



October 31, 2018

*Sent via email*

Mr. Roger Connelly  
Chairperson  
Inuvialuit Water Board  
PO Box 2531  
Inuvik, NT X0E 0T0

Dear Mr. Connelly:

**N7L1-1835 - Inuvik Tuktoyaktuk Highway Project - Water Sampling results**

Attached are the remaining ALS results for this year's SNP AEMP.

Should you have any questions regarding the above, do not hesitate to contact me at (867) 777-7478.

Sincerely,

Dean Ahmet  
Senior Program Manager, ITH  
Department of Infrastructure

- c. Kevin McLeod, Assistant Deputy Minister, Asset Management, INF
- Binay Yadav, Director, Transportation, INF
- Lloyd Gruben, Water Resources Officer, Environment and Natural Resources, GNWT



GOVERNMENT OF NWT  
ATTN: Kelly Kamo McHugh  
5009 49 STREET  
PO BOX 1320  
YELLOWKNIFE NT X1A 2L9

Date Received: 28-SEP-18  
Report Date: 16-OCT-18 13:38 (MT)  
Version: FINAL

Client Phone: 867-767-9083

## Certificate of Analysis

Lab Work Order #: L2172732  
Project P.O. #: NOT SUBMITTED  
Job Reference:  
C of C Numbers: 14  
Legal Site Desc:

\_\_\_\_\_  
Rick Zolkiewski  
General Manager

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

ADDRESS: 314 Old Airport Road, Unit 116, Yellowknife, NT X1A 3T3 Canada | Phone: +1 867 873 5593 |  
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2172732-1	L2172732-2	L2172732-3		
		Description	WATER	WATER	WATER		
		Sampled Date	25-SEP-18	25-SEP-18	25-SEP-18		
		Sampled Time	15:38	15:36	16:14		
		Client ID	1835-78-D	1835-78-C	1835-78-A		
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	pH (pH)		7.71	8.15	8.12		
	Total Suspended Solids (mg/L)		17.1	105	46.3		
<b>Volatile Organic Compounds</b>	Benzene (mg/L)		<0.00050	<0.00050	<0.00050		
	EthylBenzene (mg/L)		<0.00050	<0.00050	<0.00050		
	Toluene (mg/L)		<0.00050	<0.00050	<0.00050		
	o-Xylene (mg/L)		<0.00050	<0.00050	<0.00050		
	m+p-Xylene (mg/L)		<0.00050	<0.00050	<0.00050		
	Xylenes (mg/L)		<0.00071	<0.00071	<0.00071		
	F1(C6-C10) (mg/L)		<0.10	<0.10	<0.10		
	F1-BTEX (mg/L)		<0.10	<0.10	<0.10		
	Surrogate: 4-Bromofluorobenzene (SS) (%)		79.8	86.0	83.0		
	Surrogate: 3,4-Dichlorotoluene (SS) (%)		113.7	111.2	112.8		
	Surrogate: 1,4-Difluorobenzene (SS) (%)		99.1	98.3	98.9		
	<b>Hydrocarbons</b>	F2 (>C10-C16) (mg/L)		<0.10	<0.10	<0.10	
F3 (C16-C34) (mg/L)			<0.25	<0.25	<0.25		
F4 (C34-C50) (mg/L)			<0.25	<0.25	<0.25		
Surrogate: 2-Bromobenzotrifluoride (%)			96.4	94.9	94.4		

## Reference Information

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
<b>BTXS,F1-ED</b>	Water	BTEX, Styrene and F1 (C6-C10)	EPA 5021/8015&8260 GC-MS & FID
<b>EC-SCREEN-VA</b>	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
<b>F2,F3,F4-ED</b>	Water	F2, F3, F4	EPA 3510/CCME PHC CWS-GC-FID
Water samples are spiked with 2-BBTF surrogate, and extracted by reciprocal action shaker for 30 minutes using a single micro-extraction with 2 mL hexane. After extraction, hexane extracts are dispensed into GC vials for GC-FID analysis.			
<b>PH-PCT-VA</b>	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
It is recommended that this analysis be conducted in the field.			
<b>TSS-VA</b>	Water	Total Suspended Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.			

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

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

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

### Chain of Custody Numbers:

14

### GLOSSARY OF REPORT TERMS

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

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

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

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

*mg/L* - milligrams per litre.

*<* - Less than.

