2018 Environmental Monitoring Program, Resolute Bay Airport Land Treatment Unit, Cornwallis Island, Nunavut

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Prepared for:

Public Services and Procurement Canada on behalf of Transport Canada

Prepared by:

Stantec Consulting Ltd.

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Sign-off Sheet

This document entitled 2018 Environmental Monitoring Program, Resolute Bay Airport Land Treatment Unit, Cornwallis Island, Nunavut was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Public Services and Procurement Canada on behalf of Transport Canada (the "Client").

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Executive Summary

Stantec Consulting Ltd. (Stantec) completed the 2018 Environmental Monitoring Program (the Program) at two Land Treatment Units (LTUs) located at the northern portion of the Resolute Bay Airport on Cornwallis Island, Nunavut (the Site). The Program was completed from August 22 to 26, 2018 with the authorization of Public Services and Procurement Canada (PSPC) on behalf of Transport Canada (TC). The program consisted of groundwater monitoring/assessment activities and a shallow soil sampling program to meet licensing requirements (Nunavut Water Board (NWB) Licence No. IBR-RLF1520), assess for potential seepage issues, and obtain background data. The monitoring work was also modified with the collection of surface water samples to supplement limited groundwater samples collected at the Site.

Stantec monitored six groundwater monitoring wells surrounding LTU 1 (MW 1 to MW3) and 2 (MW4 to MW6). Only one of the six monitoring wells (MW1) that was hydraulically upgradient of LTU1, contained sufficient groundwater to allow for sampling. Groundwater samples were analyzed for the parameters required by the Nunavut Water Board (NWB) Licence No. 1BR-RLF1520 (NWB Licence parameters) including total suspended solids (TSS), polycyclic aromatic hydrocarbons (PAH), benzene, toluene, ethylbenzene, xylenes (BTEX), oil and grease (OG), total phenols (TP), total metals, and routine parameters. Ten shallow soil samples (SS1-SS10) and a duplicate ranging from 0.4 to 0.6 metres below ground surface (mbgs) were collected and analyzed for BTEX, Petroleum Hydrocarbon (PHC) Fraction F1-F4, and nutrients (nitrogen, phosphorous, and potassium). Five surface water samples (SW1-SW5) were collected to supplement groundwater data and to assess for the LTU integrity. The samples were analyzed for the NWB Licence parameters of TSS, PAHs, BTEX, total extractable hydrocarbons (TEH), OG, TP, total metals and routine parameters including fertilizers. A surface water sample was also duplicated in the field, in lieu of a groundwater sample duplicate as part of the quality assurance, quality control program (QA/QC). The field duplicate was analyzed for the NWB Licence groundwater parameters.

The effluent guidelines provided in the licence apply only to a limited number of the parameters that required analysis; therefore, as directed by the NWB, the Ontario Ministry of the Environment, Conservation and Parks (MECP) 2011 Site Condition Standards (under Ontario Regulation 153/04) were used to evaluate parameter concentrations in groundwater. Because the Site is non-potable, the MECP 2011 Table 3: Full Depth Generic Site Condition Standards (SCS) in a Non-Potable Condition (MECP Table 3) were selected for use. The Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines (CWQG) and Canada Wide Standards for Petroleum Hydrocarbons in Soil (CWS) were also used to assess soil and water quality at the Site.

A weathered drum containing aviation fuel was observed on the Site west of LTU 3, a weathered 1 m^3 bag containing salt was observed on the Site south of LTU 1, and a pile of construction debris was observed located inside the berms of LTU 2. Neither items were the property of TC. Stantec coordinated the disposal of these materials with the airport authority. These materials had been removed by the time Stantec had left the Site. The final disposal location of these materials was not communicated to Stantec.

While onsite, Stantec personnel visually assessed the condition of the exposed portions geomembrane liners and berms of the LTUs. Stantec personnel noted two locations in LTU 2 where surface water contained within the LTU has potentially breached the berm. One area is located near the centre of the west berm of LTU 2, and one area is

located near the west corner of the south berm of LTU 2. Accumulated surface water and associated vegetation growth was observed adjacent to each of the potential berm breach locations (outside the LTU).

The shallow soil samples generally consisted of medium brown gravelly sand with trace silt. Soil sample SS1 was collected from inside the LTU as a reference sample to evaluate for potential seepage issues. There are no applicable guidelines / standards for the nutrient parameters analyzed. Since nutrients were added to the LTUs in 2002 and 2003 (Arcadis, 2017), and it was suspected that nutrients may have leached from the LTUs, six of the ten soil samples, including a duplicate, were analyzed for nutrients as indicator parameters to assess for potential seepage/berm breach issues. One background sample was collected at SS10, and two were in the vicinity of each LTU (LTU1: SS2, SS4, LTU2: SS1, SS7). The measured nutrient soil concentrations were generally less than the laboratory RDLs with the exception of available potassium in the six soil samples analyzed for nutrients. The available potassium concentrations ranged from 9.5 mg/kg (SS10) to 36 mg/kg (SS1). The detectable concentrations of available potassium inside the LTU ranged from 3.7 to 3.4 times greater than the concentrations outside the LTU. The lowest concentration of available potassium was encountered in the up-gradient soil sample location (SS10). The concentrations in the remaining soil samples outside of the LTU were 1.6 times higher than the concentration in the up-gradient sample.

A summary of exceedances is provided below for the various media/areas monitored or issues assessed.

Investigation Purpose	Surface Water (SW) / groundwater	Shallow Soil (SS)
LTU 1 (Associated Monitoring wells MW 1 to MW3)		
MW1	No surface water samples collected. MW1 PHC F2: 0.029 mg/L exceeds MECP (0.15 mg/L).	No samples collected
Licence substitution for MW 2 and 3 / seepage	SW3 Total lead: 0.034 mg/L exceeds CWQG (0.007 mg/L) and background SW5 sample that was non-detectable.MW2 and MW3 No groundwater available.	SS5 - No exceedances.
North side seepage	No samples collected.	SS2 & SS3 - No exceedances
West side seepage	No samples collected.	SS4 - No exceedances
LTU 2 (Associated Monitoring wells MW4 to MW6)		
Licence substitution for MW 4	SW4 - No Exceedances MW4 - No groundwater available.	No samples collected
Licence substitution for MW 5, Southwest corner Potential berm breach	SW1 Total Lead: (0.032 mg/L) & duplicate Dup 18-01 (0.03 mg/L). Values exceed CWQG (0.007 mg/L) and background SW5 sample that was non-detectable. Nitrate: 4.6 mg/L exceeds CWQG (3mg/L), Nitrite: 21 mg/L exceed CWQG (13 mg/L). Both of these concentrations were two orders of magnitude greater than their respective background concentrations collected at SW5. MW5 - No groundwater available.	SS7 & SS8 - No exceedances
Licence substitution for MW4	SW4 - No exceedances. MW4 - No groundwater data.	No samples collected
LTU 2 (Associated Monitoring wells MW4 to MW6) Continued		
Central West side Potential berm breach	SW2 - No exceedances	SS6 - No exceedances

Other		
South west vegetated area between LTU 1 and 2	No samples collected	SS9 - No exceedances
LTU 2 interior soil reference /nutrient reference	No samples collected	SS1, duplicate Dup18-01 PHC F2 280 mg/kg exceeded CCME (260 mg/kg) but not SS1.
Background (topographically upgradient)	SW5 - No exceedances	SS10 - No exceedances

The groundwater exceedance at MW1 and the surface water exceedance at SW3 suggest that PHC and lead impacts are present outside of LTU on the east and west side of LTU1. Impacts outside of LTU 1 may be a result of holes in the liner (if present) or the overflow of water; however, these mechanisms were not observed by Stantec during the Program. As limited background data is currently available (i.e., one sample – SW5), additional background sampling in soil and surface water is recommended to determine if the total lead exceedances in surface water at the Site are a result of anthropogenic activities associated with the LTUs or the result of natural/background conditions at the Site.

Two potential berm breaches were observed by Stantec personnel at LTU 2. The surface water sample collected from accumulated surface water outside LTU 2 near the SW corner of LTU 2 indicated concentrations of total lead, nitrate (N), and nitrate (NO_3) above background concentrations and exceeding the applicable CWQGs. Due to the nature of the parameter concentrations encountered, their locations in relation to the LTUs, and field observations with regard to erosion channels and vegetation, Stantec is of the opinion that water overflowing the berm of LTU 2 has impacted soil, surface water, and groundwater exterior to LTU 2 at the Site.

Based on the results of the 2018 Program, Stantec recommends the following:

1. Attempt to remove the bailer frozen in MW5 to make the well operable using hot water flush to melt the ice in contact with the bailer. After removing the bailer, the well will need to be re-developed prior to monitoring and sample collection.
2. Due to heaving, MW4 and MW6 are inoperable and should be removed from the Program and decommissioned.
3. Conduct additional background sampling of soil and surface water to determine if total lead exceedances are a result of anthropogenic activities associated with the LTUs.
4. Conduct preliminary quantitative human health and ecological risk assessment (PQHHERA) to determine whether further remediation or risk management measures may be required to mitigate potential risk to human health of the environment for the ongoing management and/or closure of the Site. At the time this report was developed, the PQHHERA was under development and the findings are provided under separate cover.
5. Install “No Dumping” signs at the Site to deter illegal dumping within the berms.
6. Conduct an engineering assessment to develop a program including costs, to assess the engineering options for improving/building up the berms to prevent accumulated surface water from overflowing and/or blowing over and impacting soil and groundwater outside the LTU.

Limitations

The statements made in the Executive Summary are subject to the same limitations included in the Limitations Section 8.0 and are to be read in conjunction with the remainder of this report.

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) completed the 2018 Site Environmental Monitoring Program (the Program) at the Land Treatment Units (LTU) located at the northern portion of the Resolute Bay Airport on Cornwallis Island, Nunavut (hereinafter referred to as the Site). The Program was completed under the authorization of Public Services and Procurement Canada (PSPC) on behalf of Transport Canada (TC).

The Site location is presented in Figure 1 of **Appendix A.**

1.1 OBJECTIVES

The objectives of the Program were as follows:

- Complete a groundwater monitoring program at the Site to assess for chemicals of concern to satisfy the Nunavut Water Board (NWB) Licence 1BR-RLF1520 requirements.
- Assess LTU 1 and 2 to evaluate the integrity of the LTU liners, and the condition of the monitoring well network.
- Perform data gap analysis and additional sampling to assess potential risk to human and ecological health[1].
- Investigate a potential breach of LTU 2, based on observations noted in the 2017-2018 groundwater monitoring program.

1.2 BACKGROUND

Stantec reviewed the background information included in the Terms of Reference (TOR) provided by PSPC (TOR, Environmental Monitoring Services, Resolute Bay Airport LTU, Nunavut, July 12, 2018) and in historical reports provided by PSPC. Based on our review, Stantec has provided below a summary of the history and background of the Site, including previous assessments, as follows:

- The Resolute Bay Airport has been in operation since 1949. It was originally constructed by the Royal Canadian Air Force. Ownership was transferred to the Government of Canada in 1964 and it was operated by Transport Canada (TC) until July 1, 1995. Ownership was transferred to the Government of the Northwest Territories in 1999 and then to the Government of Nunavut.
- In 2002, two LTU (LTU 1 and 2) were constructed to treat petroleum hydrocarbon (PHC) impacted soil from a former above ground storage tank (AST) farm that stored bulk fuel and a former fire mock up training area (FTA). Approximately 500 cubic metres (m^3) of PHC impacted soil was excavated from the FTA and approximately 300 m^3 of PHC impacted soil was excavated from the AST farm for treatment in the LTU.
- Two smaller LTU (LTU 3 and 4) are also present. There is no background information regarding the origin of these LTU. TC is not the custodian of LTU 3 and 4, and these LTU are not included in the scope of work presented herein.
- In 2015, a soil sampling program confirmed the perfluorooctanesulfonic acid (PFOS), one of the per- and polyfluoroalkyl substances (PFAS) concentrations exceeded the then interim guidelines in the LTU soils, and PHC concentrations exceeded applicable environmental guidelines at the time in the LTU soils.

[1] Completed during proposal preparation

- In 2016-2017 the condition of six existing monitoring wells was assessed (MW1 through MW6), and the liner integrity was assessed in the LTU. In 2017, only one groundwater sample could be collected from the monitoring wells at the Site as the wells were frozen, dry, or heaved. Surface water samples were also collected around the LTU perimeter to assess for potential impacts, and to compensate for the lack of groundwater samples. Monitoring wells MW4 and MW6 (located upgradient and downgradient of LTU 2), were reported to have heaved and were not considered viable for future sampling.

An operating licence for the historical LTU (LTU 1 and 2) was obtained by TC through the Nunavut Water Board (NWB) in 2015 (Licence No. IBR-RLF1520) and requires annual groundwater monitoring and soil sampling. However, no active remediation of the impacted LTU soil is currently programmed at this time due to previously identified soil PFOS exceedances. Therefore, soil sampling requirements before and after treatment are not being undertaken at this time. TC is in the process of developing a risk management strategy in order to remediate the Site. Consequently, the soil sampling requirements of the NWB licence have been suspended by TC until remediation is resumed. When remediation is resumed, soil monitoring will be resumed, and the results will be shared with the NWB.

1.3 SCOPE OF WORK

The scope of work of the Program is outlined in the sections below.

1.3.1 Task 1 – Health and Safety

- Prepare a site-specific health and safety plan to identify and address site specific hazards.

1.3.2 Task 2 – Groundwater Monitoring and Sampling

- Retain a local field assistant to provide support to Stantec staff.
- Monitor the existing groundwater monitoring wells (MW1, MW2, MW3, and MW5) for depth to liquid petroleum hydrocarbons (if present), depth to water, and field parameters.
- Purge the existing monitoring wells and collect four groundwater samples and one field duplicate sample.
- Submit the samples to Maxxam Analytics International Corporation (Maxxam) of Ottawa, ON for analysis of the parameters specified in the NWB Licence (and Section 3.4 of this report).
- Georeference monitoring well locations.
- Provide a letter from Maxxam confirming review of the quality control sampling plan.

1.3.3 Task 3 – Additional Soil and Surface Water Sampling

- Collect up to four surface water samples (if possible) and one field duplicate surface water sample from the perimeter of LTU 2 in areas where vegetation is inconsistent with baseline vegetation to assess seepage issues and in support of future risk assessment.
  - Visually assess vegetation in support of future risk assessment.
- Collect up to four surface soil samples and one field duplicate soil sample from the perimeter of LTU 2 (coincident to the surface water samples) in areas where vegetation is inconsistent with baseline vegetation for benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbon fractions 1 through 4 (PHC F1-F4), and nutrients to assess seepage issues and in support of future risk management. The soil sample locations are coincident with the surface water samples.
- Collect one soil sample from within LTU 2 (if possible) for laboratory analysis of BTEX, PHC F1-F4, PHC fractionation, and nutrients in support of future risk assessment.

- Submit the samples to Maxxam Analytics International Corporation (Maxxam) of Ottawa, Ontario for analysis of the parameters specified in Section 3.4 of this report.
- Georeference soil sample locations.
- Where visible, observe and record the condition of the Liners in LTUs 1 and 2.

1.3.4 Deviations from Scope of Work

- Groundwater samples were collected with the dedicated bailers that were present within the wells upon Stantec's arrival onsite as sampling equipment requisitioned from suppliers had not arrived at the time of sampling.
- GPS equipment was unreliable at the time of the field program; therefore, sample locations and site features were not georeferenced.
  - Sample locations were measured from semi-permanent site features.
- A weathered drum containing aviation fuel was present on the Site west of LTU 3, a weathered 1 cubic metre (m^3) bag containing salt was also observed on the Site south of LTU 1, and a pile of construction debris was located inside the berm of LTU 2.
  - Stantec coordinated the removal and disposal of the three items with the airport authority.
- One groundwater sample was collected from one of the existing monitoring wells (MW1) as the remaining monitoring wells were either frozen, heaved, or contained insufficient water to allow for sample collection.
- As only one monitoring well (MW1) had sufficient groundwater for sample collection, five surface water samples (SW-1 through SW-5) were analyzed for the NWB Licence groundwater parameters. A surface water sample was also duplicated in the field (SW-DUP-18-01), in lieu of a groundwater sample duplicate. The field duplicate was analyzed for the NWB Licence groundwater parameters.
- Due to shipping delays, monitoring and sampling equipment did not arrive to the Site until August 26, 2018. The initial water level measurements were not collected using an interface probe; therefore, the initial monitoring data (August 23, 2018) is considered approximate.
  - The wells were monitored with an interface probe on August 26, 2018, when the equipment arrived.

2.0 REGULATORY FRAMEWORK

The guidelines and standards considered applicable to the program are summarized in Table 2-1, below.

Table 2-1 Summary of Applicable Guidelines and Standards

Source	Guidelines / Standards	Rationale
Soil	Canadian Council of Ministers of the Environment (CCME) 2008. Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (CWS). Nunavut Water Board (NWB) Licence No. 1-BR-RLF-1530, Part J, Item 5 (Effluent Guidelines) Ontario Ministry of the Environment (now referred to as MECP) 2011 Soil, Groundwater, and Sediment Standards for use under Part X.V.1 of the Environmental Protection Act (MECP, 2011). Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Condition (MECP Table 3 SCS).	The concentrations of petroleum hydrocarbon fractions 1 through 4 (PHC F1-F4) were compared to the CWS. The CWS do not have guidelines for benzene, toluene, ethylbenzene, and xylenes (BTEX); therefore, the MECP Table 3 SCS for Industrial/Commercial/Community Property Use were used for evaluation purposes based on instructions from the NWB to TC.
Groundwater	NWB Licence No. 1-BR-RLF-1530, Part D, Item 6 (Effluent Guidelines) MECP Table 3 SCS	The effluent guidelines provided in the licence apply only to a limited number of the parameters that required analysis; therefore, the NWB directed TC to use the MECP, 2011 Site Condition Standards (under Ontario Regulation 153/04) for evaluation of parameter concentrations in groundwater. Because the Site is non-potable, the MECP 2011 Table 3: Full Depth Generic Site Condition Standards (SCS) in a Non-Potable Condition (MECP Table 3) were selected for use. The MECP Table 3 SCS are not dependent on land use.
Surface Water	Effluent Guidelines CCME Canadian Water Quality Guidelines for Freshwater Aquatic Life (CWQG) MECP Table 3 SCS	Because only one monitoring well contained sufficient water to allow for sampling, surface water samples were also evaluated per the MECP Table 3 SCS. While the licence does not specify guidelines for evaluation, the Freshwater CWQG were used as they are applicable to surface water. Because the Site is located more than 1km from the ocean, the CWQG for protection of Marine Life were not included for comparison to surface water sample results. The MECP Table 3 SCS are not intended for use when evaluating parameter concentrations in surface water. However, they were provided for reference purposes as the surface water samples were collected in lieu of groundwater samples as five of the six monitoring wells on-site could not be sampled.

3.0 METHODOLOGY

3.1 TASK 1 – HEALTH AND SAFETY

Stantec prepared a site-specific health and safety plan (HSP) to address site specific hazards. The HSP was submitted to PSPC on August 17, 2018 prior to the initiation of field activities.

3.2 TASK 2 – GROUNDWATER MONITORING AND SAMPLING

The groundwater monitoring and sampling portion of the Program was completed from August 22 to 26, 2018. On August 23, 2018, the depth to groundwater in the six existing groundwater monitoring wells (MW1 through MW6) was measured using a measuring tape, as field monitoring equipment had not yet arrived due to shipping delays. Concentrations of combustible headspace vapour (CHV) and ionizable headspace vapour (IHV) were measured using an RKI Eagle 2™; however, the equipment required to measure the remaining field parameters was also delayed. Stantec observed the following on-Site on August 22, 2018:

- Two monitoring wells (MW4 and MW6) at LTU 2 were confirmed to be heaved and were not considered to be acceptable for monitoring or sample collection as the well screen was partially above the ground surface; therefore, water within the well was likely influenced by surface water.
- One monitoring well (MW3) at LTU 1 was dry and could not be monitored or sampled, and one monitoring well (MW5) was frozen within the stand pipe and could not be monitored or sampled.
- One monitoring well (MW2) at LTU 1 did not contain sufficient water to allow for monitoring of field parameters or sample collection.
- Monitoring well MW1, located immediately northeast and hydraulically cross-gradient (based on the direction of surface water drainage) of LTU 1, was the only monitoring well with sufficient water to allow for sample collection.

Refer to Figure 2, **Appendix A** for locations of the monitoring wells at the Site and to Table 1, **Appendix C** for field observations at monitoring well locations. On August 24, 2018, MW1 was purged until the well was essentially dry using the dedicated bailer that was inside the well when Stantec arrived at the Site. The purge water was contained in a bucket and disposed of on LTUs 1 and 2. The well was allowed to recharge prior to sample collection. One groundwater sample was collected from MW1 using the dedicated bailer present within the monitoring well. The sample was immediately transferred to laboratory supplied containers and stored in an ice-chilled cooler prior to and during transportation to the laboratory.

One field blank sample was prepared by Stantec personnel by pouring laboratory-provided water over the sampling equipment into laboratory supplied bottles for laboratory analysis of the NWB Licence parameters for QA/QC purposes. One laboratory-prepared trip blank was shipped with the sample and analyzed for NWB Licence parameters for QA/QC purposes.

The samples were shipped by air by First Air Cargo to Maxxam's laboratory in Ottawa, Ontario.

On August 26, 2018, when the field monitoring equipment arrived, the six existing monitoring wells (MW1 through MW6) were monitored for depth to liquid petroleum hydrocarbons (if present) and depth to water using an interface probe, CHV and IVH using an RKI Eagle 2™, and temperature, pH, redox potential, electrical conductivity, and dissolved oxygen using a YSI Multi Parameter Water Quality Meter.

3.3 TASK 3 – ADDITIONAL SOIL AND SURFACE WATER SAMPLING

3.3.1 Surface Water Sampling

The surface water sampling portion of the Program was completed on August 25, 2018. Multiple locations of accumulated surface water were encountered in the vicinity of the LTUs. The approximate locations of accumulated surface water are indicated on Figure 3, **Appendix A**.

Stantec collected five surface water samples and one field duplicate for laboratory analysis of the NWB Licence parameters. Surface water samples were collected by dipping laboratory-provided bottles directly into the surface water. The samples were stored in an ice-chilled cooler prior to and during transportation to the laboratory. The samples were shipped by air by First Air Cargo to Maxxam's laboratory in Ottawa, Ontario.

The surface water sample locations are summarized in Table 3-1, below and are presented on Figure 3, **Appendix A**.

Table 3-1 Surface Water Sample Locations

Sample ID	Purpose	Location
SW1/Duplicate	Licence substitution for MW5 / Seepage	Approximately 11.5 m south of LTU 2 (hydraulically down-gradient of LTUs 1 and 2 based on estimated surface drainage).
SW2	Seepage	Immediately west of LTU 2 (hydraulically down-gradient of LTU 1, adjacent to potential berm breach of LTU 2).
SW3	Licence substitution for MW2 and MW3 / Seepage	Approximately 11.3 m west southwest of LTU 1 (hydraulically cross-gradient of LTU 1 and up-gradient of LTU 2 based on estimated surface drainage).
SW4	Licence substitution for MW4 / Seepage	Immediately north of LTU 2 (hydraulically cross-gradient of LTU 1 and up-gradient of LTU 2 based on estimated surface drainage).
SW5	Background / Risk assessment	Approximately 10 m north of LTU 2 (hydraulically cross-gradient of LTU 1 and up-gradient of LTU 2 based on estimated surface drainage).

3.3.2 Soil Sampling

The soil sampling portion of the program was conducted on August 22, 2018.

Stantec collected one discrete soil sample and one field duplicate soil sample using hand tools from approximately 0.4-0.6 m depth within LTU 2. Nine discrete surface soil samples were collected using hand tools from locations outside of the LTU. One half of each soil sample was immediately transferred into laboratory supplied containers and stored in ice-chilled coolers prior to and during transportation to the laboratory. The second half of each sample was transferred to a plastic bag and allowed to warm up in the running field vehicle, at an ambient temperature of

approximately 21ºC, for approximately 15 minutes prior to field screening for combustible headspace vapour (CHV) and ionizable headspace vapour (IHV) concentrations using an RKI Eagle 2™.The samples were shipped by air by First Air Cargo to Maxxam's laboratory in Ottawa, Ontario.

The soil sample locations are summarized in Table 3-2, below and are presented on Figure 3, **Appendix A**.

Table 3-2 Soil Sample Locations

Sample ID	Purpose	Location
SS1 / Duplicate	Risk assessment (reference sample within LTU 2 to support preliminary quantitative human health and ecological risk assessment [PQHHERA])	Inside LTU 2 at an approximate depth of 0.4-0.6 m.
SS2	Assess area with vegetation	Approximately 8 m northwest of LTU 1 (hydraulically up-gradient based on surface drainage direction).
SS3	Assess area with vegetation	Approximately 16 m northwest of LTU 1 (hydraulically up-gradient based on surface drainage direction).
SS4	Assess area with vegetation	Approximately 10 m west of LTU 1 (hydraulically cross-gradient based on surface drainage direction).
SS5	Correlation with SW3	Approximately 20 m west of LTU 1 (hydraulically cross-gradient based on surface drainage direction).
SS6	Seepage / Correlation with SW2	Approximately 6.5 m west of LTU 2 (hydraulically down-gradient of LTU 1 and cross-gradient of LTU 2 based on surface drainage direction, immediately adjacent to potential berm breach identified by Stantec during the Program).
SS7	Seepage / Correlation with SW1	Approximately 23 m southwest of LTU 2 (hydraulically down-gradient of LTUs 1 and 2, south of potential berm breach identified by Stantec during the Program).
SS8	Seepage / Assess area with vegetation	Approximately 35 m southwest of LTU 2 (hydraulically down-gradient of LTUs 1 and 2, south of potential berm breach identified by Stantec during the Program).
SS9	Assess area with vegetation	Approximately 48 m southwest of LTU 4 (hydraulically down-gradient of LTU 1 and cross-gradient of LTU 2 based on surface drainage direction).
SS10	Background	Approximately 200 m north of LTU 2 (hydraulically up-gradient of LTUs 1 and 2 based on surface drainage direction).

It should be noted that areas with vegetation not consistent with background areas were sampled for seepage. Vegetated areas are not considered common place in the vicinity of the Site and represent an area of potential water accumulation and/or nutrient availability.

3.3.3 Laboratory Program

The laboratory analytical program is summarized in Table 3-3, below.

Table 3-3 Laboratory Program Summary

Source	Laboratory Analysis
Groundwater MW 1	Total Suspended Solids (TSS) Polycyclic Aromatic Hydrocarbons (PAH) Benzene, toluene, ethylbenzene, xylenes (BTEX) Total extractable hydrocarbons (TEH) Oil and Grease Total Phenols Total Metals (aluminum, cadmium, copper, lead, nickel, silver, zinc, arsenic, cobalt, iron, molybdenum, selenium, titanium) Routine parameters (total hardness, conductivity, calcium, sodium, chloride, magnesium, potassium, sulphate, total alkalinity, nitrate-nitrite, ammonia nitrogen, and pH)
Surface Water SW1 to SW5	Total Suspended Solids (TSS) Polycyclic Aromatic Hydrocarbons (PAH) Benzene, toluene, ethylbenzene, xylenes (BTEX) Total extractable hydrocarbons (TEH) Oil and Grease Total Phenols Total Metals (aluminum, cadmium, copper, lead, nickel, silver, zinc, arsenic, cobalt, iron, molybdenum, selenium, titanium) Routine parameters (total hardness, conductivity, calcium, sodium, chloride, magnesium, potassium, sulphate, total alkalinity, nitrate-nitrite, ammonia nitrogen, and pH) Routine Parameters (including fertilizer)
Surface Soil SS2 to SS10	BTEX PHC fractions 1 through 4 (PHC F1-F4) Nutrients (nitrogen, phosphorous, potassium)
LTU Soil SS1 Dup18-01	BTEX PHC fractions 1 through 4 (PHC F1-F4) PHC fractionation Nutrients (nitrogen, phosphorous, potassium)

3.3.4 Quality Assurance and Quality Control

The following field quality assurance and quality control (QA/QC) procedures were followed during the Program.

- Soil and groundwater sample collection and equipment decontamination were completed in general accordance with Stantec's SOPs
- Equipment was calibrated by Stantec personnel prior to fieldwork
- Soil and groundwater samples were stored in ice-chilled coolers prior to and during transportation to the laboratory
- Soil and groundwater samples were delivered to the laboratory following standard chain-of-custody protocols
- Samples selected for analysis were analyzed by Maxxam Analytics International Corporation (Maxxam), which is accredited by the Canadian Association of Laboratory Accreditation (CALA)
- One field duplicate surface water sample and one field duplicate soil sample were collected by Stantec and analyzed by Maxxam. The analytical results were compared to those of the parent samples using the method of relative percent difference (RPD) to evaluate precision
- One trip blank and one field blank were collected by Stantec and analyzed by Maxxam

In addition to the Stantec QA/QC procedures, the laboratory analyzes and assesses method blanks, Certified Reference Materials, method spikes, and surrogate recoveries to monitor data quality. These results are presented as part of laboratory certificates of analysis.

Maxxam reviewed Stantec's sampling plan prior to field work and provided confirmation that the sampling plan satisfied the CCME requirements for field QC. A copy of Maxxam's letter is provided in **Appendix B**.

3.3.5 Liner Visual Assessment

While onsite, Stantec personnel visually assessed the condition of the exposed portions of the geomembrane liners and berms of the LTU for evidence of overflow, and visible indications of tearing or material distress. Areas of concern were recorded and are summarized in Section 4.4.3, and indicated on Figure 3, **Appendix A**.

4.0 RESULTS

The results of the Program are presented in the following figures, tables, and appendices of the report, and are presented in detail in subsections presented below:

Description	Figures or Tables and Associated Appendix
Site layout and monitoring well locations	Figure 2, **Appendix A**
Accumulated surface water, surface water sampling locations, and soil sampling locations	Figure 3, **Appendix A**
Groundwater monitoring results	Table 1, **Appendix C**
Groundwater analytical results	Table 2, **Appendix C** Figure 2, **Appendix A**
Surface water analytical results	Table 3, **Appendix C** Figure 3, **Appendix A**
Soil monitoring results	Table 4, **Appendix C**
Soil analytical results	Table 5, **Appendix C** Figure 3, **Appendix A**
QA/QC results	Table 6, **Appendix C**
Photographic log	**Appendix D**
Copies of the laboratory certificates of analysis	**Appendix E**

4.1 SITE CONDITIONS

The 2018 field program was conducted from August 22 to August 26, 2018.

The temperature ranged from -2 degrees Celsius (^{0}C) to 6 ^{0}C. Light snow showers occurred on August 23 and August 25, 2019; however, snow did not accumulate at the Site.

A weathered drum containing aviation fuel was observed on the Site west of LTU 3, a weathered 1 m^3 bag containing salt was observed on the Site south of LTU 1, and a pile of construction debris was observed located inside the berms of LTU 2. Stantec coordinated the disposal of these materials with the airport authority. These materials had been removed by the time Stantec had left the Site. The final disposal location of these materials was not communicated to Stantec.

4.2 GEOLOGY AND SURFICIAL GEOLOGY

The surficial geology in the area of the Site consists of colluvial deposits that are residual materials deposited as veneers and blankets of debris through downslope movement and in-place disintegration of bedrock, including areas of rock outcrop (Arcadis, 2017). The colluvial rubble reportedly contains rubble and silt derived from carbonate and consolidated fine clastic sedimentary rock substrate (Canada-Nunavut Geoscience Office, 2006a). The bedrock of

the Site is of Paleozoic era, specifically the Arctic Platform and is composed of Silurian carbonate and siliciclastic rocks (Canada-Nunavut Geoscience Office, 2006b).

Resolute Bay is subject to continuous permafrost, and groundwater is not used as potable water (Arcadis, 2017).

During the program, Stantec personnel estimated the surface water drainage direction at the Site to be southerly. The groundwater flow direction in the vicinity of the Site is unknown; however, based on local topography, Stantec interpreted the shallow groundwater flow direction to be southerly.

4.3 GROUNDWATER MONITORING AND SAMPLING

Stantec monitored six groundwater monitoring wells surrounding LTU 1 and 2. During the monitoring portion of the Program, only one of the six monitoring wells contained sufficient groundwater to allow for sampling. The remaining monitoring wells were either frozen (MW5), heaved and concluded to be comprised as the screen was partially above surface (MW4 and MW6), contained insufficient water to allow for sample collection (MW2 and MW6), or were dry (MW3). During future programs, a hot water flushing may be used to thaw the ice within the standpipe of MW5 and remove the bailer. This may dislodge the bailer and allow the well to be used once again for monitoring and/or sampling; however, MW5 will need to be dryer-developed prior to monitoring and sampling. Due to heaving, MW4 should be removed from the program.

The depth to water in MW1, MW2, and MW6 ranged from 0.906 metres below top of casing (mBTOC) in MW1 to 1.566 mBTOC in MW6 on August 26, 2018. The depth to ice in MW5 was 0.739 mBTOC indicating that the well was frozen within the standpipe.

Combustible headspace vapour concentrations ranged from 0 parts per million (ppm) in numerous wells to 121 ppm in MW1 on August 23, 2018. Volatile headspace vapour concentrations ranged from 0 ppm in numerous wells to 2 ppm in MW1 on August 26, 2018. Parameters including temperature, specific conductance, pH, oxidation reduction potential, and dissolved oxygen were also measured in MW1. The groundwater monitoring results are summarized in Table 1, **Appendix C**.

The groundwater analytical results for this program as compared to the applicable guidelines/standards and the results from the 2017 monitoring program conducted by Arcadis are summarized in Table 2, **Appendix C**.

The concentrations of the parameters analyzed in MW1 were below the applicable guidelines / standards with the exception of those described in Table 4-1, below.

Table 4-1 Summary of Groundwater Parameters Exceeding Applicable Guidelines from 2018 Sampling Event

Sample Location	Parameter Category	Individual Parameter	Applicable Guideline Exceeded
MW1 (located northeast of LTU 1 and northwest of LTU 2, hydraulically cross-gradient of LTU 1 and hydraulically up-gradient of LTU 2)	Petroleum Hydrocarbons	F2	MECP The F2 concentration exceeded the MECP Table 3 SCS but was within the same order of magnitude. In 2017, the F2 concentration satisfied the MECP Table 3 SCS.

In 2017, the toluene concentration exceeded the NWB licence guideline (0.002 mg/L); however, in 2018, the toluene concentration was less than the laboratory reportable detection limit (RDL) (0.00040 mg/L). Select PAHs parameter concentrations increased by one to two orders of magnitude between 2017 and 2018 but remained below the applicable guidelines / standards. The laboratory reported concentrations of BTEX and PHC F1 were less than the laboratory RDLs.

Where detectable concentrations of total metals and routine parameters were reported, the concentrations ranged from one order of magnitude below the applicable guideline to the same order of magnitude as the applicable guidelines.

Locations where concentrations exceed the applicable guidelines are indicated on Figure 2, **Appendix A**.

4.4 ADDITIONAL SOIL AND SURFACE WATER SAMPLING

4.4.1 Surface Water Sampling

Stantec collected five surface water samples and one field duplicate sample from accumulated surface water at the Site. Because the locations of the accumulated surface water were not consistent with the surface water samples collected during the 2017 Program, the laboratory analytical results cannot be directly compared to previous results by location. Due to their proximity to monitoring wells that could not be sampled, SW1, SW3, and SW4 were analyzed for the NWB Licence Parameters to replace/substitute for the groundwater samples.

In general, the reported concentrations of the parameters analyzed were below the applicable guidelines, with the exception of those shown in Table 4-2, below.

Table 4-2 Summary of Surface Water Parameters Exceeding Applicable Guidelines from 2018 Sampling Event

Sample Location	Purpose	Parameter Category	Individual Parameter	Applicable Guideline Exceeded
SW1 Approximately 11.5 m south of LTU 2, hydraulically down-gradient of LTUs 1 and 2 based on estimated surface drainage, south of potential berm breach.	Licence substitution for MW5 / Seepage	Total Metals	Total Lead	CWQG Total lead was 0.032 mg/L (parent) and 0.03 mg/L (duplicate) and greater than the CWQG (0.007 mg/L) in both the parent and duplicate samples. The lead concentration in the background sample (SW5) was less than the laboratory RDL (0.00020 mg/L).
		Routine Parameters	Nitrate (N) Nitrate (NO_3)	The nitrate (N) (4.6 mg/L) and nitrate (NO_3) (21 mg/L) were greater than the applicable guidelines in the parent sample and the same order of magnitude as the applicable guidelines in the duplicate sample. The duplicate sample concentrations did not exceed the CWQG.
SW3 Approximately 11.3 m west southwest of LTU 1, hydraulically cross-gradient of LTU 1 and up-gradient of LTU 2 based on estimated surface drainage.	Licence substitution for MW2 and MW3	Total Metals	Total Lead	CWQG The total lead concentration (0.034 mg/L) was greater than the CWQG (0.007 mg/L).

The reported concentrations of BTEX and PHC F1 and F2 were generally less than the laboratory RDLs with the exception of toluene in SW4 (0.00057mg/L and less than the both applicable guidelines [0.002 mg/L]), ethylbenzene in SW2 (0.00044 mg/L) and SW3 (0.00057mg/L), PHC F1 in SW2 and SW4 (no applicable guidelines), and PHC F2 in SW1, SW2, SW3, and SW4 (no applicable guidelines).

The reported concentrations of PAH parameters were less than the laboratory RDLs with the exception of 1-Methylnaphthalene and 2-Methlynaphthalene in SW2, SW3, and SW4 which ranged between 0.00016 and 0.00024 mg/L. There are no applicable guidelines for methylnaphthalene.

Where total metals and routine parameter concentrations were detectable but less than the applicable guidelines, the reported concentrations generally ranged from two orders of magnitude below the applicable guidelines to the same order of magnitude as the applicable guidelines.

The surface water analytical results are summarized in Table 3, **Appendix C**. Locations where concentrations exceed the applicable guidelines are indicated on Figure 3, **Appendix A**.

4.4.2 Soil Sampling

Stantec collected 10 soil samples on August 22, 2018. Soil samples were collected from a depth of approximately 0.4-0.6 m BGS within LTU 2 (SS1/Dup18-01) and approximately 0.1-0.3 m BGS outside the LTU (SS2 to SS10). The soil samples generally consisted of medium brown gravelly sand with trace silt. Field screening results for CHV ranged from 0 ppm in numerous soil samples to 35 ppm in SS1 (located within LTU 2). Field screening results for IHV ranged from 0 ppm in numerous samples to 4 ppm in SS1. Refer to Table 4, **Appendix C** for observed and measured soil conditions.

The laboratory-reported concentrations of the parameters analyzed were below the applicable guidelines / standards with the exception of those listed in Table 4-3, below.

Table 4-3 Soil Parameters Exceeding Applicable Guidelines from 2018 Sampling Event

Sample Location	Parameter Category	Individual Parameter	Applicable Guideline Exceeded
SS1 Within LTU 2 (0.4-0.6 m BGS)	PHC	PHC F2	CWS, MECP The F2 concentration in the duplicate sample exceeded the applicable guidelines / standards and the concentration in the parent sample was below the applicable guidelines / standards. Both concentrations were within the same order of magnitude as the applicable guidelines / standards.

Detectable concentrations of PHC F2 (210 mg/kg), F3 (570 mg/kg), and F4 (310 mg/kg) were measured in the one soil sample (SS1) collected within the LTU. The reported concentrations were one order of magnitude less than the applicable guidelines / standards except for PHC F2 which was the same order of magnitude. Detectable concentrations of PHC F2 were indicated in samples SS6 and SS9 (outside of the LTU). The reported concentrations were one order of magnitude less than the applicable guideline / standard.

While there are no applicable guidelines / standards for the nutrient parameters analyzed, the laboratory reported concentrations were reviewed as previous reports indicate that nutrients were added to the soil in the LTU in 2002 and 2003 (Arcadis, 2017). The measured concentrations of nutrient parameters were generally less than the laboratory RDLs with the exception of available potassium in the six soil samples analyzed for nutrients. The available potassium concentrations ranged from 9.5 mg/kg (SS10) to 36 mg/kg (SS1). The detectable concentrations of available potassium inside the LTU ranged from 3.7 to 3.4 times greater than the concentrations outside the LTU. The lowest concentration (9.5 mg/kg) of available potassium was encountered in the up-gradient soil sample location (SS10). The concentrations in the remaining soil samples outside of the LTU were 1.6 times higher than the concentration in the up-gradient sample.

The soil analytical results are summarized in Table 5, **Appendix C.** Locations where concentrations exceeded the applicable guidelines / standards are indicated on Figure 3, **Appendix A**.

4.4.3 Liner Visual Assessment

While onsite, Stantec personnel visually assessed the condition of the exposed portions of the geomembrane liners and berms of the LTU. Stantec personnel noted two locations in LTU 2 where surface water contained within the LTU has potentially breached the berm. One location is located near the centre of the west berm of LTU 2, and one location is located near the west corner of the south berm of LTU 2 (refer to Photographs 4 and 5 in **Appendix D**). Accumulated surface water was located adjacent to each of the potential break locations. One surface water sample (SW1) was collected from the accumulated surface water south of the berm breach on the south berm, and one surface water sample (SW2) was collected from the accumulated surface water located near berm breach on the west wall. One surface soil sample (SS6) was collected near SW2, and two surface soil samples (SS7 and SS8) were collected near SW1. The surface water analytical results are described in Section 4.4.1, and the surface soil analytical results are described in Section 4.4.2 of this report.

The locations of the potential berm breaches are indicated on Figure 3, **Appendix A**.

5.0 QUALITY ASSURANCE / QUALITY CONTROL

A QA/QC program was conducted to assess data reliability. Soil and groundwater samples were collected in general accordance with Stantec's sampling SOPs, were uniquely labelled, and control was maintained using chain-of-custody forms. Soil samples were collected in laboratory-supplied containers and preserved in ice-chilled insulated coolers.

The data quality objective (DQO) of the Program was to collect data that were reproducible, complete, and suitable for comparison with the referenced guidelines / standards.

5.1 SAMPLE CONTAINERS

In 2016, the CCME updated the sample container requirements for soil analyzed for BTEX and PHC F1 from a 125 mL glass jar, to a sample preserved in methanol. Due to transportation of dangerous goods requirements on commercial flights, methanol could not be shipped from Resolute Bay; therefore, the samples submitted for BTEX and PHC F1 analysis were submitted in 125 mL glass jars supplied by the laboratory. While this procedure does not satisfy the CCME sampling requirements, it is consistent with the historical sampling programs at the Site; therefore, the 2018 soil analytical results were considered suitable for the Program.

5.2 SAMPLE HOLD TIMES

Due to unexpected complications with shipping, the laboratory hold times for some groundwater samples were exceeded for BTEX, PHC F1 and F2, TSS, and other inorganic parameters. The laboratory certificate of analysis states that exceedance of hold time increases the uncertainty of test results but does not necessarily imply that that the results are compromised.

The reported concentrations of parameters with applicable guidelines / standards were less than the laboratory RDLs with the exception of PHC F2 (exceeded the applicable guideline), 1- and 2-Methynaphthalene (three orders of magnitude less than the applicable guidelines / standards), and naphthalene (two orders of magnitude less than the applicable guidelines / standards). Because the reported concentrations either exceeded the applicable guideline or were less than the laboratory RDLs which were two to three orders of magnitude lower than the applicable guideline, the exceeded hold times did not impact the interpretations of the groundwater data for the Program.

5.3 TEMPERATURE

Sample temperatures were recorded upon arrival at the laboratory by measuring up to three random sample container temperatures and calculating the average result to obtain a representative temperature. The ideal temperature should be approximately 4°C. Samples that arrive at the laboratory with temperatures measured above 4°C may have reported concentrations that are biased low as a result of the elevated sample temperatures.

Although it is ideal to have sample temperatures below 4°C, Maxxam has noted the difficulty in maintaining samples below 4°C. As such, Maxxam considers a temperature range of 4°C to 10°C as acceptable. Samples submitted to the laboratory indicated temperatures that were considered acceptable.

5.4 FIELD DUPLICATES

The method of RPD is used to evaluate the sample result variability and is calculated by the following equation:

$$RPD = \left[\frac{|S1 - S2|}{S3} \right] \times 100$$

Where:
RPD = relative percent difference
S1 = original soil or groundwater sample concentration
S2 = duplicate soil or groundwater sample concentration
S3 = average concentration = (S1 + S2)/2

In the event that the analytical result for either sample is less than five times the laboratory reportable detection limit (RDL), any calculated RPD is considered not to be valid and no conclusion can be made with respect to the data reproducibility. The generally accepted industry standard for acceptable RPD's analyses is less than or equal to 60% for field duplicated soil samples and less than or equal to 40% for field duplicated water samples (CCME, 2016).

SW-DUP18-01 was a field duplicate surface water sample collected from SW1. Where they could be calculated, the RPD's ranged from 0% (numerous parameters) to 147.11% (Nitrate (NO_3)). In general, the calculated RPDs were less than the acceptable range indicated in the CCME guidance. In most cases where the RPD was greater than the CCME guidance, there were no applicable guidelines (i.e., total ammonia, total phosphorous, and phenols); therefore, the interpretation of the surface water data was not impacted. However, the RPDs for Nitrate (N) at 145.22% and Nitrate (NO3) at 147.11% were greater than the acceptable range indicated in the CCME guidance. In this case, the parent sample concentrations exceeded the applicable guidelines while the duplicate sample concentrations were less than the applicable guidelines. For the purpose of this Program, Stantec assumed the higher concentration to be representative of surface water quality at this location at the Site as it was the more conservative approach.

Dup 18-01 was a field duplicate soil sample collected from SS-1. Where they could be calculated, the RPDs ranged from 2.1% (>C21-C34 Aliphatic) to 28.6% (PHC F2) and were within the range of acceptable values indicated in the CCME guidance.

The RPD results are summarized on Table 3, **Appendix C** for surface water and Table 5, **Appendix C** for soil.

