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## Introduction

On Sunday October 2, 2016, Absolute Petroleum Ltd. (Absolute), a third party contractor to the Petroleum Products Division (PPD) within the Government of Nunavut (GN), identified a contaminated area located northeast of the PPD Aboveground Storage Tank Facility in Arviat.

PPD was alerted of the contamination at approximately 8:15am on Monday, October 3 by representatives from Absolute, who were onsite to complete API653 inspections on Tanks 9 and 11. PPD responded in order to conduct an extremely basic environmental site assessment (ESA) to determine the origin of the contamination, obtain measurements of the contaminated area, and to collect samples. The environmental assessment was completed in accordance with all associated guidelines, including but not limited to the Department of Environment Environmental Guideline for Contaminated Site Remediation, PPD's Environmental Emergency Plan, and PPD's Oil Pollution Emergency Plan.

## Objectives

The objective is to summarize the ESA conducted and to determine whether or not PPD is liable for the contaminated area identified by Absolute.

## Scope of Work

To meet the objectives above, the scope of work for this project consisted of the following;

- Determine the status of the site and associated infrastructure (i.e. resupply pipeline, all associated tanks within the tank farm, etc.).
- Determine the size and location of the contaminated site.
- Collect water and soil samples from the contaminated area.
- Supervise the pipeline tests of the resupply line.
- Determine plausible cause for contamination.
- Determine whether or not PPD is liable for the contaminated area.
- Prepare a summary report detailing the actions taken by PPD.

## Site Description

The Arviat tankfarm consists of 6 vertical tanks (5 diesel and 1 gas), 6 horizontal tanks for emergency purposes, an operator shelter, a dispenser island and one dispenser building for diesel and gasoline. The resupply pipeline runs northeast through the center of the northeastern border of the tank farm (Figure 1 in Appendix A).

The tankfarm was constructed approximately 21 years ago, in 1995, and is listed as lined within the Operations and Maintenance Manual (O&M). The tank farm slopes southeast, therefore any surface drainage would flow in a southeasterly direction towards the field opening.

The area surrounding the tankfarm is tundra wetland.

There is another tankfarm owned and operated by Eskimo Point Lumber Supply Ltd. (EPLS) located north of the PPD tankfarm. There are 6 small vertical tanks located within the tankfarm. A pipeline runs from the northern boundary of the Arviat tank farm to the EPLS tankfarm. The main valve for this pipeline is located outside of the tankfarm in the space between PPD and EPLS tank farms.

The general layout of the Site is shown on Figure 1 in Appendix A.

## Scope of Work

### Summary of Events

- PPD was alerted of the contamination at approximately 8:15am on Monday October 3, 2016 by Absolute.
- PPD traveled to Arviat on Wednesday October 5, 2016 at 10:15am to conduct a basic Environmental Site Assessment due to scheduling.
- Discussed any potential issues with Padlei Co-op staff in the operator shack;
  - No recorded historical spills,
  - No known historical spills of a quantity more than 5-10L,
  - Additional information for PPD HQ information included;
    - Certain accounts not appearing in the new POS system that PPD installed recently.
      - Natick 20-00604, 71L443 – gas works but diesel does not
      - Hamlet vehicles – certain vehicles, not all of them
      - Department of Environment (DOE) 123066, 113418
    - New nozzles for dispensers required, gasoline priority
    - More spill equipment required; only 1 boom and no absorbent pads left
- Met with Absolute representatives who identified the contaminated area.
  - Surveyed perimeter of tank farm,
  - Surveyed perimeter of contaminated area,
    - Noted slope and gradients
    - Noted vegetation type
    - Collected water and soil samples
    - Collected photographs
  - Aviation Gasoline (AvGas) is not locked within the tank farm, but set just beside the tank farm. Issue with where the drums are placed; any driver could accidentally drive into them and cause a spill. Needs to be moved or made more secure.
  - Absolute was conducting API 653 inspections (American Petroleum Institute Inspections);
    - Overall, tanks are in good condition
    - The floors needed a lot of work on the two tanks (Tanks 9 and 11)
    - Walls were fine, overall
  - A lot of vegetation is currently within the tank farm, this needs to be dealt with as it is a fire hazard;
    - Mentioned by Absolute
    - Reported by Assistant Fire Marshall
  - EPLS' pipeline is directly connected to PPD's. The valve could be turned at any point and PPD's supply could be gravity fed into EPLS. Something to make note of for future reference as volume differences could be the result of this. An EPLS rep was not available.

- No product volume missing at this time.
- Small contaminated area noticed on eastern side of tank farm where berm water is discharged. Requires surficial scrapping. Water sample obtained, results listed below.
- Met with The Arviat Hamlet to discuss snow removal;
  - The contaminated area is located close to the road and a local dumping site for snow;
    - Discussed with Hamlet not to pile snow in that area in case of contamination.
  - Resupply pipeline at the shore manifold is slowly bending under the weight and pressure of snow build up. It could lead to a break and a future spill if not remedied immediately.
  - Daniel Kaludjak with the garage noted that the Hamlet will no longer pile snow onto the resupply pipeline. They will make every effort to move the snow to the other side, away from the shore manifold.
    - A representative from PPD should check to ensure the Hamlet does not pile any snow during the winter season.
- Absolute Petroleum tested PPD's resupply line October 7;
  - Both diesel and gas lines passed (refer to document in Appendix D).
  - No evidence of leaks in either resupply line.

## Environmental Site Assessment

The ESA was conducted on October 5 and 7, 2016. The objective of the ESA was to determine where the contamination originated, where impacts from the contaminated area were present and, if possible, delineate the extent of the impacts. The following work was conducted in order to meet this objective;

- Review historic spill reports and historic product measurement levels,
  - A list of historical spills within Arviat for the last 17 years is located in Appendix C.
  - Volume Reconciliation is located in Appendix E.
    - No volume of product is unaccounted for.
- Research applicable regulatory framework for sample analysis comparison where Nunavut guidelines do not exist,
- Prepare a site specific health and safety plan,
- Collected characterization soil samples to determine the contaminants of concern for the site,
- Collected surface water samples to investigate the presence of hydrocarbon impacts,
- Investigate nearby surface water bodies for indications of impacts and collect characterization surface water samples,
- Collect photographs of area, and
- Determine cause of contamination and whether it is PPD's liability.

The location of the samples collected during the ESA are shown in Appendix A, Figures.

## Regulatory Framework

### Soil

The GN has issued the Environmental Guidelines for Site Remediation (GN Guidelines) under the authority of the territorial Environmental Protection Act (EPA) in 2002 (last updated March 2009). For the purposes of evaluation soil quality, the GN has adopted the Canadian Council of

Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (SQG) and the Canada Wide Standards for Petroleum Hydrocarbons in Soil (CWS). In cases where GN Guidelines or CCME guidelines do not exist, PPD had applied environmental quality guidelines and standards from other Canadian jurisdictions.

- Canadian Council of Ministers of the Environment (CCME). Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, 1999 updated 2010.
- CCME Canada-wide Standards (CWS) for PHCs in Soil, 2008.

The SQGs are based on protection of either ecological or human health. For each soil quality guideline, the CCME also provides pathway-specific guidelines. The most stringent of the applicable human health or ecological pathway was selected as the applicable guideline for use as a remediation target. In the tankfarm and road area, the industrial land use standard was applied.

## Water

Given the Site location next to a small water body in non-potable groundwater condition, concentrations of Benzene, Toluene, Ethylbenzenes, and Xylenes (BTEX) and PHCs in samples collected have been compared to the following generic guidelines;

- CCME Canadian Water Quality Guidelines (CWQG) for the Protection of Aquatic Life 1999, updated 2010 (freshwater and marine aquatic life protection);
- Atlantic Risk Based Corrective Action (RBCA), Ecological Screening Levels, 2012,
- Ontario MOE Table 9 Generic Site Condition Standards for use within 30m of a Water Body in Non-potable Groundwater Condition for Use Under Part XV.1 of the Environment Protection Act (MOE, 2011).

## Results

### Field Observations

Upon arrival at the Site, an overview of the Site was completed to identify areas of concern. Visual evidence of contamination was observed in the area identified by Absolute; northeast of the Arviat Aboveground Storage Tank Facility. The contaminated area measured an average of 100m x 2m x 0.4m. At its widest, the area measured 100m x 10m x 0.75m. Refer to Appendix A, Figures for location.

The Site is within a small tundra wetland system with a southeastern slope. It is rich in moss, lichen and arctic cotton. Large pools of water are located southeast of the Arviat Aboveground Storage Tank System.

Visual evidence of a release was not observed within the tankfarm or the PPD resupply pipeline. However, there was evidence of disturbance to the pipeline support for the EPLS line and a strong odour around the line. There was also evidence of old pipe and other equipment lying around the EPLS tankfarm and yard (refer to Appendix B Photographs).

The support looks partially dug up and the valve potentially replaced with a newer model. However, as the valve and line do not belong to PPD, additional information could not be obtained from PPD headquarters.

Every effort was made by PPD to obtain additional information from EPLS representatives. PPD went to the EPLS garage located directly beside the tankfarm and received no information. All email communication has not been acknowledged or answered by EPLS.

A small contaminated area was observed southeast of the Aboveground Storage Tank Facility. This was clearly a discharge area for water as a hose was still within the berm leading to the area. Small traces of free petroleum hydrocarbons were observed and recorded. A water sample was collected.

### Laboratory Analysis

Table 1.0 Arviat Environmental Assessment Water Samples – October 5, 2016

Parameter	Regulation	Sample		
	CCME*	WS1-Valve	WS2	WS3
<b>Volatiles</b>				
Benzene	370 ug/L	79.6	1.9	ND (0.5)
Carbon Tetrachloride	13.3 ug/L	ND (0.2)	ND (0.2)	ND (0.2)
Chlorobenzene	1.3 ug/L	ND (0.5)	ND (0.5)	ND (0.5)
Chloroform	1.8 ug/L	ND (0.5)	ND (0.5)	ND (0.5)
1,2-Dichlorobenzene	0.7 ug/L	ND (0.5)	ND (0.5)	ND (0.5)
1,3-Dichlorobenzene	150 ug/L	ND (0.5)	ND (0.5)	ND (0.5)
1,4-Dichlorobenzene	26 ug/L	ND (0.5)	ND (0.5)	ND (0.5)
1,2-Dichloroethane	100 ug/L	ND (0.5)	ND (0.5)	ND (0.5)
Ethylbenzene	90 ug/L	83.0	1.5	ND (0.5)
Hexane		24.8	3.5	ND (1.0)
Methyl tert-butyl-ether	10,000 ug/L	ND (2.0)	ND (2.0)	ND (2.0)
Methylene Chloride	98.1 ug/L	ND (5.0)	ND (5.0)	ND (5.0)
Styrene	72 ug/L	ND (0.5)	ND (0.5)	ND (0.5)
Tetrachloroethylene	111 ug/L	ND (0.5)	ND (0.5)	ND (0.5)
Toluene	2 ug/L	564	14.2	ND (0.5)
m/p-xylene	n/a	628	16.5	ND (0.5)
o-xylene	n/a	375	23.8	ND (0.5)
Xylenes, total	330 ug/L*	1000	40.3	ND (0.5)
<b>Hydrocarbons</b>				
F1 PHCs (C6-10)	420 ug/L**	1200	ND (25)	ND (25)
F2 PHCs (C10-16)	150 ug/L**	760	ND (100)	ND (100)
F3 PHCs (C16-34)	500 ug/L**	240	419	ND (100)
F4 PHCs (C34-50)	500 ug/L**	ND (100)	ND (100)	ND (100)

CCME\* Freshwater Aquatic.

\*Atlantic Based Corrective Action (RBCA) Ecological Screening, Surface Water Screening Level.

\*\*Ontario MOE Table 9 Generic Site Condition Standards.

ND Not detectable, below detectable limit or 0.

N/A No standard or guideline available.

(00) Denotes laboratory detection limits.

■ Exceeds applicable guidelines.