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

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

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

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

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



# Quality Control Report

Workorder: L2172732

Report Date: 16-OCT-18

Page 1 of 4

Client: GOVERNMENT OF NWT  
 5009 49 STREET PO BOX 1320  
 YELLOWKNIFE NT X1A 2L9

Contact: Kelly Kamo McHugh

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>BTXS,F1-ED</b>		<b>Water</b>						
<b>Batch</b>	<b>R4245978</b>							
<b>WG2892045-2</b>	<b>LCS</b>							
Benzene			79.8		%		70-130	02-OCT-18
Toluene			73.0		%		70-130	02-OCT-18
EthylBenzene			82.0		%		70-130	02-OCT-18
m+p-Xylene			82.7		%		70-130	02-OCT-18
o-Xylene			83.0		%		70-130	02-OCT-18
F1(C6-C10)			N/A		ug/L			02-OCT-18
F1(C6-C10)			N/A		mg/L			02-OCT-18
<b>WG2892045-3</b>	<b>LCS</b>							
Benzene			N/A		ug/L			02-OCT-18
Benzene			N/A		mg/L			02-OCT-18
Toluene			N/A		ug/L			02-OCT-18
Toluene			N/A		mg/L			02-OCT-18
EthylBenzene			N/A		ug/L			02-OCT-18
EthylBenzene			N/A		mg/L			02-OCT-18
m+p-Xylene			N/A		ug/L			02-OCT-18
m+p-Xylene			N/A		mg/L			02-OCT-18
o-Xylene			N/A		ug/L			02-OCT-18
o-Xylene			N/A		mg/L			02-OCT-18
F1(C6-C10)			84.5		%		70-130	02-OCT-18
<b>WG2892045-1</b>	<b>MB</b>							
Benzene			<0.00050		mg/L		0.0005	02-OCT-18
Toluene			<0.00050		mg/L		0.0005	02-OCT-18
EthylBenzene			<0.00050		mg/L		0.0005	02-OCT-18
m+p-Xylene			<0.00050		mg/L		0.0005	02-OCT-18
o-Xylene			<0.00050		mg/L		0.0005	02-OCT-18
F1(C6-C10)			<0.10		mg/L		0.1	02-OCT-18
Surrogate: 1,4-Difluorobenzene (SS)			100.5		%		70-130	02-OCT-18
Surrogate: 4-Bromofluorobenzene (SS)			85.4		%		70-130	02-OCT-18
Surrogate: 3,4-Dichlorotoluene (SS)			109.9		%		70-130	02-OCT-18
<b>F2,F3,F4-ED</b>		<b>Water</b>						
<b>Batch</b>	<b>R4256369</b>							
<b>WG2890338-2</b>	<b>LCS</b>	<b>DIESEL/MOTOR OIL</b>						
F2 (>C10-C16)			109.3		%		70-130	30-SEP-18
F3 (C16-C34)			111.4		%		70-130	30-SEP-18
F4 (C34-C50)			110.3		%		70-130	30-SEP-18



## Quality Control Report

Workorder: L2172732

Report Date: 16-OCT-18

Page 2 of 4

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>F2,F3,F4-ED</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4256369</b>							
<b>WG2890338-1</b>	<b>MB</b>							
F2 (>C10-C16)			<0.10		mg/L		0.1	30-SEP-18
F3 (C16-C34)			<0.25		mg/L		0.25	30-SEP-18
F4 (C34-C50)			<0.25		mg/L		0.25	30-SEP-18
Surrogate: 2-Bromobenzotrifluoride			94.9		%		60-140	30-SEP-18
<b>PH-PCT-VA</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4263385</b>							
<b>WG2895206-2</b>	<b>CRM</b>	<b>VA-PH7-BUF</b>						
pH			7.03		pH		6.9-7.1	05-OCT-18
<b>TSS-VA</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4258298</b>							
<b>WG2893168-5</b>	<b>LCS</b>							
Total Suspended Solids			100.9		%		85-115	02-OCT-18
<b>WG2893168-4</b>	<b>MB</b>							
Total Suspended Solids			<3.0		mg/L		3	02-OCT-18

# Quality Control Report

Workorder: L2172732

Report Date: 16-OCT-18

Page 3 of 4

## Legend:

---

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

# Quality Control Report

Workorder: L2172732

Report Date: 16-OCT-18

Page 4 of 4

## Hold Time Exceedances:

---

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
<b>Physical Tests</b>							
pH by Meter (Automated)							
	1	25-SEP-18 15:38	05-OCT-18 14:12	0.25	239	hours	EHTR-FM
	2	25-SEP-18 15:36	05-OCT-18 14:12	0.25	239	hours	EHTR-FM
	3	25-SEP-18 16:14	05-OCT-18 14:12	0.25	238	hours	EHTR-FM

## Legend & Qualifier Definitions:

---

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

### Notes\*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.  
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2172732 were received on 28-SEP-18 11:30.

