APPENDIX G -

ESA REPORT AND GEOTECHNICAL MEMO

DILLON CONSULTING

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

Historical Review/Phase I ESA and Phase II ESA – Final Report

Former Mess Hall and Barracks, Former USN Argentia
Argentia, NL

October 2016 – 16-3976

October 24, 2016

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Attention: Ms. Melissa O'Reilly-Nash
PWGSC Project Manager

Historical Review/Phase I ESA and Phase II ESA – Final Report
Former Mess Hall and Barracks, Former USN Argentia, Argentia, NL

Dillon Consulting Limited is pleased to provide the final Historical Review/Phase I Environmental Site Assessment and Phase II Environmental Site Assessment report for the Former Mess Hall and Barracks property, Former USN Argentia located in Argentia, NL.

We trust this report is sufficient for your purposes at this time. However, if you have any questions or comments, please do not hesitate to contact the undersigned.

Sincerely,

DILLON CONSULTING LIMITED

Dawne Skinner, P.Eng., MASc.
Project Manager

DMS:jb
Enclosure

Our file: 16-3976

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Executive Summary

Dillon Consulting Limited (Dillon) was retained by Public Works and Government Services Canada (PWGSC) to conduct a historical review/Phase I Environmental Site Assessment (ESA) and preliminary Phase II ESA on a portion of the Marine Telecommunications Traffic Centre (MCTC) property located on Placentia Pike in Argentia, NL. The MCTC property is currently owned by the Department of Fisheries and Oceans (DFO) and the Canadian Coast Guard (CCG) and is occupied by the MCTC Operations building and associated infrastructure near the centre of the property, a CCG helipad and refuelling tanks behind the MCTC and an Environment and Climate Change Canada (ECCC) weather station located in the area between the MCTC building and Placentia Pike. The portion of the property of interest for the Phase I/II ESA is the area bounded by the site driveway and Placentia Pike. It is our understanding that the CCG may build a new MCTC building on this Site.

A review of historical reports and figures, interviews with people who have knowledge of the Site and a Site walkover was conducted to identify historical and current sources of potential environmental contamination that may impact the subject Site. Potential sources of contamination were identified including the historical presence of tank farms and a landfill on adjacent properties as well as the presence of metals and petroleum hydrocarbon contaminated soils and aboveground storage tanks (ASTs) at the MCTC building and CCG Helipad immediately northwest of the site. While there are currently no buildings on the subject Site, the site was formerly occupied by the USN Mess Hall and Barracks (Buildings 301 and 302). Records indicate that the buildings were removed in 1972 however it is not known if the building foundations and steam pipe line were removed or if they remain onsite. Currently, the ECCC weather station as well buried infrastructure (underground and overhead power lines, underground communication lines, potable water line) exist on the site. There are also a number of manholes on site leading towards Placentia Bay to the west, presumably for stormwater discharge. Historical site drawings also identify the presence of a buried grounding network for historical and/or current towers located on the property on the northwestern half of the subject Site.

Based upon this information, Dillon recommended that a Phase II ESA be completed on the subject site to determine if the foundations and steam pipeline of the former Mess Hall and Barracks buildings still exist on site and to assess the concentration of contaminants of potential concern (polycyclic aromatic hydrocarbon (PAH's), metals and petroleum hydrocarbon (TPH)) in soils and groundwater. An intrusive investigation could not be conducted on the western portion of the site due to the presence of the buried grounding network and the weather station. However, given the historical information available for that area of the subject site, it is not anticipated that the environmental condition of that portion will vary greatly from the remainder of the site.

The field component of the Phase II ESA was conducted from June 14 – 17, 2016 and included the excavation of three test pits and one trench in the vicinity of the former Mess Hall and Barracks buildings as well as the drilling of two monitor wells. During excavation of the test pits and trench, the

foundations for both former buildings were observed as was what appeared to be the concrete casing for the steam pipeline between the two foundations. The steam pipeline itself was not observed due to the presence of the concrete casing. Concrete debris and rebar was also uncovered in the trench.

Several soil samples (including field duplicates) were collected from the testpits/trench and the boreholes and submitted to Maxxam Analytics for TPH, metals and PAH analyses. No exceedances of the CCME Tier I Soil Quality Guidelines (SQG's) were identified for any of the contaminants of potential concern.

Two groundwater samples plus a field duplicate were collected from the newly constructed monitor wells on site (MW16-1 and MW 16-2) and two groundwater samples were collected from two existing monitoring wells located behind the MCTC building to the west of the subject site. The samples (along with a field duplicate) were submitted to Maxxam Analytics for TPH, dissolved metals and PAH analyses. Samples collected from the existing wells (MW1 and MW2) had elevated Detection Level's (RDL) that exceeded the Tier I Federal Interim Groundwater Quality Guidelines (FIGWQ) for eight metals and exceeded the FIGWQ for dissolved boron. All samples, with the exception of MW16-1, exceeded the FIGWQ for dissolved cadmium. All samples, with the exception of MW-2 (which had an elevated RDL compared to the FIGQG), exceeded the guideline for dissolved iron. Samples MW16-1 and MW16-2 contained dissolved manganese concentrations that exceeded the FIGQG. The Tier I FIGQG's represent the lowest available numeric guideline for all exposure pathways and the guidelines do not consider the dilution impact of the receiving water body. By applying a 10-fold dilution factor, all groundwater metal concentrations are at or near the Tier I criteria therefore the metal exceedances identified in groundwater do not pose an unacceptable risk to human or ecological receptors. No other exceedances were identified.

Based upon the results of the Historical Review/Phase I ESA and the preliminary Phase II ESA, no contaminants of potential concern exceed the applicable criteria for a commercial site with coarse grained soils and non-potable groundwater. From an environmental perspective, the presence of the buried foundations and concrete casing of the former Mess Hall and Barracks buildings and steam line does not represent a risk however a contractor should be consulted on whether or not the foundations should be removed prior to building the new MCTC building. If the steam pipeline is to be removed during construction, the pipe material/insulation should be analysed for asbestos and handled and disposed of accordingly. MW 16-1 and MW16-2 should be properly decommissioned prior to constructing the new MCTC building.

1.0 Introduction and Background

Dillon Consulting Limited (Dillon) was retained by Public Works and Government Services Canada (PWGSC), to conduct a historical review/Phase I Environmental Site Assessment (ESA) and preliminary Phase II ESA on a portion of the Marine Communications Traffic Centre (MCTC) property located approximately 100 m west of the intersection of Placentia Pike and Waterfront Drive in the community of Argentia, Placentia Bay, NL (See Figure 1, Appendix A). The MCTC property was part of the United States Navy (USN) Military Base from the 1940's to 1963 at which point the Department of Fisheries and Oceans (DFO) and the Canadian Coast Guard (CCG) took over. The property is currently occupied by the MCTC Operations building and associated infrastructure near the centre of the property, a CCG helipad and refuelling tanks behind the MCTC and an Environment and Climate Change Canada (ECCC) weather station located in the area between the MCTC building and Placentia Pike. The portion of the property assessed during this Phase I/II ESA (the "subject site") is the area of the property located in front of the MCTC building that is bounded by the MCTC driveway and Placentia Pike (See Figure 2, Appendix A). It is our understanding that the CCG may build a new MCTC building on this Site.

2.0 Project Objectives

The specific objectives of the project were to:

- Identify historical or current sources of potential environmental contamination that may impact the subject site;
- Assess the soil and groundwater on the subject site for contaminants of potential concern (COPC's) and compare the results against applicable guidelines;
- Determine if the foundations and a steam pipeline from former Mess Hall and Barracks buildings remain onsite; and
- Provide a report documenting the findings of the Historical Review/Phase I ESA and Phase II ESA.

3.0 Scope of Work

To meet the project objectives, the following scope of work was completed:

- A historical review/Phase I ESA of the subject site, as well as the surrounding properties, including:
  - A review of available and relevant records for the subject property and adjacent properties (neither a title search nor a request for government files related to the subject property, other than those provided by PWGSC, were included in this scope of work);
  - Interviews with available PWGSC/ DFO/ CCG personnel with knowledge of the subject site; and,
  - A site walkover, with a focus on identifying sources of COPC's.
- Based upon the results of the historical review/Phase I ESA, a Phase II ESA which included soil and groundwater sampling programs was completed and involved the following tasks:
  - Locating underground/buried utilities;
  - Excavating three test pits and a trench in the vicinity of the former Barracks and Mess Hall buildings to identify the presence/absence of building foundations, steam lines and/or debris and to collect soil samples for analysis for COPC's; and
  - Drilling and installing two (2) groundwater monitoring wells in the vicinity of the former mess hall and barracks to collect soil and groundwater samples for analysis of COPC's.
  - Groundwater samples were also collected from two existing monitoring wells located west of the subject site on the property owned by DFO.
- Provide a report outlining the findings of the Historical Review/Phase I/II ESA.

4.0 Phase I ESA/Historical Review

The methodology and findings of the historical review are presented below.

4.1 Methodology

The historical review was conducted in general accordance with the guidelines and principles established by the Canadian Standards Association (CSA), as presented in the document Z768-01 Phase I Environmental Site Assessment, November 2001 (reaffirmed 2012) and included a review of available and relevant historical documentation, interviews with personnel who had knowledge of the subject site, and a site visit. Since the Argentia Management Authority (AMA) and PWGSC have access to the current and historical records of the subject property, it was deemed unnecessary to conduct a title search or request document records pertaining to the environmental condition of the subject property and surrounding properties from other government agencies.

4.1.1 Records Review

The following reports were reviewed as part of this Historical Review/Phase I ESA:

- Sheppard Green Engineering (SGE) & Porter Dillon. December 1993. Environmental Site Assessment Northside U.S. Naval Facility, Argentia. Final Report for Priority Areas 2 & 3;
- Sheppard Green Engineering (SGE) & Porter Dillon. March 1994. Argentia Northside Environmental Site Assessment U.S. Naval Facility, Argentia Newfoundland Final Report Volume I of III: Text (select pages);
- Dillon Consulting. March 2001. Phase I Environmental Site Assessment, CCG MCTS Station, Argentia, NL Final Report.
- Dillon Consulting. March 2001. Phase I/II Environmental Site Assessment, CCG Helipad, Argentia, NL Final Report;
- Dillon Consulting. March 2002. Phase II/III Environmental Site Assessment Final Report - Argentia VTC Helo Fuel Dump, NF, DFRP #23241, NA #00007;
- Dillon Consulting. March 2002. Phase II/III Environmental Site Assessment Final Report – Placentia MCTS Centre, Argentia, NF, DFRP #23241, NA #00008;
- Dillon Consulting. March, 2011. Closure Documentation, Former USN, Argentia NL, Volume 1 Northside Peninsula; and
- AME., January 2013. Hazardous Building Materials Survey, Canadian Coast Guard Marine Communications Traffic Center, Argentia, Newfoundland and Labrador. Final Report.

The following maps and drawings were reviewed:

- USN Base Plate Drawing 6 (no date);
- USN Base Plate Drawing 9 (no date); and
- Drawing S-4224-4 (Received from client on May 3, 2016).

Aerial photographs reviewed from the 2001 Phase I/II ESA of the Canadian Coast Guard Helipad, Argentia, Newfoundland final report are presented in Appendix B. Topographical mapping and geological maps from the NL Department of Natural Resources (NLDNR) were also reviewed to assess the local settings and hydrogeological conditions in the vicinity of the subject site.

4.1.2 Interviews

Historical information was gathered throughout the ESA by corresponding with a number of individuals who have knowledge of the subject property's history as well as the surrounding properties. These individuals include Melissa O'Reilly-Nash (PWGSC), Janette Dwyer (DFO), Patrick McQuarrie (DFO/CCG), Fred Heffernan (AMA), Junior Pomeroy (AMA), and Bill Legge (PWGSC). Information obtained from these individuals is presented within this report.

4.1.3 Site Visit

Dillon personnel completed a site visit on May 26, 2016 to visually assess and document potential or actual environmental liabilities at the subject site including those resulting from adjacent sites. The presence of any visible infrastructure, physical obstructions, discarded materials and stressed vegetation were noted, if found, on the subject site and details are included in this report.

4.2 Historical Review/Phase I ESA Results

4.2.1 Aerial Photo Review

Aerial photographs for the years 1951, 1971, 1982, 1993/4 1995 and 2010 were reviewed and a summary of the findings is presented in the following table. The scale and resolution of the photographs varied and did not always allow for a detailed evaluation of the surface conditions at the Site or adjacent properties. The aerial photos are presented in Appendix B.

Table 1 - Air Photo and Imagery Review Summary

Year	Observation
1951	Former Mess Hall and Barracks (Buildings 301 and 302) are visible. There appears to be a possible structure located to the west of the subject site. The former Irving Tank Farm is visible to the south and Building 292 is visible to the north.
1971	Buildings 301 and 302 and a semi-circular driveway are visible on the subject site. Building 292 is visible to the north of the subject Site. What appears to be the berm around the former Irving Tank Farm is also visible.
1982	The foundations of Buildings 301 and 302 are visible, which is consistent with the reports that indicate these buildings had been removed by this time. The MCTC building and garage is also visible. What appears to be the berm around the former Irving Tank Farm is visible. Building 292 no longer appears to be present.
1993/4	The foundations of Buildings 301 and 302 are visible on the subject site. The MCTC building and garage is also visible. Berm surrounding the former Irving Tank Farm is visible southwest of the subject site.
1994/5	The foundations of Buildings 301 and 302 and the adjacent areas appear to be covered over with gravel. No other infrastructure is observed on the subject site. The MCTC building and garage is visible. The berm surrounding the former Irving Tank Farm is visible. Gravel roads and a tennis court are visible on the property north of the subject site.
1995	The MCTC building and garage are visible as are roads/driveways on the MCTC property and the property to the north of the subject site. It appears as though gravel has been placed on the subject site to cover the former building foundations and the surrounding area.
2010	The semi-circular driveway and a structure in the vicinity of the MCTC building are visible. No other infrastructure can be identified, partly due to the poor resolution of the photograph.

4.2.2 Historical Reports and Figures

4.2.2.1 Subject Property

According to a review of historical records and information provided PWGSC, the MCTC property was occupied by the USN from the 1940's to 1963 at which point DFO/CCG took over the property. It is our understanding that the former Mess Hall and Barracks buildings occupied the subject site until 1972 at which time they were demolished by the USN. As identified in Table 1 (above), as of 1994/1995, the foundations and underground infrastructure associated with the buildings do not appear to have been removed from the subject site, but were filled in and covered with gravel. There is no record of the foundations of these buildings being removed during a base-wide foundation removal program in 1999/2000. According to historical drawings, two buried grounding systems for historical and/or existing towers are present on the MCTC property and extend across the northwestern half of the subject site (see Figure 2, Appendix A). It is assumed that the grounding network remains onsite.

The MCTC operations centre is located approximately 12.5 m to the west of the subject site and has historically comprised a MCTC building, garage, communications/radio towers and buried grounding networks. The buildings and the majority of the infrastructure was developed by the USN in the 1940's and taken over by CCG in 1963. The buildings and infrastructure have undergone several upgrades since that time. An underground fuel storage tank was removed from the site in 2000. An aboveground storage tank containing diesel fuel for an emergency generator was located inside the garage building. A septic tank and field for the MCTC building is located to the west of the building. Previously conducted phased ESAs/ Hazardous Materials Assessment on the MCTC identified the presence of the following contaminants/hazardous materials:

- Asbestos Containing Materials (ACMs);
- lead-acid batteries;
- mercury containing thermostats and light tubes;
- potential ozone depleting substances;
- paint containing lead and mercury concentrations exceeding applicable guidelines inside the building;
- potential lead-containing pipes inside the building; and,
- lead and copper impacted soils (above CCME Commercial Soil Quality Guidelines (SQG's)) along the west and north sides of the MCTC building and west and west sides of the garage (see Figure 3, Appendix A). The estimated volume of impacted soils was approximately 83 m^3 (Dillon, 2002).

The Coast Guard Helipad is located behind the MCTC Building. It was first developed in 1994 and operates as a refuelling station for helicopters. Historical reports indicate that an above ground storage tank (AST) containing aviation fuel for refuelling helicopters has been onsite since 1994. Prior to that helicopter refueling was conducted using 50 gallon drums. Previous studies conducted on the CCG Helipad found that the 9,090 L tank containing Jet 'A' type fuel was non-compliant with several federal

and provincial regulations and that TPH concentrations in the vicinity of the tank exceeded applicable guidelines. The area of TPH impacted soil was estimated to be 5 m^2 with a depth of approximately 1 m.

4.2.2.2 Adjacent Properties

It is our understanding that two former 5000 gallon fuel tanks were located across Placentia Pike from the subject site and were used to heat the former Mess Hall and Barracks buildings. The tanks were removed during a tank removal program that took place between 1987 and 1989 however it is not known if the fuel pipes connecting the tanks to the building were removed.

Priority Area II is located to the northwest of the subject site and was historically the site of the Department of National Defence (DND) Fuel Storage Area. A 1993 report (SGE-Porter Dillon, 1993) indicates that, at the time of the report, two underground steel petroleum storage tanks (ID#'s 611 and 612) were present onsite. The tanks had a capacity of 9 million litres and were used to store heavy diesel at the time. Previously, they had stored aviation gas. As part of an environmental site assessment, six groundwater wells were installed on the site in 1993 and soils and groundwater were analysed for TPH. No exceedances of the applicable guidelines of the time were identified. The groundwater flow direction indicated in the report was to the northwest (away from the subject site). The tanks were backfilled in place during a 1987-1989 tank removal program. It is not known if the underground pipelines were removed.

The former Irving Tank Farm site is located to the south of the subject property. The site historically contained four above ground bulk fuel storage tanks of unknown size. The tanks were separated by a firewall and an earthen berm and were removed between 1951 and 1966. Debris, including the concrete firewalls and 56 m^3 of potentially contaminated soil (hydrocarbons and non-friable asbestos) was removed from site in 1998/1999. A Phase III/IV ESA found no unacceptable environmental risks at the site. The ESA associated monitoring wells were decommissioned in 1999.

4.2.3 Site Visit

A site visit was conducted by Amanda Rietze on May 26, 2016. Weather conditions at the time of the site visit were cool with rain, drizzle and fog. Observations made of the current condition of the subject site and adjacent properties during the site visit are described below.

4.2.3.1 Site Description

The subject site is flat and grassy and is bordered by a semi- circular paved driveway which provides access to the adjacent MCTC building and garage. There are currently no buildings on the subject property however there are several pieces of weather sensing equipment near the centre of the subject site that is owned by ECCC. Several pieces of partially buried concrete and wooden blocks were observed at various locations (See Figure 3, Appendix A). Overhead power lines run along the eastern boundary of the subject property (along the right-of-way for Placentia Pike) and cut through the southern portion of the subject site towards the MCTC Building.

Buried infrastructure (see Figure 3) located on the subject site includes:

- a water line that supplies the MCTC building with municipal potable water;
- power/communication lines;
- a grounding grid associated with historical and/or current USN/MCTC towers; and
- manholes, presumably associated with stormwater pipes.

A sign, indicating the presence of the CCG MCTC, is located near the southern corner of the subject site anchored in a partially buried concrete base. A flag pole is located near the driveway on the western side of the property. What appear to be two stick up wells were also observed on the northeast corner of the subject site however the covers were unable to be opened. No staining was observed on the ground on the subject site. Subject site photographs are presented in Appendix C.

The MCTC building and associated infrastructure, including garage, a mobile trailer and towers, are located immediately to the west of the subject site. The MCTC building is serviced by municipal potable water, a septic tank and field (located to the northwest of the building) and electricity from NL Power. What appeared to be air conditioning units were observed at the rear of the MCTC building. Two monitoring wells (MW1 and MW2) from a previous environmental site assessment were observed behind the MCTC building. The condition of these wells was assessed during the site visit and they were deemed to be in good condition.

To the west of the MCTC site is the CCG helipad and two above ground storage tanks which contain jet fuel.

4.2.3.2 Adjacent Properties

The adjacent properties to the north/northeast of the subject site appear to be laydown areas for industrial materials and equipment. Both areas and their contents were secured with chain linked fences.

All other adjacent properties were vacant, grassy fields.

4.2.4 Potential Contaminants of Concern

Based upon the information presented in the historical documents and the observations made during the site visit, the contaminants of concern for the subject site were determined to be petroleum hydrocarbons, metals and polycyclic aromatic hydrocarbons (PAH's) in soils and groundwater.

5.0 Phase II ESA

The purpose of the Phase II ESA was to assess if the soil or groundwater on the subject site contain COPC concentrations in excess of the applicable criteria for the proposed site use (construction of a new MCTC building) and to determine if the foundations and steam pipeline from the former Mess Hall and Barracks buildings remain on the subject site.

