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WorleyParsons Group

Government of Nunavut
2017 Phase II Environmental Site Assessment
Arviat Tank Farm - Arviat, NU



Appendix 2 Line Locate Sketches





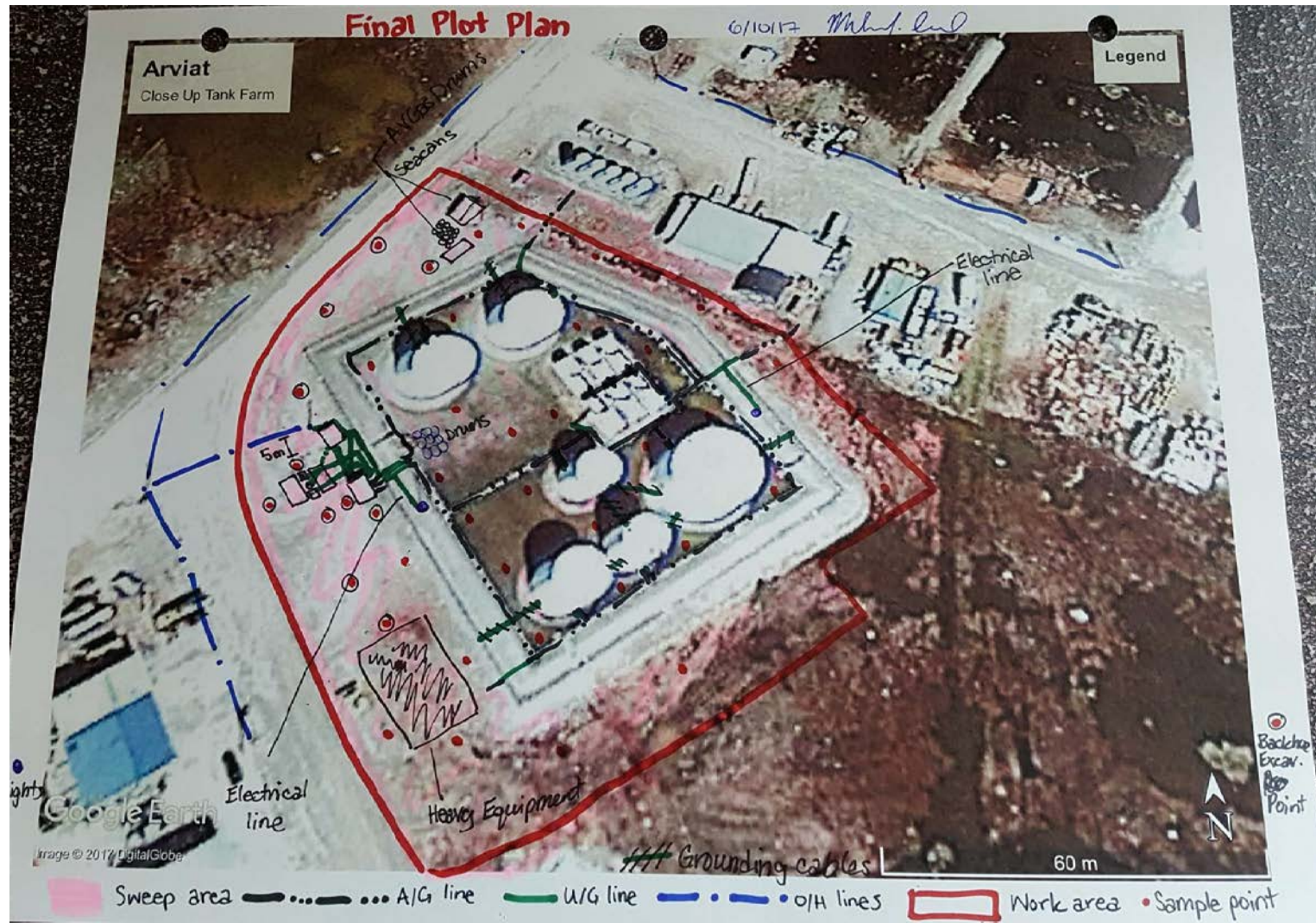
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Government of Nunavut

2017 Phase II Environmental Site Assessment

Arviat Tank Farm - Arviat, NU





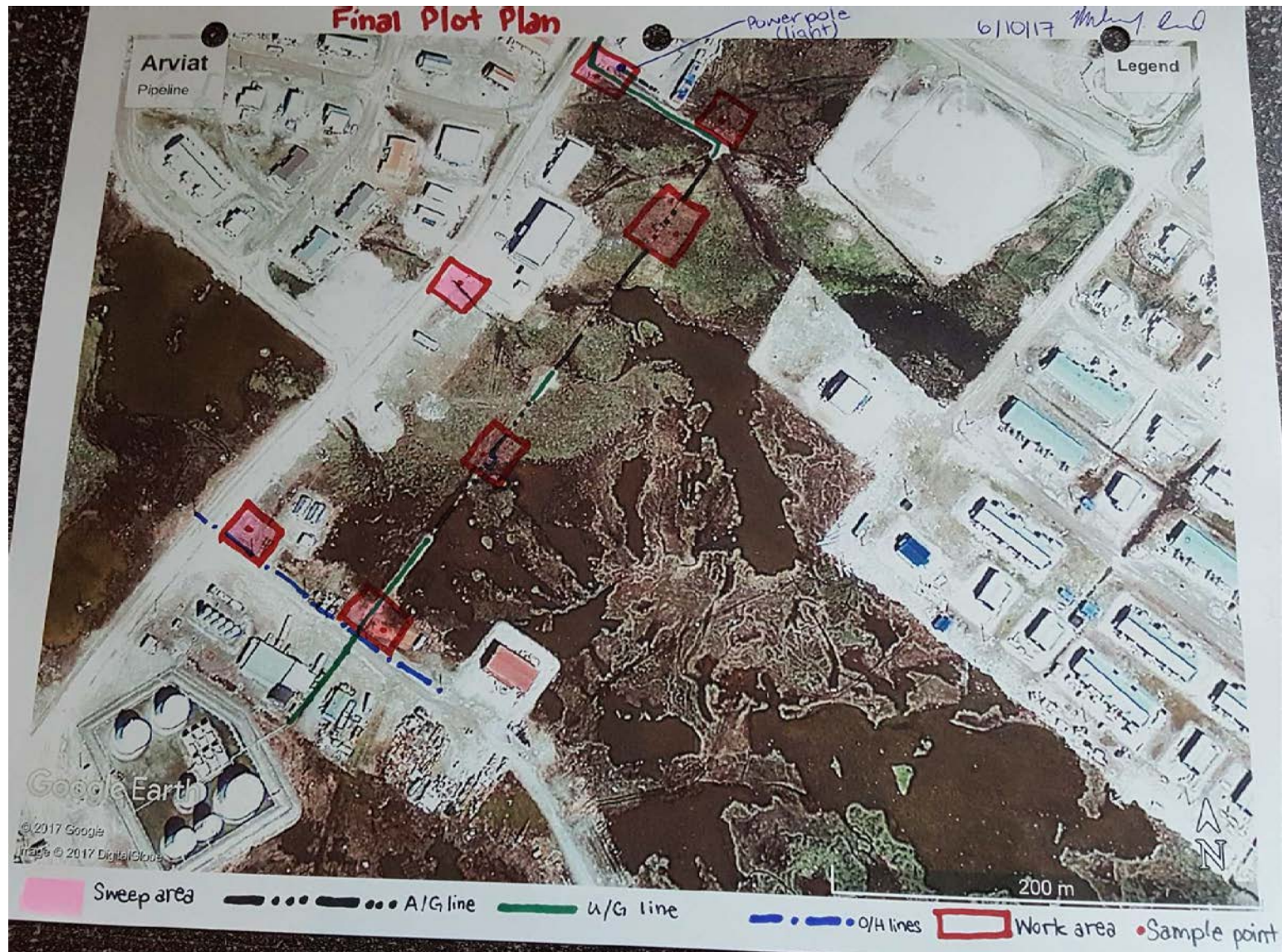
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2017 Phase II Environmental Site Assessment

Arviat Tank Farm - Arviat, NU





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2017 Phase II Environmental Site Assessment

Arviat Tank Farm - Arviat, NU

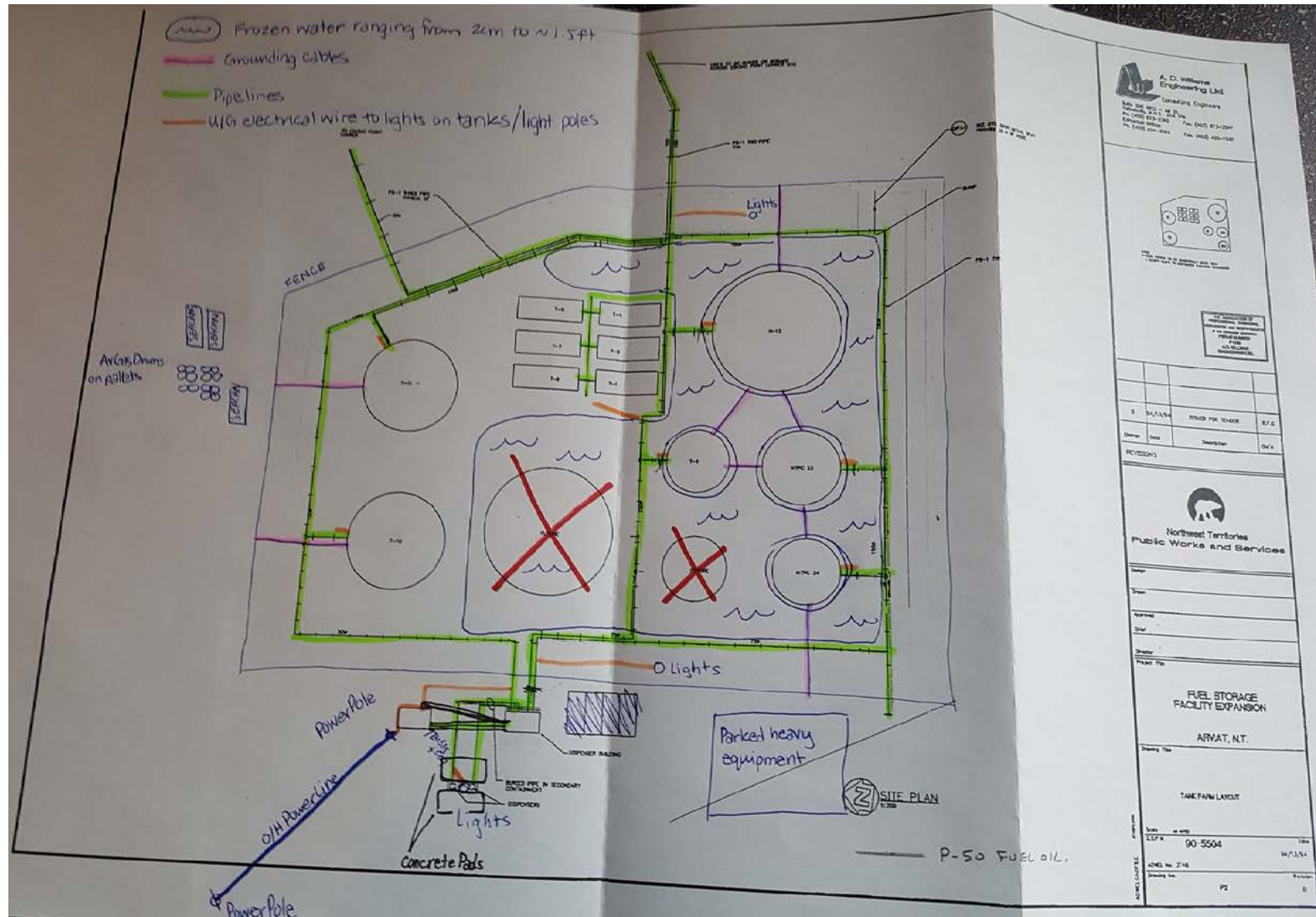


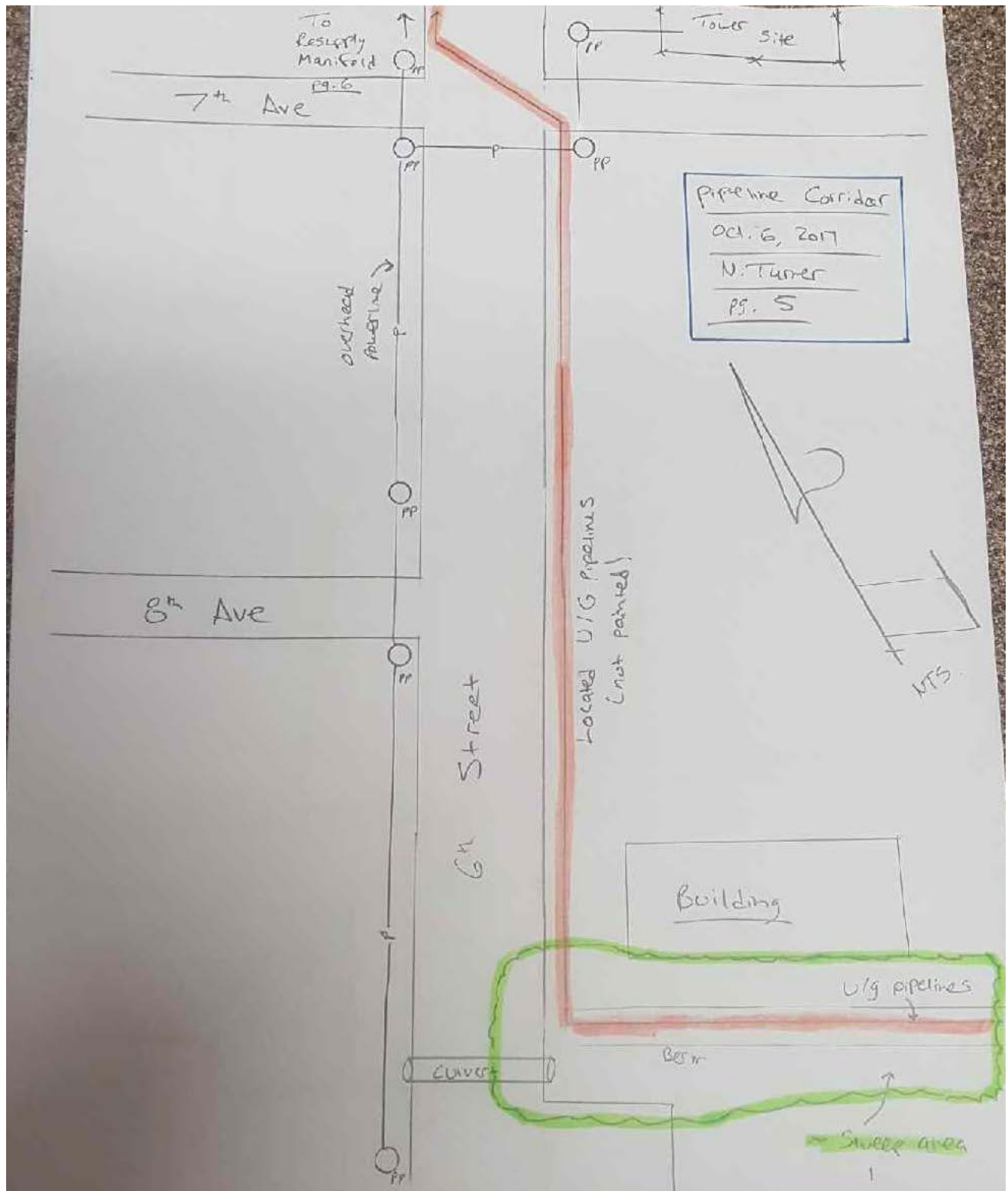


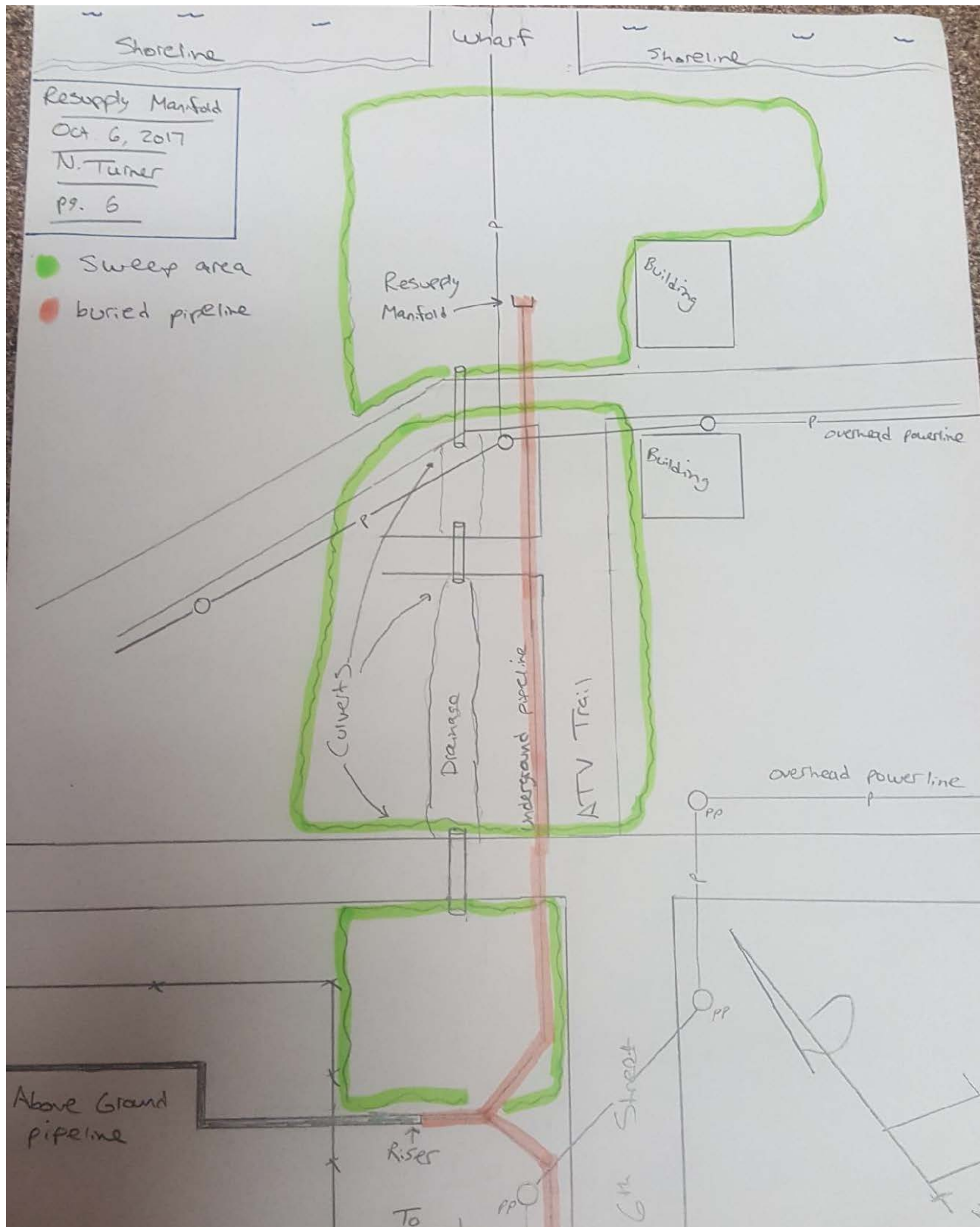
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2017 Phase II Environmental Site Assessment
Arviat Tank Farm - Arviat, NU









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2017 Phase II Environmental Site Assessment
Arviat Tank Farm - Arviat, NU



Appendix 3

Laboratory Certificates of Analysis and Data Quality Review Form



Your Project #: 307031-00048

Site Location: ARVIAT, NU

Attention: SAM BIRD

WORLEYPARSONS
500, 151 CANADA OLYMPIC RD. SW
CANADA OLYMPIC PARK
CALGARY, AB
CANADA T3B 6B7

Your C.O.C. #: m063696, m063695, m063694, m063693

Report Date: 2017/10/23

Report #: R2464584

Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B790895

Received: 2017/10/16, 11:04

Sample Matrix: Soil
Samples Received: 36

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 by HS GC/MS/FID (MeOH extract)	16	2017/10/16	2017/10/18	AB SOP-00039	CCME CWS/EPA 8260c m
BTEX/F1 by HS GC/MS/FID (MeOH extract)	20	2017/10/16	2017/10/20	AB SOP-00039	CCME CWS/EPA 8260c m
CCME Hydrocarbons (F2-F4 in soil) (1)	24	2017/10/17	2017/10/18	AB SOP-00036	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in soil) (1)	12	2017/10/17	2017/10/19	AB SOP-00036	CCME PHC-CWS m
Moisture	36	N/A	2017/10/18	AB SOP-00002	CCME PHC-CWS m
Lead	17	2017/10/19	2017/10/19	AB SOP-00001 / AB SOP-00043	EPA 200.8 R5.4 m
Lead	19	2017/10/20	2017/10/20	AB SOP-00001 / AB SOP-00043	EPA 200.8 R5.4 m
Particle Size by Sieve (75 micron)	3	N/A	2017/10/18	AB SOP-00022	ASTM D6913-17 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam 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.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam 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 Maxxam, unless otherwise agreed in writing.

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.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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

Your Project #: 307031-00048

Site Location: ARVIAT, NU

Attention: SAM BIRD

WORLEYPARSONS
500, 151 CANADA OLYMPIC RD. SW
CANADA OLYMPIC PARK
CALGARY, AB
CANADA T3B 6B7

Your C.O.C. #: m063696, m063695, m063694, m063693

Report Date: 2017/10/23

Report #: R2464584

Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B790895

Received: 2017/10/16, 11:04

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

(1) All CCME results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam 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



Jamie Carter
Project Manager
23 Oct 2017 14:48:07

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

Ioana Stoica, Project Manager

Email: IStoica@maxxam.ca

Phone# (403) 735-2227

=====

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

Maxxam Job #: B790895
Report Date: 2017/10/23

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		SF6219		SF6220		SF6220			
Sampling Date		2017/10/12 15:15		2017/10/12 15:45		2017/10/12 15:45			
COC Number		m063696		m063696		m063696			
	UNITS	SS17-01	MU	SS17-02	MU	SS17-02 Lab-Dup	MU	RDL	QC Batch
Physical Properties									
Moisture	%	14	+/- 1.0	18	+/- 1.3	N/A	N/A	0.30	8796461
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	10	+/- <RDL	12	+/- <RDL	13	+/- <RDL	10	8796821
F3 (C16-C34 Hydrocarbons)	mg/kg	120	+/- <RDL	300	+/- 110	240	+/- 84	50	8796821
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	N/A	72	+/- <RDL	57	+/- <RDL	50	8796821
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	Yes	N/A	N/A	8796821
Volatiles									
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	N/A	N/A	0.0050	8796703
Toluene	mg/kg	<0.020	N/A	<0.020	N/A	N/A	N/A	0.020	8796703
Ethylbenzene	mg/kg	<0.010	N/A	<0.010	N/A	N/A	N/A	0.010	8796703
Xylenes (Total)	mg/kg	<0.040	N/A	<0.040	N/A	N/A	N/A	0.040	8796703
m & p-Xylene	mg/kg	<0.040	N/A	<0.040	N/A	N/A	N/A	0.040	8796703
o-Xylene	mg/kg	<0.020	N/A	<0.020	N/A	N/A	N/A	0.020	8796703
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	N/A	N/A	10	8796703
F1 (C6-C10)	mg/kg	<10	N/A	<10	N/A	N/A	N/A	10	8796703
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	107	N/A	106	N/A	N/A	N/A	N/A	8796703
4-Bromofluorobenzene (sur.)	%	91	N/A	91	N/A	N/A	N/A	N/A	8796703
D10-o-Xylene (sur.)	%	101	N/A	93	N/A	N/A	N/A	N/A	8796703
D4-1,2-Dichloroethane (sur.)	%	100	N/A	99	N/A	N/A	N/A	N/A	8796703
O-TERPHENYL (sur.)	%	102	N/A	103	N/A	108	N/A	N/A	8796821
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate MU = Measurement Uncertainty N/A = Not Applicable									

Maxxam Job #: B790895
Report Date: 2017/10/23

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		SF6221		SF6222			SF6223			
Sampling Date		2017/10/12 16:15		2017/10/12 16:45			2017/10/12 17:25			
COC Number		m063696		m063696			m063696			
	UNITS	SS17-03	MU	SS17-04	MU	RDL	SS17-05	MU	RDL	QC Batch

Physical Properties										
Moisture	%	26	+/- 1.8	27	+/- 1.9	0.30	67	+/- 4.6	0.30	8796461
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	<10	N/A	10	79 (1)	+/- 31	30	8796821
F3 (C16-C34 Hydrocarbons)	mg/kg	440	+/- 150	630	+/- 220	50	1400 (1)	+/- 490	150	8796821
F4 (C34-C50 Hydrocarbons)	mg/kg	110	+/- <RDL	160	+/- 59	50	260 (1)	+/- <RDL	150	8796821
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	N/A	Yes	N/A	N/A	8796821
Volatiles										
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	<0.015 (1)	N/A	0.015	8796703
Toluene	mg/kg	<0.020	N/A	<0.020	N/A	0.020	<0.058 (1)	N/A	0.058	8796703
Ethylbenzene	mg/kg	<0.010	N/A	<0.010	N/A	0.010	<0.029 (1)	N/A	0.029	8796703
Xylenes (Total)	mg/kg	<0.040	N/A	<0.040	N/A	0.040	<0.12 (1)	N/A	0.12	8796703
m & p-Xylene	mg/kg	<0.040	N/A	<0.040	N/A	0.040	<0.12 (1)	N/A	0.12	8796703
o-Xylene	mg/kg	<0.020	N/A	<0.020	N/A	0.020	<0.058 (1)	N/A	0.058	8796703
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	10	<29 (1)	N/A	29	8796703
F1 (C6-C10)	mg/kg	<10	N/A	<10	N/A	10	<29 (1)	N/A	29	8796703
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	105	N/A	106	N/A	N/A	106	N/A	N/A	8796703
4-Bromofluorobenzene (sur.)	%	92	N/A	91	N/A	N/A	92	N/A	N/A	8796703
D10-o-Xylene (sur.)	%	116	N/A	102	N/A	N/A	106	N/A	N/A	8796703
D4-1,2-Dichloroethane (sur.)	%	101	N/A	101	N/A	N/A	100	N/A	N/A	8796703
O-TERPHENYL (sur.)	%	106	N/A	112	N/A	N/A	109	N/A	N/A	8796821
RDL = Reportable Detection Limit MU = Measurement Uncertainty N/A = Not Applicable (1) Detection limits raised due to high moisture content, sample contains => 50% moisture.										

Maxxam Job #: B790895
Report Date: 2017/10/23

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		SF6224			SF6225		SF6226			
Sampling Date		2017/10/12 17:55			2017/10/13 08:30		2017/10/13 09:00			
COC Number		m063696			m063696		m063696			
	UNITS	SS17-06	MU	RDL	SS17-07	MU	SS17-08	MU	RDL	QC Batch

Physical Properties										
Moisture	%	87	+/- 6.0	0.30	25	+/- 1.8	19	+/- 1.3	0.30	8796183
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	48 (1)	+/- 19	16	<10	N/A	<10	N/A	10	8796370
F3 (C16-C34 Hydrocarbons)	mg/kg	1500 (1)	+/- 530	52	55	+/- <RDL	160	+/- 56	50	8796370
F4 (C34-C50 Hydrocarbons)	mg/kg	210 (1)	+/- 76	50	<50	N/A	<50	N/A	50	8796370
Reached Baseline at C50	mg/kg	Yes	N/A	N/A	Yes	N/A	Yes	N/A	N/A	8796370
Volatiles										
Benzene	mg/kg	<0.030 (1)	N/A	0.030	<0.0050	N/A	<0.0050	N/A	0.0050	8796700
Toluene	mg/kg	<0.071 (1)	N/A	0.071	<0.020	N/A	<0.020	N/A	0.020	8796700
Ethylbenzene	mg/kg	<0.022 (1)	N/A	0.022	0.019	+/- <RDL	<0.010	N/A	0.010	8796700
Xylenes (Total)	mg/kg	<0.28 (2)	N/A	0.28	0.18	+/- 0.043	<0.040	N/A	0.040	8796700
m & p-Xylene	mg/kg	<0.28 (2)	N/A	0.28	0.11	+/- 0.044	<0.040	N/A	0.040	8796700
o-Xylene	mg/kg	<0.14 (2)	N/A	0.14	0.072	+/- 0.028	<0.020	N/A	0.020	8796700
F1 (C6-C10) - BTEX	mg/kg	<25 (1)	N/A	25	<10	N/A	<10	N/A	10	8796700
F1 (C6-C10)	mg/kg	<25 (1)	N/A	25	<10	N/A	<10	N/A	10	8796700
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	104	N/A	N/A	104	N/A	105	N/A	N/A	8796700
4-Bromofluorobenzene (sur.)	%	93	N/A	N/A	93	N/A	92	N/A	N/A	8796700
D10-o-Xylene (sur.)	%	115	N/A	N/A	113	N/A	114	N/A	N/A	8796700
D4-1,2-Dichloroethane (sur.)	%	109	N/A	N/A	107	N/A	109	N/A	N/A	8796700
O-TERPHENYL (sur.)	%	120	N/A	N/A	109	N/A	113	N/A	N/A	8796370
RDL = Reportable Detection Limit MU = Measurement Uncertainty N/A = Not Applicable (1) Detection limits calculated based on method detection limits (MDLs) due to high moisture content, sample contains => 50% moisture. (2) Detection limits raised due to high moisture content, sample contains => 50% moisture.										

