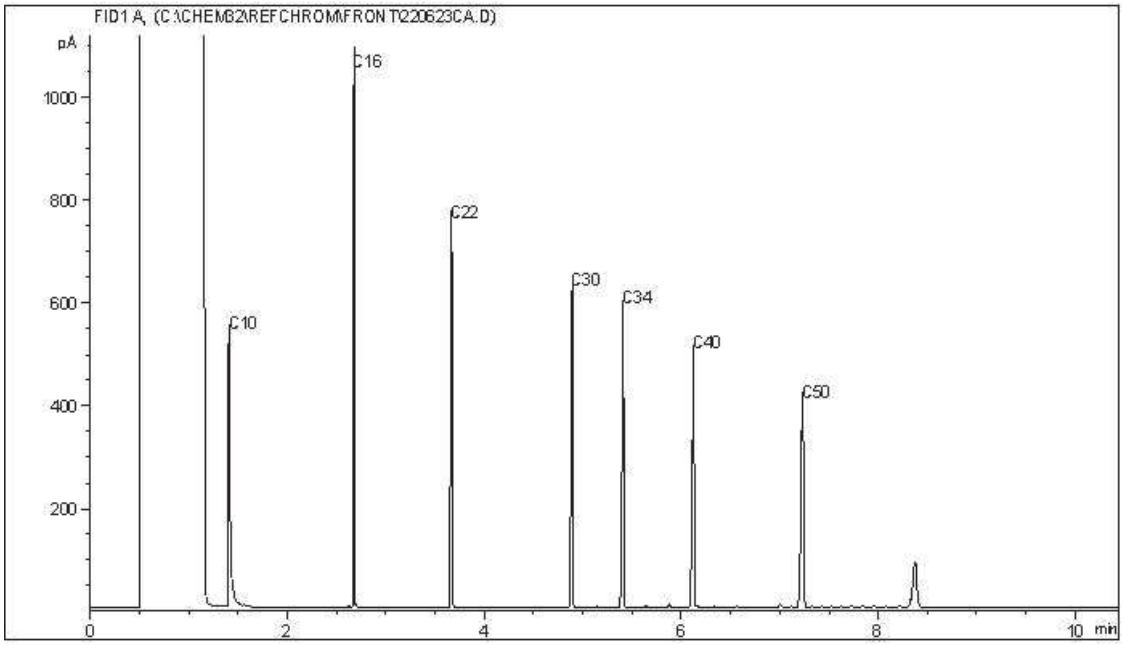
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



Carbon Range Distribution - Reference Chromatogram



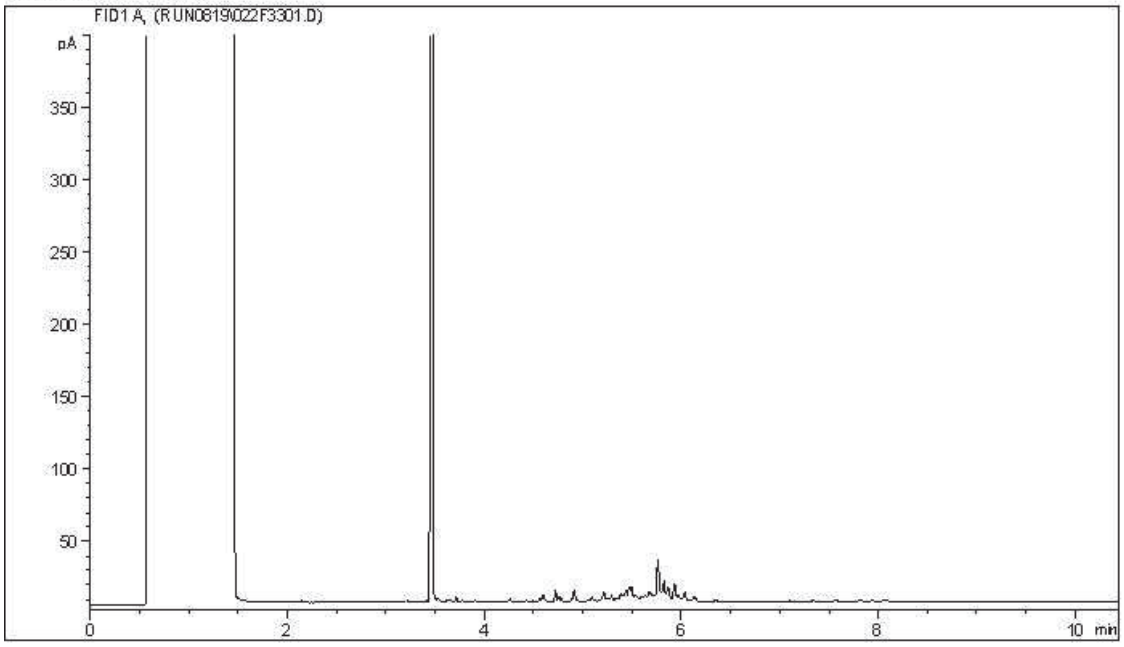
TYPICAL PRODUCT CARBON NUMBER RANGES

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

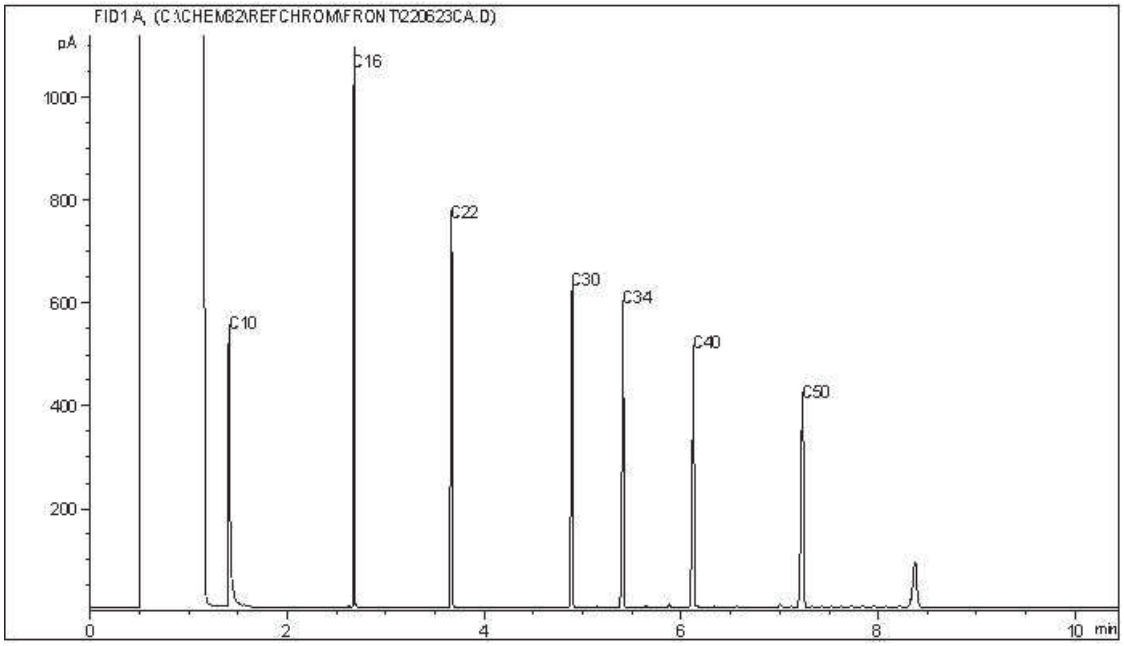
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



Carbon Range Distribution - Reference Chromatogram



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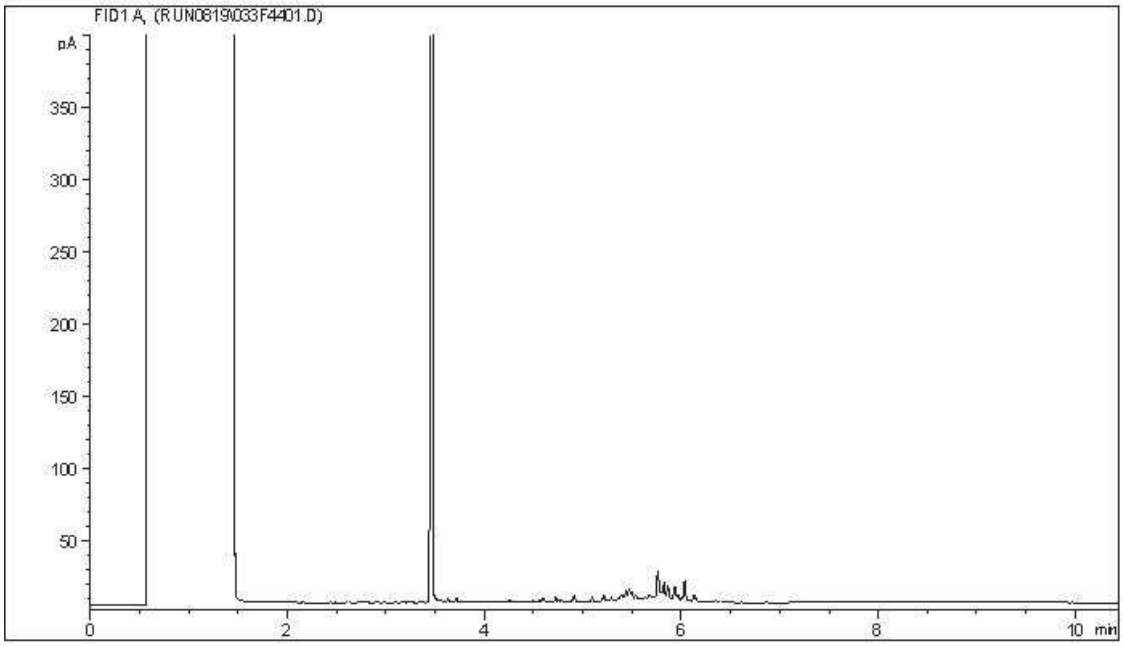
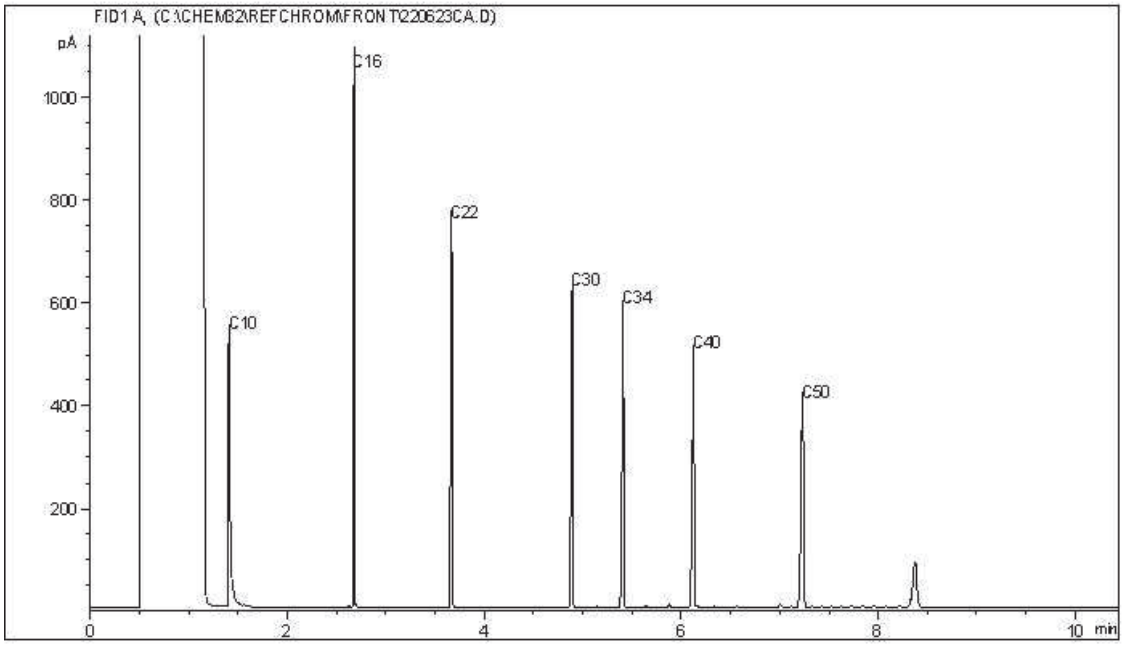
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



Carbon Range Distribution - Reference Chromatogram



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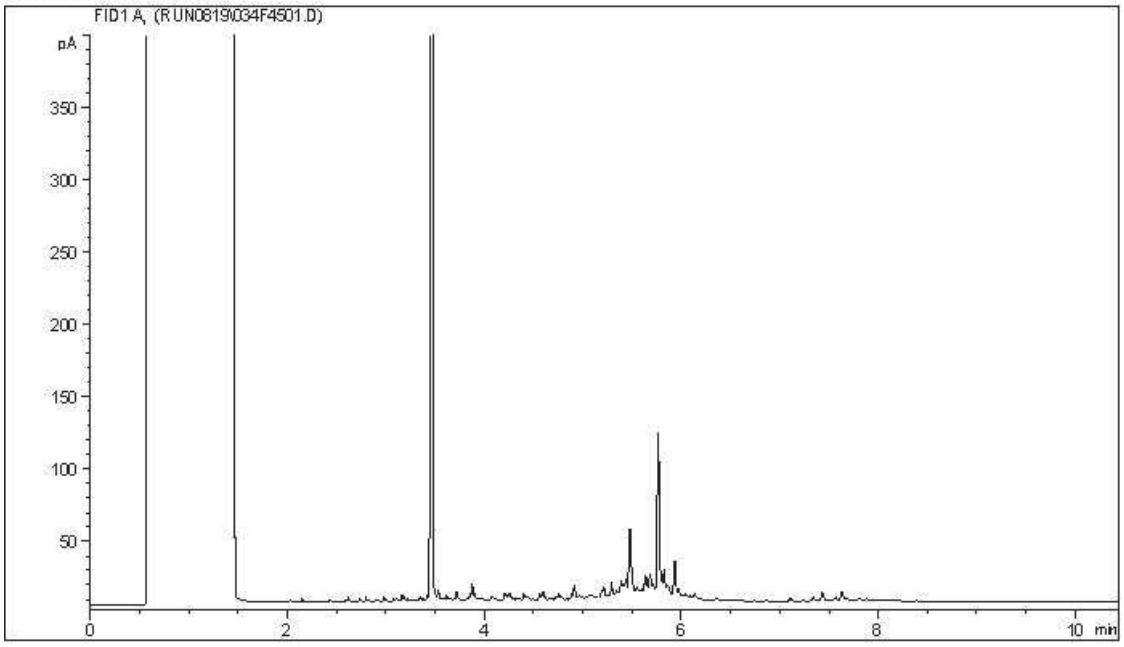
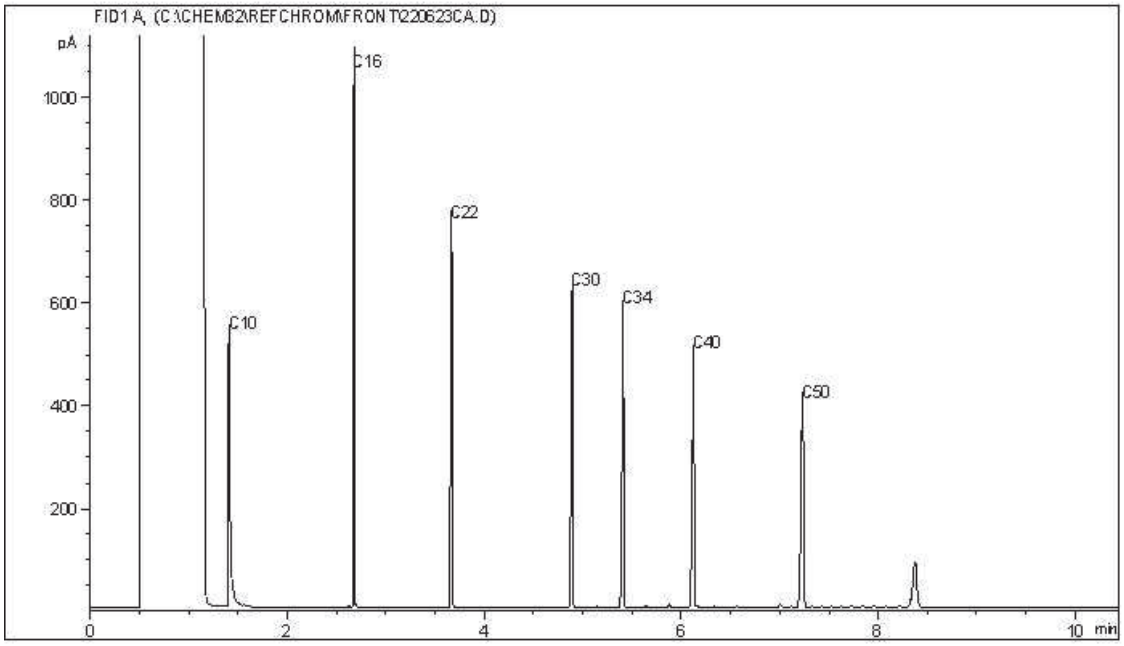
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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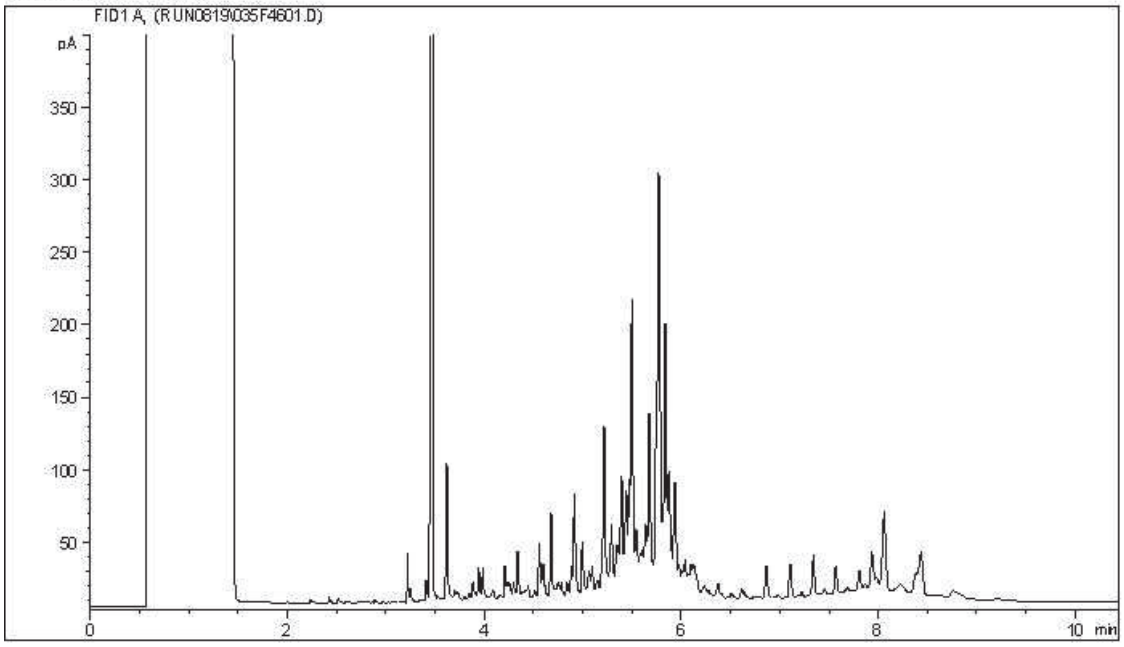
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

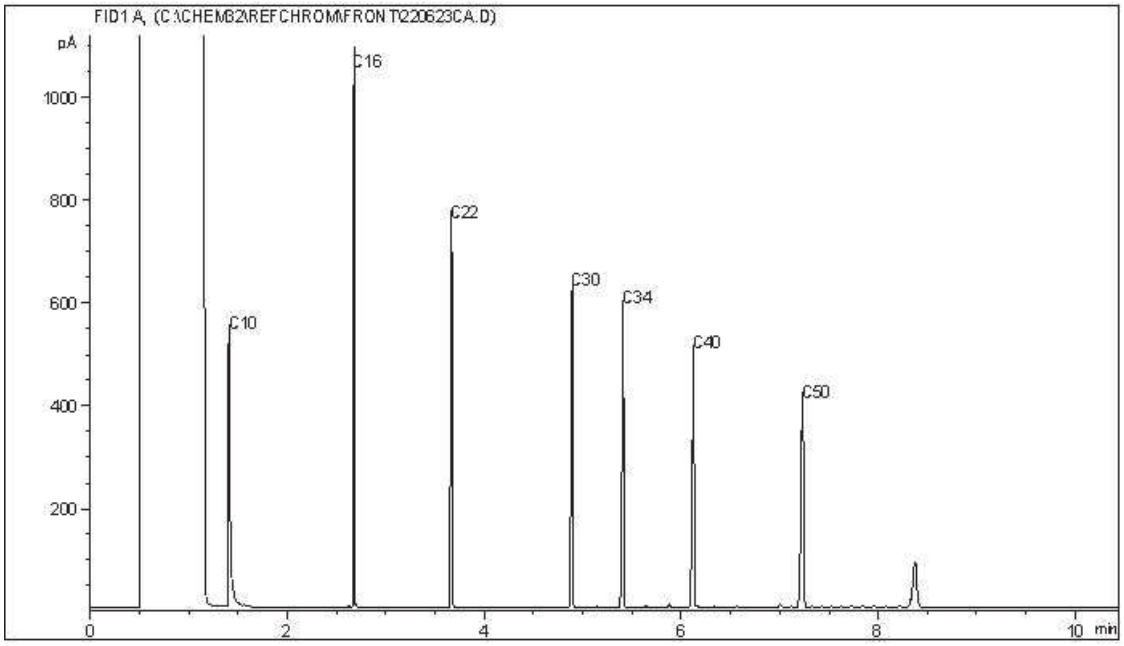
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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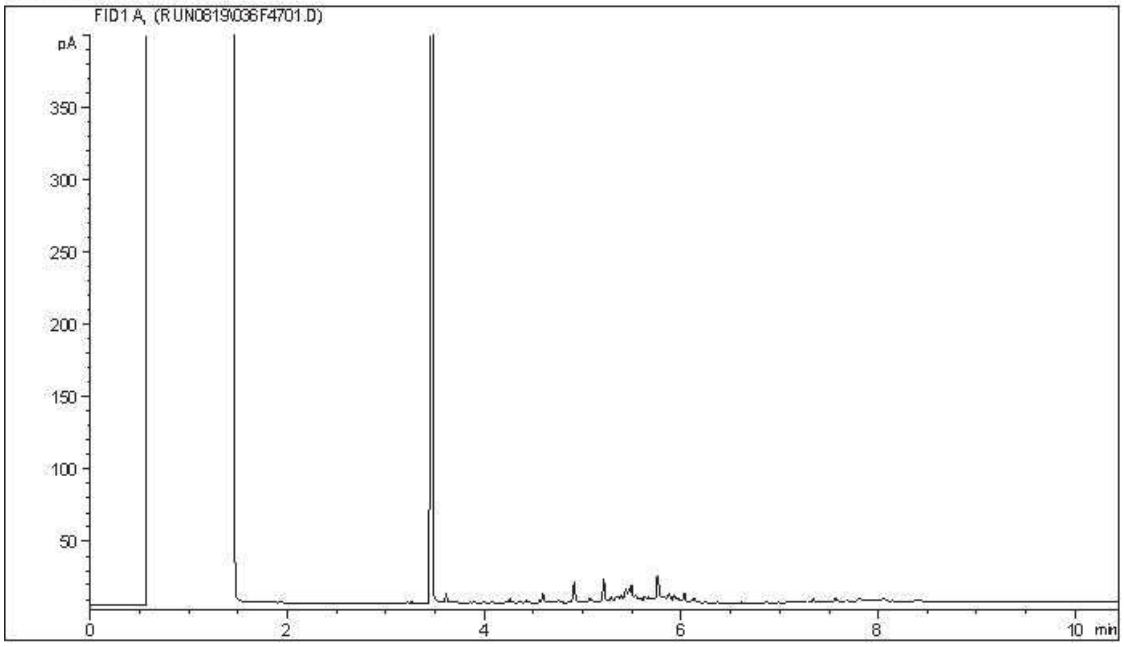
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