5.1 Regulatory Framework/Guidelines

The proposed future use of the subject site is as a commercial site with non-potable groundwater and coarse-grained soil. The following guidelines were used to assess soil and groundwater quality on-site as part of this assessment.

Soil

- Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG), Canadian Soil Quality Guidelines (CSQG) for the Protection of Environmental and Human Health, July 2016 (website);
- CCME, Canada Wide Standards (CWS) for Petroleum Hydrocarbons (PHC) in Soil, July 2016 (website); and
- Atlantic RBCA Implementation (PIRI) Tier I Risk-Based Screening Levels (RBSLs), Risk Based Corrective Action.

Groundwater

- Federal Interim Groundwater Quality Guidelines (FIGQG), November 2012; and
- Atlantic RBCA Implementation (PIRI) Tier I Risk-Based Screening Levels (RBSLs), Risk Based Corrective Action.

5.2 Methodology

Methodologies used to conduct the assessment are presented in the following subsections.

5.2.1 Utility Clearances

Underground Consulting Services (UCS) was retained to locate the underground services on the subject site. While UCS was able to locate the underground water, power and sewer conduits, due to what is assumed to be geological interference with their Ground Penetrating Radar equipment, they were unable to determine if the foundations of the former buildings, or the tower grounding networks depicted in the historical drawings, remained onsite. Furthermore, prior to the completion of the Phase II ESA, it could not be ascertained if these networks continued to be in use. Consequently, the northwestern side of the subject site where these networks were located was not assessed during the intrusive Phase II ESA.

5.2.2 Drilling Program

From June 14 to 15, 2016, a drilling program was conducted to assess soil and groundwater conditions on the subject site. Logan Drilling Group (Logan) of Stewiacke, NS conducted the drilling under the supervision of Dillon personnel. Two monitor wells (MW16-1 and MW16-2) were installed to a depth of 15.25 m below surface (m bgs). Monitoring well locations are presented in Figure 3.

Split spoon soil samples were collected at approximately 0.6 m intervals around the water table depth. To minimize the potential for cross-contamination, sampling equipment was thoroughly rinsed between each sampling event and a new pair of nitrile gloves was used to collect each sample. Samples were collected in duplicate with a portion of the sample placed in laboratory supplied sample bottles and the remainder of the sample placed in an airtight plastic bag, if enough sample was present. The analytical samples were placed in a cooler on ice and kept cool until delivery to the laboratory.

The bagged samples were allowed to stabilize for a minimum of thirty (30) minutes, at which time organic vapour headspace readings for volatile organic compounds (VOCs) were measured using a portable photo ionization detector (PID, model RKI Eagle), calibrated to a hexane standard and operated in methane elimination mode. Vapour head space readings are used as a field screening tool to evaluate the relative concentrations of volatiles (i.e., petroleum hydrocarbon vapours) emitted from the soil. Vapour head space readings cannot be used to correlate petroleum hydrocarbon concentrations in soil. However, they can be used to compare vapour readings for soil sample collected from an individual location to identify which sample has the highest potential for petroleum hydrocarbons to be present. Vapour head space readings can also be used to compare readings to a background location which is considered to be free of contamination.

While advancing the two monitor wells, the soil stratigraphy was continuously logged. Soil type, colour and physical indication of contamination (i.e., visible staining or odour) were documented. If indication of contamination was encountered while advancing the monitor wells, a soil sample was collected using the same protocol as described above. Soil samples were selected for analysis based on field observation and VOC head space results. A chain of custody form was completed and submitted with the samples.

Upon completion of the drilling, two monitor wells were installed using 50 mm diameter, schedule 40 PVC screen (0.025 cm slot) and casing. The annulus between the screened PVC pipe and native soil was backfilled with clean silica sand with hydrated bentonite seals to provide a watertight seal for the well. The monitoring wells were then secured with a compression plug and metal stick up cover. Photos of the installation are presented in Appendix C (see Photos 17 and 18). Details of the construction of both monitor wells are presented in the monitor well logs provided in Appendix D.

5.2.3 Excavation Program

Three test pits (TP16-1 to TP16-3) and a trench adjacent to TP16-2 were advanced to a depth of approximately 3 m by Edward Collins Contracting Inc. on June 17, 2016 using a back hoe. Soil samples were collected directly from the back hoe bucket at intervals of 0.6 m until the desired depth was achieved. During the excavation, a hydraulic hose failed on the back hoe and leaked hydraulic fluid on the ground. Upon fixing the hose, impacted soils were removed from the site by the contractor. A soil sample was collected and analysed for TPH to determine if any impacts from the leak remain.

While advancing each test pit, the soil stratigraphy was continuously logged. Soil type, colour and any physical indication of contamination (i.e., visible staining or odour) was documented. Samples were collected in duplicate with a portion of the sample placed in laboratory supplied sample bottles and the remainder of the sample placed in an airtight plastic bag. The analytical samples were placed in a cooler on ice, and kept cool until delivered to the laboratory. The bagged samples were analyzed as described above.

Soil samples were selected for analysis based on field observations and VOC head space results. A chain of custody form was completed and submitted with the samples.

Photos of the excavations are presented in Appendix C (see Photos 20 through 24). Environmental test pit logs are presented in Appendix D. Test pit locations are presented on Figure 3.

5.2.4 Groundwater Sampling Program

After installation, monitor wells MW16-1 and MW16-2 were developed by purging approximately 1000 L of water from each well on June 20, 2016. Field readings of pH, temperature and conductivity were recorded while the monitor wells were being developed until readings stabilized indicating adequate well development was achieved. Prior to sampling, the depth to groundwater was measured from an established reference point (top of PVC casing) using an electronic interface probe prior to sampling on June 22, 2016. The two new monitoring wells along with the two existing monitoring wells (MW-1 and MW-2) located behind the MCTC building were purged a minimum of three well casing volumes prior to sample collection to draw representative water into the well casing from the surrounding hydrogeologic unit. Field readings of pH, temperature and conductivity were also recorded during purging. Groundwater samples were collected after field readings stabilized. Groundwater samples were submitted to Maxxam for analysis of metals, PAHs, BTEX and petroleum hydrocarbons.

5.3 Laboratory Analytical Program

Soil and groundwater samples collected for this program were submitted to Maxxam Analytics Inc. (Maxxam) in St. John's , NL for metals, polycyclic aromatic hydrocarbons (PAHs), and petroleum hydrocarbon analysis, specifically benzene, toluene, ethylbenzene, xylenes (collectively referred to as BTEX) and total petroleum hydrocarbons (TPH).

The following table presents a summary of the samples analyzed as part of this program.

Table 2 - Analytical Summary

Media	Sample ID	BTEX/Modified TPH	Metals	PAHs
Soil	TP16-1 SA1		✓	✓
	TP16-1 SA2	✓	✓	✓
	TP16-1 SA4	✓		
	TP16-1 SA5	✓		
	TP16-2 SA1	✓	✓	✓
	TP16-2 SA100[1]		✓	✓
	TP16-2 SA2	✓	✓	✓
	TP16-2 SA5	✓		
	TP16-3 SA1		✓	✓
	TP16-3 SA2	✓	✓	✓
	TP16-3 SA3	✓		
	TP16-3 SA5	✓		
	TP16-3 SA100[1]	✓		
	MW16-1 SA2	✓		
	MW16-1 SA3	✓		
	MW16-1 SA100[1]	✓		
	MW16-2 SA2	✓		
	Hydraulic Leak[2]	✓		
Groundwater	MW16-1	✓	✓	✓
	MW16-2	✓	✓	✓
	MW 16-100[1]	✓	✓	✓
	MW-1	✓	✓	✓
	MW-2	✓	✓	✓

Notes:

1. FD denotes a field/blind duplicate
2. Sample submitted from underneath the hydraulic fluid spill

5.4 Quality Assurance/Quality Control

A Quality Assurance / Quality Control (QA/QC) Program was implemented to evaluate if the data collected were of suitable quality to characterize the site soil and groundwater conditions, and to compare soil and groundwater chemistry data to the appropriate environmental quality criteria. To this end, validation criteria (or data quality objectives) were established that required the field-collected data to have an acceptable level of precision, accuracy, representativeness, comparability and

completeness (i.e., the "PARCC" criteria). A summary of how each PARCC criteria were evaluated follows:

Precision: Precision (often referred to as reproducibility) is a measure of how tightly grouped a series of repeat measurements are about one central value. Data precision was evaluated by calculating the Relative Percent Difference (RPD) between the soil and groundwater sample results and their field duplicate results (where collected). In the current ESA, Dillon established RPD acceptance criterion of <30% for groundwater analytical results and <25-60% for soil analytical results. The field duplicate samples collected were as follows:

- Sample labeled TP16-2 SA100 collected from TP16-2 SA1 for metals and PAH analysis in soils (June 17, 2016);
- Sample labeled TP16-3 SA100 collected from TP16-3 SA3 for BTEX/mTPH analysis in soils (June 17, 2016);
- Sample labeled MW16-1 SA100 collected from MW16-1 SA3 for BTEX/mTPH in analysis in soils (June 15, 2016); and,
- Sample labeled MW16-100 collected from MW16-2 for BTEX/TPH, metals and PAH's in groundwater (June 22, 2016).

Accuracy: Accuracy is a measure of how close a measure or group of measures is to the true value. The accuracy of the analytical results is completed by the laboratory by completing surrogate recoveries and analyzing spike samples to determine whether the results are within the acceptance criteria established by the laboratory.

Representativeness: The representativeness of the data was assessed by reviewing several factors, including the following:

- Field procedures and laboratory methods follow industry accepted practices (i.e. sample collection methods, laboratory analytical methods, sample containers, preservative(s), holding times, and chain of custody documentation);
- Sampling program design was adequate to characterize unit or area of interest;
- Analytical results are consistent with visual and olfactory observations; and,
- The number of samples analyzed and parameters for which analyses were performed were sufficient.

Comparability: Data comparability assesses how well the sample result collected at one location or point in time can be compared to other sample results or criteria.

Completeness: Completeness is determined by confirming analytical results were obtained for all the samples submitted and all the analytical parameters requested, the supporting laboratory documentation has been received (i.e., chain of custody), the number of samples collected and analyzed and the frequency of inclusion of quality control samples (approximately 10%) is sufficient.
The results of the QA/QC program are discussed in subsequent sections within this report.

5.5 Phase II ESA Results

The following subsections present the findings and results of the Phase II ESA.

5.5.1 Field Observations

5.5.1.1 Buried Infrastructure

During excavation of the trench adjacent to TP16-2, what appeared to the concrete casing for the former steam pipeline was observed between the former buildings. The former steam pipeline itself could not be observed due to the presence of the concrete casing. The concrete casing had a height of approximately 1.1 m and a concrete thickness of approximately 0.15 – 0.22 m. The casing appeared to still be connected to the foundations of both former buildings. Concrete debris and rebar was also uncovered in the trench.

During the excavation of TP16-3, a portion of the foundation of former building 302 was uncovered at a depth of approximately 0.3 mbgs. The concrete wall was approximately 0.22 m thick and 1.85 m high (including a footing of 0.45 m). Water infiltrated the excavation at a depth of a 2.13 -2.43 m however this may have been a result of the water introduced to the subsurface during coring activities the previous day.

No buried infrastructure was encountered during the advancement of TP16-1.

5.5.1.2 Stratigraphy

The soil stratigraphy on-site generally consists of course sand, with gravel to cobbles. Boulders were encountered in TP16-1 and TP16-3 between 2.74 and 3.04 mbgs. Bedrock was not encountered during the drilling activities for MW16-1 and MW16-2. The borehole logs for the existing monitoring wells located behind the MCTC building (MW1 and MW2) indicate that bedrock was not encountered at depths up to 15.24 and 13.72 mbgs, respectively. The stratigraphy encountered during the drilling and test pitting program is presented on the test pit and monitor well logs in Appendix B.

Soil staining and hydrocarbon odours were not observed during the excavation and drilling programs.

5.5.1.3 Groundwater Conditions

Groundwater was encountered at depths ranging from 10.95 to 13.16 m below the top of casing (m btoc) on June 22, 2016. Based on previous assessment reports for adjacent properties the generalized groundwater flow direction is to the northwest. LNAPL was not observed during the groundwater monitoring event. No hydrocarbon odours or sheen was observed during the development of the new monitor wells or during the groundwater sampling program. The groundwater sample locations are presented on Figure 3.

5.5.1.4 Headspace Soil Vapour Conditions

As noted previously, headspace soil vapour measurements were collected using an Eagle Gastech. Elevated headspace soil vapour concentrations, typically above 100 to 200 ppm or in the % lower explosive limit (LEL) range (10% LEL is equivalent to 1000 ppm for gasoline), are generally indicative of the presence of volatile petroleum products (i.e. gasoline and to a lesser extent diesel and fuel oil). The volatile organic compound (VOC) measurement does not provide quantification of hydrocarbons in soil, but rather is an indication of the degree of contamination due to volatile hydrocarbon compounds relative to other samples. The headspace VOC readings are provided on the monitoring wells logs in Appendix D. Measured VOC concentrations from the collected samples ranged from 0 to 1300 ppm.

5.5.2 Laboratory Analytical Results

Tables summarizing the laboratory results and applicable guidelines are presented in Appendix E. Laboratory certificates for the analyzed samples are presented in Appendix F.

5.5.2.1 Metals in Soil

Seven soil samples (including one field duplicate) were submitted to the laboratory for metals analysis. One laboratory duplicate was also analysed.
All samples contained metals below the applicable CCME SQG's.

The analytical results are presented in Table 1, Appendix E. The certificates of analysis are presented in Appendix F, for reference.

Soil Samples – Metals
• 8 samples analysed (including 1 field duplicate and 1 lab duplicate).
• No exceedances identified.

5.5.2.2 PAHs in Soil

Seven soil samples (including one field duplicate) was submitted to the laboratory for PAH analysis. No exceedances of the CCME SQG's were identified.

Soil Samples – PAH's
• 7 samples analysed (including 1 field duplicate).
• No exceedances identified.

The analytical results are presented in Table 2, Appendix E. The certificates of analysis are presented in Appendix F, for reference.

5.5.2.3 BTEX and Petroleum Hydrocarbons in Soil

Sixteen soil samples (including 2 field duplicates and 1 lab duplicate) were analysed for BTEX /TPH. All of the samples, with the exception of samples MW16-2 SA2 and Hydraulic Leak, had BTEX and mTPH concentrations below the laboratory detection limits. MW16-2 SA2 had an mTPH concentration of 33 mg/kg in the lube oil fraction

Soil Samples – TPH
• 16 samples analysed (including 2 field duplicates and 1 lab duplicate).
• No exceedances identified.

and Hydraulic Leak had an mTPH concentration of 62 mg/kg in the fuel/lube range. No exceedances of the CCME SQG's, Canada Wide Standards or Atlantic RBCA guidelines were identified.

The analytical results are presented in Table 3, Appendix E. The certificates of analysis are presented in Appendix F, for reference.

5.5.2.4 Metals in Groundwater

Five groundwater samples (including one field duplicate) were submitted to the laboratory for dissolved metals analysis. Samples collected from the existing wells (MW1 and MW2) had elevated reportable detection limits (RDL's) that exceeded the Federal Interim Groundwater Quality Guidelines (FIGQG) for 8 metals. Samples MW16-2, its field duplicate MW16-100, MW-1 and MW-2 exceeded the FIGQG for cadmium. Samples MW16-1, MW16-2, its field duplicate MW16-100 and MW-1 exceeded the FIGQG for dissolved iron. The remaining sample, MW-2, had an elevated detection limit of 500 µg/L which was above the applicable guideline of 300 µg/L for iron. MW16-1, MW16-2 and its field duplicate exceed the criteria for dissolved manganese and MW-1 and MW-2 exceeded the criteria for dissolved boron. No other exceedances were identified. The analytical results are presented in Table 5, Appendix E. The certificates of analysis are presented in Appendix F, for reference.

Groundwater Samples – Metals

- 5 samples analysed (including 1 field duplicate).
- 4 samples exceeded the cadmium Tier 1 FIGQG.
- 4 samples exceeded the iron Tier 1 FIGQG.
- 2 samples exceed the boron Tier 1 FIGQG
- 2 samples had elevated RDL's above the FIGQG for 8 metals.
- 1 sample had an elevated RDL above the FIGQG for iron.

It should be noted that while exceedances of the Tier I FIGQG's were identified in groundwater, Tier I guidelines represent the lowest available numeric guidelines for all exposure pathways and do not consider the dilution impact of the receiving water body. Both the British Columbia Contaminated Site regulations and the Ontario Ministry of the Environment use a 10-fold dilution factor, which is also recommended by the Atlantic RBCA (historically a dilution factor of 1000 was used to account for groundwater loading at Argentia in October 1995 (Argentia Remediation Group, 1995)). By applying a 10-fold dilution factor, all groundwater metal concentrations are at or near the Tier I criteria therefore the metal exceedances identified in groundwater do not pose an unacceptable risk to human or ecological receptors. No other exceedances were identified.

5.5.2.5 PAHs in Groundwater

Six groundwater samples (including one field duplicate and one laboratory duplicate) were analysed for PAH's. No exceedances of the applicable criteria was identified.

Groundwater Samples – PAHs

- 6 samples analysed (including 1 field duplicate and 1 lab duplicate).
- No exceedances identified.

The analytical results are presented in Table 6, Appendix E. The certificates of analysis are presented in Appendix F, for reference.

5.5.2.6 BTEX and Petroleum Hydrocarbons in Groundwater

Seven groundwater samples (including one field duplicate and two laboratory duplicates) were analysed for BTEX/TPH concentrations. No exceedances of the applicable criteria were identified.

Groundwater Samples – TPH

- 7 samples analysed (including 1 field duplicate and 2 lab duplicates).
- No exceedances identified.

The analytical results are presented in Table 4, Appendix E. The certificates of analysis are presented in Appendix F, for reference.

5.5.3 Quality Assurance/Quality Control Results

As discussed in Section 6.6, the QA/QC program required the field collected data to meet the "PARCC" criteria.

The calculated relative percent differences (RPD) between the original soil/groundwater samples and the field duplicate samples were as follows:

- 0% to 46% for TP16-2 SA1 (metals and PAH; June 17, 2016) in soil;
- Could not be calculated for TP16-3 SA3 for (BTEX/mTPH; June 17, 2016) in soils, all non-detect;
- Could not be calculated for MW16-1 SA3 (BTEX/mTPH; June 15, 2016) in soils, all non-detect; and
- 0% to 33% for MW16-2 (June 22, 2016) in groundwater.

The calculated RPD values between the TP16-2 SA1 soil sample and its field duplicate were deemed acceptable as each value was less than the required soil RPD criterion of 60%. The RPD value calculated for dissolved iron (33%) in groundwater sample MW16-2 was marginally above the Dillon RPD criterion of 30%. Both concentrations measured (1,400 and 1,000 µg/L) were greater than 10x the reportable detection limit (50 µg/L); however, there is no FIGQG or CCME guideline established for iron. Therefore, the high RPD value does not affect the interpretation of the results. All other RPDs calculated for MW16-2 and its field duplicate had RPD values below 30%, or were unable to be calculate as the concentrations were non-detect. Additionally, the RPD between original and field duplicate samples for soil (TP16-3 SA3, and MW16-1 SA3) were unable to be calculated, as all parameters were below laboratory detection limits.

Maxxam analyzed a blank sample, as well as prepared samples with known concentrations of chemicals added (i.e., surrogates and spiked samples), and then compares the percentage recovered to confirm the analysis is in reasonable agreement to the known concentration added. Maxxam reported the percent recovery of surrogates and spiked samples are within the laboratory's acceptable limits confirming analytical results are accurate. The quality control reports from Maxxam are provided with the laboratory certificates of analysis in Appendix F.

Based on field procedures, laboratory methods, sampling program design, and field observations, the analytical results are concluded to be representative of the site conditions in general.

Comparability was assessed qualitatively to confirm the sample results were suitable for use. The sampling results are considered to be comparable as field methods and laboratory methods were consistent throughout the sampling program, and analytical results of similar samples of like materials across the site gave similar and/or expected results.

Dillon concluded the dataset of sample results was complete as analytical results were obtained for all of the samples submitted and all the analytical parameters requested, including supporting laboratory documentation.

Based on the results of this QA/QC program, the analytical data did meet the PARCC criteria, and as such, based on field procedures, laboratory methods, sampling program design, and field observations, the soil and groundwater analytical results are concluded to be representative of the site conditions in general.

6.0 Conclusions and Recommendations

A review of historical information, interviews with people who have knowledge of the subject property and a Site walkover identified a number of potential sources of environmental contamination on the subject site, the subject property and the adjacent properties. Based upon this review, the contaminants of potential concern were identified as petroleum hydrocarbons, PAH's and metals in groundwater and soils on the subject site.

