GEMTEC
www.gemtec.ca

# Step 3 Initial Testing Program and Site 4 Site Classification Former Pinetree Line Radar Station Cut Throat Island DCC Project Number: NL17AS01

Contract Number: 65745

GEMTEC Project: 10550.04.01 (Final)

www.gemtec.ca

Submitted to:

Defence Construction Canada
180 Kent Street, 14th Floor
Ottawa, Ontario
K1P 0B6

# Step 3 Initial Testing Program and Site 4 Site Classification Former Pinetree Line Radar Station Cut Throat Island

DCC Project Number: NL17AS01
Contract Number: 65745

November 23, 2018
GEMTEC Project: 10550.04.01 (Final)

experience • knowledge • integrity

GEMTEC Consulting Engineers and Scientists Limited
191 Doak Road
Fredericton, NB, Canada
E3C 2E6

November 23, 2018 File: 10550.04.01 (Final)

Defence Construction Canada
180 Kent Street, 14th floor
Ottawa, Ontario
K1P 0B6

Attention: Maria Drake, Regional Service Line Leader, Environmental Services

**Re: Final Report: Step 3 Initial Testing Program and Site 4 Site Classification, Former Pine Tree Line Radar Station, Cut Throat Island, Labrador DCC Project Number: NL17AS01, Contract Number 65745**

Please find enclosed the Final Report: Step 3 Initial Testing Program and Site 4 Site Classification, Former Pine Tree Line Radar Station, Cut Throat Island, Labrador DCC Project Number: NL17AS01, Contract Number 65745.

If you have any questions regarding the contents of this report, please do not hesitate to contact the undersigned at (506) 453-1025 or via email at abigail.garnett@gemtec.ca. This report was prepared by Melanie Langille, M.Env.Sc. and Shaun Pelkey, and reviewed by Abigail Garnett, M.Sc.Eng., P.Eng. and Steve Livingstone, M.Sc., P.Geo. on behalf of GEMTEC Consulting Engineers and Scientists Limited.

Melanie Langille, M.Env.Sc.
Environmental Scientist

Abigail Garnett, M.Sc.Eng., P.Eng.
Senior Environmental Engineer

N:\files\10500\10550.04\6_Cut Throat Island\Reports\Final\2_Final (Final)\NL17AS01_Cut Throat Island_Final Report_20181123.docx

## EXECUTIVE SUMMARY

GEMTEC Consulting Engineers and Scientists Limited (GEMTEC) was retained by Defence Construction Canada (DCC) to conduct a Federal Approach to Contaminated Sites (FACS) Step 3 Initial Testing Program and a Step 4 Site Classification for a former United States Air Force (USAF) Pinetree Line Radar Station located on Cut Throat Island, Labrador (herein referred to as the “Site”). The objectives of the work were to complete Steps 3 and 4 of the FACS. Step 3 of the FACS involves an Initial Testing Program (also known as a Phase II Environmental Site Assessment (ESA)) and Step 4 of the FACS involves the completion of the Canadian Council of Ministers of the Environment (CCME) National Classification System for Contaminated Sites (NCSCS). The work was initiated based on the results of a FACS Step 2 Historical Review (also known as a Phase I ESA) in which potential contamination was identified based on historical activities at the Site (GHD, 2016). The objective of the work was to determine the presence/absence of impacts at the Site, and to determine a priority for action should impacts exist (NCSCS Classification).

The Site is a former manned Pinetree Line Gap Filler Radar Station for the United States Air Force (USAF) Cartwright Air Station, located on Cut Throat Island, Labrador. The Site was operated by the USAF between the mid-1950s and early 1960s. The Sites is identified as having an Upper Site and a Lower Site with approximately 1.5 kilometres of gravel roadway separating the two Sites. Diesel fuel was stored at both the Upper and Lower Sites in (approximately) 1,578,000 and 1,625,000 litre (L) aboveground storage tanks (ASTs), respectively, and an aboveground pipeline connected the two ASTs. Reportedly, a fuel pump house was also located at both the Upper and Lower Sites. Reportedly, fuel was also stored in portable ASTs and drums, in various locations across the Upper and Lower Sites.

While in operation, the Upper Site consisted of: a two-storey main building with an attached radar and radio tower (radome); a garage; a heating and power plant; a barracks (housing 25-50 personnel); an office building; and a dining hall.

The Upper Site also contained two communication antennae, catch basins, a water pumping station and supply lines (from a nearby freshwater lake), a disaster shack, a storage shed with an antenna, and a helicopter landing pad. A former USAF quarry and dump, used during Site operations, were reportedly located southeast of the Upper Site. During the Site reconnaissance completed as part of this assessment in September, 2017, a landfill was identified north of the helicopter landing pad. A dock was also reported to be located at the Lower Site. A seasonal community of fishing sheds is located near the Lower Site. Access to all areas of the Site is not restricted.

The following is a summary of the Step 3 Initial Testing Program and Site 4 Site Classification using the NCSCS:

**APECS:**

- Based on a document review, 15 preliminary Areas of Potential Environmental Concern (APECs) were identified for field investigation; and
- Following the completion of a Site Reconnaissance, the locations and chemicals of potential concern (COPCs) were adjusted for some APECs, as compared to what was proposed in the GEMTEC work plan, and an additional APEC (#6A, presumed landfill) was identified.

**Field Program/Testing Program:**

- A total of 66 surface soil (0-0.05 m) samples (including 5 field duplicates), 5 sediment samples and 5 surface water samples were collected from the Site in September, 2017; and
- Concentrations of COPCs were compared to the applicable Provincial (petroleum hydrocarbons (PHCs) only) and Federal screening levels. The regulatory framework includes residential guidelines for the Lower Site, due to the proximity of the Lower Site to a nearby seasonal community (fishing sheds) and commercial for the Upper Site, non-groundwater use/non-potable, and coarse-grained soil. Concentrations of COPCs were compared to the applicable ecological and human health guidelines.

**Data Evaluation:**

- Based on the results of the analytical program, the following were identified at concentrations exceeding the referenced screening levels:
    - Soil (Upper and Lower Site): PHCs, polycyclic aromatic hydrocarbons (PAHs) and metals;
    - Sediment (Upper Site): PHCs; and
    - Surface water (Upper Site): PHCs and metals;
- Asbestos containing debris (cement board, vinyl floor tiles, and mastic) was confirmed at the Site; and
- Delineation of the impacts has generally not been achieved based on the Initial Testing Program.

**NCSCS Scoring and GIS Database:**

- The calculated NCSCS score for the Site is 73.4. Based on this score, the Site is classified as Class 1, indicating a High priority for action; and
- The Department of National Defence (DND) Environmental Geospatial Information System (GIS) Data Template was updated with all data collected as part of this mandate.

Based on the results of this Step 3 Initial Testing Program and Step 4 Site Classification, preliminary estimates of the area and volume of impacted soil are provided in Table E.1.1, for each of the now confirmed APECs. Areas provided below include both human and ecological exceedances, when compared to both federal and provincial guidelines, and are considered preliminary estimates only, as delineation was not achieved during the Step 3 Initial Testing Program.

**Table E.1.1 Estimated Area and Volume of Impacts**

| Sample ID | COPC | Matrix | Preliminary Estimates | | |
|---|---|---|---|---|---|
| | | | Depth[1] | Area ($m^2$) | Volume ($m^3$) |
| **APEC #1 (AST (Upper Site))** | | | | | |
| BS_CT_02A | Chrysotile Asbestos | Asbestos/Soil Mixture | 0.05 | 2200 | 110 |
| **APEC #2 (AST, Lower site)** | | | | | |
| SS_CT_48, SS_CT_49 | F2, F3, modified TPH | Soil | 0.10 | 400 | 40 |
| **APEC #3 (Aboveground Fuel Line)** | | | | | |
| SS_CT_15 | F3, modified TPH | Soil | 0.10 | 250 | 30 |
| SS_CT_54 | modified TPH | Soil | 0.10 | 250 | 30 |
| **APEC #4 (USAF Quarry and Dump)** | | | | | |
| SS_CT_41, SS_CT_42, SS_CT_44 | nickel, chromium | Soil | 0.10 | 1100 | 110 |
| **APEC #6 (1987 Landfill/Bury Site)** | | | | | |
| SS_CT_08 | F3, F4 | Soil | 0.90 | 50 | 50 |
| SS_CT_09 | F4 | Soil | 0.90 | 150 | 140 |
| **APEC #6A (Landfill/Bury Site)** | | | | | |
| SS_CT_62, SS_CT_61, SS_CT_60 | chromium, copper, nickel, F2, F3, F4, modified TPH | Soil | 0.60 | 900 | 540 |

**Table E.1.1 Estimated Area and Volume of Impacts**

| Sample ID | COPC | Matrix | Preliminary Estimates | | |
|---|---|---|---|---|---|
| | | | Depth[1] | Area ($m^2$) | Volume ($m^3$) |
| **APEC #8 (Water Source)** | | | | | |
| BS_CT_01C | Chrysotile Asbestos | Asbestos/Soil Mixture | 0.05 | 400 | 20 |
| SW_CT_02 | aluminum, iron | Surface Water | 0.50 | 150 | 80 |
| | modified TPH | Sediment | 0.15 | 150 | 30 |
| SW_CT_03 | aluminum, iron | Surface Water | 0.50 | 250 | 130 |
| | modified TPH | Sediment | 0.15 | 150 | 30 |
| **APEC #9 (Pump House)** | | | | | |
| BS_CT_01D | Chrysotile Asbestos | Asbestos/Soil Mixture | 0.05 | 400 | 20 |
| SS_CT_52, SS_CT_53 | F3, modified TPH | Soil | 0.10 | 200 | 20 |
| **APEC #10 (Main Building and Motor Pool)** | | | | | |
| BS_CT_01B | Chrysotile Asbestos | Asbestos/Soil Mixture | 0.05 | 2,200 | 110 |
| SS_CT_02, SS_CT_03 | Several PAHs, arsenic, copper, chromium, lead, nickel, zinc, | Soil | 0.10 | 500 | 50 |
| SS_CT_01 | Zinc | Soil | 0.10 | 200 | 20 |
| **APEC #11 (Disaster Shack)** | | | | | |
| BS_CT_01B | Chrysotile Asbestos | Asbestos/Soil Mixture | 0.05 | 450 | 30 |
| **APEC #12 (Former Storage Building)** | | | | | |
| SS_CT_24 | F4 | Soil | 0.10 | 100 | 10 |

**Table E.1.1 Estimated Area and Volume of Impacts**

| Sample ID | COPC | Matrix | Preliminary Estimates | | |
|---|---|---|---|---|---|
| | | | Depth[1] | Area ($m^2$) | Volume ($m^3$) |
| **APEC #13 (Former Catch Basin)** | | | | | |
| SS_CT_26, SS_CT_27, SS_CT_28 | F2, F3, modified TPH | Soil | 0.30 | 600 | 180 |
| **APEC #14 (Waterbody, northeast of the Helicopter Pad)** | | | | | |
| SW_CT_04 | Copper, aluminum | Surface Water | 0.50 | 250 | 130 |
| **APEC #15 (Waterbody, north of water source)** | | | | | |
| SW_CT_01 | aluminum, iron | Surface Water | 0.50 | 200 | 100 |
| **Total Estimated Volume of Impacted Soil at the Site** | | | | | 1,220 |
| **Total Estimated Volume of Asbestos/Soil Mixture** | | | | | 290 |
| **Total Estimated Volume of Impacted Sediment at the Site** | | | | | 60 |
| **Total Estimated Volume of Surface Water at the Site** | | | | | 440 |

Notes:
m = metres; $m^2$ = square metres; and $m^3$ = cubic metres
1) Depth inferred on an APEC by APEC basis is based on observations made at the time of sampling; however, impacts were not delineated vertically during the Step 3 Initial Testing Program. These depths are estimates only.
2) Area estimates were determined on a number of factors presented in Section 7.3.5.
3) Volume estimates are preliminary at this stage as delineation was not achieved during the Step 3 Initial Testing Program. As such, the presented volume estimates have been rounded up to the nearest 10 $m^3$ (e.g., 22.5 is rounded to 30 $m^3$).
4) All estimates presented herein should be revised following completion of a Step 5 Detailed Testing Program.

Based on the information gathered in the Step 3 Initial Testing Program and Step 4 Site Classification, and taking into consideration the anticipated land use (vacant, adjacent to seasonal community with no municipal infrastructure), a work plan is recommended to further delineate and characterize the APECs and to further refine and prioritize the contaminant risk.

The proposed next step is to close the data/information gaps by conducting a FACS Step 5 Detailed Testing Program and Step 6 Site Re-Classification using the CCME NCSCS of the FACS. The scope of a Detailed Testing Program could include the following:

- Additional data gathering including:
  - Interviews with seasonal fishermen/hunters (if possible) at Cut Throat Island, to determine the source of drinking water in the area (groundwater, surface water, and/or off-island source). As the USAF used surface water for drinking, current use of surface water for potable purposes has not been ruled out.
- Additional field data gathering including:
  - Supplemental background soil sampling to determine background conditions outside the influence of the former Site activities.
  - Collecting surface and subsurface (if applicable) soil samples, sediment samples, and surface water samples to delineate the extent of the identified contaminants; and
  - Geophysical survey of landfills (suspected and confirmed) to determine the volume of debris.
- Complete data analysis and evaluation:
  - Analysis of the degree of contamination on the Site (compare data to applicable pathway specific provincial and federal guidelines for human health and ecological health);
  - Refine/update the preliminary assessment of exposure pathways (Human Health and Ecological Conceptual Site Models (CSMs));
  - Update the DND Environmental GIS Data Template with all data collected as part of the mandate;
  - Determine the need for additional environmental site assessment and/or risk assessment work (if any); and
  - Identifying any management actions that may be necessary.
- Complete the FACS Step 6 Site Re-Classification using the CCME NCSCS.

A cost estimate to complete the Step 5 Detailed Testing Program and Step 6 Site Re-Classification is provided under separate cover. Actual costs to complete additional phases of work at the Site will be dictated by Site conditions, the scope of the programs completed, and market values (for professional fees, analytical testing and transportation) at the time the work is completed.

The statements made in this Executive Summary should be read in conjunction with the remainder of the report.

## TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF DRAWINGS



## LIST OF APPENDICES

## 1.0 INTRODUCTION

GEMTEC Consulting Engineers and Scientists Limited (GEMTEC) was retained by Defence Construction Canada (DCC) to conduct a Federal Approach to Contaminated Sites (FACS) Step 3 Initial Testing Program and a Step 4 Site Classification for a former United States Air Force (USAF) Pinetree Line Radar Station located on Cut Throat Island, Labrador (herein referred to as the "Site"; Drawing 1, Appendix A). The objectives of the work were to complete Steps 3 and 4 of the FACS. Step 3 of the FACS involves an Initial Testing Program (also known as a Phase II Environmental Site Assessment (ESA)) and Step 4 of the FACS involves the completion of the Canadian Council of Ministers of the Environment (CCME) National Classification System for Contaminated Sites (NCSCS). The work was initiated based on the results of a FACS Step 2 Historical Review (also known as a Phase I Environmental Site Assessment) in which potential contamination was identified based on historical activities at the Site (GHD, 2016).

The purpose of the work completed under this mandate was to determine the presence/absence of impacts at the Site, and determine a priority for action should impacts exist (NCSCS Classification).

### 1.1 Scope of Work

The scope of work for this Step 3 Initial Testing Program and Step 4 Site Classification included the following:

- Preparing a Health and Safety Plan (HSP);
- Completing documentation review;
- Updating the work plan for the Step 3 Initial Testing Program;
- Conducting the Step 3 Initial Testing Program consisting of sampling and analysis of surface soil, surface water, sediment, building materials, and paint;
- Conducting a site inventory including infrastructure, buildings, and/or debris identified at the Site;
- Developing a regulatory framework to assess Site analytical data;
- Classifying the Site using the CCME NCSCS;
- Updating the Department of National Defence (DND) Environmental Geospatial Information System (GIS) Data Template with all data collected as part of this mandate;
- Developing a Conceptual Site Model (CSM) for the Site;
- Preparing a written report and manageable electronic files of all data collected in the specified format; and
- Providing a work plan for additional environmental site assessment work required (if any), to delineate and further characterize any on-site impacts.

## 1.2 Previous Environmental Site Assessments

The following environmental site assessment was previously completed for the Site:

- Phase I Environmental Site Assessment. Former United States Military Site. Cut Throat Island, NL. Prepared for the Department of Environment and Conservation (Newfoundland and Labrador). March 2016. GHD Limited.

The above-noted document was reviewed by GEMTEC as part of this mandate. Relevant details are cited throughout this report.

## 1.3 Background and Site Description

Cut Throat Island is an island situated off the eastern coast of Labrador. It is located approximately 88 kilometres north of the town of Cartwright, Labrador. The Site comprises of four separate parcels of land (Drawing 2) covering an area of approximately 478,015 square meters ($m^2$) (GHD, 2016). The Site is identified as having an Upper Site and a Lower Site with approximately 1.5 km of gravel roadway separating the two Sites.

The Site is a former manned Pinetree Line Gap Filler Radar Station for the United States Air Force (USAF) Cartwright Air Station. The Pinetree Line was a network of Aircraft Control and Warning (AC&W) stations used in the detection of Soviet aircraft flying toward the US and Canada during the Cold War. The Radar Station on Cut Throat Island was established in 1957 and operated until 1961. Soon after, the facility was transferred to the Canadian Armed Forces, was deactivated and closed. In 1986, the property ownership was transferred to the Province of Newfoundland and Labrador (GHD, 2016). The Province of Newfoundland and Labrador remains the current Site owner.

While in operation, the Upper Site consisted of a:

- Main two-storey building (which housed a motor pool/maintenance garage), heating and power plant, barracks (housing 25-50 personnel), office space, and a dining hall;
- Tower (Radome) ,housing the radar equipment, which was connected to the main building by an enclosed corridor;
- Total of two communication antennae;
- Disaster shack;
- Fuel pump house;
- Water pumping station;
- Storage shed;
- Catch basins;
- 1,578,000 litre (L) above ground storage tank (AST) containing diesel/fuel oil; and
- Helicopter pad.

Features of the Upper Site are shown on Drawings 3 and 4 (Appendix A). Also, a freshwater lake, located east of the Upper Site, was used as a source of drinking water by the USAF. A water pump house was installed at the western boundary of the lake, and water was transported via an above-ground pipeline to the Upper Site (Drawing 3, Appendix A). Along the eastern side of the roadway was an above ground pipeline, which transferred fuel from the Lower Site (accessible by boat) to the Upper Site. It is assumed that the pipeline was removed during Site decommissioning work. Some concrete supports of the former pipeline remain.

An area of dumping/landfill associated with the USAF was identified in September 2017 between the Upper Site and the Lower Site along the west side of the roadway (Drawing 4, Appendix A). Sections of the roadway/ former above ground diesel pipeline are shown on Drawings 4 and 6 (along with areas of potential environmental concern, see Section 2.2). A former USAF quarry and dump (Drawing 5, Appendix A) used during Site operations was reportedly located southeast of the Upper Site (GHD 2016).

The Lower Site (Drawing 6, Appendix A) consisted of a 1,625,000 L diesel/fuel oil AST and pump house. This AST was filled via an above ground pipeline that was accessible by boat.

In 1987, the Site was decommissioned. The decommissioning contract included the razing of on-site structures and the burning of all materials, followed by the burying and covering of all building materials. The contractor reportedly did not complete all the work at the Site. All material brought to the radar station, during its construction and operation, remains on-site in various states in landfills.

## 2.0 DOCUMENT REVIEW

### 2.1 Geology and Hydrogeology

Surficial geology mapping (Map 1620 A, Cartwright Labrador Newfoundland; Fulton, 1986), indicates that Cut Throat Island is entirely made up of Pre-Quaternary rock and rock thinly covered in drift colluvium, and vegetation; generally hilly and hummocky, steep slopes common; includes small areas of other units and small swampy hollows.

Bedrock geology mapping (Gower, 1979), indicates that the surficial deposits, if any, are underlain by Aphebian-Helikian biotite granodiorite, minor hornblende, fine to coarse grained, foliated to gneissic; and Aphebian-Helikian biotite granodiorite, with potassium feldspar phenocrysts, porphyroblasts or augen, seriate texture in part, foliated and gneissic. Based on the information presented in the bedrock geology map, the bedrock geology for Cut Throat Island was determined via helicopter supported reconnaissance mapping and was not field verified.

Based on the information presented in the “Hydrogeology of Labrador” (AECOM, 2013), the Site is located in the Pre-Cambrian age geological province referred to as the “Grenville Province”. The Grenville Province is located in the southern portion of Labrador and is west to northeast trending, and consists of high grade metamorphic rocks (*i.e.*, gneiss, formed by the metamorphosis of granite or sedimentary rock) and associated intrusive rocks (AECOM, 2013).

Granitic and gneissic rocks of the Grenville Province were found to have low to moderate yields ranging from 0.6 to 315 Liters per minute (Lpm), with a geometric mean of 8.6 Lpm (AECOM, 2013). It is therefore anticipated that the rock at the Site is gneissic and has a relatively low hydraulic conductivity.

### 2.2 Permafrost

The southern portion of Labrador has isolated patches of permafrost (ground that remains frozen for more than one year), which are typically associated with peaty wetlands (AECOM, 2013). Permafrost was not encountered at the Site during the manual test pitting. Based on the location of the Site and soil conditions encountered at the Site (i.e., no peaty wetland are present), permafrost is not likely to be present.

### 2.3 Topography and Drainage

Labrador is part of the Canadian Shield physiographic region of Canada. The Mecantina Plateau, located in southeastern Labrador (i.e., the area of the Site) consists of changes in elevation from sea level (at the eastern and southern coasts) to 600 metres above sea level, at the center of the plateau (ESWG, 1996).

Site topography is depicted on Drawing 2 in Appendix A and shown on images obtained from Google Earth Pro® in Appendix B. The Upper Site is situated at 120 to 130 metres above sea level (masl), while the Lower Site is situated at an elevation of less than 10 masl (Natural Resources Canada, 2017). The terrain at Cut Throat Island is rugged, with steep cliffs, particularly along the north and northwestern shore of the island. Much of the Site surfaces are exposed bedrock, with some small herbaceous vegetation.

Groundwater flow direction is expected to mimic the local topography, flowing from high elevations to low elevations along the coast. Based on the topography and geology mapping, drainage is expected to occur primarily by overland flow, following the surface topography, which generally slopes toward the Labrador Sea.

### 2.4 Climate

The closest weather station to the Site is in Cartwright, which is located approximately 150 km to the southeast of the Site. Based on Environment Canada Climate Normals from 1971 to 2000 (EC, 2018), the daily average temperature in Cartwright is -0.5 degrees Celsius, with January and February being the coldest months (January (-14.8) and February (-14.1) and July and August being the hottest months (both 12.1 degrees Celsius). Total annual precipitation is 1050.1 millimetres (mm), which includes 573 mm of rainfall and 477.1 mm as rainfall equivalents (includes annual snowfall of 487.6 cm). The average wind speed is 20.2 kilometres per hour (km/hr).

### 2.5 Environmentally Sensitive areas, Shallow Soil Conditions, Surface Water Bodies

A review of ecologically significant areas (CCEA, 2017), revealed no area of ecological significance within 5 kilometres (km) of the Site. The nearest protected ecological area is the Gannet Islands Ecological Reserve, located approximately 70 km east of the Site. No unique or special habitat was identified at the Site.

### 2.6 Preliminary Identification of APECs

In preparing the work plan for this Step 3 Initial Testing Program and Step 4 Site Classification, GEMTEC reviewed:

- The previous Step 2 Historical Review prepared by GHD (GHD, 2016). It is noted that, at the request of the client of the Step 2 Historical Review (Province of Newfoundland and Labrador), a Site visit was not completed by GHD; and
- High-resolution aerial imagery, purchased from Sikumiat Environmental Management Limited.

Based on the review of the above information, 15 Areas of Potential Environmental Concern (APECs) were identified (GEMTEC, 2017). A summary of preliminary APECs, activities historically conducted at the Site and the associated Chemicals of Potential Concern (COPCs) is provided in Table 2.1. Selected Site photographs are presented in Appendix B.

### Table 2.1 Preliminary APECs and COPCs

| APEC (Preliminary) | | Historical Activities | COPCs |
|---|---|---|---|
| # | Description | | |
| **1** | AST (Upper Site) | Storage of up to 1,578,000 L of diesel/fuel oil | PHCs |
| | | Burning of Site structures | PAHs |
| **2** | AST (Lower Site) | Storage of up to 1,625,000 L of diesel/fuel oil | PHCs |
| | | Burning of Site structures | PAHs |
| **3A & 3B** | Aboveground Fuel Line | Transport of diesel fuel between the 1,625,000 L Lower Site AST and the 1,578,000 L Upper Site AST | PHCs |
| **4** | USAF Quarry and Dump | Potential for any Site materials to be buried / disposed in a landfill/bury Site | PHCs, metals, PCBs, VOCs |
| **5 & 6** | 1987 Landfill/Bury Site (assumed 2 locations) | Potential for any Site materials to be buried / disposed in a landfill/bury Site | PHCs, metals, PCBs, PAHs |
| **7** | Helicopter Pad | Thousands of fuel drums reportedly stored, and portable fueling station for fueling helicopters | PHCs (fuel stored), Metals (from metal drums), PCBs |
| | | Burning of Site structures | PAHs |
| **8** | Pump House and Water Source (Upper Site) | Anticipated use of fuel to power water pumps (Burning of Site Structures) | PHCs, PAHs |
| **9** | Pump House and Shack (Lower Site) | Anticipated use of fuel to power water pumps (Burning of Site Structures) | PHCs, PAHs |
| **10** | Main Building and Motor Pool | Fueling and maintenance of Site machinery | PHCs |
| | | Metal works in maintenance of Site machinery. Potential lead or mercury-based paint on exterior of building | Metals |
| | | Presumed use of solvents in machinery maintenance | VOCs |
| | | Electricity generation | PCBs |
| | | Burning of Site Structures | PAHs |
| **11** | Disaster Shack (Upper Site) | Assumed fuel storage part of emergency plan | PHCs (fuel stored) |
| | | Potential lead or mercury-based paint on exterior of building | Metals |
| | | Burning of Site structures | PAHs |
| **12** | Storage Building | Potential storage of fuel. Potential lead or mercury-based paint on exterior of building | PHCs, Metals |
| | | Burning of Site structures | PAHs |
| **13** | Former Catch Basin | Use is unknown | PHCs, Metals |
| **14** | Waterbody (northeast of the Helicopter Pad) | Due to its proximity to the helicopter pad and catch basin the water body may have been impacted by the historical on-site activities. | PHCs, PAHs, metals, PCBs, VOCs |

**Table 2.1 Preliminary APECs and COPCs**

| APEC (Preliminary) | | Historical Activities | COPCs |
|---|---|---|---|
| **#** | **Description** | | |
| **15A**[1] | Waterbody (north of water source) | Due to its proximity to the Upper Site AST and the pump house and water source, the water body may have been impacted by the historical on-Site activities. | PHCs, PAHs, metals, PCBs, VOCs |

COPCs = chemicals of potential concern
PHCs = petroleum hydrocarbons (PHC)
PCBs = Polychlorinated biphenyls
PAHs = Polycyclic aromatic hydrocarbons
VOCs = volatile organic compounds
1) In the initial planning phases of this project, sampling in multiple water bodies was proposed, with APEC names 15A, 15B, 15C, *etc.* As the program was refined, only APEC 15A was carried forward into the initial testing program. The original nomenclature was retained for consistency with initial drafts.

In addition to the sampling described above, background samples were collected for analysis of PHCs, PAHs, metals, and PCBs. A background concentration is defined as the concentration of analytical parameters in environment media (*i.e.*, soil, surface water, *etc.*) surrounding a Site, that have not been influenced by activities at a Site or related to any releases of contaminants to the environment. Background concentrations can be naturally occurring (*e.g.*, erosion of naturally occurring mineral deposits) or as a result of anthropogenic activities that have occurred off-site and are unrelated to Site activities.

The document review was supplemented by Site Reconnaissance by air and on land, as discussed in Section 5.0.

## 2.7 Neighbouring Land Use

Fishing sheds (approximately 10) are located to the south of the Lower Site. The area of the sheds is located approximately 250 m southwest of the former AST at the Lower Site. At the time of the USAF operation at the Site, the cook at the main building was a civilian who lived with his family in the area of the fishing sheds (GHD, 2016). It is not clear if the family left the island when the radar station closed. The current use of this area is seasonal residential.

## 3.0 SITE DESCRIPTION

### 3.1 Site Characterization

The Site, including the Upper and Lower Sites, is currently vacant with the exception of remnant structures (*e.g.*, foundations, *etc.*). As identified in Section 2.7, an area of fishing sheds is located approximately 250 m to the southeast of the Lower Site. The historical land use was mixed commercial and residential; US military personnel were housed on-site to operate the radar station and a seasonal community (i.e., the fishing sheds) has historically been located in proximity to the Lower Site. Access to both the Upper and Lower Sites is not restricted to people who use the fishing sheds or other visitors to the Site by air or boat. The Site is not located in a developed residential area, nor is such development anticipated due to the remote and rocky nature of the Site.

Based on the distance of the fishing sheds to the Lower Site, it is assumed that residents may regularly access the Lower Site. As such, areas within 250 m of the seasonal community (*i.e.*, APEC #2, APEC #3B, APEC #4 and APEC #9) have been considered “residential” for the purpose of this assessment. A “residential” scenario assumes exposure of 24 hours per day, 365 days per year, for toddlers, children and adults (CCME, 2006).

For areas greater than 250 m from the seasonal community, it is assumed that residents may visit these areas less frequently and for shorter periods of time. Therefore adults, children and toddlers visiting these areas (greater than 250 m from the seasonal community) are assumed to be present for a duration consistent with (or less frequent than) a commercial exposure scenario (*i.e.*, 10 hours per day, 5 days per week, 48 weeks per year (CCME, 2006)). As such, the applicable human health receptor scenario for areas greater than 250 m of the seasonal community has been considered to be “commercial”.

Although the USAF obtained drinking water from a surface water body, sources of water, used by residents of the nearby fishing sheds, were not confirmed during the current assessment. Based on the location of the Site, it is highly unlikely that a municipal water distribution system is available. Private groundwater wells were not observed in the seasonal community during the Site visit. The likelihood of drilled wells on the island is considered low, as the island is accessible only by boat, and mobilization cost of a standard drill rig would be very high. Hand-dug wells are unlikely in this area due to the shallow bedrock and close proximity to the sea (salt water intrusion would be a concern for groundwater resources in this area). No signs of water input pipes were observed in any of the waterbodies visited, thus use of freshwater bodies as drinking water was not apparent. Due to the seasonal nature of the fishing sheds, residents may transport water from off-island; however this has not been confirmed. As result of the above, non-potable soil guidelines were selected, as groundwater is not anticipated to be a source of drinking water now or in the future.

Based on the Site reconnaissance, herbaceous and woody vegetation, moss, and wildlife (including bears, hares and wolves) are present at the Site. Based on the overall healthy vegetation community (with the exception of stressed vegetation observed at APEC #2 (Photo 18, Appendix B) and APEC #6A (Photo 48, Appendix B)), the soil invertebrate population is expected to be intact. Species of gull were observed in the freshwater habitat. A fox was observed on Cut Throat Island during the Site visit along with evidence of hares and black bears. Based on a provincial database (Province of Newfoundland and Labrador, 2018), the mapped range of polar bears and wolverines (both considered Species at Risk) overlap the site; other SAR are also potentially present on the Site. The potential for Species at Risk located at the Site was not ruled out as part of this mandate.

Coarse-grained soil texture has been assumed based on field observations, as it is conservative for screening purposes.

The Site characteristics used in selecting screening criteria are summarized in Table 3.1.

**Table 3.1 Site Characteristics Used in Selecting Screening Criteria**

| Site Characteristic | Selection |
|---|---|
| Land Use | Residential (for areas within 250 m of the seasonal community: portions of APECs #2, #3B, #4, and #9) |
| | Commercial (areas >250 m of the seasonal community) |
| Groundwater Use | Non-Potable |
| Soil Type | Coarse-grained |

## 3.2 Contaminant Sources

Potential sources of contamination (COPCs) at the Site include the following, resulting from the historical use of the Site by the USAF:

- Fuel storage and use (PHCs);
- Burning of Site structures (PAHs);
- Metal drums or structures, lead-based paint on former buildings (VOCs, metals);
- Disposed electrical equipment (PCBs);
- Waste incineration (furans and dioxin-like compounds).

## 3.3 Potential Receptors

### 3.3.1 Human Receptors

Based on the residential (Lower Site) and commercial (Upper Site) characterization, human receptors on the Site include:

- Adults;
- Children; and
- Toddlers.

### 3.3.2 Ecological Receptors

Based on the residential (Lower Site) and commercial (Upper Site) characterization, ecological receptors on the Site include:

- Mammals;
- Birds;
- Plants and Invertebrates;
- Freshwater Aquatic Life; and
- Potential Species at Risk.

## 3.4 Exposure Pathways

### 3.4.1 Human Health Receptors

Source media, transport mechanisms, potential exposure pathways and an assessment of whether the exposure pathway is incomplete or complete, is presented for human receptors on and off the site, respectively, in Table 3.2.

**Table 3.2 Human Health Exposure Pathway Assessment**

| Source Media | Transport Mechanism | Potential Exposure Pathway | Human Health Pathway Assessment | Exposure Pathway Complete or Incomplete? |
|---|---|---|---|---|
| **Surface Soil** | Vegetation Uptake | Consumption of Vegetation | The Site and surrounding area are not currently used for agricultural purposes. The Site location/topography and rocky surface, with limited surficial soils, would preclude agricultural use of the Site or surrounding areas in the future. | Incomplete |
| | - | Soil/Dust Dermal Contact and Ingestion | On-site receptors may come into contact with COPCs in surface soil or dust, via dermal contact and incidental ingestion, in the absence of a barrier (such as concrete) or during construction activities. | **Complete** |
| | Wind Erosion – Atmospheric Dispersion | Inhalation of Particles | Possible at Site. | **Complete** |
| **Surface Soil** | Volatilization (Organic Contaminants) – Atmospheric Dispersion | Inhalation of Outdoor Vapours | Possible at Site. | **Complete** |
| | Volatilization (Organic Contaminants) – Enclosed Space Accumulation | Inhalation of Indoor Vapours | There are no buildings or structures at the Site and hence no enclosed spaces. However, inhalation of vapours inside a potential future building at the Site cannot be ruled out. | **Complete** |

**Table 3.2 Human Health Exposure Pathway Assessment**

| Source Media | Transport Mechanism | Potential Exposure Pathway | Human Health Pathway Assessment | Exposure Pathway Complete or Incomplete? |
|---|---|---|---|---|
| **Groundwater** | Soil Leaching to Groundwater | Groundwater Transport – Inhalation of Vapours (Organic Contaminants) | There are no buildings or structures at the Site and hence no enclosed spaces. However, inhalation of vapours inside a potential future building at the Site cannot be ruled out. | **Complete** |
| | | Groundwater Incidental Ingestion | Groundwater is not used as a source of drinking water (i.e., there are no potable wells on the Site) and groundwater does not daylight at the Site. It is very unlikely that groundwater resources would be developed on the Site, based on the geology and close proximity to the sea (i.e., sea water intrusion would be a concern near the coast). | Incomplete |
| | | Groundwater Dermal Contact | | Incomplete |
| **Surface Water /Sediment** | - | Surface Water/Sediment Incidental Ingestion | Surface water has in the past and may be current used as a source of potable water (for the seasonal community). Future use of surface water as potable resource, cannot be ruled out. | **Complete** |
| | | Surface Water/Sediment Dermal Contact | | |

### 3.4.2 Ecological Receptors

Source media, exposure media, potential exposure pathways and an assessment of whether the exposure pathway is incomplete or complete, is presented for ecological receptors on and off the Site, respectively, in Table 3.3. The potential for SAR in the area has not been ruled out as part of this mandate.

**Table 3.3 Ecological Health Exposure Pathway Assessment**

| Source Media | Exposure Media | Potential Exposure Pathway | Ecological Health Pathway Assessment | Exposure Pathway Complete or Incomplete? |
|---|---|---|---|---|
| **Surface Soil** | Direct Exposure & Ingestion | Plants & Invertebrates | With the exception of the concrete foundations and gravel roadway, Site surfaces are generally rock covered or covered in short vegetation/mosses. Therefore, invertebrates and plants are likely to be in direct contact with impacted surface soil. | **Complete** |
| **Surface Soil** | | Wildlife (mammals/birds) | Incidental ingestion of soil by wildlife, while anticipated to be low, (as wildlife are not anticipated to remain in the previously developed areas of the Site for the duration of their lifetime), cannot be ruled out. | **Complete** |
| **Groundwater** | Ingestion/Plant Uptake | Plants/ invertebrates | Although it is unlikely based on the geology of the Site and encountered soil conditions, it is still possible for plants and invertebrates to come into contact with groundwater. | **Complete** |
| | | Mammals/birds | No shallow waterbodies or dugouts for wildlife watering were observed at the Site. | Incomplete |
| **Surface Water/ Sediment** | Surface Water and Freshwater Sediment | Direct Exposure and/or Ingestion | There are surface water bodies on the Site; therefore, freshwater aquatic life may be present. | **Complete** |

## 4.0 APPLICABLE SCREENING LEVELS (REGULATORY FRAMEWORK)

### 4.1 Rationale for Selected Screening Levels

Screening levels are selected based on the applicable contaminant sources, potential exposure pathways, and potential receptors at the Site. Sources, pathways, and potential receptors for this Site are described in Section 3.0.

Federal and provincial screening levels are numerical limits or statements which can be used for comparison with measured contaminant levels at a site in order to determine whether further investigation or actions are required (screening). It should be noted, however, that the definition of impact does not necessarily imply that there will be significant risks to human health and the environment. Natural attenuation mechanisms such as biodegradation and adsorption; the exposure pathways, the frequency and distances to potential receptors must be considered to determine specific risks and potential impacts. GEMTEC has conducted the screening for this Site in the context of both the federal and provincial frameworks, in consideration that our client is a federal organization, and under the understanding that the Province of Newfoundland is the current owner of the property. Both frameworks have been given equal weight in this assessment.

The Province of Newfoundland and Labrador has adopted the Atlantic Risk-Based Corrective Action (Atlantic RBCA) methodology for the assessment of contaminated sites and as such, the Atlantic Partnership in RBCA Implementation (Atlantic PIRI) risk-based screening levels (RBSLs) and ecological screening levels (ESLs) have been referenced for petroleum hydrocarbons. Atlantic PIRI does not currently provide guidelines for non-petroleum contaminants.

For federal screening, the primary source of screening levels are the Canadian Council of Ministers of the Environment (CCME) environmental quality guidelines. The CCME maintains an online database (http://st-ts.ccme.ca/en/index.html) that serves as a repository for the most up-to-date CCME guidelines available. This database was accessed in May 2018 in preparation of this report.

In the absence of provincial or federal screening levels, the following jurisdictions were referenced, in order of preference:

- Nova Scotia Environment (NSE). 2013. PRO 100: Notification of Contamination Protocol; and
- World Health Organization (WHO). 2006. Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds.

## 4.2 Comparison of Provincial and Federal Guidelines for Petroleum Hydrocarbons

Samples collected as part of this Initial Testing Program were analyzed using the CCME Canada-Wide Standard (CWS) methodology. A comparison of the two methods is provided in Table 4.1 (adapted from Atlantic PIRI, 2012).

**Table 4.1 Comparison of PHC Analytical Methods**

| | Atlantic Risk-Based Corrective Action (RBCA) | CCME CWS |
|---|---|---|
| Tier I Reporting | $C_{>6}$-$C_{10}$ (aromatic + aliphatic, minus BTEX)<br>$C_{>10}$-$C_{16}$ (aromatic + aliphatic)<br>$C_{>16}$-$C_{21}$ (aromatic + aliphatic)<br>$C_{>21}$-$C_{32}$ (aromatic + aliphatic)<br>modified TPH (equals all TPH less BTEX) | F1 = $C_{>6}$-$C_{10}$ (aromatic + aliphatic)<br>F2 = $C_{>10}$-$C_{16}$ (aromatic + aliphatic)<br>F3 = $C_{>16}$-$C_{34}$ (aromatic + aliphatic)<br>F4 = $C_{>34}$ (aromatic + aliphatic)<br>(Note: BTEX is covered under other CCME methods) |

For comparison of the laboratory results to the Provincial guidelines (modified TPH, $C_{>6}$-$C_{32}$)), GEMTEC has summed the detected concentrations of F1, F2, and F3 fractions ($C_6$-$C_{34}$). In the instance of no detections, the highest detection limit is used as the approximate value for modified TPH. This approximation is a slight over representation of the modified TPH concentration. It is noted that the CWS detection limits, in some instances, exceed the Atlantic RBCA guidelines.

## 4.3 Selected Criteria

The applicable provincial and federal soil criteria for the Site are summarized in Table 4.2.

**Table 4.2 Applicable Soil Criteria**

<table>
<tr><th rowspan="2">Parameter</th><th colspan="2">Criteria</th></tr>
<tr><th>Ecological Health</th><th>Human Health</th></tr>
<tr><td colspan="3">Federal</td></tr>
<tr><td>Petroleum Hydrocarbons (PHCs)</td><td><u>Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX compounds):</u><br><br>CCME $SQG_E$ (2004, accessed online May 2018). Commercial and residential land use.</td><td><u>BTEX compounds:</u><br><br>CCME $SQG_{HH}$ (2004, accessed online May 2018). Commercial and residential land use. Incremental cancer risk: $10^{-5}$ (benzene). Non potable groundwater use.</td></tr>
<tr><td rowspan="2">Petroleum Hydrocarbons (PHCs)</td><td><u>PHC Fractions F1, F2, F3, and F4:</u><br><br>Canada-Wide Standards (CWS) for coarse-grained surface soil (2008) - Ecological Health Standards. Commercial and residential land use. Most conservative exposure pathway.</td><td><u>PHC Fractions F1, F2, F3, and F4:</u><br><br>CWS for coarse-grained surface soil (2008) - Human Health Standards. Commercial and residential land use. Most conservative exposure pathway.</td></tr>
<tr><td colspan="2">Where the chromatogram did not return to baseline, additional analysis (F4 Gravimetric (F4G) method) was conducted to quantify concentrations of $C_{>50}$ hydrocarbons. In these instances, the greater of the (preliminary) F4 ($C_{>34}$-$C_{50}$) and F4G ($C_{>50}$) are compared to the guideline for F4 ($C_{>34}$).</td></tr>
</table>

### Table 4.2 Applicable Soil Criteria

<table>
<tr><th rowspan="2">Parameter</th><th colspan="2">Criteria</th></tr>
<tr><th>Ecological Health</th><th>Human Health</th></tr>
<tr><td rowspan="2">Polycyclic Aromatic Hydrocarbons (PAHs)</td><td rowspan="2">CCME $SQG_E$ (1999 and various updates, accessed online May 2018). Commercial and residential land use.</td><td><u>Carcinogenic PAH compounds:</u><br><br>CCME $SQG_{HH}$ (2010) for Benzo(a)pyrene Total Potency Equivalent (B(a)P TPE)</td></tr>
<tr><td><u>Non-carcinogenic PAH compounds:</u><br><br>No guidelines provided by CCME: however CCME recommends referencing other Canadian jurisdictions.<br>Thus:<br>Nova Scotia Environment (NSE) Tier 1 Environmental Quality Standards (EQS) for Commercial and residential, non-potable Site (2013).</td></tr>
<tr><td>VOCs</td><td>CCME $SQG_E$ (1999, accessed online May 2018). Commercial land use.</td><td>CCME $SQG_{HH}$ (1999, accessed online May 2018). Commercial land use.</td></tr>
<tr><td>Furans and dioxin-like compounds</td><td colspan="2">CCME SQG (2002, accessed online May 2018). Commercial land use. Guideline is for toxic equivalent. Toxic equivalent calculated using 2005 World Health Organization Toxic equivalency Factors (WHO, 2006).<br><br>The generic guideline provided by CCME is assumed to be protective of both ecological and human health receptors.</td></tr>
<tr><td rowspan="2">Metals<br>PCBs</td><td>CCME $SQG_E$ (1999, accessed online May 2018). Commercial and residential land use.</td><td>CCME $SQG_{HH}$ (1999, accessed online May 2018). Commercial and residential land use.</td></tr>
<tr><td colspan="2">For some parameters (antimony, cobalt, tin), CCME does not provide separate $SQG_E$ and $SQG_{HH}$. In these instances, the generic (or interim) guideline was referenced and is assumed to be protective of both ecological and human health receptors.</td></tr>
<tr><td colspan="3">Provincial</td></tr>
<tr><td>PHCs</td><td>Atlantic RBCA Tier I Ecological Screening Levels (ESLs) for the direct contact pathway for a property with coarse-grained soil. (2015). Commercial land use.</td><td>Atlantic Risk-Based Corrective Action (RBCA) Tier I Soil Risk-Based Screening Levels (RBSLs) for non-potable groundwater use, coarse-grained soil and diesel impacts (closest resemblance to hydrocarbon composition reported by the laboratory, 2015). Commercial and residential land use.</td></tr>
</table>

The applicable provincial and federal sediment criteria for the Site are summarized in Table 4.3.

**Table 4.3 Applicable Sediment Criteria**

| Parameter | Criteria | |
|---|---|---|
| | Ecological Health | Human Health |
| **Federal** | | |
| PHCs<br>VOCs | None available | Not applicable [1] |
| PAHs<br>Metals<br>PCBs | CCME Interim Sediment Quality Guidelines (ISQGs) for the Protection of Freshwater Aquatic Life<br><br>Probable Effects Level (PELs) for the Protection of Freshwater Aquatic Life | Not applicable [1] |
| **Provincial** | | |
| PHCs | Atlantic RBCA Tier I Ecological Screening Levels (ESLs) for typical sediment (2015)/ | Not applicable [1] |

Notes:
1) It has been assumed that the surface water bodies are not used as a significant recreational water body (*e.g.*, Swimming), and as such, human receptors would not be in contact with sediment.

The applicable provincial and federal surface water criteria for the Site are summarized in Table 4.4.

**Table 4.4 Applicable Surface Water Criteria**

| Parameter | Criteria | |
|---|---|---|
| | Ecological Health | Human Health[1,2] |
| **Federal** | | |
| PCBs | None available | Not applicable |
| PHCs<br>PAHs<br>General Chemistry Parameters<br>Metals | CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater | Not applicable |
| **Provincial** | | |
| PHCs | Atlantic RBCA Tier I ESLs for the protection of freshwater and marine aquatic life. Diesel/lube oil (most conservative) petroleum type. | Not applicable |

Notes:
1. Although the USAF used a surface water body for drinking water, for the purposes of this Initial Testing Program, it is presumed that residents of the seasonal community are not using surface water for drinking.
2. It has been assumed that the surface water bodies are not used as a significant recreational water body (*e.g.,* Swimming).

The applicable provincial and federal building material criteria for the Site are summarized in Table 4.5.

**Table 4.5 Building Material Criteria**

| Parameter | Criteria | |
|---|---|---|
| | Ecological Health | Human Health |
| **Federal** | | |
| Asbestos | Not applicable | As hazardous building materials are regulated by the Province, and disposal of the waste products will occur within the Province, only Provincial guidelines are referenced. |
| **Provincial** | | |
| Asbestos | Not applicable | Under Newfoundland and Labrador Regulation 111/98 (Asbestos Abatement Regulations, 1998 under the Occupational Health and Safety Act (O.C. 98-730)), Asbestos Containing Material is defined as having >1% asbestos fibres by weight. |

## 5.0 SITE RECONNAISSANCE AND SITE CHARACTERISTICS

GEMTEC personnel were on-Site on September 12 and 13, 2017. The Site reconnaissance was conducted through a combination of aerial observations (from a helicopter) and Site walkover. The objective of the Site reconnaissance was to confirm the initial work plan (as prepared by GEMTEC, 2017) met the objectives of the project and to assess potential logistical/access considerations for collecting samples at the proposed locations. Site features and details from the Site visit are presented in the following subsections.

### 5.1 Aerial Observations

Cut Throat Island is approximately 925 Hectares in size with the Site covering the eastern portion of the island. The Lower Site is roughly 200 metres from the shoreline on the southeastern corner of the island, while the Upper Site is 400 metres from the shore on the northeast corner.

The island is predominantly barren bedrock with some low growing grass, mosses and shrubs. There is a large number of surface waterbodies ranging in size from 14,000 square metres to <10 square metres. The northern portion of the island is quite elevated with steep rock cliffs, while the southern shore is much lower in elevation with calmer rocky beaches.

Previous infrastructure has been demolished and buried; however, concrete slabs, foundations, and pipeline supports remain and are quite prevalent from the air. There is minimal to no vegetation impeding on concrete structures. The road between Upper and Lower Sites is well defined and appears to be in excellent condition with gravel cover and little vegetation intrusion.

To the south of the Lower Site on the southernmost peninsula of the island, there is a small seasonal community of fishing sheds. They appear to be in various states of repair with some showing a strong likelihood of regular usage. There does not appear to be any tracks or trails on land surrounding these sheds, which may indicate no overland travel towards the Site and only water transportation to access these sheds is used.

### 5.2 Site Inventory and Modifications to Preliminary APECs

The following is based on observations made during the site walkover.

#### 5.2.1 APEC #1: AST (Upper Site)

APEC #1 consists of the area of the former 1,578,000 L diesel AST. A 16 m diameter gravel pad, with concrete edging remains in the footprint of the former AST. The area, and much of the former gravel pad are vegetated with grasses and forbs. A concrete berm, approximately 1.8 m high and approximately 0.30 m wide surrounds the former AST to the north, east, and south. A hole in south berm wall permits surface drainage to the south. The berm is approximately 80 m in total length. Both the concrete perimeter and the berm are in good condition. The estimated volume of concrete here is approximately 50 $m^3$ (berm and AST pad perimeter). Bedrock outcrops surround the former AST to the south, forming a natural berm.

Concrete cradles associated with former above ground piping were found at this APEC.

Potential asbestos-containing black caulking was identified on the concrete joints of the berm. A few discarded pieces of metal piping where identified. Pieces of transite board were strewn over the area, possibly carried there by the wind. Neither PHC odours nor surface staining was observed at APEC #1.

Modifications to this APEC were not required based on the Site reconnaissance.

### 5.2.2 APEC #2: AST (Lower Site)

APEC #2 consists of the area of the former 1,625,000 L diesel AST. A 12 m diameter gravel pad, with concrete edging remains in the footprint of the former AST. A concrete berm, approximately 1.8 m high and approximately 0.30 m wide surrounds the former AST and measures approximately 28 m by 30 m.

The berm wall is in fair (crumbling portions) to good (few to no cracks) condition, the east wall to the berm was at grade with a rock face. Three holes in the east berm wall permits surface drainage, one drain is of corrugated steel with a black sealant covering some of the drain. The concrete blocks (former pipeline supports) which lead to the berm from the wharf area are in poor (mostly disintegrated) condition. The estimated volume of concrete here is approximately 50 $m^3$ (berm and AST pad perimeter).

Soil samples in APEC #2 were modified based on stressed vegetation observed in the field (assumed impacted area): SS_CT_48 and SS_CT_49 were moved to the east from inside the berm to outside of the berm. Soil sample SS_CT_48 was taken at a depth of 0.12 to 0.20 mbgs and soil sample SS_CT_49 was taken at 0.05 to 0.075 mbgs to aid in determining the depth of impacts.

No odours or staining were identified inside the berm. No signs of stressed vegetation were observed inside the berm. A lack of vegetation/stressed vegetation was observed east of the berm. Some odours were identified in the sample SS_CT_48 similar to that of weathered PHCs.

Concrete cradles associated with former above ground piping were found at this APEC.

### 5.2.3 APEC #3: Aboveground Fuel Line (Upper Site and Lower Site)

APEC #3 is an approximately 1.5 kilometre long gravel roadway that spans from the Upper Site to the Lower Site. Historically, the above ground fuel line ran alongside the roadway. This APEC is referred to herein as two distinct sections:

- APEC #3A: portion of the roadway/former fuel line at the Upper Site; and
- APEC #3B: portion of the roadway/former fuel line at the Lower Site.

Historically, the former above ground fuel line was located alongside the current roadway. A few concrete supports that were likely associated with the former pipeline remain. A couple of pieces of rebar were protruding along the roadway. A large metal dock anchor (approximately 1.5 metres tall) was located near the end of the roadway (southeastern portion of APEC #3B) in the area of the former dock.

Neither PHC odours nor surface staining was observed. The roadway ended at APEC #2 (Lower AST). Based on field observations, the lower portion of APEC #3 (3B) was modified more to the east to follow the roadway and the concrete structures leading to the assumed wharf area. Therefore, soil sample SS_CT_54 was moved to the slightly to the east.

#### 5.2.4 APEC #4: USAF Quarry and Dump

APEC #4 consists of the former USAF Quarry and reported dump area. However, no evidence of any dumping activities was identified during the Site reconnaissance. Signs of historical quarry activities where rock was cut away from the outcrops was evident. The gravel present in the quarry appeared to be the same as that of the roadway. The northern soil sample points were originally outside the footprint of the quarry where it was only rock; therefore, the sample points were moved within the footprint of the quarry (SS_CT_42 and SS_CT_44). Neither PHC odours nor surface staining was observed. No signs of stressed vegetation were observed.

Modifications to this APEC were not required based on the Site reconnaissance.

#### 5.2.5 APEC #5: 1987 Landfill/Bury Site (Assumed Location)

Based on the historical review, the assumed location of APEC #5 was southeast of the helicopter pad (APEC #7, described below). APEC #5 area consists primarily of rock, which is vegetated with grasses, forbs, and low lying shrubs. No signs of any dumping was present in the area. One barrel (rusted, broken, and empty) was located within the area. Neither PHC odours nor surface staining was observed. No signs of stressed vegetation were observed. Soil sample SS_CT_37 was moved to the area of the barrel. While no obvious signs of dumping were observed in this area, it is still possible that this area was used for dumping in the past and waste was removed.

#### 5.2.6 APEC #6: 1987 Landfill/Bury Site (Assumed Location)

Based on the historical review, the assumed location of APEC #6 was to the south (downgradient) of the main building and motor pool (APEC #10). This area is vegetated with grasses, forbs, and low lying shrubs. A test hole was dug to a depth of 0.9 mbgs to assess for potential debris that may have been buried in the area. Peat was encountered 0 to 0.6 mbgs and very wet sand from 0.6 to 0.9 mbgs. No signs of any dumping were present in the area. A few small pieces of steel were present on the northeast side of the APEC. Neither PHC odours nor surface staining was observed. No signs of stressed vegetation were observed. While no obvious signs of dumping were observed in this area, it is still possible that this area was used for dumping in the past and waste was removed.

Modifications to this APEC were not required based on the Site reconnaissance.

### 5.2.7 APEC #6A: Landfill/Bury Site (Identified During the 2017 Site Reconnaissance)

While APEC #6 did not appear, based on the field observations, to be a landfill/bury site, an area northeast of the helicopter pad (APEC #7) did appear consistent with a landfill/bury site, and as such was added to the field program and labelled APEC #6A. An abundance of various pieces of debris were identified across the area including: metal debris (rusty broken cans, pipes, and fittings); broken glass; transite board; and wood. Signs of stressed vegetation and areas of no vegetative growth were present. Possible peat odors were identified in sample SS_CT_60. This APEC was not identified in GEMTEC's work plan (GEMTEC, 2017). Four samples were collected from this area. Given that the Site appeared to be a landfill/bury area, furans and dioxin-like compounds were added as a COPC to this APEC. One soil sample was submitted for analysis of furans and dioxin-like compounds.

### 5.2.8 APEC #7: Helicopter Pad

The helicopter pad consists of a gravel and sand surface with some low lying grasses and shrubs. The roadway with a drainage ditch runs along the east of the helicopter pad. An access culvert from the roadway is located at the eastern entrance. A large metal air cylinder with the top missing was located on the culvert. Neither PHC odours nor surface staining was observed. No signs of stressed vegetation were observed.

Modifications to this APEC were not required based on the Site reconnaissance.

### 5.2.9 APEC #8: Pump House and Water Source

APEC #8 consists of a reservoir, pump house remnants (foundation), and a spillway. This reservoir was used as a water source by the USAF. The ground surface of the Site consists of bedrock outcrops and low-lying grasses and shrubs; the ground surface slopes easterly towards the Labrador Sea. The concrete foundation of the former pump house, which is in good condition (few cracks), measures 5 m by 5 m and is approximately 0.5 m thick. The volume of concrete in the foundation is approximately 13 $m^3$. Piping remains in the slab. The concrete blocks leading from the pump house to the main structure are disintegrating. Small pieces of transite board (approximately 20 pieces) and asphalt roofing shingles are scattered around the pump house foundation. A few pieces of wood and buildings materials are located near the pump house foundation.

The reservoir, which is approximately 14,000 $m^2$, appears to be manmade. At the time of the Site visit, the water was blue, and the bottom substrate (rock) was visible near the shore. The depth of the reservoir could not be determined, as boat access would be required to do so. A concrete berm approximately 135 metres in length runs along the entire eastern side of the reservoir. A concrete spillway is located at the southeast side of the reservoir. The spillway is approximately 7 metres wide extending 35 metres in length and appears to be in good shape (few cracks). The spillway slopes north-easterly to a natural swale that eventually discharges towards the Atlantic Ocean. A few pieces of rebar are located in the area of the reservoir and spillway. There is a significant volume of concrete in this area (likely greater than 2,000 $m^3$).

Neither PHC odours nor surface staining was observed. No signs of stressed vegetation were observed.

Modifications to this APEC were not required based on the Site reconnaissance.

### 5.2.10 APEC #9: Fuel Pump House and Shack (Lower Site)

APEC #9, the former fuel pump house and shack, is located to the east of APEC #2 (AST Lower Site). The ground cover consists of rock and low-lying grasses and shrubs. The Site slopes south-easterly towards the former dock area. The concrete pad is approximately 5 m by 5 m and is in good condition (few cracks). Some piping remains in the concrete. Small pieces of transite board (approximately 0.05 m in size) were identified in the area (approximately 40 pieces). No PHC odours or staining were identified. No signs of stressed vegetation were observed.

Modifications to this APEC were not required based on the Site reconnaissance.

### 5.2.11 APEC #10: Main Building and Motor Pool

APEC #10 is generally flat, with a gravel roadway around the west of the former main building and the former radome. The Site slopes radially away from the main building. The concrete slab (12.5 m by 60 m) of the former main building remains in fair (cracked and crumbling portions) to good (few cracks) condition. The depth of the slab is estimated to be 0.5 m. Therefore the total volume of concrete in this slab is approximately 375 $m^3$. Numerous drain pipes were observed in the floor of the slab foundation along with pipe fittings. Five bases with exposed pipe fittings are located on the slab. These were likely cradles for the former boilers. Various holes were located in the foundation showing rebar with exposed ground surface. Metal fittings remaining in concrete slab are suspected to be lead-based. Rubber gaskets were also identified.

Concrete supports are located to the west of the main building, adjacent to the octagonal gravel pad with concrete curbing (former radome).

Two sets of three concrete blocks (each 0.5 m x 0.5 m by 1 m), associated with former tripillar communication antennae, are present. Metal plates are located on the pillars. The total volume of concrete related to the blocks is approximately 1.5 $m^3$.

Numerous (30 or more) small concrete blocks (each approximately 0.61 m by 0.61 m by 0.25 m; with black tar on top and 0.10 m by 0.10 m wood inside), lead north of the radome and veered to the west. The total volume of concrete related to these pillars/blocks is approximately 3 $m^3$. GHD (2016) suggests these pillars formerly housed electrical wiring.

Transite board is strewn across the Site ranging from 0.05 m to 0.10 m in size (>100 pieces). Plywood board, metal debris (piping, flashing) and a hydraulic fuel container are also on the Site.

Neither PHC odours nor surface staining was observed. No signs of stressed vegetation were observed.

Modifications to this APEC were not required based on the Site reconnaissance.

#### 5.2.12 APEC #11: Disaster Shack (Upper Site)

A concrete slab foundation of the former disaster shack (13.5 m by 6 m by 0.5 m; volume of 40 $m^3$) is present. The slab is in good condition (few cracks). There were no visible drains or pipes within the slab, with the exception of a pipe that was observed exiting the east side of the foundation of the slab. The black caulking between the slab and foundation was sampled for asbestos analysis. Small pieces of transite board were scattered around the slab (approximately 50 pieces). A piece of rebar was protruding from the ground near the northern corner of the slab. Neither PHC odours nor surface staining was observed. No signs of stressed vegetation were observed.

Modifications to this APEC were not required based on the Site reconnaissance.

#### 5.2.13 APEC #12: Storage Building

APEC #12 is located west of the roadway (APEC #3) and is accessed by a gravel access road. The APEC is slightly upgradient to the main roadway. A concrete slab foundation 5 m by 12 m by 0.5 m is present (estimated volume of 30 $m^3$). A possible metal track was located in the floor; however, no evidence of piping was observed. An approximate 1.5 m by 1.5 m by 0.5 m concrete slab (with metal drain pipes in the structure) is located to the north of the building foundation; the estimate volume of this concrete slab is 1 $m^3$. Some wood and metal debris (rebar) was identified in the area. Neither PHC odours nor surface staining was observed. No signs of stressed vegetation were observed.

#### 5.2.14 APEC #13: Former Catch Basin

The ground surface of APEC #13 slopes to the east. The ground surface consists of bedrock outcrops and low-lying grasses and shrubs. A concrete slab 5 m by 12 m by 0.15 m is present (estimated volume of 9 $m^3$). The slab is disintegrating with rebar showing. No visible signs of piping were observed. A large concrete structure (2 m by 6 m by 4 m; estimated volume of 48 $m^3$) is located to the east; its former use is unknown. Pipe holes appear to be located on the top of the concrete structure. Potential hazardous materials were not identified at either structure. Neither PHC odours nor surface staining was observed. No signs of stressed vegetation were observed.

Modifications to this APEC were not required based on the Site reconnaissance.

### 5.2.15 APEC #14: Waterbody (Northeast of the Helicopter Pad)

The freshwater waterbody is located northeast and downgradient of the helicopter pad. This APEC is also downgradient of the former catch basin located to the east. The Site was selected as an APEC due to its proximity to the helicopter pad (APEC #7) and potential impacts from historical fueling and spillage.

The waterbody is approximately 800 $m^2$. At the time of the Site visit, the water was blue, and the bottom substrate (brown to dark brown sand, silt and gravel with cobble) was visible more than one metre from the shoreline. The depth of the reservoir could not be determined; a boat would be required to do so.

Modifications to this APEC were not required based on the Site reconnaissance.

### 5.2.16 APEC #15A: Waterbody (North of the Water Source)

In the initial planning phases of this project, sampling in multiple similar water bodies was proposed, with APEC names #15A, #15B, #15C, etc. As the program was refined, only APEC 15A was carried forward into the initial testing program. The original nomenclature was retained for consistency with initial drafts. APEC #15A is located northeast and downgradient to the former AST at the Upper Site and was selected as an APEC due to its proximity to the AST to investigate potential historical leaks from the AST.

The waterbody is approximately 3,500 $m^2$. At the time of the Site visit, the water was blue, and the bottom substrate (brown to dark brown sand, silt and gravel with cobble) was visible more than one metre from the shoreline. The depth of the reservoir could not be determined; a boat would be required to do so.

## 5.3 Test Pitting

A minimum of one test pit was completed at each APEC during the completion of the Step 3 Initial Testing Program. Details of the test pits are provided in Appendix C. Test pits were excavated to depths ranging from 0.1 to 0.9 metres in each area; bedrock was encountered in most test pits at a depth of 0.1 mbgs. In most areas, surficial soil was 0.1 m thick and overlay hard, competent bedrock. Surficial soil was found to be mostly sand and gravel (with some silt) with the presence of organics in most area. Permafrost was not encountered at any of the test pit locations, and based on the shallow soil conditions encountered, permafrost is not anticipated to present across the Site. On-site soil observations are presented in Section 6.3.

### 5.4 On-Site Habitat and Natural Environment

The Site consists of four primary habitat types:

- Surface water body (freshwater): many small surface water bodies are scattered throughout the Site and the entire island;
- Gravel access roads: approximately 1.5 km of gravel roadway connects the Upper and Lower Sites. Gravel road also connected the main building, Upper Site AST, disaster shack, and helicopter pad;
- Exposed bedrock/concrete foundations: much of the Site is devoid of, or supports limited vegetation due to the presence of bedrock outcropping and remains of former structure foundations; and
- Low-lying Vegetation: a mixture of grasses and forbs are present in scattered areas across the Site. No trees or woody vegetation were observed. This habitat is typical of the coastal island region of Labrador.

Cut Throat Island appears to have a healthy invertebrate community. Species of gull were observed in the freshwater habitat. A fox was observed on Cut Throat Island during the Site visit along with evidence of hares and black bears. Stressed vegetation was observed at APEC #2 (Lower Site AST) and APEC #6A Landfill/Bury Site were identified in 2017.