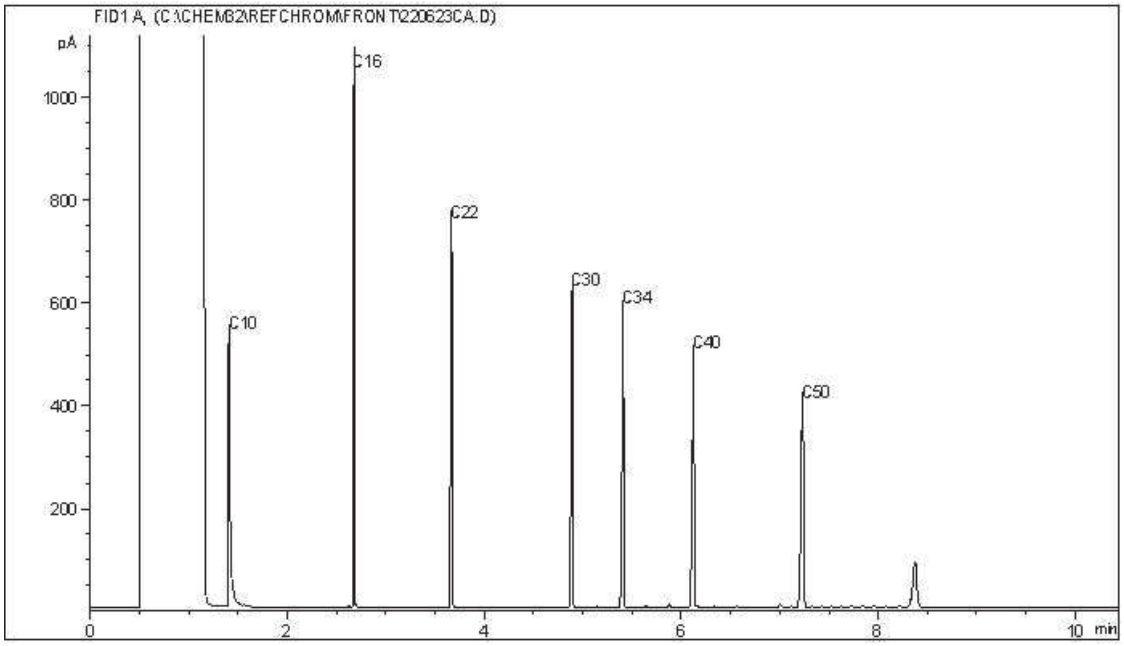
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



Carbon Range Distribution - Reference Chromatogram



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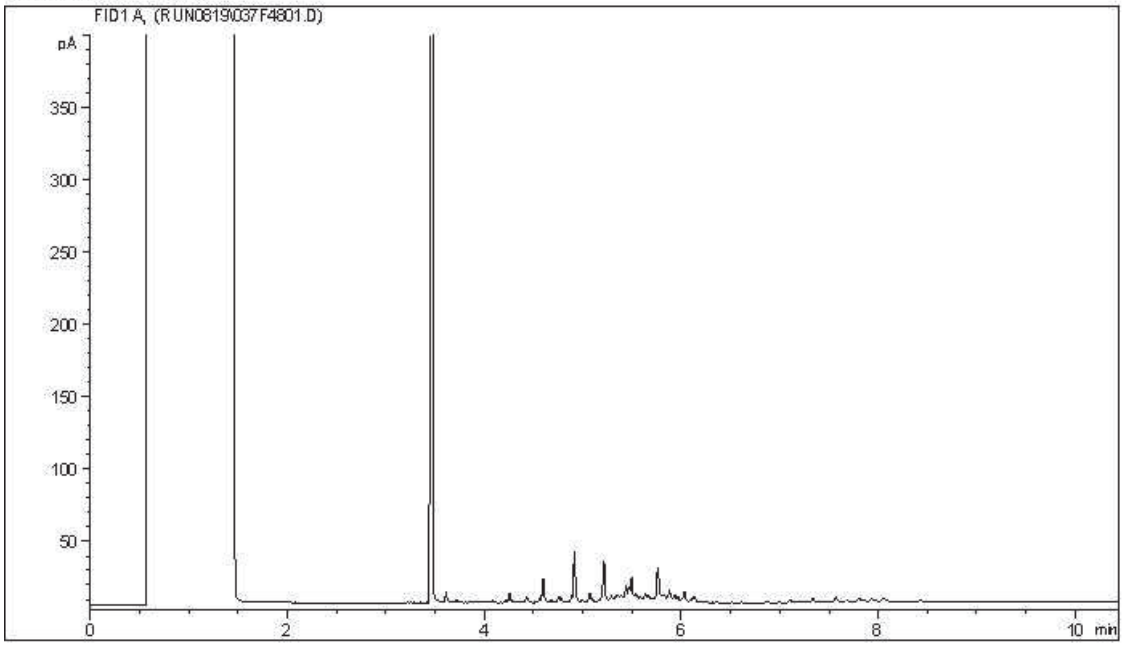
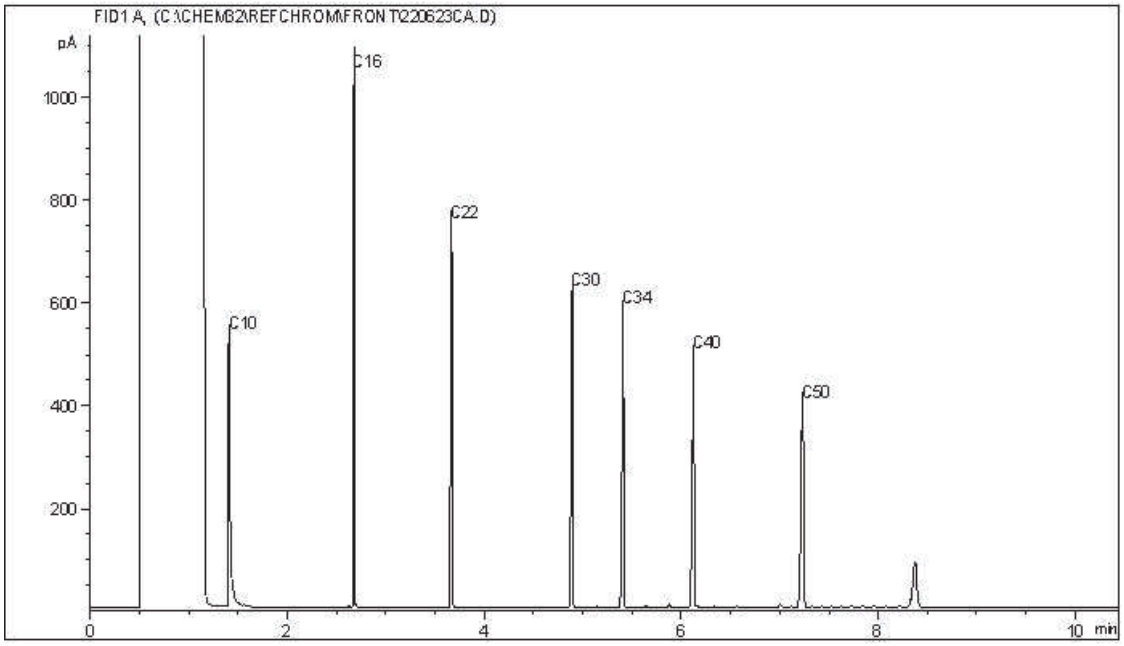
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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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.

Your P.O. #: 22525414-1100-1104
Your Project #: 22525414-1000
Site Location: CAMP FAIRWELL
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: 2023/01/12
Report #: R3287446
Version: 7 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C262029
Received: 2022/08/17, 12:45

Sample Matrix: Soil
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 by HS GC/MS/FID (MeOH extract) (1, 3)	12	N/A	2022/08/20	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX (1)	12	N/A	2022/08/20		Auto Calc
Toluene (13C/12C) CSIA (2)	2	N/A	2022/10/19		
Toluene (13C/12C) CSIA (1)	1	N/A	2023/01/10		See Attachment
CCME Hydrocarbons (F2-F4 in soil) (1, 4)	2	2022/08/19	2022/08/19	AB SOP-00036	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in soil) (1, 4)	9	2022/08/19	2022/08/20	AB SOP-00036	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in soil) (1, 4)	1	2022/08/20	2022/08/20	AB SOP-00036	CCME PHC-CWS m
CCME Hydrocarbons (F4G in soil) (1, 4)	3	2022/08/19	2022/08/22	AB SOP-00036 AB SOP-00040	CCME PHC-CWS m
CCME Hydrocarbons (F4G in soil) (1, 4)	2	2022/09/20	2022/08/22	AB SOP-00036 AB SOP-00040	CCME PHC-CWS m
Moisture (1)	4	N/A	2022/08/19	AB SOP-00002	CCME PHC-CWS m
Moisture (1)	8	N/A	2022/08/20	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.

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

Your P.O. #: 22525414-1100-1104
Your Project #: 22525414-1000
Site Location: CAMP FAIRWELL
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: 2023/01/12
Report #: R3287446
Version: 7 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C262029

Received: 2022/08/17, 12:45

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) This test was performed by Microbial insights c/o EBPI, 735 Griffith Court , Burlington, ON, L7L 5R9
(3) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.
(4) 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.

Encryption Key

Brody Andersen
Program Specialist-Emergency Spill Response
12 Jan 2023 14:39:07

Please direct all questions regarding this Certificate of Analysis to:
Cynny Hagen, Key Account Soecialist
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 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 Job #: C262029
Report Date: 2023/01/12

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

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		AZY173	AZY173		AZY174			AZY175		
Sampling Date		2022/08/13 08:00	2022/08/13 08:00		2022/08/13 08:15			2022/08/13 08:30		
COC Number		1 of 1	1 of 1		1 of 1			1 of 1		
	UNITS	MW 22-09-01	MW 22-09-01 Lab-Dup	RDL	MW 22-09-02	RDL	QC Batch	MW 22-09-03	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	180 (1)	130	22	120	10	A687951	15	10	A687729
F3 (C16-C34 Hydrocarbons)	mg/kg	2300 (2)	1500 (3)	110	1500	50	A687951	170	50	A687729
F4 (C34-C50 Hydrocarbons)	mg/kg	690 (1)	530	110	410	50	A687951	<50	50	A687729
Reached Baseline at C50	mg/kg	No	No	N/A	No	N/A	A687951	Yes	N/A	A687729
Physical Properties										
Moisture	%	55	N/A	0.30	43	0.30	A688093	19	0.30	A688093
Volatiles										
Xylenes (Total)	mg/kg	<0.13	N/A	0.13	<0.13	0.13	A686814	<0.045	0.045	A686814
F1 (C6-C10) - BTEX	mg/kg	<24	N/A	24	<24	24	A686814	<10	10	A686814
Field Preserved Volatiles										
Benzene	mg/kg	<0.015 (4)	N/A	0.015	<0.014 (4)	0.014	A687767	<0.0050	0.0050	A687767
Toluene	mg/kg	0.85 (4)	N/A	0.15	1.3 (4)	0.14	A687767	<0.050	0.050	A687767
Ethylbenzene	mg/kg	<0.030 (4)	N/A	0.030	<0.028 (4)	0.028	A687767	<0.010	0.010	A687767
m & p-Xylene	mg/kg	<0.12 (4)	N/A	0.12	<0.11 (4)	0.11	A687767	<0.040	0.040	A687767
o-Xylene	mg/kg	<0.059 (4)	N/A	0.059	<0.056 (4)	0.056	A687767	<0.020	0.020	A687767
F1 (C6-C10)	mg/kg	<24 (5)	N/A	24	<24 (5)	24	A687767	<10	10	A687767
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	96	N/A	N/A	97	N/A	A687767	96	N/A	A687767
4-Bromofluorobenzene (sur.)	%	110	N/A	N/A	109	N/A	A687767	111	N/A	A687767
D10-o-Xylene (sur.)	%	87	N/A	N/A	92	N/A	A687767	96	N/A	A687767
D4-1,2-Dichloroethane (sur.)	%	88	N/A	N/A	94	N/A	A687767	92	N/A	A687767

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 raised due to high moisture content, sample contains => 50% moisture.
Duplicate exceeds acceptance criteria due to sample non homogeneity.
(3) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
(4) Detection limits raised based on sample weight used for analysis.
(5) Detection limits raised 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 #: C262029
Report Date: 2023/01/12

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

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		AZY173	AZY173		AZY174			AZY175		
Sampling Date		2022/08/13 08:00	2022/08/13 08:00		2022/08/13 08:15			2022/08/13 08:30		
COC Number		1 of 1	1 of 1		1 of 1			1 of 1		
	UNITS	**MW 22-09-01**	**MW 22-09-01 Lab-Dup**	**RDL**	**MW 22-09-02**	**RDL**	**QC Batch**	**MW 22-09-03**	**RDL**	**QC Batch**
O-TERPHENYL (sur.)	%	126	101	N/A	97	N/A	A687951	110	N/A	A687729

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 #: C262029
Report Date: 2023/01/12

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

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		AZY176			AZY177		AZY178			AZY179		
Sampling Date		2022/08/13 08:45			2022/08/13 08:45		2022/08/13 09:00			2022/08/13 09:15		
COC Number		1 of 1			1 of 1		1 of 1			1 of 1		
	UNITS	BH22-49-01	RDL	QC Batch	DUP M	RDL	BH22-49-02	RDL	QC Batch	BH22-49-03	RDL	QC Batch
Ext. Pet. Hydrocarbon												
F2 (C10-C16 Hydrocarbons)	mg/kg	930 (1)	28	A687951	190 (1)	29	21	10	A687729	<10	10	A687951
F3 (C16-C34 Hydrocarbons)	mg/kg	8700 (1)	140	A687951	2800 (1)	140	660	50	A687729	<50	50	A687951
F4 (C34-C50 Hydrocarbons)	mg/kg	2700 (1)	140	A687951	1100 (1)	140	230	50	A687729	<50	50	A687951
Reached Baseline at C50	mg/kg	No	N/A	A687951	No	N/A	Yes	N/A	A687729	Yes	N/A	A687951
Physical Properties												
Moisture	%	64	0.30	A688093	65	0.30	40	0.30	A688047	19	0.30	A688093
Volatiles												
Xylenes (Total)	mg/kg	<0.21	0.21	A686814	1.2	0.20	<0.098	0.098	A686814	<0.045	0.045	A686814
F1 (C6-C10) - BTEX	mg/kg	<24	24	A686814	<44	44	<22	22	A686814	<10	10	A686814
Field Preserved Volatiles												
Benzene	mg/kg	<0.023 (2)	0.023	A687767	0.060 (2)	0.022	0.012 (2)	0.011	A687767	0.010	0.0050	A687767
Toluene	mg/kg	0.36 (2)	0.23	A687767	48 (2)	0.22	8.2 (2)	0.11	A687767	0.088	0.050	A687767
Ethylbenzene	mg/kg	<0.047 (2)	0.047	A687767	0.27 (2)	0.044	<0.022 (2)	0.022	A687767	<0.010	0.010	A687767
m & p-Xylene	mg/kg	<0.19 (2)	0.19	A687767	0.87 (2)	0.18	<0.088 (2)	0.088	A687767	<0.040	0.040	A687767
o-Xylene	mg/kg	<0.093 (2)	0.093	A687767	0.30 (2)	0.088	<0.044 (2)	0.044	A687767	<0.020	0.020	A687767
F1 (C6-C10)	mg/kg	<24 (3)	24	A687767	67 (2)	44	<22 (2)	22	A687767	<10	10	A687767
Surrogate Recovery (%)												
1,4-Difluorobenzene (sur.)	%	98	N/A	A687767	97	N/A	96	N/A	A687767	98	N/A	A687767
4-Bromofluorobenzene (sur.)	%	108	N/A	A687767	109	N/A	107	N/A	A687767	109	N/A	A687767
D10-o-Xylene (sur.)	%	92	N/A	A687767	94	N/A	98	N/A	A687767	96	N/A	A687767
D4-1,2-Dichloroethane (sur.)	%	94	N/A	A687767	94	N/A	94	N/A	A687767	93	N/A	A687767
O-TERPHENYL (sur.)	%	108	N/A	A687951	140	N/A	117	N/A	A687729	109	N/A	A687951

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

Bureau Veritas Job #: C262029
Report Date: 2023/01/12

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

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		AZY180	AZY181			AZY182			AZY183		
Sampling Date		2022/08/13 09:30	2022/08/13 09:45			2022/08/13 10:00			2022/08/13 10:15		
COC Number		1 of 1	1 of 1			1 of 1			1 of 1		
	UNITS	BH22-11-01	BH22-11-02	RDL	QC Batch	BH22-47-01	RDL	QC Batch	BH22-10-01	RDL	QC Batch
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	6400	13	10	A687951	380 (1)	48	A687729	76 (1)	26	A687729
F3 (C16-C34 Hydrocarbons)	mg/kg	520	<50	50	A687951	8300 (1)	240	A687729	780 (1)	130	A687729
F4 (C34-C50 Hydrocarbons)	mg/kg	140	<50	50	A687951	3200 (1)	240	A687729	380 (1)	130	A687729
Reached Baseline at C50	mg/kg	Yes	Yes	N/A	A687951	No	N/A	A687729	Yes	N/A	A687729
Physical Properties											
Moisture	%	10	20	0.30	A688093	79	0.30	A688047	62	0.30	A688091
Volatiles											
Xylenes (Total)	mg/kg	0.12	0.47	0.045	A686814	<0.51	0.51	A686814	<0.37	0.37	A686814
F1 (C6-C10) - BTEX	mg/kg	110	86	10	A686814	<30	30	A686814	<24	24	A686814
Field Preserved Volatiles											
Benzene	mg/kg	<0.0050	0.024	0.0050	A687767	<0.057 (2)	0.057	A687767	<0.041 (2)	0.041	A687767
Toluene	mg/kg	<0.050	<0.050	0.050	A687767	13 (2)	0.57	A687767	<0.080 (3)	0.080	A687767
Ethylbenzene	mg/kg	0.016	0.12	0.010	A687767	<0.040 (3)	0.040	A687767	<0.030 (3)	0.030	A687767
m & p-Xylene	mg/kg	0.054	0.39	0.040	A687767	<0.45 (2)	0.45	A687767	<0.33 (2)	0.33	A687767
o-Xylene	mg/kg	0.063	0.082	0.020	A687767	<0.23 (2)	0.23	A687767	<0.16 (2)	0.16	A687767
F1 (C6-C10)	mg/kg	110	87	10	A687767	<30 (3)	30	A687767	<24 (3)	24	A687767
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	99	96	N/A	A687767	95	N/A	A687767	94	N/A	A687767
4-Bromofluorobenzene (sur.)	%	109	108	N/A	A687767	112	N/A	A687767	110	N/A	A687767
D10-o-Xylene (sur.)	%	108	83	N/A	A687767	87	N/A	A687767	91	N/A	A687767
D4-1,2-Dichloroethane (sur.)	%	96	95	N/A	A687767	95	N/A	A687767	95	N/A	A687767
O-TERPHENYL (sur.)	%	84	107	N/A	A687951	123	N/A	A687729	111	N/A	A687729

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

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

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		AZY184		
Sampling Date		2022/08/13 10:30		
COC Number		1 of 1		
	UNITS	BH22-48-01	RDL	QC Batch
Ext. Pet. Hydrocarbon				
F2 (C10-C16 Hydrocarbons)	mg/kg	140 (1)	39	A687729
F3 (C16-C34 Hydrocarbons)	mg/kg	2300 (1)	190	A687729
F4 (C34-C50 Hydrocarbons)	mg/kg	990 (1)	190	A687729
Reached Baseline at C50	mg/kg	Yes	N/A	A687729
Physical Properties				
Moisture	%	74	0.30	A688047
Volatiles				
Xylenes (Total)	mg/kg	<0.24	0.24	A686814
F1 (C6-C10) - BTEX	mg/kg	<24	24	A686814
Field Preserved Volatiles				
Benzene	mg/kg	<0.026 (2)	0.026	A687767
Toluene	mg/kg	<0.080 (3)	0.080	A687767
Ethylbenzene	mg/kg	<0.030 (3)	0.030	A687767
m & p-Xylene	mg/kg	<0.21 (2)	0.21	A687767
o-Xylene	mg/kg	<0.11 (2)	0.11	A687767
F1 (C6-C10)	mg/kg	<24 (3)	24	A687767
Surrogate Recovery (%)				
1,4-Difluorobenzene (sur.)	%	98	N/A	A687767
4-Bromofluorobenzene (sur.)	%	109	N/A	A687767
D10-o-Xylene (sur.)	%	94	N/A	A687767
D4-1,2-Dichloroethane (sur.)	%	95	N/A	A687767
O-TERPHENYL (sur.)	%	136	N/A	A687729

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, sample contains => 50% moisture.
(2) Detection limits raised based on sample weight used for analysis.
(3) Detection limits raised 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 #: C262029
Report Date: 2023/01/12

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

RESULTS OF CHEMICAL ANALYSES OF SOIL

Bureau Veritas ID		AZY173	AZY174		AZY178	
Sampling Date		2022/08/13 08:00	2022/08/13 08:15		2022/08/13 09:00	
COC Number		1 of 1	1 of 1		1 of 1	
	UNITS	MW 22-09-01	MW 22-09-02	QC Batch	BH22-49-02	QC Batch
Parameter						
Subcontract Parameter	N/A	SEE ATTACH	SEE ATTACH	A763373	ATTACHED	A849901

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Bureau Veritas Job #: C262029
Report Date: 2023/01/12

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

PETROLEUM HYDROCARBONS (CCME)

Bureau Veritas ID		AZY173	AZY173		AZY174		AZY176	AZY177		
Sampling Date		2022/08/13 08:00	2022/08/13 08:00		2022/08/13 08:15		2022/08/13 08:45	2022/08/13 08:45		
COC Number		1 of 1	1 of 1		1 of 1		1 of 1	1 of 1		
	UNITS	MW 22-09-01	MW 22-09-01 Lab-Dup	RDL	MW 22-09-02	RDL	BH22-49-01	DUP M	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F4G-SG (Heavy Hydrocarbons-Grav.)	mg/kg	6500 (1)	5300 (1)	1100	4800	500	16000 (1)	5000 (1)	1400	A689459

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
(1) Detection limits raised due to high moisture content.

Bureau Veritas ID		AZY182		
Sampling Date		2022/08/13 10:00		
COC Number		1 of 1		
	UNITS	BH22-47-01	RDL	QC Batch
Ext. Pet. Hydrocarbon				
F4G-SG (Heavy Hydrocarbons-Grav.)	mg/kg	13000 (1)	2400	A689459

RDL = Reportable Detection Limit
(1) Detection limits raised due to high moisture content.

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GENERAL COMMENTS

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

Package 1	7.7°C
Package 2	4.3°C
Package 3	7.3°C
Package 4	4.7°C
Package 5	4.7°C
Package 6	3.0°C
Package 7	2.3°C

Change Request: Report to include results on below samples as per client request received 2022/09/20.
BH22-49-02/AZY178 - Chromatogram and Biotoluene review
BH22-11-01/AZY180 - Chromatogram review

Version #7:Toluene Stage 3 Assessment has been done on sample AZY178 as per client request on 20221117. Updated report is attached to this job.

Version #6:Toluene Stage 3 Assessment has been done on sample AZY173 (MW22-09-01) & AZY174 (MW22-09-02) as per client request on 2022097. Report is attached to this job.

Version #5: Additional Toluene assessmetn has been done on sample AZY173 (MW22-09--01) & AZY174 (MW22-09-02) as per request from client 20220831

Version #4: Additional Chromatogram review has been done on sample AZY173 (MW22-09-01), AZY174 (MW22-09-02) and AZY184 (BH22-48-01) as per request from client 20220829

Version #3: Additional Chromatogram review has been done on sample AZY183 (BH22-10-01) as per request from client 20220823

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 AZY173 [MW 22-09-01] : 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 AZY174 [MW 22-09-02] : 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.

Sample AZY178 [BH22-49-02] : 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.