The presence of above ground infrastructure (Environment Canada's weather equipment), known underground infrastructure (water, power and communication lines) and the potential presence of two buried tower grounding systems, only a portion of the property could be assessed during the Phase II ESA. However, based upon the historical site information available for this section of the subject site, it is not anticipated that the environmental condition of this area differs significantly from the area that could be assessed.

The field component of the Phase II ESA was conducted from June 14 – 17, 2016 and included the excavation of three test pits and one trench and the drilling of two monitor wells on the southeast portion of the subject site. During excavation of the test pits and trench, the concrete foundations of the former Mess Hall and Barracks buildings that formerly occupied the site, as well as the concrete casing for a former steam pipeline were observed. The steam pipeline itself could not be observed. Concrete debris and rebar were also uncovered in the trench.

Several soil samples (including field duplicates) were collected from the testpits/trench and the boreholes and submitted to Maxxam Analytics for TPH, metals and PAH analyses. No exceedances of the criteria for metals, PAH's or TPH's were identified. Two groundwater samples plus a field duplicate were collected from the newly constructed monitor wells on site (MW16-1 and MW 16-2) and two groundwater samples were collected from two existing monitoring wells that remained on the MCTC site from a previous assessment and were submitted to Maxxam Analytics for TPH, dissolved metals and PAH analyses. Samples collected from the existing wells (MW1 and MW2) had elevated reportable detection limits (RDL's) that exceeded the Tier I FIGQG for 8 metals. Samples MW16-2, its field duplicate MW16-100, MW-1 and MW-2 exceeded the guideline for dissolved cadmium. Samples MW16-1, MW16-2, its field duplicate MW16-100 and MW-1 exceeded the FIGQG for dissolved iron. The remaining sample (MW-2) had an elevated detection limit of 500 µg/L which was above the applicable guideline of 300 µg/L. Samples collected from MW-1 and MW-2 exceeded the guideline for dissolved boron. The Tier I FIGQG's represent the lowest available numeric guidelines for all exposure pathways and the guidelines do not consider the dilution impact of the receiving water body. By applying a 10-fold dilution factor, all groundwater metal concentrations are at or near the Tier I criteria therefore the metal exceedances identified in groundwater do not pose an unacceptable risk to human or ecological receptors. No other exceedances were identified.

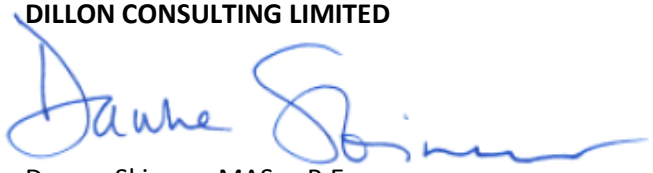
Based upon the results of the Historical Review/Phase I ESA and the preliminary Phase II ESA, no contaminants of potential concern exceed the applicable criteria for a commercial site with coarse grained soils and non-potable groundwater. From an environmental perspective, the presence of the buried foundations and concrete casing of the former Mess Hall and Barracks buildings and steam pipeline does not represent an environmental risk however a contractor should be consulted on whether or not the foundations should be removed prior to building the new MCTC building. If the steam pipeline is to be removed during construction, the pipe material/insulation should be analysed for asbestos and handled and disposed of accordingly. MW 16-1 and MW16-2 should be properly decommissioned prior to constructing the new MCTC building.

7.0 Closure

This report was prepared by Amanda Rietze, GIT and reviewed by Dawne Skinner, P. Eng., MASc, Andrew J. Blackmer, M.Sc., P.Geo.

Dillon has prepared this report for the exclusive use of PWGSC for specific application to the site. The Dillon investigation was conducted in accordance with Dillon's scope of work and accepted environmental assessment practices. Limitations to this report are included in the Disclaimer presented in Appendix G. No other warranty, expressed or implied, is made.

Sincerely,
DILLON CONSULTING LIMITED



Dawne Skinner, MASc., P.Eng.
Project Manager/Site Professional

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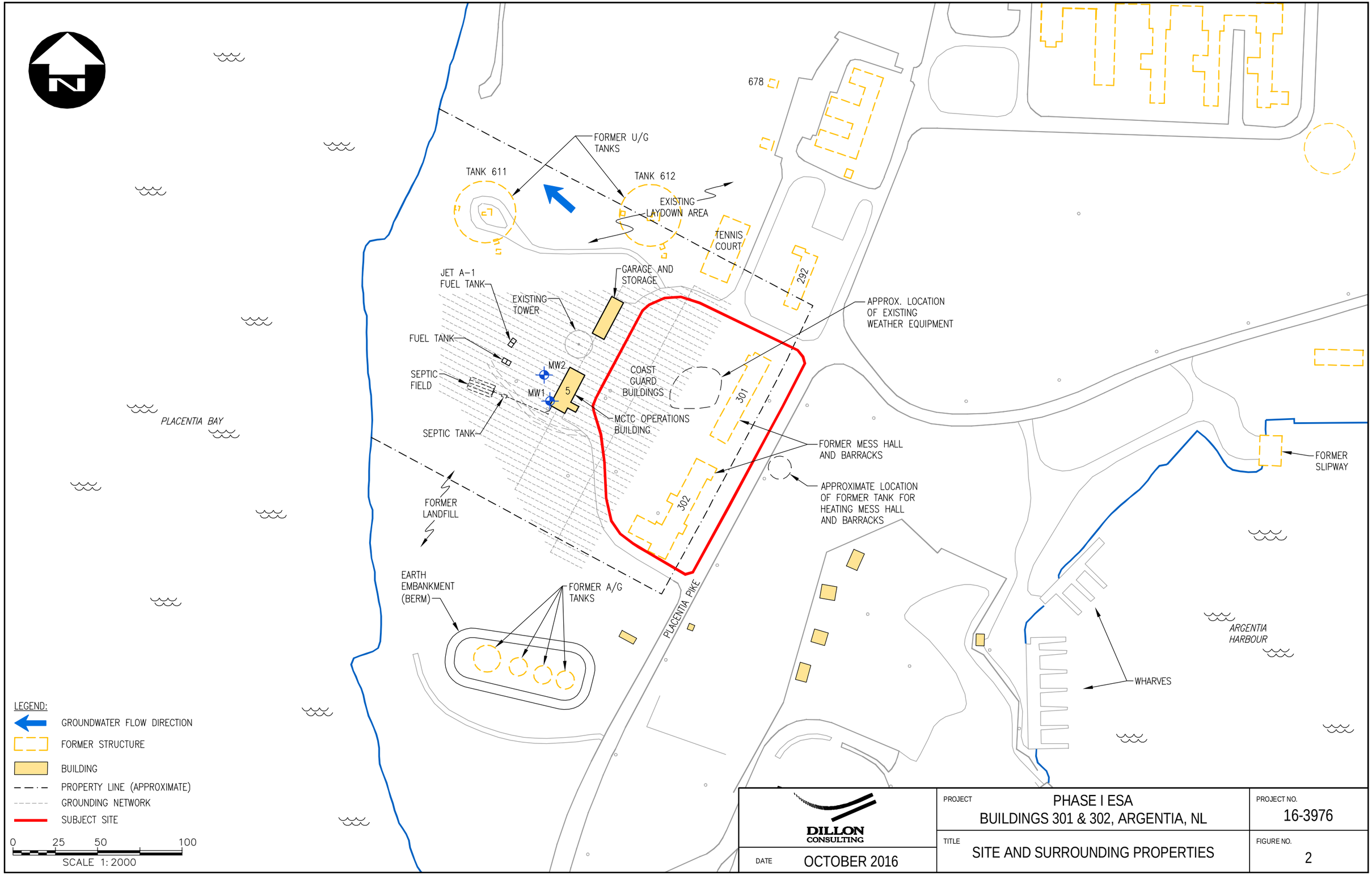
Appendix A

Figures

DILLON CONSULTING	PROJECT: PHASE I ESA BUILDINGS 301 & 302, ARGENTIA, NL	PROJECT NO.: 16-3976
DATE: OCTOBER 2016	TITLE: SITE LOCATION PLAN	FIGURE NO.: 1

leName:c:\projectwise\working directory\active\50\drd\03622781163976-05-03-fig1.dwg



FileName:c:\projectwise\working directory\active\50tlrd\d03622781\163976-05-03-fig2.dwg

DILLON CONSULTING

DATE	OCTOBER 2016	PROJECT	PHASE I ESA BUILDINGS 301 & 302, ARGENTIA, NL
		PROJECT NO.	16-3976
		TITLE	SITE AND SURROUNDING PROPERTIES
		FIGURE NO.	2

SEPTIC FIELD
SEPTIC TANK
MH
JET A-1 FUEL TANK
FUEL TANK
CHAIN LINK FENCE (TYP.)
GRAVEL ROAD
TOE OF BANK
TOP OF BANK
MW2
CONCRETE BLOCK
MW1
MH
U/G FUEL TANK
5 MCTC OPERATIONS BUILDING
COAST GUARD BUILDINGS
GARAGE AND STORAGE
CABLE TRENCH
MW1-61
TANK 612
MW1-62
MW1-62B
CONCRETE BLOCK
CONCRETE BLOCK PARTLY COVERED
TOE OF BANK
TOP OF BANK
TENNIS COURT
MH
WEATHER STATION AREA
COULD NOT LOCATE U/G UTILITY LINE
CONCRETE BLOCK
MW16-2
MW16-1
TP16-3
CONCRETE BLOCK SIGN CCG
302
TP16-2
301
TP16-1
TRENCH
CONCRETE BLOCK
MH
CULVERT (TYP.)
SHOULDER
PLACENTIA PIKE
OLD CONCRETE SIDEWALK
APPROXIMATE LOCATION OF UTILITY POLE (TYP.)

LEGEND:
- FORMER STRUCTURE
- PROPERTY LINE
- SUBJECT SITE
- POWER LINES
- WATER LINES
- SEWER LINES
- MONITORING WELL
- TEST PIT
- ANTICIPATED EXTENT OF METALS IN IMPACTED SOIL

0 10 20 30 40 50m
SCALE 1:750

FileName:c:\projectwise\working directory\active\50dlrd\d03622781163976-05-03-fig3.dwg

DILLON CONSULTING

DATE	OCTOBER 2016	PROJECT	PHASE I ESA BUILDINGS 301 & 302, ARGENTIA, NL
		TITLE	SURVEYED SITE PLAN
		PROJECT NO.	16-3976
		FIGURE NO.	3

Appendix B

Aerial Photos

DILLON CONSULTING	PROJECT HISTORICAL REVIEW /PHASE I ESA/PHASE II ESA FORMER MESS HALL and BARRACKS FORMER USN ARGENTIA, ARGENTIA, NL	PROJECT NO. 16-3976
DATE OCTOBER 2016	TITLE AERIAL PHOTOGRAPH - 1951	FIGURE NO. A-1

DILLON CONSULTING

DATE OCTOBER 2016

PROJECT HISTORICAL REVIEW /PHASE I ESA/PHASE II ESA
FORMER MESS HALL and BARRACKS
FORMER USN ARGENTIA, ARGENTIA, NL

PROJECT NO. 16-3976

TITLE AERIAL PHOTOGRAPH - 1971

FIGURE NO. A-2

ileName:c:\projectwise\working directory\active\50tlr\d03622781\63976-05-03-fig aerials.dwg

DILLON CONSULTING

DATE OCTOBER 2016

PROJECT HISTORICAL REVIEW /PHASE I ESA/PHASE II ESA
FORMER MESS HALL and BARRACKS
FORMER USN ARGENTIA, ARGENTIA, NL

PROJECT NO. 16-3976

TITLE AERIAL PHOTOGRAPH - 1982

FIGURE NO. A-3

ileName:c:\projectwiselworking directory\active\50tlrld036227\81639 76-05-03-fig aerials.dwg

DILLON CONSULTING	PROJECT HISTORICAL REVIEW /PHASE I ESA/PHASE II ESA FORMER MESS HALL and BARRACKS FORMER USN ARGENTIA, ARGENTIA, NL	PROJECT NO. 16-3976
DATE OCTOBER 2016	TITLE AERIAL PHOTOGRAPH - 1993/94	FIGURE NO. A-4

DILLON CONSULTING

DATE OCTOBER 2016

PROJECT HISTORICAL REVIEW /PHASE I ESA/PHASE II ESA
FORMER MESS HALL and BARRACKS
FORMER USN ARGENTIA, ARGENTIA, NL

PROJECT NO. 16-3976

TITLE AERIAL PHOTOGRAPH - 1994/95

FIGURE NO. A-5

DILLON CONSULTING

DATE OCTOBER 2016

PROJECT HISTORICAL REVIEW /PHASE I ESA/PHASE II ESA
FORMER MESS HALL and BARRACKS
FORMER USN ARGENTIA, ARGENTIA, NL

PROJECT NO. 16-3976

TITLE AERIAL PHOTOGRAPH - 1995

FIGURE NO. A-6

ileName:c:\projectwise\working directory\active\50tlr\d03622781\63976-05-03-fig aerials.dwg

DILLON CONSULTING

DATE OCTOBER 2016

PROJECT HISTORICAL REVIEW /PHASE I ESA/PHASE II ESA
FORMER MESS HALL and BARRACKS
FORMER USN ARGENTIA, ARGENTIA, NL

PROJECT NO. 16-3976

TITLE AERIAL PHOTOGRAPH - 2010

FIGURE NO. A-7

ileName:c:\projectwiselworking directory\active\50tlrld036227\81163976-05-03-fig aerials.dwg

Appendix C

Site Photos

Photo 1: Standing near the Southern corner of the Site looking North towards Subject Site (grassy area) and MCTC buildings

Photo 2: Standing near the Southern corner of the Site looking Northeast at the Subject Site in the foreground and industrial laydown areas on an adjacent property in the background

Photo 3: Environment Canada weather sensing equipment near the centre of the Subject Site

Photo 4: EC weather sensing equipment

Photo 5: Looking south: concrete blocks with rebar in the foreground, MCTC sign in the foreground

Photo 6: Buried Wooden Posts

Photo 7: Looking northeast from the southern corner of the Site: MCTC sign, Placentia Pike and overhead power lines

Photo 8: Possible monitoring well located on the subject Site

Photo 9: MCTS building and mobile trailer

Photo 10: Flag pole, MCTC building, mobile trailer, garage and radar tower

Photo 11: Radar tower located between MCTC building and garage

Photo 12: Side view of MCTC building showing pole mounted transformers

Photo 13: Two 9,090 L above ground storage tanks containing jet fuel located at the CCG helipad behind the MCTC building

Photo 14: Fenced in lay-down area located north of the subject Site (adjacent to the MCTC garage)

Photo 15: Fenced in lay-down area located north of the MCTC garage

Photo 16: Large fenced in lay-down area located northeast of the subject site; east of the smaller lay-down area

Photo 17: Drilling locations of MW16-1 and MW16-2 on June 15, 2016. MCTS building visible to the left

Photo 18: Monitor well MW16-2 complete with stick-up, June 16, 2016

Photo 19: Excavation of testpit TP16-1, June 17, 2016

Photo 20: Lithology observed in TP16-1 – the surface unit consisting of a brown sand with some gravel, pebbles, and cobbles throughout is visible at the top portion of the photograph

Photo 21: Top of the concrete steam line casing uncovered between former buildings 301 and 302

Photo 22: Extent of concrete steam line casing located between the former building foundations that was uncovered during test pitting, July 17, 2016

Photo 23: Excavation of TP16-3, adjacent to remains of the former building's foundation

Appendix D

Monitor Well and Test Pit Logs

Dillon Consulting Ltd.
66 Kenmount Road, Suite 203
St. John's, NL, A1B 3V7
Telephone: (709) 754-2374
Fax: (709) 754-2380

MW16-1

Client: Public Works & Government Services Canada
Project No.: 16-3976
Drilling Co.: Logan Geotech Inc.
Supervised by: A. Rietze

Project: Former USN Argentia Mess Hall & Barracks Buildings
Location: Former USN Argentia Building No. 302, Argentia, NL
Drilling Method: Split Spoon, Auger, Coring
Date Started: 14/6/16 Date Completed: 15/6/16

Depth Scale (m)	Stratigraphic Description	Lithology	Depth (m)	Well Construction	Sample Method	Sample Number	Sample N Value	Sample Rec %	Sample VOC(ppm or %LEL)	Depth Scale (m)
	TOPSOIL Brown organic-rich TOPSOIL with roots.					---	14	54	---	
1.0	**SAND** Dark brown, medium-dense, coarse-grained SAND with some gravel, cobbles and pebbles, moist.		0.6	MW completed with 0.88 m stick-up and j-plug.		---	20	50	---	1.0
						---	---	---	---	
2.0				50 mm PVC casing c/w bentonite seal.		---	18	33	---	2.0
	SAND Dark brown, dense to very dense, coarse-grained gravelly SAND with some cobbles and trace silt, wet.		2.13			---	41	54	---	
3.0						---	---	---	---	3.0
						---	73	54	---	
	SAND Dark brown, very-dense, coarse-grained SAND with some gravel and cobbles, wet.		3.66			---	52	63	---	
4.0				50 mm solid PVC casing.		---	---	---	---	4.0
						---	46	0	---	
5.0						---	51	38	---	5.0
6.0				50 mm PVC casing c/w bentonite seal.		---	---	---	---	6.0

Static Water Level (12.94 m btoc (June 22, 2016))

LITHOLOGY SYMBOLS: Organics; Gravely Sand; Sand with boulders and cobbles; Boulders and cobbles

SAMPLE TYPE: Split Spoon; Rock Core

* Indicates sample submitted for analysis

DILLON MW 16-3976 USN ARGENTIA - LOGS - JULY 2016 - AL.GPJ DILLON TEMPLATE - JAN2011.GDT 24/10/16

Dillon Consulting Ltd.
66 Kenmount Road, Suite 203
St. John's, NL, A1B 3V7
Telephone: (709) 754-2374
Fax: (709) 754-2380

MW16-1

Client: Public Works & Government Services Canada
Project: Former USN Argentia Mess Hall & Barracks Buildings
Project No.: 16-3976
Location: Former USN Argentia Building No. 302, Argentia, NL
Drilling Co.: Logan Geotech Inc.
Drilling Method: Split Spoon, Auger, Coring
Supervised by: A. Rietze
Date Started: 14/6/16 Date Completed: 15/6/16

Depth Scale (m)	Stratigraphic Description (continued)	Lithology	Depth (m)	Well Construction	Sample Method	Sample Number	Sample N Value	Sample Rec %	Sample VOC(ppm or %LEL)	Depth Scale (m)
						---	83	48	---	
7.0	**COBBLES** COBBLES and fractures/weather bedrock.		6.71			---	---	----	---	7.0
8.0	**SAND** Dark brown, very-dense, gravelly, cobbly, coarse-grained SAND, wet.		7.62			---	63	46	---	8.0
						---	56	75	---	
9.0				50 mm PVC 0.010 inch slot screen c/w silica sand filter pack.						9.0
10.0						---		---	---	10.0
11.0						SA1	53	54	770	11.0
12.0	Cobbles from 12.2-12.8 m bgs.					SA2*	50	54	1300	12.0
						SA3*	Refusal	25	930	

DILLON MW 16-3976 USN ARGENTIA - LOGS - JULY 2016 - AL.GPJ DILLON TEMPLATE - JAN2011.GDT 24/10/16

Static Water Level (12.94 m btoc (June 22, 2016))

LITHOLOGY SYMBOLS: Organics; Gravely Sand; Sand with boulders and cobbles; Boulders and cobbles

SAMPLE TYPE: Split Spoon; Rock Core

* Indicates sample submitted for analysis

Dillon Consulting Ltd.
66 Kenmount Road, Suite 203
St. John's, NL, A1B 3V7
Telephone: (709) 754-2374
Fax: (709) 754-2380

MW16-1

Client: Public Works & Government Services Canada
Project: Former USN Argentia Mess Hall & Barracks Buildings
Project No.: 16-3976
Location: Former USN Argentia Building No. 302, Argentia, NL
Drilling Co.: Logan Geotech Inc.
Drilling Method: Split Spoon, Auger, Coring
Supervised by: A. Rietze
Date Started: 14/6/16 Date Completed: 15/6/16

Depth Scale (m)	Stratigraphic Description	Lithology	Depth (m)	Well Construction	Sample Method	Sample Number	Sample N Value	Sample Rec %	Sample VOC(ppm or %LEL)	Depth Scale (m)
	(continued)									
13.0	**SAND** Dark brown, very-dense, gravelly, cobbly, coarse-grained SAND, wet.*(Continued)*			▼		SA4	33	83	310	13.0
	COBBLES COBBLES and fractures/weather bedrock.		13.41			---	---	---	---	
14.0				50 mm PVC 0.010 inch slot screen c/w silica sand filter pack.		---	13	0	---	14.0
						---	54	29	---	
15.0				Push on end cap.		---	---	---	---	15.0
	End of borehole at 15.24 m bgs (50 feet)		15.24							