## 6.0 INITIALTESTING PROGRAM RESULTS

### 6.1 Scope of Field Program

The preliminary APECs and COPCs identified in Table 1.1 were modified based on the findings during the Site reconnaissance. The updated APECs, COPCs, and the scope of Initial Testing Program and NCSCS Classification are summarized in Table 6.1.

**Table 6.1 Field Program**

| APEC | | COPCs | Sample IDs | | | |
|---|---|---|---|---|---|---|
| # | Description | | Soil | Surface Water | Sediment | Building Materials |
| 1 | AST (Upper Site) | PHCs, PAHs | SS_CT_11, SS_CT_12, SS_CT_13, SS_CT_14 | - | - | BS_CT_02A |
| 2 | AST (Lower Site) | PHCs, PAHs, metals | SS_CT_45, SS_CT_46, SS_CT_47, SS_CT_48, SS_CT_49 | - | - | |
| 3 | Aboveground Fuel Line | PHCs | SS_CT_15, SS_CT_21, SS_CT_34, SS_CT_40, SS_CT_54 | - | - | |
| 4 | USAF Quarry and Dump | PHCs, VOCs, metals, PCBs | SS_CT_41, SS_CT_42, SS_CT_43, SS_CT_44 | - | - | |
| 5 | 1987 Landfill/Bury Site (assumed location) | PHCs, PAHs, metals, PCBs | SS_CT_36, SS_CT_37, SS_CT_38, SS_CT_39 | - | - | |
| 6 | 1987 Landfill/Bury Site (assumed location) | PHCs, PAHs, metals, PCBs | SS_CT_07, SS_CT_08, SS_CT_09, SS_CT_10 | - | - | |
| 6A | Landfill/Bury Site (identified during the 2017 Site reconnaissance) | PHCs, metals, PCBs, VOCs, Dioxins, Furans, and Dioxin-like Compounds | SS_CT_60, SS_CT_61, SS_CT_62, SS_CT_63 | - | - | |
| 7 | Helicopter Pad | PHCs, PAHs, metals, PCBs | SS_CT_30, SS_CT_31, SS_CT_32, SS_CT_33 | - | - | |

**Table 6.1 Field Program**

| APEC # | APEC Description | COPCs | Sample IDs: Soil | Sample IDs: Surface Water | Sample IDs: Sediment | Sample IDs: Building Materials |
|---|---|---|---|---|---|---|
| 8 | Pump House and Water Source | PHCs, PAHs | SS_CT_55, SS_CT_56, SS_CT_57, SS_CT_58 | SW_CT_02, SW_CT_03 | SD_CT_02, SD_CT_03 | BS_CT_01C, BS_CT_03A |
| 9 | Pump House and Shack (Lower Site) | PHCs, PAHs | SS_CT_50, SS_CT_51, SS_CT_52, SS_CT_53 | - | - | BS_CT_01D |
| 10 | Main Building and Motor Pool | PHCs, metals, PCBs, VOCs, PAHs | SS_CT_01, SS_CT_02, SS_CT_03, SS_CT_04, SS_CT_05, SS_CT_06 | - | - | BS_CT_01A |
| 11 | Disaster Shack (Upper Site) | PHCs, PAHs, metals | SS_CT_16, SS_CT_17, SS_CT_18, SS_CT_19 | - | - | BS_CT_02B, BS_CT_01B |
| 12 | Storage Building | PHCs, PAHs, metals | SS_CT_22, SS_CT_23, SS_CT_24, SS_CT_25 | - | - | |
| 13 | Former Catch Basin | PHCs, PAHs, metals | SS_CT_26, SS_CT_27, SS_CT_28, SS_CT_29 | - | - | |
| 14 | Waterbody (northeast of the Helicopter Pad) | PHCs, PAHs, metals, PCBs, VOCs | - | SW_CT_04 | SD_CT_04 | |
| 15 A | Waterbody (north of water source) | PHCs, PAHs, metals, PCBs, VOCs | - | SW_CT_01 | SD_CT_01 | |

COPCs = chemicals of potential concern
PHCs = petroleum hydrocarbons (including Benzene, Toluene, Ethylbenzene and Xylene (BTEX))
PCBs = Polychlorinated biphenyls
PAHs = Polycyclic aromatic hydrocarbons
VOCs = volatile organic compounds

Soil samples were collected in general accordance with the proposed sampling locations included in the Work Plan (GEMTEC, 2017), or adjusted based on field observations to situate samples where contaminants of potential concern were expected to be present (adjacent to historical structures, near apparent areas of former petroleum storage, and/or in suspected landfill locations).

In addition to the APEC sampling indicated above, background samples were collected in areas that were anticipated to be outside of the areas influenced by historical Site activities. The intention of background sampling is to determine the potential presence of naturally occurring substances (such as metals) that may be elevated compared to generic standards, but are not attributable to contamination, but rather characteristic of the region. Background samples included:

- Soil located approximately 90 m northwest of APEC #1 (Upper Site AST), and approximately 150 m west of APEC #2 (helicopter pad). There was no indication of historical use of this area, and as such, impacts related to Site activities were not anticipated. Sample SS_CT_20BG (Drawing 3, Appendix A) was analyzed for PHCs, PAHs, PCBs, and metals; and
- Surface water (SW_CT_05BG) and sediment (SD_CT_05BG) in a waterbody located approximately 200 m south of the southernmost edge of the former water supply waterbody (APEC #8), and approximately 500 m south of the former pump house at APEC #8. The background waterbody is not connected to the former water supply water body, and as no USAF infrastructure was located in this immediate area, Site-related impacts are not anticipated. There were no other upstream surface water bodies within this area of the Site; therefore, this waterbody was selected as the most appropriate location for background sampling. The surface water sample was analyzed for PHCs, PAHs, metals, and general chemistry parameters; the sediment sample was analyzed for PHCs, PAHs, and metals.

## 6.2 Sampling Methods

Soil samples were collected using a hand trowel. Between sampling locations, the trowel was decontaminated. A wire brush was used to knock off loose particles, then the tool was spritzed with a solution of biodegradable detergent and water. A clean paper towel was used to wash the trowel, and then it was rinsed with deionized water. GEMTEC personnel wore disposable, nitrile gloves during sampling; the gloves were replaced prior to sampling the next location. Each surface soil sample was collected in a 120 mL glass jar supplied by the analytical laboratory. The 120 mL soil sample jar was completely filled to eliminate headspace losses of potential volatile contaminants in the sample. After sampling, each sample container was tightly capped, labelled and placed into an insulated cooler containing ice for transport to the analytical laboratory. All samples were maintained in temperature-controlled storage until delivered to the analytical laboratory.

Soil samples for potential PHC or VOC analysis were collected in 60 millilitre (mL) glass jars and 40 mL pre-weighed vials supplied by the analytical laboratory. The 40 mL vials contained 10 mL of methanol preservative, measured by the laboratory. Approximately five grams of soil was extracted using a dedicated sampling device supplied by the laboratory; the sample was placed into the 40 mL vial containing methanol per laboratory sampling requirements. The vial was then swirled to ensure the soil was fully dispersed in the methanol. The soil sample jar was completely filled to eliminate headspace losses of potential volatile contaminants in the sample. A duplicate sample jar was only partially filled to allow for volatilization of contaminants for headspace analysis using a photoionization detector. The soil samples were maintained in ice-packed coolers until delivered to the analytical laboratory.

Surface water samples were collected in the appropriate laboratory-provided bottles containing all required preservatives. Samples were collected from the shore by skimming the water surface at each sampling location, where possible. Sample collection containers were completely filled to eliminate headspace losses of potential volatile contaminants in the sample. After sampling, each sample container was tightly capped, labelled and placed into insulated coolers containing ice.

Sediment samples were collected from the shore from the same sampling locations as the surface water samples, where possible. Sediment samples were collected using a hand trowel at depths of 0 to 0.05 metres below the sediment/water interface. Water was allowed to drain from the trowel prior to placing the sediment into the sample jars. The trowel was washed with a non-petroleum based cleaner and thoroughly wiped with a clean towel between each sampling location. GEMTEC personnel wore disposable nitrile gloves during sampling; the gloves were replaced prior to collecting the next sample.

Sediment samples were collected in 120 mL glass jars and 40 mL pre-weighed vials (for PHC or VOC analysis) supplied by the analytical laboratory. The 40 mL vials contained 10 mL of methanol preservative, measured by the laboratory. Approximately 5 grams of sediment was extracted using a dedicated syringe supplied by the laboratory; the sample was placed into the 40 mL vial containing methanol per laboratory sampling requirements. The vial was then swirled to ensure the sediment was fully dispersed in the methanol. The 120 mL soil sample jar was completely filled to eliminate headspace losses of potential volatile contaminants in the sample. After sampling, each sample container was tightly capped, labelled and placed into insulated coolers containing ice.

Hazardous building material samples (suspected ACM) were collected from the scattered debris at the Site. Larger debris pieces were broken by hand to a size that would fit in a large zip-top plastic bag (approximately 0.25 m by 0.25 m). One sample was collected to represent each hazardous material type at each APEC. For example, if many pieces of green vinyl floor tile were observed in an APEC, one representative green vinyl floor tile sample was collected for the APEC.

All samples were placed on ice in insulated coolers for transport back to GEMTEC's accommodations in Happy Valley-Goose Bay, Labrador. Additional packing materials (bubble wrap, *etc.*) were added to the coolers to ensure sample integrity during shipping. The samples were shipped to Maxxam Analytics in Bedford, Nova Scotia for analysis. Several parameters (CCME Hydrocarbons, furans and dioxin-like compounds) were analyzed at the Maxxam Analytics laboratory in Mississauga, Ontario.

In the analysis of PHCs, the laboratory provides a comment regarding whether the equipment (chromatogram) returned to baseline following the analysis of $C_{>34}$-$C_{50}$ analysis. Where the chromatogram returns to baseline following the $C_{>34}$-$C_{50}$ analysis, additional hydrocarbons in the $C_{>50}$ range are not expected, and the preliminary F4 ($C_{>34}$-$C_{50}$) analysis is deemed an appropriate approximation of CCME F4 ($C_{>34}$) hydrocarbons. Where the chromatogram did not return to baseline following the $C_{>34}$-$C_{50}$ analysis (25 of the 73 samples submitted for PHC analysis), additional analysis (F4 Gravimetric method) was conducted to quantify hydrocarbons in the $C_{>50}$ range.

### 6.3 Field Observations

Samples and manual test pits were logged in the field during the September 2017 field program. Soil color, texture, odours, presence of debris, and headspace vapour readings were recorded. Sample locations were collected using a hand-held GARMIN GPS unit.

In general, the soil conditions at the sampling locations consisted of brown sand and gravel with some areas of organics. Petroleum hydrocarbon odours were observed in samples SS_CT_28 (APEC #13) and SS_CT_60 (APEC #6A) upon disturbing the soil.

A summary of the soil sampling locations and field observations are provided in Appendix C.

### 6.4 Geospatial Data Collection

Proposed sampling locations were determined using GPS coordinates. Site features were digitized from high-resolution aerial photos, and geospatial data for sampling locations were collected relative to readily identifiable features on aerial mapping, such as the remains of building foundations.

The DND Contaminated Sites Sampling Database was updated. The updated ESRI File Geodatabase was provided to DND/DCC.

### 6.5 Quality Assurance/Quality Control

The quality assurance/quality control (QA/QC) program consisted of the following:

- Collecting field duplicate samples (FD) of approximately 10% of the sampling program;
- Laboratory duplicates (LD), conducted at random by the laboratory;
- Laboratory in-house routine quality control checks including blanks and matrix spikes; and
- Sending a laboratory prepared trip blank (deionized water) in the coolers along with samples. This trip blank was analyzed for VOCs to assess the potential influence of vehicle emissions (car, helicopter, and airplane) on the sample integrity.

Blind field duplicates were generally conducted when the number of samples was greater than 10. Thus, the following packages were not duplicated in the field due to limited sampling:

- Soil: VOCs (5 samples), furans and dioxin-like compounds (1 sample),
- Sediment: PCBs, VOCs (2 samples each);
- Surface Water: PAHs, General Chemistry, metals (5 samples each), PCBs (2 samples) PHCs, general chemistry, metals (5 samples each), PCBs (4 samples) PAHs (2 samples)

Lab duplicates are conducted per laboratory protocols, based on each batch of samples analyzed which may include samples from other clients. The number of lab duplicates is out of the control of each client.

The results of VOC analysis for the trip blank sample are provided in Table D19 (Appendix D). VOCs were not detected in the trip blank, indicating no background source of VOCs was present during the transport of the samples that could have influenced the other sample results.

Blind field duplicates and laboratory duplicates were analyzed to determine the extent to which they agree with the parent sample. General data quality targets for duplicate samples, per Health Canada (2008), are summarized in Table 6.2.

**Table 6.2 Acceptable Relative Percent Difference**

| Duplicate Type | Soil | Water |
|---|---|---|
| Laboratory Duplicate | 28-42% | 21-28% |
| Field Duplicate[2] | 57-85% | 42-57% |

Notes:
1) Relative Percent Difference is calculated as absolute value of the difference over the mean, times 100%
2) Elevated variability due to sampling and handling procedures, in addition to laboratory instrument variation

Elevated variation is often seen near the detection limit. Where the results are within five times the detection limit, the difference between the duplicate concentrations should be no more than two times the detection limit (Health Canada, 2008). Variation in the dataset is summarized in Table 6.3.

**Table 6.3 Variation in the Dataset**

| Duplicate Type | Analytical Package | Duplicates within 5 x RDL[1] | | Duplicates > 5 x RDL[1] | | Percent within Acceptable Range |
|---|---|---|---|---|---|---|
| | | Number of analytes | Absolute Difference[2] | Number of analytes | Range of RPD[3] | |
| **Soil Samples** | | | | | | |
| Laboratory | PHC | 26 | 0 - 0.5 X RDL | 2 | 12-21% | 100% |
| | PAH | 20 | 0[4] | - | - | 100% |
| | Metals | 11 | 0 - 0.3 X RDL | 16 | 1-37% | 100% |
| | PCB | 7 | 0[4] | - | - | 100% |
| Field | PHC | 38 | 0 - 0.4 x RDL | 9 | 21-121% | 91% |
| | PAH | 38 | 0 - 7.2 x RDL | 4 | 40-89% | 79% |
| | Metals | 33 | 0 - 1.2 x RDL | 48 | 1-37% | 100% |
| | PCB | 8 | 0[4] | - | - | 100% |
| **Sediment Samples** | | | | | | |
| Laboratory | PHC | - | - | 2 | 12-17% | 100% |
| | PAH | 20 | 0[4] | - | - | 100% |
| | Metals | 8 | 0 - 0.4 X RDL | 18 | 4-17% | 100% |
| Field | PHC | 7 | 0 - 22 X RDL | 4 | 160-191% | 64% |
| **Water Samples** | | | | | | |
| Field | PHC | 8 | 0[4] | - | - | 100% |

Notes:
EDL = Estimated detection limit
1) Reportable detection limit (RDL)
2) For values within 5 times the detection limit, duplicate concentrations should be no more than two times the reportable detection limit (RDL x 2, Health Canada, 2008)
3) Relative Percent Difference (RPD). Calculated as absolute value of the difference over the mean, times 100% for values >5 times the detection limit. Acceptable RPD range for laboratory duplicates is 28-42% for soil, and 21-28% for water. Acceptable RPD range for field duplicates is 57-85% for soil, and 42-57% for water (Health Canada, 2008)
4) All values in original and duplicate sample were below the RDL
5) The laboratory provides Estimated Detection Limits for the Furans and Dioxin-like compounds analysis that were different for the parent and lab duplicate sample. Multiples of the EDL are shown here based on the average EDL for the parent and duplicate

Elevated variability (>85%) was found in PHC and PAH concentrations between surface soil samples SS_CT_07 and SS_CT_07FD. Concentrations of F3 and F4 were above the provincial and/or federal ecological screening levels in the parent sample (SS_CT_07), but below the screening levels in the duplicate (SS_CT_07FD). No obvious reasons for this variability were noted based on field observations during sampling. To address this variability, GEMTEC has conservatively assumed that the higher concentration is representative of the sample location for the purposes of the Drawings (Appendix A) and estimates of impacted areas (Section 5.0).

Elevated variability (>85%) was found in PHC concentrations between sediment samples SD_CT_02 and SD_CT_02FD. However, as the concentrations of each parameter in both samples was either both above or both below the guidelines, the variability of PHCs in the collected sediment samples does not have a significant impact on the overall interpretation of the dataset. Nonetheless, GEMTEC has conservatively assumed that the higher concentration is representative of the sample location for the purposes of the Drawings (Appendix A) and estimates of impacted areas (Section 5.0).

In-house quality checks performed by the lab are summarized in the laboratory certificates (Appendix E) and are generally within the acceptable ranges. The overall data quality is considered good.

## 6.6 Analytical Data Review

The sampling locations for the Initial Testing Program are shown on Drawings 3 - 8 (Appendix A). Analytical data were compiled, compared to the screening levels identified in Section 3.4, and presented in tables in Appendix D. Laboratory certificates of analysis are provided in Appendix E.

### 6.6.1 Background Sampling Program

F3 hydrocarbons were detected in the background soil sample (SS_CT_20_BG and SS_CT_20_BG_LD). The detected concentrations were below the Federal and Provincial screening levels.

PCBs, PAHs, VOCs, were not detected in the background soil sample (SS_CT_20_BG).

Metal concentrations were detected in the background soil sample (SS_CT_20_BG). The detected metals concentrations were generally below the referenced screening levels, with the exception of chromium (68 mg/kg) which exceeded the $SQG_E$ for residential land use (64 mg/kg).

#### 6.6.1.1 Background sediment sample results

PHCs and PAHs were not detected in the background sediment sample (SD_CT_05_BG). Concentrations of metals in the background sediment sample were below the ISQG and PELs.

#### 6.6.1.2 Background Surface Water sample Results

PHCs and PAHs were not detected in the background sample (SW_CT_05_BG). General chemistry parameters in the background sample (SW_CT_05_BG) did not exceed the referenced screening levels.

The concentrations of aluminum, copper, and iron in the background sample (SW_CT_05_BG) were above the referenced screening levels.

### 6.6.2 Soil

#### 6.6.2.1 PHCs in Soil

Concentrations of PHCs in soil are presented in Tables D1-1 (for samples compared to residential guidelines) and D1-2 (for samples compared to commercial guidelines). Soil samples with concentrations exceeding the referenced screening levels are summarized in Table 6.4.

**Table 6.4 Concentrations of PHCs in Soil above Referenced Screening Levels**

| Parameter | APEC | Sample Details | | | Screening Level (mg/kg) | | Were Impacts Delineated?[1] |
|---|---|---|---|---|---|---|---|
| | | ID | Depth (m) | Result (mg/kg) | HH | Eco | |
| **Commercial Screening (Areas > 250 m from hunting/fishing sheds)** | | | | | | | |
| **F2** | 13 | SS_CT_26 | 0-0.05 | 6500 | 1000[3] | 260[2,3] | **No** |
| | 13 | SS_CT_29 | 0-0.05 | 1200 | | | **No** |
| | 6A | SS_CT_60 | 0-0.05 | 610 | | | **No** |
| | 6A | SS_CT_62 | 0-0.05 | 400 | 1000[3] | 260[2,3] | **No** |
| **F3** | 3 | SS_CT_03 | 0-0.05 | 2000 | 3500[3] | 1700[2,3] | **No** |
| | 6 | SS_CT_09 | 0-0.05 | 3500 | | | **No** |
| | 13 | SS_CT_26 | 0-0.05 | 5500 | | | **No** |
| | 6A | SS_CT_60 | 0-0.05 | 5600 | | | **No** |
| | 6A | SS_CT_62 | 0-0.05 | 9000 | | | **No** |
| **F4** | 5 | SS_CT_36 | 0-0.05 | 4800 | 10000[3] | 3300[2,3] | **No** |
| | 6 | SS_CT_08 | 0-0.05 | 4900 | | | **No** |
| | 12 | SS_CT_24 | 0-0.05 | 4500 | | | **No** |
| | 6A | SS_CT_62 | 0-0.05 | 9400 | | | **No** |

## Table 6.4 Concentrations of PHCs in Soil above Referenced Screening Levels

| Parameter | APEC | Sample Details | | | Screening Level (mg/kg) | | Were Impacts Delineated?[1] |
|---|---|---|---|---|---|---|---|
| | | ID | Depth (m) | Result (mg/kg) | HH | Eco | |
| Modified TPH | 13 | SS_CT_26 | 0-0.05 | 12000 | 4000[2] | - | **No** |
| | 6A | SS_CT_60 | 0-0.05 | 6210 | | | **No** |
| **Residential Screening (Areas within 250 m from hunting/fishing sheds)** | | | | | | | |
| **F2** | 2 | SS_CT_48 | 0-0.05 | 4300 | 150[3] | 150[2,3] | **No** |
| **F3** | 3 | SS_CT_15 | 0-0.05 | 470 | 2500[3] | 300[2,3] | **No** |
| | 2 | SS_CT_48 | 0.12-0.20 | 1900 | | | **No** |
| | 2 | SS_CT_49 | 0.05-0.075 | 620 | | | **No** |
| | 2 | SS_CT_49 FD | 0.05-0.07 | 810 | | | **No** |
| | 9 | SS_CT_53 | 0-0.05 | 310 | | | **No** |
| | 3 | SS_CT_54 | 0-0.05 | 330 | | | **No** |
| **Modified TPH** | 3 | SS_CT_15 | 0-0.05 | 483 | 270[2] | - | **No** |
| | 2 | SS_CT_48 | 0-0.05 | 6200 | | | **No** |
| | 2 | SS_CT_49 | 0-0.05 | 620 | | | **No** |
| | 2 | SS_CT_49 FD | 0-0.05 | 810 | | | **No** |
| | 9 | SS_CT_52 | 0-0.05 | 400 | | | **No** |
| | 9 | SS_CT_53 | 0-0.05 | 355 | | | **No** |
| | 3 | SS_CT_54 | 0-0.05 | 346 | | | **No** |

Notes:
HH = Human Health; Eco = Ecological
FD = field duplicate
"-" No screening level
1.) Refers to horizontal delineation. Impacts are not expected to extend into bedrock, which was encountered in most sampling locations at a depth of 0.10 m.
2.) Atlantic RBCA Tier I RBSL (HH) and ESL (Eco)
3.) CCME Canada-Wide Standard for Petroleum Hydrocarbons in soil.

### 6.6.2.2 PAHs in Soil

Concentrations of PAHs in soil are presented in Tables D2-1 (for samples compared to residential guidelines) and D2-2 (for samples compared to commercial guidelines). Soil samples with concentrations exceeding the referenced screening levels are summarized in Table 6.5. Samples collected within 250 m of the seasonal community contained concentrations of PAHs below the residential screening levels.

**Table 6.5 Concentrations of PAHs in Soil above Referenced Screening Levels**

| Parameter | APEC | Sample Details | | | Screening Level (mg/kg) | | Were Impacts Delineated?[1] |
|---|---|---|---|---|---|---|---|
| | | ID | Depth (m) | Result (mg/kg) | HH | Eco | |
| **Commercial Screening (Areas > 250 m from hunting/fishing sheds)** | | | | | | | |
| **Acenaphthene** | 10 | SS_CT_03 | 0-0.05 | 5.2 | 8000[2] | 0.28 | Yes |
| **Fluorene** | 10 | SS_CT_03 | 0-0.05 | 4.9 | 4100[2] | 0.25 | Yes |
| **Naphthalene** | 10 | SS_CT_03 | 0-0.05 | 0.16 | 25[2] | 0.013 | Yes |
| **Phenanthrene** | 10 | SS_CT_02 | 0-0.05 | 0.065 | - | 0.046 | Yes |
| | 10 | SS_CT_03 | 0-0.05 | 63 | | | **No** |
| | 11 | SS_CT_19 | 0-0.05 | 0.18 | | | **No** |
| **Benzo[a]anthracene** | 10 | SS_CT_03 | 0-0.05 | 47 | - | 10 | Yes |
| **Benzo[b]fluoranthene** | 10 | SS_CT_03 | 0-0.05 | 26 | - | 10[3] | Yes |
| **Benzo[j]fluoranthene** | 10 | SS_CT_03 | 0-0.05 | 15 | - | | Yes |
| **Benzo[k]fluoranthene** | 10 | SS_CT_03 | 0-0.05 | 15 | - | | Yes |
| **Indeno[1,2,3-cd]pyrene** | 10 | SS_CT_03 | 0-0.05 | 12 | - | 10 | Yes |
| **B(a)P TPE (calculated)[4]** | 10 | SS_CT_03 | 0-0.05 | 131.55 | 5.3 | - | Yes |

Notes:
HH = Human Health; Eco = Ecological
1.) Refers to horizontal delineation. Impacts are not expected to extend into bedrock, which was encountered in most sampling locations at a depth of 0.10 m.
2.) In the absence of CCME guidelines for non-carcinogenic parameters for the protection of human health, CCME stipulates that provincial guidelines be referenced. GEMTEC has referenced Nova Scotia Environment Tier 1 EQS (2012)
3.) Guideline is for the sum of Benzo[a]anthracene, Benzo[j]fluoranthene, Benzo[k]fluoranthene.
4.) Benzo(a)pyrene total potency equivalent is a calculated sum of each of the carcinogenic PAHs, multiplied by their respective "potency equivalency factor). The sum here has been multiplied by 3 per CCME guidance as the PAH source may be creosote.

### 6.6.2.3 Metals in Soil

Concentrations of metals in soil are presented in Tables D3-1 (for samples compared to residential guidelines) and D3-2 (for samples compared to commercial guidelines). Soil samples with concentrations exceeding the referenced screening levels are summarized in Table 6.6.

**Table 6.6 Concentrations of Metals in Soil above Referenced Screening Levels**

| Parameter | APEC | Sample Details | | | Screening Level (mg/kg) | | Were Impacts Delineated?[3] |
|---|---|---|---|---|---|---|---|
| | | ID | Depth (m) | Result (mg/kg) | HH[1] | Eco[2] | |
| Commercial Screening (Areas > 250 m from hunting/fishing sheds) | | | | | | | |
| **Arsenic** | 10 | SS_CT_03 | 0-0.05 | 24 | 12 | 26 | **No** |
| **Chromium** | 10 | SS_CT_03 | 0-0.05 | 170 | 630 | 87 | **No** |
| | 13 | SS_CT_27 | 0-0.05 | 310 | | | **No** |
| | 13 | SS_CT_28 | 0-0.05 | 190 | | | **No** |
| | 5 | SS_CT_38 | 0-0.05 | 90 | | | **No** |
| | 6A | SS_CT_60 | 0-0.05 | 200 | | | **No** |
| | 6A | SS_CT_61 | 0-0.05 | 430 | | | **No** |
| | 6A | SS_CT_62 | 0-0.05 | 310 | | | **No** |
| **Copper** | 10 | SS_CT_03 | 0-0.05 | 210 | 4000 | 91 | **No** |
| | 13 | SS_CT_28 | 0-0.05 | 130 | | | **No** |
| | 6A | SS_CT_60 | 0-0.05 | 130 | 4000 | 91 | **No** |
| | 6A | SS_CT_61 | 0-0.05 | 170 | | | **No** |
| **Lead** | 10 | SS_CT_03 | 0-0.05 | 3200 | 260 | 600 | **No** |
| **Nickel** | 10 | SS_CT_03 | 0-0.05 | 150 | 310 | 89 | **No** |
| | 13 | SS_CT_27 | 0-0.05 | 450 | | | **No** |
| | 13 | SS_CT_28 | 0-0.05 | 280 | | | **No** |
| | 6A | SS_CT_60 | 0-0.05 | 460 | | | **No** |
| | 6A | SS_CT_61 | 0-0.05 | 560 | | | **No** |

### Table 6.6 Concentrations of Metals in Soil above Referenced Screening Levels

| Parameter | APEC | Sample Details | | | Screening Level (mg/kg) | | Were Impacts Delineated?[3] |
|---|---|---|---|---|---|---|---|
| | | ID | Depth (m) | Result (mg/kg) | HH[1] | Eco[2] | |
| **Zinc** | 10 | SS_CT_02 | 0-0.05 | 1100 | - | 200 | **No** |
| | 10 | SS_CT_03 | 0-0.05 | 1900 | | | **No** |
| **Residential Screening (Lower Site, and lower portions of APEC #7 (pipeline))** | | | | | | | |
| **Chromium** | 4 | SS_CT_41 | 0.0-0.05 | 79 | 220 | 64 | **No** |
| | 4 | SS_CT_42 | 0.0-0.05 | 370 | | | **No** |
| | 4 | SS_CT_44 | 0.0-0.05 | 200 | | | **No** |
| **Lead** | 14 | SS_CT_62 | 0.0-0.05 | 210 | 140 | 300 | **No** |
| **Nickel** | 4 | SS_CT_42 | 0.0-0.05 | 90 | 200 | 45 | **No** |
| **Thallium** | 4 | SS_CT_41 | 0.0-0.05 | 1.3 | 1 | 1.4 | |
| **Zinc** | 11 | SS_CT_45 | 0.0-0.05 | 770 | N/A | 200 | **No** |

Notes:
HH = Human Health; Eco = Ecological
1.) CCME $SQG_{HH}$
2.) CCME $SQG_{E}$
3.) Refers to horizontal delineation. Impacts are not expected to extend into bedrock, which was encountered in most sampling locations at a depth of 0.10 m.

#### 6.6.2.4 PCBs in Soil

Concentrations of PCBs in soil are presented in Tables D4-1 (for samples compared to residential guidelines) and D4-2 (for samples compared to commercial guidelines). PCBs were not detected in the analyzed soil samples, and the laboratory detection limits were below the human health and ecological guidelines for residential and commercial land use.

#### 6.6.2.5 VOCs in Soil

Concentrations of VOCs in soil are presented in Table D5 for samples compared to commercial guidelines. No samples were collected for VOC analysis in the residential screening area of the Site. VOCs were not detected in the analyzed soil samples, and the laboratory detection limits were below the human health and ecological guidelines for commercial land use.

#### 6.6.2.6 Furans and Dioxin-like compounds in Soil

Concentrations of furans and dioxin-like compounds in soil are presented in Table D6 for samples compared to commercial guidelines. No samples were collected for furans and dioxin-like compounds analysis in the residential screening area of the Site. A Toxic Equivalency Quotient (TEQ) was calculated for the analyzed sample by summing the concentration of each parameter, multiplied by its respective Toxic Equivalency Factor (TEF). The calculated TEQ (0.365 ng/kg in SS_CT_63) is below the human health screening level of 1000 ng/kg, and below the ecological screening level of 4 ng/kg.

### 6.6.3 Sediment

#### 6.6.3.1 PHCs in Sediment

Concentrations of PHCs in sediment are presented in Table D7. Sediment samples with concentrations exceeding the referenced screening levels are summarized in Table 6.7 and are shown on Drawings 13 and 14 (Appendix A). The detection limit for modified TPH exceeds the referenced screening level.

**Table 6.7 Concentrations of PHCs in Sediment above Referenced Screening Levels**

| Parameter | APEC | Sample Details | | | Screening Level (mg/kg) | Were Impacts Delineated?[1] |
|---|---|---|---|---|---|---|
| | | ID | Depth (m) | Concentration (mg/kg) | | |
| **Modified TPH** | 13 | SD_CT_02 | 0-0.05 | 962 | 15[2] | **No** |
| | | SD_CT_02_FD | 0-0.05 | 100 | | |
| | | SD_CT_03 | 0-0.05 | 170 | | |

Notes:
FD = field duplicate
1.) Horizontal delineation. Samples were collected at one depth only (0-0.05 m) thus, the vertical extent of impacts has not been determined.
2.) Atlantic RBCA Tier I ESL for typical sediment.

#### 6.6.3.2 PAHs in Sediment

Concentrations of PAHs in sediment are presented in Table D8. PAHs were not detected in the analyzed sediment samples, and the detection limits were below the referenced screening levels.

#### 6.6.3.3 Metals in Sediment

Concentrations of metals in sediment are presented in Table D9. The detected metals in sediment were below the referenced screening levels.

#### 6.6.3.4 PCBs in Sediment

Concentrations of PCBs in sediment are presented in Table D10. PCBs were not detected in the analyzed sediment samples, however the detection limit for (calculated) total PCBs exceeds the referenced screening level. Sediment samples with concentrations exceeding the referenced screening levels are summarized in Table 6.8.

**Table 6.8 Concentrations of PCBs in Sediment above Referenced Screening Levels**

| Parameter | APEC | Sample Details | | | Screening Level (mg/kg) | | Were Impacts Delineated?[3] |
|---|---|---|---|---|---|---|---|
| | | ID | Depth (m) | Result (mg/kg) | ISQG[1] | PEL[2] | |
| **Calculated Total PCB** | 8 | SD_CT_02 | 0-0.05 | <0.050 | 0.0341 | 0.277 | **No** |
| | 14 | SD_CT_04 | 0-0.05 | <0.050 | | | **No** |

Notes:
1.) Interim Sediment Quality Guideline (ISQG), represents tolerable effects level, which is the level below which adverse effects are expected to occur rarely (CCME, 1999).
2.) Probable Effects Level (PEL), level above which adverse effects are expected to occur frequently (CCME, 1999)
3.) Horizontal delineation. Samples were collected at one depth only (0-0.05 m) thus, the vertical extent of impacts has not been determined.

Although the calculated total PCB concentration exceeds the ISGQ, each individual PCB parameter was below the laboratory detection limits, and below their respective ISQG (where available). The calculated total PCB concentration is below the PEL at both APEC #8 and APEC #14.

#### 6.6.3.5 VOCs in Sediment

Concentrations of VOCs in sediment are presented in Table D11. VOCs were not detected in the analyzed sediment samples, and the detection limits were below the referenced guidelines.

### 6.6.4 Surface Water

#### 6.6.4.1 PHCs in Surface Water

Concentrations of PHCs in surface water are presented in Table D12. Samples with concentrations exceeding the referenced screening levels are summarized in Table 6.9.

**Table 6.9 Concentrations of PHCs in Surface Water above Referenced Screening Levels**

| Parameter | APEC | Sample Details | | | Ecological Screening Level (mg/L) |
|---|---|---|---|---|---|
| | | ID | Depth (m) | Result (mg/L) | |
| **Modified TPH** | 15A | SW_CT_01 | N/A | <0.2 | 0.1[1] |
| | 8 | SW_CT_02 | N/A | | |
| | 8 | SW_CT_02_FD | N/A | | |
| | 8 | SW_CT_03 | N/A | | |
| | 14 | SW_CT_04 | N/A | | |

Notes:
1) Atlantic RBCA Tier I ESL for surface water.
N/A = not applicable; FD = field duplicate

Surface water samples were analyzed using the CCME CWS method. For comparison of the laboratory results to the Provincial guidelines (modified TPH, $C_{>6}$-$C_{32}$), GEMTEC has summed the detected concentrations of F1, F2, and F3 fractions ($C_6$-$C_{34}$). In the instance of no detections, the highest detection limit of the F1, F2, and F3 fractions is used as the approximate value for modified TPH. This approximation is a slight over representation of the modified TPH concentration. It is noted that the CWS detection limits, in some instances, exceed the Atlantic RBCA guidelines. Nevertheless, petroleum hydrocarbon products (F1, F2, and F3) were not detected by the laboratory in the above-noted samples.

#### 6.6.4.2 PAHs in Surface Water

Concentrations of PAHs in surface water are presented in Table D13. PAHs were not detected in the background sample (SW_SP_01_BG). PAHs were not detected in the analyzed surface water samples, and the detection limits were below the referenced guidelines.

#### 6.6.4.3 General Chemistry in Surface water

Concentrations of general chemistry parameters in surface water are presented in Table D14. Concentrations of general chemistry parameters in surface water were below the referenced ecological screening levels.

#### 6.6.4.4 Metals in Surface water

Concentrations of metals in surface water are presented in Table D15. Surface water samples with concentrations exceeding the referenced screening levels are summarized in Table 6.10.

**Table 6.10 Concentrations of Metals in Surface Water above Referenced Screening Levels**

| Parameter | APEC | Sample Details | | | Ecological Screening Level (mg/kg) |
|---|---|---|---|---|---|
| | | ID | Depth (m) | Result (mg/L) | |
| **Aluminum**[1] | 8 | SW_CT_02 | N/A | 200 | 100 |
| | | SW_CT_03 | N/A | 180 | 100 |
| | 13 | SW_SP_04 | N/A | 340 | 100 |
| | 14 | SW_CT_04 | N/A | 270 | 100 |
| | 15A | SW_CT_01 | N/A | 120 | 100 |
| **Copper**[1] | 14 | SW_CT_04 | N/A | 4.3 | 2 |

**Table 6.10 Concentrations of Metals in Surface Water above Referenced Screening Levels**

| Parameter | APEC | Sample Details | | | Ecological Screening Level (mg/kg) |
|---|---|---|---|---|---|
| | | ID | Depth (m) | Result (mg/L) | |
| **Iron** | 15A | SW_CT_01 | N/A | 380 | 300 |
| | 8 | SW_CT_02 | N/A | 510 | |
| | 8 | SW_CT_03 | N/A | 530 | |

Notes:
N/A = not applicable
1) Guidelines for aluminum and copper are dependent on pH and/or hardness. Sample-specific guidelines were calculated based on the pH and hardness measured by the lab and are presented here.

### 6.6.4.5 PCBs in Surface water

Concentrations of PCBs in surface water are presented in Table D16. PCBs were not detected in the analyzed surface water samples, and the laboratory detection limits were below the referenced guidelines.

### 6.6.5 Building Materials

Concentrations of asbestos and lead and mercury in paint are presented in Table D17. Building materials meeting the definition of “hazardous” (> 1% asbestos fibres by weight) are summarized in Table 6.11.

**Table 6.11 Hazardous Building Materials**

| Sample ID | APEC | Description | Result |
|---|---|---|---|
| **Asbestos Containing Materials** | | | |
| BS_CT_01A | 10 | Transite Board | 15% Chrysotile |
| BS_CT_01B | 11 | Transite Board | 15% Chrysotile |
| BS_CT_01C | 8 | Transite Board | 15% Chrysotile |
| BS_CT_01D | 9 | Transite Board | 15% Chrysotile |
| BS_CT_02A | 1 | Caulking | 6% Chrysotile |

## 7.0 DISCUSSION

### 7.1 Background Sampling

The location of the background soil sample (SS_CT_20_BG) was originally selected based on aerial imagery, and located in an area that did not appear to have been part of the former USAF operations. During the site reconnaissance the sample location was moved southwest to a higher elevation where it was assumed that influence from Site activities (e.g. potential overland runoff) would be even less likely. However, detectable concentrations of petroleum hydrocarbons in the F3 range and modified TPH were detected in the background sample (below the referenced screening levels). Similarly, petroleum hydrocarbons were detected on the same order of magnitude as the background samples (below the screening levels) in samples collected from APEC #3 (former above ground fuel line), APEC #4 (USAF dump), APEC #8 (water supply), APEC #6A (presumed landfill), and APEC #11 (disaster shack). Given the scattered nature of the detections, a background source cannot be ruled out at this time.

A total of 11 of the 39 soil samples submitted for metals analysis had elevated concentrations of chromium exceeding the referenced ecological screening levels, with one exceeding the referenced human health screening level. Soil sample concentrations ranged from 4.4 mg/kg to 430 mg/kg. Chromium exceedances were identified in the areas of: APEC #4 (USAF Quarry and Dump); APEC #10 (Main Building and Motor Pool); APEC #13 (former Catch Basin); APEC #5 (1987 Landfill/Bury Site); and APEC #6A (Landfill/Bury Site). When compared to residential screening levels the background soil sample SS_CT_20_BG (68 mg/kg) slightly exceeded the ecological screening level (64 mg/kg) however was below the ecological screening level for a commercial site (87 mg/kg). Based on the findings naturally occurring (background) elevated chromium cannot be ruled out.

Background surface water sampling revealed concentrations of aluminum, copper, and iron above the referenced screening levels. These same metals were also found at concentrations above the referenced guidelines in samples collected from other surface water bodies at the Site. As there are no obvious sources of these metals in the immediate area of the background sampling location, there were no metals impacts at APEC #6 (located to the west of the background surface water body) above screening levels and there were no metals impacts at APEC #11 (located upgrading of the background surface water body), it is very unlikely that aluminum, copper, and iron in the surface water samples are attributable to the former USAF Site activities, but rather they are likely naturally occurring.

## 7.2 Detection Limits Exceeding Guidelines

There were several occurrences of laboratory detection limits exceeding the referenced screening levels.

- Total PCBs in sediment (SD_CT_02, and SD_CT_04). Although the calculated total PCB concentration exceeds the ISGQ, each individual PCB parameter was below the laboratory detection limits, and below their respective ISQG (where available). The calculated total PCB concentration is below the PEL. Given that PCBs are not a concern at the adjacent land-based APECs, and no substantive source of PCBs is expected in the vicinity of the collected sediment samples, the detection limit for the Total PCB parameter above the ISQG does not represent a gap in the overall understanding of the Site conditions. No unacceptable risk associated with PCBs is anticipated.
- Modified TPH in surface water (SW_CT_01, SW_CT_02, SW_CT_02_FD, SW_CT_03, and SW_CT_04): Surface water samples were analyzed using the CCME CWS method. For comparison of the laboratory results to the Provincial guidelines (modified TPH, $C_{>6}$-$C_{32}$), GEMTEC has summed the detected concentrations of F1, F2, and F3 fractions ($C_6$-$C_{34}$). In the instance of no detections, the highest detection limit is used as the approximate value for modified TPH. This approximation is a slight over representation of the modified TPH concentration. It is noted that the CWS detection limits, in some instances, exceed the Atlantic RBCA guidelines. Nevertheless, petroleum hydrocarbon products (F1, F2, and F3) were not detected by the laboratory in the above-noted samples.
    - Should additional surface water sampling for PHCs be desired in future studies and if continued comparison to the Atlantic RBCA guidelines is anticipated, Atlantic MUST methodology analysis may be preferable to the CCME methodology analysis conducted as part of this mandate.

With the exception of PCBs in sediment, detection limits above the guidelines have been included as “exceedances” warranting additional study for the remainder of this assessment.

## 7.3 Conceptual Site Model

### 7.3.1 Human Receptors and Exposure Pathways

Human receptors identified at the Site include adults, children and toddlers. The complete exposure pathways by which human receptors could come into contact with impacts at the Site include: soil/dust dermal contact and ingestion; wind erosion and atmospheric dispersion; volatilization of organic contaminants and atmospheric dispersion, enclosed space accumulation; soil leaching to groundwater, and incidental ingestion and dermal contact with surface water and sediment.

### 7.3.2 Ecological Receptors and Exposure Pathways

Ecological receptors identified at the Site include mammals, birds, plants and invertebrates, freshwater aquatic life and potential species at risk. The complete exposure pathways by which ecological receptors could come into contact with impacts at the Site include: direct exposure and ingestion of surface soil; ingestion/plant uptake of groundwater; and direction exposure and/or ingestion with surface water and freshwater sediment.

### 7.3.3 Contaminants of Potential Concern

Based on the results of the analytical program the following COPC were identified as requiring further assessment, risk assessment and/or risk management:

- PHCs, PAHs and metals in soil;
- PHCs in sediment; and
- PHCs and Metals in surface water.

### 7.3.4 Confirmation/Refutation of APECs

A summary of the initial testing program is provided in Table 7.1. Based on the results, each APEC has either been confirmed as an area of potential concern, or has been ruled out as no environmental concerns were identified.

**Table 7.1 Confirmation / Refutation of AECs**

| APEC | | Assessment Results | Conclusion |
|---|---|---|---|
| **Number** | **Description** | | |
| **1** | AST (Upper site) | Four surface soil samples were analyzed for PHCs and PAHs. Concentrations were below guidelines. | No environmental concern in soil. **ACM debris confirmed.** |
| **2** | AST (Lower site) | Five surface soil samples were analyzed for PHCs and PAHs, and metals. SS_CT_48 and SS_CT_49 exceeded the PHC guidelines. Concentrations of PAHs and metals were below guidelines. | **Confirmed APEC (F2, F3, modified TPH in soil).** |
| **3** | Aboveground Fuel Line | Five surface soil samples were analyzed for PHCs. Two samples exceeded for F3 and modified TPH. Concentrations of PHCs and PAHs were below guidelines. | **Confirmed APEC (F3 and modified TPH in soil)** |
| **4** | USAF Quarry and Dump | Four surface soil samples were analyzed for PHCs, VOCs, metals, and PCBs. (Meet for PHC) Three samples exceeded the F4 guidelines. | **Confirmed APEC (F4 in soil).** |

**Table 7.1 Confirmation / Refutation of AECs**

| APEC | | Assessment Results | Conclusion |
|---|---|---|---|
| **Number** | **Description** | | |
| **5** | 1987 Landfill/Bury Site (assumed location) | Four surface soil samples were analyzed for PHCs, PAHs, metals, and PCBS. | No environmental concern. Based on the results, it is possible that this area was not in fact a former landfill/bury Site. |
| **6** | 1987 Landfill/Bury Site (assumed location) | Four surface soil samples were analyzed for PHCs, PAHs, metals, and PCBs. PHCs, PAHs, and PCBs were below the guidelines. Two samples exceeded the nickel and/or chromium guidelines. | **Confirmed APEC (modified TPH in soil).** |
| **6A** | Landfill/Bury Site (identified during the 2017 Site reconnaissance) | Four surface soil samples were analyzed for PHCs, PAHs, metals, PCBs. SS_CT_60 and SS_CT_62 exceeded the PHC and metals guidelines. Metals exceedances were also confirmed in SS_CT_61. | **Confirmed APEC (Chromium, copper, nickel, F2, F3, F4, modified TPH)** |
| **7** | Helicopter Pad | Four surface soil samples were analyzed for PHCs, PAHs, metals, PCBs. Measured concentrations were below the referenced guidelines. | No environmental concern. |
| **8** | Water Source | Four surface soil samples were analyzed for PHCs and PAHs. Concentrations in soil were below the guidelines. | **Confirmed APEC (modified TPH in sediment, aluminum[1], and iron[1] in surface water)** |
| | | West side: one soil and one sediment sample were collected. The sediment sample was analysed for PHC, PAH, Metals, PCBs and VOCs. The surface water sample was analyzed for PHC, PAH, Metals, PCBs and general chemistry. Modified TPH in sediment exceeds the guideline. Aluminum and iron in surface water exceeded the guidelines. | |
| | | East side: one surface water and one sediment sample were analyzed PHC, PAHs, metals, and general chemistry (water only). Modified TPH in sediment exceeds the guideline. Aluminum and iron in surface water exceeded the guidelines. | |
| **9** | Pump House | Four surface soil samples were analyzed for PHCs and PAHs. Samples SS_CT_52 and SS_CT_53 contained PHCs above the referenced guidelines. | **Confirmed APEC (F3, modified TPH in soil). ACM debris confirmed** |

**Table 7.1 Confirmation / Refutation of AECs**

| APEC | | Assessment Results | Conclusion |
|---|---|---|---|
| **Number** | **Description** | | |
| **10** | Main Building and Motor Pool | Four surface soil samples were analyzed for PHC, PAHs, PCBs, VOCs, and metals. The concentration of zinc in SS_CT_01 exceeded the referenced $SQG_{E,}$ while SS_CT_02 and SS_CT_03 contained concentrations of several PAHs, metals, and PHCs above the guidelines | **Confirmed APEC (arsenic, copper, chromium, lead, nickel, zinc, F2, F3, acenapthene, fluorine, naphthalene, phenanthrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, ideno(1,2,3-cd)pyrene, and B(a)P TPE in soil). ACM debris confirmed.** |
| **11** | Disaster Shack (Upper Site) | Four surface soil samples were analyzed for PHC, PAHs, and metals. Measured concentrations were below the referenced guidelines. | No environmental concern. |
| **12** | Storage Building | Four surface soil samples were analyzed for PHC, PAHs and metals. Measured concentrations were below the referenced guidelines with the exception of F4 in SS_CT_24. | **Confirmed APEC (F4 in soil)** |
| **13** | Former Catch Basin | Four surface soil samples were analyzed for PHC and metals. Concentrations were below the referenced screening levels with the exception of PHCs in SS_CT26 and SS_CT_29 | **Confirmed APEC (F2, F3, and modified TPH in soil)** |
| **14** | Waterbody (northeast of the Helicopter Pad) | One surface water and one sediment were analyzed for PHCs, PAHs, metals, PCBs, and/or VOCs. Concentrations were below the referenced guidelines with the exception of copper and aluminum in the surface water sample. The detection limit for modified TPH in surface water exceeds the referenced guideline. | **Confirmed APEC (copper, aluminum[1], and modified TPH[2] in surface water).** |
| **15** | Waterbody (north of water source) | One surface water and one sediment were analyzed for PHCs, PAHs, metals, PCBs, and/or VOCs. Concentrations were below the referenced guideline with the exception of aluminum and iron in the surface water. The detection limit for modified TPH in surface water exceeds the referenced guideline. | **Confirmed APEC (iron[1], aluminum[1], and modified TPH[2] in surface water )** |

### Table 7.1 Confirmation / Refutation of AECs

| APEC | | Assessment Results | Conclusion |
|---|---|---|---|
| Number | Description | | |
| Notes:<br>ACM = asbestos-containing materials<br>1) iron and aluminum are commonly naturally found in freshwater surface water bodies. As these parameters exceeded the guidelines also in the background samples, iron and aluminum here may be naturally occurring and not attributable to historical USAF site activities.<br>2.) parameter not detected, however the detection limit was greater than the screening level; further assessment is recommended. | | | |

### 7.3.5 Estimated Area and Volume of Impacts

The aerial extent of contamination in generally estimated by either measuring the distance from an impacted sample to the next clean sample, or by halfway to the next clean sample. As the Initial Testing Program was limited in scope, and generally included only four to six samples per APEC; the next clean sample could be located hundreds of metres away within a separate APEC. Further, the Site is characterized by frequent bedrock outcropping, which may limit the spread of contaminants between samples. Supplemental data from Future Detailed Testing Program(s), if conducted, would help to refine these estimate. Often detailed testing programs involve “stepping out” beyond an impacted sample to delineate the aerial extent of the impacts. In absence of obstruction such as buildings, cliffs, *etc.*, this “stepping out” is generally done on an approximately 10 m scale. As such, for the purpose of calculating preliminary estimates of extent of impacts, GEMTEC has applied the following approach (in order of preference) to demarcate the estimated limits of impacts (whichever is the smaller distance):

- Distance to nearest bedrock outcrop/foundation remains;
- Halfway to the nearest clean sample within the same APEC;
- Distance to the edge of the APEC (or waterbody in the case of surface water and sediment); or
- 10 m.

Depth of impacts has preliminarily been assumed to be equal to the depth of overburden in each APEC. The depth of overburden was estimated/inferred based on field observations at each APEC. Although the depth of the waterbodies was not confirmed as part of this mandate (boat access would have been required to do so), for the purposes of these preliminary estimates a 0.5 m depth has been assumed based on the Site observations at the sampling locations, which were generally shallow water along the waterbody’s edge.

To determine volumes of asbestos, due to the small pieces of asbestos containing materials, it was conservatively assumed that 0.05 m of soil over a 10 $m^2$ area would be inadvertently removed with the asbestos during remediation, if completed. The area of impacts were identified based on field information. As such, the volume estimates for asbestos are identified as asbestos/soil mixtures.

Table 7.2 provides a summary of sample results that exceeded a human health and/or ecological guideline (provincial and/or federal) for one or more COPC. Estimated impacted areas are shown on Drawings19-22 (Appendix A).

**Table 7.2 Preliminary Estimates of Impacted Areas**

| Sample ID | COPC | Matrix | Preliminary Estimates | | |
|---|---|---|---|---|---|
| | | | Depth[1] | Area ($m^2$) | Volume ($m^3$) |
| **APEC #1 (AST (Upper Site))** | | | | | |
| BS_CT_02A | Chrysotile Asbestos | Asbestos/Soil Mixture | 0.05 | 2200 | 110 |
| **APEC #2 (AST, Lower site)** | | | | | |
| SS_CT_48, SS_CT_49 | F2, F3, modified TPH | Soil | 0.10 | 400 | 40 |
| **APEC #3 (Aboveground Fuel Line)** | | | | | |
| SS_CT_15 | F3, modified TPH | Soil | 0.10 | 250 | 30 |
| SS_CT_54 | modified TPH | Soil | 0.10 | 250 | 30 |
| **APEC #4 (USAF Quarry and Dump)** | | | | | |
| SS_CT_41, SS_CT_42, SS_CT_44 | nickel, chromium | Soil | 0.10 | 1100 | 110 |
| **APEC #6 (1987 Landfill/Bury Site)** | | | | | |
| SS_CT_08 | F3, F4 | Soil | 0.90 | 50 | 50 |
| SS_CT_09 | F4 | Soil | 0.90 | 150 | 140 |
| **APEC #6A (Landfill/Bury Site)** | | | | | |
| SS_CT_62, SS_CT_61, SS_CT_60 | chromium, copper, nickel, F2, F3, F4, modified TPH | Soil | 0.60 | 900 | 540 |

### Table 7.2 Preliminary Estimates of Impacted Areas

| Sample ID | COPC | Matrix | Preliminary Estimates | | |
|---|---|---|---|---|---|
| | | | Depth[1] | Area ($m^2$) | Volume ($m^3$) |
| **APEC #8 (Water Source)** | | | | | |
| BS_CT_01C | Chrysotile Asbestos | Asbestos/Soil Mixture | 0.05 | 400 | 20 |
| SW_CT_02 | aluminum, iron | Surface Water | 0.50 | 150 | 80 |
| | modified TPH | Sediment | 0.15 | 150 | 30 |
| SW_CT_03 | aluminum, iron | Surface Water | 0.50 | 250 | 130 |
| | modified TPH | Sediment | 0.15 | 150 | 30 |
| **APEC #9 (Pump House)** | | | | | |
| BS_CT_01D | Chrysotile Asbestos | Asbestos/Soil Mixture | 0.05 | 400 | 20 |
| SS_CT_52, SS_CT_53 | F3, modified TPH | Soil | 0.10 | 200 | 20 |
| **APEC #10 (Main Building and Motor Pool)** | | | | | |
| BS_CT_01B | Chrysotile Asbestos | Asbestos/Soil Mixture | 0.05 | 2,200 | 110 |
| SS_CT_02, SS_CT_03 | Several PAHs, arsenic, copper, chromium, lead, nickel, zinc, | Soil | 0.10 | 500 | 50 |
| SS_CT_01 | Zinc | Soil | 0.10 | 200 | 20 |
| **APEC #11 (Disaster Shack)** | | | | | |
| BS_CT_01B | Chrysotile Asbestos | Asbestos/Soil Mixture | 0.05 | 450 | 30 |
| **APEC #12 (Former Storage Building)** | | | | | |
| SS_CT_24 | F4 | Soil | 0.10 | 100 | 10 |

## Table 7.2 Preliminary Estimates of Impacted Areas

| Sample ID | COPC | Matrix | Preliminary Estimates | | |
|---|---|---|---|---|---|
| | | | Depth[1] | Area ($m^2$) | Volume ($m^3$) |
| **APEC #13 (Former Catch Basin)** | | | | | |
| SS_CT_26, SS_CT_27, SS_CT_28 | F2, F3, modified TPH | Soil | 0.30 | 600 | 180 |
| **APEC #14 (Waterbody, northeast of the Helicopter Pad)** | | | | | |
| SW_CT_04 | Copper, aluminum | Surface Water | 0.50 | 250 | 130 |
| **APEC #15 (Waterbody, north of water source)** | | | | | |
| SW_CT_01 | aluminum, iron | Surface Water | 0.50 | 200 | 100 |
| **Total Estimated Volume of Impacted Soil at the Site** | | | | | 1,220 |
| **Total Estimated Volume of Asbestos/Soil Mixture** | | | | | 290 |
| **Total Estimated Volume of Impacted Sediment at the Site** | | | | | 60 |
| **Total Estimated Volume of Surface Water at the Site** | | | | | 440 |

Notes:
m = metres; $m^2$ = square metres; and $m^3$ = cubic metres
1) Depth inferred on an APEC by APEC basis is based on observations made at the time of sampling; however, impacts were not delineated vertically during the Step 3 Initial Testing Program. These depths are estimates only.
2) Area estimates were determined on a number of factors presented in Section 7.3.5.
3) Volume estimates are preliminary at this stage as delineation was not achieved during the Step 3 Initial Testing Program. As such, the presented volume estimates have been rounded up to the nearest 10 $m^3$ (e.g., 22.5 is rounded to 30 $m^3$).
4) All estimates presented herein should be revised following completion of a Step 5 Detailed Testing Program.

## 8.0 NCSCS CLASSIFICATION

The National Classification System for Contaminated Sites (NCSCS) process provides a uniform approach to evaluating need for further action at Sites to protect human health and the environment. The evaluation form was developed by the CCME in March 1992 (updated 2008, 2010 v1.2) and the process generally considers contaminant sources, exposure pathways, and potential human and environmental receptors, but is not intended to be used as a risk assessment tool. The scoring system reflects the concentrations and potential exposures of contaminants in relation to generic CCME remediation criteria. NCSCS Site Score categories are shown in Table 8.1.

**Table 8.1 NCSCS Scoring Summary**

| Total Score | Class | Priority for Action |
|---|---|---|
| >70 | Class 1 | High |
| 50-69.9 | Class 2 | Medium |
| 37-49.9 | Class 3 | Low |
| <37 | Class N | Not a priority |
| >15% of Responses are "Do not know" | Class INS | Insufficient Information |

Based on the information gathered during the Initial Testing Program Investigation, a NCSCS score was calculated for the Site. The calculated NCSCS score is 73.4, a breakdown of the score is presented in Table 8.2. Based on this score, the Site is classified as Class 1, indicating a High Priority for action. The detailed NCSCS evaluation form is presented in Appendix F.

**Table 8.2 NCSCS Score Breakdown**

| Category | Score |
|---|---|
| Contaminant Characteristics | 25.6 |
| Migration Potential | 23.5 |
| Exposure | 24.4 |
| Certainty Percentage | 75% |
| **Total NCSCS Score[1]** | **73.4** |
| Note:<br>1) As provided in the NCSCS output. The apparent discrepancy between this value and the sum of the category scores is based on intermediate rounding of category scores. | |

## 9.0 SUMMARY

GEMTEC conducted an Initial Testing Program and NCSCS Classification at the former USAF manned Pinetree Line Radar Station located on Cut Throat Island, Labrador. The following is a summary of the results of the Initial Testing Program:

**APECs:**

- Based on a document review, 15 preliminary APECs were identified for field investigation; and
- Following a Site Reconnaissance, the locations and COPCs were adjusted for some APECs, and an additional APEC (#6A, presumed landfill) was identified.

**Field Program/Testing Program**

- A total of 66 surface soil (0-0.05 m) samples (including 5 field duplicates), 5 sediment samples and 5 surface water samples were collected from the Site in September, 2017; and
- Concentrations of COPCs were compared to the applicable Provincial (PHCs only) and Federal screening levels. The regulatory framework includes residential guidelines, due to the proximity of the Lower Site to a nearby seasonal community (fishing sheds) and commercial for the Upper Site, non-groundwater use/non-potable, and coarse-grained soil. Concentrations of COPCs were compared to the applicable ecological and human health guidelines.

**Data Evaluation:**

- Based on the results of the analytical program, the following were identified at concentrations exceeding the referenced screening levels:
  - Soil (Upper and Lower Site): PHCs, PAHs, and metals;
  - Sediment (Upper Site): PHCs; and
  - Surface water (Upper Site): PHCs, and metals;
- Asbestos containing debris (cement board, vinyl floor tiles, and mastic) was confirmed at the Site; and
- Delineation of the impacts has generally not been achieved based on the Initial Testing Program.

**NCSCS Scoring and GIS Database:**

- The calculated NCSCS score for the Site is 73.4. Based on this score, the Site is classified as Class 1, indicating a High priority for action; and
- The DND Environmental GIS Data Template was updated with all data collected as part of this mandate.

## 10.0 RECOMMENDATIONS

Based on the information gathered in the Step 3 Initial Testing Program and Site 4 Site Classification, and taking into consideration the anticipated land use (vacant, adjacent to fishing sheds (Lower Site)), the following work plan is recommended to further delineate and characterize the APECs and to further refine and prioritize the contaminant risk to:

- Additional data gathering including:
  - Interviews with seasonal residents (if possible) at Cut Throat Island, to determine the source of drinking water in the area (groundwater, surface water, and/or off-island source). As the USAF used surface water for drinking, current use of surface water for potable purposes has not been ruled out.
- Additional field data gathering including:
  - Supplemental background soil sampling to determine background conditions outside the influence of the former Site activities.
  - Collecting surface and subsurface (if applicable) soil samples, sediment samples, and surface water samples to delineate the extent of the identified contaminants; and
  - Geophysical survey of landfills (suspected and confirmed) to determine the volume of debris.
- Complete data analysis and evaluation:
  - Analysis of the degree of contamination on the Site (compare data to applicable pathway specific provincial and federal guidelines for human health and ecological health);
  - Refine/update the preliminary assessment of exposure pathways (Human Health and Ecological Conceptual Site Models (CSMs));
  - Update the DND Environmental GIS Data Template with all data collected as part of the mandate;
  - Determine the need for additional environmental site assessment and/or risk assessment work (if any); and
  - Identifying any management actions that may be necessary.
- Complete the FACS Step 6 Site Re-Classification using the CCME NCSCS.

A cost estimate to complete the Step 5 Detailed Testing Program is provided under separate cover. Actual costs to complete additional phases of work at the Site will be dictated by Site conditions, the scope of the programs completed, and market values (for professional fees, analytical testing and transportation) at the time the work is completed.

## 11.0 CLOSURE

The information and conclusions presented represent the best technical judgment of GEMTEC Consulting Engineers and Scientists Limited based on current engineering and scientific practices and environmental standards at the time the work was performed. The conclusions are based on the Site conditions encountered at the time the work was performed at the sampling locations, and can only be extrapolated to an undefined limited area around these locations. Soil and groundwater conditions including Site history will dictate the extent of the limited area. In addition, analysis was only performed for a limited number of chemical parameters and media, and it should not be inferred that other chemical compounds are not present on the Site. Due to the nature of the investigation and to the limited data available, GEMTEC Consulting Engineers and Scientists Limited cannot warrant against undiscovered environmental liabilities.

Should additional information become available, GEMTEC Consulting Engineers and Scientists Limited requests that this information be brought to our attention so that we may re-assess the conclusions presented herein. This report was prepared by Melanie Langille, M.Env.Sc. and Shaun Pelkey, M.Sc.E, P.Eng., and was reviewed by Abigail Garnett, M.Sc.Eng., P.Eng. and Steve Livingstone, M.Sc., P.Geo. on behalf of GEMTEC Consulting Engineers and Scientists Limited.

Shaun Pelkey, M.Sc.E., P.Eng.
Senior Environmental Engineer

Melanie Langille, M.Env.Sc.
Environmental Scientist

Steve Livingstone, M.Sc., P.Geo.
Senior Environmental Geoscientist

Abigail Garnett, M.Sc.Eng., P.Eng
Senior Environmental Engineer /
Hydrogeologist

## 12.0 REFERENCES


AECOM. 2013. Hydrogeology of Labrador. Prepared for the Government of Newfoundland and Labrador, Department of Environment and Conservation – Water Resources Management Division. March, 2013.

Alberta Environment Tier I Soil Remediation Guidelines (AENV, 2016).

Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (Atlantic PIRI). 2012 with 2015 updates. Atlantic RBCA (Risk-Based Correction Action) for Petroleum Impacted Sites in Atlantic Canada. Version 3. User Guidance.

Canadian Council of Ecological Areas (CCEA). 2018. Conservation Areas Reporting and Tracking System (CARTS) online database. Accessed at http://www.ccea.org/carts/ January 2018.

Canadian Council of Ministers of the Environment (CCME). 2006. A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines.

Canadian Council of Ministers of the Environment (CCME). 2008a. Canada-Wide Standard for Petroleum Hydrocarbons in Soil.

Canadian Council of Ministers of the Environment (CCME). 2008b. National Classification System for Contaminated Sites. Guidance Document.

Canadian Council of Ministers of the Environment (CCME). 1999 with updates obtained from the online database http://ceqg-rcqe.ccme.ca/en/index.html in September 2017. Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health.

Contaminated Sites Management Working Group. 1999. A Federal Approach to Contaminated Sites.

Defence Construction Canada. 2017. Statement of Work. Initial Testing Program and NCSCS Classification. Two Former Pinetree Line Radar Stations, One Former Weather Station, Labrador. DCC Project Number: NL17AS01. Dated June 2017.

Environment Canada. 2018. Canadian Climate Normals. http://climate.weather.gc.ca/climate_normals/. Accessed online: May, 2018.

Fulton, R.J. 1986. Surficial geology, Cartwright, Labrador, Newfoundland, Geological Survey of Canada, Map 1620A, Scale 1:500,000.