Sample AZY180 [BH22-11-01] : The CCME F2-F4 chromatographic peak profile is consistent with a light distillate petroleum product (e.g. Gasoline, Mineral spirits, Stoddard solvent). These are typically characterized by a cluster of peaks between C10 and C16, representing a variety of straight-chain, branched-chain and cyclic hydrocarbons. These peaks will decrease in height, relative to the unresolved complex mixture (UCM or “hump”) with increased weathering of the product material.
Chromatogram also indicates a minor contribution of biogenic organic material (e.g. peat). Chromatograms of biogenic organic material may contain

peak patterns spanning the C18 to C50 range, but they are most commonly characterized by a profile of unevenly distributed sharp peaks between C28 and C34.

Sample AZY183 [BH22-10-01] : 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 AZY184 [BH22-48-01] : 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.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A687729	GG3	Matrix Spike	O-TERPHENYL (sur.)	2022/08/19		113	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/19		113	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/19		116	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/19		116	%	60 - 140
A687729	GG3	Spiked Blank	O-TERPHENYL (sur.)	2022/08/19		123	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/19		122	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/19		125	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/19		124	%	60 - 140
A687729	GG3	Method Blank	O-TERPHENYL (sur.)	2022/08/19		138	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/19	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2022/08/19	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2022/08/19	<50		mg/kg	
A687729	GG3	RPD	F2 (C10-C16 Hydrocarbons)	2022/08/19	NC		%	40
			F3 (C16-C34 Hydrocarbons)	2022/08/19	3.3		%	40
			F4 (C34-C50 Hydrocarbons)	2022/08/19	NC		%	40
A687767	DO1	Matrix Spike	1,4-Difluorobenzene (sur.)	2022/08/20		94	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/20		111	%	50 - 140
			D10-o-Xylene (sur.)	2022/08/20		97	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/20		91	%	50 - 140
			Benzene	2022/08/20		88	%	50 - 140
			Toluene	2022/08/20		90	%	50 - 140
			Ethylbenzene	2022/08/20		91	%	50 - 140
			m & p-Xylene	2022/08/20		94	%	50 - 140
			o-Xylene	2022/08/20		92	%	50 - 140
			F1 (C6-C10)	2022/08/20		99	%	60 - 140
A687767	DO1	Spiked Blank	1,4-Difluorobenzene (sur.)	2022/08/20		89	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/20		107	%	50 - 140
			D10-o-Xylene (sur.)	2022/08/20		112	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/20		90	%	50 - 140
			Benzene	2022/08/20		109	%	60 - 130
			Toluene	2022/08/20		106	%	60 - 130
			Ethylbenzene	2022/08/20		108	%	60 - 130
			m & p-Xylene	2022/08/20		111	%	60 - 130
			o-Xylene	2022/08/20		109	%	60 - 130
			F1 (C6-C10)	2022/08/20		88	%	60 - 140
A687767	DO1	Method Blank	1,4-Difluorobenzene (sur.)	2022/08/20		95	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/20		110	%	50 - 140
			D10-o-Xylene (sur.)	2022/08/20		87	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/20		96	%	50 - 140
			Benzene	2022/08/20	<0.0050		mg/kg	
			Toluene	2022/08/20	<0.050		mg/kg	
			Ethylbenzene	2022/08/20	<0.015 (1)		mg/kg	
			m & p-Xylene	2022/08/20	<0.045 (1)		mg/kg	
			o-Xylene	2022/08/20	<0.025 (1)		mg/kg	
			F1 (C6-C10)	2022/08/20	<10		mg/kg	
A687767	DO1	RPD	Benzene	2022/08/20	14		%	50
			Toluene	2022/08/20	NC		%	50
			Ethylbenzene	2022/08/20	24		%	50
			m & p-Xylene	2022/08/20	NC		%	50
			o-Xylene	2022/08/20	NC		%	50
			F1 (C6-C10)	2022/08/20	NC		%	30
A687951	CAU	Matrix Spike [AZY173-01]	O-TERPHENYL (sur.)	2022/08/20		114	%	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
			F2 (C10-C16 Hydrocarbons)	2022/08/20		78	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/20		NC	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/20		68	%	60 - 140
A687951	CAU	Spiked Blank	O-TERPHENYL (sur.)	2022/08/20		112	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/20		106	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/20		111	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/20		108	%	60 - 140
A687951	CAU	Method Blank	O-TERPHENYL (sur.)	2022/08/20		116	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/20	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2022/08/20	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2022/08/20	<50		mg/kg	
A687951	CAU	RPD [AZY173-01]	F2 (C10-C16 Hydrocarbons)	2022/08/20	30		%	40
			F3 (C16-C34 Hydrocarbons)	2022/08/20	42 (2)		%	40
			F4 (C34-C50 Hydrocarbons)	2022/08/20	26		%	40
A688047	ETS	Method Blank	Moisture	2022/08/19	<0.30		%	
A688047	ETS	RPD	Moisture	2022/08/19	8.1		%	20
A688091	A1H	Method Blank	Moisture	2022/08/20	<0.30		%	
A688091	A1H	RPD	Moisture	2022/08/20	16		%	20
A688093	A1H	Method Blank	Moisture	2022/08/20	<0.30		%	
A688093	A1H	RPD	Moisture	2022/08/20	8.9		%	20
A689459	JB9	Spiked Blank	F4G-SG (Heavy Hydrocarbons-Grav.)	2022/08/22		109	%	60 - 140
A689459	JB9	Method Blank	F4G-SG (Heavy Hydrocarbons-Grav.)	2022/08/22	<500		mg/kg	
A689459	JB9	RPD [AZY173-01]	F4G-SG (Heavy Hydrocarbons-Grav.)	2022/08/22	22 (3)		%	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 (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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) Detection limit raised due to interferent.

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

(3) Detection limits raised due to high moisture content.

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

Bureau Veritas Job #: C262029
Report Date: 2023/01/12

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

VALIDATION SIGNATURE PAGE

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

Cynny Hagen, Key Account Soecialist

Gita Pokhrel, Laboratory Supervisor

Nadeem Cheema, Project Solutions Representative

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.

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

918

MCAL

BUREAU VERITAS

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY #	
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COOLER OBSERVATIONS:

CUSTODY SEAL	YES	NO	COOLER ID	TEMP 1	TEMP 2	TEMP 3
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			6	8	9
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			5	4	4
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			7	8	7
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			5	3	6
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			5	4	5
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			2	3	4
PRESENT / INTACT / ICE PRESENT	✓ / ✓ / ✓			3	3	1
PRESENT / INTACT / ICE PRESENT						
PRESENT / INTACT / ICE PRESENT						
PRESENT / INTACT / ICE PRESENT						

BV JOB#:

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

RECEIVED BY (SIGN & PRINT)		DATE (YYYY/MM/DD)	TIME (HH:MM)
[signature]	JASON BIL	2022/08/18	~~1310~~ 1510

JR

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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		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#:	22525414-3100-3104
Street Address:		Street Address:		Project #:	22525414-3000
City: Calgary Prov: AB Postal Code:		City: Calgary AB Postal Code:	T2P 4K3	Site #:	Camp Farwell NA
Phone:		Phone:	403-299-5600	Site Location:	WEST CHANNEL, NT
Email:	Canada Account Payable	Email:	aurelie.bellavance@wsp.com	Site Location Province:	NT
Copies:		Copies:	Peter.Tan@wsp.com	Sampled By:	J. MacPhail / S. Pascal

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

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	MW 22-09-01	2022	08	13	08	00	Soil				X																	3		also email report to
2	MW 22-09-02				08	15					X																	3		gld.Shelldqs@wsp.com
3	MW22-09-03				08	30					X																	3		gld.iol_eqwis@wsp.com
4	BH 22-49-01				08	45					X																	3		Upload to Facility code
5	Dup M				08	45					X																	3		41259544
6	BH 22-49-02				09	00					X																	3		Samples may contain
7	BH 22-49-03				09	15					X																	3		headspace
8	BH 22-11-01				09	30					X																	3		
9	BH 22-11-02				09	45					X																	3		
10	BH 22-47-01				10	00					X																	3		
11	BH 22-10-01				10	15					X																	3		
12	BH 22-48-01	↓	↓	↓	10	30	↓				X																	3		

Received in Yellowknife By: [illegible] @ 12:48 AUG 17 2022

Temp: [illegible]

*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						

ACTK

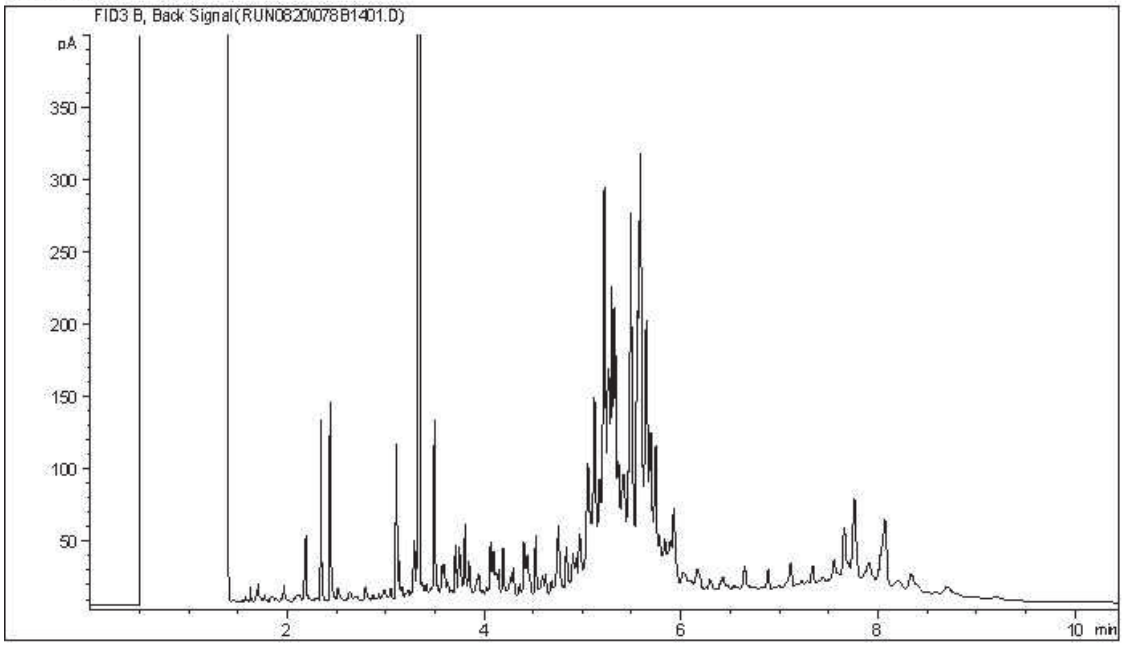
LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal intact						
Cooling media present						

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

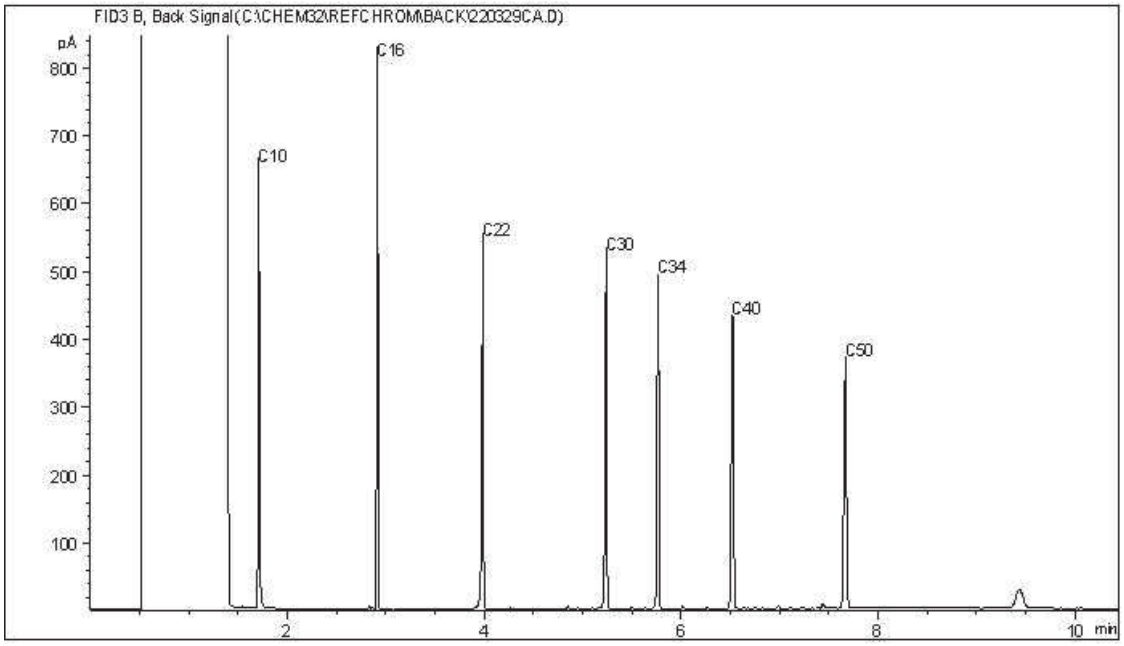
	Relinquished by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Special instructions
1	J. MacPhail	2022	08	14	09	15	1 JASON BIL	22	08	18	15	10	C262029
2							2						

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



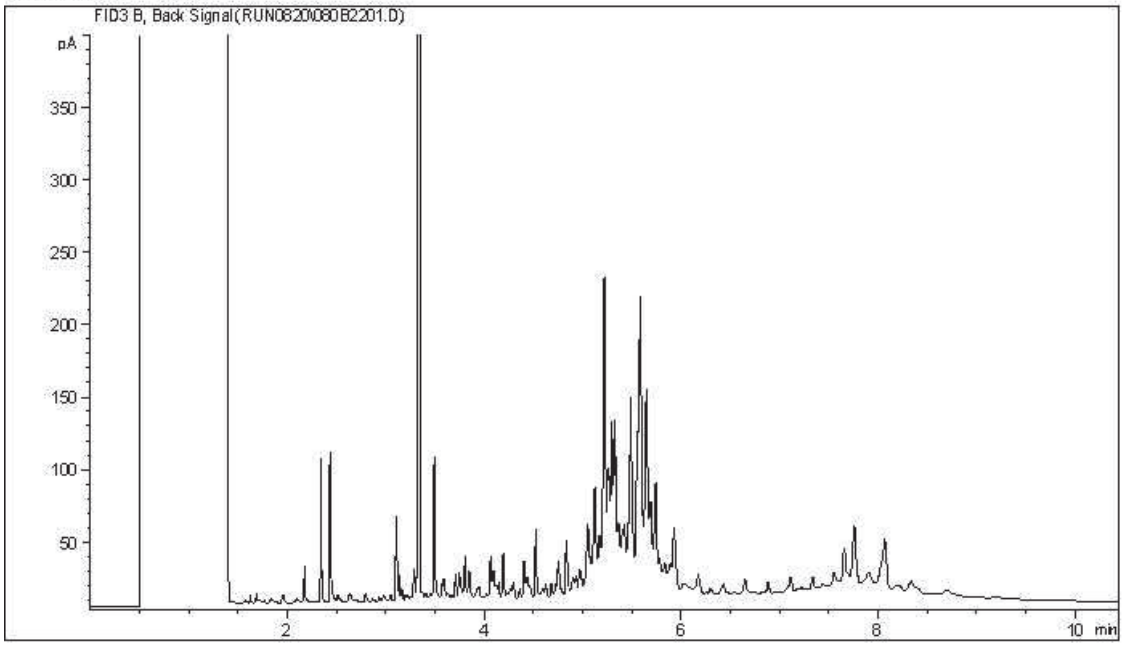
TYPICAL PRODUCT CARBON NUMBER RANGES

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: GC13



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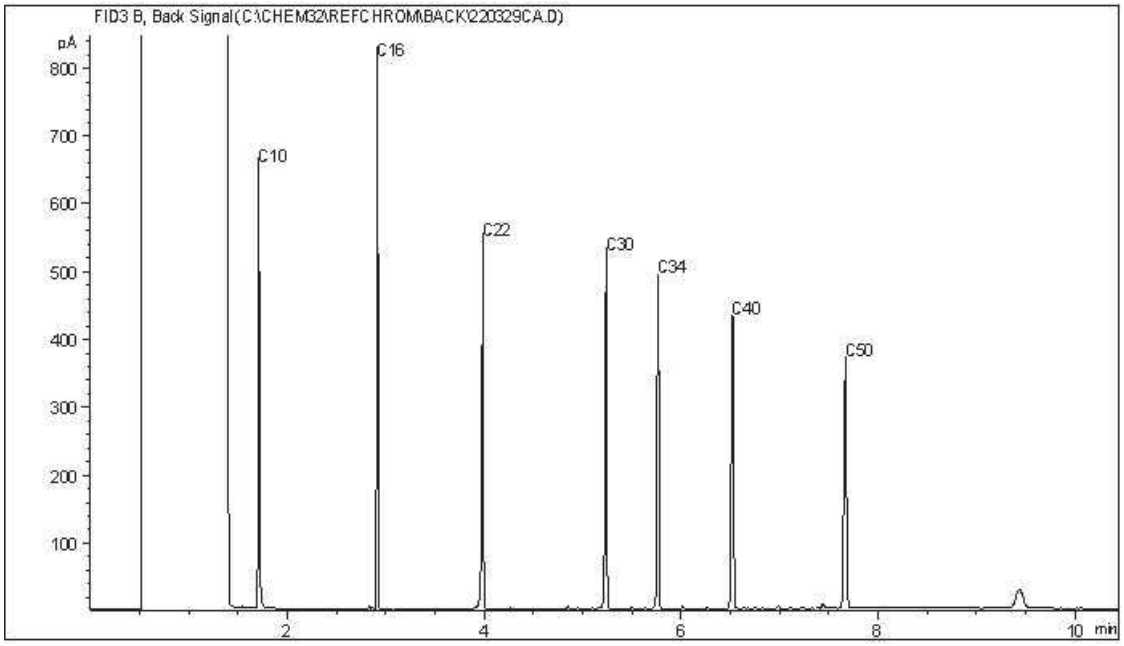

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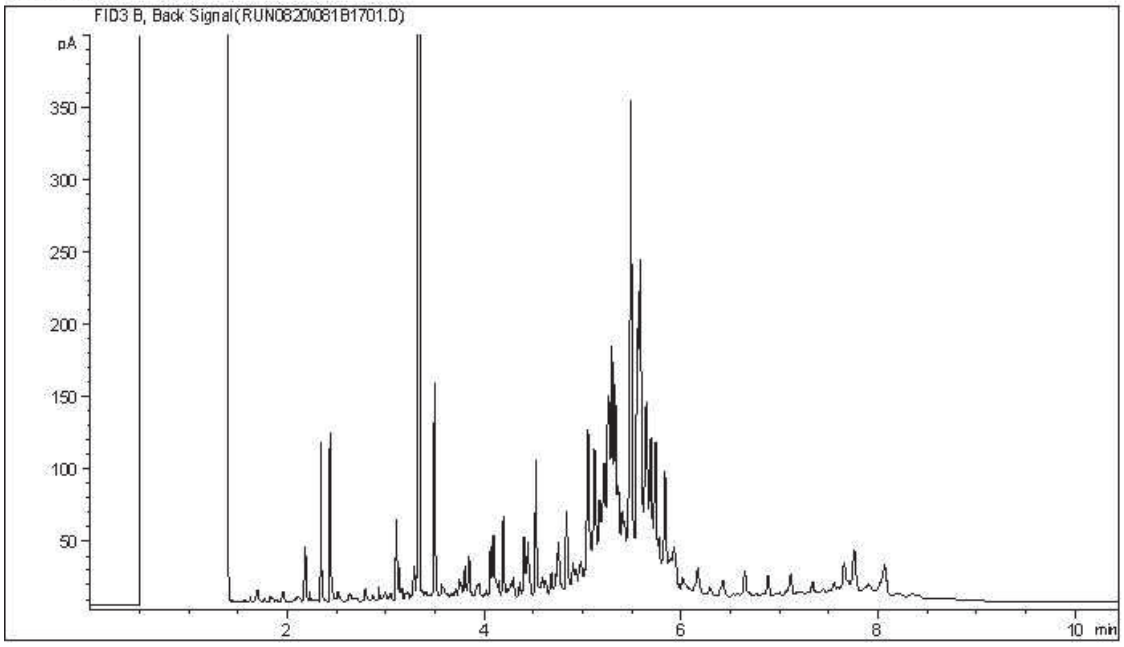
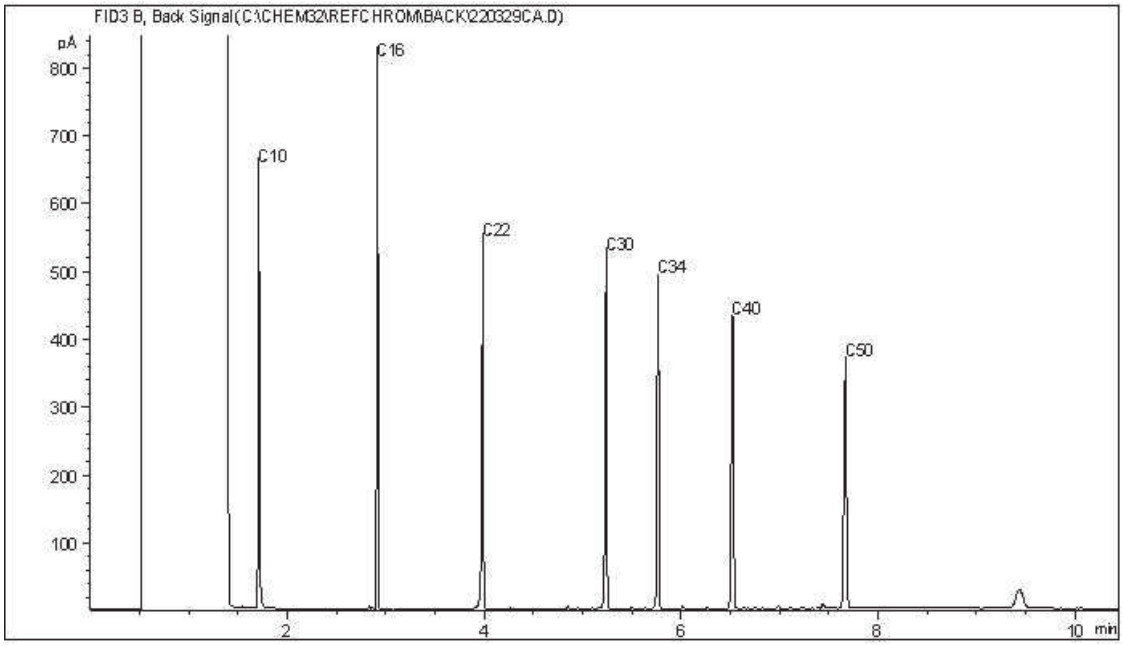


Carbon Range Distribution - Reference Chromatogram



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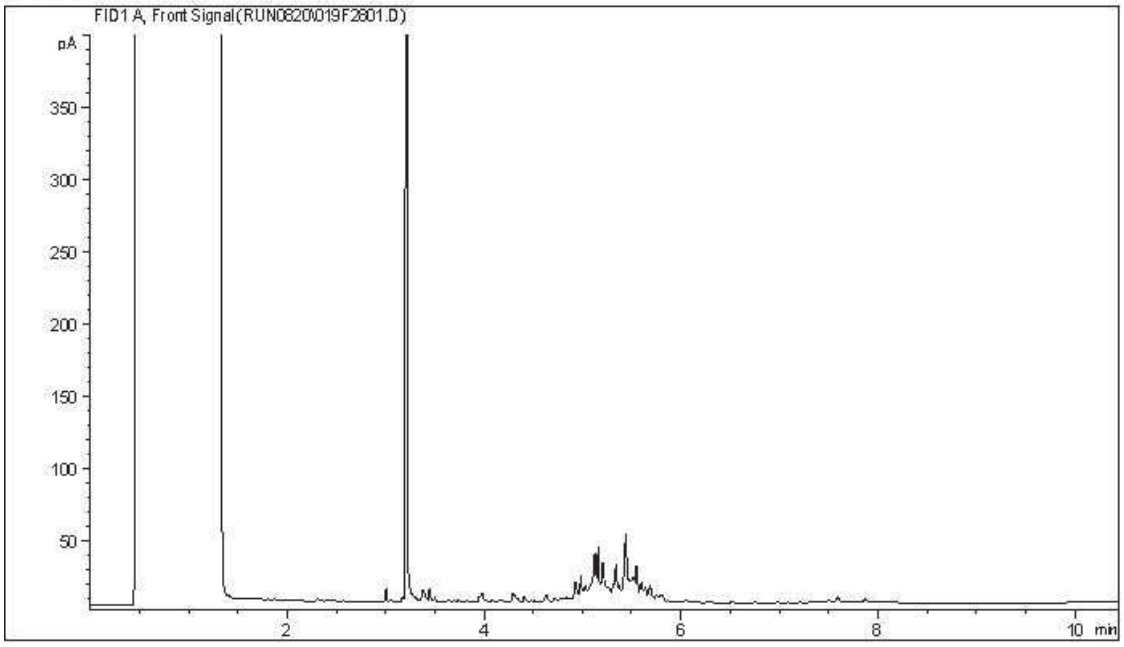