5.5 TRIP BLANK

TB-1 consisted of de-ionized water prepared by the laboratory. The trip blank sample was submitted for analysis of the NWB Licence parameters. The laboratory analytical results indicated that the reported concentrations were less than the laboratory RDL with the exception of total aluminum, total chromium, and total molybdenum. While the total chromium and molybdenum concentrations were less than the applicable guidelines / standards in the groundwater and surface water samples, the total aluminum concentrations exceeded the applicable guidelines / standards in the groundwater sample from MW1 by one order of magnitude. Because the total aluminum concentrations in the surface water samples were one order of magnitude less than the applicable guidelines / standards, and because they were transported with MW1, Stantec is of the opinion that the detectable concentration of total aluminum in the trip blank did not impact the analytical results.

5.6 FIELD BLANK

FB-1 was a field blank prepared by Stantec personnel using deionized water provided by the laboratory. The field blank sample was packaged in laboratory-supplied bottles in the field by Stantec using the same equipment used to collect the groundwater samples. The field blank sample was submitted for analysis of NWB Licence parameters. Laboratory analytical results indicated the reported concentrations of the tested parameters were less than the laboratory RDLs. As such, the field blank results indicate that sample handling and sampling equipment did not influence the groundwater analytical results.

5.7 LABORATORY QA/QC

In addition to the Stantec QA/QC procedures, the laboratory analyzes and assesses method blanks, Certified Reference Materials, method spikes, and surrogate recoveries to monitor data quality. In general, the laboratory QA/QC results were considered acceptable; however, the matrix spike exceeded acceptance limits due to matrix interference for some PAH parameters in SW3. These PAH concentrations were less than the RDL and consistent with the PAH concentrations reported for the remaining surface water samples. The matrix spike exceedance did not impact the interpretation of the data from SW3. The laboratory QA/QC results are presented as part of laboratory certificates of analysis in **Appendix D.**

5.8 SUMMARY

Based on the results of the assessment above, the DQO for the Program was considered to have been met.

6.0 DISCUSSION

Stantec completed the 2018 Site Environmental Monitoring Program at the LTU located at the Resolute Bay Airport on Cornwallis Island, Nunavut in August 2018. The findings of the Program are summarized below.

Site Conditions

A weathered drum containing aviation fuel was observed on the Site west of LTU 3, a weathered 1 m^3 bag containing salt was observed on the Site south of LTU 1, and a pile of construction debris was also observed located inside the berms of LTU 2. Stantec coordinated the disposal of these materials with the airport authority. These materials had been removed by the time Stantec had left the Site. The final disposal location of these materials was not provided to Stantec.

Groundwater Monitoring and Sampling

Stantec attempted to monitor six groundwater monitoring wells surrounding LTU 1 and 2. During the monitoring portion of the Program, only one of the six monitoring wells contained sufficient groundwater to allow for sampling. The remaining monitoring wells were either frozen (MW5), heaved so that the screen was partially above surface (MW4 and MW6), contained insufficient water to allow for sample collection (MW2 and MW6), or were dry (MW5).

The depth to water in MW1, MW2, and MW6 ranged from 0.906 metres below top of casing (mBTOC) in MW1 to 1.566 mBTOC in MW6 on August 26, 2018. The depth to ice in MW5 was 0.739 mBTOC indicating that the well was frozen within the standpipe.

CHV concentrations ranged from 0 parts per million (ppm) in MW2 through MW6 to 121 ppm in MW1 on August 23, 2018. Ionizable Headspace Vapour (IHV) concentrations ranged from 0 ppm in each of the wells monitored with the exception of MW1 on August 26, 2018 where the IHV measured 2 ppm.

The concentrations of the parameters analyzed in MW1 were generally below the applicable guidelines / standards with the exception of PHC F2. The PHC F2 concentration exceeded MECP Table 3 SCS but were within the same order of magnitude. Stantec compared the 2017 Arcadis groundwater sample results for MW1 and noted that the PHC F2 concentration was below the MECP Table 3 SCS

In 2017, the dissolved toluene concentration at MW 1 exceeded the NWB licence guideline; however, the concentration was below the RDL and the NWB licence guideline. Select PAHs parameter concentrations increased by one to two orders of magnitude between 2017 and 2018 but remained below the applicable guidelines / standards. Concentrations of dissolved BTEX and PHC F1 were less than the laboratory RDLs in 2018.

Surface Water Sampling

Stantec collected five surface water samples and one field duplicate sample from accumulated surface water at the Site in lieu of groundwater samples and to monitor potential seepage. Because the locations of the accumulated surface water were not consistent with the surface water samples collected during the 2017 Program, the laboratory analytical results cannot be directly compared to previous sample results.

In general, the reported concentrations of the parameters analyzed in the surface water samples satisfied the applicable guidelines / standards with the exception of total lead, nitrate (N), and nitrate (NO_3) in SW1 and total lead in SW3.

Soil Sampling

Stantec collected 10 soil samples (SS1 through SS10) during the Program. Soil sample SS1 was collected from inside the LTU, while the remaining nine were collected outside the LTU. The soil samples generally consisted of medium brown gravelly sand with trace silt. Field screening results for combustible headspace (CHV) ranged from 0 parts per million (ppm) in numerous soil samples to 35 ppm in SS1 (located within LTU 2). Field screening results for volatile headspace vapour concentrations (VHV) ranged from 0 ppm in numerous samples to 4 ppm in SS1.

The soil concentrations of the parameters analyzed were below the applicable guidelines / standards which the exception of PHC F2 in SS1 (located within LTU 2). The concentration in the duplicate sample (Dup18-01) exceeded the applicable guideline / standards while the concentration in the parent sample (SS1) did not. Both concentrations were within the same order of magnitude as the applicable guidelines / standards.

Detectable concentrations of PHC F3 and F4 were also indicated in SS1 (within the LTU). The reported concentrations were one order of magnitude less than the applicable guidelines / standards. Detectable concentrations of PHC F2 were encountered in SS6 (located immediately west of LTU 2, near potential berm breach noted by Stantec during the Program) and SS9 (located downgradient of LTU 1 and cross-gradient of LTU 2). The reported concentrations were one order of magnitude less than the applicable guidelines / standards.

While there are no applicable guidelines / standards for the nutrient parameters analyzed, the laboratory reported concentrations were reviewed as previous reports indicate that nutrients were added to the soil in the LTU in 2002 and 2003 (Arcadis, 2017). The laboratory-reported concentrations of nutrient parameters were generally less than the laboratory RDLs with the exception of available potassium in the six soil samples analyzed for nutrients. The available potassium concentrations ranged from 9.5 mg/kg (SS10) to 36 mg/kg (SS1). The detectable concentrations of available potassium inside the LTU ranged from 3.7 to 3.4 times greater than the concentrations outside the LTU. The lowest concentration of available potassium was encountered in the up-gradient soil sample location (SS10). The concentrations in the remaining soil samples outside of the LTU were 1.6 times higher than the concentration in the up-gradient sample.

Liner Visual Assessment

While onsite, Stantec personnel visually assessed the condition of the exposed portions geomembrane liners and berms of the LTU. Surface water was observed to be accumulating within the LTUs against the berms. In two locations at LTU 2, surface water was also accumulated immediately outside of the berm which suggested the surface water potentially over-flowed the berm in these locations (along the west berm, and in the south west corner of the LTU) (refer to Photographs 4, 5, 8, and 9 in **Appendix D**). Further, drainage channels were visible from the berm to the ponded surface water providing a pathway for potential off-site migration. Accumulated surface water was noted in other areas of the Site, but it was ponded in depressions that did not appear to be connected to the surface water ponded immediately outside of the LTU.

Quality Assurance / Quality Control

In general, the DQO for the Program was considered to have been met. The exceeded laboratory hold times, sample containers, elevated RPDs, elevated matrix spike, and detectable concentrations of metals parameters did not impact Stantec's interpretation of the results.

LTU Integrity

Two potential berm breaches were observed by Stantec personnel during the Program.

The reference soil sample collected within LTU 2 (SS1) indicated the PHC F2 concentration exceeded the applicable guidelines / standards, and the PHC F2 concentration in MW1 (adjacent to LTU 1) also exceeded the applicable guidelines / standards.

Previous reports indicate that nutrients were added to the LTU in 2002 and 2003. Laboratory analysis of nutrients in soil indicated available potassium concentrations above the laboratory RDL. The concentrations were highest within LTU 2 (SS1). Despite being lower than the concentration SS1, the available potassium concentrations in down-gradient soil sample locations (SS2, SS4, and SS7) were 1.6 times higher than the concentration in the up-gradient sample (SS1). Additional nutrient parameters (Nitrate (N), and Nitrate (NO_3)) exceeded the applicable guidelines / standards in SW1 (located adjacent to a possible berm breach). While nutrients have not been added to the LTU since 2003, nutrients may remain in soil due to the following factors:

- No soil handling has been completed since the nutrients were added in 2003.
  - Soil handling would further mix soil and nutrients.
- The Site is located within a desert environment (Ecological Stratification Working Group, 1996).
  - There has been limited precipitation to promote nutrient absorption to soil; therefore, water accumulated within the berms of LTU 2 and potentially over flowing the berms during the annual spring melt may be and/or has been transporting nutrients outside of LTU 2, leading to offsite migration.
- The region has a short summer season where soil microbes would be active thus limiting usage uptake / usage.
- The region, and LTU 2, have limited vegetation growth thus limiting nutrient uptake / usage.

Due to the nature of the parameter concentrations encountered, their locations in relation to the LTUs, and the visual observations of accumulated water from the potential berm breaches in LTU 2, Stantec is of the opinion that water overflowing the berm of LTU 2 has impacted soil, surface water, and groundwater at the Site. At the time of the Program, berm breaches were not observed at LTU 1; however, a sample collected from MW1 indicated an exceedance of PHC F2 this year in the groundwater on the east side of LTU 1, indicating potential off-site migration east of LTU 1.

Total lead exceeded the CWQG in two surface water samples (SW1 and SW3) located south of LTU 2 and southwest of LTU 1, respectively. The total lead concentration in the background surface water sample (SW5) was less than the laboratory detection limit (0.00020 mg/L). Due to the limited background data available (one sample – SW5), additional background sampling in soil and surface water is recommended to determine if the total lead exceedances in surface water at the Site are a result of anthropogenic activities associated with the LTUs. Further, the NWB licence provides a guideline for dissolved lead, so any additional sampling should be conducted for both total and dissolved lead concentrations.

7.0 RECOMMENDATIONS

Based on the results of the 2018 Program, Stantec recommends the following:

1. Attempt to remove the bailer frozen in MW5 to make the well operable using hot water flush to melt the ice in contact with the bailer. After removing the bailer, the well will need to be re-developed prior to monitoring and sample collection.
2. Due to heaving, MW4 and MW6 are inoperable and should be removed from the Program and decommissioned.
3. Conduct additional background sampling of soil and surface water to determine if total lead exceedances are a result of anthropogenic activities associated with the LTUs.
    a. Because the NWB guideline provides a guideline for dissolved lead, additional sampling should also be conducted for total and dissolved lead concentrations.
4. Conduct preliminary quantitative human health and ecological risk assessment (PQHHERA) to determine whether further remediation or risk management measures may be required to mitigate potential risk to human health of the environment for the ongoing management and/or closure of the Site. A PQHHERA is underway and the findings will be provided under separate cover.
5. Conduct an engineering assessment to develop a program including costs, to assess the engineering options for improving/building up the berms to prevent accumulated surface water from overflowing and/or blowing over and impacting soil and groundwater outside the LTU.

Cost estimates for the recommendations above have been provided under separate cover.

8.0 LIMITATIONS

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an 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 Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of PSPC and TC and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

This report is limited by the following:

- The condition and volume of water in the groundwater monitoring wells.
- Transportation of dangerous goods requirements for shipping methanol on commercial flights.
- Increased shipping times from a remote location to the laboratory.
- Data presented herein from Arcadis (2017) is assumed to be complete and correct, and of suitable use for interpretation in this report.

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

Limitations
March 2019

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site. As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the site is beyond the scope of this assessment.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

9.0 REFERENCES

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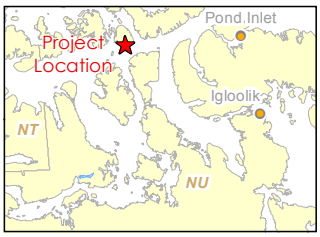
Public works and Government Services Canada. July 12, 2018. Terms of Reference Environmental Monitoring Services, Resolute Bay Airport LTU, Nunavut.

APPENDIX A

Figures



★ Site Location

Land Parcel

PSPC: Public Services and Procurement Canada

0 600 1,200 metres

1:40,000 (at original document size of 8.5x11)

Notes

1. Coordinate System: NAD 1983 UTM Zone 15N
2. Base features: Geogratis, ©Department of Natural Resources Canada. All rights reserved.
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Stantec

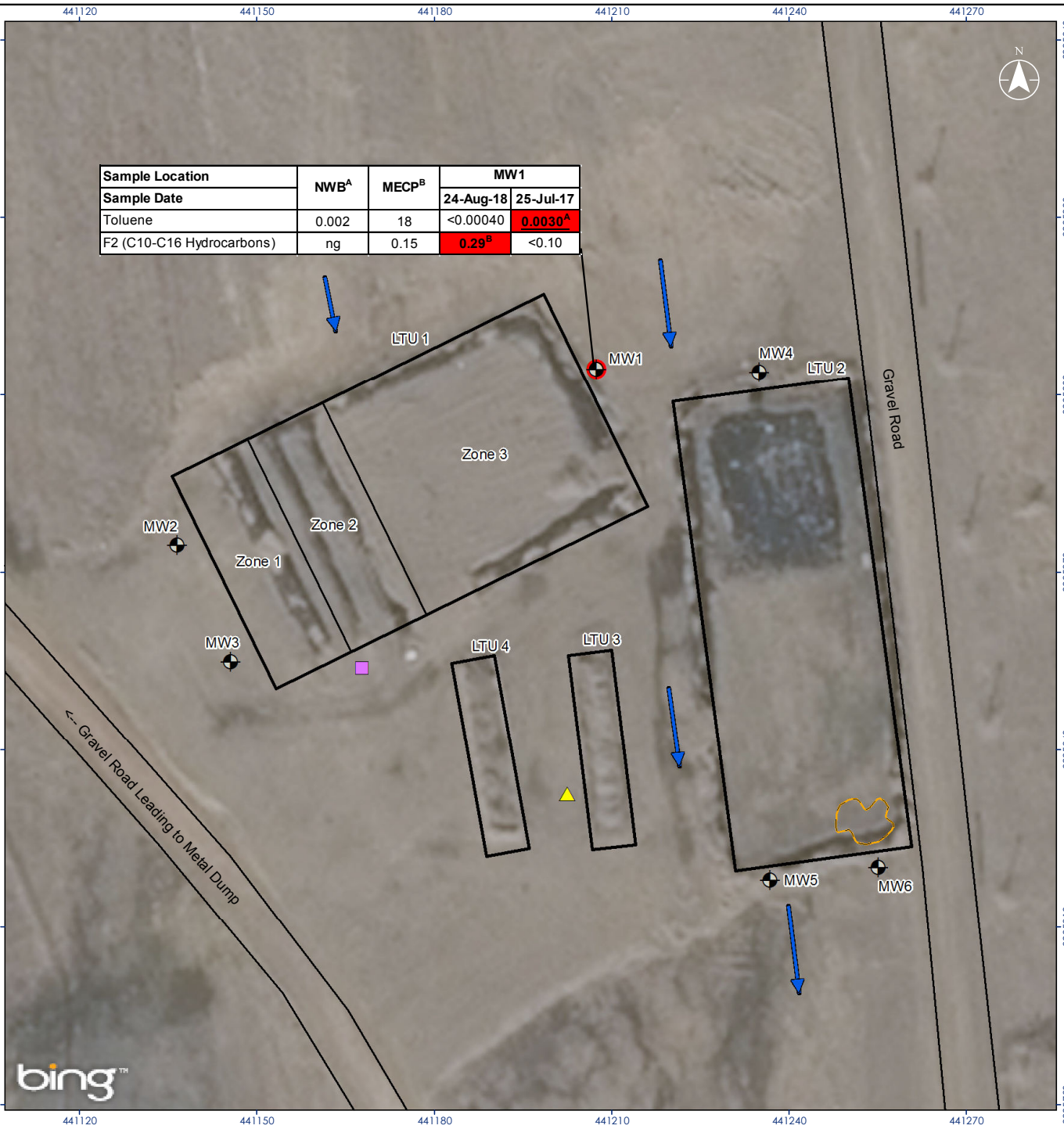
Project Location
Cornwallis Island, Nunavut

110220180
Prepared by MK on 2019-01-22
Quality Review by DJ on 2019-01-23
Approved by LVN on 2019-03-21

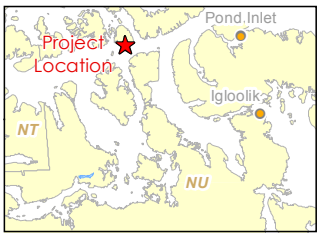
Client/Project
PSPC for Transport Canada
2018 Environmental Monitoring Program
Resolute Bay Airport Land Treatment Unit

Figure No.
1

Title
Site Location Plan



Sample Location	NWB[A]	MECP[B]	MW1	
Sample Date			24-Aug-18	25-Jul-17
Toluene	0.002	18	<0.00040	0.0030[A]
F2 (C10-C16 Hydrocarbons)	ng	0.15	0.29[B]	<0.10



- Monitoring Well Location (Others)
- Groundwater Sample Above Applicable Guidelines
- Aviation Fuel Drum
- Bag of Weathered Salt
- Surface Drainage Flow Direction Based on Topography
- Land Treatment Unit (LTU)
- Construction Debris

PSPC: Public Services and Procurement Canada

0 15 30 metres

1:1,000 (at original document size of 8.5x11)

Notes
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3. Imagery: Microsoft Bing product screen shot(s) reprinted with ermission from Microsoft Corporation.

[A] Nunavut Water Board License No. 1BR-RLF1520 requirements for effluent discharted from a sump at the Landfarm Facility, Part D, Item 6.
[B] Ontario Ministry of the Environment and Climate Change (now referred to as the Ministry of Environment, Conservation, and Parks). Soil, Groundwater, and Sediment Standards for use under Part XV.1 of the Environmental Protection Act. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition.

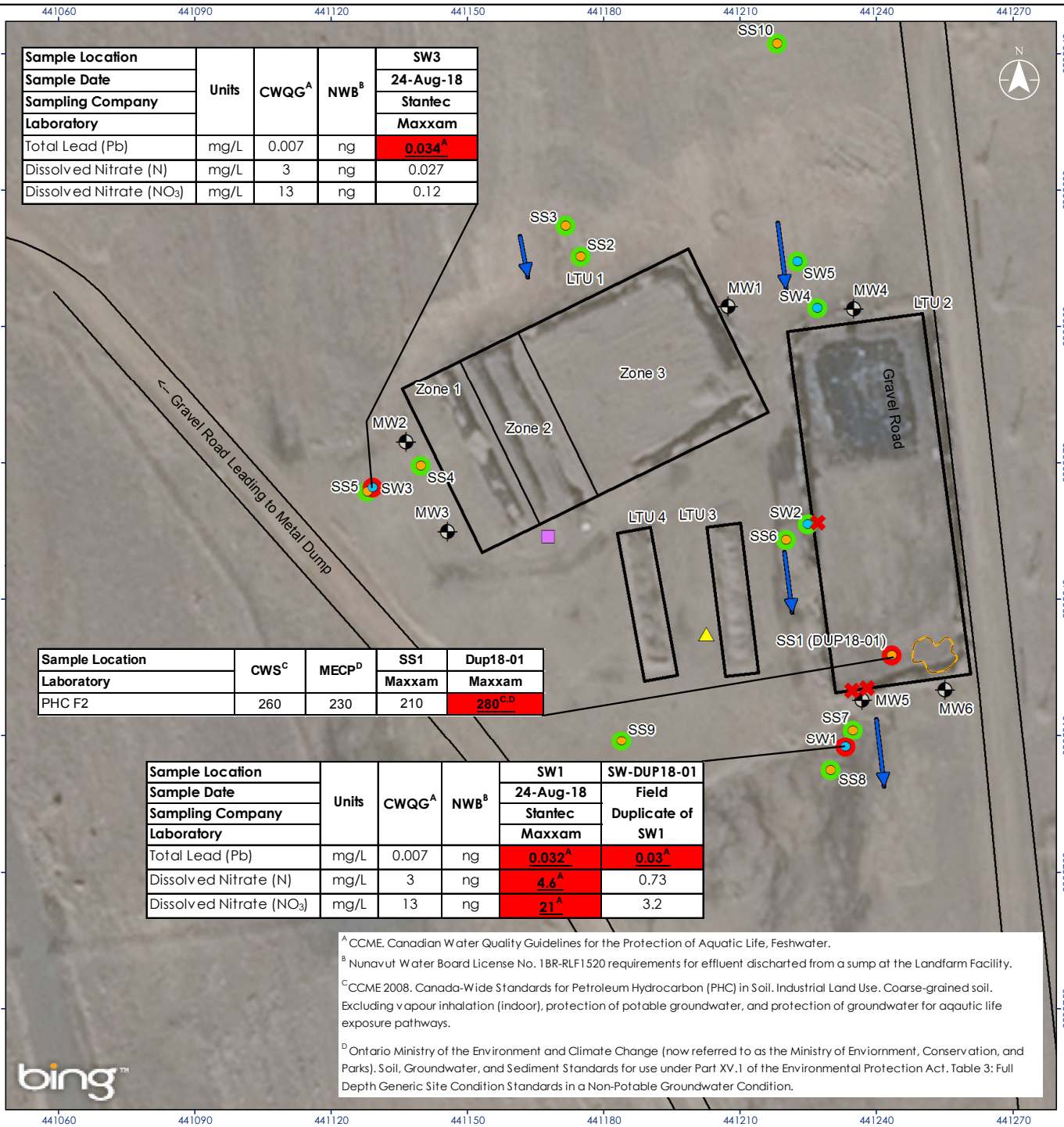
Stantec

Project Location: Cornwallis Island, Nunavut
110220180
Prepared by MK on 2019-01-22
Quality Review by DJ on 2019-01-23
Approved by LVN on 2019-03-21

Client/Project
PSPC for Transport Canada
2018 Environmental Monitoring Program
Resolute Bay Airport Land Treatment Unit

Figure No.
2

Title
Site Plan Showing Groundwater Monitoring Well Locations and Groundwater Analytical Results



Sample Location	Units	CWQG[A]	NWB[B]	SW3
Sample Date				24-Aug-18
Sampling Company				Stantec
Laboratory				Maxxam
Total Lead (Pb)	mg/L	0.007	ng	**0.034[A]**
Dissolved Nitrate (N)	mg/L	3	ng	0.027
Dissolved Nitrate (NO_3)	mg/L	13	ng	0.12

Sample Location	CWS[C]	MECP[D]	SS1	Dup18-01
Laboratory			Maxxam	Maxxam
PHC F2	260	230	210	**280[C,D]**

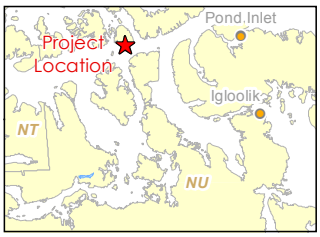
Sample Location	Units	CWQG[A]	NWB[B]	SW1	SW-DUP18-01
Sample Date				24-Aug-18	Field Duplicate of SW1
Sampling Company				Stantec	
Laboratory				Maxxam	
Total Lead (Pb)	mg/L	0.007	ng	**0.032[A]**	**0.03[A]**
Dissolved Nitrate (N)	mg/L	3	ng	**4.6[A]**	0.73
Dissolved Nitrate (NO_3)	mg/L	13	ng	**21[A]**	3.2

[A] CCME. Canadian Water Quality Guidelines for the Protection of Aquatic Life, Feshwater.

[B] Nunavut Water Board License No. 1BR-RLF1520 requirements for effluent discharted from a sump at the Landfarm Facility.

[C] CCME 2008. Canada-Wide Standards for Petroleum Hydrocarbon (PHC) in Soil. Industrial Land Use. Coarse-grained soil. Excluding vapour inhalation (indoor), protection of potable groundwater, and protection of groundwater for aqautic life exposure pathways.

[D] Ontario Ministry of the Environment and Climate Change (now referred to as the Ministry of Enviornment, Conservation, and Parks). Soil, Groundwater, and Sediment Standards for use under Part XV.1 of the Environmental Protection Act. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition.



Notes
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2. Base features: Geogratis, ©Department of Natural Resources Canada, All rights reserved.
3. Imagery: Microsoft Bing product screen shot(s) reprinted with permission from Microsoft Corporation.

PSPC: Public Services and Procurement Canada
mg/L: milligrams per litre

- Monitoring Well Location (Others)
- Soil Sampling Location
- Surface Water Sample Location
- Sample Above Applicable Guidelines
- Sample Below Applicable Guidelines
- Potential Berm Breach (Observed August 2018)
- Aviation Fuel Drum
- Bag of Weathered Salt
- Surface Drainage Flow Direction Based on Topography
- Land Treatment Unit (LTU)
- Construction Debris

0 15 30 metres
1:1,300 (at original document size of 8.5x11)

Stantec

Project Location
Cornwallis Island, Nunavut

110220180
Prepared by MK on 2019-01-22
Quality Review by DJ on 2019-01-23
Approved by LVN on 2019-03-21

Client/Project
PSPC for Transport Canada
2018 Environmental Monitoring Program
Resolute Bay Airport Land Treatment Unit

Figure No.
3

Title
Site Plan showing Soil and Surface Water Sampling Locations and Analytical Results

\\Cd1001-c200\workgroup\1102\active\110220180\gis\figures\resolute bol_airport_ltu\Fig_3_site_plan_ltu_sw_ss.mxd Revised: 2019-03-22 By: mkuhl

APPENDIX B

Maxxam Letter RE: QC

maxxam.ca
MAXXAM ANALYTICS
4606 Canada Way
Burnaby, BC V5G 1K5
Office 604 734 7276
Toll Free 800 665 8566
Fax 604 731 2386

Stantec
10160 112 Street
Edmonton AB T5K 2L6 CA

Attn: Lindsay van Noortwyk , Associate / Project Manager

Re: Resolute Bay Airport LTU Sampling Plan (as provided by Stantec)

Dear Ms van Noortwyk

As requested, Maxxam has reviewed the Resolute Airport LTU Sampling Plan (appended). In our opinion the Plan meets the CCME requirements for field QC.

I trust this meets your needs. If anything further is required, please do not hesitate to contact me directly. bloescher@maxxam.ca 250 325-8887.

Sincerely,

Barry Loescher, PhD PChem QP
Quality Systems Specialist

Source	Location	Laboratory Analysis
Groundwater	MW1 MW2 MW3 MW5 Field Duplicate Trip Blank Field Blank	Total Suspended Solids (TSS) Polycyclic Aromatic Hydrocarbons (PAH) Benzene, toluene, ethylbenzene, xylenes (BTEX) Total extractable hydrocarbons (TEH) Oil and Grease Total Phenols Total Metals (aluminum, cadmium, copper, lead, nickel, silver, zinc, arsenic, cobalt, iron, molybdenum, selenium, titanium) Routine parameters (total hardness, conductivity, calcium, sodium, chloride, magnesium, potassium, sulphate, total alkalinity, nitrate-nitrite, ammonia nitrogen, and pH)
Surface Water	4 locations around the perimeter of LTU 2 Field Duplicate	BTEX TEH Routine Parameters (including fertilizer) Note: If monitoring wells are noted as dry, surface water samples will be submitted for groundwater parameter analysis.
Surface Soil	4 locations around the perimeter of LTU 2 Field Duplicate	BTEX* PHC fractions 1 through 4 (PHC F1-F4) Nutrients (nitrogen, phosphorous, potassium)
LTU	1 location from 0.45-0.6 metres below ground surface within LTU 2	Nutrients (nitrogen, phosphorous, potassium)
Data Gap / Risk Assessment	LTU 2 (> 5 cm, ideally 45-60 cm depth). 7 locations around perimeter of LTUs Background Field Duplicate	BTEX, PHC F1-F4, PHC aliphatic/aromatic subfraction analysis (sample from LTU2 only)

APPENDIX C

Tables

Stantec

2018 Environmental Monitoring Program
Resolute Bay Airport, Land Treatment Unit
Public Services and Procurement Canada for Transport Canada
110220180
Sep-18

Table 1 - 2018 Groundwater Monitoring Results

Well ID	Monitoring Date	Well Condition	Water Level (mBTOC)	Frozen Level (mBTOC)	Depth to Bottom (mBTOC)	Stick-up Height (mAGS)	Depth to Water (mBGS)	CHV (ppm)	VHV (ppm)	Temperature (^{0}C)	TDS (g/L)	Electrical Conductivity (mS/cm)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	pH	Oxidation Reduction Potential (mV)	Comments
MW1	23-Aug-18*	Good (no repairs required)	0.806	-	1.165	0.717	0.089	121	0	nm	nm	nm	nm	nm	nm	nm	Sample collected using a bailer on August 24, 2018
	26-Aug-18		0.906	-	1.186		0.189	10	2	0.96	0.553	0.914	68.6	9.15	8.52	65.2	
MW2	23-Aug-18*	Frozen (no repairs required)	1.114	-	1.127	0.752	0.362	0	0	nm	nm	nm	nm	nm	nm	nm	Insufficient water to sample
	26-Aug-18		1.188	-	1.192		0.440	0	0	nm	nm	nm	nm	nm	nm	nm	
MW3	23-Aug-18*	Dry (no repairs required)	Dry	-	1.156	0.774	-	0	0	nm	nm	nm	nm	nm	nm	nm	Dry - Cannot sample
	26-Aug-18		Dry	-	1.239		-	0	0	nm	nm	nm	nm	nm	nm	nm	
MW4**	23-Aug-18*	Heaved (remove from program / decommission)	1.209	-	1.241	1.069	-0.021	0	0	nm	nm	nm	nm	nm	nm	nm	Insufficient water to sample. Well has heaved and screen is above surface. Cannot sample.
	26-Aug-18		1.241	-	1.262		0.193	0	0	nm	nm	nm	nm	nm	nm	nm	
MW5	23-Aug-18*	Frozen (remove frozen bailer)	-	0.689	NM	0.944	-	0	0	nm	nm	nm	nm	nm	nm	nm	Frozen - Cannot sample
	26-Aug-18		-	0.739	-		-	0	0	nm	nm	nm	nm	nm	nm	nm	
MW6**	23-Aug-18*	Heaved (remove from program / decommission)	1.464	-	1.556	1.006	0.458	0	0	nm	nm	nm	nm	nm	nm	nm	Insufficient water to sample
	26-Aug-18		1.566	-	1.572		0.566	0	0	nm	nm	nm	nm	nm	nm	nm	

Notes:

*	Wells monitored on August 23, 2018 were not monitored with an interface probe; therefore, monitoring date is considered approximate.
**	Well was heaved so screen was above surface.
NM	Could not monitor
CHV	Combustible headspace vapour concentrations
IHV	Ionizable headspace vapour concentrations
m BTOC	Metres below top of Casing
m AGS	Meters above ground surface
ppm	parts per million
mBGS	Metres below ground surface
^{0}C	Degrees Celsius
g/L	Grams per litre
mS/cm	Millisiemens per centimetre
%	percent
mg/L	milligrams per litre.
mV	millivolts

2018 Environmental Monitoring Program
Resolute Bay Airport, Land Treatment Unit
Public Services and Procurement Canada for Transport Canada
110220180
Jan-19

Table 2 - Nunavut Water Board Licence Requirements - Groundwater Analytical Results

Sample Location	Units	NWB[A]	MECP[B]	MW1	
Sample Date				24-Aug-18	25-Jul-17
Sampling Company				Stantec	Arcadis
Laboratory				Maxxam	Maxxam
Petroleum Hydrocarbons					
Benzene	mg/L	0.37	0.044	<0.00040	<0.00020
Toluene	mg/L	0.002	18	<0.00040	**0.0030[A]**
Ethylbenzene	mg/L	0.090	2.3	<0.00040	0.00036
m & p-Xylene	mg/L	ng	ng	<0.00080	0.0021
o-Xylene	mg/L	ng	ng	0.00072	0.0012
Xylenes (Total)	mg/L	ng	4.2	<0.00089	0.0033
F1 (C6-C10) - BTEX	mg/L	ng	0.75	<0.10	<0.025
F1 (C6-C10)	mg/L	ng	ng	<0.10	<0.025
F2 (C10-C16 Hydrocarbons)	mg/L	ng	0.15	**0.29[B]**	<0.10
Polycyclic Aromatic Hydrocarbons					
Benzo[a]pyrene equivalency	mg/L	ng	ng	<0.000010	na
Acenaphthene	mg/L	ng	0.6	<0.00010	<0.000010
Acenaphthylene	mg/L	ng	0.00018	<0.00010	<0.000010
Acridine	mg/L	ng	ng	<0.000050	na
Anthracene	mg/L	ng	0.0024	<0.000010	<0.000010
Benzo(a)anthracene	mg/L	ng	0.0047	<0.0000085	<0.000010
Benzo(b&j)fluoranthene	mg/L	ng	0.00075	<0.0000085	<0.000010
Benzo(k)fluoranthene	mg/L	ng	0.0004	<0.0000085	<0.000010
Benzo(g,h,i)perylene	mg/L	ng	0.0002	<0.0000085	<0.000010
Benzo(c)phenanthrene	mg/L	ng	ng	<0.000050	na
Benzo(a)pyrene	mg/L	ng	0.00081	<0.0000075	<0.000010
Benzo[e]pyrene	mg/L	ng	ng	<0.000050	na
Chrysene	mg/L	ng	0.0001	<0.0000085	<0.000010
Dibenz(a,h)anthracene	mg/L	ng	0.00052	<0.0000075	<0.000010
Fluoranthene	mg/L	ng	0.13	<0.000010	<0.000010
Fluorene	mg/L	ng	0.4	<0.000050	<0.000010
Indeno(1,2,3-cd)pyrene	mg/L	ng	0.0002	<0.0000085	<0.000010
1-Methylnaphthalene	mg/L	ng	1.8	0.0036	0.000050
2-Methylnaphthalene	mg/L	ng	1.8	0.0038	0.000040
Naphthalene	mg/L	ng	1.4	0.02	0.000050
Phenanthrene	mg/L	ng	0.58	<0.000050	<0.000010
Perylene	mg/L	ng	ng	<0.000050	na
Pyrene	mg/L	ng	0.068	<0.000020	<0.000010
Quinoline	mg/L	ng	ng	<0.00020	na
Metals					
Total Aluminum (Al)	mg/L	ng	ng	5	8.7
Total Antimony (Sb)	mg/L	ng	ng	<0.00060	<0.00050
Total Arsenic (As)	mg/L	ng	ng	0.0033	0.0035
Total Barium (Ba)	mg/L	ng	ng	0.061	0.164
Total Beryllium (Be)	mg/L	ng	ng	<0.0010	0.0018
Total Boron (B)	mg/L	ng	45	0.035	<0.5
Total Cadmium (Cd)	mg/L	ng	ng	0.00078	0.00237
Total Calcium (Ca)	mg/L	ng	ng	620	2430
Total Chromium (Cr)	mg/L	ng	ng	0.01	0.016
Total Cobalt (Co)	mg/L	ng	ng	0.005	0.0103
Total Copper (Cu)	mg/L	ng	ng	0.0085	0.0223
Total Iron (Fe)	mg/L	ng	ng	7.4	9.990
Total Lead (Pb)	mg/L	ng	ng	0.039	0.144
Total Lithium (Li)	mg/L	ng	ng	<0.020	<0.020
Total Magnesium (Mg)	mg/L	ng	ng	290	1070
Total Manganese (Mn)	mg/L	ng	ng	0.62	1.850
Total Molybdenum (Mo)	mg/L	ng	ng	0.0011	<0.010
Total Nickel (Ni)	mg/L	ng	ng	0.011	0.018
Total Phosphorus (P)	mg/L	ng	ng	0.27	na
Total Potassium (K)	mg/L	ng	ng	2.4	3.36
Total Selenium (Se)	mg/L	ng	ng	0.00027	<0.0010
Total Silicon (Si)	mg/L	ng	ng	6.8	8.680
Total Silver (Ag)	mg/L	ng	ng	<0.00010	0.00050
Total Sodium (Na)	mg/L	ng	ng	3.8	7.42
Total Strontium (Sr)	mg/L	ng	ng	0.33	0.973
Total Sulphur (S)	mg/L	ng	ng	1.1	<30
Total Thallium (Tl)	mg/L	ng	ng	<0.00020	0.00026
Total Tin (Sn)	mg/L	ng	ng	0.0011	<0.050
Total Titanium (Ti)	mg/L	ng	ng	0.15	0.077
Total Uranium (U)	mg/L	ng	ng	0.00078	0.0034
Total Vanadium (V)	mg/L	ng	ng	0.013	<0.050
Total Zinc (Zn)	mg/L	ng	ng	0.11	0.297

2018 Environmental Monitoring Program
Resolute Bay Airport, Land Treatment Unit
Public Services and Procurement Canada for Transport Canada
110220180
Jan-19

Table 2 - Nunavut Water Board Licence Requirements - Groundwater Analytical Results

Routine Parameters					
Anion Sum	meq/L	ng	ng	3.8	na
Cation Sum	meq/L	ng	ng	3.8	na
Hardness (CaCO3)	mg/L	ng	ng	180	10500
Ion Balance (% Difference)	%	ng	ng	0.14	na
Dissolved Nitrate (N)	mg/L	ng	ng	<0.020	<0.010
Dissolved Nitrate (NO3)	mg/L	3.0	ng	<0.089	na
Dissolved Nitrite (NO2)	mg/L	0.197	ng	<0.033	na
Calculated Total Dissolved Solids	mg/L	ng	ng	180	na
Conductivity	uS/cm	ng	ng	330	270
pH	pH	6-9	ng	7.86	8.19
Alkalinity (PP as CaCO3)	mg/L	ng	ng	<1.0	na
Alkalinity (Total as CaCO3)	mg/L	ng	ng	180	130
Bicarbonate (HCO3)	mg/L	ng	ng	220	na
Carbonate (CO3)	mg/L	ng	ng	<1.0	na
Hydroxide (OH)	mg/L	ng	ng	<1.0	na
Dissolved Sulphate (SO4)	mg/L	ng	ng	1.5	3.4
Dissolved Chloride (Cl)	mg/L	ng	2300	3.7	12
Dissolved Nitrite (N)	mg/L	ng	ng	<0.010	na
Dissolved Nitrate plus Nitrite (N)	mg/L	ng	ng	<0.020	na
Dissolved Calcium (Ca)	mg/L	ng	ng	48	na
Dissolved Iron (Fe)	mg/L	ng	ng	<0.060	na
Dissolved Magnesium (Mg)	mg/L	ng	ng	14	na
Dissolved Manganese (Mn)	mg/L	ng	ng	<0.0040	na
Dissolved Potassium (K)	mg/L	ng	ng	0.85	na
Dissolved Sodium (Na)	mg/L	ng	2300	4.1	na
Miscellaneous Parameters					
Total Suspended Solids	mg/L	ng	ng	4800	4800
Total Ammonia (N)	mg/L	ng	ng	0.12	<0.050
Total Phosphorus (P)	mg/L	ng	ng	0.54	na
Extractable (n-Hex.) Oil and grease	mg/L	5	ng	2	<0.50
Phenols	mg/L	ng	12	0.075	<0.0010

Notes:

[A] Nunavut Water Board License No. 1BR-RLF1520 requirements for effluent discharted from a sump at the Landfarm Facility, Part D, Item 6.

[B] Ontario Ministry of the Enviornment and Climate Change (now referred to as the Ministry of Enviornment, Conservation, and Parks). Soil, Groundwater, and Sediment Standards for use under Part XV.1 of the Environmental Protection Act. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition.