Maxxam Job #: B790895
Report Date: 2017/10/23

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		SF6227		SF6228		SF6230		SF6230			
Sampling Date		2017/10/13 09:20		2017/10/13 09:45		2017/10/12 15:47		2017/10/12 15:47			
COC Number		m063696		m063696		m063695		m063695			
	UNITS	SS17-09	MU	SS17-10	MU	DUP 01	MU	DUP 01 Lab-Dup	MU	RDL	QC Batch

Physical Properties											
Moisture	%	25	+/- 1.8	43	+/- 3.0	35	+/- 2.4	36	+/- 2.5	0.30	8796183
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	<10	N/A	46	+/- 18	N/A	N/A	10	8796370
F3 (C16-C34 Hydrocarbons)	mg/kg	240	+/- 83	120	+/- <RDL	1300	+/- 440	N/A	N/A	50	8796370
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	N/A	<50	N/A	270	+/- 98	N/A	N/A	50	8796370
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	Yes	N/A	N/A	N/A	N/A	8796370
Volatiles											
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	<0.0050	N/A	N/A	N/A	0.0050	8796700
Toluene	mg/kg	<0.020	N/A	0.049	+/- 0.024	<0.020	N/A	N/A	N/A	0.020	8796700
Ethylbenzene	mg/kg	<0.010	N/A	0.19	+/- 0.079	<0.010	N/A	N/A	N/A	0.010	8796700
Xylenes (Total)	mg/kg	<0.040	N/A	1.7	+/- 0.41	<0.040	N/A	N/A	N/A	0.040	8796700
m & p-Xylene	mg/kg	<0.040	N/A	1.1	+/- 0.43	<0.040	N/A	N/A	N/A	0.040	8796700
o-Xylene	mg/kg	<0.020	N/A	0.65	+/- 0.25	<0.020	N/A	N/A	N/A	0.020	8796700
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	<10	N/A	N/A	N/A	10	8796700
F1 (C6-C10)	mg/kg	<10	N/A	<10	N/A	<10	N/A	N/A	N/A	10	8796700
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	105	N/A	104	N/A	104	N/A	N/A	N/A	N/A	8796700
4-Bromofluorobenzene (sur.)	%	92	N/A	92	N/A	92	N/A	N/A	N/A	N/A	8796700
D10-o-Xylene (sur.)	%	119	N/A	123	N/A	118	N/A	N/A	N/A	N/A	8796700
D4-1,2-Dichloroethane (sur.)	%	107	N/A	107	N/A	110	N/A	N/A	N/A	N/A	8796700
O-TERPHENYL (sur.)	%	111	N/A	117	N/A	116	N/A	N/A	N/A	N/A	8796370
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate MU = Measurement Uncertainty N/A = Not Applicable											

Maxxam Job #: B790895
Report Date: 2017/10/23

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		SF6231		SF6232		SF6232			
Sampling Date		2017/10/13 10:00		2017/10/13 10:15		2017/10/13 10:15			
COC Number		m063695		m063695		m063695			
	UNITS	SS17-11	MU	SS17-12	MU	SS17-12 Lab-Dup	MU	RDL	QC Batch
Physical Properties									
Moisture	%	10	+/- 0.79	16	+/- 1.2	N/A	N/A	0.30	8796183
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	<10	N/A	N/A	N/A	10	8796370
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	N/A	66	+/- <RDL	N/A	N/A	50	8796370
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	N/A	<50	N/A	N/A	N/A	50	8796370
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	N/A	N/A	N/A	8796370
Volatiles									
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	<0.0050	N/A	0.0050	8796700
Toluene	mg/kg	0.032	+/- <RDL	0.49	+/- 0.23	0.58	+/- 0.27	0.020	8796700
Ethylbenzene	mg/kg	0.16	+/- 0.065	3.5	+/- 1.4	4.1	+/- 1.7	0.010	8796700
Xylenes (Total)	mg/kg	1.4	+/- 0.33	28	+/- 6.6	33	+/- 7.7	0.040	8796700
m & p-Xylene	mg/kg	0.86	+/- 0.34	18	+/- 7.0	21	+/- 8.2	0.040	8796700
o-Xylene	mg/kg	0.52	+/- 0.20	10	+/- 4.0	12	+/- 4.7	0.020	8796700
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	<10	N/A	10	8796700
F1 (C6-C10)	mg/kg	<10	N/A	33	+/- <RDL	32	+/- <RDL	10	8796700
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	103	N/A	103	N/A	100	N/A	N/A	8796700
4-Bromofluorobenzene (sur.)	%	93	N/A	93	N/A	93	N/A	N/A	8796700
D10-o-Xylene (sur.)	%	118	N/A	116	N/A	119	N/A	N/A	8796700
D4-1,2-Dichloroethane (sur.)	%	112	N/A	112	N/A	116	N/A	N/A	8796700
O-TERPHENYL (sur.)	%	109	N/A	109	N/A	N/A	N/A	N/A	8796370
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate MU = Measurement Uncertainty N/A = Not Applicable									

Maxxam Job #: B790895
Report Date: 2017/10/23

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		SF6233		SF6234			SF6235			
Sampling Date		2017/10/13 10:30		2017/10/13 10:45			2017/10/13 12:00			
COC Number		m063695		m063695			m063695			
	UNITS	SS17-13	MU	SS17-14	MU	RDL	SS17-15	MU	RDL	QC Batch

Physical Properties										
Moisture	%	20	+/- 1.4	15	+/- 1.1	0.30	50	+/- 3.5	0.30	8796183
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	<10	N/A	10	41 (1)	+/- <RDL	20	8796370
F3 (C16-C34 Hydrocarbons)	mg/kg	53	+/- <RDL	<50	N/A	50	580 (1)	+/- 200	100	8796370
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	N/A	<50	N/A	50	100 (1)	+/- <RDL	100	8796370
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	N/A	Yes	N/A	N/A	8796370
Volatiles										
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	<0.0090 (1)	N/A	0.0090	8796700
Toluene	mg/kg	0.36	+/- 0.17	0.040	+/- 0.020	0.020	<0.036 (1)	N/A	0.036	8796700
Ethylbenzene	mg/kg	1.4	+/- 0.58	0.21	+/- 0.087	0.010	<0.018 (1)	N/A	0.018	8796700
Xylenes (Total)	mg/kg	11	+/- 2.6	2.0	+/- 0.46	0.040	<0.072 (1)	N/A	0.072	8796700
m & p-Xylene	mg/kg	7.4	+/- 2.9	1.2	+/- 0.48	0.040	<0.072 (1)	N/A	0.072	8796700
o-Xylene	mg/kg	3.5	+/- 1.4	0.76	+/- 0.29	0.020	<0.036 (1)	N/A	0.036	8796700
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	10	<18 (1)	N/A	18	8796700
F1 (C6-C10)	mg/kg	11	+/- <RDL	<10	N/A	10	<18 (1)	N/A	18	8796700
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	103	N/A	109	N/A	N/A	107	N/A	N/A	8796700
4-Bromofluorobenzene (sur.)	%	93	N/A	90	N/A	N/A	90	N/A	N/A	8796700
D10-o-Xylene (sur.)	%	119	N/A	103	N/A	N/A	114	N/A	N/A	8796700
D4-1,2-Dichloroethane (sur.)	%	111	N/A	103	N/A	N/A	103	N/A	N/A	8796700
O-TERPHENYL (sur.)	%	111	N/A	114	N/A	N/A	118	N/A	N/A	8796370
RDL = Reportable Detection Limit MU = Measurement Uncertainty N/A = Not Applicable (1) Detection limits raised due to high moisture content, sample contains => 50% moisture.										

Maxxam Job #: B790895
Report Date: 2017/10/23

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		SF6236		SF6237		SF6238		SF6239			
Sampling Date		2017/10/13 12:30		2017/10/13 13:20		2017/10/13 13:50		2017/10/13 14:00			
COC Number		m063695		m063695		m063695		m063695			
	UNITS	SS17-16	MU	SS17-17	MU	SS17-18	MU	SS17-19	MU	RDL	QC Batch

Physical Properties											
Moisture	%	44	+/- 3.0	12	+/- 0.87	10	+/- 0.76	19	+/- 1.4	0.30	8796183
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	<10	N/A	170	+/- 65	7100	+/- 2700	10	8796370
F3 (C16-C34 Hydrocarbons)	mg/kg	200	+/- 71	78	+/- <RDL	130	+/- <RDL	1800	+/- 630	50	8796370
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	N/A	<50	N/A	<50	N/A	<50	N/A	50	8796370
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	Yes	N/A	Yes	N/A	N/A	8796370
Volatiles											
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	<0.0050	N/A	0.057 (1)	+/- 0.024	0.0050	8796700
Toluene	mg/kg	<0.020	N/A	<0.020	N/A	<0.020	N/A	2.8	+/- 1.3	0.020	8796700
Ethylbenzene	mg/kg	<0.010	N/A	<0.010	N/A	<0.010	N/A	2.3	+/- 0.93	0.010	8796700
Xylenes (Total)	mg/kg	<0.040	N/A	<0.040	N/A	<0.040	N/A	45	+/- 11	0.040	8796700
m & p-Xylene	mg/kg	<0.040	N/A	<0.040	N/A	<0.040	N/A	28	+/- 11	0.040	8796700
o-Xylene	mg/kg	<0.020	N/A	<0.020	N/A	<0.020	N/A	18	+/- 6.9	0.020	8796700
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	<10	N/A	1400	+/- 460	10	8796700
F1 (C6-C10)	mg/kg	<10	N/A	<10	N/A	<10	N/A	1500	+/- 350	10	8796700
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	108	N/A	108	N/A	109	N/A	111	N/A	N/A	8796700
4-Bromofluorobenzene (sur.)	%	91	N/A	90	N/A	86	N/A	98	N/A	N/A	8796700
D10-o-Xylene (sur.)	%	107	N/A	90	N/A	102	N/A	114	N/A	N/A	8796700
D4-1,2-Dichloroethane (sur.)	%	102	N/A	103	N/A	103	N/A	113	N/A	N/A	8796700
O-TERPHENYL (sur.)	%	119	N/A	116	N/A	113	N/A	111	N/A	N/A	8796370
RDL = Reportable Detection Limit MU = Measurement Uncertainty N/A = Not Applicable (1) Qualifying ion outside of acceptance criteria. Results are tentatively identified and potentially biased high.											

Maxxam Job #: B790895
Report Date: 2017/10/23

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		SF6240			SF6241		SF6242			
Sampling Date		2017/10/13 14:35			2017/10/13 10:02		2017/10/13 14:55			
COC Number		m063694			m063694		m063694			
	UNITS	SS17-20	MU	QC Batch	DUP 02	MU	SS17-21	MU	RDL	QC Batch
Physical Properties										
Moisture	%	7.3	+/- 0.59	8796183	11	+/- 0.81	12	+/- 0.89	0.30	8796461
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	8796821	<10	N/A	<10	N/A	10	8796821
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	N/A	8796821	<50	N/A	62	+/- <RDL	50	8796821
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	N/A	8796821	<50	N/A	<50	N/A	50	8796821
Reached Baseline at C50	mg/kg	Yes	N/A	8796821	Yes	N/A	Yes	N/A	N/A	8796821
Volatiles										
Benzene	mg/kg	<0.0050	N/A	8796700	<0.0050	N/A	<0.0050	N/A	0.0050	8796703
Toluene	mg/kg	<0.020	N/A	8796700	0.14	+/- 0.067	<0.020	N/A	0.020	8796703
Ethylbenzene	mg/kg	<0.010	N/A	8796700	0.29	+/- 0.12	<0.010	N/A	0.010	8796703
Xylenes (Total)	mg/kg	<0.040	N/A	8796700	2.4	+/- 0.57	<0.040	N/A	0.040	8796703
m & p-Xylene	mg/kg	<0.040	N/A	8796700	1.6	+/- 0.64	<0.040	N/A	0.040	8796703
o-Xylene	mg/kg	<0.020	N/A	8796700	0.82	+/- 0.32	<0.020	N/A	0.020	8796703
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	8796700	<10	N/A	<10	N/A	10	8796703
F1 (C6-C10)	mg/kg	<10	N/A	8796700	<10	N/A	<10	N/A	10	8796703
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	108	N/A	8796700	106	N/A	106	N/A	N/A	8796703
4-Bromofluorobenzene (sur.)	%	90	N/A	8796700	92	N/A	92	N/A	N/A	8796703
D10-o-Xylene (sur.)	%	101	N/A	8796700	104	N/A	103	N/A	N/A	8796703
D4-1,2-Dichloroethane (sur.)	%	102	N/A	8796700	103	N/A	103	N/A	N/A	8796703
O-TERPHENYL (sur.)	%	111	N/A	8796821	117	N/A	122	N/A	N/A	8796821
RDL = Reportable Detection Limit										
MU = Measurement Uncertainty										
N/A = Not Applicable										

Maxxam Job #: B790895
Report Date: 2017/10/23

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		SF6242		SF6243			SF6244			
Sampling Date		2017/10/13 14:55		2017/10/13 15:25			2017/10/13 15:50			
COC Number		m063694		m063694			m063694			
	UNITS	SS17-21 Lab-Dup	MU	SS17-22	MU	QC Batch	SS17-23A	MU	RDL	QC Batch

Physical Properties										
Moisture	%	11	+/- 0.82	5.8	+/- 0.49	8796461	15	+/- 1.1	0.30	8796461
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	N/A	N/A	<10	N/A	8796821	10	+/- <RDL	10	8796370
F3 (C16-C34 Hydrocarbons)	mg/kg	N/A	N/A	52	+/- <RDL	8796821	55	+/- <RDL	50	8796370
F4 (C34-C50 Hydrocarbons)	mg/kg	N/A	N/A	<50	N/A	8796821	<50	N/A	50	8796370
Reached Baseline at C50	mg/kg	N/A	N/A	Yes	N/A	8796821	Yes	N/A	N/A	8796370
Volatiles										
Benzene	mg/kg	N/A	N/A	<0.0050	N/A	8796703	<0.0050	N/A	0.0050	8796700
Toluene	mg/kg	N/A	N/A	<0.020	N/A	8796703	<0.020	N/A	0.020	8796700
Ethylbenzene	mg/kg	N/A	N/A	<0.010	N/A	8796703	<0.010	N/A	0.010	8796700
Xylenes (Total)	mg/kg	N/A	N/A	<0.040	N/A	8796703	<0.040	N/A	0.040	8796700
m & p-Xylene	mg/kg	N/A	N/A	<0.040	N/A	8796703	<0.040	N/A	0.040	8796700
o-Xylene	mg/kg	N/A	N/A	<0.020	N/A	8796703	<0.020	N/A	0.020	8796700
F1 (C6-C10) - BTEX	mg/kg	N/A	N/A	<10	N/A	8796703	<10	N/A	10	8796700
F1 (C6-C10)	mg/kg	N/A	N/A	<10	N/A	8796703	<10	N/A	10	8796700
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	N/A	N/A	105	N/A	8796703	107	N/A	N/A	8796700
4-Bromofluorobenzene (sur.)	%	N/A	N/A	91	N/A	8796703	90	N/A	N/A	8796700
D10-o-Xylene (sur.)	%	N/A	N/A	96	N/A	8796703	105	N/A	N/A	8796700
D4-1,2-Dichloroethane (sur.)	%	N/A	N/A	101	N/A	8796703	100	N/A	N/A	8796700
O-TERPHENYL (sur.)	%	N/A	N/A	109	N/A	8796821	111	N/A	N/A	8796370
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate MU = Measurement Uncertainty N/A = Not Applicable										

Maxxam Job #: B790895
Report Date: 2017/10/23

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		SF6244			SF6245			SF6246			
Sampling Date		2017/10/13 15:50			2017/10/13 16:00			2017/10/14 08:25			
COC Number		m063694			m063694			m063694			
	UNITS	SS17-23A Lab-Dup	MU	QC Batch	SS17-23B	MU	QC Batch	SS17-25	MU	RDL	QC Batch

Physical Properties											
Moisture	%	N/A	N/A	8796461	9.8	+/- 0.75	8796461	45	+/- 3.1	0.30	8796183
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	8796370	<10	N/A	8796821	<10	N/A	10	8796370
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	N/A	8796370	<50	N/A	8796821	260	+/- 91	50	8796370
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	N/A	8796370	<50	N/A	8796821	75	+/- <RDL	50	8796370
Reached Baseline at C50	mg/kg	Yes	N/A	8796370	Yes	N/A	8796821	Yes	N/A	N/A	8796370
Volatiles											
Benzene	mg/kg	N/A	N/A	8796700	<0.0050	N/A	8796703	<0.0050	N/A	0.0050	8796703
Toluene	mg/kg	N/A	N/A	8796700	<0.020	N/A	8796703	<0.020	N/A	0.020	8796703
Ethylbenzene	mg/kg	N/A	N/A	8796700	<0.010	N/A	8796703	<0.010	N/A	0.010	8796703
Xylenes (Total)	mg/kg	N/A	N/A	8796700	<0.040	N/A	8796703	<0.040	N/A	0.040	8796703
m & p-Xylene	mg/kg	N/A	N/A	8796700	<0.040	N/A	8796703	<0.040	N/A	0.040	8796703
o-Xylene	mg/kg	N/A	N/A	8796700	<0.020	N/A	8796703	<0.020	N/A	0.020	8796703
F1 (C6-C10) - BTEX	mg/kg	N/A	N/A	8796700	<10	N/A	8796703	<10	N/A	10	8796703
F1 (C6-C10)	mg/kg	N/A	N/A	8796700	<10	N/A	8796703	<10	N/A	10	8796703
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	N/A	N/A	8796700	105	N/A	8796703	106	N/A	N/A	8796703
4-Bromofluorobenzene (sur.)	%	N/A	N/A	8796700	91	N/A	8796703	91	N/A	N/A	8796703
D10-o-Xylene (sur.)	%	N/A	N/A	8796700	101	N/A	8796703	117	N/A	N/A	8796703
D4-1,2-Dichloroethane (sur.)	%	N/A	N/A	8796700	102	N/A	8796703	101	N/A	N/A	8796703
O-TERPHENYL (sur.)	%	106	N/A	8796370	112	N/A	8796821	114	N/A	N/A	8796370
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate MU = Measurement Uncertainty N/A = Not Applicable											

Maxxam Job #: B790895
Report Date: 2017/10/23

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		SF6246			SF6247			SF6248			
Sampling Date		2017/10/14 08:25			2017/10/14 09:00			2017/10/14 09:10			
COC Number		m063694			m063694			m063694			
	UNITS	SS17-25 Lab-Dup	MU	QC Batch	SS17-26	MU	RDL	SS17-27	MU	RDL	QC Batch
Physical Properties											
Moisture	%	N/A	N/A	8796183	24	+/- 1.7	0.30	64	+/- 4.4	0.30	8796183
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	N/A	N/A	8796370	<10	N/A	10	<28 (1)	N/A	28	8796370
F3 (C16-C34 Hydrocarbons)	mg/kg	N/A	N/A	8796370	150	+/- 54	50	390 (1)	+/- 140	140	8796370
F4 (C34-C50 Hydrocarbons)	mg/kg	N/A	N/A	8796370	<50	N/A	50	<140 (1)	N/A	140	8796370
Reached Baseline at C50	mg/kg	N/A	N/A	8796370	Yes	N/A	N/A	Yes	N/A	N/A	8796370
Volatiles											
Benzene	mg/kg	<0.0050	N/A	8796703	<0.0050	N/A	0.0050	<0.014 (1)	N/A	0.014	8796700
Toluene	mg/kg	<0.020	N/A	8796703	<0.020	N/A	0.020	<0.054 (1)	N/A	0.054	8796700
Ethylbenzene	mg/kg	<0.010	N/A	8796703	<0.010	N/A	0.010	<0.027 (1)	N/A	0.027	8796700
Xylenes (Total)	mg/kg	<0.040	N/A	8796703	<0.040	N/A	0.040	<0.11 (1)	N/A	0.11	8796700
m & p-Xylene	mg/kg	<0.040	N/A	8796703	<0.040	N/A	0.040	<0.11 (1)	N/A	0.11	8796700
o-Xylene	mg/kg	<0.020	N/A	8796703	<0.020	N/A	0.020	<0.054 (1)	N/A	0.054	8796700
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	8796703	<10	N/A	10	<27 (1)	N/A	27	8796700
F1 (C6-C10)	mg/kg	<10	N/A	8796703	<10	N/A	10	<27 (1)	N/A	27	8796700
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	106	N/A	8796703	105	N/A	N/A	107	N/A	N/A	8796700
4-Bromofluorobenzene (sur.)	%	91	N/A	8796703	91	N/A	N/A	90	N/A	N/A	8796700
D10-o-Xylene (sur.)	%	107	N/A	8796703	103	N/A	N/A	113	N/A	N/A	8796700
D4-1,2-Dichloroethane (sur.)	%	100	N/A	8796703	105	N/A	N/A	103	N/A	N/A	8796700
O-TERPHENYL (sur.)	%	N/A	N/A	8796370	114	N/A	N/A	112	N/A	N/A	8796370
RDL = Reportable Detection Limit Lab-Dup = Laboratory Initiated Duplicate MU = Measurement Uncertainty N/A = Not Applicable (1) Detection limits raised due to high moisture content, sample contains => 50% moisture.											

Maxxam Job #: B790895
Report Date: 2017/10/23

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		SF6249			SF6250		SF6251			
Sampling Date		2017/10/14 09:30			2017/10/14 10:00		2017/10/13 13:52			
COC Number		m063694			m063693		m063693			
	UNITS	SS17-28	MU	QC Batch	SS17-29	MU	DUP 03	MU	RDL	QC Batch
Physical Properties										
Moisture	%	43	+/- 3.0	8796183	22	+/- 1.6	9.4	+/- 0.72	0.30	8796461
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	5300	+/- 2000	8796370	<10	N/A	360	+/- 140	10	8796821
F3 (C16-C34 Hydrocarbons)	mg/kg	1300	+/- 440	8796370	120	+/- <RDL	190	+/- 66	50	8796821
F4 (C34-C50 Hydrocarbons)	mg/kg	59	+/- <RDL	8796370	<50	N/A	<50	N/A	50	8796821
Reached Baseline at C50	mg/kg	Yes	N/A	8796370	Yes	N/A	Yes	N/A	N/A	8796821
Volatiles										
Benzene	mg/kg	0.17	+/- 0.069	8796700	<0.0050	N/A	<0.0050	N/A	0.0050	8796703
Toluene	mg/kg	2.7	+/- 1.3	8796700	<0.020	N/A	<0.020	N/A	0.020	8796703
Ethylbenzene	mg/kg	0.14	+/- 0.059	8796700	<0.010	N/A	<0.010	N/A	0.010	8796703
Xylenes (Total)	mg/kg	0.90	+/- 0.21	8796700	0.045	+/- <RDL	<0.040	N/A	0.040	8796703
m & p-Xylene	mg/kg	0.63	+/- 0.25	8796700	<0.040	N/A	<0.040	N/A	0.040	8796703
o-Xylene	mg/kg	0.28	+/- 0.11	8796700	0.045	+/- <RDL	<0.020	N/A	0.020	8796703
F1 (C6-C10) - BTEX	mg/kg	290	+/- 94	8796700	<10	N/A	<10	N/A	10	8796703
F1 (C6-C10)	mg/kg	290	+/- 68	8796700	<10	N/A	<10	N/A	10	8796703
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	108	N/A	8796700	103	N/A	107	N/A	N/A	8796703
4-Bromofluorobenzene (sur.)	%	80	N/A	8796700	88	N/A	89	N/A	N/A	8796703
D10-o-Xylene (sur.)	%	109	N/A	8796700	99	N/A	98	N/A	N/A	8796703
D4-1,2-Dichloroethane (sur.)	%	104	N/A	8796700	97	N/A	101	N/A	N/A	8796703
O-TERPHENYL (sur.)	%	110	N/A	8796370	113	N/A	110	N/A	N/A	8796821
RDL = Reportable Detection Limit MU = Measurement Uncertainty N/A = Not Applicable										

Maxxam Job #: B790895
Report Date: 2017/10/23

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		SF6252		SF6253		SF6254		SF6255			
Sampling Date		2017/10/14 10:25		2017/10/14 11:35		2017/10/14 13:00		2017/10/14 08:25			
COC Number		m063693		m063693		m063693		m063693			
	UNITS	SS17-30	MU	SS17-31	MU	SS17-32	MU	SS17-24	MU	RDL	QC Batch

Physical Properties											
Moisture	%	44	+/- 3.1	45	+/- 3.1	12	+/- 0.88	21	+/- 1.5	0.30	8796461
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	63	+/- 25	470	+/- 180	<10	N/A	<10	N/A	10	8796821
F3 (C16-C34 Hydrocarbons)	mg/kg	860	+/- 300	1700	+/- 590	<50	N/A	380	+/- 130	50	8796821
F4 (C34-C50 Hydrocarbons)	mg/kg	200	+/- 71	360	+/- 130	<50	N/A	170	+/- 59	50	8796821
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	Yes	N/A	Yes	N/A	N/A	8796821
Volatiles											
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	<0.0050	N/A	<0.0050	N/A	0.0050	8796703
Toluene	mg/kg	<0.020	N/A	<0.020	N/A	<0.020	N/A	<0.020	N/A	0.020	8796703
Ethylbenzene	mg/kg	<0.010	N/A	0.054	+/- 0.023	<0.010	N/A	<0.010	N/A	0.010	8796703
Xylenes (Total)	mg/kg	<0.040	N/A	0.25	+/- 0.058	<0.040	N/A	<0.040	N/A	0.040	8796703
m & p-Xylene	mg/kg	<0.040	N/A	0.15	+/- 0.059	<0.040	N/A	<0.040	N/A	0.040	8796703
o-Xylene	mg/kg	<0.020	N/A	0.10	+/- 0.039	<0.020	N/A	<0.020	N/A	0.020	8796703
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	23	+/- 11	<10	N/A	<10	N/A	10	8796703
F1 (C6-C10)	mg/kg	<10	N/A	24	+/- <RDL	<10	N/A	<10	N/A	10	8796703
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	107	N/A	106	N/A	106	N/A	106	N/A	N/A	8796703
4-Bromofluorobenzene (sur.)	%	90	N/A	86	N/A	91	N/A	91	N/A	N/A	8796703
D10-o-Xylene (sur.)	%	115	N/A	98	N/A	98	N/A	101	N/A	N/A	8796703
D4-1,2-Dichloroethane (sur.)	%	100	N/A	100	N/A	99	N/A	100	N/A	N/A	8796703
O-TERPHENYL (sur.)	%	107	N/A	110	N/A	112	N/A	122	N/A	N/A	8796821
RDL = Reportable Detection Limit MU = Measurement Uncertainty N/A = Not Applicable											

Maxxam Job #: B790895
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WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		SF6219		SF6224			SF6237			
Sampling Date		2017/10/12 15:15		2017/10/12 17:55			2017/10/13 13:20			
COC Number		m063696		m063696			m063695			
	UNITS	SS17-01	MU	SS17-06	MU	QC Batch	SS17-17	MU	RDL	QC Batch
Physical Properties										
Sieve - Pan	%	12	+/- 1.2	47	+/- 4.8	8795822	3.1	+/- 0.32	0.20	8796467
Sieve - #200 (>0.075mm)	%	88	+/- 18	53	+/- 10	8795822	97	+/- 19	0.20	8796467
Grain Size	%	COARSE	N/A	COARSE	N/A	8795822	COARSE	N/A	0.20	8796467
RDL = Reportable Detection Limit MU = Measurement Uncertainty N/A = Not Applicable										

Maxxam Job #: B790895
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WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		SF6219		SF6220		SF6221		SF6222			
Sampling Date		2017/10/12 15:15		2017/10/12 15:45		2017/10/12 16:15		2017/10/12 16:45			
COC Number		m063696		m063696		m063696		m063696			
	UNITS	SS17-01	MU	SS17-02	MU	SS17-03	MU	SS17-04	MU	RDL	QC Batch

Elements											
Total Lead (Pb)	mg/kg	7.9	+/- 1.1	9.1	+/- 1.2	20	+/- 2.3	17	+/- 2.0	0.50	8799401
RDL = Reportable Detection Limit											
MU = Measurement Uncertainty											

Maxxam ID		SF6223		SF6224				SF6225			
Sampling Date		2017/10/12 17:25		2017/10/12 17:55				2017/10/13 08:30			
COC Number		m063696		m063696				m063696			
	UNITS	SS17-05	MU	SS17-06	MU	RDL	QC Batch	SS17-07	MU	RDL	QC Batch

Elements											
Total Lead (Pb)	mg/kg	11	+/- 1.4	7.6	+/- 1.1	1.0	8800728	4.6	+/- 0.85	0.50	8799401
RDL = Reportable Detection Limit											
MU = Measurement Uncertainty											

Maxxam ID		SF6226			SF6227		SF6228		SF6230			
Sampling Date		2017/10/13 09:00			2017/10/13 09:20		2017/10/13 09:45		2017/10/12 15:47			
COC Number		m063696			m063696		m063696		m063695			
	UNITS	SS17-08	MU	QC Batch	SS17-09	MU	SS17-10	MU	DUP 01	MU	RDL	QC Batch

Elements												
Total Lead (Pb)	mg/kg	4.8	+/- 0.87	8799401	6.0	+/- 0.96	150	+/- 17	15	+/- 1.8	0.50	8800728
RDL = Reportable Detection Limit												
MU = Measurement Uncertainty												

Maxxam ID		SF6231		SF6232		SF6233		SF6234			
Sampling Date		2017/10/13 10:00		2017/10/13 10:15		2017/10/13 10:30		2017/10/13 10:45			
COC Number		m063695		m063695		m063695		m063695			
	UNITS	SS17-11	MU	SS17-12	MU	SS17-13	MU	SS17-14	MU	RDL	QC Batch

Elements											
Total Lead (Pb)	mg/kg	28	+/- 3.2	13	+/- 1.6	5.9	+/- 0.95	120	+/- 13	0.50	8800728
RDL = Reportable Detection Limit											
MU = Measurement Uncertainty											

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Client Project #: 307031-00048
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ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		SF6235		SF6236		SF6236			SF6237			
Sampling Date		2017/10/13 12:00		2017/10/13 12:30		2017/10/13 12:30			2017/10/13 13:20			
COC Number		m063695		m063695		m063695			m063695			
	UNITS	SS17-15	MU	SS17-16	MU	SS17-16 Lab-Dup	MU	QC Batch	SS17-17	MU	RDL	QC Batch

Elements

Total Lead (Pb)	mg/kg	7.2	+/- 1.1	5.7	+/- 0.94	6.0	+/- 0.96	8800728	4.4	+/- 0.84	0.50	8799401
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RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

MU = Measurement Uncertainty

Maxxam ID		SF6238		SF6239			SF6240		SF6241			
Sampling Date		2017/10/13 13:50		2017/10/13 14:00			2017/10/13 14:35		2017/10/13 10:02			
COC Number		m063695		m063695			m063694		m063694			
	UNITS	SS17-18	MU	SS17-19	MU	QC Batch	SS17-20	MU	DUP 02	MU	RDL	QC Batch

Elements

Total Lead (Pb)	mg/kg	5.3	+/- 0.90	21	+/- 2.5	8800728	3.5	+/- 0.77	37	+/- 4.2	0.50	8799401
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RDL = Reportable Detection Limit

MU = Measurement Uncertainty

Maxxam ID		SF6242		SF6243			SF6244				
Sampling Date		2017/10/13 14:55		2017/10/13 15:25			2017/10/13 15:50				
COC Number		m063694		m063694			m063694				
	UNITS	SS17-21	MU	SS17-22	MU	QC Batch	SS17-23A	MU	RDL	QC Batch	

Elements

Total Lead (Pb)	mg/kg	3.1	+/- 0.75	3.1	+/- 0.75	8799401	2.4	+/- 0.71	0.50	8800728	
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RDL = Reportable Detection Limit

MU = Measurement Uncertainty

Maxxam ID		SF6245			SF6246			SF6247			
Sampling Date		2017/10/13 16:00			2017/10/14 08:25			2017/10/14 09:00			
COC Number		m063694			m063694			m063694			
	UNITS	SS17-23B	MU	QC Batch	SS17-25	MU	QC Batch	SS17-26	MU	RDL	QC Batch

Elements

Total Lead (Pb)	mg/kg	2.3	+/- 0.71	8800728	2.8	+/- 0.73	8799401	3.3	+/- 0.76	0.50	8800728
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RDL = Reportable Detection Limit

MU = Measurement Uncertainty

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Site Location: ARVIAT, NU
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ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		SF6248		SF6248		SF6249		SF6250			
Sampling Date		2017/10/14 09:10		2017/10/14 09:10		2017/10/14 09:30		2017/10/14 10:00			
COC Number		m063694		m063694		m063694		m063693			
	UNITS	SS17-27	MU	SS17-27 Lab-Dup	MU	SS17-28	MU	SS17-29	MU	RDL	QC Batch

Elements											
Total Lead (Pb)	mg/kg	10	+/- 1.4	9.8	+/- 1.3	25	+/- 2.9	4.2	+/- 0.82	0.50	8799401
RDL = Reportable Detection Limit											
Lab-Dup = Laboratory Initiated Duplicate											
MU = Measurement Uncertainty											

Maxxam ID		SF6251			SF6252			SF6253			
Sampling Date		2017/10/13 13:52			2017/10/14 10:25			2017/10/14 11:35			
COC Number		m063693			m063693			m063693			
	UNITS	DUP 03	MU	QC Batch	SS17-30	MU	QC Batch	SS17-31	MU	RDL	QC Batch

Elements											
Total Lead (Pb)	mg/kg	4.8	+/- 0.87	8799401	30	+/- 3.4	8800728	17	+/- 2.1	0.50	8799401
RDL = Reportable Detection Limit											
MU = Measurement Uncertainty											

Maxxam ID		SF6254		SF6255			
Sampling Date		2017/10/14 13:00		2017/10/14 08:25			
COC Number		m063693		m063693			
	UNITS	SS17-32	MU	SS17-24	MU	RDL	QC Batch
Elements							
Total Lead (Pb)	mg/kg	2.9	+/- 0.74	3.6	+/- 0.78	0.50	8800728
RDL = Reportable Detection Limit							
MU = Measurement Uncertainty							

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Site Location: ARVIAT, NU
Sampler Initials: ML

GENERAL COMMENTS

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

Package 1	4.3°C
Package 2	4.7°C

Sample SF6219 [SS17-01] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6220 [SS17-02] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6221 [SS17-03] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6222 [SS17-04] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6223 [SS17-05] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6224 [SS17-06] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6225 [SS17-07] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6226 [SS17-08] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6227 [SS17-09] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6228 [SS17-10] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6230 [DUP 01] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6231 [SS17-11] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6232 [SS17-12] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6233 [SS17-13] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6234 [SS17-14] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6235 [SS17-15] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6236 [SS17-16] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6237 [SS17-17] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6238 [SS17-18] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6239 [SS17-19] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6240 [SS17-20] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6241 [DUP 02] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6242 [SS17-21] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6243 [SS17-22] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

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Sample SF6244 [SS17-23A] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6245 [SS17-23B] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6246 [SS17-25] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6247 [SS17-26] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6248 [SS17-27] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6249 [SS17-28] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6250 [SS17-29] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6251 [DUP 03] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6252 [SS17-30] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6253 [SS17-31] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6254 [SS17-32] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

Sample SF6255 [SS17-24] : Sample received was not in compliance with CCME sampling requirements for VOC/BTEX/F1 in soil.