GEMTEC Consulting Engineers and Scientist Limited (GEMTEC). 2017. Proposed Work Plan. Step 3 Initial Testing Program. Two Former Pinetree Line Radar Stations, One Former Weather Station, Labrador. DCC Project Number: NL17AS01. Dated August 22, 2017.

GHD Limited (GHD). 2016. Phase I Environmental Site Assessment. Former United States Military Site. Cut Throat Island, NL. Prepared for the Department of Environment and Conservation (Newfoundland and Labrador).

Government of Newfoundland and Labrador, Mineral Development Division, Department of Mines and Energy. 1986. Based on Geology by C.F. Gower, T. A. Nostrand, G. McRoberts, L. Crisby and S. Prevec, 1985.

C.F. Gower. 1979. Geology on northside of Groswater Bay. Geology of remainder of area by C.F. Gower, N. Noel and R.T. Gillispie, 1980. Data from Stevenson (1970; G.S.C. Paper 69-48) have also been incorporated into the map.

Ecological Stratification Working Group (ESWG) 1996. Ecoregions of Labrador. Accessed from: http://www.heritage.nf.ca/environment/ecoregionas_lab.html#maplab.

Government of Canada. 2015. Federal Contaminated Sites Action Plan (FCSAP). Guidance Document of Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites.

Health Canada. 2010. Federal Contaminated Site Risk Assessment in Canada. Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 2.0.

Health Canada. 2008. Guidance Manual for Environmental Site Characterization in Support of Human Health Risk Assessment. Volume 1 Technical Guidance.

Klassen, R.A., Paradis, S., Bolduc, A.M., and Thomas, R.D., 1992. Glacial Landforms and Deposits, Labrador, Newfoundland and eastern Quebec. Geological Survey of Canada, Map 1814A, scale 1:1,000,000.

Natural Resources Canada. 1995. The National Atlas of Canada, 5th Edition. Canada Permafrost.

Natural Resources Canada. 2017. The Atlas of Canada – Toporama. Accessed online, November 2017.

Nova Scotia Environment: 2013. PRO:100. Notification of Contamination Protocol. Adopted by the Minister of Environment, Pursuant to the Contaminated Sites Regulations.

Ontario Ministry of the Environment (MOE) Soil Standards for Use under Part XV.1 of the Environmental Protection Act (OMOE, 2011).

Province of Newfoundland and Labrador. 2010. Environmental Standards for Construction and Demolition Waste Disposal Sites (GD-PPD-050.3).

Province of Newfoundland and Labrador. Fisheries and Land Resources. Species At Risk. Accessed online at https://www.flr.gov.nl.ca/wildlife/endangeredspecies/index.html in October, 2018.

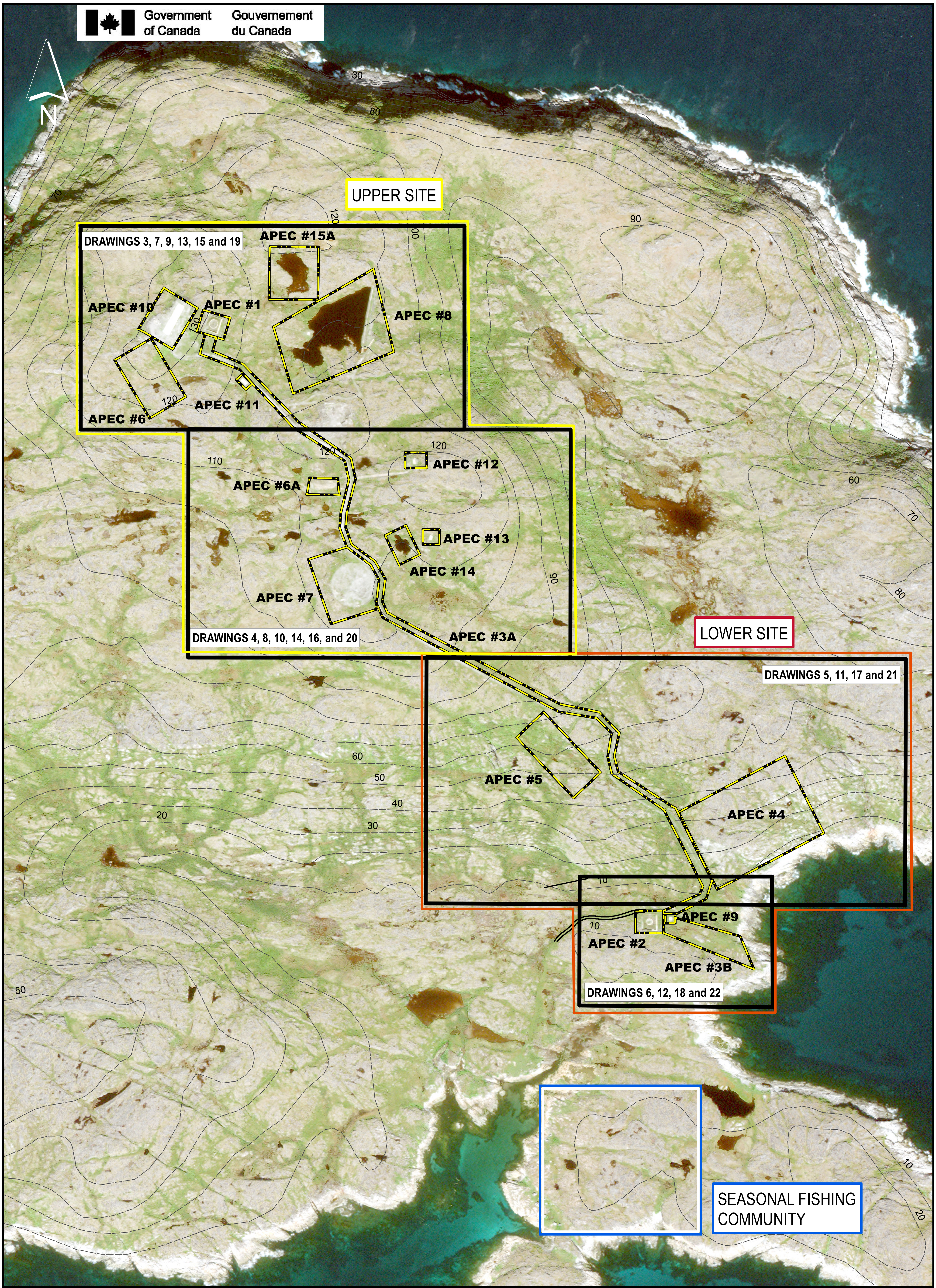
Province of Newfoundland and Labrador. 2012. Occupational Health and Safety Regulations, under the Occupational Health and Safety Act (O.C. 2012-005).

World Health Organization. 2006. The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds.

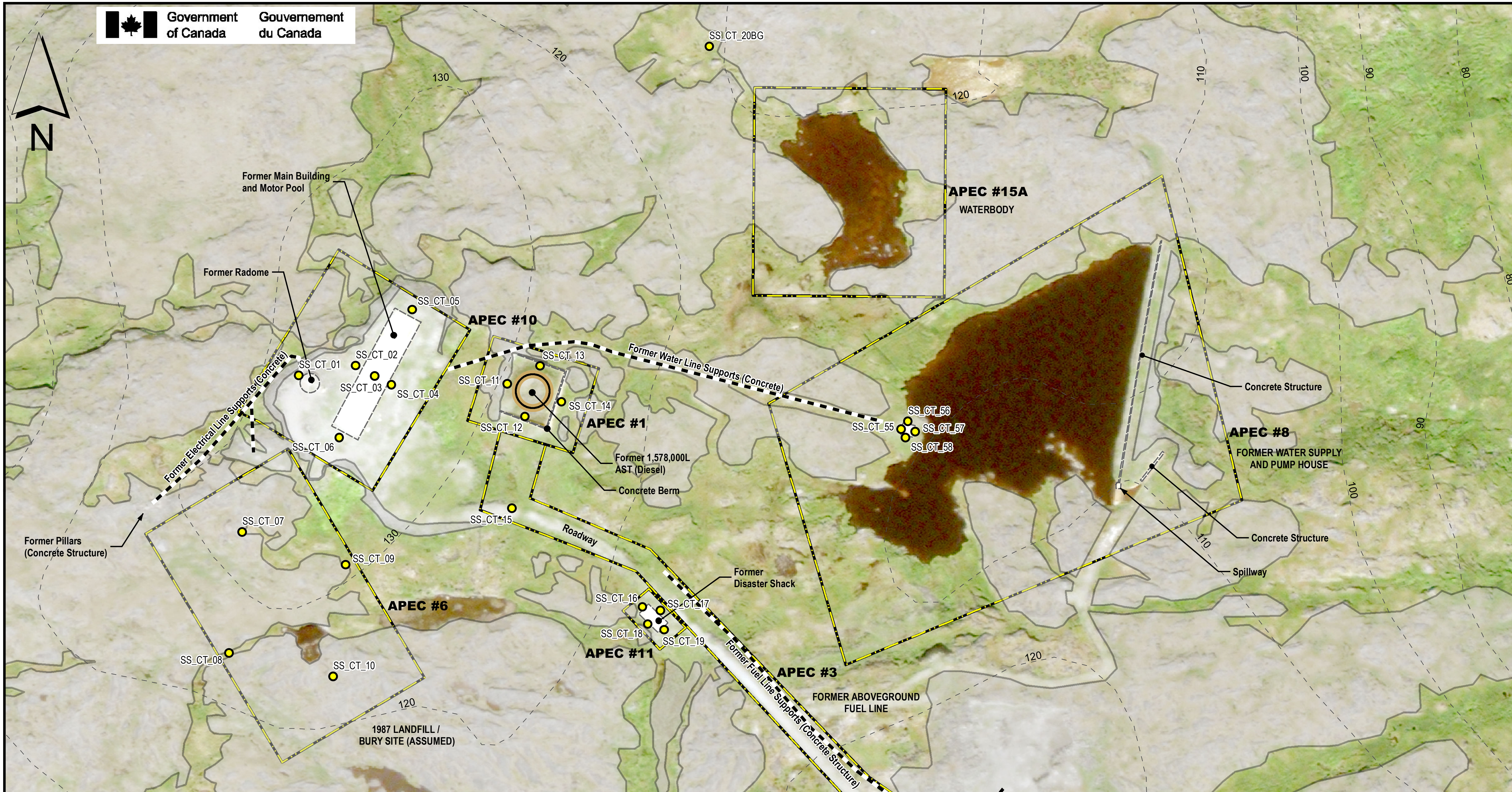
# APPENDIX A

Drawings


| | | | |
|---|---|---|---|
| PROJECT: PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINE TREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL. | APPROVED: APPROUVÉ PAR: | MC | |
| | | ML | |
| SUBJECT: SUJET: SITE LOCATION PLAN | SCALE: ÉCHELLE: | 1:50,000 | |
| | WBS NO.: NO. OTP: | NL17AS01 | |
| | PF NO.: NO. DP: | 65745 | |
| DATE: OCTOBER 2018 — GEMTEC Consulting Engineers and Scientists | DWG NO.: NO. DESSIN: | 10550.04.01 - Drawing 1 | |




| | | |
|---|---|---|
| Notes<br>Coordinate System: NAD_1983_CSRS_UTM_Zone_21N<br>WKID: 2962 Authority: EPSG<br>Contour source: Data extrated from "Geospatial Data Extraction" of Natural Resources Canada, Goverment of Canada. (http://maps.canada.ca/czs/index-en.html)<br>GEMTEC<br>Consulting Engineers and Scientists | PROJECT: PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.<br>SUBJECT: SUJET: SITE OVERVIEW<br>DATE: OCTOBER 2018 | APPROVED: APPROUVÉ PAR: MC / ML<br>SCALE: ÉCHELLE: 1:7,500<br>WBS NO.: NO. OTP: NL17AS01<br>PF NO.: NO. DP: 65745<br>DWG NO.: NO. DESSIN: 10550.04.01 - Drawing 2 |




Legend
- Surface Soil Sample
- Concrete Support
- Contour - 10m
- Concrete Structure
- Former Fuel Stores
- Former Barracks
- Rock
- APEC

0 12.5 25 50 Meters

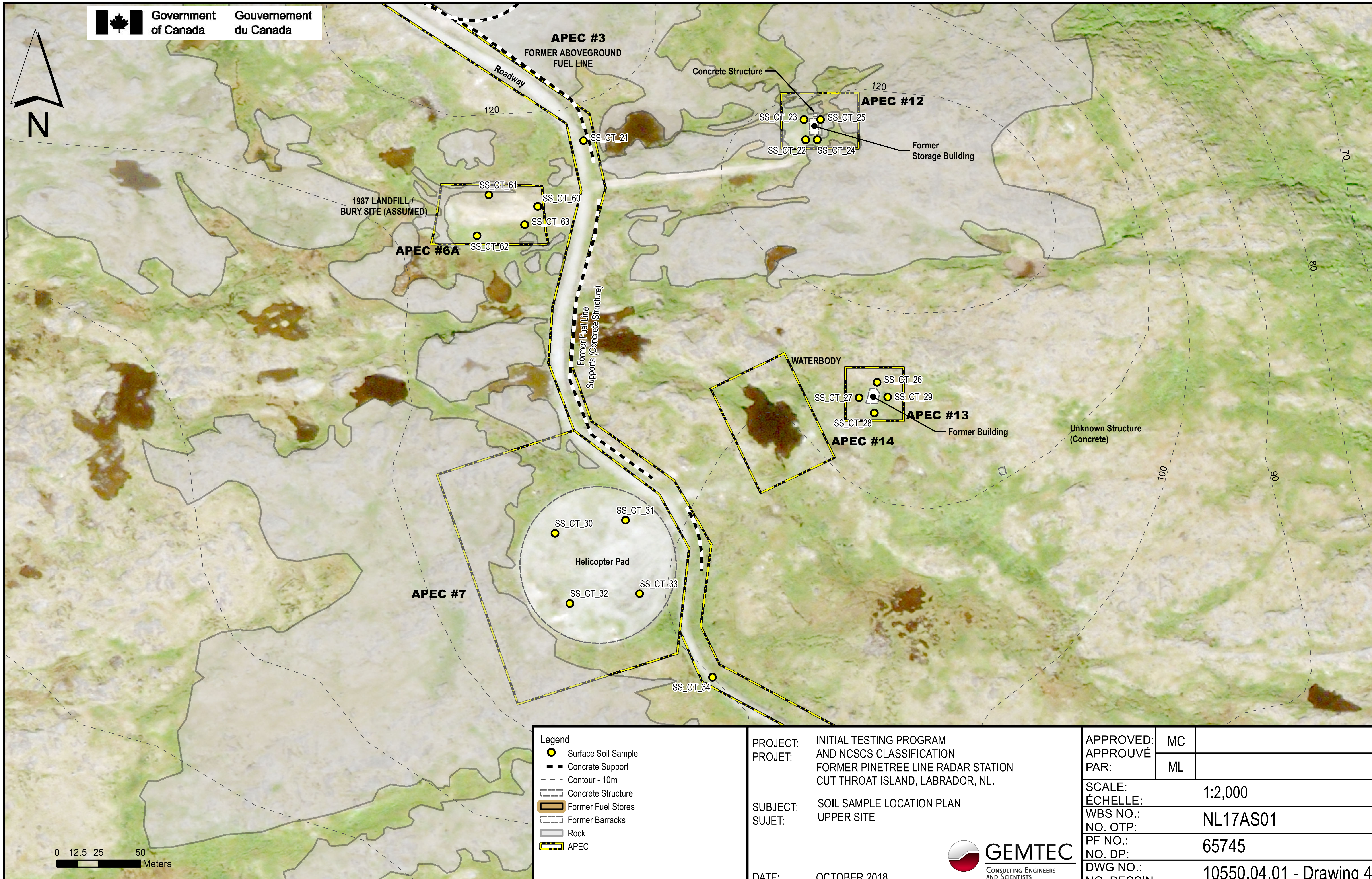
PROJECT: / PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.

SUBJECT: / SUJET: SOIL SAMPLE LOCATION PLAN UPPER SITE

DATE: OCTOBER 2018

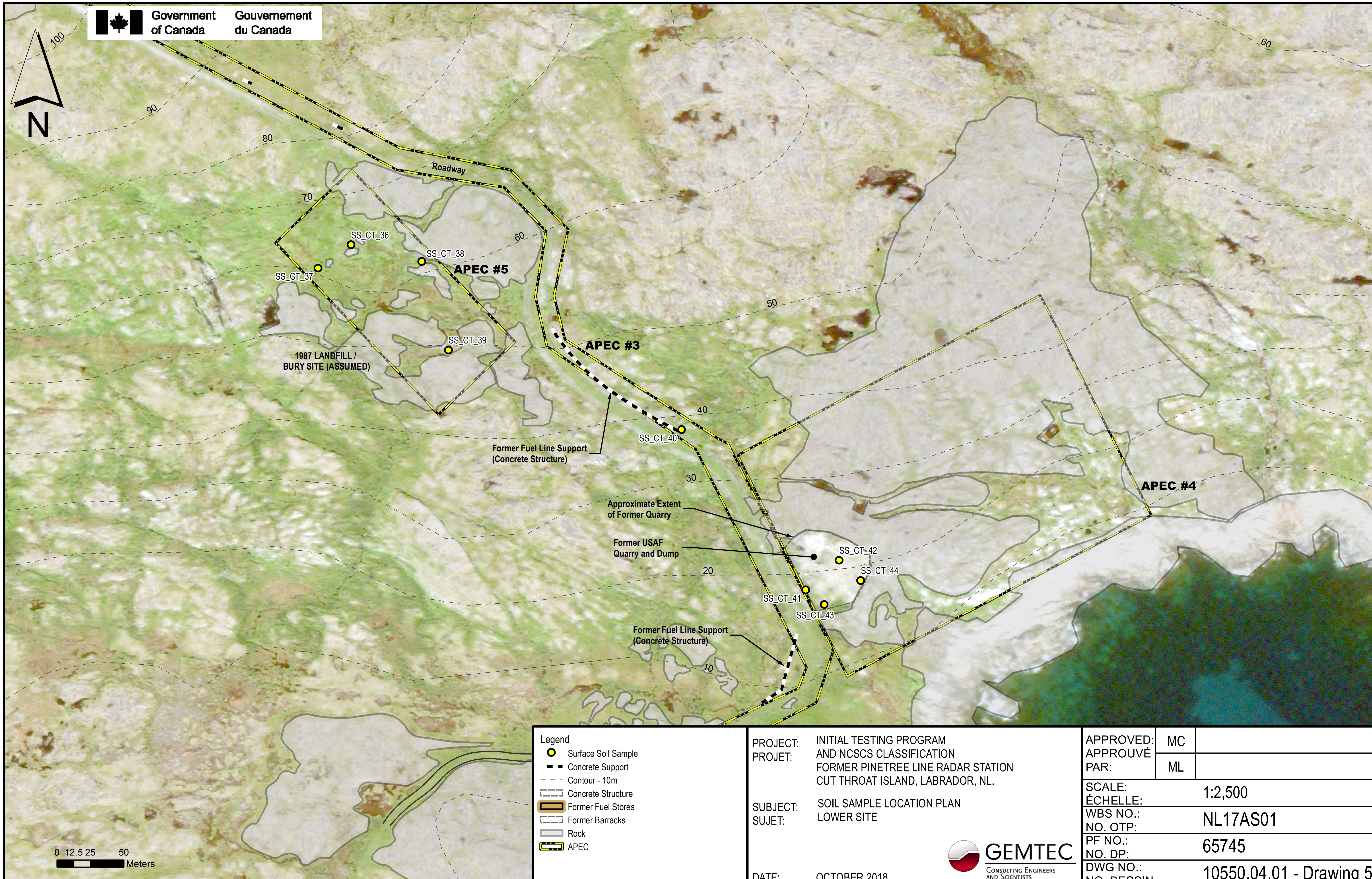
GEMTEC CONSULTING ENGINEERS AND SCIENTISTS

| | |
|---|---|
| APPROVED: / APPROUVÉ PAR: | MC |
| | ML |
| SCALE: / ÉCHELLE: | 1:2,000 |
| WBS NO.: / NO. OTP: | NL17AS01 |
| PF NO.: / NO. DP: | 65745 |
| DWG NO.: / NO. DESSIN: | 10550.04.01 - Drawing 3 |

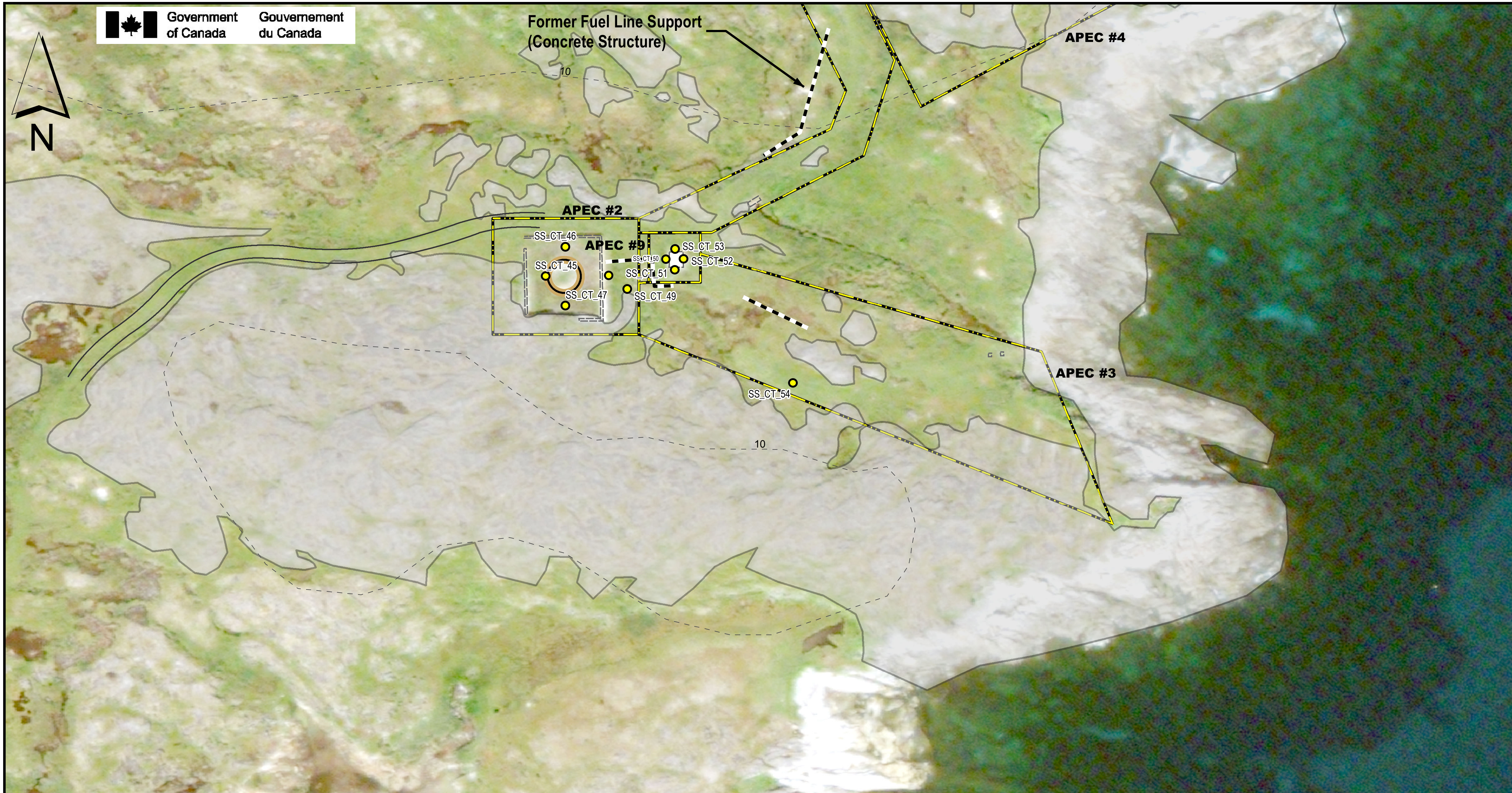



Legend
- Surface Soil Sample
- Concrete Support
- Contour - 10m
- Concrete Structure
- Former Fuel Stores
- Former Barracks
- Rock
- APEC

| | | | |
|---|---|---|---|
| PROJECT: PROJET: | INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL. | APPROVED: APPROUVÉ PAR: | MC |
| | | | ML |
| SUBJECT: SUJET: | SOIL SAMPLE LOCATION PLAN UPPER SITE | SCALE: ÉCHELLE: | 1:2,000 |
| | | WBS NO.: NO. OTP: | NL17AS01 |
| | GEMTEC Consulting Engineers and Scientists | PF NO.: NO. DP: | 65745 |
| DATE: | OCTOBER 2018 | DWG NO.: NO. DESSIN: | 10550.04.01 - Drawing 4 |



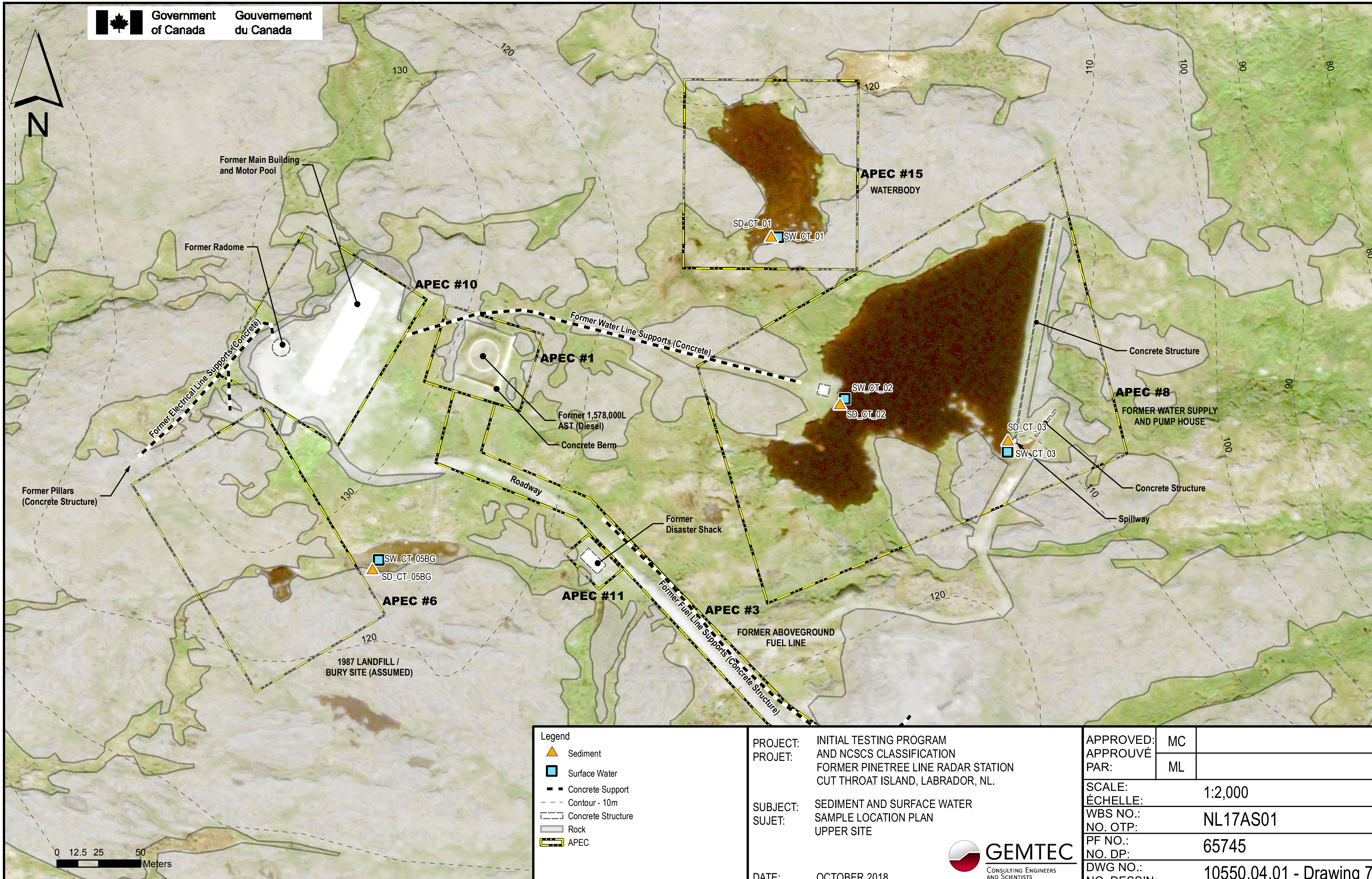

| | | | |
|---|---|---|---|
| PROJECT: PROJET: | INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL. | APPROVED: APPROUVÉ PAR: | MC / ML |
| SUBJECT: SUJET: | SOIL SAMPLE LOCATION PLAN LOWER SITE | SCALE: ÉCHELLE: | 1:2,500 |
| | | WBS NO.: NO. OTP: | NL17AS01 |
| | GEMTEC Consulting Engineers and Scientists | PF NO.: NO. DP: | 65745 |
| DATE: | OCTOBER 2018 | DWG NO.: NO. DESSIN: | 10550.04.01 - Drawing 5 |



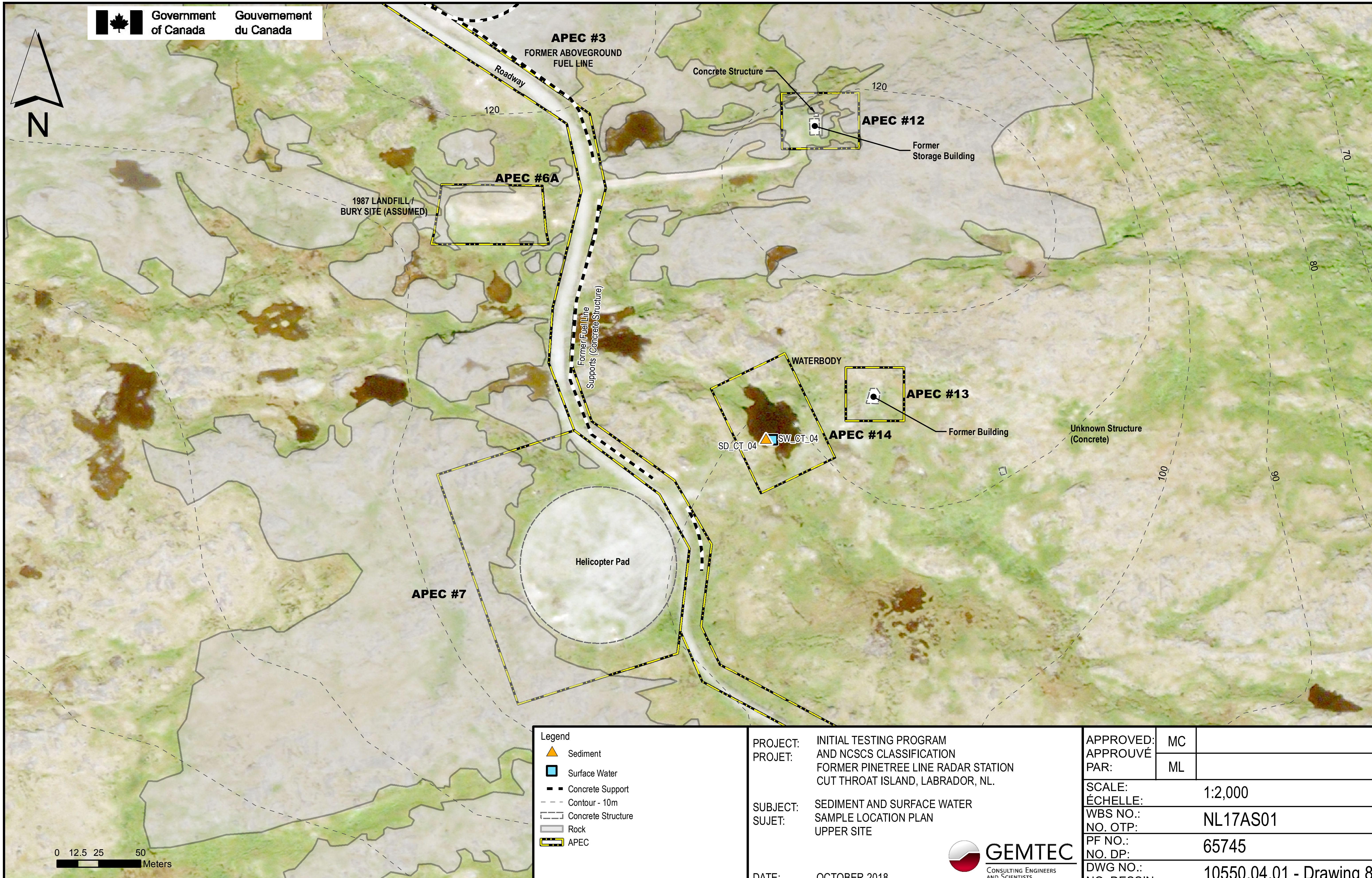

| | |
|---|---|
| PROJECT: PROJET: | INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL. |
| SUBJECT: SUJET: | SOIL SAMPLE LOCATION PLAN LOWER SITE |
| DATE: | OCTOBER 2018 |

GEMTEC Consulting Engineers and Scientists

| | |
|---|---|
| APPROVED: APPROUVÉ PAR: | MC |
| | ML |
| SCALE: ÉCHELLE: | 1:1,500 |
| WBS NO.: NO. OTP: | NL17AS01 |
| PF NO.: NO. DP: | 65745 |
| DWG NO.: NO. DESSIN: | 10550.04.01 - Drawing 6 |




| | | | |
|---|---|---|---|
| PROJECT: PROJET: | INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL. | APPROVED: APPROUVÉ PAR: | MC / ML |
| SUBJECT: SUJET: | SEDIMENT AND SURFACE WATER SAMPLE LOCATION PLAN UPPER SITE | SCALE: ÉCHELLE: | 1:2,000 |
| | | WBS NO.: NO. OTP: | NL17AS01 |
| | GEMTEC Consulting Engineers and Scientists | PF NO.: NO. DP: | 65745 |
| DATE: | OCTOBER 2018 | DWG NO.: NO. DESSIN: | 10550.04.01 - Drawing 7 |




Legend
- Sediment
- Surface Water
- Concrete Support
- Contour - 10m
- Concrete Structure
- Rock
- APEC

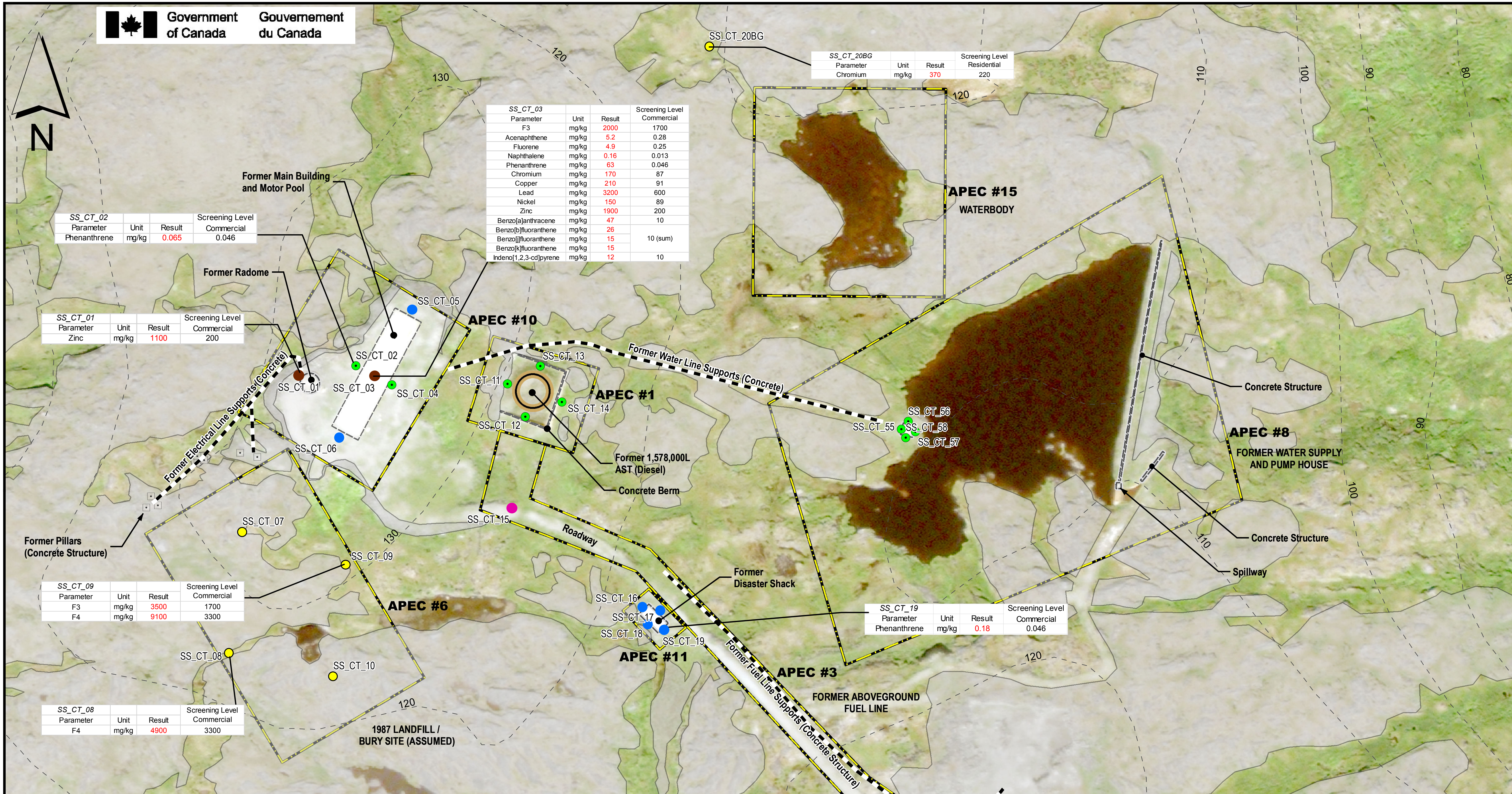
PROJECT: / PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.

SUBJECT: / SUJET: SEDIMENT AND SURFACE WATER SAMPLE LOCATION PLAN UPPER SITE

DATE: OCTOBER 2018

GEMTEC Consulting Engineers and Scientists

| | | |
|---|---|---|
| APPROVED: APPROUVÉ PAR: | MC | |
| | ML | |
| SCALE: ÉCHELLE: | 1:2,000 | |
| WBS NO.: NO. OTP: | NL17AS01 | |
| PF NO.: NO. DP: | 65745 | |
| DWG NO.: NO. DESSIN: | 10550.04.01 - Drawing 8 | |




| SS_CT_20BG | | | Screening Level Residential |
|---|---|---|---|
| Parameter | Unit | Result | |
| Chromium | mg/kg | 370 | 220 |

| SS_CT_03 | | | Screening Level Commercial |
|---|---|---|---|
| Parameter | Unit | Result | |
| F3 | mg/kg | 2000 | 1700 |
| Acenaphthene | mg/kg | 5.2 | 0.28 |
| Fluorene | mg/kg | 4.9 | 0.25 |
| Naphthalene | mg/kg | 0.16 | 0.013 |
| Phenanthrene | mg/kg | 63 | 0.046 |
| Chromium | mg/kg | 170 | 87 |
| Copper | mg/kg | 210 | 91 |
| Lead | mg/kg | 3200 | 600 |
| Nickel | mg/kg | 150 | 89 |
| Zinc | mg/kg | 1900 | 200 |
| Benzo[a]anthracene | mg/kg | 47 | 10 |
| Benzo[b]fluoranthene | mg/kg | 26 | 10 (sum) |
| Benzo[j]fluoranthene | mg/kg | 15 | |
| Benzo[k]fluoranthene | mg/kg | 15 | |
| Indeno[1,2,3-cd]pyrene | mg/kg | 12 | 10 |

| SS_CT_02 | | | Screening Level Commercial |
|---|---|---|---|
| Parameter | Unit | Result | |
| Phenanthrene | mg/kg | 0.065 | 0.046 |

| SS_CT_01 | | | Screening Level Commercial |
|---|---|---|---|
| Parameter | Unit | Result | |
| Zinc | mg/kg | 1100 | 200 |

| SS_CT_09 | | | Screening Level Commercial |
|---|---|---|---|
| Parameter | Unit | Result | |
| F3 | mg/kg | 3500 | 1700 |
| F4 | mg/kg | 9100 | 3300 |

| SS_CT_08 | | | Screening Level Commercial |
|---|---|---|---|
| Parameter | Unit | Result | |
| F4 | mg/kg | 4900 | 3300 |

| SS_CT_19 | | | Screening Level Commercial |
|---|---|---|---|
| Parameter | Unit | Result | |
| Phenanthrene | mg/kg | 0.18 | 0.046 |

**Samples Analyzed For:**

- PHC
- PHC, PAH
- PHC, PAH, Metals
- PHC, PAH, Metals, VOCs
- PHC, PAH, Metals, PCBs

Red Text = Exceedance

**Legend**

- Pillars
- Concrete Structure
- Contour - 10m
- Bedrock
- Former Barracks
- Former Fuel Stores
- Concrete Structure
- APEC

*Residential guidelines have been applied to areas where human activity may be prevalent. Otherwise, commercial guidelines have been applied.
** If there was an exceedance of a sample or related field duplicate, the higher value was taken
*** Samples taken at 0.0 - 0.05 m, unless otherwise indicated

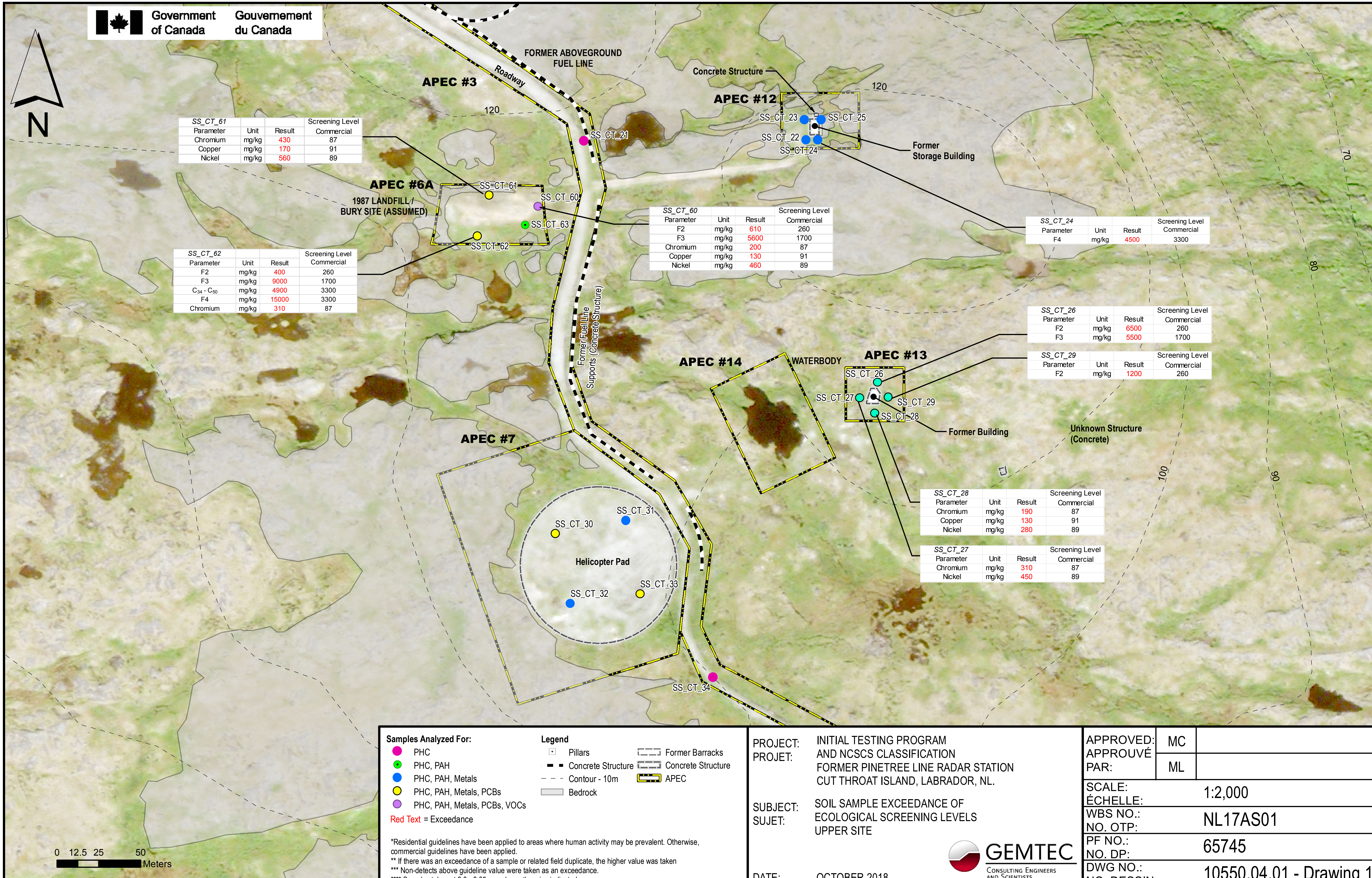
PROJECT: / PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.

SUBJECT: / SUJET: SOIL SAMPLE EXCEEDANCE OF ECOLOGICAL SCREENING LEVELS UPPER SITE

DATE: OCTOBER 2018

GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

| | | |
|---|---|---|
| APPROVED: / APPROUVÉ PAR: | MC | |
| | ML | |
| SCALE: / ÉCHELLE: | 1:2,000 | |
| WBS NO.: / NO. OTP: | NL17AS01 | |
| PF NO.: / NO. DP: | 65745 | |
| DWG NO.: / NO. DESSIN: | 10550.04.01 - Drawing 9 | |




| SS_CT_61 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| Chromium | mg/kg | 430 | 87 |
| Copper | mg/kg | 170 | 91 |
| Nickel | mg/kg | 560 | 89 |

| SS_CT_62 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| F2 | mg/kg | 400 | 260 |
| F3 | mg/kg | 9000 | 1700 |
| $C_{34}$ - $C_{50}$ | mg/kg | 4900 | 3300 |
| F4 | mg/kg | 15000 | 3300 |
| Chromium | mg/kg | 310 | 87 |

| SS_CT_60 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| F2 | mg/kg | 610 | 260 |
| F3 | mg/kg | 5600 | 1700 |
| Chromium | mg/kg | 200 | 87 |
| Copper | mg/kg | 130 | 91 |
| Nickel | mg/kg | 460 | 89 |

| SS_CT_24 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| F4 | mg/kg | 4500 | 3300 |

| SS_CT_26 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| F2 | mg/kg | 6500 | 260 |
| F3 | mg/kg | 5500 | 1700 |

| SS_CT_29 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| F2 | mg/kg | 1200 | 260 |

| SS_CT_28 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| Chromium | mg/kg | 190 | 87 |
| Copper | mg/kg | 130 | 91 |
| Nickel | mg/kg | 280 | 89 |

| SS_CT_27 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| Chromium | mg/kg | 310 | 87 |
| Nickel | mg/kg | 450 | 89 |

**Samples Analyzed For:**
- PHC
- PHC, PAH
- PHC, PAH, Metals
- PHC, PAH, Metals, PCBs
- PHC, PAH, Metals, PCBs, VOCs

Red Text = Exceedance

**Legend**
- Pillars
- Concrete Structure
- Contour - 10m
- Bedrock
- Former Barracks
- Concrete Structure
- APEC

*Residential guidelines have been applied to areas where human activity may be prevalent. Otherwise, commercial guidelines have been applied.
** If there was an exceedance of a sample or related field duplicate, the higher value was taken
*** Non-detects above guideline value were taken as an exceedance.
**** Samples taken at 0.0 - 0.05 m, unless otherwise indicated

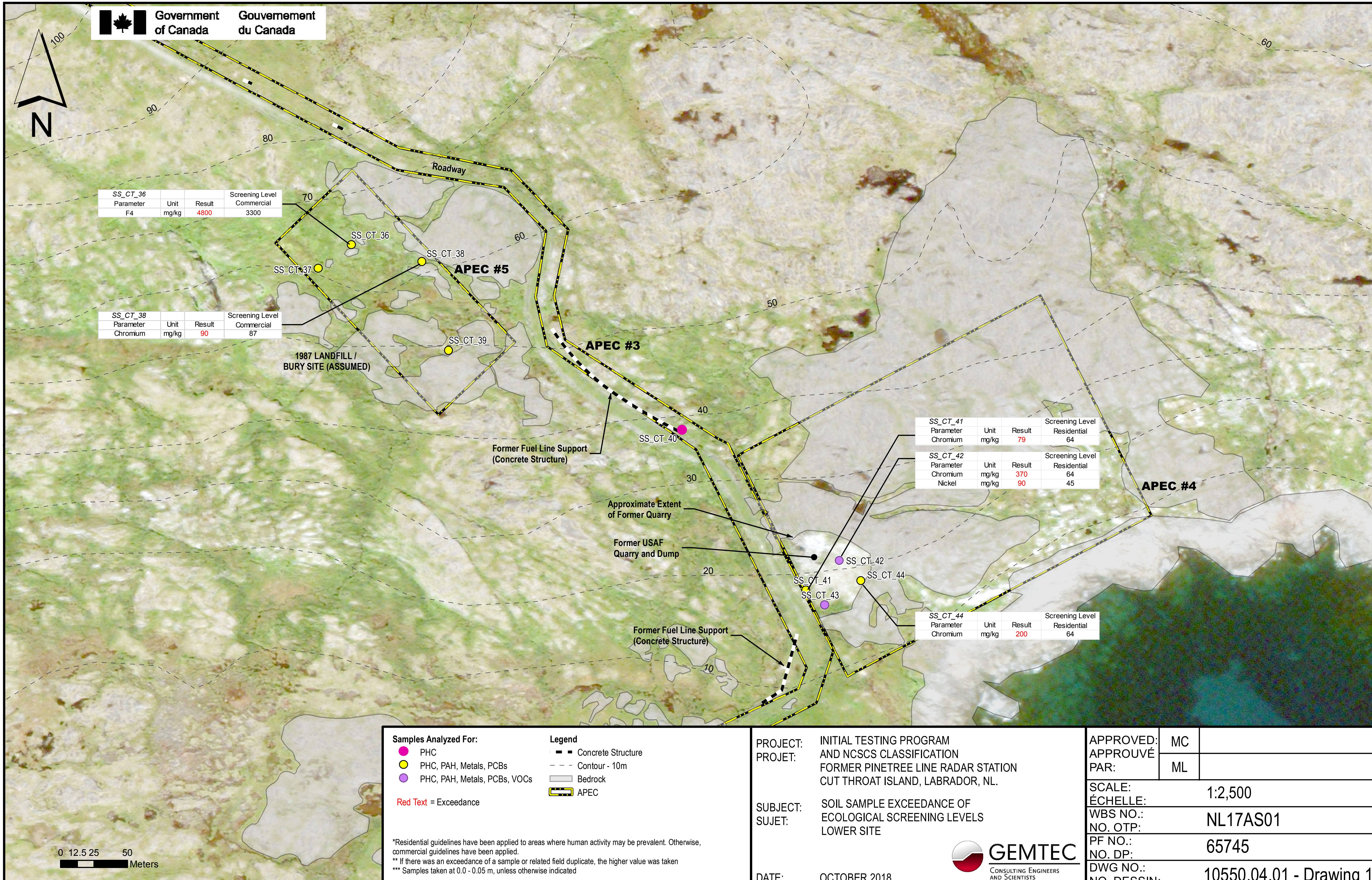
PROJECT: / PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.

SUBJECT: / SUJET: SOIL SAMPLE EXCEEDANCE OF ECOLOGICAL SCREENING LEVELS UPPER SITE

DATE: OCTOBER 2018

GEMTEC
Consulting Engineers and Scientists

| | |
|---|---|
| APPROVED: APPROUVÉ PAR: | MC |
| | ML |
| SCALE: ÉCHELLE: | 1:2,000 |
| WBS NO.: NO. OTP: | NL17AS01 |
| PF NO.: NO. DP: | 65745 |
| DWG NO.: NO. DESSIN: | 10550.04.01 - Drawing 10 |




**Samples Analyzed For:**

- PHC
- PHC, PAH, Metals, PCBs
- PHC, PAH, Metals, PCBs, VOCs

Red Text = Exceedance

**Legend**

- Concrete Structure
- Contour - 10m
- Bedrock
- APEC

*Residential guidelines have been applied to areas where human activity may be prevalent. Otherwise, commercial guidelines have been applied.
** If there was an exceedance of a sample or related field duplicate, the higher value was taken
*** Samples taken at 0.0 - 0.05 m, unless otherwise indicated

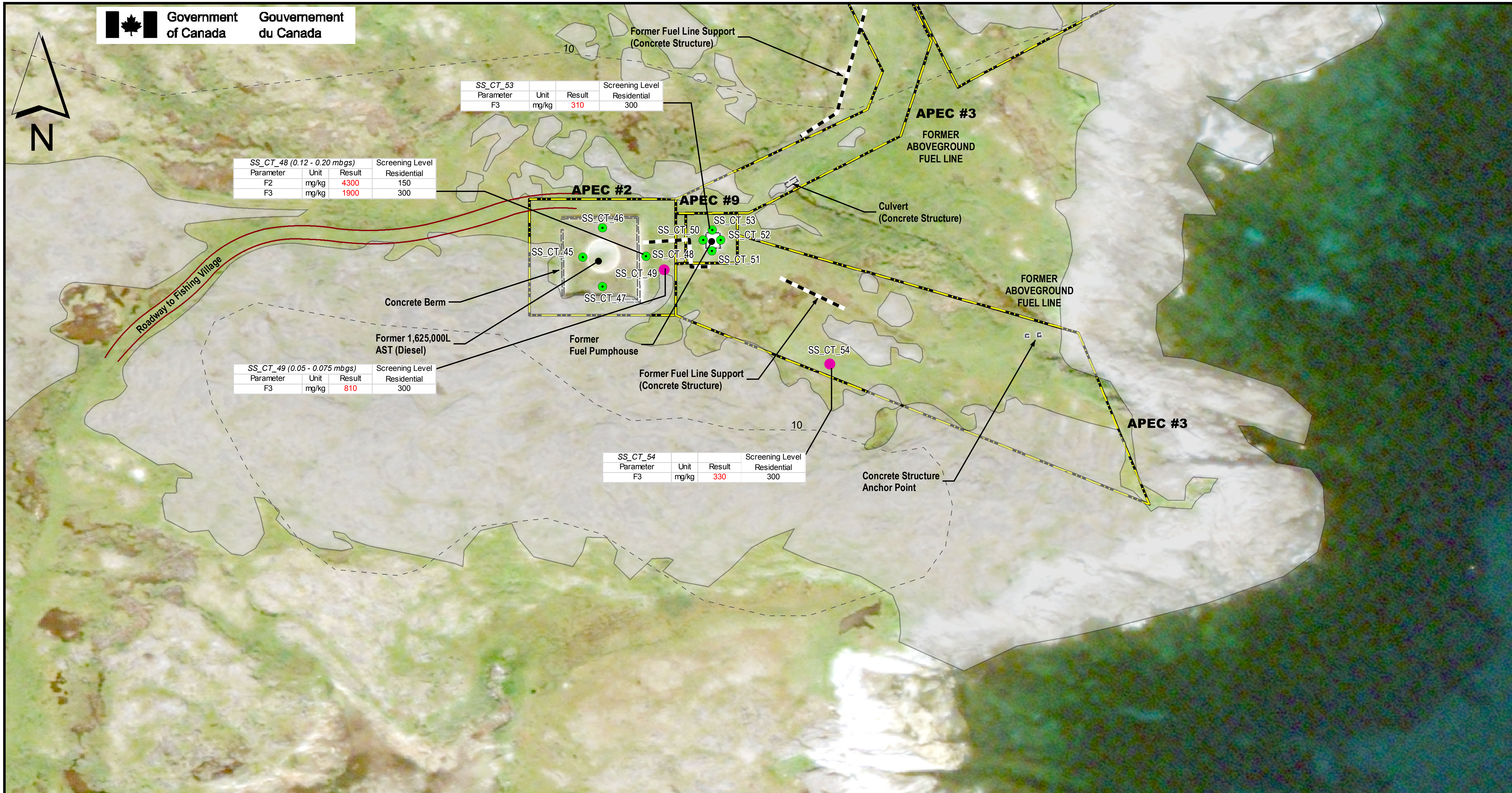
PROJECT: / PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.

SUBJECT: / SUJET: SOIL SAMPLE EXCEEDANCE OF ECOLOGICAL SCREENING LEVELS LOWER SITE

DATE: OCTOBER 2018

GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

| | |
|---|---|
| APPROVED: / APPROUVÉ PAR: | MC |
| | ML |
| SCALE: / ÉCHELLE: | 1:2,500 |
| WBS NO.: / NO. OTP: | NL17AS01 |
| PF NO.: / NO. DP: | 65745 |
| DWG NO.: / NO. DESSIN: | 10550.04.01 - Drawing 11 |




| SS_CT_53 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Residential |
| F3 | mg/kg | 310 | 300 |

| SS_CT_48 (0.12 - 0.20 mbgs) | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Residential |
| F2 | mg/kg | 4300 | 150 |
| F3 | mg/kg | 1900 | 300 |

| SS_CT_49 (0.05 - 0.075 mbgs) | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Residential |
| F3 | mg/kg | 810 | 300 |

| SS_CT_54 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Residential |
| F3 | mg/kg | 330 | 300 |

**Samples Analyzed For:**
- PHC
- PHC, PAH

Red Text = Exceedance

**Legend**
- Concrete Structure
- Contour - 10m
- Bedrock
- Former Barracks
- Concrete Structure
- APEC

*Residential guidelines have been applied to areas where human activity may be prevalent. Otherwise, commercial guidelines have been applied.
** If there was an exceedance of a sample or related field duplicate, the higher value was taken
*** Non-detects above guideline values were taken as an exceedance.
**** Samples taken at 0.0 - 0.05 m, unless otherwise indicated

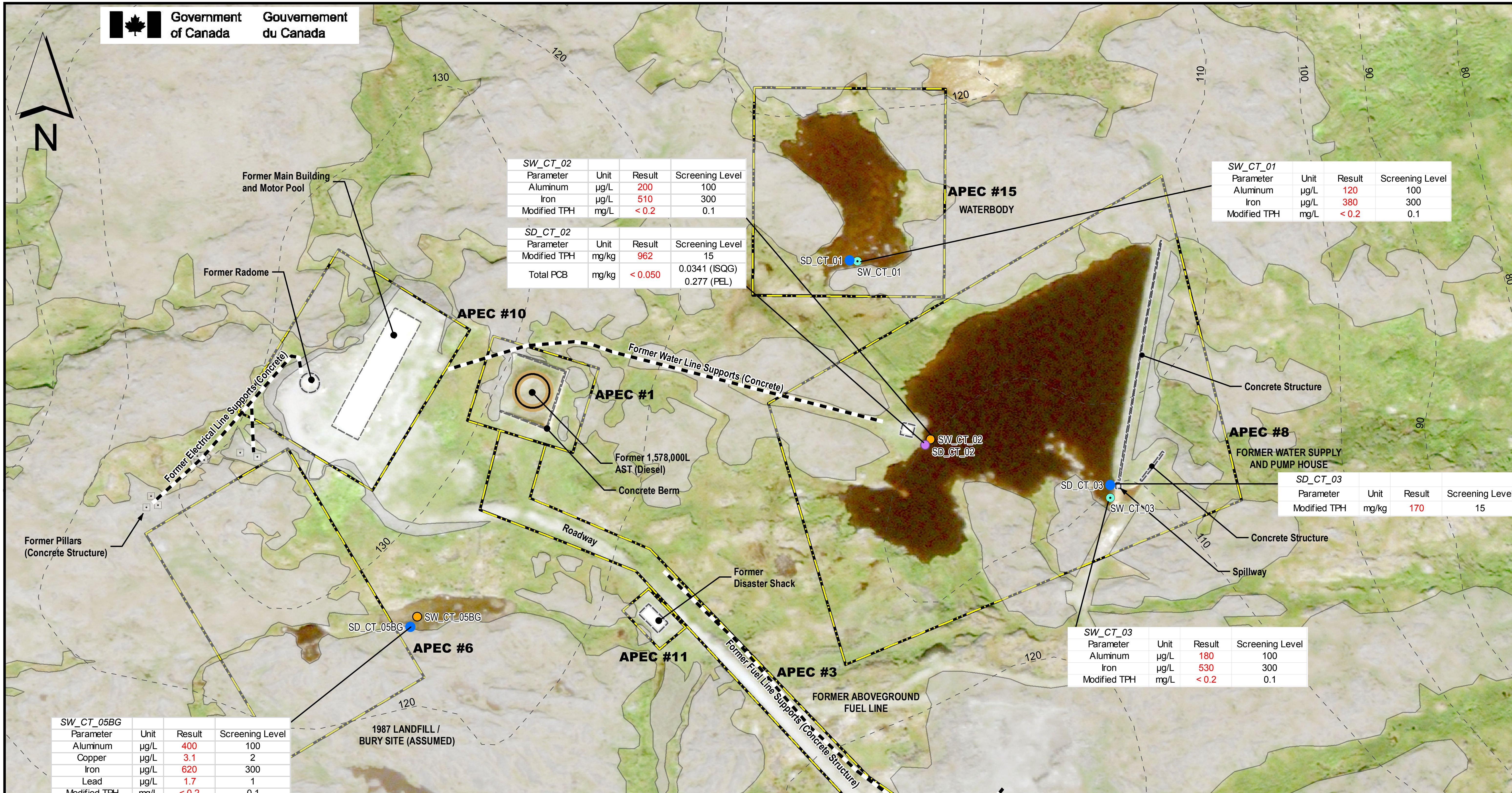
PROJECT: / PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.