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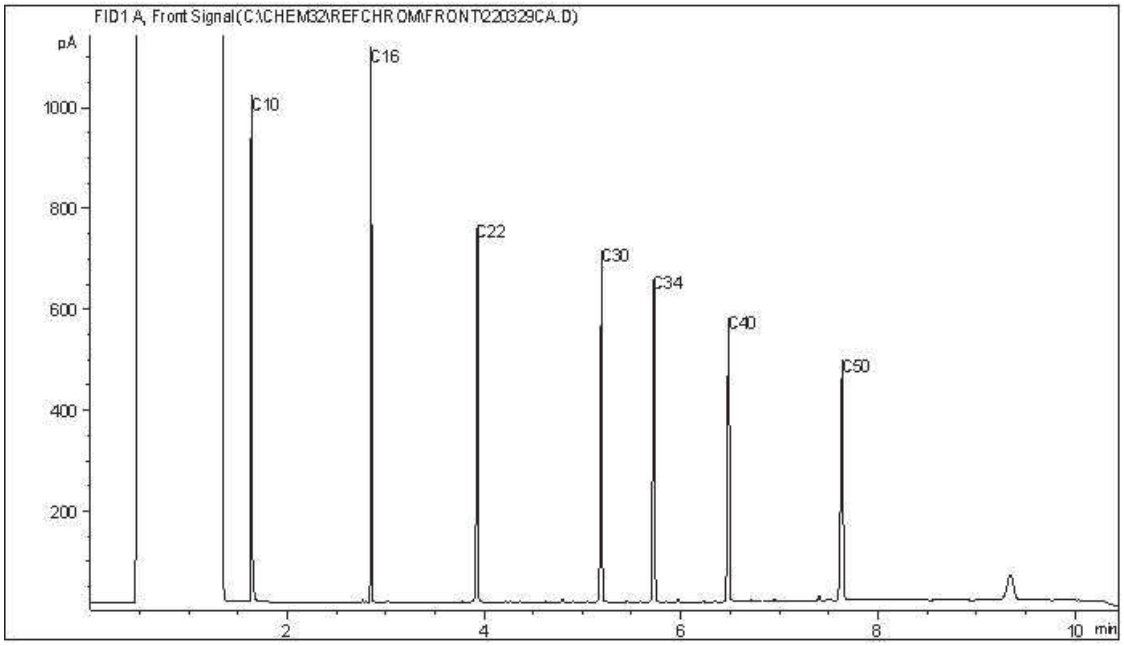

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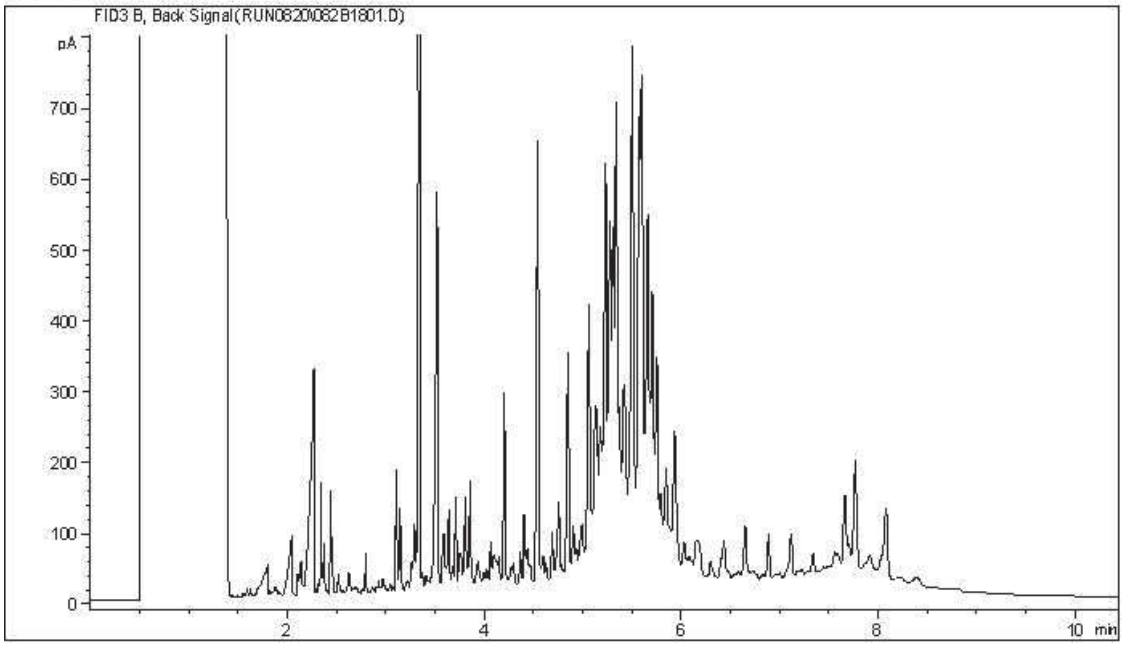

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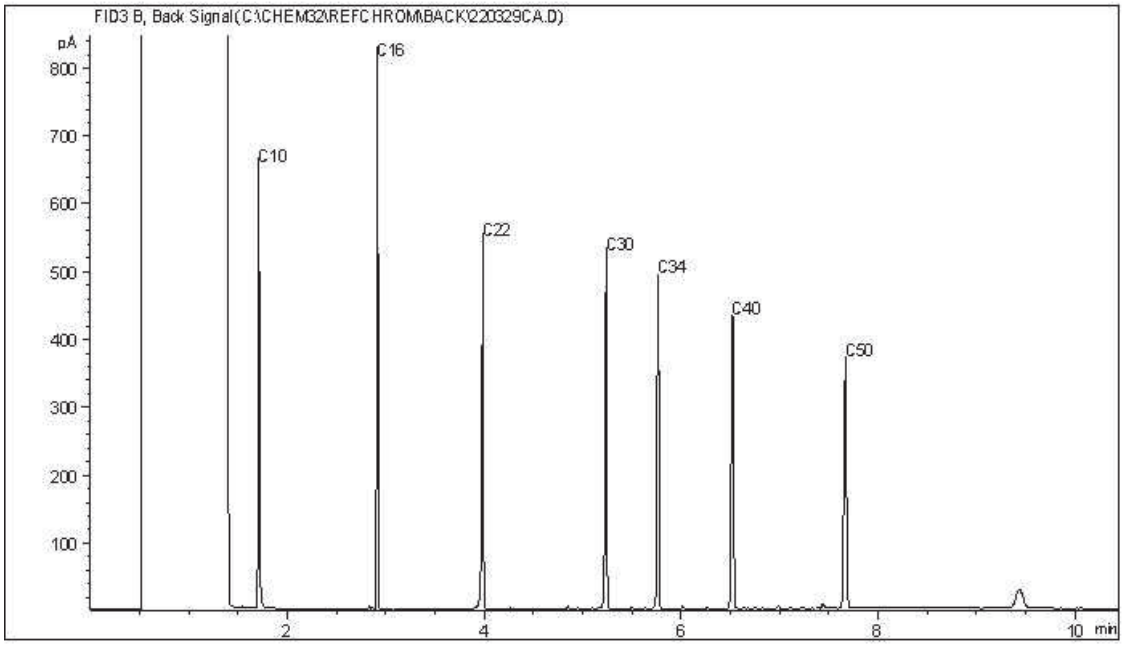

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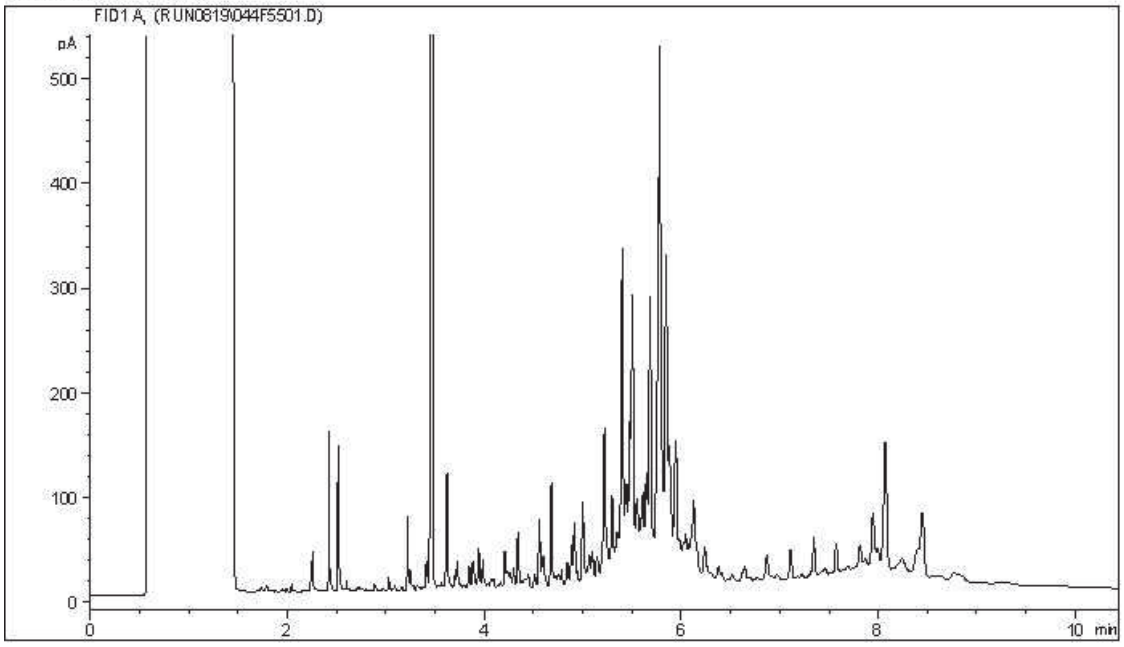
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC12



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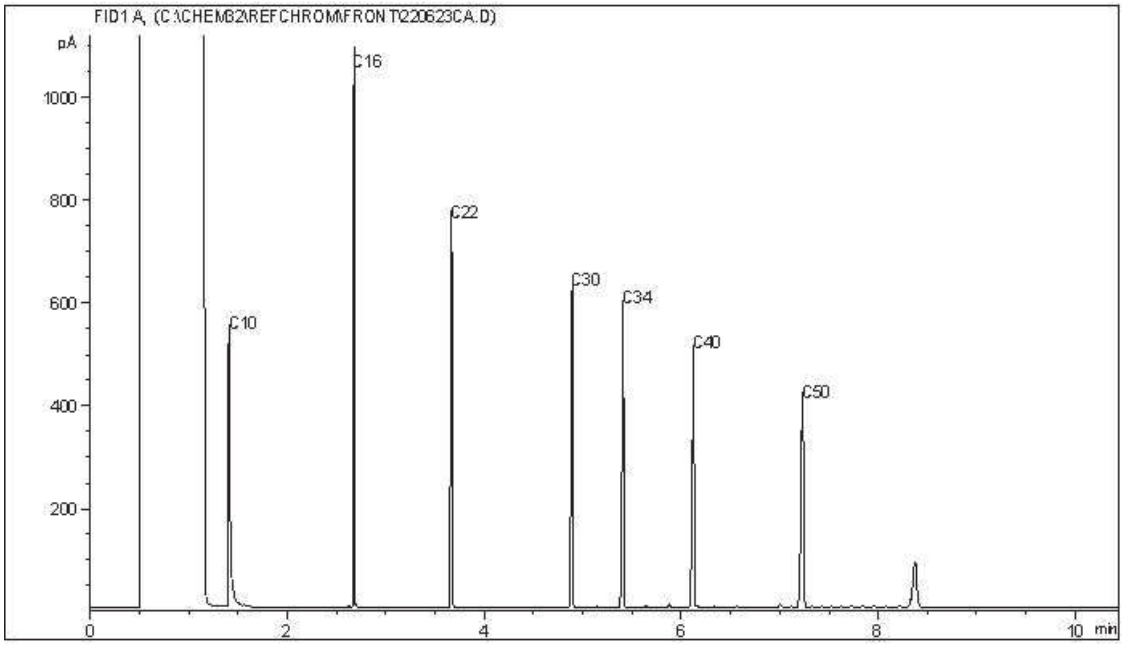

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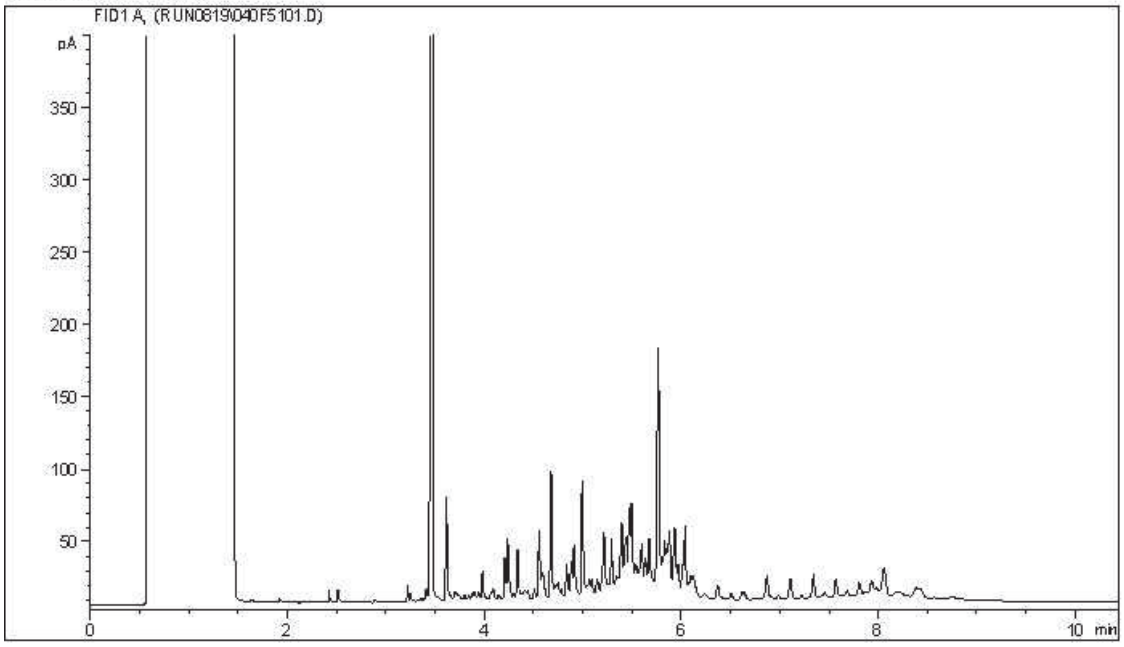
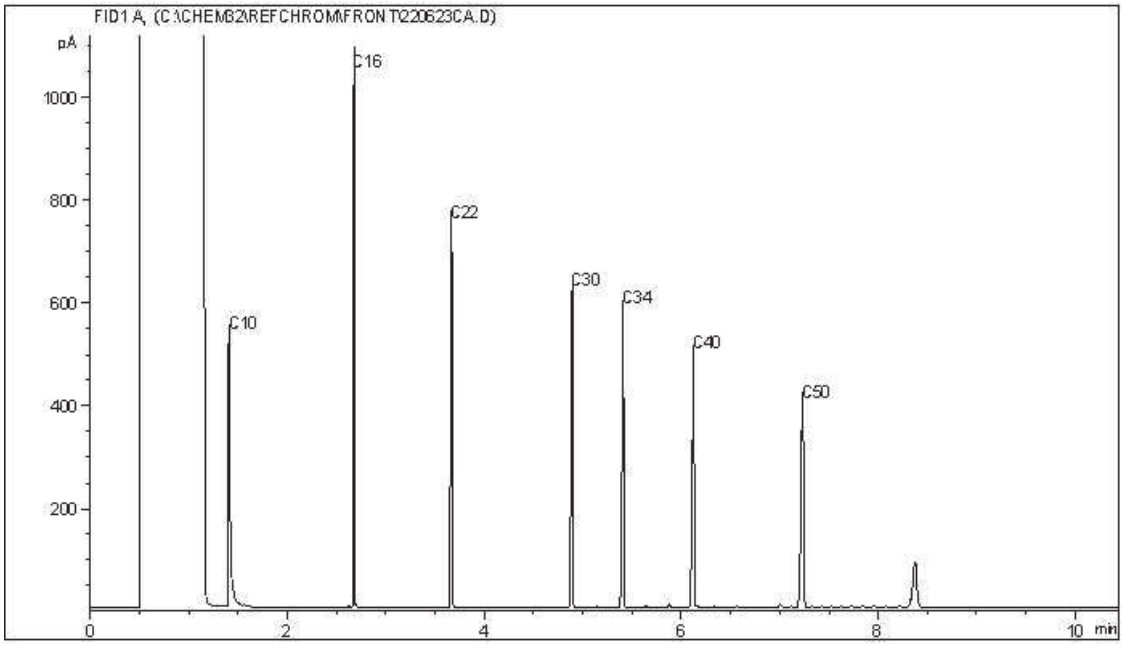


Carbon Range Distribution - Reference Chromatogram



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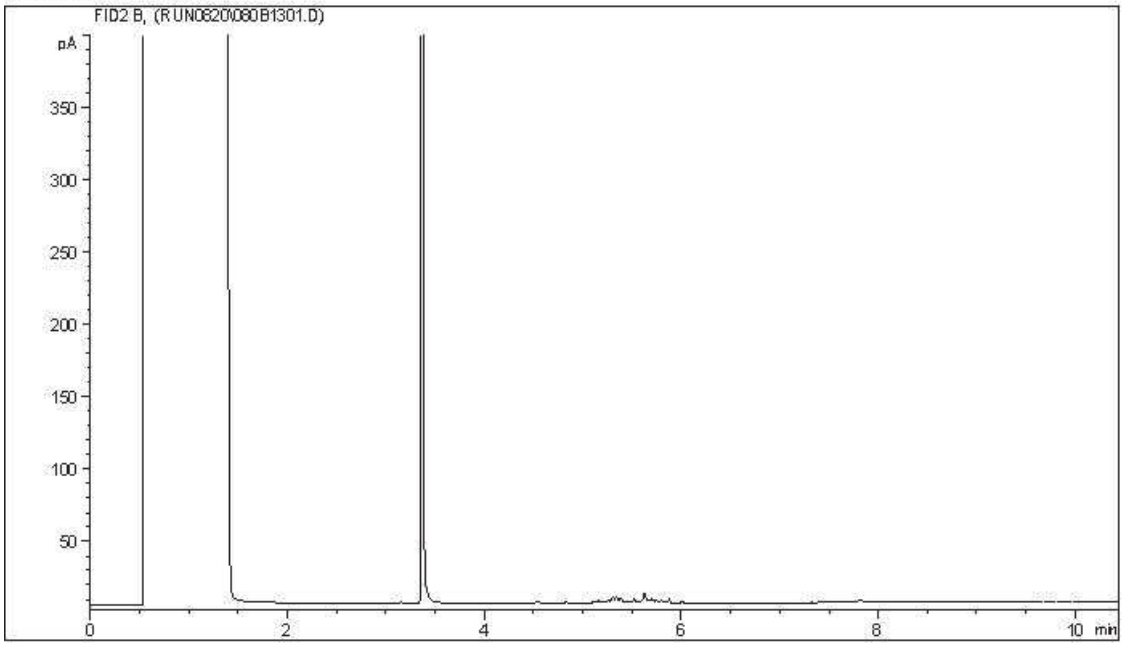
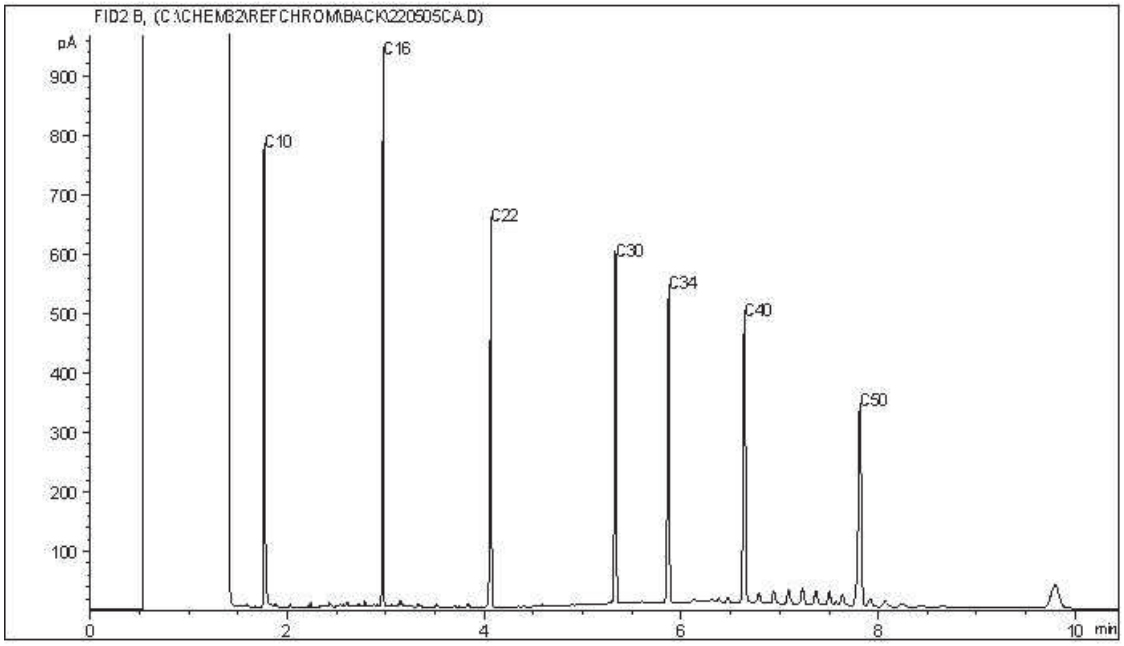
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



Carbon Range Distribution - Reference Chromatogram



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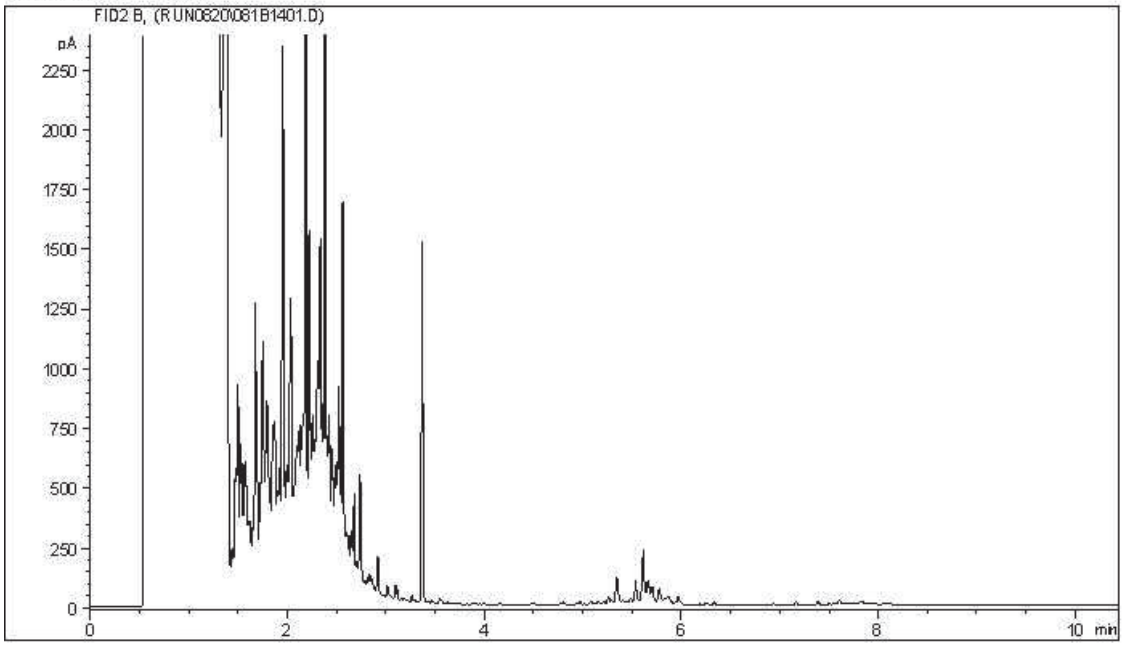
CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC21