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL) Comments

Sample SF6223 [SS17-05] Lead: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample SF6224 [SS17-06] Lead: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

The estimate of uncertainty has been reported as an expanded uncertainty and calculated using a coverage factor of 2, which gives a level of confidence of 95%.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8796370	O-TERPHENYL (sur.)	2017/10/18	128	60 - 130	126	60 - 130	111	%				
8796700	1,4-Difluorobenzene (sur.)	2017/10/20	106	60 - 130	100	60 - 130	104	%				
8796700	4-Bromofluorobenzene (sur.)	2017/10/20	92	60 - 130	90	60 - 130	92	%				
8796700	D10-o-Xylene (sur.)	2017/10/20	99	60 - 130	110	60 - 130	111	%				
8796700	D4-1,2-Dichloroethane (sur.)	2017/10/20	114	60 - 130	102	60 - 130	109	%				
8796703	1,4-Difluorobenzene (sur.)	2017/10/18	103	60 - 130	104	60 - 130	105	%				
8796703	4-Bromofluorobenzene (sur.)	2017/10/18	94	60 - 130	92	60 - 130	91	%				
8796703	D10-o-Xylene (sur.)	2017/10/18	115	60 - 130	97	60 - 130	97	%				
8796703	D4-1,2-Dichloroethane (sur.)	2017/10/18	101	60 - 130	100	60 - 130	98	%				
8796821	O-TERPHENYL (sur.)	2017/10/18	95	60 - 130	99	60 - 130	109	%				
8795822	Sieve - #200 (>0.075mm)	2017/10/18							6.2	30	101	75 - 125
8795822	Sieve - Pan	2017/10/18							1.9	30	99	75 - 125
8796183	Moisture	2017/10/18					<0.30	%	2.6	20		
8796370	F2 (C10-C16 Hydrocarbons)	2017/10/18	98	60 - 130	99	70 - 130	<10	mg/kg	2.3	40		
8796370	F3 (C16-C34 Hydrocarbons)	2017/10/18	101	60 - 130	103	70 - 130	<50	mg/kg	9.1	40		
8796370	F4 (C34-C50 Hydrocarbons)	2017/10/18	96	60 - 130	97	70 - 130	<50	mg/kg	NC	40		
8796461	Moisture	2017/10/18					<0.30	%	8.8	20		
8796467	Sieve - #200 (>0.075mm)	2017/10/18							11	30	98	75 - 125
8796467	Sieve - Pan	2017/10/18							5.3	30	101	75 - 125
8796700	Benzene	2017/10/20	106	60 - 140	126	60 - 130	<0.0050	mg/kg	NC	50		
8796700	Ethylbenzene	2017/10/20	101	60 - 140	126	60 - 130	<0.010	mg/kg	16	50		
8796700	F1 (C6-C10) - BTEX	2017/10/20					<10	mg/kg	NC	40		
8796700	F1 (C6-C10)	2017/10/20	84	60 - 140	94	60 - 130	<10	mg/kg	2.9	40		
8796700	m & p-Xylene	2017/10/20	92	60 - 140	119	60 - 130	<0.040	mg/kg	15	50		
8796700	o-Xylene	2017/10/20	94	60 - 140	122	60 - 130	<0.020	mg/kg	16	50		
8796700	Toluene	2017/10/20	97	60 - 140	116	60 - 130	<0.020	mg/kg	17	50		
8796700	Xylenes (Total)	2017/10/20					<0.040	mg/kg	16	50		
8796703	Benzene	2017/10/18	104	60 - 140	108	60 - 130	<0.0050	mg/kg	NC	50		
8796703	Ethylbenzene	2017/10/18	101	60 - 140	109	60 - 130	<0.010	mg/kg	NC	50		
8796703	F1 (C6-C10) - BTEX	2017/10/18					<10	mg/kg	NC	40		
8796703	F1 (C6-C10)	2017/10/18	93	60 - 140	94	60 - 130	<10	mg/kg	NC	40		

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QUALITY ASSURANCE REPORT(CONT'D)

WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8796703	m & p-Xylene	2017/10/18	97	60 - 140	102	60 - 130	<0.040	mg/kg	NC	50		
8796703	o-Xylene	2017/10/18	99	60 - 140	104	60 - 130	<0.020	mg/kg	NC	50		
8796703	Toluene	2017/10/18	96	60 - 140	101	60 - 130	<0.020	mg/kg	NC	50		
8796703	Xylenes (Total)	2017/10/18					<0.040	mg/kg	NC	50		
8796821	F2 (C10-C16 Hydrocarbons)	2017/10/18	104	60 - 130	106	70 - 130	<10	mg/kg	6.8	40		
8796821	F3 (C16-C34 Hydrocarbons)	2017/10/18	111	60 - 130	117	70 - 130	<50	mg/kg	23	40		
8796821	F4 (C34-C50 Hydrocarbons)	2017/10/18	116	60 - 130	118	70 - 130	<50	mg/kg	24	40		
8799401	Total Lead (Pb)	2017/10/19	116	75 - 125	117	80 - 120	<0.50	mg/kg	6.0	35	121	79 - 121
8800728	Total Lead (Pb)	2017/10/20	86	75 - 125	107	80 - 120	<0.50	mg/kg	3.7	35	90	79 - 121

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 (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).

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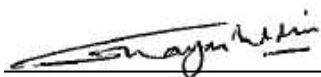
WORLEYPARSONS
Client Project #: 307031-00048
Site Location: ARVIAT, NU
Sampler Initials: ML

VALIDATION SIGNATURE PAGE

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



Dennis Ngundu, B.Sc., P.Chem., QP, Supervisor, Organics



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



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



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

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

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company: <u>WorleyParsons</u>	Company:	Quotation #:	<input checked="" type="checkbox"/> 5 - 7 Days Regular (Most analyses)		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS		
Contact Name: <u>Sam Bird</u>	Contact Name:	P.O. #/ AFE#:					
Address: <u>500-151 Canada Olympic Rd SW</u>	Address:	Project #:	<u>307031-00048</u>		Rush TAT (Surcharges will be applied)		
City: <u>Calgary, AB T3B 6B7</u>		Site Location:	<u>Arviat, NU</u>		<input type="checkbox"/> Same Day	<input type="checkbox"/> 2 Days	
Phone: <u>403-247-0200</u>	Phone:	Site #:			<input type="checkbox"/> 1 Day	<input type="checkbox"/> 3-4 Days	
Email: <u>sam.bird@advisian.com</u>	Email: <u>canada.chemistry@worleyparsons.com</u>	Sampled By:	<u>Melissa Lord</u>		Date Required:		
Copies: <u>sanjay.khera@worleyparsons.com</u>	Copies: <u>melissa.lord@advisian.com</u>			Rush Confirmation #:			

Laboratory Use Only				Analysis Requested												Regulatory Criteria		
Seal Present	YES	NO	Cooler ID	<div style="display: flex; justify-content: space-between;"> <div> # of containers <input type="checkbox"/> VOC <input type="checkbox"/> BTEX F1-F2 <input type="checkbox"/> BTEX F1-F4 <input type="checkbox"/> Routine Water <input type="checkbox"/> Regulated Metals <input type="checkbox"/> Total Mercury <input type="checkbox"/> Salinity 4 <input type="checkbox"/> Sieve (75 micron) <input type="checkbox"/> Texture (% Sand, Silt, Clay) <input type="checkbox"/> Basic Class II Landfill <input type="checkbox"/> Lead in Soil </div> <div> <input type="checkbox"/> AT1 <input checked="" type="checkbox"/> CCME <input type="checkbox"/> Drinking Water <input type="checkbox"/> D50 (Drilling Waste) <input type="checkbox"/> Saskatchewan <input type="checkbox"/> Other: </div> </div>												Special Instructions Soil samples not preserved with methanol as samples were collected in Nunavut and methanol preservation is not required.		
Seal Intact	Temp	4	4															5
Cooling Media	Temp	5	4															5
Seal Present	YES	NO	Cooler ID															
Seal Intact	Temp																	
Cooling Media	Temp																	

Sample Identification		Depth (Unit)	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	# of containers	BTEX F1	VOC	BTEX F1-F2	BTEX F1-F4	Routine Water	Regulated Metals	Total Mercury	Salinity 4	Sieve (75 micron)	Texture (% Sand, Silt, Clay)	Basic Class II Landfill	Lead in Soil
1	SSI7-01		2017/10/12	15:15	Soil	3												
2	SSI7-02			15:45		2												
3	SSI7-03			16:15		2												
4	SSI7-04			16:45		2												
5	SSI7-05			17:25		2												
6	SSI7-06			17:55		3												
7	SSI7-07		2017/10/13	08:30		2												
8	SSI7-08			09:00		2												
9	SSI7-09			09:20		2												
10	SSI7-10			09:45		2												

Please indicate Filtered, Preserved or Both (F, P, F/P)

Relinquished by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)	Received by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)
<u>Melissa Lord</u>	2017/10/16	11:00	<u>Ioana Stoica</u>	2017/10/16	11:04

16-Oct-17 11:04
Ioana Stoica
B790895
JMQ INS-0001

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company: <u>Same as page 1</u>		Company:		Quotation #: <u>Same as page 1</u>		<input checked="" type="checkbox"/> 5 - 7 Days Regular (Most analyses)	
Contact Name:		Contact Name:		P.O. #/ AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:		Project #:		Rush TAT (Surcharges will be applied)	
Phone:		Phone:		Site Location:		<input type="checkbox"/> Same Day	<input type="checkbox"/> 2 Days
Email:		Email:		Site #:		<input type="checkbox"/> 1 Day	<input type="checkbox"/> 3-4 Days
Copies:		Copies: <u>Same as page 1</u>		Sampled By:		Date Required: _____	
						Rush Confirmation #: _____	

Laboratory Use Only				Analysis Requested												Regulatory Criteria	
Seal Present	YES	NO	Cooler ID														
Seal Intact	<input checked="" type="checkbox"/>		Temp														
Cooling Media	<input checked="" type="checkbox"/>		4														
Seal Present	YES	NO	Cooler ID														
Seal Intact	<input checked="" type="checkbox"/>		Temp														
Cooling Media	<input checked="" type="checkbox"/>		5														
Seal Present	YES	NO	Cooler ID														
Seal Intact	<input checked="" type="checkbox"/>		Temp														
Cooling Media	<input checked="" type="checkbox"/>		5														

Sample Identification		Depth (Unit)	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	# of containers	BTEX F1	VOC	BTEX F1-F2	BTEX F1-F4	Routine Water	Regulated Metals	Tot	Diss	Mercury	Total	Salinity	Sieve (75 micron)	Texture (% Sand, Silt, Clay)	Basic Class II Landfill	Lead in Soil	Hold - DO NOT ANALYZE	Special Instructions
1	DUP 01		2017/10/12	15:47	Soil	2																	Same as page 1
2	SSI7-11		2017/10/13	10:00		2																	
3	SSI7-12			10:15		2																	
4	SSI7-13			10:30		2																	
5	SSI7-14			10:45		2																	
6	SSI7-15			12:00		2																	
7	SSI7-16			12:30		2																	
8	SSI7-17			13:20		3																	
9	SSI7-18			13:50		2																	
10	SSI7-19			14:00		2																	

Please indicate Filtered, Preserved or Both (F, P, F/P)

Relinquished by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)	Received by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)	Maxxam Job #
<u>Melissa Lord</u>	<u>2017/10/16</u>	<u>11:00</u>	<u>[Signature]</u>	<u>2017/10/16</u>	<u>11:04</u>	<u>B790895</u>

AB FCD-00331/7

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company: <u>Same as page 1</u>	Company:	Quotation #: <u>Same as page 1</u>	<input checked="" type="checkbox"/> 5 - 7 Days Regular (Most analyses)		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS		
Contact Name:	Contact Name:	P.O. #/ AFE#:					
Address:	Address:	Project #:	Rush TAT (Surcharges will be applied)				
Phone:	Phone:	Site Location:	<input type="checkbox"/> Same Day <input type="checkbox"/> 2 Days				
Email:	Email:	Site #:	<input type="checkbox"/> 1 Day <input type="checkbox"/> 3-4 Days				
Copies:	Copies: <u>Same as page 1</u>	Sampled By:	Date Required:				
			Rush Confirmation #:				

Laboratory Use Only				Analysis Requested												Regulatory Criteria		
Seal Present	YES NO	Cooler ID	Depot Reception	# of containers	BTEX F1 <input type="checkbox"/> VOC <input type="checkbox"/>	BTEX F1-F2	BTEX F1-F4	Routine Water	Regulated Metals	Total	Mercury	Salinity 4	Sieve (75 micron)	Texture (% Sand, Silt, Clay)	Basic Class II Landfill	Lead in Soil	HOLD - DO NOT ANALYZE	<input type="checkbox"/> AT1 <input checked="" type="checkbox"/> CCME <input type="checkbox"/> Drinking Water <input type="checkbox"/> D50 (Drilling Waste) <input type="checkbox"/> Saskatchewan <input type="checkbox"/> Other:
Seal Intact		Temp																
Cooling Media																		
Seal Present	YES NO	Cooler ID																
Seal Intact		Temp																
Cooling Media																		
Seal Present	YES NO	Cooler ID																
Seal Intact		Temp																
Cooling Media																		

Sample Identification		Depth (Unit)	Date Sampled (YYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Analysis Requested												Regulatory Criteria	
1	SS17-29		2017/10/14	10:00	Soil	2												Same as page 1 Limited sample quantity HOLD - DO NOT ANALYZE	
2	DUP 03		2017/10/13	13:52	1	2													
3	SS17-30		2017/10/14	10:25	1	2													
4	SS17-31		1	11:35	2														
5	SS17-32		1	13:00	2														
6	SS17-24		1	08:25	Soil	2													
7																			
8																			
9																			
10																			

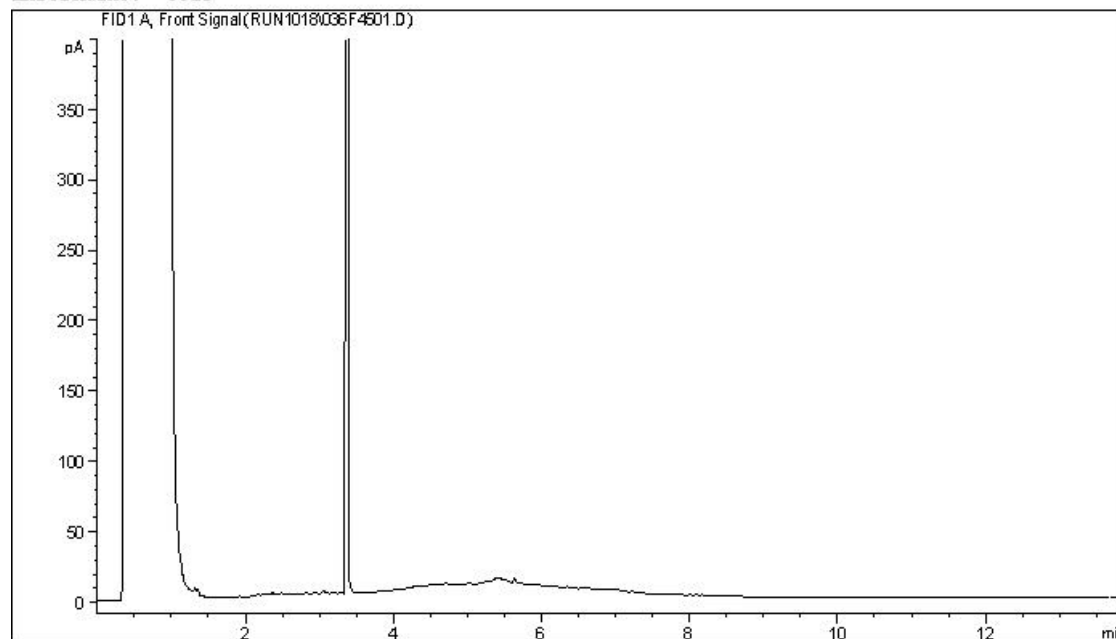
Please indicate Filtered, Preserved or Both (F, P, F/P)

Relinquished by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)	Received by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)	Maxxam Job #
<u>Melissa Lord</u>	<u>2017/10/16</u>	<u>11:00</u>	<u>Sean Kewis</u>	<u>2017/10/16</u>	<u>11:04</u>	<u>B790895</u>

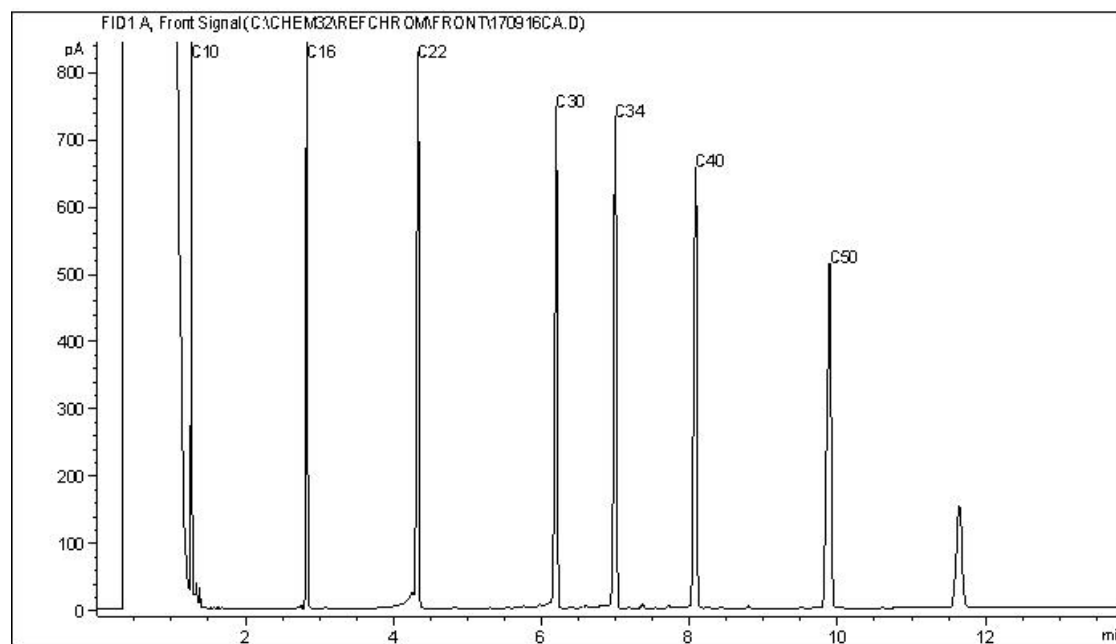
Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Maxxam's standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms which are available for viewing at www.maxxam.ca/terms

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC15



Carbon Range Distribution - Reference Chromatogram



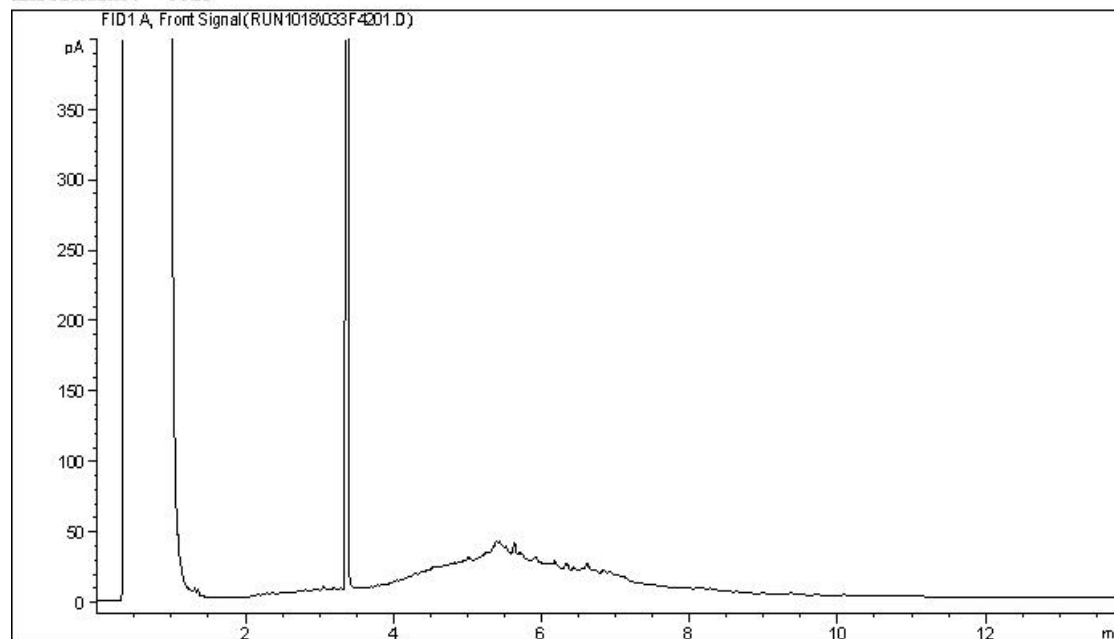
TYPICAL PRODUCT CARBON NUMBER RANGES

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

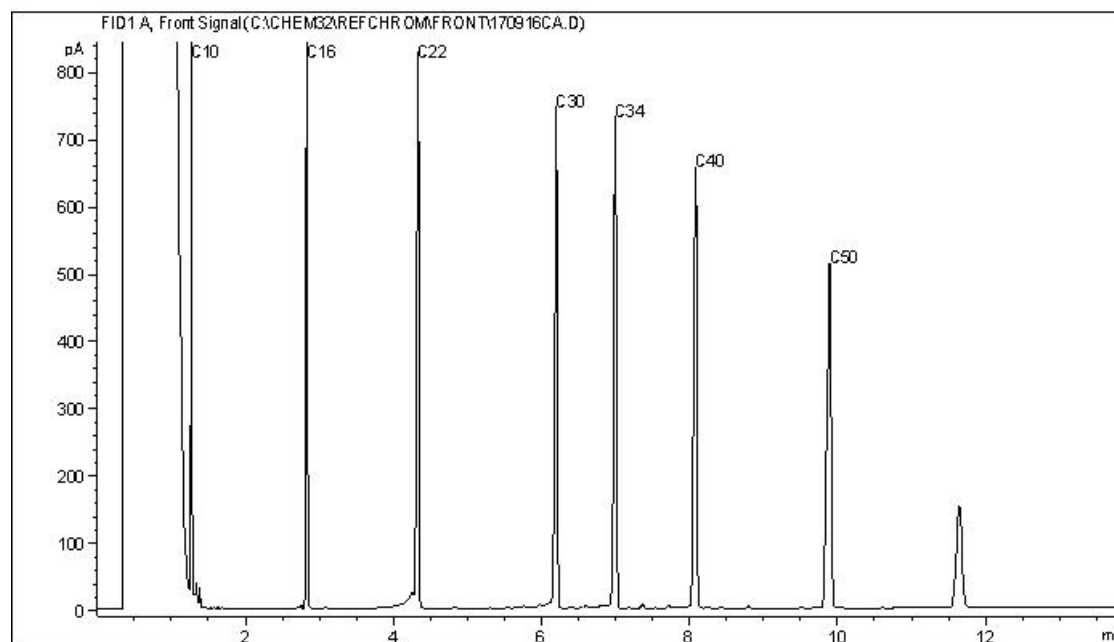
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC15



Carbon Range Distribution - Reference Chromatogram



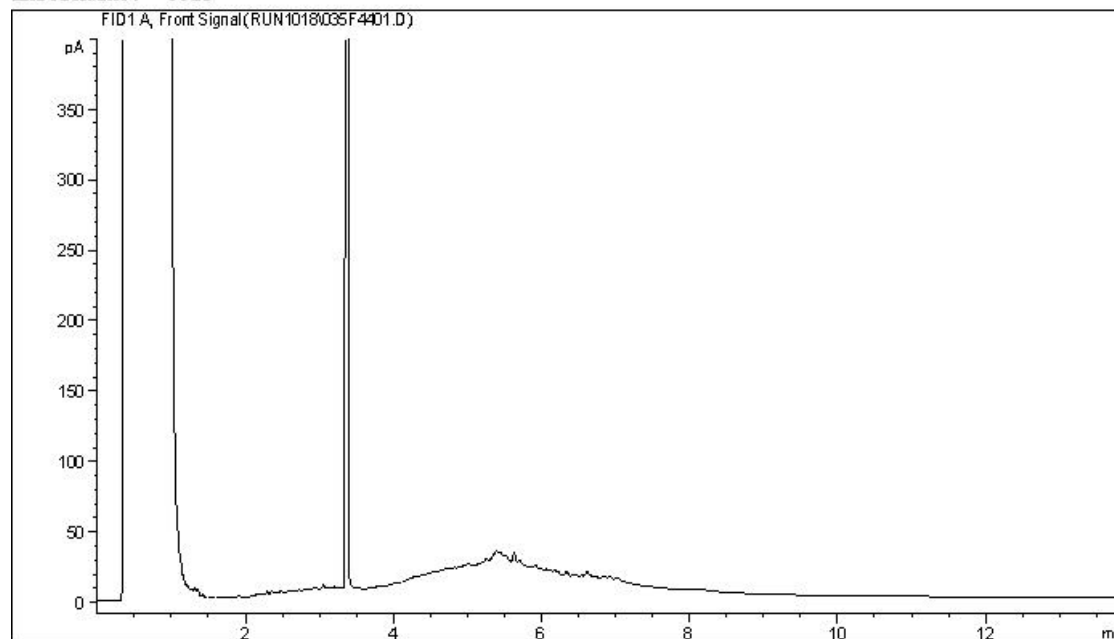
TYPICAL PRODUCT CARBON NUMBER RANGES

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

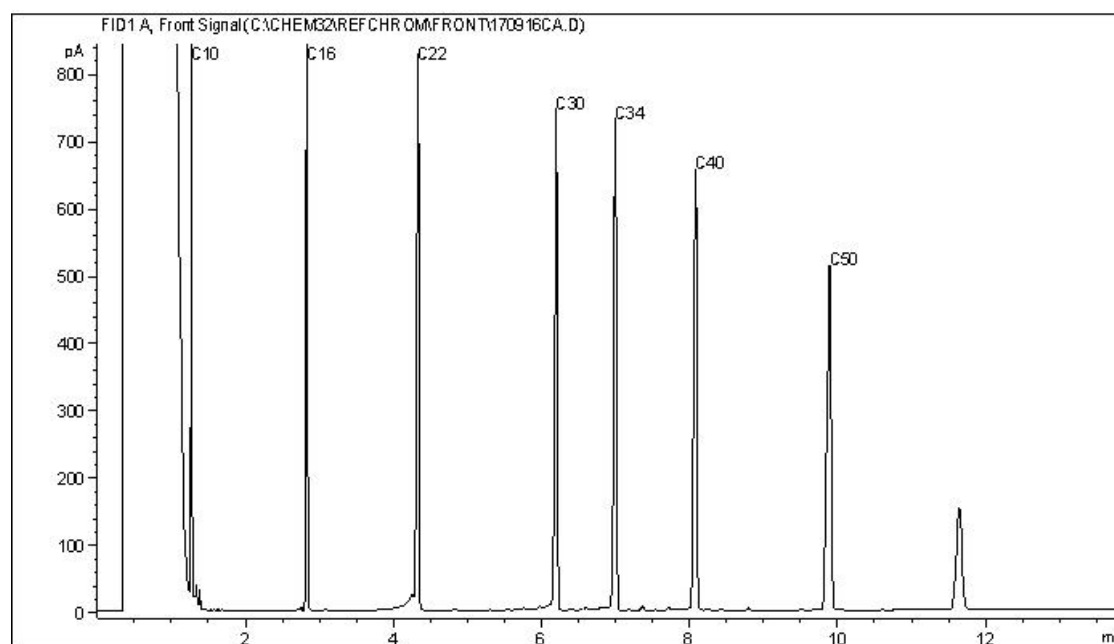
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC15



Carbon Range Distribution - Reference Chromatogram



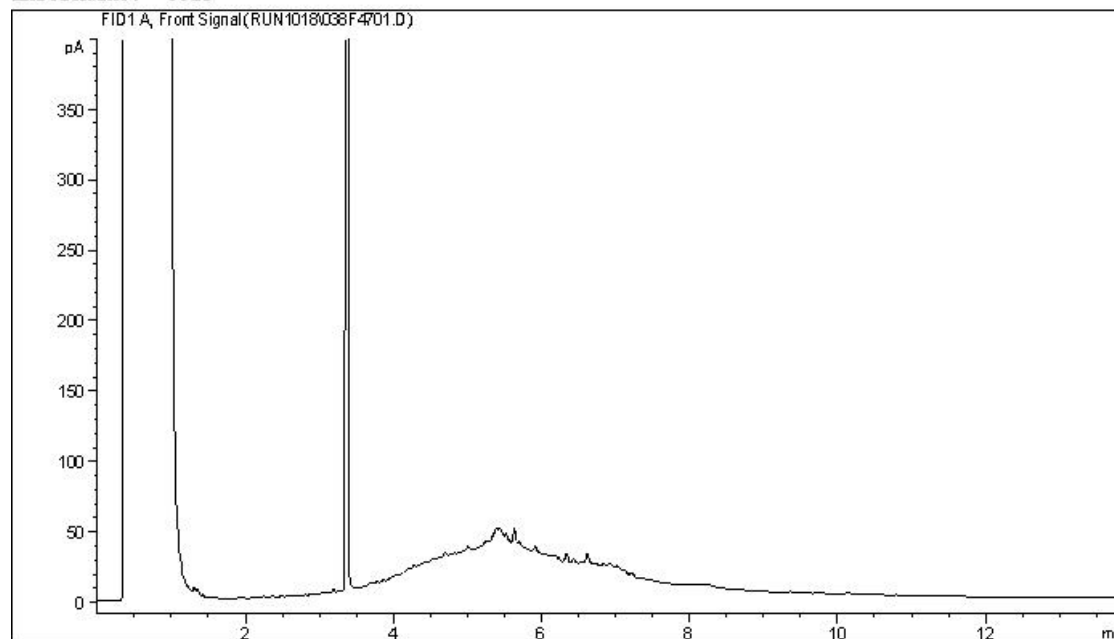
TYPICAL PRODUCT CARBON NUMBER RANGES

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

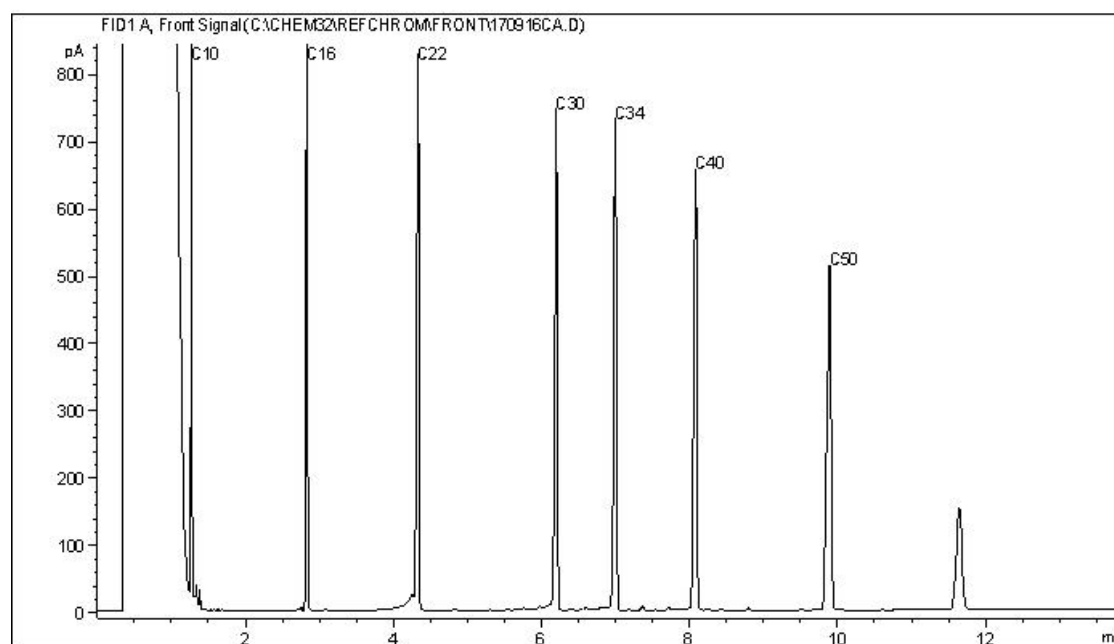
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC15