Table 2.0 Arviat Environmental Assessment Soil Samples – October 5, 2016

Parameter	Regulation	Sample	
	CCME*	SS1	SS2
<b>Physical Characteristics</b>			
% solids (% by weight)		72.7% by wt.	89.2% by wt.
<b>Metals</b>			
Copper	91 ug/g dry	8.5	9.2
Lead	600 ug/g dry	7.3	2.6
Nickel	89 ug/g dry	7.5	6.9
<b>Volatiles</b>			
Benzene	0.03 ug/g dry	ND (0.02)	ND (0.002)
Carbon Tetrachloride	50 ug/g dry	ND (0.05)	ND (0.002)
Chlorobenzene	10 ug/g dry	ND (0.05)	ND (0.002)
Chloroethane	50 ug/g dry	ND (0.05)	ND (0.005)
Chloroform	50 ug/g dry	ND (0.05)	ND (0.003)
Chloromethane	50 ug/g dry	ND (0.05)	ND (0.02)
1,2-Dichlorobenzene	10 ug/g dry	ND (0.05)	ND (0.002)
1,3-Dichlorobenzene	10 ug/g dry	ND (0.05)	ND (0.002)
1,4-Dichlorobenzene	10 ug/g dry	ND (0.05)	ND (0.002)
1,1-Dichloroethane	50 ug/g dry	ND (0.05)	ND (0.002)
1,2-Dichloroethane	50 ug/g dry	ND (0.05)	ND (0.002)
1,1-Dichloroethylene	50 ug/g dry	ND (0.05)	ND (0.002)
Cis 1,2-Dichloroethylene	50 ug/g dry	ND (0.05)	ND (0.002)
Trans 1,2-Dichloroethylene	50 ug/g dry	ND (0.05)	ND (0.003)
1,2-Dichloropropane	50 ug/g dry	ND (0.05)	ND (0.002)
Cis 1,3-Dichloropropylene	50 ug/g dry	ND (0.05)	ND (0.002)
Trans 1,3-dichloropropylene	50 ug/g dry	ND (0.05)	ND (0.002)
Ethylbenzene	0.082 ug/g dry	1.25	ND (0.002)
Hexane	6.5 ug/g dry	ND (0.05)	N/A
Methylene Chloride	50 ug/g dry	ND (0.05)	ND (0.003)
Styrene	50 ug/g dry	ND (0.05)	ND (0.002)
Tetrachloroethylene	0.6 ug/g dry	ND (0.05)	ND (0.002)
Toluene	0.37 ug/g dry	0.34	ND (0.002)
m/p-xylene		6.94	ND (0.002)
o-xylene		3.03	ND (0.002)
Xylenes, total	11 ug/g dry	9.97	ND (0.002)
<b>Hydrocarbons</b>			
F1 PHCs (C6-10)	240 ug/g dry	ND (7)	ND (7)
F2 PHCs (C10-16)	260 ug/g dry	ND (4)	ND (4)
F3 PHCs (C16-34)	1700 ug/g dry	209	70
F4 PHCs (C34-50)	3300 ug/g dry	63	22

CCME\* Soil Quality Guidelines; Commercial, coarse material

ND Not detectable, below detectable limit or 0.

N/A Not Applicable

■ Exceeds applicable guidelines

## Discussion

Based on the water samples (WS1-Valve and WS2) collected from the Site, higher levels of hydrocarbons from WS1-Valve suggest that this is the origin of the contamination, which travelled downslope (southeast) towards WS2.

WS1-valve, the water sample collected directly downstream of the EPLS pipeline and valve, had levels of toluene, xylene (total), F1 and F2 PHCs that exceeded applicable guidelines. WS2, the water sample collected downstream of the PPD resupply pipelines, exceeded applicable guidelines for toluene. There is approximately 60m between the two water samples.

Water sample WS3 is not related to the Site based on visual observations. It did not exceed guidelines for hydrocarbons or volatiles. It is the water discharge area confirmed by discussion with the local Co-op and visual interpretation; i.e. discharge hose clearly laid out from the berm to the sample area. It should be noted that an inspection of the water should be conducted by a representative from the Department of Environment before discharge. If sheen is observed in the water, a water sample should be collected to confirm it meets applicable guidelines before discharging.

Soil samples SS1 and SS2 collected from the Site did not exceed applicable guidelines for hydrocarbons. SS1 exceeded volatile guidelines for ethylbenzene. This suggests that the Site contamination has not permeated the soil.

Naturally-occurring organic compounds exist in this type of vegetation (tundra wetland), however due to the levels of hydrocarbons and volatiles found within the water sample WS1-valve, paired with the odour surrounding the area, it is highly unlikely that this is the cause of the sheen in this area.

Historical data shows that no spills have been recorded from the PPD Tankfarm or the EPLS pipeline. No known spills of 10L or more have ever been noted from the local Co-op. The small spills that have been noted within the Tankfarm have occurred at the gas/diesel island dispenser or the gas/diesel dispenser building located on the opposite side of the Site location. Refer to Appendix A, Figures.

Based on volume reconciliation within PPD Headquarters (refer to Appendix E), there is no product unaccounted for. The line test completed by Absolute on October 7, 2016 indicates that the lines are in working order and are not leaking. Therefore there is no cause to believe that the contamination is due to PPD product.

Unfortunately, the cause of the contamination is still unknown. There are multiple probable causes, however without all the evidence, it is unknown if the source originates from the EPLS line, potential contaminated snow moved into the area from the Hamlet, the old pipe equipment in the EPLS yard, scattered drums in the EPLS yard, etc.

It is strongly advised that additional inspections are completed by unbiased parties. It is also recommended that EPLS conduct their own investigation into the small tankfarm to ensure that their product is not the cause of the contamination.

## **Conclusion**

Activities at the Site conducted by PPD focused on determined whether or not free hydrocarbons were present, the origin of the contamination and whether PPD would be liable for any remediation that could occur at the Site.

Field observations indicate that free hydrocarbons exist at Site. Laboratory analysis indicates that free hydrocarbons exist in the water around the sample area.

Based on volume reconciliation, lines tests, and known historical spills within the community, PPD is not liable for the contamination of this area.

However, PPD concludes that an additional Site inspection be completed by the Department of Environment to ensure the removal of all free hydrocarbons by the responsible party.

## **Closure**

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the work was completed. The evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to PPD at the time. All information provided by Padlei Co-op in the preparation of this report has been assumed by PPD to be correct.

## References

Atlantic Risk Based Corrective Action (RBCA) for Petroleum Impacted Sites in Atlantic Canada, Version 3, User Guide, Ecological Screening Levels, July 2012 (revised January 2015),

[http://www.atlanticrbca.com/wp-content/files\\_mf/1443702097ATLANTIC\\_RBCA\\_User\\_Guidancev3\\_updated\\_September2015.pdf](http://www.atlanticrbca.com/wp-content/files_mf/1443702097ATLANTIC_RBCA_User_Guidancev3_updated_September2015.pdf)

Canadian Council of Ministers of the Environment (CCME). Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, 1999 updated 2010.

[http://www.ccme.ca/en/resources/canadian\\_environmental\\_quality\\_guidelines/](http://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines/)

CCME Canada-wide Standards (CWS) for PHCs in Soil, 2008.

[http://www.ccme.ca/en/resources/canadian\\_environmental\\_quality\\_guidelines/](http://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines/)

CCME Canadian Water Quality Guidelines (CWQG) for the Protection of Aquatic Life 1999, updated 2010 (freshwater and marine aquatic life protection);

[http://www.ccme.ca/en/resources/canadian\\_environmental\\_quality\\_guidelines/](http://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines/)

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Government of Nunavut, Department of Environment. 1999, revised 2009. Environmental Guideline for Contaminated Site Remediation. Accessed online November 9, 2015 at:

<http://env.gov.nu.ca/sites/default/files/Guideline%20Contaminated%20Site%20Remediation.pdf>

Ontario MOE Table 9 Generic Site Condition Standards for use within 30m of a Water Body in Non-potable Groundwater Condition for Use Under Part XV.1 of the Environment Protection Act, 2011, <https://dr6j45jk9xcmk.cloudfront.net/documents/998/3-6-3-sediment-standards-en.pdf>

## Appendix A: Figures

Figure 1.0 Aerial overview of the Arviat Aboveground Storage Tank Facility Site



Figure 2.0 Aerial overview of the contaminated site around the Arviat Aboveground Storage Tank Facility Site



\*Please note this figure is not to scale.

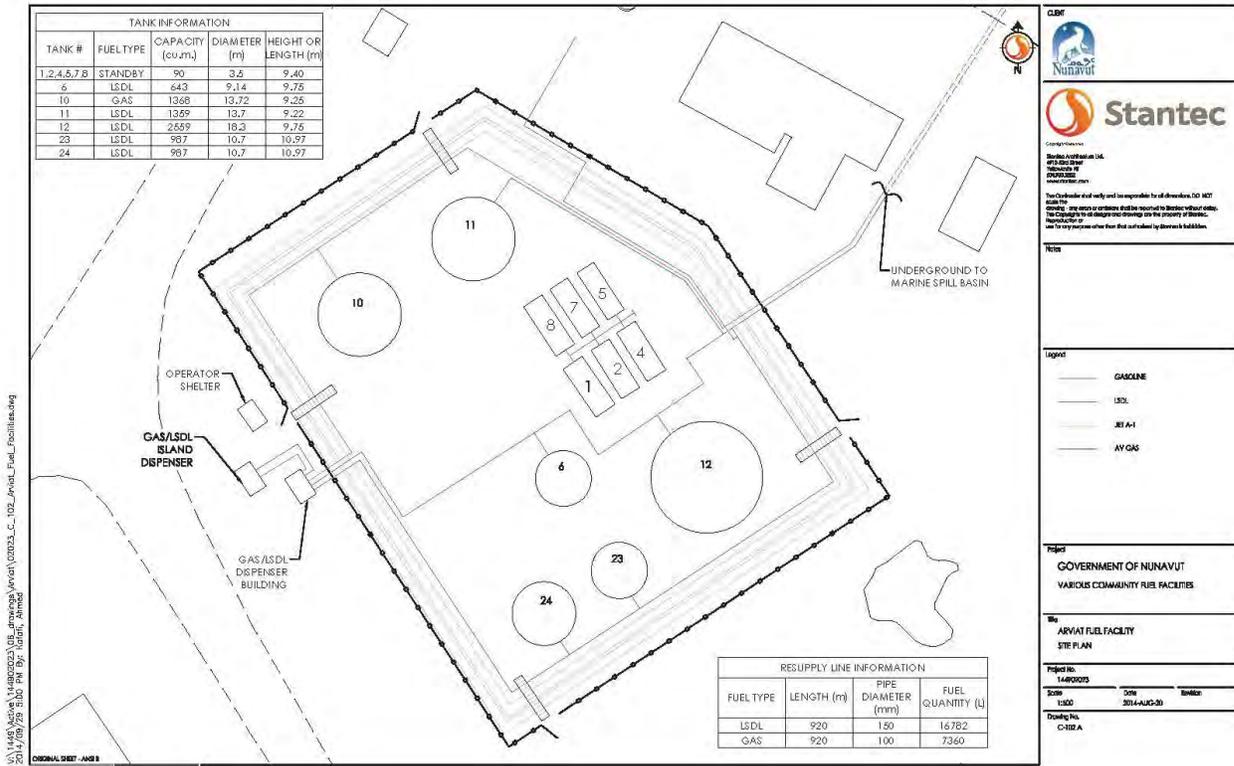
Figure 3.0 Aerial overview of water sample locations around the Arviat Aboveground Storage Tank Facility



Figure 4.0 Aerial overview of soil sample locations around the Arviat Aboveground Storage Tank Facility



Figure 5.0 Overview of Arviat Site Plan



## Appendix B: Photographs

Photo 1 – Overview of EPLS tankfarm and line next to PPD Tankfarm, October 5 2016.



Photo 2 – View of EPLS line from PPD Tankfarm to EPLS Tankfarm, October 5 2016.



Photo 3 – View of EPLS flex connection, October 5 2016.



Photo 4 – View of partly unearthed EPLS support stand, October 5 2016.



Photo 5 – View of contaminated area next to EPLS line looking Northwest, October 5 2016.



Photo 6 – View of contaminated water at the north end of the Site, October 5 2016.



Photo 7 – View of PPD resupply pipeline next to newly developed ELPS building, October 5 2016.

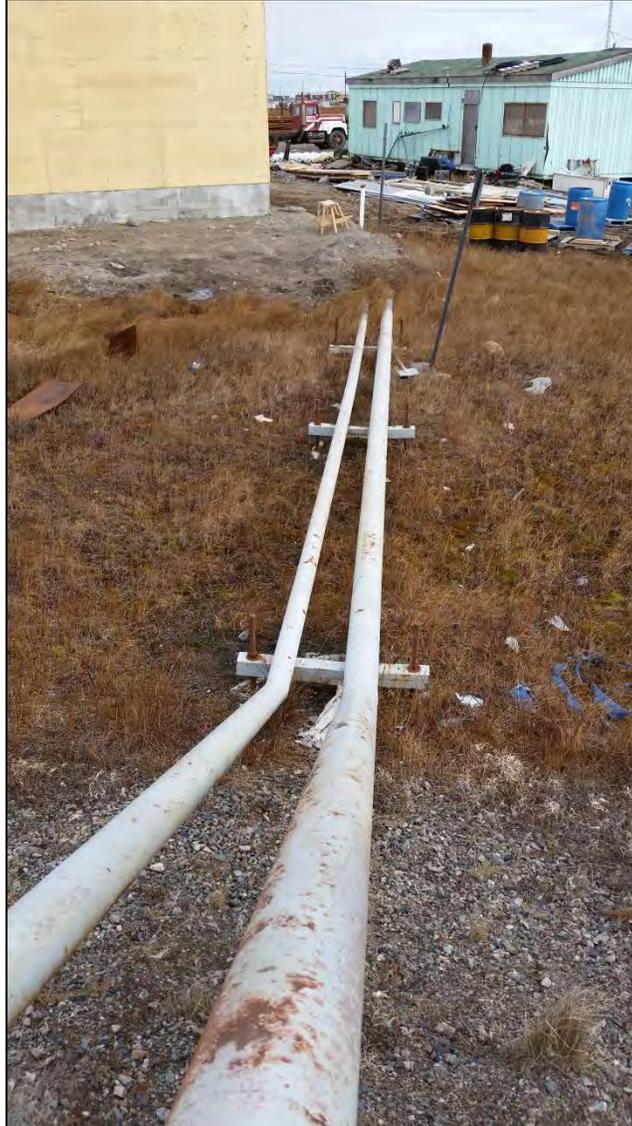


Photo 8 – View of contaminated area next to PPD resupply pipeline, October 5 2016.