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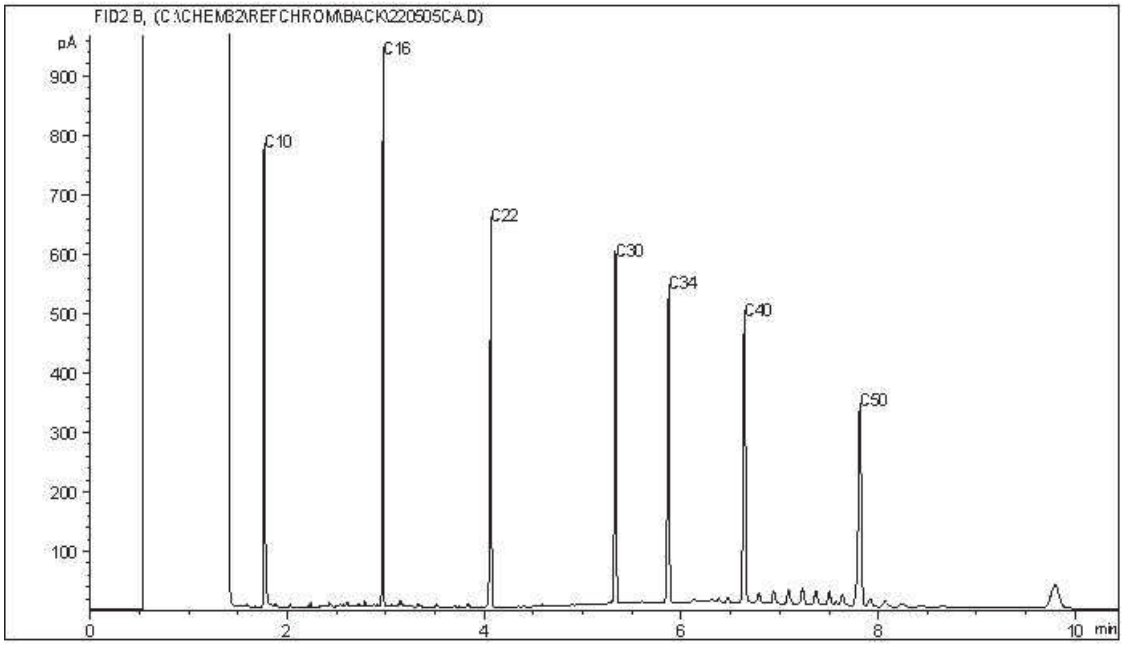

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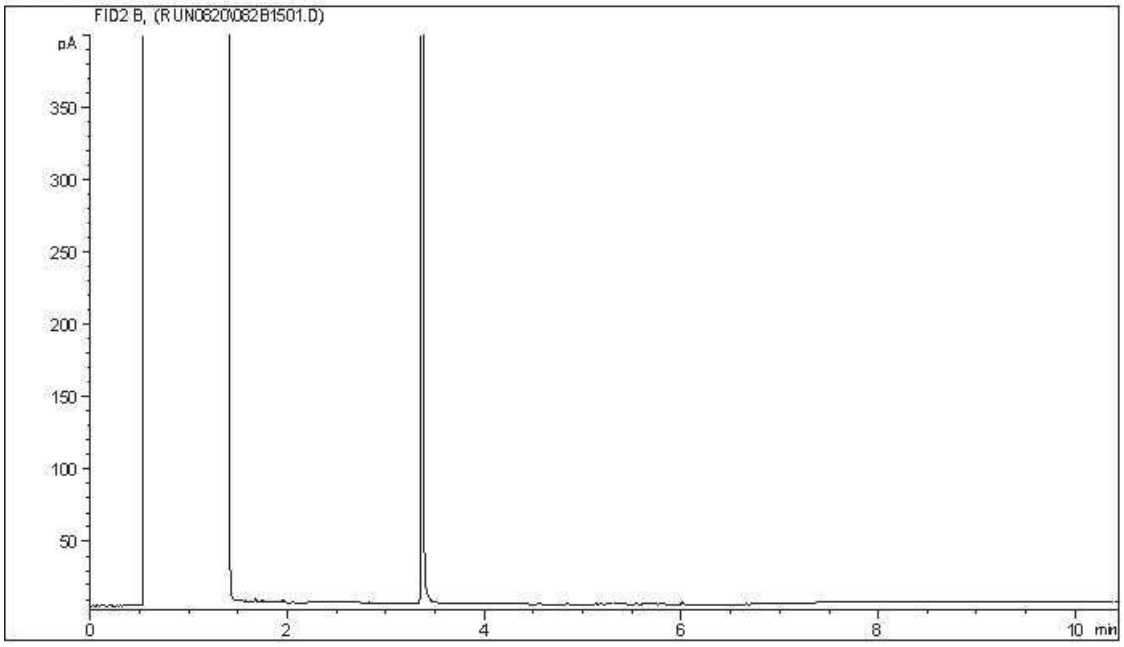

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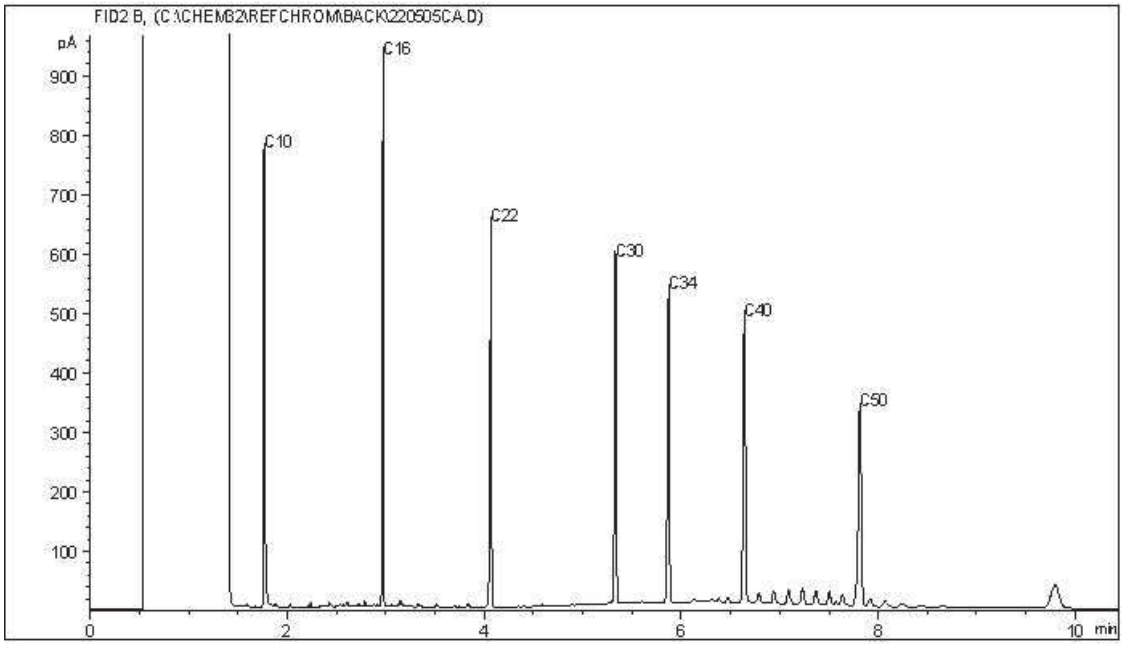

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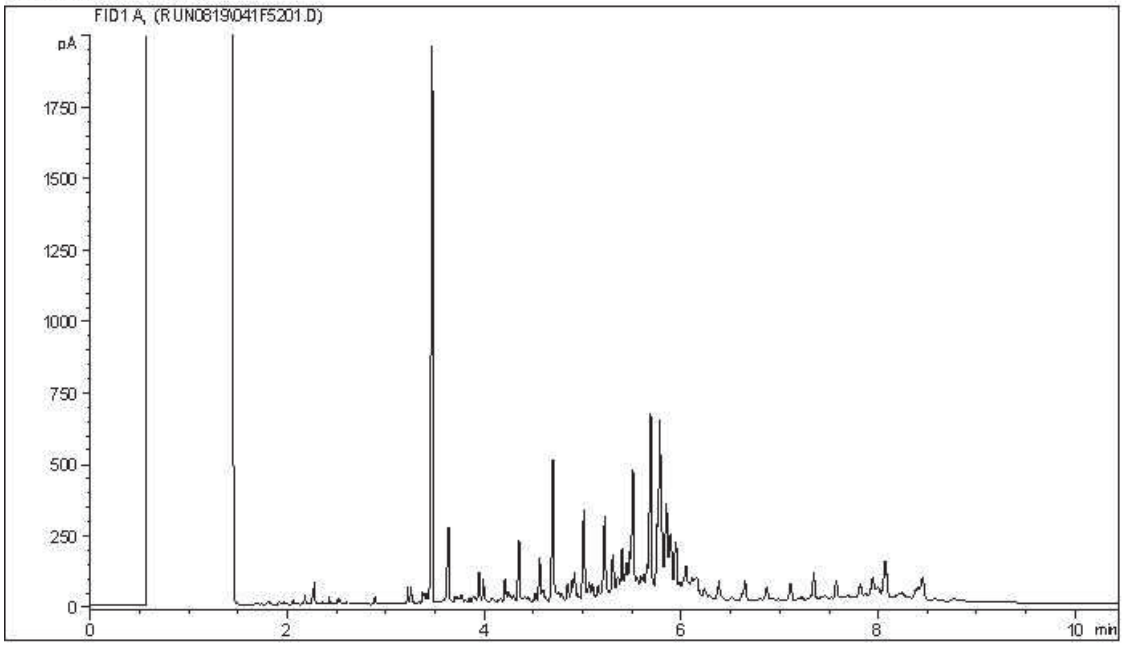
Instrument: GC12



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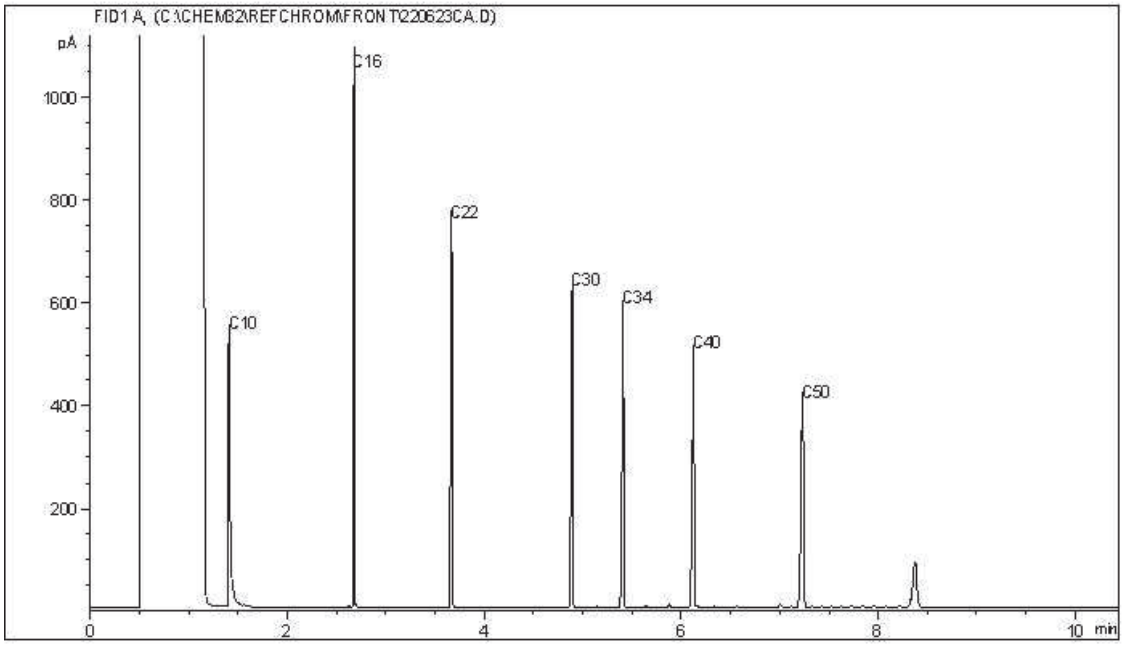

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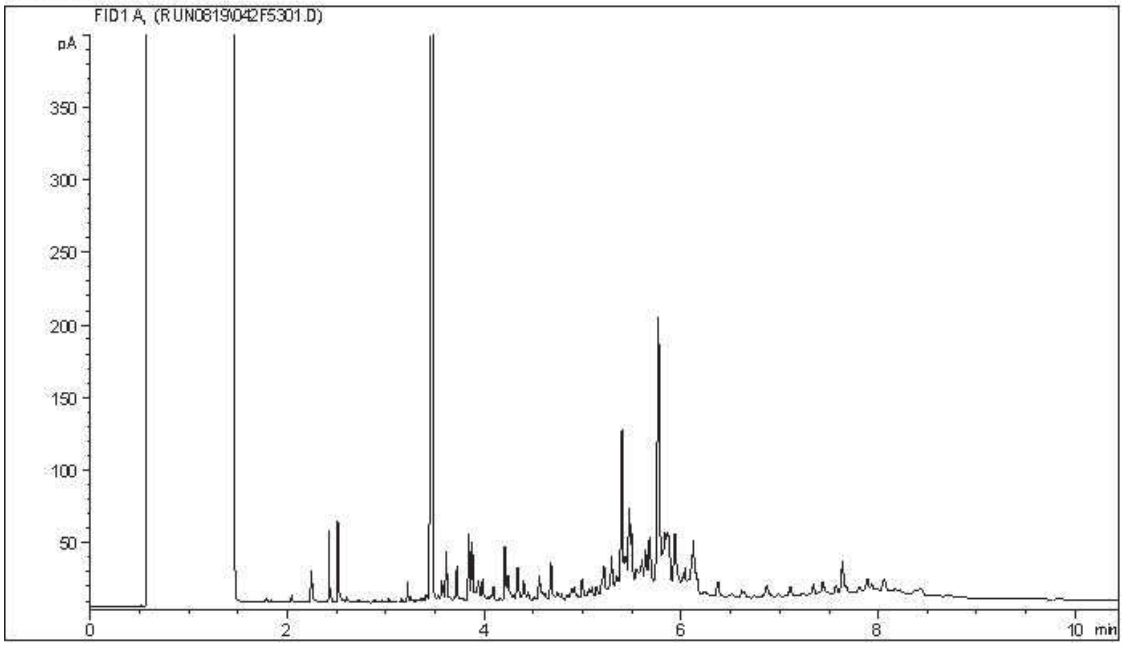

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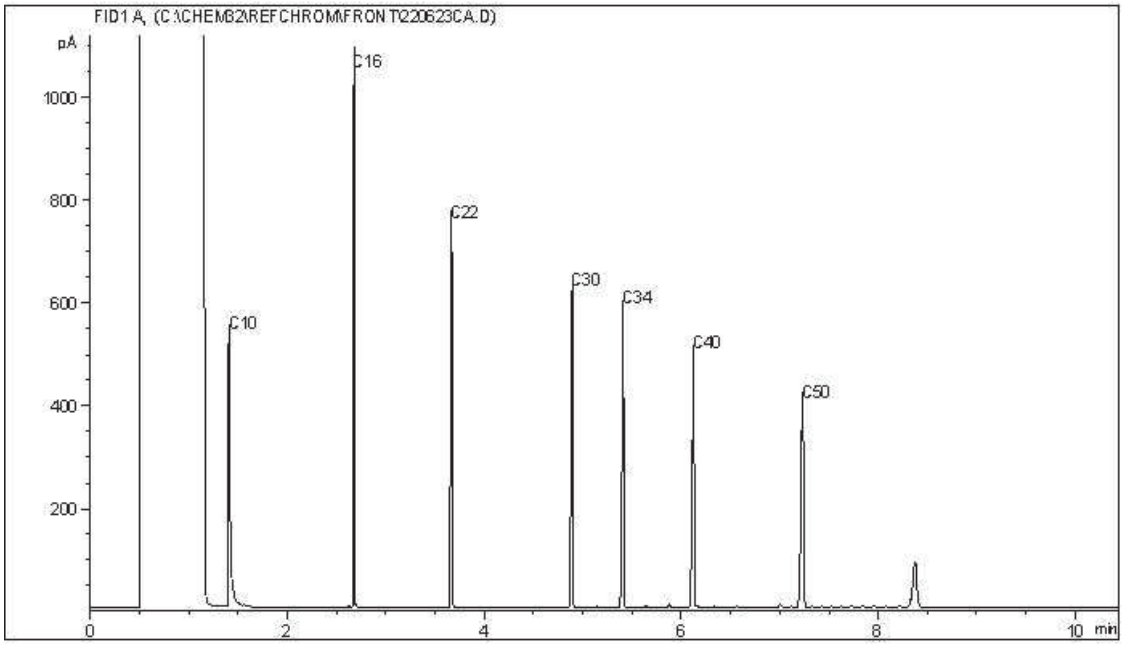

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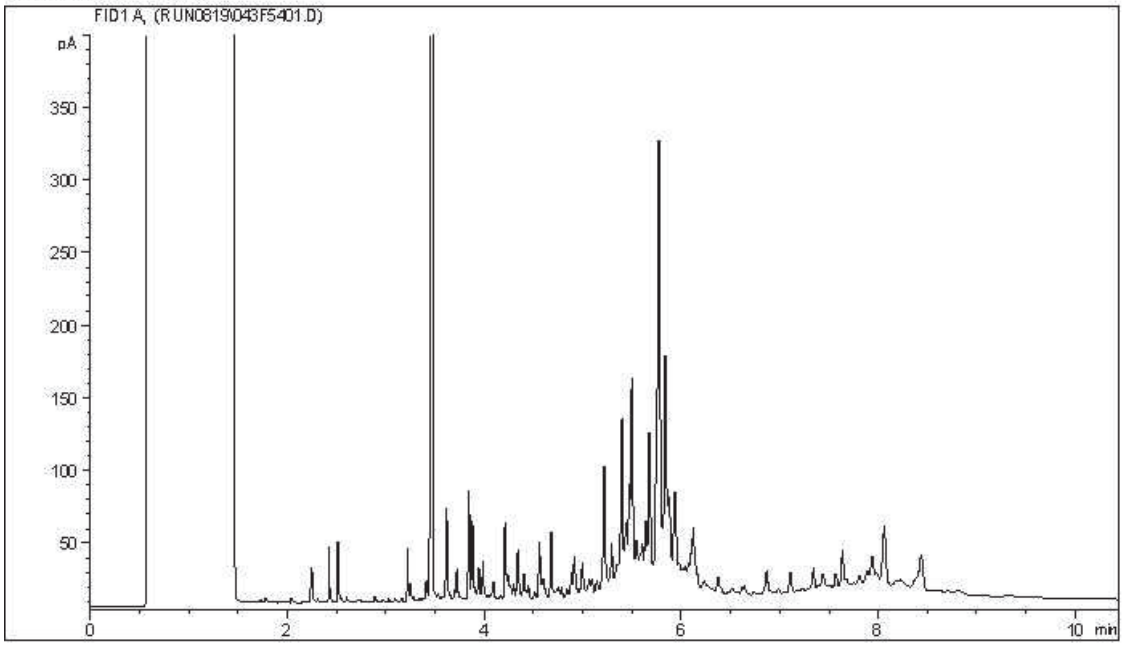

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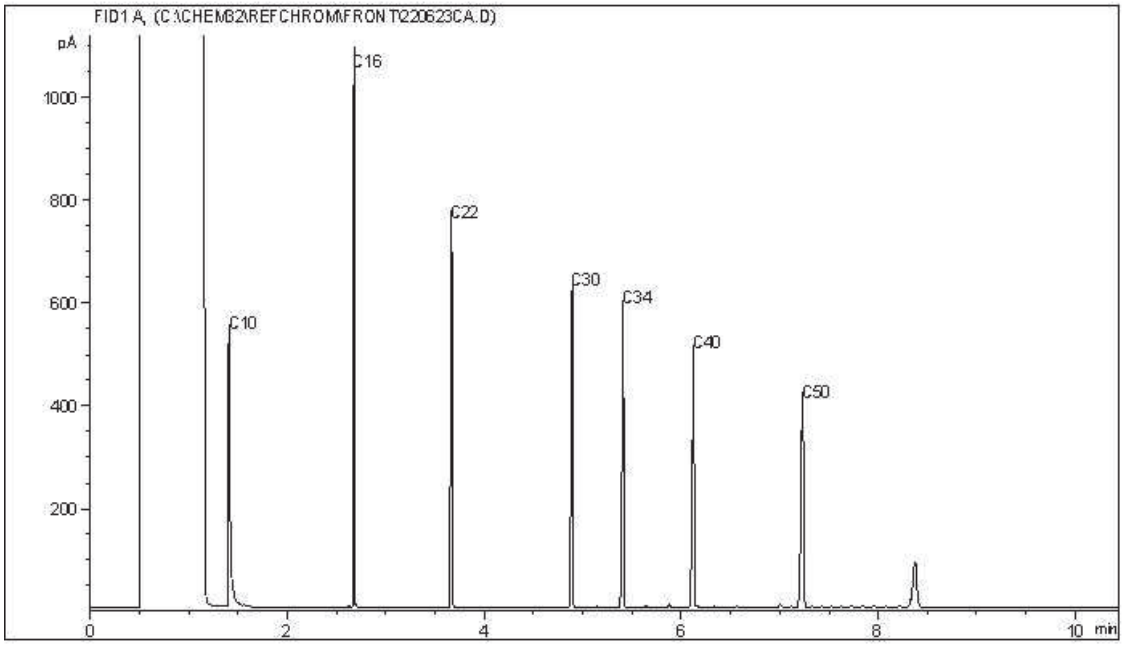

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Cynny Hagen

From: MacLean, Colleen <Colleen_MacLean@golder.com>
Sent: Wednesday, September 7, 2022 11:48 AM
To: Cynny Hagen
Cc: Bellavance, Aurelie
Subject: Stage 3 toluene isotope assessment request - Camp Farewell - project: 22525414-1000, PO 22525414-1100-1104

Hello,

Could you please complete a stage 3 toluene isotope assessment for the samples below?

Job	Sample ID	Sample name
C262029	AZY173	MW22-09-01
	AZY174	MW22-09-02

Thanks very much,

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

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

GOLDER

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

September 2, 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.: C262029

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}	
AZY173	MW 22-09-01	M	No	Yes	No	1.0	NC	Inconclusive (neither)
AZY174	MW 22-09-02	M	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)

September 27, 2022

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

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- 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}	
AZY178	BH22-49-02	M	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)

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: 005TJ **Date Rec:** 10/03/2022 **Report Date:** 10/19/2022

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

MI Project Number: **005TJ**
Date Received: 10/03/2022

Sample Information

Client Sample ID:	**AZY173 (MW22-09-01)**	**AZY174 (MW22-09-02)**
Sample Date:	09/13/2022	09/13/2022
Analyst/Reviewer:	SB/MW	SB/MW

Carbon	**Units**		
$^{13}C/^{12}C$ Toluene (‰)	$\delta^{13}C$, VPDB (‰)	**-29.0 (J)**	**-31.3**

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 **10/3/2022**

Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control (‰ Std. Dev.)*	Blank
$^{13}C/^{12}C$ Toluene (‰)	10/03/2022	10/14/2022	14.2 °C	0.1	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: 005TJ **Date Rec:** 10/03/2022 **Report Date:** 10/19/2022

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

Purchase Order #: C262029

Comments: An in-house screening method was used to estimate VOC concentrations. Please note that the precision of toluene in sample AZY174 (MW 22-09-02) was +/- 0.9 which is outside of the acceptance range (+/- 0.5).