SUBJECT: / SUJET: SOIL SAMPLE EXCEEDANCE OF ECOLOGICAL SCREENING LEVELS LOWER SITE

DATE: OCTOBER 2018

GEMTEC
Consulting Engineers and Scientists

| | | |
|---|---|---|
| APPROVED: / APPROUVÉ PAR: | MC | |
| | ML | |
| SCALE: / ÉCHELLE: | 1:1,500 | |
| WBS NO.: / NO. OTP: | NL17AS01 | |
| PF NO.: / NO. DP: | 65745 | |
| DWG NO.: / NO. DESSIN: | 10550.04.01 - Drawing 12 | |




| *SW_CT_02* | | | |
|---|---|---|---|
| Parameter | Unit | Result | Screening Level |
| Aluminum | µg/L | 200 | 100 |
| Iron | µg/L | 510 | 300 |
| Modified TPH | mg/L | < 0.2 | 0.1 |

| *SD_CT_02* | | | |
|---|---|---|---|
| Parameter | Unit | Result | Screening Level |
| Modified TPH | mg/kg | 962 | 15 |
| Total PCB | mg/kg | < 0.050 | 0.0341 (ISQG)<br>0.277 (PEL) |

| *SW_CT_01* | | | |
|---|---|---|---|
| Parameter | Unit | Result | Screening Level |
| Aluminum | µg/L | 120 | 100 |
| Iron | µg/L | 380 | 300 |
| Modified TPH | mg/L | < 0.2 | 0.1 |

| *SD_CT_03* | | | |
|---|---|---|---|
| Parameter | Unit | Result | Screening Level |
| Modified TPH | mg/kg | 170 | 15 |

| *SW_CT_03* | | | |
|---|---|---|---|
| Parameter | Unit | Result | Screening Level |
| Aluminum | µg/L | 180 | 100 |
| Iron | µg/L | 530 | 300 |
| Modified TPH | mg/L | < 0.2 | 0.1 |

| *SW_CT_05BG* | | | |
|---|---|---|---|
| Parameter | Unit | Result | Screening Level |
| Aluminum | µg/L | 400 | 100 |
| Copper | µg/L | 3.1 | 2 |
| Iron | µg/L | 620 | 300 |
| Lead | µg/L | 1.7 | 1 |
| Modified TPH | mg/L | < 0.2 | 0.1 |

**Samples Analyzed For:**
- PHC, PAH, Metals
- PHC, PAH, Metals, PCBs, VOCs
- PHC, PAH, GenChem, Metals
- PHC, PAH, GenChem, Metals, PCB

Red Text = Exceedance

**Legend**
- Pillars
- Concrete Structure
- Contour - 10m
- Bedrock
- Former Barracks
- Former Fuel Stores
- Concrete Structure
- APEC

*Residential guidelines have been applied to areas where human activity may be prevalent. Otherwise, commercial guidelines have been applied.
** If there was an exceedance of a sample or related field duplicate, the higher value was taken
*** Non-detects above guideline values were taken as an exceedance.
**** Samples taken at 0.0 - 0.05 m, unless otherwise indicated

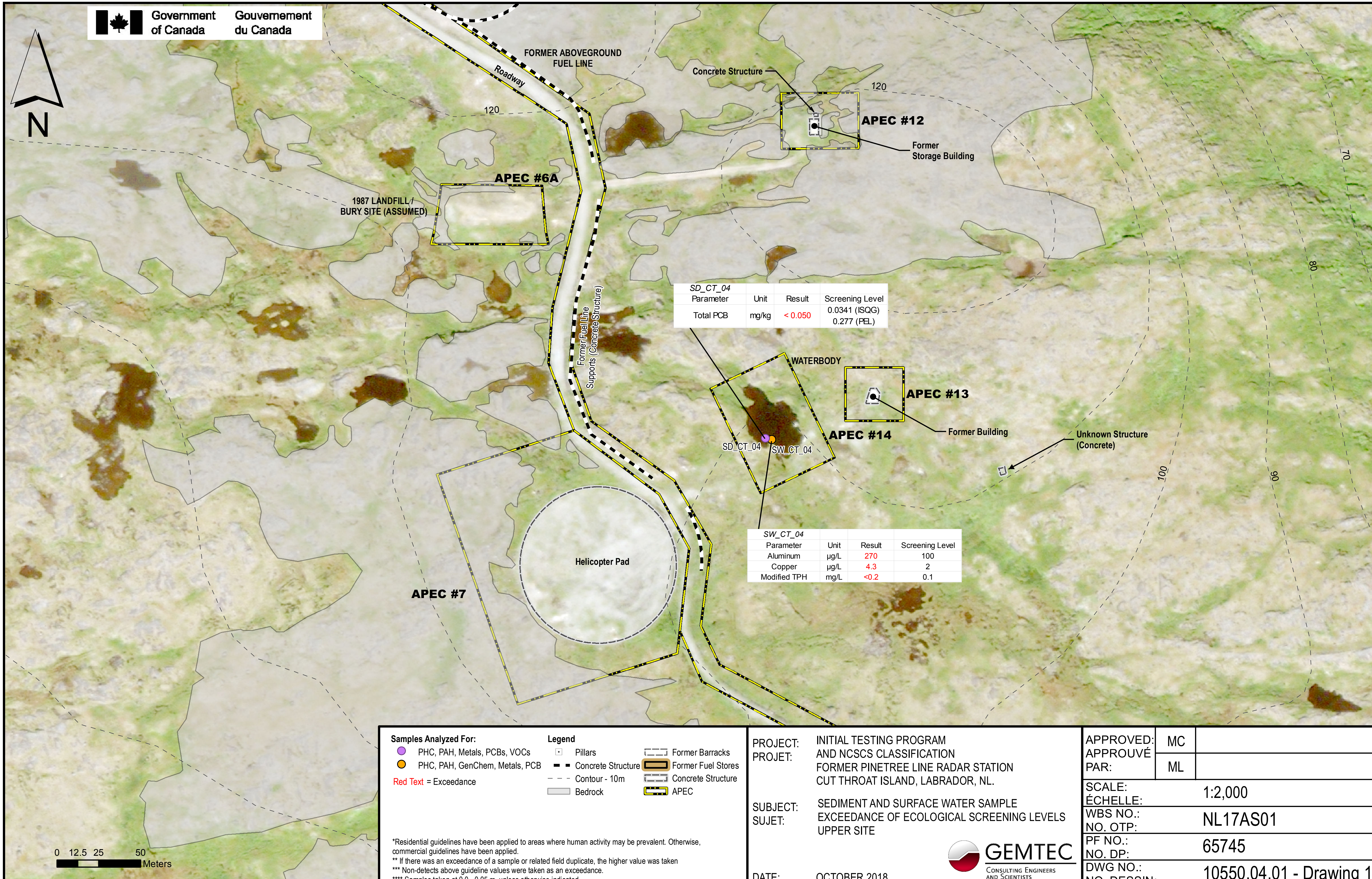
PROJECT: / PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.

SUBJECT: / SUJET: SEDIMENT AND SURFACE WATER SAMPLE EXCEEDANCE OF ECOLOGICAL SCREENING LEVELS UPPER SITE

DATE: OCTOBER 2018

GEMTEC
Consulting Engineers and Scientists

| | | |
|---|---|---|
| APPROVED: / APPROUVÉ PAR: | MC | |
| | ML | |
| SCALE: / ÉCHELLE: | 1:2,000 | |
| WBS NO.: / NO. OTP: | NL17AS01 | |
| PF NO.: / NO. DP: | 65745 | |
| DWG NO.: / NO. DESSIN: | 10550.04.01 - Drawing 13 | |




SD_CT_04

| Parameter | Unit | Result | Screening Level |
|---|---|---|---|
| Total PCB | mg/kg | < 0.050 | 0.0341 (ISQG)<br>0.277 (PEL) |

SW_CT_04

| Parameter | Unit | Result | Screening Level |
|---|---|---|---|
| Aluminum | µg/L | 270 | 100 |
| Copper | µg/L | 4.3 | 2 |
| Modified TPH | mg/L | <0.2 | 0.1 |

**Samples Analyzed For:**

- PHC, PAH, Metals, PCBs, VOCs
- PHC, PAH, GenChem, Metals, PCB

Red Text = Exceedance

**Legend**

- Pillars
- Concrete Structure
- Contour - 10m
- Bedrock
- Former Barracks
- Former Fuel Stores
- Concrete Structure
- APEC

*Residential guidelines have been applied to areas where human activity may be prevalent. Otherwise, commercial guidelines have been applied.
** If there was an exceedance of a sample or related field duplicate, the higher value was taken
*** Non-detects above guideline values were taken as an exceedance.
**** Samples taken at 0.0 - 0.05 m, unless otherwise indicated

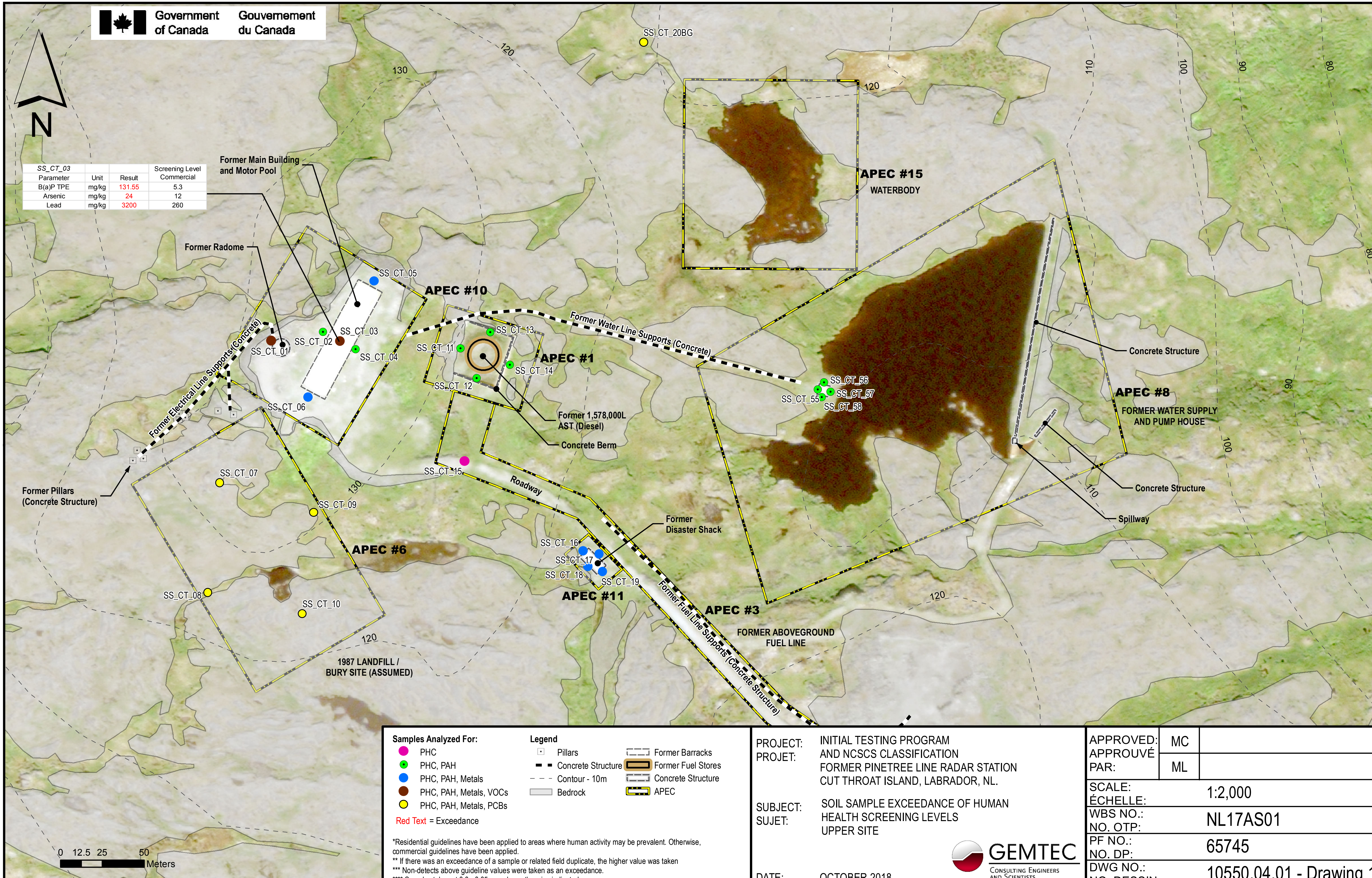
PROJECT: / PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.

SUBJECT: / SUJET: SEDIMENT AND SURFACE WATER SAMPLE EXCEEDANCE OF ECOLOGICAL SCREENING LEVELS UPPER SITE

DATE: OCTOBER 2018

GEMTEC
Consulting Engineers and Scientists

| | |
|---|---|
| APPROVED: / APPROUVÉ PAR: | MC<br>ML |
| SCALE: / ÉCHELLE: | 1:2,000 |
| WBS NO.: / NO. OTP: | NL17AS01 |
| PF NO.: / NO. DP: | 65745 |
| DWG NO.: / NO. DESSIN: | 10550.04.01 - Drawing 14 |




| SS_CT_03 | | | Screening Level Commercial |
|---|---|---|---|
| Parameter | Unit | Result | |
| B(a)P TPE | mg/kg | 131.55 | 5.3 |
| Arsenic | mg/kg | 24 | 12 |
| Lead | mg/kg | 3200 | 260 |

**Samples Analyzed For:**

- PHC
- PHC, PAH
- PHC, PAH, Metals
- PHC, PAH, Metals, VOCs
- PHC, PAH, Metals, PCBs

Red Text = Exceedance

**Legend**

- Pillars
- Concrete Structure
- Contour - 10m
- Bedrock
- Former Barracks
- Former Fuel Stores
- Concrete Structure
- APEC

*Residential guidelines have been applied to areas where human activity may be prevalent. Otherwise, commercial guidelines have been applied.
** If there was an exceedance of a sample or related field duplicate, the higher value was taken
*** Non-detects above guideline values were taken as an exceedance.
**** Samples taken at 0.0 - 0.05 m, unless otherwise indicated

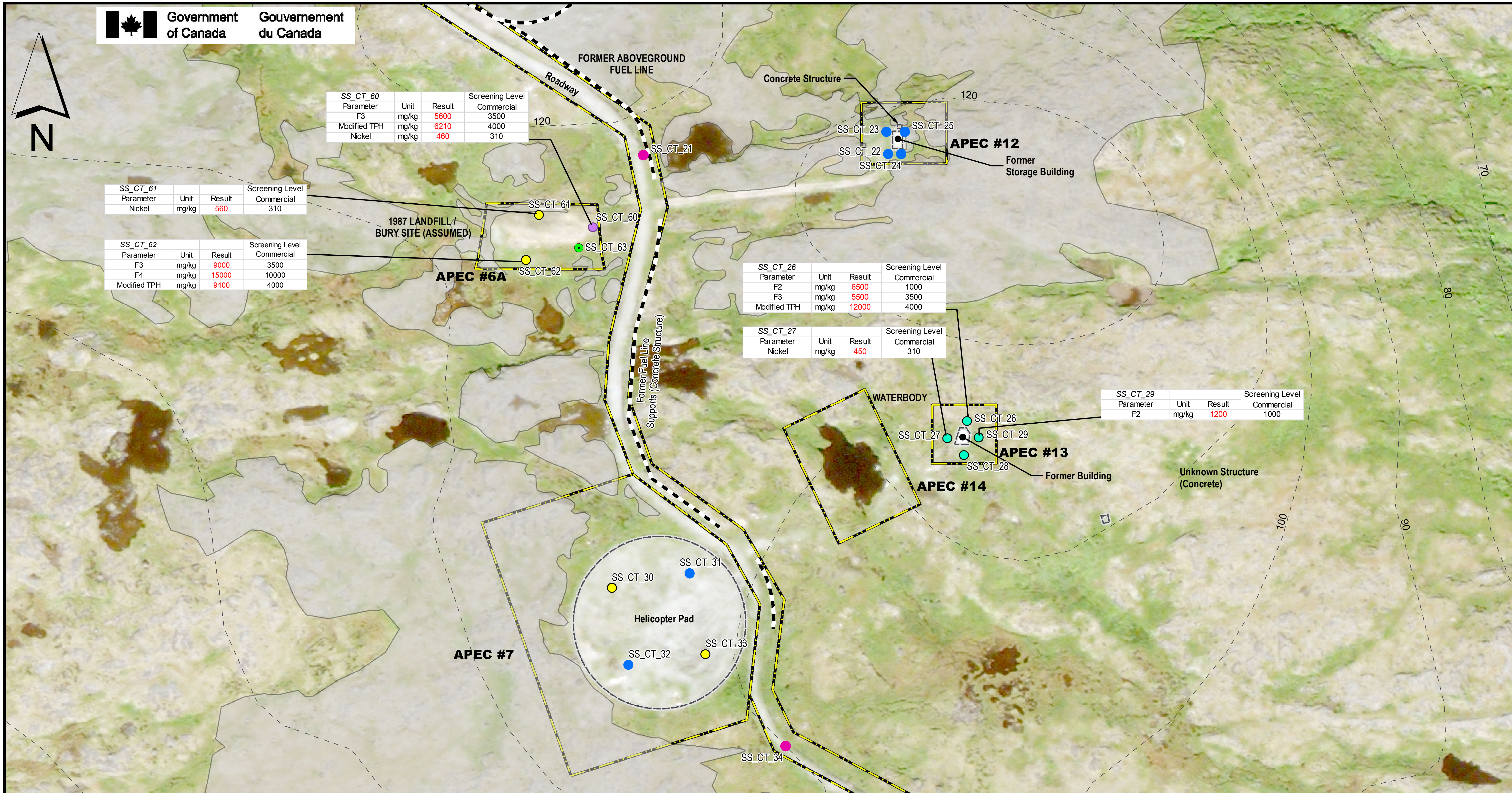
PROJECT: / PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.

SUBJECT: / SUJET: SOIL SAMPLE EXCEEDANCE OF HUMAN HEALTH SCREENING LEVELS UPPER SITE

DATE: OCTOBER 2018

GEMTEC
Consulting Engineers and Scientists

| | |
|---|---|
| APPROVED: / APPROUVÉ PAR: | MC |
| | ML |
| SCALE: / ÉCHELLE: | 1:2,000 |
| WBS NO.: / NO. OTP: | NL17AS01 |
| PF NO.: / NO. DP: | 65745 |
| DWG NO.: / NO. DESSIN: | 10550.04.01 - Drawing 15 |




| SS_CT_60 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| F3 | mg/kg | 5600 | 3500 |
| Modified TPH | mg/kg | 6210 | 4000 |
| Nickel | mg/kg | 460 | 310 |

| SS_CT_61 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| Nickel | mg/kg | 560 | 310 |

| SS_CT_62 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| F3 | mg/kg | 9000 | 3500 |
| F4 | mg/kg | 15000 | 10000 |
| Modified TPH | mg/kg | 9400 | 4000 |

| SS_CT_26 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| F2 | mg/kg | 6500 | 1000 |
| F3 | mg/kg | 5500 | 3500 |
| Modified TPH | mg/kg | 12000 | 4000 |

| SS_CT_27 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| Nickel | mg/kg | 450 | 310 |

| SS_CT_29 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Commercial |
| F2 | mg/kg | 1200 | 1000 |

**Samples Analyzed For:**
- PHC
- PHC, PAH
- PHC, PAH, Metals
- PHC, PAH, Metals, PCBs
- PHC, PAH, Metals, PCBs, VOCs

Red Text = Exceedance

**Legend**
- Pillars
- Concrete Structure
- Contour - 10m
- Bedrock
- Former Barracks
- Concrete Structure
- APEC

*Residential guidelines have been applied to areas where human activity may be prevalent. Otherwise, commercial guidelines have been applied.
** If there was an exceedance of a sample or related field duplicate, the higher value was taken
*** Non-detects above guideline values were taken as an exceedance.
**** Samples taken at 0.0 - 0.05 m, unless otherwise indicated

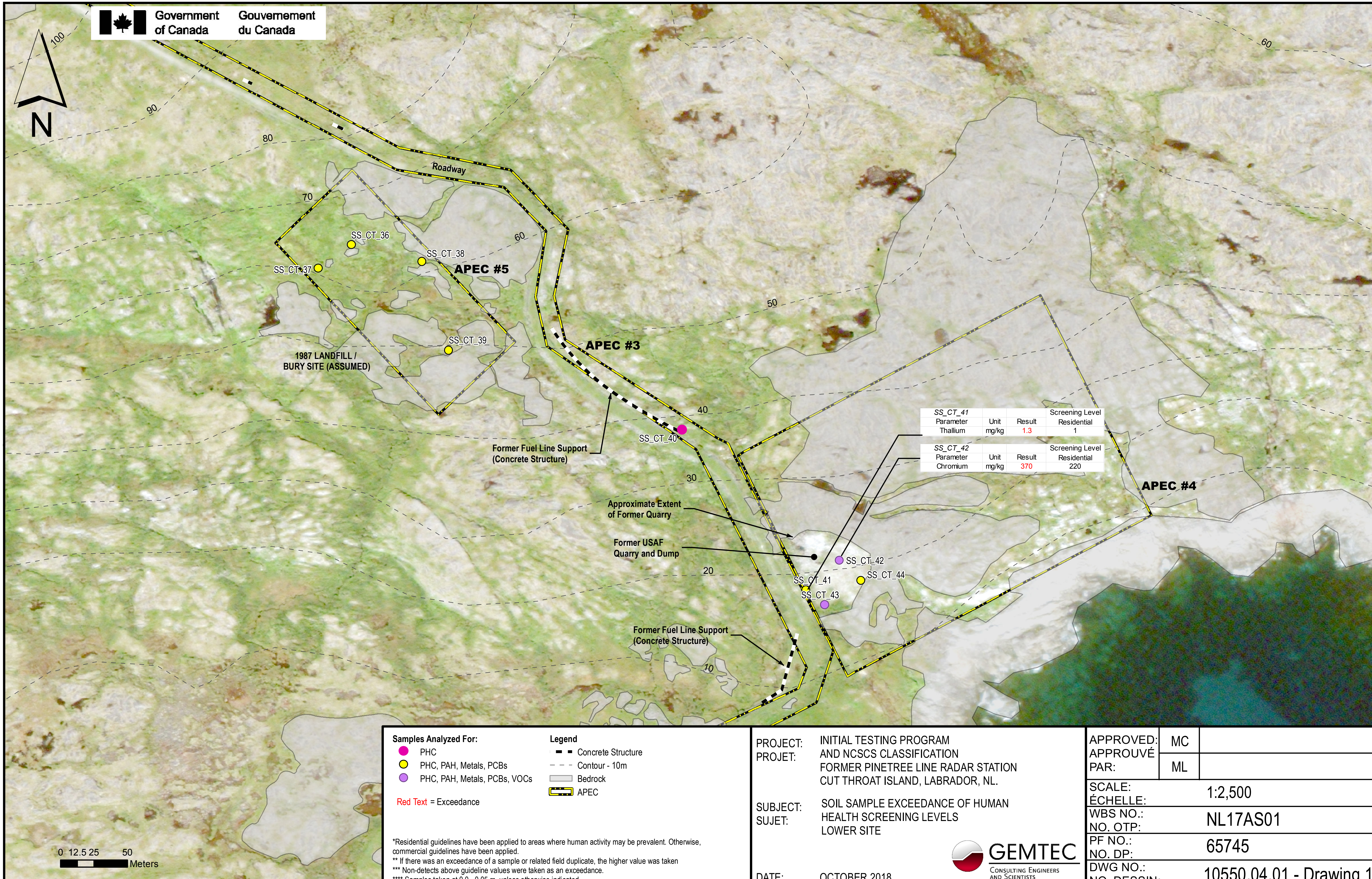
PROJECT: / PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.

SUBJECT: / SUJET: SOIL SAMPLE EXCEEDANCE OF HUMAN HEALTH SCREENING LEVELS UPPER SITE

DATE: OCTOBER 2018

GEMTEC Consulting Engineers and Scientists

| | |
|---|---|
| APPROVED: APPROUVÉ PAR: | MC<br>ML |
| SCALE: ÉCHELLE: | 1:2,000 |
| WBS NO.: NO. OTP: | NL17AS01 |
| PF NO.: NO. DP: | 65745 |
| DWG NO.: NO. DESSIN: | 10550.04.01 - Drawing 16 |




| SS_CT_41 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Residential |
| Thallium | mg/kg | 1.3 | 1 |

| SS_CT_42 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Residential |
| Chromium | mg/kg | 370 | 220 |

**Samples Analyzed For:**
- PHC
- PHC, PAH, Metals, PCBs
- PHC, PAH, Metals, PCBs, VOCs

Red Text = Exceedance

**Legend**
- Concrete Structure
- Contour - 10m
- Bedrock
- APEC

*Residential guidelines have been applied to areas where human activity may be prevalent. Otherwise, commercial guidelines have been applied.
** If there was an exceedance of a sample or related field duplicate, the higher value was taken
*** Non-detects above guideline values were taken as an exceedance.
**** Samples taken at 0.0 - 0.05 m, unless otherwise indicated

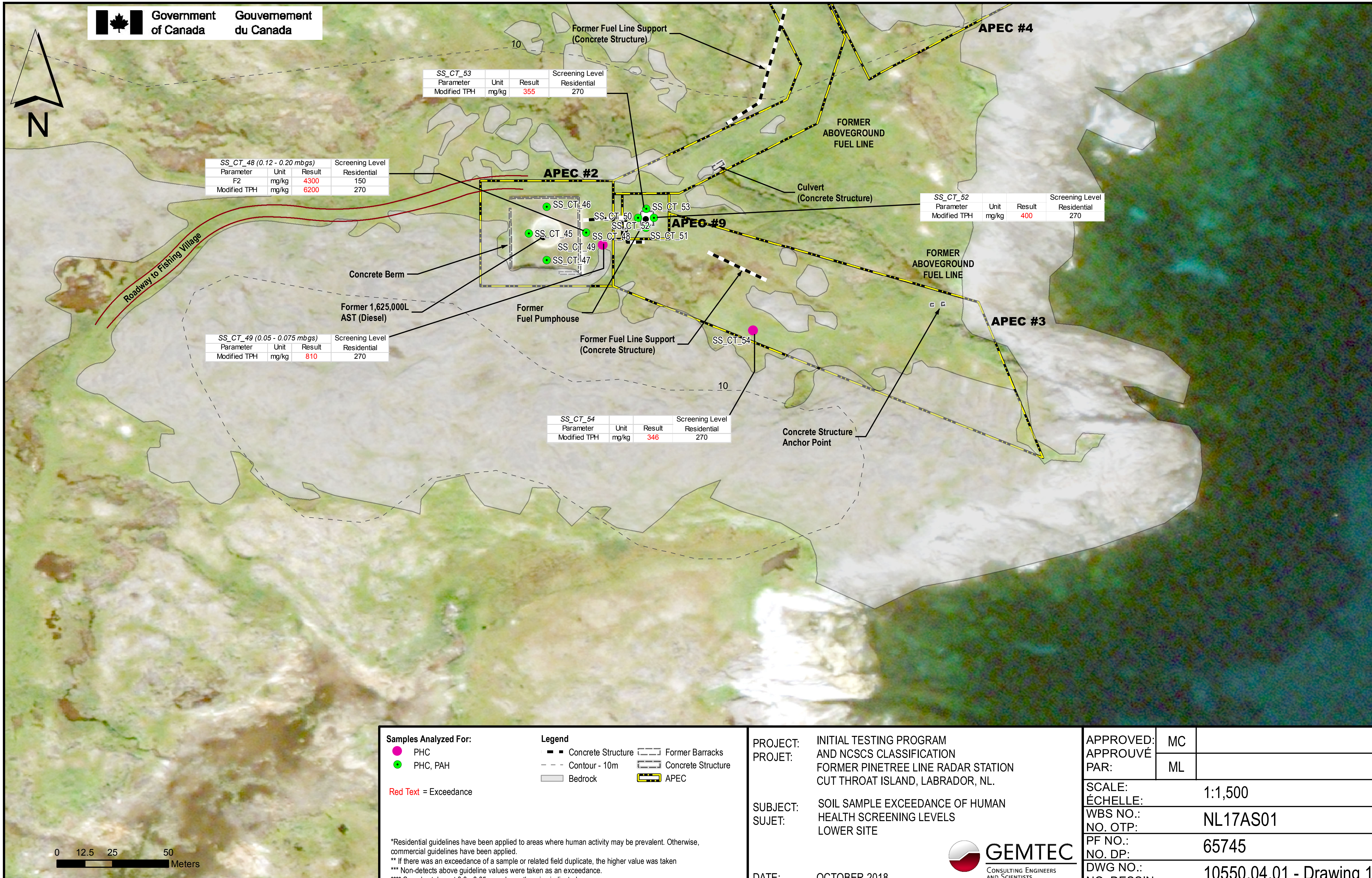
PROJECT:
PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.

SUBJECT:
SUJET: SOIL SAMPLE EXCEEDANCE OF HUMAN HEALTH SCREENING LEVELS LOWER SITE

DATE: OCTOBER 2018

GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

| | |
|---|---|
| APPROVED: APPROUVÉ PAR: | MC |
| | ML |
| SCALE: ÉCHELLE: | 1:2,500 |
| WBS NO.: NO. OTP: | NL17AS01 |
| PF NO.: NO. DP: | 65745 |
| DWG NO.: NO. DESSIN: | 10550.04.01 - Drawing 17 |




| SS_CT_53 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Residential |
| Modified TPH | mg/kg | 355 | 270 |

| SS_CT_48 (0.12 - 0.20 mbgs) | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Residential |
| F2 | mg/kg | 4300 | 150 |
| Modified TPH | mg/kg | 6200 | 270 |

| SS_CT_52 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Residential |
| Modified TPH | mg/kg | 400 | 270 |

| SS_CT_49 (0.05 - 0.075 mbgs) | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Residential |
| Modified TPH | mg/kg | 810 | 270 |

| SS_CT_54 | | | Screening Level |
|---|---|---|---|
| Parameter | Unit | Result | Residential |
| Modified TPH | mg/kg | 346 | 270 |

**Samples Analyzed For:**
- PHC
- PHC, PAH

Red Text = Exceedance

**Legend**
- Concrete Structure
- Contour - 10m
- Bedrock
- Former Barracks
- Concrete Structure
- APEC

*Residential guidelines have been applied to areas where human activity may be prevalent. Otherwise, commercial guidelines have been applied.
** If there was an exceedance of a sample or related field duplicate, the higher value was taken
*** Non-detects above guideline values were taken as an exceedance.
**** Samples taken at 0.0 - 0.05 m, unless otherwise indicated

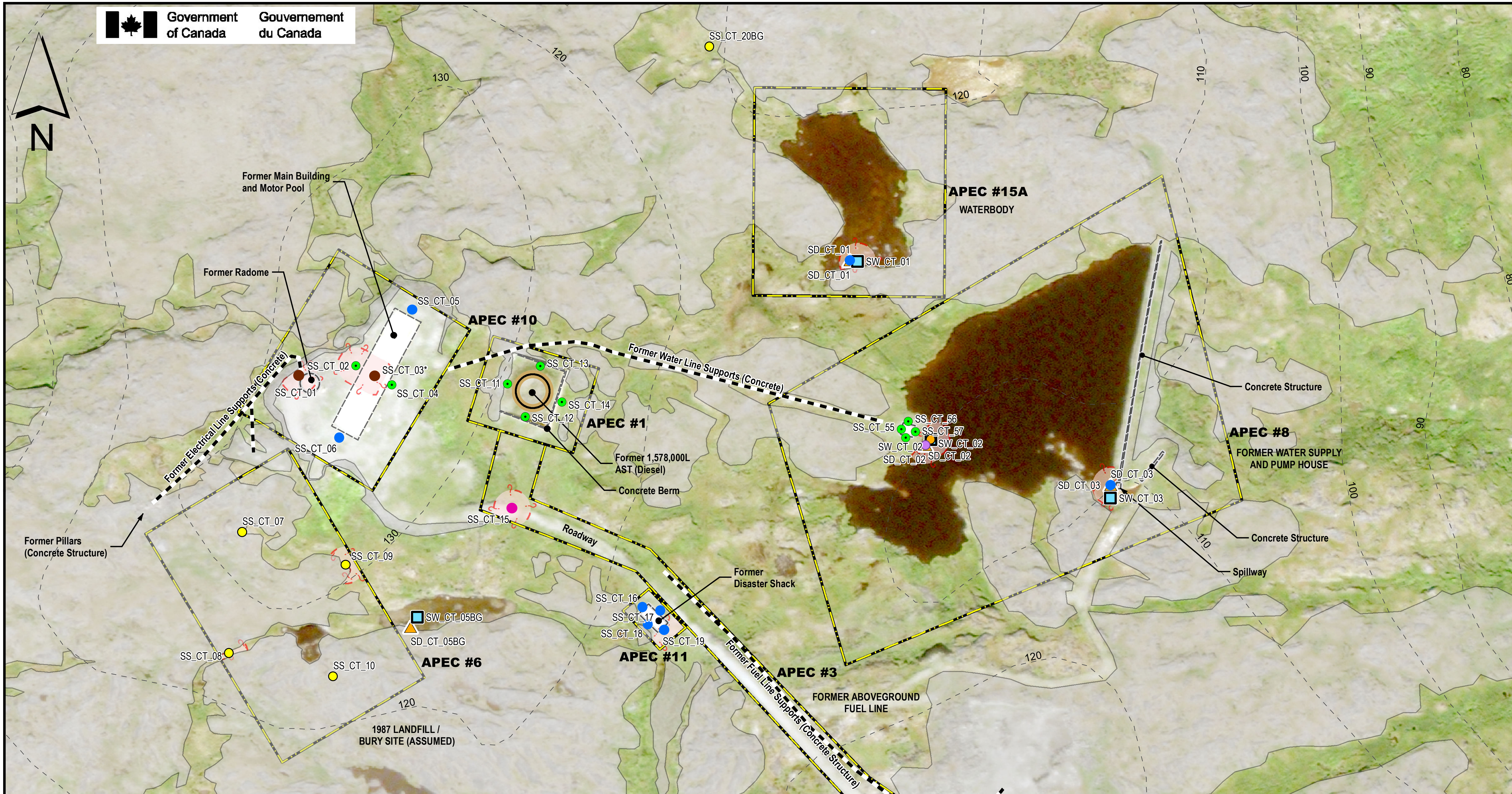
PROJECT:
PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.

SUBJECT:
SUJET: SOIL SAMPLE EXCEEDANCE OF HUMAN HEALTH SCREENING LEVELS LOWER SITE

DATE: OCTOBER 2018

GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

| | |
|---|---|
| APPROVED: APPROUVÉ PAR: | MC |
| | ML |
| SCALE: ÉCHELLE: | 1:1,500 |
| WBS NO.: NO. OTP: | NL17AS01 |
| PF NO.: NO. DP: | 65745 |
| DWG NO.: NO. DESSIN: | 10550.04.01 - Drawing 18 |




**Samples Analyzed For:**

- PHC
- PHC, PAH
- PHC, Metals
- PHC, PAH, Metals
- PHC, PAH, Metals, VOCs
- PHC, PAH, Metals, PCBs
- PHC, PAH, Metals, PCBs, VOCs
- PHC, PAH, GenChem, Metals, PCB

**Legend**

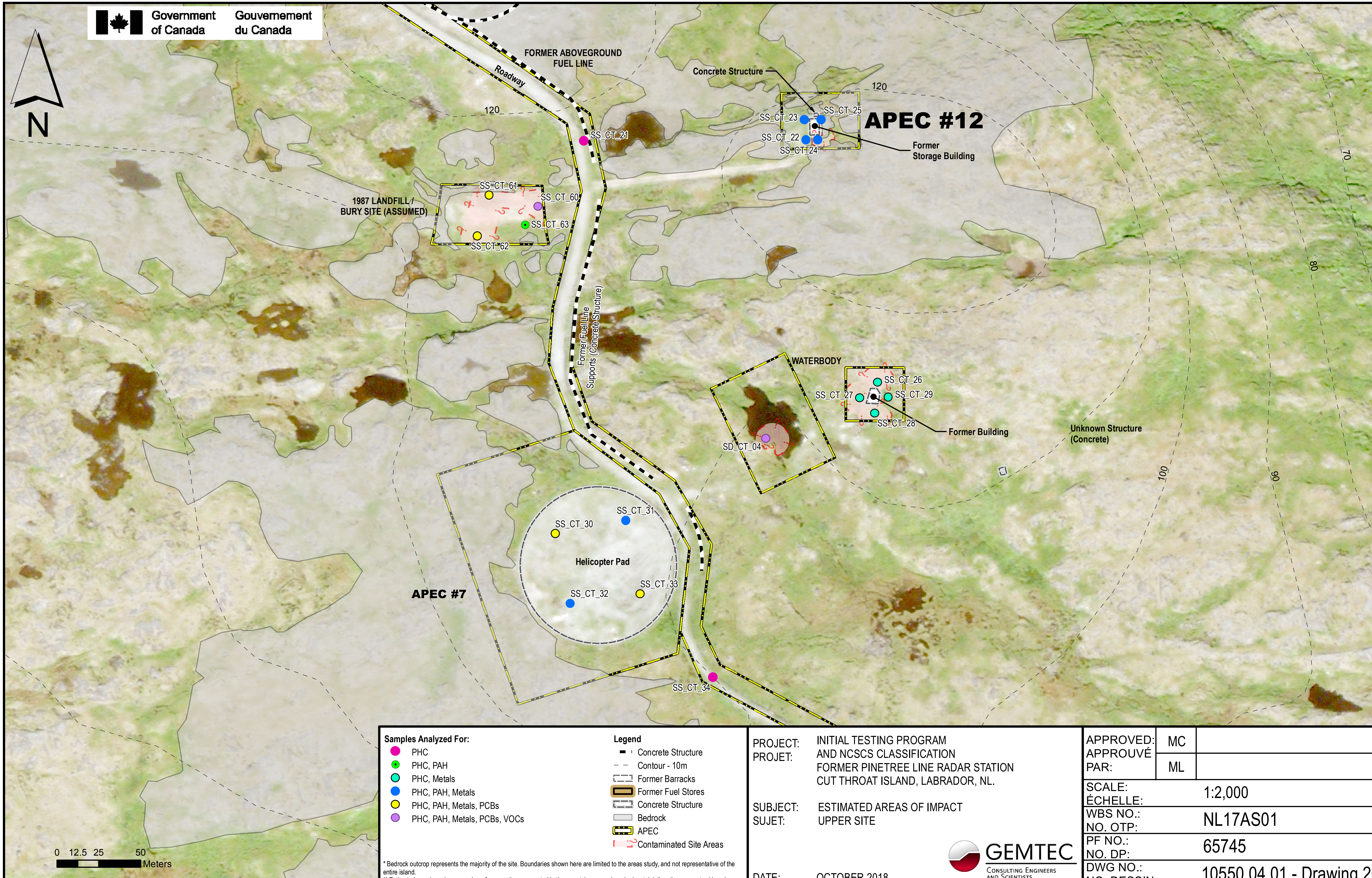
- Concrete Structure
- Contour - 10m
- Former Barracks
- Former Fuel Stores
- Concrete Structure
- Bedrock
- APEC
- Contaminated Site Areas

* Bedrock outcrop represents the majority of the site. Boundaries shown here are limited to the areas study, and not representative of the entire island.
** Estimated area based on a number of assumptions presented in the report, in areas where horizontal delineation was not achieved.

| | |
|---|---|
| PROJECT: PROJET: | INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL. |
| SUBJECT: SUJET: | ESTIMATED AREAS OF IMPACT UPPER SITE |
| DATE: | OCTOBER 2018 |

GEMTEC
Consulting Engineers and Scientists

| | |
|---|---|
| APPROVED: APPROUVÉ PAR: | MC |
| | ML |
| SCALE: ÉCHELLE: | 1:2,000 |
| WBS NO.: NO. OTP: | NL17AS01 |
| PF NO.: NO. DP: | 65745 |
| DWG NO.: NO. DESSIN: | 10550.04.01 - Drawing 19 |



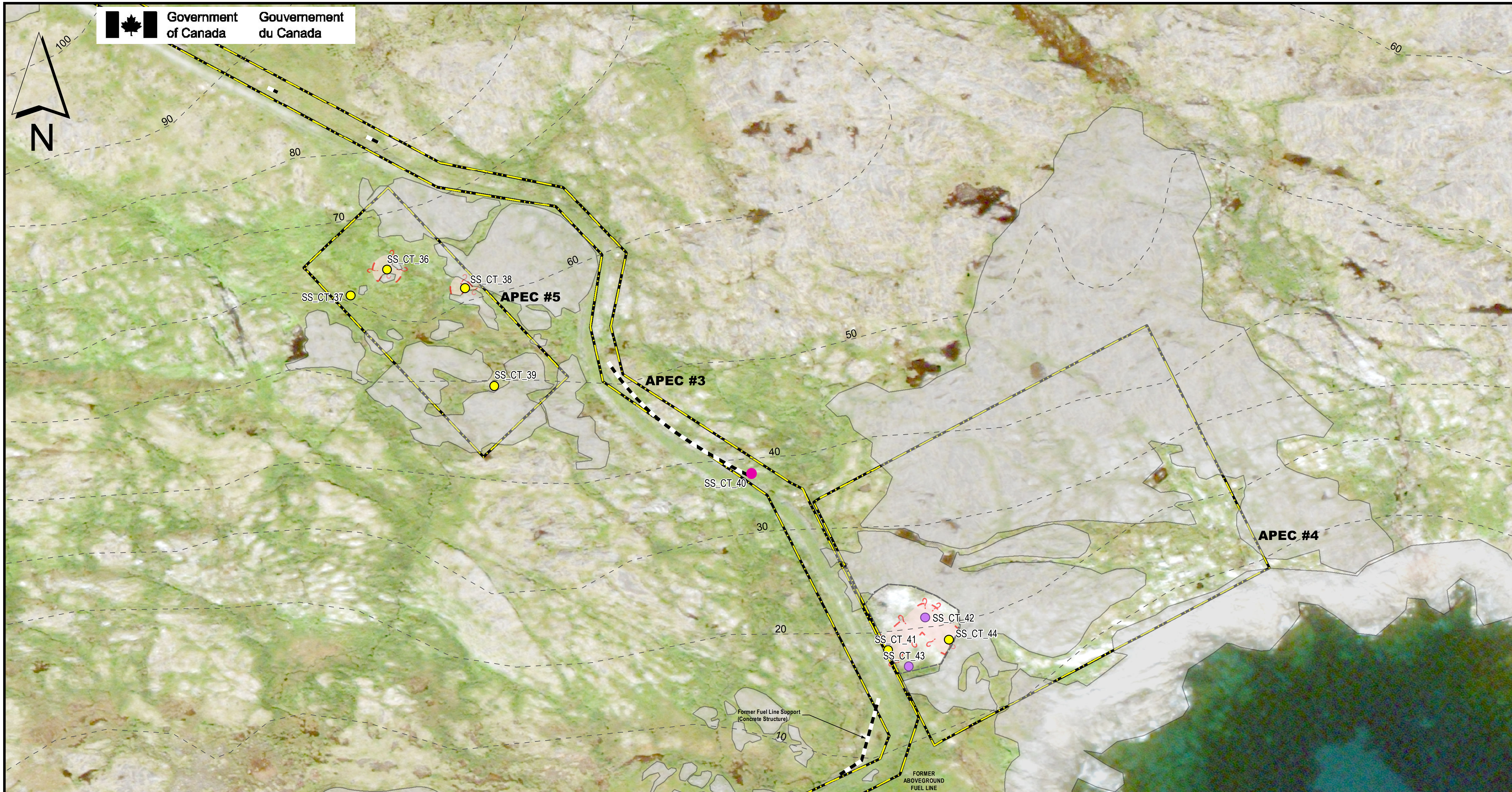

PROJECT: / PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL.

SUBJECT: / SUJET: ESTIMATED AREAS OF IMPACT UPPER SITE

DATE: OCTOBER 2018

GEMTEC Consulting Engineers and Scientists

| | |
|---|---|
| APPROVED: / APPROUVÉ PAR: | MC / ML |
| SCALE: / ÉCHELLE: | 1:2,000 |
| WBS NO.: / NO. OTP: | NL17AS01 |
| PF NO.: / NO. DP: | 65745 |
| DWG NO.: / NO. DESSIN: | 10550.04.01 - Drawing 20 |




**Samples Analyzed For:**

- PHC
- PHC, PAH
- PHC, Metals
- PHC, PAH, Metals
- PHC, PAH, Metals, VOCs
- PHC, PAH, Metals, PCBs
- PHC, PAH, Metals, PCBs, VOCs
- PHC, PAH, GenChem, Metals, PCB

**Legend**

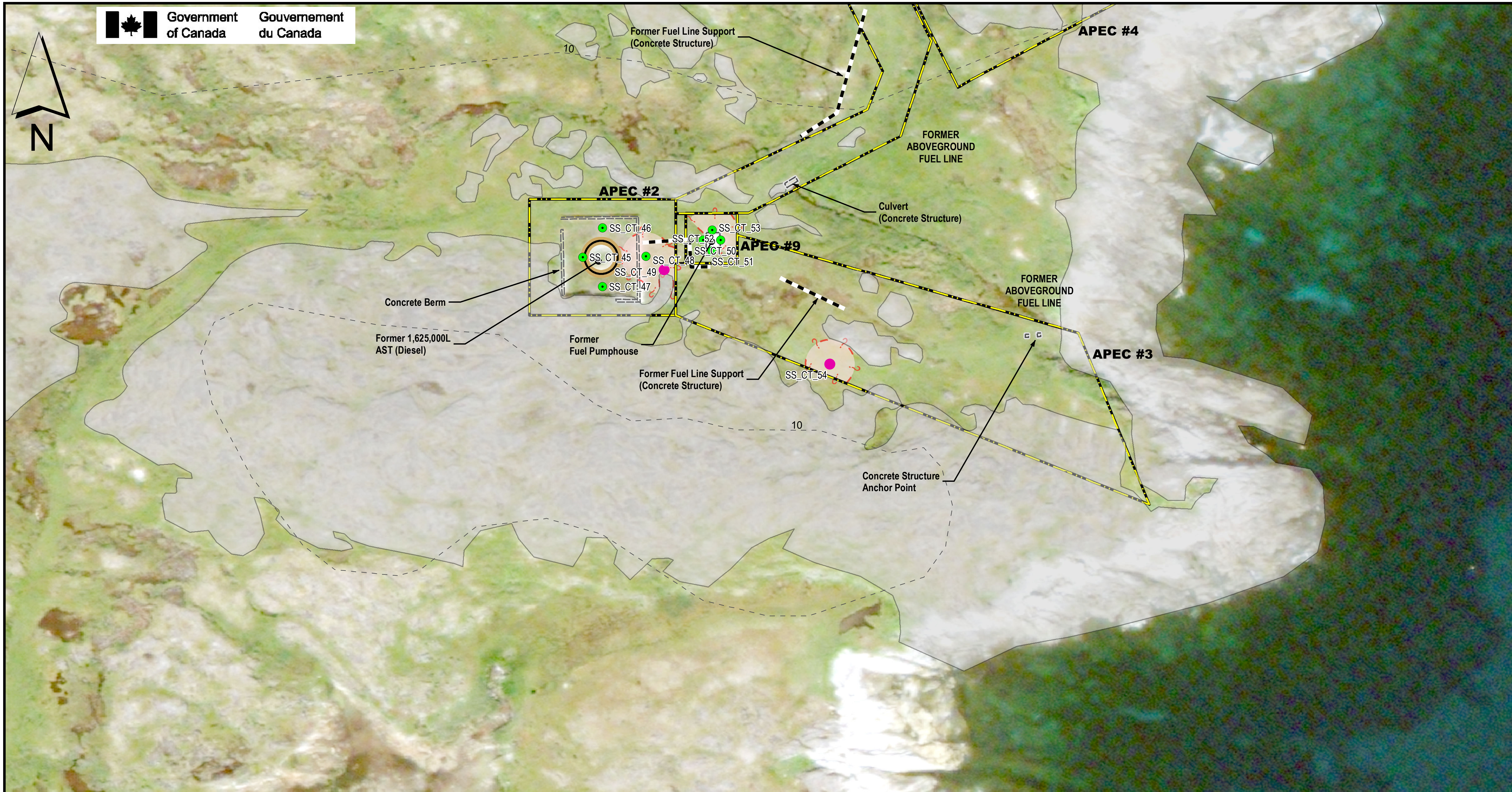
- Concrete Structure
- Contour - 10m
- Former Barracks
- Former Fuel Stores
- Concrete Structure
- Bedrock
- APEC
- Contaminated Site Areas

* Bedrock outcrop represents the majority of the site. Boundaries shown here are limited to the areas study, and not representative of the entire island.
** Estimated area based on a number of assumptions presented in the report, in areas where horizontal delineation was not achieved.

| | |
|---|---|
| PROJECT: PROJET: | INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL. |
| SUBJECT: SUJET: | ESTIMATED AREAS OF IMPACT LOWER SITE |
| DATE: | OCTOBER 2018 |

GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

| | | |
|---|---|---|
| APPROVED: APPROUVÉ PAR: | MC | |
| | ML | |
| SCALE: ÉCHELLE: | 1:2,500 | |
| WBS NO.: NO. OTP: | NL17AS01 | |
| PF NO.: NO. DP: | 65745 | |
| DWG NO.: NO. DESSIN: | 10550.04.01 - Drawing 21 | |




**Samples Analyzed For:**

- PHC
- PHC, PAH
- PHC, Metals
- PHC, PAH, Metals
- PHC, PAH, Metals, VOCs
- PHC, PAH, Metals, PCBs
- PHC, PAH, Metals, PCBs, VOCs
- PHC, PAH, GenChem, Metals, PCB

**Legend**

- Concrete Structure
- Contour - 10m
- Former Barracks
- Former Fuel Stores
- Concrete Structure
- Bedrock
- APEC
- Contaminated Site Areas

* Bedrock outcrop represents the majority of the site. Boundaries shown here are limited to the areas study, and not representative of the entire island.
** Estimated area based on a number of assumptions presented in the report, in areas where horizontal delineation was not achieved.

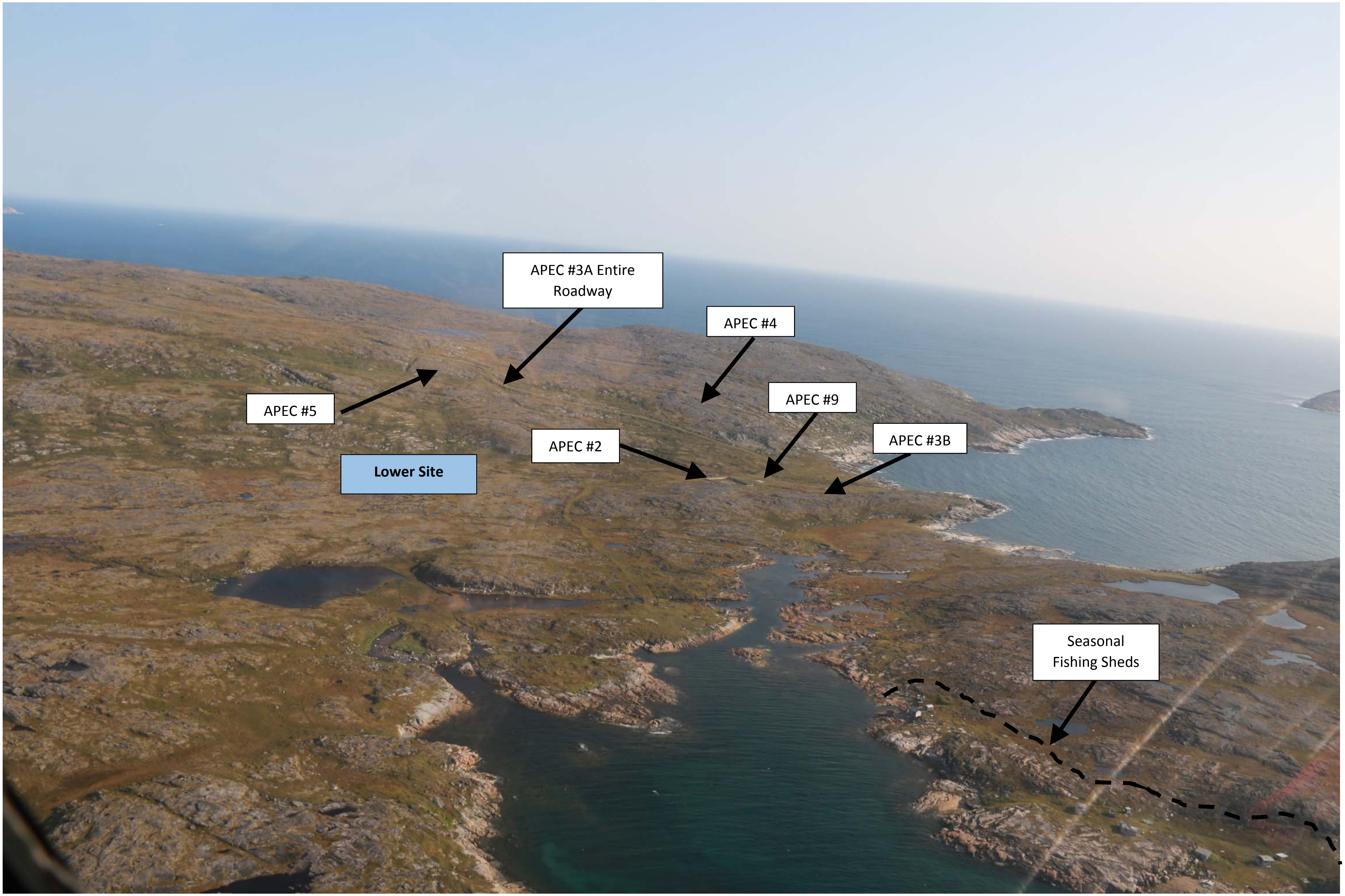
| | |
|---|---|
| PROJECT: PROJET: | INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER PINETREE LINE RADAR STATION CUT THROAT ISLAND, LABRADOR, NL. |
| SUBJECT: SUJET: | ESTIMATED AREAS OF IMPACT LOWER SITE |
| DATE: | OCTOBER 2018 |

GEMTEC
Consulting Engineers and Scientists

| | |
|---|---|
| APPROVED: APPROUVÉ PAR: | MC |
| | ML |
| SCALE: ÉCHELLE: | 1:1,500 |
| WBS NO.: NO. OTP: | NL17AS01 |
| PF NO.: NO. DP: | 65745 |
| DWG NO.: NO. DESSIN: | 10550.04.01 - Drawing 22 |

# APPENDIX B

Selected Site Photographs and Google Earth® Mapping



APEC #3A Entire Roadway
APEC #4
APEC #5
APEC #9
APEC #2
APEC #3B
Lower Site
Seasonal Fishing Sheds


APEC #7
APEC #6A
APEC #14
APEC #12
APEC #13


APEC #6
Upper Site
APEC #10
APEC #1
APEC #11
APEC #15A
APEC #8

PHOTO 1 - Aerial view facing northwest of Cut Throat Island). Former water source and spillway located in foreground. (September, 2017)

PHOTO 2 - Aerial view facing west of former AST (Upper Site) and main building and motor pool foundations. (September, 2017)

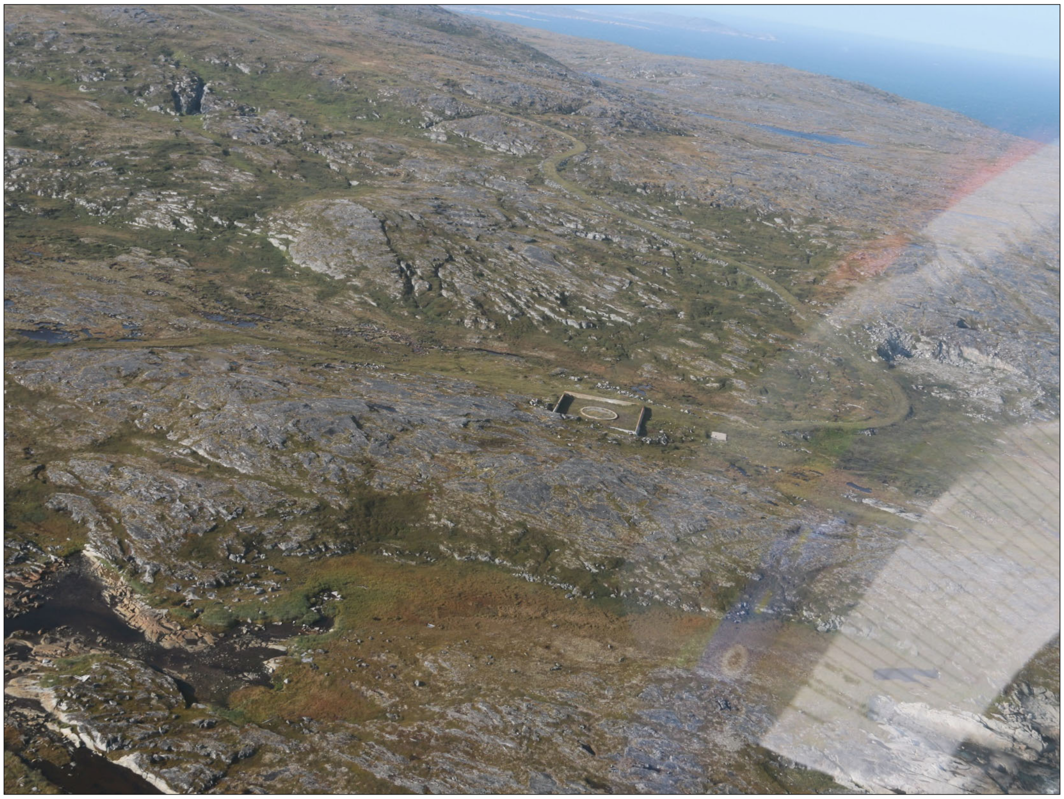


PHOTO 3 - Aerial view facing northeast of former AST (Lower Site) foundation. (September, 2017)

PHOTO 4 - Aerial view facing northeast of fishing sheds located southwest of the Lower Site. (September, 2017)


PHOTO 5 - APEC #1: View of concrete berm (in the background). (September, 2017)

PHOTO 6 - APEC #1: View of piece of rebar on the ground. (September, 2017)


PHOTO 7 - APEC #1: View of inside the berm wall of the former Upper Site AST. (September, 2017)


PHOTO 8 - APEC #1: View facing northeast of concrete blocks used to support piping for the water supply. (September, 2017)

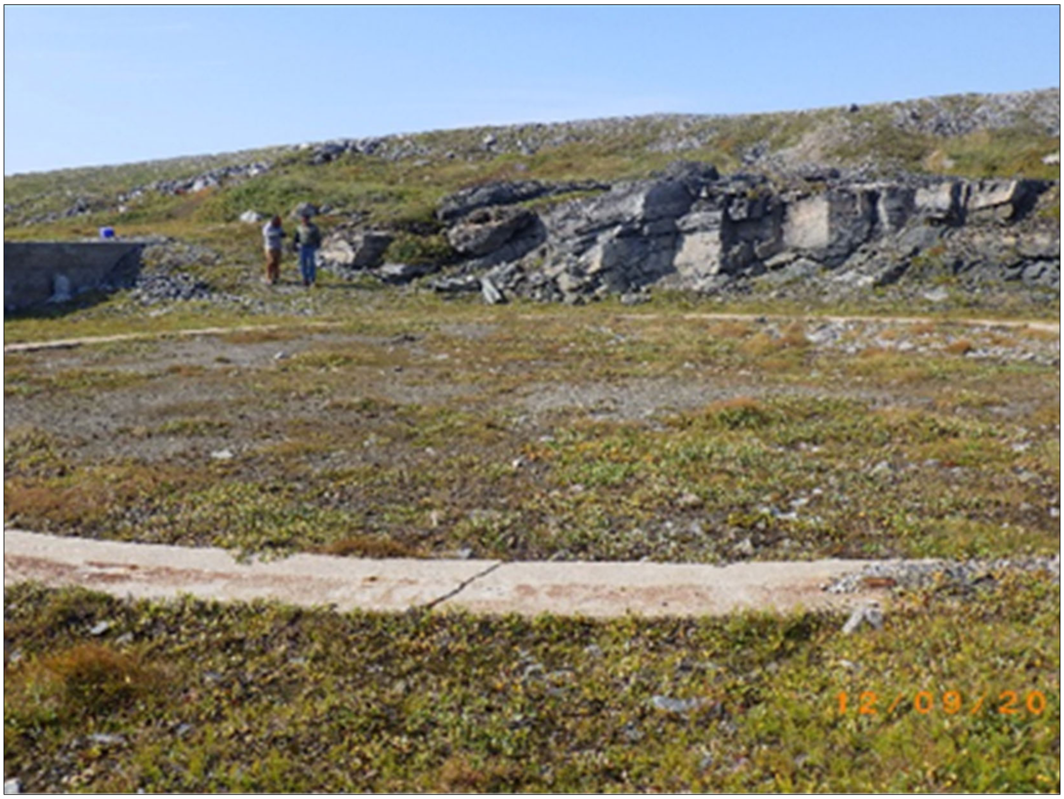



PHOTO 9 - APEC #1: View of the bedrock outcrop used as a natural berm on one side. (September, 2017)

PHOTO 10 - APEC #1: View of the pipe, likely for draining water through the concrete berm. (September, 2017)


PHOTO 11 - APEC #1: View of concrete block. (September, 2017)

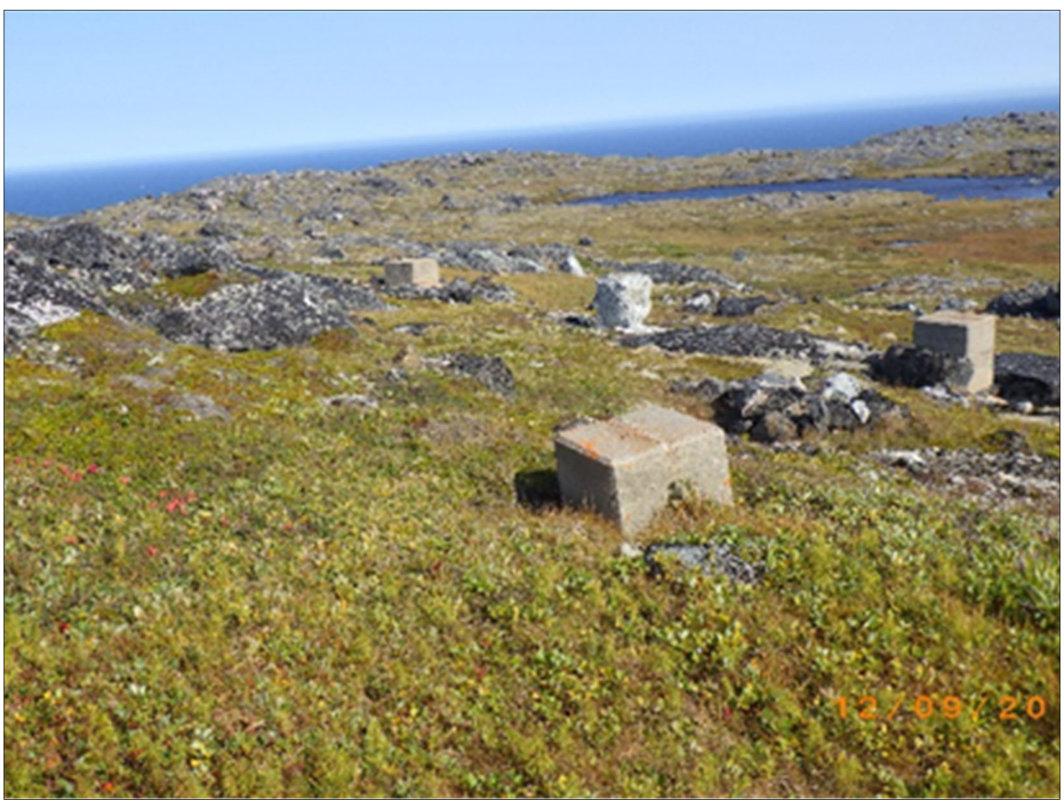



PHOTO 12 - APEC #1: View of concrete blocks. (September, 2017)

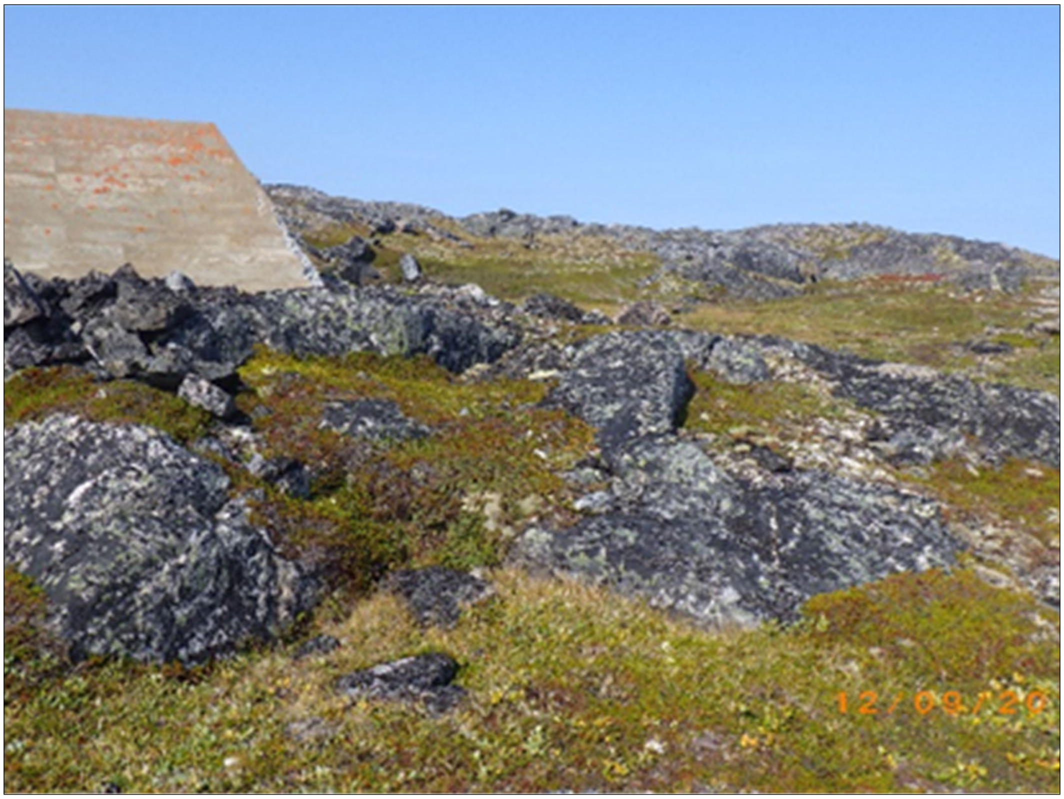



PHOTO 13 - APEC #1: View of concrete berm looking uphill; bedrock outcrops are evident throughout the area. (September, 2017)


PHOTO 14 - APEC #1: View of the concrete berm. Berm in good condition. (September, 2017)


PHOTO 15 - APEC #2: View of inside the berm wall of the former Lower Site AST. (September, 2017)


PHOTO 16 - APEC #2: Drain pipe in the berm of the former Lower Site AST. Other black caulking analyzed at the site was found to be asbestos-containing. (September, 2017)

GEMTEC
Consulting Engineers
and Scientists

PHOTO 17 - APEC #2: View of concrete berm. Moss and lichen growing on bedrock is observed in the forefront. (September, 2017)

PHOTO 18 - APEC #2: Outflow of drainpipe and area of stressed vegetation. (September, 2017)


PHOTO 19 - APEC #2: View of pipe, likely for draining water through the concrete berm. (September, 2017)


PHOTO 20 - APEC #2: View of APEC #2 from the top of the bedrock berm wall. (September, 2017)

PHOTO 21 - APEC #2: View of rebar coming out of the vegetation. (September, 2017)