Photo 9 – View of contaminated area and naturally-occurring organics, October 5 2016.



Photo 10 – View of EPLS yard and part of contaminated area, October 5 2016.



## Appendix C: Historical Spill Database Report

Search Criteria: 1999, 2016, Arviat, NU, KEE, GN, PL,

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### Hazardous Materials Spill Database

Environment Division of ENR  
 Scotia 6, 5102 50th Avenue; Yellowknife, NT X1A 3S8  
 Phone: (867) 873-7654 Fax: (867) 873-0221

Sorted By: SpillNo for the year 2016  
 (s):

Spill No.	Date	Ter	Region	Location	Site Description	Commodity	Quantity	Source	Agency
2000164	2000-06-26	NU	KEE	Arviat	Inside Steel Berm Power Plant	Diesel P-50	205 PL		GN
2001317	2001-10-09	NU	KEE	Arviat	Lot 357	Fuel Oil P-50	364 PL		GN
2001325	2001-10-16	NU	KEE	Arviat	Old Historical Society House	Heating Fuel	455 PL		GN
2002522	2002-09-20	NU	KEE	Arviat	Unit 174 A	Diesel Fuel	0 L		GN
2003427	2003-06-12	NU	KEE	Arviat	Back of Arena	Heating Fuel	100 L		GN
2004400	2004-06-18	NU	KEE	Arviat	Abandoned House End of Town	Heating Fuel	1137 L		GN
2007374	2007-08-03	NU	KEE	Arviat	Airport	Jet A	1 L		GN
2008110	2008-03-31	NU	KEE	Arviat	M. Tommy Owljood House	Heating Fuel	80 L		GN
2008381	2008-08-06	NU	KEE	Arviat	Wolfcreek Pump house	Heating Fuel P-50	22 L		GN
2009218	2009-05-18	NU	KEE	Arviat	389A GN Staff Housing Unit	Heating Fuel	26 L		GN
2012033	2012-02-21	NU	KEE	Arviat	Arviat, house of Sam Alagalak	Raw Sewage	400 L		GN
2013163	2013-06-03	NU	KEE	Arviat	Arviat High School	Heating Fuel	300 L		GN
2014134	2014-05-01	NU	KEE	Arviat	404 A&B 5th Street	Heating Fuel	450 L		GN
2015062	2015-02-23	NU	KEE	Arviat	Arviat, QEC power plant area	Propylene Glycol 60%	1600 L		GN
2015146	2015-04-10	NU	KEE	Arviat	Arviat NU, Unit 228/800-7th Ave, 5-plex	Heating Fuel #2	1058 L		GN
2015227	2015-05-27	NU	KEE	Arviat	803 1st Avenue	P-50	205 L		GN
2015244	2015-06-06	NU	KEE	Arviat	Arviat, 801, 1st Ave	Heating Fuel	0 L		GN
2015319	2015-07-29	NU	KEE	Arviat	Arviat Elementary School	Heating fuel	100 L		GN

Total Spills on this Report: 18

This report contains information regarding spills that were reported to the NWT 24-Hour Spill Line. The absence of information on any particular location in no way guarantees that contamination has not occurred at that location.

#### LEGEND

Region:	Source:	Agency:
BAF - Baffin	AIR - Aircraft	CCG - Canadian Coast Guard
DEH - Deh Cho	DRUM - Drum or Barrel	EP - Environment Canada
INU - Inuvik	RT - Rail Train	GN - Government of Nunavut
KEE - Keewatin	SL - Sewage Lagoon	GNWT - Government of Northwest Territories
KIT - Kitikmeot	NS - Natural Seepage	ILA - Inuvialuit Land Administration
NSL - North Slave	OTH - Other Transportation	INAC - Indian and Northern Affairs Canada
SAH - Sahtu	PL - Pipe or Line	NEB - National Energy Board
SSL - South Slave	ST< - Storage Tank <4000 litres	
	ST> - Storage Tank >4000 litres	
	TP - Tailings Pond	
	TRU - Truck	
	UK - Unknown	
	WELL - Wet Wells, Flaring Boom	

**Appendix D: Tank and Line Test**

	<b>Absolute Petroleum Ltd.</b> 1561 Erin St. Wpg. Mb. R3E-2T2	
	<b>TANK AND LINE TEST SHEET</b>	
Customer:	Nunavet PPD	
Address:	Arviat bulk site	
Date of Test: <b>Oct 7 / 2016</b>	Test Site: <b>Arviat bulk site</b>	
TESTING FORMAN: <b>Jason Tucker</b>	TESTING ASSISTANT:	
PRODUCT TYPE: <b>Diesel Fuel - tank supply line from Bay</b>	PRODUCT TYPE: <b>Gas - tank supply line from bay</b>	
PRIMARY LINE <input checked="" type="checkbox"/> SECONDARY LINE ( ) TANK ( ) VENT ( )	PRIMARY LINE <input checked="" type="checkbox"/> SECONDARY LINE ( ) TANK ( ) VENT ( )	
DISPENSER SUMP ( ) TANK SUMP ( ) TRANSITION SUMP ( )	DISPENSER SUMP ( ) TANK SUMP ( ) TRANSITION SUMP ( )	
TIME OF TEST: <b>Oct 6 - 8 am</b> PRESSURE: <b>60</b>	TIME OF TEST: <b>Oct 6 - 8 am</b> PRESSURE: <b>60</b>	
TIME OF TEST:      PRESSURE: <b>60</b>	TIME OF TEST:      PRESSURE: <b>60</b>	
TIME OF TEST: <b>Oct 6 - 8 pm</b> PRESSURE: <b>60</b>	TIME OF TEST: <b>Oct 6 - 8 pm</b> PRESSURE: <b>60</b>	
TIME OF TEST: <b>12 hour test</b> PRESSURE: <b>60</b>	TIME OF TEST: <b>12 hour test</b> PRESSURE: <b>60</b>	
TIME OF TEST:      PRESSURE:	TIME OF TEST:      PRESSURE:	
TIME OF TEST: <b>SINGLE WALL</b> PRESSURE:	TIME OF TEST: <b>SINGLE WALL</b> PRESSURE:	
TIME OF TEST: <b>STEEL PIPE</b> PRESSURE:	TIME OF TEST: <b>STEEL PIPE</b> PRESSURE:	
TIME OF TEST:      PRESSURE:	TIME OF TEST:      PRESSURE:	
TIME OF TEST:      PRESSURE:	TIME OF TEST:      PRESSURE:	
TIME OF TEST:      PRESSURE:	TIME OF TEST:      PRESSURE:	
TEST: PASS <input checked="" type="checkbox"/> FAIL ( )	TEST: PASS <input checked="" type="checkbox"/> FAIL ( )	
**TANK TEST RESULTS ARE FOR ABSOLUTE PETROLEUM USE ONLY, USED ONLY AS A PRELIMINARY TO PRESSURE TIGHT TANK TESTING**		
**TANK TEST RESULTS ARE FROM THE DATE STATED AND MAY CHANGE, ACTS OF GOD CANNOT BE THE RESPONSIBILITY OF ABSOLUTE PETROLEUM LTD.**		
FOR ABSOLUTE PETROLEUM USE ONLY ABSOLUTE PETROLEUM LTD. SIGN OFF (DIRECTOR OR FOREMAN)		
DATE: <b>October 7 / 2016</b>		
PRINT NAME: <b>Jason Tucker</b>	SIGNATURE: 	

## Appendix E: Volume Reconciliation

### Tank Gauge Report 1 – March 26, 2016



**TANK GAUGE REPORT**  
 PETROLEUM PRODUCTS DIVISION

Region Number  
 Community Number  
 Contractor I.D.

Kivalliq  
 Arviat  
 Padlei Co-operative

TG 505525

DD MM YYYY

Document Date  
 Bulk Fuel Storage Facility

Code	Number	Gauge Tape	Water Tape	Temperature	Gross Volume	Water Volume	Product Volume	Temp Corr Factor	Vol at Std. Temp.
01	9	158	0	-22	10,389	0	10,389	1.0326	10,728
04	10	4247	0	-23	627,885	0	627,885	1.0464	657,019
01	11	129	0	-22	19071 19,072	0	19071 19,072	1.0326	19,694
01	12	3435	0	-24	903,480	0	903,480	1.0344	934,560

Product Code	Dispenser I.D.	Opening Read	Closing Read	Volume
01	AB	27,884,300	28,365,030	480,730
01	AD	3,517,600	3,520,000	2,400
01	AE	0	0	0
01	AF	808,667	848,803	40,135
01	AG	669,431	669,431	0
01	AH	0	0	0
01	AI	20,037,358	20,233,750	196,392
01	AJ	8,063,290	8,063,290	0
01	AK	927,367	1,091,600	164,233
04	BB	1,355,030	1,355,030	0
04	BC	1,076,835	1,114,731	37,896
04	BD	635,310	682,592	47,282
01	DL	0	0	0
05	GB	0	0	0
07	NP	0	0	0

Code	Truck Volume	Package Count	Package Size	Package Volume	Tank Volume	Stock Total
01	9,353	0	0	0	964,982	974,334
04	0	0	0	0	657,019	657,019
05	0	27	205	5,535	0	5,535
07	0	2601	4	10,604	0	10,604

**ENTERED IN SYSTEM**  
 MAY 03 2016  
 Petroleum Products

Hash Total 1,647,492

EMILINE SAMMURTON  
 INVENTORY CONTROL  
 SPECIALIST

PPD Officer Signature \_\_\_\_\_ Contractor Signature \_\_\_\_\_

Date: 04/MAY/2016

Petroleum Products Division  
 Daily Accepted Transactions  
 Tank Gauge Report

Page : 2  
 Report ID: PP399

Territory : 02 Eastern Territory  
 Region : 05 KIVALLIQ Area: 01 - KIVALLIQ  
 Community : 601 ARVIAT  
 Contractor : 5019 PADLEI COOP ASSOC. LTDBulk Fuel Storage Facility: C - TANK FARM

Document Number: 505525  
 Document Date: 26/MAR/2016

Prod	Description	Stock Total
01	P 50	374,334.0
04	GASOLINE	657,019.0
05	100LL AVGAS	5,535.0
07	NAPHTHA	10,604.0
Hash Total		1,647,492.0

EMILINE SAMMURTON  
 INVENTORY CONTROL  
 SPECIALIST

Tank Gauge Report 2 – April 30, 2016



**TANK GAUGE REPORT**  
 PETROLEUM PRODUCTS DIVISION

Region Number **05**  
 Community Number **601**  
 Contractor I.D. **5019**

Kivalliq  
 Arviat  
 Padlei Co-operative

TG **508376**

DD MM YYYY

Document Date **30/04/2016**

Bulk Fuel Storage Facility **C**

Code	Number	Gauge Tape	Water Tape	Temperature	Gross Volume	Water Volume	Product Volume	Temp Corr Factor	Vol at Std. Temp.
01	9	158	0	-8	10,389	0	10,389	1.0186	10,582
04	10	3565	0	-7	527,057	0	527,057	1.0271	541,340
01	11	95	0	-6	14,045	0	14,045	1.0186	14,306
01	12	1800	0	-12	473,439	0	473,439	1.0239	484,754

Product Code	Dispenser I.D.	Opening Read	Closing Read	Volume
01	AB	28,365,030	28,772,000	406,970
01	AD	3,520,000	3,520,000	0
01	AE	0	0	0
01	AF	848,803	897,754	48,951
01	AG	669,431	669,431	0
01	AH	0	0	0
01	AI	20,233,750	20,493,650	259,900
01	AJ	8,063,290	8,063,290	0
01	AK	1,091,600	1,239,960	148,360
04	BB	1,355,030	1,355,030	0
04	BC	1,114,731	1,154,740	40,009
04	BD	682,592	755,400	72,809
01	DL	0	0	0
05	GB	0	0	0
07	NP	0	0	0

Code	Truck Volume	Package Count	Package Volume	Stock Total
01	8,766	0	0	518,408
04	0	0	0	541,340
05	0	27	5,535	5,535
07	0	2,468	9,872	9,872

Hash Total **1,075,155**

**ENTERED IN SYSTEM**  
 MAY 26 2016  
  
 Petroleum Products

ONLINE SAGINAWTON  
 INVENTORY CONTROL  
 SPECIALIST  
 13/05/16

PPD-Officer Signature Contractor Signature

**TANK GAUGE REPORT**

DATE: SAT. APRIL 30/16

Padlei Co-op

Location	Product	Meter ID	Meter Reading	Fuel in Truck
2004 GMC	P-50	AI	20493650L	6,408.3L
2010 Freightliner	P-50	AJ		
2016 Freightliner	P-50	AK	1239960L	2,358.5L

Location	Product	Meter ID	Meter Reading
Truck Fill Dispenser	P-50	AB	28772000L
Pump House Dispenser	P-50	AD	3520000L
Diesel Island Dispenser	P-50	AF	897753903
Diesel Island Dispenser	P-50	AG	669430786
Gas Bar Dispenser	Gas	BC	1154739955
Gas Bar Dispenser	Gas	BD	755400110