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

---

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

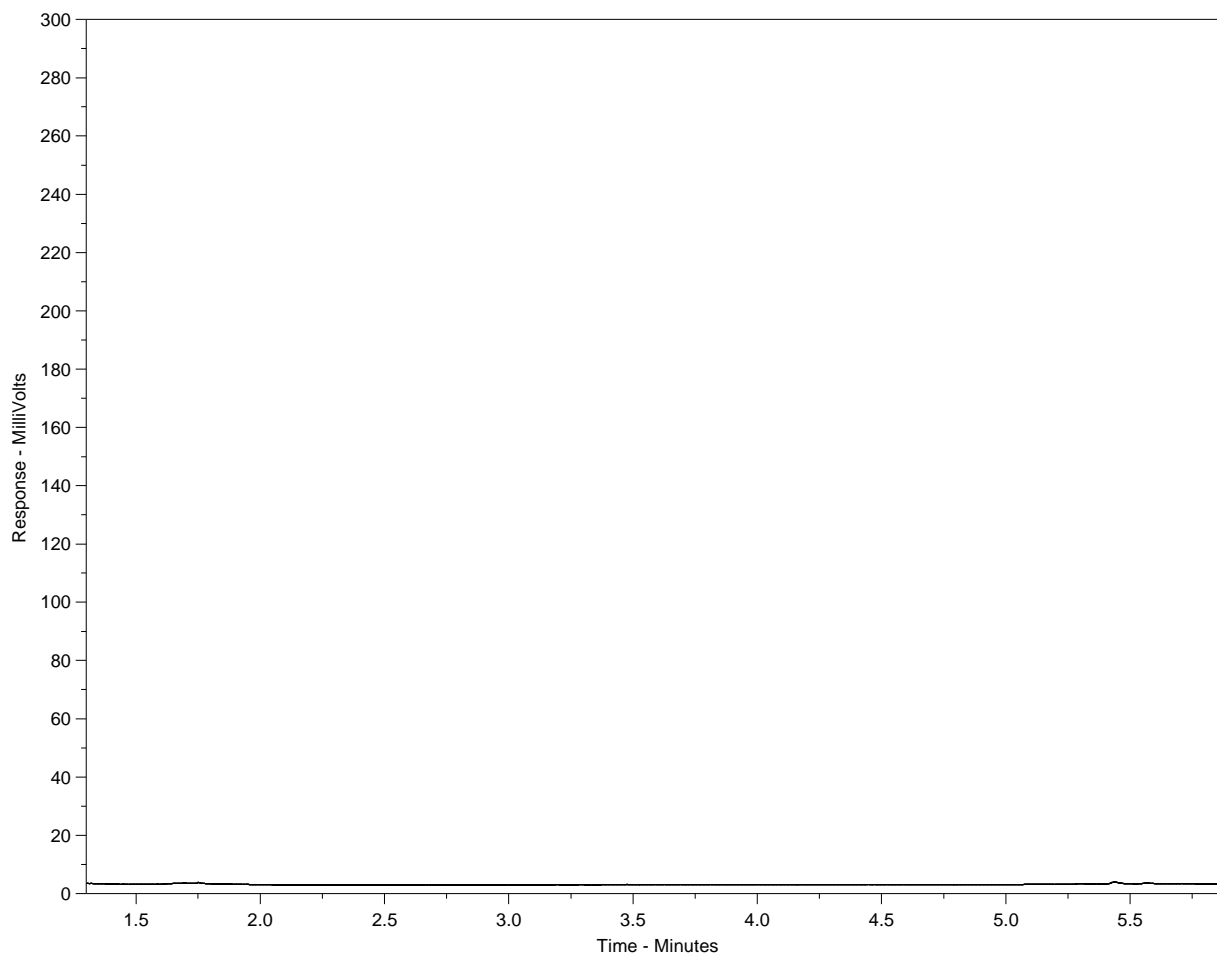
Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