RPD	Relative percent difference. Calculated as the difference between the concentrations divided by their average, expressed as a percent.
%	Percent
mg/L	milligrams per litre
meq/L	milliequivalents per litre
µS/cm	microsiemens per centimetre
nG/L	nanogram per litre
ng	No Applicable guideline
nc	RPD could not be calculated as one or both of the concentrations were less than five times the laboratory reportable detection limit.
na	Parameter not analyzed
0.0043	Concentration exceeds applicable guideline
34.6	RPD exceeds industry standard
<0.060	Concentration is less than laboratory reportable detection Limit

2018 Environmental Monitoring Program
Resolute Bay Airport, Land Treatment Unit
Public Services and Procurement Canada for Transport Canada
110220180
Jan-19

Table 3 - Surface Water Sampling - Analytical Results

Sample Location	Units	CWQG[A]	NWB Licence[B]	MECP[C]	SW1	SW-DUP18-01	RPD	SW2	SW3	SW4	SW5
Sample Date					24-Aug-18	Field Duplicate of SW1		24-Aug-18	24-Aug-18	24-Aug-18	24-Aug-18
Sampling Company					Stantec			Stantec	Stantec	Stantec	Stantec
Laboratory					Maxxam			Maxxam	Maxxam	Maxxam	Maxxam
Petroleum Hydrocarbons											
Benzene	mg/L	0.37	0.37	0.044	<0.00040	<0.00040	nc	<0.00040	<0.00040	<0.00040	<0.00040
Toluene	mg/L	0.002	0.002	18	<0.00040	<0.00040	nc	<0.00040	<0.00040	0.00057	<0.00040
Ethylbenzene	mg/L	0.090	0.090	2.3	<0.00040	<0.00040	nc	0.00044	0.00057	<0.00040	<0.00040
m & p-Xylene	mg/L	ng	ng	ng	<0.00080	<0.00080	nc	<0.00080	<0.00080	0.0012	<0.00080
o-Xylene	mg/L	ng	ng	ng	<0.00040	<0.00040	nc	<0.00040	<0.00040	0.0012	<0.00040
Xylenes (Total)	mg/L	ng	ng	4.2	<0.00089	<0.00089	nc	<0.00089	<0.00089	0.0024	<0.00089
F1 (C6-C10) - BTEX	mg/L	ng	ng	0.75	<0.10	<0.10	nc	0.15	0.15	<0.10	<0.10
F1 (C6-C10)	mg/L	ng	ng	ng	<0.10	<0.10	nc	0.15	0.15	<0.10	<0.10
F2 (C10-C16 Hydrocarbons)	mg/L	ng	ng	0.15	0.15	0.16	6.45	0.37	0.27	0.31	<0.10
Polycyclic Aromatic Hydrocarbons											
Benzo[a]pyrene equivalency	mg/L	ng	ng	ng	<0.000010	<0.000010	nc	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthene	mg/L	0.0058	ng	0.6	<0.00010	<0.00010	nc	<0.00010	<0.00010	<0.00010	<0.00010
Acenaphthylene	mg/L	ng	ng	0.00018	<0.00010	<0.00010	nc	<0.00010	<0.00010	<0.00010	<0.00010
Acridine	mg/L	0.0044	ng	ng	<0.000050	<0.000050	nc	<0.000050	<0.000050	<0.000050	<0.000050
Anthracene	mg/L	0.000012	ng	0.0024	<0.000010	<0.000010	nc	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)anthracene	mg/L	0.000018	ng	0.0047	<0.0000085	<0.0000085	nc	<0.0000085	<0.0000085	<0.0000085	<0.0000085
Benzo(b&j)fluoranthene	mg/L	ng	ng	0.00075	<0.0000085	<0.0000085	nc	<0.0000085	<0.0000085	<0.0000085	<0.0000085
Benzo(k)fluoranthene	mg/L	ng	ng	0.0004	<0.0000085	<0.0000085	nc	<0.0000085	<0.0000085	<0.0000085	<0.0000085
Benzo(g,h,i)perylene	mg/L	ng	ng	0.0002	<0.0000085	<0.0000085	nc	<0.0000085	<0.0000085	<0.0000085	<0.0000085
Benzo(c)phenanthrene	mg/L	ng	ng	ng	<0.000050	<0.000050	nc	<0.000050	<0.000050	<0.000050	<0.000050
Benzo(a)pyrene	mg/L	0.000015	ng	0.00081	<0.0000075	<0.0000075	nc	<0.0000075	<0.0000075	<0.0000075	<0.0000075
Benzo[e]pyrene	mg/L	ng	ng	ng	<0.000050	<0.000050	nc	<0.000050	<0.000050	<0.000050	<0.000050
Chrysene	mg/L	ng	ng	0.0001	<0.0000085	<0.0000085	nc	<0.0000085	<0.0000085	<0.0000085	<0.0000085
Dibenz(a,h)anthracene	mg/L	ng	ng	0.00052	<0.0000075	<0.0000075	nc	<0.0000075	<0.0000075	<0.0000075	<0.0000075
Fluoranthene	mg/L	0.00004	ng	0.13	<0.000010	<0.000010	nc	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	0.003	ng	0.4	<0.000050	<0.000050	nc	<0.000050	<0.000050	<0.000050	<0.000050
Indeno(1,2,3-cd)pyrene	mg/L	ng	ng	0.0002	<0.0000085	<0.0000085	nc	<0.0000085	<0.0000085	<0.0000085	<0.0000085
1-Methylnaphthalene	mg/L	ng	ng	1.8	<0.00010	<0.00010	nc	0.00024	0.00023	0.00023	<0.00010
2-Methylnaphthalene	mg/L	ng	ng	1.8	<0.00010	<0.00010	nc	0.00016	<0.00010	0.00027	<0.00010
Naphthalene	mg/L	0.0011	ng	1.4	<0.00010	<0.00010	nc	<0.00010	<0.00010	<0.00010	<0.00010
Phenanthrene	mg/L	0.0004	ng	0.58	<0.000050	<0.000050	nc	<0.000050	<0.000050	<0.000050	<0.000050
Perylene	mg/L	ng	ng	ng	<0.000050	<0.000050	nc	<0.000050	<0.000050	<0.000050	<0.000050
Pyrene	mg/L	0.000025	ng	0.068	<0.000020	<0.000020	nc	<0.000020	<0.000020	<0.000020	<0.000020
Quinoline	mg/L	0.0034	ng	ng	<0.00020	<0.00020	nc	<0.00020	<0.00020	<0.00020	<0.00020
Metals											
Total Aluminum (Al)[C]	mg/L	0.10	ng	ng	0.095	0.065	37.50	0.017	0.019	0.027	0.018
Total Antimony (Sb)	mg/L	ng	ng	ng	<0.00060	<0.00060	nc	<0.00060	<0.00060	<0.00060	<0.00060
Total Arsenic (As)	mg/L	0.005	ng	ng	0.0019	0.0017	11.11	0.0013	0.0016	0.0002	<0.00020
Total Barium (Ba)	mg/L	ng	ng	ng	0.025	0.023	nc	0.028	0.018	0.011	<0.010
Total Beryllium (Be)	mg/L	ng	ng	ng	<0.0010	<0.0010	nc	<0.0010	<0.0010	<0.0010	<0.0010
Total Boron (B)	mg/L	1.5	ng	45	0.032	0.029	nc	0.028	0.033	0.023	<0.020
Total Cadmium (Cd)	mg/L	0.00009	ng	ng	0.000037	0.000022	nc	<0.000020	<0.000020	<0.000020	<0.000020
Total Calcium (Ca)	mg/L	ng	ng	ng	84	75	11.32	61	44	43	30
Total Chromium (Cr)	mg/L	ng	ng	ng	<0.0010	0.0011	nc	0.0011	<0.0010	0.0011	<0.0010
Total Cobalt (Co)	mg/L	ng	ng	ng	0.00055	0.00051	nc	0.00047	0.00041	<0.00030	<0.00030
Total Copper (Cu)	mg/L	0.004[E]	ng	ng	0.0025	0.0025	0.00	0.0023	0.0025	0.0012	0.00045
Total Iron (Fe)	mg/L	0.3	ng	ng	0.21	0.14	nc	<0.060	0.081	<0.060	<0.060
Total Lead (Pb)	mg/L	0.007[E]	ng	ng	**0.032[A]**	**0.03[A]**	6.45	0.0056	**0.034[A]**	0.0049	<0.00020
Total Lithium (Li)	mg/L	ng	ng	ng	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020
Total Magnesium (Mg)	mg/L	ng	ng	ng	22	20	9.52	15	39	13	13
Total Manganese (Mn)	mg/L	ng	ng	ng	0.059	0.049	18.52	0.021	0.0043	0.021	<0.0040
Total Molybdenum (Mo)	mg/L	0.073	ng	ng	0.00087	0.00075	nc	0.00053	0.0023	0.0015	0.00065
Total Nickel (Ni)	mg/L	0.15[E]	ng	ng	0.004	0.0042	4.88	0.0045	0.0038	0.00056	<0.00050
Total Phosphorus (P)	mg/L	ng	ng	ng	0.41	0.23	nc	<0.10	<0.10	<0.10	<0.10
Total Potassium (K)	mg/L	ng	ng	ng	7.1	7	1.42	7.2	5.1	1.4	0.49
Total Selenium (Se)	mg/L	0.001	ng	ng	0.00021	<0.00020	nc	0.00021	0.00033	<0.00020	<0.00020
Total Silicon (Si)	mg/L	ng	ng	ng	1.5	1.4	6.90	0.53	1.6	0.39	0.27
Total Silver (Ag)	mg/L	0.00025	ng	ng	<0.00010	<0.00010	nc	<0.00010	<0.00010	<0.00010	<0.00010
Total Sodium (Na)	mg/L	ng	ng	ng	4.7	4.6	2.15	2.6	4.6	8.1	3
Total Strontium (Sr)	mg/L	ng	ng	ng	0.23	0.21	9.09	0.22	0.21	0.11	0.063
Total Sulphur (S)	mg/L	ng	ng	ng	2.5	2.4	4.08	3.8	2.7	1.5	0.66
Total Thallium (Tl)	mg/L	0.0008	ng	ng	<0.00020	<0.00020	nc	<0.00020	<0.00020	<0.00020	<0.00020
Total Tin (Sn)	mg/L	ng	ng	ng	<0.0010	<0.0010	nc	<0.0010	<0.0010	<0.0010	<0.0010
Total Titanium (Ti)	mg/L	ng	ng	ng	0.0051	0.0036	nc	<0.0010	0.001	0.0013	<0.0010
Total Uranium (U)	mg/L	0.015	ng	ng	0.00096	0.00073	27.22	0.0008	0.00081	0.0002	0.00013
Total Vanadium (V)	mg/L	ng	ng	ng	<0.0010	<0.0010	nc	<0.0010	<0.0010	<0.0010	<0.0010
Total Zinc (Zn)	mg/L	0.0070	ng	ng	0.0041	0.0042	nc	<0.0030	<0.0030	<0.0030	<0.0030

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Table 3 - Surface Water Sampling - Analytical Results

Routine Parameters											
Anion Sum	meq/L	ng	ng	ng	5.1	5.3	nc	4.7	5.8	3.8	2.7
Cation Sum	meq/L	ng	ng	ng	5.1	5.2	nc	4.8	5.9	3.8	2.7
Hardness (CaCO3)	mg/L	ng	ng	ng	230	240	4.26	220	280	170	130
Ion Balance (% Difference)	%	ng	ng	ng	0.14	0.88	nc	0.44	1.4	0.58	0.74
Dissolved Nitrate (N)	mg/L	3	ng	ng	**4.6**[A]	0.73	**145.22**	0.93	0.027	<0.020	0.021
Dissolved Nitrate (NO3)	mg/L	13	ng	ng	**21**[A]	3.2	**147.11**	4.1	0.12	<0.089	0.093
Dissolved Nitrite (NO2)	mg/L	0.197	ng	ng	0.11	0.19	**53.33**	0.12	<0.033	<0.033	<0.033
Calculated Total Dissolved Solids	mg/L	ng	ng	ng	260	260	0.00	240	270	190	130
Conductivity	uS/cm	ng	ng	ng	480	480	0.00	430	500	340	240
pH	pH	6.5-9.0	6-9	ng	7.47	7.45	nc	8.01	8.30	8.09	8.14
Alkalinity (PP as CaCO3)	mg/L	ng	ng	ng	<1.0	<1.0	nc	<1.0	<1.0	<1.0	<1.0
Alkalinity (Total as CaCO3)	mg/L	ng	ng	ng	230	250	8.33	220	280	170	130
Bicarbonate (HCO3)	mg/L	ng	ng	ng	280	300	6.90	270	340	210	160
Carbonate (CO3)	mg/L	ng	ng	ng	<1.0	<1.0	nc	<1.0	<1.0	<1.0	<1.0
Hydroxide (OH)	mg/L	ng	ng	ng	<1.0	<1.0	nc	<1.0	<1.0	<1.0	<1.0
Dissolved Sulphate (SO4)	mg/L	ng	ng	ng	5	4.7	nc	8.6	2.8	4.2	2.0
Dissolved Chloride (Cl)	mg/L	120	ng	2300	6	5.9	1.68	2.5	3.6	10	2.1
Dissolved Nitrite (N)	mg/L	0.06	ng	ng	0.035	0.057	nc	0.035	<0.010	<0.010	<0.010
Dissolved Nitrate plus Nitrite (N)	mg/L	ng	ng	ng	4.7	0.78	nc	0.97	0.027	<0.020	0.021
Dissolved Calcium (Ca)	mg/L	ng	ng	ng	64	66	3.08	62	44	44	30
Dissolved Iron (Fe)	mg/L	0.3	ng	ng	<0.060	<0.060	nc	<0.060	<0.060	<0.060	<0.060
Dissolved Magnesium (Mg)	mg/L	ng	ng	ng	18	18	0.00	15	41	13	12
Dissolved Manganese (Mn)	mg/L	ng	ng	ng	<0.0040	0.0049	nc	<0.0040	<0.0040	<0.0040	<0.0040
Dissolved Potassium (K)	mg/L	ng	ng	ng	7	7.3	4.20	7.6	5.3	1.4	0.46
Dissolved Sodium (Na)	mg/L	ng	ng	2300	5.8	5.6	3.51	3.2	5.6	9.3	3.6
Miscellaneous Parameters											
Total Suspended Solids	mg/L	ng	ng	ng	110	150	30.77	1.3	10	2.0	16
Total Ammonia (N)	mg/L	4.27[F]	ng	ng	0.28	0.11	**87.18**	1.3	0.045	<0.015	<0.015
Total Phosphorus (P)	mg/L	ng	ng	ng	1.0	0.24	**122.58**	0.030	0.23	0.0073	0.011
Extractable (n-Hex.) Oil and grease	mg/L	ng	5	ng	<2.0	<2.0	nc	3.0	3.0	<2.0	<2.0
Phenols	mg/L	ng[G]	ng	12	0.014	0.0087	**46.70**	0.023	0.021	0.0092	<0.0020

Notes:

[A] CCME. Canadian Water Quality Guidelines for the Protection of Aquatic Life, Freshwater.

[B] Nunavut Water Board License No. 1BR-RLF1520 requirements for effluent discharged from a sump at the Landfarm Facility.

[C] Ontario Ministry of the Environment and Climate Change (now referred to as the Ministry of Environment, Conservation, and Parks). Soil, Groundwater, and Sediment Standards for use under Part XV.1 of the Environmental Protection Act. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition.

[D] Guideline is applicable when pH is > 6.5.

[E] Guideline is calculated based on hardness ($CaCO_3$). An average hardness of 218 mg/L was used for the calculation.

[F] Guideline is based on temperature and pH. The Ammonia (NH_3) guideline was multiplied by a factor of 0.8824 to calculate the Ammonia (N) guideline. The ambient temperature at the Site on August 24, 2018 ranged from 1 degree Celsius (^oC) to 4^oC. A temperature of 5^oC and a pH of 7.5 were used to calculate the guideline.

[G] The CCME CWQG provide a guideline for phenols (phenolic compounds). This guideline cannot be compared to the phenols concentration provided by the laboratory.

RPD	Relative percent difference. Calculated as the difference between the concentrations divided by their average, expressed as a percent.
%	Percent
mg/L	milligrams per litre
meq/L	milliequivalents per litre
µS/cm	microsiemens per centimetre
nG/L	nanogram per liter
ng	No Applicable guideline
nc	RPD could not be calculated as one or both of the concentrations were less than five times the laboratory reportable detection limit.
0.0043	Concentration exceeds applicable guideline
34.6	RPD exceeds industry standard
<0.060	Concentration is less than laboratory reportable detection Limit

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Table 4 - Soil Monitoring Results

Sample ID	Date	Depth (m BGS)	CHV (ppm)	IHV (ppm)	Texture	Analysis
SS1	22-Aug-18	0.4-0.6	35	4	Gravelly sand, trace silt, medium brown, medium to coarse grained, moist	BTEX, PHC F1-F4, Fractionation, Nutrients
SS2	22-Aug-18	0.1-0.3	5	0	Gravelly sand, some silt, medium brown, medium to coarse grained, wet	BTEX, PHC F1-F4, Nutrients
SS3	22-Aug-18	0.1-0.3	0	0	Gravelly sand, some silt, medium brown, medium to coarse grained, moist	BTEX, PHC F1-F4
SS4	22-Aug-18	0.1-0.3	0	0	Gravelly sand, some silt, medium brown, medium to coarse grained, moist	BTEX, PHC F1-F4, Nutrients
SS5	22-Aug-18	0.1-0.3	0	0	Silty gravelly sand, light brown, medium to coarse grained, wet	BTEX, PHC F1-F4
SS6	22-Aug-18	0.1-0.3	0	0	Silty gravelly sand, light brown, medium to coarse grained, wet	BTEX, PHC F1-F4
SS7	22-Aug-18	0.1-0.3	0	1	Silty sand, some gravel, light brown, fine to medium grained, wet	BTEX, PHC F1-F4, Nutrients
SS8	22-Aug-18	0.1-0.3	0	0	Silty gravelly sand, medium brown, medium to coarse grained, wet	BTEX, PHC F1-F4
SS9	22-Aug-18	0.1-0.3	0	0	Sand and gravel, some silt, medium brown, medium to coarse grained, moist	BTEX, PHC F1-F4
SS10	22-Aug-18	0.1-0.3	0	0	Sand and gravel, trace silt, medium brown, medium to coarse grained, moist	BTEX, PHC F1-F4, Nutrients

Notes:

DUP18-01	Duplicate of SS1
SS10	Background location
CHV	Combustible headspace vapour concentrations
IHV	Ionizable headspace vapour concentrations
m BGS	Metres below ground surface
ppm	parts per million
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
PHC F1-F4	Petroleum hydrocarbon fractions 1 through 4
Fractionation	PHC aliphatic and aromatic subfraction analysis
Nutrients	Available NO_2 and NO_3, phosphorous, and potassium.

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Table 5 - Soil Sampling - Analytical Results

Sample Location	Units	CCME CWS[A]	MECP[B]	SS1 @0.4-0.6	Dup 18-01	RPD (%)	SS2 @0.1-0.3	SS3 @0.1-0.3	SS4 @0.1-0.3	SS5 @0.1-0.3	SS6 @0.1-0.3	SS7 @0.1-0.3	SS8 @0.1-0.3	SS9 @0.1-0.3	SS10 @0.1-0.3
Sample Date				**22-Aug-18**	**22-Aug-18**		**22-Aug-18**	**22-Aug-18**	**22-Aug-18**	**22-Aug-18**	**22-Aug-18**	**22-Aug-18**	**22-Aug-18**	**22-Aug-18**	**22-Aug-18**
Sample Depth (m BGS)				**0.4-0.6**	**Duplicate of S1 @0.4-0.6**		**0.1-0.3**	**0.1-0.3**	**0.1-0.3**	**0.1-0.3**	**0.1-0.3**	**0.1-0.3**	**0.1-0.3**	**0.1-0.3**	**0.1-0.3**
Sampling Company				**Stantec**			**Stantec**	**Stantec**	**Stantec**	**Stantec**	**Stantec**	**Stantec**	**Stantec**	**Stantec**	**Stantec**
Laboratory				**Maxxam**			**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**
Petroleum Hydrocarbons															
Benzene	mg/kg	ng	0.32	<0.0050	<0.0050	nc	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	ng	68	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylbenzene	mg/kg	ng	9.5	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
m & p-Xylene	mg/kg	ng	ng	<0.040	<0.040	nc	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
o-Xylene	mg/kg	ng	ng	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes (Total)	mg/kg	ng	26	<0.045	<0.045	nc	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
F1 (C6-C10)	mg/kg	ng	ng	<10	<10	nc	<10	<10	<10	<10	<10	<10	<10	<10	<10
F1 (C6-C10) - BTEX	mg/kg	320	55	<10	<10	nc	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10-C16 Hydrocarbons)	mg/kg	260	230	210	280[A,B]	28.6	<10	<10	<10	<10	51	<10	<10	40	<10
F3 (C16-C34 Hydrocarbons)	mg/kg	1700	1700	570	650	13.1	<50	<50	<50	<50	190	<50	<50	<50	<50
F4 (C34-C50 Hydrocarbons)	mg/kg	3300	3300	310	360	14.9	<50	<50	<50	<50	110	<50	<50	<50	<50
Reached Baseline at C50	mg/kg	ng	ng	Yes	No	nc	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F4G-SG (Heavy Hydrocarbons-Grav.)	mg/kg	3300	3300	-	1100	nc	-	-	-	-	-	-	-	-	-
Petroleum Hydrocarbon Fractionation															
Calculated >C8-C10 Aromatics (-EX)	mg/kg	ng	ng	<10	<10	nc	-	-	-	-	-	-	-	-	-
Calculated Aliphatic >C8-C10	mg/kg	ng	ng	<10	<10	nc	-	-	-	-	-	-	-	-	-
Calculated Aliphatic C6-C8	mg/kg	ng	ng	<10	<10	nc	-	-	-	-	-	-	-	-	-
>C10 - C12 Aliphatic	mg/kg	ng	ng	44	43	2.3	-	-	-	-	-	-	-	-	-
>C10 - C12 Aromatic	mg/kg	ng	ng	8.6	7.4	15.0	-	-	-	-	-	-	-	-	-
>C12 - C16 Aliphatic	mg/kg	ng	ng	180	200	10.5	-	-	-	-	-	-	-	-	-
>C12 - C16 Aromatic	mg/kg	ng	ng	23	25	8.3	-	-	-	-	-	-	-	-	-
>C16 - C21 Aliphatic	mg/kg	ng	ng	86	81	6.0	-	-	-	-	-	-	-	-	-
>C16 - C21 Aromatic	mg/kg	ng	ng	19	21	10.0	-	-	-	-	-	-	-	-	-
>C21 - C34 Aliphatic	mg/kg	ng	ng	490	480	2.1	-	-	-	-	-	-	-	-	-
>C21 - C34 Aromatic	mg/kg	ng	ng	80	84	4.9	-	-	-	-	-	-	-	-	-
>C34 Aliphatic (up to C50)	mg/kg	ng	ng	330	360	8.7	-	-	-	-	-	-	-	-	-
>C34 Aromatic (up to C50)	mg/kg	ng	ng	66	71	7.3	-	-	-	-	-	-	-	-	-
Nutrients															
Available (KCl) Nitrate plus Nitrite (N)	mg/kg	ng	ng	<2.0	<2.0	nc	<2.0	-	<2.0	-	-	<2.0	-	-	<2.0
Available (Mod Kel) Phosphorus (P)	mg/kg	ng	ng	<4.0	<4.0	nc	<4.0	-	<4.0	-	-	<4.0	-	-	<4.0
Available (Mod Kel) Potassium (K)	mg/kg	ng	ng	36	32	11.8	16	-	17	-	-	17	-	-	9.5
Available (KCl) Nitrite (N)	mg/kg	ng	ng	<2.0	<2.0	nc	<2.0	-	<2.0	-	-	<2.0	-	-	<2.0
Available (KCl) Nitrate (N)	mg/kg	ng	ng	<2.0	<2.0	nc	<2.0	-	<2.0	-	-	<2.0	-	-	<2.0

Notes:

[A] CCME 2008. Canada-Wide Standards for Petroleum Hydrocarbon (PHC) in Soil. Industrial Land Use. Coarse-grained soil. Excluding vapour inhalation (indoor), protection of potable groundwater, and protection of groundwater for aquatic life exposure pathways.

[B] Ontario Ministry of the Environment and Climate Change (now referred to as the Ministry of Environment, Conservation, and Parks). Soil, Groundwater, and Sediment Standards for use under Part XV.1 of the Environmental Protection Act. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition.

RPD	relative percent difference calculated as the difference between the two concentrations divided by their average and expressed as a percent.
mBGS	metres below ground surface
mg/kg	milligrams per kilogram
%	percent
-	parameter not analyzed
ng	no applicable guideline / standard
nc	RPD could not be calculated as one or both of the concentrations were less than five times the laboratory reportable detection limit.
<0.0050	Concentration is less than the laboratory reportable detection limit.
390[B]	Concentrations exceed applicable standard.
71	RPD exceeds industry standard.

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Resolute Bay Airport, Land Treatment Unit
Public Services and Procurement Canada for Transport Canada
110220180
Jan-19

Table 6 - Quality Assurance/Quality Control

Sample Location	**Units**	**TB-1**	**FB-1**
Sample Date		**24-Aug-18**	**24-Aug-18**
Sampling Company		**Stantec**	**Stantec**
Laboratory		**Maxxam**	**Maxxam**
Petroleum Hydrocarbons			
Benzene	mg/L	<0.00040	<0.00040
Toluene	mg/L	<0.00040	<0.00040
Ethylbenzene	mg/L	<0.00040	<0.00040
m & p-Xylene	mg/L	<0.00080	<0.00080
o-Xylene	mg/L	<0.00040	<0.00040
Xylenes (Total)	mg/L	<0.00089	<0.00089
F1 (C6-C10) - BTEX	mg/L	<0.10	<0.10
F1 (C6-C10)	mg/L	<0.10	<0.10
F2 (C10-C16 Hydrocarbons)	mg/L	<0.10	<0.10
Polycyclic Aromatic Hydrocarbons			
Benzo[a]pyrene equivalency	mg/L	<0.000010	<0.000010
Acenaphthene	mg/L	<0.00010	<0.00010
Acenaphthylene	mg/L	<0.00010	<0.00010
Acridine	mg/L	<0.000050	<0.000050
Anthracene	mg/L	<0.000010	<0.000010
Benzo(a)anthracene	mg/L	<0.0000085	<0.0000085
Benzo(b&j)fluoranthene	mg/L	<0.0000085	<0.0000085
Benzo(k)fluoranthene	mg/L	<0.0000085	<0.0000085
Benzo(g,h,i)perylene	mg/L	<0.0000085	<0.0000085
Benzo(c)phenanthrene	mg/L	<0.000050	<0.000050
Benzo(a)pyrene	mg/L	<0.0000075	<0.0000075
Benzo[e]pyrene	mg/L	<0.000050	<0.000050
Chrysene	mg/L	<0.0000085	<0.0000085
Dibenz(a,h)anthracene	mg/L	<0.0000075	<0.0000075
Fluoranthene	mg/L	<0.000010	<0.000010
Fluorene	mg/L	<0.000050	<0.000050
Indeno(1,2,3-cd)pyrene	mg/L	<0.0000085	<0.0000085
1-Methylnaphthalene	mg/L	<0.00010	<0.00010
2-Methylnaphthalene	mg/L	<0.00010	<0.00010
Naphthalene	mg/L	<0.00010	<0.00010
Phenanthrene	mg/L	<0.000050	<0.000050
Perylene	mg/L	<0.000050	<0.000050
Pyrene	mg/L	<0.000020	<0.000020
Quinoline	mg/L	<0.00020	<0.00020
Metals			
Total Aluminum (Al)	mg/L	**0.015**	<0.0030
Total Antimony (Sb)	mg/L	<0.00060	<0.00060
Total Arsenic (As)	mg/L	<0.00020	<0.00020
Total Barium (Ba)	mg/L	<0.010	<0.010
Total Beryllium (Be)	mg/L	<0.0010	<0.0010
Total Boron (B)	mg/L	<0.020	<0.020
Total Cadmium (Cd)	mg/L	<0.000020	<0.000020
Total Calcium (Ca)	mg/L	<0.30	<0.30
Total Chromium (Cr)	mg/L	**0.0012**	<0.0010
Total Cobalt (Co)	mg/L	<0.00030	<0.00030
Total Copper (Cu)	mg/L	<0.00020	<0.00020
Total Iron (Fe)	mg/L	<0.060	<0.060
Total Lead (Pb)	mg/L	<0.00020	<0.00020
Total Lithium (Li)	mg/L	<0.020	<0.020
Total Magnesium (Mg)	mg/L	<0.20	<0.20
Total Manganese (Mn)	mg/L	<0.0040	<0.0040
Total Molybdenum (Mo)	mg/L	**0.00028**	<0.00020
Total Nickel (Ni)	mg/L	<0.00050	<0.00050
Total Phosphorus (P)	mg/L	<0.10	<0.10
Total Potassium (K)	mg/L	<0.30	<0.30
Total Selenium (Se)	mg/L	<0.00020	<0.00020
Total Silicon (Si)	mg/L	<0.10	<0.10
Total Silver (Ag)	mg/L	<0.00010	<0.00010
Total Sodium (Na)	mg/L	<0.50	<0.50
Total Strontium (Sr)	mg/L	<0.020	<0.020
Total Sulphur (S)	mg/L	<0.20	<0.20
Total Thallium (Tl)	mg/L	<0.00020	<0.00020
Total Tin (Sn)	mg/L	<0.0010	<0.0010
Total Titanium (Ti)	mg/L	<0.0010	<0.0010
Total Uranium (U)	mg/L	<0.00010	<0.00010
Total Vanadium (V)	mg/L	<0.0010	<0.0010
Total Zinc (Zn)	mg/L	<0.0030	<0.0030

2018 Environmental Monitoring Program
Resolute Bay Airport, Land Treatment Unit
Public Services and Procurement Canada for Transport Canada
110220180
Jan-19

Table 6 - Quality Assurance/Quality Control

Routine Parameters			
Anion Sum	meq/L	0	0
Cation Sum	meq/L	0.013	0.044
Hardness (CaCO3)	mg/L	<0.50	<0.50
Ion Balance (% Difference)	%	NC	NC
Dissolved Nitrate (N)	mg/L	<0.020	<0.020
Dissolved Nitrate (NO3)	mg/L	<0.089	<0.089
Dissolved Nitrite (NO2)	mg/L	<0.033	<0.033
Calculated Total Dissolved Solids	mg/L	<0.022	<0.022
Conductivity	uS/cm	<2.0	<2.0
pH	pH	4.9	4.35
Alkalinity (PP as CaCO3)	mg/L	<1.0	<1.0
Alkalinity (Total as CaCO3)	mg/L	<1.0	<1.0
Bicarbonate (HCO3)	mg/L	<1.0	<1.0
Carbonate (CO3)	mg/L	<1.0	<1.0
Hydroxide (OH)	mg/L	<1.0	<1.0
Dissolved Sulphate (SO4)	mg/L	<1.0	<1.0
Dissolved Chloride (Cl)	mg/L	<1.0	<1.0
Dissolved Nitrite (N)	mg/L	<0.010	<0.010
Dissolved Nitrate plus Nitrite (N)	mg/L	<0.020	<0.020
Dissolved Calcium (Ca)	mg/L	<0.30	<0.30
Dissolved Iron (Fe)	mg/L	<0.060	<0.060
Dissolved Magnesium (Mg)	mg/L	<0.20	<0.20
Dissolved Manganese (Mn)	mg/L	<0.0040	<0.0040
Dissolved Potassium (K)	mg/L	<0.30	<0.30
Dissolved Sodium (Na)	mg/L	<0.50	<0.50
Miscellaneous Parameters			
Total Suspended Solids	mg/L	<1.0	<1.0
Total Ammonia (N)	mg/L	<0.015	<0.015
Total Phosphorus (P)	mg/L	<0.0030	<0.0030
Extractable (n-Hex.) Oil and grease	mg/L	<2.0	<2.0
Phenols	mg/L	<0.0020	<0.0020

Notes:
Notes:

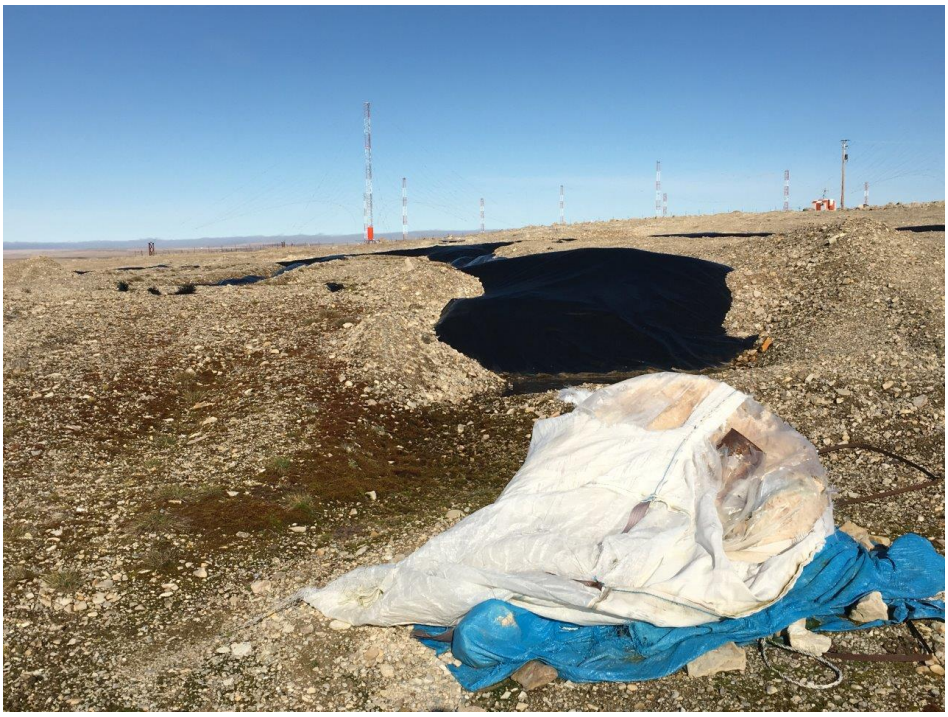
%	Percent
mg/L	milligrams per litre
meq/L	milliequivalents per litre
µS/cm	microsiemens per centimetre
ng	No Applicable guideline
0.00031	Concentration exceeds laboratory reportable detection limit.

APPENDIX D

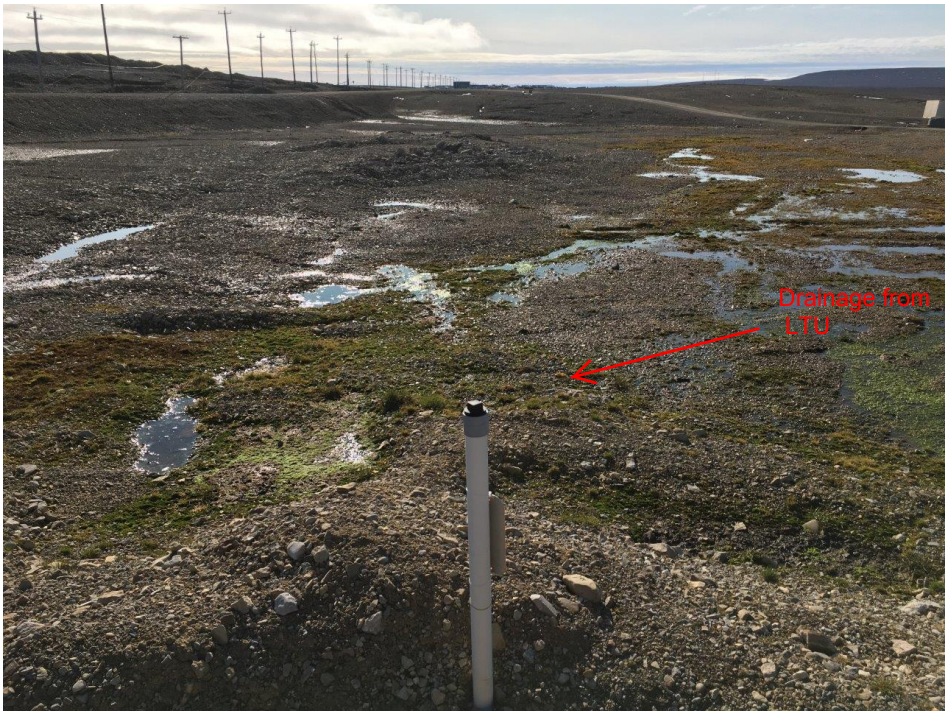
Photographic Log

Photograph 1: Northeast view of aviation fuel drum near LTU 3, August 22, 2018

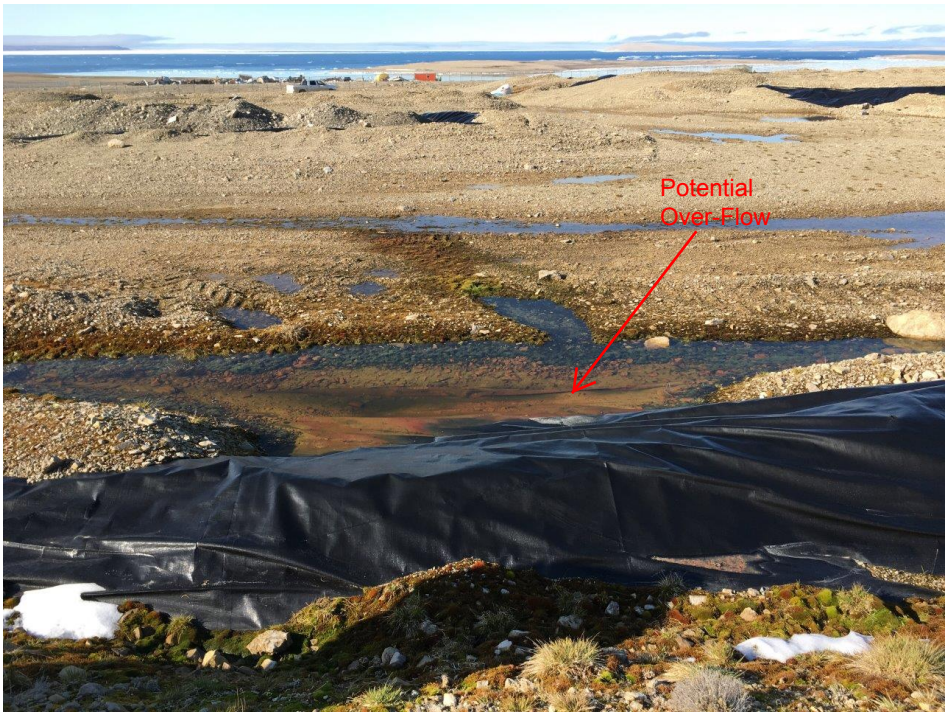
Photograph 2: Construction Debris pile within the berm of LTU 2, August 22, 2018



Photograph 3: Bag containing salt near LTU 1, August 22, 2018.



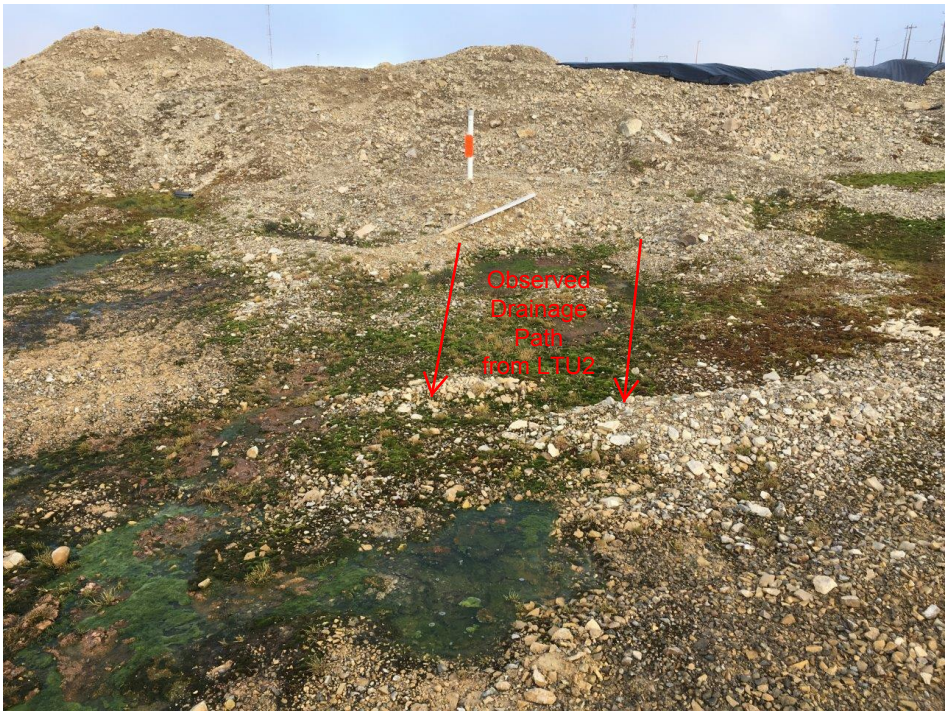
Photograph 4: South view of potential berm breach in southwest corner of LTU 2, August 22, 2018.



Photograph 5: Potential berm breach along west berm of LTU 2, August 22, 2018.

Photograph 6: Northeast view of MW1, August 22, 2018

Photograph 7: Close up view of MW4 showing screen above ground surface, August 22, 2018.

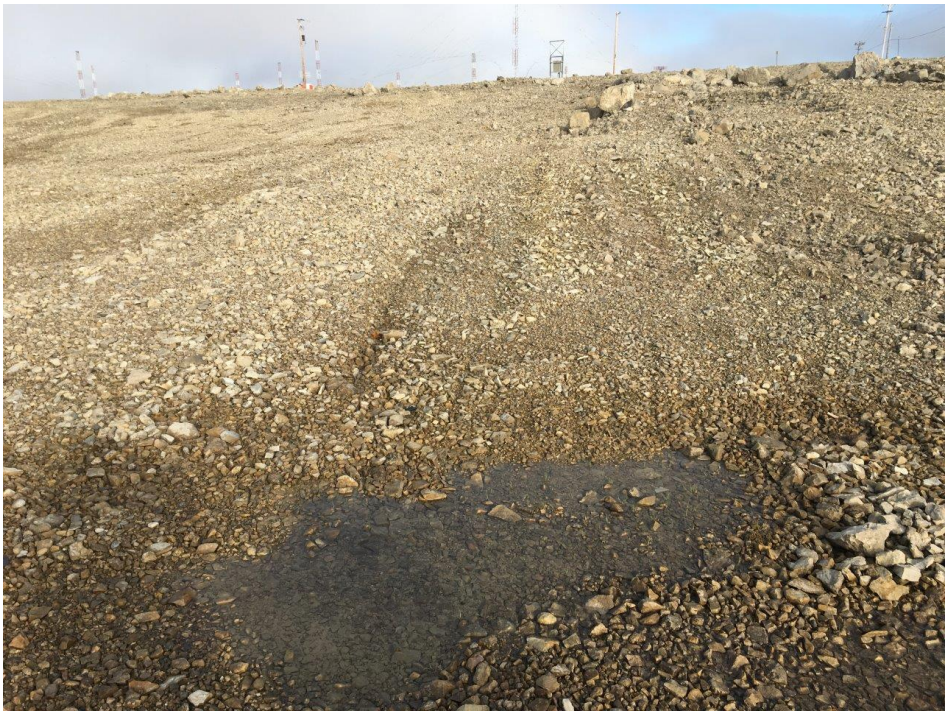


Photograph 8: North view of SW1 (LTU 2 in background), August 25, 2018.

Photograph 9: North view of SW2, August 25, 2018

Photograph 10: West view of SW3 (ocean in background), August 22, 2018.

Photograph 11: South view of SW4 (LTU 2 in background), August 25, 2018.



Photograph 12: North view of SW5, August 25, 2018.

APPENDIX E

Copies of Laboratory Certificates of Analysis

Your Project #: 110220180
Site Location: RESOLUTE BAY, NV
Your C.O.C. #: 1of1

Attention: LINDSAY VAN NOORTWYK

STANTEC CONSULTING LTD
10160-112 STREET
EDMONTON, AB
CANADA T5K 2L6

Report Date: 2018/09/19
Report #: R2621914
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B879078
Received: 2018/09/10, 16:00

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH	8	N/A	2018/09/15	AB SOP-00005	SM 23 2320 B m
Alkalinity @25C (pp, total), CO3,HCO3,OH	1	N/A	2018/09/19	AB SOP-00005	SM 23 2320 B m
BTEX/F1 in Water by HS GC/MS/FID	9	N/A	2018/09/15	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX	9	N/A	2018/09/18	AB SOP-00039	Auto Calc
Chloride by Automated Colourimetry	9	N/A	2018/09/15	AB SOP-00020	SM 22 4500-Cl-E m
Conductivity @25C	9	N/A	2018/09/15	AB SOP-00005	SM 23 2510 B m
CCME Hydrocarbons in Water (F2; C10-C16) (1)	6	2018/09/15	2018/09/17	AB SOP-00037 / AB SOP-00040	CCME PHC-CWS m
CCME Hydrocarbons in Water (F2; C10-C16) (1)	3	2018/09/15	2018/09/18	AB SOP-00037 / AB SOP-00040	CCME PHC-CWS m
Hardness	9	N/A	2018/09/15	AB WI-00065	Auto Calc
Elements by ICP-Dissolved-Lab Filtered (2)	9	N/A	2018/09/15	AB SOP-00042	EPA 6010d R4 m
Elements by ICP - Total	9	2018/09/16	2018/09/17	AB SOP-00014 / AB SOP-00042	EPA 6010d R4 m
Elements by ICPMS - Total	8	2018/09/16	2018/09/16	AB SOP-00014 / AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Total	1	2018/09/16	2018/09/18	AB SOP-00014 / AB SOP-00043	EPA 6020b R2 m
Ion Balance	9	N/A	2018/09/15	AB WI-00065	Auto Calc
Sum of cations, anions	9	N/A	2018/09/15	AB WI-00065	Auto Calc
Ammonia-N (Total)	9	N/A	2018/09/17	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate and Nitrite	9	N/A	2018/09/16	AB WI-00065	Auto Calc
Nitrate (as N)	9	2018/09/14	2018/09/16	AB WI-00065	Auto Calc
NO2 - NO2 + NO3 (N) by CFA	9	N/A	2018/09/16	AB SOP-00082	IM 857-871m
Oil and Grease (Gravimetric, n-Hexane)	9	2018/09/18	2018/09/19	EENVSOP-00093	SM 23 5520B m
Benzo[a]pyrene Equivalency (3)	9	N/A	2018/09/18	AB SOP-00003	Auto Calc
PAH in Water by GC/MS	9	2018/09/15	2018/09/17	AB SOP-00037 / AB SOP-00003	EPA 3510C/8270E m
pH @25°C (4)	9	N/A	2018/09/15	AB SOP-00005	SM 23 4500 H+ B m
Phenols (4-AAP)	9	N/A	2018/09/18	EENVSOP-00061	MMCW 154 1996 m
Sulphate by Automated Colourimetry	9	N/A	2018/09/15	AB SOP-00018	SM 22 4500-SO4 E m

Your Project #: 110220180
Site Location: RESOLUTE BAY, NV
Your C.O.C. #: 1of1

Attention: LINDSAY VAN NOORTWYK

STANTEC CONSULTING LTD
10160-112 STREET
EDMONTON, AB
CANADA T5K 2L6

Report Date: 2018/09/19
Report #: R2621914
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B879078
Received: 2018/09/10, 16:00

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Dissolved Solids (Calculated)	8	N/A	2018/09/17	AB WI-00065	Auto Calc
Total Dissolved Solids (Calculated)	1	N/A	2018/09/19	AB WI-00065	Auto Calc
Total Phosphorus	9	2018/09/18	2018/09/19	AB SOP-00024	SM 22 4500-P A,B,F m
Total Suspended Solids (NFR)	9	2018/09/15	2018/09/17	AB SOP-00061	SM 23 2540 D m

Remarks:

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

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

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

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

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

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

(1) Silica gel clean up employed.
(2) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(3) B[a]P TPE is calculated using 1/2 of the RDL for non detect results as per Alberta Environment instructions. This protocol may not apply in other jurisdictions.
(4) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Maxxam endeavours to analyze samples as soon as possible after receipt.