DILLON MW 16-3976 USN ARGENTIA - LOGS - JULY 2016 - AL.GPJ DILLON TEMPLATE - JAN2011.GDT 24/10/16

▼ Static Water Level (12.94 m btoc (June 22, 2016))

LITHOLOGY SYMBOLS: Organics; Gravely Sand; Sand with boulders and cobbles; Boulders and cobbles

SAMPLE TYPE: Split Spoon; Rock Core

* Indicates sample submitted for analysis

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Telephone: (709) 754-2374
Fax: (709) 754-2380

MW16-2

Client: Public Works & Government Services Canada
Project: Former USN Argentia Mess Hall & Barracks Buildings
Project No.: 16-3976
Location: Former USN Argentia Building No. 302, Argentia, NL
Drilling Co.: Logan Geotech Inc.
Drilling Method: Split Spoon, Auger, Coring
Supervised by: A. Rietze
Date Started: 15/6/16 Date Completed: 16/6/16

Depth Scale (m)	Stratigraphic Description	Lithology	Depth (m)	Well Construction	Sample Method	Sample Number	Sample N Value	Sample Rec %	Sample VOC(ppm or %LEL)	Depth Scale (m)
	TOPSOIL Dark brown to black fine-grained, organic-rich TOPSOIL with some roots.		0.2	MW completed with 1.05 m stick-up and j-plug.		---	45	63	---	
1.0	**SAND** Dark brown, dense, coarse-grained gravely SAND with some pebbles and cobbles throughout, wet.					---	Refusal	42	---	1.0
						---	---	---	---	
2.0				50 mm PVC casing c/w bentonite seal.		---	41	25	---	2.0
	COBBLES COBBLES and boulders, wet.		2.18			---	Refusal	25	---	
3.0						---		---	---	3.0
						---	Refusal	13	---	
	GRAVEL Dark brown, dense, cobbly GRAVEL with some coarse-grained sand, wet. Sand content decreasing with depth.		3.66			---	40	46	---	
4.0				50 mm solid PVC casing.		---	---	---	---	4.0
						---	Refusal	25	---	
5.0						---	47	50	---	5.0
6.0				50 mm PVC casing c/w bentonite seal.		---	---	---	---	6.0

DILLON MW 16-3976 USN ARGENTIA - LOGS - JULY 2016 - ALGPJ DILLON TEMPLATE - JAN2011.GDT 24/10/16

Static Water Level (13.17 m btoc (June 22, 2016))

LITHOLOGY SYMBOLS: Organics; Boulders and cobbles; Gravely Sand; Gravel

SAMPLE TYPE: Split Spoon; Rock Core

* Indicates sample submitted for analysis

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MW16-2

Client: Public Works & Government Services Canada
Project: Former USN Argentia Mess Hall & Barracks Buildings
Project No.: 16-3976
Location: Former USN Argentia Building No. 302, Argentia, NL
Drilling Co.: Logan Geotech Inc.
Drilling Method: Split Spoon, Auger, Coring
Supervised by: A. Rietze
Date Started: 15/6/16 Date Completed: 16/6/16

Depth Scale (m)	Stratigraphic Description	Lithology	Depth (m)	Well Construction	Sample Method	Sample Number	Sample N Value	Sample Rec %	Sample VOC(ppm or %LEL)	Depth Scale (m)
	(continued)									
	GRAVEL Dark brown, dense, cobbly GRAVEL with some coarse-grained sand, wet. Sand content decreasing with depth.*(Continued)*					---	21	38	---	
7.0						---	19	5	---	7.0
						---	---	---	---	
8.0						---	65	20	---	8.0
	COBBLES COBBLES, pebbles, and boulders, wet.		8.23			---	64	---	---	
9.0						---	---	---	---	9.0
				50 mm PVC 0.010 inch slot screen c/w silica sand filter pack.		---	31	8	---	
10.0						---	42	0	---	10.0
						---	---	---	---	
11.0	**GRAVEL** Dark brown, very dense, cobbly GRAVEL with some pebbles, wet. Trace sand present from 11.3 to 11.9 m bgs.		10.67			SA1	53	38	5	11.0
						SA2*	62	33	15	
12.0	**COBBLES** Dark brown COBBLES and pebbles, with trave gravel, wet.		11.89			---	44	17	---	12.0

DILLON MW 16-3976 USN ARGENTIA - LOGS - JULY 2016 - AL.GPJ DILLON TEMPLATE - JAN2011.GDT 24/10/16

Static Water Level (13.17 m btoc (June 22, 2016))

LITHOLOGY SYMBOLS: Organics; Boulders and cobbles; Gravelly Sand; Gravel

SAMPLE TYPE: Split Spoon; Rock Core

* Indicates sample submitted for analysis

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MW16-2

Client: Public Works & Government Services Canada
Project: Former USN Argentia Mess Hall & Barracks Buildings
Project No.: 16-3976
Location: Former USN Argentia Building No. 302, Argentia, NL
Drilling Co.: Logan Geotech Inc.
Drilling Method: Split Spoon, Auger, Coring
Supervised by: A. Rietze
Date Started: 15/6/16 Date Completed: 16/6/16

Depth Scale (m)	Stratigraphic Description	Lithology	Depth (m)	Well Construction	Sample Method	Sample Number	Sample N Value	Sample Rec %	Sample VOC(ppm or %LEL)	Depth Scale (m)
	(continued)									
13.0	**COBBLES** Dark brown COBBLES and pebbles, with trave gravel, wet.*(Continued)*					---	20	17	---	13.0
						---	25	12.5	---	
14.0				50 mm PVC 0.010 inch slot screen c/w silica sand filter pack.		---	Refusal	0	---	14.0
15.0				Push on end cap.		---	---	---	---	15.0
	End of borehole at 15.24 m bgs (50 feet).		15.24							

DILLON MW 16-3976 USN ARGENTIA - LOGS - JULY 2016 - AL.GPJ DILLON TEMPLATE - JAN2011.GDT 24/10/16

Static Water Level (13.17 m btoc (June 22, 2016))

LITHOLOGY SYMBOLS: Organics; Boulders and cobbles; Gravely Sand; Gravel

SAMPLE TYPE: Split Spoon; Rock Core

* Indicates sample submitted for analysis

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TP16-1

Client: Public Works & Government Services Canada
Project: Former USN Argentia Mess Hall & Barracks Buildings
Project No.: 16-3976
Location: Former USN Argentia Building No. 302, Argentia, NL
Sub-Contractor: Edward Collins Contracting
Equipment: Backhoe
Supervised by: A. Rietze
Date Started: 17/6/16 Date Completed: 17/6/16

Depth Scale (m)	Stratigraphic Description	Lithology	Depth (m)	Sample Number	Sample VOC (ppm or %LEL)	Depth Scale (m)
0.5	**SAND** Brown SAND with some gravel, pebbles, and cobbles, moist. Rootlets present throughout.			SA1*	10 ppm	0.5
1.0	**SAND** Brown, coarse-grained silty SAND with some gravel and cobbles, moist to dry. Trace dark brown organics throughout.		0.61	SA2	15 ppm	1.0
1.5	**SAND** Brown coarse-grained SAND with some gravel, pebbles, and cobbles, dry.		1.22	SA3	10 ppm	1.5
2.0				SA4*	25 ppm	2.0
2.5				SA5*	30 ppm	2.5
3.0	Large boulder present at 3.05 m bgs.					3.0
	End of test pit at 3.05 m bgs (10 feet).		3.05			

LITHOLOGY SYMBOLS: Gravely Sand; Silty Sand and Gravel

* Indicates sample submitted for analysis

DILLON TP3 16-3976 USN ARGENTIA - LOGS - JULY 2016 - AL.GPJ DILLON TEMPLATE - JAN2011.GDT 24/10/16

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TP16-2

Client: Public Works & Government Services Canada
Project: Former USN Argentia Mess Hall & Barracks Buildings
Project No.: 16-3976
Location: Former USN Argentia Building No. 302, Argentia, NL
Sub-Contractor: Eward Collins Contracting
Equipment: Backhoe
Supervised by: A. Rietze
Date Started: 17/6/16 Date Completed: 17/6/16

Depth Scale (m)	Stratigraphic Description	Lithology	Depth (m)	Sample Number	Sample VOC (ppm or %LEL)	Depth Scale (m)
0.5	**SAND** Brown coarse-grained SAND with some gravels and cobbles, dry. Rootlets present from surface to 0.61 m bgs. Increase in water content to moist at ~0.6 m bgs.			SA1*	5 ppm	0.5
1.0				SA2*	5 ppm	1.0
1.5	Increase in water content to wet at ~1.2 m bgs.			SA3	0 ppm	1.5
2.0	Some pockets of fine-grained silt and sand at 1.8 m bgs through to the bottom of the unit.			SA4	0 ppm	2.0
2.5	**SAND** Brown coarse-grained silty SAND with some pebbles and cobbles, wet.		2.44	SA5*	5 ppm	2.5
3.0	End of test pit at 3.05 m bgs (10 feet).		3.05			3.0

LITHOLOGY SYMBOLS: Gravely Sand; Silty Sand and Gravel

* Indicates sample submitted for analysis

DILLON TP3 16-3976 USN ARGENTIA - LOGS - JULY 2016 - AL.GPJ DILLON TEMPLATE - JAN2011.GDT 24/10/16

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Telephone: (709) 754-2374
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TP16-3

Client: Public Works & Government Services Canada
Project: Former USN Argentia Mess Hall & Barracks Buildings
Project No.: 16-3976
Location: Former USN Argentia Building No. 302, Argentia, NL
Sub-Contractor: Edward Collins Contracting
Equipment: Backhoe
Supervised by: A. Rietze
Date Started: 17/6/16
Date Completed: 17/6/16

Depth Scale (m)	Stratigraphic Description	Lithology	Depth (m)	Sample Number	Sample VOC (ppm or %LEL)	Depth Scale (m)
0.5	**SAND** Brown SAND with some gravel, pebbles, and cobbles, dry. Rootlets present at surface through to 0.3 m bgs. Increase in water content to moist at ~0.6 m bgs.			SA1	10 ppm	0.5
1.0				SA2*	20 ppm	1.0
1.5	Increase in water content to wet at ~1.2 m bgs.			SA3*	15 ppm	1.5
2.0	Water present at 2.1 m bgs.			SA4	10 ppm	2.0
2.5				SA5*	15 ppm	2.5
3.0	End of test pit at 3.05 m bgs (10 feet).		3.05			3.0

LITHOLOGY SYMBOLS — Gravely Sand

* Indicates sample submitted for analysis

DILLON TP3 16-3976 USN ARGENTIA - LOGS - JULY 2016 - AL.GPJ DILLON TEMPLATE - JAN2011.GDT 24/10/16

Appendix E

Tables

TABLE 1
METALS CONCENTRATIONS IN SOIL
Phase I/II ESA - Former Barracks and Mess Hall, Former USN, Argentia, NL

Parameter	CCME CEQG	RDL	Metals Concentrations (mg/kg)							
			TP16-1 SA1		TP16-1 SA2	TP16-2 SA1		TP16-2 SA2	TP16-3 SA1	TP16-3 SA2
	SQG $_{Commercial}$	(mg/L)	6/17/16	6/17/2016 (L/D)	6/17/16	6/17/16	6/17/2016 (F/D)	6/17/16	6/17/16	6/17/16
			0-0.6 m	0-0.6 m	0.6-1.2 m	0-0.6 m	0-0.6 m	0.6-1.2 m	0-0.6 m	0.6-1.2 m
Aluminum	NGA	10	14000	13000	14000	13000	13000	13000	13000	13000
Antimony	40[A]	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Arsenic	12	2.0	5.0	4.7	5.2	5.2	5.0	4.7	6.7	6.0
Barium	2000	5.0	27	29	22	20	20	20	24	18
Beryllium	8[A]	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	NGA	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	NGA	50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	22	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Chromium	87	2.0	25	24	26	24	24	22	23	27
Cobalt	300[A]	1.0	13	12	13	13	13	12	13	13
Copper	91	2.0	38	37	23	30	31	32	34	34
Iron	NGA	50	29000	27000	29000	28000	28000	26000	27000	27000
Lead	260	0.50	34	32	33	36	38	33	36	34
Lithium	NGA	2.0	20	18	18	18	18	18	18	19
Manganese	NGA	2.0	1000	1000	1000	1100	1100	1000	1200	1100
Mercury	24	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<1.0
Molybdenum	40[A]	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Nickel	89	2.0	20	19	18	19	19	19	19	22
Rubidium	NGA	2.0	2.1	2.0	2.4	<2.0	<2.0	<2.0	<2.0	<2.0
Selenium	2.9	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	40[A]	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50	<0.50
Strontium	NGA	5.0	17	16	21	19	16	15	16	15
Thallium	1	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	300[A]	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Uranium	33	0.10	0.39	0.39	0.51	0.44	0.40	0.37	0.42	0.39
Vanadium	130	2.0	41	37	41	38	37	34	36	36
Zinc	360	5.0	84	78	71	81	88	79	93	91

CCME CEQG: Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG)
SQG: Soil Quality Guidelines (website June 2016)
NGA: No established guideline available
< 2.0: Concentration is less than the detection limit of 2.0 mg/kg
RDL: Reportable detection limit
L/D - Lab Duplicate; F/D - Field Duplicate
m: sampling depth below ground surface in meters
Bold: Exceeds CCME Soil Contact Guideline
[A] - Interim remediation crition CCME 1991.

TABLE 2
POLYCYCLIC AROMATIC HYDROCARBON (PAH) CONCENTRATIONS IN SOIL
Phase I/II ESA - Former Barracks and Mess Hall, Former USN, Argentia, NL

Parameter	CCME CEQG		RDL (mg/kg)	PAH Concentrations (mg/kg)						
	SQG_{HH}	SQG_{E}		TP16-1 SA1	TP16-1 SA2	TP16-2 SA1		TP16-2 SA2	TP16-3 SA1	TP16-3 SA2
				6/17/16	6/17/16	6/17/16	6/17/2016 (F/D)	6/17/16	6/17/16	6/17/16
				0-0.6 m	0.6-1.2 m	0-0.6 m	0-0.6 m	0.6-1.2 m	0-0.6 m	0.6-1.2 m
1-Methylnaphthalene	NGA	NGA	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
2-Methylnaphthalene	NGA	NGA	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthene	NGA	NGA	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	NGA	NGA	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene	NGA	32	0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)anthracene	NGA	10	0.010	0.033	<0.010	0.012	0.012	<0.010	<0.010	0.040
Benzo(a)pyrene	NGA	72	0.010	0.027	<0.010	0.010	<0.010	<0.010	<0.010	0.038
Benzo(b)fluoranthene	NGA	10	0.010	0.025	<0.010	<0.010	<0.010	<0.010	<0.010	0.032
Benzo(g,h,i)perylene	NGA	NGA	0.010	0.022	<0.010	<0.010	<0.010	<0.010	<0.010	0.032
Benzo(j)fluoranthene	NGA	NGA	0.010	0.015	<0.010	<0.010	<0.010	<0.010	<0.010	0.018
Benzo(k)fluoranthene	NGA	10	0.010	0.015	<0.010	<0.010	<0.010	<0.010	<0.010	0.018
Chrysene	NGA	NGA	0.010	0.040	<0.010	0.018	0.017	<0.010	<0.010	0.048
Dibenz(a,h)anthracene	NGA	10	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluoranthene	NGA	180	0.010	0.074	<0.010	0.032	0.033	0.013	<0.010	0.084
Fluorene	NGA	NGA	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	NGA	10	0.010	0.017	<0.010	<0.010	<0.010	<0.010	<0.010	0.024
Naphthalene	NGA	NGA	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Perylene	NGA	NGA	0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	0.011
Phenanthrene	NGA	NGA	0.010	0.040	<0.010	0.018	0.018	<0.010	<0.010	0.026
Pyrene	NGA	100	0.010	0.059	<0.010	0.024	0.026	0.011	<0.010	0.066
B(a)P TPE	5.3	NGA	-	0.13	0.02	0.04	0.03	0.02	0.02	0.16

CCME CEQG: Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG)

SQG_{HH}: Soil Quality Guidelines for the protection of human health

SQG_{E}: Soil Quality Guidelines for the protection of environmental health

NGA: No established guideline available

B(a)P TPE = Benzo[a]pyrene Total Potency Equivalent calculated based on the sum of B(a)P PEF multiplied by the carcinogenic PAH concentrations.

B(a)P PEFs = Benzo[a]pyrene Potency Equivalence Factors:

Benzo(a)anthracene	PEF = 0.1
Benzo(a)pyrene	PEF = 1.0
Benzo(b)fluoranthene	PEF = 0.1
Benzo(g,h,i)perylene	PEF = 0.01
Benzo(k)fluoranthene	PEF = 0.1
Chrysene	PEF = 0.01
Indeno(1,2,3-cd)pyrene	PEF = 0.1
Dibenz(a,h)anthracene	PEF = 1.0

<0.010: Concentration is less than the detection limit of 0.010 mg/kg.

RDL: Reportable detection limit

F/D - Field Duplicate

m: sampling depth below ground surface in meters

Bold: Exceeds CCME Human Health Guideline

Highlighted: Exceeds CCME Environmental Health Guidelines

TABLE 3
PETROLEUM HYDROCARBON CONCENTRATIONS IN SOIL
Phase I/II ESA - Former Barracks and Mess Hall, Former USN, Argentia, NL

					Sample ID	MW16-1 SA2		MW16-1 SA3		MW16-2 SA2	TP16-1 SA2	TP16-1 SA4	TP16-1 SA5	TP16-2 SA1	TP16-2 SA2	TP16-2 SA5	TP16-3 SA2	TP16-3 SA3		TP16-3 SA5	Hydraulic Leak
					Date Sampled	17-Jun-16	17-Jun-16 (L/D)	17-Jun-16	17-Jun-16 (F/D)	17-Jun-16	17-Jun-16	17-Jun-16	17-Jun-16	17-Jun-16	17-Jun-16	17-Jun-16	17-Jun-16	17-Jun-16	17-Jun-16 (F/D)	17-Jun-16	17-Jun-16
Parameters	**Units**	**Atlantic PIRI** Tier 1 RBSL (Commercial, Non-Potable, Coarse-grained)	**CCME SQG** Tier I	**CWS** Tier I		11.6-12.2 m	11.6-12.2 m	12.2-12.8 m	12.2-12.8 m	11.3-11.9 m	0.6-1.2 m	1.8-2.4 m	2.4-3.0 m	0-0.6 m	0.6-1.2 m	2.4-3.0 m	0.6-1.2 m	1.2-1.8	1.2-1.8 m	2.4-3.0 m	0-0.3 m
Benzene	mg/kg	2.5	0.03	-		<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	mg/kg	10,000	0.37	-		<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Ethylbenzene	mg/kg	10,000	0.082	-		<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes	mg/kg	110	11	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)	mg/kg	NGA	NGA	240		<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
>C10-C16 Hydrocarbons	mg/kg	NGA	NGA	260		<10	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons	mg/kg	NGA	NGA	1,700		<10	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	12
>C21-<C32 Hydrocarbons	mg/kg		NGA	3,300		<15	-	<15	<15	33	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	50
Modified TPH (Tier1)	mg/kg	Gasoline = 870 Diesel = 4,000 Lube Oil = 10,000	NGA	-		<15	-	<15	<15	33	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	62
Reached Baseline at C32	mg/kg	-	-	-		Yes	-	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance	mg/kg	-	-	-						Lube Oil Fraction											U/C in Fuel/Lube Range. Possible Lube Oil Fraction.