**NAPHTHA**  
 CASES 617 x4 =  
 + CANS \_\_\_\_\_  
 TOTAL:

11 cases  
 store back  
 606 cases  
 garage

**AVGAS**  
 DRUMS 27

TANK #	Product	DIP Measurement			WATER DIP		Temperature
		M	CM	MM	CM	MM	
9	Diesel		15.8	8			-6°C
10	Gas	3	565				-7°C
11	Diesel		9.5				-6°C
12	Diesel	1	800				-12°C

Date: 28/MAY/2016

Petroleum Products Division  
 Daily Accepted Transactions  
 Tank Gauge Report

Page : 2  
 Report ID: PP399

Territory : 02 Eastern Territory  
 Region : 05 KIVALLIQ Area: 01 - KIVALLIQ  
 Community : 601 ARVIAT  
 Contractor : 5019 PADLEI COOP ASSOC. LTD Bulk Fuel Storage Facility: C - TANK FARM

Document Number: 508376  
 Document Date: 30/APR/2016

Prod	Description	Stock Total
01	P 50	518,408.0
04	GASOLINE	541,340.0
05	100LL AVGAS	5,835.0
07	NAPHTHA	9,872.0
Hash Total		1,075,155.0

EMILINE SAMMATOR  
 INVENTORY CONTROL  
 SPECIALIST  
 91  
 01/06/16

Tank Gauge Report 3 – May 28, 2016



**TANK GAUGE REPORT**  
 PETROLEUM PRODUCTS DIVISION

Region Number: 05 ✓  
 Community Number: 601 ✓  
 Contractor I.D.: 5019 ✓  
 Kivalliq  
 Arviat  
 Padlei Co-operative

TG: 508377 ✓  
 DD MM YYYY: 28/05/2016 ✓  
 Document Date: 28/05/2016 ✓  
 Bulk Fuel Storage Facility: C ✓

Code	Number	Gauge Tape	Water Tape	Temperature	Gross Volume	Water Volume	Product Volume	Temp Corr Factor	Vol at Std. Temp.
01	9	158	0	-2	10,389	0	10,389	1.0151	10,546
04	10	3027	0	0	447,518	0	447,518	1.0185	455,797
01	11	131	0	-1	19,367	0	19,367	1.0142	19,642
01	12	1183	0	-2	311,155	0	311,155	1.0151	315,853

Product Code	Dispenser I.D.	Opening Read	Closing Read	Volume	Code	Truck Volume	Package Count	Package Volume	Stock Total
01	AB	28,772,000	28,912,050	140,050	01	9,306	0	0	355,347
01	AD	3,520,000	3,520,000	0	04	0	0	0	455,797
01	AE	0	0	0	05	0	26	5,330	5,330
01	AF	897,754	901,837	4,083	07	0	2,252	9,008	9,008
01	AF	0	12,367	12,367					
01	AG	0	13,783	13,783					
01	AG	669,431	669,431	0					
01	AH	0	0	0					
01	AI	20,493,650	20,531,360	37,710					
01	AJ	8,063,290	8,063,290	0					
01	AK	1,239,960	1,342,230	102,270					
04	BB	1,355,030	1,355,030	0					
04	BC	0	41,436	41,436					
04	BD	0	35,115	35,115					
01	DL	0	0	0					
05	GB	0	0	0					
07	NP	0	0	0					

825,482 ✓

EMILINE SAMMURTON  
 INVENTORY CONTROL  
 SPECIALIST

30/06/16

**ENTERED IN SYSTEM**  
 JUN 29 2016  
 Petroleum Products

**RECEIVED**  
 MAY 30 2016  
 Kivalliq Office

PPD Officer Signature: \_\_\_\_\_ Contractor Signature: \_\_\_\_\_

Date: 30/JUN/2016

Petroleum Products Division  
 Daily Accepted Transactions  
 Tank Gauge Report

Page : 2  
 Report ID: PP399

Territory : 02 ✓ Eastern Territory  
 Region : 05 ✓ KIVALLIQ  
 Community : 601 ✓ ARVIAT  
 Contractor : 5019 ✓ PADLEI COOP ASSOC. LTD Bulk Fuel Storage Facility: C - TANK FARM

Document Number: 508377 ✓  
 Document Date: 28/MAY/2016 ✓

Prod	Description	Stock Total
01	P 50	355,347.0
04	GASOLINE	455,797.0
05	100LL AVGAS	5,330.0
07	NAPHTHA	9,008.0
	Hash Total	825,482.0

EMILINE SAMMURTON  
 INVENTORY CONTROL  
 SPECIALIST

30/06/16

Tank Gauge Report 4 – July 2, 2016



**TANK GAUGE REPORT**  
 PETROLEUM PRODUCTS DIVISION

Region Number 05 ✓  
 Community Number 601 ✓  
 Contractor I.D. 5019 ✓

Kivalliq  
Arviat  
Padlei Co-operative

TG 508378

DD MM YYYY

Document Date 02/07/2016

Bulk Fuel Storage Facility C ✓

**ENTERED IN SYSTEM**  
 JUL 2 5 2016  
 Petroleum Products

Code	Number	Gauge Tape	Water Tape	Temperature	Gross Volume	Water Volume	Product Volume	Temp Corr Factor	Vol at Std Temp.
01	9	20	0	1	1,315	0	1,315	1.0124	1,331
04	10	2411	0	12	356,447	0	356,447	1.0037	357,766
01	11	13	0	8	1,922	0	1,922	1.0062	1,933
01	12	765	0	5	201,212	0	201,212	1.0089	203,002

Product Code	Dispenser I.D.	Opening Read	Closing Read	Volume
01	AB	28,912,050	28,991,250	79,200
01	AD	3,520,000	3,520,000	0
01	AE	0	0	0
01	AF	12,367	32,232	19,864
01	AG	13,783	31,039	17,256
01	AH	0	0	0
01	AI	20,531,360	20,531,360	0
01	AJ	8,063,290	8,063,340	50
01	AK	1,342,230	1,425,630	83,400
04	BB	1,355,030	1,355,030	0
04	BC	41,436	88,374	46,938
04	BD	35,115	83,318	48,203
01	DL	0	0	0
05	GB	0	0	0
07	NP	0	0	0

Code	Truck Volume	Package Count	Package Volume	Stock Total
01	0	0	0	206,258
04	0	0	0	357,766
05	0	26	5,330	5,330
07	0	2,032	8,128	8,128

Hash Total 577,492

200,266 ✓  
 577,490 ✓

EMILINE SAMMUTOK  
 INVENTORY CONTROL  
 SPECIALIST

15/07/16

PPD Officer Signature \_\_\_\_\_ Contractor Signature \_\_\_\_\_

**RECEIVED**  
 JUL 15 2016



**TANK GAUGE REPORT**  
 Padlei Co-op

DATE: Sat. July 2/16

Location	Product	Meter ID	Meter Reading	Fuel in Truck
2004 GMC	P-50	AI	20531360L	
2010 Freightliner	P-50	AJ	8063340L	
2016 Freightliner	P-50	AK	1425630L	

Location	Product	Meter ID	Meter Reading
Truck Fill Dispenser	P-50	AB	12991250
Pump House Dispenser	P-50	AD	3520000
Diesel Island Dispenser	P-50	AF	32231842
Diesel Island Dispenser	P-50	AG	31038914
Gas Bar Dispenser	Gas	BC	88373752
Gas Bar Dispenser	Gas	BD	83317575

<b>NAPHTHA</b>
CASES _____ x4 = _____
+ CANS _____
<b>TOTAL:</b>
<b>AVGAS</b>
DRUMS <u>26</u>

*473 cases garage  
 31 cases store box  
 16 cases store shelf*

TANK #	Product	DIP Measurement			WATER DIP		Temperature
		M	CM	MM	CM	MM	
9	Diesel		20cm				+1°C
10	Gas	2	411				+12°C
11	Diesel		13cm				+8°C
12	Diesel		765				+15°C

Date: 26/JUL/2016

Petroleum Products Division  
 Daily Accepted Transactions  
 Tank Gauge Report

Page : 2  
 Report ID: PP399

Territory : 02 / Eastern Territory  
 Region : 05 / KIVALLIQ Area: 01 - KIVALLIQ  
 Community : 601 / ARVIAT  
 Contractor : 5019 / PADLEI COOP ASSOC. LTD Bulk Fuel Storage Facility: C - TANK FARM

Document Number: 508378  
 Document Date: 02/JUL/2016

Prod	Description	Stock Total
01	P 50	206,266.0
04	GASOLINE	357,766.0
05	100LL AVGAS	5,330.0
07	NAPHTHA	8,128.0
Hash Total		577,490.0

EMILINE SAMMURTOX  
 INVENTORY CONTROL  
 SPECIALIST

*26/07/16*

Tank Gauge Report 5 – July 31, 2016



**TANK GAUGE REPORT**  
 PETROLEUM PRODUCTS DIVISION

TG 508379 ✓

DD MM YYYY

Document Date 31/07/2016 ✓

Region Number 05 ✓  
 Community Number 601 ✓  
 Contractor I.D. 5019 ✓

Kivalliq  
 Arviat  
 Padlei Co-operative

Bulk Fuel Storage Facility C ✓

Code	Number	Gauge Tape	Water Tape	Temperature	Gross Volume	Water Volume	Product Volume	Temp Corr Factor	Vol at Std. Temp.
01	9	642	0	7	42,215	0	42,215	1.0071	42,515
04	10	8520	0	11	1,259,614	0	1,259,614	1.0050	1,265,912
01	11	130	0	7	19,219	0	19,219	1.0071	19,355
01	12	6495	0	10	1,708,327	0	1,708,327	1.0044	1,715,844

Product Code	Dispenser I.D.	Opening Read	Closing Read	Volume
01	AB	28,991,250	29,125,700	134,450
01	AD	3,520,000	3,520,000	0
01	AE	0	0	0
01	AF	32,232	40,465	8,233
01	AG	31,039	50,619	19,580
01	AH	0	0	0
01	AI	20,531,360	20,531,360	0
01	AJ	8,063,340	8,063,340	0
01	AK	1,425,630	1,559,630	134,000
04	BB	1,355,030	1,355,030	0
04	BC	88,374	135,174	46,800
04	BD	83,318	131,991	48,674
01	DL	0	0	0
05	GB	0	0	0
07	NP	0	0	0

Code	Truck Volume	Package Count	Package Volume	Stock Total
01	2,953	0	0	1,780,667
04	0	0	0	1,265,912
05	0	57	11,685	11,685
07	0	1,794	7,176	7,176

Hash Total 3,065,440 ✓

ENTERED IN SYSTEM  
 AUG 17 2016  
 Petroleum Products

EMILINE SAMBURTON  
 INVENTORY CONTROL  
 SPECIALIST  
 10/08/16

PPD Officer Signature \_\_\_\_\_ Contractor Signature \_\_\_\_\_

## TANK GAUGE REPORT

DATE: July 31/16

**Padlei Co-op**

Location	Product	Meter ID	Meter Reading	Fuel in Truck
2004 GMC	P-50	AI		
2010 Freightliner	P-50	AJ		
2016 Freightliner	P-50		01559630	2953.5 L

421  
cases  
gasoline  
GAL

Location	Product	Meter ID	Meter Reading	NAPHTHA
Truck Fill Dispenser	P-50	AB	2912570.0	CASES _____ x4 = 24 + CANS _____
Pump House Dispenser	P-50	AD	552460.0 <del>0040465.001</del>	
Diesel Island Dispenser	P-50	AF	0040465.601	TOTAL: _____
Diesel Island Dispenser	P-50	AG	0050618.947	
Gas Bar Dispenser	Gas	BC	0135174.742	AVGAS DRUMS _____
Gas Bar Dispenser	Gas	BD	0131991.282	

1/2 cans  
Self  
cases  
back  
17 old  
40 NEL

TANK #	Product	DIP Measurement			WATER DIP		Temperature
		M	CM	MM	CM	MM	
9	Diesel	0m	642				+7°C
10	Gas	4m	520				+11°C
11	Diesel	0m	13cm				+7°C
12	Diesel	6m	495				+10°C

Date: 20/AUG/2016

Petroleum Products Division  
 Daily Accepted Transactions  
 Tank Gauge Report

Page : 2  
 Report ID: PP399

Territory : 02 Eastern Territory  
 Region : 05 KIVALLIQ Area: 01 - KIVALLIQ  
 Community : 601 ARVIAT  
 Contractor : 5019 PADLEI COOP ASSOC. LTD Bulk Fuel Storage Facility: C - TANK FARM

Document Number: 508379  
 Document Date: 31/JUL/2016

Prod	Description	Stock Total
01	P 50	1,780,667.0
04	GASOLINE	1,265,912.0
05	100LL AVGAS	11,685.0
07	NAPHTHA	7,176.0
Hash Total		3,065,440.0

EMILINE SAHMURTOX  
 INVENTORY CONTROL  
 SPECIALIST  
 22/08/16

Tank Gauge Report 6 – October 1, 2016 (please note the August Report was never sent in from the contractor)



**TANK GAUGE REPORT**

PETROLEUM PRODUCTS DIVISION

Region Number **05** Kivalliq  
 Community Number **601** Arviat  
 Contractor I.D. **5019** Padlei Co-operative