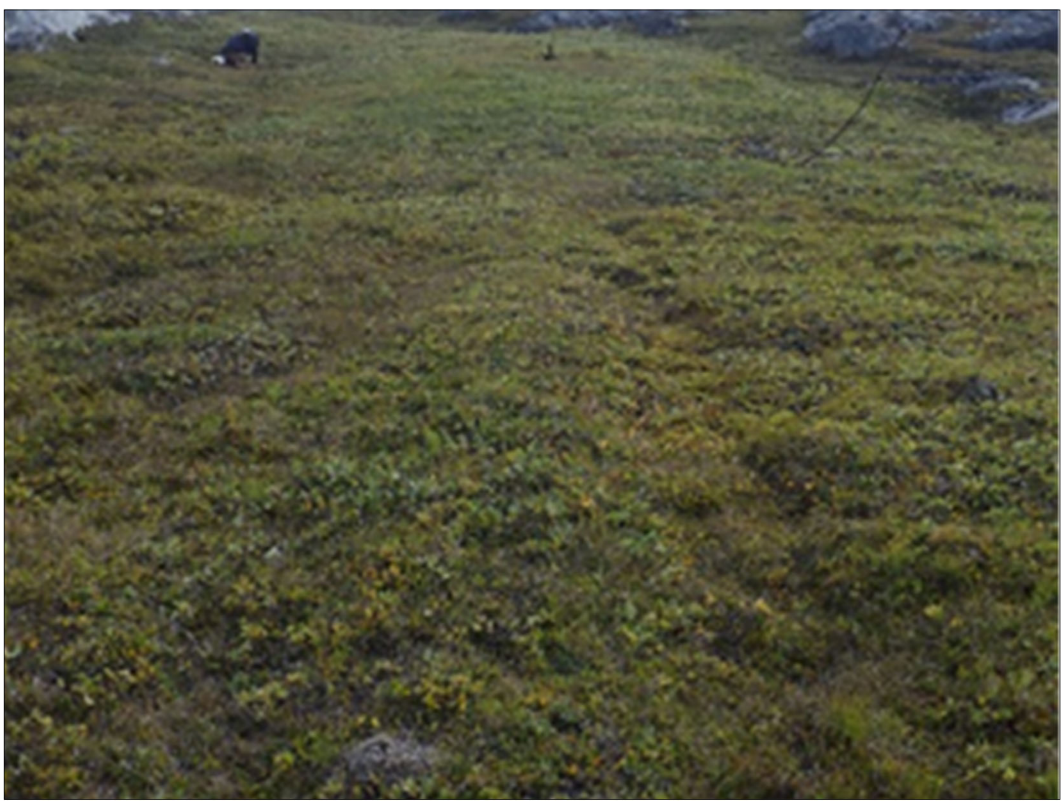


PHOTO 22 - APEC #3: Former location of aboveground fuel line. (September, 2017)


PHOTO 23 - APEC #3: View of roadway towards the Upper Site (helicopter pad and main building). (September, 2017)


PHOTO 24 - APEC #3: View of roadway towards the Lower Site. (September, 2017)

PHOTO 25 - APEC #3: Rebar (debris). (September, 2017)

PHOTO 26 - APEC #3: Metal pipe in ground. (September, 2017)

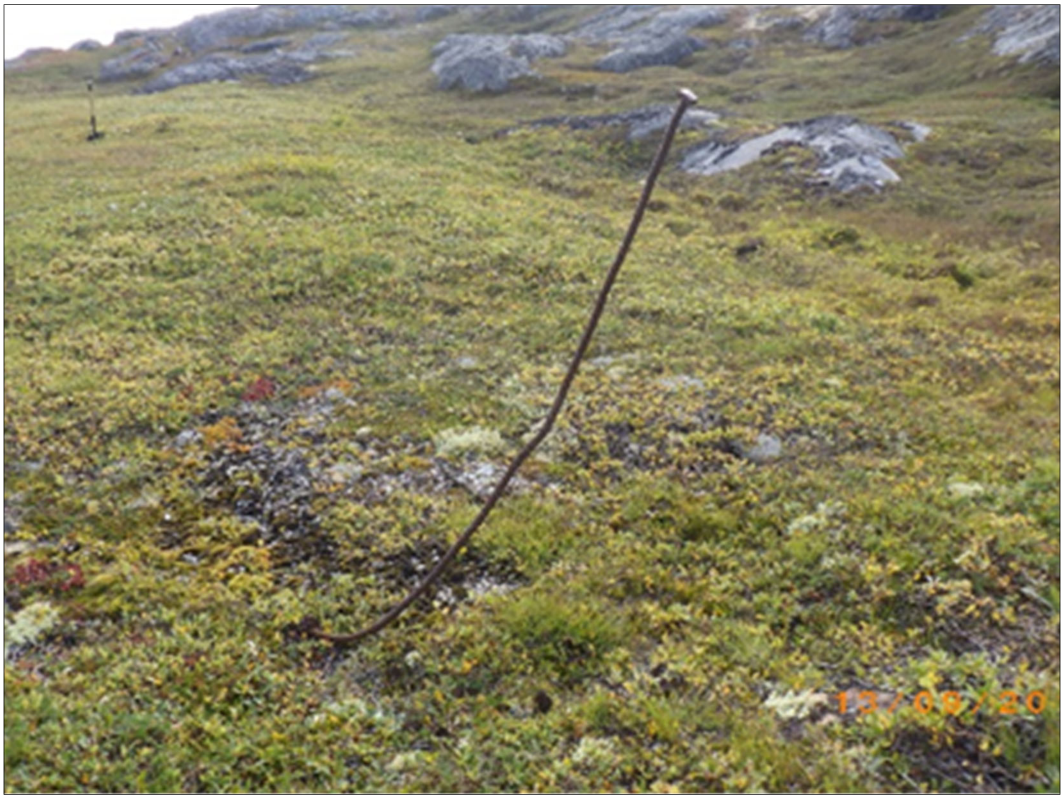


PHOTO 27 - APEC 3: Rebar (debris). (September, 2017)


PHOTO 28 - APEC #3: Metal anchor near coast. (September, 2017)

GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

PHOTO 29 - APEC #3: Concrete block with steel coming out at coast. (September, 2017)

PHOTO 30 - APEC #3: Metal piping debris along coast. (September, 2017)

PHOTO 31- APEC #3: Former roadway/location of pipeline, now grown over with short vegetation. (September, 2017)


PHOTO 32 - APEC #3: Former roadway/location of pipeline. (September, 2017)


PHOTO 33 - APEC #3: Former roadway/location of pipeline. (September, 2017)


PHOTO 34 - APEC #4: View of gradient of the quarry. (September, 2017)


PHOTO 35 - APEC #4: View of USAF Quarry. No signs of dumping were visible during the 2017 site visit. (September, 2017)


PHOTO 36 - APEC #4: View of rock wall at Quarry. Drill holes observed in the rock. (September, 2017)


PHOTO 37 - APEC #5: View of Potential Landfill / Bury Site. No signs of dumping were visible during the 2017 site visit other than the one barrel identified. (September, 2017)


PHOTO 38 - APEC #5: Close-up of drum (45 gallons). (September, 2017)

PHOTO 39 - APEC #5: Area of APEC #5. (September, 2017)

PHOTO 40 - APEC #5: Area of APEC #5. (September, 2017)


PHOTO 41 - APEC #6: View of APEC #6. (September, 2017)

PHOTO 42 - APEC #6: View of wood waste. (September, 2017)

PHOTO 43 - APEC #6: View of APEC #6. (September, 2017)

PHOTO 44 - APEC #6A: Metal waste on bedrock at APEC #6. (September, 2017)


PHOTO 45 - APEC #6: View of Potential Landfill / Bury Site. No signs of dumping were visible during the 2017 site visit. It is unlikely that this location was used as a landfill site, however a more intrusive investigation would be required to confirm. (September, 2017)

PHOTO 46 - APEC #6: Test pit at APEC #6. (September, 2017)

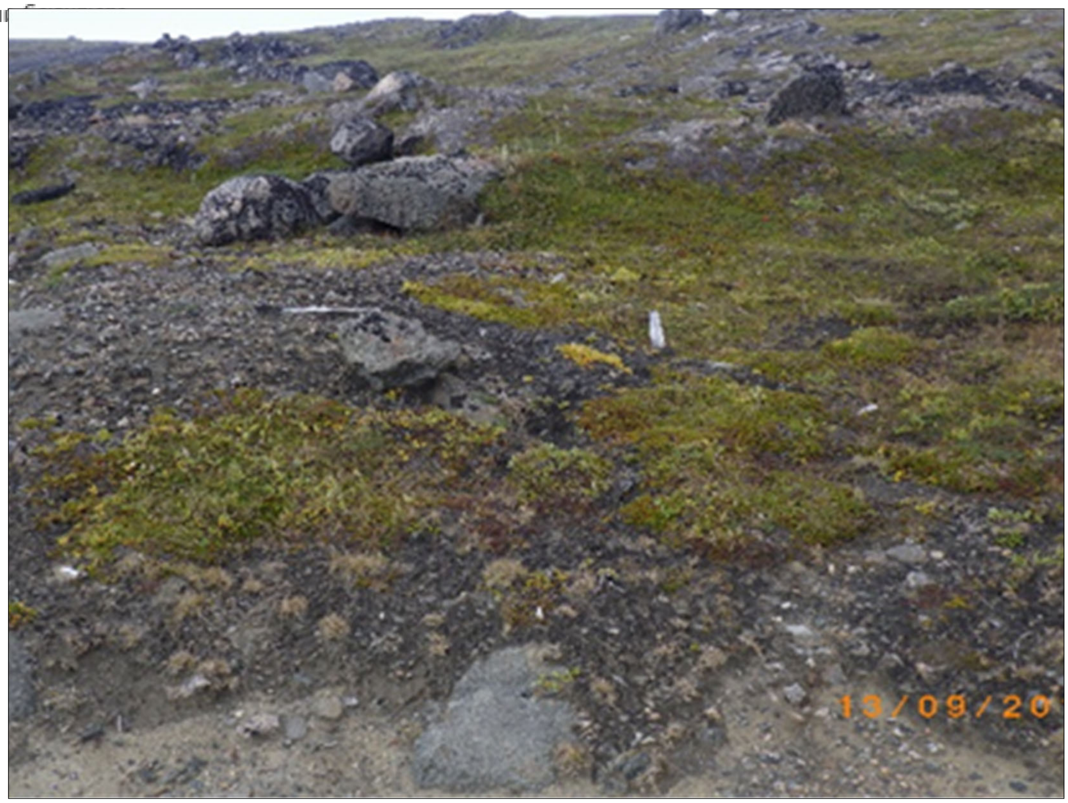


PHOTO 47 - APEC #6A: View of various small pieces of debris. (September, 2017)

PHOTO 48 - APEC #6A: View of dumpsite located during the September 2017 site visit. This area is located north of the helicopter pad, and has limited / stressed vegetation. (September, 2017)

PHOTO 49 - APEC #6A: View of various small pieces of debris. (September, 2017)


PHOTO 50 - APEC #6A: View of various small pieces of debris. (September, 2017)


PHOTO 51 - APEC #6A: Piece of metal pipe. (September, 2017)


PHOTO 52 - APEC #6A: View of subsurface vegetation on bedrock. (September, 2017)


PHOTO 53 - APEC #6A: Piece of metal pipes (debris). (September, 2017)


PHOTO 54 - APEC #6A: Piece of wood debris. (September, 2017)


PHOTO 55 - APEC #6A: Test pit. (September, 2017)


PHOTO 56 - APEC #6A: Test pit. (September, 2017)

GEMTEC
Consulting Engineers and Scientists


PHOTO 57 - APEC #6A: Test pit. (September, 2017)

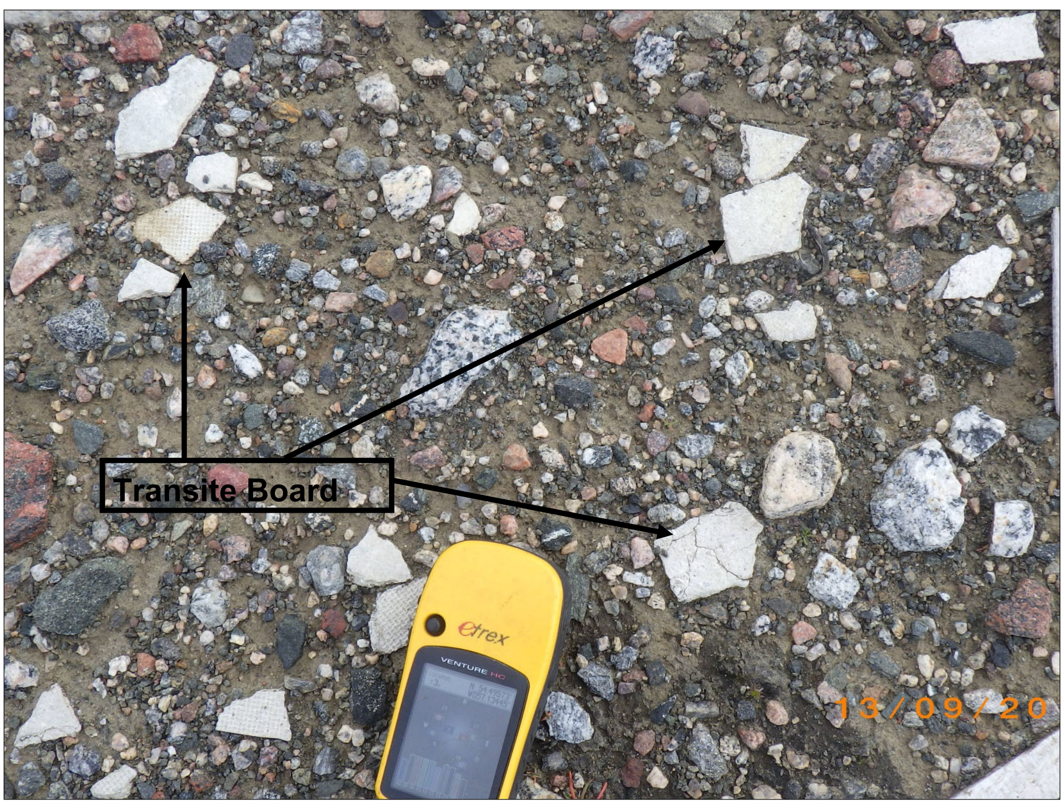



PHOTO 58 - APEC #6A: View potential ACMs (transited board pieces) located at the dumpsite. (September, 2017)

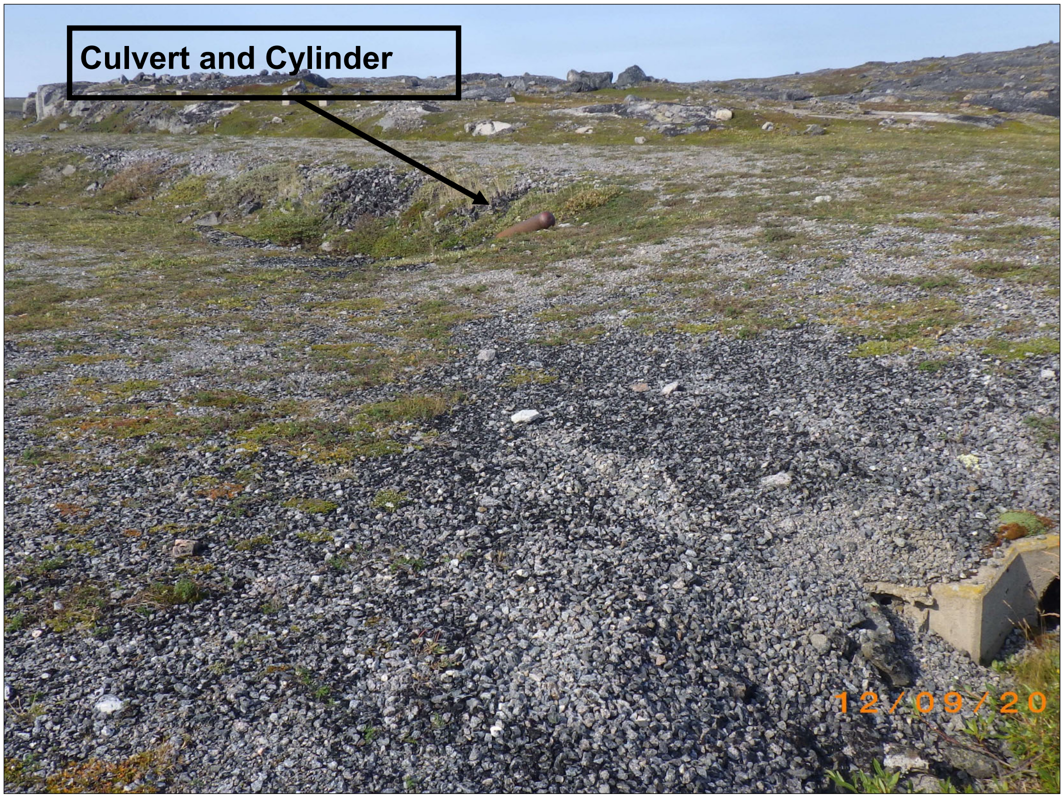



PHOTO 59 - APEC #7: View potential concrete culvert and metal cylinder. (September, 2017)


PHOTO 60 - APEC #7: Metal cylinder debris. (September, 2017)


PHOTO 61 - APEC #7: Gravel helicopter pad. (September, 2017)


PHOTO 62 - APEC #7: Helicopter (GEMTEC's transportation to the Site) on the gravel landing pad. (September, 2017)


PHOTO 63 - APEC #7: View looking toward APEC #7 from the gravel access roadway. (September, 2017)


PHOTO 64 - APEC #7: View of helicopter pad. (September, 2017)


PHOTO 65 - APEC #7: Surface water/concrete foundation of the former pump house. (September, 2017)


PHOTO 66 - APEC #8: View of water source and spillway. (September, 2017)


PHOTO 67 - APEC #8: View of spillway leading from water source. (September, 2017)


PHOTO 68 - APEC #8: View of foundation of former pump house at the Upper Site. (September, 2017)

PHOTO 69 - APEC #8: Former pump house concrete slab. (September, 2017)

PHOTO 70 - APEC #8: View of concrete blocks used to support water piping uphill. (September, 2017)

PHOTO 71 - APEC #8: Shore of water body. (September, 2017)

PHOTO 72 - APEC #8: Piece of transited board. (September, 2017)


PHOTO 73 - APEC #8: Metal debris. (September, 2017)


PHOTO 74 - APEC #8: Wood debris. (September, 2017)


PHOTO 75 - APEC #8: Concrete drainage channel. (September, 2017)


PHOTO 76 - APEC #8: End of concrete drainage channel. (September, 2017)


PHOTO 77 - APEC #8: View of APEC #8, looking from an area of high ground towards the former pump house concrete foundation. (September, 2017)


PHOTO 78 - APEC #8: A metal buoy located along the shore. (September, 2017)


PHOTO 79 - APEC #9: Former shack concrete foundation. (September, 2017)


PHOTO 80 - APEC #10: Pipe in concrete shack foundation. (September, 2017)



PHOTO 81 - APEC #9: Pipes in concrete shack foundation. (September, 2017)



PHOTO 82 - APEC #9: Transite board. (September, 2017)

GEMTEC
Consulting Engineers and Scientists


PHOTO 83 - APEC #9: View of foundation of former pump house located at the Lower Site. (September, 2017)

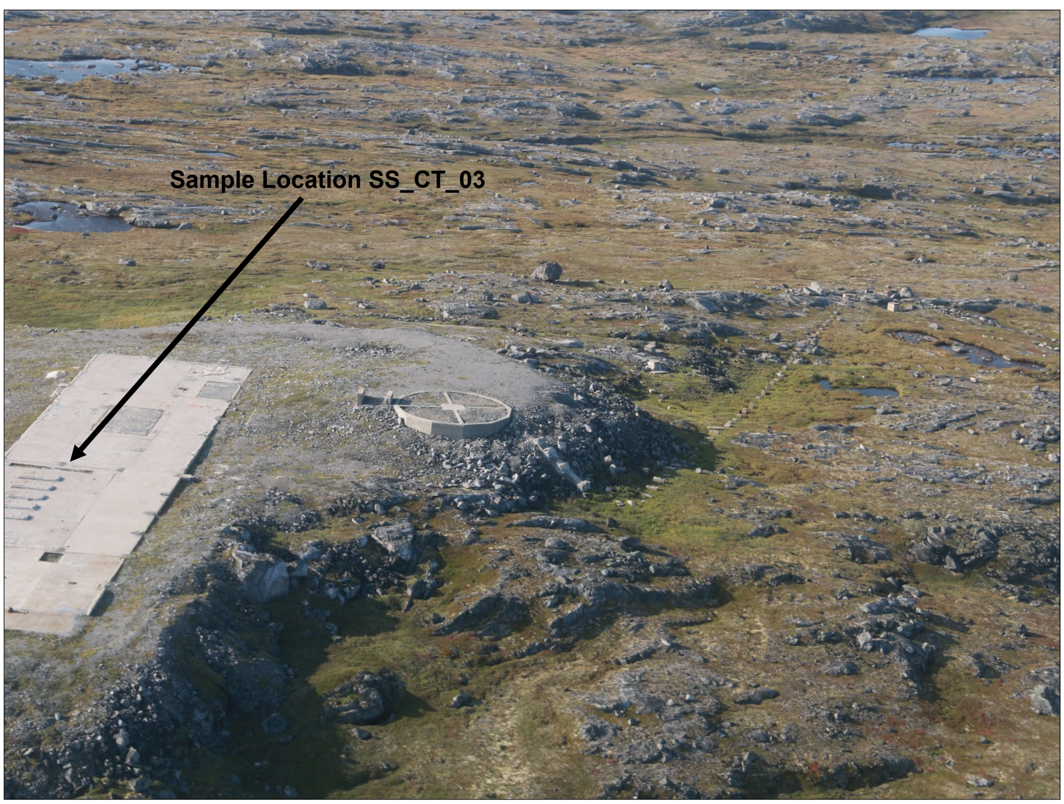



PHOTO 84 - APEC #10: Aerial view of main building and radiomen foundations. (September, 2017)


PHOTO 85 - APEC #10: View toward the Labrador Sea. (September, 2017)


PHOTO 86 - APEC #10: Former concrete curbing for the radiomen to the west of the main building. (September, 2017)

PHOTO 87 - APEC #10: Metal pipe partially buried. (September, 2017)

PHOTO 88 - APEC #10: Piece of rebar coming out of the ground. (September, 2017)

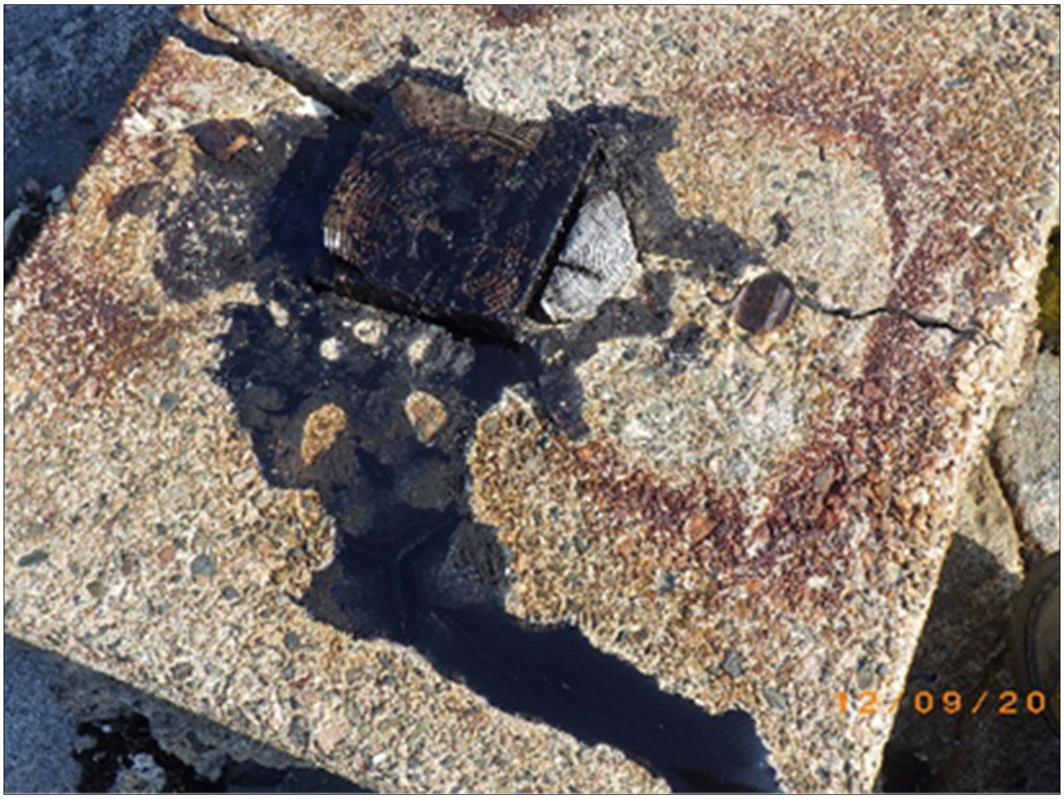



PHOTO 89 - APEC #10: Close-up of one of the concrete curbing for the radome. (September, 2017)


PHOTO 90 - APEC #10: Another one of the concrete curbing for the radiomen. (September, 2017)


PHOTO 91 - APEC #10: Hydraulic oil container (debris). (September, 2017)


PHOTO 92 - APEC #10: Former main building concrete foundation. (September, 2017)

PHOTO 93 - APEC #10: Various pieces of debris. (September, 2017)

PHOTO 94 - APEC #10: Former main building concrete foundation. (September, 2017)


PHOTO 95 - APEC #10: Concrete slab of former main building foundation. Soil is exposed in various location within the slab. (September, 2017)


PHOTO 96 - APEC #10: Various debris was located over APEC including gaskets, various sizes of metal pieces, batteries, transited board and wood. (September, 2017)


PHOTO 97 - APEC #10: Metal debris. (September, 2017)


PHOTO 98 - APEC #10: Other debris. (September, 2017)


PHOTO 99 - APEC #10: Foundation of former radiomen. (September, 2017)


PHOTO 100 - APEC #10: Foundation of former trailer communication tower. (September, 2017)


PHOTO 101 - APEC #10: Debris in vegetation at the base of rock pile.
(September, 2017)


PHOTO 102 - APEC #10: Metal protruding out of the former main building concrete slab.
(September, 2017)

GEMTEC
Consulting Engineers and Scientists


PHOTO 103 - APEC #10: Vegetation growing out of what appears to be a drain in the former main building concrete slab. (September, 2017)


PHOTO 104 - APEC #10: Metal structure in the former main building concrete slab. (September, 2017)


PHOTO 105 - APEC #11: View facing northwest of the former disaster shack foundation. (September, 2017)


PHOTO 106 - APEC #11: Concrete foundation of former disaster shack. (September, 2017)


PHOTO 107 - APEC #12: Gravel road leading to APEC #12. (September, 2017)


PHOTO 108 - APEC #12: View facing west of gravel roadway leading to the former storage building. (September, 2017)


PHOTO 109 - APEC #12: View former storage building foundation. A potential track is located in the floor. (September, 2017)

PHOTO 110 - APEC #12: Piece of wood debris. (September, 2017)

GEMTEC
Consulting Engineers and Scientists


PHOTO 111 - APEC #12: View from the concrete foundation looking toward the Labrador Sea. (September, 2017)


PHOTO 112 - APEC #12: Pipes in a piece of concrete. (September, 2017)


PHOTO 113 - APEC #12: View from the concrete foundation looking toward the Labrador Sea. (September, 2017)


PHOTO 114 - APEC #13: View facing north from the area that was previously identified as the former catch basin. The concrete slab was disintegrated. (September, 2017)


PHOTO 115 - APEC #13: View from the disintegrated concrete foundation looking toward the Labrador Sea. (September, 2017)


PHOTO 116 - APEC #13: View from the disintegrated concrete foundation looking toward the Labrador Sea. (September, 2017)

GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS


PHOTO 117 - APEC #13: View of a surface water body from the disintegrated concrete foundation. (September, 2017)


PHOTO 118 - APEC #13: Large concrete block (approximately 2 m high). Unknown use. (September, 2017)

PHOTO 119 - APEC #13: Large concrete block (approximately 2 m high).
(September, 2017)

PHOTO 120 - APEC #14: View of waterbody located northeast of the helicopter pad.
(September, 2017)


PHOTO 121 - APEC #15A: Pipe of unknown age and purpose, inside of waterbody located north of the water source. Not identified as being a water source for the USAF.


PHOTO 122 - View of an upper quarry identified during the 2017 Site visit. (September, 2017)


PHOTO 123 - View of an upper quarry identified during the 2017 Site visit.
(September, 2017)


127 m
359 m
9.0%
Cut Throat Island
Image © 2018 DigitalGlobe
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google earth
2014
Imagery Date: 7/2/2014
54°29'28.11" N 57°08'13.99" W elev 66 m eye alt 2.89 km
Graph: Min, Avg, Max Elevation: -0, 88, 135 m
Range Totals: Distance: 2.38 km Elev Gain/Loss: 122 m, -144 m Max Slope: 60.9%, -21.5% Avg Slope: 20.2%, -8.0%
135 m
100 m
75 m
50 m
25 m
-0 m
127 m
9.0%
0.25 km
359 m
0.5 km
0.75 km
1 km
1.25 km
1.5 km
1.75 km
2 km
2.38 km


112 m
1.98 km
-3.4%
Cut Throat Island
Image © 2018 DigitalGlobe
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google earth
2014
Imagery Date: 7/2/2014
54°29'39.93" N 57°08'02.11" W elev 112 m eye alt 3.83 km
Graph: Min, Avg, Max Elevation: 0, 72, 117 m
Range Totals: Distance: 3.41 km
Elev Gain/Loss: 133 m, -153 m
Max Slope: 20.7%, -40.1%
Avg Slope: 7.0%, -9.7%
117 m
100 m
75 m
50 m
25 m
0 m
112 m
-3.4%
0.25 km
0.5 km
0.75 km
1 km
1.25 km
1.5 km
1.75 km
1.98 km
2.25 km
2.5 km
2.75 km
3 km
3.41 km

# APPENDIX C

Field Information

**Table C1 - Soil Descriptions**

| Sample Location | Depth (mbgs) | Easting NAD83 (CSRS) | Northing NAD83 (CSRS) | Zone | Colour | Description | Fill Y/N | Stains Y/N | Petroleum Odours Y/N | VOC Reading (ppm) | Debris Type Present / Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SS_CT_01 | 0-0.05 | 490911.93040 | 6039035.98780 | 21 N | Brown | Sand and gravel | | | | 0.0 | |
| SS_CT_02 | 0-0.05 | 490942.70460 | 6039041.26590 | 21 N | Brown | Silty sand and gravel | | | | 0.0 | |
| SS_CT_03 | 0-0.05 | 490953.06870 | 6039035.62650 | 21 N | Brown | Sand and gravel | | | | 0.0 | |
| SS_CT_04 | 0-0.05 | 490962.23910 | 6039030.94530 | 21 N | Brown | Sand and gravel | | | | 0.0 | |
| SS_CT_05 | 0-0.05 | 490973.41510 | 6039071.52790 | 21 N | Brown | Sand and gravel | | | | 0.0 | |
| SS_CT_06 | 0-0.05 | 490933.85050 | 6039002.33810 | 21 N | Brown | Sand and gravel | | | | 0.0 | |
| SS_CT_07 | 0-0.05 | 490881.27490 | 6038951.12980 | 21 N | Black | Sand and peat | | | | 0.0 | Organics |
| SS_CT_08 | 0-0.05 | 490874.10960 | 6038885.68180 | 21 N | Black | Organics | | | | 0.0 | Organics |
| SS_CT_09 | 0-0.05 | 490937.34900 | 6038933.34730 | 21 N | Black | Organics | | | | 0.0 | Organics |
| SS_CT_10 | 0-0.05 | 490930.44830 | 6038872.99770 | 21 N | Black | Sand and peat | | | | 0.0 | Organics |
| SS_CT_11 | 0-0.05 | 491024.76890 | 6039031.38510 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_12 | 0-0.05 | 491034.47070 | 6039013.72800 | 21 N | Brown | Sand and gravel | | Y | N | 0.0 | Organics |
| SS_CT_13 | 0-0.05 | 491042.51280 | 6039041.11260 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_14 | 0-0.05 | 491054.19620 | 6039021.67420 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_15 | 0-0.05 | 491027.40330 | 6038964.08040 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_16 | 0-0.05 | 491098.12730 | 6038910.49340 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_17 | 0-0.05 | 491107.84600 | 6038908.67680 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_18 | 0-0.05 | 491100.96970 | 6038901.14310 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_19 | 0-0.05 | 491109.88490 | 6038898.21520 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_20BG | 0-0.05 | 491134.29660 | 6039214.12630 | 21 N | | Peat, with sand and silt | | | | 0.0 | |
| SS_CT_21 | 0-0.05 | 491328.45620 | 6038725.42070 | 21 N | Brown | Sand and Gravel | | | | 0.0 | Organics |
| SS_CT_22 | 0-0.05 | 491461.00000 | 6038726.00000 | 21 N | Brown | Gravel and silty sand | | | | 0.0 | Organics |
| SS_CT_23 | 0-0.05 | 491460.00000 | 6038738.00000 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_24 | 0-0.05 | 491468.00000 | 6038726.00000 | 22 N | Brown | Sand and gravel | | | | 0.0 | |

## Table C1 - Soil Descriptions

| Sample Location | Depth (mbgs) | Easting NAD83 (CSRS) | Northing NAD83 (CSRS) | Zone | Colour | Description | Fill Y/N | Stains Y/N | Petroleum Odours Y/N | VOC Reading (ppm) | Debris Type Present / Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SS_CT_25 | 0-0.05 | 491470.00000 | 6038738.00000 | 21 N | Brown | Sand with trace gravel | | | | 0.0 | |
| SS_CT_26 | 0-0.05 | 491503.70620 | 6038581.16140 | 21 N | Brown | Sand and gravel | | | | 0.0 | |
| SS_CT_27 | 0-0.05 | 491493.03660 | 6038571.93360 | 21 N | Brown | Sand and gravel | | | | 0.0 | |
| SS_CT_28 | 0.02-0.20 | 491501.97590 | 6038562.70590 | 21 N | Brown | Sand and gravel | | | Y | 0.0 | |
| SS_CT_29 | 0.05-0.075 | 491510.05020 | 6038572.51040 | 21 N | Brown | Peat and root material | | | N | 0.0 | |
| SS_CT_30 | 0-0.05 | 491311.25310 | 6038490.98270 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_31 | 0-0.05 | 491353.53390 | 6038498.84300 | 21 N | Brown | Gravel, silt, and sand | | | | 0.0 | Organics |
| SS_CT_32 | 0-0.05 | 491320.33220 | 6038449.12640 | 21 N | Brown | Gravel, silt, and sand | | | | 0.0 | Organics |
| SS_CT_33 | 0-0.05 | 491362.00870 | 6038454.97410 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_34 | 0-0.05 | 491405.54880 | 6038405.07600 | 21 N | Brown | Sand and Gravel | | | | 0.0 | Organics |
| SS_CT_36 | 0-0.05 | 491740.56080 | 6038145.55940 | 21 N | Black | Organics | | | | 0.0 | Organics |
| SS_CT_37 | 0-0.05 | 491715.77180 | 6038128.05710 | 21 N | Black | Organics | | | | 0.0 | Organics |
| SS_CT_38 | 0-0.05 | 491793.28740 | 6038133.14940 | 21 N | Black | Organics | | | | 0.0 | Organics |
| SS_CT_39 | 0-0.05 | 491813.26300 | 6038066.98460 | 21 N | Black | Organics | | | | 0.0 | Organics |
| SS_CT_40 | 0-0.05 | 491987.36470 | 6038007.58290 | 21 N | Brown | Sand and Gravel | | | | 0.0 | Organics |
| SS_CT_41 | 0-0.05 | 492080.00000 | 6037888.00000 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_42 | 0-0.05 | 492105.00000 | 6037910.00000 | 21 N | Brown | Gravel and silty sand | | | | 0.0 | |
| SS_CT_43 | 0-0.05 | 492094.00000 | 6037877.00000 | 21 N | Brown | Gravel and silty sand | | | | 0.0 | Organics |
| SS_CT_44 | 0-0.05 | 492121.00000 | 6037895.00000 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_45 | 0-0.05 | 491958.51460 | 6037754.70350 | 21 N | Brown | Sand, silt, and gravel | Y | | | 0.0 | |
| SS_CT_46 | 0-0.05 | 491966.58960 | 6037766.64580 | 21 N | Brown | Sand and gravel | Y | | | 0.0 | Organics |
| SS_CT_47 | 0-0.05 | 491966.53040 | 6037742.74180 | 21 N | Brown | Gravel and silty sand | Y | | | 0.0 | Organics |
| SS_CT_48 | 0.12-0.20 | 491984.23050 | 6037755.04030 | 21 N | Brown | Sand, some gravel | Y | | | 0.0 | |
| SS_CT_49 | 0.05-0.075 | 491991.69950 | 6037749.47570 | 21 N | Brown | Sand and gravel | | | | 0.0 | |

**Table C1 - Soil Descriptions**

| Sample Location | Depth (mbgs) | Easting NAD83 (CSRS) | Northing NAD83 (CSRS) | Zone | Colour | Description | Fill Y/N | Stains Y/N | Petroleum Odours Y/N | VOC Reading (ppm) | Debris Type Present / Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SS_CT_50 | 0-0.05 | 492007.48610 | 6037761.66010 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_51 | 0-0.05 | 492011.02920 | 6037757.28060 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_52 | 0-0.05 | 492014.57620 | 6037761.70290 | 21 N | Brown | Gravel and silty sand | | | | 0.0 | Organics |
| SS_CT_53 | 0-0.05 | 492011.08820 | 6037765.74950 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| SS_CT_54 | 0-0.05 | 492059.00850 | 6037711.29730 | 21 N | Black | Organics, some sand | | | | 0.0 | Organics |
| SS_CT_55 | 0-0.05 | 491238.22740 | 6039006.86740 | 21 N | Brown | Sand and gravel | | | | 0.0 | |
| SS_CT_56 | 0-0.05 | 491241.97940 | 6039011.07320 | 21 N | Brown | Sand and gravel | | | | 0.0 | |
| SS_CT_57 | 0-0.05 | 491245.78450 | 6039005.52910 | 21 N | Brown | Sand and gravel | | | | 0.0 | |
| SS_CT_58 | 0-0.05 | 491240.61630 | 6039002.39630 | 21 N | Brown | Sand and gravel | | | | 0.0 | |
| SS_CT_60 | 0-0.05 | 491300.97260 | 6038686.29210 | 21 N | Gray-brown | Sand and silt | | | Y | 0.0 | |
| SS_CT_61 | 0-0.05 | 491271.83960 | 6038693.02400 | 21 N | ark gray-brow | Sand and silt | | | N | 0.0 | |
| SS_CT_62 | 0-0.05 | 491264.66820 | 6038668.55840 | 21 N | own-dark bro | Sand and silt | | | N | 0.0 | |
| SS_CT_63 | 0-0.05 | 491293.17910 | 6038675.18000 | 21 N | own-dark bro | Sand and silt | | | N | 0.0 | |

Notes:
BG = background sample
FD = field duplicate

## Table C2 - Test Pit Logs-Cut Throat Island

| APEC | Sample Location | Depth (mbgs) | Easting NAD83 (CSRS) | Northing NAD83 (CSRS) | Zone | Colour | Description | Fill Y/N | Stains Y/N | Petroleum Odours Y/N | VOC Reading (ppm) | Debris Type Present / Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APEC 1 | SS_CT_14 | 0-0.1 | 491054.19620 | 6039021.67420 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| | | 0.1 | | | | | Bedrock ecountered | | | | | |
| APEC 2 | SS_CT_48 | 0-0.025 | 491984.23050 | 6037755.04030 | 21 N | Brown | Sand | Y | | | 0.0 | |
| | | 0.025-0.12 | | | | Brown | Sand with gravel | Y | | | | |
| | | 0.12-0.20 | | | | Brown | Sand, some gravel | Y | | | 0.0 | |
| | | 0.2 | | | | | Bedrock ecountered | | | | | |
| APEC 2 | SS_CT_49 | 0-0.05 | 491991.69950 | 6037749.47570 | 21 N | Brown | Peat and root material | | | | 0.0 | |
| | | 0.05-0.075 | | | | Brown | Sand and gravel | | | | 0.0 | |
| | | 0.075 | | | | | Bedrock ecountered | | | | | |
| APEC 3 | SS_CT_15 | 0-0.1 | 491027.40330 | 6038964.08040 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| | | 0.1 | | | | | Bedrock ecountered | | | | | |
| APEC 4 | SS_CT_42 | 0-0.1 | 492105.00000 | 6037910.00000 | 21 N | Brown | Gravel and silty sand | | | | 0.0 | |
| | | 0.1 | | | | | Bedrock ecountered | | | | | |
| APEC 5 | SS_CT_37 | 0-0.1 | 491715.77180 | 6038128.05710 | 21 N | Black | Organics | | | | 0.0 | Organics |
| | | 0.1 | | | | | Bedrock ecountered | | | | | |
| APEC 6 | SS_CT_09 | 0-0.06 | 490937.34900 | 6038933.34730 | 21 N | Black | Organics (Peat) | | | | 0.0 | Organics |
| | | 0.06-0.09 | | | | Dark brown | wet sand (slurry) | | | | | |
| | | 0.09 | | | | Black | Bedrock ecountered | | | | | |
| APEC 6A | SS_CT_61 | 0-0.09 | 491271.83960 | 6038693.02400 | 21 N | Dark gray-brown | Sand and silt | | | N | 0.0 | |
| | | 0.09 | | | | | Bedrock ecountered | | | | | |
| APEC 7 | SS_CT_32 | 0-0.1 | 491320.33220 | 6038449.12640 | 21 N | Brown | Gravel, silt, and sand | | | | 0.0 | Organics |
| | | 0.1 | | | | | Bedrock ecountered | | | | | |
| APEC 8 | SS_CT_56 | 0-0.1 | 491241.97940 | 6039011.07320 | 21 N | Brown | Sand and gravel | | | | 0.0 | |
| | | 0.1 | | | | | Bedrock ecountered | | | | | |
| APEC 9 | SS_CT_52 | 0-0.1 | 492014.57620 | 6037761.70290 | 21 N | Brown | Gravel and silty sand | | | | 0.0 | Organics |
| | | 0.1 | | | | | Bedrock ecountered | | | | | |
| APEC 10 | SS_CT_04 | 0-0.1 | 490962.23910 | 6039030.94530 | 21 N | Brown | Sand and gravel | | | | 0.0 | |
| | | 0.1 | | | | | Bedrock ecountered | | | | | |

**Table C2 - Test Pit Logs-Cut Throat Island**

| APEC | Sample Location | Depth (mbgs) | Easting NAD83 (CSRS) | Northing NAD83 (CSRS) | Zone | Colour | Description | Fill Y/N | Stains Y/N | Petroleum Odours Y/N | VOC Reading (ppm) | Debris Type Present / Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APEC 11 | SS_CT_16 | 0-0.1 | 491098.12730 | 6038910.49340 | 21 N | Brown | Sand and gravel | | | | 0.0 | Organics |
| | | 0.1 | | | | | Bedrock ecountered | | | | | |
| APEC 12 | SS_CT_24 | 0-0.1 | 491468.00000 | 6038726.00000 | 22 N | Brown | Sand and gravel | | | | 0.0 | |
| | | 0.1 | | | | | Bedrock ecountered | | | | | |
| APEC 13 | SS_CT_28 | 0.02-0.20 | 491501.97590 | 6038562.70590 | 21 N | Brown | Sand and gravel | | | Y | 0.0 | |
| | | 0.20-0.3 | | | | Brown | Sand and gravel | | | | | |
| | | 0.3 | | | | | Bedrock ecountered | | | | | |

# APPENDIX D

Analytical Tables

Report to: Defence Construction Canada
Project: 10550.04.01 (Final) (November 23, 2018)

## Table D1-1 Petroleum Hydrocarbons in Soil (mg/kg) (Residential)

| Sample ID | Sample Depth (mbgs) | Sample Date | B | T | E | X | Total Petroleum Hydrocarbons $C_6$-$C_{10}$ F1[3] | $C_{10}$-$C_{16}$ F2 | $C_{16}$-$C_{34}$ F3 | $C_{34}$-$C_{50}$[4] - | $C_{>50}$[5] - | $C_{>34}$ F4[6] | Modified TPH ($C_6$-$C_{32}$)[7] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Provincial Screening Levels [1]** | | | | | | | | | | | | | |
| **Human Health** | | | **0.099** | **77** | **30** | **8.8** | **-** | **-** | **-** | **-** | **-** | **-** | **270** |
| **Ecological** | | | **31** | **75** | **55** | **95** | **210** | **150** | **300** | **2800** | **-** | **2800** | **-** |
| **Federal Screening Levels [2]** | | | | | | | | | | | | | |
| **Human Health** | | | **110** | **22000** | **10000** | **150000** | **30** | **150** | **2500** | **-** | **-** | **10000** | **-** |
| **Ecological** | | | **31** | **75** | **120** | **95** | **210** | **150** | **300** | **-** | **-** | **2800** | **-** |
| SS_CT_20 BG | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 55 | <50 | - | <50 | 55 |
| SS_CT_20 BG_LD | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 63 | <50 | - | <50 | 63 |
| SS_CT_21 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_34 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_40 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 78 | <50 | - | <50 | 78 |
| SS_CT_40_LD | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 54 | <50 | - | <50 | 54 |
| SS_CT_41 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 110 | <50 | - | <50 | 110 |
| SS_CT_42 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_43 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 97 | <50 | - | <50 | 97 |
| SS_CT_44 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 110 | 84 | 150 | 150 | 110 |
| SS_CT_45 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | 28 | 150 | <50 | - | <50 | 178 |
| SS_CT_45_FD | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | 31 | 150 | <50 | - | <50 | 181 |
| SS_CT_46 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | 30 | 94 | <50 | - | <50 | 124 |
| SS_CT_47 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | 56 | 120 | <50 | - | <50 | 176 |
| SS_CT_48 | 0.12-0.20 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | **4300** | **1900** | 66 | - | 66 | 6200 |
| SS_CT_49 | 0.05-0.075 | 13-Sep-17 | <0.012 | <0.040 | <0.020 | <0.040 | <20 | <20 | **620** | 350 | 1200 | 1200 | 620 |
| SS_CT_49_FD | 0-0.05 | 13-Sep-17 | <0.018 | <0.060 | <0.030 | <0.060 | <30 | <20 | **810** | 570 | 830 | 830 | 810 |

## Table D1-1 Petroleum Hydrocarbons in Soil (mg/kg) (Residential)

| Sample ID | Sample Depth (mbgs) | Sample Date | B | T | E | X | Total Petroleum Hydrocarbons $C_6$-$C_{10}$ | $C_{10}$-$C_{16}$ | $C_{16}$-$C_{34}$ | $C_{34}$-$C_{50}$ [4] | $C_{>50}$ [5] | $C_{>34}$ | Modified TPH ($C_6$-$C_{32}$)[7] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | F1[3] | F2 | F3 | - | - | F4[6] | |
| **Provincial Screening Levels [1]** | | | | | | | | | | | | | |
| **Human Health** | | | **0.099** | **77** | **30** | **8.8** | **-** | **-** | **-** | **-** | **-** | **-** | **270** |
| **Ecological** | | | **31** | **75** | **55** | **95** | **210** | **150** | **300** | **2800** | **-** | **2800** | **-** |
| **Federal Screening Levels [2]** | | | | | | | | | | | | | |
| **Human Health** | | | **110** | **22000** | **10000** | **150000** | **30** | **150** | **2500** | **-** | **-** | **10000** | **-** |
| **Ecological** | | | **31** | **75** | **120** | **95** | **210** | **150** | **300** | **-** | **-** | **2800** | **-** |
| SS_CT_50 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 100 | <50 | - | <50 | 100 |
| SS_CT_51 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_52 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | 100 | 300 | 73 | 160 | 160 | 400 |
| SS_CT_53 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | 45 | **310** | 100 | 480 | 480 | 355 |
| SS_CT_53 LD | 0-0.05 | 13-Sep-17 | - | - | - | - | - | - | - | - | 390 | 390 | - |
| SS_CT_54 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | 16 | **330** | 180 | 410 | 410 | 346 |

Notes:

1. Tier I RBSLs and ESLs for a residential/parkland, non-potable site with coarse-grained soil, and diesel fuel impacts. Soil ESL for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (mg/kg dry weight) (Atlantic PIRI, 2015).
2. CCME Canadian Soil Quality Guidelines for the Protection of Environmentaland Human Health and Canada Wide Standard (CWS) for Petroleum Hydrocarbons (PHC) in Soil (residential, coarse-grained surface soil, (cancer risk: 10-5 (benzene), (Management Limit and Eco Soil Contact (CWS))
3. Does not include BTEX compounds
4. Where the chromatogram returns to baseline following the $C_{>34}$-$C_{50}$ analysis, additional hydrocarbons in the $C_{>50}$ range are not expected, and the preliminary F4 ( $C_{>34}$-$C_{50}$) analysis is deemed an appropriate approximation of CCME F4 ($C_{>34}$) hydrocarbons.
5. Where the chromatogram did not return to baseline following the $C_{>34}$-$C_{50}$ analysis, additional anlysis (F4 Gravimetric method) was conducted to quantify hydrocarbons in the $C_{>50}$ range.
6. CCME hydrocarbon range F4 presented here is the greater value of $C_{34}$-$C_{50}$ and $C_{>50}$ (where analyzed. See notes 4 and 5).
7. Modified TPH calculated from the sum of the detected parameters of the CWS F1-F3 fractions. Though generally consistent with the Atlantic RBCA Guidelines for Laboratories (V3.1, 2016), the Atlantic RBCA modified TPH represents $C_{>6}$-$C_{32}$, while the CWS represents $C_{>6}$-$C_{34}$. Thus the calculated mTPH concentration presented here is a slight over estimate of mTPH in the Atlantic RBCA context.

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

Exceedances of Atlantic RBCA Human Health Screening Levels are underlined.

Exceedances of the Atlantic RBCA Ecological Screening Levels are *italicized* .

NA = not applicable

"-" = Not available/ Not analyzed.

**Table D1-2  Petroleum Hydrocarbons in Soil (mg/kg) (Commercial)**

| Sample ID | Sample Depth (mbgs) | Sample Date | B | T | E | X | Total Petroleum Hydrocarbons | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | $C_6$-$C_{10}$ | $C_{10}$-$C_{16}$ | $C_{16}$-$C_{34}$ | $C_{34}$-$C_{50}$[4] | $C_{>50}$[5] | $C_{>34}$ | Modified TPH ($C_6$-$C_{32}$)[6] |
| | | | | | | | F1[3] | F2 | F3 | - | - | F4[6] | |
| **Provincial Screening Levels**[1] | | | | | | | | | | | | | |
| **Human Health** | | | **2.5** | **10000** | **10000** | **110** | **-** | **-** | **-** | **-** | **-** | **-** | **4000** |
| **Ecological** | | | **180** | **250** | **300** | **350** | **320** | **260** | **1700** | **3300** | **-** | **3300** | **-** |
| **Federal Screening Levels**[2] | | | | | | | | | | | | | |
| **Human Health** | | | **0.03** | **0.37** | **0.082** | **11** | **700** | **1000** | **3500** | **-** | **-** | **10000** | **-** |
| **Ecological** | | | **180** | **250** | **300** | **350** | **320** | **260** | **1700** | **-** | **-** | **3300** | **-** |
| SS_CT_01 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_02 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 58 | <50 | - | <50 | 58 |
| SS_CT_03 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | 46 | **2000** | 520 | - | 520 | 2046 |
| SS_CT_03_LD | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | - | - | - | - | - | - |
| SS_CT_04 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_05 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 73 | <50 | - | <50 | 73 |
| SS_CT_05_FD | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 52 | <50 | - | <50 | 52 |
| SS_CT_06 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_07 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <20 | 920 | 770 | 2400 | 2400 | 920 |
| SS_CT_07 FD | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 270 | 190 | 810 | 810 | 270 |
| SS_CT_07 FD LD | 0-0.05 | 12-Sep-17 | - | - | - | - | - | - | - | - | 720 | 720 | - |
| SS_CT_08 | 0-0.05 | 12-Sep-17 | <0.018 | <0.060 | <0.030 | <0.060 | <30 | <40 | 1700 | 1300 | 4900 | 4900 | 1700 |
| SS_CT_09 | 0-0.05 | 12-Sep-17 | <0.024 | <0.080 | <0.040 | <0.080 | <40 | 80 | **3500** | 2800 | 9100 | 9100 | 3580 |
| SS_CT_10 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <20 | 180 | 170 | 290 | 290 | 180 |
| SS_CT_11 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | 77 | 460 | 70 | - | 70 | 537 |
| SS_CT_12 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | 11 | 160 | 64 | <100 | 64 | 171 |
| SS_CT_13 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 130 | 73 | 150 | 150 | 130 |
| SS_CT_14 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | 10 | 120 | <50 | - | <50 | 130 |

Table D1-2 Petroleum Hydrocarbons in Soil (mg/kg) (Commercial)

| Sample ID | Sample Depth (mbgs) | Sample Date | B | T | E | X | Total Petroleum Hydrocarbons | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | $C_6$-$C_{10}$ | $C_{10}$-$C_{16}$ | $C_{16}$-$C_{34}$ | $C_{34}$-$C_{50}$[4] | $C_{>50}$[5] | $C>_{34}$ | Modified TPH ($C_6$-$C_{32}$)[6] |
| | | | | | | | F1[3] | F2 | F3 | - | - | F4[6] | |
| **Provincial Screening Levels**[1] | | | | | | | | | | | | | |
| **Human Health** | | | **2.5** | **10000** | **10000** | **110** | **-** | **-** | **-** | **-** | **-** | **-** | **4000** |
| **Ecological** | | | **180** | **250** | **300** | **350** | **320** | **260** | **1700** | **3300** | **-** | **3300** | **-** |
| **Federal Screening Levels**[2] | | | | | | | | | | | | | |
| **Human Health** | | | **0.03** | **0.37** | **0.082** | **11** | **700** | **1000** | **3500** | **-** | **-** | **10000** | **-** |
| **Ecological** | | | **180** | **250** | **300** | **350** | **320** | **260** | **1700** | **-** | **-** | **3300** | **-** |
| SS_CT_15 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | 13 | 470 | 78 | 660 | 660 | 483 |
| SS_CT_16 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 140 | 89 | 240 | 240 | 140 |
| SS_CT_17 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | 20 | 65 | <50 | - | <50 | 85 |
| SS_CT_18 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_18_LD | 0-0.05 | 12-Sep-17 | - | - | - | - | - | <10 | <50 | <50 | - | <50 | - |
| SS_CT_19 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 53 | 53 | 330 | 330 | 53 |
| SS_CT_20 BG | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 55 | <50 | - | <50 | 55 |
| SS_CT_20 BG_LD | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 63 | <50 | - | <50 | 63 |
| SS_CT_22 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_22_FD | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 59 | <50 | - | <50 | 59 |
| SS_CT_23 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_24 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 260 | 1200 | 4500 | 4500 | 260 |
| SS_CT_25 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 57 | <50 | - | <50 | 57 |
| SS_CT_26 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | **6500** | **5500** | <50 | - | <50 | <u>12000</u> |
| SS_CT_27 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_28 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 150 | 58 | 270 | 270 | 150 |
| SS_CT_29 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | **1200** | 490 | 170 | 750 | 750 | 1690 |
| SS_CT_30 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_31 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |

## Table D1-2  Petroleum Hydrocarbons in Soil (mg/kg) (Commercial)

| Sample ID | Sample Depth (mbgs) | Sample Date | B | T | E | X | Total Petroleum Hydrocarbons | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | $C_6$-$C_{10}$ | $C_{10}$-$C_{16}$ | $C_{16}$-$C_{34}$ | $C_{34}$-$C_{50}$[4] | $C_{>50}$[5] | $C_{>34}$ | Modified TPH ($C_6$-$C_{32}$)[6] |
| | | | | | | | F1[3] | F2 | F3 | - | - | F4[6] | |
| **Provincial Screening Levels[1]** | | | | | | | | | | | | | |
| **Human Health** | | | 2.5 | 10000 | 10000 | 110 | - | - | - | - | - | - | 4000 |
| **Ecological** | | | 180 | 250 | 300 | 350 | 320 | 260 | 1700 | 3300 | - | 3300 | - |
| **Federal Screening Levels[2]** | | | | | | | | | | | | | |
| **Human Health** | | | 0.03 | 0.37 | 0.082 | 11 | 700 | 1000 | 3500 | - | - | 10000 | - |
| **Ecological** | | | 180 | 250 | 300 | 350 | 320 | 260 | 1700 | - | - | 3300 | - |
| SS_CT_32 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_33 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_36 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <20 | 980 | 860 | 4800 | 4800 | 980 |
| SS_CT_37 | 0-0.05 | 13-Sep-17 | <0.012 | <0.040 | <0.020 | <0.040 | <20 | <30 | 590 | 460 | 480 | 480 | 590 |
| SS_CT_38 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 150 | 100 | 170 | 170 | 150 |
| SS_CT_39 | 0-0.05 | 13-Sep-17 | <0.012 | <0.040 | <0.020 | <0.040 | <20 | <40 | 970 | 520 | 2000 | 2000 | 970 |
| SS_CT_55 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 70 | <50 | - | <50 | 70 |
| SS_CT_56 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_57 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_58 | 0-0.05 | 12-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_60 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | **610** | **5600** | 2400 | - | 2400 | 6210 |
| SS_CT_61 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SS_CT_62 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | **400** | **9000** | *4900* | 15000 | 15000 | 9400 |
| SS_CT_63 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 64 | <50 | - | <50 | 64 |

Notes:

1. Tier 1 RBSLs and ESLs for a commercial, non-potable site with coarse-grained soil, and diesel impacts, Soil ESL for Protection of Plants and Soil Invertebrates, Direct Soil Contact (mg/kg dry weight) (Atlantic PIRI, 2015).
2. CCME Canadian Soil Quality Guidelines for the Protection of Environmentaland Human Health and Canada Wide Standard (CWS) for Petroleum Hydrocarbons (PHC) in Soil (commercial, coarse-grained surface soil, (cancer risk: 10-5 (benzene), (Management Limit and Eco Soil Contact (CWS))
3. Does not include BTEX compounds

Table D1-2  Petroleum Hydrocarbons in Soil (mg/kg) (Commercial)

| Sample ID | Sample Depth (mbgs) | Sample Date | B | T | E | X | Total Petroleum Hydrocarbons | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | $C_6$-$C_{10}$ | $C_{10}$-$C_{16}$ | $C_{16}$-$C_{34}$ | $C_{34}$-$C_{50}$[4] | $C_{>50}$[5] | $C_{>34}$ | Modified TPH ($C_6$-$C_{32}$)[6] |
| | | | | | | | F1[3] | F2 | F3 | - | - | F4[6] | |
| **Provincial Screening Levels**[1] | | | | | | | | | | | | | |
| **Human Health** | | | 2.5 | 10000 | 10000 | 110 | - | - | - | - | - | - | 4000 |
| **Ecological** | | | 180 | 250 | 300 | 350 | 320 | 260 | 1700 | 3300 | - | 3300 | - |
| **Federal Screening Levels**[2] | | | | | | | | | | | | | |
| **Human Health** | | | 0.03 | 0.37 | 0.082 | 11 | 700 | 1000 | 3500 | - | - | 10000 | - |
| **Ecological** | | | 180 | 250 | 300 | 350 | 320 | 260 | 1700 | - | - | 3300 | - |

4. Where the chromatogram returns to baseline following the $C_{>34}$-$C_{50}$ analysis, additional hydrocarbons in the $C_{>50}$ range are not expected, and the preliminary F4 ( $C_{>34}$-$C_{50}$) analysis is deemed an appropriate approximation of CCME F4 ($C_{>34}$) hydrocarbons.

5. Where the chromatogram did not return to baseline following the $C_{>34}$-$C_{50}$ analysis, additional anlysis (F4 Gravimetric method) was conducted to quantify hydrocarbons in the $C_{>50}$ range.

6. CCME hydrocarbon range F4 presented here is the greater value of $C_{34}$-$C_{50}$ and $C_{>50}$ (where analyzed. See notes 4 and 5).

7. Modified TPH calculated from the sum of the detected parameters of the CWS F1-F3 fractions. Though generally consistent with the Atlantic RBCA Guidelines for Laboratories (V3.1, 2016), the Atlantic RBCA modified TPH represents $C_{>6}$-$C_{32}$, while the CWS represents $C_{>6}$-$C_{34}$. Thus the calculated mTPH concentration presented here is a slight over estimate of mTPH in the Atlantic RBCA context.

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

Exceedances of Provincial Human Health Screening Levels are underlined.

Exceedances of the Provincial Ecological Screening Levels are *italicized* .

NA = not applicable

"-" = Not available/ Not analyzed.

**Table D2-1 PAH Concentrations in Soil (mg/kg) (Residential)**

| Parameter | Human Health | | CCME Ecological Guideline | Concentration (mg/kg) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sample Identification | | | | | |
| | NSE TIER 1 EQS (Residential) | B(a)P PEF | | SS_CT_20 BG | SS_CT_41 | SS_CT_42 | SS_CT_43 | SS_CT_44 | SS_CT_44_LD |
| **Non-Carcinogenic PAHs** | | | | | | | | | |
| Acenaphthene | 3900 | - | 0.28 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Acenaphthylene | 4.5 | - | 320 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Anthracene | 24000 | - | 2.5 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluoranthene | 3500 | - | 50 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluorene | 2700 | - | 0.25 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Naphthalene | 2.2 | - | 0.013 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Perylene | - | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Phenanthrene | - | - | 0.046 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Pyrene | 2100 | - | 10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| 1-Methylnaphthalene | 72 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| 2-Methylnaphthalene | 72 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **Carcinogenic PAHs** | | | | | | | | | |
| Benzo[a]anthracene | - | 0.1 | 1 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[a]pyrene | - | 1 | 20 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[b]fluoranthene | - | 0.1 | 1 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo(b/j)fluoranthene | - | - | - | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | - |
| Benzo[ghi]perylene | - | 0.01 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[j]fluoranthene | - | 0.1 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[k]fluoranthene | - | 0.1 | 1 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Chrysene | - | 0.01 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Dibenz[a,h]anthracene | - | 1 | 1 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Indeno[1,2,3-cd]pyrene | - | 0.1 | 1 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **B(a)P TPE** | **-** | **-** | 5.3 | 0.02 [1] | 0.02 [1] | 0.02 [1] | 0.02 [1] | 0.02 [1] | 0.02 [1] |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 12-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

**Notes:**

NSE TIER 1 EQS = Nova Scotia Environment Tier 1 Environmental Quality Standards (2013)

B(a)P PEF = Benzo(a)pyrene potency equivalency factor

[1] Uncertainty factor of 3 was used as the PAH source is expected to be creosote.

[2] Guideline is for the sum of Benzo [b+j+k]fluoranthene

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

If the concentration was less than the detection limit, then 1/2 the detection limit was used in B(a)P TPE calculations.

" -" = no guideline available, not analysed

**Table D2-1 PAH Concentrations in Soil (mg/kg) (Residential)**

| Parameter | Human Health | | CCME Ecological Guideline | Concentration (mg/kg) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Identification | | | | |
| | NSE TIER 1 EQS (Residential) | B(a)P PEF | | SS_CT_45 | SS_CT_45_FD | SS_CT_46 | SS_CT_47 | SS_CT_48 |
| **Non-Carcinogenic PAHs** | | | | | | | | |
| Acenaphthene | 3900 | - | 0.28 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Acenaphthylene | 4.5 | - | 320 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.025 |
| Anthracene | 24000 | - | 2.5 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.010 |
| Fluoranthene | 3500 | - | 50 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluorene | 2700 | - | 0.25 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Naphthalene | 2.2 | - | 0.013 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Perylene | - | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Phenanthrene | - | - | 0.046 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.013 |
| Pyrene | 2100 | - | 10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| 1-Methylnaphthalene | 72 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.018 |
| 2-Methylnaphthalene | 72 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.018 |
| **Carcinogenic PAHs** | | | | | | | | |
| Benzo[a]anthracene | - | 0.1 | 1 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[a]pyrene | - | 1 | 20 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[b]fluoranthene | - | 0.1 | 1 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo(b/j)fluoranthene | - | - | - | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Benzo[ghi]perylene | - | 0.01 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[j]fluoranthene | - | 0.1 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[k]fluoranthene | - | 0.1 | 1 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Chrysene | - | 0.01 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Dibenz[a,h]anthracene | - | 1 | 1 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Indeno[1,2,3-cd]pyrene | - | 0.1 | 1 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **B(a)P TPE** | **-** | **-** | 5.3 | 0.02 [1] | 0.02 [1] | 0.02 [1] | 0.02 [1] | 0.02 [1] |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0.12-0.20 |
| | | | **Sample Date** | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

**Notes:**

NSE TIER 1 EQS = Nova Scotia Environment Tier 1 Environmental Quality Standards (2013)

B(a)P PEF = Benzo(a)pyrene potency equivalency factor

[1] Uncertainty factor of 3 was used as the PAH source is expected to be creosote.