Your Project #: 110220180
Site Location: RESOLUTE BAY, NV
Your C.O.C. #: 1of1

Attention: LINDSAY VAN NOORTWYK

STANTEC CONSULTING LTD
10160-112 STREET
EDMONTON, AB
CANADA T5K 2L6

Report Date: 2018/09/19
Report #: R2621914
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B879078
Received: 2018/09/10, 16:00

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Geraldlyn Gouthro, Client Service Specialist
Email: GGouthro@maxxam.ca
Phone# (403)735-2230

==========

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

Maxxam Job #: B879078
Report Date: 2018/09/19

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

AT1 BTEX AND F1-F2 IN WATER (WATER)

Maxxam ID		UH8272		UH8273		UH8273			
Sampling Date		2018/08/24 13:44		2018/08/24 14:02		2018/08/24 14:02			
COC Number		1of1		1of1		1of1			
	UNITS	SW1	MU	SW2	MU	SW2 Lab-Dup	MU	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	+/- <RDL	0.37	+/- 0.17	N/A	N/A	0.10	9140522
Volatiles									
Benzene	mg/L	<0.00040	N/A	<0.00040	N/A	<0.00040	N/A	0.00040	9144370
Toluene	mg/L	<0.00040	N/A	<0.00040	N/A	<0.00040	N/A	0.00040	9144370
Ethylbenzene	mg/L	<0.00040	N/A	0.00044	+/- <RDL	0.00047	+/- <RDL	0.00040	9144370
m & p-Xylene	mg/L	<0.00080	N/A	<0.00080	N/A	<0.00080	N/A	0.00080	9144370
o-Xylene	mg/L	<0.00040	N/A	<0.00040	N/A	<0.00040	N/A	0.00040	9144370
Xylenes (Total)	mg/L	<0.00089	N/A	<0.00089	N/A	N/A	N/A	0.00089	9143156
F1 (C6-C10) - BTEX	mg/L	<0.10	N/A	0.15	N/A	N/A	N/A	0.10	9143156
F1 (C6-C10)	mg/L	<0.10	N/A	0.15	+/- <RDL	0.29	+/- 0.11	0.10	9144370
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	110	N/A	112	N/A	112	N/A	N/A	9144370
4-Bromofluorobenzene (sur.)	%	107	N/A	101	N/A	133	N/A	N/A	9144370
D4-1,2-Dichloroethane (sur.)	%	123	N/A	116	N/A	123	N/A	N/A	9144370
O-TERPHENYL (sur.)	%	85	N/A	86	N/A	N/A	N/A	N/A	9140522

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

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B879078
Report Date: 2018/09/19

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

AT1 BTEX AND F1-F2 IN WATER (WATER)

Maxxam ID		UH8274		UH8275		UH8276		UH8277			
Sampling Date		2018/08/24 14:21		2018/08/24 14:46		2018/08/24 15:24		2018/08/24 13:18			
COC Number		1of1		1of1		1of1		1of1			
	UNITS	SW3	MU	SW4	MU	SW5	MU	TB-1	MU	RDL	QC Batch
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/L	0.27	+/- 0.13	0.31	+/- 0.14	<0.10	N/A	<0.10	N/A	0.10	9140522
Volatiles											
Benzene	mg/L	<0.00040	N/A	<0.00040	N/A	<0.00040	N/A	<0.00040	N/A	0.00040	9144370
Toluene	mg/L	<0.00040	N/A	0.00057	+/- <RDL	<0.00040	N/A	<0.00040	N/A	0.00040	9144370
Ethylbenzene	mg/L	0.00057	+/- <RDL	<0.00040	N/A	<0.00040	N/A	<0.00040	N/A	0.00040	9144370
m & p-Xylene	mg/L	<0.00080	N/A	0.0012	+/- <RDL	<0.00080	N/A	<0.00080	N/A	0.00080	9144370
o-Xylene	mg/L	<0.00040	N/A	0.0012	+/- <RDL	<0.00040	N/A	<0.00040	N/A	0.00040	9144370
Xylenes (Total)	mg/L	<0.00089	N/A	0.0024	N/A	<0.00089	N/A	<0.00089	N/A	0.00089	9143156
F1 (C6-C10) - BTEX	mg/L	0.15	N/A	<0.10	N/A	<0.10	N/A	<0.10	N/A	0.10	9143156
F1 (C6-C10)	mg/L	0.15	+/- <RDL	<0.10	N/A	<0.10	N/A	<0.10	N/A	0.10	9144370
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	113	N/A	111	N/A	110	N/A	112	N/A	N/A	9144370
4-Bromofluorobenzene (sur.)	%	112	N/A	103	N/A	96	N/A	96	N/A	N/A	9144370
D4-1,2-Dichloroethane (sur.)	%	118	N/A	112	N/A	113	N/A	118	N/A	N/A	9144370
O-TERPHENYL (sur.)	%	88	N/A	86	N/A	95	N/A	85	N/A	N/A	9140522

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B879078
Report Date: 2018/09/19

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

AT1 BTEX AND F1-F2 IN WATER (WATER)

Maxxam ID		UH8278		UH8279		UH8280			
Sampling Date		2018/08/24 13:31		2018/08/24 13:51		2018/08/25 11:05			
COC Number		1of1		1of1		1of1			
	UNITS	FB-1	MU	SW-DUP18-01	MU	MW1	MU	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/L	<0.10	N/A	0.16	+/- <RDL	0.29	+/- 0.14	0.10	9140522
Volatiles									
Benzene	mg/L	<0.00040	N/A	<0.00040	N/A	<0.00040	N/A	0.00040	9144370
Toluene	mg/L	<0.00040	N/A	<0.00040	N/A	<0.00040	N/A	0.00040	9144370
Ethylbenzene	mg/L	<0.00040	N/A	<0.00040	N/A	<0.00040	N/A	0.00040	9144370
m & p-Xylene	mg/L	<0.00080	N/A	<0.00080	N/A	<0.00080	N/A	0.00080	9144370
o-Xylene	mg/L	<0.00040	N/A	<0.00040	N/A	0.00072	+/- <RDL	0.00040	9144370
Xylenes (Total)	mg/L	<0.00089	N/A	<0.00089	N/A	<0.00089	N/A	0.00089	9143156
F1 (C6-C10) - BTEX	mg/L	<0.10	N/A	<0.10	N/A	<0.10	N/A	0.10	9143156
F1 (C6-C10)	mg/L	<0.10	N/A	<0.10	N/A	<0.10	N/A	0.10	9144370
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	109	N/A	110	N/A	110	N/A	N/A	9144370
4-Bromofluorobenzene (sur.)	%	95	N/A	106	N/A	96	N/A	N/A	9144370
D4-1,2-Dichloroethane (sur.)	%	115	N/A	122	N/A	112	N/A	N/A	9144370
O-TERPHENYL (sur.)	%	90	N/A	84	N/A	94	N/A	N/A	9140522

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Maxxam Job #: B879078
Report Date: 2018/09/19

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

ROUTINE WATER -LAB FILTERED (WATER)

Maxxam ID		UH8272		UH8273		UH8274			
Sampling Date		2018/08/24 13:44		2018/08/24 14:02		2018/08/24 14:21			
COC Number		1of1		1of1		1of1			
	UNITS	SW1	MU	SW2	MU	SW3	MU	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	5.1	N/A	4.7	N/A	5.8	N/A	N/A	9143456
Cation Sum	meq/L	5.1	N/A	4.8	N/A	5.9	N/A	N/A	9143456
Hardness (CaCO3)	mg/L	230	N/A	220	N/A	280	N/A	0.50	9143556
Ion Balance (% Difference)	%	0.14	N/A	0.44	N/A	1.4	N/A	N/A	9143162
Dissolved Nitrate (N)	mg/L	4.6	N/A	0.93	N/A	0.027	N/A	0.020	9143457
Dissolved Nitrate (NO3)	mg/L	21	N/A	4.1	N/A	0.12	N/A	0.089	9143557
Dissolved Nitrite (NO2)	mg/L	0.11	N/A	0.12	N/A	<0.033	N/A	0.033	9143557
Calculated Total Dissolved Solids	mg/L	260	N/A	240	N/A	270	N/A	0.022	9143458
Misc. Inorganics									
Conductivity	uS/cm	480	+/- 42	430	+/- 38	500	+/- 44	2.0	9144703
pH	pH	7.47	+/- 0.108	8.01	+/- 0.116	8.30	+/- 0.120	N/A	9144700
Anions									
Alkalinity (PP as CaCO3)	mg/L	<1.0	N/A	<1.0	N/A	<1.0	N/A	1.0	9144702
Alkalinity (Total as CaCO3)	mg/L	230	+/- 9.9	220	+/- 9.7	280	+/- 12	1.0	9144702
Bicarbonate (HCO3)	mg/L	280	+/- 68	270	+/- 67	340	+/- 83	1.0	9144702
Carbonate (CO3)	mg/L	<1.0	N/A	<1.0	N/A	<1.0	N/A	1.0	9144702
Hydroxide (OH)	mg/L	<1.0	N/A	<1.0	N/A	<1.0	N/A	1.0	9144702
Dissolved Sulphate (SO4)	mg/L	5.0	+/- 1.3	8.6	+/- 1.8	2.8	+/- 1.1	1.0	9144704
Dissolved Chloride (Cl)	mg/L	6.0	+/- <RDL	2.5	+/- <RDL	3.6	+/- <RDL	1.0	9144701
Nutrients									
Dissolved Nitrite (N)	mg/L	0.035	N/A	0.035	N/A	<0.010	N/A	0.010	9145082
Dissolved Nitrate plus Nitrite (N)	mg/L	4.7	N/A	0.97	N/A	0.027	N/A	0.020	9145082
Lab Filtered Elements									
Dissolved Calcium (Ca)	mg/L	64	+/- 4.2	62	+/- 4.1	44	+/- 2.9	0.30	9144571
Dissolved Iron (Fe)	mg/L	<0.060	N/A	<0.060	N/A	<0.060	N/A	0.060	9144571
Dissolved Magnesium (Mg)	mg/L	18	+/- 0.95	15	+/- 0.80	41	+/- 2.1	0.20	9144571
Dissolved Manganese (Mn)	mg/L	<0.0040	N/A	<0.0040	N/A	<0.0040	N/A	0.0040	9144571
Dissolved Potassium (K)	mg/L	7.0	+/- 0.49	7.6	+/- 0.52	5.3	+/- 0.39	0.30	9144571
Dissolved Sodium (Na)	mg/L	5.8	+/- <RDL	3.2	+/- <RDL	5.6	+/- <RDL	0.50	9144571

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Maxxam Job #: B879078
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STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

ROUTINE WATER -LAB FILTERED (WATER)

Maxxam ID		UH8275		UH8276		UH8277			
Sampling Date		2018/08/24 14:46		2018/08/24 15:24		2018/08/24 13:18			
COC Number		1of1		1of1		1of1			
	UNITS	SW4	MU	SW5	MU	TB-1	MU	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	3.8	N/A	2.7	N/A	0.0000	N/A	N/A	9143456
Cation Sum	meq/L	3.8	N/A	2.7	N/A	0.013	N/A	N/A	9143456
Hardness (CaCO3)	mg/L	170	N/A	130	N/A	<0.50	N/A	0.50	9143556
Ion Balance (% Difference)	%	0.58	N/A	0.74	N/A	NC	N/A	N/A	9143162
Dissolved Nitrate (N)	mg/L	<0.020	N/A	0.021	N/A	<0.020	N/A	0.020	9143457
Dissolved Nitrate (NO3)	mg/L	<0.089	N/A	0.093	N/A	<0.089	N/A	0.089	9143557
Dissolved Nitrite (NO2)	mg/L	<0.033	N/A	<0.033	N/A	<0.033	N/A	0.033	9143557
Calculated Total Dissolved Solids	mg/L	190	N/A	130	N/A	<0.022	N/A	0.022	9143458
Misc. Inorganics									
Conductivity	uS/cm	340	+/- 30	240	+/- 22	<2.0	N/A	2.0	9144703
pH	pH	8.09	+/- 0.117	8.14	+/- 0.118	4.90	+/- 0.0710	N/A	9144700
Anions									
Alkalinity (PP as CaCO3)	mg/L	<1.0	N/A	<1.0	N/A	<1.0	N/A	1.0	9144702
Alkalinity (Total as CaCO3)	mg/L	170	+/- 7.6	130	+/- 5.9	<1.0	N/A	1.0	9144702
Bicarbonate (HCO3)	mg/L	210	+/- 53	160	+/- 42	<1.0	N/A	1.0	9144702
Carbonate (CO3)	mg/L	<1.0	N/A	<1.0	N/A	<1.0	N/A	1.0	9144702
Hydroxide (OH)	mg/L	<1.0	N/A	<1.0	N/A	<1.0	N/A	1.0	9144702
Dissolved Sulphate (SO4)	mg/L	4.2	+/- 1.2	2.0	+/- 1.0	<1.0	N/A	1.0	9144704
Dissolved Chloride (Cl)	mg/L	10	+/- <RDL	2.1	+/- <RDL	<1.0	N/A	1.0	9144701
Nutrients									
Dissolved Nitrite (N)	mg/L	<0.010	N/A	<0.010	N/A	<0.010	N/A	0.010	9145082
Dissolved Nitrate plus Nitrite (N)	mg/L	<0.020	N/A	0.021	N/A	<0.020	N/A	0.020	9145082
Lab Filtered Elements									
Dissolved Calcium (Ca)	mg/L	44	+/- 2.9	30	+/- 2.0	<0.30	N/A	0.30	9144571
Dissolved Iron (Fe)	mg/L	<0.060	N/A	<0.060	N/A	<0.060	N/A	0.060	9144571
Dissolved Magnesium (Mg)	mg/L	13	+/- 0.71	12	+/- 0.66	<0.20	N/A	0.20	9144571
Dissolved Manganese (Mn)	mg/L	<0.0040	N/A	<0.0040	N/A	<0.0040	N/A	0.0040	9144571
Dissolved Potassium (K)	mg/L	1.4	+/- <RDL	0.46	+/- <RDL	<0.30	N/A	0.30	9144571
Dissolved Sodium (Na)	mg/L	9.3	+/- 0.66	3.6	+/- <RDL	<0.50	N/A	0.50	9144571

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Maxxam Job #: B879078
Report Date: 2018/09/19

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

ROUTINE WATER -LAB FILTERED (WATER)

Maxxam ID		UH8278			UH8279		UH8280			
Sampling Date		2018/08/24 13:31			2018/08/24 13:51		2018/08/25 11:05			
COC Number		1of1			1of1		1of1			
	UNITS	FB-1	MU	QC Batch	SW-DUP18-01	MU	MW1	MU	RDL	QC Batch
Calculated Parameters										
Anion Sum	meq/L	0.0000	N/A	9143456	5.3	N/A	3.8	N/A	N/A	9143456
Cation Sum	meq/L	0.044	N/A	9143456	5.2	N/A	3.8	N/A	N/A	9143456
Hardness (CaCO3)	mg/L	<0.50	N/A	9143556	240	N/A	180	N/A	0.50	9143556
Ion Balance (% Difference)	%	NC	N/A	9143162	0.88	N/A	0.14	N/A	N/A	9143162
Dissolved Nitrate (N)	mg/L	<0.020	N/A	9143457	0.73	N/A	<0.020	N/A	0.020	9143457
Dissolved Nitrate (NO3)	mg/L	<0.089	N/A	9143557	3.2	N/A	<0.089	N/A	0.089	9143557
Dissolved Nitrite (NO2)	mg/L	<0.033	N/A	9143557	0.19	N/A	<0.033	N/A	0.033	9143557
Calculated Total Dissolved Solids	mg/L	<0.022	N/A	9143458	260	N/A	180	N/A	0.022	9143458
Misc. Inorganics										
Conductivity	uS/cm	<2.0	N/A	9144703	480	+/- 43	330	+/- 30	2.0	9144703
pH	pH	4.35	+/- 0.0631	9144700	7.45	+/- 0.108	7.86	+/- 0.114	N/A	9144700
Anions										
Alkalinity (PP as CaCO3)	mg/L	<1.0	N/A	9148841	<1.0	N/A	<1.0	N/A	1.0	9144702
Alkalinity (Total as CaCO3)	mg/L	<1.0	N/A	9148841	250	+/- 11	180	+/- 8.0	1.0	9144702
Bicarbonate (HCO3)	mg/L	<1.0	N/A	9148841	300	+/- 74	220	+/- 56	1.0	9144702
Carbonate (CO3)	mg/L	<1.0	N/A	9148841	<1.0	N/A	<1.0	N/A	1.0	9144702
Hydroxide (OH)	mg/L	<1.0	N/A	9148841	<1.0	N/A	<1.0	N/A	1.0	9144702
Dissolved Sulphate (SO4)	mg/L	<1.0	N/A	9144704	4.7	+/- 1.3	1.5	+/- <RDL	1.0	9144704
Dissolved Chloride (Cl)	mg/L	<1.0	N/A	9144701	5.9	+/- <RDL	3.7	+/- <RDL	1.0	9144701
Nutrients										
Dissolved Nitrite (N)	mg/L	<0.010	N/A	9145082	0.057	N/A	<0.010	N/A	0.010	9145082
Dissolved Nitrate plus Nitrite (N)	mg/L	<0.020	N/A	9145082	0.78	N/A	<0.020	N/A	0.020	9145082
Lab Filtered Elements										
Dissolved Calcium (Ca)	mg/L	<0.30	N/A	9144571	66	+/- 4.3	48	+/- 3.1	0.30	9144571
Dissolved Iron (Fe)	mg/L	<0.060	N/A	9144571	<0.060	N/A	<0.060	N/A	0.060	9144571
Dissolved Magnesium (Mg)	mg/L	<0.20	N/A	9144571	18	+/- 0.94	14	+/- 0.75	0.20	9144571
Dissolved Manganese (Mn)	mg/L	<0.0040	N/A	9144571	0.0049	+/- <RDL	<0.0040	N/A	0.0040	9144571
Dissolved Potassium (K)	mg/L	<0.30	N/A	9144571	7.3	+/- 0.50	0.85	+/- <RDL	0.30	9144571
Dissolved Sodium (Na)	mg/L	<0.50	N/A	9144571	5.6	+/- <RDL	4.1	+/- <RDL	0.50	9144571

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Maxxam Job #: B879078
Report Date: 2018/09/19

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

REGULATED METALS (CCME/AT1) - TOTAL

Maxxam ID		UH8272		UH8273		UH8274			
Sampling Date		2018/08/24 13:44		2018/08/24 14:02		2018/08/24 14:21			
COC Number		1of1		1of1		1of1			
	UNITS	SW1	MU	SW2	MU	SW3	MU	RDL	QC Batch
Elements									
Total Aluminum (Al)	mg/L	0.095	+/- 0.021	0.017	+/- 0.0093	0.019	+/- 0.0095	0.0030	9145197
Total Antimony (Sb)	mg/L	<0.00060	N/A	<0.00060	N/A	<0.00060	N/A	0.00060	9145197
Total Arsenic (As)	mg/L	0.0019	+/- 0.00069	0.0013	+/- 0.00065	0.0016	+/- 0.00067	0.00020	9145197
Total Barium (Ba)	mg/L	0.025	+/- <RDL	0.028	+/- <RDL	0.018	+/- <RDL	0.010	9145206
Total Beryllium (Be)	mg/L	<0.0010	N/A	<0.0010	N/A	<0.0010	N/A	0.0010	9145197
Total Boron (B)	mg/L	0.032	+/- <RDL	0.028	+/- <RDL	0.033	+/- <RDL	0.020	9145206
Total Cadmium (Cd)	mg/L	0.000037	+/- <RDL	<0.000020	N/A	<0.000020	N/A	0.000020	9145197
Total Calcium (Ca)	mg/L	84	+/- 8.5	61	+/- 6.2	44	+/- 4.5	0.30	9145206
Total Chromium (Cr)	mg/L	<0.0010	N/A	0.0011	+/- <RDL	<0.0010	N/A	0.0010	9145197
Total Cobalt (Co)	mg/L	0.00055	+/- <RDL	0.00047	+/- <RDL	0.00041	+/- <RDL	0.00030	9145197
Total Copper (Cu)	mg/L	0.0025	+/- 0.00051	0.0023	+/- 0.00050	0.0025	+/- 0.00052	0.00020	9145197
Total Iron (Fe)	mg/L	0.21	+/- <RDL	<0.060	N/A	0.081	+/- <RDL	0.060	9145206
Total Lead (Pb)	mg/L	0.032	+/- 0.0040	0.0056	+/- 0.00070	0.034	+/- 0.0043	0.00020	9145197
Total Lithium (Li)	mg/L	<0.020	N/A	<0.020	N/A	<0.020	N/A	0.020	9145206
Total Magnesium (Mg)	mg/L	22	+/- 1.8	15	+/- 1.2	39	+/- 3.3	0.20	9145206
Total Manganese (Mn)	mg/L	0.059	+/- 0.0060	0.021	+/- <RDL	0.0043	+/- <RDL	0.0040	9145206
Total Molybdenum (Mo)	mg/L	0.00087	+/- 0.00041	0.00053	+/- 0.00041	0.0023	+/- 0.00049	0.00020	9145197
Total Nickel (Ni)	mg/L	0.0040	+/- 0.00061	0.0045	+/- 0.00067	0.0038	+/- 0.00059	0.00050	9145197
Total Phosphorus (P)	mg/L	0.41	+/- <RDL	<0.10	N/A	<0.10	N/A	0.10	9145206
Total Potassium (K)	mg/L	7.1	+/- 0.74	7.2	+/- 0.75	5.1	+/- 0.54	0.30	9145206
Total Selenium (Se)	mg/L	0.00021	+/- <RDL	0.00021	+/- <RDL	0.00033	+/- <RDL	0.00020	9145197
Total Silicon (Si)	mg/L	1.5	+/- 0.16	0.53	+/- <RDL	1.6	+/- 0.17	0.10	9145206
Total Silver (Ag)	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9145197
Total Sodium (Na)	mg/L	4.7	+/- 0.65	2.6	+/- <RDL	4.6	+/- 0.64	0.50	9145206
Total Strontium (Sr)	mg/L	0.23	+/- <RDL	0.22	+/- <RDL	0.21	+/- <RDL	0.020	9145206
Total Sulphur (S)	mg/L	2.5	+/- <RDL	3.8	+/- 0.25	2.7	+/- <RDL	0.20	9145206
Total Thallium (Tl)	mg/L	<0.00020	N/A	<0.00020	N/A	<0.00020	N/A	0.00020	9145197
Total Tin (Sn)	mg/L	<0.0010	N/A	<0.0010	N/A	<0.0010	N/A	0.0010	9145197
Total Titanium (Ti)	mg/L	0.0051	+/- 0.0011	<0.0010	N/A	0.0010	+/- <RDL	0.0010	9145197
Total Uranium (U)	mg/L	0.00096	+/- 0.00012	0.00080	+/- 0.00010	0.00081	+/- 0.00010	0.00010	9145197

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Maxxam Job #: B879078
Report Date: 2018/09/19

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

REGULATED METALS (CCME/AT1) - TOTAL

Maxxam ID		UH8272		UH8273		UH8274			
Sampling Date		2018/08/24 13:44		2018/08/24 14:02		2018/08/24 14:21			
COC Number		1of1		1of1		1of1			
	UNITS	SW1	MU	SW2	MU	SW3	MU	RDL	QC Batch
Total Vanadium (V)	mg/L	<0.0010	N/A	<0.0010	N/A	<0.0010	N/A	0.0010	9145197
Total Zinc (Zn)	mg/L	0.0041	+/- <RDL	<0.0030	N/A	<0.0030	N/A	0.0030	9145197

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Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

REGULATED METALS (CCME/AT1) - TOTAL

Maxxam ID		UH8274		UH8275		UH8276			
Sampling Date		2018/08/24 14:21		2018/08/24 14:46		2018/08/24 15:24			
COC Number		1of1		1of1		1of1			
	UNITS	SW3 Lab-Dup	MU	SW4	MU	SW5	MU	RDL	QC Batch
Elements									
Total Aluminum (Al)	mg/L	0.015	+/- 0.0092	0.027	+/- 0.010	0.018	+/- 0.0094	0.0030	9145197
Total Antimony (Sb)	mg/L	<0.00060	N/A	<0.00060	N/A	<0.00060	N/A	0.00060	9145197
Total Arsenic (As)	mg/L	0.0016	+/- 0.00067	0.00020	+/- 0.00060	<0.00020	N/A	0.00020	9145197
Total Barium (Ba)	mg/L	0.018	+/- <RDL	0.011	+/- <RDL	<0.010	N/A	0.010	9145206
Total Beryllium (Be)	mg/L	<0.0010	N/A	<0.0010	N/A	<0.0010	N/A	0.0010	9145197
Total Boron (B)	mg/L	0.032	+/- <RDL	0.023	+/- <RDL	<0.020	N/A	0.020	9145206
Total Cadmium (Cd)	mg/L	<0.000020	N/A	<0.000020	N/A	<0.000020	N/A	0.000020	9145197
Total Calcium (Ca)	mg/L	43	+/- 4.4	43	+/- 4.4	30	+/- 3.1	0.30	9145206
Total Chromium (Cr)	mg/L	<0.0010	N/A	0.0011	+/- <RDL	<0.0010	N/A	0.0010	9145197
Total Cobalt (Co)	mg/L	0.00038	+/- <RDL	<0.00030	N/A	<0.00030	N/A	0.00030	9145197
Total Copper (Cu)	mg/L	0.0025	+/- 0.00051	0.0012	+/- 0.00043	0.00045	+/- 0.00040	0.00020	9145197
Total Iron (Fe)	mg/L	<0.060	N/A	<0.060	N/A	<0.060	N/A	0.060	9145206
Total Lead (Pb)	mg/L	0.036	+/- 0.0044	0.0049	+/- 0.00061	<0.00020	N/A	0.00020	9145197
Total Lithium (Li)	mg/L	<0.020	N/A	<0.020	N/A	<0.020	N/A	0.020	9145206
Total Magnesium (Mg)	mg/L	39	+/- 3.2	13	+/- 1.1	13	+/- 1.0	0.20	9145206
Total Manganese (Mn)	mg/L	<0.0040	N/A	0.021	+/- <RDL	<0.0040	N/A	0.0040	9145206
Total Molybdenum (Mo)	mg/L	0.0021	+/- 0.00048	0.0015	+/- 0.00044	0.00065	+/- 0.00041	0.00020	9145197
Total Nickel (Ni)	mg/L	0.0037	+/- 0.00057	0.00056	+/- <RDL	<0.00050	N/A	0.00050	9145197
Total Phosphorus (P)	mg/L	<0.10	N/A	<0.10	N/A	<0.10	N/A	0.10	9145206
Total Potassium (K)	mg/L	4.9	+/- 0.53	1.4	+/- <RDL	0.49	+/- <RDL	0.30	9145206
Total Selenium (Se)	mg/L	0.00032	+/- <RDL	<0.00020	N/A	<0.00020	N/A	0.00020	9145197
Total Silicon (Si)	mg/L	1.6	+/- 0.17	0.39	+/- <RDL	0.27	+/- <RDL	0.10	9145206
Total Silver (Ag)	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9145197
Total Sodium (Na)	mg/L	4.5	+/- 0.63	8.1	+/- 0.97	3.0	+/- 0.51	0.50	9145206
Total Strontium (Sr)	mg/L	0.21	+/- <RDL	0.11	+/- <RDL	0.063	+/- <RDL	0.020	9145206
Total Sulphur (S)	mg/L	2.6	+/- <RDL	1.5	+/- <RDL	0.66	+/- <RDL	0.20	9145206
Total Thallium (Tl)	mg/L	<0.00020	N/A	<0.00020	N/A	<0.00020	N/A	0.00020	9145197
Total Tin (Sn)	mg/L	<0.0010	N/A	<0.0010	N/A	<0.0010	N/A	0.0010	9145197
Total Titanium (Ti)	mg/L	<0.0010	N/A	0.0013	+/- <RDL	<0.0010	N/A	0.0010	9145197

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

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Maxxam Job #: B879078
Report Date: 2018/09/19

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

REGULATED METALS (CCME/AT1) - TOTAL

Maxxam ID		UH8274		UH8275		UH8276			
Sampling Date		2018/08/24 14:21		2018/08/24 14:46		2018/08/24 15:24			
COC Number		1of1		1of1		1of1			
	UNITS	SW3 Lab-Dup	MU	SW4	MU	SW5	MU	RDL	QC Batch
Total Uranium (U)	mg/L	0.00072	+/- <RDL	0.00020	+/- <RDL	0.00013	+/- <RDL	0.00010	9145197
Total Vanadium (V)	mg/L	<0.0010	N/A	<0.0010	N/A	<0.0010	N/A	0.0010	9145197
Total Zinc (Zn)	mg/L	<0.0030	N/A	<0.0030	N/A	<0.0030	N/A	0.0030	9145197

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

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STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

REGULATED METALS (CCME/AT1) - TOTAL

Maxxam ID		UH8277		UH8278		UH8279			
Sampling Date		2018/08/24 13:18		2018/08/24 13:31		2018/08/24 13:51			
COC Number		1of1		1of1		1of1			
	UNITS	TB-1	MU	FB-1	MU	SW-DUP18-01	MU	RDL	QC Batch
Elements									
Total Aluminum (Al)	mg/L	0.015	+/- 0.0092	<0.0030	N/A	0.065	+/- 0.016	0.0030	9145197
Total Antimony (Sb)	mg/L	<0.00060	N/A	<0.00060	N/A	<0.00060	N/A	0.00060	9145197
Total Arsenic (As)	mg/L	<0.00020	N/A	<0.00020	N/A	0.0017	+/- 0.00068	0.00020	9145197
Total Barium (Ba)	mg/L	<0.010	N/A	<0.010	N/A	0.023	+/- <RDL	0.010	9145206
Total Beryllium (Be)	mg/L	<0.0010	N/A	<0.0010	N/A	<0.0010	N/A	0.0010	9145197
Total Boron (B)	mg/L	<0.020	N/A	<0.020	N/A	0.029	+/- <RDL	0.020	9145206
Total Cadmium (Cd)	mg/L	<0.000020	N/A	<0.000020	N/A	0.000022	+/- <RDL	0.000020	9145197
Total Calcium (Ca)	mg/L	<0.30	N/A	<0.30	N/A	75	+/- 7.6	0.30	9145206
Total Chromium (Cr)	mg/L	0.0012	+/- <RDL	<0.0010	N/A	0.0011	+/- <RDL	0.0010	9145197
Total Cobalt (Co)	mg/L	<0.00030	N/A	<0.00030	N/A	0.00051	+/- <RDL	0.00030	9145197
Total Copper (Cu)	mg/L	<0.00020	N/A	<0.00020	N/A	0.0025	+/- 0.00051	0.00020	9145197
Total Iron (Fe)	mg/L	<0.060	N/A	<0.060	N/A	0.14	+/- <RDL	0.060	9145206
Total Lead (Pb)	mg/L	<0.00020	N/A	<0.00020	N/A	0.030	+/- 0.0038	0.00020	9145197
Total Lithium (Li)	mg/L	<0.020	N/A	<0.020	N/A	<0.020	N/A	0.020	9145206
Total Magnesium (Mg)	mg/L	<0.20	N/A	<0.20	N/A	20	+/- 1.6	0.20	9145206
Total Manganese (Mn)	mg/L	<0.0040	N/A	<0.0040	N/A	0.049	+/- 0.0052	0.0040	9145206
Total Molybdenum (Mo)	mg/L	0.00028	+/- 0.00040	<0.00020	N/A	0.00075	+/- 0.00041	0.00020	9145197
Total Nickel (Ni)	mg/L	<0.00050	N/A	<0.00050	N/A	0.0042	+/- 0.00063	0.00050	9145197
Total Phosphorus (P)	mg/L	<0.10	N/A	<0.10	N/A	0.23	+/- <RDL	0.10	9145206
Total Potassium (K)	mg/L	<0.30	N/A	<0.30	N/A	7.0	+/- 0.73	0.30	9145206
Total Selenium (Se)	mg/L	<0.00020	N/A	<0.00020	N/A	<0.00020	N/A	0.00020	9145197
Total Silicon (Si)	mg/L	<0.10	N/A	<0.10	N/A	1.4	+/- 0.15	0.10	9145206
Total Silver (Ag)	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9145197
Total Sodium (Na)	mg/L	<0.50	N/A	<0.50	N/A	4.6	+/- 0.64	0.50	9145206
Total Strontium (Sr)	mg/L	<0.020	N/A	<0.020	N/A	0.21	+/- <RDL	0.020	9145206
Total Sulphur (S)	mg/L	<0.20	N/A	<0.20	N/A	2.4	+/- <RDL	0.20	9145206
Total Thallium (Tl)	mg/L	<0.00020	N/A	<0.00020	N/A	<0.00020	N/A	0.00020	9145197
Total Tin (Sn)	mg/L	<0.0010	N/A	<0.0010	N/A	<0.0010	N/A	0.0010	9145197
Total Titanium (Ti)	mg/L	<0.0010	N/A	<0.0010	N/A	0.0036	+/- <RDL	0.0010	9145197
Total Uranium (U)	mg/L	<0.00010	N/A	<0.00010	N/A	0.00073	+/- <RDL	0.00010	9145197

RDL = Reportable Detection Limit
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STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

REGULATED METALS (CCME/AT1) - TOTAL

Maxxam ID		UH8277		UH8278		UH8279			
Sampling Date		2018/08/24 13:18		2018/08/24 13:31		2018/08/24 13:51			
COC Number		1of1		1of1		1of1			
	UNITS	**TB-1**	**MU**	**FB-1**	**MU**	**SW-DUP18-01**	**MU**	**RDL**	**QC Batch**
Total Vanadium (V)	mg/L	<0.0010	N/A	<0.0010	N/A	<0.0010	N/A	0.0010	9145197
Total Zinc (Zn)	mg/L	<0.0030	N/A	<0.0030	N/A	0.0042	+/- <RDL	0.0030	9145197

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

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Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

REGULATED METALS (CCME/AT1) - TOTAL

Maxxam ID		UH8280			
Sampling Date		2018/08/25 11:05			
COC Number		1of1			
	UNITS	MW1	MU	RDL	QC Batch
Elements					
Total Aluminum (Al)	mg/L	5.0	+/- 0.98	0.0030	9145197
Total Antimony (Sb)	mg/L	<0.00060	N/A	0.00060	9145197
Total Arsenic (As)	mg/L	0.0033	+/- 0.00084	0.00020	9145197
Total Barium (Ba)	mg/L	0.061	+/- <RDL	0.010	9145206
Total Beryllium (Be)	mg/L	<0.0010	N/A	0.0010	9145197
Total Boron (B)	mg/L	0.035	+/- <RDL	0.020	9145206
Total Cadmium (Cd)	mg/L	0.00078	+/- 0.000079	0.000020	9145197
Total Calcium (Ca)	mg/L	620 (1)	+/- 63	3.0	9145206
Total Chromium (Cr)	mg/L	0.010	+/- 0.0014	0.0010	9145197
Total Cobalt (Co)	mg/L	0.0050	+/- 0.00057	0.00030	9145197
Total Copper (Cu)	mg/L	0.0085	+/- 0.0012	0.00020	9145197
Total Iron (Fe)	mg/L	7.4	+/- 0.85	0.060	9145206
Total Lead (Pb)	mg/L	0.039	+/- 0.0049	0.00020	9145197
Total Lithium (Li)	mg/L	<0.020	N/A	0.020	9145206
Total Magnesium (Mg)	mg/L	290	+/- 24	0.20	9145206
Total Manganese (Mn)	mg/L	0.62	+/- 0.056	0.0040	9145206
Total Molybdenum (Mo)	mg/L	0.0011	+/- 0.00042	0.00020	9145197
Total Nickel (Ni)	mg/L	0.011	+/- 0.0014	0.00050	9145197
Total Phosphorus (P)	mg/L	0.27	+/- <RDL	0.10	9145206
Total Potassium (K)	mg/L	2.4	+/- <RDL	0.30	9145206
Total Selenium (Se)	mg/L	0.00027	+/- <RDL	0.00020	9145197
Total Silicon (Si)	mg/L	6.8	+/- 0.70	0.10	9145206
Total Silver (Ag)	mg/L	<0.00010	N/A	0.00010	9145197
Total Sodium (Na)	mg/L	3.8	+/- 0.57	0.50	9145206
Total Strontium (Sr)	mg/L	0.33	+/- 0.025	0.020	9145206
Total Sulphur (S)	mg/L	1.1	+/- <RDL	0.20	9145206
Total Thallium (Tl)	mg/L	<0.00020	N/A	0.00020	9145197
Total Tin (Sn)	mg/L	0.0011	+/- <RDL	0.0010	9145197

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

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STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

REGULATED METALS (CCME/AT1) - TOTAL

Maxxam ID		UH8280			
Sampling Date		2018/08/25 11:05			
COC Number		1of1			
	UNITS	**MW1**	**MU**	**RDL**	**QC Batch**
Total Titanium (Ti)	mg/L	0.15	+/- 0.030	0.0010	9145197
Total Uranium (U)	mg/L	0.00078	+/- 0.00010	0.00010	9145197
Total Vanadium (V)	mg/L	0.013	+/- 0.0026	0.0010	9145197
Total Zinc (Zn)	mg/L	0.11	+/- 0.019	0.0030	9145197

RDL = Reportable Detection Limit
MU = Measurement Uncertainty

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STANTEC CONSULTING LTD
Client Project #: 110220180
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Sampler Initials: BS

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		UH8272			UH8273		UH8274			
Sampling Date		2018/08/24 13:44			2018/08/24 14:02		2018/08/24 14:21			
COC Number		1of1			1of1		1of1			
	UNITS	SW1	MU	RDL	SW2	MU	SW3	MU	RDL	QC Batch
Misc. Inorganics										
Total Suspended Solids	mg/L	110	+/- 10	1.0	1.3	+/- <RDL	10	+/- <RDL	1.0	9144834
Nutrients										
Total Ammonia (N)	mg/L	0.28	+/- 0.041	0.015	1.3	+/- 0.12	0.045	+/- 0.031	0.015	9145636
Total Phosphorus (P)	mg/L	1.0 (1)	+/- 0.12	0.015	0.030	+/- 0.0058	0.23	+/- 0.027	0.0030	9147481
Misc. Organics										
Extractable (n-Hex.) Oil and grease	mg/L	<2.0	N/A	2.0	3.0	+/- <RDL	3.0	+/- <RDL	2.0	9148304
Phenols	mg/L	0.014	+/- <RDL	0.0020	0.023	+/- 0.0025	0.021	+/- 0.0023	0.0020	9147341

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam ID		UH8275		UH8276		UH8277		UH8278			
Sampling Date		2018/08/24 14:46		2018/08/24 15:24		2018/08/24 13:18		2018/08/24 13:31			
COC Number		1of1		1of1		1of1		1of1			
	UNITS	SW4	MU	SW5	MU	TB-1	MU	FB-1	MU	RDL	QC Batch
Misc. Inorganics											
Total Suspended Solids	mg/L	2.0	+/- <RDL	16	+/- 1.4	<1.0	N/A	<1.0	N/A	1.0	9144834
Nutrients											
Total Ammonia (N)	mg/L	<0.015	N/A	<0.015	N/A	<0.015	N/A	<0.015	N/A	0.015	9145636
Total Phosphorus (P)	mg/L	0.0073	+/- 0.0039	0.011	+/- 0.0041	<0.0030	N/A	<0.0030	N/A	0.0030	9147481
Misc. Organics											
Extractable (n-Hex.) Oil and grease	mg/L	<2.0	N/A	<2.0	N/A	<2.0	N/A	<2.0	N/A	2.0	9148304
Phenols	mg/L	0.0092	+/- <RDL	<0.0020	N/A	<0.0020	N/A	<0.0020	N/A	0.0020	9147341

RDL = Reportable Detection Limit
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N/A = Not Applicable

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Client Project #: 110220180
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Sampler Initials: BS

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		UH8279			UH8280			
Sampling Date		2018/08/24 13:51			2018/08/25 11:05			
COC Number		1of1			1of1			
	UNITS	SW-DUP18-01	MU	RDL	MW1	MU	RDL	QC Batch
Misc. Inorganics								
Total Suspended Solids	mg/L	150	+/- 13	1.0	4800 (1)	+/- 430	6.0	9144834
Nutrients								
Total Ammonia (N)	mg/L	0.11	+/- 0.033	0.015	0.12	+/- 0.033	0.015	9145636
Total Phosphorus (P)	mg/L	0.24	+/- 0.030	0.0030	0.54 (2)	+/- 0.063	0.0060	9147481
Misc. Organics								
Extractable (n-Hex.) Oil and grease	mg/L	<2.0	N/A	2.0	2.0	+/- <RDL	2.0	9148304
Phenols	mg/L	0.0087	+/- <RDL	0.0020	0.075	+/- 0.0073	0.0020	9147341

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable
(1) Detection limit raised based on sample volume used for analysis.
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.

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SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		UH8272		UH8272		UH8273			
Sampling Date		2018/08/24 13:44		2018/08/24 13:44		2018/08/24 14:02			
COC Number		1of1		1of1		1of1			
	UNITS	SW1	MU	SW1 Lab-Dup	MU	SW2	MU	RDL	QC Batch
Polycyclic Aromatics									
Benzo[a]pyrene equivalency	mg/L	<0.000010	N/A	N/A	N/A	<0.000010	N/A	0.000010	9142787
Acenaphthene	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9144361
Acenaphthylene	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9144361
Acridine	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Anthracene	mg/L	<0.000010	N/A	<0.000010	N/A	<0.000010	N/A	0.000010	9144361
Benzo(a)anthracene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
Benzo(b&j)fluoranthene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
Benzo(k)fluoranthene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085 (1)	N/A	0.0000085	9144361
Benzo(g,h,i)perylene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
Benzo(c)phenanthrene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050 (1)	N/A	0.000050	9144361
Benzo(a)pyrene	mg/L	<0.0000075	N/A	<0.0000075	N/A	<0.0000075	N/A	0.0000075	9144361
Benzo[e]pyrene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Chrysene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085 (1)	N/A	0.0000085	9144361
Dibenz(a,h)anthracene	mg/L	<0.0000075	N/A	<0.0000075	N/A	<0.0000075	N/A	0.0000075	9144361
Fluoranthene	mg/L	<0.000010	N/A	<0.000010	N/A	<0.000010 (1)	N/A	0.000010	9144361
Fluorene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Indeno(1,2,3-cd)pyrene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
1-Methylnaphthalene	mg/L	<0.00010	N/A	<0.00010	N/A	0.00024	N/A	0.00010	9144361
2-Methylnaphthalene	mg/L	<0.00010	N/A	<0.00010	N/A	0.00016	+/- <RDL	0.00010	9144361
Naphthalene	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9144361
Phenanthrene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Perylene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Pyrene	mg/L	<0.000020	N/A	<0.000020	N/A	<0.000020 (1)	N/A	0.000020	9144361
Quinoline	mg/L	<0.00020	N/A	<0.00020	N/A	<0.00020	N/A	0.00020	9144361
Surrogate Recovery (%)									
D10-ANTHRACENE (sur.)	%	139 (2)	N/A	110	N/A	117	N/A	N/A	9144361

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
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N/A = Not Applicable
(1) Matrix spike exceeds acceptance limits due to matrix interference.
(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		UH8272		UH8272		UH8273			
Sampling Date		2018/08/24 13:44		2018/08/24 13:44		2018/08/24 14:02			
COC Number		1of1		1of1		1of1			
	UNITS	SW1	MU	SW1 Lab-Dup	MU	SW2	MU	RDL	QC Batch
D8-ACENAPHTHYLENE (sur.)	%	129	N/A	108	N/A	128	N/A	N/A	9144361
D8-NAPHTHALENE (sur.)	%	127	N/A	105	N/A	118	N/A	N/A	9144361
TERPHENYL-D14 (sur.)	%	128	N/A	121	N/A	145 (1)	N/A	N/A	9144361

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
MU = Measurement Uncertainty
N/A = Not Applicable
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Job #: B879078
Report Date: 2018/09/19

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		UH8274		UH8275		UH8276			
Sampling Date		2018/08/24 14:21		2018/08/24 14:46		2018/08/24 15:24			
COC Number		1of1		1of1		1of1			
	UNITS	SW3	MU	SW4	MU	SW5	MU	RDL	QC Batch
Polycyclic Aromatics									
Benzo[a]pyrene equivalency	mg/L	<0.000010	N/A	<0.000010	N/A	<0.000010	N/A	0.000010	9142787
Acenaphthene	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9144361
Acenaphthylene	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9144361
Acridine	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Anthracene	mg/L	<0.000010	N/A	<0.000010	N/A	<0.000010	N/A	0.000010	9144361
Benzo(a)anthracene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
Benzo(b&j)fluoranthene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
Benzo(k)fluoranthene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
Benzo(g,h,i)perylene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
Benzo(c)phenanthrene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Benzo(a)pyrene	mg/L	<0.0000075	N/A	<0.0000075	N/A	<0.0000075	N/A	0.0000075	9144361
Benzo[e]pyrene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Chrysene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
Dibenz(a,h)anthracene	mg/L	<0.0000075	N/A	<0.0000075	N/A	<0.0000075	N/A	0.0000075	9144361
Fluoranthene	mg/L	<0.000010	N/A	<0.000010	N/A	<0.000010	N/A	0.000010	9144361
Fluorene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Indeno(1,2,3-cd)pyrene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
1-Methylnaphthalene	mg/L	0.00023	N/A	0.00023	N/A	<0.00010	N/A	0.00010	9144361
2-Methylnaphthalene	mg/L	<0.00010	N/A	0.00027	+/- <RDL	<0.00010	N/A	0.00010	9144361
Naphthalene	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9144361
Phenanthrene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Perylene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Pyrene	mg/L	<0.000020	N/A	<0.000020	N/A	<0.000020	N/A	0.000020	9144361
Quinoline	mg/L	<0.00020	N/A	<0.00020	N/A	<0.00020	N/A	0.00020	9144361
Surrogate Recovery (%)									
D10-ANTHRACENE (sur.)	%	101	N/A	125	N/A	121	N/A	N/A	9144361
D8-ACENAPHTHYLENE (sur.)	%	109	N/A	120	N/A	119	N/A	N/A	9144361
D8-NAPHTHALENE (sur.)	%	94	N/A	102	N/A	104	N/A	N/A	9144361
TERPHENYL-D14 (sur.)	%	122	N/A	129	N/A	150 (1)	N/A	N/A	9144361

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

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Maxxam Job #: B879078
Report Date: 2018/09/19

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		UH8277		UH8278		UH8279			
Sampling Date		2018/08/24 13:18		2018/08/24 13:31		2018/08/24 13:51			
COC Number		1of1		1of1		1of1			
	UNITS	TB-1	MU	FB-1	MU	SW-DUP18-01	MU	RDL	QC Batch
Polycyclic Aromatics									
Benzo[a]pyrene equivalency	mg/L	<0.000010	N/A	<0.000010	N/A	<0.000010	N/A	0.000010	9142787
Acenaphthene	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9144361
Acenaphthylene	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9144361
Acridine	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Anthracene	mg/L	<0.000010	N/A	<0.000010	N/A	<0.000010	N/A	0.000010	9144361
Benzo(a)anthracene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
Benzo(b&j)fluoranthene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
Benzo(k)fluoranthene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
Benzo(g,h,i)perylene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
Benzo(c)phenanthrene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Benzo(a)pyrene	mg/L	<0.0000075	N/A	<0.0000075	N/A	<0.0000075	N/A	0.0000075	9144361
Benzo[e]pyrene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Chrysene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
Dibenz(a,h)anthracene	mg/L	<0.0000075	N/A	<0.0000075	N/A	<0.0000075	N/A	0.0000075	9144361
Fluoranthene	mg/L	<0.000010	N/A	<0.000010	N/A	<0.000010	N/A	0.000010	9144361
Fluorene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Indeno(1,2,3-cd)pyrene	mg/L	<0.0000085	N/A	<0.0000085	N/A	<0.0000085	N/A	0.0000085	9144361
1-Methylnaphthalene	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9144361
2-Methylnaphthalene	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9144361
Naphthalene	mg/L	<0.00010	N/A	<0.00010	N/A	<0.00010	N/A	0.00010	9144361
Phenanthrene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Perylene	mg/L	<0.000050	N/A	<0.000050	N/A	<0.000050	N/A	0.000050	9144361
Pyrene	mg/L	<0.000020	N/A	<0.000020	N/A	<0.000020	N/A	0.000020	9144361
Quinoline	mg/L	<0.00020	N/A	<0.00020	N/A	<0.00020	N/A	0.00020	9144361
Surrogate Recovery (%)									
D10-ANTHRACENE (sur.)	%	124	N/A	121	N/A	120	N/A	N/A	9144361
D8-ACENAPHTHYLENE (sur.)	%	133 (1)	N/A	129	N/A	120	N/A	N/A	9144361
D8-NAPHTHALENE (sur.)	%	122	N/A	116	N/A	100	N/A	N/A	9144361

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

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STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		UH8277		UH8278		UH8279			
Sampling Date		2018/08/24 13:18		2018/08/24 13:31		2018/08/24 13:51			
COC Number		1of1		1of1		1of1			
	UNITS	TB-1	MU	FB-1	MU	SW-DUP18-01	MU	RDL	QC Batch
TERPHENYL-D14 (sur.)	%	124	N/A	153 (1)	N/A	160 (1)	N/A	N/A	9144361

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

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SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		UH8280			
Sampling Date		2018/08/25 11:05			
COC Number		1of1			
	UNITS	MW1	MU	RDL	QC Batch
Polycyclic Aromatics					
Benzo[a]pyrene equivalency	mg/L	<0.000010	N/A	0.000010	9142787
Acenaphthene	mg/L	<0.00010	N/A	0.00010	9144361
Acenaphthylene	mg/L	<0.00010	N/A	0.00010	9144361
Acridine	mg/L	<0.000050	N/A	0.000050	9144361
Anthracene	mg/L	<0.000010	N/A	0.000010	9144361
Benzo(a)anthracene	mg/L	<0.0000085	N/A	0.0000085	9144361
Benzo(b&j)fluoranthene	mg/L	<0.0000085	N/A	0.0000085	9144361
Benzo(k)fluoranthene	mg/L	<0.0000085	N/A	0.0000085	9144361
Benzo(g,h,i)perylene	mg/L	<0.0000085	N/A	0.0000085	9144361
Benzo(c)phenanthrene	mg/L	<0.000050	N/A	0.000050	9144361
Benzo(a)pyrene	mg/L	<0.0000075	N/A	0.0000075	9144361
Benzo[e]pyrene	mg/L	<0.000050	N/A	0.000050	9144361
Chrysene	mg/L	<0.0000085	N/A	0.0000085	9144361
Dibenz(a,h)anthracene	mg/L	<0.0000075	N/A	0.0000075	9144361
Fluoranthene	mg/L	<0.000010	N/A	0.000010	9144361
Fluorene	mg/L	<0.000050	N/A	0.000050	9144361
Indeno(1,2,3-cd)pyrene	mg/L	<0.0000085	N/A	0.0000085	9144361
1-Methylnaphthalene	mg/L	0.0036	N/A	0.00010	9144361
2-Methylnaphthalene	mg/L	0.0038	+/- 0.0011	0.00010	9144361
Naphthalene	mg/L	0.020	+/- 0.0058	0.00010	9144361
Phenanthrene	mg/L	<0.000050	N/A	0.000050	9144361
Perylene	mg/L	<0.000050	N/A	0.000050	9144361
Pyrene	mg/L	<0.000020	N/A	0.000020	9144361
Quinoline	mg/L	<0.00020	N/A	0.00020	9144361
Surrogate Recovery (%)					
D10-ANTHRACENE (sur.)	%	98	N/A	N/A	9144361
D8-ACENAPHTHYLENE (sur.)	%	119	N/A	N/A	9144361
D8-NAPHTHALENE (sur.)	%	109	N/A	N/A	9144361
TERPHENYL-D14 (sur.)	%	69	N/A	N/A	9144361

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

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GENERAL COMMENTS

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

Package 1	6.7°C
Package 2	7.7°C
Package 3	7.0°C

Sample UH8272 [SW1] : Sample was analyzed past method specified hold time for CCME Hydrocarbons in Water (F2; C10-C16). Sample was analyzed past method specified hold time for PAH in Water by GC/MS. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Total Suspended Solids (NFR). Sample was analyzed past method specified hold time for NO2 - NO2 + NO3 (N) by CFA. Sample was analyzed past method specified hold time for Alkalinity @25C (pp, total), CO3,HCO3,OH. Sample was analyzed past method specified hold time for BTEX/F1 in Water by HS GC/MS/FID.