Carbon Range Distribution - Reference Chromatogram



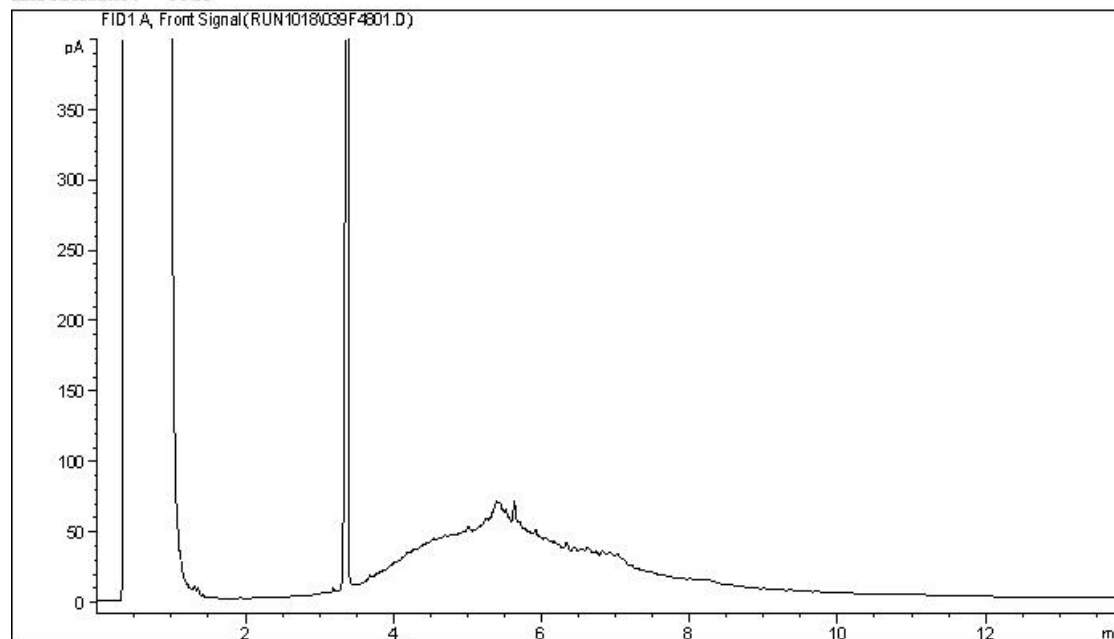
TYPICAL PRODUCT CARBON NUMBER RANGES

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

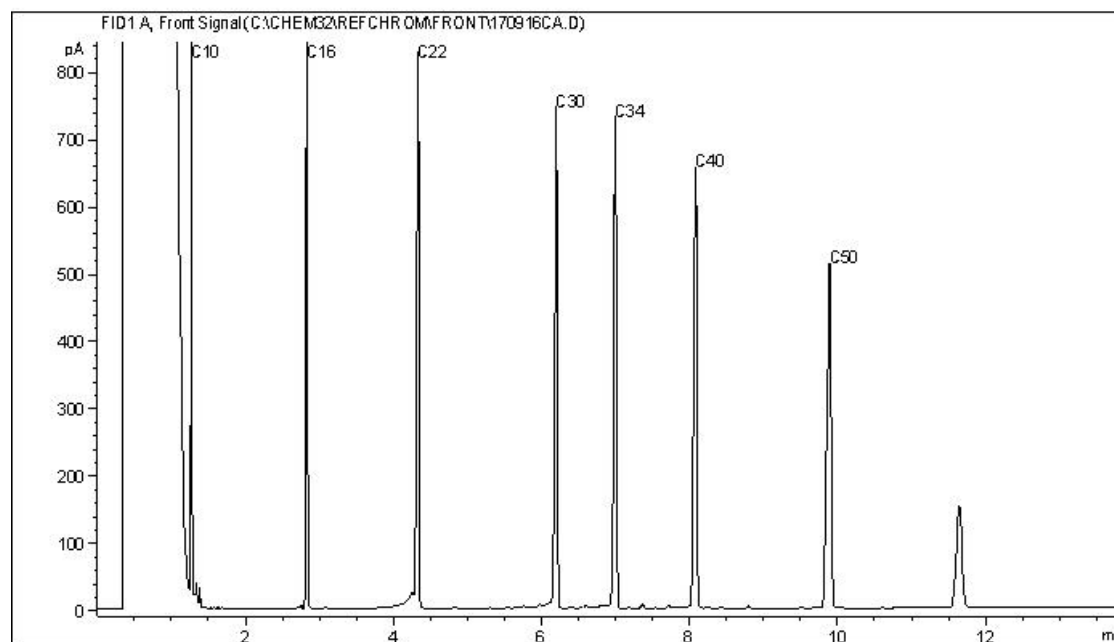
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC15



Carbon Range Distribution - Reference Chromatogram



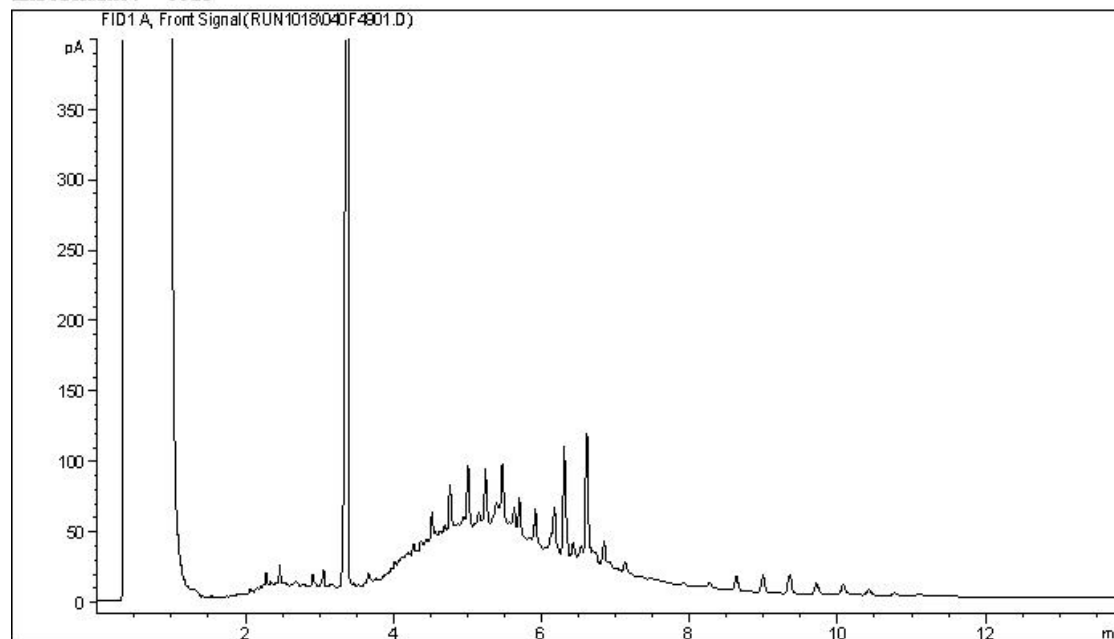
TYPICAL PRODUCT CARBON NUMBER RANGES

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

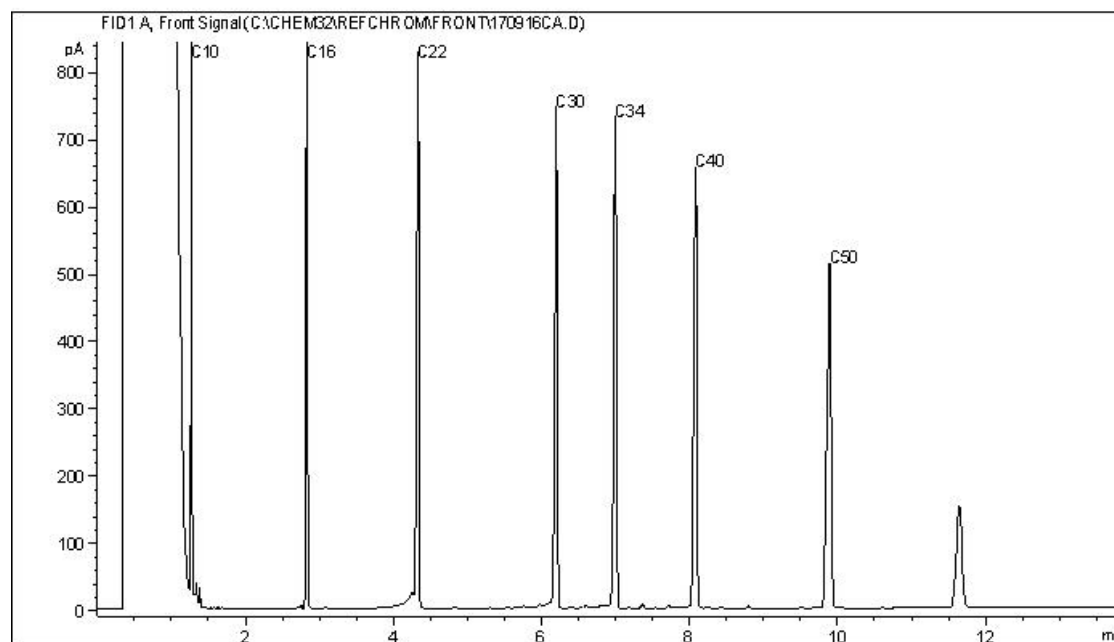
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC15



Carbon Range Distribution - Reference Chromatogram



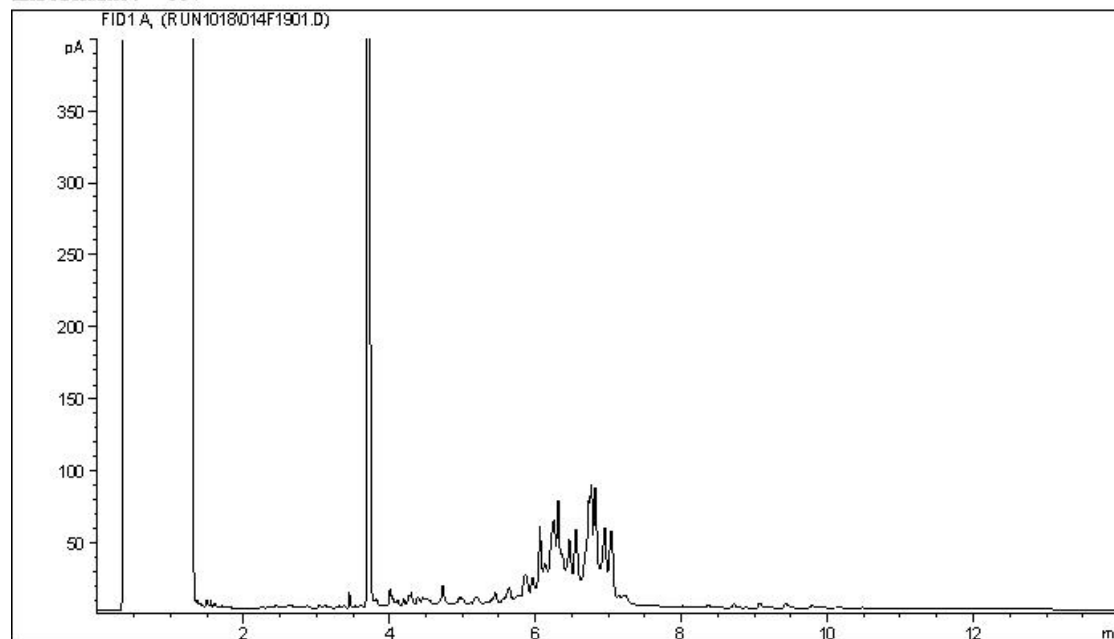
TYPICAL PRODUCT CARBON NUMBER RANGES

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

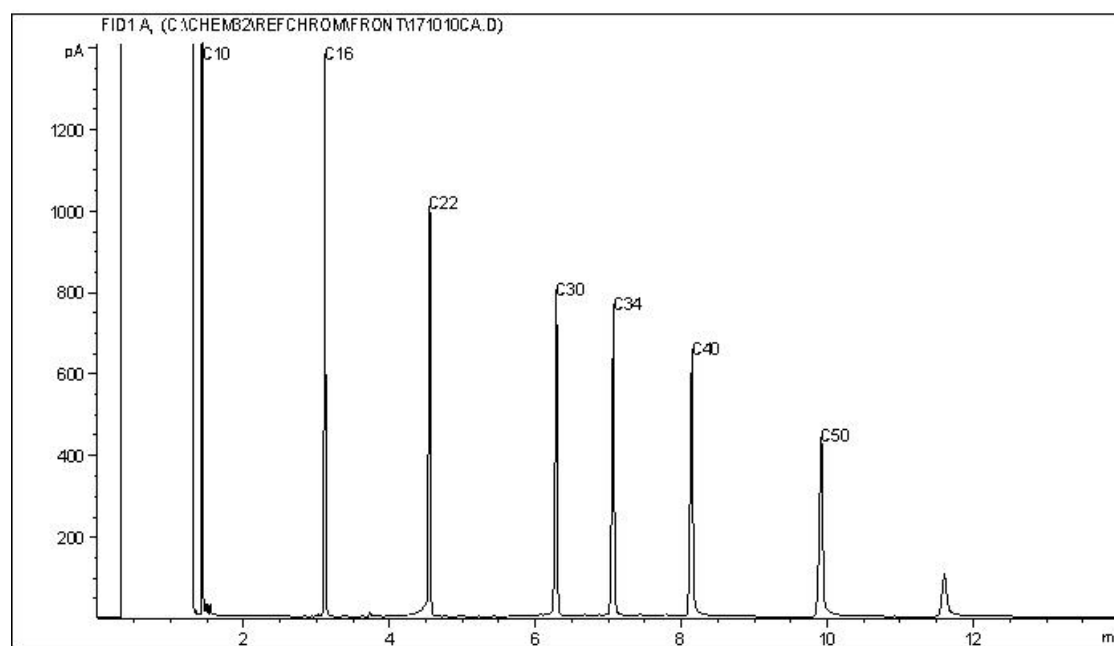
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



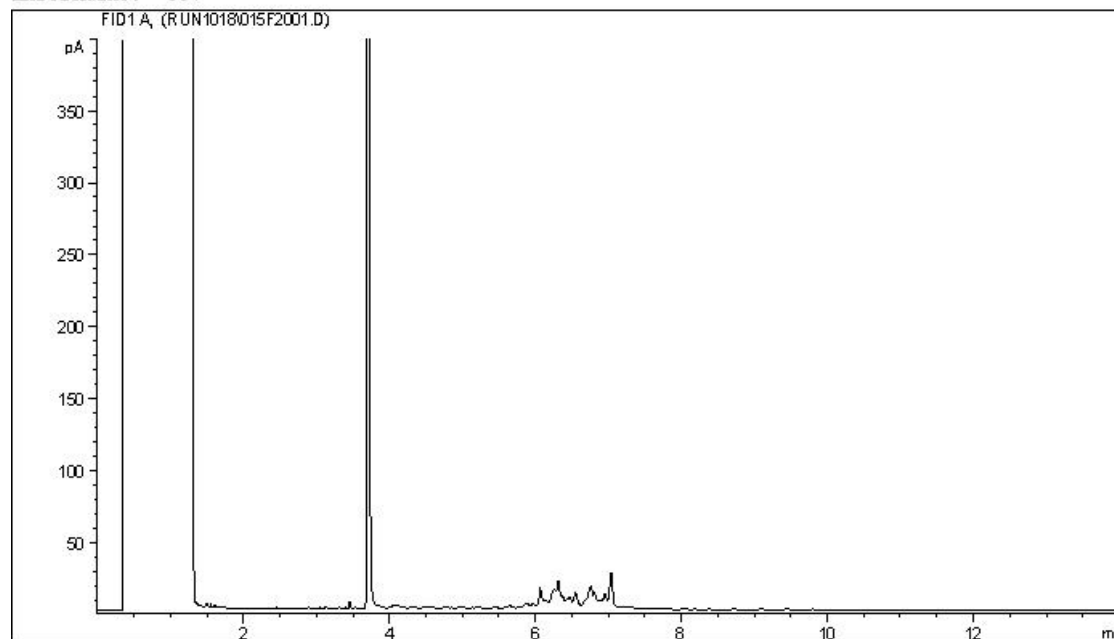
TYPICAL PRODUCT CARBON NUMBER RANGES

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

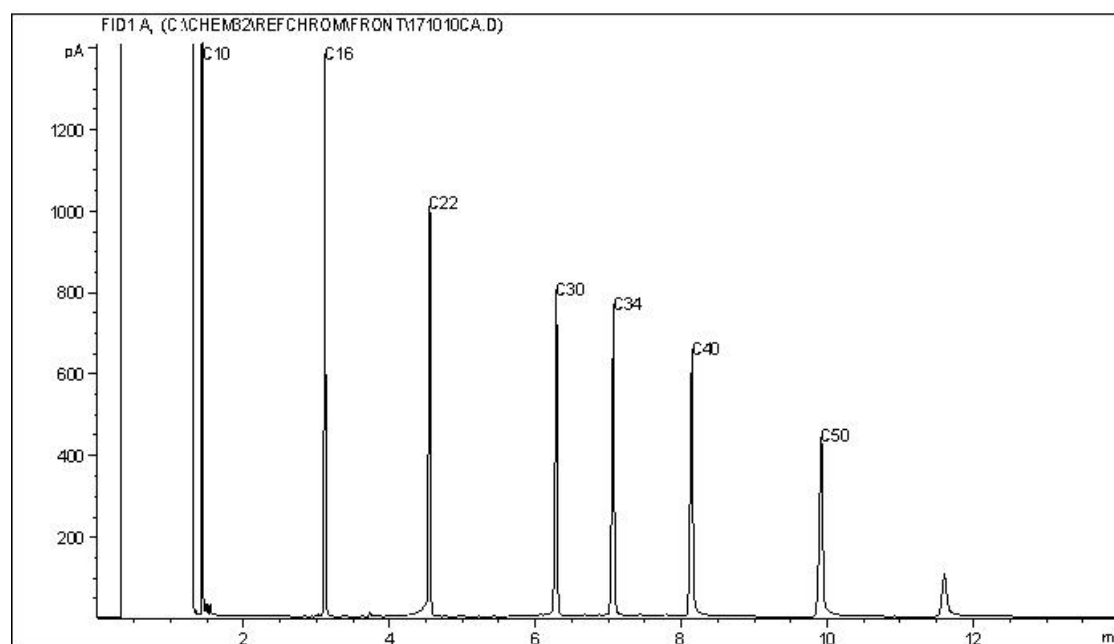
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



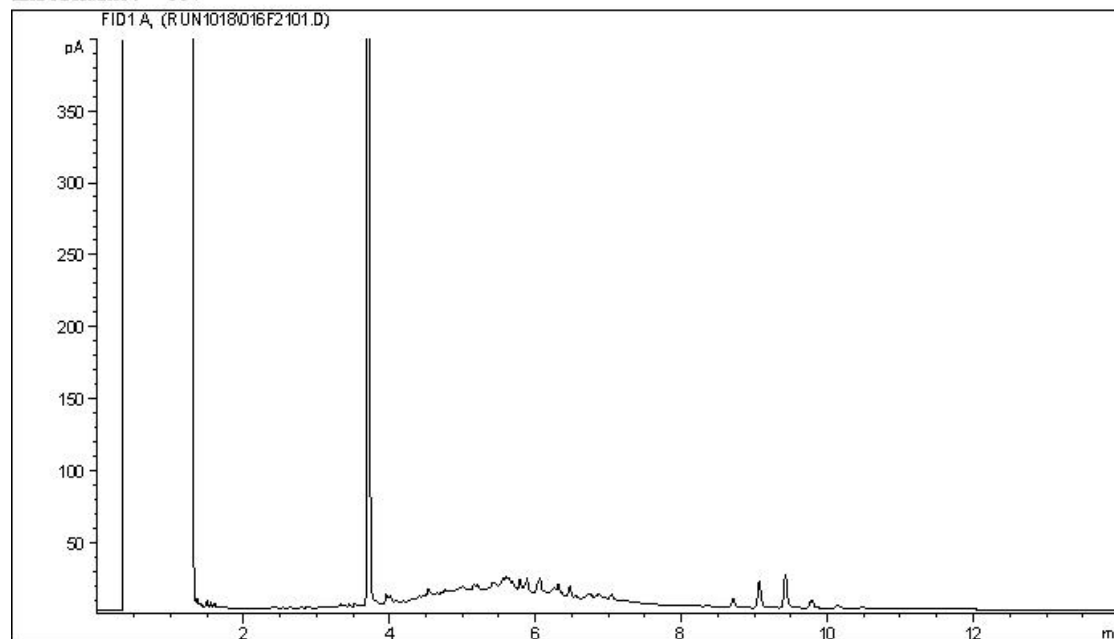
TYPICAL PRODUCT CARBON NUMBER RANGES

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

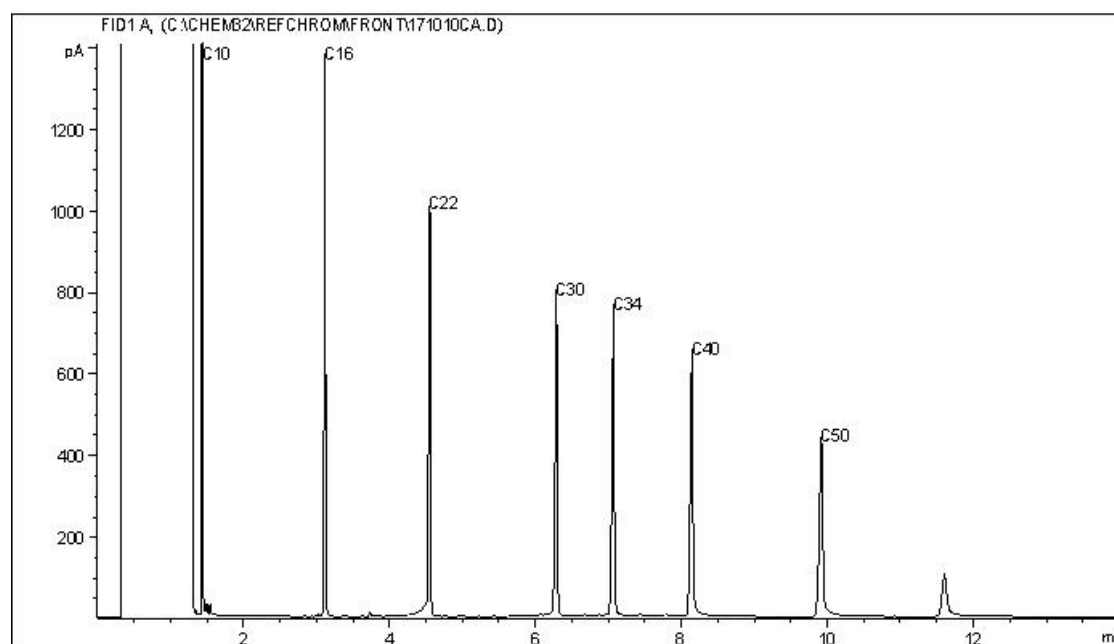
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



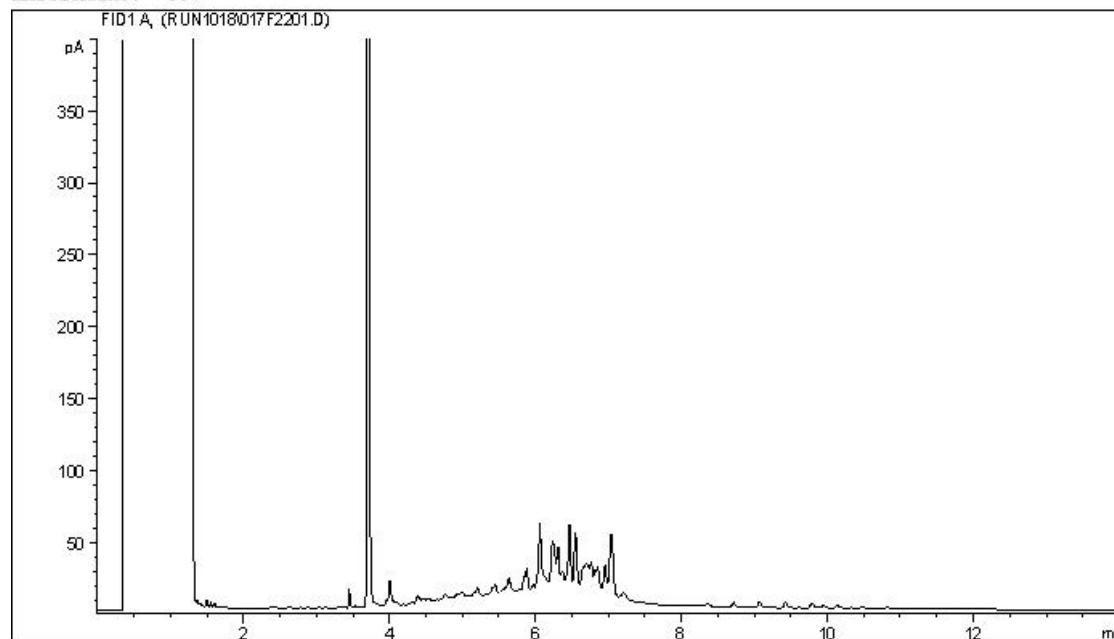
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Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

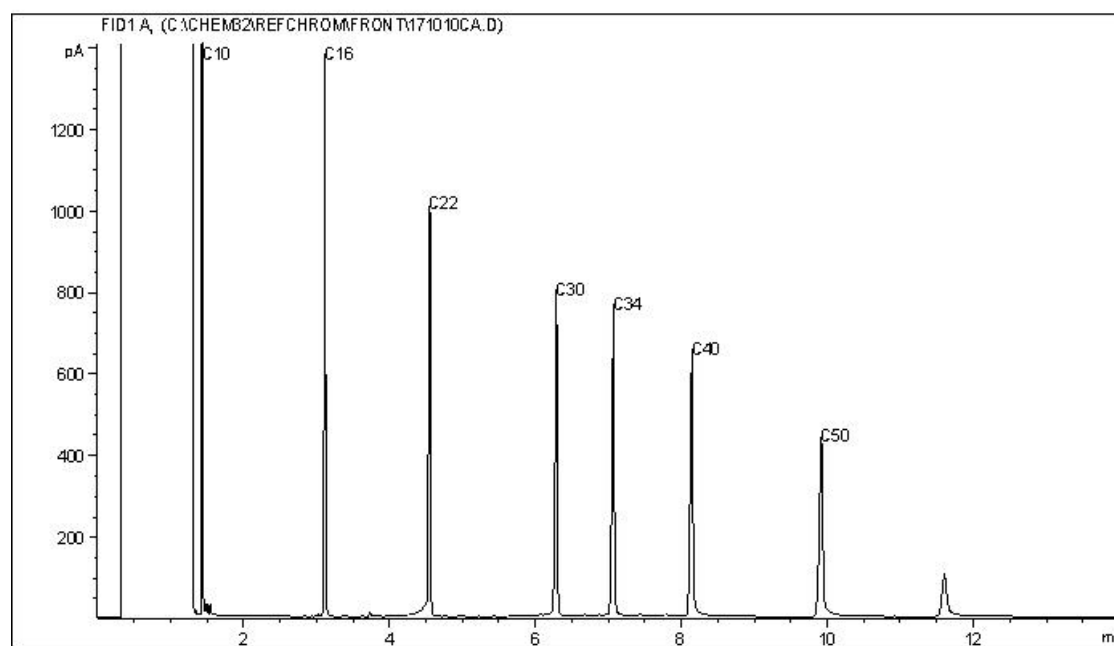
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



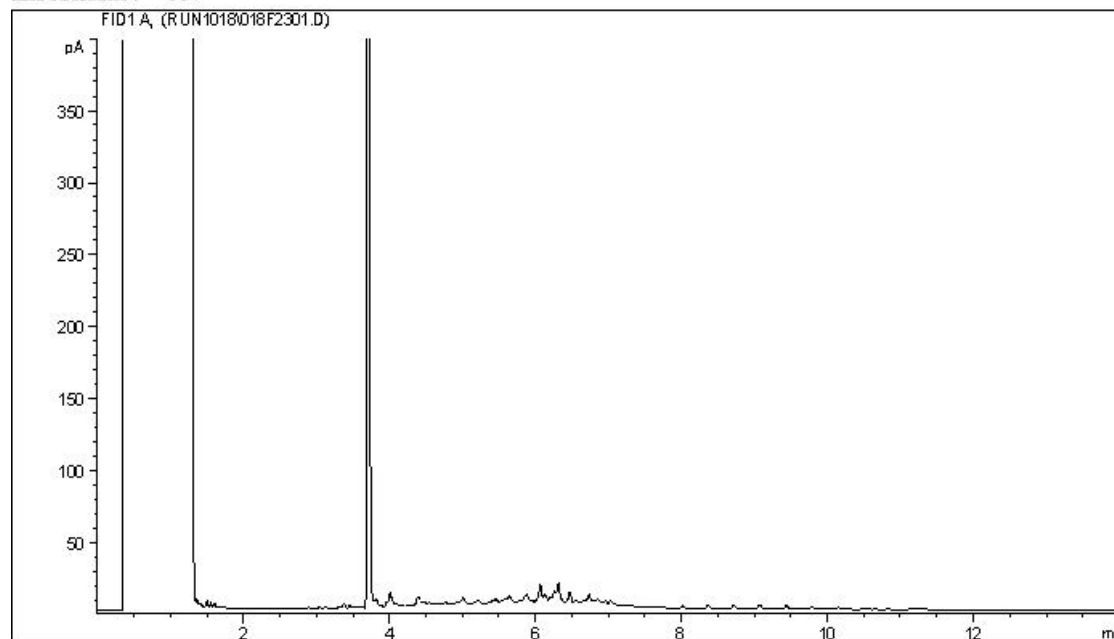
TYPICAL PRODUCT CARBON NUMBER RANGES

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

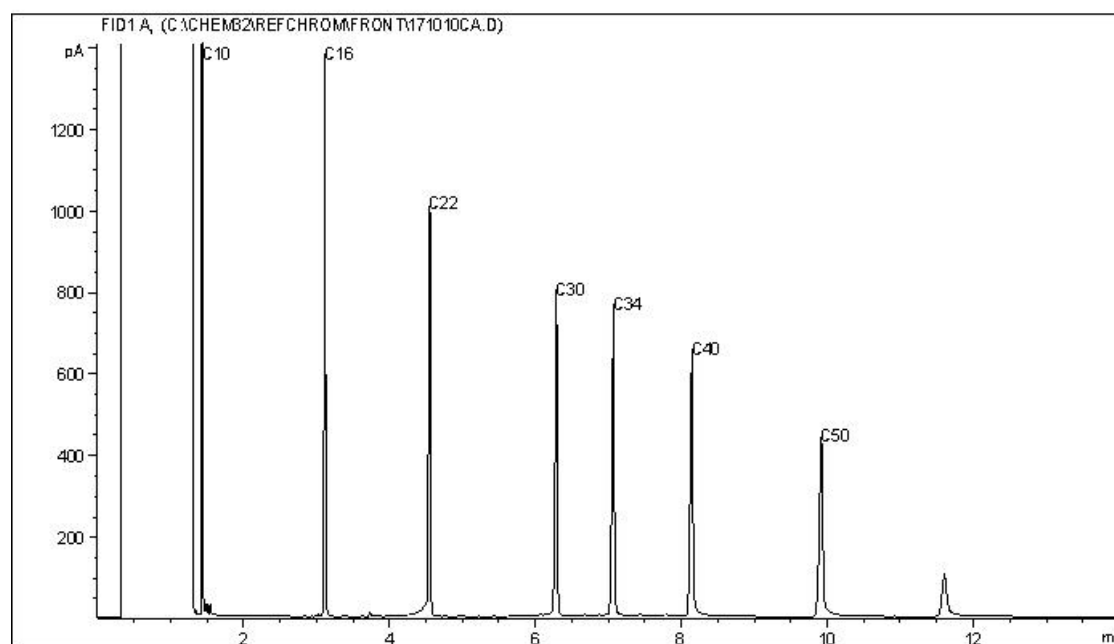
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