TG **508380**

DD MM YYYY

Document Date **01/10/2016**

Bulk Fuel Storage Facility **C**

Code	Number	Gauge Tape	Water Tape	Temperature	Gross Volume	Water Volume	Product Volume	Temp Corr Factor	Vol at Std. Temp.
01	9	0	0	0	0	0	0	0.0000	0
04	10	6095 9774	0	-4	1,445,008	901097	1,445,008	1.0234	1,470,821
01	11	0	0	0	0	0	0	0.0000	0
01	12	5998	0	-3	1,577,606	1577605	1,577,606	1.0160	1,602,848

Product Code	Dispenser I.D.	Opening Read	Closing Read	Volume
01	AB	29,125,700	29,463,670	337,970
01	AD	3,520,000	3,520,000	0
01	AE	0	0	0
01	AF	40,465	86,877	46,412
01	AG	50,619	86,878	36,259
01	AH	0	0	0
01	AI	20,531,360	20,531,360	0
01	AJ	8,063,340	8,063,340	0
01	AK	1,559,630	1,899,190	339,560
04	BB	1,355,030	1,355,030	0
04	BC	135,174	237,317	102,143
04	BD	131,991	233,168	101,177
01	DL	0	0	0
05	GB	0	0	0
07	NP	0	0	0

Code	Truck Volume	Package Count	Package Volume	Stock Total
01	5,208	0	0	1,608,056
04	0	0	0	1,379,821
05	0	43	8,815	8,815
07	0	2,757	11,028	11,028

Hash Total **3,108,720**



EMILINE SAMMORTON  
 INVENTORY CONTROL  
 SPECIALIST

TONY DIAS  
 HEAD KIVALLIQ REG OPS

PPD Officer Signature **1 887 645 8430** Contractor Signature

Date: 03/NOV/2016

Petroleum Products Division  
 Daily Accepted Transactions  
 Tank Gauge Report

Page 1 of 2  
 Report ID: PP399

Territory : 02 Eastern Territory  
 Region : 05 KIVALLIQ  
 Community : 601 ARVIAT  
 Contractor : 5019 PADLEI COOP ASSOC. LTD Bulk Fuel Storage Facility: C - TANK FARM

Document Number: 508380  
 Document Date: 01/OCT/2016

Prod	Description	Stock Total
01	P 50	1,608,054.0
04	GASOLINE	922,182.0
05	100LL AVGAS	8,815.0
07	NAPHTHA	11,028.0
Hash Total		2,550,079.0

EMILINE SAMMORTON  
 INVENTORY CONTROL  
 SPECIALIST

Tank Gauge Report 7 – October 30, 2016



**TANK GAUGE REPORT**  
 PETROLEUM PRODUCTS DIVISION

Region Number 05  
 Community Number 601  
 Contractor I.D. 5019

Kivalliq  
Arviat  
Padlei Co-operative

TG 508381  
 DD MM YYYY 30/10/2016  
 Document Date  
 Bulk Fuel Storage Facility C



Code	Number	Gauge Tape	Water Tape	Temperature	Gross Volume	Water Volume	Product Volume	Temp Corr Factor	Vol at Std. Temp.
01	9	9500	0	-5	624,677	0	624,677	1.0177	635,734
04	10	6047	0	-6	894,001	0	894,001	1.0258	917,066
01	11	7026	0	-7	1,038,738	0	1,038,738	1.0195	1,058,993
01	12	8904	0	0	2,341,947	0	2,341,947	1.0133	2,373,095

Product Code	Dispenser I.D.	Opening Read	Closing Read	Volume
01	AB	29,463,670	29,684,220	220,550
01	AD	3,520,000	3,520,000	0
01	AE	0	0	0
01	AF	86,877	107,198	20,321
01	AG	86,878	105,483	18,605
01	AH	0	0	0
01	AI	20,531,360	20,553,440	22,080
01	AJ	8,063,340	8,063,340	0
01	AK	1,899,190	2,095,460	196,270
04	BB	1,355,030	1,355,030	0
04	BC	237,317	283,083	45,766
04	BD	233,168	276,871	43,703
01	DL	0	0	0
05	GB	0	0	0
07	NP	0	0	0

Code	Truck Volume	Package Count	Package Volume	Stock Total
01	6,500	0	0	4,074,322
04	0	0	0	917,066
05	0	40	8,200	8,200
07	0	2,707	10,828	10,828

Hash Total 5,010,416

EMILYNE SAMUDATOK  
 INVENTORY CONTROL  
 SPECIALIST  
 23/11/16

PPD Officer Signature  Contractor Signature 

**TANK GAUGE REPORT**

Padlei Co-op

DATE: October 30th, 16

Location	Product	Meter ID	Meter Reading	Fuel in Truck
2004 GMC	P-50	AI	2055344	4500
2010 Freightliner	P-50	AJ		
2016 Freightliner	P-50	AK	2095460	1000

Location	Product	Meter ID	Meter Reading
Truck Fill Dispenser	P-50	AB	29684220
Pump House Dispenser	P-50	AD	03520000
Diesel Island Dispenser	P-50	AF	0107198997
Diesel Island Dispenser	P-50	AG	0105483161
Gas Bar Dispenser	Gas	BC	0283083799
Gas Bar Dispenser	Gas	BD	0274871128

**NAPHTHA**  
 CASES \_\_\_\_\_ x4 = \_\_\_\_\_  
 + CANS \_\_\_\_\_  
 TOTAL: 2707

**AVGAS**  
 DRUMS 40

TANK #	Product	DIP Measurement			WATER DIP		Temperature
		M	CM	MM	CM	MM	
9	Diesel	9	5	0	0		-5
10	Gas	6	0	4	7		-6
11	Diesel	7	0	2	6		-7
12	Diesel	8	9	0	4		-4



**TANK GAUGE REPORT**  
 PETROLEUM PRODUCTS DIVISION

TG 508381

Region Number 05  
 Community Number 601  
 Contractor I.D. 5019

Kivalliq  
 Arviat  
 Padlei Co-operative

Document Date 30/10/2016  
 Bulk Fuel Storage Facility C

Code	Number	Gauge Tape	Water Tape	Temperature	Gross Volume	Water Volume	Product Volume	Temp Corr Factor	Vol at Std. Temp.
01	9	9500	0						
04	10	6047	0	-5	624,677	0	624,677	1.0177	635,734
01	11	7026	0	-6	894,001	0	894,001	1.0258	917,066
01	12	8904	0	-7	1,038,738	0	1,038,738	1.0195	1,058,993
			0	0	2,341,947	0	2,341,947	1.0133	2,373,095

Product Code	Dispenser I.D.	Opening Read	Closing Read	Volume
01	AB	29,463,670	29,684,220	220,550
01	AD	3,520,000	3,520,000	0
01	AE	0	0	0
01	AF	86,877	107,198	20,321
01	AG	86,878	105,483	18,605
01	AH	0	0	0
01	AI	20,531,360	20,553,440	22,080
01	AJ	8,063,340	8,063,340	0
01	AK	1,899,190	2,095,460	196,270
04	BB	1,355,030	1,355,030	0
04	BC	237,317	283,083	45,766
04	BD	233,168	276,871	43,703
01	DL	0	0	0
05	GB	0	0	0
07	NP	0	0	0

Code	Truck Volume	Package Count	Package Volume	Stock Total
01	6,500	0	0	4,074,322
04	0	0	0	917,066
05	0	40	8,200	8,200
07	0	2,707	10,828	10,828

Hash Total 5,010,416

PPD Officer Signature \_\_\_\_\_ Contractor Signature \_\_\_\_\_

Date: 25/NOV/2016

Petroleum Products Division  
 Daily Accepted Transactions  
 Tank Gauge Report

Page : 2  
 Report ID: PP399

Territory : 02 Eastern Territory  
 Region : 05 KIVALLIQ Area: 01 - KIVALLIQ  
 Community : 601 ARVIAT  
 Contractor : 5019 PADLEI COOP ASSOC. LTD Bulk Fuel Storage Facility: C - TANK FARM

Document Number: 508381  
 Document Date: 30/OCT/2016

Prod	Description	Stock Total
01	P 50	4,074,322.0
04	GASOLINE	917,066.0
05	100LL AVGAS	8,200.0
07	NAFHTHA	10,828.0
	Hash Total	5,010,416.0

EMILINE SAMMURTON  
 INVENTORY CONTROL  
 SPECIALIST  
 25/11/16

## Appendix F: Certificate of Analysis



TRUSTED.  
RESPONSIVE.  
RELIABLE.

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Ottawa, ON, K1G 4J8  
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www.paracellabs.com

### Certificate of Analysis

**Government of Nunavut - Petroleum Product Division**

P.O. Box 590 Rankin Inlet  
Rankin Inlet, NU XOC 0G0  
Attn: Kaitlin Heron

Client PO:  
Project:  
Custody: 108779

Report Date: 25-Oct-2016  
Order Date: 19-Oct-2016

**Order #: 1643250**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Parcel ID	Client ID
1643250-01	WS1-Valve
1643250-02	WS2
1643250-03	WS3

Approved By:

A handwritten signature in black ink that reads "Mark Foto".

Mark Foto, M.Sc.  
Lab Supervisor

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Page 1 of 8



**Order #: 1643250**

Certificate of Analysis  
Client: Government of Nunavut - Petroleum Product Division  
Client PO:

Report Date: 25-Oct-2016  
Order Date: 19-Oct-2016  
Project Description:

**Analysis Summary Table**

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	19-Oct-16	19-Oct-16
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	20-Oct-16	20-Oct-16
VOCs by P&T GC-MS	EPA 824 - P&T GC-MS	19-Oct-16	19-Oct-16



**Order #: 1643250**

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

	Client ID:	WS1-Valve	WS2	WS3	-
	Sample Date:	05-Oct-16	05-Oct-16	05-Oct-16	-
	Sample ID:	1643250-01	1643250-02	1643250-03	-
	MDL/Units	Water	Water	Water	-
<b>Volatiles</b>					
Acetone	5.0 ug/L	<5.0 [1]	<5.0 [1]	<5.0 [1]	-
Benzene	0.5 ug/L	79.6 [1]	1.9 [1]	<0.5 [1]	-
Bromodichloromethane	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
Bromoform	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
Bromomethane	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
Carbon Tetrachloride	0.2 ug/L	<0.2 [1]	<0.2 [1]	<0.2 [1]	-
Chlorobenzene	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
Chloroethane	1.0 ug/L	<1.0 [1]	<1.0 [1]	<1.0 [1]	-
Chloroform	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
Chloromethane	3.0 ug/L	<3.0 [1]	<3.0 [1]	<3.0 [1]	-
Dibromochloromethane	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
Dichlorodifluoromethane	1.0 ug/L	<1.0 [1]	<1.0 [1]	<1.0 [1]	-
1,2-Dibromoethane	0.2 ug/L	<0.2 [1]	<0.2 [1]	<0.2 [1]	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
1,1-Dichloroethane	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
1,2-Dichloroethane	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
1,1-Dichloroethylene	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
1,2-Dichloroethylene, total	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
1,2-Dichloropropane	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
Ethylbenzene	0.5 ug/L	83.0 [1]	1.5 [1]	<0.5 [1]	-
Hexane	1.0 ug/L	24.8 [1]	3.5 [1]	<1.0 [1]	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0 [1]	<5.0 [1]	<5.0 [1]	-
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0 [1]	<10.0 [1]	<10.0 [1]	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0 [1]	<5.0 [1]	<5.0 [1]	-
Methyl tert-butyl ether	2.0 ug/L	<2.0 [1]	<2.0 [1]	<2.0 [1]	-
Methylene Chloride	5.0 ug/L	<5.0 [1]	<5.0 [1]	<5.0 [1]	-
Styrene	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-



**Order #: 1643250**

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

	Client ID:	WS1-Valve	WS2	WS3	
	Sample Date:	05-Oct-16	05-Oct-16	05-Oct-16	
	Sample ID:	1643250-01	1643250-02	1643250-03	
	MDL/Units	Water	Water	Water	
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
Tetrachloroethylene	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
Toluene	0.5 ug/L	564 [1]	14.2 [1]	<0.5 [1]	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
Trichloroethylene	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
Trichlorofluoromethane	1.0 ug/L	<1.0 [1]	<1.0 [1]	<1.0 [1]	-
1,3,5-Trimethylbenzene	0.5 ug/L	10.6 [1]	<0.5 [1]	<0.5 [1]	-
Vinyl chloride	0.5 ug/L	<0.5 [1]	<0.5 [1]	<0.5 [1]	-
m,p-Xylenes	0.5 ug/L	628 [1]	16.5 [1]	<0.5 [1]	-
o-Xylene	0.5 ug/L	375 [1]	23.8 [1]	<0.5 [1]	-
Xylenes, total	0.5 ug/L	1000 [1]	40.3 [1]	<0.5 [1]	-
4-Bromofluorobenzene	Surrogate	90.3% [1]	86.3% [1]	93.3% [1]	-
Dibromofluoromethane	Surrogate	95.1% [1]	97.2% [1]	114% [1]	-
Toluene-d8	Surrogate	110% [1]	109% [1]	100% [1]	-
<b>Hydrocarbons</b>					
F1 PHCs (C6-C10)	25 ug/L	1200	<25 [1]	<25 [1]	-
F2 PHCs (C10-C16)	100 ug/L	760 [1]	<100 [1]	<100 [1]	-
F3 PHCs (C16-C34)	100 ug/L	240 [1]	419 [1]	<100 [1]	-
F4 PHCs (C34-C50)	100 ug/L	<100 [1]	<100 [1]	<100 [1]	-