[2] Guideline is for the sum of Benzo [b+j+k]fluoranthene

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

If the concentration was less than the detection limit, then 1/2 the detection limit was used in B(a)P TPE calculations.

" -" = no guideline available, not analysed

**Table D2-2 PAH Concentrations in Soil (mg/kg) (Commercial)**

| Parameter | | | | Concentration (mg/kg) | | | | |
|---|---|---|---|---|---|---|---|---|
| | Human Health | | | Sample Identification | | | | |
| | NSE TIER 1 EQS (Commercial) | B(a)P PEF | CCME Ecological Guideline | SS_CT_01 | SS_CT_02 | SS_CT_03 | SS_CT_04 | SS_CT_05 |
| **Non-Carcinogenic PAHs** | | | | | | | | |
| Acenaphthene | 8000 | - | 0.28 | <0.0050 | <0.0050 | **5.2** | <0.0050 | <0.0050 |
| Acenaphthylene | 66 | - | 320 | <0.0050 | <0.0050 | <0.049 | <0.0050 | <0.0050 |
| Anthracene | 37000 | - | 32 | 0.0053 | 0.0093 | 9.3 | <0.0050 | <0.0050 |
| Fluoranthene | 5300 | - | 180 | 0.017 | 0.16 | 120 | 0.026 | 0.009 |
| Fluorene | 4100 | - | 0.25 | <0.0050 | <0.0050 | **4.9** | <0.0050 | <0.0050 |
| Naphthalene | 25 | - | 0.013 | <0.0050 | <0.0050 | **0.16** | <0.0050 | <0.0050 |
| Perylene | - | - | - | <0.0050 | 0.015 | 7.5 | <0.0050 | <0.0050 |
| Phenanthrene | - | - | 0.046 | 0.0058 | **0.065** | **63** | 0.008 | <0.0050 |
| Pyrene | 3200 | - | 100 | 0.014 | 0.12 | 85 | 0.021 | 0.0094 |
| 1-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | 0.15 | <0.0050 | <0.0050 |
| 2-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | 0.12 | <0.0050 | <0.0050 |
| **Carcinogenic PAHs** | | | | | | | | |
| Benzo[a]anthracene | - | 0.1 | 10 | <0.0050 | 0.07 | **47** | 0.014 | 0.0062 |
| Benzo[a]pyrene | - | 1 | 72 | <0.0050 | 0.06 | 28 | 0.013 | <0.0050 |
| Benzo[b]fluoranthene | - | 0.1 | 10 [2] | 0.0089 | 0.064 | **26** | 0.013 | <0.0050 |
| Benzo(b/j)fluoranthene | - | - | - | <0.010 | 0.1 | 41 | 0.02 | <0.010 |
| Benzo[ghi]perylene | - | 0.01 | - | 0.0079 | 0.034 | 12 | 0.0094 | 0.021 |
| Benzo[j]fluoranthene | - | 0.1 | - | <0.0050 | 0.036 | **15** | 0.0062 | <0.0050 |
| Benzo[k]fluoranthene | - | 0.1 | 10 [2] | <0.0050 | 0.036 | **15** | 0.0072 | <0.0050 |
| Chrysene | - | 0.01 | - | 0.011 | 0.067 | 43 | 0.016 | 0.0057 |
| Dibenz[a,h]anthracene | - | 1 | 10 [2] | <0.0050 | 0.0093 | **3.8** | <0.0050 | <0.0050 |
| Indeno[1,2,3-cd]pyrene | - | 0.1 | 10 | 0.0059 | 0.032 | 12 | 0.0085 | 0.01 |
| **B(a)P TPE** | **-** | **-** | 5.3 | 0.02 [1] | 0.28 [1] | 131.55 [1] | 0.06 [1] | 0.02 [1] |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 |

**Notes:**

NSE TIER 1 EQS = Nova Scotia Environment Tier 1 Environmental Quality Standards (2013)

B(a)P PEF = Benzo(a)pyrene potency equivalency factor

[1] Uncertainty factor of 3 was used as the PAH source is expected to be creosote.

[2] Guideline is for the sum of Benzo [b+j+k]fluoranthene

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

If the concentration was less than the detection limit, then 1/2 the detection limit was used in B(a)P TPE calculations.

" -" = no guideline available, not analysed

**Table D2-2 PAH Concentrations in Soil (mg/kg) (Commercial)**

| Parameter | Human Health | | CCME Ecological Guideline | Concentration (mg/kg) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Identification | | | | |
| | NSE TIER 1 EQS (Commercial) | B(a)P PEF | | SS_CT_05_FD | SS_CT_06 | SS_CT_07 | SS_CT_07 FD | SS_CT_08 |
| **Non-Carcinogenic PAHs** | | | | | | | | |
| Acenaphthene | 8000 | - | 0.28 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Acenaphthylene | 66 | - | 320 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Anthracene | 37000 | - | 32 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluoranthene | 5300 | - | 180 | 0.0055 | 0.0058 | <0.0050 | <0.0050 | <0.0050 |
| Fluorene | 4100 | - | 0.25 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Naphthalene | 25 | - | 0.013 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Perylene | - | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Phenanthrene | - | - | 0.046 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Pyrene | 3200 | - | 100 | <0.0050 | 0.0058 | <0.0050 | <0.0050 | <0.0050 |
| 1-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| 2-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **Carcinogenic PAHs** | | | | | | | | |
| Benzo[a]anthracene | - | 0.1 | 10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[a]pyrene | - | 1 | 72 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[b]fluoranthene | - | 0.1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo(b/j)fluoranthene | - | - | - | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Benzo[ghi]perylene | - | 0.01 | - | 0.013 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[j]fluoranthene | - | 0.1 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[k]fluoranthene | - | 0.1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Chrysene | - | 0.01 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Dibenz[a,h]anthracene | - | 1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Indeno[1,2,3-cd]pyrene | - | 0.1 | 10 | 0.007 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **B(a)P TPE** | **-** | **-** | 5.3 | 0.02 [1] | 0.02 [1] | 0.02 [1] | 0.02 [1] | 0.02 [1] |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 |

**Notes:**

NSE TIER 1 EQS = Nova Scotia Environment Tier 1 Environmental Quality Standards (2013)

B(a)P PEF = Benzo(a)pyrene potency equivalency factor

[1] Uncertainty factor of 3 was used as the PAH source is expected to be creosote.

[2] Guideline is for the sum of Benzo [b+j+k]fluoranthene

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

If the concentration was less than the detection limit, then 1/2 the detection limit was used in B(a)P TPE calculations.

" -" = no guideline available, not analysed

Table D2-2 PAH Concentrations in Soil (mg/kg) (Commercial)

| Parameter | Human Health | | CCME Ecological Guideline | Concentration (mg/kg) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Identification | | | | |
| | NSE TIER 1 EQS (Commercial) | B(a)P PEF | | SS_CT_09 | SS_CT_10 | SS_CT_10_LD | SS_CT_11 | SS_CT_12 |
| **Non-Carcinogenic PAHs** | | | | | | | | |
| Acenaphthene | 8000 | - | 0.28 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Acenaphthylene | 66 | - | 320 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Anthracene | 37000 | - | 32 | 0.12 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluoranthene | 5300 | - | 180 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluorene | 4100 | - | 0.25 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Naphthalene | 25 | - | 0.013 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Perylene | - | - | - | <0.0050 | <0.0050 | <0.0050 | 0.013 | <0.0050 |
| Phenanthrene | - | - | 0.046 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Pyrene | 3200 | - | 100 | <0.0050 | <0.0050 | <0.0050 | 0.0069 | <0.0050 |
| 1-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| 2-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **Carcinogenic PAHs** | | | | | | | | |
| Benzo[a]anthracene | - | 0.1 | 10 | <0.0050 | <0.0050 | <0.0050 | 0.0081 | <0.0050 |
| Benzo[a]pyrene | - | 1 | 72 | <0.0050 | <0.0050 | <0.0050 | 0.082 | <0.0050 |
| Benzo[b]fluoranthene | - | 0.1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | 0.018 | <0.0050 |
| Benzo(b/j)fluoranthene | - | - | - | <0.010 | <0.010 | - | 0.018 | <0.010 |
| Benzo[ghi]perylene | - | 0.01 | - | <0.0050 | <0.0050 | <0.0050 | 0.27 | <0.0050 |
| Benzo[j]fluoranthene | - | 0.1 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[k]fluoranthene | - | 0.1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Chrysene | - | 0.01 | - | <0.0050 | <0.0050 | <0.0050 | 0.016 | <0.0050 |
| Dibenz[a,h]anthracene | - | 1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | 0.016 | <0.0050 |
| Indeno[1,2,3-cd]pyrene | - | 0.1 | 10 | <0.0050 | <0.0050 | <0.0050 | 0.031 | <0.0050 |
| **B(a)P TPE** | **-** | **-** | 5.3 | 0.02 [1] | 0.02 [1] | 0.02 [1] | 0.32 [1] | 0.02 [1] |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 |

**Notes:**

NSE TIER 1 EQS = Nova Scotia Environment Tier 1 Environmental Quality Standards (2013)

B(a)P PEF = Benzo(a)pyrene potency equivalency factor

[1] Uncertainty factor of 3 was used as the PAH source is expected to be creosote.

[2] Guideline is for the sum of Benzo [b+j+k]fluoranthene

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

If the concentration was less than the detection limit, then 1/2 the detection limit was used in B(a)P TPE calculations.

" -" = no guideline available, not analysed

Table D2-2   PAH Concentrations in Soil (mg/kg) (Commercial)

| Parameter | Human Health | | | Concentration (mg/kg) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Identification | | | | |
| | NSE TIER 1 EQS (Commercial) | B(a)P PEF | CCME Ecological Guideline | SS_CT_13 | SS_CT_14 | SS_CT_16 | SS_CT_17 | SS_CT_18 |
| **Non-Carcinogenic PAHs** | | | | | | | | |
| Acenaphthene | 8000 | - | 0.28 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Acenaphthylene | 66 | - | 320 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Anthracene | 37000 | - | 32 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluoranthene | 5300 | - | 180 | 0.023 | <0.0050 | 0.0130 | <0.0050 | <0.0050 |
| Fluorene | 4100 | - | 0.25 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Naphthalene | 25 | - | 0.013 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Perylene | - | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Phenanthrene | - | - | 0.046 | 0.008 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Pyrene | 3200 | - | 100 | 0.019 | <0.0050 | 0.013 | <0.0050 | <0.0050 |
| 1-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| 2-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **Carcinogenic PAHs** | | | | | | | | |
| Benzo[a]anthracene | - | 0.1 | 10 | 0.012 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[a]pyrene | - | 1 | 72 | 0.011 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[b]fluoranthene | - | 0.1 | 10 [2] | 0.012 | <0.0050 | 0.02 | <0.0050 | <0.0050 |
| Benzo(b/j)fluoranthene | - | - | - | 0.018 | <0.010 | 0.03 | <0.010 | <0.010 |
| Benzo[ghi]perylene | - | 0.01 | - | <0.0050 | <0.0050 | 0.013 | <0.0050 | <0.0050 |
| Benzo[j]fluoranthene | - | 0.1 | - | 0.0062 | <0.0050 | 0.01 | <0.0050 | <0.0050 |
| Benzo[k]fluoranthene | - | 0.1 | 10 [2] | 0.0062 | <0.0050 | 0.0083 | <0.0050 | <0.0050 |
| Chrysene | - | 0.01 | - | 0.013 | <0.0050 | 0.015 | <0.0050 | <0.0050 |
| Dibenz[a,h]anthracene | - | 1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Indeno[1,2,3-cd]pyrene | - | 0.1 | 10 | <0.0050 | <0.0050 | 0.011 | <0.0050 | <0.0050 |
| **B(a)P TPE** | **-** | **-** | 5.3 | 0.05 [1] | 0.02 [1] | 0.03 [1] | 0.02 [1] | 0.02 [1] |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 |

**Notes:**

NSE TIER 1 EQS = Nova Scotia Environment Tier 1 Environmental Quality Standards (2013)

B(a)P PEF = Benzo(a)pyrene potency equivalency factor

[1] Uncertainty factor of 3 was used as the PAH source is expected to be creosote.

[2] Guideline is for the sum of Benzo [b+j+k]fluoranthene

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

If the concentration was less than the detection limit, then 1/2 the detection limit was used in B(a)P TPE calculations.

" -" = no guideline available, not analysed

Table D2-2 PAH Concentrations in Soil (mg/kg) (Commercial)

| Parameter | Human Health | | | Concentration (mg/kg) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Identification | | | | |
| | NSE TIER 1 EQS (Commercial) | B(a)P PEF | CCME Ecological Guideline | SS_CT_19 | SS_CT_20 BG | SS_CT_22 | SS_CT_22_FD | SS_CT_23 |
| **Non-Carcinogenic PAHs** | | | | | | | | |
| Acenaphthene | 8000 | - | 0.28 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Acenaphthylene | 66 | - | 320 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Anthracene | 37000 | - | 32 | 0.037 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluoranthene | 5300 | - | 180 | 0.4 | <0.0050 | 0.056 | 0.023 | <0.0050 |
| Fluorene | 4100 | - | 0.25 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Naphthalene | 25 | - | 0.013 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Perylene | - | - | - | 0.047 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Phenanthrene | - | - | 0.046 | **0.18** | <0.0050 | 0.008 | 0.012 | <0.0050 |
| Pyrene | 3200 | - | 100 | 0.29 | <0.0050 | 0.044 | 0.017 | <0.0050 |
| 1-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| 2-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **Carcinogenic PAHs** | | | | | | | | |
| Benzo[a]anthracene | - | 0.1 | 10 | 0.18 | <0.0050 | 0.011 | <0.0050 | <0.0050 |
| Benzo[a]pyrene | - | 1 | 72 | 0.16 | <0.0050 | 0.014 | <0.0050 | <0.0050 |
| Benzo[b]fluoranthene | - | 0.1 | 10 [2] | 0.17 | <0.0050 | 0.029 | 0.01 | <0.0050 |
| Benzo(b/j)fluoranthene | - | - | - | 0.26 | <0.010 | 0.046 | 0.01 | <0.010 |
| Benzo[ghi]perylene | - | 0.01 | - | 0.1 | <0.0050 | 0.014 | 0.0066 | <0.0050 |
| Benzo[j]fluoranthene | - | 0.1 | - | 0.085 | <0.0050 | 0.016 | <0.0050 | <0.0050 |
| Benzo[k]fluoranthene | - | 0.1 | 10 [2] | 0.093 | <0.0050 | 0.016 | <0.0050 | <0.0050 |
| Chrysene | - | 0.01 | - | 0.2 | <0.0050 | 0.029 | 0.011 | <0.0050 |
| Dibenz[a,h]anthracene | - | 1 | 10 [2] | 0.027 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Indeno[1,2,3-cd]pyrene | - | 0.1 | 10 | 0.09 | <0.0050 | 0.012 | <0.0050 | <0.0050 |
| **B(a)P TPE** | **-** | **-** | 5.3 | 0.76 [1] | 0.02 [1] | 0.08 [1] | 0.02 [1] | 0.02 [1] |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 12-Sep-17 | 12-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

**Notes:**

NSE TIER 1 EQS = Nova Scotia Environment Tier 1 Environmental Quality Standards (2013)

B(a)P PEF = Benzo(a)pyrene potency equivalency factor

[1] Uncertainty factor of 3 was used as the PAH source is expected to be creosote.

[2] Guideline is for the sum of Benzo [b+j+k]fluoranthene

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

If the concentration was less than the detection limit, then 1/2 the detection limit was used in B(a)P TPE calculations.

" -" = no guideline available, not analysed

**Table D2-2 PAH Concentrations in Soil (mg/kg) (Commercial)**

| Parameter | Human Health | | | Concentration (mg/kg) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Identification | | | | |
| | NSE TIER 1 EQS (Commercial) | B(a)P PEF | CCME Ecological Guideline | SS_CT_24 | SS_CT_25 | SS_CT_30 | SS_CT_31 | SS_CT_32 |
| **Non-Carcinogenic PAHs** | | | | | | | | |
| Acenaphthene | 8000 | - | 0.28 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Acenaphthylene | 66 | - | 320 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Anthracene | 37000 | - | 32 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluoranthene | 5300 | - | 180 | 0.012 | 0.017 | <0.0050 | <0.0050 | 0.0064 |
| Fluorene | 4100 | - | 0.25 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Naphthalene | 25 | - | 0.013 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Perylene | - | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Phenanthrene | - | - | 0.046 | 0.0085 | 0.012 | <0.0050 | <0.0050 | <0.0050 |
| Pyrene | 3200 | - | 100 | 0.0096 | 0.011 | <0.0050 | <0.0050 | <0.0050 |
| 1-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| 2-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **Carcinogenic PAHs** | | | | | | | | |
| Benzo[a]anthracene | - | 0.1 | 10 | 0.006 | 0.0079 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[a]pyrene | - | 1 | 72 | 0.0082 | 0.0071 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[b]fluoranthene | - | 0.1 | 10 [2] | 0.014 | 0.0073 | <0.0050 | <0.0050 | <0.0050 |
| Benzo(b/j)fluoranthene | - | - | - | 0.014 | <0.010 | <0.010 | <0.010 | <0.010 |
| Benzo[ghi]perylene | - | 0.01 | - | 0.018 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[j]fluoranthene | - | 0.1 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[k]fluoranthene | - | 0.1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Chrysene | - | 0.01 | - | 0.02 | 0.01 | <0.0050 | <0.0050 | <0.0050 |
| Dibenz[a,h]anthracene | - | 1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Indeno[1,2,3-cd]pyrene | - | 0.1 | 10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **B(a)P TPE** | **-** | **-** | 5.3 | 0.04 [1] | 0.04 [1] | 0.02 [1] | 0.02 [1] | 0.02 [1] |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

**Notes:**

NSE TIER 1 EQS = Nova Scotia Environment Tier 1 Environmental Quality Standards (2013)

B(a)P PEF = Benzo(a)pyrene potency equivalency factor

[1] Uncertainty factor of 3 was used as the PAH source is expected to be creosote.

[2] Guideline is for the sum of Benzo [b+j+k]fluoranthene

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

If the concentration was less than the detection limit, then 1/2 the detection limit was used in B(a)P TPE calculations.

" -" = no guideline available, not analysed

**Table D2-2 PAH Concentrations in Soil (mg/kg) (Commercial)**

| Parameter | Human Health | | CCME Ecological Guideline | Concentration (mg/kg) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Identification | | | | |
| | NSE TIER 1 EQS (Commercial) | B(a)P PEF | | SS_CT_33 | SS_CT_36 | SS_CT_37 | SS_CT_38 | SS_CT_39 |
| **Non-Carcinogenic PAHs** | | | | | | | | |
| Acenaphthene | 8000 | - | 0.28 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Acenaphthylene | 66 | - | 320 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Anthracene | 37000 | - | 32 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluoranthene | 5300 | - | 180 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluorene | 4100 | - | 0.25 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Naphthalene | 25 | - | 0.013 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Perylene | - | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Phenanthrene | - | - | 0.046 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Pyrene | 3200 | - | 100 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| 1-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| 2-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **Carcinogenic PAHs** | | | | | | | | |
| Benzo[a]anthracene | - | 0.1 | 10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[a]pyrene | - | 1 | 72 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[b]fluoranthene | - | 0.1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo(b/j)fluoranthene | - | - | - | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Benzo[ghi]perylene | - | 0.01 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[j]fluoranthene | - | 0.1 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[k]fluoranthene | - | 0.1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Chrysene | - | 0.01 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Dibenz[a,h]anthracene | - | 1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Indeno[1,2,3-cd]pyrene | - | 0.1 | 10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **B(a)P TPE** | **-** | **-** | 5.3 | 0.02 [1] | 0.02 [1] | 0.02 [1] | 0.02 [1] | 0.02 [1] |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

**Notes:**

NSE TIER 1 EQS = Nova Scotia Environment Tier 1 Environmental Quality Standards (2013)

B(a)P PEF = Benzo(a)pyrene potency equivalency factor

[1] Uncertainty factor of 3 was used as the PAH source is expected to be creosote.

[2] Guideline is for the sum of Benzo [b+j+k]fluoranthene

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

If the concentration was less than the detection limit, then 1/2 the detection limit was used in B(a)P TPE calculations.

" -" = no guideline available, not analysed

**Table D2-2 PAH Concentrations in Soil (mg/kg) (Commercial)**

| Parameter | Human Health | | | Concentration (mg/kg) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Identification | | | | |
| | NSE TIER 1 EQS (Commercial) | B(a)P PEF | CCME Ecological Guideline | SS_CT_50 | SS_CT_51 | SS_CT_52 | SS_CT_53 | SS_CT_55 |
| **Non-Carcinogenic PAHs** | | | | | | | | |
| Acenaphthene | 8000 | - | 0.28 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Acenaphthylene | 66 | - | 320 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Anthracene | 37000 | - | 32 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluoranthene | 5300 | - | 180 | 0.014 | <0.0050 | <0.0050 | <0.0050 | 0.0069 |
| Fluorene | 4100 | - | 0.25 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Naphthalene | 25 | - | 0.013 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Perylene | - | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Phenanthrene | - | - | 0.046 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Pyrene | 3200 | - | 100 | 0.012 | <0.0050 | <0.0050 | <0.0050 | 0.0088 |
| 1-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| 2-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **Carcinogenic PAHs** | | | | | | | | |
| Benzo[a]anthracene | - | 0.1 | 10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo[a]pyrene | - | 1 | 72 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.013 |
| Benzo[b]fluoranthene | - | 0.1 | 10 [2] | 0.014 | <0.0050 | <0.0050 | 0.0088 | 0.013 |
| Benzo(b/j)fluoranthene | - | - | - | 0.014 | <0.010 | <0.010 | <0.010 | 0.019 |
| Benzo[ghi]perylene | - | 0.01 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.039 |
| Benzo[j]fluoranthene | - | 0.1 | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0056 |
| Benzo[k]fluoranthene | - | 0.1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Chrysene | - | 0.01 | - | 0.022 | <0.0050 | <0.0050 | <0.0050 | 0.012 |
| Dibenz[a,h]anthracene | - | 1 | 10 [2] | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Indeno[1,2,3-cd]pyrene | - | 0.1 | 10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0089 |
| **B(a)P TPE** | **-** | **-** | 5.3 | 0.02 [1] | 0.02 [1] | 0.02 [1] | 0.02 [1] | 0.06 [1] |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 12-Sep-17 |

**Notes:**

NSE TIER 1 EQS = Nova Scotia Environment Tier 1 Environmental Quality Standards (2013)

B(a)P PEF = Benzo(a)pyrene potency equivalency factor

[1] Uncertainty factor of 3 was used as the PAH source is expected to be creosote.

[2] Guideline is for the sum of Benzo [b+j+k]fluoranthene

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

If the concentration was less than the detection limit, then 1/2 the detection limit was used in B(a)P TPE calculations.

" -" = no guideline available, not analysed

Table D2-2 PAH Concentrations in Soil (mg/kg) (Commercial)

| Parameter | Human Health | | CCME Ecological Guideline | Concentration (mg/kg) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Identification | | | | |
| | NSE TIER 1 EQS (Commercial) | B(a)P PEF | | SS_CT_56 | SS_CT_57 | SS_CT_58 | SS_CT_60 | SS_CT_61 |
| **Non-Carcinogenic PAHs** | | | | | | | | |
| Acenaphthene | 8000 | - | 0.28 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Acenaphthylene | 66 | - | 320 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Anthracene | 37000 | - | 32 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluoranthene | 5300 | - | 180 | <0.0050 | <0.0050 | 0.032 | <0.0050 | <0.0050 |
| Fluorene | 4100 | - | 0.25 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Naphthalene | 25 | - | 0.013 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Perylene | - | - | - | <0.0050 | <0.0050 | 0.0068 | <0.0050 | <0.0050 |
| Phenanthrene | - | - | 0.046 | <0.0050 | <0.0050 | 0.01 | <0.0050 | <0.0050 |
| Pyrene | 3200 | - | 100 | <0.0050 | <0.0050 | 0.032 | 0.028 | <0.0050 |
| 1-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| 2-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| **Carcinogenic PAHs** | | | | | | | | |
| Benzo[a]anthracene | - | 0.1 | 10 | <0.0050 | <0.0050 | 0.011 | <0.0050 | <0.0050 |
| Benzo[a]pyrene | - | 1 | 72 | <0.0050 | <0.0050 | 0.032 | <0.0050 | <0.0050 |
| Benzo[b]fluoranthene | - | 0.1 | 10 [2] | <0.0050 | <0.0050 | 0.044 | 0.014 | <0.0050 |
| Benzo(b/j)fluoranthene | - | - | - | <0.010 | <0.010 | 0.062 | 0.014 | <0.010 |
| Benzo[ghi]perylene | - | 0.01 | - | <0.0050 | 0.0071 | 0.088 | <0.0050 | <0.0050 |
| Benzo[j]fluoranthene | - | 0.1 | - | <0.0050 | <0.0050 | 0.018 | <0.0050 | <0.0050 |
| Benzo[k]fluoranthene | - | 0.1 | 10 [2] | <0.0050 | <0.0050 | 0.017 | <0.0050 | <0.0050 |
| Chrysene | - | 0.01 | - | <0.0050 | <0.0050 | 0.038 | 0.09 | <0.0050 |
| Dibenz[a,h]anthracene | - | 1 | 10 [2] | <0.0050 | <0.0050 | 0.0071 | <0.0050 | <0.0050 |
| Indeno[1,2,3-cd]pyrene | - | 0.1 | 10 | <0.0050 | <0.0050 | 0.025 | <0.0050 | <0.0050 |
| **B(a)P TPE** | **-** | **-** | 5.3 | 0.02 [1] | 0.02 [1] | 0.16 [1] | 0.02 [1] | 0.02 [1] |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 13-Sep-17 | 13-Sep-17 |

**Notes:**

NSE TIER 1 EQS = Nova Scotia Environment Tier 1 Environmental Quality Standards (2013)

B(a)P PEF = Benzo(a)pyrene potency equivalency factor

[1] Uncertainty factor of 3 was used as the PAH source is expected to be creosote.

[2] Guideline is for the sum of Benzo [b+j+k]fluoranthene

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

If the concentration was less than the detection limit, then 1/2 the detection limit was used in B(a)P TPE calculations.

" -" = no guideline available, not analysed

**Table D2-2 PAH Concentrations in Soil (mg/kg) (Commercial)**

| Parameter | Human Health | | CCME Ecological Guideline | Concentration (mg/kg) Sample Identification | |
|---|---|---|---|---|---|
| | NSE TIER 1 EQS (Commercial) | B(a)P PEF | | SS_CT_62 | SS_CT_63 |
| **Non-Carcinogenic PAHs** | | | | | |
| Acenaphthene | 8000 | - | 0.28 | <0.0050 | <0.0050 |
| Acenaphthylene | 66 | - | 320 | <0.0050 | <0.0050 |
| Anthracene | 37000 | - | 32 | <0.0050 | <0.0050 |
| Fluoranthene | 5300 | - | 180 | 0.022 | <0.0050 |
| Fluorene | 4100 | - | 0.25 | <0.0050 | <0.0050 |
| Naphthalene | 25 | - | 0.013 | <0.0050 | <0.0050 |
| Perylene | - | - | - | <0.0050 | <0.0050 |
| Phenanthrene | - | - | 0.046 | <0.0050 | <0.0050 |
| Pyrene | 3200 | - | 100 | 0.042 | <0.0050 |
| 1-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 |
| 2-Methylnaphthalene | 560 | - | - | <0.0050 | <0.0050 |
| **Carcinogenic PAHs** | | | | | |
| Benzo[a]anthracene | - | 0.1 | 10 | <0.0050 | <0.0050 |
| Benzo[a]pyrene | - | 1 | 72 | <0.0050 | <0.0050 |
| Benzo[b]fluoranthene | - | 0.1 | 10 [2] | 0.03 | <0.0050 |
| Benzo(b/j)fluoranthene | - | - | - | 0.039 | <0.010 |
| Benzo[ghi]perylene | - | 0.01 | - | <0.0050 | <0.0050 |
| Benzo[j]fluoranthene | - | 0.1 | - | 0.0085 | <0.0050 |
| Benzo[k]fluoranthene | - | 0.1 | 10 [2] | <0.0050 | <0.0050 |
| Chrysene | - | 0.01 | - | 0.22 | <0.0050 |
| Dibenz[a,h]anthracene | - | 1 | 10 [2] | <0.0050 | <0.0050 |
| Indeno[1,2,3-cd]pyrene | - | 0.1 | 10 | <0.0050 | <0.0050 |
| **B(a)P TPE** | **-** | **-** | 5.3 | 0.04 [1] | 0.02 [1] |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 13-Sep-17 | 13-Sep-17 |

**Notes:**

NSE TIER 1 EQS = Nova Scotia Environment Tier 1 Environmental Quality Standards (2013)

B(a)P PEF = Benzo(a)pyrene potency equivalency factor

[1] Uncertainty factor of 3 was used as the PAH source is expected to be creosote.

[2] Guideline is for the sum of Benzo [b+j+k]fluoranthene

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

If the concentration was less than the detection limit, then 1/2 the detection limit was used in B(a)P TPE calculations.

" -" = no guideline available, not analysed

## Table D3-1 Metals in Soil (mg/kg) (Residential)

| Parameter | CCME[1] Human Health | CCME[1] Ecological Health | CCME[1] Generic[2] | SS_CT_20 BG | SS_CT_41 | SS_CT_42 | SS_CT_43 | SS_CT_44 |
|---|---|---|---|---|---|---|---|---|
| Aluminum | - | - | - | 14000 | 25000 | 19000 | 12000 | 14000 |
| Antimony | - | - | 20 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Arsenic | 12 | 17 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Barium | 6800 | 500 | - | 67 | 230 | 210 | 130 | 110 |
| Beryllium | 75 | 4 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Bismuth | - | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Boron | - | - | - | <50 | <50 | <50 | <50 | <50 |
| Cadmium | 14 | 10 | - | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 |
| Chromium | 220 | 64 | - | **68** | **79** | **370** | 61 | **200** |
| Cobalt | - | - | 50 | 16 | 13 | 17 | 7.9 | 10 |
| Copper | 1100 | 63 | - | 17 | 18 | 25 | 32 | 19 |
| Iron | - | - | - | 28000 | 50000 | 30000 | 26000 | 25000 |
| Lead | 140 | 300 | - | 2.7 | 8.9 | 5.7 | 9.3 | 8.3 |
| Lithium | - | - | - | 15 | 45 | 27 | 22 | 20 |
| Manganese | - | - | - | 270 | 900 | 470 | 430 | 370 |
| Mercury | 6.6 | 12 | - | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Molybdenum | - | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Nickel | 200 | 45 | - | 32 | 19 | **90** | 19 | 43 |
| Rubidium | - | - | - | 25 | 190 | 83 | 84 | 69 |
| Selenium | 80 | 1 | - | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Silver | - | 40 | - | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Strontium | - | - | - | 13 | 12 | 11 | 8.3 | 7.5 |
| Thallium | 1 | 1.4 | - | 0.21 | 1.3 | 0.63 | 0.66 | 0.53 |
| Tin | - | - | 50 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Uranium | 23 | 500 | - | 0.53 | 1.9 | 1.3 | 1.5 | 0.66 |
| Vanadium | - | 130 | - | 43 | 44 | 40 | 23 | 25 |
| Zinc | - | 200 | - | 42 | 160 | 73 | 81 | 68 |
| | | | **depth (m)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 12-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (residential site)

2. Generic CCME guideline: no distinction regarding whether derivation is human health or ecologically based

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels **Bolded**.

- = no guideline, or parameter not analyzed

**Table D3-2 Metals in Soil (mg/kg) (Commercial)**

| Parameter | CCME[1] Human Health | CCME[1] Ecological Health | CCME[1] Generic[2] | SS_CT_01 | SS_CT_03 | SS_CT_05 | SS_CT_05_FD | SS_CT_06 |
|---|---|---|---|---|---|---|---|---|
| Aluminum | - | - | - | 9500 | 6600 | 9600 | 9500 | 11000 |
| Antimony | - | - | 40 | <2.0 | 4.7 | <2.0 | <2.0 | <2.0 |
| Arsenic | 12 | 26 | - | 2.1 | 24 | 2.2 | <2.0 | <2.0 |
| Barium | 10000 | 2000 | - | 100 | 75 | 110 | 110 | 120 |
| Beryllium | 110 | 8 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Bismuth | - | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Boron | - | - | - | <50 | <50 | <50 | <50 | <50 |
| Cadmium | 49 | 22 | - | 1.3 | 5.3 | 0.52 | <0.30 | <0.30 |
| Chromium | 630 | 87 | - | 34 | **170** | 33 | 23 | 38 |
| Cobalt | - | - | 300 | 11 | 35 | 9.4 | 7.7 | 7.5 |
| Copper | 4000 | 91 | - | 27 | **210** | 26 | 24 | 22 |
| Iron | - | - | - | 33000 | 270000 | 27000 | 27000 | 28000 |
| Lead | 260 | 600 | - | 77 | **3200** | 52 | 48 | 7.5 |
| Lithium | - | - | - | 17 | 14 | 17 | 18 | 19 |
| Manganese | - | - | - | 410 | 1500 | 380 | 370 | 410 |
| Mercury | 24 | 50 | - | <0.10 | 0.29 | <0.10 | <0.10 | <0.10 |
| Molybdenum | - | - | - | <2.0 | 18 | 2.3 | <2.0 | <2.0 |
| Nickel | 310 | 89 | - | 24 | **150** | 22 | 11 | 14 |
| Rubidium | - | - | - | 52 | 16 | 61 | 64 | 75 |
| Selenium | 125 | 2.9 | - | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Silver | - | 40 | - | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Strontium | - | - | - | 10 | 78 | 14 | 9.6 | 7.5 |
| Thallium | 1 | 3.6 | - | 0.41 | 0.17 | 0.44 | 0.46 | 0.59 |
| Tin | - | - | 300 | <2.0 | 39 | <2.0 | <2.0 | <2.0 |
| Uranium | 33 | 2000 | - | 0.31 | 0.61 | 0.28 | 0.25 | 0.45 |
| Vanadium | - | 130 | - | 19 | 24 | 19 | 18 | 20 |
| Zinc | - | 200 | - | **1100** | **1900** | 200 | 180 | 93 |
| **depth (m)** | | | | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| **Sample Date** | | | | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (commercial site)

2. Generic CCME guideline: no distinction regarding whether derivation is human health or ecologically based

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

- = no guideline, or parameter not analyzed

Table D3-2 Metals in Soil (mg/kg) (Commercial)

| Parameter | CCME[1] Human Health | CCME[1] Ecological Health | CCME[1] Generic[2] | SS_CT_06_LD | SS_CT_07 | SS_CT_07 FD | SS_CT_08 | SS_CT_09 |
|---|---|---|---|---|---|---|---|---|
| Aluminum | - | - | - | 11000 | 3900 | 4200 | 4300 | 6800 |
| Antimony | - | - | 40 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Arsenic | 12 | 26 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Barium | 10000 | 2000 | - | 120 | 13 | 13 | 45 | 52 |
| Beryllium | 110 | 8 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Bismuth | - | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Boron | - | - | - | <50 | <50 | <50 | <50 | <50 |
| Cadmium | 49 | 22 | - | <0.30 | <0.30 | <0.30 | <0.30 | 0.31 |
| Chromium | 630 | 87 | - | 40 | 11 | 13 | 4.4 | 4.5 |
| Cobalt | - | - | 300 | 7.4 | 1.6 | 2.0 | <1.0 | 1.1 |
| Copper | 4000 | 91 | - | 21 | 3.2 | 3.5 | 12 | 11 |
| Iron | - | - | - | 29000 | 12000 | 15000 | 8700 | 2300 |
| Lead | 260 | 600 | - | 11 | 3.9 | 3.9 | 5.2 | 3.9 |
| Lithium | - | - | - | 20 | <2.0 | <2.0 | <2.0 | <2.0 |
| Manganese | - | - | - | 440 | 68 | 91 | 8.3 | 12 |
| Mercury | 24 | 50 | - | <0.10 | 0.12 | <0.10 | 0.18 | 0.11 |
| Molybdenum | - | - | - | 2.6 | 2.9 | 3.5 | <2.0 | <2.0 |
| Nickel | 310 | 89 | - | 15 | 2.4 | 3.00 | 2.4 | 3.1 |
| Rubidium | - | - | - | 80 | 18 | 21 | 2.8 | <2.0 |
| Selenium | 125 | 2.9 | - | <1.0 | <1.0 | <1.0 | 2.1 | 1.2 |
| Silver | - | 40 | - | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Strontium | - | - | - | 8.0 | 7.9 | 7.00 | 24 | 32 |
| Thallium | 1 | 3.6 | - | 0.6 | 0.12 | 0.13 | <0.10 | <0.10 |
| Tin | - | - | 300 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Uranium | 33 | 2000 | - | 0.47 | 0.52 | 0.49 | 1.8 | 1.3 |
| Vanadium | - | 130 | - | 21 | 25 | 33 | 2.7 | 3.1 |
| Zinc | - | 200 | - | 100 | 15 | 15 | 10 | 37 |
| | | | **depth (m)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (commercial site)

2. Generic CCME guideline: no distinction regarding whether derivation is human health or ecologically based

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

- = no guideline, or parameter not analyzed

## Table D3-2 Metals in Soil (mg/kg) (Commercial)

| Parameter | CCME[1] Human Health | CCME[1] Ecological Health | CCME[1] Generic[2] | SS_CT_10 | SS_CT_16 | SS_CT_17 | SS_CT_18 | SS_CT_19 |
|---|---|---|---|---|---|---|---|---|
| Aluminum | - | - | - | 4500 | 10000 | 9100 | 4700 | 12000 |
| Antimony | - | - | 40 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Arsenic | 12 | 26 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Barium | 10000 | 2000 | - | 15 | 95 | 99 | 33 | 120 |
| Beryllium | 110 | 8 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Bismuth | - | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Boron | - | - | - | <50 | <50 | <50 | <50 | <50 |
| Cadmium | 49 | 22 | - | <0.30 | 0.34 | 1.0 | <0.30 | 2.1 |
| Chromium | 630 | 87 | - | 6.8 | 38 | 18 | 14 | 72 |
| Cobalt | - | - | 300 | 1.3 | 7.7 | 6.2 | 3.6 | 13 |
| Copper | 4000 | 91 | - | 3.5 | 20 | 20 | 16 | 40 |
| Iron | - | - | - | 12000 | 27000 | 26000 | 9900 | 38000 |
| Lead | 260 | 600 | - | 3.3 | 26 | 14 | 2.3 | 52 |
| Lithium | - | - | - | <2.0 | 16 | 17 | 4.4 | 16 |
| Manganese | - | - | - | 79 | 380 | 360 | 130 | 460 |
| Mercury | 24 | 50 | - | 0.11 | <0.10 | <0.10 | <0.10 | <0.10 |
| Molybdenum | - | - | - | 2.8 | <2.0 | <2.0 | <2.0 | 2.4 |
| Nickel | 310 | 89 | - | <2.0 | 18 | 8.3 | 7.5 | 61 |
| Rubidium | - | - | - | 30 | 62 | 63 | 8.4 | 57 |
| Selenium | 125 | 2.9 | - | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Silver | - | 40 | - | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Strontium | - | - | - | 6.4 | 9.6 | 7.9 | 8.9 | 16 |
| Thallium | 1 | 3.6 | - | 0.19 | 0.49 | 0.46 | <0.10 | 0.44 |
| Tin | - | - | 300 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Uranium | 33 | 2000 | - | 0.72 | 0.55 | 0.24 | 0.65 | 0.62 |
| Vanadium | - | 130 | - | 19 | 20 | 17 | 17 | 25 |
| Zinc | - | 200 | - | 17 | 94 | 92 | 18 | 120 |
| | | | **depth (m)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (commercial site)

2. Generic CCME guideline: no distinction regarding whether derivation is human health or ecologically based

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

- = no guideline, or parameter not analyzed

**Table D3-2 Metals in Soil (mg/kg) (Commercial)**

| Parameter | CCME[1] Human Health | CCME[1] Ecological Health | CCME[1] Generic[2] | SS_CT_20 BG | SS_CT_22 | SS_CT_22_FD | SS_CT_23 | SS_CT_24 |
|---|---|---|---|---|---|---|---|---|
| Aluminum | - | - | - | 14000 | 11000 | 11000 | 12000 | 11000 |
| Antimony | - | - | 40 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Arsenic | 12 | 26 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Barium | 10000 | 2000 | - | 67 | 98 | 93 | 120 | 83 |
| Beryllium | 110 | 8 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Bismuth | - | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Boron | - | - | - | <50 | <50 | <50 | <50 | 88 |
| Cadmium | 49 | 22 | - | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 |
| Chromium | 630 | 87 | - | 68 | 28 | 31 | 41 | 28 |
| Cobalt | - | - | 300 | 16 | 7.1 | 7.2 | 8.1 | 6.8 |
| Copper | 4000 | 91 | - | 17 | 18 | 19 | 21 | 23 |
| Iron | - | - | - | 28000 | 26000 | 27000 | 30000 | 30000 |
| Lead | 260 | 600 | - | 2.7 | 8.3 | 7.9 | 7.0 | 15 |
| Lithium | - | - | - | 15 | 13 | 14 | 20 | 14 |
| Manganese | - | - | - | 270 | 440 | 460 | 470 | 570 |
| Mercury | 24 | 50 | - | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Molybdenum | - | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Nickel | 310 | 89 | - | 32 | 12 | 12 | 15 | 13 |
| Rubidium | - | - | - | 25 | 49 | 50 | 78 | 47 |
| Selenium | 125 | 2.9 | - | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Silver | - | 40 | - | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Strontium | - | - | - | 13 | 11 | 11 | 9.7 | 9.4 |
| Thallium | 1 | 3.6 | - | 0.21 | 0.35 | 0.38 | 0.59 | 0.36 |
| Tin | - | - | 300 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Uranium | 33 | 2000 | - | 0.53 | 0.39 | 0.38 | 0.48 | 0.50 |
| Vanadium | - | 130 | - | 43 | 23 | 22 | 20 | 15 |
| Zinc | - | 200 | - | 42 | 76 | 77 | 92 | 190 |
| | | | **depth (m)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 12-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (commercial site)

2. Generic CCME guideline: no distinction regarding whether derivation is human health or ecologically based

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

- = no guideline, or parameter not analyzed

## Table D3-2 Metals in Soil (mg/kg) (Commercial)

| Parameter | CCME[1] Human Health | CCME[1] Ecological Health | CCME[1] Generic[2] | SS_CT_25 | SS_CT_26 | SS_CT_27 | SS_CT_28 | SS_CT_29 |
|---|---|---|---|---|---|---|---|---|
| Aluminum | - | - | - | 13000 | 12000 | 7400 | 7900 | 17000 |
| Antimony | - | - | 40 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Arsenic | 12 | 26 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Barium | 10000 | 2000 | - | 110 | 120 | 35 | 35 | 90 |
| Beryllium | 110 | 8 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Bismuth | - | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Boron | - | - | - | <50 | <50 | <50 | <50 | <50 |
| Cadmium | 49 | 22 | - | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 |
| Chromium | 630 | 87 | - | 23 | 11 | **310** | **190** | 52 |
| Cobalt | - | - | 300 | 10 | 11 | 120 | 76 | 14 |
| Copper | 4000 | 91 | - | 28 | 60 | 87 | **130** | 24 |
| Iron | - | - | - | 24000 | 23000 | 75000 | 49000 | 27000 |
| Lead | 260 | 600 | - | 7.3 | 2.3 | 1.1 | 13 | 2.8 |
| Lithium | - | - | - | 13 | 11 | 3.3 | 4.3 | 25 |
| Manganese | - | - | - | 280 | 190 | 1100 | 700 | 360 |
| Mercury | 24 | 50 | - | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Molybdenum | - | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Nickel | 310 | 89 | - | 8.2 | 8.8 | **450** | **280** | 19 |
| Rubidium | - | - | - | 35 | 13 | <2.0 | 7.7 | 19 |
| Selenium | 125 | 2.9 | - | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Silver | - | 40 | - | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Strontium | - | - | - | 32 | 8.8 | 19 | 21 | 14 |
| Thallium | 1 | 3.6 | - | 0.25 | 0.12 | <0.10 | 0.10 | 0.13 |
| Tin | - | - | 300 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Uranium | 33 | 2000 | - | 0.35 | 0.21 | <0.10 | 0.16 | 0.33 |
| Vanadium | - | 130 | - | 44 | 50 | 12 | 17 | 46 |
| Zinc | - | 200 | - | 50 | 27 | 65 | 60 | 59 |
| | | | **depth (m)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (commercial site)

2. Generic CCME guideline: no distinction regarding whether derivation is human health or ecologically based

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

- = no guideline, or parameter not analyzed

## Table D3-2 Metals in Soil (mg/kg) (Commercial)

| Parameter | CCME[1] Human Health | CCME[1] Ecological Health | CCME[1] Generic[2] | SS_CT_30 | SS_CT_31 | SS_CT_32 | SS_CT_33 | SS_CT_36 |
|---|---|---|---|---|---|---|---|---|
| Aluminum | - | - | - | 10000 | 12000 | 11000 | 12000 | 2000 |
| Antimony | - | - | 40 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Arsenic | 12 | 26 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Barium | 10000 | 2000 | - | 110 | 130 | 110 | 130 | 17 |
| Beryllium | 110 | 8 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Bismuth | - | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Boron | - | - | - | <50 | <50 | <50 | <50 | <50 |
| Cadmium | 49 | 22 | - | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 |
| Chromium | 630 | 87 | - | 32 | 37 | 28 | 35 | 33 |
| Cobalt | - | - | 300 | 7.7 | 7.4 | 6.7 | 8.7 | 1.7 |
| Copper | 4000 | 91 | - | 36 | 22 | 19 | 23 | 3.3 |
| Iron | - | - | - | 27000 | 30000 | 27000 | 32000 | 5300 |
| Lead | 260 | 600 | - | 3.4 | 9.8 | 8.8 | 6.0 | 1.9 |
| Lithium | - | - | - | 19 | 20 | 19 | 21 | <2.0 |
| Manganese | - | - | - | 380 | 450 | 410 | 450 | 22 |
| Mercury | 24 | 50 | - | <0.10 | <0.10 | <0.10 | <0.10 | 0.12 |
| Molybdenum | - | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Nickel | 310 | 89 | - | 11 | 11 | 10 | 14 | 3.7 |
| Rubidium | - | - | - | 66 | 80 | 78 | 85 | <2.0 |
| Selenium | 125 | 2.9 | - | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Silver | - | 40 | - | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Strontium | - | - | - | 9.4 | 8.7 | 8.2 | 8.3 | 13 |
| Thallium | 1 | 3.6 | - | 0.5 | 0.61 | 0.56 | 0.64 | <0.10 |
| Tin | - | - | 300 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Uranium | 33 | 2000 | - | 0.24 | 0.59 | 0.48 | 0.40 | 0.86 |
| Vanadium | - | 130 | - | 17 | 20 | 19 | 21 | 8.2 |
| Zinc | - | 200 | - | 83 | 96 | 87 | 97 | <5.0 |
| | | | **depth (m)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (commercial site)

2. Generic CCME guideline: no distinction regarding whether derivation is human health or ecologically based

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

\- = no guideline, or parameter not analyzed

## Table D3-2 Metals in Soil (mg/kg) (Commercial)

| Parameter | CCME[1] Human Health | CCME[1] Ecological Health | CCME[1] Generic[2] | SS_CT_37 | SS_CT_38 | SS_CT_39 | SS_CT_60 | SS_CT_61 |
|---|---|---|---|---|---|---|---|---|
| Aluminum | - | - | - | 4300 | 6100 | 11000 | 8000 | 9200 |
| Antimony | - | - | 40 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Arsenic | 12 | 26 | - | <2.0 | <2.0 | 2.4 | <2.0 | <2.0 |
| Barium | 10000 | 2000 | - | 49 | 61 | 190 | 18 | 23 |
| Beryllium | 110 | 8 | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Bismuth | - | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Boron | - | - | - | <50 | <50 | <50 | <50 | <50 |
| Cadmium | 49 | 22 | - | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 |
| Chromium | 630 | 87 | - | 23 | **90** | 20 | **200** | **430** |
| Cobalt | - | - | 300 | 6.2 | 6.4 | 3.1 | 97 | 120 |
| Copper | 4000 | 91 | - | 15 | 3.8 | 74 | **130** | **170** |
| Iron | - | - | - | 28000 | 9000 | 12000 | 65000 | 79000 |
| Lead | 260 | 600 | - | 22 | 1.1 | 3.6 | 1.4 | 1.9 |
| Lithium | - | - | - | <2.0 | 3.0 | 8.1 | 2.4 | 3.1 |
| Manganese | - | - | - | 130 | 95 | 150 | 870 | 1100 |
| Mercury | 24 | 50 | - | 0.21 | <0.10 | 0.28 | <0.10 | <0.10 |
| Molybdenum | - | - | - | 3.8 | <2.0 | 8.6 | <2.0 | <2.0 |
| Nickel | 310 | 89 | - | 12 | 5.3 | 6.7 | **460** | **560** |
| Rubidium | - | - | - | 7.6 | 17 | 63 | <2.0 | <2.0 |
| Selenium | 125 | 2.9 | - | 1.6 | <1.0 | 2.8 | <1.0 | <1.0 |
| Silver | - | 40 | - | <0.50 | <0.50 | 0.70 | <0.50 | <0.50 |
| Strontium | - | - | - | 30 | 7.2 | 28 | 26 | 25 |
| Thallium | 1 | 3.6 | - | 0.14 | 0.11 | 0.47 | <0.10 | <0.10 |
| Tin | - | - | 300 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Uranium | 33 | 2000 | - | 1.9 | <0.10 | 7.3 | <0.10 | <0.10 |
| Vanadium | - | 130 | - | 28 | 36 | 9.8 | 12 | 11 |
| Zinc | - | 200 | - | 13 | 17 | 38 | 58 | 66 |
| | | | **depth (m)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | | **Sample Date** | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (commercial site)

2. Generic CCME guideline: no distinction regarding whether derivation is human health or ecologically based

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

- = no guideline, or parameter not analyzed

## Table D3-2 Metals in Soil (mg/kg) (Commercial)

| Parameter | CCME[1] Human Health | CCME[1] Ecological Health | CCME[1] Generic[2] | SS_CT_62 |
|---|---|---|---|---|
| Aluminum | - | - | - | 15000 |
| Antimony | - | - | 40 | <2.0 |
| Arsenic | 12 | 26 | - | <2.0 |
| Barium | 10000 | 2000 | - | 160 |
| Beryllium | 110 | 8 | - | <2.0 |
| Bismuth | - | - | - | <2.0 |
| Boron | - | - | - | <50 |
| Cadmium | 49 | 22 | - | <0.30 |
| Chromium | 630 | 87 | - | **310** |
| Cobalt | - | - | 300 | 19 |
| Copper | 4000 | 91 | - | 14 |
| Iron | - | - | - | 18000 |
| Lead | 260 | 600 | - | 1.8 |
| Lithium | - | - | - | 11 |
| Manganese | - | - | - | 230 |
| Mercury | 24 | 50 | - | <0.10 |
| Molybdenum | - | - | - | <2.0 |
| Nickel | 310 | 89 | - | 24 |
| Rubidium | - | - | - | 19 |
| Selenium | 125 | 2.9 | - | <1.0 |
| Silver | - | 40 | - | <0.50 |
| Strontium | - | - | - | 14 |
| Thallium | 1 | 3.6 | - | 0.14 |
| Tin | - | - | 300 | <2.0 |
| Uranium | 33 | 2000 | - | <0.10 |
| Vanadium | - | 130 | - | 39 |
| Zinc | - | 200 | - | 32 |
| | | | **depth (m)** | 0-0.05 |
| | | | **Sample Date** | 13-Sep-17 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (commercial site)

2. Generic CCME guideline: no distinction regarding whether derivation is human health or ecologically based

Exceedances of the Federal Human Health Screening Levels or Detection Limits greater than the Federal Human Health Screening Levels are shaded red.

Exceedances of the Federal Ecological Screening Levels or Detection Limits greater than the Federal Ecological Screening Levels are **Bolded**.

- = no guideline, or parameter not analyzed

**Table D4-1 PCBs in Soil (mg/kg) (Residential)**

| | CCME [1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Human Health** | **Ecological Health** | **SS_CT_20 BG** | **SS_CT_20 BG** | **SS_CT_41** | **SS_CT_42** | **SS_CT_43** | **SS_CT_44** |
| Aroclor 1016 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1221 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1232 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1248 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1242 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1254 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1260 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Calculated Total PCB | 5 | 1.3 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | **Sample Date** | 12-Sep-17 | 12-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (residential site)

= no guideline, or parameter not analyzed

**Table D4-2 PCBs in Soil (mg/kg) (Commercial)**

| | CCME [1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Human Health** | **Ecological Health** | **SS_CT_07** | **SS_CT_07_LD** | **SS_CT_07 FD** | **SS_CT_08** | **SS_CT_09** | **SS_CT_10** |
| Aroclor 1016 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1221 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1232 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1248 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1242 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1254 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1260 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Calculated Total PCB | 50 | 33 | <0.050 | - | <0.050 | <0.050 | <0.050 | <0.050 |
| | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | **Sample Date** | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 | 12-Sep-17 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (commercial site)

= no guideline, or parameter not analyzed

**Table D4-2 PCBs in Soil (mg/kg) (Commercial)**

| Parameter | CCME [1] Human Health | CCME [1] Ecological Health | SS_CT_20 BG | SS_CT_30 | SS_CT_33 | SS_CT_36 | SS_CT_37 | SS_CT_38 |
|---|---|---|---|---|---|---|---|---|
| Aroclor 1016 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1221 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1232 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1248 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1242 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1254 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1260 | - | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Calculated Total PCB | 50 | 33 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| **Sample Depth (mbgs)** | | | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| **Sample Date** | | | 12-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines
for the Protection of Environmental and Human Health (commercial site)

= no guideline, or parameter not analyzed

**Table D4-2 PCBs in Soil (mg/kg) (Commercial)**

| | CCME [1] | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Human Health** | **Ecological Health** | **SS_CT_39** | **SS_CT_60** | **SS_CT_61** | **SS_CT_62** |
| Aroclor 1016 | - | - | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1221 | - | - | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1232 | - | - | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1248 | - | - | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1242 | - | - | <0.050 | <0.050 | <0.050 | <0.050 |
| Aroclor 1254 | - | - | <0.050 | 2.3 | <0.050 | 6.0 |
| Aroclor 1260 | - | - | <0.050 | 1.4 | <0.050 | 3.7 |
| Calculated Total PCB | 50 | 33 | <0.050 | 3.6 | <0.050 | 9.7 |
| | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | **Sample Date** | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines
for the Protection of Environmental and Human Health (commercial site)

= no guideline, or parameter not analyzed

**Table D5-1 Volatile Organic Compounds (Excluding BTEX) Concentrations in Soil (µg/kg) (Residential)**

| | CCME [1] | | | | |
|---|---|---|---|---|---|
| Parameter (other names for the same compound) | Human Health | Ecological Health | Generic[2] | SS_CT_42 | SS_CT_43 |
| 1,1,1-Trichloroethane | - | - | 5000 | <25 | <25 |
| 1,1,2,2-Tetrachlorethane | - | - | 200 | <25 | <25 |
| 1,1,2-Trichloroethane | - | - | 5000 | <25 | <25 |
| 1,1-Dichloroethane | - | - | 5000 | <25 | <25 |
| 1,1-Dichloroethene (Dichloroethylene) | - | - | 5000 | <25 | <25 |
| 1,2-Dichloroethane | - | - | 5000 | <25 | <25 |
| 1,2-Dichloropropane | - | - | 5000 | <25 | <25 |
| 1,3-Dichlorobenzene | - | - | 1000 | <25 | <25 |
| 1,4-Dichlorobenzene | - | - | 1000 | <25 | <25 |
| Bromodichloromethane (Dichlorobromomethane) | - | - | - | <25 | <25 |
| Bromoform (Tribromomethane) | - | - | - | <25 | <25 |
| Bromomethane (Monobromomethane, Methyl Bromide) | - | - | - | <50 | <50 |
| Carbon Tetrachloride (Tetrachloromethane) | - | - | 5000 | <25 | <25 |
| Chlorobenzene (Monochlorobenzene) | - | - | 1000 | <25 | <25 |
| Chloroethane (Monochloroethane, Ethyl Chloride) | - | - | - | <200 | <200 |
| cis-1,2-Dichloroethene (1,2-Dichloroethylene) | - | - | 5000 | <25 | <25 |
| Dibromochloromethane | - | - | - | <25 | <25 |
| Methyl t-butyl ether (MTBE) | - | - | - | <25 | <25 |
| Methylene Chloride (Dichloromethane) | - | - | 5000 | <50 | <50 |
| Styrene | - | - | 5000 | <25 | <25 |
| Tetrachloroethylene (1,1,2,2- Tetrachloroethene, PCE) | 200 | 3800 | - | <25 | <25 |
| trans-1,2-Dichloroethylene (1,2-Dichloroethylene) | - | - | - | <25 | <25 |
| trans-1,3-Dichloropropene | - | - | - | <25 | <25 |
| Trichloroethylene (1,1,2-Trichloroethene, TCE) | 10 | 50 | - | <10 | <10 |
| Trichlorofluoromethane (Freon 11) | - | - | - | <25 | <25 |
| Vinyl Chloride | - | - | - | <20 | <20 |
| | | | **Sample Date** | 13-Sep-17 | 13-Sep-17 |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (residential site)
2. Generic CCME guideline: no distinction regarding whether derivation is human health or ecologically based

NC = None calculated

- = no guideline, or parameter not analyzed

**Table D5-2 Volatile Organic Compounds (Excluding BTEX) Concentrations in Soil (µg/kg) (Commercial)**

| | CCME [1] | | | | | |
|---|---|---|---|---|---|---|
| **Parameter (other names for the same compound)** | **Human Health** | **Ecological Health** | **Generic[2]** | **SS_CT_01** | **SS_CT_03** | **SS_CT_60** |
| 1,1,1-Trichloroethane | - | - | 50000 | <25 | <25 | <25 |
| 1,1,2,2-Tetrachlorethane | - | - | 500 | <25 | <25 | <25 |
| 1,1,2-Trichloroethane | - | - | 50000 | <25 | <25 | <25 |
| 1,1-Dichloroethane | - | - | 50000 | <25 | <25 | <25 |
| 1,1-Dichloroethene (Dichloroethylene) | - | - | 50000 | <25 | <25 | <25 |
| 1,2-Dichloroethane | - | - | 50000 | <25 | <25 | <25 |
| 1,2-Dichloropropane | - | - | 50000 | <25 | <25 | <25 |
| 1,3-Dichlorobenzene | - | - | 10000 | <25 | <25 | <25 |
| 1,4-Dichlorobenzene | - | - | 10000 | <25 | <25 | <25 |
| Bromodichloromethane (Dichlorobromomethane) | - | - | - | <25 | <25 | <25 |
| Bromoform (Tribromomethane) | - | - | - | <25 | <25 | <25 |
| Bromomethane (Monobromomethane, Methyl Bromide) | - | - | - | <50 | <50 | <50 |
| Carbon Tetrachloride (Tetrachloromethane) | - | - | 50000 | <25 | <25 | <25 |
| Chlorobenzene (Monochlorobenzene) | - | - | 10000 | <25 | <25 | <25 |
| Chloroethane (Monochloroethane, Ethyl Chloride) | - | - | - | <200 | <200 | <200 |
| cis-1,2-Dichloroethene (1,2-Dichloroethylene) | - | - | 50000 | <25 | <25 | <25 |
| Dibromochloromethane | - | - | - | <25 | <25 | <25 |
| Methyl t-butyl ether (MTBE) | - | - | - | <25 | <25 | <25 |
| Methylene Chloride (Dichloromethane) | - | - | 50000 | <50 | <50 | <50 |
| Styrene | - | - | 50000 | <25 | <25 | <25 |
| Tetrachloroethylene (1,1,2,2- Tetrachloroethene, PCE) | 500 | 34000 | - | <25 | <25 | <25 |
| trans-1,2-Dichloroethylene (1,2-Dichloroethylene) | - | - | - | <25 | <25 | <25 |
| trans-1,3-Dichloropropene | - | - | - | <25 | <25 | <25 |
| Trichloroethylene (1,1,2-Trichloroethene, TCE) | 10 | 50 | - | <10 | <10 | <10 |
| Trichlorofluoromethane (Freon 11) | - | - | - | <25 | <25 | <25 |
| Vinyl Chloride | - | - | - | <20 | <20 | <20 |
| | | | **Sample Date** | 12-Sep-17 | 12-Sep-17 | 13-Sep-17 |
| | | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 | 0-0.05 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (commercial site)
2. Generic CCME guideline: no distinction regarding whether derivation is human health or ecologically based
NC = None calculated
- = no guideline, or parameter not analyzed

**Table D6   Concentrations of Furans, and Dioxin-like Compounds in Soil (ng/kg)**

| Parameter | CCME[1] Human Health | CCME[1] Ecological Health | TEF[2] | SS_CT_63 |
|---|---|---|---|---|
| 2,3,7,8-Tetra CDD * | - | - | 1 | <0.107 |
| 1,2,3,7,8-Penta CDD * | - | - | 1 | <0.117 |
| 1,2,3,4,7,8-Hexa CDD * | - | - | 0.1 | <0.113 |
| 1,2,3,6,7,8-Hexa CDD * | - | - | 0.1 | 0.209 |
| 1,2,3,7,8,9-Hexa CDD * | - | - | 0.1 | <0.116 |
| 1,2,3,4,6,7,8-Hepta CDD * | - | - | 0.01 | 2.69 |
| Octa CDD * | - | - | 0.0003 | 22.3 |
| Total Tetra CDD * | - | - | - | <0.107 |
| Total Penta CDD * | - | - | - | <0.141 |
| Total Hexa CDD * | - | - | - | 1.35 |
| Total Hepta CDD * | - | - | - | 5.67 |
| 2,3,7,8-Tetra CDF ** | - | - | 0.1 | <0.143 |
| 1,2,3,7,8-Penta CDF ** | - | - | 0.03 | <0.099 |
| 2,3,4,7,8-Penta CDF ** | - | - | 0.3 | 0.233 |
| 1,2,3,4,7,8-Hexa CDF ** | - | - | 0.1 | 0.156 |
| 1,2,3,6,7,8-Hexa CDF ** | - | - | 0.1 | 0.344 |
| 2,3,4,6,7,8-Hexa CDF ** | - | - | 0.1 | 0.327 |
| 1,2,3,7,8,9-Hexa CDF ** | - | - | 0.1 | <0.100 |
| 1,2,3,4,6,7,8-Hepta CDF ** | - | - | 0.01 | 1.95 |
| 1,2,3,4,7,8,9-Hepta CDF ** | - | - | 0.01 | <0.097 |
| Octa CDF ** | - | - | 0.0003 | 2.46 |
| Total Tetra CDF ** | - | - | - | 6.68 |
| Total Penta CDF ** | - | - | - | 13.5 |
| Total Hexa CDF ** | - | - | - | 5.07 |
| Total Hepta CDF ** | - | - | - | 3.29 |
| **Toxic Equivalency Quotient (TEQ)** | 1000 | 4 | - | 0.365 |
| | | | **Sample Date** | 13-Sep-17 |
| | | | **Depth (m)** | 0-0.05 |

1. Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health (residential site)

2. Toxic equivalency factors (Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds per World Health Organization, 2005)

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

- = no guideline, or parameter not analyzed

If the concentration was less than the detection limit, then 1/2  the detection limit was used in the TEQ calculation.