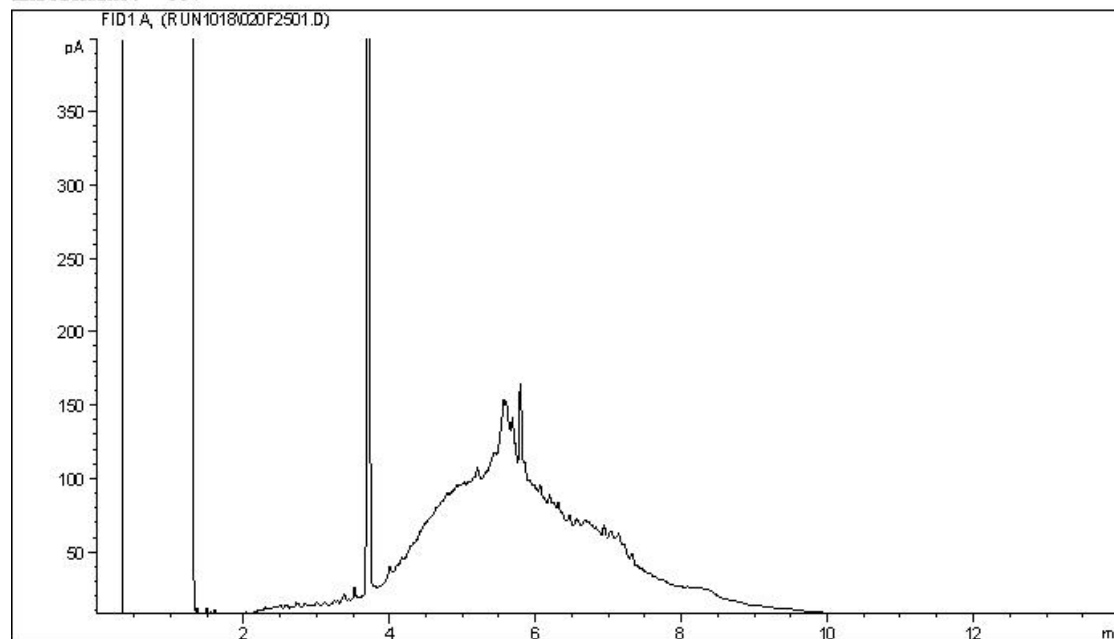
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Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

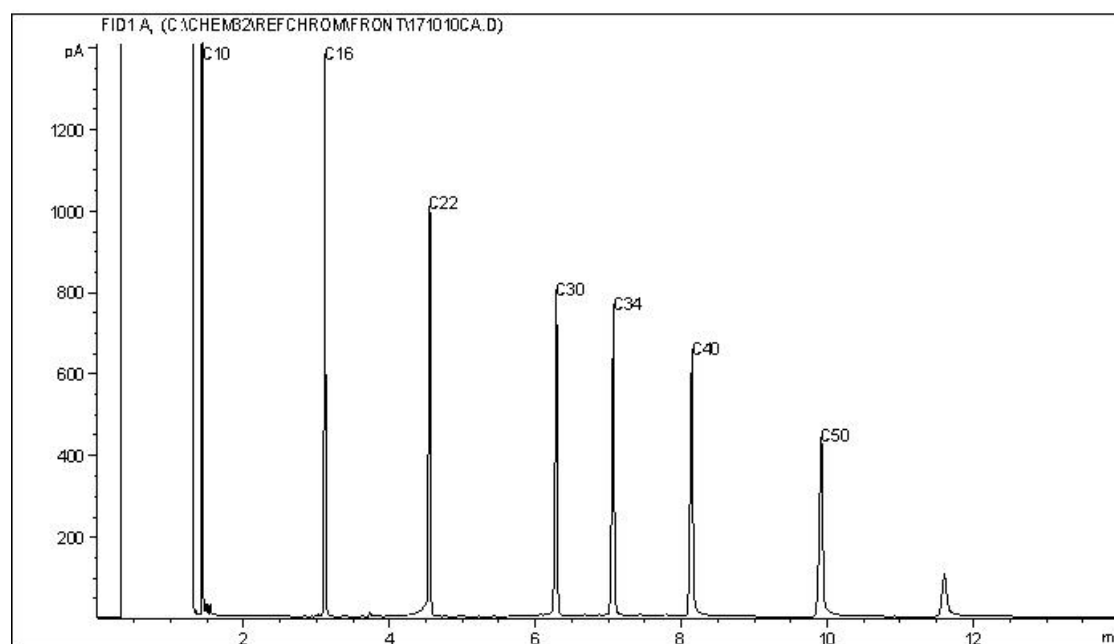
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



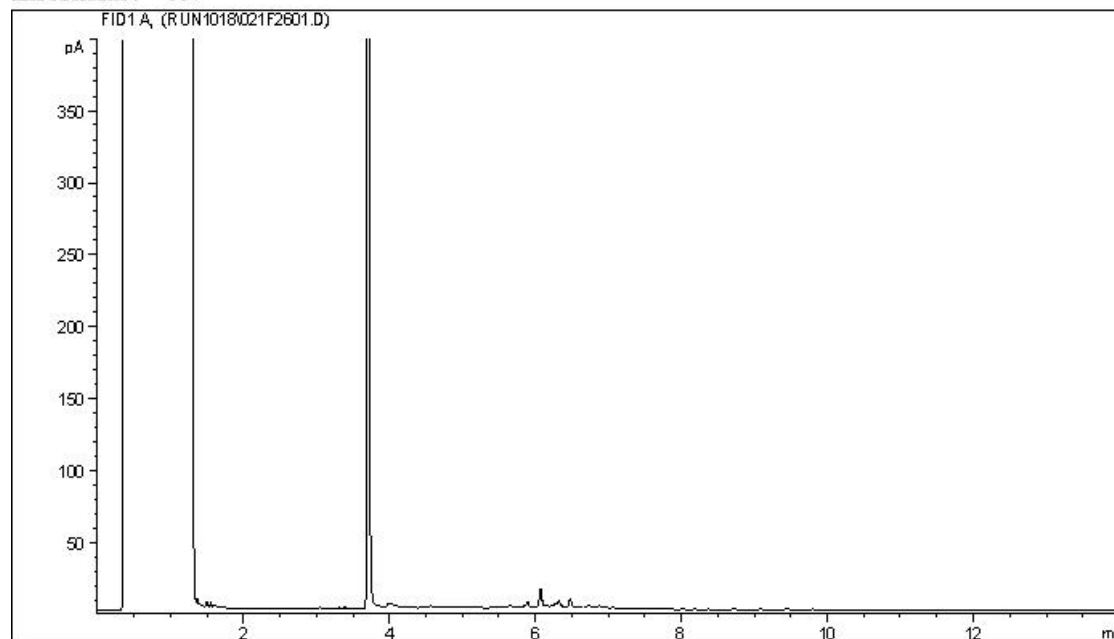
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Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
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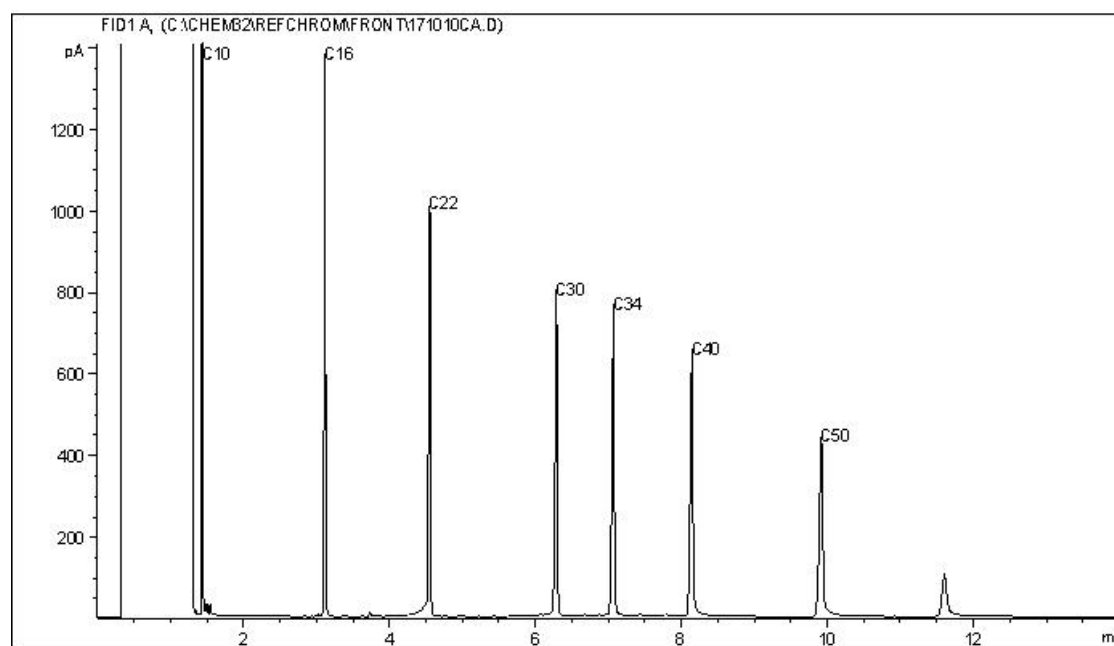
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



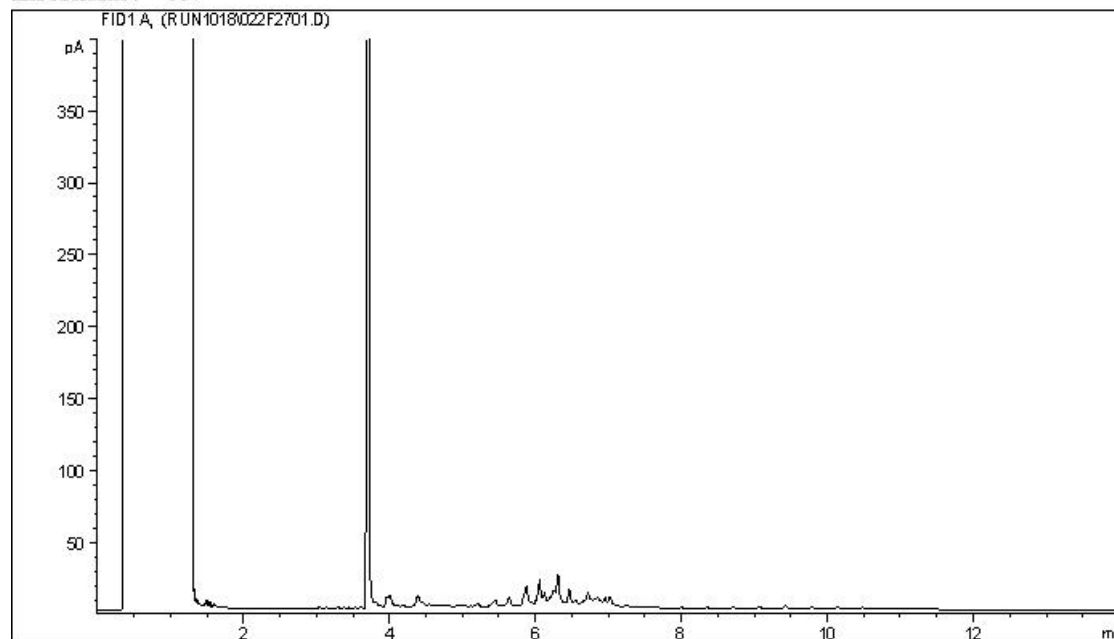
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Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
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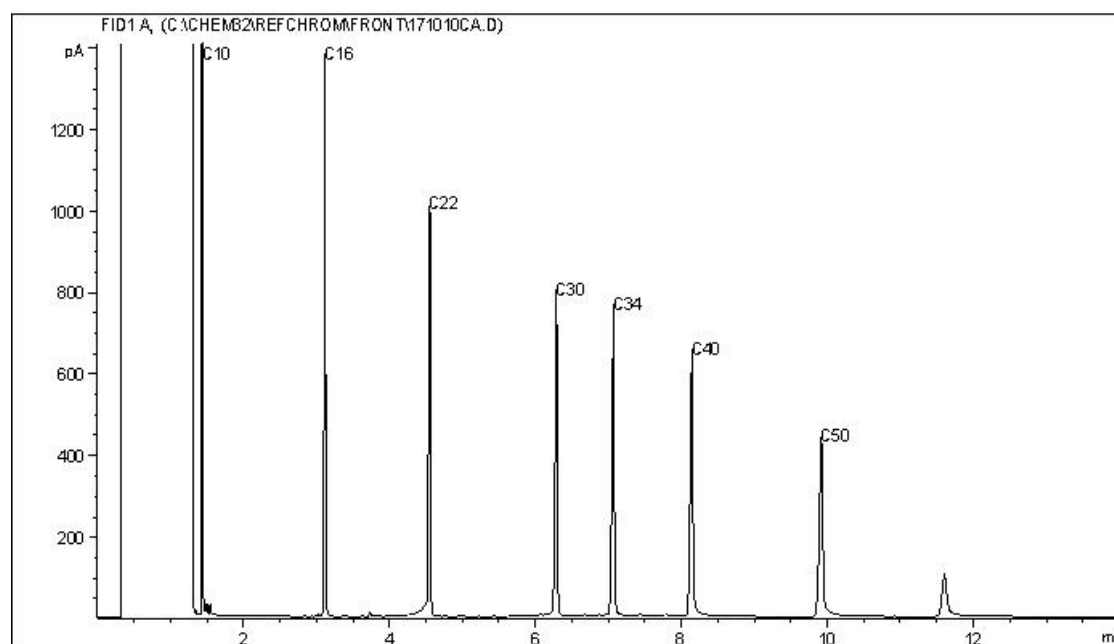
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



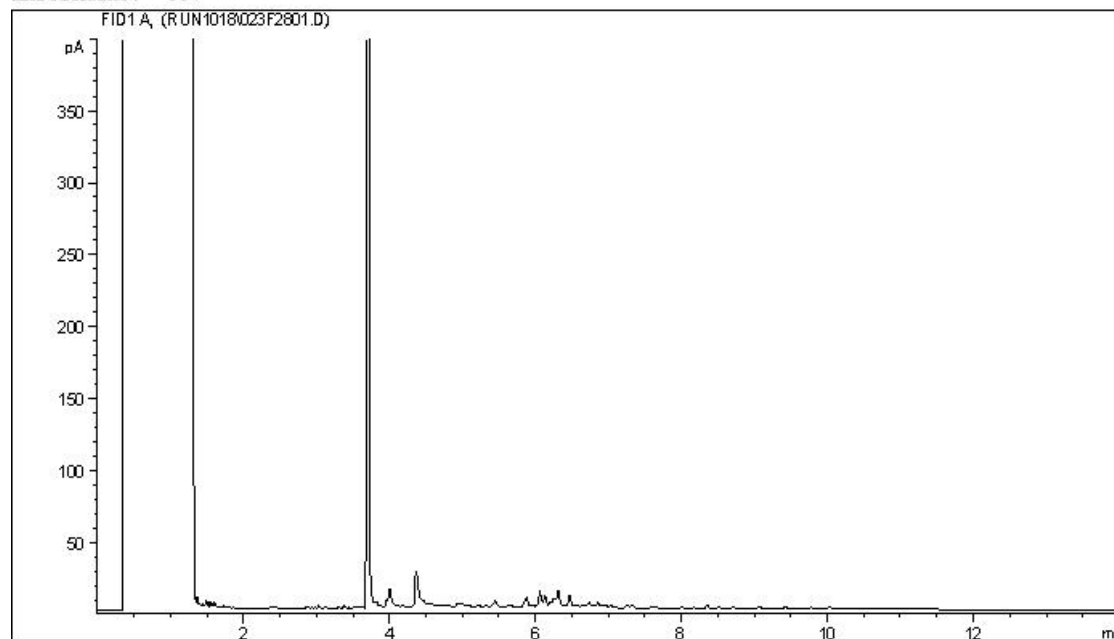
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Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
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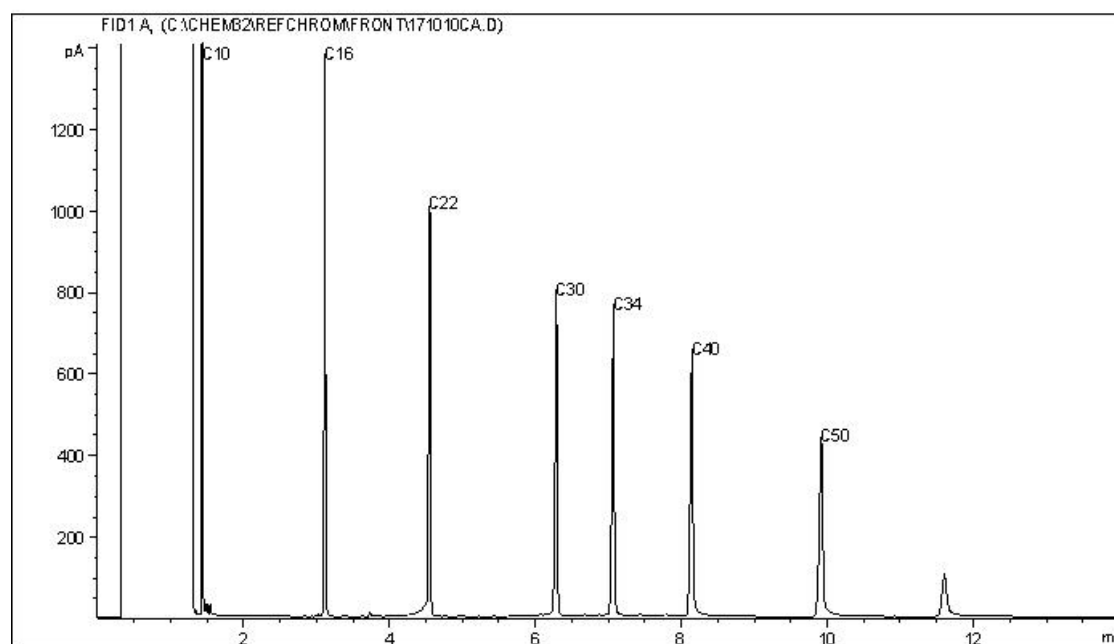
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



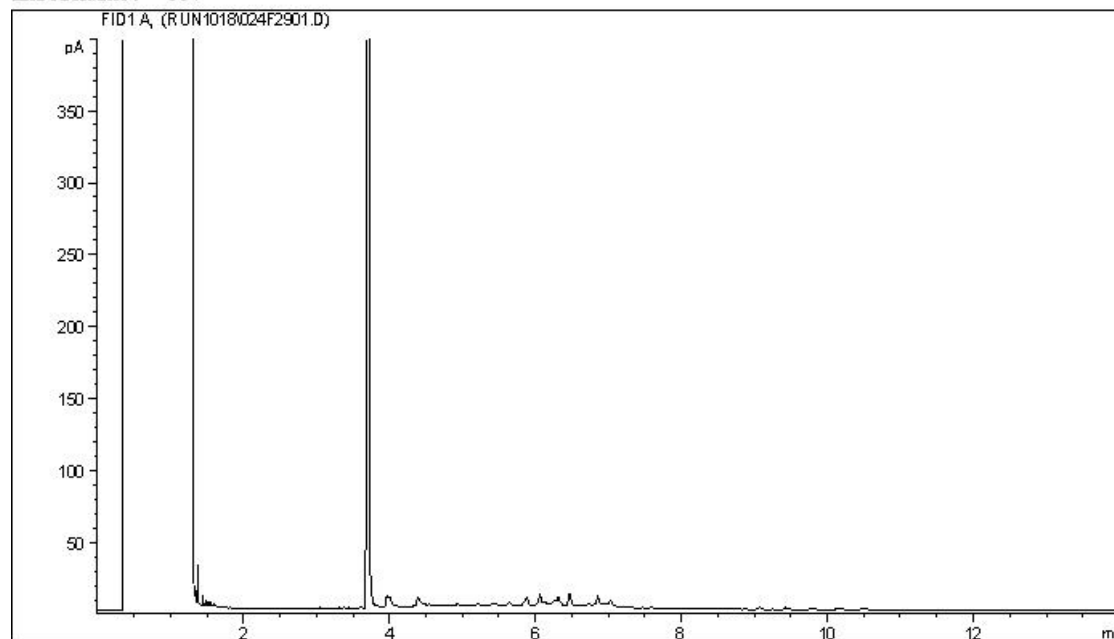
TYPICAL PRODUCT CARBON NUMBER RANGES

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

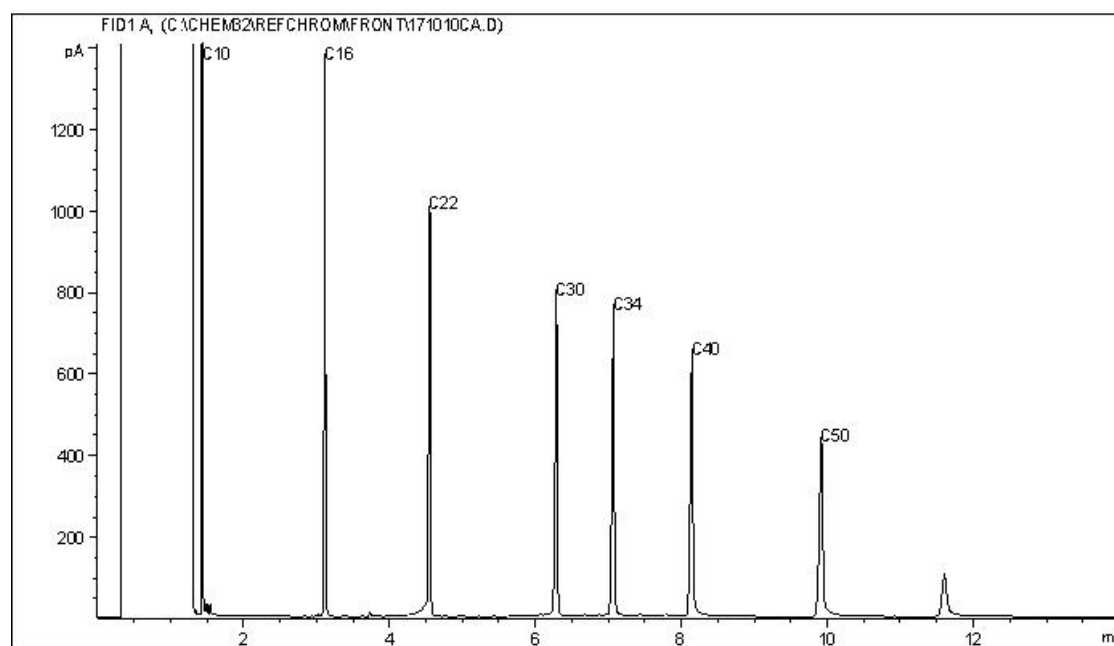
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



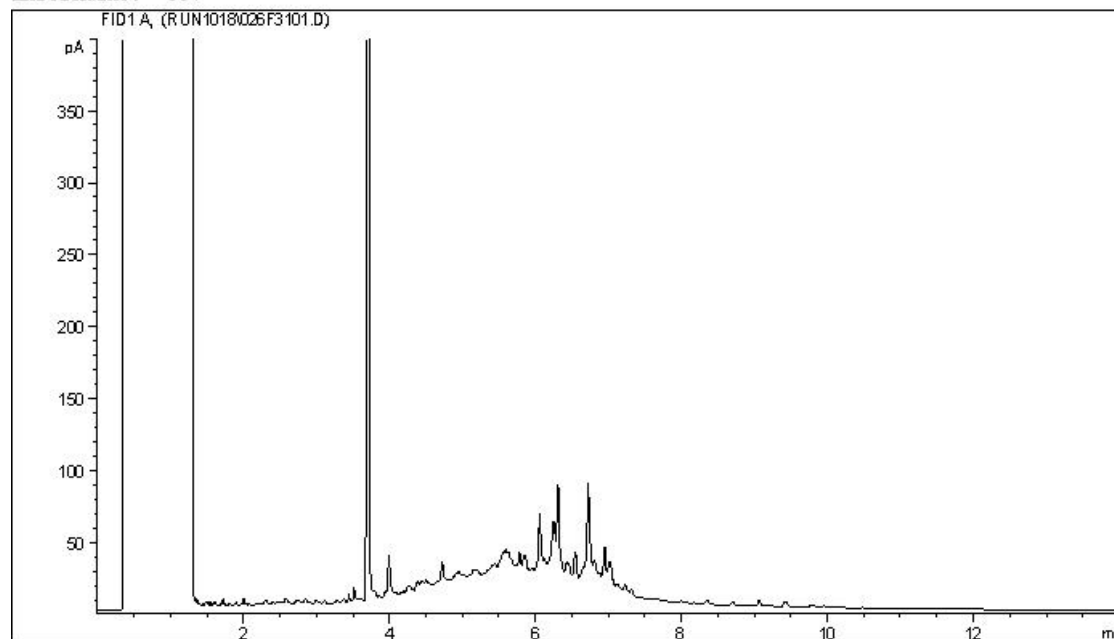
TYPICAL PRODUCT CARBON NUMBER RANGES

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

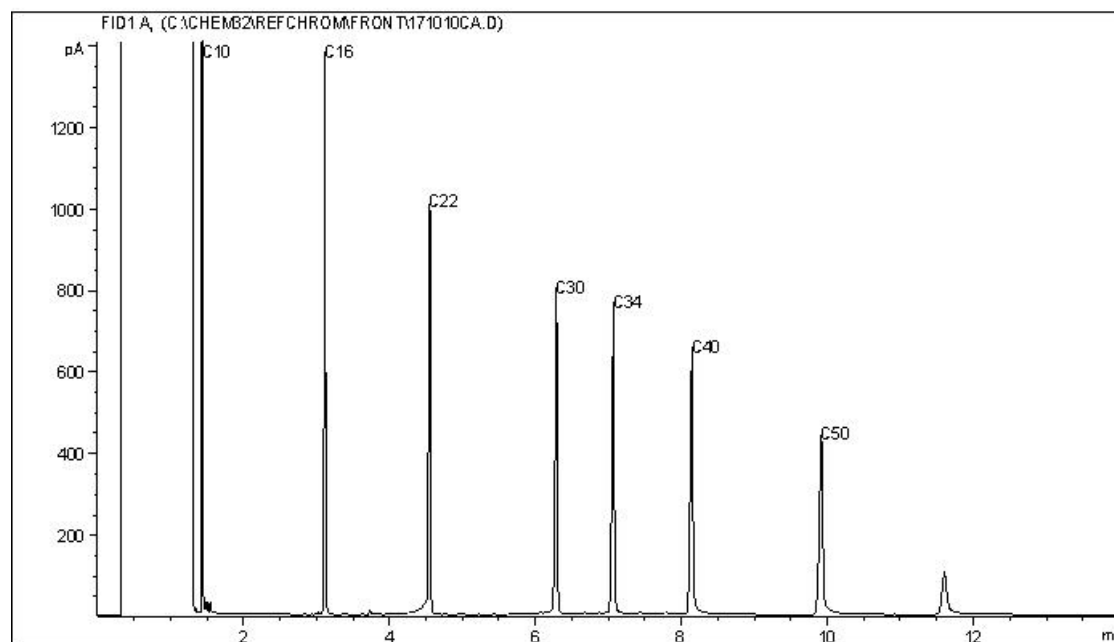
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



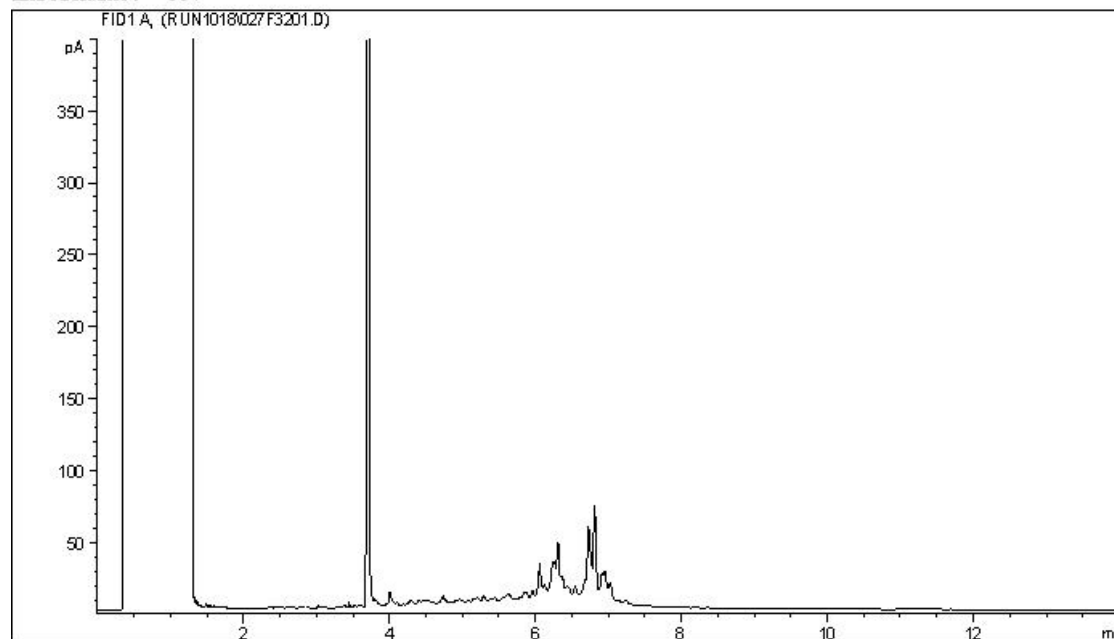
TYPICAL PRODUCT CARBON NUMBER RANGES

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

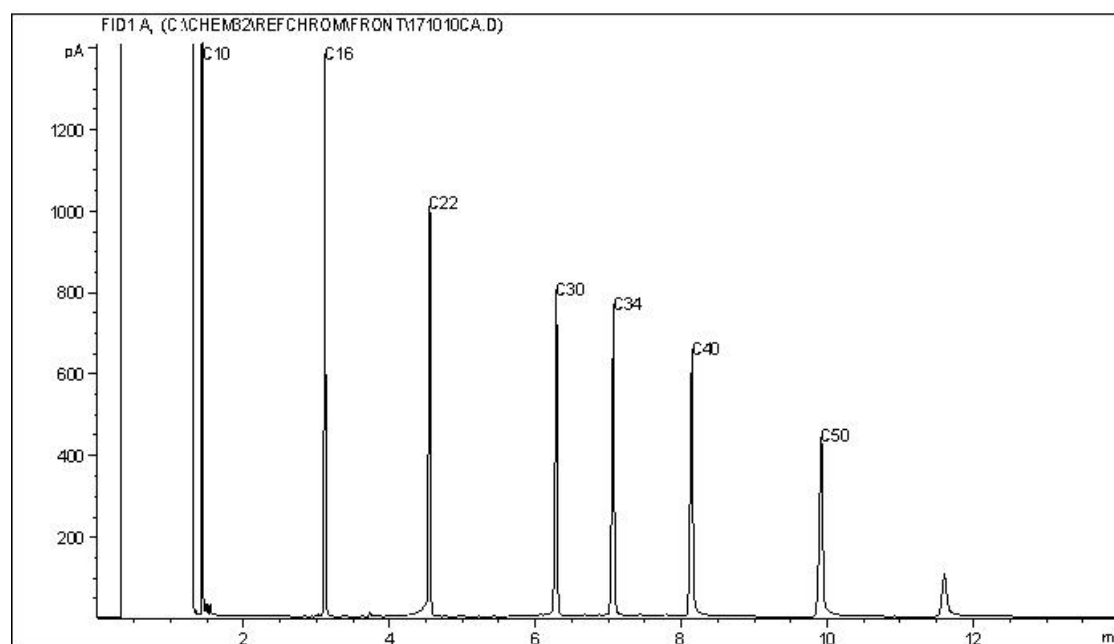
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