Sample UH8273 [SW2] : Sample was analyzed past method specified hold time for CCME Hydrocarbons in Water (F2; C10-C16). Sample was analyzed past method specified hold time for PAH in Water by GC/MS. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Total Suspended Solids (NFR). Sample was analyzed past method specified hold time for NO2 - NO2 + NO3 (N) by CFA. Sample was analyzed past method specified hold time for Alkalinity @25C (pp, total), CO3,HCO3,OH. Sample was analyzed past method specified hold time for BTEX/F1 in Water by HS GC/MS/FID.

Sample UH8274 [SW3] : Sample was analyzed past method specified hold time for CCME Hydrocarbons in Water (F2; C10-C16). Sample was analyzed past method specified hold time for PAH in Water by GC/MS. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Total Suspended Solids (NFR). Sample was analyzed past method specified hold time for NO2 - NO2 + NO3 (N) by CFA. Sample was analyzed past method specified hold time for Alkalinity @25C (pp, total), CO3,HCO3,OH. Sample was analyzed past method specified hold time for BTEX/F1 in Water by HS GC/MS/FID.

Sample UH8275 [SW4] : Sample was analyzed past method specified hold time for CCME Hydrocarbons in Water (F2; C10-C16). Sample was analyzed past method specified hold time for PAH in Water by GC/MS. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Total Suspended Solids (NFR). Sample was analyzed past method specified hold time for NO2 - NO2 + NO3 (N) by CFA. Sample was analyzed past method specified hold time for Alkalinity @25C (pp, total), CO3,HCO3,OH. Sample was analyzed past method specified hold time for BTEX/F1 in Water by HS GC/MS/FID.

Sample UH8276 [SW5] : Sample was analyzed past method specified hold time for CCME Hydrocarbons in Water (F2; C10-C16). Sample was analyzed past method specified hold time for PAH in Water by GC/MS. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Total Suspended Solids (NFR). Sample was analyzed past method specified hold time for NO2 - NO2 + NO3 (N) by CFA. Sample was analyzed past method specified hold time for Alkalinity @25C (pp, total), CO3,HCO3,OH. Sample was analyzed past method specified hold time for BTEX/F1 in Water by HS GC/MS/FID.

Sample UH8277 [TB-1] : Sample was analyzed past method specified hold time for CCME Hydrocarbons in Water (F2; C10-C16). Sample was analyzed past method specified hold time for PAH in Water by GC/MS. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Total Suspended Solids (NFR). Sample was analyzed past method specified hold time for NO2 - NO2 + NO3 (N) by CFA. Sample was analyzed past method specified hold time for Alkalinity @25C (pp, total), CO3,HCO3,OH. Sample was analyzed past method specified hold time for BTEX/F1 in Water by HS GC/MS/FID.

Sample UH8278 [FB-1] : Sample was analyzed past method specified hold time for CCME Hydrocarbons in Water (F2; C10-C16). Sample was analyzed past method specified hold time for PAH in Water by GC/MS. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Total Suspended Solids (NFR). Sample was analyzed past method specified hold time for NO2 - NO2 + NO3 (N) by CFA. Sample was analyzed past method specified hold time for Alkalinity @25C (pp, total), CO3,HCO3,OH. Sample was analyzed past method specified hold time for BTEX/F1 in Water by HS GC/MS/FID.

Sample UH8279 [SW-DUP18-01] : Sample was analyzed past method specified hold time for CCME Hydrocarbons in Water (F2; C10-C16). Sample was analyzed past method specified hold time for PAH in Water by GC/MS. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Total Suspended Solids (NFR). Sample was analyzed past method specified hold time for NO2 - NO2 + NO3 (N) by CFA. Sample was analyzed past method specified hold time for Alkalinity @25C (pp, total), CO3,HCO3,OH. Sample was analyzed past method specified hold time for BTEX/F1 in Water by HS GC/MS/FID.

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Sample UH8280 [MW1] : Sample was analyzed past method specified hold time for CCME Hydrocarbons in Water (F2; C10-C16). Sample was analyzed past method specified hold time for PAH in Water by GC/MS. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Total Suspended Solids (NFR). Sample was analyzed past method specified hold time for NO2 - NO2 + NO3 (N) by CFA. Sample was analyzed past method specified hold time for Alkalinity @25C (pp, total), CO3,HCO3,OH. Sample was analyzed past method specified hold time for BTEX/F1 in Water by HS GC/MS/FID.

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

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9140522	KHO	Matrix Spike	O-TERPHENYL (sur.)	2018/09/13		99	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2018/09/13		102	%	60 - 140
9140522	KHO	Spiked Blank	O-TERPHENYL (sur.)	2018/09/13		98	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2018/09/13		101	%	60 - 140
9140522	KHO	Method Blank	O-TERPHENYL (sur.)	2018/09/13		100	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2018/09/13	<0.10		mg/L	
9140522	KHO	RPD	F2 (C10-C16 Hydrocarbons)	2018/09/13	NC		%	30
9144361	DR5	Matrix Spike [UH8273-05]	D10-ANTHRACENE (sur.)	2018/09/17		144 (1)	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2018/09/17		136 (1)	%	50 - 130
			D8-NAPHTHALENE (sur.)	2018/09/17		113	%	50 - 130
			TERPHENYL-D14 (sur.)	2018/09/17		161 (1)	%	50 - 130
			Acenaphthene	2018/09/17		123	%	50 - 130
			Acenaphthylene	2018/09/17		128	%	50 - 130
			Acridine	2018/09/17		130	%	50 - 130
			Anthracene	2018/09/17		120	%	50 - 130
			Benzo(a)anthracene	2018/09/17		119	%	50 - 130
			Benzo(b&j)fluoranthene	2018/09/17		108	%	50 - 130
			Benzo(k)fluoranthene	2018/09/17		142 (1)	%	50 - 130
			Benzo(g,h,i)perylene	2018/09/17		114	%	50 - 130
			Benzo(c)phenanthrene	2018/09/17		135 (1)	%	50 - 130
			Benzo(a)pyrene	2018/09/17		117	%	50 - 130
			Benzo[e]pyrene	2018/09/17		114	%	50 - 130
			Chrysene	2018/09/17		133 (1)	%	50 - 130
			Dibenz(a,h)anthracene	2018/09/17		124	%	50 - 130
			Fluoranthene	2018/09/17		144 (1)	%	50 - 130
			Fluorene	2018/09/17		127	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2018/09/17		105	%	50 - 130
			1-Methylnaphthalene	2018/09/17		112	%	50 - 130
			2-Methylnaphthalene	2018/09/17		123	%	50 - 130
			Naphthalene	2018/09/17		120	%	50 - 130
			Phenanthrene	2018/09/17		119	%	50 - 130
			Perylene	2018/09/17		104	%	50 - 130
			Pyrene	2018/09/17		140 (1)	%	50 - 130
			Quinoline	2018/09/17		95	%	50 - 130
9144361	DR5	Spiked Blank	D10-ANTHRACENE (sur.)	2018/09/17		110	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2018/09/17		100	%	50 - 130
			D8-NAPHTHALENE (sur.)	2018/09/17		85	%	50 - 130
			TERPHENYL-D14 (sur.)	2018/09/17		117	%	50 - 130
			Acenaphthene	2018/09/17		88	%	50 - 130
			Acenaphthylene	2018/09/17		93	%	50 - 130
			Acridine	2018/09/17		93	%	50 - 130
			Anthracene	2018/09/17		88	%	50 - 130
			Benzo(a)anthracene	2018/09/17		88	%	50 - 130
			Benzo(b&j)fluoranthene	2018/09/17		79	%	50 - 130
			Benzo(k)fluoranthene	2018/09/17		100	%	50 - 130
			Benzo(g,h,i)perylene	2018/09/17		87	%	50 - 130
			Benzo(c)phenanthrene	2018/09/17		95	%	50 - 130
			Benzo(a)pyrene	2018/09/17		85	%	50 - 130
			Benzo[e]pyrene	2018/09/17		84	%	50 - 130
			Chrysene	2018/09/17		93	%	50 - 130
			Dibenz(a,h)anthracene	2018/09/17		96	%	50 - 130
			Fluoranthene	2018/09/17		113	%	50 - 130

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Fluorene	2018/09/17		94	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2018/09/17		82	%	50 - 130
			1-Methylnaphthalene	2018/09/17		82	%	50 - 130
			2-Methylnaphthalene	2018/09/17		85	%	50 - 130
			Naphthalene	2018/09/17		85	%	50 - 130
			Phenanthrene	2018/09/17		83	%	50 - 130
			Perylene	2018/09/17		77	%	50 - 130
			Pyrene	2018/09/17		111	%	50 - 130
			Quinoline	2018/09/17		99	%	50 - 130
9144361	DR5	Method Blank	D10-ANTHRACENE (sur.)	2018/09/17		112	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2018/09/17		98	%	50 - 130
			D8-NAPHTHALENE (sur.)	2018/09/17		87	%	50 - 130
			TERPHENYL-D14 (sur.)	2018/09/17		119	%	50 - 130
			Acenaphthene	2018/09/17	<0.00010		mg/L	
			Acenaphthylene	2018/09/17	<0.00010		mg/L	
			Acridine	2018/09/17	<0.000050		mg/L	
			Anthracene	2018/09/17	<0.000010		mg/L	
			Benzo(a)anthracene	2018/09/17	<0.0000085		mg/L	
			Benzo(b&j)fluoranthene	2018/09/17	<0.0000085		mg/L	
			Benzo(k)fluoranthene	2018/09/17	<0.0000085		mg/L	
			Benzo(g,h,i)perylene	2018/09/17	<0.0000085		mg/L	
			Benzo(c)phenanthrene	2018/09/17	<0.000050		mg/L	
			Benzo(a)pyrene	2018/09/17	<0.0000075		mg/L	
			Benzo[e]pyrene	2018/09/17	<0.000050		mg/L	
			Chrysene	2018/09/17	<0.0000085		mg/L	
			Dibenz(a,h)anthracene	2018/09/17	<0.0000075		mg/L	
			Fluoranthene	2018/09/17	<0.000010		mg/L	
			Fluorene	2018/09/17	<0.000050		mg/L	
			Indeno(1,2,3-cd)pyrene	2018/09/17	<0.0000085		mg/L	
			1-Methylnaphthalene	2018/09/17	<0.00010		mg/L	
			2-Methylnaphthalene	2018/09/17	<0.00010		mg/L	
			Naphthalene	2018/09/17	<0.00010		mg/L	
			Phenanthrene	2018/09/17	<0.000050		mg/L	
			Perylene	2018/09/17	<0.000050		mg/L	
			Pyrene	2018/09/17	<0.000020		mg/L	
			Quinoline	2018/09/17	<0.00020		mg/L	
9144361	DR5	RPD [UH8272-05]	Acenaphthene	2018/09/17	NC		%	30
			Acenaphthylene	2018/09/17	NC		%	30
			Acridine	2018/09/17	NC		%	30
			Anthracene	2018/09/17	NC		%	30
			Benzo(a)anthracene	2018/09/17	NC		%	30
			Benzo(b&j)fluoranthene	2018/09/17	NC		%	30
			Benzo(k)fluoranthene	2018/09/17	NC		%	30
			Benzo(g,h,i)perylene	2018/09/17	NC		%	30
			Benzo(c)phenanthrene	2018/09/17	NC		%	30
			Benzo(a)pyrene	2018/09/17	NC		%	30
			Benzo[e]pyrene	2018/09/17	NC		%	30
			Chrysene	2018/09/17	NC		%	30
			Dibenz(a,h)anthracene	2018/09/17	NC		%	30
			Fluoranthene	2018/09/17	NC		%	30
			Fluorene	2018/09/17	NC		%	30
			Indeno(1,2,3-cd)pyrene	2018/09/17	NC		%	30

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			1-Methylnaphthalene	2018/09/17	NC		%	30
			2-Methylnaphthalene	2018/09/17	NC		%	30
			Naphthalene	2018/09/17	NC		%	30
			Phenanthrene	2018/09/17	NC		%	30
			Perylene	2018/09/17	NC		%	30
			Pyrene	2018/09/17	NC		%	30
			Quinoline	2018/09/17	NC		%	30
9144370	DUO	Matrix Spike [UH8274-09]	1,4-Difluorobenzene (sur.)	2018/09/15		102	%	50 - 140
			4-Bromofluorobenzene (sur.)	2018/09/15		111	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2018/09/15		121	%	50 - 140
			Benzene	2018/09/15		91	%	50 - 140
			Toluene	2018/09/15		89	%	50 - 140
			Ethylbenzene	2018/09/15		80	%	50 - 140
			m & p-Xylene	2018/09/15		80	%	50 - 140
			o-Xylene	2018/09/15		84	%	50 - 140
			F1 (C6-C10)	2018/09/15		83	%	60 - 140
9144370	DUO	Spiked Blank	1,4-Difluorobenzene (sur.)	2018/09/15		104	%	50 - 140
			4-Bromofluorobenzene (sur.)	2018/09/15		94	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2018/09/15		115	%	50 - 140
			Benzene	2018/09/15		92	%	60 - 130
			Toluene	2018/09/15		90	%	60 - 130
			Ethylbenzene	2018/09/15		80	%	60 - 130
			m & p-Xylene	2018/09/15		81	%	60 - 130
			o-Xylene	2018/09/15		84	%	60 - 130
			F1 (C6-C10)	2018/09/15		97	%	60 - 140
9144370	DUO	Method Blank	1,4-Difluorobenzene (sur.)	2018/09/15		113	%	50 - 140
			4-Bromofluorobenzene (sur.)	2018/09/15		95	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2018/09/15		119	%	50 - 140
			Benzene	2018/09/15	<0.00040		mg/L	
			Toluene	2018/09/15	<0.00040		mg/L	
			Ethylbenzene	2018/09/15	<0.00040		mg/L	
			m & p-Xylene	2018/09/15	<0.00080		mg/L	
			o-Xylene	2018/09/15	<0.00040		mg/L	
			F1 (C6-C10)	2018/09/15	<0.10		mg/L	
9144370	DUO	RPD [UH8273-09]	Benzene	2018/09/15	NC		%	30
			Toluene	2018/09/15	NC		%	30
			Ethylbenzene	2018/09/15	7.7		%	30
			m & p-Xylene	2018/09/15	NC		%	30
			o-Xylene	2018/09/15	NC		%	30
			F1 (C6-C10)	2018/09/15	NC		%	30
9144571	ACY	Matrix Spike	Dissolved Calcium (Ca)	2018/09/15		93	%	80 - 120
			Dissolved Iron (Fe)	2018/09/15		98	%	80 - 120
			Dissolved Magnesium (Mg)	2018/09/15		100	%	80 - 120
			Dissolved Manganese (Mn)	2018/09/15		99	%	80 - 120
			Dissolved Potassium (K)	2018/09/15		103	%	80 - 120
			Dissolved Sodium (Na)	2018/09/15		96	%	80 - 120
9144571	ACY	Spiked Blank	Dissolved Calcium (Ca)	2018/09/15		96	%	80 - 120
			Dissolved Iron (Fe)	2018/09/15		98	%	80 - 120
			Dissolved Magnesium (Mg)	2018/09/15		99	%	80 - 120
			Dissolved Manganese (Mn)	2018/09/15		98	%	80 - 120
			Dissolved Potassium (K)	2018/09/15		103	%	80 - 120
			Dissolved Sodium (Na)	2018/09/15		104	%	80 - 120

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9144571	ACY	Method Blank	Dissolved Calcium (Ca)	2018/09/15	<0.30		mg/L	
			Dissolved Iron (Fe)	2018/09/15	<0.060		mg/L	
			Dissolved Magnesium (Mg)	2018/09/15	<0.20		mg/L	
			Dissolved Manganese (Mn)	2018/09/15	<0.0040		mg/L	
			Dissolved Potassium (K)	2018/09/15	<0.30		mg/L	
			Dissolved Sodium (Na)	2018/09/15	<0.50		mg/L	
9144571	ACY	RPD	Dissolved Calcium (Ca)	2018/09/15	0.67		%	20
			Dissolved Iron (Fe)	2018/09/15	NC		%	20
			Dissolved Magnesium (Mg)	2018/09/15	0.90		%	20
			Dissolved Manganese (Mn)	2018/09/15	0.43		%	20
			Dissolved Potassium (K)	2018/09/15	0.43		%	20
			Dissolved Sodium (Na)	2018/09/15	0.16		%	20
9144700	KPG	Spiked Blank	pH	2018/09/15		100	%	97 - 103
9144700	KPG	RPD	pH	2018/09/15	0.061		%	N/A
9144701	CH7	Matrix Spike	Dissolved Chloride (Cl)	2018/09/15		109	%	80 - 120
9144701	CH7	Spiked Blank	Dissolved Chloride (Cl)	2018/09/15		106	%	80 - 120
9144701	CH7	Method Blank	Dissolved Chloride (Cl)	2018/09/15	<1.0		mg/L	
9144701	CH7	RPD	Dissolved Chloride (Cl)	2018/09/15	NC		%	20
9144702	KPG	Spiked Blank	Alkalinity (Total as CaCO3)	2018/09/15		101	%	80 - 120
9144702	KPG	Method Blank	Alkalinity (PP as CaCO3)	2018/09/15	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2018/09/15	<1.0		mg/L	
			Bicarbonate (HCO3)	2018/09/15	<1.0		mg/L	
			Carbonate (CO3)	2018/09/15	<1.0		mg/L	
			Hydroxide (OH)	2018/09/15	<1.0		mg/L	
9144702	KPG	RPD	Alkalinity (PP as CaCO3)	2018/09/15	NC		%	20
			Alkalinity (Total as CaCO3)	2018/09/15	0.17		%	20
			Bicarbonate (HCO3)	2018/09/15	0.17		%	20
			Carbonate (CO3)	2018/09/15	NC		%	20
			Hydroxide (OH)	2018/09/15	NC		%	20
9144703	KPG	Spiked Blank	Conductivity	2018/09/15		100	%	90 - 110
9144703	KPG	Method Blank	Conductivity	2018/09/15	<2.0		uS/cm	
9144703	KPG	RPD	Conductivity	2018/09/15	0.49		%	10
9144704	CH7	Matrix Spike	Dissolved Sulphate (SO4)	2018/09/15		113	%	80 - 120
9144704	CH7	Spiked Blank	Dissolved Sulphate (SO4)	2018/09/15		99	%	80 - 120
9144704	CH7	Method Blank	Dissolved Sulphate (SO4)	2018/09/15	<1.0		mg/L	
9144704	CH7	RPD	Dissolved Sulphate (SO4)	2018/09/15	5.4		%	20
9144834	LCA	Matrix Spike	Total Suspended Solids	2018/09/17		95	%	80 - 120
9144834	LCA	Spiked Blank	Total Suspended Solids	2018/09/17		93	%	80 - 120
9144834	LCA	Method Blank	Total Suspended Solids	2018/09/17	<1.0		mg/L	
9144834	LCA	RPD	Total Suspended Solids	2018/09/17	NC		%	20
9145082	AF6	Matrix Spike	Dissolved Nitrite (N)	2018/09/16		105	%	80 - 120
			Dissolved Nitrate plus Nitrite (N)	2018/09/16		97	%	80 - 120
9145082	AF6	Spiked Blank	Dissolved Nitrite (N)	2018/09/16		102	%	80 - 120
			Dissolved Nitrate plus Nitrite (N)	2018/09/16		97	%	80 - 120
9145082	AF6	Method Blank	Dissolved Nitrite (N)	2018/09/16	<0.010		mg/L	
			Dissolved Nitrate plus Nitrite (N)	2018/09/16	<0.020		mg/L	
9145082	AF6	RPD	Dissolved Nitrite (N)	2018/09/16	NC		%	20
			Dissolved Nitrate plus Nitrite (N)	2018/09/16	0.83		%	20
9145197	APY	Matrix Spike [UH8272-07]	Total Aluminum (Al)	2018/09/16		98	%	80 - 120
			Total Antimony (Sb)	2018/09/16		102	%	80 - 120
			Total Arsenic (As)	2018/09/16		95	%	80 - 120
			Total Beryllium (Be)	2018/09/16		96	%	80 - 120

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			Total Cadmium (Cd)	2018/09/16		97	%	80 - 120
			Total Chromium (Cr)	2018/09/16		97	%	80 - 120
			Total Cobalt (Co)	2018/09/16		96	%	80 - 120
			Total Copper (Cu)	2018/09/16		94	%	80 - 120
			Total Lead (Pb)	2018/09/16		94	%	80 - 120
			Total Molybdenum (Mo)	2018/09/16		101	%	80 - 120
			Total Nickel (Ni)	2018/09/16		94	%	80 - 120
			Total Selenium (Se)	2018/09/16		98	%	80 - 120
			Total Silver (Ag)	2018/09/16		95	%	80 - 120
			Total Thallium (Tl)	2018/09/16		94	%	80 - 120
			Total Tin (Sn)	2018/09/16		100	%	80 - 120
			Total Titanium (Ti)	2018/09/16		100	%	80 - 120
			Total Uranium (U)	2018/09/16		96	%	80 - 120
			Total Vanadium (V)	2018/09/16		99	%	80 - 120
			Total Zinc (Zn)	2018/09/16		95	%	80 - 120
9145197	APY	Spiked Blank	Total Aluminum (Al)	2018/09/17		101	%	80 - 120
			Total Antimony (Sb)	2018/09/17		102	%	80 - 120
			Total Arsenic (As)	2018/09/17		98	%	80 - 120
			Total Beryllium (Be)	2018/09/17		97	%	80 - 120
			Total Cadmium (Cd)	2018/09/17		97	%	80 - 120
			Total Chromium (Cr)	2018/09/17		99	%	80 - 120
			Total Cobalt (Co)	2018/09/17		99	%	80 - 120
			Total Copper (Cu)	2018/09/17		97	%	80 - 120
			Total Lead (Pb)	2018/09/17		99	%	80 - 120
			Total Molybdenum (Mo)	2018/09/17		100	%	80 - 120
			Total Nickel (Ni)	2018/09/17		96	%	80 - 120
			Total Selenium (Se)	2018/09/17		95	%	80 - 120
			Total Silver (Ag)	2018/09/17		98	%	80 - 120
			Total Thallium (Tl)	2018/09/17		99	%	80 - 120
			Total Tin (Sn)	2018/09/17		101	%	80 - 120
			Total Titanium (Ti)	2018/09/17		99	%	80 - 120
			Total Uranium (U)	2018/09/17		97	%	80 - 120
			Total Vanadium (V)	2018/09/17		100	%	80 - 120
			Total Zinc (Zn)	2018/09/17		96	%	80 - 120
9145197	APY	Method Blank	Total Aluminum (Al)	2018/09/16	<0.0030		mg/L	
			Total Antimony (Sb)	2018/09/16	<0.00060		mg/L	
			Total Arsenic (As)	2018/09/16	<0.00020		mg/L	
			Total Beryllium (Be)	2018/09/16	<0.0010		mg/L	
			Total Cadmium (Cd)	2018/09/16	<0.000020		mg/L	
			Total Chromium (Cr)	2018/09/16	<0.0010		mg/L	
			Total Cobalt (Co)	2018/09/16	<0.00030		mg/L	
			Total Copper (Cu)	2018/09/16	<0.00020		mg/L	
			Total Lead (Pb)	2018/09/16	<0.00020		mg/L	
			Total Molybdenum (Mo)	2018/09/16	<0.00020		mg/L	
			Total Nickel (Ni)	2018/09/16	<0.00050		mg/L	
			Total Selenium (Se)	2018/09/16	<0.00020		mg/L	
			Total Silver (Ag)	2018/09/16	<0.00010		mg/L	
			Total Thallium (Tl)	2018/09/16	<0.00020		mg/L	
			Total Tin (Sn)	2018/09/16	<0.0010		mg/L	
			Total Titanium (Ti)	2018/09/16	<0.0010		mg/L	
			Total Uranium (U)	2018/09/16	<0.00010		mg/L	
			Total Vanadium (V)	2018/09/16	<0.0010		mg/L	

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			Total Zinc (Zn)	2018/09/16	<0.0030		mg/L	
9145197	APY	RPD [UH8274-07]	Total Aluminum (Al)	2018/09/16	NC		%	20
			Total Antimony (Sb)	2018/09/16	NC		%	20
			Total Arsenic (As)	2018/09/16	0.12		%	20
			Total Beryllium (Be)	2018/09/16	NC		%	20
			Total Cadmium (Cd)	2018/09/16	NC		%	20
			Total Chromium (Cr)	2018/09/16	NC		%	20
			Total Cobalt (Co)	2018/09/16	7.3		%	20
			Total Copper (Cu)	2018/09/16	3.0		%	20
			Total Lead (Pb)	2018/09/16	4.1		%	20
			Total Molybdenum (Mo)	2018/09/16	9.3		%	20
			Total Nickel (Ni)	2018/09/16	4.0		%	20
			Total Selenium (Se)	2018/09/16	4.9		%	20
			Total Silver (Ag)	2018/09/16	NC		%	20
			Total Thallium (Tl)	2018/09/16	NC		%	20
			Total Tin (Sn)	2018/09/16	NC		%	20
			Total Titanium (Ti)	2018/09/16	1.9		%	20
			Total Uranium (U)	2018/09/16	12		%	20
			Total Vanadium (V)	2018/09/16	NC		%	20
			Total Zinc (Zn)	2018/09/16	NC		%	20
9145206	BAH	Matrix Spike [UH8273-07]	Total Barium (Ba)	2018/09/17		94	%	80 - 120
			Total Boron (B)	2018/09/17		101	%	80 - 120
			Total Calcium (Ca)	2018/09/17		NC	%	80 - 120
			Total Iron (Fe)	2018/09/17		95	%	80 - 120
			Total Lithium (Li)	2018/09/17		98	%	80 - 120
			Total Magnesium (Mg)	2018/09/17		95	%	80 - 120
			Total Manganese (Mn)	2018/09/17		94	%	80 - 120
			Total Phosphorus (P)	2018/09/17		94	%	80 - 120
			Total Potassium (K)	2018/09/17		95	%	80 - 120
			Total Silicon (Si)	2018/09/17		94	%	80 - 120
			Total Sodium (Na)	2018/09/17		96	%	80 - 120
			Total Strontium (Sr)	2018/09/17		95	%	80 - 120
9145206	BAH	Spiked Blank	Total Barium (Ba)	2018/09/17		95	%	80 - 120
			Total Boron (B)	2018/09/17		96	%	80 - 120
			Total Calcium (Ca)	2018/09/17		93	%	80 - 120
			Total Iron (Fe)	2018/09/17		96	%	80 - 120
			Total Lithium (Li)	2018/09/17		96	%	80 - 120
			Total Magnesium (Mg)	2018/09/17		96	%	80 - 120
			Total Manganese (Mn)	2018/09/17		95	%	80 - 120
			Total Phosphorus (P)	2018/09/17		93	%	80 - 120
			Total Potassium (K)	2018/09/17		95	%	80 - 120
			Total Silicon (Si)	2018/09/17		95	%	80 - 120
			Total Sodium (Na)	2018/09/17		94	%	80 - 120
			Total Strontium (Sr)	2018/09/17		95	%	80 - 120
9145206	BAH	Method Blank	Total Barium (Ba)	2018/09/17	<0.010		mg/L	
			Total Boron (B)	2018/09/17	<0.020		mg/L	
			Total Calcium (Ca)	2018/09/17	<0.30		mg/L	
			Total Iron (Fe)	2018/09/17	<0.060		mg/L	
			Total Lithium (Li)	2018/09/17	<0.020		mg/L	
			Total Magnesium (Mg)	2018/09/17	<0.20		mg/L	
			Total Manganese (Mn)	2018/09/17	<0.0040		mg/L	
			Total Phosphorus (P)	2018/09/17	<0.10		mg/L	

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Maxxam Job #: B879078
Report Date: 2018/09/19

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Potassium (K)	2018/09/17	<0.30		mg/L	
			Total Silicon (Si)	2018/09/17	<0.10		mg/L	
			Total Sodium (Na)	2018/09/17	<0.50		mg/L	
			Total Strontium (Sr)	2018/09/17	<0.020		mg/L	
			Total Sulphur (S)	2018/09/17	<0.20		mg/L	
9145206	BAH	RPD [UH8274-07]	Total Barium (Ba)	2018/09/17	1.3		%	20
			Total Boron (B)	2018/09/17	4.8		%	20
			Total Calcium (Ca)	2018/09/17	1.6		%	20
			Total Iron (Fe)	2018/09/17	NC		%	20
			Total Lithium (Li)	2018/09/17	NC		%	20
			Total Magnesium (Mg)	2018/09/17	1.6		%	20
			Total Manganese (Mn)	2018/09/17	6.2		%	20
			Total Phosphorus (P)	2018/09/17	NC		%	20
			Total Potassium (K)	2018/09/17	2.8		%	20
			Total Silicon (Si)	2018/09/17	2.4		%	20
			Total Sodium (Na)	2018/09/17	2.5		%	20
			Total Strontium (Sr)	2018/09/17	1.6		%	20
			Total Sulphur (S)	2018/09/17	2.7		%	20
9145636	AL2	Matrix Spike	Total Ammonia (N)	2018/09/17		110	%	80 - 120
9145636	AL2	Spiked Blank	Total Ammonia (N)	2018/09/17		109	%	80 - 120
9145636	AL2	Method Blank	Total Ammonia (N)	2018/09/17	<0.015		mg/L	
9145636	AL2	RPD	Total Ammonia (N)	2018/09/17	NC		%	20
9147341	AF6	Matrix Spike	Phenols	2018/09/18		88	%	80 - 120
9147341	AF6	Spiked Blank	Phenols	2018/09/18		96	%	80 - 120
9147341	AF6	Method Blank	Phenols	2018/09/18	<0.0020		mg/L	
9147341	AF6	RPD	Phenols	2018/09/18	14		%	20
9147481	AL2	Matrix Spike	Total Phosphorus (P)	2018/09/19		99	%	80 - 120
9147481	AL2	QC Standard	Total Phosphorus (P)	2018/09/19		98	%	80 - 120
9147481	AL2	Spiked Blank	Total Phosphorus (P)	2018/09/19		102	%	80 - 120
9147481	AL2	Method Blank	Total Phosphorus (P)	2018/09/19	<0.0030		mg/L	
9147481	AL2	RPD	Total Phosphorus (P)	2018/09/19	4.3		%	20
9148304	KSX	Spiked Blank	Extractable (n-Hex.) Oil and grease	2018/09/19		90	%	70 - 130
9148304	KSX	Method Blank	Extractable (n-Hex.) Oil and grease	2018/09/19	<2.0		mg/L	
9148841	MA4	Spiked Blank	Alkalinity (Total as CaCO3)	2018/09/19		101	%	80 - 120
9148841	MA4	Method Blank	Alkalinity (PP as CaCO3)	2018/09/19	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2018/09/19	<1.0		mg/L	
			Bicarbonate (HCO3)	2018/09/19	<1.0		mg/L	
			Carbonate (CO3)	2018/09/19	<1.0		mg/L	
			Hydroxide (OH)	2018/09/19	<1.0		mg/L	
9148841	MA4	RPD	Alkalinity (PP as CaCO3)	2018/09/19	NC		%	20
			Alkalinity (Total as CaCO3)	2018/09/19	0.20		%	20
			Bicarbonate (HCO3)	2018/09/19	0.20		%	20
			Carbonate (CO3)	2018/09/19	NC		%	20

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Maxxam Job #: B879078
Report Date: 2018/09/19

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Hydroxide (OH)	2018/09/19	NC		%	20

N/A = Not Applicable

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

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

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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

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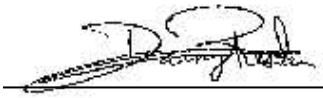
Maxxam Job #: B879078
Report Date: 2018/09/19

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NV
Sampler Initials: BS

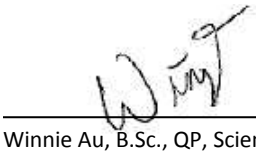
VALIDATION SIGNATURE PAGE

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



Daniel Reslan, cCT, QP, Organics Manager

Justin Geisel, B.Sc., Organics Supervisor



Winnie Au, B.Sc., QP, Scientific Specialist

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

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COR FCD-00265 / 4
Page 1 of 1

Maxxam
A Bureau Veritas Group Company

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

Page	CHAIN OF CUSTODY #
Page 1 of 1	—
Page ___ of ___	
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COOLER OBSERVATIONS:

MAXXAM JOB#: B879078

CUSTODY SEAL	YES	NO	COOLER ID	TEMP 1	TEMP 2	TEMP 3
PRESENT	✓			1	-1	4
INTACT	✓					
ICE PRESENT	✓					
PRESENT	✓			-1	0	0
INTACT	✓					
ICE PRESENT	✓					
PRESENT	—			-2	0	-2
INTACT	✓					
ICE PRESENT	—					
PRESENT						
INTACT						
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ICE PRESENT						

CUSTODY SEAL	YES	NO	COOLER ID	TEMP 1	TEMP 2	TEMP 3
PRESENT						
INTACT						
ICE PRESENT						
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ICE PRESENT						
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RECEIVED BY (SIGN & PRINT)		DATE (YYYY/MM/DD)	TIME (HH:MM)
[signature]	Jenna Walter	20180914	0939

Maxxam
A Bureau Veritas Group Company

Calgary: 4000 19th St. NE, T2E 6P8. Toll Free (800) 386-7247
Edmonton: 9331-48 St. T6B 2R4. Toll Free (800) 386-7247
maxxam.ca

CHAIN OF CUSTODY RECORD

Invoice Information

Company: Stantec
Contact Name: Lindsay Van NoortWyk
Address: 10160 112 St NW
Edmonton, AB T5K 2L6
Phone: 780-232-1114
Email: brad.suley@stantec.com
Copies: lindsay.van[illegible]Noortwyk@stantec.com

Report Information (if differs from invoice)

Company:
Contact Name:
Address:
Phone:
Email:
Copies:

Project Information

Quotation #: Per Quote
P.O. #/ AFE#:
Project #: 110220180
Site Location: Resolute Bay, NU
Site #:
Sampled By: Brad Suley

Turnaround Time (TAT) Required

[X] 5 - 7 Days Regular (Most analyses)

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Rush TAT (Surcharges will be applied)

[ ] Same Day [ ] 2 Days
[ ] 1 Day [ ] 3-4 Days

Date Required:
Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present	\		Temp	7	7	6
Seal Intact	\					
Cooling Media	\					
Seal Present	\		Temp	8	7	8
Seal Intact	\					
Cooling Media	\					
Seal Present	\		Temp	6	7	8
Seal Intact	\					
Cooling Media	\					

Depot Reception

Analysis Requested

#	Sample Identification	Depth (Unit)	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	# of containers	BTEX F1 / VOC	BTEX F1-F2 (CCME)	BTEX F1-F4	Routine Water	Regulated Metals (Tot [X] Diss)	Mercury (Total / Dissolved)	Salinity 4	Sieve (75 micron)	Texture (% Sand, Silt, Clay)	Basic Class II Landfill	PAHs	TSS	TOG	Total Phenolics	Nitrogen, Ammonia	Total Phosphorous					HOLD - DO NOT ANALYZE
1	SW1	–	2018/08/24	13:44	W	13		X		X	X						X	X	X	X	X	X					
2	SW2	–	↓	14:02		13		X		X	X						X	X	X	X	X	X					
3	SW3	–		14:21		13		X		X	X						X	X	X	X	X	X					
4	SW4	–		14:46		13		X		X	X						X	X	X	X	X	X					
5	SW5	–		15:24		13		X		X	X						X	X	X	X	X	X					
6	TB-1	–		13:18		12		X		X	X						X	X	X	X	X	X					
7	FB-1	–		13:31		13		X		X	X						X	X	X	X	X	X					
8	SW-DUP18-01	–	↓	13:51	↓	13		X		X	X						X	X	X	X	X	X					
9	~~MW1 NP~~	–	~~2018/08/24~~	~~17:44~~	~~W~~	~~13~~																					~~X~~
10	MW1	–	2018/08/25	11:05	W	13		X		X	X						X	X	X	X	X						

Regulatory Criteria

[ ] AT1
[X] CCME
[ ] Drinking Water
[ ] D50 (Drilling Waste)
[ ] Saskatchewan
[X] Other: NU

Special Instructions

TB-1 is limited sample due to bottles breaking in the shipment up. Please proceed with analysis

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

Relinquished by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)	Received by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)	Maxxam Job #
Brad Suley	2018/08/25	11:15	Serge Léger	2018/09/10	16:00	
			[illegible]	2018/09/11	08:00	

RECEIVED IN OTTAWA

Rec'd MED2 Jenna Walter
20180914 0939
See ACTR

6/5/5
6/8/6
5/4/5

10-Sep-18 16:00
Cristina (Maria) Bacchus
B8N5771
KVG ENV-1177

B879078 ct MED2

AB FCD-00331/7

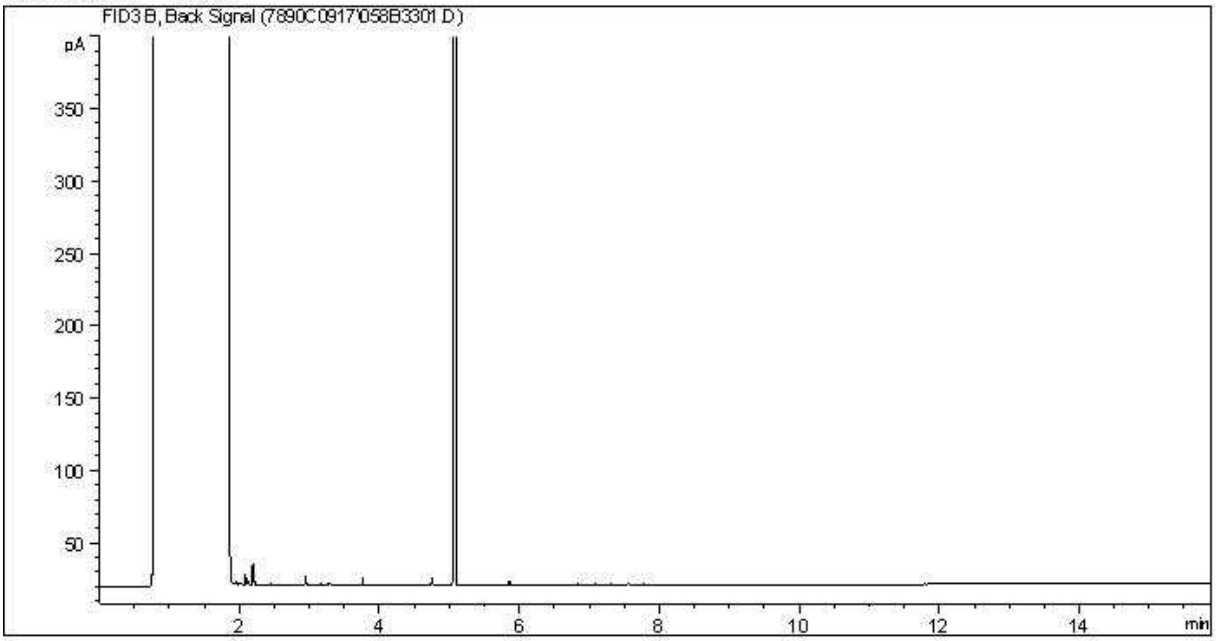
AB FCD-00331/7

Maxxam Job #: B879078
Report Date: 2018/09/19
Maxxam Sample: UH8272

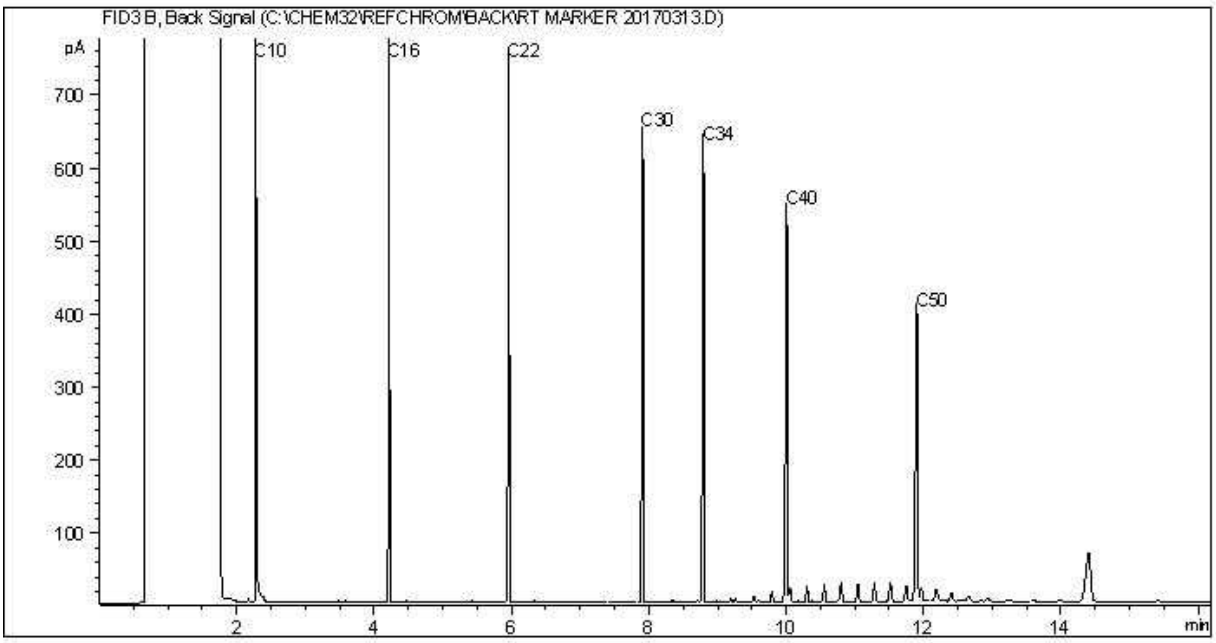
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NV
Client ID: SW1

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

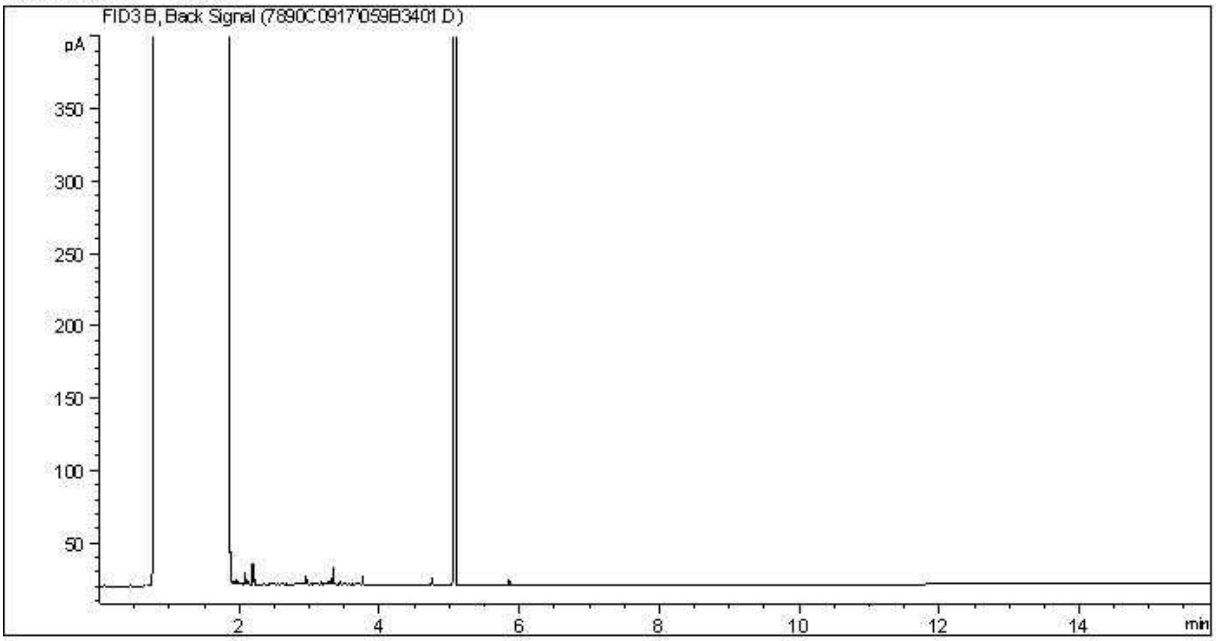
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B879078
Report Date: 2018/09/19
Maxxam Sample: UH8273