Primary Guideline: CCME: Canadian Council of Ministers of the Environment (CCME)
Primary Guideline: CWS: Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil
Secondary Guideline: Atlantic PIRI: Atlantic Partnership in RBCA Implementation
RBCA: Risk Based Corrective Action
RBSL: Risk-Based Screening Level
RDL: Reportable detection limit
L/D - Lab Duplicate; F/D - Field Duplicate
U/C - Unidentified Compounds
NR: No resemblance to petroleum products
−: No established guideline concentration
<0.025: Concentration is less than the detection limit of 0.025 mg/kg
m: sampling depth below ground surface in meters
Bold: Concentration exceeds the Atlantic PIRI Tier I RBSL
Shaded: Concentration exceeds the CCME SQG
Shaded: Concentration exceeds the CWS (Surface Soils)
Shaded: Concentration exceeds Atlantic PIRI

TABLE 4
PETROLEUM HYDROCARBON CONCENTRATIONS IN GROUNDWATER
Phase I/II ESA - Former Barracks and Mess Hall, Former USN, Argentia, NL

Sample ID	Sample Date / RDL (mg/L)	BTEX Concentrations (mg/L)				Petroleum Hydrocarbon Concentrations (mg/L)					
		Benzene	Toluene	E. Benzene	Xylenes	F1 (C_6-C_{10})	F2 (>C_{10}-C_{16})	F3 (>C_{16}-C_{32})		Modified TPH	Resemblance
								>C_{16}-C_{21}	>C_{21}-<C_{32}		
	RDL (mg/L)	0.0010	0.0010	0.0010	0.0020	0.010	0.050	0.050	0.10	0.10	
MW16-1	22-Jun-16	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.05	<0.05	<0.10	<0.10	
	22-Jun-16 (L/D)	---	---	---	---	---	<0.05	<0.05	<0.10	---	
MW16-2	22-Jun-16	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.05	<0.05	<0.10	<0.10	
	22-Jun-16 (L/D)	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	---	---	---	---	
	22-Jun-16 (F/D)	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.05	<0.05	<0.10	<0.10	
MW1	22-Jun-16	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.05	<0.05	<0.10	<0.10	
MW2	22-Jun-16	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.05	<0.05	<0.10	<0.10	
Environment Canada Guidelines											
FIGQG (Tier 1: commercial/coarse)		0.69	0.083	11	18	9.1	1.3	-	-	-	
Atlantic PIRI Tier I Guidelines											
RBSL (Commercial, non-potable, coarse-grained)		20	20	20	20	-	-	-	-	20* 20** 20***	-

Primary Guideline: FIGQG: Federal Interim Groundwater Quality Guidelines (Tier 1) for Commercial Land Uses
Secondary Guideline: Atlantic PIRI: Atlantic Partnership in RBCA Implementation
RBCA: Risk Based Corrective Action
RBSL: Risk-Based Screening Level
RDL: Reportable Detection Limit
F/D: Field Duplicate
NR: No resemblance to petroleum products
NGA: No guideline available
---: not analyzed
<0.0010: Concentration is less than the detection limit of 0.0010 mg/L
Shaded: Concentration exceeds the FIGQG
Shaded: Concentration exceeds the Atlantic PIRI Tier I RBSL

TABLE 5
DISSOLVED METAL CONCENTRATIONS IN GROUNDWATER
Phase I/II ESA - Former Barracks and Mess Hall, Former USN, Argentia, NL

			Dissolved Metal Concentrations (ug/L)				
		Sample ID	MW16-1	MW16-2		MW-1	MW-2
		Date Sampled	22-Jun-16	22-Jun-16	22-Jun-16	22-Jun-16	22-Jun-16
Parameters	**Units**	**FIGQG Tier 1**			**F/D**		
Dissolved Aluminum (Al)	µg/L	NGA	5.5	<5.0	<5.0	<50	<50
Dissolved Antimony (Sb)	µg/L	2000	<1.0	<1.0	<1.0	<10	<10
Dissolved Arsenic (As)	µg/L	5	2.6	<1.0	<1.0	**<10**	**<10**
Dissolved Barium (Ba)	µg/L	500	96	160	150	210	190
Dissolved Beryllium (Be)	µg/L	5.3	<1.0	<1.0	<1.0	**<10**	**<10**
Dissolved Bismuth (Bi)	µg/L	NGA	<2.0	<2.0	<2.0	<20	<20
Dissolved Boron (B)	µg/L	500	<50	150	140	1100	760
Dissolved Cadmium (Cd)	µg/L	0.017	<0.010	0.17	0.15	0.10	0.23
Dissolved Calcium (Ca)	mg/L	NGA	57	110	100	250	190
Dissolved Chromium (Cr)	µg/L	56	<1.0	<1.0	<1.0	<10	<10
Dissolved Cobalt (Co)	µg/L	50	<0.40	0.61	0.61	<4.0	<4.0
Dissolved Copper (Cu)	µg/L	2	<2.0	<2.0	<2.0	**<20**	**<20**
Dissolved Iron (Fe)	µg/L	300	2700	1400	1000	1400	**<500**
Dissolved Lead (Pb)	µg/L	2	<0.50	<0.50	<0.50	**<5.0**	**<5.0**
Dissolved Magnesium (Mg)	mg/L	NGA	9.1	56	52	370	250
Dissolved Manganese (Mn)	µg/L	200	560	670	650	67	<20
Dissolved Molybdenum (Mo)	µg/L	7.3	3.9	<2.0	<2.0	**<20**	**<20**
Dissolved Nickel (Ni)	µg/L	83	<2.0	<2.0	<2.0	<20	<20
Dissolved Phosphorus (P)	µg/L	NGA	<100	<0.1	<0.1	<1	<1
Dissolved Potassium (K)	µg/L	NGA	4200	15	14	99	67
Dissolved Selenium (Se)	µg/L	1	<1.0	<1.0	<1.0	**<10**	**<10**
Dissolved Silver (Ag)	µg/L	1.5	<0.10	<0.10	<0.10	<1.0	<1.0
Dissolved Sodium (Na)	mg/L	NGA	30	410	380	2900	2000
Dissolved Strontium (Sr)	µg/L	NGA	140	490	470	2500	1700
Dissolved Thallium (Tl)	µg/L	0.8	<0.10	<0.10	<0.10	**<1.0**	**<1.0**
Dissolved Tin (Sn)	µg/L	NGA	<2.0	<2.0	<2.0	<20	<20
Dissolved Titanium (Ti)	µg/L	100	<2.0	<2.0	<2.0	<20	<20
Dissolved Uranium (U)	µg/L	10	0.62	0.14	0.14	<1.0	<1.0
Dissolved Vanadium (V)	µg/L	100	<2.0	<2.0	<2.0	<20	<20
Dissolved Zinc (Zn)	µg/L	10	<5.0	5.9	5.5	**<50**	**<50**

FIGQG: Federal Interim Groundwater Quality Guidelines for commercial land use, coarse grained soil

* pH dependent

NGA: No established guideline available

< 2.0: Concentration is less than the detection limit of 2.0 µg/L

F/D - Field Duplicate

BOLD: Lab reportable detection limit was higher than guideline

Shaded: Exceeds FIGQG Tier 1 for commercial land use/coarse grained soil

TABLE 6
PAH CONCENTRATIONS IN GROUNDWATER
Phase I/II ESA - Former Barracks and Mess Hall, Former USN, Argentia, NL

			PAH Concentrations (ug/L)					
		Sample ID	MW16-1		MW16-2		MW-1	MW-2
		Date Sampled	22-Jun-16	22-Jun-16	22-Jun-16	22-Jun-16	22-Jun-16	22-Jun-16
Parameters	**Units**	**FIGQG**		**L/D**		**F/D**		
		Tier 1						
1-Methylnaphthalene	ug/L	180	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	ug/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	ug/L	5.8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	ug/L	46	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	ug/L	0.012	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	ug/L	NGA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	ug/L	NGA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	ug/L	NGA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(g,h,i)perylene	ug/L	NGA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	µg/L	NGA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	ug/L	NGA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	ug/L	NGA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenz(a,h)anthracene	ug/L	NGA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	ug/L	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	ug/L	3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	ug/L	NGA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	ug/L	1.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Perylene	ug/L	NGA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	ug/L	0.4	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	ug/L	0.025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

FIGQG: Federal Interim Groundwater Quality Guidelines Tier 2 for commercial land use, coarse grained

NGA: No established guideline available

< 0.01: Concentration is less than the detection limit of 0.01 µg/L

L/D - Lab Duplicate; F/D - Field Duplicate

BOLD: Lab reportable detection limit was higher than guideline

Shaded: Exceeds FIGQG Tier 1 for commercial land use/coarse grained soil

Appendix F

Laboratory Certificates

Your Project #: 16-3976
Site Location: USN ARGENTIA
Your C.O.C. #: D05991

Attention:Dawne Skinner

Dillon Consulting Limited
66 Kenmount Rd., Suite 203
St.John's, NL
CANADA A1B 3V7

Report Date: 2016/07/04
Report #: R4051710
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6C9410
Received: 2016/06/23, 11:40

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Water (PIRI)	5	2016/06/30	2016/07/04	ATL SOP 00198	Atl. RBCA v3 m
VPH in Water (PIRI)	5	N/A	2016/06/29	ATL SOP 00200	Atl. RBCA v3 m
ModTPH (T1) Calc. for Water	5	N/A	2016/07/04	N/A	Atl. RBCA v3 m

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.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rob Whelan, Laboratory Manager
Email: RWhelan@maxxam.ca
Phone# (709)754-0203
==========
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.

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Maxxam Job #: B6C9410
Report Date: 2016/07/04

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

RBCA HYDROCARBONS IN WATER (WATER)

Maxxam ID		COY191	COY191		COY192	COY192	COY193		
Sampling Date		2016/06/22 08:45	2016/06/22 08:45		2016/06/22 10:00	2016/06/22 10:00	2016/06/22 10:00		
COC Number		D05991	D05991		D05991	D05991	D05991		
	UNITS	MW16-1	MW16-1 Lab-Dup	QC Batch	MW16-2	MW16-2 Lab-Dup	MW16-100	RDL	QC Batch
Petroleum Hydrocarbons									
Benzene	mg/L	<0.0010		4556300	<0.0010	<0.0010	<0.0010	0.0010	4559647
Toluene	mg/L	<0.0010		4556300	<0.0010	<0.0010	<0.0010	0.0010	4559647
Ethylbenzene	mg/L	<0.0010		4556300	<0.0010	<0.0010	<0.0010	0.0010	4559647
Total Xylenes	mg/L	<0.0020		4556300	<0.0020	<0.0020	<0.0020	0.0020	4559647
C6 - C10 (less BTEX)	mg/L	<0.010		4556300	<0.010	<0.010	<0.010	0.010	4559647
>C10-C16 Hydrocarbons	mg/L	<0.050	<0.050	4561132	<0.050		<0.050	0.050	4561132
>C16-C21 Hydrocarbons	mg/L	<0.050	<0.050	4561132	<0.050		<0.050	0.050	4561132
>C21-<C32 Hydrocarbons	mg/L	<0.10	<0.10	4561132	<0.10		<0.10	0.10	4561132
Modified TPH (Tier1)	mg/L	<0.10		4551975	<0.10		<0.10	0.10	4551975
Reached Baseline at C32	mg/L	Yes	Yes	4561132	Yes		Yes	N/A	4561132
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	106	103	4561132	104		104		4561132
n-Dotriacontane - Extractable	%	106	102	4561132	104 (1)		105 (1)		4561132
Isobutylbenzene - Volatile	%	93		4556300	96	88	89		4559647

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) TEH sample contained sediment.

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Maxxam Job #: B6C9410
Report Date: 2016/07/04

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

RBCA HYDROCARBONS IN WATER (WATER)

Maxxam ID		COY194	COY195		
Sampling Date		2016/06/22 11:30	2016/06/22 12:30		
COC Number		D05991	D05991		
	UNITS	MW-1	MW-2	RDL	QC Batch
Petroleum Hydrocarbons					
Benzene	mg/L	<0.0010	<0.0010	0.0010	4559647
Toluene	mg/L	<0.0010	<0.0010	0.0010	4559647
Ethylbenzene	mg/L	<0.0010	<0.0010	0.0010	4559647
Total Xylenes	mg/L	<0.0020	<0.0020	0.0020	4559647
C6 - C10 (less BTEX)	mg/L	<0.010	<0.010	0.010	4559647
>C10-C16 Hydrocarbons	mg/L	<0.050	<0.050	0.050	4561132
>C16-C21 Hydrocarbons	mg/L	<0.050	<0.050	0.050	4561132
>C21-<C32 Hydrocarbons	mg/L	<0.10	<0.10	0.10	4561132
Modified TPH (Tier1)	mg/L	<0.10	<0.10	0.10	4551975
Reached Baseline at C32	mg/L	Yes	Yes	N/A	4561132
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	104	102		4561132
n-Dotriacontane - Extractable	%	103	101		4561132
Isobutylbenzene - Volatile	%	100	97		4559647

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B6C9410
Report Date: 2016/07/04

Dillon Consulting Limited
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GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B6C9410
Report Date: 2016/07/04

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4556300	DDE	Matrix Spike	Isobutylbenzene - Volatile	2016/06/28		110	%	70 - 130
			Benzene	2016/06/28		115	%	70 - 130
			Toluene	2016/06/28		130	%	70 - 130
			Ethylbenzene	2016/06/28		115	%	70 - 130
			Total Xylenes	2016/06/28		145 (1)	%	70 - 130
4556300	DDE	Spiked Blank	Isobutylbenzene - Volatile	2016/06/28		111	%	70 - 130
			Benzene	2016/06/28		125	%	70 - 130
			Toluene	2016/06/28		125	%	70 - 130
			Ethylbenzene	2016/06/28		115	%	70 - 130
			Total Xylenes	2016/06/28		123	%	70 - 130
4556300	DDE	Method Blank	Isobutylbenzene - Volatile	2016/06/28		100	%	70 - 130
			Benzene	2016/06/28	<0.0010		mg/L	
			Toluene	2016/06/28	<0.0010		mg/L	
			Ethylbenzene	2016/06/28	<0.0010		mg/L	
			Total Xylenes	2016/06/28	<0.0020		mg/L	
			C6 - C10 (less BTEX)	2016/06/28	<0.010		mg/L	
4556300	DDE	RPD	Benzene	2016/06/27	NC		%	40
			Toluene	2016/06/27	NC		%	40
			Ethylbenzene	2016/06/27	NC		%	40
			Total Xylenes	2016/06/27	0		%	40
			C6 - C10 (less BTEX)	2016/06/27	0.57		%	40
4559647	DDE	Matrix Spike [COY193-01]	Isobutylbenzene - Volatile	2016/06/30		92	%	70 - 130
			Benzene	2016/06/30		95	%	70 - 130
			Toluene	2016/06/30		100	%	70 - 130
			Ethylbenzene	2016/06/30		95	%	70 - 130
			Total Xylenes	2016/06/30		102	%	70 - 130
4559647	DDE	Spiked Blank	Isobutylbenzene - Volatile	2016/06/30		96	%	70 - 130
			Benzene	2016/06/30		100	%	70 - 130
			Toluene	2016/06/30		100	%	70 - 130
			Ethylbenzene	2016/06/30		105	%	70 - 130
			Total Xylenes	2016/06/30		103	%	70 - 130
4559647	DDE	Method Blank	Isobutylbenzene - Volatile	2016/06/30		100	%	70 - 130
			Benzene	2016/06/30	<0.0010		mg/L	
			Toluene	2016/06/30	<0.0010		mg/L	
			Ethylbenzene	2016/06/30	<0.0010		mg/L	
			Total Xylenes	2016/06/30	<0.0020		mg/L	
			C6 - C10 (less BTEX)	2016/06/30	<0.010		mg/L	
4559647	DDE	RPD [COY192-01]	Benzene	2016/06/29	NC		%	40
			Toluene	2016/06/29	NC		%	40
			Ethylbenzene	2016/06/29	NC		%	40
			Total Xylenes	2016/06/29	NC		%	40
			C6 - C10 (less BTEX)	2016/06/29	NC		%	40
4561132	SPI	Matrix Spike [COY194-01]	Isobutylbenzene - Extractable	2016/07/04		101	%	30 - 130
			n-Dotriacontane - Extractable	2016/07/04		106	%	30 - 130
			>C10-C16 Hydrocarbons	2016/07/04		108	%	70 - 130
			>C16-C21 Hydrocarbons	2016/07/04		118	%	70 - 130
			>C21-<C32 Hydrocarbons	2016/07/04		89	%	70 - 130
4561132	SPI	Spiked Blank	Isobutylbenzene - Extractable	2016/07/04		84	%	30 - 130
			n-Dotriacontane - Extractable	2016/07/04		95	%	30 - 130
			>C10-C16 Hydrocarbons	2016/07/04		104	%	70 - 130
			>C16-C21 Hydrocarbons	2016/07/04		115	%	70 - 130
			>C21-<C32 Hydrocarbons	2016/07/04		89	%	70 - 130

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Maxxam Job #: B6C9410
Report Date: 2016/07/04

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4561132	SPI	Method Blank	Isobutylbenzene - Extractable	2016/07/04		93	%	30 - 130
			n-Dotriacontane - Extractable	2016/07/04		92	%	30 - 130
			>C10-C16 Hydrocarbons	2016/07/04	<0.050		mg/L	
			>C16-C21 Hydrocarbons	2016/07/04	<0.050		mg/L	
			>C21-<C32 Hydrocarbons	2016/07/04	<0.10		mg/L	
4561132	SPI	RPD [COY191-01]	>C10-C16 Hydrocarbons	2016/07/04	NC		%	40
			>C16-C21 Hydrocarbons	2016/07/04	NC		%	40
			>C21-<C32 Hydrocarbons	2016/07/04	NC		%	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 (one or both samples < 5x RDL).

(1) If the original sample concentration is greater than 2X the matrix spike level, the matrix spike does not need to be repeated.

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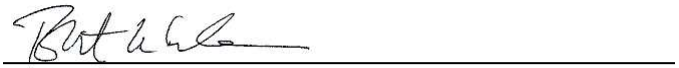
Maxxam Job #: B6C9410
Report Date: 2016/07/04

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

VALIDATION SIGNATURE PAGE

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



Rob Whelan, Laboratory Manager

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Maxxam
A Bureau Veritas Group Company

Your Project #: 16-3976
Site Location: USN ARGENTIA
Your C.O.C. #: D05975

Attention:Dawne Skinner

Dillon Consulting Limited
66 Kenmount Rd., Suite 203
St.John's, NL
CANADA A1B 3V7

Report Date: 2016/06/29
Report #: R4046243
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6C7232
Received: 2016/06/21, 16:00

Sample Matrix: Soil
Samples Received: 14

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Soil (PIRI) (1, 2)	8	2016/06/24	2016/06/27	ATL SOP 00197	Atl. RBCA v3 m
TEH in Soil (PIRI) (2)	6	2016/06/27	2016/06/29	ATL SOP 00197	Atl. RBCA v3 m
Moisture	14	N/A	2016/06/24	ATL SOP-00196	OMOE Handbook 1983 m
VPH in Soil (PIRI)	14	2016/06/27	2016/06/28	ATL SOP 00199	Atl. RBCA v3 m
ModTPH (T1) Calc. for Soil	8	N/A	2016/06/28	N/A	Atl. RBCA v3 m
ModTPH (T1) Calc. for Soil	6	N/A	2016/06/29	N/A	Atl. RBCA v3 m

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) Reported on a dry weight basis.
(2) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rob Whelan, Laboratory Manager
Email: RWhelan@maxxam.ca
Phone# (709)754-0203

==========

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Maxxam Job #: B6C7232
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		CON677	CON677	CON724	CON725	CON726	CON727		
Sampling Date		2016/06/15	2016/06/15	2016/06/15	2016/06/15	2016/06/15	2016/06/17		
COC Number		D05975	D05975	D05975	D05975	D05975	D05975		
	UNITS	MW16-1 SA2	MW16-1 SA2 Lab-Dup	MW16-1 SA3	MW16-1 SA100	MW16-2 SA2	TP16-1 SA2	RDL	QC Batch
Inorganics									
Moisture	%	15		7.7	12	7.9	16	1.0	4551652
Petroleum Hydrocarbons									
Benzene	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.025	4556275
Toluene	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.025	4556275
Ethylbenzene	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.025	4556275
Total Xylenes	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4556275
C6 - C10 (less BTEX)	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	2.5	4556275
>C10-C16 Hydrocarbons	mg/kg	<10		<10	<10	<10	<10	10	4553823
>C16-C21 Hydrocarbons	mg/kg	<10		<10	<10	<10	<10	10	4553823
>C21-<C32 Hydrocarbons	mg/kg	<15		<15	<15	33	<15	15	4553823
Modified TPH (Tier1)	mg/kg	<15		<15	<15	33	<15	15	4547893
Reached Baseline at C32	mg/kg	Yes		Yes	Yes	No	Yes	N/A	4553823
Hydrocarbon Resemblance	mg/kg					COMMENT (1)		N/A	4553823
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	102		103	98	101	100		4553823
n-Dotriacontane - Extractable	%	100 (2)		98 (2)	100 (2)	107 (2)	106 (2)		4553823
Isobutylbenzene - Volatile	%	115	108	101	107	101	100		4556275

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Lube oil fraction.
(2) Triple silica gel cleanup was used to remove organic interferences from sample extract as per client request.