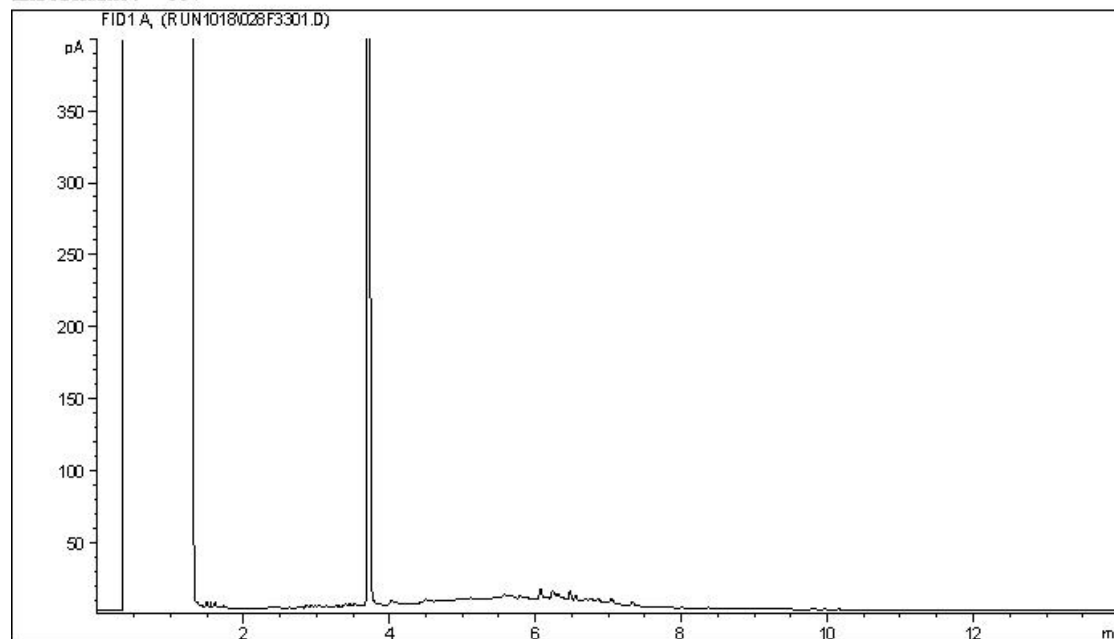
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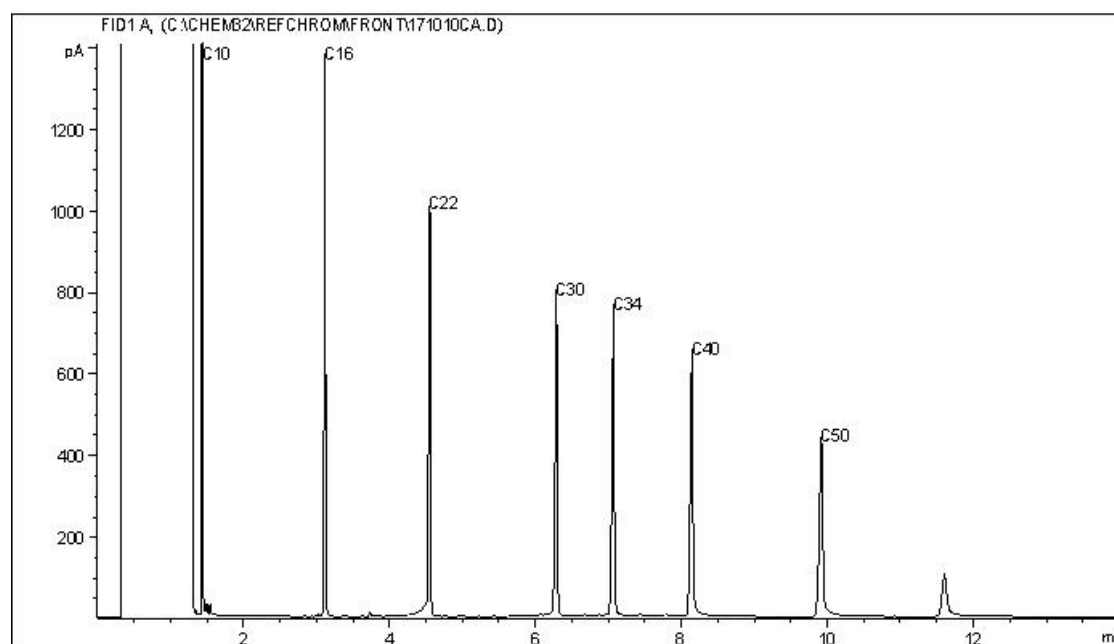
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Carbon Range Distribution - Reference Chromatogram



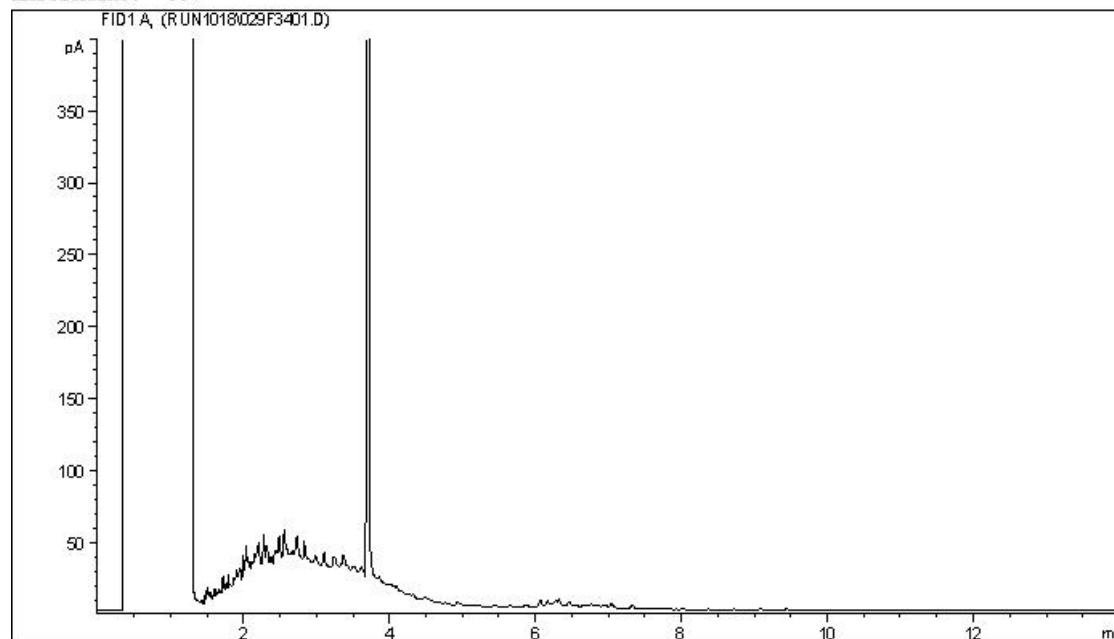
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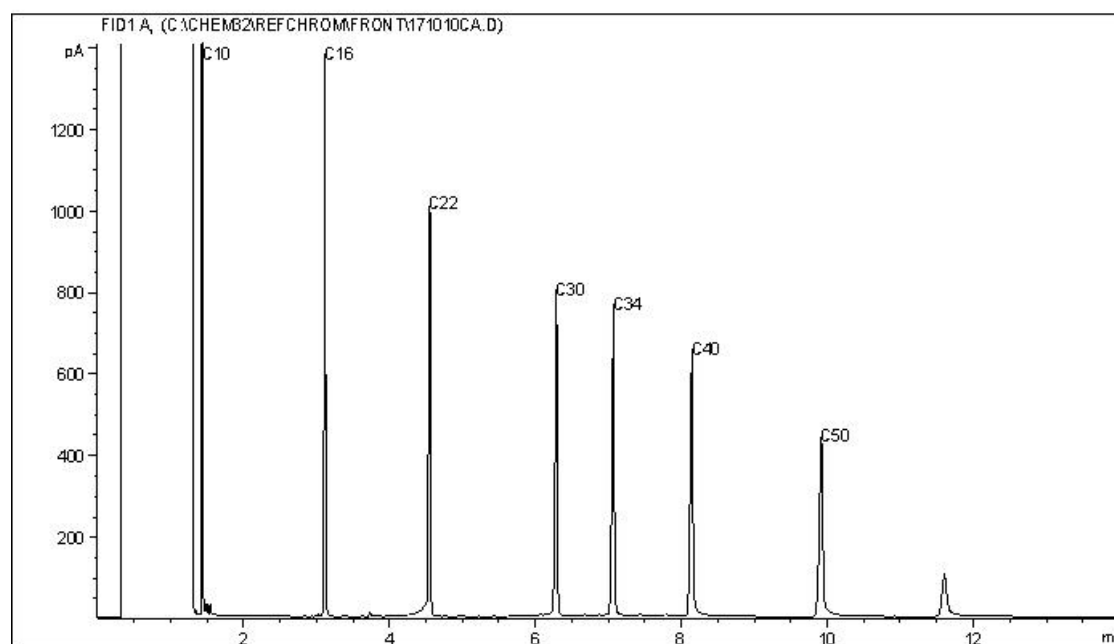
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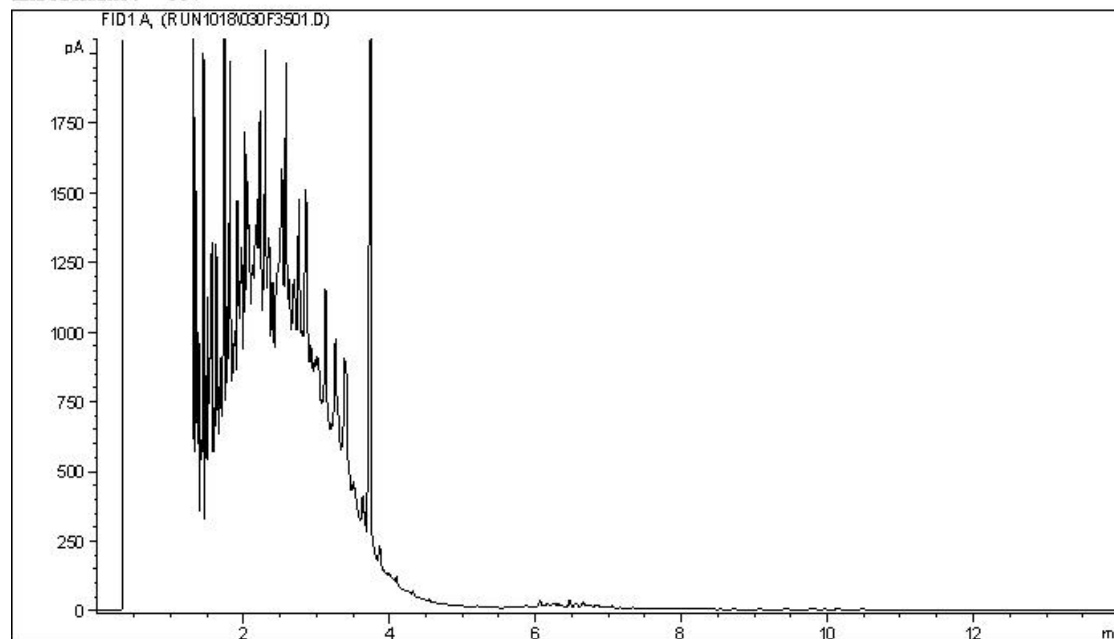
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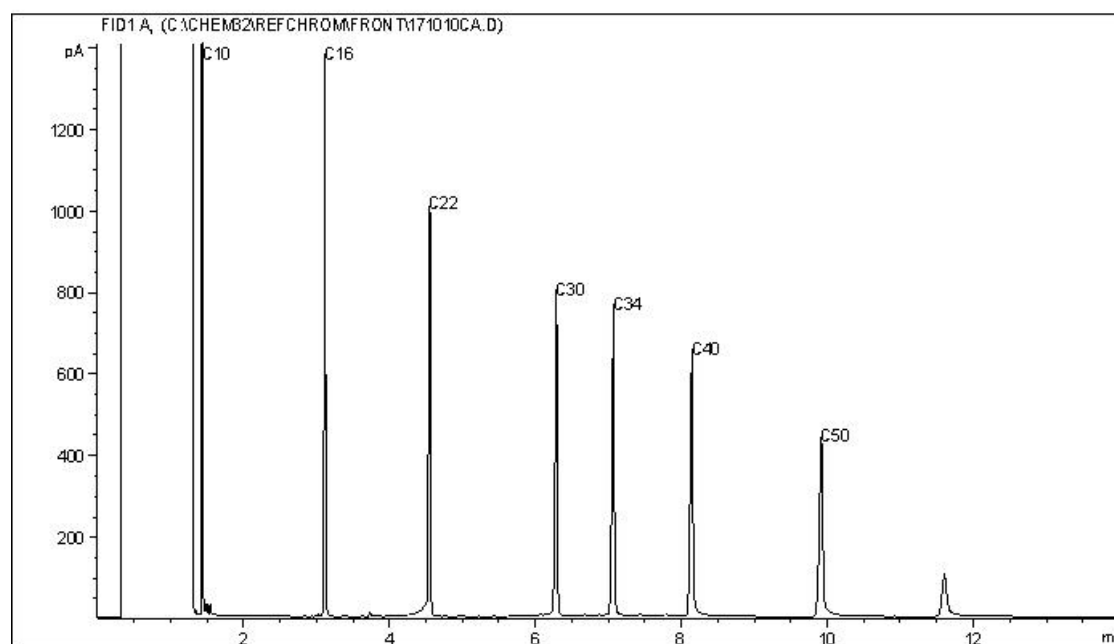
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Carbon Range Distribution - Reference Chromatogram



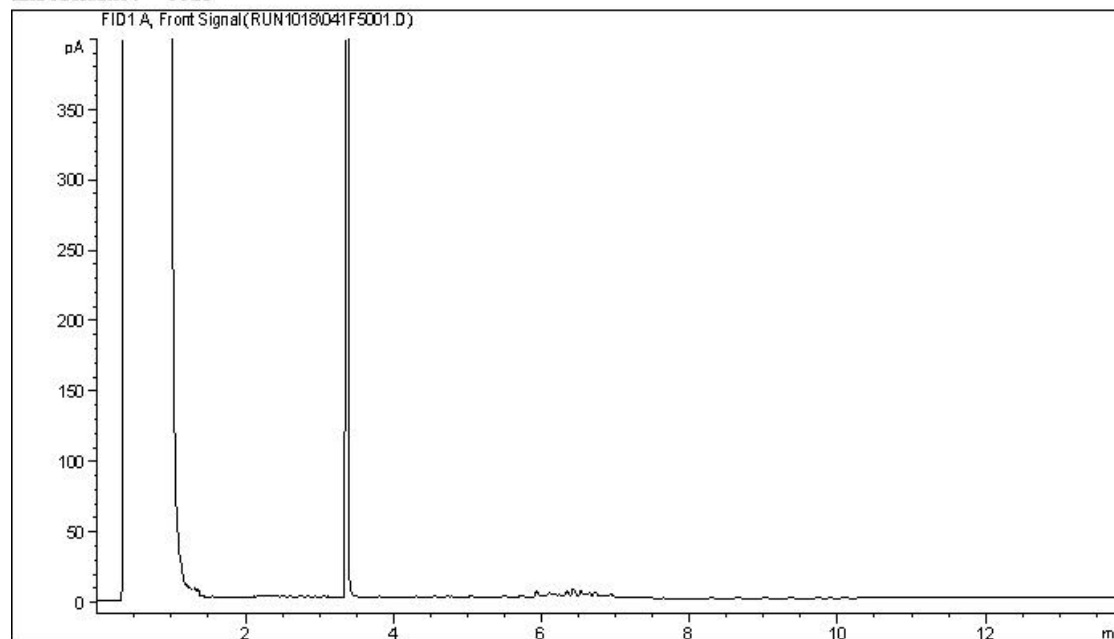
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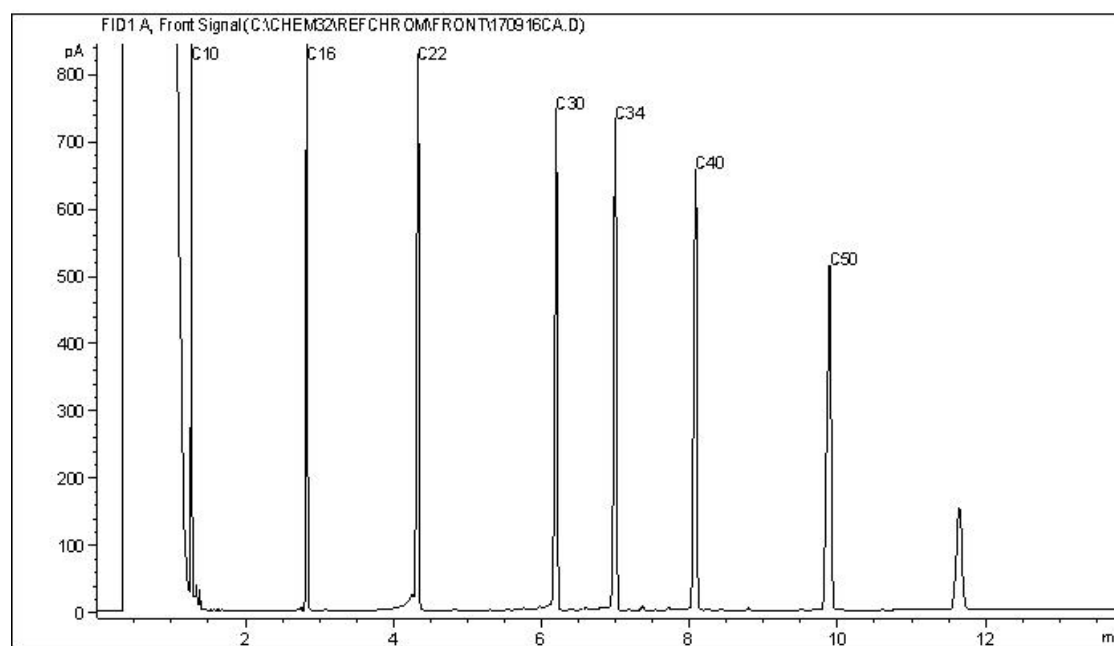
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC15



Carbon Range Distribution - Reference Chromatogram



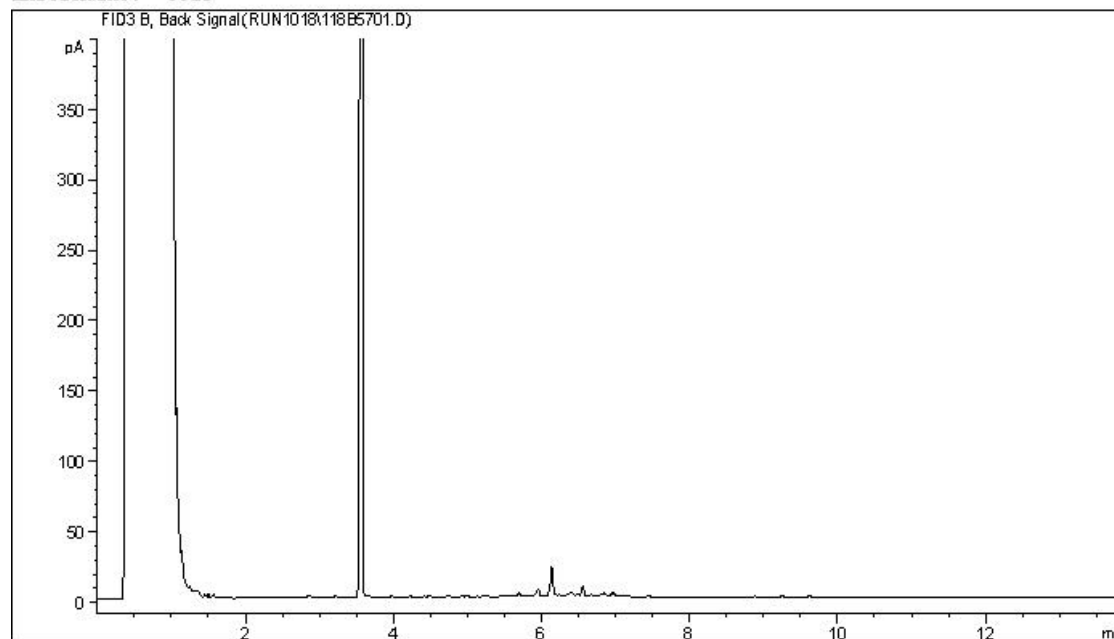
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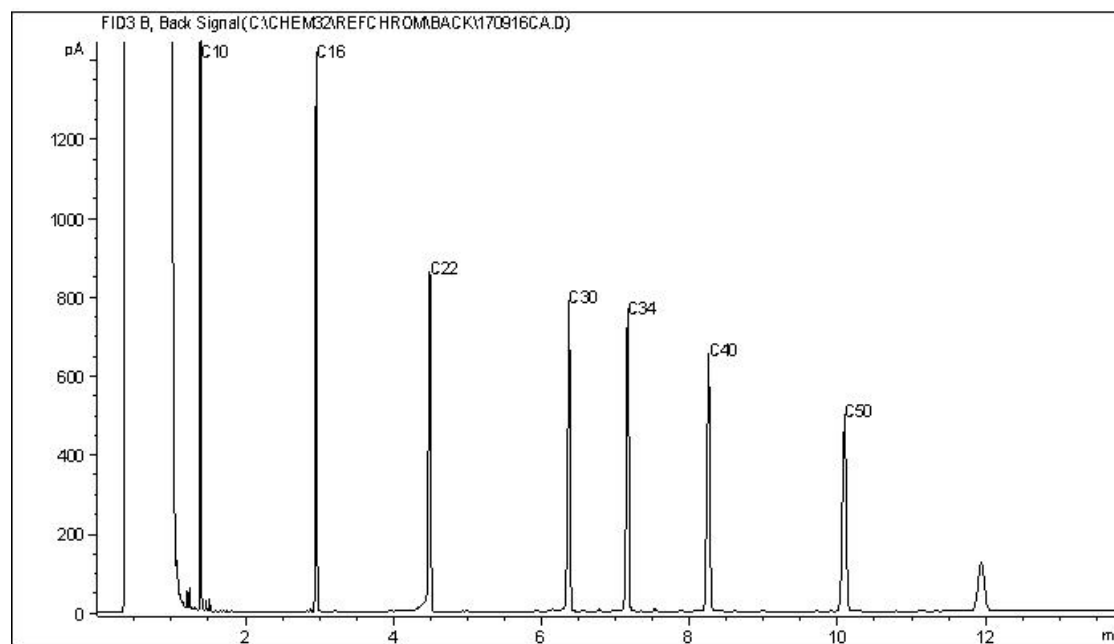
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC15



Carbon Range Distribution - Reference Chromatogram



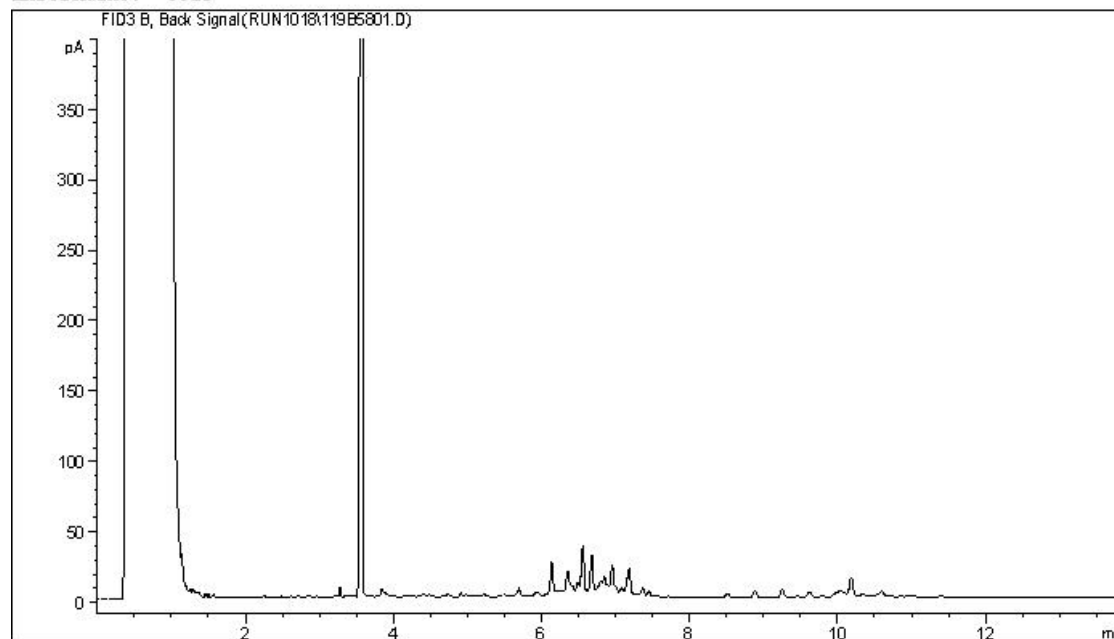
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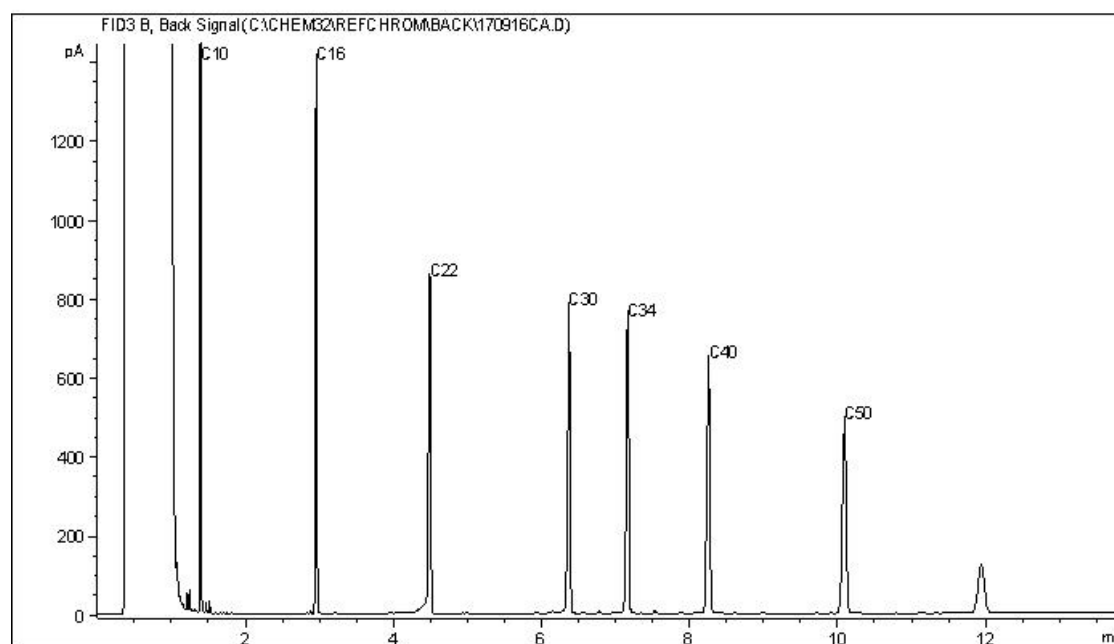
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC15



Carbon Range Distribution - Reference Chromatogram



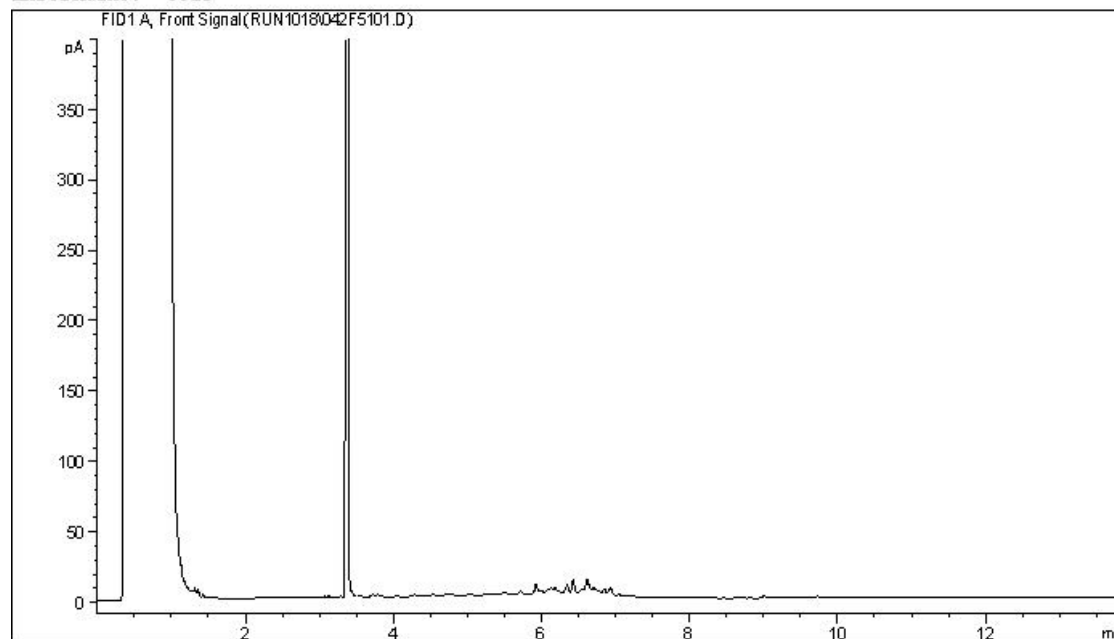
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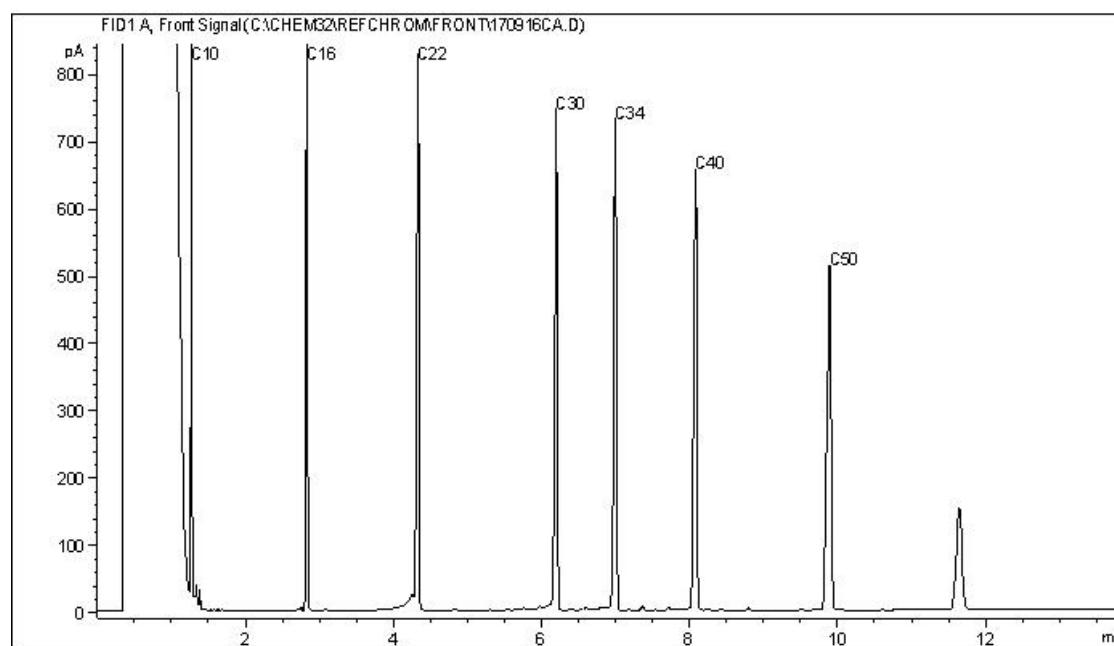
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC15