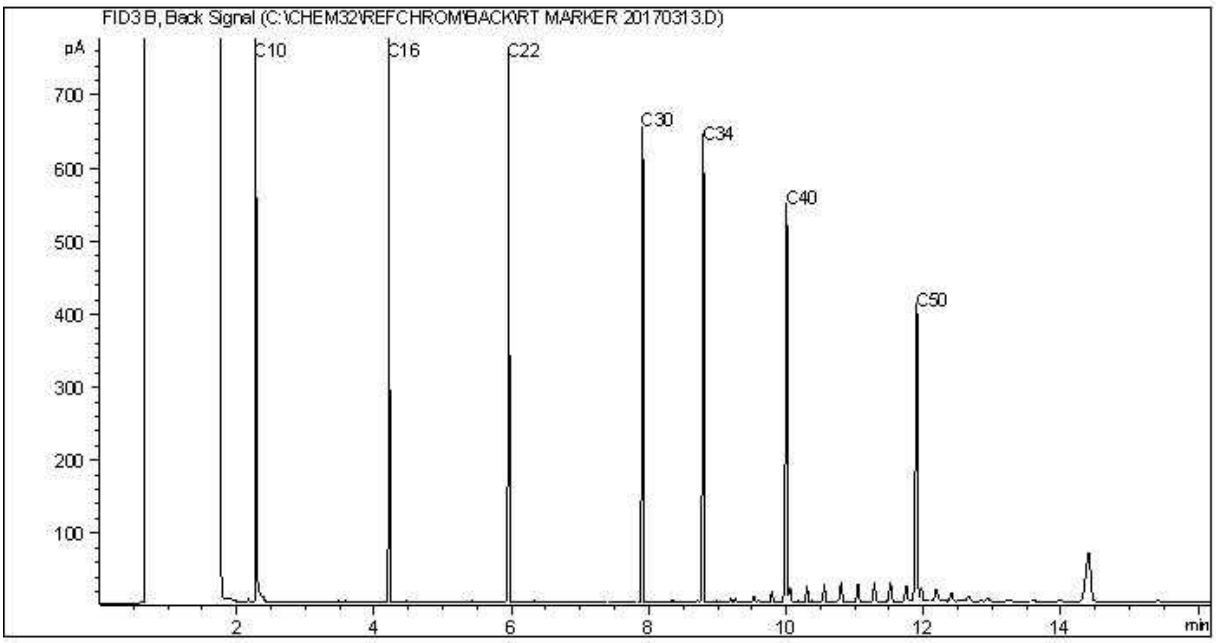
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NV
Client ID: SW2

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

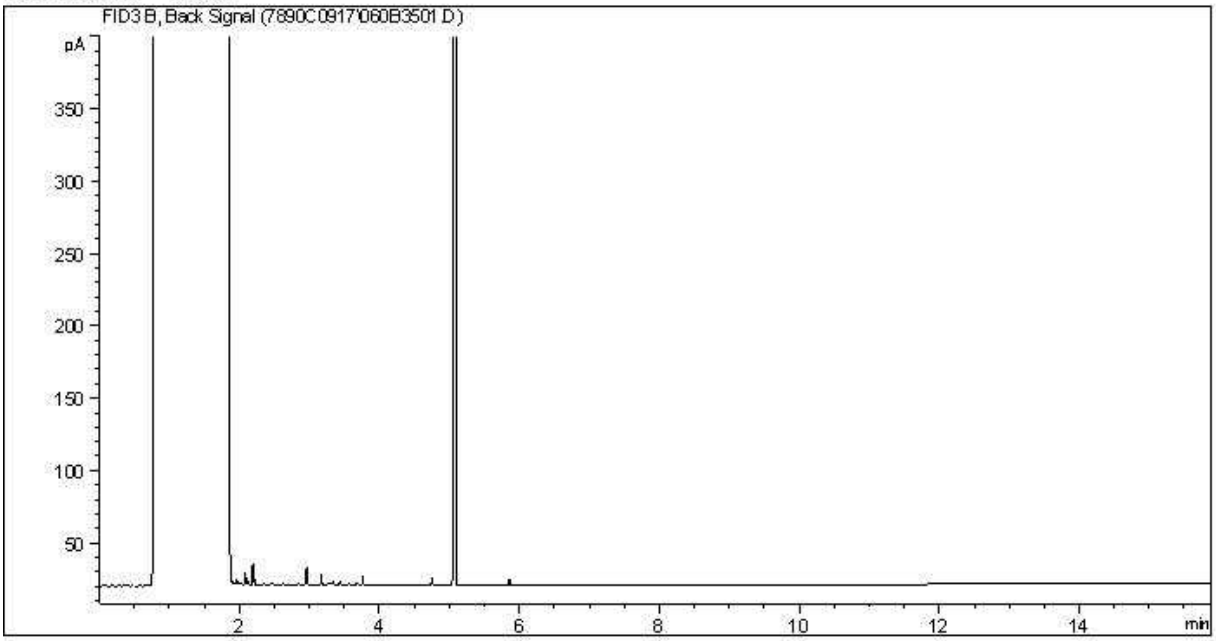
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B879078
Report Date: 2018/09/19
Maxxam Sample: UH8274

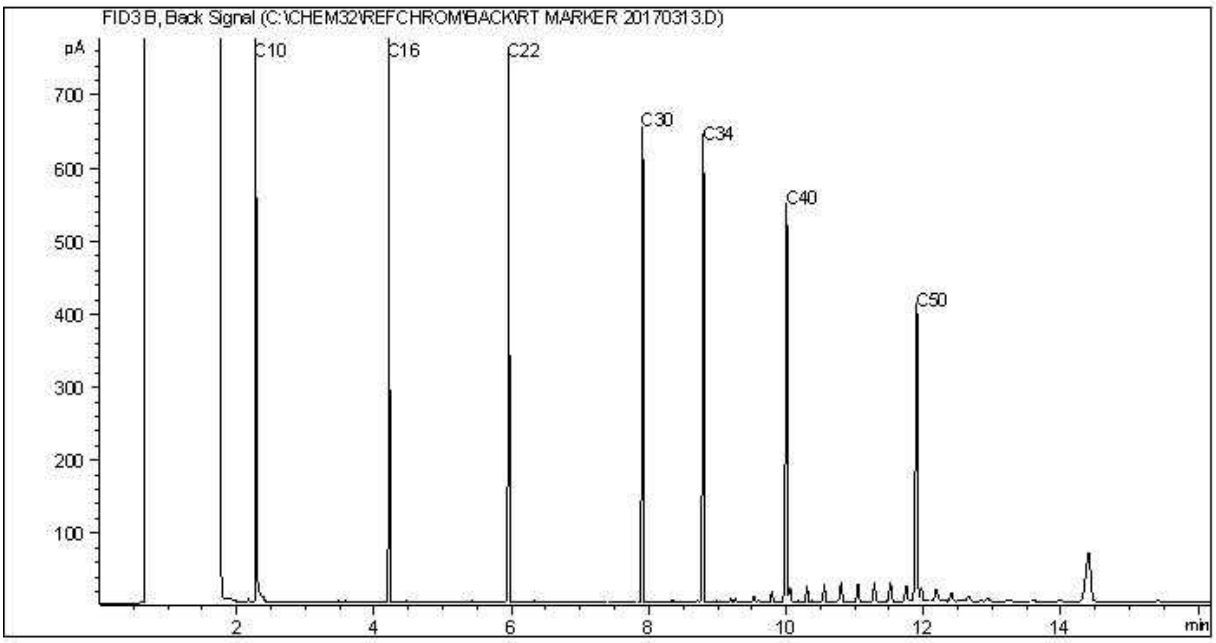
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NV
Client ID: SW3

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

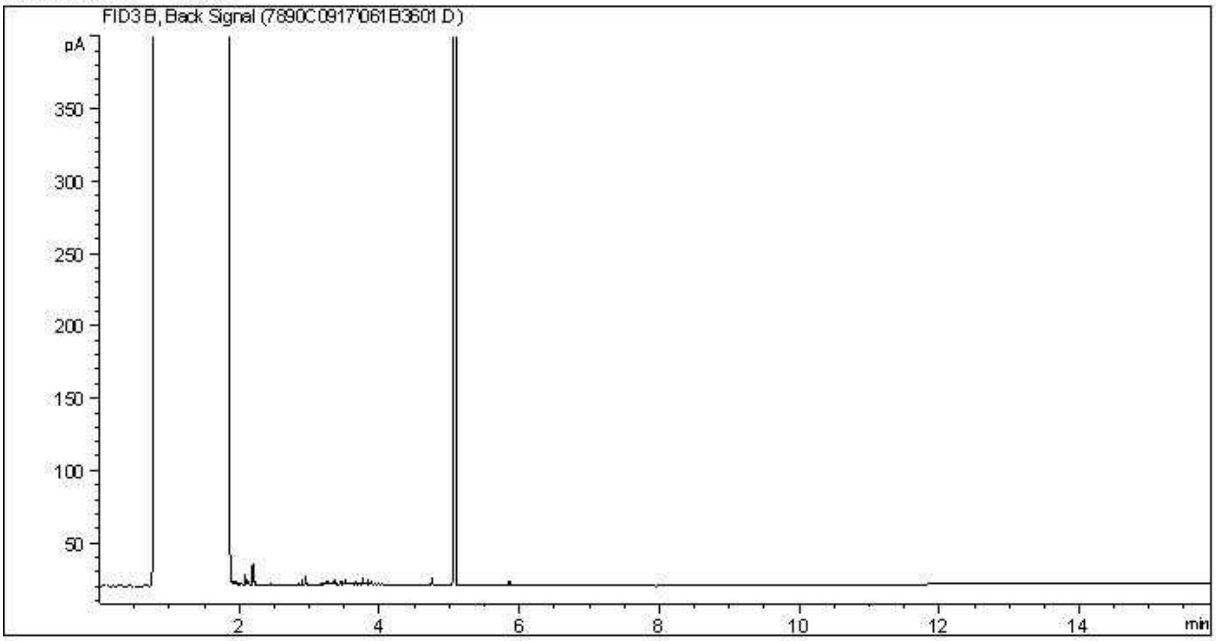
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B879078
Report Date: 2018/09/19
Maxxam Sample: UH8275

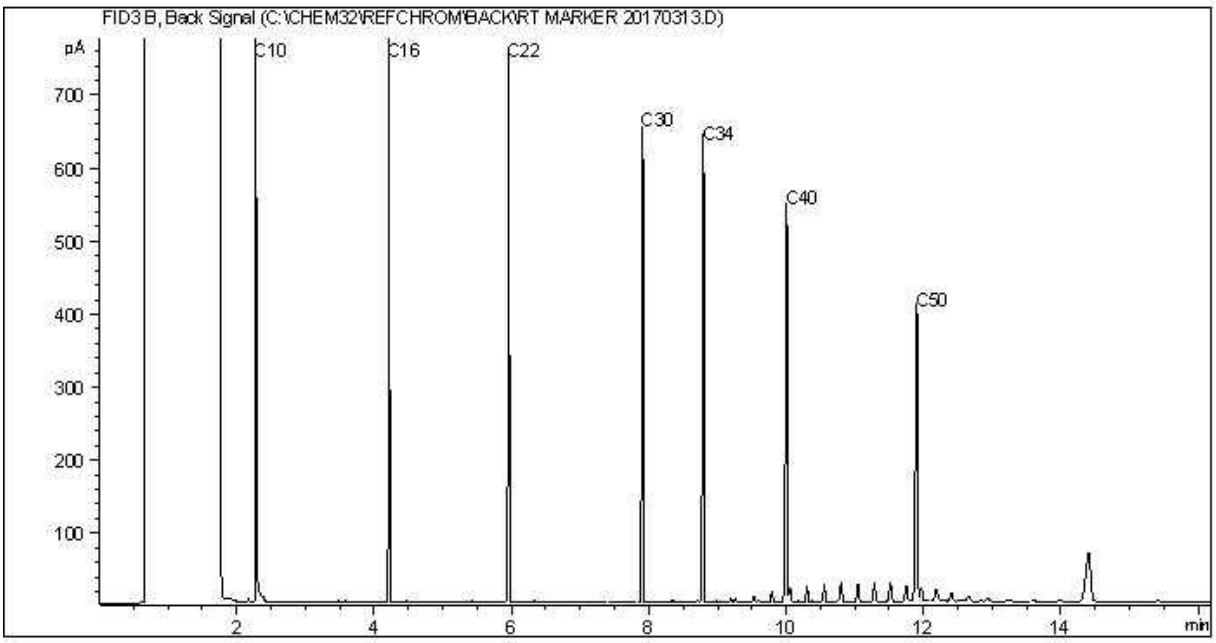
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NV
Client ID: SW4

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

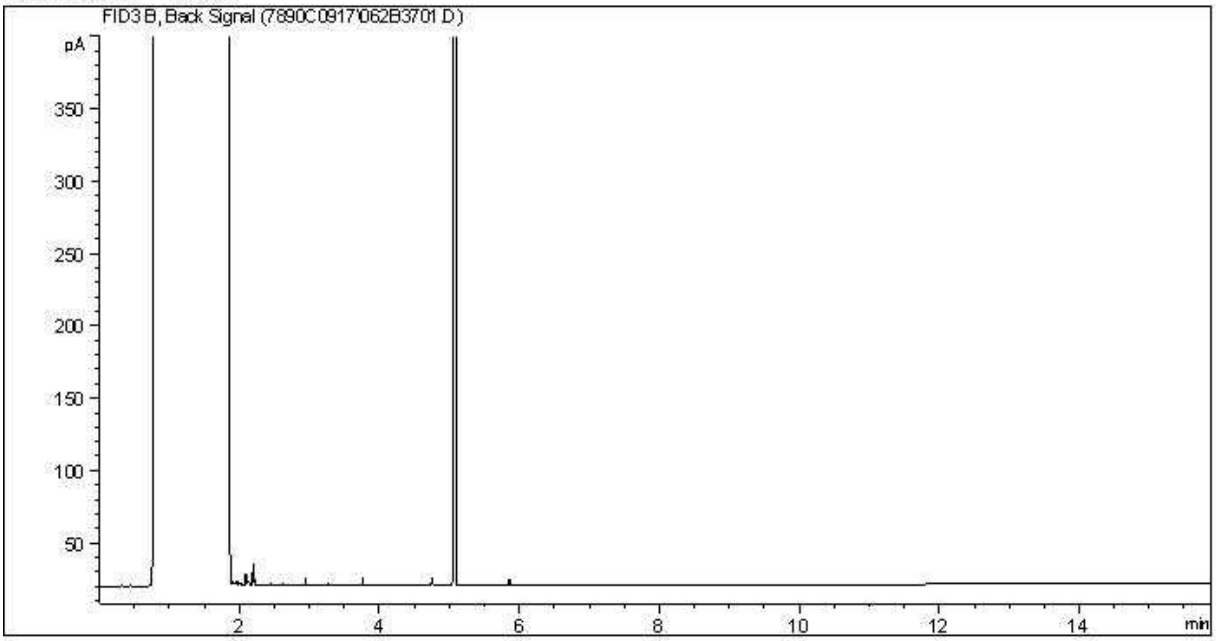
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B879078
Report Date: 2018/09/19
Maxxam Sample: UH8276

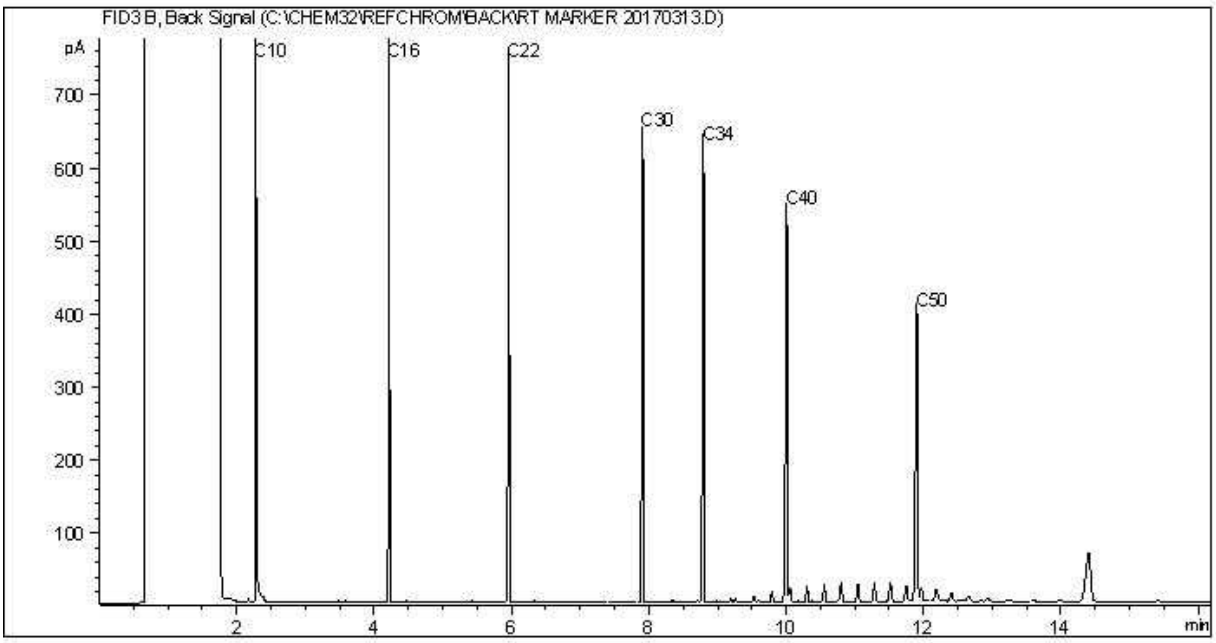
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NV
Client ID: SW5

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



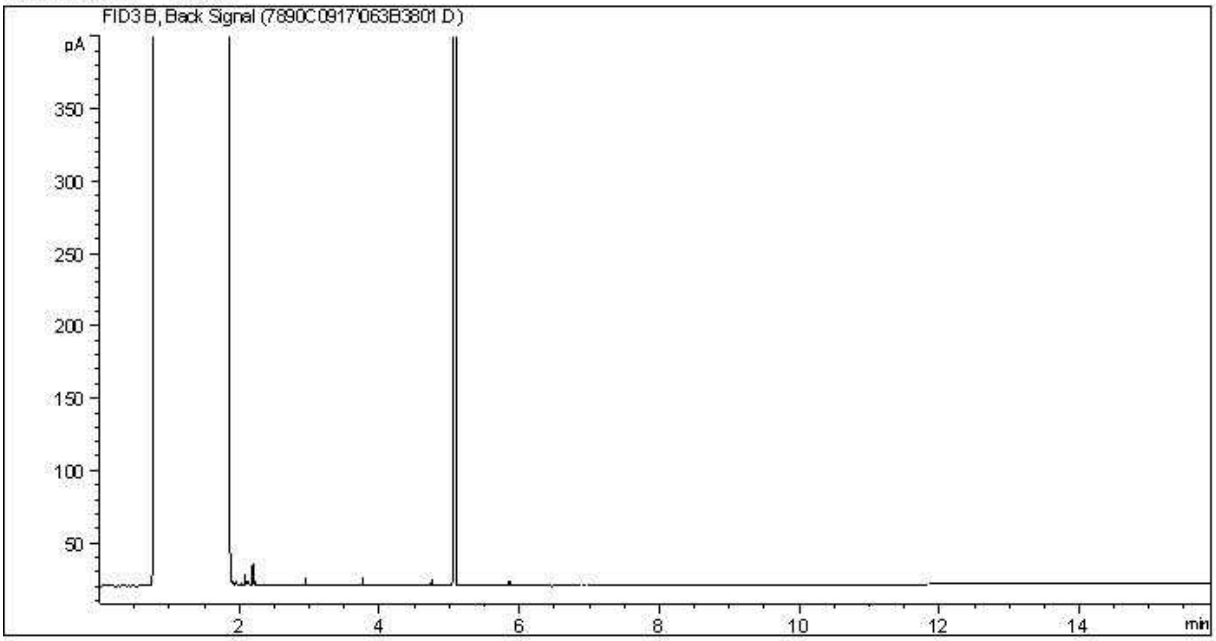
TYPICAL PRODUCT CARBON NUMBER RANGES

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

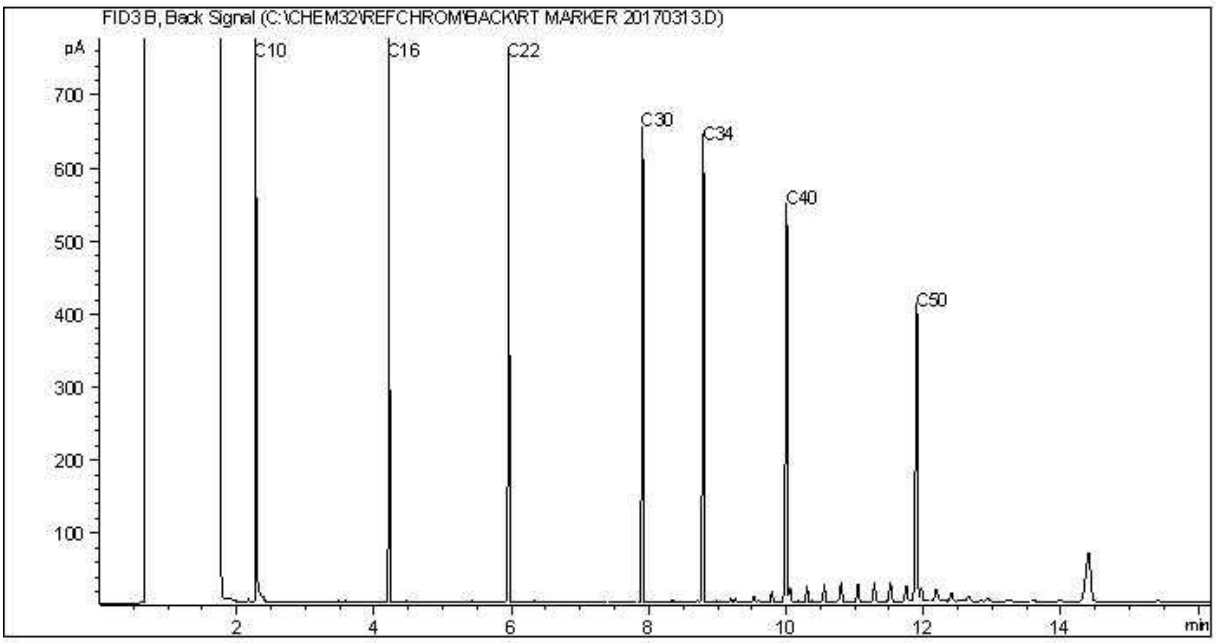
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

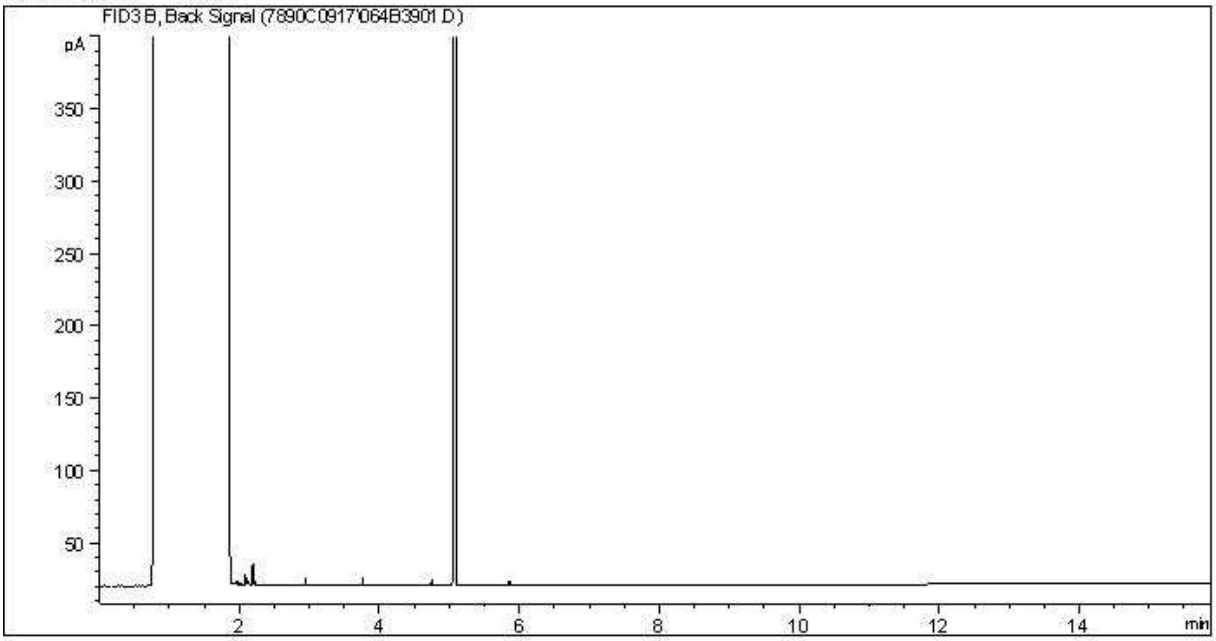
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B879078
Report Date: 2018/09/19
Maxxam Sample: UH8278

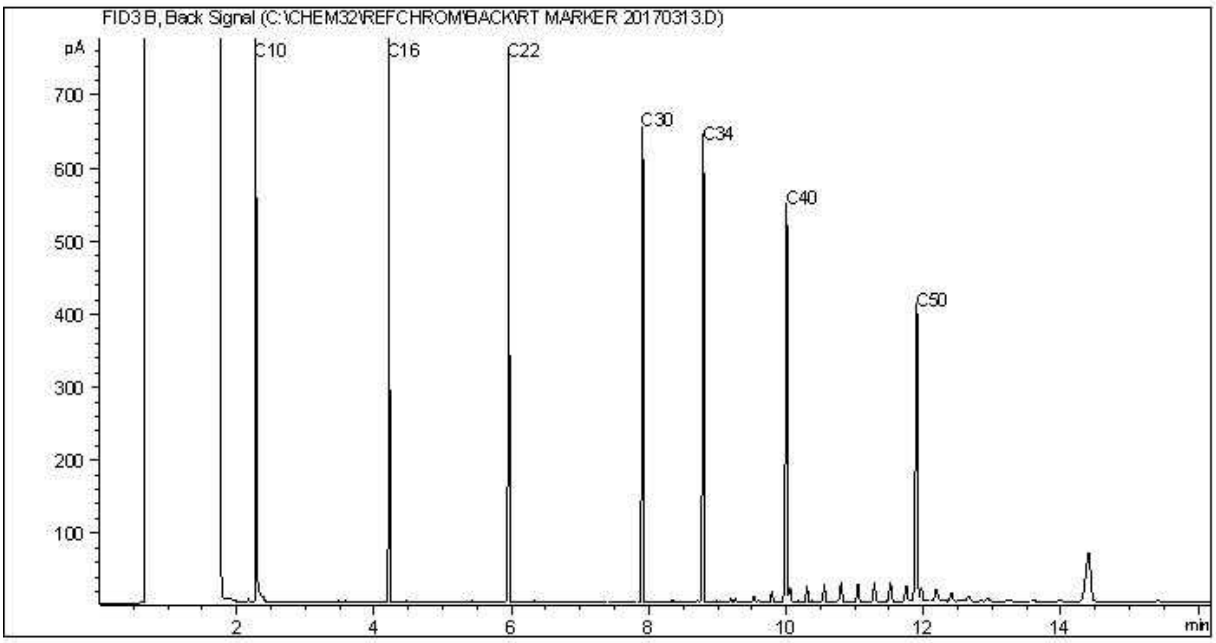
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NV
Client ID: FB-1

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

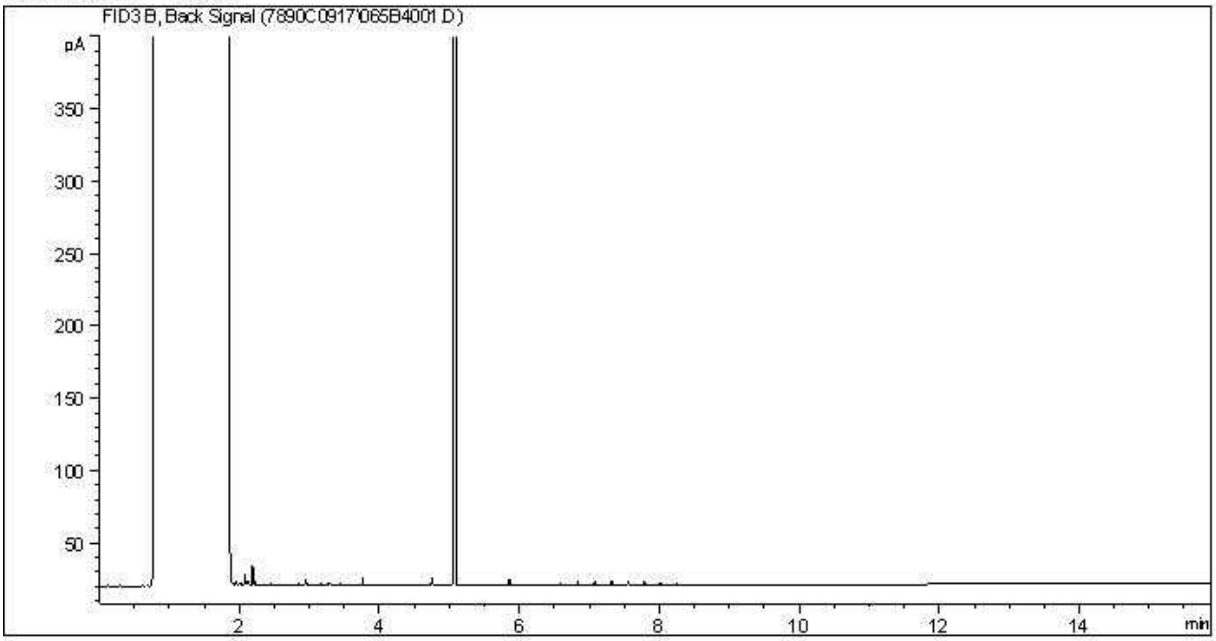
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B879078
Report Date: 2018/09/19
Maxxam Sample: UH8279

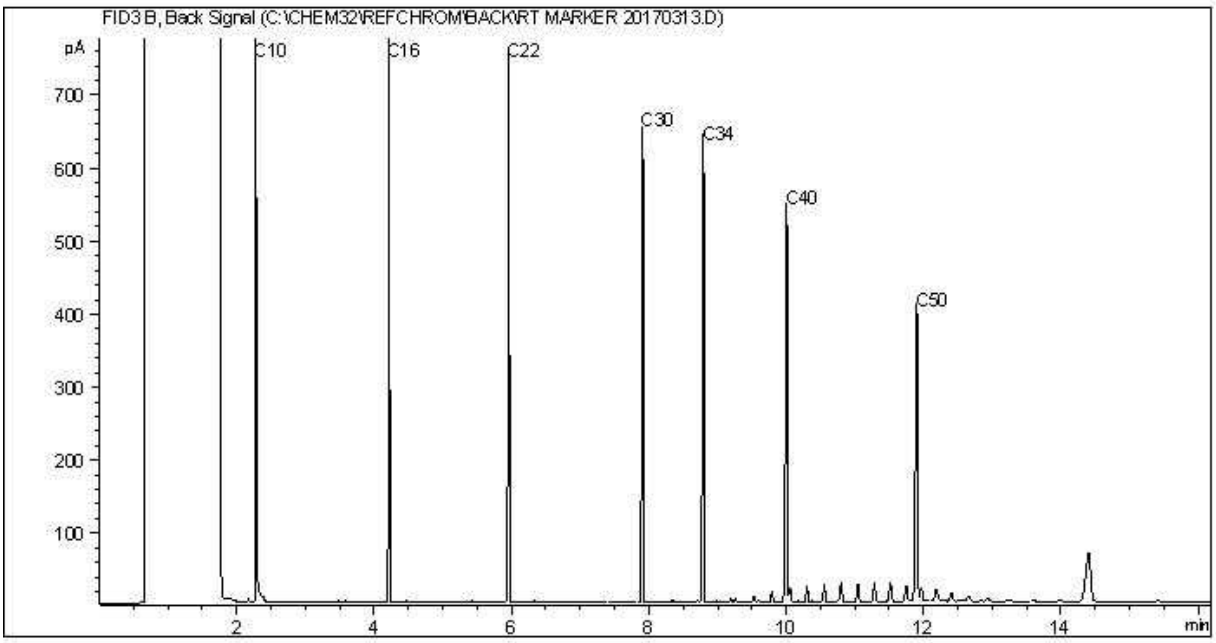
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NV
Client ID: SW-DUP18-01

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

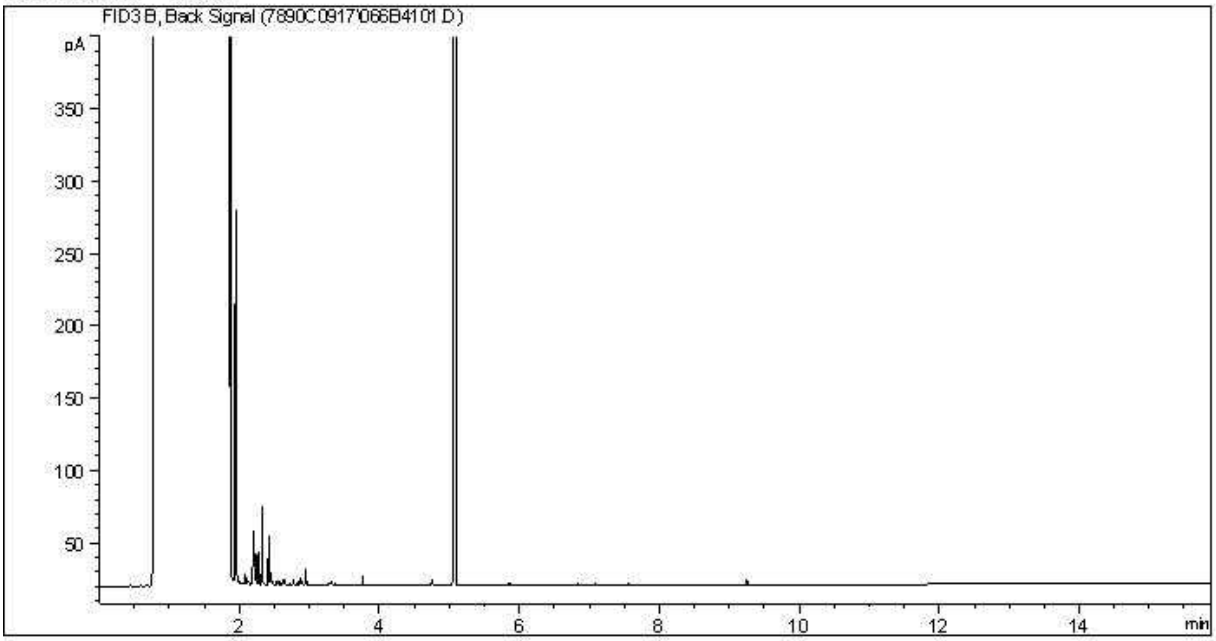
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B879078
Report Date: 2018/09/19
Maxxam Sample: UH8280

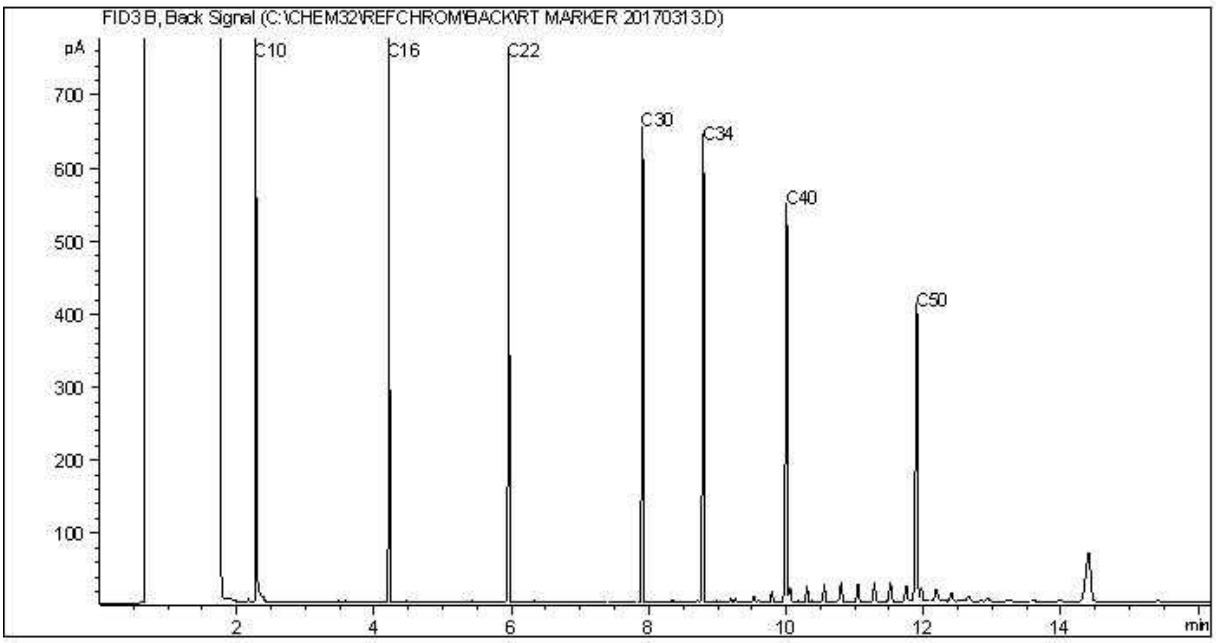
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NV
Client ID: MW1

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

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

Your Project #: 110220180
Site Location: RESOLUTE BAY, NO
Your C.O.C. #: 1 of 2, 2 of 2

Attention: LINDSAY VAN NOORTWYK

STANTEC CONSULTING LTD
10160-112 STREET
EDMONTON, AB
CANADA T5K 2L6

Report Date: 2018/09/07
Report #: R2615950
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B873067
Received: 2018/08/27, 12:00

Sample Matrix: Soil
Samples Received: 11

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 by HS GC/MS/FID (MeOH extract) (1)	11	N/A	2018/08/31	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX	11	N/A	2018/09/01	AB SOP-00039	Auto Calc
Aromatic Fraction >C8-C10 in Soil	2	2018/08/29	2018/09/05	CAL SOP-00240	Auto Calc
CCME Hydrocarbons (F2-F4 in soil) (2)	11	2018/08/30	2018/08/31	AB SOP-00036	CCME PHC-CWS m
CCME Hydrocarbons (F4G in soil) (2)	1	2018/08/30	2018/09/05	AB SOP-00036 AB SOP-00040	CCME PHC-CWS m
Aliphatic Fractions C6-C10 in Soil	2	2018/08/29	2018/09/05	CAL SOP-00240	Auto Calc
BTEX/F1/Fractionation of C6-C10 in Soil	2	2018/08/30	2018/09/04	CAL SOP-00240	Atl. RBCA v3.1 m
Aliphatic & Aromatic Fractions >C10-C50	2	2018/08/30	2018/09/07	CAL SOP-00184	Atl. RBCA v3 m
Moisture	11	N/A	2018/08/31	AB SOP-00002	CCME PHC-CWS m
Nitrite and Nitrate Available (10:1) Wet	6	2018/09/04	2018/09/04	AB SOP-00027 / AB SOP-00023	SM 23 4110 B m
NO2 + NO3 Available (10:1 Wet)	6	2018/08/29	2018/09/05	AB SOP-00027/AB SOP-00023	Auto Calc
Phosphorus, Potassium - Available	6	2018/09/05	2018/09/05	AB SOP-00028 / AB SOP-00042	EPA 6010d R4 m

Remarks:

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

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

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

Your Project #: 110220180
Site Location: RESOLUTE BAY, NO
Your C.O.C. #: 1 of 2, 2 of 2

Attention: LINDSAY VAN NOORTWYK

STANTEC CONSULTING LTD
10160-112 STREET
EDMONTON, AB
CANADA T5K 2L6

Report Date: 2018/09/07
Report #: R2615950
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B873067
Received: 2018/08/27, 12:00

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

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

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

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

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Geraldlyn Gouthro, Client Service Specialist
Email: GGouthro@maxxam.ca
Phone# (403)735-2230

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

Maxxam Job #: B873067
Report Date: 2018/09/07

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NO
Sampler Initials: BS

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Maxxam ID		UE3982		UE3983		UE3984			
Sampling Date		2018/08/22 16:22		2018/08/22 16:33		2018/08/22 16:45			
COC Number		1 of 2		1 of 2		1 of 2			
	UNITS	SS1 @ 0.4-0.6M	MU	SS2 @ 0.1-0.3M	MU	SS3 @ 0.1-0.3M	MU	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	210	+/- 79	<10	N/A	<10	N/A	10	9124496
F3 (C16-C34 Hydrocarbons)	mg/kg	570	+/- 200	<50	N/A	<50	N/A	50	9124496
F4 (C34-C50 Hydrocarbons)	mg/kg	310	+/- 110	<50	N/A	<50	N/A	50	9124496
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	Yes	N/A	N/A	9124496
Physical Properties									
Moisture	%	15	+/- 1.1	10	+/- 0.76	9.8	+/- 0.75	0.30	9124511
Volatiles									
Xylenes (Total)	mg/kg	<0.045	N/A	<0.045	N/A	<0.045	N/A	0.045	9121189
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	<10	N/A	10	9121189
Field Preserved Volatiles									
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	<0.0050	N/A	0.0050	9125430
Toluene	mg/kg	<0.020	N/A	<0.020	N/A	<0.020	N/A	0.020	9125430
Ethylbenzene	mg/kg	<0.010	N/A	<0.010	N/A	<0.010	N/A	0.010	9125430
m & p-Xylene	mg/kg	<0.040	N/A	<0.040	N/A	<0.040	N/A	0.040	9125430
o-Xylene	mg/kg	<0.020	N/A	<0.020	N/A	<0.020	N/A	0.020	9125430
F1 (C6-C10)	mg/kg	<10	N/A	<10	N/A	<10	N/A	10	9125430
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	93	N/A	93	N/A	87	N/A	N/A	9125430
4-Bromofluorobenzene (sur.)	%	97	N/A	95	N/A	91	N/A	N/A	9125430
D10-o-Xylene (sur.)	%	108	N/A	107	N/A	100	N/A	N/A	9125430
D4-1,2-Dichloroethane (sur.)	%	99	N/A	102	N/A	99	N/A	N/A	9125430
O-TERPHENYL (sur.)	%	96	N/A	102	N/A	111	N/A	N/A	9124496

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B873067
Report Date: 2018/09/07

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NO
Sampler Initials: BS

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Maxxam ID		UE3985		UE3986		UE3987			
Sampling Date		2018/08/22 16:55		2018/08/22 17:07		2018/08/22 17:09			
COC Number		1 of 2		1 of 2		1 of 2			
	UNITS	SS4 @ 0.1-0.3M	MU	SS5 @ 0.1-0.3M	MU	SS6 @ 0.1-0.3M	MU	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	<10	N/A	51	+/- 20	10	9124496
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	N/A	<50	N/A	190	+/- 66	50	9124496
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	N/A	<50	N/A	110	+/- <RDL	50	9124496
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	Yes	N/A	N/A	9124496
Physical Properties									
Moisture	%	5.1	+/- 0.45	11	+/- 0.83	16	+/- 1.2	0.30	9124511
Volatiles									
Xylenes (Total)	mg/kg	<0.045	N/A	<0.045	N/A	<0.045	N/A	0.045	9121189
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	<10	N/A	10	9121189
Field Preserved Volatiles									
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	<0.0050	N/A	0.0050	9125430
Toluene	mg/kg	<0.020	N/A	<0.020	N/A	<0.020	N/A	0.020	9125430
Ethylbenzene	mg/kg	<0.010	N/A	<0.010	N/A	<0.010	N/A	0.010	9125430
m & p-Xylene	mg/kg	<0.040	N/A	<0.040	N/A	<0.040	N/A	0.040	9125430
o-Xylene	mg/kg	<0.020	N/A	<0.020	N/A	<0.020	N/A	0.020	9125430
F1 (C6-C10)	mg/kg	<10	N/A	<10	N/A	<10	N/A	10	9125430
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	91	N/A	96	N/A	102	N/A	N/A	9125430
4-Bromofluorobenzene (sur.)	%	94	N/A	89	N/A	89	N/A	N/A	9125430
D10-o-Xylene (sur.)	%	105	N/A	84	N/A	85	N/A	N/A	9125430
D4-1,2-Dichloroethane (sur.)	%	97	N/A	87	N/A	87	N/A	N/A	9125430
O-TERPHENYL (sur.)	%	99	N/A	100	N/A	100	N/A	N/A	9124496

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B873067
Report Date: 2018/09/07

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NO
Sampler Initials: BS

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Maxxam ID		UE3988		UE3989		UE3990			
Sampling Date		2018/08/22 17:31		2018/08/22 17:40		2018/08/22 17:51			
COC Number		1 of 2		1 of 2		1 of 2			
	UNITS	SS7 @ 0.1-0.3M	MU	SS8 @ 0.1-0.3M	MU	SS9 @ 0.1-0.3M	MU	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	<10	N/A	40	+/- 16	10	9124496
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	N/A	<50	N/A	<50	N/A	50	9124496
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	N/A	<50	N/A	<50	N/A	50	9124496
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	Yes	N/A	N/A	9124496
Physical Properties									
Moisture	%	13	+/- 0.98	11	+/- 0.82	7.7	+/- 0.61	0.30	9124511
Volatiles									
Xylenes (Total)	mg/kg	<0.045	N/A	<0.045	N/A	<0.045	N/A	0.045	9121189
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	<10	N/A	10	9121189
Field Preserved Volatiles									
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	<0.0050	N/A	0.0050	9125430
Toluene	mg/kg	<0.020	N/A	<0.020	N/A	<0.020	N/A	0.020	9125430
Ethylbenzene	mg/kg	<0.010	N/A	<0.010	N/A	<0.010	N/A	0.010	9125430
m & p-Xylene	mg/kg	<0.040	N/A	<0.040	N/A	<0.040	N/A	0.040	9125430
o-Xylene	mg/kg	<0.020	N/A	<0.020	N/A	<0.020	N/A	0.020	9125430
F1 (C6-C10)	mg/kg	<10	N/A	<10	N/A	<10	N/A	10	9125430
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	103	N/A	101	N/A	98	N/A	N/A	9125430
4-Bromofluorobenzene (sur.)	%	90	N/A	90	N/A	91	N/A	N/A	9125430
D10-o-Xylene (sur.)	%	90	N/A	84	N/A	79	N/A	N/A	9125430
D4-1,2-Dichloroethane (sur.)	%	95	N/A	90	N/A	89	N/A	N/A	9125430
O-TERPHENYL (sur.)	%	101	N/A	93	N/A	105	N/A	N/A	9124496