# Hydrocarbon Distribution Report



ALS Sample ID: L2172732-1  
Client ID: 1835-78-D



F2		F3		F4		>F4	
nC10	nC16			nC34		nC50	
174°C	287°C			481°C		575°C	
346°F	549°F			898°F		1067°F	
← Gasoline →				← Motor Oils/ Lube Oils/ Grease →			
← Diesel/ Jet Fuels →							

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

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

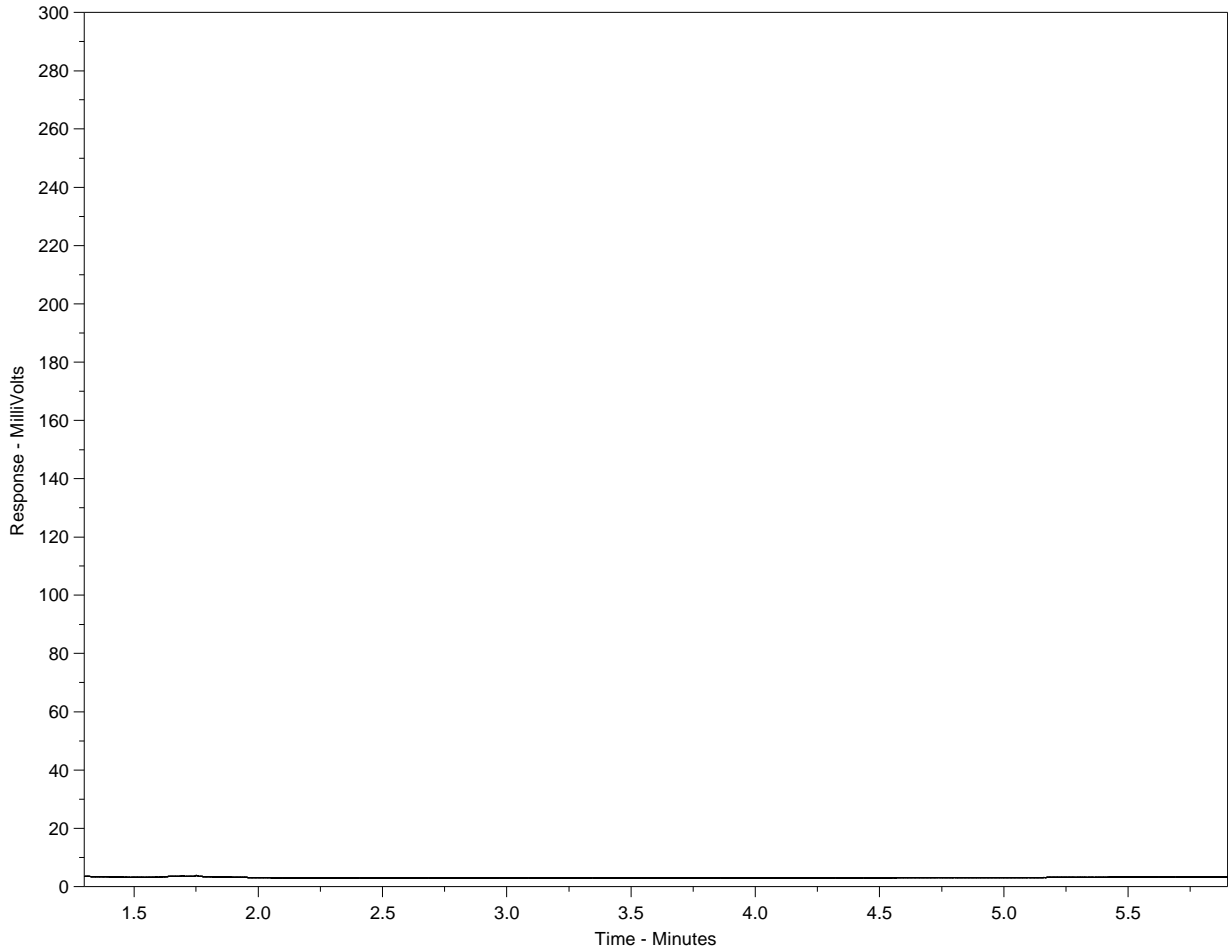
**Note:**

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

# Hydrocarbon Distribution Report



ALS Sample ID: L2172732-2  
 Client ID: 1835-78-C



← F2 →		← F3 →		← F4 →		← F4 →
nC10	nC16		nC34		nC50	
174°C	287°C		481°C		575°C	
346°F	549°F		898°F		1067°F	
← Gasoline →			← Motor Oils/ Lube Oils/ Grease →			
← Diesel/ Jet Fuels →						