Carbon Range Distribution - Reference Chromatogram



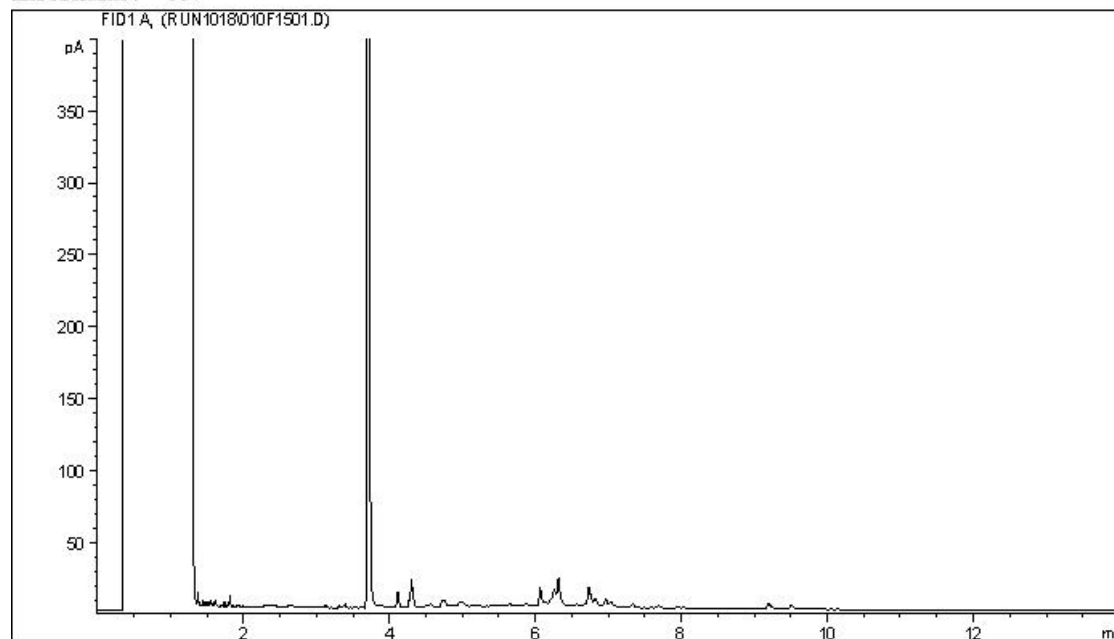
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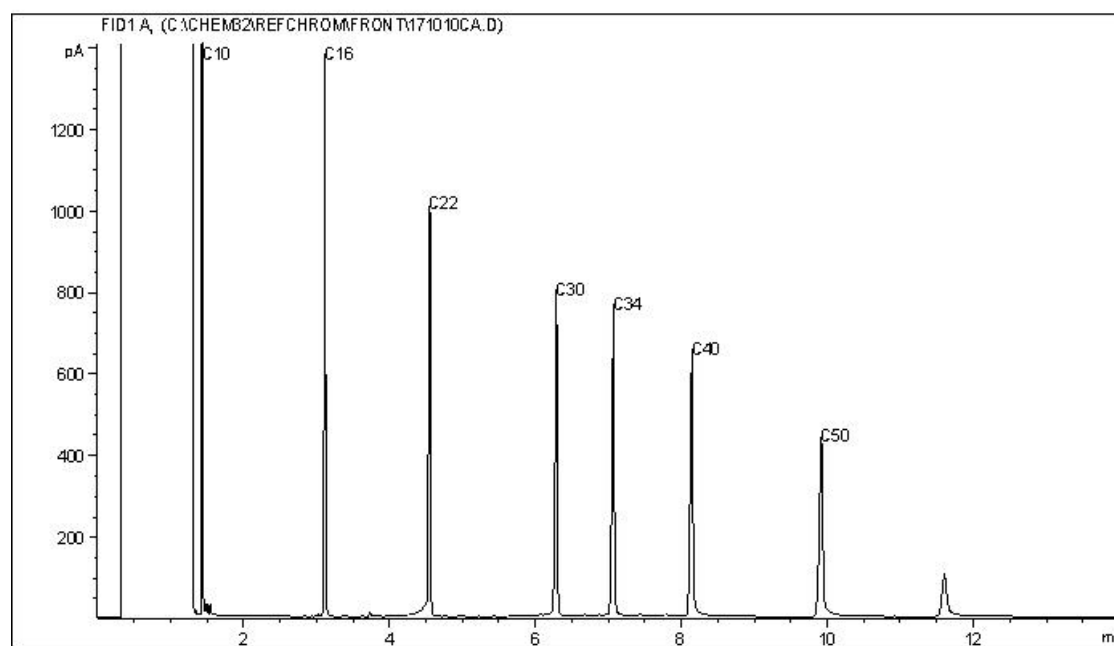
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



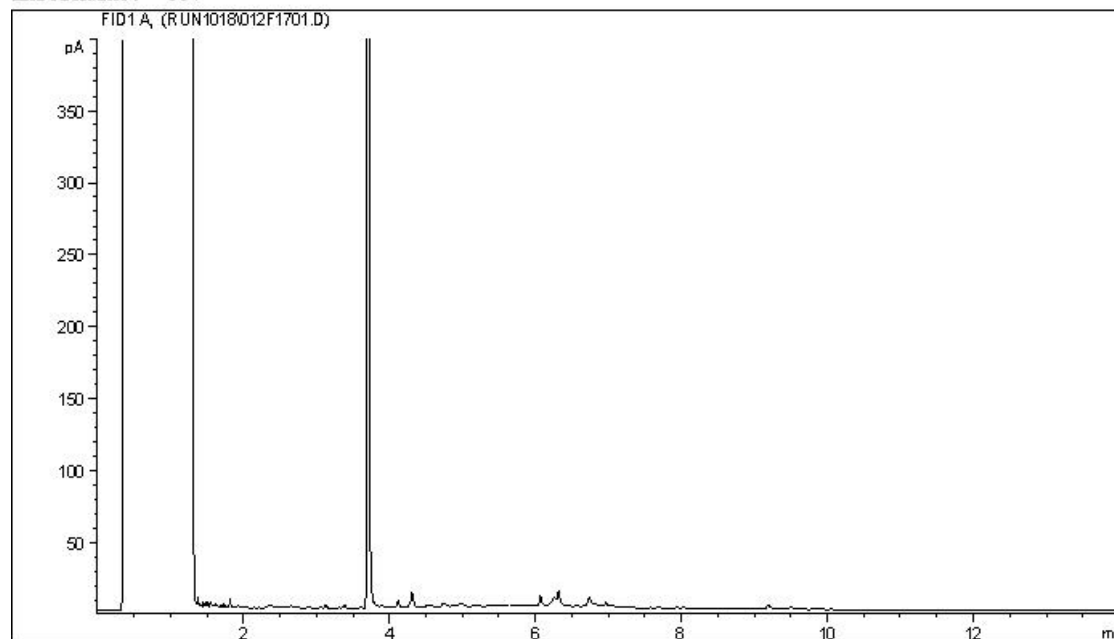
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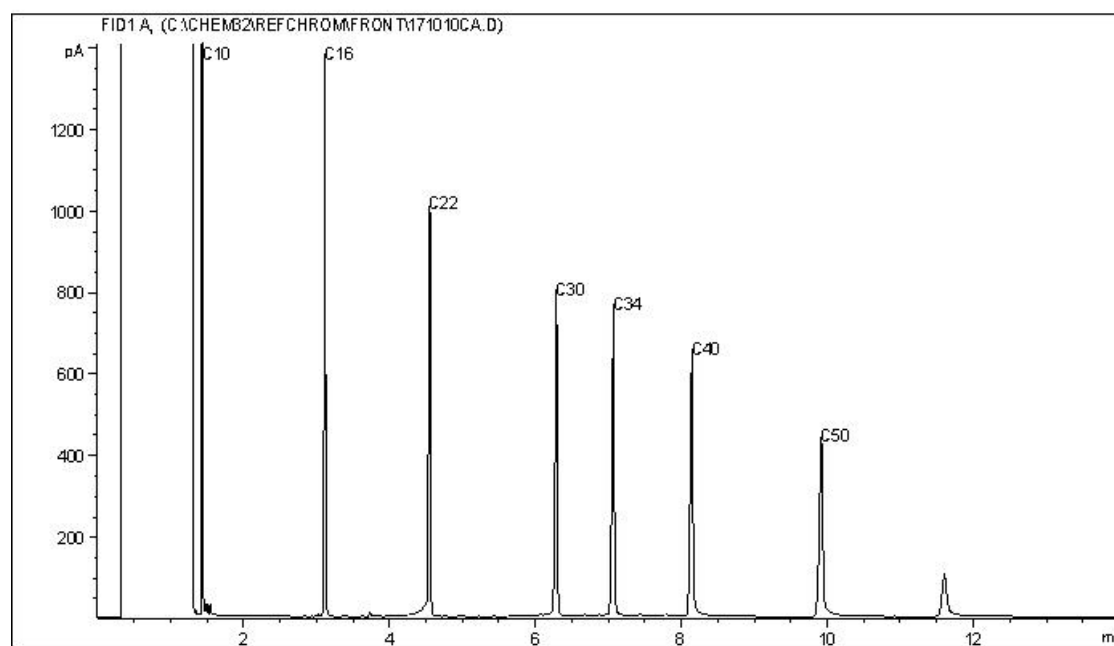
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Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



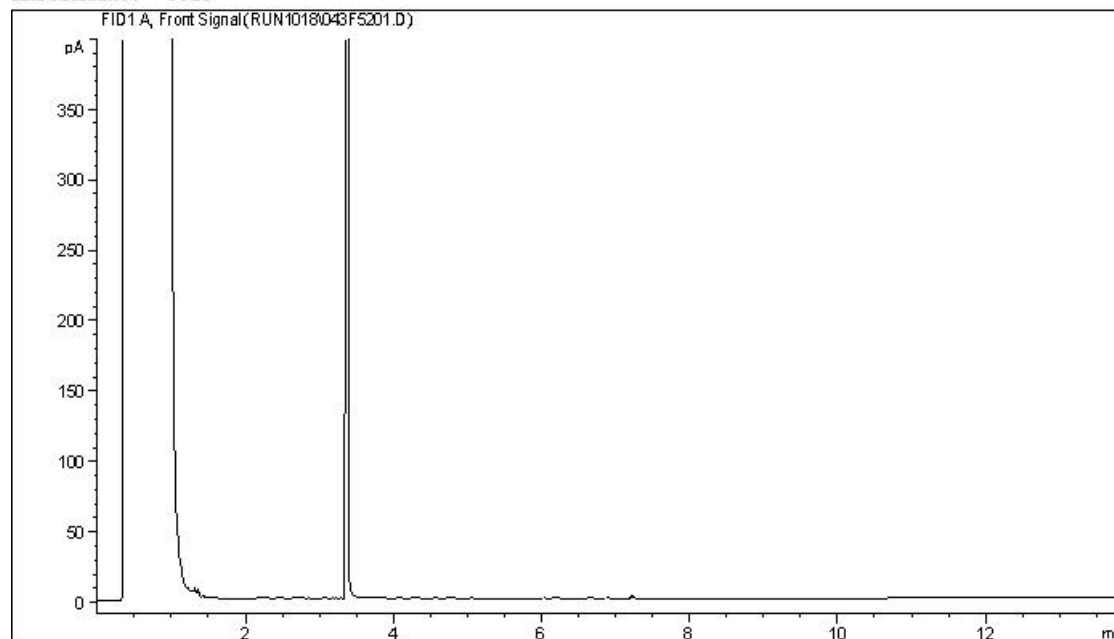
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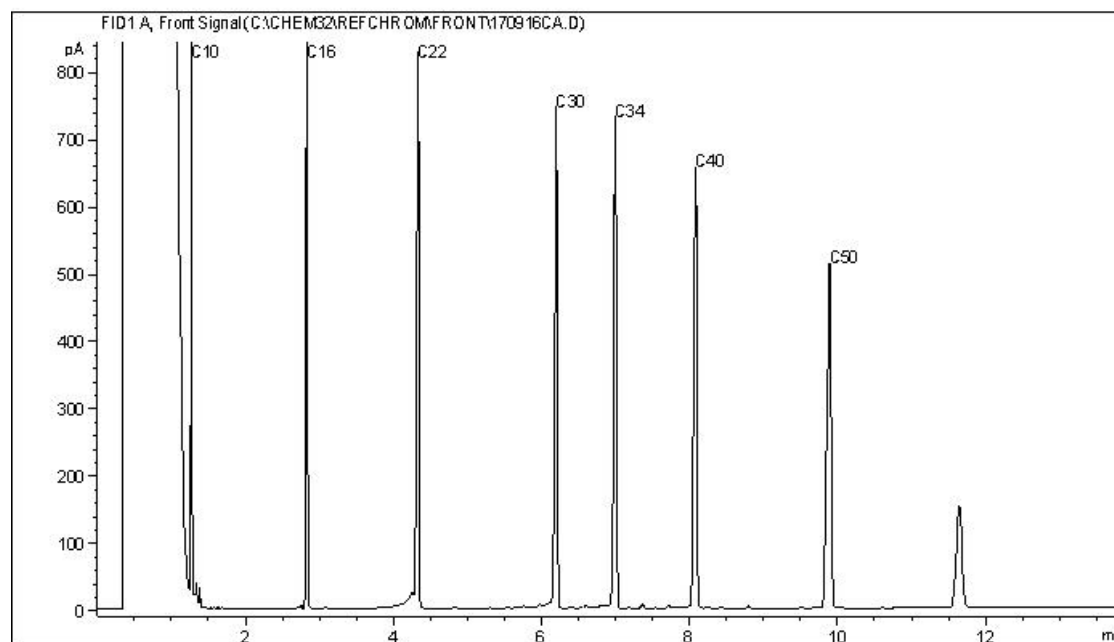
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC15



Carbon Range Distribution - Reference Chromatogram



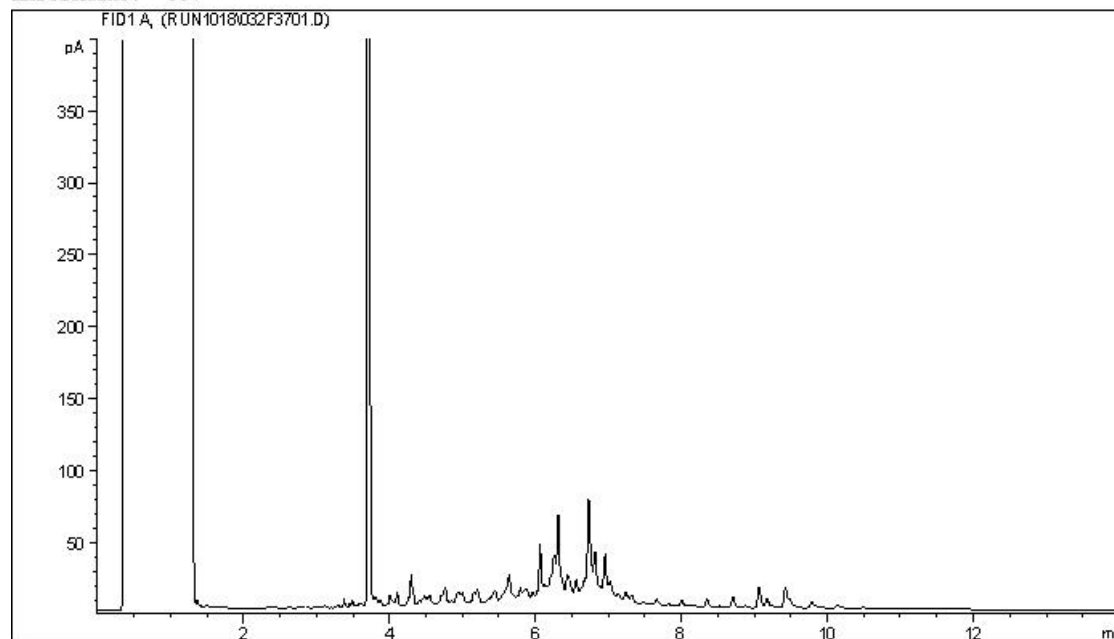
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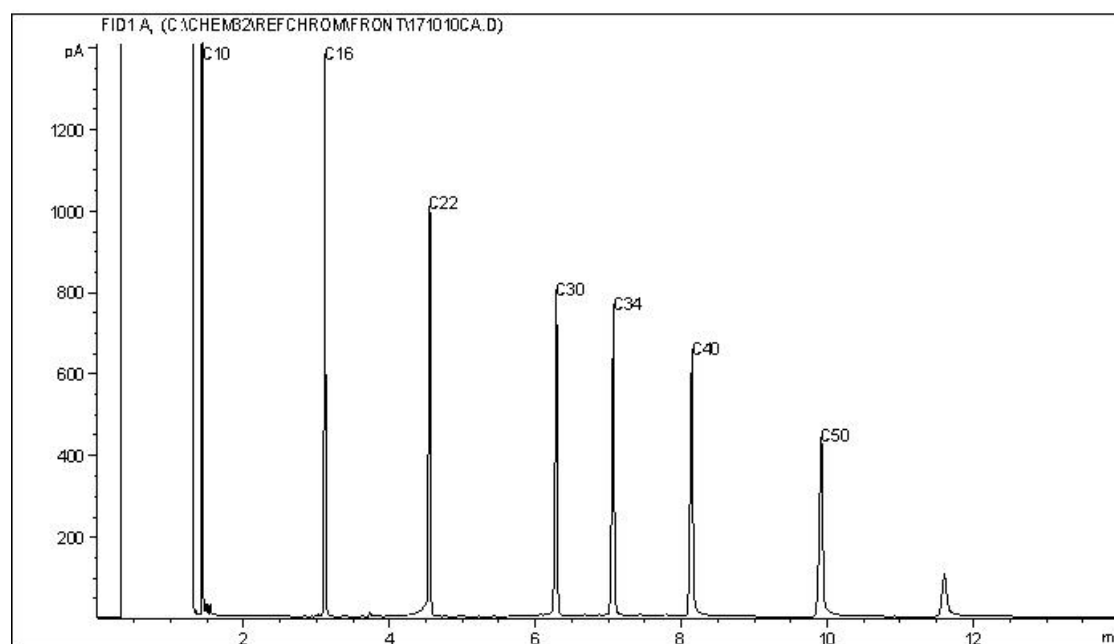
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Carbon Range Distribution - Reference Chromatogram



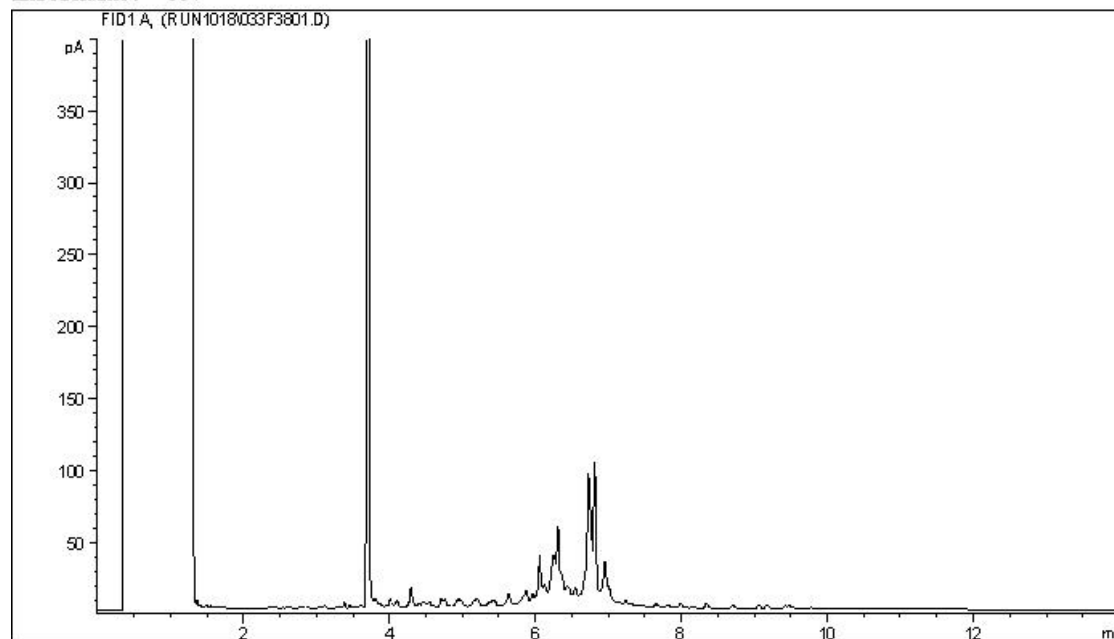
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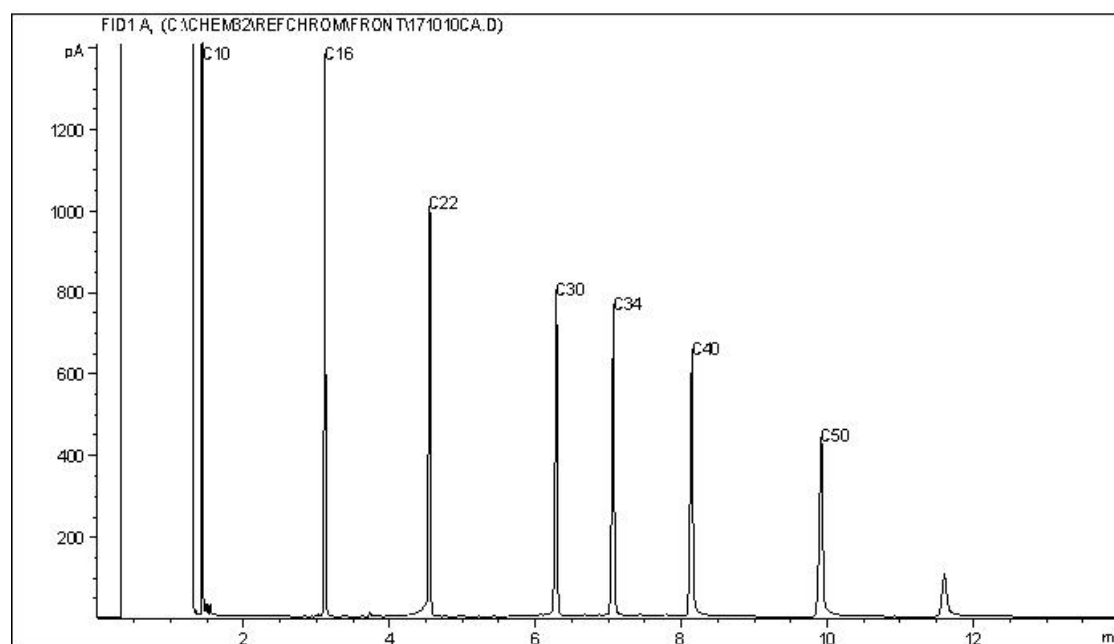
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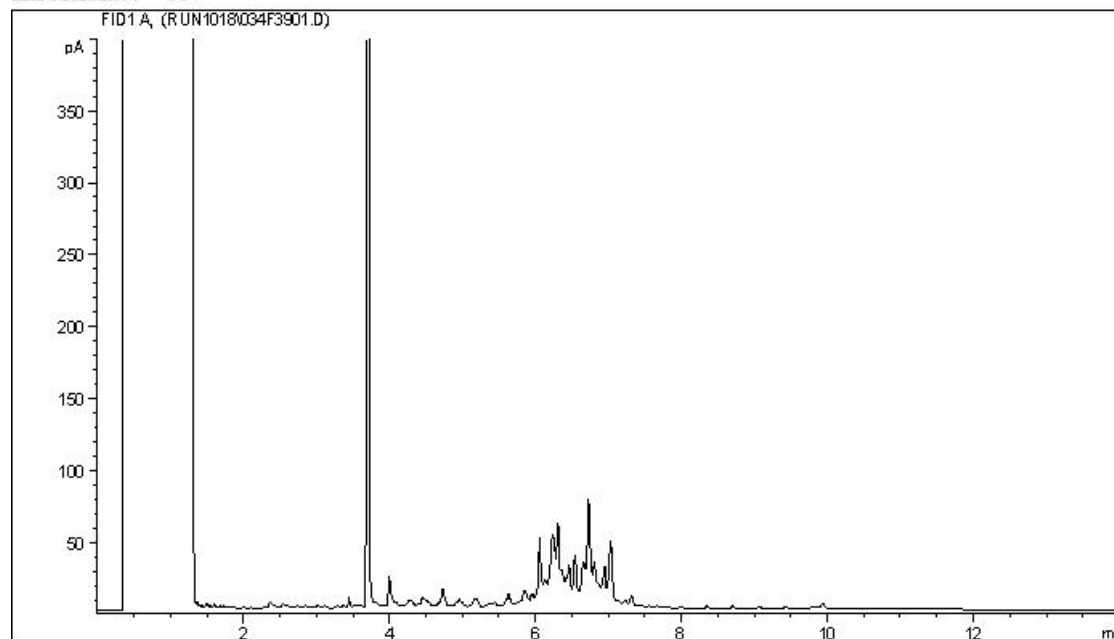
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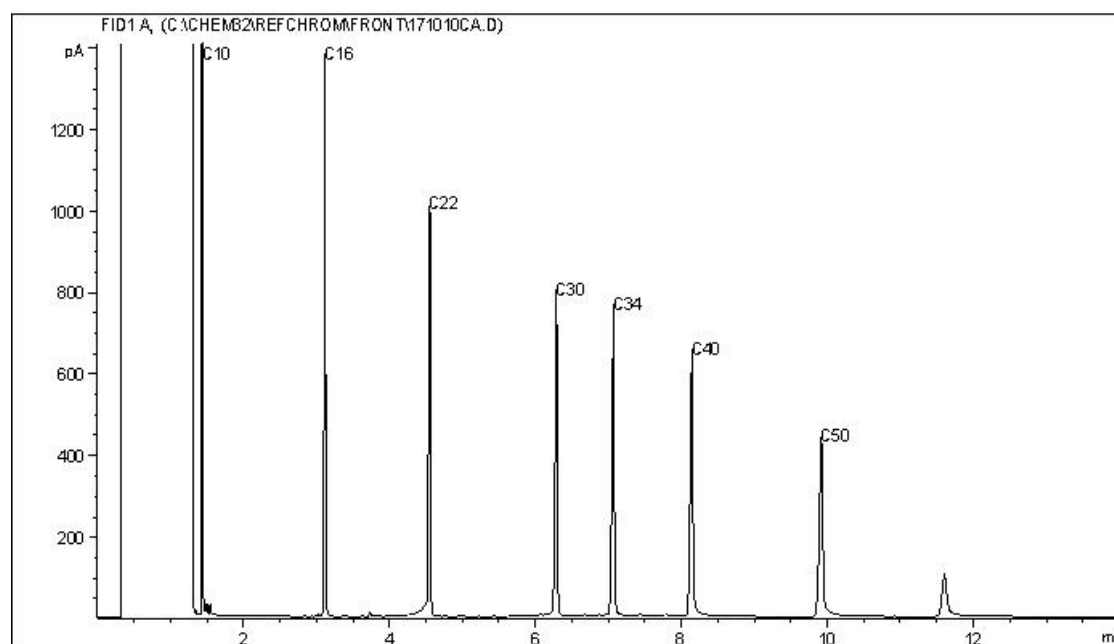
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Carbon Range Distribution - Reference Chromatogram