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Maxxam Job #: B6C7232
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		CON728	CON729	CON730		CON731	CON732		
Sampling Date		2016/06/17	2016/06/17	2016/06/17		2016/06/17	2016/06/17		
COC Number		D05975	D05975	D05975		D05975	D05975		
	UNITS	TP16-1 SA4	TP16-1 SA5	TP16-2 SA1	QC Batch	TP16-2 SA2	TP16-2 SA5	RDL	QC Batch
Inorganics									
Moisture	%	8.3	7.2	8.9	4551652	10	14	1.0	4551652
Petroleum Hydrocarbons									
Benzene	mg/kg	<0.025	<0.025	<0.025	4556275	<0.025	<0.025	0.025	4556275
Toluene	mg/kg	<0.025	<0.025	<0.025	4556275	<0.025	<0.025	0.025	4556275
Ethylbenzene	mg/kg	<0.025	<0.025	<0.025	4556275	<0.025	<0.025	0.025	4556275
Total Xylenes	mg/kg	<0.050	<0.050	<0.050	4556275	<0.050	<0.050	0.050	4556275
C6 - C10 (less BTEX)	mg/kg	<2.5	<2.5	<2.5	4556275	<2.5	<2.5	2.5	4556275
>C10-C16 Hydrocarbons	mg/kg	<10	<10	<10	4553823	<10	<10	10	4556281
>C16-C21 Hydrocarbons	mg/kg	<10	<10	<10	4553823	<10	<10	10	4556281
>C21-<C32 Hydrocarbons	mg/kg	<15	<15	<15	4553823	<15	<15	15	4556281
Modified TPH (Tier1)	mg/kg	<15	<15	<15	4547893	<15	<15	15	4547893
Reached Baseline at C32	mg/kg	Yes	Yes	Yes	4553823	Yes	Yes	N/A	4556281
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	100	103	99	4553823	105	106		4556281
n-Dotriacontane - Extractable	%	105 (1)	107 (1)	104 (1)	4553823	108 (1)	108 (1)		4556281
Isobutylbenzene - Volatile	%	104	95	95	4556275	98	102		4556275

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Triple silica gel cleanup was used to remove organic interferences from sample extract as per client request.

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Maxxam Job #: B6C7232
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		CON733	CON733		CON734	CON735	CON736		
Sampling Date		2016/06/17	2016/06/17		2016/06/17	2016/06/17	2016/06/17		
COC Number		D05975	D05975		D05975	D05975	D05975		
	UNITS	TP16-3 SA2	TP16-3 SA2 Lab-Dup	QC Batch	TP16-3 SA3	TP16-3 SA100	TP16-3 SA5	RDL	QC Batch
Inorganics									
Moisture	%	9.8	9.7	4552194	10	10	12	1.0	4552194
Petroleum Hydrocarbons									
Benzene	mg/kg	<0.025		4556275	<0.025	<0.025	<0.025	0.025	4556275
Toluene	mg/kg	<0.025		4556275	<0.025	<0.025	<0.025	0.025	4556275
Ethylbenzene	mg/kg	<0.025		4556275	<0.025	<0.025	<0.025	0.025	4556275
Total Xylenes	mg/kg	<0.050		4556275	<0.050	<0.050	<0.050	0.050	4556275
C6 - C10 (less BTEX)	mg/kg	<2.5		4556275	<2.5	<2.5	<2.5	2.5	4556275
>C10-C16 Hydrocarbons	mg/kg	<10		4556281	<10	<10	<10	10	4556281
>C16-C21 Hydrocarbons	mg/kg	<10		4556281	<10	<10	<10	10	4556281
>C21-<C32 Hydrocarbons	mg/kg	<15		4556281	<15	<15	<15	15	4556281
Modified TPH (Tier1)	mg/kg	<15		4547893	<15	<15	<15	15	4548489
Reached Baseline at C32	mg/kg	Yes		4556281	Yes	Yes	Yes	N/A	4556281
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	107		4556281	112	109	106		4556281
n-Dotriacontane - Extractable	%	106 (1)		4556281	109 (1)	109 (1)	105 (1)		4556281
Isobutylbenzene - Volatile	%	103		4556275	103	100	100		4556275

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Triple silica gel cleanup was used to remove organic interferences from sample extract as per client request.

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Maxxam Job #: B6C7232
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B6C7232
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4551652	ACL	RPD	Moisture	2016/06/24	0		%	25
4552194	ACL	RPD [CON733-01]	Moisture	2016/06/24	1.0		%	25
4553823	SPI	Matrix Spike	Isobutylbenzene - Extractable	2016/06/27		95	%	30 - 130
			n-Dotriacontane - Extractable	2016/06/27		105	%	30 - 130
			>C10-C16 Hydrocarbons	2016/06/27		85	%	30 - 130
			>C16-C21 Hydrocarbons	2016/06/27		86	%	30 - 130
			>C21-<C32 Hydrocarbons	2016/06/27		68	%	30 - 130
4553823	SPI	Spiked Blank	Isobutylbenzene - Extractable	2016/06/27		100	%	30 - 130
			n-Dotriacontane - Extractable	2016/06/27		104	%	30 - 130
			>C10-C16 Hydrocarbons	2016/06/27		95	%	30 - 130
			>C16-C21 Hydrocarbons	2016/06/27		104	%	30 - 130
			>C21-<C32 Hydrocarbons	2016/06/27		75	%	30 - 130
4553823	SPI	Method Blank	Isobutylbenzene - Extractable	2016/06/27		96	%	30 - 130
			n-Dotriacontane - Extractable	2016/06/27		95	%	30 - 130
			>C10-C16 Hydrocarbons	2016/06/27	<10		mg/kg	
			>C16-C21 Hydrocarbons	2016/06/27	<10		mg/kg	
			>C21-<C32 Hydrocarbons	2016/06/27	<15		mg/kg	
4553823	SPI	RPD	>C10-C16 Hydrocarbons	2016/06/27	NC		%	50
			>C16-C21 Hydrocarbons	2016/06/27	NC		%	50
			>C21-<C32 Hydrocarbons	2016/06/27	NC		%	50
4556275	MCT	Matrix Spike [CON725-01]	Isobutylbenzene - Volatile	2016/06/28		101	%	60 - 130
			Benzene	2016/06/28		87	%	60 - 130
			Toluene	2016/06/28		82	%	60 - 130
			Ethylbenzene	2016/06/28		89	%	60 - 130
			Total Xylenes	2016/06/28		84	%	60 - 130
4556275	MCT	Spiked Blank	Isobutylbenzene - Volatile	2016/06/28		99	%	60 - 130
			Benzene	2016/06/28		98	%	60 - 140
			Toluene	2016/06/28		91	%	60 - 140
			Ethylbenzene	2016/06/28		95	%	60 - 140
			Total Xylenes	2016/06/28		94	%	60 - 140
4556275	MCT	Method Blank	Isobutylbenzene - Volatile	2016/06/28		93	%	60 - 130
			Benzene	2016/06/28	<0.025		mg/kg	
			Toluene	2016/06/28	<0.025		mg/kg	
			Ethylbenzene	2016/06/28	<0.025		mg/kg	
			Total Xylenes	2016/06/28	<0.050		mg/kg	
			C6 - C10 (less BTEX)	2016/06/28	<2.5		mg/kg	
4556275	MCT	RPD [CON677-01]	Benzene	2016/06/28	NC		%	50
			Toluene	2016/06/28	NC		%	50
			Ethylbenzene	2016/06/28	NC		%	50
			Total Xylenes	2016/06/28	NC		%	50
			C6 - C10 (less BTEX)	2016/06/28	NC		%	50
4556281	SPI	Matrix Spike	Isobutylbenzene - Extractable	2016/06/29		0 (1)	%	30 - 130
			n-Dotriacontane - Extractable	2016/06/29		0 (2)	%	30 - 130
			>C10-C16 Hydrocarbons	2016/06/29		97	%	30 - 130
			>C16-C21 Hydrocarbons	2016/06/29		96	%	30 - 130
			>C21-<C32 Hydrocarbons	2016/06/29		77	%	30 - 130
4556281	SPI	Spiked Blank	Isobutylbenzene - Extractable	2016/06/28		97	%	30 - 130
			n-Dotriacontane - Extractable	2016/06/28		104	%	30 - 130
			>C10-C16 Hydrocarbons	2016/06/28		90	%	30 - 130
			>C16-C21 Hydrocarbons	2016/06/28		94	%	30 - 130
			>C21-<C32 Hydrocarbons	2016/06/28		84	%	30 - 130

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Maxxam Job #: B6C7232
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4556281	SPI	Method Blank	Isobutylbenzene - Extractable	2016/06/28		105	%	30 - 130
			n-Dotriacontane - Extractable	2016/06/28		102	%	30 - 130
			>C10-C16 Hydrocarbons	2016/06/28	<10		mg/kg	
			>C16-C21 Hydrocarbons	2016/06/28	<10		mg/kg	
			>C21-<C32 Hydrocarbons	2016/06/28	<15		mg/kg	
4556281	SPI	RPD	>C10-C16 Hydrocarbons	2016/06/29	NC		%	50
			>C16-C21 Hydrocarbons	2016/06/29	NC		%	50
			>C21-<C32 Hydrocarbons	2016/06/29	NC		%	50

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 (one or both samples < 5x RDL).

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

(2) Surrogate recovery(ies) unavailable due to sample was not spiked with surrogate solution.

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Maxxam Job #: B6C7232
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

VALIDATION SIGNATURE PAGE

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

Rob Whelan, Laboratory Manager

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Your Project #: 16-3976
Site Location: USN ARGENTIA
Your C.O.C. #: D 05975

Attention:Dawne Skinner

Dillon Consulting Limited
66 Kenmount Rd., Suite 203
St.John's, NL
CANADA A1B 3V7

Report Date: 2016/06/30
Report #: R4047585
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6D0519
Received: 2016/06/23, 10:57

Sample Matrix: Soil
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Solids Acid Extr. ICPMS (1)	7	2016/06/29	2016/06/29	ATL SOP 00058	EPA 6020A R1 m
Moisture (1)	7	N/A	2016/06/29	ATL SOP 00001	OMOE Handbook 1983 m
PAH Compounds by GCMS (SIM) (1, 2)	7	2016/06/28	2016/06/30	ATL SOP 00102	EPA 8270D 2007 m

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

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

(1) This test was performed by Maxxam Bedford
(2) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Heather Macumber, Project Manager
Email: HMacumber@maxxam.ca
Phone# (902)420-0203 Ext:226

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Maxxam Job #: B6D0519
Report Date: 2016/06/30

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

RESULTS OF ANALYSES OF SOIL

Maxxam ID		CPD878	CPD879	CPD880	CPD881	CPD882	CPD883	CPD884		
Sampling Date		2016/06/17	2016/06/17	2016/06/17	2016/06/17	2016/06/17	2016/06/17	2016/06/17		
COC Number		D 05975	D 05975	D 05975	D 05975	D 05975	D 05975	D 05975		
	UNITS	TP16-1 SA1	TP16-1 SA2	TP16-2 SA1	TP16-2 SA100	TP16-2 SA2	TP16-3 SA1	TP16-3 SA2	RDL	QC Batch
Inorganics										
Moisture	%	8.1	19	8.8	11	11	9.6	9.6	1.0	4557224

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6D0519
Report Date: 2016/06/30

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		CPD878	CPD878	CPD879	CPD880	CPD881	CPD882		
Sampling Date		2016/06/17	2016/06/17	2016/06/17	2016/06/17	2016/06/17	2016/06/17		
COC Number		D 05975	D 05975	D 05975	D 05975	D 05975	D 05975		
	UNITS	TP16-1 SA1	TP16-1 SA1 Lab-Dup	TP16-1 SA2	TP16-2 SA1	TP16-2 SA100	TP16-2 SA2	RDL	QC Batch
Metals									
Acid Extractable Aluminum (Al)	mg/kg	14000	13000	14000	13000	13000	13000	10	4559009
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4559009
Acid Extractable Arsenic (As)	mg/kg	5.0	4.7	5.2	5.2	5.0	4.7	2.0	4559009
Acid Extractable Barium (Ba)	mg/kg	27	29	22	20	20	20	5.0	4559009
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4559009
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4559009
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	<50	50	4559009
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	4559009
Acid Extractable Chromium (Cr)	mg/kg	25	24	26	24	24	22	2.0	4559009
Acid Extractable Cobalt (Co)	mg/kg	13	12	13	13	13	12	1.0	4559009
Acid Extractable Copper (Cu)	mg/kg	38	37	23	30	31	32	2.0	4559009
Acid Extractable Iron (Fe)	mg/kg	29000	27000	29000	28000	28000	26000	50	4559009
Acid Extractable Lead (Pb)	mg/kg	34	32	33	36	38	33	0.50	4559009
Acid Extractable Lithium (Li)	mg/kg	20	18	18	18	18	18	2.0	4559009
Acid Extractable Manganese (Mn)	mg/kg	1000	1000	1000	1100	1100	1000	2.0	4559009
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	4559009
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4559009
Acid Extractable Nickel (Ni)	mg/kg	20	19	18	19	19	19	2.0	4559009
Acid Extractable Rubidium (Rb)	mg/kg	2.1	2.0	2.4	<2.0	<2.0	<2.0	2.0	4559009
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	4559009
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4559009
Acid Extractable Strontium (Sr)	mg/kg	17	16	21	19	16	15	5.0	4559009
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	4559009
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4559009
Acid Extractable Uranium (U)	mg/kg	0.39	0.39	0.51	0.44	0.40	0.37	0.10	4559009
Acid Extractable Vanadium (V)	mg/kg	41	37	41	38	37	34	2.0	4559009
Acid Extractable Zinc (Zn)	mg/kg	84	78	71	81	88	79	5.0	4559009

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B6D0519
Report Date: 2016/06/30

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		CPD883	CPD884		
Sampling Date		2016/06/17	2016/06/17		
COC Number		D 05975	D 05975		
	UNITS	TP16-3 SA1	TP16-3 SA2	RDL	QC Batch
Metals					
Acid Extractable Aluminum (Al)	mg/kg	13000	13000	10	4559009
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	2.0	4559009
Acid Extractable Arsenic (As)	mg/kg	6.7	6.0	2.0	4559009
Acid Extractable Barium (Ba)	mg/kg	24	18	5.0	4559009
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	2.0	4559009
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	2.0	4559009
Acid Extractable Boron (B)	mg/kg	<50	<50	50	4559009
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	0.30	4559009
Acid Extractable Chromium (Cr)	mg/kg	23	27	2.0	4559009
Acid Extractable Cobalt (Co)	mg/kg	13	13	1.0	4559009
Acid Extractable Copper (Cu)	mg/kg	34	34	2.0	4559009
Acid Extractable Iron (Fe)	mg/kg	27000	27000	50	4559009
Acid Extractable Lead (Pb)	mg/kg	36	34	0.50	4559009
Acid Extractable Lithium (Li)	mg/kg	18	19	2.0	4559009
Acid Extractable Manganese (Mn)	mg/kg	1200	1100	2.0	4559009
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	0.10	4559009
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	2.0	4559009
Acid Extractable Nickel (Ni)	mg/kg	19	22	2.0	4559009
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	<2.0	2.0	4559009
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	1.0	4559009
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	0.50	4559009
Acid Extractable Strontium (Sr)	mg/kg	16	15	5.0	4559009
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	0.10	4559009
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	2.0	4559009
Acid Extractable Uranium (U)	mg/kg	0.42	0.39	0.10	4559009
Acid Extractable Vanadium (V)	mg/kg	36	36	2.0	4559009
Acid Extractable Zinc (Zn)	mg/kg	93	91	5.0	4559009

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6D0519
Report Date: 2016/06/30

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		CPD878	CPD879	CPD880	CPD881	CPD882	CPD883	CPD884		
Sampling Date		2016/06/17	2016/06/17	2016/06/17	2016/06/17	2016/06/17	2016/06/17	2016/06/17		
COC Number		D 05975	D 05975	D 05975	D 05975	D 05975	D 05975	D 05975		
	UNITS	TP16-1 SA1	TP16-1 SA2	TP16-2 SA1	TP16-2 SA100	TP16-2 SA2	TP16-3 SA1	TP16-3 SA2	RDL	QC Batch
Polyaromatic Hydrocarbons										
1-Methylnaphthalene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4557548
2-Methylnaphthalene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4557548
Acenaphthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4557548
Acenaphthylene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4557548
Anthracene	mg/kg	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4557548
Benzo(a)anthracene	mg/kg	0.033	<0.010	0.012	0.012	<0.010	<0.010	0.040	0.010	4557548
Benzo(a)pyrene	mg/kg	0.027	<0.010	0.010	<0.010	<0.010	<0.010	0.038	0.010	4557548
Benzo(b)fluoranthene	mg/kg	0.025	<0.010	<0.010	<0.010	<0.010	<0.010	0.032	0.010	4557548
Benzo(g,h,i)perylene	mg/kg	0.022	<0.010	<0.010	<0.010	<0.010	<0.010	0.032	0.010	4557548
Benzo(j)fluoranthene	mg/kg	0.015	<0.010	<0.010	<0.010	<0.010	<0.010	0.018	0.010	4557548
Benzo(k)fluoranthene	mg/kg	0.015	<0.010	<0.010	<0.010	<0.010	<0.010	0.018	0.010	4557548
Chrysene	mg/kg	0.040	<0.010	0.018	0.017	<0.010	<0.010	0.048	0.010	4557548
Dibenz(a,h)anthracene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4557548
Fluoranthene	mg/kg	0.074	<0.010	0.032	0.033	0.013	<0.010	0.084	0.010	4557548
Fluorene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4557548
Indeno(1,2,3-cd)pyrene	mg/kg	0.017	<0.010	<0.010	<0.010	<0.010	<0.010	0.024	0.010	4557548
Naphthalene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4557548
Perylene	mg/kg	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	0.011	0.010	4557548
Phenanthrene	mg/kg	0.040	<0.010	0.018	0.018	<0.010	<0.010	0.026	0.010	4557548
Pyrene	mg/kg	0.059	<0.010	0.024	0.026	0.011	<0.010	0.066	0.010	4557548
Surrogate Recovery (%)										
D10-Anthracene	%	93	89	92	95	88	77	100		4557548
D14-Terphenyl (FS)	%	96	91	85	99	88	70	99		4557548
D8-Acenaphthylene	%	88	86	89	89	85	89	95		4557548

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6D0519
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GENERAL COMMENTS