## Table D7 Petroleum Hydrocarbons in Sediment (mg/kg)

| Sample ID | Sample Depth | Sample Date | B | T | E | X | Total Petroleum Hydrocarbons $C_6$-$C_{10}$ | $C_{10}$-$C_{16}$ | $C_{16}$-$C_{34}$ | $C_{34}$-$C_{50}$ | $C_{>50}$ | $C_{>34}$ | Modified TPH ($C_6$-$C_{32}$)[5] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **F1[3]** | **F2** | **F3** | **-** | **-** | **F4[4]** | |
| **Provincial Screening Levels[1]** | | | **1.2** | **1.4** | **1.2** | **1.3** | **-** | **-** | **-** | **-** | | **-** | **15** |
| **Federal Screening Levels[2]** | | | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | | **-** | **-** |
| SD_CT_01 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SD_CT_02 | 0-0.05 | 13-Sep-17 | <0.012 | <0.040 | <0.020 | <0.040 | <20 | 52 | 910 | 720 | 2200 | 2920 | *962* |
| SD_CT_02_LD | 0-0.05 | 13-Sep-17 | - | - | - | - | - | - | - | - | 2600 | 2600 | - |
| SD_CT_02_FD | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 100 | 69 | <100 | 69 | *100* |
| SD_CT_03 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | 170 | 110 | 440 | 550 | *170* |
| SD_CT_04 | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <10 | <50 | <50 | - | <50 | <50 |
| SD_CT_05_BG | 0-0.05 | 13-Sep-17 | <0.0060 | <0.020 | <0.010 | <0.020 | <10 | <20 | <100 | <100 | - | <100 | <100 |

Notes:

1. Tier I ESLs for "typical" sediment (Atlantic PIRI, 2015), gasoline fuel type (most conservative)
2. CCME does not provide Sediment Quality Guidelines for these parameters
3. Does not include BTEX compounds
4. Where the chromatogram did not return to baseline following the $C_{>34}$-$C_{50}$ analysis, F4G analysis was conducted to quantify hydrocarbons in the $C_{>50}$ range. The sum of the two analyses, where applicable, is compared to the F4 guideline.
5. Modified TPH calculated from the sum of the detected parameters of the CWS F1-F3 fractions. Though generally consistent with the Atlantic RBCA Guidelines for Laboratories (V3.1, 2016), the Atlantic RBCA modified TPH represents $C_{>6}$-$C_{32}$, while the CWS represents $C_{>6}$-$C_{34}$. Thus the calculated mTPH concentration presented here is a slight over estimate of mTPH in the Atlantic RBCA context.

Exceedances of the Atlantic RBCA Ecological Screening Levels are *italicized*.

NA = not applicable

"-" = Not available/ Not analyzed.

**Table D8   PAHs in Sediment (mg/kg)**

| Contaminant of Potential Concern | CCME | | Sample ID | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ISQG | PEL | SD_CT_01 | SD_CT_02 | SD_CT_03 | SD_CT_04 | SD_CT_04_LD | SD_CT_05_BG |
| 1-Methylnaphthalene | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| 2-Methylnaphthalene | 0.0202 | 0.201 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Acenaphthene | 0.00671 | 0.0889 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Acenaphthylene | 0.00587 | 0.128 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Anthracene | 0.0469 | 0.245 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benz(a)anthracene | 0.0317 | 0.385 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo(a)pyrene | 0.0319 | 0.782 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo(b)fluoranthene | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo(g,h,i)perylene | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo(j)fluoranthene | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Benzo(k)fluoranthene | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Chrysene/Triphenylene | 0.0571 | 0.862 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Dibenz(a,h)anthracene | 0.00622 | 0.135 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluoranthene | 0.111 | 2.355 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Fluorene | 0.0212 | 0.144 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Indeno(1,2,3-c,d)pyrene | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Naphthalene | 0.0346 | 0.391 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Perylene | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Phenanthrene | 0.0419 | 0.515 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Pyrene | 0.053 | 0.875 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| | | Sample Date | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

Notes:
CCME = Canadian Council of Ministers of the Environment Sediment Quality Guidelines for the Protection of Aquatic Life - Freshwater (1998).
"-" = no guideline available or parameter not analyzed
ISQG = Interim Sediment Quality Guideline
PEL = Probable Effects Level

**Table D9 Metals in Sediment (mg/kg)**

| Parameter | CCME ISQG[1] | CCME PEL[2] | SD_CT_01 | SD_CT_02 | SD_CT_03 | SD_CT_04 | SD_CT_05_BG | SD_CT_05_BG_LD |
|---|---|---|---|---|---|---|---|---|
| Aluminum | - | - | 7800 | 4300 | 6600 | 5800 | 10000 | 9300 |
| Antimony | - | - | <2.0 | <2.0 | <2.0 | <2.0 | 5.7 | 5.5 |
| Arsenic | 5.9 | 17 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Barium | - | - | 46 | 31 | 70 | 66 | 52 | 48 |
| Beryllium | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Bismuth | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Boron | - | - | <50 | <50 | <50 | <50 | <50 | <50 |
| Cadmium | 0.6 | 3.5 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 |
| Chromium | 37.3 | 90 | 15 | 6.2 | 32 | 18 | 22 | 19 |
| Cobalt | - | - | 3.4 | <1.0 | 7.5 | 5.1 | 5.5 | 4.5 |
| Copper | 36 | 197 | 9.1 | 5.0 | 15 | 12 | 25 | 23 |
| Iron | - | - | 12000 | 1900 | 18000 | 13000 | 28000 | 25000 |
| Lead | 35 | 91.3 | 3.7 | 2.2 | 3.8 | 2.4 | 15 | 15 |
| Lithium | - | - | 7.9 | <2.0 | 9.5 | 11 | 15 | 14 |
| Manganese | - | - | 180 | 12 | 230 | 130 | 200 | 180 |
| Mercury | 0.17 | 0.486 | <0.10 | <0.10 | <0.10 | <0.10 | 0.11 | <0.10 |
| Molybdenum | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Nickel | - | - | 7.0 | 2.6 | 22 | 9.4 | 7.3 | 6.9 |
| Rubidium | - | - | 19 | <2.0 | 29 | 9.6 | 30 | 26 |
| Selenium | - | - | <1.0 | <1.0 | <1.0 | <1.0 | 1.4 | 1.3 |
| Silver | - | - | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Strontium | - | - | 10 | 13 | 8.6 | 9.0 | 13 | 11 |
| Thallium | - | - | 0.15 | <0.10 | 0.23 | <0.10 | 0.24 | 0.22 |
| Tin | - | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Uranium | - | - | 0.56 | 3.1 | 0.46 | 0.38 | 1.2 | 1.2 |
| Vanadium | - | - | 24 | 5.5 | 20 | 26 | 25 | 23 |
| Zinc | 123 | 315 | 42 | <5.0 | 45 | 25 | 78 | 71 |
| | | **depth (m)** | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 | 0-0.05 |
| | | **Sample Date** | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

1. Canadian Council of Ministers of the Environment Interim Sediment Quality Guidelines (ISQGs) for the Protection of Freshwater Aquatic Life

2. Canadian Council of Ministers Probable Effects Level (PELs) for the Protection of Freshwater Aquatic Life

- = no guideline, or parameter not analyzed

**Table D10 PCBs in Sediment (mg/kg)**

| Parameter | CCME ISQG[1] | CCME PEL[2] | SD_CT_02 | SD_CT_04 |
|---|---|---|---|---|
| Aroclor 1016 | - | - | <0.050 | <0.050 |
| Aroclor 1221 | - | - | <0.050 | <0.050 |
| Aroclor 1232 | - | - | <0.050 | <0.050 |
| Aroclor 1248 | - | - | <0.050 | <0.050 |
| Aroclor 1242 | - | - | <0.050 | <0.050 |
| Aroclor 1254 | 0.06 | 0.34 | <0.050 | <0.050 |
| Aroclor 1260 | - | - | <0.050 | <0.050 |
| Calculated Total PCB | 0.0341 | 0.277 | **<0.050** | **<0.050** |
| | | **Sample Depth (mbgs)** | 0-0.05 | 0-0.05 |
| | | **Sample Date** | 13-Sep-17 | 13-Sep-17 |

1. Canadian Council of Ministers of the Environment Interim Sediment Quality Guidelines (ISQGs) for the Protection of Freshwater Aquatic Life
2. Canadian Council of Ministers Probable Effects Level (PELs) for the Protection of Freshwater Aquatic Life
NC = None calculated
- = no guideline, or parameter not analyzed
Exceedances of the ISQG are **Bolded**.

**Table D11 Volatile Organic Compounds (Excluding BTEX) Concentrations in Sediment (µg/kg)**

| Parameter (other names for the same compound) | CCME ISQG[1] | CCME PEL[2] | SD_CT_02 | SD_CT_04 |
|---|---|---|---|---|
| 1,1,1-Trichloroethane | - | - | <25 | <25 |
| 1,1,2,2-Tetrachlorethane | - | - | <25 | <25 |
| 1,1,2-Trichloroethane | - | - | <25 | <25 |
| 1,1-Dichloroethane | - | - | <25 | <25 |
| 1,1-Dichloroethene (Dichloroethylene) | - | - | <25 | <25 |
| 1,2-Dichloroethane | - | - | <25 | <25 |
| 1,2-Dichloropropane | - | - | <25 | <25 |
| 1,3-Dichlorobenzene | - | - | <25 | <25 |
| 1,4-Dichlorobenzene | - | - | <25 | <25 |
| Bromodichloromethane (Dichlorobromomethane) | - | - | <25 | <25 |
| Bromoform (Tribromomethane) | - | - | <25 | <25 |
| Bromomethane (Monobromomethane, Methyl Bromide) | - | - | <50 | <50 |
| Carbon Tetrachloride (Tetrachloromethane) | - | - | <25 | <25 |
| Chlorobenzene (Monochlorobenzene) | - | - | <25 | <25 |
| Chloroethane (Monochloroethane, Ethyl Chloride) | - | - | <200 | <200 |
| cis-1,2-Dichloroethene (1,2-Dichloroethylene) | - | - | <25 | <25 |
| Dibromochloromethane | - | - | <25 | <25 |
| Methyl t-butyl ether (MTBE) | - | - | <25 | <25 |
| Methylene Chloride (Dichloromethane) | - | - | <50 | <50 |
| Styrene | - | - | <25 | <25 |
| Tetrachloroethylene (1,1,2,2- Tetrachloroethene, PCE) | - | - | <25 | <25 |
| trans-1,2-Dichloroethylene (1,2-Dichloroethylene) | - | - | <25 | <25 |
| trans-1,3-Dichloropropene | - | - | <25 | <25 |
| Trichloroethylene (1,1,2-Trichloroethene, TCE) | - | - | <10 | <10 |
| Trichlorofluoromethane (Freon 11) | - | - | <25 | <25 |
| Vinyl Chloride | - | - | <20 | <20 |
| | | **Sample Date** | 13-Sep-17 | 13-Sep-17 |
| | | **Sample Depth (m)** | 0-0.05 | 0-0.05 |

1. Canadian Council of Ministers of the Environment Interim Sediment Quality Guidelines (ISQGs) for the Protection of Freshwater Aquatic Life

2. Canadian Council of Ministers Probable Effects Level (PELs) for the Protection of Freshwater Aquatic Life

CCME does not provide Sediment Quality Guidelines for these parameters

## Table D12 Petroleum Hydrocarbons in Surface Water (mg/L)

| Sample ID | Sample Date | B | T | E | X | Total Petroleum Hydrocarbons $C_6$-$C_{10}$ F1 | $C_{10}$-$C_{16}$ F2 | $C_{16}$-$C_{34}$ F3 | $C_{34}$-$C_{50}$ F4 | Modfied TPH |
|---|---|---|---|---|---|---|---|---|---|---|
| Provincial Screening Levels [1] | | 2.1 | 0.77 | 0.32 | 0.33 | - | - | - | - | 0.10 |
| Federal Screening Levels [2] | | 0.37 | 0.002 | 0.09 | - | - | - | - | - | - |
| SW_CT_01 | 13-Sep-17 | <0.0002 | <0.0002 | <0.0002 | <0.0004 | <0.025 | <0.10 | <0.20 | <0.20 | **<0.20** |
| SW_CT_02 | 13-Sep-17 | <0.0002 | <0.0002 | <0.0002 | <0.0004 | <0.025 | <0.10 | <0.20 | <0.20 | **<0.20** |
| SW_CT_02_FD | 13-Sep-17 | <0.0002 | <0.0002 | <0.0002 | <0.0004 | <0.025 | <0.10 | <0.20 | <0.20 | **<0.20** |
| SW_CT_03 | 13-Sep-17 | <0.0002 | <0.0002 | <0.0002 | <0.0004 | <0.025 | <0.10 | <0.20 | <0.20 | **<0.20** |
| SW_CT_04 | 13-Sep-17 | <0.0002 | <0.0002 | <0.0002 | <0.0004 | <0.025 | <0.10 | <0.20 | <0.20 | **<0.20** |
| SW_CT_05_BG | 13-Sep-17 | <0.0002 | <0.0002 | <0.0002 | <0.0004 | <0.025 | <0.10 | <0.20 | <0.20 | **<0.20** |

Notes:

1. Tier I ESLs for Surface Water (Atlantic PIRI, 2015), diesel/lube oil type (most conservative)
2. CCME Water Quality Guidelines for the Protection of Aquatic Life

"-" = parameter not analyzed

Exceedances of the Atlantic RBCA Screening Levels / or Detection Limits Greater than the Provincial Guidelines are **Bolded**.

**Table D13 PAHs in Surface Water (µg/L)**

| Contaminant of Potential Concern | CCME FWAL [1] | SW_CT_01 | SW_CT_02 | SW_CT_03 | SW_CT_04 | SW_CT_05_BG |
|---|---|---|---|---|---|---|
| 1-Methylnaphthalene | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| 2-Methylnaphthalene | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Acenaphthene | 5.8 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Acenaphthylene | - | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Acridine | 4.4 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Anthracene | 0.012 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Benz(a)anthracene | 0.018 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Benzo(a)pyrene | 0.015 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Benzo(b)fluoranthene | - | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Benzo(b/j)fluoranthene | - | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 |
| Benzo(g,h,i)perylene | - | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Benzo(j)fluoranthene | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Benzo(k)fluoranthene | - | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Chrysene/Triphenylene | - | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Dibenz(a,h)anthracene | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Fluoranthene | 0.04 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Fluorene | 3 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Indeno(1,2,3-c,d)pyrene | - | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Naphthalene | 1.1 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Perylene | - | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Phenanthrene | 0.4 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Pyrene | 0.025 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Quinoline | 3.4 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | **Sample Date** | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

Notes:

1. CCME = Canadian Council of Ministers of the Environment Water Quality Guidelines for the Protection of Aquatic Life - Freshwater

- = no guideline, or parameter not analyzed

**Table D14 General Chemistry Concentrations in Surface Water**

| Parameter | Units | CCME FAL | SW_CT_01 | SW_CT_02 | SW_CT_03 | SW_CT_04 | SW_CT_05_BG |
|---|---|---|---|---|---|---|---|
| **Calculated Parameters** | | | | | | | |
| Anion Sum | me/L | - | 0.580 | 0.620 | 0.600 | 0.650 | 0.700 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | - | 7.1 | 8.7 | 8.9 | 15 | 9.8 |
| Calculated TDS | mg/L | - | 33 | 36 | 35 | 37 | 41 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | - | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Cation Sum | me/L | - | 0.640 | 0.620 | 0.620 | 0.700 | 0.730 |
| Hardness (CaCO3) | mg/L | - | 8.9 | 12 | 12 | 14 | 13 |
| Ion Balance (% Difference) | % | - | 4.92 | 0.00 | 1.64 | 3.70 | 2.10 |
| Langelier Index (@ 20C) | N/A | - | -3.24 | -3.06 | -2.68 | -2.39 | -2.71 |
| Langelier Index (@ 4C) | N/A | - | -3.50 | -3.31 | -2.93 | -2.64 | -2.96 |
| Nitrate (N) | mg/L | 13 | <0.050 | 0.079 | <0.050 | <0.050 | <0.050 |
| Saturation pH (@ 20C) | N/A | - | 10.3 | 9.93 | 9.93 | 9.68 | 9.84 |
| Saturation pH (@ 4C) | N/A | - | 10.6 | 10.2 | 10.2 | 9.94 | 10.1 |
| **Inorganics** | | | | | | | |
| Total Alkalinity (Total as CaCO3) | mg/L | - | 7.1 | 8.8 | 8.9 | 15 | 9.8 |
| Dissolved Chloride (Cl) | mg/L | 120 | 16 | 12 | 12 | 13 | 15 |
| Colour | TCU | - | 66 | 73 | 70 | 86 | 45 |
| Nitrate + Nitrite | mg/L | - | <0.050 | 0.079 | <0.050 | <0.050 | <0.050 |
| Nitrite (N) | mg/L | 0.06 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.5 | 0.096 | <0.050 | <0.050 | <0.050 | 0.24 |
| Total Organic Carbon (C) | mg/L | - | 8.1 | 8.3 | 8.6 | 9.5 | 9.5 |
| Orthophosphate (P) | mg/L | - | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | pH | 6.5 to 9 | 7.08 | 6.88 | 7.25 | 7.29 | 7.13 |
| Reactive Silica (SiO2) | mg/L | - | <0.50 | 0.83 | 0.70 | 1.3 | 0.58 |
| Dissolved Sulphate (SO4) | mg/L | - | <2.0 | 4.4 | 4.2 | <2.0 | 4.000 |
| Turbidity | NTU | - | 0.61 | 5.2 | 1.6 | 1.8 | 1.1 |
| Conductivity | uS/cm | - | 71 | 72 | 70 | 74 | 77 |
| | | **Sample Date** | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

1. CCME FAL = Canadian Council of Ministers of the Environment Environmental Quality Guidelines for the Protection of Freshwater Aquatic Life.

- = no guideline, or parameter not analyzed

Table D15   Metals in Surface Water (µg/L)

| Contaminant of Potential Concern | CCME FWAL | SW_CT_01 | SW_CT_02 | SW_CT_03 | SW_CT_04 | SW_CT_05_BG |
|---|---|---|---|---|---|---|
| Aluminum[1] | 5-100 | 120 | 200 | 180 | 270 | 400 |
| ***Aluminum (Sample-Specific Guideline)*** | | ***100*** | ***100*** | ***100*** | ***100*** | ***100*** |
| Antimony | - | <1.0 | <1.0 | <1.0 | <1.0 | 4.4 |
| Arsenic | 5 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Barium | - | 4.4 | 6.3 | 6.1 | 9.0 | 7.5 |
| Beryllium | - | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Bismuth | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Boron | 1500 | <50 | <50 | <50 | <50 | <50 |
| Cadmium | 0.04 | <0.010 | <0.010 | <0.010 | <0.010 | 0.013 |
| ***Cadmium (Sample-Specific Guideline)*** | | ***0.04*** | ***0.04*** | ***0.04*** | ***0.04*** | ***0.04*** |
| Calcium | - | 1300 | 2700 | 2600 | 2800 | 3000 |
| Chromium | 8.9 | <1.0 | <1.0 | <1.0 | 1.1 | <1.0 |
| Cobalt | - | <0.40 | <0.40 | <0.40 | <0.40 | <0.40 |
| Copper[1] | 2 | <2.0 | <2.0 | 2.0 | 4.3 | 3.1 |
| ***Copper (Sample-Specific Guideline)*** | | ***2*** | ***2*** | ***2*** | ***2*** | ***2*** |
| Iron | 300 | 380 | 510 | 530 | 250 | 620 |
| Lead[1] | 1 | <0.50 | <0.50 | <0.50 | <0.50 | 1.7 |
| ***Lead (Sample-Specific Guideline)*** | | ***1*** | ***1*** | ***1*** | ***1*** | ***1*** |
| Magnesium | - | 1400 | 1400 | 1400 | 1700 | 1400 |
| Manganese | - | 2.4 | 6.0 | 6.1 | <2.0 | 10 |
| Mercury | 0.026 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 |
| Molybdenum | 73 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Nickel[1] | 25 | <2.0 | <2.0 | <2.0 | 2.1 | <2.0 |
| ***Nickel (Sample-Specific Guideline)*** | - | ***25*** | ***25*** | ***25*** | ***25*** | ***25*** |
| Phosphorus | - | <100 | <100 | <100 | <100 | <100 |
| Potassium | - | 590 | 790 | 810 | 740 | 900 |
| Selenium | 1 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Silver | 0.25 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Sodium | - | 9800 | 7700 | 7600 | 8900 | 9400 |
| Strontium | - | 9.3 | 14 | 13 | 12 | 16 |
| Thallium | 0.8 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Tin | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Titanium | - | <2.0 | 11 | 5.8 | 3.1 | 15 |
| Uranium | 15 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Vanadium | - | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Zinc | 30 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 |
| pH (Laboratory) | 6.5-9 | 7.08 | 6.88 | 7.25 | 7.29 | 7.13 |
| Hardness | | 8.9 | 12 | 12 | 14 | 13 |
| **Sample Date** | | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 | 13-Sep-17 |

**Notes:**

1. Guidelines for aluminum, copper, lead, and nickel are dependent on pH and/or hardness. The most conservative values are provided for reference, while sample-specific guidelines were also calculated and presented based on the pH and hardness measured by the lab
CCME FAL = Canadian Council of Ministers of the Environment Environmental Quality Guidelines for the Protection of Freshwater Aquatic Life (Long-Term).

Exceedances of the Federal Screening Levels are shaded red.

- = no guideline, or parameter not analyzed

**Table D16 PCBs in Surface Water (µg/L)**

| Parameter | CCME FAL Guideline | SW_CT_02 | SW_CT_04 |
|---|---|---|---|
| Aroclor 1016 | - | <0.050 | <0.050 |
| Aroclor 1221 | - | <0.050 | <0.050 |
| Aroclor 1232 | - | <0.050 | <0.050 |
| Aroclor 1248 | - | <0.050 | <0.050 |
| Aroclor 1242 | - | <0.050 | <0.050 |
| Aroclor 1254 | - | <0.050 | <0.050 |
| Aroclor 1260 | - | <0.050 | <0.050 |
| Calculated Total PCB | - | <0.050 | <0.050 |
| | **Sample Date** | 13-Sep-17 | 13-Sep-17 |

1. CCME FAL = Canadian Council of Ministers of the Environment Environmental Quality Guidelines for the Protection of Freshwater Aquatic Life.

CCME does not provide surface water quality guidelines for these parameters

- = no guideline, or parameter not analyzed

**Table D17   Asbestos Fibres in Building Materials (%)**

| APEC | Sample ID | Sample Date | Description | Color | Concentration | Asbestos Type |
|---|---|---|---|---|---|---|
| 10 | BS_CT_01A TRANSITE BOARD | 12-Sep-17 | TRANSITE | GREY | 15 | Chrysotile |
| 11 | BS_CT_01B TRANSITE BOARD | 12-Sep-17 | TRANSITE | GREY | 15 | Chrysotile |
| 8 | BS_CT_01C TRANSITE BOARD | 12-Sep-17 | TRANSITE | GREY | 15 | Chrysotile |
| 9 | BS_CT_01D TRANSITE BOARD | 13-Sep-17 | TRANSITE | GREY | 15 | Chrysotile |
| 1 | BS_CT_02A BLACK CAULKING | 12-Sep-17 | CAULKING | BLACK | 6.0 | Chrysotile |
| 11 | BS_CT_02B BLACK CAULKING | 12-Sep-17 | CAULKING | BLACK | <0.5 | - |
| 8 | BS_CT_03A ASPHALT SHEET ROOFING | 12-Sep-17 | ASPHALT | BLACK | <0.5 | - |

Under Newfoundland and Labrador Regulation 111/98 (Asbestos Abatement Regulations, 1998 under the Occupational Health and Safety Act (O.C. 98-730)), Abestos Containing Material is defined as having >1% asbestos fibres by weight.

Asbestos Containing Materials are shaded red

**Table D18 VOCs in Water - Quality Control Sample (μg/L)**

| Parameter | Trip Blank |
|---|---|
| 1,2-Dichlorobenzene | <0.50 |
| 1,3-Dichlorobenzene | <1.0 |
| 1,4-Dichlorobenzene | <1.0 |
| Chlorobenzene | <1.0 |
| 1,1,1-Trichloroethane | <1.0 |
| 1,1,2,2-Tetrachloroethane | <0.50 |
| 1,1,2-Trichloroethane | <1.0 |
| 1,1-Dichloroethane | <2.0 |
| 1,1-Dichloroethylene | <0.50 |
| 1,2-Dichloroethane | <1.0 |
| 1,2-Dichloropropane | <0.50 |
| Benzene | <1.0 |
| Bromodichloromethane | <1.0 |
| Bromoform | <1.0 |
| Bromomethane | <0.50 |
| Carbon Tetrachloride | <0.50 |
| Chloroethane | <8.0 |
| Chloromethane | <8.0 |
| cis-1,3-Dichloropropene | <0.50 |
| Ethylene Dibromide | <0.20 |
| Methyl t-butyl ether (MTBE) | <2.0 |
| Methylene Chloride(Dichloromethane) | <3.0 |
| o-Xylene | <1.0 |
| p+m-Xylene | <2.0 |
| Styrene | <1.0 |
| Total Trihalomethanes | <1.0 |
| Total Xylenes | <1.0 |
| trans-1,2-Dichloroethylene | <0.50 |
| trans-1,3-Dichloropropene | <0.50 |
| Trichloroethylene | <1.0 |
| Trichlorofluoromethane (FREON 11) | <8.0 |
| Vinyl Chloride | <0.50 |

# APPENDIX E

Laboratory Certificates of Analysis

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your Project #: 10550.04
Your C.O.C. #: 627210-01-01


**Attention:Abigail Garnett**

GEMTEC LIMITED
191 Doak Rd
Fredericton, NB
Canada E3C 2E6


**Report Date: 2017/09/29**
Report #: R4746326
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**MAXXAM JOB #: B7K8817**
**Received: 2017/09/20, 10:00**

Sample Matrix: SOLID
# Samples Received: 7

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Reference |
|---|---|---|---|---|---|
| 200 Point Count by PLM (1, 2) | 7 | N/A | 2017/09/28 | CAM SOP-00475 | EPA/600/R-93/116 |

**Remarks:**

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Analytics Mississauga
(2) Maxxam Analytics' Asbestos Laboratory is accredited by NVLAP for bulk asbestos analysis by polarized light microscopy, NVLAP Code 600136-0.
This report may not be reproduced, except in full, without the written approval of Maxxam Analytics. This report may not be used by the client to claim product endorsement by NVLAP, NIST or any other agency of the U.S. Government.
Maxxam Analytics' scope of accreditation includes EPA-600/M4-82-020: "Interim Method for the Determination of Asbestos in Bulk Insulation Samples" and EPA-600/R-93/116: "Method for the Determination of Asbestos in Bulk Building Materials".




Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Your Project #: 10550.04
Your C.O.C. #: 627210-01-01

**Attention:Abigail Garnett**

GEMTEC LIMITED
191 Doak Rd
Fredericton, NB
Canada E3C 2E6

**Report Date: 2017/09/29**
Report #: R4746326
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**MAXXAM JOB #: B7K8817**
**Received: 2017/09/20, 10:00**

Encryption Key

Sara Mason
Project Manager Assistant
29 Sep 2017 17:39:59

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

Maxxam Job #: B7K8817
Report Date: 2017/09/29

GEMTEC LIMITED
Client Project #: 10550.04

## ASBESTOS (SOLID)

| Maxxam ID | | FEK886 | FEK887 | FEK888 | FEK889 | | |
|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627210-01-01 | 627210-01-01 | 627210-01-01 | 627210-01-01 | | |
| | **UNITS** | **BS_CT_01A TRANSITE BOARD** | **BS_CT_02A BLACK CAULKING** | **BS_CT_02B BLACK CAULKING** | **BS_CT_01B TRANSITE BOARD** | **RDL** | **QC Batch** |
| | | | | | | | |
| Number of Layers | % | 1.0 | 1.0 | 1.0 | 1.0 | | 5186612 |
| Layer 1 Homogenous? | % | Yes | Yes | Yes | Yes | | 5186612 |
| Layer 1 Colour | % | GREY | BLACK | BLACK | GREY | | 5186612 |
| Layer 1 Description | % | TRANSITE | CAULKING | CAULKING | TRANSITE | | 5186612 |
| Layer 1 Asbestos | % | DETECTED | DETECTED | <0.5 | DETECTED | 0.5 | 5186612 |
| Layer 1 Chrysotile | % | 15 | 6.0 | | 15 | 0.5 | 5186612 |
| Layer 1 Cellulose | % | | | 20 | | 0.5 | 5186612 |
| Layer 1 Non Fibrous Material | % | 20 | 94 | 80 | 85 | 0.5 | 5186612 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

| Maxxam ID | | FEK890 | FEK891 | FEK892 | | |
|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/13 | 2017/09/12 | | |
| COC Number | | 627210-01-01 | 627210-01-01 | 627210-01-01 | | |
| | **UNITS** | **BS_CT_01C TRANSITE BOARD** | **BS_CT_01D TRANSITE BOARD** | **BS_CT_03A ASPHALT SHEET ROOFING** | **RDL** | **QC Batch** |
| | | | | | | |
| Number of Layers | % | 1.0 | 1.0 | 1.0 | | 5186612 |
| Layer 1 Homogenous? | % | Yes | Yes | Yes | | 5186612 |
| Layer 1 Colour | % | GREY | GREY | BLACK | | 5186612 |
| Layer 1 Description | % | TRANSITE | TRANSITE | ASPHALT | | 5186612 |
| Layer 1 Asbestos | % | DETECTED | DETECTED | <0.5 | 0.5 | 5186612 |
| Layer 1 Chrysotile | % | 15 | 15 | | 0.5 | 5186612 |
| Layer 1 Non Fibrous Material | % | 85 | 85 | 100 | 0.5 | 5186612 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

## GENERAL COMMENTS

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

| | |
|---|---|
| Package 1 | 3.2°C |

**ASBESTOS (SOLID)**

200 Point Count by PLM: VFT = Vinyl Floor Tile

**Results relate only to the items tested.**

Maxxam Job #: B7K8817
Report Date: 2017/09/29

GEMTEC LIMITED
Client Project #: 10550.04

## VALIDATION SIGNATURE PAGE

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

Banu Gurgen-Keough, Supervisor

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



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Your Project #: 10550.04
Site Location: CUT THROAT ISALND
Your C.O.C. #: 627212-01-01

**Attention:Abigail Garnett**

GEMTEC LIMITED
191 Doak Rd
Fredericton, NB
Canada E3C 2E6

**Report Date: 2017/10/17**
Report #: R4787614
Version: 3 - Revision

# CERTIFICATE OF ANALYSIS – REVISED REPORT

**MAXXAM JOB #: B7K3259**
**Received: 2017/09/18, 09:09**

Sample Matrix: Soil
# Samples Received: 68

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Reference |
|---|---|---|---|---|---|
| Benzo(b/j)fluoranthene Sum (LL soil) | 10 | N/A | 2017/09/28 | N/A | Auto Calc. |
| Benzo(b/j)fluoranthene Sum (LL soil) | 20 | N/A | 2017/09/29 | N/A | Auto Calc. |
| Benzo(b/j)fluoranthene Sum (LL soil) | 26 | N/A | 2017/10/02 | N/A | Auto Calc. |
| Petroleum Hydrocarbons F2-F4 in Soil (1, 2) | 8 | 2017/09/22 | 2017/09/23 | CAM SOP-00316 | CCME CWS m |
| Petroleum Hydrocarbons F2-F4 in Soil (1, 2) | 13 | 2017/09/23 | 2017/09/25 | CAM SOP-00316 | CCME CWS m |
| Petroleum Hydrocarbons F2-F4 in Soil (1, 2) | 7 | 2017/09/23 | 2017/09/26 | CAM SOP-00316 | CCME CWS m |
| Petroleum Hydrocarbons F2-F4 in Soil (1, 2) | 40 | 2017/09/25 | 2017/09/26 | CAM SOP-00316 | CCME CWS m |
| F4G (CCME Hydrocarbons Gravimetric) (1) | 3 | 2017/09/27 | 2017/09/27 | CAM SOP-00316 | CCME PHC-CWS m |
| F4G (CCME Hydrocarbons Gravimetric) (1) | 23 | 2017/09/29 | 2017/09/29 | CAM SOP-00316 | CCME PHC-CWS m |
| Metals Solids Acid Extr. ICPMS | 38 | 2017/09/22 | 2017/09/22 | ATL SOP 00058 | EPA 6020A R1 m |
| Metals Solids Acid Extr. ICPMS | 2 | 2017/09/22 | 2017/09/25 | ATL SOP 00058 | EPA 6020A R1 m |
| Metals Solids Acid Extr. ICPMS | 1 | 2017/09/26 | 2017/09/26 | ATL SOP 00058 | EPA 6020A R1 m |
| Moisture | 31 | N/A | 2017/09/20 | ATL SOP 00001 | OMOE Handbook 1983 m |
| Moisture | 25 | N/A | 2017/09/21 | ATL SOP 00001 | OMOE Handbook 1983 m |
| Moisture (1) | 12 | N/A | 2017/09/23 | CAM SOP-00445 | Carter 2nd ed 51.2 m |
| PAH in sediment by GC/MS (Low Level) (3) | 2 | 2017/09/20 | 2017/09/29 | ATL SOP 00102 | EPA 8270D 2014 m |
| PAH in sediment by GC/MS (Low Level) (3) | 1 | 2017/09/20 | 2017/09/30 | ATL SOP 00102 | EPA 8270D 2014 m |
| PAH in sediment by GC/MS (Low Level) (3) | 10 | 2017/09/22 | 2017/09/28 | ATL SOP 00102 | EPA 8270D 2014 m |
| PAH in sediment by GC/MS (Low Level) (3) | 18 | 2017/09/23 | 2017/09/29 | ATL SOP 00102 | EPA 8270D 2014 m |
| PAH in sediment by GC/MS (Low Level) (3) | 6 | 2017/09/25 | 2017/09/29 | ATL SOP 00102 | EPA 8270D 2014 m |
| PAH in sediment by GC/MS (Low Level) (3) | 19 | 2017/09/25 | 2017/09/30 | ATL SOP 00102 | EPA 8270D 2014 m |
| PCBs in soil by GC/ECD (3) | 18 | 2017/09/21 | 2017/09/26 | ATL SOP 00106 | EPA 8082A 2007 m |
| PCB Aroclor sum (soil) | 18 | N/A | 2017/09/26 | N/A | Auto Calc. |
| Volatile Organic Compounds and F1 PHCs (1) | 6 | N/A | 2017/09/23 | CAM SOP-00230 | EPA 8260 m |
| Volatile Organic Compounds and F1 PHCs (1) | 21 | N/A | 2017/09/25 | CAM SOP-00230 | EPA 8260 m |
| Volatile Organic Compounds and F1 PHCs (1) | 41 | N/A | 2017/09/26 | CAM SOP-00230 | EPA 8260 m |
| VOCs in Soil - Field Preserved (4) | 6 | N/A | 2017/09/20 | ATL SOP 00133 | EPA 8260C R3 m |

**Remarks:**

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



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Your Project #: 10550.04
Site Location: CUT THROAT ISALND
Your C.O.C. #: 627212-01-01

**Attention:Abigail Garnett**

GEMTEC LIMITED
191 Doak Rd
Fredericton, NB
Canada E3C 2E6

**Report Date: 2017/10/17**
Report #: R4787614
Version: 3 - Revision

# CERTIFICATE OF ANALYSIS – REVISED REPORT

**MAXXAM JOB #: B7K3259**
**Received: 2017/09/18, 09:09**

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Analytics Mississauga
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.
(3) Soils are reported on a dry weight basis unless otherwise specified.
(4) No lab extraction date is given for C6-C10/BTEX and VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.

Encryption Key Sara Mason
Sara Mason
Project Manager Assistant
17 Oct 2017 15:51:21

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Heather Macumber, Senior Project Manager
Email: HMacumber@maxxam.ca
Phone# (902)420-0203 Ext:226
====================================================================
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## ATLANTIC VOC IN SOIL (FIELD PRES.)

| **Maxxam ID** | | FDL023 | FDL023 | FDL025 | | FDL067 | FDL068 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/12 | 2017/09/12 | 2017/09/12 | | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_01** | **SS_CT_01 Lab-Dup** | **SS_CT_03** | **QC Batch** | **SS_CT_42** | **SS_CT_43** | **RDL** | **QC Batch** |
| **Inorganics** | | | | | | | | | |
| Moisture | % | 4.7 | 4.5 | 34 | 5170876 | 20 | 11 | 1.0 | 5173520 |
| **Volatile Organics** | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| 1,1,2,2-Tetrachloroethane | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| 1,1,2-Trichloroethane | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| 1,1-Dichloroethane | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| 1,1-Dichloroethylene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| 1,2-Dichlorobenzene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| 1,2-Dichloroethane | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| 1,2-Dichloropropane | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| 1,3-Dichlorobenzene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| 1,4-Dichlorobenzene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Benzene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Bromodichloromethane | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Bromoform | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Bromomethane | ug/kg | <50 | | <50 | 5172674 | <50 | <50 | 50 | 5172674 |
| Carbon Tetrachloride | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Chlorobenzene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Chloroethane | ug/kg | <200 | | <200 | 5172674 | <200 | <200 | 200 | 5172674 |
| Chloroform | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| cis-1,2-Dichloroethylene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| cis-1,3-Dichloropropene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Dibromochloromethane | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Ethylbenzene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Ethylene Dibromide | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Methyl t-butyl ether (MTBE) | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Methylene Chloride(Dichloromethane) | ug/kg | <50 | | <50 | 5172674 | <50 | <50 | 50 | 5172674 |
| o-Xylene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| p+m-Xylene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Styrene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Tetrachloroethylene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Toluene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Total Xylenes | ug/kg | <50 | | <50 | 5172674 | <50 | <50 | 50 | 5172674 |
| trans-1,2-Dichloroethylene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |

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


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## ATLANTIC VOC IN SOIL (FIELD PRES.)

| Maxxam ID | | FDL023 | FDL023 | FDL025 | | FDL067 | FDL068 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/12 | 2017/09/12 | 2017/09/12 | | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_01** | **SS_CT_01 Lab-Dup** | **SS_CT_03** | **QC Batch** | **SS_CT_42** | **SS_CT_43** | **RDL** | **QC Batch** |
| trans-1,3-Dichloropropene | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Trichloroethylene | ug/kg | <10 | | <10 | 5172674 | <10 | <10 | 10 | 5172674 |
| Trichlorofluoromethane (FREON 11) | ug/kg | <25 | | <25 | 5172674 | <25 | <25 | 25 | 5172674 |
| Vinyl Chloride | ug/kg | <20 | | <20 | 5172674 | <20 | <20 | 20 | 5172674 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| 4-Bromofluorobenzene | % | 101 | | 101 | 5172674 | 101 | 100 | | 5172674 |
| D10-o-Xylene | % | 109 (1) | | 111 | 5172674 | 118 | 112 (1) | | 5172674 |
| D4-1,2-Dichloroethane | % | 95 | | 96 | 5172674 | 92 | 93 | | 5172674 |
| D8-Toluene | % | 101 | | 101 | 5172674 | 102 | 102 | | 5172674 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) VOC samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## ATLANTIC VOC IN SOIL (FIELD PRES.)

| **Maxxam ID** | | FDL087 | FDL090 | | |
|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SD_CT_02** | **SD_CT_04** | **RDL** | **QC Batch** |
| **Inorganics** | | | | | |
| Moisture | % | 64 | 16 | 1.0 | 5173520 |
| **Volatile Organics** | | | | | |
| 1,1,1-Trichloroethane | ug/kg | <25 | <25 | 25 | 5172674 |
| 1,1,2,2-Tetrachloroethane | ug/kg | <25 | <25 | 25 | 5172674 |
| 1,1,2-Trichloroethane | ug/kg | <25 | <25 | 25 | 5172674 |
| 1,1-Dichloroethane | ug/kg | <25 | <25 | 25 | 5172674 |
| 1,1-Dichloroethylene | ug/kg | <25 | <25 | 25 | 5172674 |
| 1,2-Dichlorobenzene | ug/kg | <25 | <25 | 25 | 5172674 |
| 1,2-Dichloroethane | ug/kg | <25 | <25 | 25 | 5172674 |
| 1,2-Dichloropropane | ug/kg | <25 | <25 | 25 | 5172674 |
| 1,3-Dichlorobenzene | ug/kg | <25 | <25 | 25 | 5172674 |
| 1,4-Dichlorobenzene | ug/kg | <25 | <25 | 25 | 5172674 |
| Benzene | ug/kg | <25 | <25 | 25 | 5172674 |
| Bromodichloromethane | ug/kg | <25 | <25 | 25 | 5172674 |
| Bromoform | ug/kg | <25 | <25 | 25 | 5172674 |
| Bromomethane | ug/kg | <50 | <50 | 50 | 5172674 |
| Carbon Tetrachloride | ug/kg | <25 | <25 | 25 | 5172674 |
| Chlorobenzene | ug/kg | <25 | <25 | 25 | 5172674 |
| Chloroethane | ug/kg | <200 | <200 | 200 | 5172674 |
| Chloroform | ug/kg | 230 | <25 | 25 | 5172674 |
| cis-1,2-Dichloroethylene | ug/kg | <25 | <25 | 25 | 5172674 |
| cis-1,3-Dichloropropene | ug/kg | <25 | <25 | 25 | 5172674 |
| Dibromochloromethane | ug/kg | <25 | <25 | 25 | 5172674 |
| Ethylbenzene | ug/kg | <25 | <25 | 25 | 5172674 |
| Ethylene Dibromide | ug/kg | <25 | <25 | 25 | 5172674 |
| Methyl t-butyl ether (MTBE) | ug/kg | <25 | <25 | 25 | 5172674 |
| Methylene Chloride(Dichloromethane) | ug/kg | <50 | <50 | 50 | 5172674 |
| o-Xylene | ug/kg | <25 | <25 | 25 | 5172674 |
| p+m-Xylene | ug/kg | <25 | <25 | 25 | 5172674 |
| Styrene | ug/kg | <25 | <25 | 25 | 5172674 |
| Tetrachloroethylene | ug/kg | <25 | <25 | 25 | 5172674 |
| Toluene | ug/kg | <25 | <25 | 25 | 5172674 |
| Total Xylenes | ug/kg | <50 | <50 | 50 | 5172674 |
| trans-1,2-Dichloroethylene | ug/kg | <25 | <25 | 25 | 5172674 |
| trans-1,3-Dichloropropene | ug/kg | <25 | <25 | 25 | 5172674 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## ATLANTIC VOC IN SOIL (FIELD PRES.)

| **Maxxam ID** | | FDL087 | FDL090 | | |
|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SD_CT_02** | **SD_CT_04** | **RDL** | **QC Batch** |
| Trichloroethylene | ug/kg | <10 | <10 | 10 | 5172674 |
| Trichlorofluoromethane (FREON 11) | ug/kg | <25 | <25 | 25 | 5172674 |
| Vinyl Chloride | ug/kg | <20 | <20 | 20 | 5172674 |
| **Surrogate Recovery (%)** | | | | | |
| 4-Bromofluorobenzene | % | 102 | 101 | | 5172674 |
| D10-o-Xylene | % | 86 | 97 | | 5172674 |
| D4-1,2-Dichloroethane | % | 92 | 95 | | 5172674 |
| D8-Toluene | % | 101 | 102 | | 5172674 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| Maxxam ID | | FDL023 | FDL024 | FDL025 | FDL025 | FDL026 | FDL027 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_01 | SS_CT_02 | SS_CT_03 | SS_CT_03 Lab-Dup | SS_CT_04 | SS_CT_05 | RDL | QC Batch |
| **Volatile Organics** | | | | | | | | | |
| Benzene | ug/g | <0.0060 | <0.0060 | <0.0060 | <0.0060 | <0.0060 | <0.0060 | 0.0060 | 5176461 |
| Ethylbenzene | ug/g | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | 5176461 |
| Toluene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5176461 |
| p+m-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5176461 |
| o-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5176461 |
| Total Xylenes | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5176461 |
| F1 (C6-C10) | ug/g | <10 | <10 | <10 | <10 | <10 | <10 | 10 | 5176461 |
| F1 (C6-C10) - BTEX | ug/g | <10 | <10 | <10 | <10 | <10 | <10 | 10 | 5176461 |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | <10 | <10 | 46 | | <10 | <10 | 10 | 5180367 |
| F3 (C16-C34 Hydrocarbons) | ug/g | <50 | 58 | 2000 | | <50 | 73 | 50 | 5180367 |
| F4 (C34-C50 Hydrocarbons) | ug/g | <50 | <50 | 520 | | <50 | <50 | 50 | 5180367 |
| Reached Baseline at C50 | ug/g | Yes | Yes | Yes | | Yes | Yes | | 5180367 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| o-Terphenyl | % | 94 | 100 | 100 | | 95 | 98 | | 5180367 |
| 4-Bromofluorobenzene | % | 92 | 91 | 93 | 92 | 93 | 92 | | 5176461 |
| D10-o-Xylene | % | 88 | 80 | 92 | 92 | 94 | 88 | | 5176461 |
| D4-1,2-Dichloroethane | % | 98 | 100 | 100 | 101 | 100 | 99 | | 5176461 |
| D8-Toluene | % | 99 | 98 | 97 | 98 | 97 | 98 | | 5176461 |

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


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| **Maxxam ID** | | FDL028 | FDL029 | | FDL030 | | FDL031 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/12 | 2017/09/12 | | 2017/09/12 | | 2017/09/12 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | | 627212-01-01 | | 627212-01-01 | | |
| | **UNITS** | **SS_CT_05_FD** | **SS_CT_06** | **RDL** | **SS_CT_07** | **RDL** | **SS_CT_07 FD** | **RDL** | **QC Batch** |
| **Volatile Organics** | | | | | | | | | |
| Benzene | ug/g | <0.0060 | <0.0060 | 0.0060 | <0.0060 | 0.0060 | <0.0060 | 0.0060 | 5176461 |
| Ethylbenzene | ug/g | <0.010 | <0.010 | 0.010 | <0.010 | 0.010 | <0.010 | 0.010 | 5176461 |
| Toluene | ug/g | <0.020 | <0.020 | 0.020 | <0.020 | 0.020 | <0.020 | 0.020 | 5176461 |
| p+m-Xylene | ug/g | <0.020 | <0.020 | 0.020 | <0.020 | 0.020 | <0.020 | 0.020 | 5176461 |
| o-Xylene | ug/g | <0.020 | <0.020 | 0.020 | <0.020 | 0.020 | <0.020 | 0.020 | 5176461 |
| Total Xylenes | ug/g | <0.020 | <0.020 | 0.020 | <0.020 | 0.020 | <0.020 | 0.020 | 5176461 |
| F1 (C6-C10) | ug/g | <10 | <10 | 10 | <10 | 10 | <10 | 10 | 5176461 |
| F1 (C6-C10) - BTEX | ug/g | <10 | <10 | 10 | <10 | 10 | <10 | 10 | 5176461 |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | <10 | <10 | 10 | <20 | 20 | <10 | 10 | 5180367 |
| F3 (C16-C34 Hydrocarbons) | ug/g | 52 | <50 | 50 | 920 | 100 | 270 | 50 | 5180367 |
| F4 (C34-C50 Hydrocarbons) | ug/g | <50 | <50 | 50 | 770 | 100 | 190 | 50 | 5180367 |
| Reached Baseline at C50 | ug/g | Yes | Yes | | No | | No | | 5180367 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| o-Terphenyl | % | 99 | 98 | | 97 | | 99 | | 5180367 |
| 4-Bromofluorobenzene | % | 91 | 92 | | 93 | | 92 | | 5176461 |
| D10-o-Xylene | % | 90 | 85 | | 73 | | 75 | | 5176461 |
| D4-1,2-Dichloroethane | % | 101 | 100 | | 101 | | 100 | | 5176461 |
| D8-Toluene | % | 99 | 97 | | 97 | | 98 | | 5176461 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| Maxxam ID | | FDL032 | | FDL033 | | FDL034 | | FDL035 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | | 2017/09/12 | | 2017/09/12 | | 2017/09/12 | | |
| COC Number | | 627212-01-01 | | 627212-01-01 | | 627212-01-01 | | 627212-01-01 | | |
| | UNITS | SS_CT_08 | RDL | SS_CT_09 | RDL | SS_CT_10 | RDL | SS_CT_11 | RDL | QC Batch |
| **Volatile Organics** | | | | | | | | | | |
| Benzene | ug/g | <0.018 | 0.018 | <0.024 | 0.024 | <0.0060 | 0.0060 | <0.0060 | 0.0060 | 5176461 |
| Ethylbenzene | ug/g | <0.030 | 0.030 | <0.040 | 0.040 | <0.010 | 0.010 | <0.010 | 0.010 | 5176461 |
| Toluene | ug/g | <0.060 | 0.060 | <0.080 | 0.080 | <0.020 | 0.020 | <0.020 | 0.020 | 5176461 |
| p+m-Xylene | ug/g | <0.060 | 0.060 | <0.080 | 0.080 | <0.020 | 0.020 | <0.020 | 0.020 | 5176461 |
| o-Xylene | ug/g | <0.060 | 0.060 | <0.080 | 0.080 | <0.020 | 0.020 | <0.020 | 0.020 | 5176461 |
| Total Xylenes | ug/g | <0.060 | 0.060 | <0.080 | 0.080 | <0.020 | 0.020 | <0.020 | 0.020 | 5176461 |
| F1 (C6-C10) | ug/g | <30 | 30 | <40 | 40 | <10 | 10 | <10 | 10 | 5176461 |
| F1 (C6-C10) - BTEX | ug/g | <30 | 30 | <40 | 40 | <10 | 10 | <10 | 10 | 5176461 |
| **F2-F4 Hydrocarbons** | | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | <40 | 40 | 80 | 40 | <20 | 20 | 77 | 10 | 5180367 |
| F3 (C16-C34 Hydrocarbons) | ug/g | 1700 | 200 | 3500 | 200 | 180 | 100 | 460 | 50 | 5180367 |
| F4 (C34-C50 Hydrocarbons) | ug/g | 1300 | 200 | 2800 | 200 | 170 | 100 | 70 | 50 | 5180367 |
| Reached Baseline at C50 | ug/g | No | | No | | No | | Yes | | 5180367 |
| **Surrogate Recovery (%)** | | | | | | | | | | |
| o-Terphenyl | % | 93 | | 93 | | 96 | | 99 | | 5180367 |
| 4-Bromofluorobenzene | % | 92 | | 91 | | 90 | | 91 | | 5176461 |
| D10-o-Xylene | % | 62 | | 81 | | 92 | | 82 | | 5176461 |
| D4-1,2-Dichloroethane | % | 101 | | 101 | | 102 | | 103 | | 5176461 |
| D8-Toluene | % | 98 | | 97 | | 98 | | 98 | | 5176461 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| Maxxam ID | | FDL036 | FDL037 | FDL038 | FDL039 | FDL040 | FDL041 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_12** | **SS_CT_13** | **SS_CT_14** | **SS_CT_15** | **SS_CT_16** | **SS_CT_17** | **RDL** | **QC Batch** |
| **Inorganics** | | | | | | | | | |
| Moisture | % | | | | 27 | | | 1.0 | 5179389 |
| **Volatile Organics** | | | | | | | | | |
| Benzene | ug/g | <0.0060 | <0.0060 | <0.0060 | <0.0060 | <0.0060 | <0.0060 | 0.0060 | 5176461 |
| Ethylbenzene | ug/g | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | 5176461 |
| Toluene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5176461 |
| p+m-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5176461 |
| o-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5176461 |
| Total Xylenes | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5176461 |
| F1 (C6-C10) | ug/g | <10 | <10 | <10 | <10 | <10 | <10 | 10 | 5176461 |
| F1 (C6-C10) - BTEX | ug/g | <10 | <10 | <10 | <10 | <10 | <10 | 10 | 5176461 |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | 11 | <10 | 10 | 13 | <10 | 20 | 10 | 5180367 |
| F3 (C16-C34 Hydrocarbons) | ug/g | 160 | 130 | 120 | 470 | 140 | 65 | 50 | 5180367 |
| F4 (C34-C50 Hydrocarbons) | ug/g | 64 | 73 | <50 | 78 | 89 | <50 | 50 | 5180367 |
| Reached Baseline at C50 | ug/g | No | No | Yes | No | No | Yes | | 5180367 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| o-Terphenyl | % | 95 | 98 | 100 | 95 | 94 | 94 | | 5180367 |
| 4-Bromofluorobenzene | % | 91 | 91 | 91 | 91 | 92 | 92 | | 5176461 |
| D10-o-Xylene | % | 95 | 86 | 91 | 89 | 90 | 91 | | 5176461 |
| D4-1,2-Dichloroethane | % | 101 | 102 | 101 | 102 | 102 | 103 | | 5176461 |
| D8-Toluene | % | 99 | 99 | 98 | 98 | 97 | 97 | | 5176461 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| Maxxam ID | | FDL042 | FDL042 | | FDL043 | FDL044 | FDL044 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/12 | | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_18 | SS_CT_18 Lab-Dup | QC Batch | SS_CT_19 | SS_CT_20 BG | SS_CT_20 BG Lab-Dup | RDL | QC Batch |
| **Volatile Organics** | | | | | | | | | |
| Benzene | ug/g | <0.0060 | | 5176461 | <0.0060 | <0.0060 | <0.0060 | 0.0060 | 5177768 |
| Ethylbenzene | ug/g | <0.010 | | 5176461 | <0.010 | <0.010 | <0.010 | 0.010 | 5177768 |
| Toluene | ug/g | <0.020 | | 5176461 | <0.020 | <0.020 | <0.020 | 0.020 | 5177768 |
| p+m-Xylene | ug/g | <0.020 | | 5176461 | <0.020 | <0.020 | <0.020 | 0.020 | 5177768 |
| o-Xylene | ug/g | <0.020 | | 5176461 | <0.020 | <0.020 | <0.020 | 0.020 | 5177768 |
| Total Xylenes | ug/g | <0.020 | | 5176461 | <0.020 | <0.020 | <0.020 | 0.020 | 5177768 |
| F1 (C6-C10) | ug/g | <10 | | 5176461 | <10 | <10 | <10 | 10 | 5177768 |
| F1 (C6-C10) - BTEX | ug/g | <10 | | 5176461 | <10 | <10 | <10 | 10 | 5177768 |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | <10 | <10 | 5180367 | <10 | <10 | <10 | 10 | 5180371 |
| F3 (C16-C34 Hydrocarbons) | ug/g | <50 | <50 | 5180367 | 53 | 55 | 63 | 50 | 5180371 |
| F4 (C34-C50 Hydrocarbons) | ug/g | <50 | <50 | 5180367 | 53 | <50 | <50 | 50 | 5180371 |
| Reached Baseline at C50 | ug/g | Yes | Yes | 5180367 | No | Yes | Yes | | 5180371 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| o-Terphenyl | % | 94 | 96 | 5180367 | 102 | 98 | 94 | | 5180371 |
| 4-Bromofluorobenzene | % | 92 | | 5176461 | 91 | 90 | 89 | | 5177768 |
| D10-o-Xylene | % | 90 | | 5176461 | 74 | 83 | 83 | | 5177768 |
| D4-1,2-Dichloroethane | % | 102 | | 5176461 | 98 | 100 | 100 | | 5177768 |
| D8-Toluene | % | 98 | | 5176461 | 99 | 98 | 98 | | 5177768 |

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

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| Maxxam ID | | FDL045 | FDL046 | FDL047 | FDL048 | FDL049 | FDL050 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_21 | SS_CT_22 | SS_CT_22_FD | SS_CT_23 | SS_CT_24 | SS_CT_25 | RDL | QC Batch |
| **Inorganics** | | | | | | | | | |
| Moisture | % | 25 | | | | | | 1.0 | 5179389 |
| **Volatile Organics** | | | | | | | | | |
| Benzene | ug/g | <0.0060 | <0.0060 | <0.0060 | <0.0060 | <0.0060 | <0.0060 | 0.0060 | 5177768 |
| Ethylbenzene | ug/g | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | 5177768 |
| Toluene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5177768 |
| p+m-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5177768 |
| o-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5177768 |
| Total Xylenes | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5177768 |
| F1 (C6-C10) | ug/g | <10 | <10 | <10 | <10 | <10 | <10 | 10 | 5177768 |
| F1 (C6-C10) - BTEX | ug/g | <10 | <10 | <10 | <10 | <10 | <10 | 10 | 5177768 |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | <10 | <10 | <10 | <10 | <10 | <10 | 10 | 5180371 |
| F3 (C16-C34 Hydrocarbons) | ug/g | <50 | <50 | 59 | <50 | 260 | 57 | 50 | 5180371 |
| F4 (C34-C50 Hydrocarbons) | ug/g | <50 | <50 | <50 | <50 | 1200 | <50 | 50 | 5180371 |
| Reached Baseline at C50 | ug/g | Yes | Yes | Yes | Yes | No | Yes | | 5180371 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| o-Terphenyl | % | 95 | 92 | 100 | 96 | 96 | 96 | | 5180371 |
| 4-Bromofluorobenzene | % | 88 | 87 | 88 | 89 | 90 | 89 | | 5177768 |
| D10-o-Xylene | % | 94 | 77 | 100 | 89 | 76 | 75 | | 5177768 |
| D4-1,2-Dichloroethane | % | 99 | 101 | 101 | 100 | 100 | 101 | | 5177768 |
| D8-Toluene | % | 98 | 99 | 99 | 99 | 99 | 99 | | 5177768 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| **Maxxam ID** | | FDL051 | FDL052 | FDL053 | FDL053 | FDL054 | FDL055 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_26** | **SS_CT_27** | **SS_CT_28** | **SS_CT_28 Lab-Dup** | **SS_CT_29** | **SS_CT_30** | **RDL** | **QC Batch** |
| **Inorganics** | | | | | | | | | |
| Moisture | % | 23 | 24 | 23 | 22 | 28 | | 1.0 | 5179389 |
| **Volatile Organics** | | | | | | | | | |
| Benzene | ug/g | <0.0060 | <0.0060 | <0.0060 | | <0.0060 | <0.0060 | 0.0060 | 5177768 |
| Ethylbenzene | ug/g | <0.010 | <0.010 | <0.010 | | <0.010 | <0.010 | 0.010 | 5177768 |
| Toluene | ug/g | <0.020 | <0.020 | <0.020 | | <0.020 | <0.020 | 0.020 | 5177768 |
| p+m-Xylene | ug/g | <0.020 | <0.020 | <0.020 | | <0.020 | <0.020 | 0.020 | 5177768 |
| o-Xylene | ug/g | <0.020 | <0.020 | <0.020 | | <0.020 | <0.020 | 0.020 | 5177768 |
| Total Xylenes | ug/g | <0.020 | <0.020 | <0.020 | | <0.020 | <0.020 | 0.020 | 5177768 |
| F1 (C6-C10) | ug/g | <10 | <10 | <10 | | <10 | <10 | 10 | 5177768 |
| F1 (C6-C10) - BTEX | ug/g | <10 | <10 | <10 | | <10 | <10 | 10 | 5177768 |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | 6500 | <10 | <10 | | 1200 | <10 | 10 | 5180371 |
| F3 (C16-C34 Hydrocarbons) | ug/g | 5500 | <50 | 150 | | 490 | <50 | 50 | 5180371 |
| F4 (C34-C50 Hydrocarbons) | ug/g | <50 | <50 | 58 | | 170 | <50 | 50 | 5180371 |
| Reached Baseline at C50 | ug/g | Yes | Yes | No | | No | Yes | | 5180371 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| o-Terphenyl | % | 118 | 96 | 95 | | 101 | 100 | | 5180371 |
| 4-Bromofluorobenzene | % | 90 | 93 | 92 | | 93 | 92 | | 5177768 |
| D10-o-Xylene | % | 80 | 96 | 85 | | 68 | 96 | | 5177768 |
| D4-1,2-Dichloroethane | % | 101 | 98 | 99 | | 100 | 98 | | 5177768 |
| D8-Toluene | % | 100 | 99 | 99 | | 98 | 99 | | 5177768 |

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

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| Maxxam ID | | FDL056 | FDL057 | FDL058 | FDL059 | | FDL061 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | 2017/09/13 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | 627212-01-01 | | |
| | UNITS | SS_CT_31 | SS_CT_32 | SS_CT_33 | SS_CT_34 | RDL | SS_CT_36 | RDL | QC Batch |
| **Inorganics** | | | | | | | | | |
| Moisture | % | | | | 8.8 | 1.0 | | 1.0 | 5179389 |
| **Volatile Organics** | | | | | | | | | |
| Benzene | ug/g | <0.0060 | <0.0060 | <0.0060 | <0.0060 | 0.0060 | <0.0060 | 0.0060 | 5177768 |
| Ethylbenzene | ug/g | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | <0.010 | 0.010 | 5177768 |
| Toluene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | <0.020 | 0.020 | 5177768 |
| p+m-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | <0.020 | 0.020 | 5177768 |
| o-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | <0.020 | 0.020 | 5177768 |
| Total Xylenes | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | <0.020 | 0.020 | 5177768 |
| F1 (C6-C10) | ug/g | <10 | <10 | <10 | <10 | 10 | <10 | 10 | 5177768 |
| F1 (C6-C10) - BTEX | ug/g | <10 | <10 | <10 | <10 | 10 | <10 | 10 | 5177768 |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | <10 | <10 | <10 | <10 | 10 | <20 | 20 | 5180371 |
| F3 (C16-C34 Hydrocarbons) | ug/g | <50 | <50 | <50 | <50 | 50 | 980 | 100 | 5180371 |
| F4 (C34-C50 Hydrocarbons) | ug/g | <50 | <50 | <50 | <50 | 50 | 860 | 100 | 5180371 |
| Reached Baseline at C50 | ug/g | Yes | Yes | Yes | Yes | | No | | 5180371 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| o-Terphenyl | % | 99 | 97 | 99 | 97 | | 98 | | 5180371 |
| 4-Bromofluorobenzene | % | 92 | 92 | 91 | 90 | | 91 | | 5177768 |
| D10-o-Xylene | % | 100 | 118 | 90 | 76 | | 61 | | 5177768 |
| D4-1,2-Dichloroethane | % | 98 | 99 | 98 | 99 | | 100 | | 5177768 |
| D8-Toluene | % | 99 | 99 | 99 | 99 | | 98 | | 5177768 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| **Maxxam ID** | | FDL062 | | FDL063 | | | FDL064 | | FDL065 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | | 2017/09/13 | | | 2017/09/13 | | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | | 627212-01-01 | | | 627212-01-01 | | 627212-01-01 | | |
| | **UNITS** | **SS_CT_37** | **RDL** | **SS_CT_38** | **RDL** | **QC Batch** | **SS_CT_39** | **RDL** | **SS_CT_40** | **RDL** | **QC Batch** |
| **Inorganics** | | | | | | | | | | | |
| Moisture | % | | 1.0 | | 1.0 | 5179389 | | 1.0 | 12 | 1.0 | 5179389 |
| **Volatile Organics** | | | | | | | | | | | |
| Benzene | ug/g | <0.012 | 0.012 | <0.0060 | 0.0060 | 5177768 | <0.012 | 0.012 | <0.0060 | 0.0060 | 5178025 |
| Ethylbenzene | ug/g | <0.020 | 0.020 | <0.010 | 0.010 | 5177768 | <0.020 | 0.020 | <0.010 | 0.010 | 5178025 |
| Toluene | ug/g | <0.040 | 0.040 | <0.020 | 0.020 | 5177768 | <0.040 | 0.040 | <0.020 | 0.020 | 5178025 |
| p+m-Xylene | ug/g | <0.040 | 0.040 | <0.020 | 0.020 | 5177768 | <0.040 | 0.040 | <0.020 | 0.020 | 5178025 |
| o-Xylene | ug/g | <0.040 | 0.040 | <0.020 | 0.020 | 5177768 | <0.040 | 0.040 | <0.020 | 0.020 | 5178025 |
| Total Xylenes | ug/g | <0.040 | 0.040 | <0.020 | 0.020 | 5177768 | <0.040 | 0.040 | <0.020 | 0.020 | 5178025 |
| F1 (C6-C10) | ug/g | <20 | 20 | <10 | 10 | 5177768 | <20 | 20 | <10 | 10 | 5178025 |
| F1 (C6-C10) - BTEX | ug/g | <20 | 20 | <10 | 10 | 5177768 | <20 | 20 | <10 | 10 | 5178025 |
| **F2-F4 Hydrocarbons** | | | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | <30 | 30 | <10 | 10 | 5180371 | <40 | 40 | <10 | 10 | 5180399 |
| F3 (C16-C34 Hydrocarbons) | ug/g | 590 | 150 | 150 | 50 | 5180371 | 970 | 200 | 78 | 50 | 5180399 |
| F4 (C34-C50 Hydrocarbons) | ug/g | 460 | 150 | 100 | 50 | 5180371 | 520 | 200 | <50 | 50 | 5180399 |
| Reached Baseline at C50 | ug/g | No | | No | | 5180371 | No | | Yes | | 5180399 |
| **Surrogate Recovery (%)** | | | | | | | | | | | |
| o-Terphenyl | % | 97 | | 96 | | 5180371 | 118 | | 117 | | 5180399 |
| 4-Bromofluorobenzene | % | 92 | | 91 | | 5177768 | 95 | | 94 | | 5178025 |
| D10-o-Xylene | % | 76 | | 77 | | 5177768 | 72 | | 84 | | 5178025 |
| D4-1,2-Dichloroethane | % | 100 | | 99 | | 5177768 | 92 | | 94 | | 5178025 |
| D8-Toluene | % | 98 | | 99 | | 5177768 | 93 | | 94 | | 5178025 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| Maxxam ID | | FDL065 | FDL066 | FDL067 | FDL068 | FDL069 | FDL070 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_40 Lab-Dup | SS_CT_41 | SS_CT_42 | SS_CT_43 | SS_CT_44 | SS_CT_45 | RDL | QC Batch |
| **Volatile Organics** | | | | | | | | | |
| Benzene | ug/g | <0.0060 | <0.0060 | <0.0060 | <0.0060 | <0.0060 | <0.0060 | 0.0060 | 5178025 |
| Ethylbenzene | ug/g | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | 5178025 |
| Toluene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5178025 |
| p+m-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5178025 |
| o-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5178025 |
| Total Xylenes | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5178025 |
| F1 (C6-C10) | ug/g | <10 | <10 | <10 | <10 | <10 | <10 | 10 | 5178025 |
| F1 (C6-C10) - BTEX | ug/g | <10 | <10 | <10 | <10 | <10 | <10 | 10 | 5178025 |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | <10 | <10 | <10 | <10 | <10 | 28 | 10 | 5180399 |
| F3 (C16-C34 Hydrocarbons) | ug/g | 54 | 110 | <50 | 97 | 110 | 150 | 50 | 5180399 |
| F4 (C34-C50 Hydrocarbons) | ug/g | <50 | <50 | <50 | <50 | 84 | <50 | 50 | 5180399 |
| Reached Baseline at C50 | ug/g | Yes | Yes | Yes | Yes | No | Yes | | 5180399 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| o-Terphenyl | % | 124 | 121 | 118 | 122 | 118 | 124 | | 5180399 |
| 4-Bromofluorobenzene | % | 94 | 94 | 94 | 92 | 93 | 93 | | 5178025 |
| D10-o-Xylene | % | 83 | 82 | 79 | 73 | 71 | 75 | | 5178025 |
| D4-1,2-Dichloroethane | % | 94 | 94 | 93 | 95 | 96 | 95 | | 5178025 |
| D8-Toluene | % | 94 | 94 | 94 | 95 | 93 | 93 | | 5178025 |