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

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

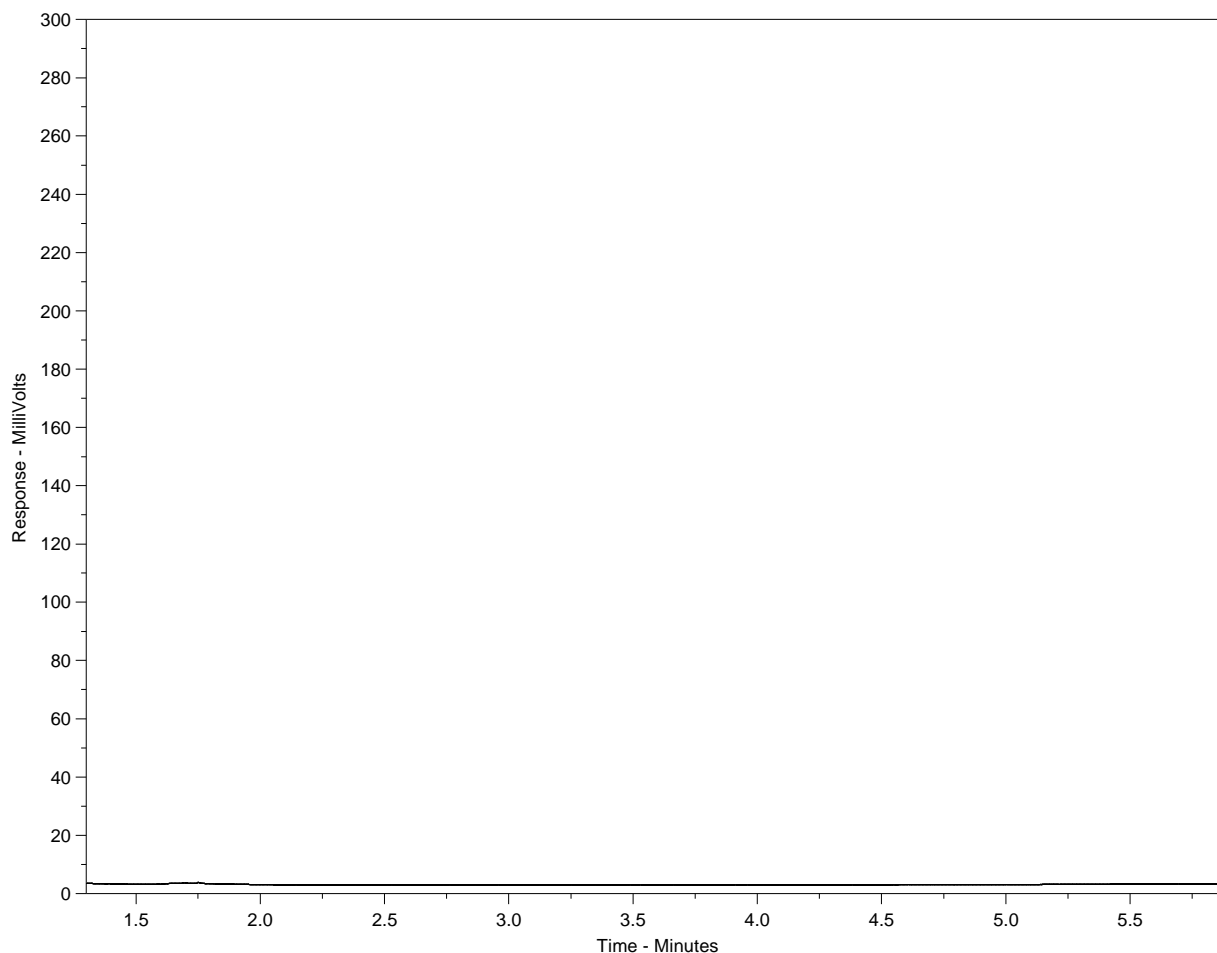
**Note:**

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

# Hydrocarbon Distribution Report



ALS Sample ID: L2172732-3  
Client ID: 1835-78-A



F2		F3		F4		>F4	
nC10	nC16			nC34		nC50	
174°C	287°C			481°C		575°C	
346°F	549°F			898°F		1067°F	
← Gasoline →				← Motor Oils/ Lube Oils/ Grease →			
← Diesel/ Jet Fuels →							

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

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

**Note:**

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