October 21, 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.: C262029

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‰

---

[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 (‡)	
AZY173	MW 22-09-01	M	No	Yes	No	1.0	NC	-31.3 ±0.9	Biogenic Toluene
AZY174	MW 22-09-02	M	No	Yes	No	1.0	NC	-29.0	Inconclusive (neither)

NC: Unable to Calculate

‡ AZY173: Analytical precision exceeded the acceptance range of the analysis (±0.5).
AZY174: Value based on estimated concentration. Concentrations below Practical Quantitation Limit (PQL), but above Lower Quantifiable Limit (LQL). Precision estimation unavailable.

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
CSIA: Biogenic Toluene δ13C < -30‰; Petrogenic Toluene δ13C between -29.5‰ and -27.5‰
Reported value sourced from Microbial Insights Inc. report 005TJ; dated 2022/10/19
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

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.: C262029

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

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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).

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- 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‰

---

[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	F3Bc	Mono	T_{ratio}	C_{ratio}	CSIA	
AZY178	BH22-49-02	M	No	Yes	No	1.0	NC	-29.8	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**
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UCM: Presence/Position of Unresolved Complex Mixture
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CSIA: Biogenic Toluene δ13C < -30‰; Petrogenic Toluene δ13C between -29.5‰ and -27.5‰
Reported value sourced from Microbial Insights Inc. report 105TK; 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. #: 22525414-1000-1104
Your Project #: 22525414-1000
Site Location: CAMPFUR WELL
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: 2022/09/15
Report #: R3233080
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C262079
Received: 2022/08/17, 12:45

Sample Matrix: Soil
Samples Received: 14

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Boron (Hot Water Soluble) (1)	2	2022/08/22	2022/08/24	AB SOP-00034 / AB SOP-00042	EPA 6010d R5 m
BTEX/F1 by HS GC/MS/FID (MeOH extract) (1, 2)	14	N/A	2022/08/22	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX (1)	14	N/A	2022/08/23		Auto Calc
Cation/EC Ratio (1)	2	N/A	2022/08/24		Auto Calc
Chloride (Soluble) (1)	2	2022/08/24	2022/08/24	AB SOP-00033 / AB SOP-00020	SM 23-4500-Cl-E m
Hexavalent Chromium (1, 3)	2	2022/08/22	2022/08/22	AB SOP-00063	SM 23 3500-Cr B m
Conductivity @25C (Soluble) (1)	2	2022/08/24	2022/08/24	AB SOP-00033 / AB SOP-00004	SM 23 2510 B m
CCME Hydrocarbons (F2-F4 in soil) (1, 4)	14	2022/08/23	2022/08/23	AB SOP-00036	CCME PHC-CWS m
Elements by ICPMS - Soils (1)	2	2022/08/21	2022/08/21	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Sum of Cations, Anions (1)	2	N/A	2022/08/24		Auto Calc
Moisture (1)	14	N/A	2022/08/23	AB SOP-00002	CCME PHC-CWS m
Benzo[a]pyrene Equivalency (1)	2	N/A	2022/08/23		Auto Calc
PAH in Soil by GC/MS (1)	2	2022/08/22	2022/08/23	AB SOP-00036 / AB SOP-00003	EPA 3540C/8270E m
pH @25C (1:2 Calcium Chloride Extract) (1)	2	2022/08/21	2022/08/21	AB SOP-00033 / AB SOP-00006	SM 23 4500 H+B m
Sodium Adsorption Ratio (1)	2	N/A	2022/08/24		Auto Calc
Soluble Ions (1)	2	2022/08/24	2022/08/24	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Paste (1)	2	2022/08/24	2022/08/24	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Ions Calculation (1)	2	N/A	2022/08/21		Auto Calc
Theoretical Gypsum Requirement (1, 5)	2	N/A	2022/08/24		Auto Calc

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

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

Your P.O. #: 22525414-1000-1104
Your Project #: 22525414-1000
Site Location: CAMPFUR WELL
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: 2022/09/15
Report #: R3233080
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C262079

Received: 2022/08/17, 12:45

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) Some soil samples may react with the Cr(VI) spike reducing it to Cr(III). These samples are highly unlikely to contain native hexavalent chromium. Thus a failed spike recovery does not invalidate a negative result on the native sample.

(4) 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.

(5) TGR calculation is based on a theoretical SAR of 4. Salt Contamination and Assessment and remediation guideline 2001 recommended SAR is ranging 4-8. TGR is reported in tonnes/ha.

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
15 Sep 2022 16:18:12

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 #: C262079
Report Date: 2022/09/15

GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMPFUR WELL
Your P.O. #: 22525414-1000-1104
Sampler Initials: JP

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		AZY347	AZY347		AZY348		AZY349		AZY350		
Sampling Date		2022/08/12 08:00	2022/08/12 08:00		2022/08/12 08:15		2022/08/12 08:30		2022/08/12 08:45		
COC Number		1 of 2	1 of 2		1 of 2		1 of 2		1 of 2		
	UNITS	BH22-14-01	BH22-14-01 Lab-Dup	RDL	BH22-14-02	RDL	BH22-14-03	RDL	MW22-13-01	RDL	QC Batch
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	24 (1)	N/A	22	45 (1)	27	39	10	34 (1)	29	A690209
F3 (C16-C34 Hydrocarbons)	mg/kg	700 (1)	N/A	110	2000 (1)	140	440	50	850 (1)	150	A690209
F4 (C34-C50 Hydrocarbons)	mg/kg	190 (1)	N/A	110	810 (1)	140	190	50	350 (1)	150	A690209
Reached Baseline at C50	mg/kg	Yes	N/A	N/A	Yes	N/A	Yes	N/A	Yes	N/A	A690209
Physical Properties											
Moisture	%	54	N/A	0.30	63	0.30	30	0.30	66	0.30	A690290
Volatiles											
Xylenes (Total)	mg/kg	<0.22	N/A	0.22	<0.14	0.14	<0.045	0.045	<0.21	0.21	A687849
F1 (C6-C10) - BTEX	mg/kg	<36	N/A	36	<22	22	<10	10	<35	35	A687849
Field Preserved Volatiles											
Benzene	mg/kg	<0.023 (2)	<0.023	0.023	<0.014 (2)	0.014	<0.0050	0.0050	<0.023 (2)	0.023	A689486
Toluene	mg/kg	<0.089 (2)	<0.089	0.089	3.9 (3)	0.15	0.66	0.050	<0.087 (2)	0.087	A689486
Ethylbenzene	mg/kg	<0.035 (2)	<0.035	0.035	<0.022 (2)	0.022	<0.010	0.010	<0.034 (2)	0.034	A689486
m & p-Xylene	mg/kg	<0.20 (3)	<0.20	0.20	<0.12 (3)	0.12	<0.040	0.040	<0.19 (3)	0.19	A689486
o-Xylene	mg/kg	<0.098 (3)	<0.098	0.098	<0.060 (3)	0.060	<0.020	0.020	<0.095 (3)	0.095	A689486
F1 (C6-C10)	mg/kg	<36 (2)	<36	36	<22 (2)	22	<10	10	<35 (2)	35	A689486
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	95	100	N/A	95	N/A	96	N/A	95	N/A	A689486
4-Bromofluorobenzene (sur.)	%	102	100	N/A	102	N/A	102	N/A	102	N/A	A689486
D10-o-Xylene (sur.)	%	97	93	N/A	114	N/A	102	N/A	110	N/A	A689486
D4-1,2-Dichloroethane (sur.)	%	106	103	N/A	106	N/A	107	N/A	108	N/A	A689486
O-TERPHENYL (sur.)	%	99	N/A	N/A	94	N/A	103	N/A	99	N/A	A690209

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 #: C262079
Report Date: 2022/09/15

GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMPFUR WELL
Your P.O. #: 22525414-1000-1104
Sampler Initials: JP

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		AZY351	AZY351		AZY352		AZY353	AZY354		
Sampling Date		2022/08/12 08:50	2022/08/12 08:50		2022/08/12 09:15		2022/08/12 09:30	2022/08/12 09:45		
COC Number		1 of 2	1 of 2		1 of 2		1 of 2	1 of 2		
	UNITS	MW22-13-02	MW22-13-02 Lab-Dup	RDL	BH22-15-01	RDL	BH22-15-02	BH22-15-03	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	140 (1)	N/A	58	54 (1)	26	<10	<10	10	A690209
F3 (C16-C34 Hydrocarbons)	mg/kg	2800 (1)	N/A	290	740 (1)	130	51	<50	50	A690209
F4 (C34-C50 Hydrocarbons)	mg/kg	1000 (1)	N/A	290	270 (1)	130	<50	<50	50	A690209
Reached Baseline at C50	mg/kg	Yes	N/A	N/A	Yes	N/A	Yes	Yes	N/A	A690209
Physical Properties										
Moisture	%	83	83	0.30	61	0.30	15	17	0.30	A690290
Volatiles										
Xylenes (Total)	mg/kg	<0.41	N/A	0.41	<0.24	0.24	<0.045	<0.045	0.045	A687849
F1 (C6-C10) - BTEX	mg/kg	<68	N/A	68	<40	40	<10	<10	10	A687849
Field Preserved Volatiles										
Benzene	mg/kg	<0.044 (2)	N/A	0.044	<0.026 (2)	0.026	<0.0050	<0.0050	0.0050	A689486
Toluene	mg/kg	3.7 (3)	N/A	0.46	<0.098 (2)	0.098	<0.050	<0.050	0.050	A689486
Ethylbenzene	mg/kg	<0.066 (2)	N/A	0.066	<0.039 (2)	0.039	<0.010	<0.010	0.010	A689486
m & p-Xylene	mg/kg	<0.37 (3)	N/A	0.37	<0.22 (3)	0.22	<0.040	<0.040	0.040	A689486
o-Xylene	mg/kg	<0.18 (3)	N/A	0.18	<0.11 (3)	0.11	<0.020	<0.020	0.020	A689486
F1 (C6-C10)	mg/kg	<68 (2)	N/A	68	<40 (2)	40	<10	<10	10	A689486
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	95	N/A	N/A	95	N/A	94	96	N/A	A689486
4-Bromofluorobenzene (sur.)	%	103	N/A	N/A	102	N/A	102	102	N/A	A689486
D10-o-Xylene (sur.)	%	110	N/A	N/A	114	N/A	121	117	N/A	A689486
D4-1,2-Dichloroethane (sur.)	%	106	N/A	N/A	107	N/A	110	106	N/A	A689486
O-TERPHENYL (sur.)	%	99	N/A	N/A	96	N/A	100	98	N/A	A690209

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.

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Bureau Veritas Job #: C262079
Report Date: 2022/09/15

GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMPFUR WELL
Your P.O. #: 22525414-1000-1104
Sampler Initials: JP

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		AZY355		AZY356		AZY357		AZY358		
Sampling Date		2022/08/12 09:45		2022/08/12 10:00		2022/08/12 10:15		2022/08/12 10:30		
COC Number		1 of 2		1 of 2		1 of 2		1 of 2		
	UNITS	DUPL	RDL	MW-22-16-01	RDL	MW22-16-02	RDL	BH22-12-01	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	10	11	10	<10	10	<55 (1)	55	A690209
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	50	310	50	<50	50	1600 (1)	270	A690209
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	50	80	50	<50	50	430 (1)	270	A690209
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	Yes	N/A	Yes	N/A	A690209
Physical Properties										
Moisture	%	16	0.30	44	0.30	11	0.30	82	0.30	A690290
Volatiles										
Xylenes (Total)	mg/kg	<0.045	0.045	<0.12	0.12	<0.045	0.045	<0.37	0.37	A687849
F1 (C6-C10) - BTEX	mg/kg	<10	10	<21	21	<10	10	<61	61	A687849
Field Preserved Volatiles										
Benzene	mg/kg	<0.0050	0.0050	<0.013 (2)	0.013	<0.0050	0.0050	<0.039 (2)	0.039	A689486
Toluene	mg/kg	<0.050	0.050	<0.051 (2)	0.051	<0.050	0.050	9.9 (3)	0.41	A689486
Ethylbenzene	mg/kg	<0.010	0.010	<0.020 (2)	0.020	<0.010	0.010	<0.059 (2)	0.059	A689486
m & p-Xylene	mg/kg	<0.040	0.040	<0.11 (3)	0.11	<0.040	0.040	<0.33 (3)	0.33	A689486
o-Xylene	mg/kg	<0.020	0.020	<0.056 (3)	0.056	<0.020	0.020	<0.16 (3)	0.16	A689486
F1 (C6-C10)	mg/kg	<10	10	<21 (2)	21	<10	10	<61 (2)	61	A689486
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	95	N/A	96	N/A	96	N/A	96	N/A	A689486
4-Bromofluorobenzene (sur.)	%	102	N/A	101	N/A	102	N/A	102	N/A	A689486
D10-o-Xylene (sur.)	%	112	N/A	98	N/A	109	N/A	107	N/A	A689486
D4-1,2-Dichloroethane (sur.)	%	106	N/A	107	N/A	107	N/A	108	N/A	A689486
O-TERPHENYL (sur.)	%	105	N/A	108	N/A	103	N/A	93	N/A	A690209

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: CAMPFUR WELL
Your P.O. #: 22525414-1000-1104
Sampler Initials: JP

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Bureau Veritas ID		AZY383		AZY385		
Sampling Date		2022/08/12 10:30		2022/08/12 10:30		
COC Number		2 OF 2		2 OF 2		
	UNITS	BH22-12-02	RDL	BH22-12-03	RDL	QC Batch
Ext. Pet. Hydrocarbon						
F2 (C10-C16 Hydrocarbons)	mg/kg	<60 (1)	60	<10	10	A690209
F3 (C16-C34 Hydrocarbons)	mg/kg	330 (1)	300	64	50	A690209
F4 (C34-C50 Hydrocarbons)	mg/kg	<300 (1)	300	<50	50	A690209
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	A690209
Physical Properties						
Moisture	%	83	0.30	23	0.30	A690290
Volatiles						
Xylenes (Total)	mg/kg	<0.40	0.40	<0.093	0.093	A687849
F1 (C6-C10) - BTEX	mg/kg	<66	66	<21	21	A687849
Field Preserved Volatiles						
Benzene	mg/kg	<0.042 (2)	0.042	<0.010 (2)	0.010	A689486
Toluene	mg/kg	3.7 (3)	0.44	<0.10 (3)	0.10	A689486
Ethylbenzene	mg/kg	<0.064 (2)	0.064	<0.015 (2)	0.015	A689486
m & p-Xylene	mg/kg	<0.36 (3)	0.36	<0.084 (3)	0.084	A689486
o-Xylene	mg/kg	<0.18 (3)	0.18	<0.042 (3)	0.042	A689486
F1 (C6-C10)	mg/kg	<66 (2)	66	<21 (3)	21	A689486
Surrogate Recovery (%)						
1,4-Difluorobenzene (sur.)	%	95	N/A	96	N/A	A689486
4-Bromofluorobenzene (sur.)	%	102	N/A	102	N/A	A689486
D10-o-Xylene (sur.)	%	114	N/A	106	N/A	A689486
D4-1,2-Dichloroethane (sur.)	%	107	N/A	106	N/A	A689486
O-TERPHENYL (sur.)	%	104	N/A	104	N/A	A690209

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.

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GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMPFUR WELL
Your P.O. #: 22525414-1000-1104
Sampler Initials: JP

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		AZY350		AZY351		
Sampling Date		2022/08/12 08:45		2022/08/12 08:50		
COC Number		1 of 2		1 of 2		
	UNITS	MW22-13-01	RDL	MW22-13-02	RDL	QC Batch
Calculated Parameters						
Anion Sum	meq/L	1.3	N/A	0.98	N/A	A687815
Cation Sum	meq/L	4.8	N/A	3.1	N/A	A687815
Cation/EC Ratio	N/A	9.3	0.10	12	0.10	A687813
Calculated Calcium (Ca)	mg/kg	200	6.9	48	3.6	A687858
Calculated Magnesium (Mg)	mg/kg	62	4.6	20	2.4	A687858
Calculated Sodium (Na)	mg/kg	140	11	76	6.0	A687858
Calculated Potassium (K)	mg/kg	28	6.0	4.9	3.1	A687858
Calculated Chloride (Cl)	mg/kg	100	46	50	24	A687858
Calculated Sulphate (SO4)	mg/kg	150	23	46	12	A687858
Soluble Parameters						
Soluble Chloride (Cl)	mg/L	22	10	21	10	A692392
Soluble Conductivity	dS/m	0.52	0.020	0.26	0.020	A692710
Soluble (CaCl2) pH	pH	4.73 (1)	N/A	4.87 (1)	N/A	A688560
Sodium Adsorption Ratio	N/A	1.0	0.10	1.5	0.10	A687856
Soluble Calcium (Ca)	mg/L	45	1.5	20	1.5	A692713
Soluble Magnesium (Mg)	mg/L	14	1.0	8.3	1.0	A692713
Soluble Sodium (Na)	mg/L	30	2.5	32	2.5	A692713
Soluble Potassium (K)	mg/L	6.1	1.3	2.0	1.3	A692713
Saturation %	%	460	N/A	240	N/A	A690241
Soluble Sulphate (SO4)	mg/L	32	5.0	19	5.0	A692713
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	<0.20	0.20	A687817

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) pH was done on a 10:1 Calcium Chloride to soil ratio due to the matrix of the sample.

GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMPFUR WELL
Your P.O. #: 22525414-1000-1104
Sampler Initials: JP

CCME REGULATED METALS - SOILS (SOIL)

Bureau Veritas ID		AZY350		AZY351		
Sampling Date		2022/08/12 08:45		2022/08/12 08:50		
COC Number		1 of 2		1 of 2		
	UNITS	MW22-13-01	RDL	MW22-13-02	RDL	QC Batch
Elements						
Soluble (Hot water) Boron (B)	mg/kg	1.2	0.10	0.29	0.10	A689874
Hex. Chromium (Cr 6+)	mg/kg	<0.23 (1)	0.23	<0.47 (1)	0.47	A689719
Total Antimony (Sb)	mg/kg	<1.0	1.0	<1.0	1.0	A688596
Total Arsenic (As)	mg/kg	2.3	2.0	<2.0	2.0	A688596
Total Barium (Ba)	mg/kg	190	2.0	160	2.0	A688596
Total Beryllium (Be)	mg/kg	<0.80	0.80	<0.80	0.80	A688596
Total Cadmium (Cd)	mg/kg	0.28	0.10	0.16	0.10	A688596
Total Chromium (Cr)	mg/kg	11	2.0	12	2.0	A688596
Total Cobalt (Co)	mg/kg	2.7	1.0	1.8	1.0	A688596
Total Copper (Cu)	mg/kg	5.7	2.0	3.7	2.0	A688596
Total Lead (Pb)	mg/kg	2.2	1.0	3.0	1.0	A688596
Total Mercury (Hg)	mg/kg	<0.10	0.10	<0.10	0.10	A688596
Total Molybdenum (Mo)	mg/kg	2.7	0.80	1.9	0.80	A688596
Total Nickel (Ni)	mg/kg	8.4	2.0	8.5	2.0	A688596
Total Selenium (Se)	mg/kg	1.1	1.0	<1.0	1.0	A688596
Total Silver (Ag)	mg/kg	<0.40	0.40	<0.40	0.40	A688596
Total Thallium (Tl)	mg/kg	<0.20	0.20	<0.20	0.20	A688596
Total Tin (Sn)	mg/kg	<2.0	2.0	<2.0	2.0	A688596
Total Uranium (U)	mg/kg	0.60	0.40	0.97	0.40	A688596
Total Vanadium (V)	mg/kg	8.9	2.0	7.0	2.0	A688596
Total Zinc (Zn)	mg/kg	<20	20	<20	20	A688596

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

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SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID		AZY350			AZY351		
Sampling Date		2022/08/12 08:45			2022/08/12 08:50		
COC Number		1 of 2			1 of 2		
	UNITS	MW22-13-01	RDL	QC Batch	MW22-13-02	RDL	QC Batch
Polycyclic Aromatics							
Acenaphthene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
B[a]P TPE Total Potency Equivalents	mg/kg	0.040	0.019	A687230	<0.038	0.038	A687907
Acenaphthylene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Acridine	mg/kg	0.11 (1)	0.026	A689763	0.19 (1)	0.053	A689763
Anthracene	mg/kg	<0.010 (1)	0.010	A689763	<0.021 (1)	0.021	A689763
Benzo(a)anthracene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Benzo(b&j)fluoranthene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Benzo(k)fluoranthene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Benzo(g,h,i)perylene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Benzo(c)phenanthrene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Benzo(a)pyrene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Benzo(e)pyrene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Chrysene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Dibenz(a,h)anthracene	mg/kg	0.031 (2)	0.013	A689763	<0.027 (1)	0.027	A689763
Fluoranthene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Fluorene	mg/kg	<0.013 (1)	0.013	A689763	0.070 (1)	0.027	A689763
Indeno(1,2,3-cd)pyrene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
1-Methylnaphthalene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
2-Methylnaphthalene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Naphthalene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Phenanthrene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Perylene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Pyrene	mg/kg	<0.013 (1)	0.013	A689763	<0.027 (1)	0.027	A689763
Quinoline	mg/kg	<0.026 (1)	0.026	A689763	<0.053 (1)	0.053	A689763
Surrogate Recovery (%)							
D10-ANTHRACENE (sur.)	%	120	N/A	A689763	105	N/A	A689763

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, sample contains => 50% moisture.
(2) Qualifying ion outside of acceptance criteria. Results are tentatively identified and potentially biased high. In addition, detection limits raised due to high moisture content, sample contains => 50% moisture.

GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMPFUR WELL
Your P.O. #: 22525414-1000-1104
Sampler Initials: JP

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID		AZY350			AZY351		
Sampling Date		2022/08/12 08:45			2022/08/12 08:50		
COC Number		1 of 2			1 of 2		
	UNITS	**MW22-13-01**	**RDL**	**QC Batch**	**MW22-13-02**	**RDL**	**QC Batch**
D8-ACENAPHTHYLENE (sur.)	%	114	N/A	A689763	94	N/A	A689763
D8-NAPHTHALENE (sur.)	%	110	N/A	A689763	94	N/A	A689763
TERPHENYL-D14 (sur.)	%	113	N/A	A689763	107	N/A	A689763

RDL = Reportable Detection Limit
N/A = Not Applicable

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GENERAL COMMENTS

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

Package 1	7.0°C

Version #2: Report reissued to include Shell DQR email address as per COC.

Version 3: Report reissued to amend client sample IDs, and to include Biotoluene analyses and Chromatogram review on below samples as per client request received 2022/09/07.
Sample ID:
BH22-13-01 to MW22-13-01
BH22-13-02 to MW22-13-02

Chromatogram review:
BH22-12-01
BH22-12-02
MW22-13-01
MW22-13-02
BH22-14-01
BH22-14-02
BH22-14-03
BH22-15-01

Biotoluene analysis:
MW22-13-02
BH22-12-01
BH22-12-02
BH22-14-02

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 AZY347 [BH22-14-01] : 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 AZY348 [BH22-14-02] : 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.

Sample AZY349 [BH22-14-03] : 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 AZY350 [MW22-13-01] : 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 AZY351 [MW22-13-02] : 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

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a profile of unevenly distributed sharp peaks between C28 and C34. The impacts are not consistent with a petroleum product or crude oil.

Sample AZY352 [BH22-15-01] : 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 AZY358 [BH22-12-01] : 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 AZY383 [BH22-12-02] : 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.

CCME REGULATED METALS - SOILS (SOIL) Comments

Sample AZY350 [MW22-13-01] Elements by ICPMS - Soils: Detection limits raised due to sample matrix.
Sample AZY351 [MW22-13-02] Elements by ICPMS - Soils: Detection limits raised due to sample matrix.