**Order #: 1643250**

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

**Method Quality Control: Blank**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Hydrocarbons</b>									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
<b>Volatiles</b>									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.5	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dibromoethane	ND	0.2	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloroethylene, total	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
1,3,5-Trimethylbenzene	ND	0.5	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	30.6		ug/L		95.6	50-140			
Surrogate: Dibromofluoromethane	28.5		ug/L		88.9	50-140			
Surrogate: Toluene-d8	29.6		ug/L		92.5	50-140			



**Order #: 1643250**

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

**Method Quality Control: Duplicate**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Hydrocarbons</b>									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
<b>Volatiles</b>									
Acetone	ND	5.0	ug/L	ND				30	
Benzene	ND	0.5	ug/L	ND				30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	ND	0.5	ug/L	ND				30	
Chloroethane	ND	1.0	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	
Chloromethane	ND	3.0	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dibromoethane	ND	0.2	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	28.6		ug/L		89.2	50-140			
Surrogate: Dibromofluoromethane	36.6		ug/L		114	50-140			
Surrogate: Toluene-d8	32.0		ug/L		100	50-140			



Order #: 1643250

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

**Method Quality Control: Spike**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Hydrocarbons</b>									
F1 PHCs (C6-C10)	1670	25	ug/L		83.5	68-117			
F2 PHCs (C10-C16)	1930	100	ug/L		107	60-140			
F3 PHCs (C16-C34)	3970	100	ug/L		107	60-140			
F4 PHCs (C34-C50)	2670	100	ug/L		108	60-140			
<b>Volatiles</b>									
Acetone	70.5	5.0	ug/L		70.5	50-140			
Benzene	25.3	0.5	ug/L		63.4	60-130			
Bromodichloromethane	27.4	0.5	ug/L		68.4	60-130			
Bromoform	41.7	0.5	ug/L		104	60-130			
Bromomethane	31.8	0.5	ug/L		79.8	50-140			
Carbon Tetrachloride	31.8	0.2	ug/L		79.5	60-130			
Chlorobenzene	42.2	0.5	ug/L		106	60-130			
Chloroethane	37.0	1.0	ug/L		92.4	50-140			
Chloroform	25.4	0.5	ug/L		63.6	60-130			
Chloromethane	29.7	3.0	ug/L		74.2	50-140			
Dibromochloromethane	44.5	0.5	ug/L		111	60-130			
Dichlorodifluoromethane	42.1	1.0	ug/L		105	50-140			
1,2-Dibromoethane	43.5	0.2	ug/L		109	60-130			
1,2-Dichlorobenzene	35.4	0.5	ug/L		88.6	60-130			
1,3-Dichlorobenzene	35.9	0.5	ug/L		89.7	60-130			
1,4-Dichlorobenzene	36.3	0.5	ug/L		90.8	60-130			
1,1-Dichloroethane	41.2	0.5	ug/L		103	60-130			
1,2-Dichloroethane	25.4	0.5	ug/L		63.5	60-130			
1,1-Dichloroethylene	31.4	0.5	ug/L		78.4	60-130			
cis-1,2-Dichloroethylene	24.9	0.5	ug/L		62.2	60-130			
trans-1,2-Dichloroethylene	36.4	0.5	ug/L		91.0	60-130			
1,2-Dichloropropane	24.3	0.5	ug/L		60.6	60-130			
cis-1,3-Dichloropropylene	34.8	0.5	ug/L		87.1	60-130			
trans-1,3-Dichloropropylene	37.5	0.5	ug/L		93.6	60-130			
Ethylbenzene	34.0	0.5	ug/L		84.9	60-130			
Hexane	25.6	1.0	ug/L		64.0	60-130			
Methyl Ethyl Ketone (2-Butanone)	64.3	5.0	ug/L		64.3	50-140			
Methyl Butyl Ketone (2-Hexanone)	92.4	10.0	ug/L		92.4	50-140			
Methyl Isobutyl Ketone	87.4	5.0	ug/L		87.4	50-140			
Methyl tert-butyl ether	74.7	2.0	ug/L		74.7	50-140			
Methylene Chloride	31.6	5.0	ug/L		78.9	60-130			
Styrene	40.1	0.5	ug/L		100	60-130			
1,1,1,2-Tetrachloroethane	45.3	0.5	ug/L		113	60-130			
1,1,2,2-Tetrachloroethane	36.9	0.5	ug/L		92.2	60-130			
Tetrachloroethylene	37.9	0.5	ug/L		94.8	60-130			
Toluene	42.5	0.5	ug/L		106	60-130			
1,1,1-Trichloroethane	24.5	0.5	ug/L		61.2	60-130			
1,1,2-Trichloroethane	25.9	0.5	ug/L		64.8	60-130			
Trichloroethylene	36.9	0.5	ug/L		92.4	60-130			
Trichlorofluoromethane	33.4	1.0	ug/L		83.6	60-130			
1,3,5-Trimethylbenzene	37.6	0.5	ug/L		94.0	60-130			
Vinyl chloride	38.2	0.5	ug/L		95.6	50-140			
m,p-Xylenes	85.3	0.5	ug/L		107	60-130			
o-Xylene	44.9	0.5	ug/L		112	60-130			
Surrogate: 4-Bromofluorobenzene	23.5		ug/L		73.4	50-140			



Order #: 1643250

Certificate of Analysis  
Client: Government of Nunavut - Petroleum Product Division  
Client PO:

Report Date: 25-Oct-2016  
Order Date: 19-Oct-2016  
Project Description:

**Qualifier Notes:**

**Login Qualifiers:**

Sample - One or more parameter received past hold time -  
*Applies to samples: WS1 Valve, WS2, WS3*

**Sample Qualifiers:**

1: Holding time had been exceeded upon receipt of the sample at the laboratory.

**Sample Data Revisions**

None

**Work Order Revisions / Comments:**

None

**Other Report Notes:**

n/a: not applicable  
ND: Not Detected  
MDL: Method Detection Limit  
Source Result: Data used as source for matrix and duplicate samples  
%REC: Percent recovery.  
RPD: Relative percent difference.

**CCME PHC additional information:**

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.



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Chain of Custody  
 (Lab Use Only)  
**No 108779**  
 Page 1 of 1

Client Name: Petroleum Products Project Reference: \_\_\_\_\_  
 Contact Name: Kaitlin Heron Quote # \_\_\_\_\_  
 Address: P.O. Box 590 PO # \_\_\_\_\_  
Rankin Inlet, NU X0C 0G0 Email Address: Kheron@gau.nu.ca  
 Telephone: \_\_\_\_\_ Date Required: \_\_\_\_\_  
 Criteria:  O. Reg. 153/04 (As Amended) Table  RSC Filing  O. Reg. 558/00  PWQO  CCME  SUB (Storm)  SUB (Sanitary) Municipality: \_\_\_\_\_  Other: \_\_\_\_\_

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)				Required Analyses											
Paracel Order Number: <u>1643 250 - water</u> <u>1643 251 - soil</u>		Matrix	Air Volume	# of Containers	Sample Taken		PECS FI-F4-BTEX	VOCs	PAHs	Metals by ICP	Fig	C/N/I	B (HW/S)		
Sample ID/Location Name					Date	Time									
1	WS1 - Valve	SW		3	Oct 5/16		✓	✓	✓						
2	WS2	SW		3	Oct 5/16		✓	✓	✓						
3	WS3	SW		3	Oct 5/16		✓	✓	✓						
4	SS 1	S		1	Oct 5/16		✓	✓	✓						
5	SS 2	S		1	Oct 5/16		✓	✓	✓						
6															
7															
8	Samples expired (~1:00pm), proceed regardless														
9	Per Kaitlin. JC.														
10															

Comments: See revised coc attached. No metals on water per Kaitlin. Preserve soils in lab. JC. Method of Delivery: FIRST AIR

Relinquished By (Sign): \_\_\_\_\_ Received by Driver/Depot: A. JENSEN Received at Lab: SUMEORN DOK MAI Verified By: Rachel Subert

Relinquished By (Print): \_\_\_\_\_ Date/Time: 19/10/16 11:45 Date/Time: OCT 19, 2016 12:05 Date/Time: Oct 19/16

Date/Time: \_\_\_\_\_ Temperature: \_\_\_\_\_ °C AM Temperature: 18.2 °C pH Verified  By: N/A 3:04

Chain of Custody (Env) - Rev 0.7 Feb. 2016



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Chain of Custody  
 (Lab Use Only)  
 No 108779  
 Page 1 of 1

Client Name: Petroleum Products  
 Contact Name: Kaitlin Hiron  
 Address: P.O. Box 570  
Rankin Lake, NU X0C 0G0  
 Telephone: 1-867-645-8444  
 Email Address: khiron@gov.nu.ca

Turnaround Time:  
 1 Day  3 Day  
 2 Day  Regular  
 Date Required: \_\_\_\_\_

Criteria:  O. Reg. 153/04 (As Amended) Table \_\_\_\_\_  RSC Filing  O. Reg. 558/00  RWQO  CCME  SUB (Storm)  SUB (Sanitary) Municipality: \_\_\_\_\_  Other: \_\_\_\_\_

Matrix Type:  S (Soil)  GW (Ground Water)  SW (Surface Water)  SS (Storm Sanitary Sewer)  P (Paint)  A (Air)  Other: \_\_\_\_\_

Parcel Order Number: <u>1643250 - Water</u> <u>1643251 - Soil</u>	Matrix	Air Volume	# of Containers	Sample Taken		Required Analyses											
				Date	Time	PERC	THAL	MTLN	VERB	PATB	MUGB	BCP	Di	CAV	BEHWS		
Sample ID/Location Name																	
1 <u>WS1 - Valve</u>	<u>SW</u>		<u>3</u>	<u>Oct 5/16</u>		<input checked="" type="checkbox"/>											
2 <u>WS2</u>	<u>SW</u>		<u>3</u>	<u>Oct 5/16</u>		<input checked="" type="checkbox"/>											
3 <u>WS3</u>	<u>SW</u>		<u>3</u>	<u>Oct 5/16</u>		<input checked="" type="checkbox"/>											
4 <u>SS 1</u>	<u>S</u>		<u>1</u>	<u>Oct 5/16</u>		<input checked="" type="checkbox"/>						<u>-7.0 pH</u>					
5 <u>SS 2</u>	<u>S</u>		<u>1</u>	<u>Oct 5/16</u>		<input checked="" type="checkbox"/>											
6																	
7																	
8																	
9																	
10																	

Comments: \_\_\_\_\_ Method of Delivery: FIRST AIR

Requisitioned By (Sign): <u>Kaitlin Hiron</u>	Received by Driver/Depot: <u>J. JENSEN</u>	Received at Lab: <u>SUNEIPORN DOK MAI</u>	Verified by: <u>Rachel Subject</u>
Requisitioned By (Print): _____	Date/Time: <u>19/10/16 11:45</u>	Date/Time: <u>OCT 19, 2016 13:05</u>	Date/Time: <u>Oct 19/16</u>
Date/Time: <u>Oct 7, 2016</u>	Temperature: <u>18.2 °C</u>	Temperature: <u>18.2 °C</u>	pH Verified <input checked="" type="checkbox"/> By <u>N/A</u> <u>3:04</u>

Chain of Custody (Env) - Rev 07 Feb 2016



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## Certificate of Analysis

### Government of Nunavut - Petroleum Product Division

P.O. Box 590 Rankin Inlet  
Rankin Inlet, NU XOC 0G0  
Attn: Kaitlin Heron

Client PO:  
Project:  
Custody: 108779

Report Date: 25-Oct-2016  
Order Date: 19-Oct-2016

**Order #: 1643251**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Parcel ID	Client ID
1643251-01	SS1
1643251-02	SS2

Approved By:

Mark Foto, M.Sc.  
Lab Supervisor

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Page 1 of 13



Order #: 1643251

Certificate of Analysis  
Client: Government of Nunavut - Petroleum Product Division  
Client PO:

Report Date: 25-Oct-2016  
Order Date: 19-Oct-2016  
Project Description:

**Analysis Summary Table**

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME-SQG: Metals by ICP-OES	based on MOE E3470, ICP-OES	24-Oct-16	24-Oct-16
PHC F1	CWS Tier 1 - P&T GC-FID	22-Oct-16	25-Oct-16
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	21-Oct-16	21-Oct-16
Solids, %	Gravimetric, calculation	22-Oct-16	22-Oct-16
VOCs by P&T GC-MS	EPA 8260 - P&T GC-MS	22-Oct-16	25-Oct-16
VOCs by P&T GC-MS, low level	EPA 8260 - P&T GC-MS	24-Oct-16	25-Oct-16



**Order #: 1643251**

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

	Client ID:	SS1	SS2		
	Sample Date:	05-Oct-16	05-Oct-16	-	-
	Sample ID:	1643251-01	1643251-02	-	-
	MDL/Units	Soil	Soil	-	-

**Physical Characteristics**

% Solids	0.1 % by Wt.	72.7	89.2	-	-
----------	--------------	------	------	---	---