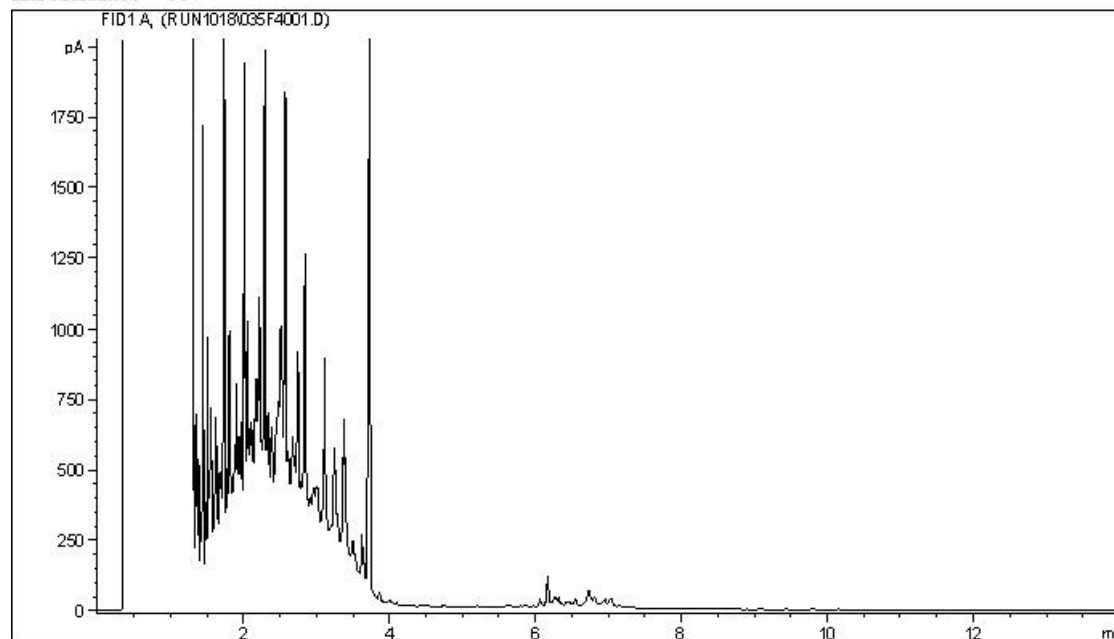
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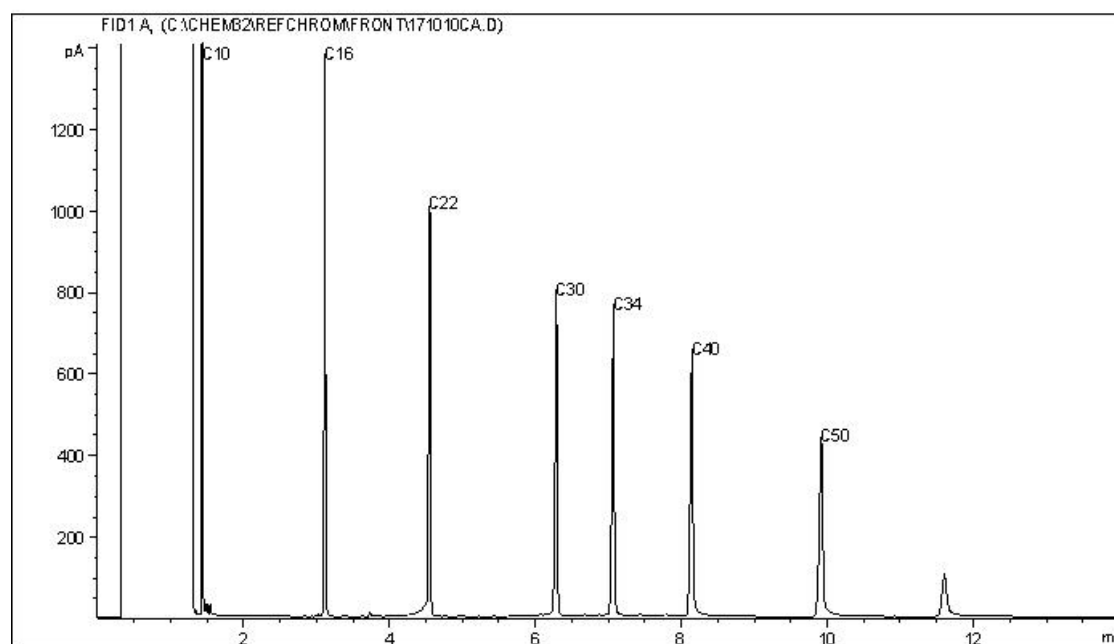
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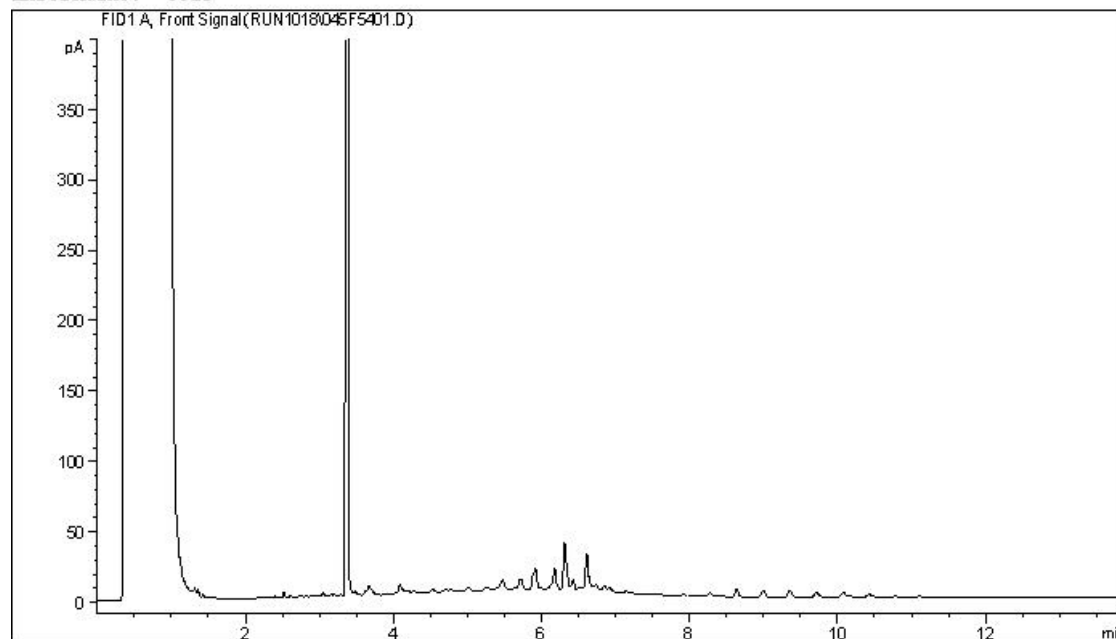
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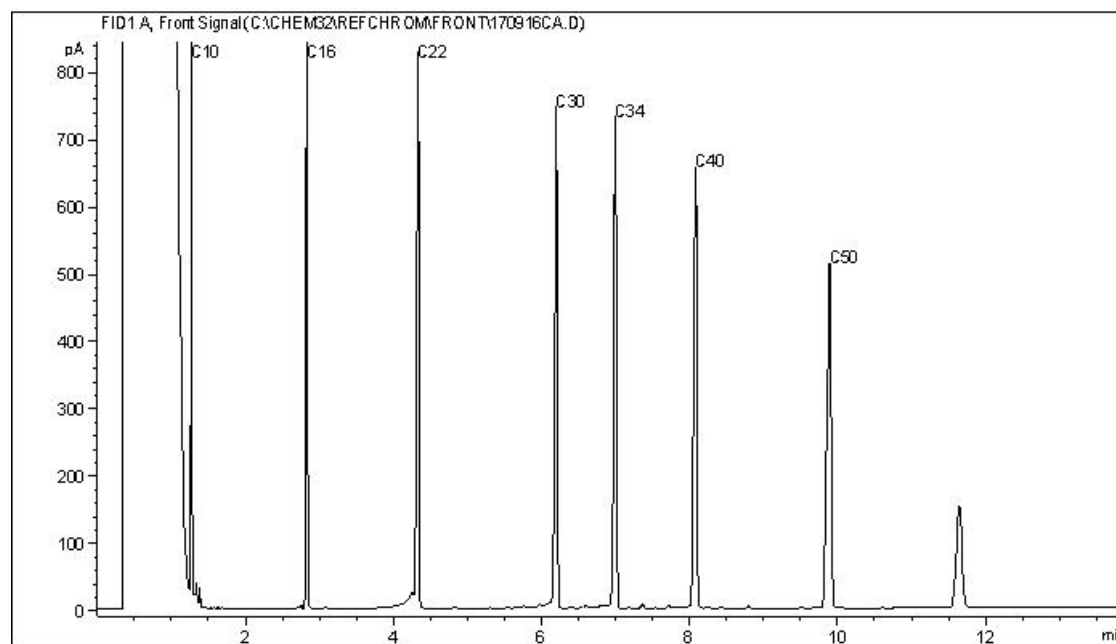
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CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC15



Carbon Range Distribution - Reference Chromatogram



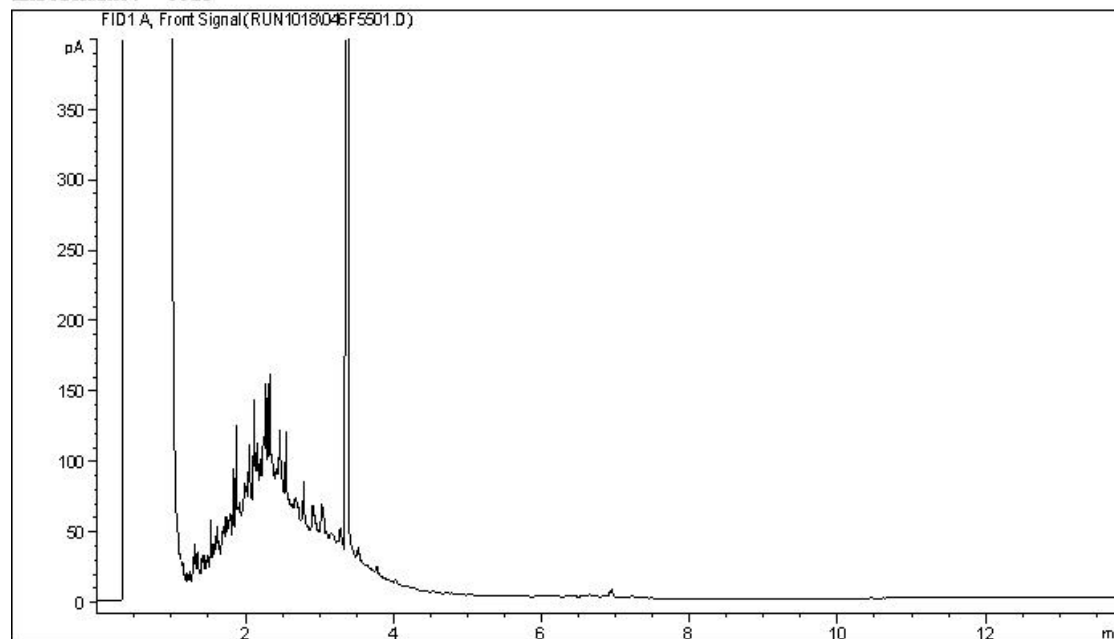
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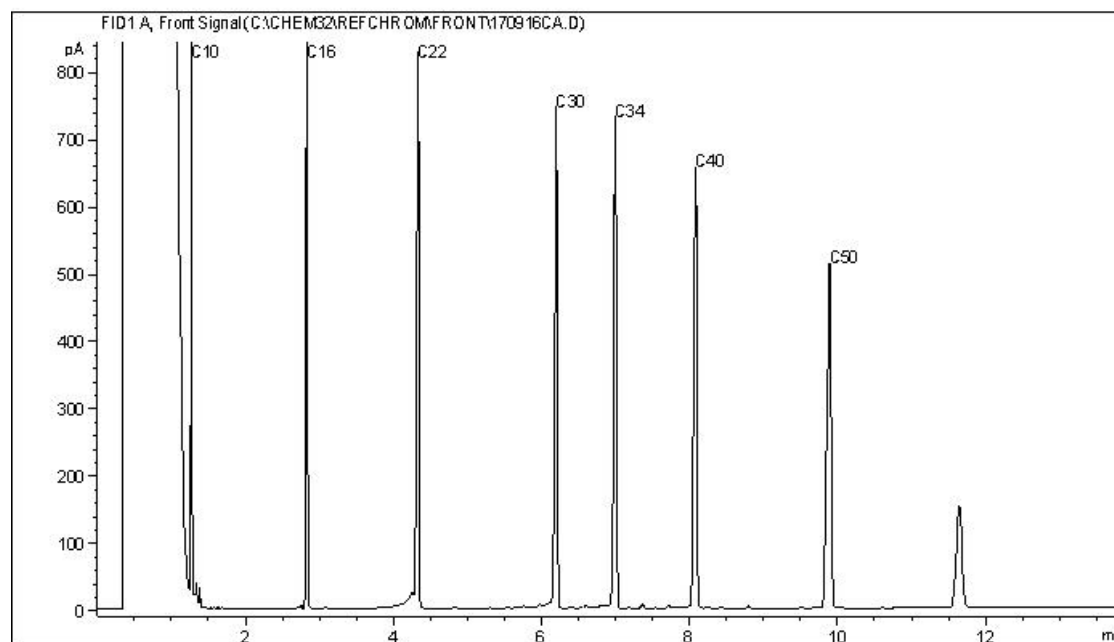
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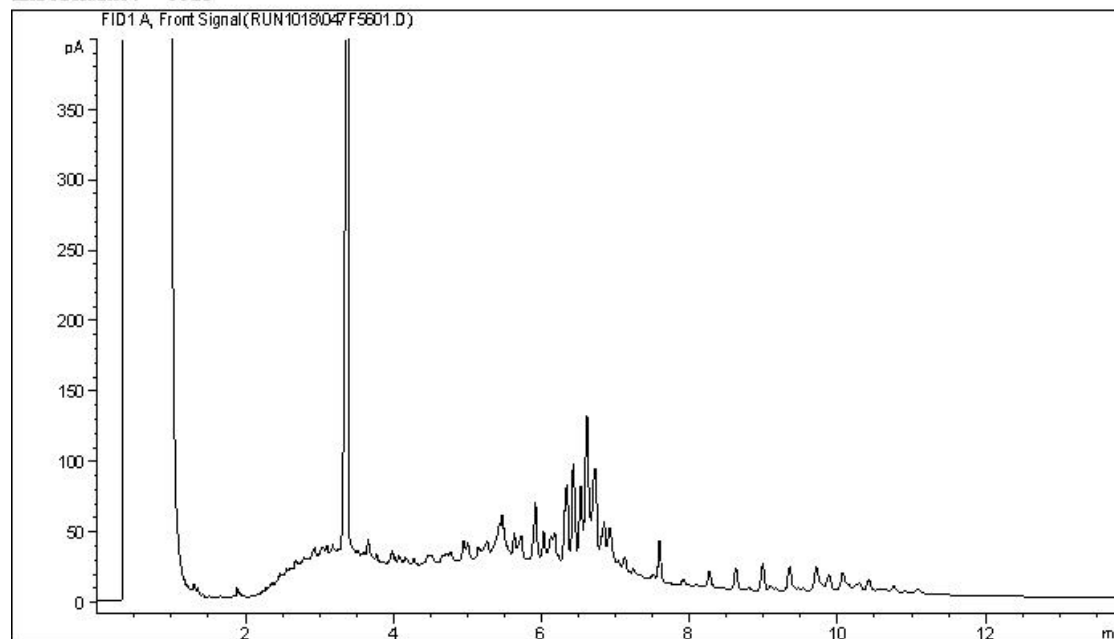
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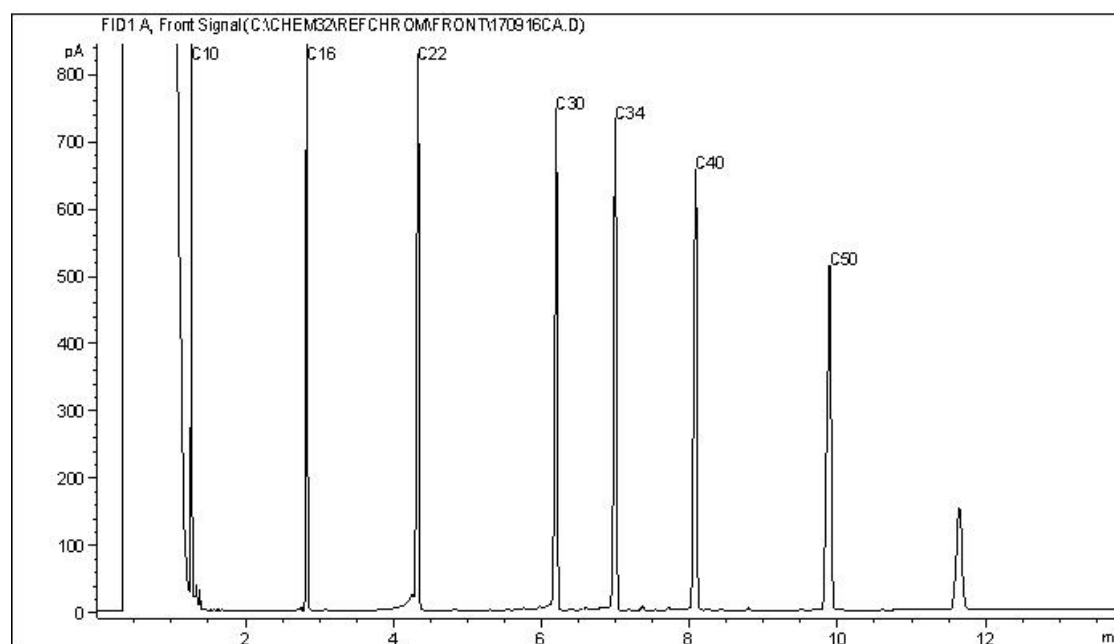
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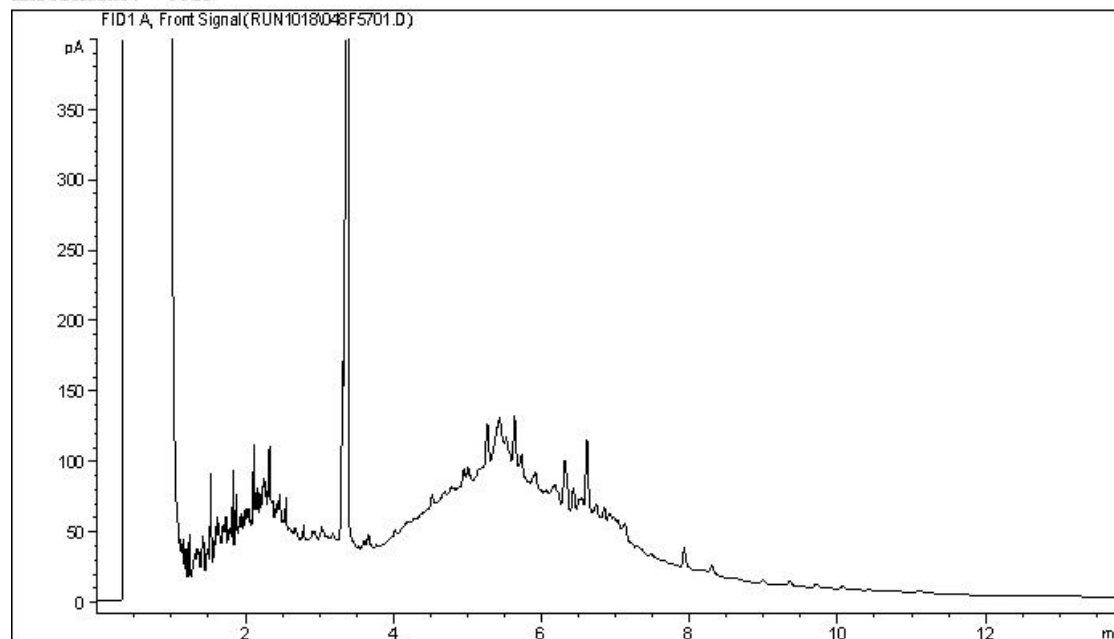
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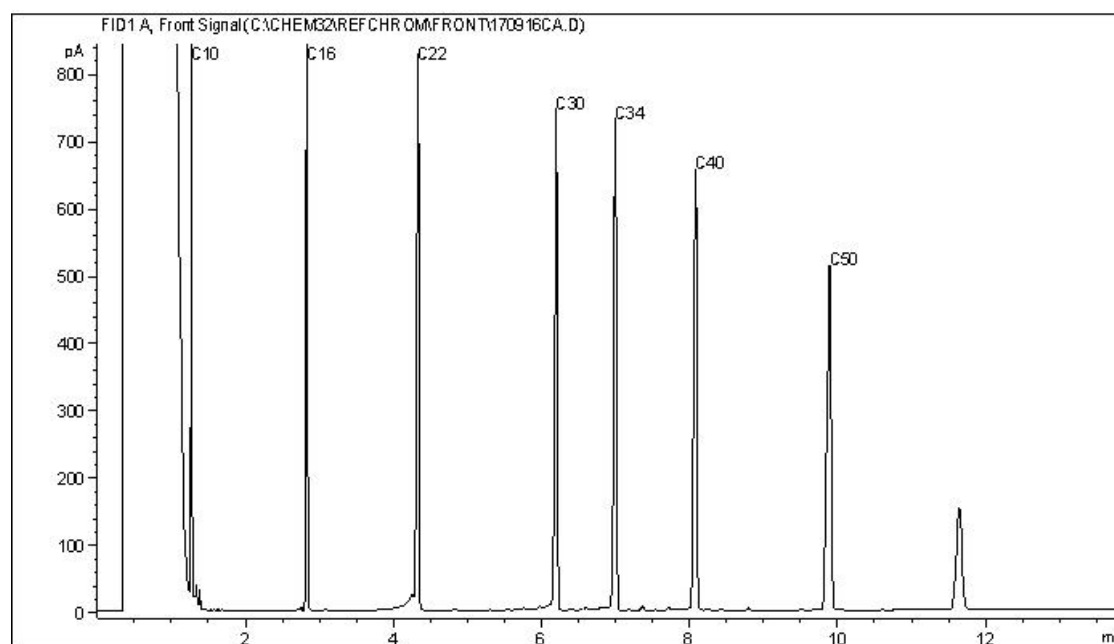
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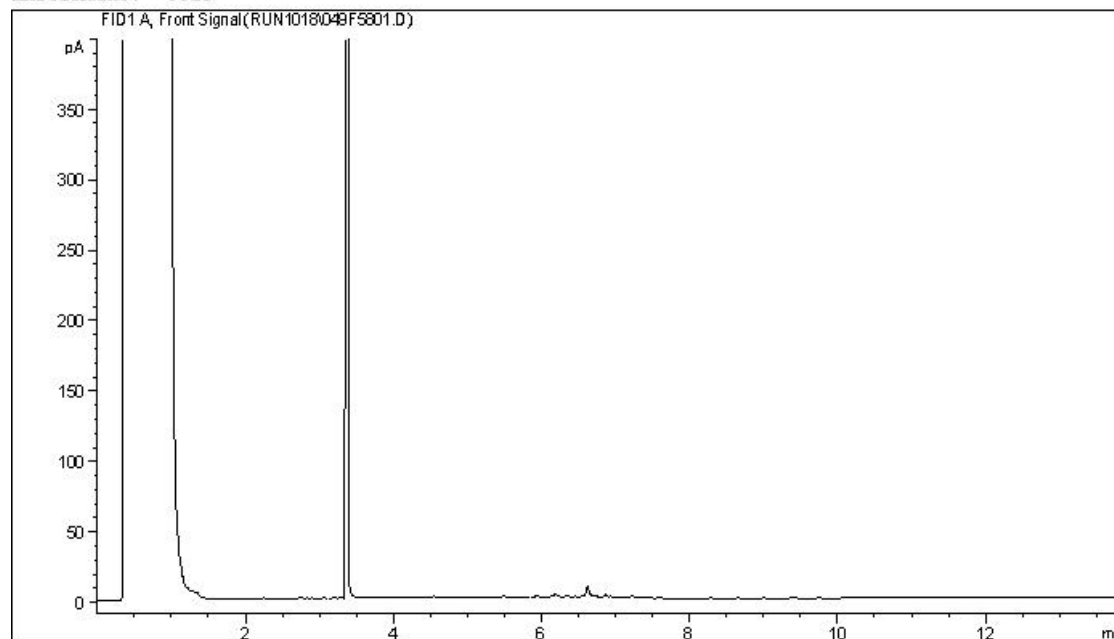
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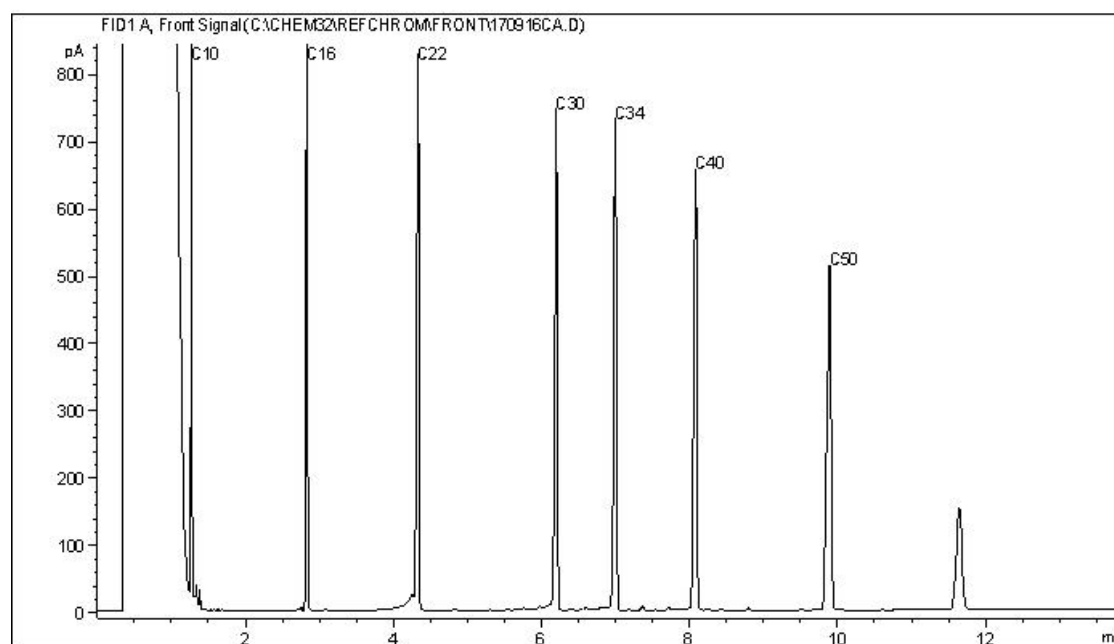
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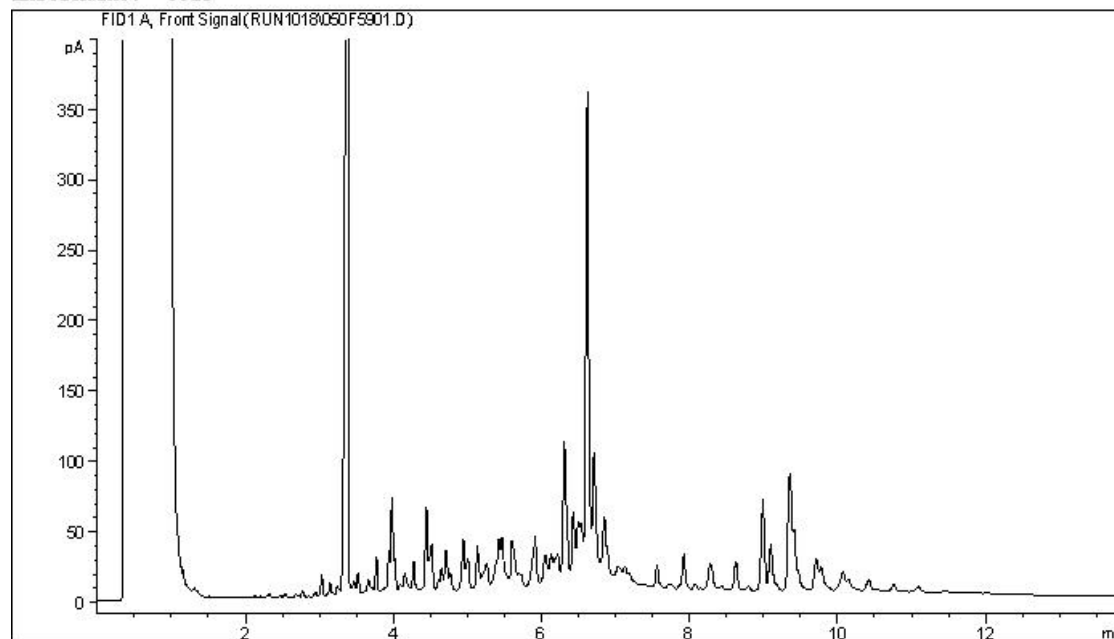
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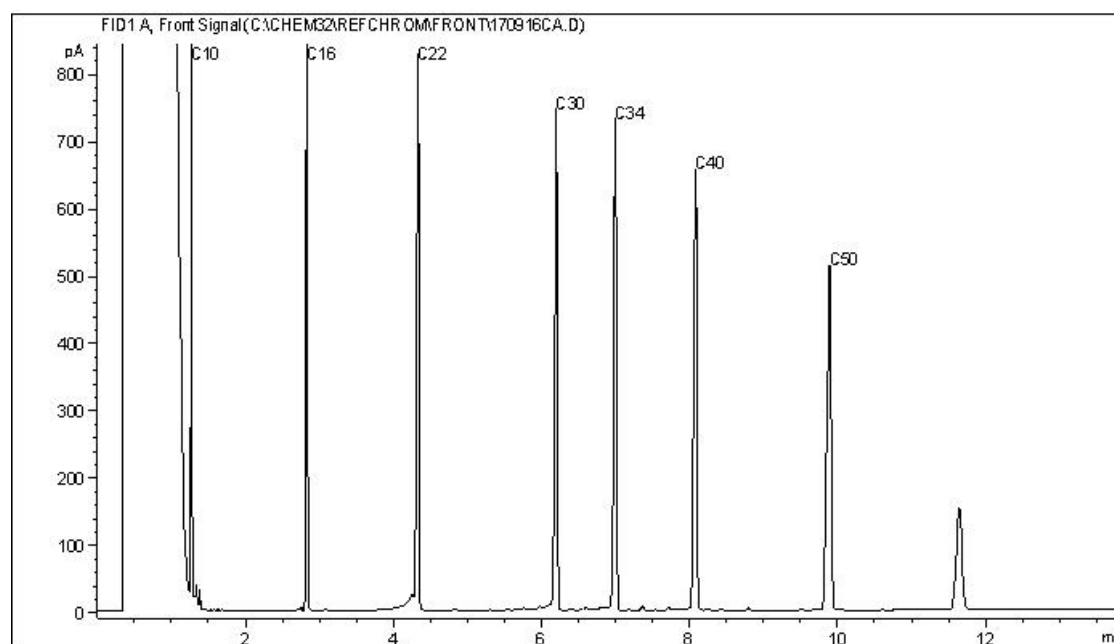
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Laboratory Report Data Checklist
*This document is to be completed
within 5 calendar days of receipt of Lab
Confirmation Package and Certificate of Analysis*

1. BACKGROUND

Client:	Government of Nunavut	Date(s) Sampled:	12-Oct-17, 13-Oct-17, 14-Oct-17
Laboratory:	Maxxam Calgary	Project Number:	307031-00048
Lab Submission Number:	B790895	Site Name:	Arviat Tank Farm

2. SAMPLE RECEIPT CONFIRMATION (SRC) - PART A

SRC cross-checked against the chain-of-custody (COC)
(sample names, analytical packages)? Yes Comments: _____

(Maxxam Only) Fundamental Laboratory Acceptance
Guideline (FLAG) received? No

If yes, FLAG type and comments: _____

Date Samples Submitted: 16-Oct-17

Due date for lab reports on SRC: 23-Oct-17

Data Check completed by: Melissa Lord Date: 13-Oct-17

4. CERTIFICATE OF ANALYSIS (COA) LAB Q/QC REPORT

Lab Data Received (PDF/EDD) with signature:	Qualifying ion outside of acceptance criteria for Benzene. Comments: Results are tentatively identified and potentially biased high for sample SS17-19.
Yes	_____
Extractions and analysis conducted within acceptable hold times?	Yes
Lab has warranted all tests were in statistical control? (look for trend rule failure notes)	Yes
Lab QA/QC samples are Acceptance Criteria?	
Instrumentation Surrogate Recovery	n/a
Extraction Surrogate Recovery	Yes
Method Blank Concentration	Yes
Matrix Duplicate RPD	Yes
Matrix Spike Recovery	Yes
Spiked Blank Recovery	Yes
Lab Control Sample (LCS) Recovery	n/a
Data Check completed by:	Date: <u>13-Nov-17</u>
<u>Vivian Baptista</u>	



Laboratory Report Data Checklist

*This document is to be completed
within 5 calendar days of receipt of Lab*

Confirmation Package and Certificate of Analysis

3. SAMPLE RECEIPT CONFIRMATION (SRC) - PART B

SRC cross-checked with program planning /analytical schedule (sample names, analytical packages correct as per schedule)?

Yes

Comments: _____

Data Check completed by:

Melissa Lord

Date:

13-Oct-17

5. CERTIFICATE OF ANALYSIS (COA) LAB QA/QC REPORT

Lab reports have all the requested packages, on the correct samples?

Yes

Detection limits are suitable for the project purpose?

(What was requested on the COC and is that correct?

Have any been raised?)

Yes

Data Check completed by:

Melissa Lord

Date:

13-Nov-17

6. CERTIFICATE OF ANALYSIS (COA) FIELD DUPLICATES, BLANKS

Field duplicates decoded and RPDs acceptable?

No

Comments: _____

Trip Blank results acceptable?

n/a

Comments: _____

Field Blank results acceptable?

n/a

Comments: _____

Equipment Blank results acceptable?

n/a

Comments: _____

Correspondence re: lab QA/QC issued attached (and saved under correct job #)?

Comments: _____

Data Check completed by:

Vivian Baptista

Date:

13-Nov-17

7. LAB DATA/FIELD DATA/HISTORICAL DATA CHECKS

Field EC vs. Lab EC RPDs acceptable?

n/a

Comments: _____

Field pH vs. Lab pH RPDs acceptable?

n/a

Comments: _____

Is lab collected data within acceptable/expected historical ranges, if applicable? Check against historical data tables if they exist.

n/a

Comments: _____

Sample SS17-02 and its field duplicate DUP 01 exceeded the 20% RPD limit for Total Lead (Pb) (49%). Sample SS17-02 and its field duplicate DUP 01 exceeded the 20% RPD limit for Moisture (64%). Sample SS17-02 and its field duplicate DUP 01 exceeded the 20% RPD limit for F2 (C10-C16 Hydrocarbons) (117%). Sample SS17-02 and its field duplicate DUP 01 exceeded the 20% RPD limit for F3 (C16-C34 Hydrocarbons) (125%). Sample SS17-02 and its field duplicate DUP 01 exceeded the 20% RPD limit for F4 (C34-C50 Hydrocarbons) (116%). Sample SS17-11 and its field duplicate DUP 02 exceeded the 20% RPD limit for Ethylbenzene (58%). Sample SS17-11 and its field duplicate DUP 02 exceeded



Laboratory Report Data Checklist

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Data Check completed by:	Melissa Lord	Date:	13-Nov-17
8. CERTIFICATE OF ANALYSIS (COA) RESULTS INTERPRETATION			
Data in in this report considered to be Fit for Purpose? Yes Date: 13-Nov-17			
Explain rational for yes/no: _____			
Request lab to recheck Data? If so give details: Comments: _____			
If Yes, Lab request to recheck must be approved by Project Manager		Date: _____	
Name: _____			
Data Check completed by:	Melissa Lord	Date:	13-Nov-17