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B873067
Report Date: 2018/09/07

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NO
Sampler Initials: BS

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

Maxxam ID		UE3991		UE3992		UE3992			
Sampling Date		2018/08/22 18:01		2018/08/22 16:27		2018/08/22 16:27			
COC Number		1 of 2		2 of 2		2 of 2			
	UNITS	SS10 @ 0.1-0.3M	MU	DUP18-01	MU	DUP18-01 Lab-Dup	MU	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	280	+/- 110	290	+/- 110	10	9124496
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	N/A	650	+/- 230	760	+/- 260	50	9124496
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	N/A	360	+/- 130	420	+/- 150	50	9124496
Reached Baseline at C50	mg/kg	Yes	N/A	No	N/A	No	N/A	N/A	9124496
Physical Properties									
Moisture	%	6.2	+/- 0.52	13	+/- 0.95	N/A	N/A	0.30	9124511
Volatiles									
Xylenes (Total)	mg/kg	<0.045	N/A	<0.045	N/A	N/A	N/A	0.045	9121189
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	N/A	N/A	10	9121189
Field Preserved Volatiles									
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	N/A	N/A	0.0050	9125430
Toluene	mg/kg	<0.020	N/A	<0.020	N/A	N/A	N/A	0.020	9125430
Ethylbenzene	mg/kg	<0.010	N/A	<0.010	N/A	N/A	N/A	0.010	9125430
m & p-Xylene	mg/kg	<0.040	N/A	<0.040	N/A	N/A	N/A	0.040	9125430
o-Xylene	mg/kg	<0.020	N/A	<0.020	N/A	N/A	N/A	0.020	9125430
F1 (C6-C10)	mg/kg	<10	N/A	<10	N/A	N/A	N/A	10	9125430
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	101	N/A	102	N/A	N/A	N/A	N/A	9125430
4-Bromofluorobenzene (sur.)	%	94	N/A	93	N/A	N/A	N/A	N/A	9125430
D10-o-Xylene (sur.)	%	84	N/A	84	N/A	N/A	N/A	N/A	9125430
D4-1,2-Dichloroethane (sur.)	%	82	N/A	81	N/A	N/A	N/A	N/A	9125430
O-TERPHENYL (sur.)	%	104	N/A	100	N/A	113	N/A	N/A	9124496

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

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B873067
Report Date: 2018/09/07

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NO
Sampler Initials: BS

NUTRIENT PACKAGE 3 (SOIL)

Maxxam ID		UE3982		UE3982		UE3983			
Sampling Date		2018/08/22 16:22		2018/08/22 16:22		2018/08/22 16:33			
COC Number		1 of 2		1 of 2		1 of 2			
	UNITS	SS1 @ 0.4-0.6M	MU	SS1 @ 0.4-0.6M Lab-Dup	MU	SS2 @ 0.1-0.3M	MU	RDL	QC Batch
Nutrients									
Available (KCl) Nitrate plus Nitrite (N)	mg/kg	<2.0	N/A	N/A	N/A	<2.0	N/A	2.0	9122213
Available (Mod Kel) Phosphorus (P)	mg/kg	<4.0	N/A	<4.0	N/A	<4.0	N/A	4.0	9128211
Available (Mod Kel) Potassium (K)	mg/kg	36	+/- <RDL	36	+/- <RDL	16	+/- <RDL	4.0	9128211
Available (KCl) Nitrite (N)	mg/kg	<2.0	N/A	N/A	N/A	<2.0	N/A	2.0	9128135
Available (KCl) Nitrate (N)	mg/kg	<2.0	N/A	N/A	N/A	<2.0	N/A	2.0	9128135

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

Maxxam ID		UE3985		UE3985		UE3988			
Sampling Date		2018/08/22 16:55		2018/08/22 16:55		2018/08/22 17:31			
COC Number		1 of 2		1 of 2		1 of 2			
	UNITS	SS4 @ 0.1-0.3M	MU	SS4 @ 0.1-0.3M Lab-Dup	MU	SS7 @ 0.1-0.3M	MU	RDL	QC Batch
Nutrients									
Available (KCl) Nitrate plus Nitrite (N)	mg/kg	<2.0	N/A	N/A	N/A	<2.0	N/A	2.0	9122213
Available (Mod Kel) Phosphorus (P)	mg/kg	<4.0	N/A	N/A	N/A	<4.0	N/A	4.0	9128211
Available (Mod Kel) Potassium (K)	mg/kg	17	+/- <RDL	N/A	N/A	17	+/- <RDL	4.0	9128211
Available (KCl) Nitrite (N)	mg/kg	<2.0	N/A	<2.0	N/A	<2.0	N/A	2.0	9128135
Available (KCl) Nitrate (N)	mg/kg	<2.0	N/A	<2.0	N/A	<2.0	N/A	2.0	9128135

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

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B873067
Report Date: 2018/09/07

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NO
Sampler Initials: BS

NUTRIENT PACKAGE 3 (SOIL)

Maxxam ID		UE3991		UE3992			
Sampling Date		2018/08/22 18:01		2018/08/22 16:27			
COC Number		1 of 2		2 of 2			
	UNITS	SS10 @ 0.1-0.3M	MU	DUP18-01	MU	RDL	QC Batch
Nutrients							
Available (KCl) Nitrate plus Nitrite (N)	mg/kg	<2.0	N/A	<2.0	N/A	2.0	9122213
Available (Mod Kel) Phosphorus (P)	mg/kg	<4.0	N/A	<4.0	N/A	4.0	9128211
Available (Mod Kel) Potassium (K)	mg/kg	9.5	+/- <RDL	32	+/- <RDL	4.0	9128211
Available (KCl) Nitrite (N)	mg/kg	<2.0	N/A	<2.0	N/A	2.0	9128135
Available (KCl) Nitrate (N)	mg/kg	<2.0	N/A	<2.0	N/A	2.0	9128135

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

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Maxxam Job #: B873067
Report Date: 2018/09/07

STANTEC CONSULTING LTD
Client Project #: 110220180
Site Location: RESOLUTE BAY, NO
Sampler Initials: BS

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		UE3982		UE3992		UE3992			
Sampling Date		2018/08/22 16:22		2018/08/22 16:27		2018/08/22 16:27			
COC Number		1 of 2		2 of 2		2 of 2			
	UNITS	SS1 @ 0.4-0.6M	MU	DUP18-01	MU	DUP18-01 Lab-Dup	MU	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F4G-SG (Heavy Hydrocarbons-Grav.)	mg/kg	N/A	N/A	1200	+/- <RDL	1100	+/- <RDL	500	9130396
Hydrocarbons									
>C10 - C12 Aliphatic	mg/kg	44	+/- 19	43	+/- 19	N/A	N/A	5.0	9124500
>C10 - C12 Aromatic	mg/kg	8.6	+/- 6.3	7.4	+/- 6.1	N/A	N/A	5.0	9124500
>C12 - C16 Aliphatic	mg/kg	180	+/- 78	200	+/- 88	N/A	N/A	10	9124500
>C12 - C16 Aromatic	mg/kg	23	+/- <RDL	25	+/- <RDL	N/A	N/A	10	9124500
>C16 - C21 Aliphatic	mg/kg	86	+/- 38	81	+/- 36	N/A	N/A	10	9124500
>C16 - C21 Aromatic	mg/kg	19	+/- <RDL	21	+/- <RDL	N/A	N/A	10	9124500
>C21 - C34 Aliphatic	mg/kg	490	+/- 190	480	+/- 190	N/A	N/A	10	9124500
>C21 - C34 Aromatic	mg/kg	80	+/- 22	84	+/- 22	N/A	N/A	10	9124500
>C34 Aliphatic (up to C50)	mg/kg	330	N/A	360	N/A	N/A	N/A	10	9124500
>C34 Aromatic (up to C50)	mg/kg	66	N/A	71	N/A	N/A	N/A	10	9124500
Surrogate Recovery (%)									
DECANE (sur)	%	112	N/A	96	N/A	N/A	N/A	N/A	9124500
O-TERPHENYL (sur.)	%	115	N/A	102	N/A	N/A	N/A	N/A	9124500

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

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VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		UE3982		UE3992		UE3992			
Sampling Date		2018/08/22 16:22		2018/08/22 16:27		2018/08/22 16:27			
COC Number		1 of 2		2 of 2		2 of 2			
	UNITS	SS1 @ 0.4-0.6M	MU	DUP18-01	MU	DUP18-01 Lab-Dup	MU	RDL	QC Batch
Volatiles									
Calculated >C8-C10 Aromatics (-EX)	mg/kg	<10	N/A	<10	N/A	N/A	N/A	10	9122192
Calculated Aliphatic >C8-C10	mg/kg	<10	N/A	<10	N/A	N/A	N/A	10	9122211
Calculated Aliphatic C6-C8	mg/kg	<10	N/A	<10	N/A	N/A	N/A	10	9122211
F1 (C6-C10)	mg/kg	<10	N/A	<10	N/A	<10	N/A	10	9124164
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	<0.0050	N/A	0.0050	9124164
Toluene	mg/kg	<0.020	N/A	<0.020	N/A	<0.020	N/A	0.020	9124164
Ethylbenzene	mg/kg	<0.010	N/A	<0.010	N/A	<0.010	N/A	0.010	9124164
Xylenes (Total)	mg/kg	<0.040	N/A	<0.040	N/A	<0.040	N/A	0.040	9124164
m & p-Xylene	mg/kg	<0.040	N/A	<0.040	N/A	<0.040	N/A	0.040	9124164
o-Xylene	mg/kg	<0.020	N/A	<0.020	N/A	<0.020	N/A	0.020	9124164
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	<10	N/A	10	9124164
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	94	N/A	97	N/A	99	N/A	N/A	9124164
4-Bromofluorobenzene (sur.)	%	93	N/A	94	N/A	97	N/A	N/A	9124164
D10-o-Xylene (sur.)	%	100	N/A	97	N/A	98	N/A	N/A	9124164
D4-1,2-Dichloroethane (sur.)	%	101	N/A	101	N/A	99	N/A	N/A	9124164

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GENERAL COMMENTS

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

Package 1	3.7°C

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

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9124164	DO1	Matrix Spike [UE3992-01]	1,4-Difluorobenzene (sur.)	2018/09/04		99	%	60 - 140
			4-Bromofluorobenzene (sur.)	2018/09/04		92	%	60 - 140
			D10-o-Xylene (sur.)	2018/09/04		105	%	60 - 140
			D4-1,2-Dichloroethane (sur.)	2018/09/04		95	%	60 - 140
			F1 (C6-C10)	2018/09/04		95	%	60 - 140
			Benzene	2018/09/04		101	%	50 - 140
			Toluene	2018/09/04		100	%	50 - 140
			Ethylbenzene	2018/09/04		104	%	50 - 140
			m & p-Xylene	2018/09/04		106	%	50 - 140
			o-Xylene	2018/09/04		99	%	50 - 140
9124164	DO1	Spiked Blank	1,4-Difluorobenzene (sur.)	2018/09/04		102	%	60 - 140
			4-Bromofluorobenzene (sur.)	2018/09/04		105	%	60 - 140
			D10-o-Xylene (sur.)	2018/09/04		105	%	60 - 140
			D4-1,2-Dichloroethane (sur.)	2018/09/04		101	%	60 - 140
			F1 (C6-C10)	2018/09/04		85	%	60 - 140
			Benzene	2018/09/04		113	%	60 - 130
			Toluene	2018/09/04		111	%	60 - 130
			Ethylbenzene	2018/09/04		115	%	60 - 130
			m & p-Xylene	2018/09/04		115	%	60 - 130
			o-Xylene	2018/09/04		109	%	60 - 130
9124164	DO1	Method Blank	1,4-Difluorobenzene (sur.)	2018/09/04		97	%	60 - 140
			4-Bromofluorobenzene (sur.)	2018/09/04		99	%	60 - 140
			D10-o-Xylene (sur.)	2018/09/04		100	%	60 - 140
			D4-1,2-Dichloroethane (sur.)	2018/09/04		103	%	60 - 140
			F1 (C6-C10)	2018/09/04	<10		mg/kg	
			Benzene	2018/09/04	<0.0050		mg/kg	
			Toluene	2018/09/04	<0.020		mg/kg	
			Ethylbenzene	2018/09/04	<0.010		mg/kg	
			Xylenes (Total)	2018/09/04	<0.040		mg/kg	
			m & p-Xylene	2018/09/04	<0.040		mg/kg	
			o-Xylene	2018/09/04	<0.020		mg/kg	
			F1 (C6-C10) - BTEX	2018/09/04	<10		mg/kg	
9124164	DO1	RPD [UE3992-01]	F1 (C6-C10)	2018/09/04	NC		%	50
			Benzene	2018/09/04	NC		%	50
			Toluene	2018/09/04	NC		%	50
			Ethylbenzene	2018/09/04	NC		%	50
			Xylenes (Total)	2018/09/04	NC		%	50
			m & p-Xylene	2018/09/04	NC		%	50
			o-Xylene	2018/09/04	NC		%	50
			F1 (C6-C10) - BTEX	2018/09/04	NC		%	50
9124496	VP4	Matrix Spike [UE3992-01]	O-TERPHENYL (sur.)	2018/09/01		97	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2018/09/01		91	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2018/09/01		111	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2018/09/01		110	%	60 - 140
9124496	VP4	Spiked Blank	O-TERPHENYL (sur.)	2018/09/01		102	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2018/09/01		118	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2018/09/01		122	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2018/09/01		115	%	60 - 140
9124496	VP4	Method Blank	O-TERPHENYL (sur.)	2018/08/31		114	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2018/08/31	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2018/08/31	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2018/08/31	<50		mg/kg	

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STANTEC CONSULTING LTD
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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9124496	VP4	RPD [UE3992-01]	F2 (C10-C16 Hydrocarbons)	2018/08/31	4.2		%	40
			F3 (C16-C34 Hydrocarbons)	2018/08/31	15		%	40
			F4 (C34-C50 Hydrocarbons)	2018/08/31	14		%	40
9124500	VP4	Method Blank	DECANE (sur)	2018/09/07		98	%	60 - 140
			O-TERPHENYL (sur.)	2018/09/07		111	%	60 - 140
			>C10 - C12 Aliphatic	2018/09/07	<5.0		mg/kg	
			>C10 - C12 Aromatic	2018/09/07	<5.0		mg/kg	
			>C12 - C16 Aliphatic	2018/09/07	<10		mg/kg	
			>C12 - C16 Aromatic	2018/09/07	<10		mg/kg	
			>C16 - C21 Aliphatic	2018/09/07	<10		mg/kg	
			>C16 - C21 Aromatic	2018/09/07	<10		mg/kg	
			>C21 - C34 Aliphatic	2018/09/07	<10		mg/kg	
			>C21 - C34 Aromatic	2018/09/07	<10		mg/kg	
			>C34 Aliphatic (up to C50)	2018/09/07	<10		mg/kg	
			>C34 Aromatic (up to C50)	2018/09/07	<10		mg/kg	
9124511	MYM	Method Blank	Moisture	2018/08/31	<0.30		%	
9124511	MYM	RPD	Moisture	2018/08/31	2.8		%	20
9125430	DO1	Matrix Spike	1,4-Difluorobenzene (sur.)	2018/08/31		94	%	50 - 140
			4-Bromofluorobenzene (sur.)	2018/08/31		96	%	50 - 140
			D10-o-Xylene (sur.)	2018/08/31		105	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2018/08/31		92	%	50 - 140
			Benzene	2018/08/31		113	%	50 - 140
			Toluene	2018/08/31		107	%	50 - 140
			Ethylbenzene	2018/08/31		107	%	50 - 140
			m & p-Xylene	2018/08/31		111	%	50 - 140
			o-Xylene	2018/08/31		115	%	50 - 140
			F1 (C6-C10)	2018/08/31		101	%	60 - 140
9125430	DO1	Spiked Blank	1,4-Difluorobenzene (sur.)	2018/08/31		95	%	50 - 140
			4-Bromofluorobenzene (sur.)	2018/08/31		96	%	50 - 140
			D10-o-Xylene (sur.)	2018/08/31		99	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2018/08/31		88	%	50 - 140
			Benzene	2018/08/31		120	%	60 - 130
			Toluene	2018/08/31		115	%	60 - 130
			Ethylbenzene	2018/08/31		114	%	60 - 130
			m & p-Xylene	2018/08/31		118	%	60 - 130
			o-Xylene	2018/08/31		119	%	60 - 130
			F1 (C6-C10)	2018/08/31		95	%	60 - 140
9125430	DO1	Method Blank	1,4-Difluorobenzene (sur.)	2018/08/31		95	%	50 - 140
			4-Bromofluorobenzene (sur.)	2018/08/31		96	%	50 - 140
			D10-o-Xylene (sur.)	2018/08/31		95	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2018/08/31		97	%	50 - 140
			Benzene	2018/08/31	<0.0050		mg/kg	
			Toluene	2018/08/31	<0.020		mg/kg	
			Ethylbenzene	2018/08/31	<0.010		mg/kg	
			m & p-Xylene	2018/08/31	<0.040		mg/kg	
			o-Xylene	2018/08/31	<0.020		mg/kg	
			F1 (C6-C10)	2018/08/31	<10		mg/kg	
9125430	DO1	RPD	Benzene	2018/08/31	NC		%	50
			Toluene	2018/08/31	NC		%	50
			Ethylbenzene	2018/08/31	NC		%	50
			m & p-Xylene	2018/08/31	NC		%	50
			o-Xylene	2018/08/31	NC		%	50

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			F1 (C6-C10)	2018/08/31	NC		%	30
9128135	SSO	Matrix Spike [UE3985-03]	Available (KCl) Nitrite (N)	2018/09/04		100	%	75 - 125
			Available (KCl) Nitrate (N)	2018/09/04		100	%	75 - 125
9128135	SSO	Spiked Blank	Available (KCl) Nitrite (N)	2018/09/04		98	%	80 - 120
			Available (KCl) Nitrate (N)	2018/09/04		98	%	80 - 120
9128135	SSO	Method Blank	Available (KCl) Nitrite (N)	2018/09/04	<2.0		mg/kg	
			Available (KCl) Nitrate (N)	2018/09/04	<2.0		mg/kg	
9128135	SSO	RPD [UE3985-03]	Available (KCl) Nitrite (N)	2018/09/04	NC		%	30
			Available (KCl) Nitrate (N)	2018/09/04	NC		%	30
9128211	FM0	Matrix Spike [UE3982-03]	Available (Mod Kel) Phosphorus (P)	2018/09/05		109	%	75 - 125
			Available (Mod Kel) Potassium (K)	2018/09/05		92	%	75 - 125
9128211	FM0	Spiked Blank	Available (Mod Kel) Phosphorus (P)	2018/09/05		110	%	80 - 120
			Available (Mod Kel) Potassium (K)	2018/09/05		99	%	80 - 120
9128211	FM0	Method Blank	Available (Mod Kel) Phosphorus (P)	2018/09/05	<4.0		mg/kg	
			Available (Mod Kel) Potassium (K)	2018/09/05	<4.0		mg/kg	
9128211	FM0	RPD [UE3982-03]	Available (Mod Kel) Phosphorus (P)	2018/09/05	NC		%	35
			Available (Mod Kel) Potassium (K)	2018/09/05	1.2		%	35
9130396	VP4	Spiked Blank	F4G-SG (Heavy Hydrocarbons-Grav.)	2018/09/05		100	%	60 - 140
9130396	VP4	Method Blank	F4G-SG (Heavy Hydrocarbons-Grav.)	2018/09/05	<500		mg/kg	
9130396	VP4	RPD [UE3992-01]	F4G-SG (Heavy Hydrocarbons-Grav.)	2018/09/05	12		%	40

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

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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VALIDATION SIGNATURE PAGE

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

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

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

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

Harry (Peng) Liang, Senior Analyst

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

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CHAIN OF CUSTODY RECORD

Invoice Information	Report Information (if differs from invoice)	Project Information	Turnaround Time (TAT) Required
Company: Stantec	Company:	Quotation #: Per Quote	☒ 5 - 7 Days Regular (Most analyses)
Contact Name: Lindsay VanNoortwyk	Contact Name:	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 10160 112 St NW Edmonton AB T5K 2L6	Address:	Project #: 110220180	Rush TAT (Surcharges will be applied)
Phone: 780-232-1114	Phone:	Site Location: Resolute Bay, NU	☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3-4 Days
Email: brad.suley@stantec.com	Email:	Site #:	Date Required:
Copies: lindsay.vannoortwyk@stantec.com	Copies:	Sampled By: Brad Suley	Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present	X					
Seal Intact	X		Temp	4	2	5
Cooling Media	X					
	YES	NO	Cooler ID	MCAC		
Seal Present	✓					
Seal Intact	✓		Temp	9	10	10
Cooling Media	✓					
	YES	NO	Cooler ID			
Seal Present	✓					
Seal Intact	✓		Temp	2	3	3
Cooling Media	✓					

Depot Reception

Regulatory Criteria

☐ AT1
☒ CCME
other: NU

	Sample Identification	Depth (cm)	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	# of containers	BTEX F1 ☐ VOC ☐	BTEX F1-F2	BTEX F1-F4	Routine Water	Regulated Metals Tot ☐ Diss ☐	Mercury Total ☐ Dissolved ☐	Salinity 4	Sieve (75 micron)	Texture (% Sand, Silt, Clay)	Basic Class II Landfill	Nutrients	pHC Fractionation	HOLD	Special Instructions
1	SS1	0.4-0.6	2018/08/22	16:22	Soil	3			X								X	X		
2	SS2	0.1-0.3	↓	16:33	↓	3			X								X			
3	SS3	0.1-0.3		16:45		2			X											
4	SS4	0.1-0.3		16:55		3			X								X			
5	SS5	0.1-0.3		17:07		2			X											
6	SS6	0.1-0.3		17:09		2			X											
7	SS7	0.1-0.3		17:31		3			X								X			
8	SS8	0.1-0.3		17:40		2			X											
9	SS9	0.1-0.3		17:51		2			X											
10	SS10	0.1-0.3	↓	18:01	↓	3			X								X			

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

RECEIVED IN OTTAWA

Relinquished by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)	Received by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)	Maxxam Job #
Brad Suley	2018/08/23	10:33	Ian Campbell	2018/08/27	12:00	B873067
				2018/08/28	08:44	

AB FCD-00331/7

AB FCD-00331/7

Maxxam
A Bureau Veritas Group Company

Calgary: 4000 19th St. NE, T2E 6P8. Toll Free (800) 386-7247
Edmonton: 9331-48 St. T6B 2R4. Toll Free (800) 386-7247
maxxam.ca

CHAIN OF CUSTODY RECORD

Invoice Information	Report Information (if differs from invoice)	Project Information	Turnaround Time (TAT) Required
Company: Stantec	Company:	Quotation #: Per Quote	[X] 5 - 7 Days Regular (Most analyses)
Contact Name: Lindsay VanNoortwyk	Contact Name:	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 10160 112 St NW Edmonton AB, T5K 2L6	Address:	Project #: 110220180	Rush TAT (Surcharges will be applied)
Phone: 780-232-1114	Phone:	Site Location: Resolute Bay, NU	[ ] Same Day [ ] 2 Days [ ] 1 Day [ ] 3-4 Days
Email: brad.suley@stantec.com	Email:	Site #:	Date Required:
Copies: lindsay.vannoortwyk@stantec.com	Copies:	Sampled By: Brad Suley	Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present	X					
Seal Intact	X		Temp	4	2	5
Cooling Media	X					
	YES	NO	Cooler ID	MCAC		
Seal Present	✓					
Seal Intact	✓		Temp	9	10	10
Cooling Media	✓					
	YES	NO	Cooler ID			
Seal Present	✓					
Seal Intact	✓		Temp	2	3	3
Cooling Media	✓					

Depot Reception

Regulatory Criteria

- [ ] AT1
- [X] CCME
- [ ] Drinking Water
- [ ] D50 (Drilling Waste)
- [ ] Saskatchewan
- [X] Other: NU

Special Instructions

Analysis Requested

	Sample Identification	Depth (Unit)	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	# of containers	BTEX F1 [ ] VOC [ ]	BTEX F1-F2	BTEX F1-F4	Routine Water	Regulated Metals [ ] Tot [ ] Diss	Mercury [ ] Total [ ] Dissolved	Salinity 4	Sieve (75 micron)	Texture (% Sand, Silt, Clay)	Basic Class II Landfill	PHC Fractionation	Nutrients	HOLD - DO NOT ANALYZE
1	DUP 18-01	—	2018/08/22	16:27	Soil	3			X								X	X	
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

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

RECEIVED IN OTTAWA

Relinquished by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)	Received by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)	Maxxam Job #
Brad Suley	2018/08/23	10:33	Ian Campbell	2018/08/27	12:00	B873067
				2018/08/28	08:44	

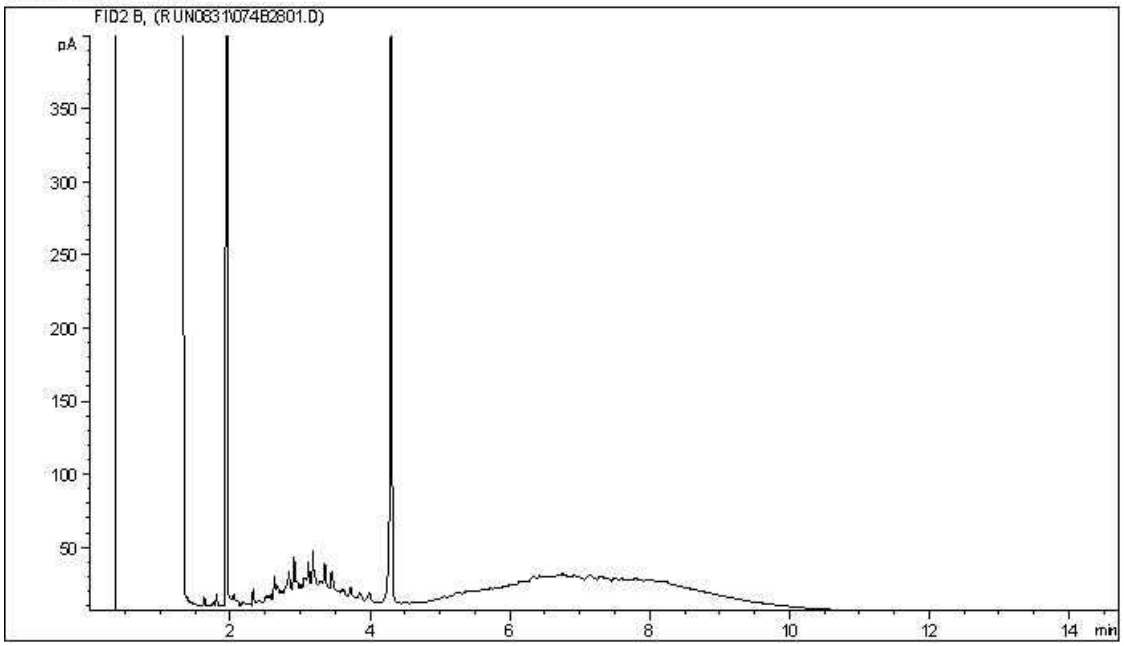
AB FCD-00331/7

Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3982

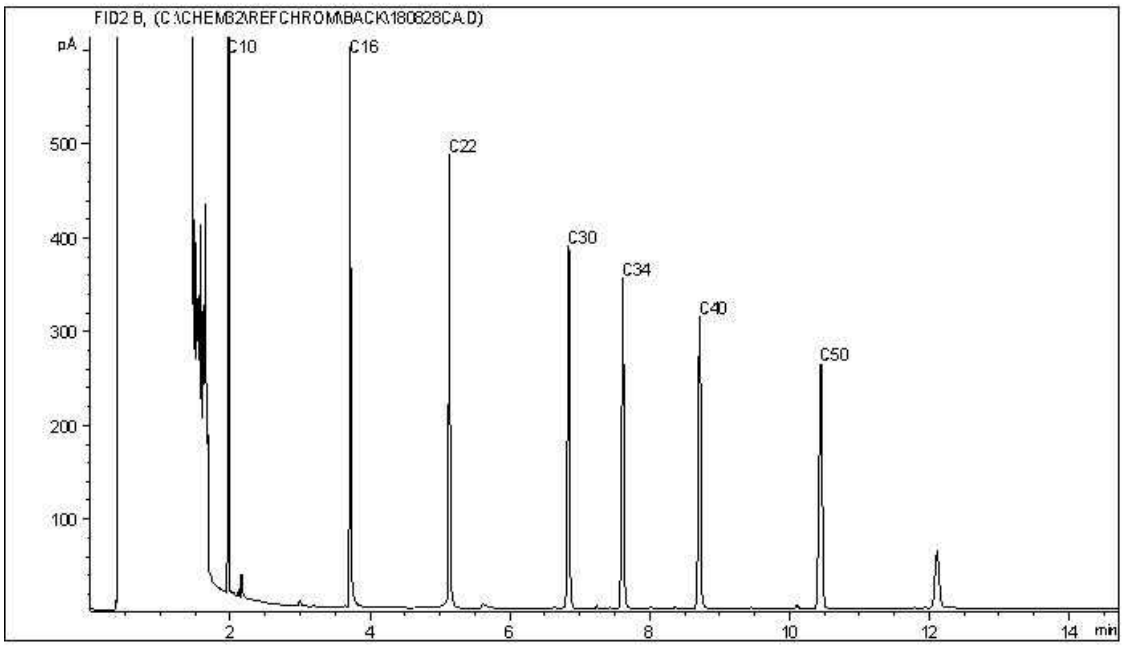
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: SS1 @ 0.4-0.6M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

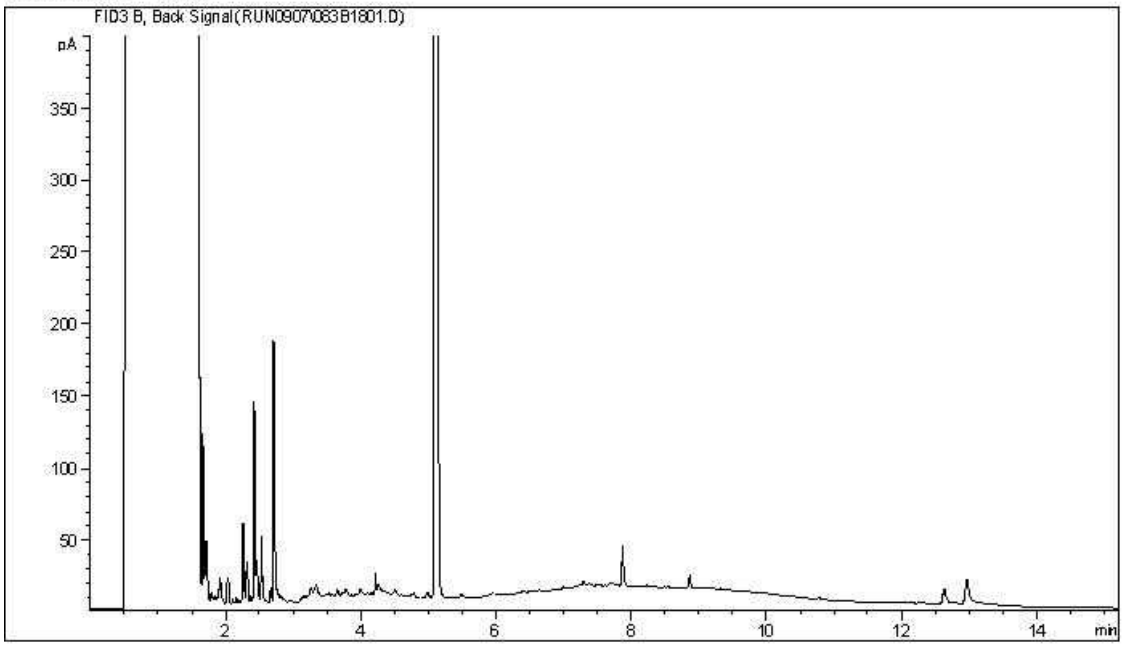
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3982

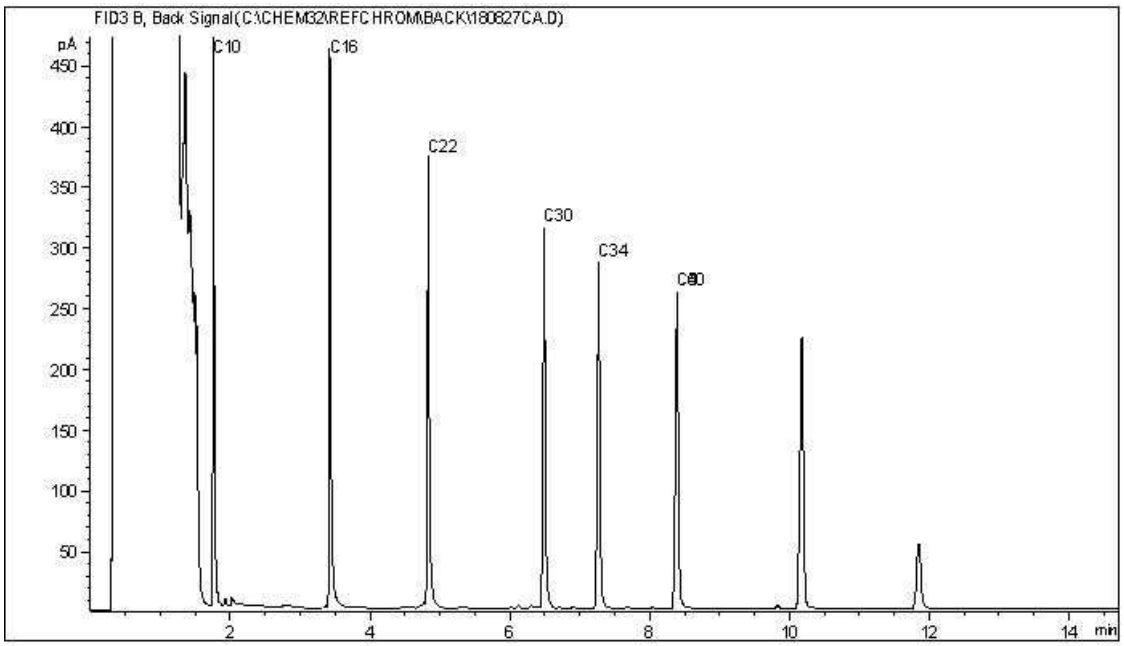
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: SS1 @ 0.4-0.6M

Aliphatic & Aromatic Fractions >C10-C50 Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

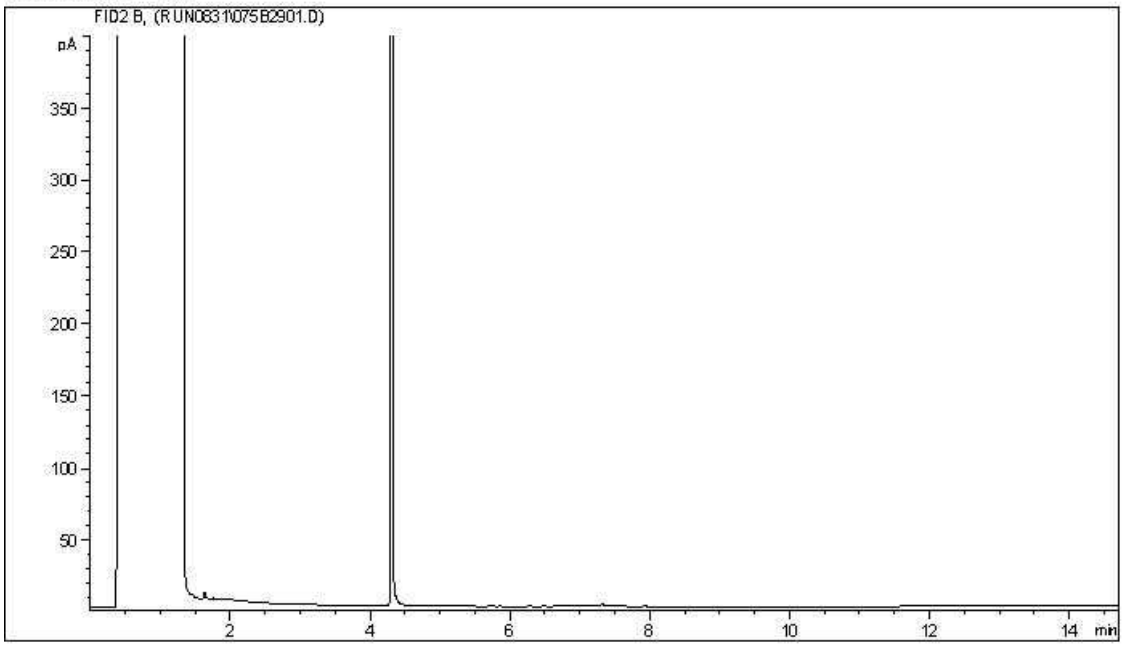
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3983

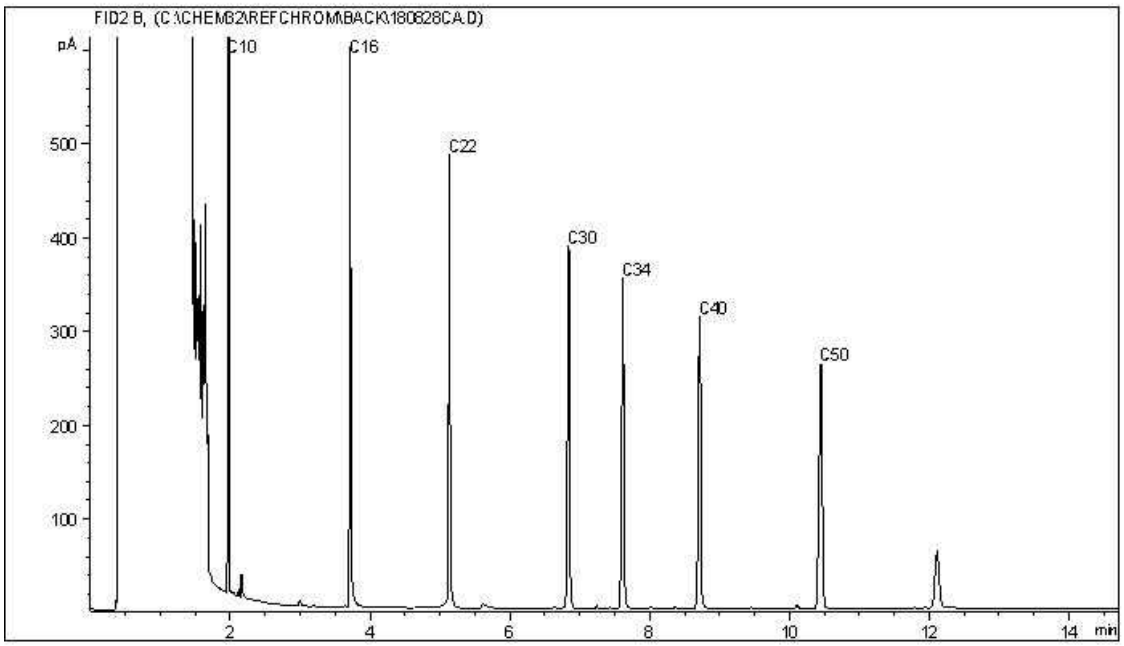
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: SS2 @ 0.1-0.3M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

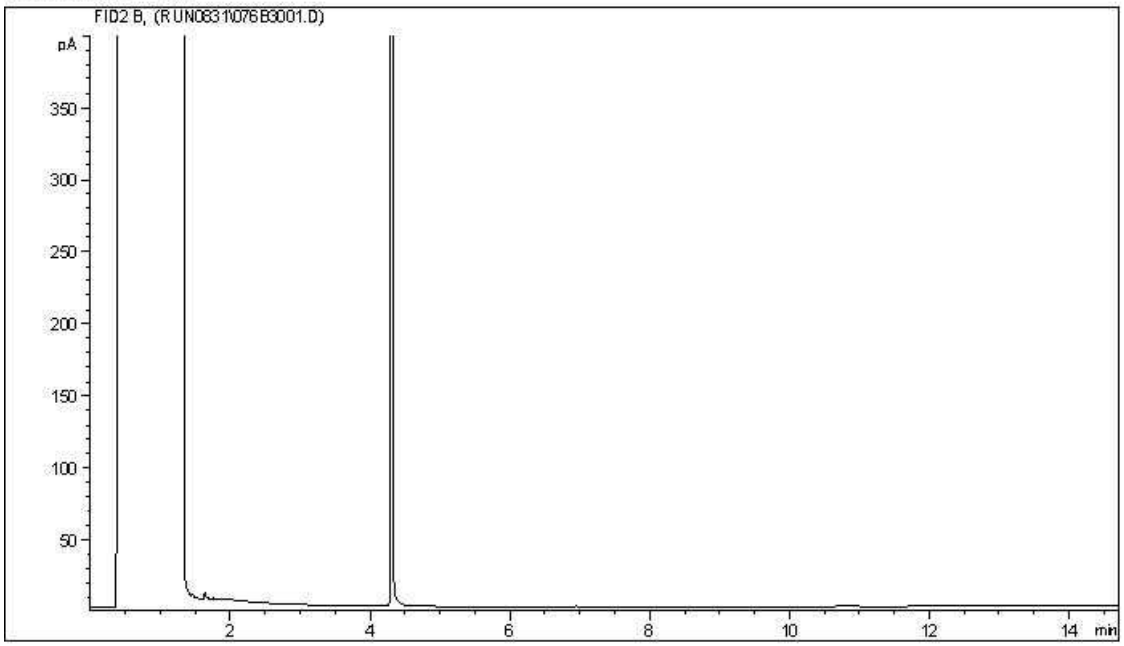
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3984

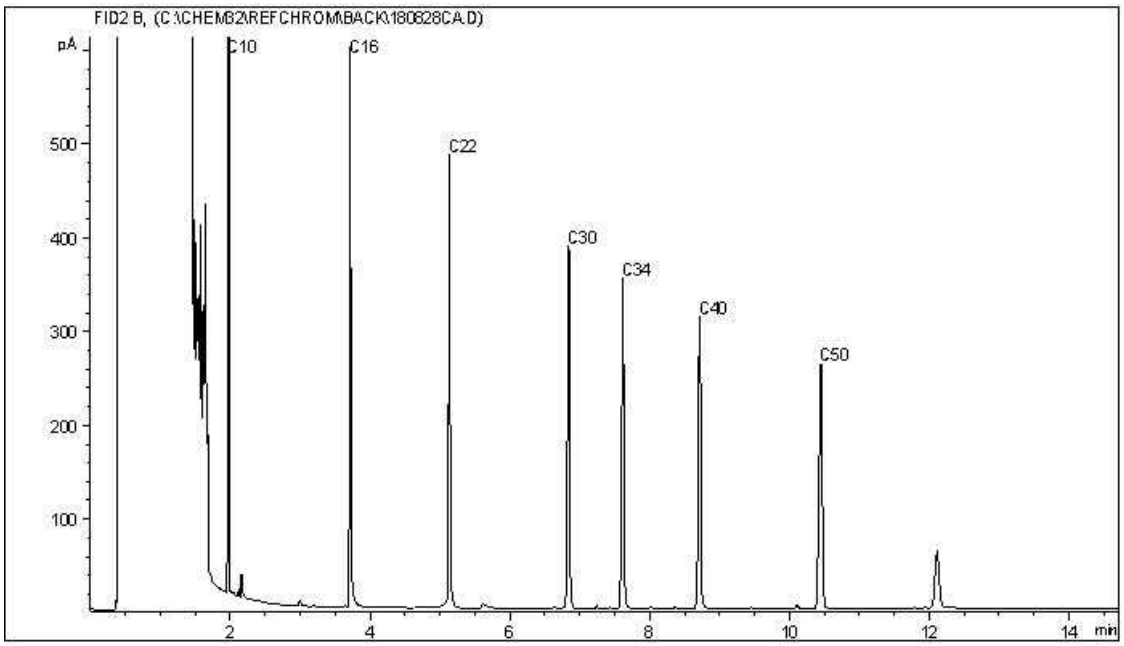
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: SS3 @ 0.1-0.3M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

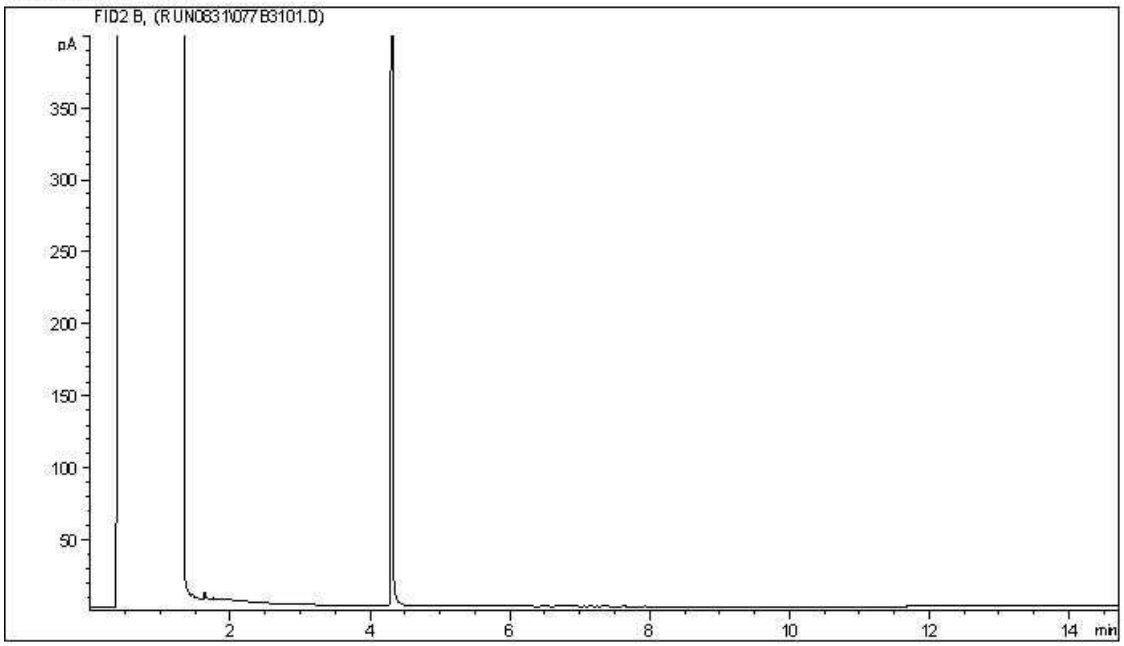
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3985