**Metals**

Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	<1.0	<1.0	-	-
Barium	1.0 ug/g dry	30.8	27.5	-	-
Beryllium	1.0 ug/g dry	<1.0	<1.0	-	-
Boron	1.0 ug/g dry	1.6	1.3	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	1.0 ug/g dry	14.9	13.8	-	-
Cobalt	1.0 ug/g dry	3.1	3.5	-	-
Copper	1.0 ug/g dry	8.5	9.2	-	-
Lead	1.0 ug/g dry	7.3	2.6	-	-
Molybdenum	1.0 ug/g dry	<1.0	<1.0	-	-
Nickel	1.0 ug/g dry	7.5	6.9	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.5 ug/g dry	<0.5	<0.5	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Tin	5.0 ug/g dry	<5.0	<5.0	-	-
Uranium	1.0 ug/g dry	<1.0	<1.0	-	-
Vanadium	1.0 ug/g dry	15.8	19.0	-	-
Zinc	1.0 ug/g dry	26.4	14.0	-	-

**Volatiles**

Acetone	0.50 ug/g dry	<0.50 [1] [5]	-	-	-
Benzene	0.02 ug/g dry	<0.02 [1] [5]	-	-	-
Bromodichloromethane	0.05 ug/g dry	<0.05 [1] [5]	-	-	-
Bromoform	0.05 ug/g dry	<0.05 [1] [5]	-	-	-
Bromomethane	0.05 ug/g dry	<0.05 [1] [5]	-	-	-
Carbon Tetrachloride	0.05 ug/g dry	<0.05 [1] [5]	-	-	-
Chlorobenzene	0.05 ug/g dry	<0.05 [1] [5]	-	-	-
Chloroethane	0.05 ug/g dry	<0.05 [1] [5]	-	-	-
Chloroform	0.05 ug/g dry	<0.05 [1] [5]	-	-	-
Chloromethane	0.20 ug/g dry	<0.20 [1] [5]	-	-	-
Dibromochloromethane	0.05 ug/g dry	<0.05 [1] [5]	-	-	-
Dichlorodifluoromethane	0.05 ug/g dry	<0.05 [1] [5]	-	-	-
1,2-Dibromoethane	0.05 ug/g dry	<0.05 [1] [5]	-	-	-



**Order #: 1643251**

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

	MDL/Units	Client ID:	SS1	SS2	-	-
		Sample Date:	05-Oct-16	05-Oct-16	-	-
		Sample ID:	1643251-01	1643251-02	-	-
			Soil	Soil	-	-
1,2-Dichlorobenzene	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
1,3-Dichlorobenzene	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
1,4-Dichlorobenzene	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
1,1-Dichloroethane	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
1,2-Dichloroethane	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
1,1-Dichloroethylene	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
cis-1,2-Dichloroethylene	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
1,2-Dichloroethylene, total	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
1,2-Dichloropropane	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
cis-1,3-Dichloropropylene	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
trans-1,3-Dichloropropylene	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
1,3-Dichloropropene, total	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
Ethylbenzene	0.05 ug/g dry		1.25 [1] [5]	-	-	-
Hexane	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry		<0.50 [1] [5]	-	-	-
Methyl Butyl Ketone (2-Hexanone)	2.00 ug/g dry		<2.00 [1] [5]	-	-	-
Methyl Isobutyl Ketone	0.50 ug/g dry		<0.50 [1] [5]	-	-	-
Methyl tert-butyl ether	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
Methylene Chloride	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
Styrene	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
Tetrachloroethylene	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
Toluene	0.05 ug/g dry		0.34 [1] [5]	-	-	-
1,1,1-Trichloroethane	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
1,1,2-Trichloroethane	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
Trichloroethylene	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
Trichlorofluoromethane	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
1,3,5-Trimethylbenzene	0.05 ug/g dry		<0.05 [1] [5]	-	-	-
Vinyl chloride	0.02 ug/g dry		<0.02 [1] [5]	-	-	-
m,p-Xylenes	0.05 ug/g dry		6.94 [1] [5]	-	-	-
o-Xylene	0.05 ug/g dry		3.03 [1] [5]	-	-	-
Xylenes, total	0.05 ug/g dry		9.97 [1] [5]	-	-	-
4-Bromofluorobenzene	Surrogate		101% [1] [5]	-	-	-
Dibromofluoromethane	Surrogate		116% [1] [5]	-	-	-



**Order #: 1643251**

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

	MDL/Units	Client ID:	SS1	SS2	-	-
		Sample Date:	05-Oct-16	05-Oct-16		
		Sample ID:	1643251-01	1643251-02	-	-
			Soil	Soil	-	-
Toluene-d8	Surrogate		102% [1] [5]	-	-	-
Benzene	0.002 ug/g dry		-	<0.002 [1]	-	-
Bromodichloromethane	0.002 ug/g dry		-	<0.002 [1]	-	-
Bromoform	0.002 ug/g dry		-	<0.002 [1]	-	-
Bromomethane	0.003 ug/g dry		-	<0.003 [1]	-	-
Carbon Tetrachloride	0.002 ug/g dry		-	<0.002 [1]	-	-
Chlorobenzene	0.002 ug/g dry		-	<0.002 [1]	-	-
Chloroethane	0.005 ug/g dry		-	<0.005 [1]	-	-
Chloroform	0.003 ug/g dry		-	<0.003 [1]	-	-
Chloromethane	0.020 ug/g dry		-	<0.020 [1]	-	-
Dibromochloromethane	0.002 ug/g dry		-	<0.002 [1]	-	-
Ethylene dibromide (dibromoethane)	0.002 ug/g dry		-	<0.002 [1]	-	-
1,2-Dichlorobenzene	0.002 ug/g dry		-	<0.002 [1]	-	-
1,3-Dichlorobenzene	0.002 ug/g dry		-	<0.002 [1]	-	-
1,4-Dichlorobenzene	0.002 ug/g dry		-	<0.002 [1]	-	-
1,1-Dichloroethane	0.002 ug/g dry		-	<0.002 [1]	-	-
1,2-Dichloroethane	0.002 ug/g dry		-	<0.002 [1]	-	-
1,1-Dichloroethylene	0.002 ug/g dry		-	<0.002 [1]	-	-
cis-1,2-Dichloroethylene	0.002 ug/g dry		-	<0.002 [1]	-	-
trans-1,2-Dichloroethylene	0.003 ug/g dry		-	<0.003 [1]	-	-
1,2-Dichloroethylene, total	0.003 ug/g dry		-	<0.003 [1]	-	-
1,2-Dichloropropane	0.002 ug/g dry		-	<0.002 [1]	-	-
cis-1,3-Dichloropropylene	0.002 ug/g dry		-	<0.002 [1]	-	-
trans-1,3-Dichloropropylene	0.002 ug/g dry		-	<0.002 [1]	-	-
1,3-Dichloropropene, total	0.002 ug/g dry		-	<0.002 [1]	-	-
Ethylbenzene	0.002 ug/g dry		-	<0.002 [1]	-	-
Methylene Chloride	0.003 ug/g dry		-	<0.003 [1]	-	-
Styrene	0.002 ug/g dry		-	<0.002 [1]	-	-
1,1,1,2-Tetrachloroethane	0.003 ug/g dry		-	<0.003 [1]	-	-
1,1,2,2-Tetrachloroethane	0.003 ug/g dry		-	<0.003 [1]	-	-
Tetrachloroethylene	0.002 ug/g dry		-	<0.002 [1]	-	-
Toluene	0.002 ug/g dry		-	<0.002 [1]	-	-
1,1,1-Trichloroethane	0.002 ug/g dry		-	<0.002 [1]	-	-
1,1,2-Trichloroethane	0.002 ug/g dry		-	<0.002 [1]	-	-
Trichloroethylene	0.003 ug/g dry		-	<0.003 [1]	-	-
Trichlorofluoromethane	0.005 ug/g dry		-	<0.005 [1]	-	-



**Order #: 1643251**

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

	MDL/Units	Client ID:	SS1	SS2	-	-
		Sample Date:	05-Oct-16	05-Oct-16		
		Sample ID:	1643251-01	1643251-02	-	-
			Soil	Soil	-	-
1,3,5-Trimethylbenzene	0.003 ug/g dry		-	<0.003 [1]	-	-
Vinyl chloride	0.002 ug/g dry		-	<0.002 [1]	-	-
m,p-Xylenes	0.002 ug/g dry		-	<0.002 [1]	-	-
o-Xylene	0.002 ug/g dry		-	<0.002 [1]	-	-
Xylenes, total	0.002 ug/g dry		-	<0.002 [1]	-	-
4-Bromofluorobenzene	Surrogate		-	104% [1]	-	-
Dibromofluoromethane	Surrogate		-	116% [1]	-	-
Toluene-d8	Surrogate		-	99.7% [1]	-	-

**Hydrocarbons**

F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	-
F2 PHCs (C10-C16)	4 mg/kg dry	<4 [1]	<4 [1]	-	-
F3 PHCs (C16-C34)	8 mg/kg dry	209 [1]	70 [1]	-	-
F4 PHCs (C34-C50)	6 mg/kg dry	63 [1]	22 [1]	-	-



Order #: 1643251

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

**Method Quality Control: Blank**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Hydrocarbons</b>									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	mg/kg						
F3 PHCs (C16-C34)	ND	8	mg/kg						
F4 PHCs (C34-C50)	ND	6	mg/kg						
<b>Metals</b>									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	1.0	ug/g						
Boron	ND	1.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	1.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	1.0	ug/g						
Lead	ND	1.0	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	1.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.5	ug/g						
Thallium	ND	1.0	ug/g						
Tin	ND	5.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	1.0	ug/g						
Zinc	ND	1.0	ug/g						
<b>Volatiles</b>									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroethane	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Chloromethane	ND	0.20	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dibromoethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloroethylene, total	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Butyl Ketone (2-Hexanone)	ND	2.00	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						



Order #: 1643251

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

**Method Quality Control: Blank**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
1,3,5-Trimethylbenzene	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	8.15		ug/g		102	50-140			
Surrogate: Dibromofluoromethane	9.91		ug/g		124	50-140			
Surrogate: Toluene-d8	8.15		ug/g		102	50-140			
Benzene	ND	0.002	ug/g						
Bromodichloromethane	ND	0.002	ug/g						
Bromoform	ND	0.002	ug/g						
Bromomethane	ND	0.003	ug/g						
Carbon Tetrachloride	ND	0.002	ug/g						
Chlorobenzene	ND	0.002	ug/g						
Chloroethane	ND	0.005	ug/g						
Chloroform	ND	0.003	ug/g						
Chloromethane	ND	0.020	ug/g						
Dibromochloromethane	ND	0.002	ug/g						
Ethylene dibromide (dibromoethane)	ND	0.002	ug/g						
1,2-Dichlorobenzene	ND	0.002	ug/g						
1,3-Dichlorobenzene	ND	0.002	ug/g						
1,4-Dichlorobenzene	ND	0.002	ug/g						
1,1-Dichloroethane	ND	0.002	ug/g						
1,2-Dichloroethane	ND	0.002	ug/g						
1,1-Dichloroethylene	ND	0.002	ug/g						
cis-1,2-Dichloroethylene	ND	0.002	ug/g						
trans-1,2-Dichloroethylene	ND	0.003	ug/g						
1,2-Dichloroethylene, total	ND	0.003	ug/g						
1,2-Dichloropropane	ND	0.002	ug/g						
cis-1,3-Dichloropropylene	ND	0.002	ug/g						
trans-1,3-Dichloropropylene	ND	0.002	ug/g						
1,3-Dichloropropene, total	ND	0.002	ug/g						
Ethylbenzene	ND	0.002	ug/g						
Methylene Chloride	ND	0.003	ug/g						
Styrene	ND	0.002	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.003	ug/g						
1,1,1,2,2-Tetrachloroethane	ND	0.003	ug/g						
Tetrachloroethylene	ND	0.002	ug/g						
Toluene	ND	0.002	ug/g						
1,1,1-Trichloroethane	ND	0.002	ug/g						
1,1,2-Trichloroethane	ND	0.002	ug/g						
Trichloroethylene	ND	0.003	ug/g						
Trichlorofluoromethane	ND	0.005	ug/g						
1,3,5-Trimethylbenzene	ND	0.003	ug/g						
Vinyl chloride	ND	0.002	ug/g						
m,p-Xylenes	ND	0.002	ug/g						
o-Xylene	ND	0.002	ug/g						
Xylenes, total	ND	0.002	ug/g						
Surrogate: 4-Bromofluorobenzene	0.139		ug/g		102	83-134			
Surrogate: Dibromofluoromethane	0.168		ug/g		124	78-124			
Surrogate: Toluene-d8	0.139		ug/g		102	76-118			