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
A688560	STB	QC Standard	Soluble (CaCl2) pH	2022/08/21		100	%	97 - 103
A688560	STB	Spiked Blank	Soluble (CaCl2) pH	2022/08/21		100	%	97 - 103
A688560	STB	RPD	Soluble (CaCl2) pH	2022/08/21	0.11		%	N/A
A688596	KGR	Matrix Spike	Total Antimony (Sb)	2022/08/21		101	%	75 - 125
			Total Arsenic (As)	2022/08/21		96	%	75 - 125
			Total Barium (Ba)	2022/08/21		NC	%	75 - 125
			Total Beryllium (Be)	2022/08/21		106	%	75 - 125
			Total Cadmium (Cd)	2022/08/21		99	%	75 - 125
			Total Chromium (Cr)	2022/08/21		106	%	75 - 125
			Total Cobalt (Co)	2022/08/21		99	%	75 - 125
			Total Copper (Cu)	2022/08/21		97	%	75 - 125
			Total Lead (Pb)	2022/08/21		98	%	75 - 125
			Total Mercury (Hg)	2022/08/21		96	%	75 - 125
			Total Molybdenum (Mo)	2022/08/21		104	%	75 - 125
			Total Nickel (Ni)	2022/08/21		94	%	75 - 125
			Total Selenium (Se)	2022/08/21		100	%	75 - 125
			Total Silver (Ag)	2022/08/21		101	%	75 - 125
			Total Thallium (Tl)	2022/08/21		100	%	75 - 125
			Total Tin (Sn)	2022/08/21		103	%	75 - 125
			Total Uranium (U)	2022/08/21		97	%	75 - 125
			Total Vanadium (V)	2022/08/21		123	%	75 - 125
			Total Zinc (Zn)	2022/08/21		99	%	75 - 125
A688596	KGR	QC Standard	Total Antimony (Sb)	2022/08/21		112	%	15 - 182
			Total Arsenic (As)	2022/08/21		105	%	53 - 147
			Total Barium (Ba)	2022/08/21		101	%	80 - 119
			Total Cadmium (Cd)	2022/08/21		119	%	72 - 128
			Total Chromium (Cr)	2022/08/21		96	%	59 - 141
			Total Cobalt (Co)	2022/08/21		100	%	58 - 142
			Total Copper (Cu)	2022/08/21		106	%	83 - 117
			Total Lead (Pb)	2022/08/21		113	%	79 - 121
			Total Molybdenum (Mo)	2022/08/21		105	%	67 - 133
			Total Nickel (Ni)	2022/08/21		108	%	79 - 121
			Total Silver (Ag)	2022/08/21		93	%	47 - 153
			Total Tin (Sn)	2022/08/21		100	%	67 - 133
			Total Uranium (U)	2022/08/21		86	%	77 - 123
			Total Vanadium (V)	2022/08/21		102	%	79 - 121
			Total Zinc (Zn)	2022/08/21		103	%	79 - 121
A688596	KGR	Spiked Blank	Total Antimony (Sb)	2022/08/21		104	%	80 - 120
			Total Arsenic (As)	2022/08/21		96	%	80 - 120
			Total Barium (Ba)	2022/08/21		99	%	80 - 120
			Total Beryllium (Be)	2022/08/21		98	%	80 - 120
			Total Cadmium (Cd)	2022/08/21		96	%	80 - 120
			Total Chromium (Cr)	2022/08/21		100	%	80 - 120
			Total Cobalt (Co)	2022/08/21		101	%	80 - 120
			Total Copper (Cu)	2022/08/21		100	%	80 - 120
			Total Lead (Pb)	2022/08/21		100	%	80 - 120
			Total Mercury (Hg)	2022/08/21		100	%	80 - 120
			Total Molybdenum (Mo)	2022/08/21		99	%	80 - 120
			Total Nickel (Ni)	2022/08/21		100	%	80 - 120
			Total Selenium (Se)	2022/08/21		101	%	80 - 120
			Total Silver (Ag)	2022/08/21		98	%	80 - 120
			Total Thallium (Tl)	2022/08/21		99	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Tin (Sn)	2022/08/21		98	%	80 - 120
			Total Uranium (U)	2022/08/21		99	%	80 - 120
			Total Vanadium (V)	2022/08/21		100	%	80 - 120
			Total Zinc (Zn)	2022/08/21		97	%	80 - 120
A688596	KGR	Method Blank	Total Antimony (Sb)	2022/08/21	<0.50		mg/kg	
			Total Arsenic (As)	2022/08/21	<1.0		mg/kg	
			Total Barium (Ba)	2022/08/21	<1.0		mg/kg	
			Total Beryllium (Be)	2022/08/21	<0.40		mg/kg	
			Total Cadmium (Cd)	2022/08/21	<0.050		mg/kg	
			Total Chromium (Cr)	2022/08/21	<1.0		mg/kg	
			Total Cobalt (Co)	2022/08/21	<0.50		mg/kg	
			Total Copper (Cu)	2022/08/21	<1.0		mg/kg	
			Total Lead (Pb)	2022/08/21	<0.50		mg/kg	
			Total Mercury (Hg)	2022/08/21	<0.050		mg/kg	
			Total Molybdenum (Mo)	2022/08/21	<0.40		mg/kg	
			Total Nickel (Ni)	2022/08/21	<1.0		mg/kg	
			Total Selenium (Se)	2022/08/21	<0.50		mg/kg	
			Total Silver (Ag)	2022/08/21	<0.20		mg/kg	
			Total Thallium (Tl)	2022/08/21	<0.10		mg/kg	
			Total Tin (Sn)	2022/08/21	<1.0		mg/kg	
			Total Uranium (U)	2022/08/21	<0.20		mg/kg	
			Total Vanadium (V)	2022/08/21	<1.0		mg/kg	
			Total Zinc (Zn)	2022/08/21	<10		mg/kg	
A688596	KGR	RPD	Total Antimony (Sb)	2022/08/21	NC		%	30
			Total Arsenic (As)	2022/08/21	15		%	30
			Total Barium (Ba)	2022/08/21	23		%	35
			Total Beryllium (Be)	2022/08/21	6.2		%	30
			Total Cadmium (Cd)	2022/08/21	8.6		%	30
			Total Chromium (Cr)	2022/08/21	3.3		%	30
			Total Cobalt (Co)	2022/08/21	17		%	30
			Total Copper (Cu)	2022/08/21	1.6		%	30
			Total Lead (Pb)	2022/08/21	4.2		%	35
			Total Molybdenum (Mo)	2022/08/21	6.4		%	35
			Total Nickel (Ni)	2022/08/21	20		%	30
			Total Selenium (Se)	2022/08/21	NC		%	30
			Total Silver (Ag)	2022/08/21	NC		%	35
			Total Thallium (Tl)	2022/08/21	10		%	30
			Total Tin (Sn)	2022/08/21	NC		%	35
			Total Uranium (U)	2022/08/21	3.9		%	30
			Total Vanadium (V)	2022/08/21	0.029		%	30
			Total Zinc (Zn)	2022/08/21	0.19		%	30
A689486	WPK	Matrix Spike [AZY347-02]	1,4-Difluorobenzene (sur.)	2022/08/22		91	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/22		104	%	50 - 140
			D10-o-Xylene (sur.)	2022/08/22		100	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/22		104	%	50 - 140
			Benzene	2022/08/22		94	%	50 - 140
			Toluene	2022/08/22		89	%	50 - 140
			Ethylbenzene	2022/08/22		94	%	50 - 140
			m & p-Xylene	2022/08/22		95	%	50 - 140
			o-Xylene	2022/08/22		97	%	50 - 140
			F1 (C6-C10)	2022/08/22		101	%	60 - 140
A689486	WPK	Spiked Blank	1,4-Difluorobenzene (sur.)	2022/08/22		94	%	50 - 140

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			4-Bromofluorobenzene (sur.)	2022/08/22		104	%	50 - 140
			D10-o-Xylene (sur.)	2022/08/22		118	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/22		105	%	50 - 140
			Benzene	2022/08/22		122	%	60 - 130
			Toluene	2022/08/22		116	%	60 - 130
			Ethylbenzene	2022/08/22		119	%	60 - 130
			m & p-Xylene	2022/08/22		118	%	60 - 130
			o-Xylene	2022/08/22		120	%	60 - 130
			F1 (C6-C10)	2022/08/22		126	%	60 - 140
A689486	WPK	Method Blank	1,4-Difluorobenzene (sur.)	2022/08/22		95	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/22		102	%	50 - 140
			D10-o-Xylene (sur.)	2022/08/22		112	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/22		105	%	50 - 140
			Benzene	2022/08/22	<0.0050		mg/kg	
			Toluene	2022/08/22	<0.050		mg/kg	
			Ethylbenzene	2022/08/22	<0.010		mg/kg	
			m & p-Xylene	2022/08/22	<0.040		mg/kg	
			o-Xylene	2022/08/22	<0.020		mg/kg	
			F1 (C6-C10)	2022/08/22	<10		mg/kg	
A689486	WPK	RPD [AZY347-02]	Benzene	2022/08/22	NC		%	50
			Toluene	2022/08/22	NC		%	50
			Ethylbenzene	2022/08/22	NC		%	50
			m & p-Xylene	2022/08/22	NC		%	50
			o-Xylene	2022/08/22	NC		%	50
			F1 (C6-C10)	2022/08/22	NC		%	30
A689719	SKM	Matrix Spike	Hex. Chromium (Cr 6+)	2022/08/22		86	%	75 - 125
A689719	SKM	Spiked Blank	Hex. Chromium (Cr 6+)	2022/08/22		97	%	80 - 120
A689719	SKM	Method Blank	Hex. Chromium (Cr 6+)	2022/08/22	<0.080		mg/kg	
A689719	SKM	RPD	Hex. Chromium (Cr 6+)	2022/08/22	NC		%	35
A689763	JU2	Matrix Spike	D10-ANTHRACENE (sur.)	2022/08/22		104	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/08/22		94	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/22		93	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/08/22		110	%	50 - 130
			Acenaphthene	2022/08/22		97	%	50 - 130
			Acenaphthylene	2022/08/22		96	%	50 - 130
			Acridine	2022/08/22		75	%	50 - 130
			Anthracene	2022/08/22		94	%	50 - 130
			Benzo(a)anthracene	2022/08/22		95	%	50 - 130
			Benzo(b&j)fluoranthene	2022/08/22		91	%	50 - 130
			Benzo(k)fluoranthene	2022/08/22		92	%	50 - 130
			Benzo(g,h,i)perylene	2022/08/22		101	%	50 - 130
			Benzo(c)phenanthrene	2022/08/22		94	%	50 - 130
			Benzo(a)pyrene	2022/08/22		102	%	50 - 130
			Benzo(e)pyrene	2022/08/22		85	%	50 - 130
			Chrysene	2022/08/22		92	%	50 - 130
			Dibenz(a,h)anthracene	2022/08/22		98	%	50 - 130
			Fluoranthene	2022/08/22		96	%	50 - 130
			Fluorene	2022/08/22		98	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2022/08/22		108	%	50 - 130
			1-Methylnaphthalene	2022/08/22		81	%	50 - 130
			2-Methylnaphthalene	2022/08/22		103	%	50 - 130
			Naphthalene	2022/08/22		98	%	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
			Phenanthrene	2022/08/22		96	%	50 - 130
			Perylene	2022/08/22		89	%	50 - 130
			Pyrene	2022/08/22		94	%	50 - 130
			Quinoline	2022/08/22		90	%	50 - 130
A689763	JU2	Spiked Blank	D10-ANTHRACENE (sur.)	2022/08/22		105	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/08/22		95	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/22		96	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/08/22		130	%	50 - 130
			Acenaphthene	2022/08/22		97	%	50 - 130
			Acenaphthylene	2022/08/22		94	%	50 - 130
			Acridine	2022/08/22		64	%	50 - 130
			Anthracene	2022/08/22		91	%	50 - 130
			Benzo(a)anthracene	2022/08/22		104	%	50 - 130
			Benzo(b&j)fluoranthene	2022/08/22		99	%	50 - 130
			Benzo(k)fluoranthene	2022/08/22		115	%	50 - 130
			Benzo(g,h,i)perylene	2022/08/22		106	%	50 - 130
			Benzo(c)phenanthrene	2022/08/22		112	%	50 - 130
			Benzo(a)pyrene	2022/08/22		94	%	50 - 130
			Benzo(e)pyrene	2022/08/22		97	%	50 - 130
			Chrysene	2022/08/22		109	%	50 - 130
			Dibenz(a,h)anthracene	2022/08/22		103	%	50 - 130
			Fluoranthene	2022/08/22		94	%	50 - 130
			Fluorene	2022/08/22		96	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2022/08/22		97	%	50 - 130
			1-Methylnaphthalene	2022/08/22		81	%	50 - 130
			2-Methylnaphthalene	2022/08/22		102	%	50 - 130
			Naphthalene	2022/08/22		99	%	50 - 130
			Phenanthrene	2022/08/22		91	%	50 - 130
			Perylene	2022/08/22		90	%	50 - 130
			Pyrene	2022/08/22		93	%	50 - 130
			Quinoline	2022/08/22		91	%	50 - 130
A689763	JU2	Method Blank	D10-ANTHRACENE (sur.)	2022/08/22		97	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/08/22		89	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/22		91	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/08/22		127	%	50 - 130
			Acenaphthene	2022/08/22	<0.0050		mg/kg	
			Acenaphthylene	2022/08/22	<0.0050		mg/kg	
			Acridine	2022/08/22	<0.010		mg/kg	
			Anthracene	2022/08/22	<0.0040		mg/kg	
			Benzo(a)anthracene	2022/08/22	<0.0050		mg/kg	
			Benzo(b&j)fluoranthene	2022/08/22	<0.0050		mg/kg	
			Benzo(k)fluoranthene	2022/08/22	<0.0050		mg/kg	
			Benzo(g,h,i)perylene	2022/08/22	<0.0050		mg/kg	
			Benzo(c)phenanthrene	2022/08/22	<0.0050		mg/kg	
			Benzo(a)pyrene	2022/08/22	<0.0050		mg/kg	
			Benzo(e)pyrene	2022/08/22	<0.0050		mg/kg	
			Chrysene	2022/08/22	<0.0050		mg/kg	
			Dibenz(a,h)anthracene	2022/08/22	<0.0050		mg/kg	
			Fluoranthene	2022/08/22	<0.0050		mg/kg	
			Fluorene	2022/08/22	<0.0050		mg/kg	
			Indeno(1,2,3-cd)pyrene	2022/08/22	<0.0050		mg/kg	
			1-Methylnaphthalene	2022/08/22	<0.0050		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			2-Methylnaphthalene	2022/08/22	<0.0050		mg/kg	
			Naphthalene	2022/08/22	<0.0050		mg/kg	
			Phenanthrene	2022/08/22	<0.0050		mg/kg	
			Perylene	2022/08/22	<0.0050		mg/kg	
			Pyrene	2022/08/22	<0.0050		mg/kg	
			Quinoline	2022/08/22	<0.010		mg/kg	
A689763	JU2	RPD	Acenaphthene	2022/08/22	NC		%	50
			Acenaphthylene	2022/08/22	NC		%	50
			Acridine	2022/08/22	NC		%	50
			Anthracene	2022/08/22	NC		%	50
			Benzo(a)anthracene	2022/08/22	NC		%	50
			Benzo(b&j)fluoranthene	2022/08/22	34		%	50
			Benzo(k)fluoranthene	2022/08/22	NC		%	50
			Benzo(g,h,i)perylene	2022/08/22	15		%	50
			Benzo(c)phenanthrene	2022/08/22	NC		%	50
			Benzo(a)pyrene	2022/08/22	NC		%	50
			Benzo(e)pyrene	2022/08/22	13		%	50
			Chrysene	2022/08/22	NC		%	50
			Dibenz(a,h)anthracene	2022/08/22	NC		%	50
			Fluoranthene	2022/08/22	NC		%	50
			Fluorene	2022/08/22	NC		%	50
			Indeno(1,2,3-cd)pyrene	2022/08/22	21		%	50
			1-Methylnaphthalene	2022/08/22	NC		%	50
			2-Methylnaphthalene	2022/08/22	NC		%	50
			Naphthalene	2022/08/22	NC		%	50
			Phenanthrene	2022/08/22	NC		%	50
			Perylene	2022/08/22	11		%	50
			Pyrene	2022/08/22	11		%	50
			Quinoline	2022/08/22	NC		%	50
A689874	MPU	Matrix Spike	Soluble (Hot water) Boron (B)	2022/08/24		91	%	75 - 125
A689874	MPU	Spiked Blank	Soluble (Hot water) Boron (B)	2022/08/24		98	%	80 - 120
A689874	MPU	Method Blank	Soluble (Hot water) Boron (B)	2022/08/24	<0.10		mg/kg	
A689874	MPU	RPD	Soluble (Hot water) Boron (B)	2022/08/24	17		%	35
A690209	GG3	Matrix Spike	O-TERPHENYL (sur.)	2022/08/23		90	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/23		82	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/23		89	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/23		87	%	60 - 140
A690209	GG3	Spiked Blank	O-TERPHENYL (sur.)	2022/08/23		107	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/23		86	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/23		94	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/23		92	%	60 - 140
A690209	GG3	Method Blank	O-TERPHENYL (sur.)	2022/08/23		101	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/23	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2022/08/23	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2022/08/23	<50		mg/kg	
A690209	GG3	RPD	F2 (C10-C16 Hydrocarbons)	2022/08/23	2.3		%	40
			F3 (C16-C34 Hydrocarbons)	2022/08/23	0.67		%	40
			F4 (C34-C50 Hydrocarbons)	2022/08/23	NC		%	40
A690241	JKV	QC Standard	Saturation %	2022/08/23		98	%	75 - 125
A690241	JKV	RPD	Saturation %	2022/08/23	2.0		%	12
A690290	A1H	Method Blank	Moisture	2022/08/23	<0.30		%	
A690290	A1H	RPD [AZY351-01]	Moisture	2022/08/23	0.24		%	20

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Bureau Veritas Job #: C262079
Report Date: 2022/09/15

GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMPFUR WELL
Your P.O. #: 22525414-1000-1104
Sampler Initials: JP

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A692392	AFI	Matrix Spike	Soluble Chloride (Cl)	2022/08/24		107	%	75 - 125
A692392	AFI	QC Standard	Soluble Chloride (Cl)	2022/08/24		96	%	75 - 125
A692392	AFI	Spiked Blank	Soluble Chloride (Cl)	2022/08/24		106	%	80 - 120
A692392	AFI	Method Blank	Soluble Chloride (Cl)	2022/08/24	<10		mg/L	
A692392	AFI	RPD	Soluble Chloride (Cl)	2022/08/24	NC		%	30
A692710	EH2	QC Standard	Soluble Conductivity	2022/08/24		101	%	75 - 125
A692710	EH2	Spiked Blank	Soluble Conductivity	2022/08/24		98	%	90 - 110
A692710	EH2	Method Blank	Soluble Conductivity	2022/08/24	<0.020		dS/m	
A692710	EH2	RPD	Soluble Conductivity	2022/08/24	5.5		%	20
A692713	MB5	Matrix Spike	Soluble Calcium (Ca)	2022/08/24		94	%	75 - 125
			Soluble Magnesium (Mg)	2022/08/24		101	%	75 - 125
			Soluble Sodium (Na)	2022/08/24		91	%	75 - 125
			Soluble Potassium (K)	2022/08/24		98	%	75 - 125
A692713	MB5	QC Standard	Soluble Calcium (Ca)	2022/08/24		102	%	75 - 125
			Soluble Magnesium (Mg)	2022/08/24		107	%	75 - 125
			Soluble Sodium (Na)	2022/08/24		97	%	75 - 125
			Soluble Potassium (K)	2022/08/24		85	%	75 - 125
			Soluble Sulphate (SO4)	2022/08/24		103	%	75 - 125
A692713	MB5	Spiked Blank	Soluble Calcium (Ca)	2022/08/24		95	%	80 - 120
			Soluble Magnesium (Mg)	2022/08/24		103	%	80 - 120
			Soluble Sodium (Na)	2022/08/24		94	%	80 - 120
			Soluble Potassium (K)	2022/08/24		98	%	80 - 120
A692713	MB5	Method Blank	Soluble Calcium (Ca)	2022/08/24	<1.5		mg/L	
			Soluble Magnesium (Mg)	2022/08/24	<1.0		mg/L	
			Soluble Sodium (Na)	2022/08/24	<2.5		mg/L	
			Soluble Potassium (K)	2022/08/24	<1.3		mg/L	
			Soluble Sulphate (SO4)	2022/08/24	<5.0		mg/L	
A692713	MB5	RPD	Soluble Calcium (Ca)	2022/08/25	66 (1)		%	30
			Soluble Magnesium (Mg)	2022/08/25	NC		%	30
			Soluble Sodium (Na)	2022/08/25	3.9		%	30
			Soluble Potassium (K)	2022/08/25	NC		%	30
			Soluble Sulphate (SO4)	2022/08/25	NC		%	30

N/A = Not Applicable

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

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

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 (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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

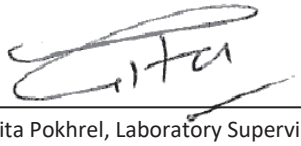
Bureau Veritas Job #: C262079
Report Date: 2022/09/15

GOLDER ASSOCIATES LTD
Client Project #: 22525414-1000
Site Location: CAMPFUR WELL
Your P.O. #: 22525414-1000-1104
Sampler Initials: JP

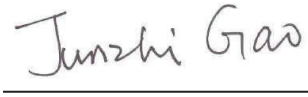
VALIDATION SIGNATURE PAGE

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

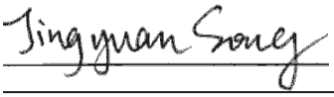
Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics



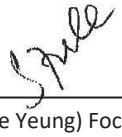
Gita Pokhrel, Laboratory Supervisor



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



Jingyuan Song, QP, Organics – Senior Analyst



Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Automated Statchk

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

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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#:	22525414-3100-3104
Street Address:		Street Address:		Project #:	22525414-3000
City:	Calgary Prov: AB Postal Code:	City:	Calgary AB Postal Code: T2P 4K3	Site #:	Camp Fairwell NA
Phone:		Phone:	403-299-5600	Site Location:	~~WEST CHANNEL, NT~~
Email:	Canada Account Payable	Email:	aurelie.bellavance@wsp.com	Site Location Province:	NT
Copies:		Copies:	Peter. Tan @ wsp.com	Sampled By:	S. Macphail / J. Pascal

LAB USE ONLY - PLACE STICKER HERE

Rush Confirmation #:

Regulatory Criteria

☐ AT1 ☐ CCME ☐ Drinking Water - Canada ☐ Drinking Water - Manitoba

☐ Saskatchewan ☐ Drinking Water - Alberta ☐ Other ______

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	Comments
1	BH22-14-01	2022	08	12	08	00	Soil				X																	3		also email report to
2	BH22-14-02				08	15					X																	3		gld.shelldgl@wsp.com
3	BH22-14-03				08	30					X																	3		gld.iol-equis@wsp.com
4	MW22-13-01				08	45					X	X				X				X							X	5		Upload to facility code
5	MW22-13-02				08	50					X	X				X				X							X	5		412595 44
6	BH22-15-01				09	15					X																	3		Samples may contain
7	BH22-15-02				09	30					X																	3		head space
8	BH22-15-03				09	45					X																	3		
9	DupL				09	45					X																	3		
10	MW22-16-01				10	00					X																	3		
11	MW22-16-02				10	15					X																	3		
12	BH22-12-01				10	30					X																	3		

Received in Yellowknife
By: J Mue... @ 12:45
AUG 17 2022
Temp: 6 / 6
ice 4-5/cooler 4

*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			1 2 3	ACTR	Seal present			1 2 3		Seal present			1 2 3	
Seal intact					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	S. Macphail	2022	08	14	09	15	1	JASON BIL	22	08	18	15	10	C262079
2							2							

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

CHAIN OF CUSTODY RECORD

ENV COC - 00013v3

CONTINUED

[PAGE 1 REFERENCE]

Company:	Client #254, Golder Associates
Contact Name:	237 - 4 Ave SW Suite 3300
Project #:	22525414-3000