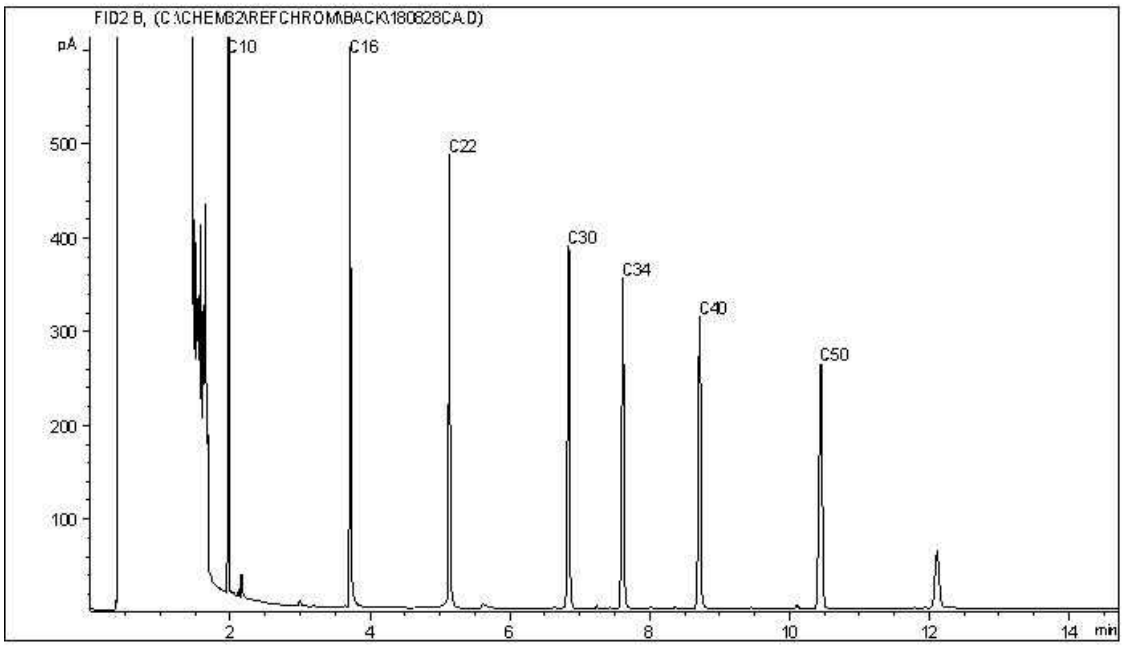
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: SS4 @ 0.1-0.3M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

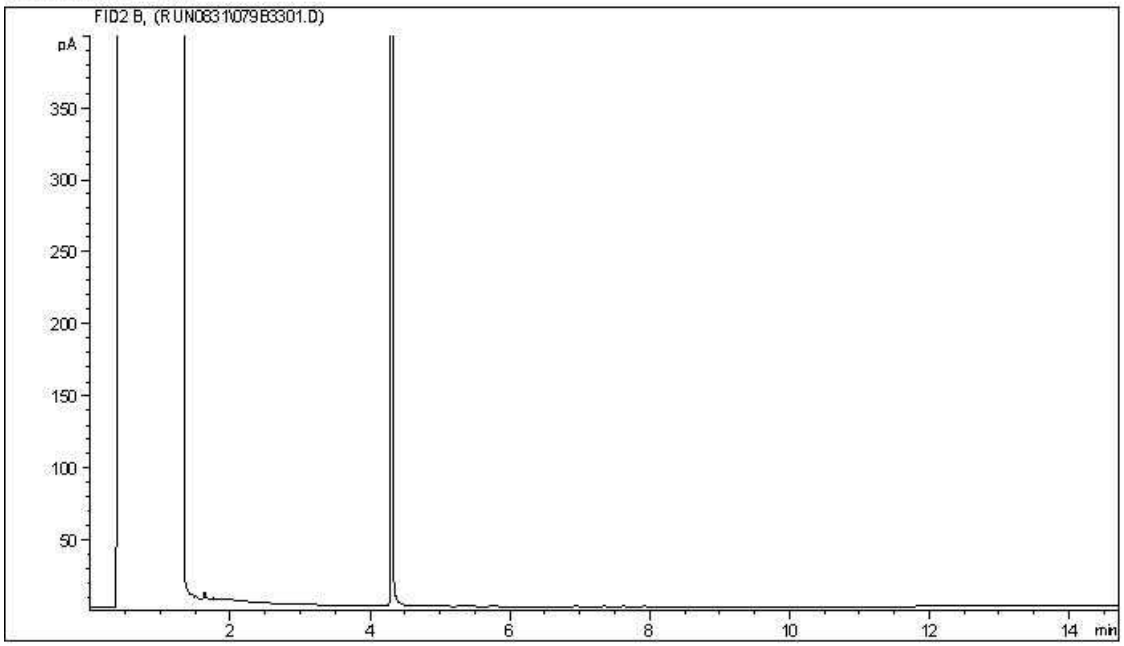
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3986

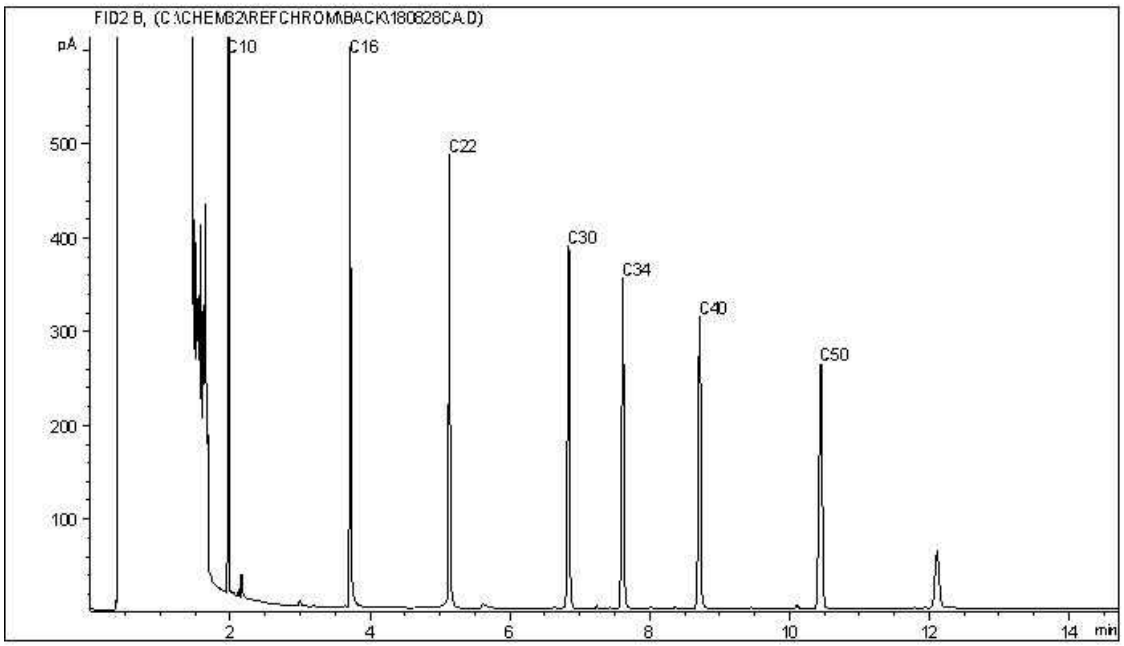
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: SS5 @ 0.1-0.3M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

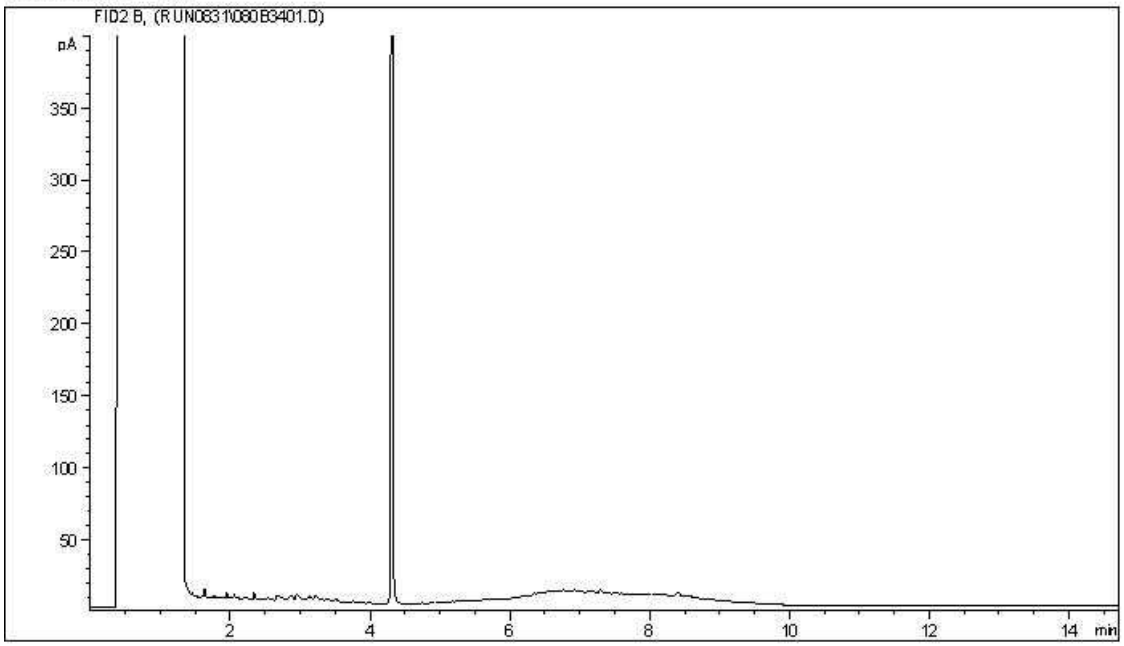
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3987

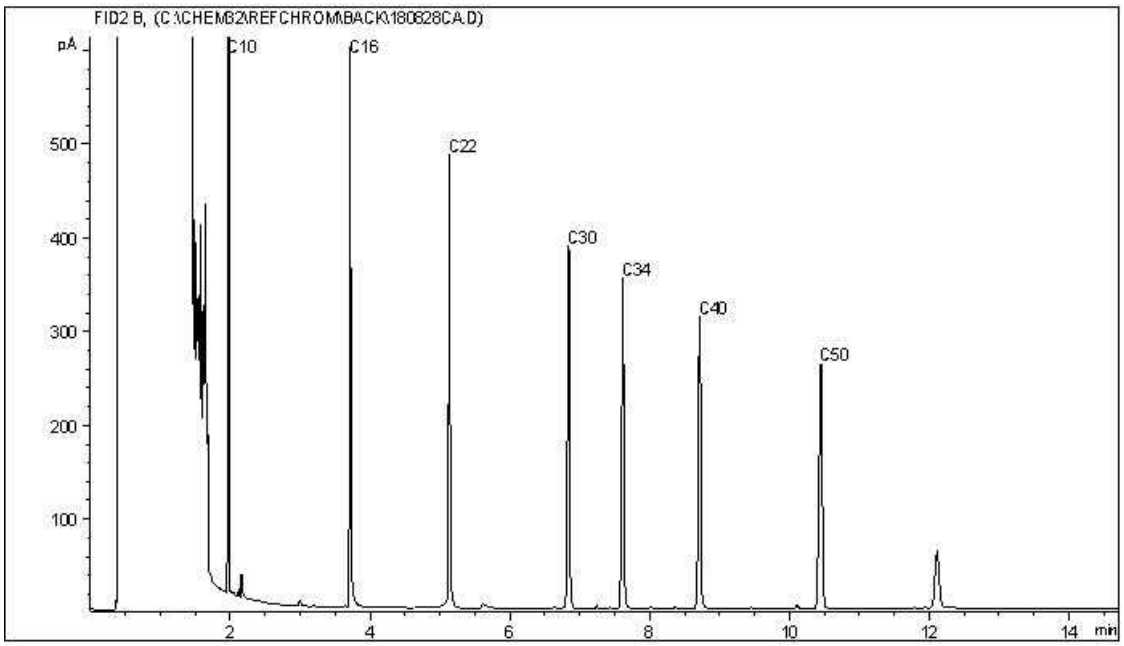
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: SS6 @ 0.1-0.3M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

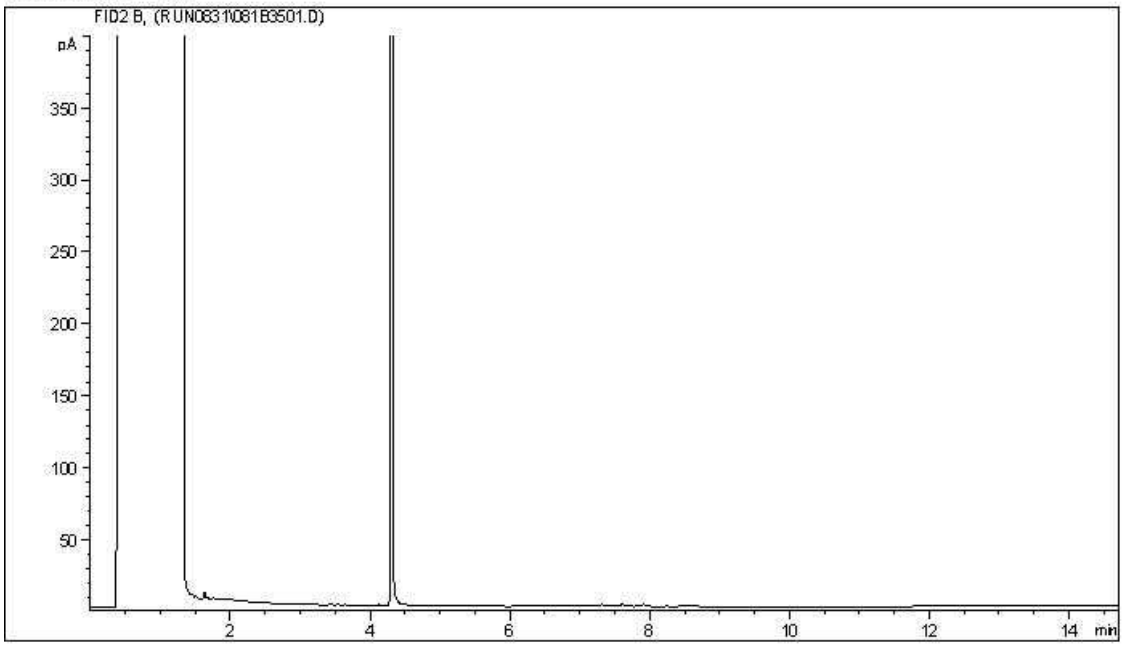
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3988

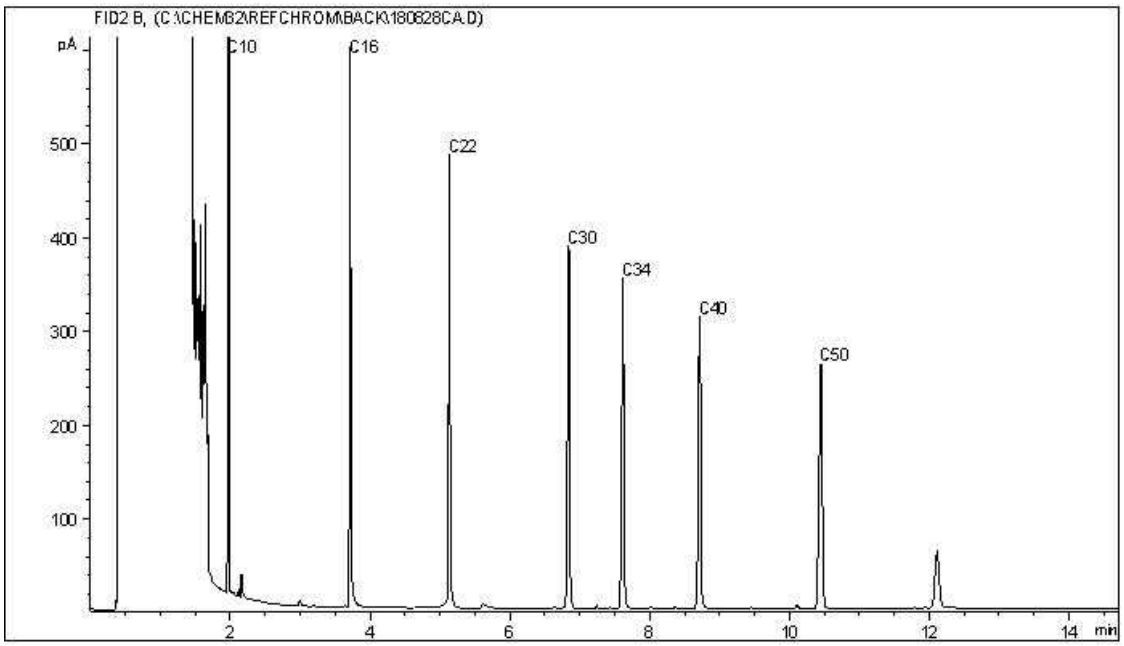
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: SS7 @ 0.1-0.3M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

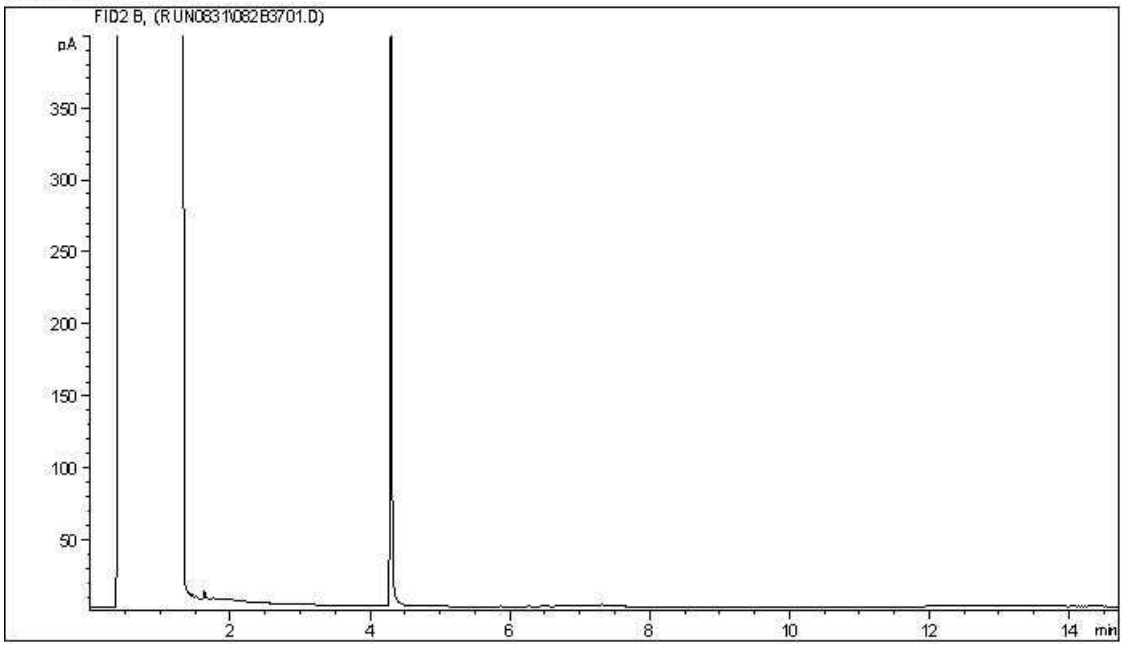
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3989

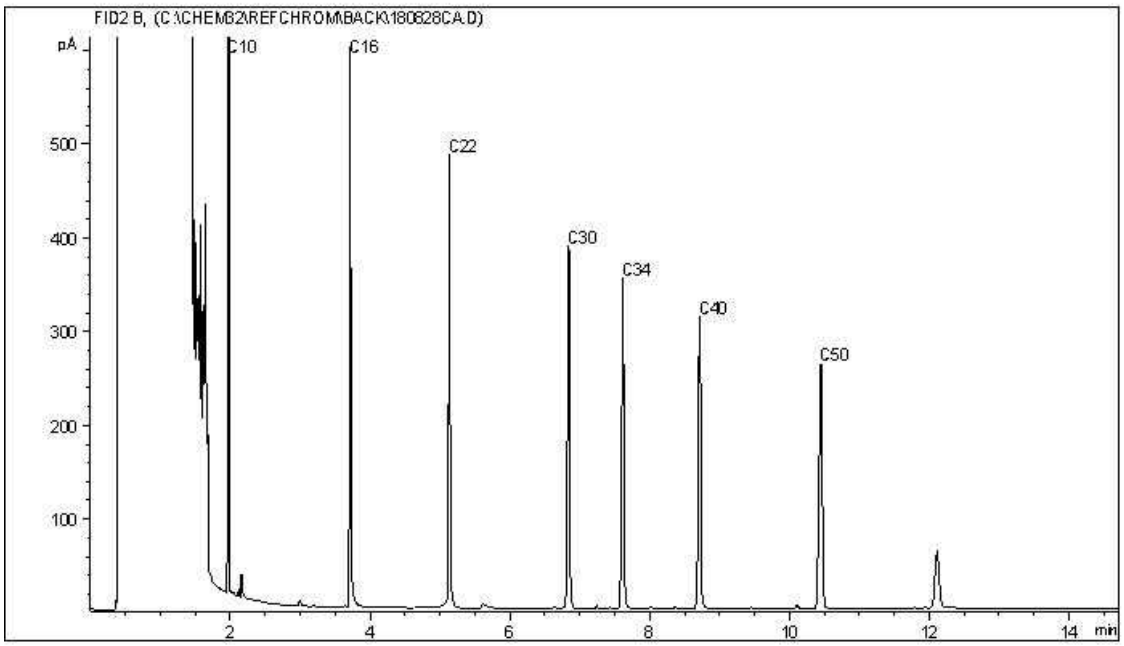
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: SS8 @ 0.1-0.3M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

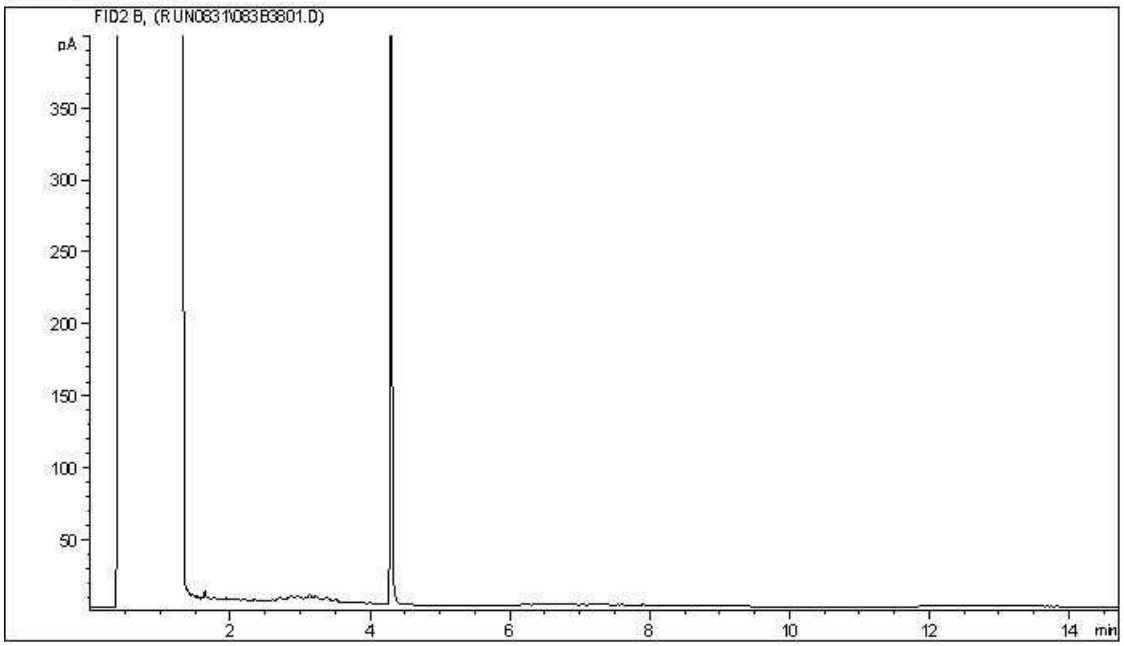
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3990

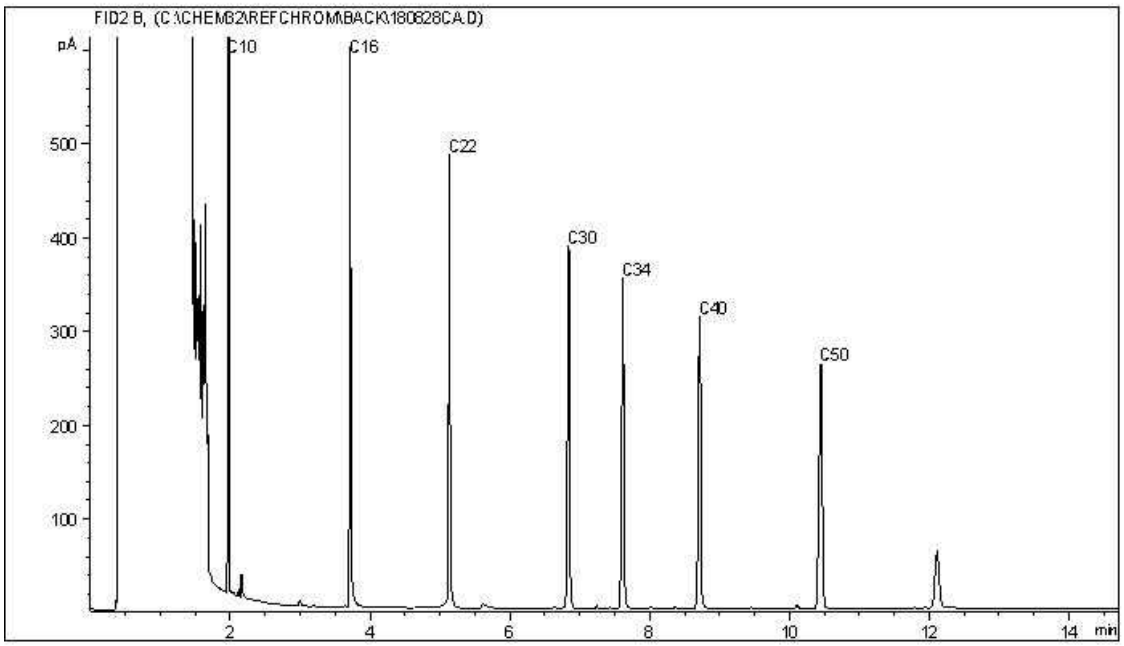
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: SS9 @ 0.1-0.3M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

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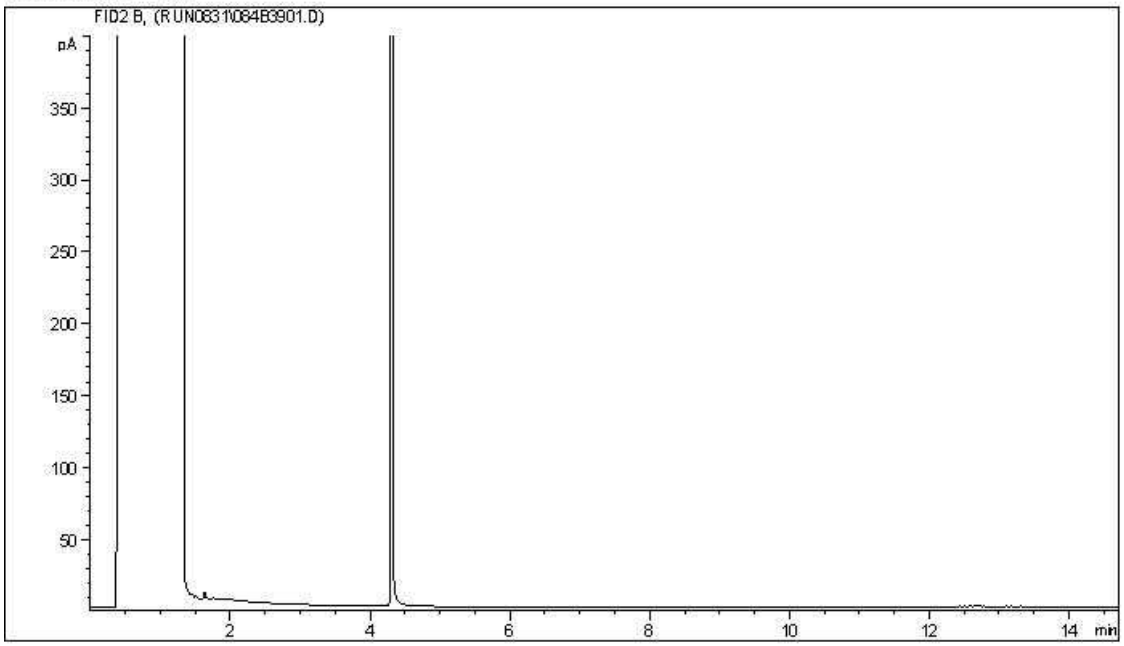
Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3991

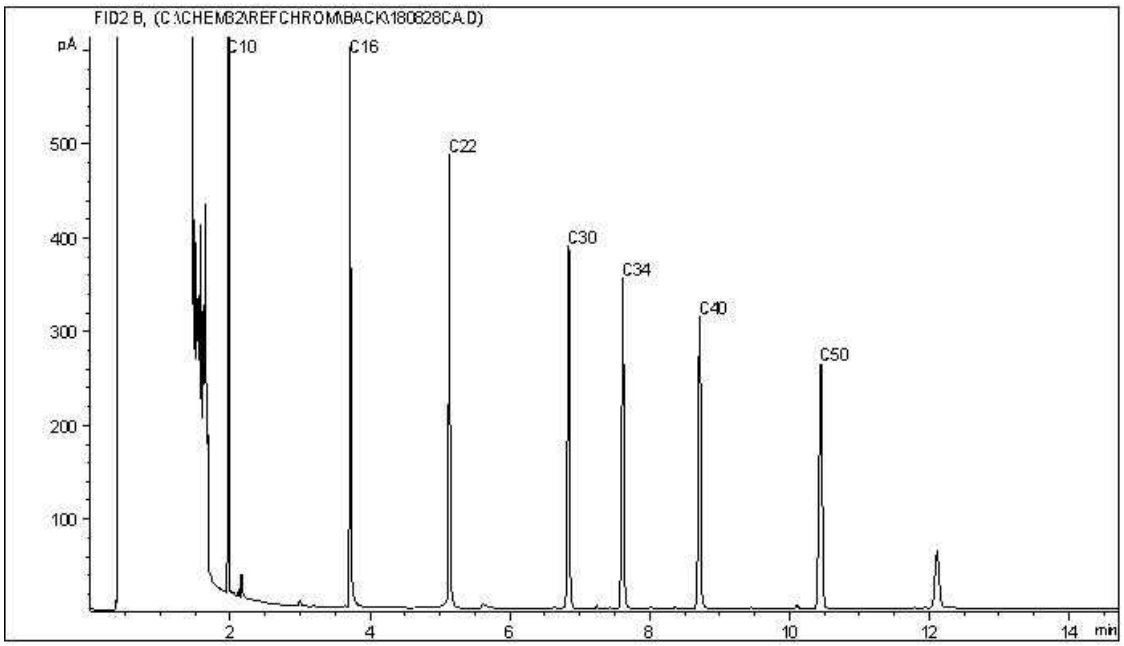
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: SS10 @ 0.1-0.3M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

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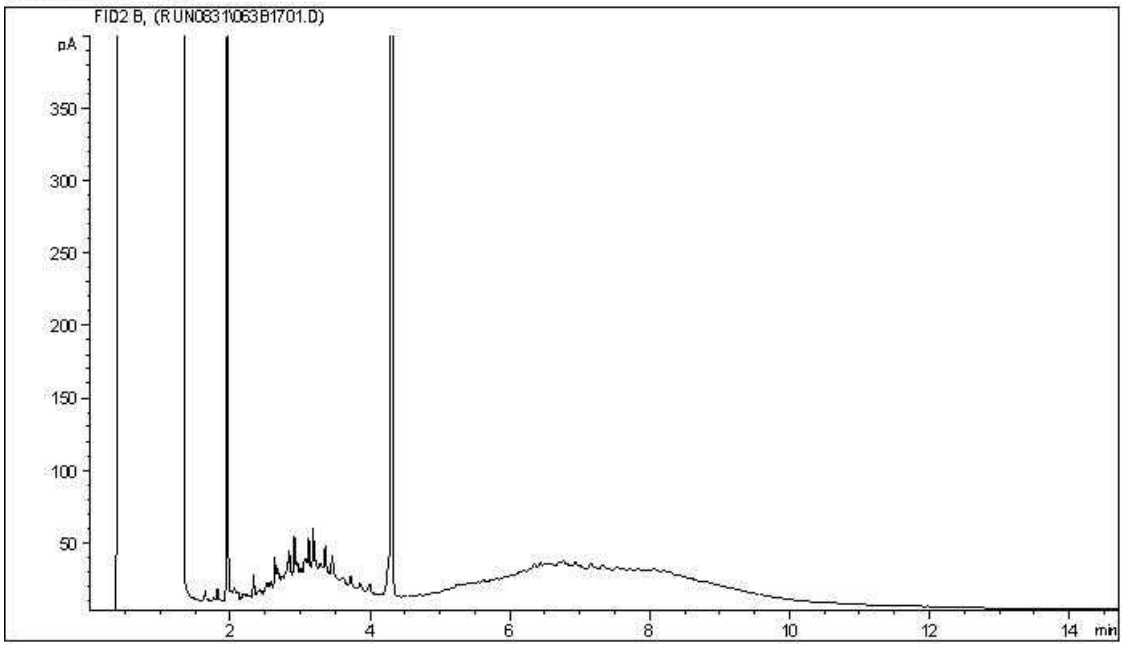
Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3992

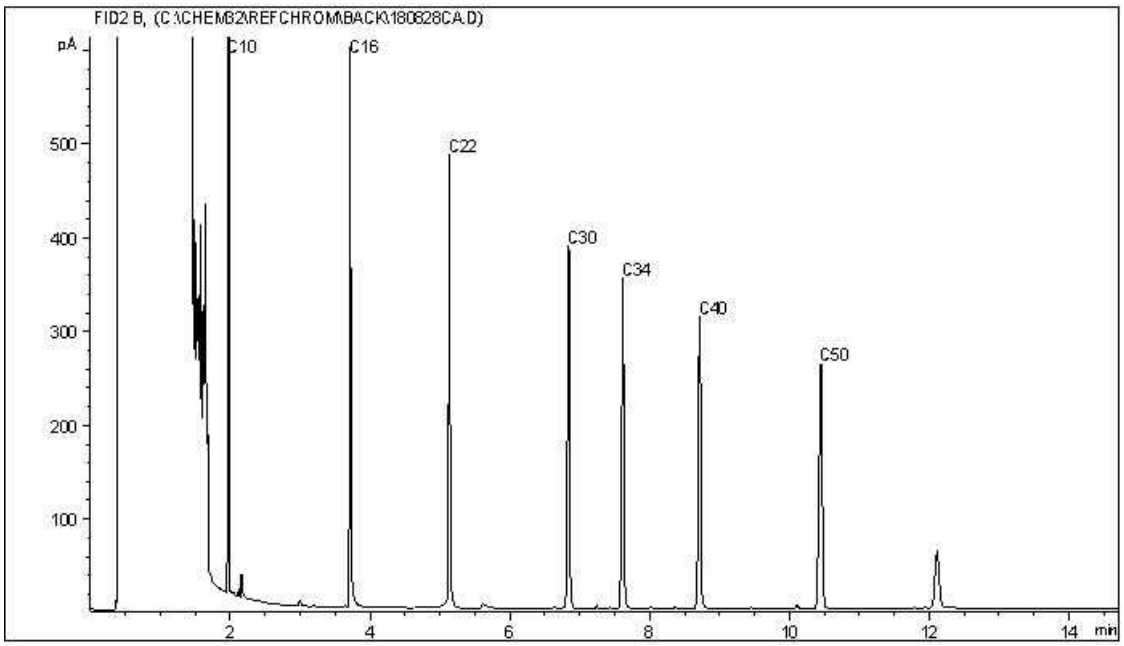
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: DUP18-01

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

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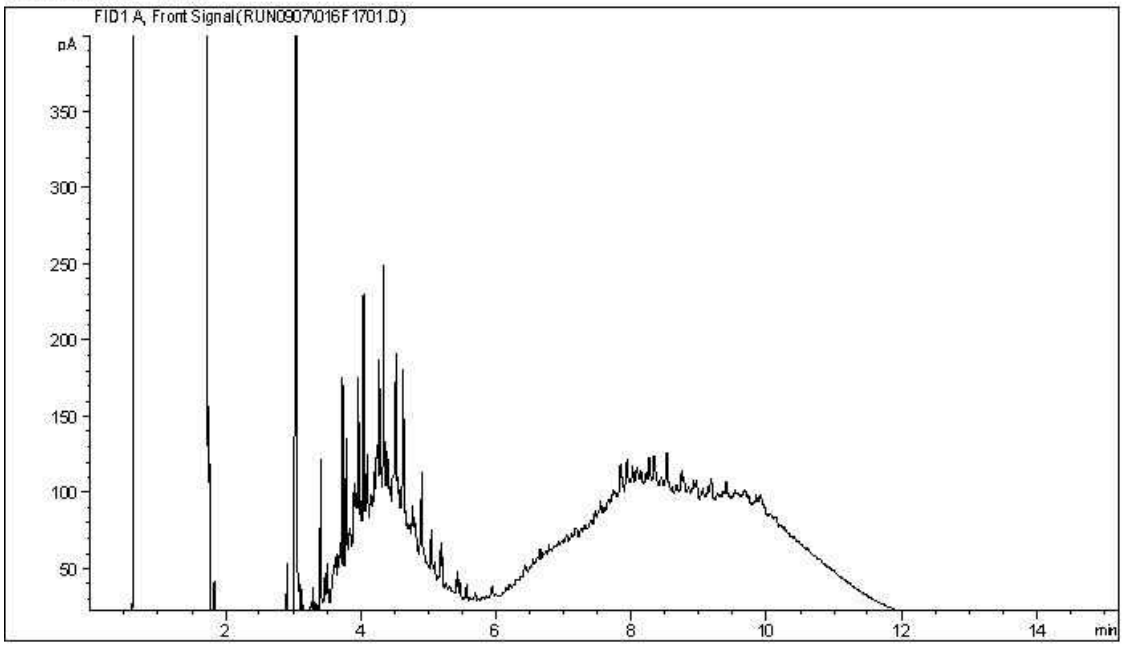
Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3992

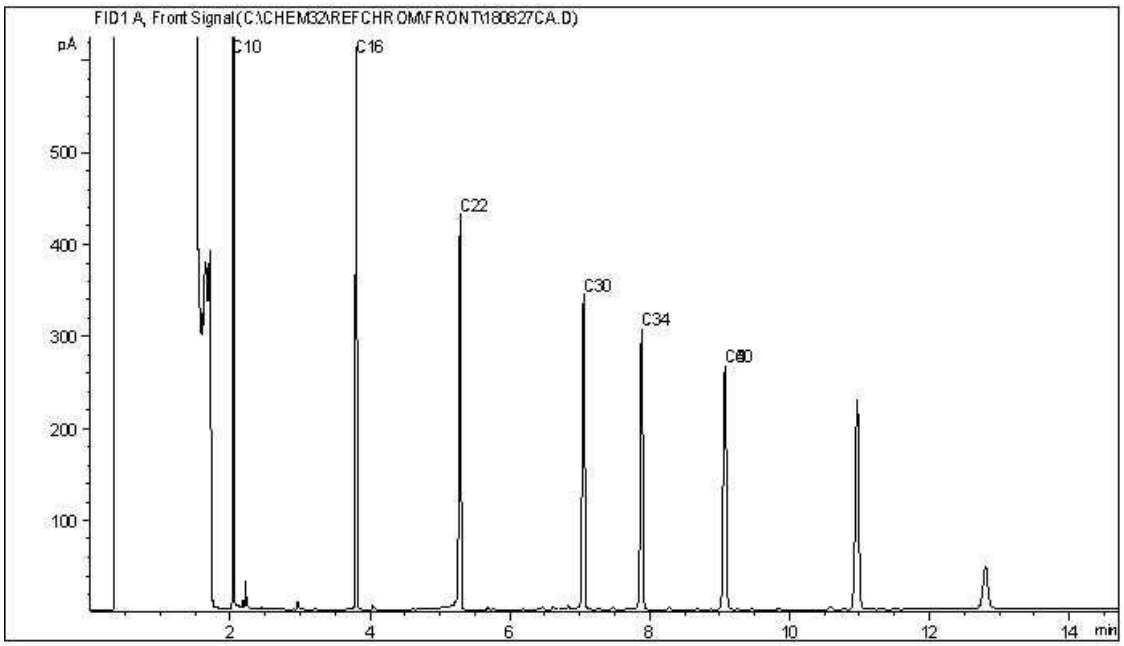
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: DUP18-01

Aliphatic & Aromatic Fractions >C10-C50 Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

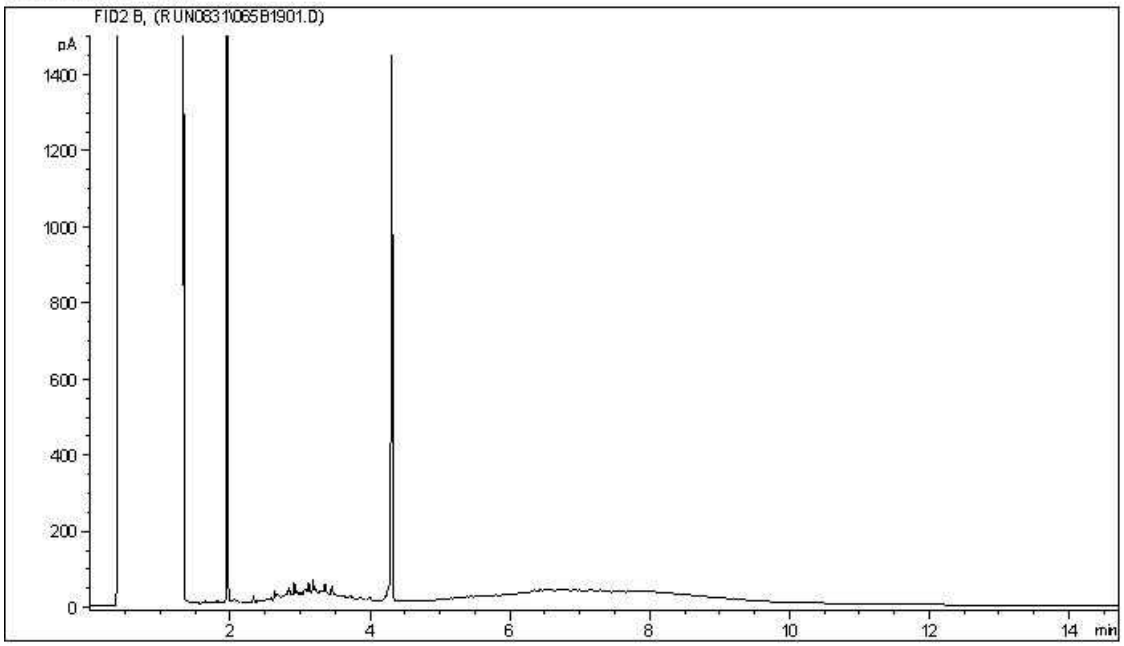
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B873067
Report Date: 2018/09/07
Maxxam Sample: UE3992 Lab-Dup

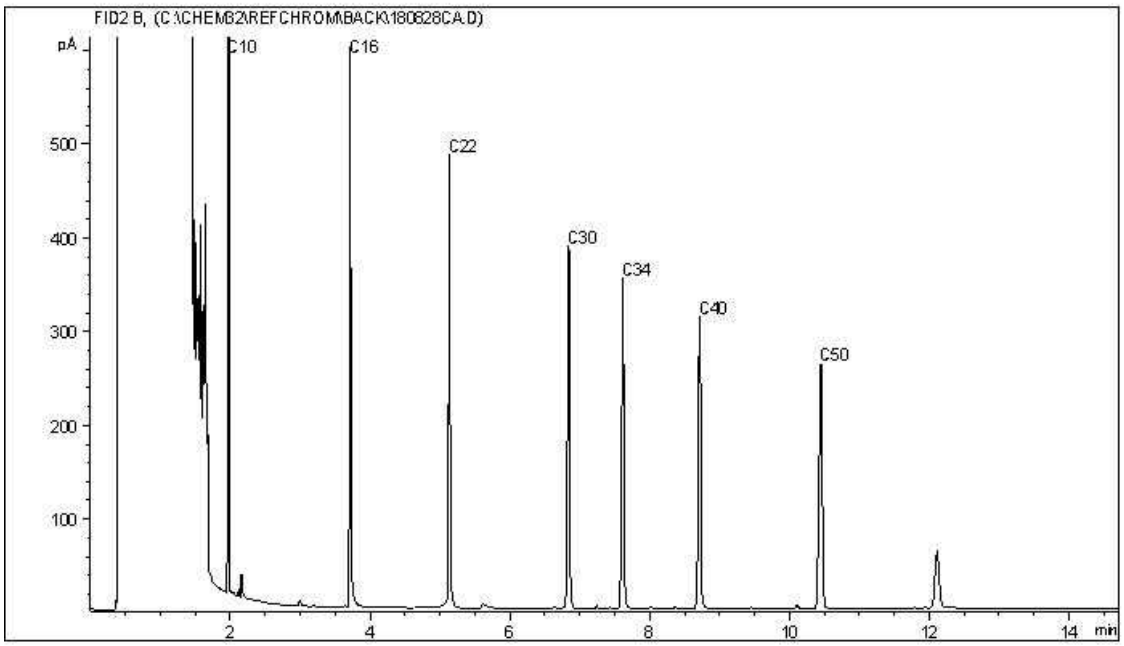
STANTEC CONSULTING LTD
Client Project #: 110220180
Site Reference: RESOLUTE BAY, NO
Client ID: DUP18-01

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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

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