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

Package 1	2.8°C

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
4557548	KKE	Matrix Spike	D10-Anthracene	2016/06/30		77	%	30 - 130
			D14-Terphenyl (FS)	2016/06/30		95	%	30 - 130
			D8-Acenaphthylene	2016/06/30		86	%	30 - 130
			1-Methylnaphthalene	2016/06/30		85	%	30 - 130
			2-Methylnaphthalene	2016/06/30		94	%	30 - 130
			Acenaphthene	2016/06/30		100	%	30 - 130
			Acenaphthylene	2016/06/30		82	%	30 - 130
			Anthracene	2016/06/30		84	%	30 - 130
			Benzo(a)anthracene	2016/06/30		104	%	30 - 130
			Benzo(a)pyrene	2016/06/30		92	%	30 - 130
			Benzo(b)fluoranthene	2016/06/30		94	%	30 - 130
			Benzo(g,h,i)perylene	2016/06/30		99	%	30 - 130
			Benzo(j)fluoranthene	2016/06/30		87	%	30 - 130
			Benzo(k)fluoranthene	2016/06/30		96	%	30 - 130
			Chrysene	2016/06/30		124	%	30 - 130
			Dibenz(a,h)anthracene	2016/06/30		95	%	30 - 130
			Fluoranthene	2016/06/30		98	%	30 - 130
			Fluorene	2016/06/30		94	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2016/06/30		94	%	30 - 130
			Naphthalene	2016/06/30		89	%	30 - 130
			Perylene	2016/06/30		91	%	30 - 130
			Phenanthrene	2016/06/30		99	%	30 - 130
			Pyrene	2016/06/30		96	%	30 - 130
4557548	KKE	Spiked Blank	D10-Anthracene	2016/06/30		91	%	30 - 130
			D14-Terphenyl (FS)	2016/06/30		95	%	30 - 130
			D8-Acenaphthylene	2016/06/30		87	%	30 - 130
			1-Methylnaphthalene	2016/06/30		82	%	30 - 130
			2-Methylnaphthalene	2016/06/30		90	%	30 - 130
			Acenaphthene	2016/06/30		93	%	30 - 130
			Acenaphthylene	2016/06/30		82	%	30 - 130
			Anthracene	2016/06/30		97	%	30 - 130
			Benzo(a)anthracene	2016/06/30		93	%	30 - 130
			Benzo(a)pyrene	2016/06/30		88	%	30 - 130
			Benzo(b)fluoranthene	2016/06/30		88	%	30 - 130
			Benzo(g,h,i)perylene	2016/06/30		92	%	30 - 130
			Benzo(j)fluoranthene	2016/06/30		87	%	30 - 130
			Benzo(k)fluoranthene	2016/06/30		91	%	30 - 130
			Chrysene	2016/06/30		103	%	30 - 130
			Dibenz(a,h)anthracene	2016/06/30		95	%	30 - 130
			Fluoranthene	2016/06/30		94	%	30 - 130
			Fluorene	2016/06/30		90	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2016/06/30		93	%	30 - 130
			Naphthalene	2016/06/30		86	%	30 - 130
			Perylene	2016/06/30		92	%	30 - 130
			Phenanthrene	2016/06/30		110	%	30 - 130
			Pyrene	2016/06/30		90	%	30 - 130
4557548	KKE	Method Blank	D10-Anthracene	2016/06/30		77	%	30 - 130
			D14-Terphenyl (FS)	2016/06/30		83	%	30 - 130
			D8-Acenaphthylene	2016/06/30		90	%	30 - 130
			1-Methylnaphthalene	2016/06/30	<0.010		mg/kg	
			2-Methylnaphthalene	2016/06/30	<0.010		mg/kg	
			Acenaphthene	2016/06/30	<0.010		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acenaphthylene	2016/06/30	<0.010		mg/kg	
			Anthracene	2016/06/30	<0.010		mg/kg	
			Benzo(a)anthracene	2016/06/30	<0.010		mg/kg	
			Benzo(a)pyrene	2016/06/30	<0.010		mg/kg	
			Benzo(b)fluoranthene	2016/06/30	<0.010		mg/kg	
			Benzo(g,h,i)perylene	2016/06/30	<0.010		mg/kg	
			Benzo(j)fluoranthene	2016/06/30	<0.010		mg/kg	
			Benzo(k)fluoranthene	2016/06/30	<0.010		mg/kg	
			Chrysene	2016/06/30	<0.010		mg/kg	
			Dibenz(a,h)anthracene	2016/06/30	<0.010		mg/kg	
			Fluoranthene	2016/06/30	<0.010		mg/kg	
			Fluorene	2016/06/30	<0.010		mg/kg	
			Indeno(1,2,3-cd)pyrene	2016/06/30	<0.010		mg/kg	
			Naphthalene	2016/06/30	<0.010		mg/kg	
			Perylene	2016/06/30	<0.010		mg/kg	
			Phenanthrene	2016/06/30	<0.010		mg/kg	
			Pyrene	2016/06/30	<0.010		mg/kg	
4557548	KKE	RPD	1-Methylnaphthalene	2016/06/30	NC		%	50
			2-Methylnaphthalene	2016/06/30	NC		%	50
			Acenaphthene	2016/06/30	NC		%	50
			Acenaphthylene	2016/06/30	NC		%	50
			Anthracene	2016/06/30	NC		%	50
			Benzo(a)anthracene	2016/06/30	NC		%	50
			Benzo(a)pyrene	2016/06/30	NC		%	50
			Benzo(b)fluoranthene	2016/06/30	NC		%	50
			Benzo(g,h,i)perylene	2016/06/30	NC		%	50
			Benzo(j)fluoranthene	2016/06/30	NC		%	50
			Benzo(k)fluoranthene	2016/06/30	NC		%	50
			Chrysene	2016/06/30	NC		%	50
			Dibenz(a,h)anthracene	2016/06/30	NC		%	50
			Fluoranthene	2016/06/30	NC		%	50
			Fluorene	2016/06/30	NC		%	50
			Indeno(1,2,3-cd)pyrene	2016/06/30	NC		%	50
			Naphthalene	2016/06/30	NC		%	50
			Perylene	2016/06/30	NC		%	50
			Phenanthrene	2016/06/30	NC		%	50
			Pyrene	2016/06/30	NC		%	50
4559009	BAN	Matrix Spike [CPD878-01]	Acid Extractable Antimony (Sb)	2016/06/29		97	%	75 - 125
			Acid Extractable Arsenic (As)	2016/06/29		102	%	75 - 125
			Acid Extractable Barium (Ba)	2016/06/29		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2016/06/29		106	%	75 - 125
			Acid Extractable Bismuth (Bi)	2016/06/29		104	%	75 - 125
			Acid Extractable Boron (B)	2016/06/29		102	%	75 - 125
			Acid Extractable Cadmium (Cd)	2016/06/29		104	%	75 - 125
			Acid Extractable Chromium (Cr)	2016/06/29		NC	%	75 - 125
			Acid Extractable Cobalt (Co)	2016/06/29		102	%	75 - 125
			Acid Extractable Copper (Cu)	2016/06/29		NC	%	75 - 125
			Acid Extractable Lead (Pb)	2016/06/29		NC	%	75 - 125
			Acid Extractable Lithium (Li)	2016/06/29		104	%	75 - 125
			Acid Extractable Manganese (Mn)	2016/06/29		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2016/06/29		99	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2016/06/29		108	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Nickel (Ni)	2016/06/29		103	%	75 - 125
			Acid Extractable Rubidium (Rb)	2016/06/29		100	%	75 - 125
			Acid Extractable Selenium (Se)	2016/06/29		104	%	75 - 125
			Acid Extractable Silver (Ag)	2016/06/29		104	%	75 - 125
			Acid Extractable Strontium (Sr)	2016/06/29		112	%	75 - 125
			Acid Extractable Thallium (Tl)	2016/06/29		106	%	75 - 125
			Acid Extractable Tin (Sn)	2016/06/29		104	%	75 - 125
			Acid Extractable Uranium (U)	2016/06/29		105	%	75 - 125
			Acid Extractable Vanadium (V)	2016/06/29		NC	%	75 - 125
			Acid Extractable Zinc (Zn)	2016/06/29		NC	%	75 - 125
4559009	BAN	Spiked Blank	Acid Extractable Antimony (Sb)	2016/06/29		100	%	75 - 125
			Acid Extractable Arsenic (As)	2016/06/29		103	%	75 - 125
			Acid Extractable Barium (Ba)	2016/06/29		100	%	75 - 125
			Acid Extractable Beryllium (Be)	2016/06/29		108	%	75 - 125
			Acid Extractable Bismuth (Bi)	2016/06/29		105	%	75 - 125
			Acid Extractable Boron (B)	2016/06/29		113	%	75 - 125
			Acid Extractable Cadmium (Cd)	2016/06/29		103	%	75 - 125
			Acid Extractable Chromium (Cr)	2016/06/29		103	%	75 - 125
			Acid Extractable Cobalt (Co)	2016/06/29		104	%	75 - 125
			Acid Extractable Copper (Cu)	2016/06/29		103	%	75 - 125
			Acid Extractable Lead (Pb)	2016/06/29		103	%	75 - 125
			Acid Extractable Lithium (Li)	2016/06/29		107	%	75 - 125
			Acid Extractable Manganese (Mn)	2016/06/29		105	%	75 - 125
			Acid Extractable Mercury (Hg)	2016/06/29		106	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2016/06/29		104	%	75 - 125
			Acid Extractable Nickel (Ni)	2016/06/29		105	%	75 - 125
			Acid Extractable Rubidium (Rb)	2016/06/29		101	%	75 - 125
			Acid Extractable Selenium (Se)	2016/06/29		106	%	75 - 125
			Acid Extractable Silver (Ag)	2016/06/29		105	%	75 - 125
			Acid Extractable Strontium (Sr)	2016/06/29		104	%	75 - 125
			Acid Extractable Thallium (Tl)	2016/06/29		104	%	75 - 125
			Acid Extractable Tin (Sn)	2016/06/29		102	%	75 - 125
			Acid Extractable Uranium (U)	2016/06/29		105	%	75 - 125
			Acid Extractable Vanadium (V)	2016/06/29		100	%	75 - 125
			Acid Extractable Zinc (Zn)	2016/06/29		104	%	75 - 125
4559009	BAN	Method Blank	Acid Extractable Aluminum (Al)	2016/06/29	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2016/06/29	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2016/06/29	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2016/06/29	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2016/06/29	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2016/06/29	<2.0		mg/kg	
			Acid Extractable Boron (B)	2016/06/29	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2016/06/29	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2016/06/29	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2016/06/29	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2016/06/29	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2016/06/29	<50		mg/kg	
			Acid Extractable Lead (Pb)	2016/06/29	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2016/06/29	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2016/06/29	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2016/06/29	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2016/06/29	<2.0		mg/kg	

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Maxxam Job #: B6D0519
Report Date: 2016/06/30

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Nickel (Ni)	2016/06/29	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2016/06/29	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2016/06/29	<1.0		mg/kg	
			Acid Extractable Silver (Ag)	2016/06/29	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2016/06/29	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2016/06/29	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2016/06/29	<2.0		mg/kg	
			Acid Extractable Uranium (U)	2016/06/29	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2016/06/29	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2016/06/29	<5.0		mg/kg	
4559009	BAN	RPD [CPD878-01]	Acid Extractable Aluminum (Al)	2016/06/29	9.9		%	35
			Acid Extractable Antimony (Sb)	2016/06/29	NC		%	35
			Acid Extractable Arsenic (As)	2016/06/29	NC		%	35
			Acid Extractable Barium (Ba)	2016/06/29	6.1		%	35
			Acid Extractable Beryllium (Be)	2016/06/29	NC		%	35
			Acid Extractable Bismuth (Bi)	2016/06/29	NC		%	35
			Acid Extractable Boron (B)	2016/06/29	NC		%	35
			Acid Extractable Cadmium (Cd)	2016/06/29	NC		%	35
			Acid Extractable Chromium (Cr)	2016/06/29	5.8		%	35
			Acid Extractable Cobalt (Co)	2016/06/29	7.8		%	35
			Acid Extractable Copper (Cu)	2016/06/29	1.1		%	35
			Acid Extractable Iron (Fe)	2016/06/29	8.8		%	35
			Acid Extractable Lead (Pb)	2016/06/29	4.5		%	35
			Acid Extractable Lithium (Li)	2016/06/29	11		%	35
			Acid Extractable Manganese (Mn)	2016/06/29	0.76		%	35
			Acid Extractable Mercury (Hg)	2016/06/29	NC		%	35
			Acid Extractable Molybdenum (Mo)	2016/06/29	NC		%	35
			Acid Extractable Nickel (Ni)	2016/06/29	7.7		%	35
			Acid Extractable Rubidium (Rb)	2016/06/29	NC		%	35
			Acid Extractable Selenium (Se)	2016/06/29	NC		%	35
			Acid Extractable Silver (Ag)	2016/06/29	NC		%	35
			Acid Extractable Strontium (Sr)	2016/06/29	NC		%	35
			Acid Extractable Thallium (Tl)	2016/06/29	NC		%	35
			Acid Extractable Tin (Sn)	2016/06/29	NC		%	35
			Acid Extractable Uranium (U)	2016/06/29	NC		%	35
			Acid Extractable Vanadium (V)	2016/06/29	11		%	35
			Acid Extractable Zinc (Zn)	2016/06/29	7.2		%	35

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

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

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 spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of 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 (one or both samples < 5x RDL).

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Maxxam Job #: B6D0519
Report Date: 2016/06/30

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

VALIDATION SIGNATURE PAGE

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

Mike MacGillivray, Scientific Specialist (Inorganics)

Rosemarie MacDonald, Scientific Specialist (Organics)

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

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Your Project #: 16-3976
Site Location: USN ARGENTIA
Your C.O.C. #: D05991

Attention:Dawne Skinner

Dillon Consulting Limited
66 Kenmount Rd., Suite 203
St.John's, NL
CANADA A1B 3V7

Report Date: 2016/06/29
Report #: R4046298
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6D0406
Received: 2016/06/24, 11:08

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Soil (PIRI) (1, 2)	1	2016/06/27	2016/06/27	ATL SOP 00111	Atl. RBCA v3 m
Moisture (1)	1	N/A	2016/06/27	ATL SOP 00001	OMOE Handbook 1983 m
VPH in Soil (PIRI) (1)	1	2016/06/27	2016/06/28	ATL SOP 00119	Atl. RBCA v3 m
ModTPH (T1) Calc. for Soil (1)	1	N/A	2016/06/28	N/A	Atl. RBCA v3 m

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Water Diss. MS (as rec'd) (1)	3	N/A	2016/06/27	ATL SOP 00058	EPA 6020A R1 m
Metals Water Diss. MS (as rec'd) (1)	1	N/A	2016/06/28	ATL SOP 00058	EPA 6020A R1 m
Metals Water Diss. MS (as rec'd) (1)	1	N/A	2016/06/29	ATL SOP 00058	EPA 6020A R1 m
PAH in Water by GC/MS (SIM) (1)	5	2016/06/27	2016/06/28	ATL SOP 00103	EPA 8270D 2007 m

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Bedford
(2) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Heather Macumber, Project Manager
Email: HMacumber@maxxam.ca
Phone# (902)420-0203 Ext:226
==========
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Maxxam Job #: B6D0406
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		CPD155		
Sampling Date		2016/06/17 10:00		
COC Number		D05991		
	UNITS	HYDRAULIC LEAK	RDL	QC Batch
Inorganics				
Moisture	%	8.5	1.0	4553624
Petroleum Hydrocarbons				
Benzene	mg/kg	<0.025	0.025	4555738
Toluene	mg/kg	<0.025	0.025	4555738
Ethylbenzene	mg/kg	<0.025	0.025	4555738
Total Xylenes	mg/kg	<0.050	0.050	4555738
C6 - C10 (less BTEX)	mg/kg	<2.5	2.5	4555738
>C10-C16 Hydrocarbons	mg/kg	<10	10	4555743
>C16-C21 Hydrocarbons	mg/kg	12	10	4555743
>C21-<C32 Hydrocarbons	mg/kg	50	15	4555743
Modified TPH (Tier1)	mg/kg	62	15	4553527
Reached Baseline at C32	mg/kg	Yes	N/A	4555743
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	N/A	4555743
Surrogate Recovery (%)				
Isobutylbenzene - Extractable	%	94		4555743
n-Dotriacontane - Extractable	%	70		4555743
Isobutylbenzene - Volatile	%	102		4555738

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Unidentified compound(s) in fuel / lube range. Possible lube oil fraction.

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Maxxam Job #: B6D0406
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		CPD150	CPD151	CPD152		CPD153	CPD154		
Sampling Date		2016/06/22 08:45	2016/06/22 10:00	2016/06/22 10:00		2016/06/22 11:30	2016/06/22 12:30		
COC Number		D05991	D05991	D05991		D05991	D05991		
	UNITS	MW16-1	MW16-2	MW16-100	RDL	MW-1	MW-2	RDL	QC Batch
Metals									
Dissolved Aluminum (Al)	ug/L	5.5	<5.0	<5.0	5.0	<50	<50	50	4555722
Dissolved Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	1.0	<10	<10	10	4555722
Dissolved Arsenic (As)	ug/L	2.6	<1.0	<1.0	1.0	<10	<10	10	4555722
Dissolved Barium (Ba)	ug/L	96	160	150	1.0	210	190	10	4555722
Dissolved Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	1.0	<10	<10	10	4555722
Dissolved Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	2.0	<20	<20	20	4555722
Dissolved Boron (B)	ug/L	<50	150	140	50	1100	760	500	4555722
Dissolved Cadmium (Cd)	ug/L	<0.010	0.17	0.15	0.010	0.10	0.23	0.10	4555722
Dissolved Calcium (Ca)	ug/L	57000	110000	100000	100	250000	190000	1000	4555722
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	1.0	<10	<10	10	4555722
Dissolved Cobalt (Co)	ug/L	<0.40	0.61	0.61	0.40	<4.0	<4.0	4.0	4555722
Dissolved Copper (Cu)	ug/L	<2.0	<2.0	<2.0	2.0	<20	<20	20	4555722
Dissolved Iron (Fe)	ug/L	2700	1400	1000	50	1400	<500	500	4555722
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	0.50	<5.0	<5.0	5.0	4555722
Dissolved Magnesium (Mg)	ug/L	9100	56000	52000	100	370000	250000	1000	4555722
Dissolved Manganese (Mn)	ug/L	560	670	650	2.0	67	<20	20	4555722
Dissolved Molybdenum (Mo)	ug/L	3.9	<2.0	<2.0	2.0	<20	<20	20	4555722
Dissolved Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	2.0	<20	<20	20	4555722
Dissolved Phosphorus (P)	ug/L	<100	<100	<100	100	<1000	<1000	1000	4555722
Dissolved Potassium (K)	ug/L	4200	15000	14000	100	99000	67000	1000	4555722
Dissolved Selenium (Se)	ug/L	<1.0	<1.0	<1.0	1.0	<10	<10	10	4555722
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	<0.10	0.10	<1.0	<1.0	1.0	4555722
Dissolved Sodium (Na)	ug/L	30000	410000	380000	100	2900000	2000000	1000	4555722
Dissolved Strontium (Sr)	ug/L	140	490	470	2.0	2500	1700	20	4555722
Dissolved Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	0.10	<1.0	<1.0	1.0	4555722
Dissolved Tin (Sn)	ug/L	<2.0	<2.0	<2.0	2.0	<20	<20	20	4555722
Dissolved Titanium (Ti)	ug/L	<2.0	<2.0	<2.0	2.0	<20	<20	20	4555722
Dissolved Uranium (U)	ug/L	0.62	0.14	0.14	0.10	<1.0	<1.0	1.0	4555722
Dissolved Vanadium (V)	ug/L	<2.0	<2.0	<2.0	2.0	<20	<20	20	4555722
Dissolved Zinc (Zn)	ug/L	<5.0	5.9	5.5	5.0	<50	<50	50	4555722

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6D0406
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		CPD150	CPD150	CPD151	CPD152	CPD153	CPD154		
Sampling Date		2016/06/22 08:45	2016/06/22 08:45	2016/06/22 10:00	2016/06/22 10:00	2016/06/22 11:30	2016/06/22 12:30		
COC Number		D05991	D05991	D05991	D05991	D05991	D05991		
	UNITS	MW16-1	MW16-1 Lab-Dup	MW16-2	MW16-100	MW-1	MW-2	RDL	QC Batch
Polyaromatic Hydrocarbons									
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4555734
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4555734
Acenaphthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Acenaphthylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Chrysene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Dibenz(a,h)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Fluorene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Naphthalene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	4555734
Perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Phenanthrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4555734
Surrogate Recovery (%)									
D10-Anthracene	%	85	105	84	75	82	101		4555734
D14-Terphenyl	%	105 (1)	112 (1)	103 (1)	95 (1)	100	106		4555734
D8-Acenaphthylene	%	100	99	100	100	102	100		4555734

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) PAH sample contained sediment.

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Maxxam Job #: B6D0406
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

GENERAL COMMENTS

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

Package 1	13.6°C

Samples recieved above 10°.

Sample CPD153-01 : Elevated reporting limits for trace metals due to sample matrix.

Sample CPD154-01 : Elevated reporting limits for trace metals due to sample matrix.

Results relate only to the items tested.