Order #: 1643251

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

**Method Quality Control: Duplicate**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Hydrocarbons</b>									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	mg/kg dry	ND				30	
F3 PHCs (C16-C34)	ND	8	mg/kg dry	59			0.0	30	
F4 PHCs (C34-C50)	ND	6	mg/kg dry	142			0.0	30	
<b>Metals</b>									
Antimony	ND	1.0	ug/g dry	ND				30	
Arsenic	6.54	1.0	ug/g dry	6.09			7.1	30	
Barium	88.9	1.0	ug/g dry	92.6			4.1	30	
Beryllium	ND	1.0	ug/g dry	ND			0.0	30	
Boron	13.1	1.0	ug/g dry	15.6			18.0	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	22.7	1.0	ug/g dry	23.8			5.0	30	
Cobalt	16.2	1.0	ug/g dry	16.2			0.2	30	
Copper	31.3	1.0	ug/g dry	31.1			0.5	30	
Lead	12.8	1.0	ug/g dry	12.4			1.6	30	
Molybdenum	ND	1.0	ug/g dry	ND			0.0	30	
Nickel	28.8	1.0	ug/g dry	28.8			0.0	30	
Selenium	ND	1.0	ug/g dry	ND				30	
Silver	ND	0.5	ug/g dry	ND			0.0	30	
Thallium	ND	1.0	ug/g dry	ND			0.0	30	
Tin	ND	5.0	ug/g dry	ND			0.0	30	
Uranium	ND	1.0	ug/g dry	ND				30	
Vanadium	29.1	1.0	ug/g dry	31.4			7.6	30	
Zinc	57.1	1.0	ug/g dry	57.2			0.2	30	
<b>Physical Characteristics</b>									
% Solids	81.2	0.1	% by Wt.	83.0			2.2	25	



Order #: 1643251

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

**Method Quality Control: Spike**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Hydrocarbons</b>									
F1 PHCs (C6-C10)	189	7	ug/g		94.5	80-120			
F2 PHCs (C10-C16)	89	4	mg/kg		88.6	80-120			
F3 PHCs (C16-C34)	220	8	mg/kg		119	80-120			
F4 PHCs (C34-C50)	128	6	mg/kg		103	80-120			
<b>Metals</b>									
Antimony	278		ug/L	ND	111	70-130			
Arsenic	368		ug/L	122	88.6	70-130			
Barium	2020		ug/L	1850	67.8	70-130			QM-07
Beryllium	238		ug/L	3.47	93.9	70-130			
Boron	544		ug/L	313	92.8	70-130			
Cadmium	238		ug/L	ND	94.9	70-130			
Chromium	674		ug/L	477	79.0	70-130			
Cobalt	627		ug/L	323	81.4	70-130			
Copper	835		ug/L	623	84.8	70-130			
Lead	470		ug/L	249	88.3	70-130			
Molybdenum	214		ug/L	ND	85.6	70-130			
Nickel	752		ug/L	576	70.4	70-130			
Selenium	200		ug/L	ND	80.2	70-130			
Silver	230		ug/L	0.73	91.8	70-130			
Thallium	283		ug/L	ND	113	70-130			
Tin	197		ug/L	ND	79.0	70-130			
Uranium	262		ug/L	ND	105	70-130			
Vanadium	821		ug/L	628	77.5	70-130			
Zinc	1280		ug/L	1140	54.5	70-130			QM-07
<b>Volatiles</b>									
Acetone	7.54	0.50	ug/g		75.4	50-140			
Benzene	3.29	0.02	ug/g		82.2	60-130			
Bromodichloromethane	3.22	0.05	ug/g		80.4	60-130			
Bromoform	3.88	0.05	ug/g		97.1	60-130			
Bromomethane	3.12	0.05	ug/g		78.1	50-140			
Carbon Tetrachloride	3.09	0.05	ug/g		77.3	60-130			
Chlorobenzene	3.29	0.05	ug/g		82.2	60-130			
Chloroethane	4.67	0.05	ug/g		117	50-140			
Chloroform	3.21	0.05	ug/g		80.3	60-130			
Chloromethane	3.02	0.20	ug/g		75.4	50-140			
Dibromochloromethane	3.56	0.05	ug/g		88.9	60-130			
Dichlorodifluoromethane	3.81	0.05	ug/g		95.2	60-140			
1,2-Dibromoethane	3.46	0.05	ug/g		86.5	60-130			
1,2-Dichlorobenzene	3.61	0.05	ug/g		90.2	60-130			
1,3-Dichlorobenzene	3.70	0.05	ug/g		92.6	60-130			
1,4-Dichlorobenzene	3.66	0.05	ug/g		91.4	60-130			
1,1-Dichloroethane	2.95	0.05	ug/g		73.9	60-130			
1,2-Dichloroethane	2.48	0.05	ug/g		62.0	60-130			
1,1-Dichloroethylene	3.97	0.05	ug/g		99.3	60-130			
cis-1,2-Dichloroethylene	3.18	0.05	ug/g		79.6	60-130			
trans-1,2-Dichloroethylene	3.39	0.05	ug/g		84.8	60-130			
1,2-Dichloropropane	3.00	0.05	ug/g		75.0	60-130			
cis-1,3-Dichloropropylene	2.51	0.05	ug/g		62.8	60-130			
trans-1,3-Dichloropropylene	2.57	0.05	ug/g		64.2	60-130			
Ethylbenzene	3.04	0.05	ug/g		76.1	60-130			
Hexane	2.82	0.05	ug/g		70.6	60-130			



Order #: 1643251

Certificate of Analysis  
 Client: Government of Nunavut - Petroleum Product Division  
 Client PO:

Report Date: 25-Oct-2016  
 Order Date: 19-Oct-2016  
 Project Description:

**Method Quality Control: Spike**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl Ethyl Ketone (2-Butanone)	9.70	0.50	ug/g		97.0	50-140			
Methyl Butyl Ketone (2-Hexanone)	6.05	2.00	ug/g		60.5	50-140			
Methyl Isobutyl Ketone	5.42	0.50	ug/g		54.2	50-140			
Methyl tert-butyl ether	8.08	0.05	ug/g		80.8	50-140			
Methylene Chloride	2.84	0.05	ug/g		70.9	60-130			
Styrene	3.46	0.05	ug/g		86.6	60-130			
1,1,1,2-Tetrachloroethane	3.39	0.05	ug/g		84.6	60-130			
1,1,2,2-Tetrachloroethane	3.15	0.05	ug/g		78.9	60-130			
Tetrachloroethylene	3.84	0.05	ug/g		96.0	60-130			
Toluene	3.35	0.05	ug/g		83.8	60-130			
1,1,1-Trichloroethane	3.13	0.05	ug/g		78.3	60-130			
1,1,2-Trichloroethane	2.85	0.05	ug/g		71.2	60-130			
Trichloroethylene	4.20	0.05	ug/g		105	60-130			
Trichlorofluoromethane	2.40	0.05	ug/g		59.9	50-140			
1,3,5-Trimethylbenzene	3.07	0.05	ug/g		76.7	60-130			
Vinyl chloride	3.60	0.02	ug/g		90.1	50-140			
m,p-Xylenes	6.68	0.05	ug/g		83.5	60-130			
o-Xylene	2.97	0.05	ug/g		74.2	60-130			
Surrogate: 4-Bromofluorobenzene	8.13		ug/g		102	50-140			
Benzene	0.0559	0.002	ug/g		82.2	55-141			
Bromodichloromethane	0.0547	0.002	ug/g		80.4	52-139			
Bromoform	0.0660	0.002	ug/g		97.1	52-170			
Bromomethane	0.0531	0.003	ug/g		78.1	32-138			
Carbon Tetrachloride	0.0525	0.002	ug/g		77.3	49-149			
Chlorobenzene	0.0559	0.002	ug/g		82.2	64-137			
Chloroethane	0.0793	0.005	ug/g		117	39-152			
Chloroform	0.0546	0.003	ug/g		80.3	58-138			
Chloromethane	0.0513	0.020	ug/g		75.4	24-163			
Dibromochloromethane	0.0605	0.002	ug/g		88.9	61-153			
Ethylene dibromide (dibromoethane)	0.0547	0.002	ug/g		80.4	60-130			
1,2-Dichlorobenzene	0.0613	0.002	ug/g		90.2	60-150			
1,3-Dichlorobenzene	0.0830	0.002	ug/g		92.6	62-149			
1,4-Dichlorobenzene	0.0822	0.002	ug/g		91.4	63-132			
1,1-Dichloroethane	0.0502	0.002	ug/g		73.9	51-156			
1,2-Dichloroethane	0.0422	0.002	ug/g		62.0	50-140			
1,1-Dichloroethylene	0.0675	0.002	ug/g		99.3	43-153			
cis-1,2-Dichloroethylene	0.0541	0.002	ug/g		79.6	58-145			
trans-1,2-Dichloroethylene	0.0576	0.003	ug/g		84.8	51-145			
1,2-Dichloropropane	0.0510	0.002	ug/g		75.0	56-138			
cis-1,3-Dichloropropylene	0.0427	0.002	ug/g		62.8	54-141			
trans-1,3-Dichloropropylene	0.0437	0.002	ug/g		64.2	61-140			
Ethylbenzene	0.0517	0.002	ug/g		76.1	61-139			
Methylene Chloride	0.0482	0.003	ug/g		70.9	58-149			
Styrene	0.0589	0.002	ug/g		86.6	63-143			
1,1,1,2-Tetrachloroethane	0.0575	0.003	ug/g		84.6	61-148			
1,1,2,2-Tetrachloroethane	0.0536	0.003	ug/g		78.9	50-157			
Tetrachloroethylene	0.0653	0.002	ug/g		96.0	51-145			
Toluene	0.0570	0.002	ug/g		83.8	54-136			
1,1,1-Trichloroethane	0.0533	0.002	ug/g		78.3	55-140			
1,1,2-Trichloroethane	0.0484	0.002	ug/g		71.2	63-144			
Trichloroethylene	0.0714	0.003	ug/g		105	52-135			
Trichlorofluoromethane	0.0408	0.005	ug/g		59.9	37-155			
1,3,5-Trimethylbenzene	0.0521	0.003	ug/g		76.7	61-151			

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Order #: 1643251

Certificate of Analysis  
Client: Government of Nunavut - Petroleum Product Division  
Client PO:

Report Date: 25-Oct-2016  
Order Date: 19-Oct-2016  
Project Description:

**Method Quality Control: Spike**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Vinyl chloride	0.0613	0.002	ug/g		90.1	31-159			
m,p-Xylenes	0.114	0.002	ug/g		83.5	61-139			
o-Xylene	0.0504	0.002	ug/g		74.2	60-142			



Order #: 1643251

Certificate of Analysis  
Client: Government of Nunavut - Petroleum Product Division  
Client PO:

Report Date: 25-Oct-2016  
Order Date: 19-Oct-2016  
Project Description:

**Qualifier Notes:**

**Log In Qualifiers :**

Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved  
*Applies to samples: SS1, SS2*

Sample - One or more parameter received past hold time -  
*Applies to samples: SS1, SS2*

**Sample Qualifiers :**

- 1: Holding time had been exceeded upon receipt of the sample at the laboratory.
- 5: Not able to complete VOC-low level analysis due to high target analyte. VOC-high level analysis completed in its place.

**QC Qualifiers :**

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

**Sample Data Revisions**

None

**Work Order Revisions / Comments:**

None

**Other Report Notes:**

n/a: not applicable  
ND: Not Detected  
MDL: Method Detection Limit  
Source Result: Data used as source for matrix and duplicate samples  
%REC: Percent recovery.  
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.  
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

**CCME PHC additional information:**

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.



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Chain of Custody  
 (Lab Use Only)  
**No 108779**

Page 1 of 1

Client Name: <b>Petroleum Products</b>	Project Reference:	Turnaround Time: <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> Regular Date Required: _____
Contact Name: <b>Kaitlin Heron</b>	Quote #	
Address: <b>P.O. Box 570 Rankin, Labst, NU X0C 0G0</b>	PO #	
Telephone:	Email Address: <b>Kheron@gov.nu.ca</b>	

Criteria:  O. Reg. 153/04 (As Amended) Table \_\_\_  RSC Filing  O. Reg. 558/00  PWQO  CCME  SUB (Storm)  SUB (Sanitary) Municipality: \_\_\_\_\_  Other.

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		Required Analyses												
				Date	Time	PHCS F1-F4+BTX	VOCs	PAHs	Metals by ICP	Hg	Cd	B (HWS)						
1643 250 - water																		
1643 251 - soil																		
WS1 - Valve	SW		3	Oct 5/16			✓	✓	✓									
WS2	SW		3	Oct 5/16			✓	✓	✓									
WS3	SW		3	Oct 5/16			✓	✓	✓									
SS 1	S		1	Oct 5/16			✓	✓	✓									- 720 ml -
SS 2	S		1	Oct 5/16			✓	✓	✓									↓
Samples expired (~1:00pm), proceed regardless per Kaitlin. JC.																		

Comments: **See revised COC attached. No metals on water per Kaitlin. Preserve soils in lab. JC.** Method of Delivery: **FILS-AIR**

Relinquished By (Sign):	Received by Driver/Depot: <b>M. JENSEN</b>	Received at Lab: <b>SUNDEPORN DOK MAI</b>	Verified By: <b>Rachel Sub, ect</b>
Relinquished By (Print):	Date/Time: <b>19/10/16 11:45</b>	Date/Time: <b>16 OCT 19 2016 12:05</b>	Date/Time: <b>Oct 19/16</b>
Date/Time:	Temperature: <b>11</b>	Temperature: <b>13.2</b>	pH Verified <input checked="" type="checkbox"/> By: <b>NA</b> 3:04

Chain of Custody (Env) - Rev 0.7 Feb. 2016