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

	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	5 VOCs	6 BTEX F1-F2	7 BTEX F1-F4	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	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE	Same as above / Comments
13	BH22-12-02	2022	08	12	10	45	Soil							X														3		
14	BH22-12-03	↓	↓	↓	11	00	↓							X														3		
15																														
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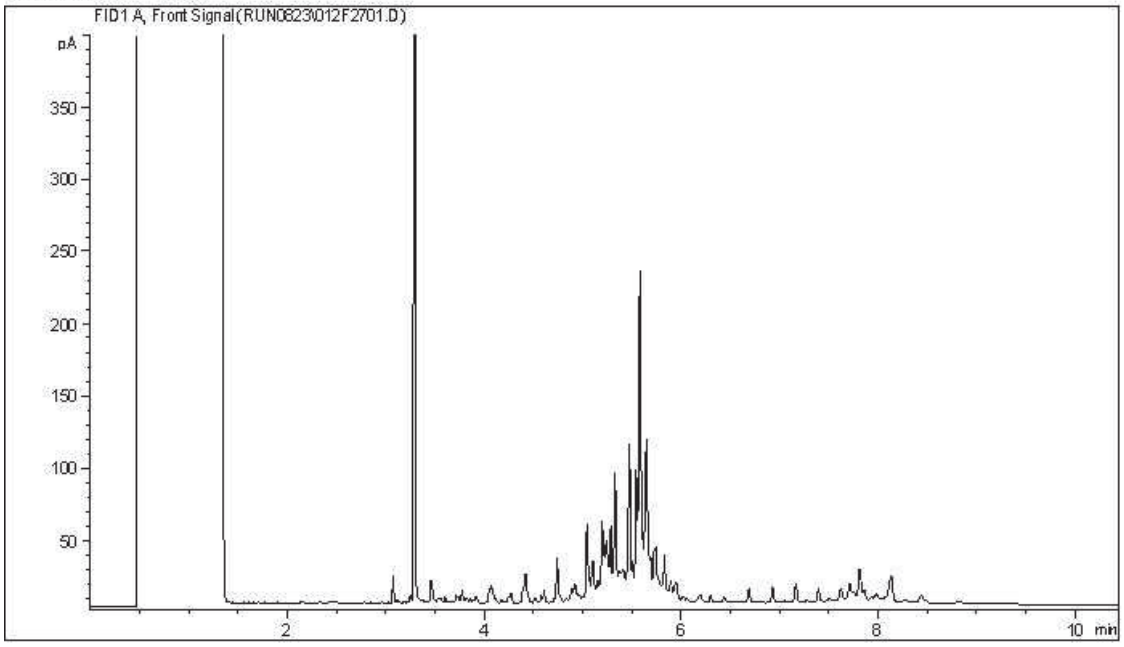
JASON BIL 2022/08/18 15:10

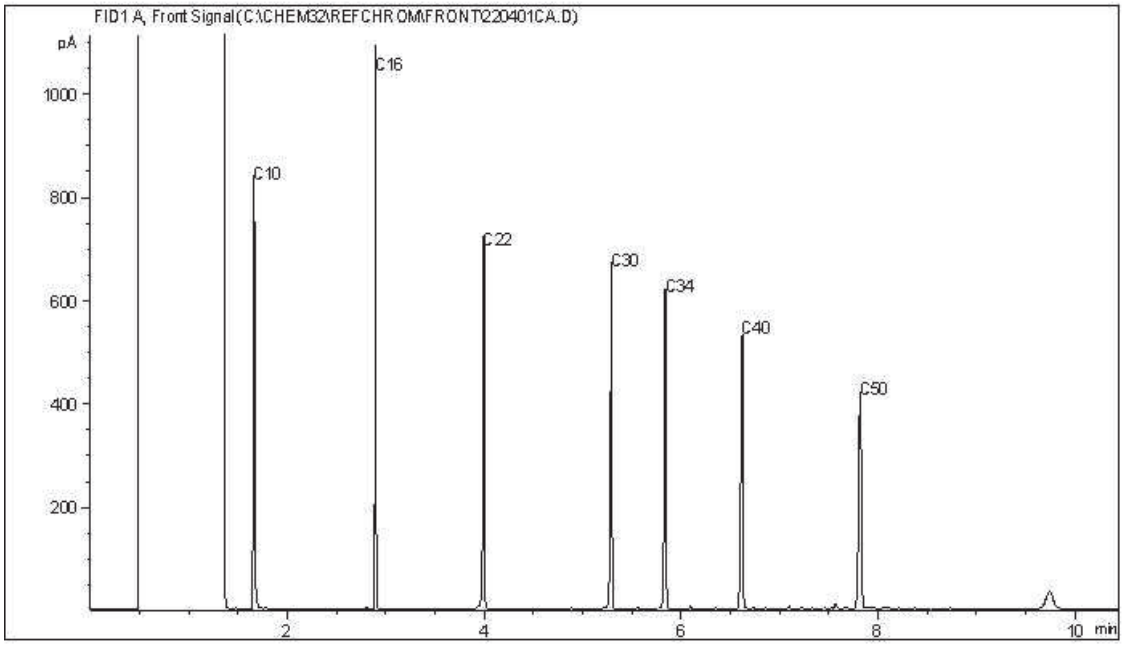
C262079

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC20



Carbon Range Distribution - Reference Chromatogram



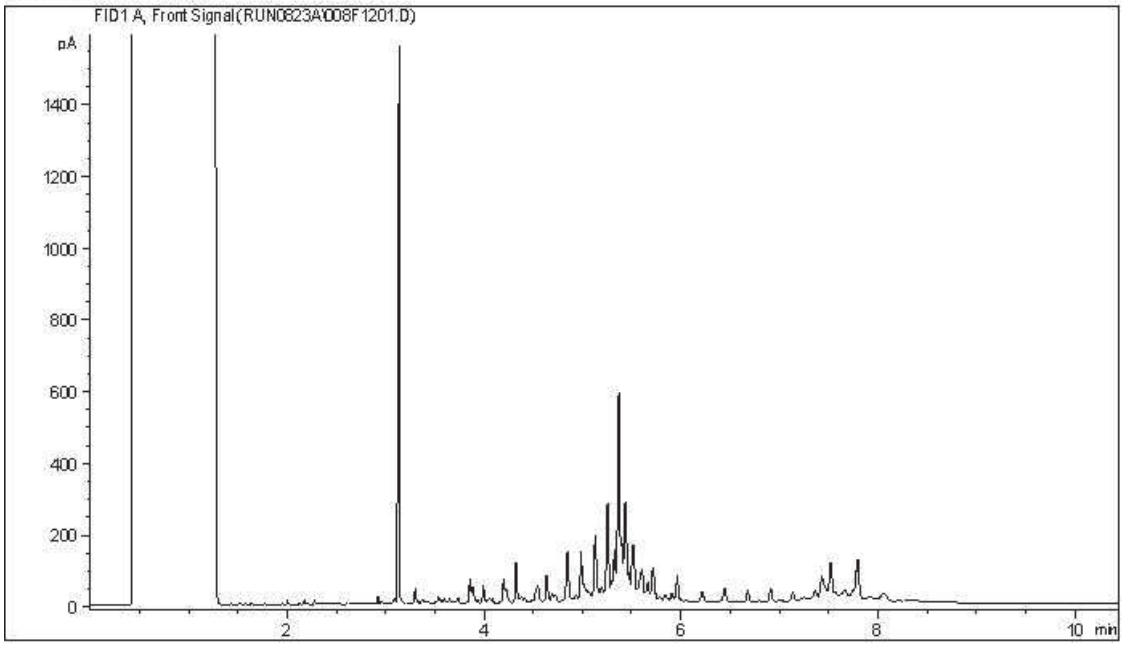
TYPICAL PRODUCT CARBON NUMBER RANGES

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

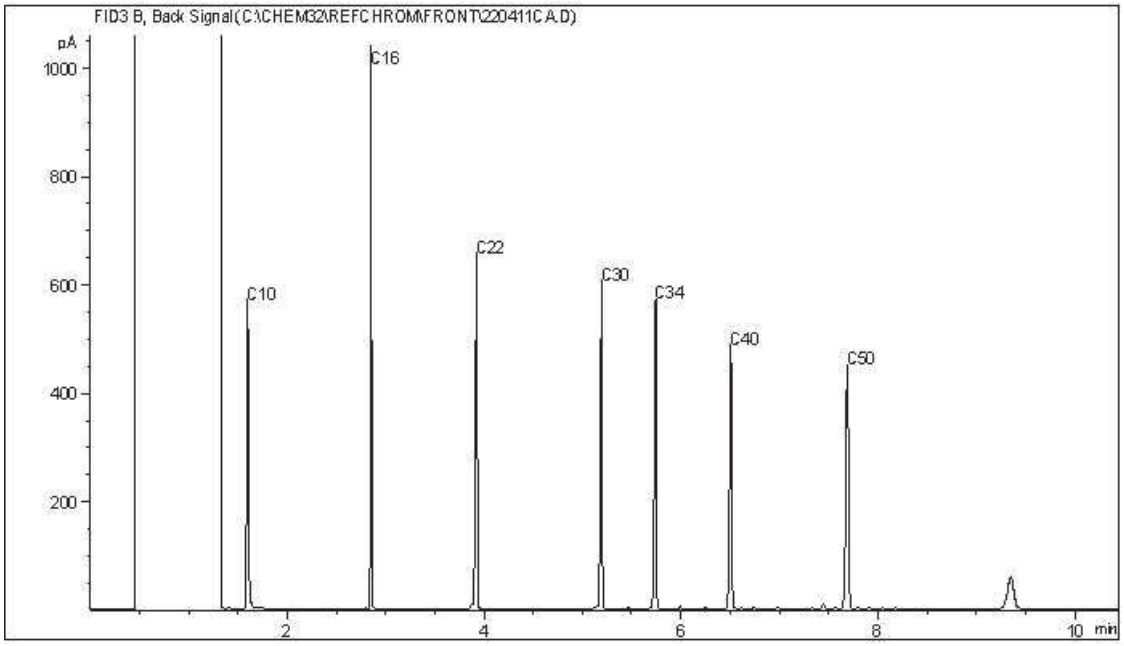
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC19



Carbon Range Distribution - Reference Chromatogram



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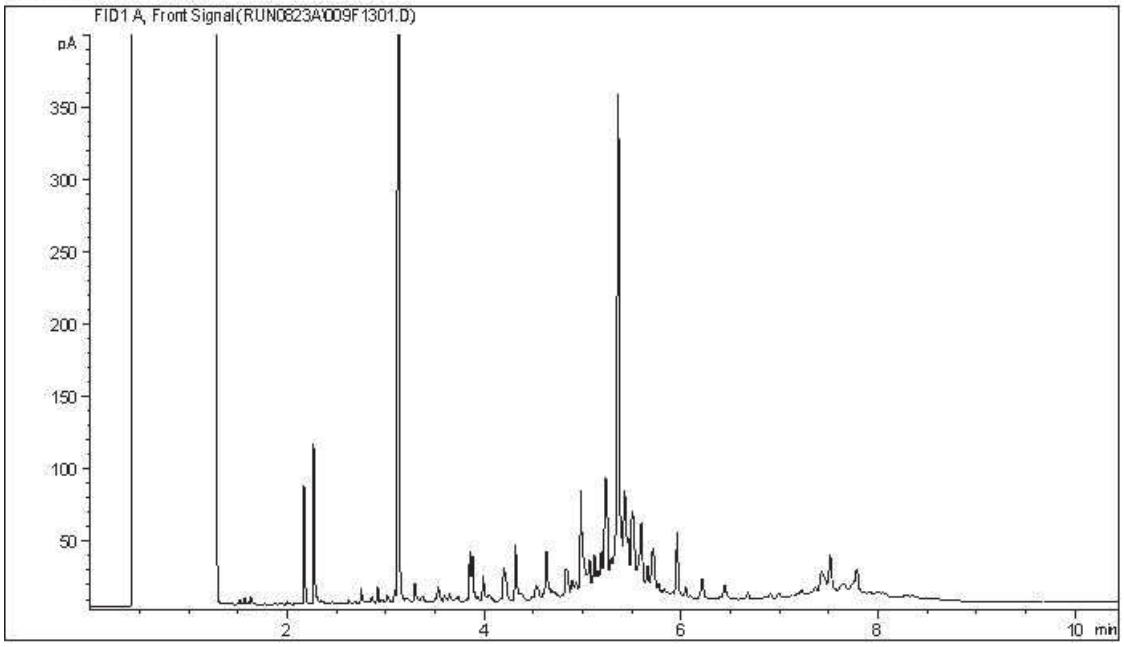
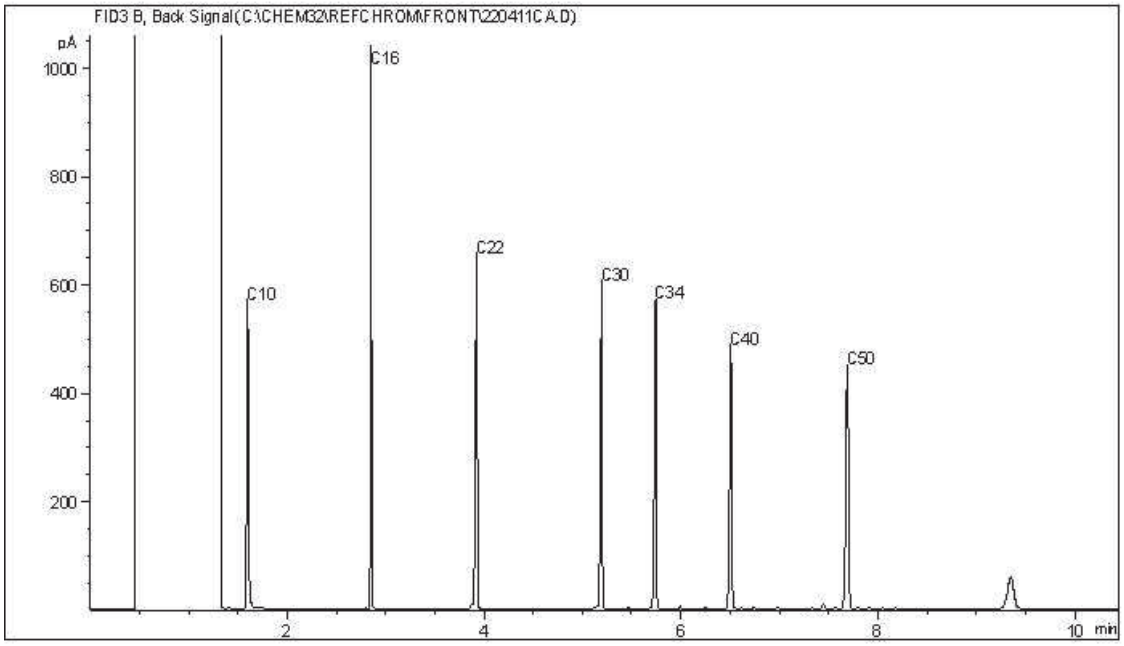


Carbon Range Distribution - Reference Chromatogram



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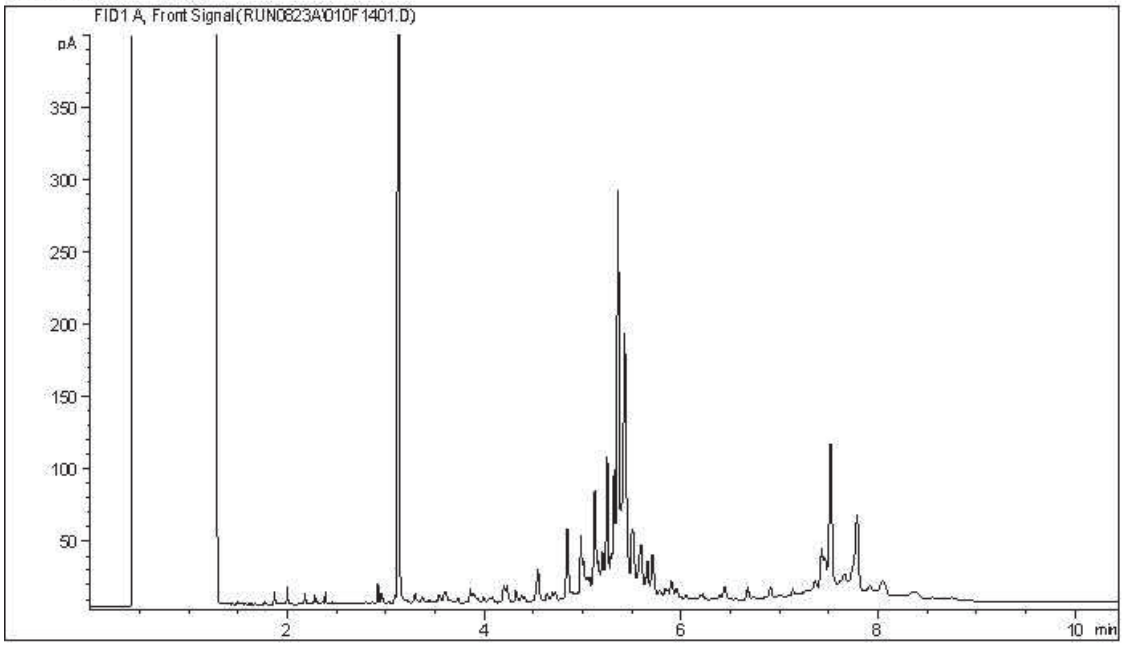
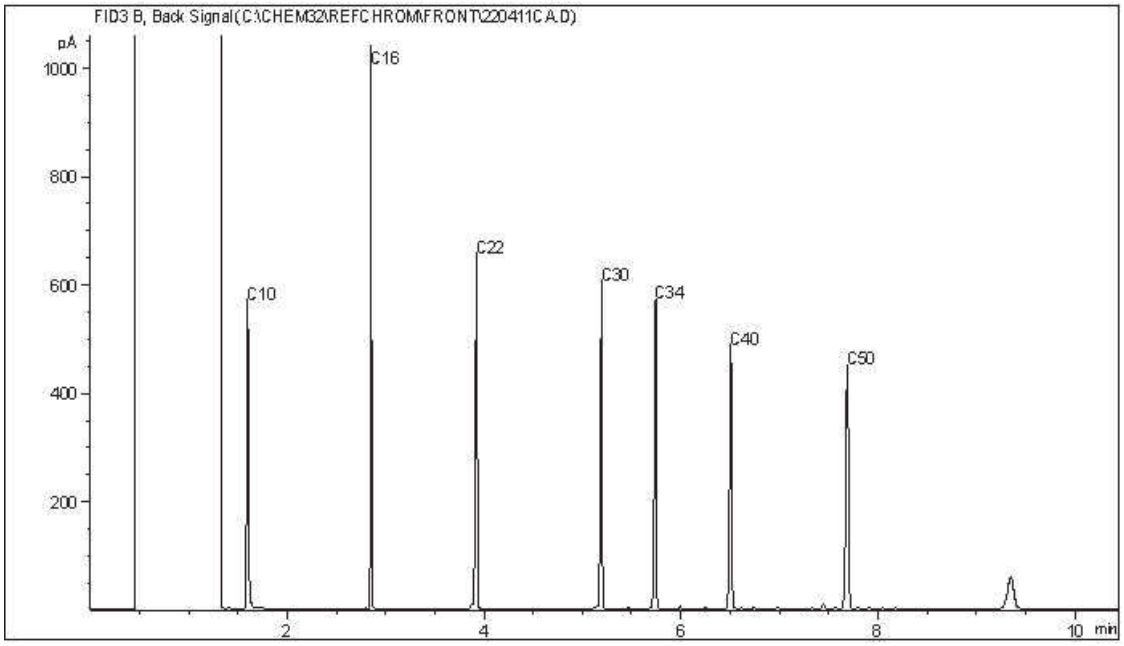
Instrument: GC19



Carbon Range Distribution - Reference Chromatogram



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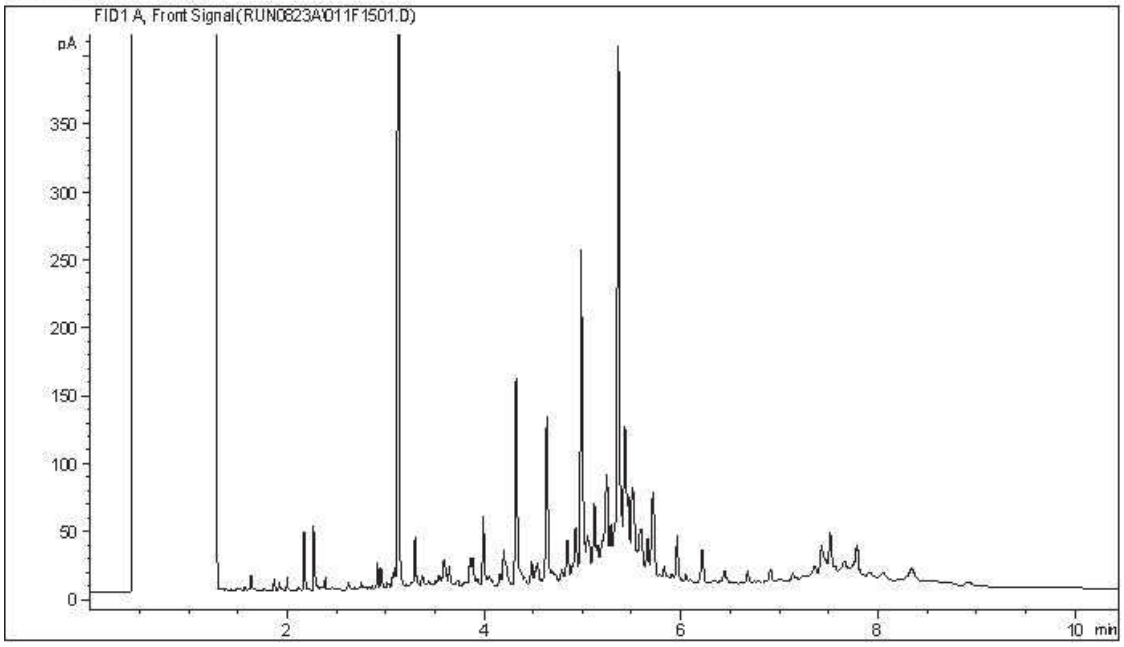
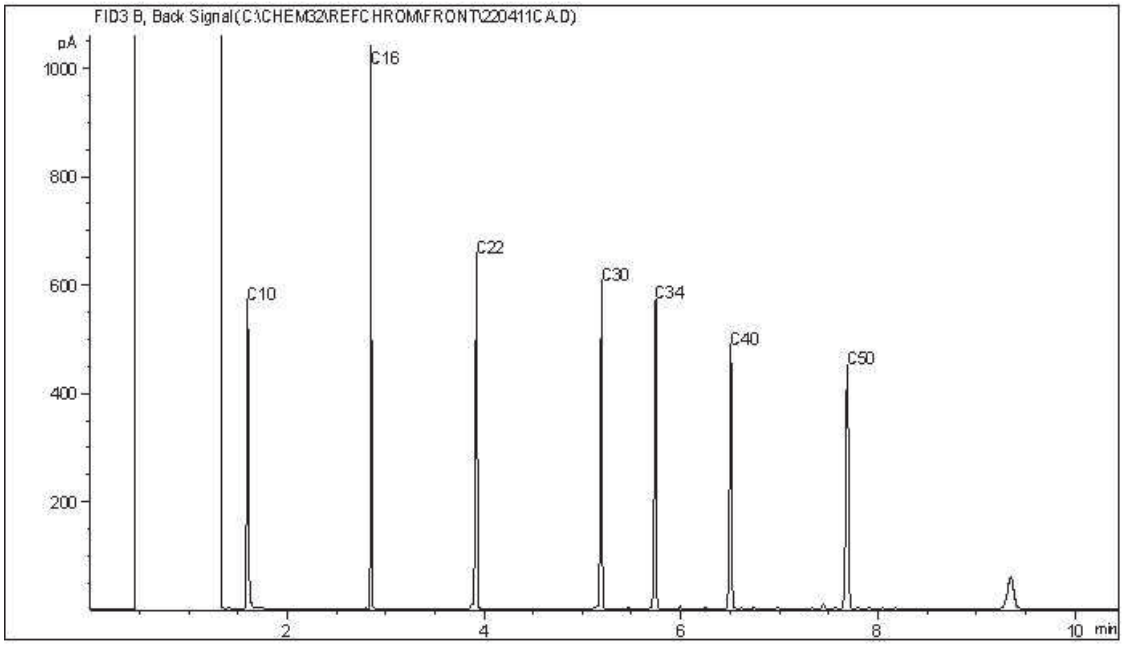
Instrument: GC19



Carbon Range Distribution - Reference Chromatogram



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