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Maxxam Job #: B6D0406
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4555722	BAN	Matrix Spike	Dissolved Aluminum (Al)	2016/06/27		106	%	80 - 120
			Dissolved Antimony (Sb)	2016/06/27		102	%	80 - 120
			Dissolved Arsenic (As)	2016/06/27		101	%	80 - 120
			Dissolved Barium (Ba)	2016/06/27		101	%	80 - 120
			Dissolved Beryllium (Be)	2016/06/27		99	%	80 - 120
			Dissolved Bismuth (Bi)	2016/06/27		98	%	80 - 120
			Dissolved Boron (B)	2016/06/27		100	%	80 - 120
			Dissolved Cadmium (Cd)	2016/06/27		104	%	80 - 120
			Dissolved Calcium (Ca)	2016/06/27		NC	%	80 - 120
			Dissolved Chromium (Cr)	2016/06/27		101	%	80 - 120
			Dissolved Cobalt (Co)	2016/06/27		101	%	80 - 120
			Dissolved Copper (Cu)	2016/06/27		101	%	80 - 120
			Dissolved Iron (Fe)	2016/06/27		103	%	80 - 120
			Dissolved Lead (Pb)	2016/06/27		102	%	80 - 120
			Dissolved Magnesium (Mg)	2016/06/27		NC	%	80 - 120
			Dissolved Manganese (Mn)	2016/06/27		102	%	80 - 120
			Dissolved Molybdenum (Mo)	2016/06/27		104	%	80 - 120
			Dissolved Nickel (Ni)	2016/06/27		99	%	80 - 120
			Dissolved Phosphorus (P)	2016/06/27		107	%	80 - 120
			Dissolved Potassium (K)	2016/06/27		103	%	80 - 120
			Dissolved Selenium (Se)	2016/06/27		103	%	80 - 120
			Dissolved Silver (Ag)	2016/06/27		90	%	80 - 120
			Dissolved Sodium (Na)	2016/06/27		NC	%	80 - 120
			Dissolved Strontium (Sr)	2016/06/27		NC	%	80 - 120
			Dissolved Thallium (Tl)	2016/06/27		100	%	80 - 120
			Dissolved Tin (Sn)	2016/06/27		103	%	80 - 120
			Dissolved Titanium (Ti)	2016/06/27		105	%	80 - 120
			Dissolved Uranium (U)	2016/06/27		104	%	80 - 120
			Dissolved Vanadium (V)	2016/06/27		104	%	80 - 120
			Dissolved Zinc (Zn)	2016/06/27		101	%	80 - 120
4555722	BAN	Spiked Blank	Dissolved Aluminum (Al)	2016/06/27		105	%	80 - 120
			Dissolved Antimony (Sb)	2016/06/27		98	%	80 - 120
			Dissolved Arsenic (As)	2016/06/27		98	%	80 - 120
			Dissolved Barium (Ba)	2016/06/27		101	%	80 - 120
			Dissolved Beryllium (Be)	2016/06/27		98	%	80 - 120
			Dissolved Bismuth (Bi)	2016/06/27		101	%	80 - 120
			Dissolved Boron (B)	2016/06/27		99	%	80 - 120
			Dissolved Cadmium (Cd)	2016/06/27		101	%	80 - 120
			Dissolved Calcium (Ca)	2016/06/27		102	%	80 - 120
			Dissolved Chromium (Cr)	2016/06/27		101	%	80 - 120
			Dissolved Cobalt (Co)	2016/06/27		103	%	80 - 120
			Dissolved Copper (Cu)	2016/06/27		103	%	80 - 120
			Dissolved Iron (Fe)	2016/06/27		104	%	80 - 120
			Dissolved Lead (Pb)	2016/06/27		104	%	80 - 120
			Dissolved Magnesium (Mg)	2016/06/27		104	%	80 - 120
			Dissolved Manganese (Mn)	2016/06/27		102	%	80 - 120
			Dissolved Molybdenum (Mo)	2016/06/27		101	%	80 - 120
			Dissolved Nickel (Ni)	2016/06/27		101	%	80 - 120
			Dissolved Phosphorus (P)	2016/06/27		106	%	80 - 120
			Dissolved Potassium (K)	2016/06/27		104	%	80 - 120
			Dissolved Selenium (Se)	2016/06/27		100	%	80 - 120
			Dissolved Silver (Ag)	2016/06/27		99	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Sodium (Na)	2016/06/27		101	%	80 - 120
			Dissolved Strontium (Sr)	2016/06/27		101	%	80 - 120
			Dissolved Thallium (Tl)	2016/06/27		101	%	80 - 120
			Dissolved Tin (Sn)	2016/06/27		100	%	80 - 120
			Dissolved Titanium (Ti)	2016/06/27		104	%	80 - 120
			Dissolved Uranium (U)	2016/06/27		105	%	80 - 120
			Dissolved Vanadium (V)	2016/06/27		104	%	80 - 120
			Dissolved Zinc (Zn)	2016/06/27		103	%	80 - 120
4555722	BAN	Method Blank	Dissolved Aluminum (Al)	2016/06/27	<5.0		ug/L	
			Dissolved Antimony (Sb)	2016/06/27	<1.0		ug/L	
			Dissolved Arsenic (As)	2016/06/27	<1.0		ug/L	
			Dissolved Barium (Ba)	2016/06/27	<1.0		ug/L	
			Dissolved Beryllium (Be)	2016/06/27	<1.0		ug/L	
			Dissolved Bismuth (Bi)	2016/06/27	<2.0		ug/L	
			Dissolved Boron (B)	2016/06/27	<50		ug/L	
			Dissolved Cadmium (Cd)	2016/06/27	<0.010		ug/L	
			Dissolved Calcium (Ca)	2016/06/27	<100		ug/L	
			Dissolved Chromium (Cr)	2016/06/27	<1.0		ug/L	
			Dissolved Cobalt (Co)	2016/06/27	<0.40		ug/L	
			Dissolved Copper (Cu)	2016/06/27	<2.0		ug/L	
			Dissolved Iron (Fe)	2016/06/27	<50		ug/L	
			Dissolved Lead (Pb)	2016/06/27	<0.50		ug/L	
			Dissolved Magnesium (Mg)	2016/06/27	<100		ug/L	
			Dissolved Manganese (Mn)	2016/06/27	<2.0		ug/L	
			Dissolved Molybdenum (Mo)	2016/06/27	<2.0		ug/L	
			Dissolved Nickel (Ni)	2016/06/27	<2.0		ug/L	
			Dissolved Phosphorus (P)	2016/06/27	<100		ug/L	
			Dissolved Potassium (K)	2016/06/27	<100		ug/L	
			Dissolved Selenium (Se)	2016/06/27	<1.0		ug/L	
			Dissolved Silver (Ag)	2016/06/27	<0.10		ug/L	
			Dissolved Sodium (Na)	2016/06/27	<100		ug/L	
			Dissolved Strontium (Sr)	2016/06/27	<2.0		ug/L	
			Dissolved Thallium (Tl)	2016/06/27	<0.10		ug/L	
			Dissolved Tin (Sn)	2016/06/27	<2.0		ug/L	
			Dissolved Titanium (Ti)	2016/06/27	<2.0		ug/L	
			Dissolved Uranium (U)	2016/06/27	<0.10		ug/L	
			Dissolved Vanadium (V)	2016/06/27	<2.0		ug/L	
			Dissolved Zinc (Zn)	2016/06/27	<5.0		ug/L	
4555722	BAN	RPD	Dissolved Cadmium (Cd)	2016/06/27	NC		%	20
			Dissolved Calcium (Ca)	2016/06/27	1.7		%	20
			Dissolved Copper (Cu)	2016/06/27	NC		%	20
			Dissolved Iron (Fe)	2016/06/27	NC		%	20
			Dissolved Lead (Pb)	2016/06/27	NC		%	20
			Dissolved Magnesium (Mg)	2016/06/27	2.1		%	20
			Dissolved Manganese (Mn)	2016/06/27	NC		%	20
			Dissolved Potassium (K)	2016/06/27	0.80		%	20
			Dissolved Sodium (Na)	2016/06/27	0.96		%	20
			Dissolved Zinc (Zn)	2016/06/27	NC		%	20
4555734	KKE	Matrix Spike [CPD151-01]	D10-Anthracene	2016/06/28		91	%	30 - 130
			D14-Terphenyl	2016/06/28		96	%	30 - 130
			D8-Acenaphthylene	2016/06/28		85	%	30 - 130
			1-Methylnaphthalene	2016/06/28		76	%	30 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			2-Methylnaphthalene	2016/06/28		83	%	30 - 130
			Acenaphthene	2016/06/28		79	%	30 - 130
			Acenaphthylene	2016/06/28		77	%	30 - 130
			Anthracene	2016/06/28		76	%	30 - 130
			Benzo(a)anthracene	2016/06/28		88	%	30 - 130
			Benzo(a)pyrene	2016/06/28		83	%	30 - 130
			Benzo(b)fluoranthene	2016/06/28		81	%	30 - 130
			Benzo(g,h,i)perylene	2016/06/28		95	%	30 - 130
			Benzo(j)fluoranthene	2016/06/28		76	%	30 - 130
			Benzo(k)fluoranthene	2016/06/28		77	%	30 - 130
			Chrysene	2016/06/28		92	%	30 - 130
			Dibenz(a,h)anthracene	2016/06/28		88	%	30 - 130
			Fluoranthene	2016/06/28		89	%	30 - 130
			Fluorene	2016/06/28		81	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2016/06/28		88	%	30 - 130
			Naphthalene	2016/06/28		78	%	30 - 130
			Perylene	2016/06/28		85	%	30 - 130
			Phenanthrene	2016/06/28		103	%	30 - 130
			Pyrene	2016/06/28		85	%	30 - 130
4555734	KKE	Spiked Blank	D10-Anthracene	2016/06/28		92	%	30 - 130
			D14-Terphenyl	2016/06/28		96	%	30 - 130
			D8-Acenaphthylene	2016/06/28		103	%	30 - 130
			1-Methylnaphthalene	2016/06/28		94	%	30 - 130
			2-Methylnaphthalene	2016/06/28		103	%	30 - 130
			Acenaphthene	2016/06/28		94	%	30 - 130
			Acenaphthylene	2016/06/28		94	%	30 - 130
			Anthracene	2016/06/28		79	%	30 - 130
			Benzo(a)anthracene	2016/06/28		79	%	30 - 130
			Benzo(a)pyrene	2016/06/28		94	%	30 - 130
			Benzo(b)fluoranthene	2016/06/28		83	%	30 - 130
			Benzo(g,h,i)perylene	2016/06/28		103	%	30 - 130
			Benzo(j)fluoranthene	2016/06/28		88	%	30 - 130
			Benzo(k)fluoranthene	2016/06/28		88	%	30 - 130
			Chrysene	2016/06/28		79	%	30 - 130
			Dibenz(a,h)anthracene	2016/06/28		95	%	30 - 130
			Fluoranthene	2016/06/28		86	%	30 - 130
			Fluorene	2016/06/28		99	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2016/06/28		97	%	30 - 130
			Naphthalene	2016/06/28		95	%	30 - 130
			Perylene	2016/06/28		96	%	30 - 130
			Phenanthrene	2016/06/28		107	%	30 - 130
			Pyrene	2016/06/28		86	%	30 - 130
4555734	KKE	Method Blank	D10-Anthracene	2016/06/28		76	%	30 - 130
			D14-Terphenyl	2016/06/28		97	%	30 - 130
			D8-Acenaphthylene	2016/06/28		99	%	30 - 130
			1-Methylnaphthalene	2016/06/28	<0.050		ug/L	
			2-Methylnaphthalene	2016/06/28	<0.050		ug/L	
			Acenaphthene	2016/06/28	<0.010		ug/L	
			Acenaphthylene	2016/06/28	<0.010		ug/L	
			Anthracene	2016/06/28	<0.010		ug/L	
			Benzo(a)anthracene	2016/06/28	<0.010		ug/L	
			Benzo(a)pyrene	2016/06/28	<0.010		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(b)fluoranthene	2016/06/28	<0.010		ug/L	
			Benzo(g,h,i)perylene	2016/06/28	<0.010		ug/L	
			Benzo(j)fluoranthene	2016/06/28	<0.010		ug/L	
			Benzo(k)fluoranthene	2016/06/28	<0.010		ug/L	
			Chrysene	2016/06/28	<0.010		ug/L	
			Dibenz(a,h)anthracene	2016/06/28	<0.010		ug/L	
			Fluoranthene	2016/06/28	<0.010		ug/L	
			Fluorene	2016/06/28	<0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2016/06/28	<0.010		ug/L	
			Naphthalene	2016/06/28	<0.20		ug/L	
			Perylene	2016/06/28	<0.010		ug/L	
			Phenanthrene	2016/06/28	<0.010		ug/L	
			Pyrene	2016/06/28	<0.010		ug/L	
4555734	KKE	RPD [CPD150-01]	1-Methylnaphthalene	2016/06/28	NC		%	40
			2-Methylnaphthalene	2016/06/28	NC		%	40
			Acenaphthene	2016/06/28	NC		%	40
			Acenaphthylene	2016/06/28	NC		%	40
			Anthracene	2016/06/28	NC		%	40
			Benzo(a)anthracene	2016/06/28	NC		%	40
			Benzo(a)pyrene	2016/06/28	NC		%	40
			Benzo(b)fluoranthene	2016/06/28	NC		%	40
			Benzo(g,h,i)perylene	2016/06/28	NC		%	40
			Benzo(j)fluoranthene	2016/06/28	NC		%	40
			Benzo(k)fluoranthene	2016/06/28	NC		%	40
			Chrysene	2016/06/28	NC		%	40
			Dibenz(a,h)anthracene	2016/06/28	NC		%	40
			Fluoranthene	2016/06/28	NC		%	40
			Fluorene	2016/06/28	NC		%	40
			Indeno(1,2,3-cd)pyrene	2016/06/28	NC		%	40
			Naphthalene	2016/06/28	NC		%	40
			Perylene	2016/06/28	NC		%	40
			Phenanthrene	2016/06/28	NC		%	40
			Pyrene	2016/06/28	NC		%	40
4555738	THL	Matrix Spike	Isobutylbenzene - Volatile	2016/06/27		106	%	60 - 130
			Benzene	2016/06/27		98	%	60 - 130
			Toluene	2016/06/27		96	%	60 - 130
			Ethylbenzene	2016/06/27		97	%	60 - 130
			Total Xylenes	2016/06/27		94	%	60 - 130
4555738	THL	Spiked Blank	Isobutylbenzene - Volatile	2016/06/27		97	%	60 - 130
			Benzene	2016/06/27		87	%	60 - 140
			Toluene	2016/06/27		85	%	60 - 140
			Ethylbenzene	2016/06/27		88	%	60 - 140
			Total Xylenes	2016/06/27		88	%	60 - 140
4555738	THL	Method Blank	Isobutylbenzene - Volatile	2016/06/27		96	%	60 - 130
			Benzene	2016/06/27	<0.025		mg/kg	
			Toluene	2016/06/27	<0.025		mg/kg	
			Ethylbenzene	2016/06/27	<0.025		mg/kg	
			Total Xylenes	2016/06/27	<0.050		mg/kg	
			C6 - C10 (less BTEX)	2016/06/27	<2.5		mg/kg	
4555738	THL	RPD	Benzene	2016/06/27	NC		%	50
			Toluene	2016/06/27	NC		%	50
			Ethylbenzene	2016/06/27	NC		%	50

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Maxxam Job #: B6D0406
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Xylenes	2016/06/27	NC		%	50
			C6 - C10 (less BTEX)	2016/06/27	NC		%	50
4555743	KCR	Matrix Spike	Isobutylbenzene - Extractable	2016/06/27		95	%	30 - 130
			n-Dotriacontane - Extractable	2016/06/27		76 (1)	%	30 - 130
			>C10-C16 Hydrocarbons	2016/06/27		NC	%	30 - 130
			>C16-C21 Hydrocarbons	2016/06/27		65	%	30 - 130
			>C21-<C32 Hydrocarbons	2016/06/27		85	%	30 - 130
4555743	KCR	Spiked Blank	Isobutylbenzene - Extractable	2016/06/27		99	%	30 - 130
			n-Dotriacontane - Extractable	2016/06/27		91	%	30 - 130
			>C10-C16 Hydrocarbons	2016/06/27		70	%	30 - 130
			>C16-C21 Hydrocarbons	2016/06/27		71	%	30 - 130
			>C21-<C32 Hydrocarbons	2016/06/27		97	%	30 - 130
4555743	KCR	Method Blank	Isobutylbenzene - Extractable	2016/06/27		97	%	30 - 130
			n-Dotriacontane - Extractable	2016/06/27		80	%	30 - 130
			>C10-C16 Hydrocarbons	2016/06/27	<10		mg/kg	
			>C16-C21 Hydrocarbons	2016/06/27	<10		mg/kg	
			>C21-<C32 Hydrocarbons	2016/06/27	<15		mg/kg	
4555743	KCR	RPD	>C10-C16 Hydrocarbons	2016/06/27	10		%	50
			>C16-C21 Hydrocarbons	2016/06/27	NC		%	50
			>C21-<C32 Hydrocarbons	2016/06/27	NC		%	50

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

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

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

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

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of 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 (one or both samples < 5x RDL).

(1) TEH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

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Maxxam Job #: B6D0406
Report Date: 2016/06/29

Dillon Consulting Limited
Client Project #: 16-3976
Site Location: USN ARGENTIA
Sampler Initials: AR

VALIDATION SIGNATURE PAGE

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

Mike MacGillivray, Scientific Specialist (Inorganics)

Rosemarie MacDonald, Scientific Specialist (Organics)

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

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Appendix G

Disclaimer

Disclaimer

Dillon Consulting Limited (Dillon) has used the degree of care and skill ordinarily exercised under similar circumstances at the time the work was performed by reputable members of the environmental consulting profession practicing in Canada. Dillon assumes no responsibility for conditions it was not authorized to investigate or which were beyond its scope of work. There is no warranty expressed or implied by Dillon that the work will discover all potential contamination since it may not be possible, even with exhaustive sampling, testing and analysis, to document all potential contamination on the site.

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Memo

To: Ian Goulding

From: Kevin Penney

cc: Ian Osmond

Date: May 31 2017

Re. New MCTF and C&P Base Facilities in Placentia

1. Introduction

This technical memo is to address the geotechnical concerns with the construction processes involved with the proposed infrastructure for New MCTF and C&P Base Facilities at the former Mess Hall and Barracks, Former USN Argentia, Argentia, NL location.

Information on the site is limited to surficial geology maps, and a Historical Review/Phase I ESA and Phase II ESA report from Dillon Consulting Limited (Dillon) in October of 2016. The report includes test pit data, monitoring well data, and a picture library which was used for the recommendations in this memo.

2. Site Conditions

The surficial geology of the area is comprised of two (2) different types of material, based on surficial geology maps. Sand and gravel beach or raised beach deposits can be found locally as well as “stony till” which can be upwards of 20 ft thick (E.P. Henderson, 1974).

Similar material was found over the site as evident in the test pit and monitoring well logs. The material was described generally as a sand with some gravel to gravelly and cobbles which overlaid a cobbley gravelly material (Dillon Consulting Limited, 2016). Monitoring wells were installed to approximately 15 m below ground surface (mbgs) with no bedrock encountered. Groundwater was encountered at approximately 11 – 13 mbgs (Dillon Consulting Limited, 2016).

3. Recommendations

It is recommended that the subgrade excavation for the foundation be taken to a competent, non-saturated, unweathered, native material and brought to finished sub-grade elevation with engineered fill. It is recommended that a geotechnical engineer be onsite to inspect the insitu

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subgrade material before the placement of any engineered fill. If weak/soft spots are encountered, addition engineered fill shall be used to stabilize the area. If surficial water enters the excavation and disturbs material, that material will be removed and replaced with engineered fill.

It is our understanding there will be no basement in the building and the foundation will be either a slab on grade with a frost wall to the required depth, or, a thickened slab.

4. Additional Comments

4.1 Fill for Site Grading

Engineered fill should be a well graded, granular material such as sand and gravel or well graded rockfill from a quarry source. The maximum allowable particle diameter is 100 mm with a maximum fines (minus 0.075 mm) content of 8 percent. All engineered fill should be approved by the site engineer and placed and compacted under controlled conditions using procedures such as the following:

I. The area extent of engineered fill should be controlled by proper surveying techniques to ensure that the top of the engineered fill extends a minimum of 2.5 m beyond the perimeter of the structures to be supported. A maximum slope of 1V:1H (45º) constructed from engineered fill is to be maintained outside of this 2.5 m perimeter. This slope should not be confused with any embankment slopes which should be 1V:2H or flatter.

II. The area to receive the engineered fill should be stripped of any topsoil, organic matter, fill and other compressible, weak and deleterious materials. After stripping, the entire area should be inspected and approved by a Geotechnical Engineer. Spongy, wet or soft/loose spots should be sub-excavated to stable subgrade and replaced with compactable approved soil, compatible with subgrade conditions, as directed by a Geotechnical Engineer.

III. The fill material should be placed in thin layers ranging from 200 mm to 300 mm in thickness, depending on the compaction equipment used. Oversize particles (cobbles and boulders) larger than 100 mm should be discarded, and each fill layer should be uniformly compacted with heavy compactors, suitable for the type of fill used, to at least 100 percent of its Standard Proctor Maximum Dry Density (SPMDD) within the building envelope and 98 percent in the parking lot and roadways.

IV. Full-time geotechnical inspection and quality control (by means of frequent field density and laboratory testing) are necessary for the construction of a certifiable engineered fill. The compaction procedure and efficiency should be closely monitored by a Geotechnical Engineer.

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V. The engineered fill should not be frozen and should be placed at moisture content within 2 percent of the optimum value for compaction. The engineered fill should not be placed during winter months when freezing ambient temperatures occur persistently or intermittently.

Based on the review of the Dillon report, the excavated material may be used as engineered fill provided it is free of organics, unweathered, and meets the specifications outlined above. The excavated material may require moisture conditioning and/or mixing with rock fill to meet specification. All materials to be used as engineered fill should be approved by the geotechnical engineer prior to placement. An allowable bearing capacity for footings installed on engineered fill or competent undisturbed native soil is 100 kPa.

Backfill material used around foundation walls should be free of deleterious material, free draining and classed as non-frost susceptible to reduce the potential effects of adfreeze. Maximum particle size should not exceed 100 mm. The granular backfill should be capped with a less permeable material and graded to promote positive drainage away from the building.

4.2 Excavation and Construction Dewatering

It is expected that excavations will be required for the foundation elements and for any underground utility installations. Conventional unsupported excavations are expected to be feasible where the groundwater table is below the bottom of the excavation. Based on previous studies, groundwater was assumed to be approximately 11-13 mbgs (Dillon Consulting Limited, 2016). Any seepage from surficial runoff into the excavations can likely be dewatered using perimeter trenches, sumps, and pumps within the excavation. All excavations should be carried out in accordance with applicable occupational health and safety rules and regulations or a stricter set of rules and regulations if required by the Owner.

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5. CLOSURE

The recommendations were developed from a desktop study of available information and are in accordance with industry standard practices. Amec Foster Wheeler did not conduct addition investigations or perform a site visit. These recommendations are for site conditions during the initial investigation carried out by Dillon Consulting Limited. If the conditions change at the time of construction, addition investigations may be required.

Yours sincerely,

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