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

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| Maxxam ID | | FDL071 | FDL072 | FDL073 | FDL074 | | FDL075 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | 2017/09/13 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | 627212-01-01 | | |
| | UNITS | SS_CT_45_FD | SS_CT_46 | SS_CT_47 | SS_CT_48 | RDL | SS_CT_49 | RDL | QC Batch |
| **Inorganics** | | | | | | | | | |
| Moisture | % | | | | | 1.0 | 59 | 1.0 | 5179389 |
| **Volatile Organics** | | | | | | | | | |
| Benzene | ug/g | <0.0060 | <0.0060 | <0.0060 | <0.0060 | 0.0060 | <0.012 | 0.012 | 5178025 |
| Ethylbenzene | ug/g | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | <0.020 | 0.020 | 5178025 |
| Toluene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | <0.040 | 0.040 | 5178025 |
| p+m-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | <0.040 | 0.040 | 5178025 |
| o-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | <0.040 | 0.040 | 5178025 |
| Total Xylenes | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | <0.040 | 0.040 | 5178025 |
| F1 (C6-C10) | ug/g | <10 | <10 | <10 | <10 | 10 | <20 | 20 | 5178025 |
| F1 (C6-C10) - BTEX | ug/g | <10 | <10 | <10 | <10 | 10 | <20 | 20 | 5178025 |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | 31 | 30 | 56 | 4300 | 10 | <20 | 20 | 5180399 |
| F3 (C16-C34 Hydrocarbons) | ug/g | 150 | 94 | 120 | 1900 | 50 | 620 | 100 | 5180399 |
| F4 (C34-C50 Hydrocarbons) | ug/g | <50 | <50 | <50 | 66 | 50 | 350 | 100 | 5180399 |
| Reached Baseline at C50 | ug/g | Yes | Yes | Yes | Yes | | No | | 5180399 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| o-Terphenyl | % | 122 | 116 | 120 | 130 | | 123 | | 5180399 |
| 4-Bromofluorobenzene | % | 94 | 93 | 92 | 101 | | 92 | | 5178025 |
| D10-o-Xylene | % | 78 | 80 | 75 | 115 | | 74 | | 5178025 |
| D4-1,2-Dichloroethane | % | 96 | 96 | 94 | 95 | | 94 | | 5178025 |
| D8-Toluene | % | 93 | 93 | 95 | 90 | | 94 | | 5178025 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| Maxxam ID | | FDL076 | | FDL077 | FDL078 | FDL079 | FDL080 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_49_FD** | **RDL** | **SS_CT_50** | **SS_CT_51** | **SS_CT_52** | **SS_CT_53** | **RDL** | **QC Batch** |
| **Inorganics** | | | | | | | | | |
| Moisture | % | 62 | 1.0 | | | | | 1.0 | 5179389 |
| **Volatile Organics** | | | | | | | | | |
| Benzene | ug/g | <0.018 | 0.018 | <0.0060 | <0.0060 | <0.0060 | <0.0060 | 0.0060 | 5178025 |
| Ethylbenzene | ug/g | <0.030 | 0.030 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | 5178025 |
| Toluene | ug/g | <0.060 | 0.060 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5178025 |
| p+m-Xylene | ug/g | <0.060 | 0.060 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5178025 |
| o-Xylene | ug/g | <0.060 | 0.060 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5178025 |
| Total Xylenes | ug/g | <0.060 | 0.060 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 5178025 |
| F1 (C6-C10) | ug/g | <30 | 30 | <10 | <10 | <10 | <10 | 10 | 5178025 |
| F1 (C6-C10) - BTEX | ug/g | <30 | 30 | <10 | <10 | <10 | <10 | 10 | 5178025 |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | <20 | 20 | <10 | <10 | 100 | 45 | 10 | 5180399 |
| F3 (C16-C34 Hydrocarbons) | ug/g | 810 | 100 | 100 | <50 | 300 | 310 | 50 | 5180399 |
| F4 (C34-C50 Hydrocarbons) | ug/g | 570 | 100 | <50 | <50 | 73 | 100 | 50 | 5180399 |
| Reached Baseline at C50 | ug/g | No | | Yes | Yes | No | No | | 5180399 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| o-Terphenyl | % | 128 | | 121 | 117 | 122 | 119 | | 5180399 |
| 4-Bromofluorobenzene | % | 93 | | 93 | 92 | 91 | 93 | | 5178025 |
| D10-o-Xylene | % | 80 | | 73 | 74 | 82 | 81 | | 5178025 |
| D4-1,2-Dichloroethane | % | 94 | | 95 | 95 | 96 | 94 | | 5178025 |
| D8-Toluene | % | 94 | | 94 | 94 | 94 | 94 | | 5178025 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| Maxxam ID | | FDL081 | FDL082 | FDL083 | | FDL084 | FDL085 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/12 | 2017/09/12 | | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_54 | SS_CT_55 | SS_CT_56 | QC Batch | SS_CT_57 | SS_CT_58 | RDL | QC Batch |
| **Inorganics** | | | | | | | | | |
| Moisture | % | 22 | | | 5179389 | | | 1.0 | 5179389 |
| **Volatile Organics** | | | | | | | | | |
| Benzene | ug/g | <0.0060 | <0.0060 | <0.0060 | 5178025 | <0.0060 | <0.0060 | 0.0060 | 5175707 |
| Ethylbenzene | ug/g | <0.010 | <0.010 | <0.010 | 5178025 | <0.010 | <0.010 | 0.010 | 5175707 |
| Toluene | ug/g | <0.020 | <0.020 | <0.020 | 5178025 | <0.020 | <0.020 | 0.020 | 5175707 |
| p+m-Xylene | ug/g | <0.020 | <0.020 | <0.020 | 5178025 | <0.020 | <0.020 | 0.020 | 5175707 |
| o-Xylene | ug/g | <0.020 | <0.020 | <0.020 | 5178025 | <0.020 | <0.020 | 0.020 | 5175707 |
| Total Xylenes | ug/g | <0.020 | <0.020 | <0.020 | 5178025 | <0.020 | <0.020 | 0.020 | 5175707 |
| F1 (C6-C10) | ug/g | <10 | <10 | <10 | 5178025 | <10 | <10 | 10 | 5175707 |
| F1 (C6-C10) - BTEX | ug/g | <10 | <10 | <10 | 5178025 | <10 | <10 | 10 | 5175707 |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | 16 | <10 | <10 | 5180399 | <10 | <10 | 10 | 5178865 |
| F3 (C16-C34 Hydrocarbons) | ug/g | 330 | 70 | <50 | 5180399 | <50 | <50 | 50 | 5178865 |
| F4 (C34-C50 Hydrocarbons) | ug/g | 180 | <50 | <50 | 5180399 | <50 | <50 | 50 | 5178865 |
| Reached Baseline at C50 | ug/g | No | Yes | Yes | 5180399 | Yes | Yes | | 5178865 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| o-Terphenyl | % | 120 | 110 | 111 | 5180399 | 98 | 96 | | 5178865 |
| 4-Bromofluorobenzene | % | 93 | 93 | 93 | 5178025 | 86 | 87 | | 5175707 |
| D10-o-Xylene | % | 76 | 76 | 78 | 5178025 | 79 | 67 | | 5175707 |
| D4-1,2-Dichloroethane | % | 94 | 94 | 93 | 5178025 | 115 | 118 | | 5175707 |
| D8-Toluene | % | 94 | 93 | 94 | 5178025 | 97 | 97 | | 5175707 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| Maxxam ID | | FDL086 | | FDL087 | | FDL088 | FDL089 | FDL090 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | 2017/09/13 | | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | | 627212-01-01 | | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SD_CT_01 | RDL | SD_CT_02 | RDL | SD_CT_02_FD | SD_CT_03 | SD_CT_04 | RDL | QC Batch |
| **Inorganics** | | | | | | | | | | |
| Moisture | % | | 1.0 | | 1.0 | 16 | | | 1.0 | 5179389 |
| **Volatile Organics** | | | | | | | | | | |
| Benzene | ug/g | <0.0060 | 0.0060 | <0.012 | 0.012 | <0.0060 | <0.0060 | <0.0060 | 0.0060 | 5175707 |
| Ethylbenzene | ug/g | <0.010 | 0.010 | <0.020 | 0.020 | <0.010 | <0.010 | <0.010 | 0.010 | 5175707 |
| Toluene | ug/g | <0.020 | 0.020 | <0.040 | 0.040 | <0.020 | <0.020 | <0.020 | 0.020 | 5175707 |
| p+m-Xylene | ug/g | <0.020 | 0.020 | <0.040 | 0.040 | <0.020 | <0.020 | <0.020 | 0.020 | 5175707 |
| o-Xylene | ug/g | <0.020 | 0.020 | <0.040 | 0.040 | <0.020 | <0.020 | <0.020 | 0.020 | 5175707 |
| Total Xylenes | ug/g | <0.020 | 0.020 | <0.040 | 0.040 | <0.020 | <0.020 | <0.020 | 0.020 | 5175707 |
| F1 (C6-C10) | ug/g | <10 | 10 | <20 | 20 | <10 | <10 | <10 | 10 | 5175707 |
| F1 (C6-C10) - BTEX | ug/g | <10 | 10 | <20 | 20 | <10 | <10 | <10 | 10 | 5175707 |
| **F2-F4 Hydrocarbons** | | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | <10 | 10 | 52 | 30 | <10 | <10 | <10 | 10 | 5178865 |
| F3 (C16-C34 Hydrocarbons) | ug/g | <50 | 50 | 910 | 150 | 100 | 170 | <50 | 50 | 5178865 |
| F4 (C34-C50 Hydrocarbons) | ug/g | <50 | 50 | 720 | 150 | 69 | 110 | <50 | 50 | 5178865 |
| Reached Baseline at C50 | ug/g | Yes | | No | | No | No | Yes | | 5178865 |
| **Surrogate Recovery (%)** | | | | | | | | | | |
| o-Terphenyl | % | 96 | | 95 | | 96 | 96 | 98 | | 5178865 |
| 4-Bromofluorobenzene | % | 87 | | 92 | | 92 | 86 | 87 | | 5175707 |
| D10-o-Xylene | % | 73 | | 84 | | 51 (1) | 69 | 73 | | 5175707 |
| D4-1,2-Dichloroethane | % | 120 | | 103 | | 104 | 119 | 120 | | 5175707 |
| D8-Toluene | % | 95 | | 101 | | 101 | 96 | 96 | | 5175707 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) The recovery for the surrogate compound was below the control limit for duplicate analyses of the soil sample. This likely indicates the presence of a sample matrix effect. As a result, there is an increased level of uncertainty associated with the values reported for this sample.


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| Maxxam ID | | FDL091 | | |
|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | |
| COC Number | | 627212-01-01 | | |
| | UNITS | SD_CT_05_BG | RDL | QC Batch |
| **Volatile Organics** | | | | |
| Benzene | ug/g | <0.0060 | 0.0060 | 5175707 |
| Ethylbenzene | ug/g | <0.010 | 0.010 | 5175707 |
| Toluene | ug/g | <0.020 | 0.020 | 5175707 |
| p+m-Xylene | ug/g | <0.020 | 0.020 | 5175707 |
| o-Xylene | ug/g | <0.020 | 0.020 | 5175707 |
| Total Xylenes | ug/g | <0.020 | 0.020 | 5175707 |
| F1 (C6-C10) | ug/g | <10 | 10 | 5175707 |
| F1 (C6-C10) - BTEX | ug/g | <10 | 10 | 5175707 |
| **F2-F4 Hydrocarbons** | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | <20 | 20 | 5178865 |
| F3 (C16-C34 Hydrocarbons) | ug/g | <100 | 100 | 5178865 |
| F4 (C34-C50 Hydrocarbons) | ug/g | <100 | 100 | 5178865 |
| Reached Baseline at C50 | ug/g | Yes | | 5178865 |
| **Surrogate Recovery (%)** | | | | |
| o-Terphenyl | % | 97 | | 5178865 |
| 4-Bromofluorobenzene | % | 86 | | 5175707 |
| D10-o-Xylene | % | 64 | | 5175707 |
| D4-1,2-Dichloroethane | % | 119 | | 5175707 |
| D8-Toluene | % | 97 | | 5175707 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## RESULTS OF ANALYSES OF SOIL

| Maxxam ID | | FDL024 | FDL026 | FDL027 | | FDL028 | FDL028 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/12 | 2017/09/12 | | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_02 | SS_CT_04 | SS_CT_05 | QC Batch | SS_CT_05_FD | SS_CT_05_FD Lab-Dup | RDL | QC Batch |
| **Inorganics** | | | | | | | | | |
| Moisture | % | 18 | 15 | 11 | 5170876 | 8.6 | 7.8 | 1.0 | 5172886 |

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

| Maxxam ID | | FDL029 | FDL030 | FDL031 | FDL032 | FDL033 | FDL034 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_06 | SS_CT_07 | SS_CT_07 FD | SS_CT_08 | SS_CT_09 | SS_CT_10 | RDL | QC Batch |
| **Inorganics** | | | | | | | | | |
| Moisture | % | 8.0 | 61 | 31 | 76 | 74 | 59 | 1.0 | 5172886 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

| Maxxam ID | | FDL035 | FDL036 | FDL037 | FDL038 | FDL040 | FDL041 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_11 | SS_CT_12 | SS_CT_13 | SS_CT_14 | SS_CT_16 | SS_CT_17 | RDL | QC Batch |
| **Inorganics** | | | | | | | | | |
| Moisture | % | 20 | 23 | 17 | 20 | 22 | 17 | 1.0 | 5172886 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

| Maxxam ID | | FDL042 | FDL043 | FDL044 | FDL046 | FDL047 | FDL048 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_18 | SS_CT_19 | SS_CT_20 BG | SS_CT_22 | SS_CT_22_FD | SS_CT_23 | RDL | QC Batch |
| **Inorganics** | | | | | | | | | |
| Moisture | % | 15 | 16 | 18 | 13 | 16 | 9.5 | 1.0 | 5172886 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## RESULTS OF ANALYSES OF SOIL

| Maxxam ID | | FDL049 | | FDL050 | FDL055 | FDL056 | FDL057 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_24** | **QC Batch** | **SS_CT_25** | **SS_CT_30** | **SS_CT_31** | **SS_CT_32** | **RDL** | **QC Batch** |
| **Inorganics** | | | | | | | | | |
| Moisture | % | 11 | 5172886 | 16 | 12 | 18 | 13 | 1.0 | 5172699 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## RESULTS OF ANALYSES OF SOIL

| Maxxam ID | | FDL058 | | FDL061 | | FDL062 | | FDL063 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | 2017/09/13 | | 2017/09/13 | | 2017/09/13 | | |
| COC Number | | 627212-01-01 | | 627212-01-01 | | 627212-01-01 | | 627212-01-01 | | |
| | UNITS | SS_CT_33 | QC Batch | SS_CT_36 | QC Batch | SS_CT_37 | QC Batch | SS_CT_38 | RDL | QC Batch |
| **Inorganics** | | | | | | | | | | |
| Moisture | % | 9.0 | 5172699 | 55 | 5173520 | 72 | 5172699 | 24 | 1.0 | 5173520 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

| Maxxam ID | | FDL063 | FDL064 | FDL066 | FDL069 | FDL070 | FDL071 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_38 Lab-Dup | SS_CT_39 | SS_CT_41 | SS_CT_44 | SS_CT_45 | SS_CT_45_FD | RDL | QC Batch |
| **Inorganics** | | | | | | | | | |
| Moisture | % | 23 | 77 | 31 | 14 | 22 | 23 | 1.0 | 5173520 |

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

| Maxxam ID | | FDL072 | | FDL073 | FDL073 | FDL074 | FDL077 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_46 | QC Batch | SS_CT_47 | SS_CT_47 Lab-Dup | SS_CT_48 | SS_CT_50 | RDL | QC Batch |
| **Inorganics** | | | | | | | | | |
| Moisture | % | 20 | 5173520 | 22 | 18 | 21 | 20 | 1.0 | 5174913 |

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

| Maxxam ID | | FDL078 | FDL079 | FDL080 | FDL082 | FDL083 | FDL084 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_51 | SS_CT_52 | SS_CT_53 | SS_CT_55 | SS_CT_56 | SS_CT_57 | RDL | QC Batch |
| **Inorganics** | | | | | | | | | |
| Moisture | % | 18 | 23 | 37 | 10 | 17 | 23 | 1.0 | 5174913 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## RESULTS OF ANALYSES OF SOIL

| Maxxam ID | | FDL085 | | FDL086 | FDL089 | FDL091 | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_58 | QC Batch | SD_CT_01 | SD_CT_03 | SD_CT_05_BG | RDL | QC Batch |
| **Inorganics** | | | | | | | | |
| Moisture | % | 6.7 | 5174913 | 26 | 22 | 41 | 1.0 | 5173520 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

| Maxxam ID | | FDL023 | | | FDL025 | | FDL027 | FDL028 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | | | 2017/09/12 | | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | | | 627212-01-01 | | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_01 | RDL | QC Batch | SS_CT_03 | RDL | SS_CT_05 | SS_CT_05_FD | RDL | QC Batch |
| **Metals** | | | | | | | | | | |
| Acid Extractable Aluminum (Al) | mg/kg | 9500 | 10 | 5182130 | 6600 | 10 | 9600 | 9500 | 10 | 5177171 |
| Acid Extractable Antimony (Sb) | mg/kg | <2.0 | 2.0 | 5182130 | 4.7 | 2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Arsenic (As) | mg/kg | 2.1 | 2.0 | 5182130 | 24 | 2.0 | 2.2 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Barium (Ba) | mg/kg | 100 | 5.0 | 5182130 | 75 | 5.0 | 110 | 110 | 5.0 | 5177171 |
| Acid Extractable Beryllium (Be) | mg/kg | <2.0 | 2.0 | 5182130 | <2.0 | 2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Bismuth (Bi) | mg/kg | <2.0 | 2.0 | 5182130 | <2.0 | 2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Boron (B) | mg/kg | <50 | 50 | 5182130 | <50 | 50 | <50 | <50 | 50 | 5177171 |
| Acid Extractable Cadmium (Cd) | mg/kg | 1.3 | 0.30 | 5182130 | 5.3 | 0.30 | 0.52 | <0.30 | 0.30 | 5177171 |
| Acid Extractable Chromium (Cr) | mg/kg | 34 | 2.0 | 5182130 | 170 | 2.0 | 33 | 23 | 2.0 | 5177171 |
| Acid Extractable Cobalt (Co) | mg/kg | 11 | 1.0 | 5182130 | 35 | 1.0 | 9.4 | 7.7 | 1.0 | 5177171 |
| Acid Extractable Copper (Cu) | mg/kg | 27 | 2.0 | 5182130 | 210 | 2.0 | 26 | 24 | 2.0 | 5177171 |
| Acid Extractable Iron (Fe) | mg/kg | 33000 | 50 | 5182130 | 270000 | 500 | 27000 | 27000 | 50 | 5177171 |
| Acid Extractable Lead (Pb) | mg/kg | 77 | 0.50 | 5182130 | 3200 | 0.50 | 52 | 48 | 0.50 | 5177171 |
| Acid Extractable Lithium (Li) | mg/kg | 17 | 2.0 | 5182130 | 14 | 2.0 | 17 | 18 | 2.0 | 5177171 |
| Acid Extractable Manganese (Mn) | mg/kg | 410 | 2.0 | 5182130 | 1500 | 2.0 | 380 | 370 | 2.0 | 5177171 |
| Acid Extractable Mercury (Hg) | mg/kg | <0.10 | 0.10 | 5182130 | 0.29 | 0.10 | <0.10 | <0.10 | 0.10 | 5177171 |
| Acid Extractable Molybdenum (Mo) | mg/kg | <2.0 | 2.0 | 5182130 | 18 | 2.0 | 2.3 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Nickel (Ni) | mg/kg | 24 | 2.0 | 5182130 | 150 | 2.0 | 22 | 11 | 2.0 | 5177171 |
| Acid Extractable Rubidium (Rb) | mg/kg | 52 | 2.0 | 5182130 | 16 | 2.0 | 61 | 64 | 2.0 | 5177171 |
| Acid Extractable Selenium (Se) | mg/kg | <1.0 | 1.0 | 5182130 | <1.0 | 1.0 | <1.0 | <1.0 | 1.0 | 5177171 |
| Acid Extractable Silver (Ag) | mg/kg | <0.50 | 0.50 | 5182130 | <0.50 | 0.50 | <0.50 | <0.50 | 0.50 | 5177171 |
| Acid Extractable Strontium (Sr) | mg/kg | 10 | 5.0 | 5182130 | 78 | 5.0 | 14 | 9.6 | 5.0 | 5177171 |
| Acid Extractable Thallium (Tl) | mg/kg | 0.41 | 0.10 | 5182130 | 0.17 | 0.10 | 0.44 | 0.46 | 0.10 | 5177171 |
| Acid Extractable Tin (Sn) | mg/kg | <2.0 | 2.0 | 5182130 | 39 | 2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Uranium (U) | mg/kg | 0.31 | 0.10 | 5182130 | 0.61 | 0.10 | 0.28 | 0.25 | 0.10 | 5177171 |
| Acid Extractable Vanadium (V) | mg/kg | 19 | 2.0 | 5182130 | 24 | 2.0 | 19 | 18 | 2.0 | 5177171 |
| Acid Extractable Zinc (Zn) | mg/kg | 1100 | 5.0 | 5182130 | 1900 | 5.0 | 200 | 180 | 5.0 | 5177171 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

| **Maxxam ID** | | FDL029 | FDL029 | FDL030 | FDL031 | FDL032 | | |
|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_06** | **SS_CT_06 Lab-Dup** | **SS_CT_07** | **SS_CT_07 FD** | **SS_CT_08** | **RDL** | **QC Batch** |
| **Metals** | | | | | | | | |
| Acid Extractable Aluminum (Al) | mg/kg | 11000 | 11000 | 3900 | 4200 | 4300 | 10 | 5177171 |
| Acid Extractable Antimony (Sb) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Arsenic (As) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Barium (Ba) | mg/kg | 120 | 120 | 13 | 13 | 45 | 5.0 | 5177171 |
| Acid Extractable Beryllium (Be) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Bismuth (Bi) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Boron (B) | mg/kg | <50 | <50 | <50 | <50 | <50 | 50 | 5177171 |
| Acid Extractable Cadmium (Cd) | mg/kg | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | 0.30 | 5177171 |
| Acid Extractable Chromium (Cr) | mg/kg | 38 | 40 | 11 | 13 | 4.4 | 2.0 | 5177171 |
| Acid Extractable Cobalt (Co) | mg/kg | 7.5 | 7.4 | 1.6 | 2.0 | <1.0 | 1.0 | 5177171 |
| Acid Extractable Copper (Cu) | mg/kg | 22 | 21 | 3.2 | 3.5 | 12 | 2.0 | 5177171 |
| Acid Extractable Iron (Fe) | mg/kg | 28000 | 29000 | 12000 | 15000 | 8700 | 50 | 5177171 |
| Acid Extractable Lead (Pb) | mg/kg | 7.5 | 11 (1) | 3.9 | 3.9 | 5.2 | 0.50 | 5177171 |
| Acid Extractable Lithium (Li) | mg/kg | 19 | 20 | <2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Manganese (Mn) | mg/kg | 410 | 440 | 68 | 91 | 8.3 | 2.0 | 5177171 |
| Acid Extractable Mercury (Hg) | mg/kg | <0.10 | <0.10 | 0.12 | <0.10 | 0.18 | 0.10 | 5177171 |
| Acid Extractable Molybdenum (Mo) | mg/kg | <2.0 | 2.6 | 2.9 | 3.5 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Nickel (Ni) | mg/kg | 14 | 15 | 2.4 | 3.0 | 2.4 | 2.0 | 5177171 |
| Acid Extractable Rubidium (Rb) | mg/kg | 75 | 80 | 18 | 21 | 2.8 | 2.0 | 5177171 |
| Acid Extractable Selenium (Se) | mg/kg | <1.0 | <1.0 | <1.0 | <1.0 | 2.1 | 1.0 | 5177171 |
| Acid Extractable Silver (Ag) | mg/kg | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 0.50 | 5177171 |
| Acid Extractable Strontium (Sr) | mg/kg | 7.5 | 8.0 | 7.9 | 7.0 | 24 | 5.0 | 5177171 |
| Acid Extractable Thallium (Tl) | mg/kg | 0.59 | 0.60 | 0.12 | 0.13 | <0.10 | 0.10 | 5177171 |
| Acid Extractable Tin (Sn) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Uranium (U) | mg/kg | 0.45 | 0.47 | 0.52 | 0.49 | 1.8 | 0.10 | 5177171 |
| Acid Extractable Vanadium (V) | mg/kg | 20 | 21 | 25 | 33 | 2.7 | 2.0 | 5177171 |
| Acid Extractable Zinc (Zn) | mg/kg | 93 | 100 | 15 | 15 | 10 | 5.0 | 5177171 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Poor RPD due to sample inhomogeneity. < 10 % of compounds in multi-component analysis in violation.


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

| **Maxxam ID** | | FDL033 | FDL034 | FDL040 | FDL041 | FDL042 | | |
|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_09** | **SS_CT_10** | **SS_CT_16** | **SS_CT_17** | **SS_CT_18** | **RDL** | **QC Batch** |
| **Metals** | | | | | | | | |
| Acid Extractable Aluminum (Al) | mg/kg | 6800 | 4500 | 10000 | 9100 | 4700 | 10 | 5177171 |
| Acid Extractable Antimony (Sb) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Arsenic (As) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Barium (Ba) | mg/kg | 52 | 15 | 95 | 99 | 33 | 5.0 | 5177171 |
| Acid Extractable Beryllium (Be) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Bismuth (Bi) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Boron (B) | mg/kg | <50 | <50 | <50 | <50 | <50 | 50 | 5177171 |
| Acid Extractable Cadmium (Cd) | mg/kg | 0.31 | <0.30 | 0.34 | 1.0 | <0.30 | 0.30 | 5177171 |
| Acid Extractable Chromium (Cr) | mg/kg | 4.5 | 6.8 | 38 | 18 | 14 | 2.0 | 5177171 |
| Acid Extractable Cobalt (Co) | mg/kg | 1.1 | 1.3 | 7.7 | 6.2 | 3.6 | 1.0 | 5177171 |
| Acid Extractable Copper (Cu) | mg/kg | 11 | 3.5 | 20 | 20 | 16 | 2.0 | 5177171 |
| Acid Extractable Iron (Fe) | mg/kg | 2300 | 12000 | 27000 | 26000 | 9900 | 50 | 5177171 |
| Acid Extractable Lead (Pb) | mg/kg | 3.9 | 3.3 | 26 | 14 | 2.3 | 0.50 | 5177171 |
| Acid Extractable Lithium (Li) | mg/kg | <2.0 | <2.0 | 16 | 17 | 4.4 | 2.0 | 5177171 |
| Acid Extractable Manganese (Mn) | mg/kg | 12 | 79 | 380 | 360 | 130 | 2.0 | 5177171 |
| Acid Extractable Mercury (Hg) | mg/kg | 0.11 | 0.11 | <0.10 | <0.10 | <0.10 | 0.10 | 5177171 |
| Acid Extractable Molybdenum (Mo) | mg/kg | <2.0 | 2.8 | <2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Nickel (Ni) | mg/kg | 3.1 | <2.0 | 18 | 8.3 | 7.5 | 2.0 | 5177171 |
| Acid Extractable Rubidium (Rb) | mg/kg | <2.0 | 30 | 62 | 63 | 8.4 | 2.0 | 5177171 |
| Acid Extractable Selenium (Se) | mg/kg | 1.2 | <1.0 | <1.0 | <1.0 | <1.0 | 1.0 | 5177171 |
| Acid Extractable Silver (Ag) | mg/kg | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 0.50 | 5177171 |
| Acid Extractable Strontium (Sr) | mg/kg | 32 | 6.4 | 9.6 | 7.9 | 8.9 | 5.0 | 5177171 |
| Acid Extractable Thallium (Tl) | mg/kg | <0.10 | 0.19 | 0.49 | 0.46 | <0.10 | 0.10 | 5177171 |
| Acid Extractable Tin (Sn) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177171 |
| Acid Extractable Uranium (U) | mg/kg | 1.3 | 0.72 | 0.55 | 0.24 | 0.65 | 0.10 | 5177171 |
| Acid Extractable Vanadium (V) | mg/kg | 3.1 | 19 | 20 | 17 | 17 | 2.0 | 5177171 |
| Acid Extractable Zinc (Zn) | mg/kg | 37 | 17 | 94 | 92 | 18 | 5.0 | 5177171 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

| **Maxxam ID** | | FDL043 | FDL044 | FDL046 | FDL047 | FDL048 | | |
|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/12 | 2017/09/12 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_19** | **SS_CT_20 BG** | **SS_CT_22** | **SS_CT_22_FD** | **SS_CT_23** | **RDL** | **QC Batch** |
| **Metals** | | | | | | | | |
| Acid Extractable Aluminum (Al) | mg/kg | 12000 | 14000 | 11000 | 11000 | 12000 | 10 | 5177173 |
| Acid Extractable Antimony (Sb) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Arsenic (As) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Barium (Ba) | mg/kg | 120 | 67 | 98 | 93 | 120 | 5.0 | 5177173 |
| Acid Extractable Beryllium (Be) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Bismuth (Bi) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Boron (B) | mg/kg | <50 | <50 | <50 | <50 | <50 | 50 | 5177173 |
| Acid Extractable Cadmium (Cd) | mg/kg | 2.1 | <0.30 | <0.30 | <0.30 | <0.30 | 0.30 | 5177173 |
| Acid Extractable Chromium (Cr) | mg/kg | 72 | 68 | 28 | 31 | 41 | 2.0 | 5177173 |
| Acid Extractable Cobalt (Co) | mg/kg | 13 | 16 | 7.1 | 7.2 | 8.1 | 1.0 | 5177173 |
| Acid Extractable Copper (Cu) | mg/kg | 40 | 17 | 18 | 19 | 21 | 2.0 | 5177173 |
| Acid Extractable Iron (Fe) | mg/kg | 38000 | 28000 | 26000 | 27000 | 30000 | 50 | 5177173 |
| Acid Extractable Lead (Pb) | mg/kg | 52 | 2.7 | 8.3 | 7.9 | 7.0 | 0.50 | 5177173 |
| Acid Extractable Lithium (Li) | mg/kg | 16 | 15 | 13 | 14 | 20 | 2.0 | 5177173 |
| Acid Extractable Manganese (Mn) | mg/kg | 460 | 270 | 440 | 460 | 470 | 2.0 | 5177173 |
| Acid Extractable Mercury (Hg) | mg/kg | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | 5177173 |
| Acid Extractable Molybdenum (Mo) | mg/kg | 2.4 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Nickel (Ni) | mg/kg | 61 | 32 | 12 | 12 | 15 | 2.0 | 5177173 |
| Acid Extractable Rubidium (Rb) | mg/kg | 57 | 25 | 49 | 50 | 78 | 2.0 | 5177173 |
| Acid Extractable Selenium (Se) | mg/kg | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 1.0 | 5177173 |
| Acid Extractable Silver (Ag) | mg/kg | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 0.50 | 5177173 |
| Acid Extractable Strontium (Sr) | mg/kg | 16 | 13 | 11 | 11 | 9.7 | 5.0 | 5177173 |
| Acid Extractable Thallium (Tl) | mg/kg | 0.44 | 0.21 | 0.35 | 0.38 | 0.59 | 0.10 | 5177173 |
| Acid Extractable Tin (Sn) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Uranium (U) | mg/kg | 0.62 | 0.53 | 0.39 | 0.38 | 0.48 | 0.10 | 5177173 |
| Acid Extractable Vanadium (V) | mg/kg | 25 | 43 | 23 | 22 | 20 | 2.0 | 5177173 |
| Acid Extractable Zinc (Zn) | mg/kg | 120 | 42 | 76 | 77 | 92 | 5.0 | 5177173 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

| **Maxxam ID** | | FDL049 | FDL050 | FDL051 | FDL052 | FDL053 | | |
|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_24** | **SS_CT_25** | **SS_CT_26** | **SS_CT_27** | **SS_CT_28** | **RDL** | **QC Batch** |
| **Metals** | | | | | | | | |
| Acid Extractable Aluminum (Al) | mg/kg | 11000 | 13000 | 12000 | 7400 | 7900 | 10 | 5177173 |
| Acid Extractable Antimony (Sb) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Arsenic (As) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Barium (Ba) | mg/kg | 83 | 110 | 120 | 35 | 35 | 5.0 | 5177173 |
| Acid Extractable Beryllium (Be) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Bismuth (Bi) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Boron (B) | mg/kg | 88 | <50 | <50 | <50 | <50 | 50 | 5177173 |
| Acid Extractable Cadmium (Cd) | mg/kg | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | 0.30 | 5177173 |
| Acid Extractable Chromium (Cr) | mg/kg | 28 | 23 | 11 | 310 | 190 | 2.0 | 5177173 |
| Acid Extractable Cobalt (Co) | mg/kg | 6.8 | 10 | 11 | 120 | 76 | 1.0 | 5177173 |
| Acid Extractable Copper (Cu) | mg/kg | 23 | 28 | 60 | 87 | 130 | 2.0 | 5177173 |
| Acid Extractable Iron (Fe) | mg/kg | 30000 | 24000 | 23000 | 75000 | 49000 | 50 | 5177173 |
| Acid Extractable Lead (Pb) | mg/kg | 15 | 7.3 | 2.3 | 1.1 | 13 | 0.50 | 5177173 |
| Acid Extractable Lithium (Li) | mg/kg | 14 | 13 | 11 | 3.3 | 4.3 | 2.0 | 5177173 |
| Acid Extractable Manganese (Mn) | mg/kg | 570 | 280 | 190 | 1100 | 700 | 2.0 | 5177173 |
| Acid Extractable Mercury (Hg) | mg/kg | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | 5177173 |
| Acid Extractable Molybdenum (Mo) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Nickel (Ni) | mg/kg | 13 | 8.2 | 8.8 | 450 | 280 | 2.0 | 5177173 |
| Acid Extractable Rubidium (Rb) | mg/kg | 47 | 35 | 13 | <2.0 | 7.7 | 2.0 | 5177173 |
| Acid Extractable Selenium (Se) | mg/kg | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 1.0 | 5177173 |
| Acid Extractable Silver (Ag) | mg/kg | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 0.50 | 5177173 |
| Acid Extractable Strontium (Sr) | mg/kg | 9.4 | 32 | 8.8 | 19 | 21 | 5.0 | 5177173 |
| Acid Extractable Thallium (Tl) | mg/kg | 0.36 | 0.25 | 0.12 | <0.10 | 0.10 | 0.10 | 5177173 |
| Acid Extractable Tin (Sn) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Uranium (U) | mg/kg | 0.50 | 0.35 | 0.21 | <0.10 | 0.16 | 0.10 | 5177173 |
| Acid Extractable Vanadium (V) | mg/kg | 15 | 44 | 50 | 12 | 17 | 2.0 | 5177173 |
| Acid Extractable Zinc (Zn) | mg/kg | 190 | 50 | 27 | 65 | 60 | 5.0 | 5177173 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

| Maxxam ID | | FDL054 | FDL055 | FDL056 | FDL057 | FDL058 | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_29 | SS_CT_30 | SS_CT_31 | SS_CT_32 | SS_CT_33 | RDL | QC Batch |
| **Metals** | | | | | | | | |
| Acid Extractable Aluminum (Al) | mg/kg | 17000 | 10000 | 12000 | 11000 | 12000 | 10 | 5177173 |
| Acid Extractable Antimony (Sb) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Arsenic (As) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Barium (Ba) | mg/kg | 90 | 110 | 130 | 110 | 130 | 5.0 | 5177173 |
| Acid Extractable Beryllium (Be) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Bismuth (Bi) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Boron (B) | mg/kg | <50 | <50 | <50 | <50 | <50 | 50 | 5177173 |
| Acid Extractable Cadmium (Cd) | mg/kg | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | 0.30 | 5177173 |
| Acid Extractable Chromium (Cr) | mg/kg | 52 | 32 | 37 | 28 | 35 | 2.0 | 5177173 |
| Acid Extractable Cobalt (Co) | mg/kg | 14 | 7.7 | 7.4 | 6.7 | 8.7 | 1.0 | 5177173 |
| Acid Extractable Copper (Cu) | mg/kg | 24 | 36 | 22 | 19 | 23 | 2.0 | 5177173 |
| Acid Extractable Iron (Fe) | mg/kg | 27000 | 27000 | 30000 | 27000 | 32000 | 50 | 5177173 |
| Acid Extractable Lead (Pb) | mg/kg | 2.8 | 3.4 | 9.8 | 8.8 | 6.0 | 0.50 | 5177173 |
| Acid Extractable Lithium (Li) | mg/kg | 25 | 19 | 20 | 19 | 21 | 2.0 | 5177173 |
| Acid Extractable Manganese (Mn) | mg/kg | 360 | 380 | 450 | 410 | 450 | 2.0 | 5177173 |
| Acid Extractable Mercury (Hg) | mg/kg | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | 5177173 |
| Acid Extractable Molybdenum (Mo) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Nickel (Ni) | mg/kg | 19 | 11 | 11 | 10 | 14 | 2.0 | 5177173 |
| Acid Extractable Rubidium (Rb) | mg/kg | 19 | 66 | 80 | 78 | 85 | 2.0 | 5177173 |
| Acid Extractable Selenium (Se) | mg/kg | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 1.0 | 5177173 |
| Acid Extractable Silver (Ag) | mg/kg | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 0.50 | 5177173 |
| Acid Extractable Strontium (Sr) | mg/kg | 14 | 9.4 | 8.7 | 8.2 | 8.3 | 5.0 | 5177173 |
| Acid Extractable Thallium (Tl) | mg/kg | 0.13 | 0.50 | 0.61 | 0.56 | 0.64 | 0.10 | 5177173 |
| Acid Extractable Tin (Sn) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Uranium (U) | mg/kg | 0.33 | 0.24 | 0.59 | 0.48 | 0.40 | 0.10 | 5177173 |
| Acid Extractable Vanadium (V) | mg/kg | 46 | 17 | 20 | 19 | 21 | 2.0 | 5177173 |
| Acid Extractable Zinc (Zn) | mg/kg | 59 | 83 | 96 | 87 | 97 | 5.0 | 5177173 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

| **Maxxam ID** | | FDL061 | FDL062 | FDL063 | FDL064 | FDL066 | | |
|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_36** | **SS_CT_37** | **SS_CT_38** | **SS_CT_39** | **SS_CT_41** | **RDL** | **QC Batch** |
| **Metals** | | | | | | | | |
| Acid Extractable Aluminum (Al) | mg/kg | 2000 | 4300 | 6100 | 11000 | 25000 | 10 | 5177372 |
| Acid Extractable Antimony (Sb) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Arsenic (As) | mg/kg | <2.0 | <2.0 | <2.0 | 2.4 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Barium (Ba) | mg/kg | 17 | 49 | 61 | 190 | 230 | 5.0 | 5177372 |
| Acid Extractable Beryllium (Be) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Bismuth (Bi) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Boron (B) | mg/kg | <50 | <50 | <50 | <50 | <50 | 50 | 5177372 |
| Acid Extractable Cadmium (Cd) | mg/kg | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | 0.30 | 5177372 |
| Acid Extractable Chromium (Cr) | mg/kg | 33 | 23 | 90 | 20 | 79 | 2.0 | 5177372 |
| Acid Extractable Cobalt (Co) | mg/kg | 1.7 | 6.2 | 6.4 | 3.1 | 13 | 1.0 | 5177372 |
| Acid Extractable Copper (Cu) | mg/kg | 3.3 | 15 | 3.8 | 74 | 18 | 2.0 | 5177372 |
| Acid Extractable Iron (Fe) | mg/kg | 5300 | 28000 | 9000 | 12000 | 50000 | 50 | 5177372 |
| Acid Extractable Lead (Pb) | mg/kg | 1.9 | 22 | 1.1 | 3.6 | 8.9 | 0.50 | 5177372 |
| Acid Extractable Lithium (Li) | mg/kg | <2.0 | <2.0 | 3.0 | 8.1 | 45 | 2.0 | 5177372 |
| Acid Extractable Manganese (Mn) | mg/kg | 22 | 130 | 95 | 150 | 900 | 2.0 | 5177372 |
| Acid Extractable Mercury (Hg) | mg/kg | 0.12 | 0.21 | <0.10 | 0.28 | <0.10 | 0.10 | 5177372 |
| Acid Extractable Molybdenum (Mo) | mg/kg | <2.0 | 3.8 | <2.0 | 8.6 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Nickel (Ni) | mg/kg | 3.7 | 12 | 5.3 | 6.7 | 19 | 2.0 | 5177372 |
| Acid Extractable Rubidium (Rb) | mg/kg | <2.0 | 7.6 | 17 | 63 | 190 | 2.0 | 5177372 |
| Acid Extractable Selenium (Se) | mg/kg | <1.0 | 1.6 | <1.0 | 2.8 | <1.0 | 1.0 | 5177372 |
| Acid Extractable Silver (Ag) | mg/kg | <0.50 | <0.50 | <0.50 | 0.70 | <0.50 | 0.50 | 5177372 |
| Acid Extractable Strontium (Sr) | mg/kg | 13 | 30 | 7.2 | 28 | 12 | 5.0 | 5177372 |
| Acid Extractable Thallium (Tl) | mg/kg | <0.10 | 0.14 | 0.11 | 0.47 | 1.3 | 0.10 | 5177372 |
| Acid Extractable Tin (Sn) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Uranium (U) | mg/kg | 0.86 | 1.9 | <0.10 | 7.3 | 1.9 | 0.10 | 5177372 |
| Acid Extractable Vanadium (V) | mg/kg | 8.2 | 28 | 36 | 9.8 | 44 | 2.0 | 5177372 |
| Acid Extractable Zinc (Zn) | mg/kg | <5.0 | 13 | 17 | 38 | 160 | 5.0 | 5177372 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

| **Maxxam ID** | | FDL067 | FDL068 | FDL069 | FDL086 | FDL087 | | |
|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_42** | **SS_CT_43** | **SS_CT_44** | **SD_CT_01** | **SD_CT_02** | **RDL** | **QC Batch** |
| **Metals** | | | | | | | | |
| Acid Extractable Aluminum (Al) | mg/kg | 19000 | 12000 | 14000 | 7800 | 4300 | 10 | 5177372 |
| Acid Extractable Antimony (Sb) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Arsenic (As) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Barium (Ba) | mg/kg | 210 | 130 | 110 | 46 | 31 | 5.0 | 5177372 |
| Acid Extractable Beryllium (Be) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Bismuth (Bi) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Boron (B) | mg/kg | <50 | <50 | <50 | <50 | <50 | 50 | 5177372 |
| Acid Extractable Cadmium (Cd) | mg/kg | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | 0.30 | 5177372 |
| Acid Extractable Chromium (Cr) | mg/kg | 370 | 61 | 200 | 15 | 6.2 | 2.0 | 5177372 |
| Acid Extractable Cobalt (Co) | mg/kg | 17 | 7.9 | 10 | 3.4 | <1.0 | 1.0 | 5177372 |
| Acid Extractable Copper (Cu) | mg/kg | 25 | 32 | 19 | 9.1 | 5.0 | 2.0 | 5177372 |
| Acid Extractable Iron (Fe) | mg/kg | 30000 | 26000 | 25000 | 12000 | 1900 | 50 | 5177372 |
| Acid Extractable Lead (Pb) | mg/kg | 5.7 | 9.3 | 8.3 | 3.7 | 2.2 | 0.50 | 5177372 |
| Acid Extractable Lithium (Li) | mg/kg | 27 | 22 | 20 | 7.9 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Manganese (Mn) | mg/kg | 470 | 430 | 370 | 180 | 12 | 2.0 | 5177372 |
| Acid Extractable Mercury (Hg) | mg/kg | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | 5177372 |
| Acid Extractable Molybdenum (Mo) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Nickel (Ni) | mg/kg | 90 | 19 | 43 | 7.0 | 2.6 | 2.0 | 5177372 |
| Acid Extractable Rubidium (Rb) | mg/kg | 83 | 84 | 69 | 19 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Selenium (Se) | mg/kg | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 1.0 | 5177372 |
| Acid Extractable Silver (Ag) | mg/kg | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 0.50 | 5177372 |
| Acid Extractable Strontium (Sr) | mg/kg | 11 | 8.3 | 7.5 | 10 | 13 | 5.0 | 5177372 |
| Acid Extractable Thallium (Tl) | mg/kg | 0.63 | 0.66 | 0.53 | 0.15 | <0.10 | 0.10 | 5177372 |
| Acid Extractable Tin (Sn) | mg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | 2.0 | 5177372 |
| Acid Extractable Uranium (U) | mg/kg | 1.3 | 1.5 | 0.66 | 0.56 | 3.1 | 0.10 | 5177372 |
| Acid Extractable Vanadium (V) | mg/kg | 40 | 23 | 25 | 24 | 5.5 | 2.0 | 5177372 |
| Acid Extractable Zinc (Zn) | mg/kg | 73 | 81 | 68 | 42 | <5.0 | 5.0 | 5177372 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

| Maxxam ID | | FDL089 | FDL090 | | FDL091 | FDL091 | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | 2017/09/13 | | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SD_CT_03 | SD_CT_04 | QC Batch | SD_CT_05_BG | SD_CT_05_BG Lab-Dup | RDL | QC Batch |
| **Metals** | | | | | | | | |
| Acid Extractable Aluminum (Al) | mg/kg | 6600 | 5800 | 5177372 | 10000 | 9300 | 10 | 5177173 |
| Acid Extractable Antimony (Sb) | mg/kg | <2.0 | <2.0 | 5177372 | 5.7 | 5.5 | 2.0 | 5177173 |
| Acid Extractable Arsenic (As) | mg/kg | <2.0 | <2.0 | 5177372 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Barium (Ba) | mg/kg | 70 | 66 | 5177372 | 52 | 48 | 5.0 | 5177173 |
| Acid Extractable Beryllium (Be) | mg/kg | <2.0 | <2.0 | 5177372 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Bismuth (Bi) | mg/kg | <2.0 | <2.0 | 5177372 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Boron (B) | mg/kg | <50 | <50 | 5177372 | <50 | <50 | 50 | 5177173 |
| Acid Extractable Cadmium (Cd) | mg/kg | <0.30 | <0.30 | 5177372 | <0.30 | <0.30 | 0.30 | 5177173 |
| Acid Extractable Chromium (Cr) | mg/kg | 32 | 18 | 5177372 | 22 | 19 | 2.0 | 5177173 |
| Acid Extractable Cobalt (Co) | mg/kg | 7.5 | 5.1 | 5177372 | 5.5 | 4.5 | 1.0 | 5177173 |
| Acid Extractable Copper (Cu) | mg/kg | 15 | 12 | 5177372 | 25 | 23 | 2.0 | 5177173 |
| Acid Extractable Iron (Fe) | mg/kg | 18000 | 13000 | 5177372 | 28000 | 25000 | 50 | 5177173 |
| Acid Extractable Lead (Pb) | mg/kg | 3.8 | 2.4 | 5177372 | 15 | 15 | 0.50 | 5177173 |
| Acid Extractable Lithium (Li) | mg/kg | 9.5 | 11 | 5177372 | 15 | 14 | 2.0 | 5177173 |
| Acid Extractable Manganese (Mn) | mg/kg | 230 | 130 | 5177372 | 200 | 180 | 2.0 | 5177173 |
| Acid Extractable Mercury (Hg) | mg/kg | <0.10 | <0.10 | 5177372 | 0.11 | <0.10 | 0.10 | 5177173 |
| Acid Extractable Molybdenum (Mo) | mg/kg | <2.0 | <2.0 | 5177372 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Nickel (Ni) | mg/kg | 22 | 9.4 | 5177372 | 7.3 | 6.9 | 2.0 | 5177173 |
| Acid Extractable Rubidium (Rb) | mg/kg | 29 | 9.6 | 5177372 | 30 | 26 | 2.0 | 5177173 |
| Acid Extractable Selenium (Se) | mg/kg | <1.0 | <1.0 | 5177372 | 1.4 | 1.3 | 1.0 | 5177173 |
| Acid Extractable Silver (Ag) | mg/kg | <0.50 | <0.50 | 5177372 | <0.50 | <0.50 | 0.50 | 5177173 |
| Acid Extractable Strontium (Sr) | mg/kg | 8.6 | 9.0 | 5177372 | 13 | 11 | 5.0 | 5177173 |
| Acid Extractable Thallium (Tl) | mg/kg | 0.23 | <0.10 | 5177372 | 0.24 | 0.22 | 0.10 | 5177173 |
| Acid Extractable Tin (Sn) | mg/kg | <2.0 | <2.0 | 5177372 | <2.0 | <2.0 | 2.0 | 5177173 |
| Acid Extractable Uranium (U) | mg/kg | 0.46 | 0.38 | 5177372 | 1.2 | 1.2 | 0.10 | 5177173 |
| Acid Extractable Vanadium (V) | mg/kg | 20 | 26 | 5177372 | 25 | 23 | 2.0 | 5177173 |
| Acid Extractable Zinc (Zn) | mg/kg | 45 | 25 | 5177372 | 78 | 71 | 5.0 | 5177173 |

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


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

| **Maxxam ID** | | FDL023 | FDL024 | | FDL025 | | FDL026 | FDL027 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/12 | 2017/09/12 | | 2017/09/12 | | 2017/09/12 | 2017/09/12 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | | 627212-01-01 | | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_01** | **SS_CT_02** | **RDL** | **SS_CT_03** | **RDL** | **SS_CT_04** | **SS_CT_05** | **RDL** | **QC Batch** |
| **Polyaromatic Hydrocarbons** | | | | | | | | | | |
| 1-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | 0.0050 | 0.15 | 0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| 2-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | 0.0050 | 0.12 | 0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Acenaphthene | mg/kg | <0.0050 | <0.0050 | 0.0050 | 5.2 | 0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Acenaphthylene | mg/kg | <0.0050 | <0.0050 | 0.0050 | <0.049 (1) | 0.049 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Anthracene | mg/kg | 0.0053 | 0.0093 | 0.0050 | 9.3 (2) | 0.25 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Benzo(a)anthracene | mg/kg | <0.0050 | 0.070 | 0.0050 | 47 (2) | 0.25 | 0.014 | 0.0062 | 0.0050 | 5178035 |
| Benzo(a)pyrene | mg/kg | <0.0050 | 0.060 | 0.0050 | 28 (2) | 0.25 | 0.013 | <0.0050 | 0.0050 | 5178035 |
| Benzo(b)fluoranthene | mg/kg | 0.0089 | 0.064 | 0.0050 | 26 (2) | 0.25 | 0.013 | <0.0050 | 0.0050 | 5178035 |
| Benzo(b/j)fluoranthene | mg/kg | <0.010 | 0.10 | 0.010 | 41 | 0.50 | 0.020 | <0.010 | 0.010 | 5170394 |
| Benzo(g,h,i)perylene | mg/kg | 0.0079 | 0.034 | 0.0050 | 12 (2) | 0.25 | 0.0094 | 0.021 | 0.0050 | 5178035 |
| Benzo(j)fluoranthene | mg/kg | <0.0050 | 0.036 | 0.0050 | 15 (2) | 0.25 | 0.0062 | <0.0050 | 0.0050 | 5178035 |
| Benzo(k)fluoranthene | mg/kg | <0.0050 | 0.036 | 0.0050 | 15 (2) | 0.25 | 0.0072 | <0.0050 | 0.0050 | 5178035 |
| Chrysene | mg/kg | 0.011 | 0.067 | 0.0050 | 43 (2) | 0.25 | 0.016 | 0.0057 | 0.0050 | 5178035 |
| Dibenz(a,h)anthracene | mg/kg | <0.0050 | 0.0093 | 0.0050 | 3.8 (2) | 0.25 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Fluoranthene | mg/kg | 0.017 | 0.16 | 0.0050 | 120 (2) | 0.25 | 0.026 | 0.0090 | 0.0050 | 5178035 |
| Fluorene | mg/kg | <0.0050 | <0.0050 | 0.0050 | 4.9 | 0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.0059 | 0.032 | 0.0050 | 12 (2) | 0.25 | 0.0085 | 0.010 | 0.0050 | 5178035 |
| Naphthalene | mg/kg | <0.0050 | <0.0050 | 0.0050 | 0.16 | 0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Perylene | mg/kg | <0.0050 | 0.015 | 0.0050 | 7.5 (2) | 0.25 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Phenanthrene | mg/kg | 0.0058 | 0.065 | 0.0050 | 63 (2) | 0.25 | 0.0080 | <0.0050 | 0.0050 | 5178035 |
| Pyrene | mg/kg | 0.014 | 0.12 | 0.0050 | 85 (2) | 0.25 | 0.021 | 0.0094 | 0.0050 | 5178035 |
| **Surrogate Recovery (%)** | | | | | | | | | | |
| D10-Anthracene | % | 104 | 116 | | 101 | | 123 | 109 | | 5178035 |
| D14-Terphenyl | % | 103 | 96 | | 66 | | 116 | 109 | | 5178035 |
| D8-Acenaphthylene | % | 100 | 102 | | 53 | | 110 | 99 | | 5178035 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.
(2) Elevated PAH RDL(s) due to sample dilution.


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

| Maxxam ID | | FDL028 | FDL029 | FDL030 | FDL031 | FDL032 | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_05_FD | SS_CT_06 | SS_CT_07 | SS_CT_07 FD | SS_CT_08 | RDL | QC Batch |
| **Polyaromatic Hydrocarbons** | | | | | | | | |
| 1-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| 2-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Acenaphthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Acenaphthylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Benzo(a)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Benzo(a)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Benzo(b)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Benzo(b/j)fluoranthene | mg/kg | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | 5170394 |
| Benzo(g,h,i)perylene | mg/kg | 0.013 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Benzo(j)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Benzo(k)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Chrysene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Dibenz(a,h)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Fluoranthene | mg/kg | 0.0055 | 0.0058 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Fluorene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.0070 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Naphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Phenanthrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| Pyrene | mg/kg | <0.0050 | 0.0058 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5178035 |
| **Surrogate Recovery (%)** | | | | | | | | |
| D10-Anthracene | % | 102 | 128 | 116 | 107 | 83 | | 5178035 |
| D14-Terphenyl | % | 110 | 98 | 98 | 113 | 96 | | 5178035 |
| D8-Acenaphthylene | % | 98 | 97 | 87 | 99 | 118 | | 5178035 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

## SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

| **Maxxam ID** | | FDL033 | FDL034 | FDL034 | FDL035 | FDL036 | FDL037 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_09** | **SS_CT_10** | **SS_CT_10 Lab-Dup** | **SS_CT_11** | **SS_CT_12** | **SS_CT_13** | **RDL** | **QC Batch** |
| **Polyaromatic Hydrocarbons** | | | | | | | | | |
| 1-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| 2-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Acenaphthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Acenaphthylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Anthracene | mg/kg | 0.12 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Benzo(a)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 0.0081 | <0.0050 | 0.012 | 0.0050 | 5179748 |
| Benzo(a)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 0.082 | <0.0050 | 0.011 | 0.0050 | 5179748 |
| Benzo(b)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 0.018 | <0.0050 | 0.012 | 0.0050 | 5179748 |
| Benzo(b/j)fluoranthene | mg/kg | <0.010 | <0.010 | | 0.018 | <0.010 | 0.018 | 0.010 | 5170394 |
| Benzo(g,h,i)perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 0.27 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Benzo(j)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0062 | 0.0050 | 5179748 |
| Benzo(k)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0062 | 0.0050 | 5179748 |
| Chrysene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 0.016 | <0.0050 | 0.013 | 0.0050 | 5179748 |
| Dibenz(a,h)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 0.016 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.023 | 0.0050 | 5179748 |
| Fluorene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Indeno(1,2,3-cd)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 0.031 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Naphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 0.013 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Phenanthrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0080 | 0.0050 | 5179748 |
| Pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 0.0069 | <0.0050 | 0.019 | 0.0050 | 5179748 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| D10-Anthracene | % | 69 | 85 | 98 | 99 | 79 | 76 | | 5179748 |
| D14-Terphenyl | % | 84 | 96 | 110 | 93 | 84 | 81 | | 5179748 |
| D8-Acenaphthylene | % | 88 | 87 | 96 | 106 | 91 | 89 | | 5179748 |

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

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

| Maxxam ID | | FDL038 | FDL040 | FDL041 | FDL042 | FDL043 | FDL044 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_14 | SS_CT_16 | SS_CT_17 | SS_CT_18 | SS_CT_19 | SS_CT_20 BG | RDL | QC Batch |
| **Polyaromatic Hydrocarbons** | | | | | | | | | |
| 1-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| 2-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Acenaphthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Acenaphthylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.037 | <0.0050 | 0.0050 | 5179748 |
| Benzo(a)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.18 | <0.0050 | 0.0050 | 5179748 |
| Benzo(a)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.16 | <0.0050 | 0.0050 | 5179748 |
| Benzo(b)fluoranthene | mg/kg | <0.0050 | 0.020 | <0.0050 | <0.0050 | 0.17 | <0.0050 | 0.0050 | 5179748 |
| Benzo(b/j)fluoranthene | mg/kg | <0.010 | 0.030 | <0.010 | <0.010 | 0.26 | <0.010 | 0.010 | 5170394 |
| Benzo(g,h,i)perylene | mg/kg | <0.0050 | 0.013 | <0.0050 | <0.0050 | 0.10 | <0.0050 | 0.0050 | 5179748 |
| Benzo(j)fluoranthene | mg/kg | <0.0050 | 0.010 | <0.0050 | <0.0050 | 0.085 | <0.0050 | 0.0050 | 5179748 |
| Benzo(k)fluoranthene | mg/kg | <0.0050 | 0.0083 | <0.0050 | <0.0050 | 0.093 | <0.0050 | 0.0050 | 5179748 |
| Chrysene | mg/kg | <0.0050 | 0.015 | <0.0050 | <0.0050 | 0.20 | <0.0050 | 0.0050 | 5179748 |
| Dibenz(a,h)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.027 | <0.0050 | 0.0050 | 5179748 |
| Fluoranthene | mg/kg | <0.0050 | 0.013 | <0.0050 | <0.0050 | 0.40 | <0.0050 | 0.0050 | 5179748 |
| Fluorene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Indeno(1,2,3-cd)pyrene | mg/kg | <0.0050 | 0.011 | <0.0050 | <0.0050 | 0.090 | <0.0050 | 0.0050 | 5179748 |
| Naphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.047 | <0.0050 | 0.0050 | 5179748 |
| Phenanthrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.18 | <0.0050 | 0.0050 | 5179748 |
| Pyrene | mg/kg | <0.0050 | 0.013 | <0.0050 | <0.0050 | 0.29 | <0.0050 | 0.0050 | 5179748 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| D10-Anthracene | % | 80 | 103 | 93 | 81 | 117 | 89 | | 5179748 |
| D14-Terphenyl | % | 85 | 106 | 98 | 87 | 121 | 92 | | 5179748 |
| D8-Acenaphthylene | % | 95 | 98 | 96 | 89 | 107 | 91 | | 5179748 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

| **Maxxam ID** | | FDL046 | FDL047 | FDL048 | FDL049 | FDL050 | FDL055 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_22** | **SS_CT_22_FD** | **SS_CT_23** | **SS_CT_24** | **SS_CT_25** | **SS_CT_30** | **RDL** | **QC Batch** |
| **Polyaromatic Hydrocarbons** | | | | | | | | | |
| 1-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| 2-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Acenaphthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Acenaphthylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Benzo(a)anthracene | mg/kg | 0.011 | <0.0050 | <0.0050 | 0.0060 | 0.0079 | <0.0050 | 0.0050 | 5179748 |
| Benzo(a)pyrene | mg/kg | 0.014 | <0.0050 | <0.0050 | 0.0082 | 0.0071 | <0.0050 | 0.0050 | 5179748 |
| Benzo(b)fluoranthene | mg/kg | 0.029 | 0.010 | <0.0050 | 0.014 | 0.0073 | <0.0050 | 0.0050 | 5179748 |
| Benzo(b/j)fluoranthene | mg/kg | 0.046 | 0.010 | <0.010 | 0.014 | <0.010 | <0.010 | 0.010 | 5170394 |
| Benzo(g,h,i)perylene | mg/kg | 0.014 | 0.0066 | <0.0050 | 0.018 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Benzo(j)fluoranthene | mg/kg | 0.016 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Benzo(k)fluoranthene | mg/kg | 0.016 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Chrysene | mg/kg | 0.029 | 0.011 | <0.0050 | 0.020 | 0.010 | <0.0050 | 0.0050 | 5179748 |
| Dibenz(a,h)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Fluoranthene | mg/kg | 0.056 | 0.023 | <0.0050 | 0.012 | 0.017 | <0.0050 | 0.0050 | 5179748 |
| Fluorene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.012 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Naphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5179748 |
| Phenanthrene | mg/kg | 0.0080 | 0.012 | <0.0050 | 0.0085 | 0.012 | <0.0050 | 0.0050 | 5179748 |
| Pyrene | mg/kg | 0.044 | 0.017 | <0.0050 | 0.0096 | 0.011 | <0.0050 | 0.0050 | 5179748 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| D10-Anthracene | % | 79 | 80 | 70 | 76 | 90 | 93 | | 5179748 |
| D14-Terphenyl | % | 96 | 85 | 88 | 91 | 92 | 95 | | 5179748 |
| D8-Acenaphthylene | % | 98 | 96 | 101 | 94 | 93 | 93 | | 5179748 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

| **Maxxam ID** | | FDL056 | FDL057 | FDL058 | | FDL061 | FDL062 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | 2017/09/13 | | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_31** | **SS_CT_32** | **SS_CT_33** | **QC Batch** | **SS_CT_36** | **SS_CT_37** | **RDL** | **QC Batch** |
| **Polyaromatic Hydrocarbons** | | | | | | | | | |
| 1-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| 2-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Acenaphthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Acenaphthylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(a)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(a)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(b)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(b/j)fluoranthene | mg/kg | <0.010 | <0.010 | <0.010 | 5170394 | <0.010 | <0.010 | 0.010 | 5170394 |
| Benzo(g,h,i)perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(j)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(k)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Chrysene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Dibenz(a,h)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Fluoranthene | mg/kg | <0.0050 | 0.0064 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Fluorene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Indeno(1,2,3-cd)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Naphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Phenanthrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5179748 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| D10-Anthracene | % | 74 | 97 | 95 | 5179748 | 69 | 55 | | 5180475 |
| D14-Terphenyl | % | 90 | 101 | 96 | 5179748 | 73 | 63 | | 5180475 |
| D8-Acenaphthylene | % | 98 | 94 | 98 | 5179748 | 82 | 74 | | 5180475 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

| **Maxxam ID** | | FDL063 | FDL064 | FDL066 | FDL067 | | FDL068 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | 627212-01-01 | | |
| | **UNITS** | **SS_CT_38** | **SS_CT_39** | **SS_CT_41** | **SS_CT_42** | **QC Batch** | **SS_CT_43** | **RDL** | **QC Batch** |
| **Polyaromatic Hydrocarbons** | | | | | | | | | |
| 1-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| 2-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Acenaphthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Acenaphthylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Benzo(a)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Benzo(a)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Benzo(b)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Benzo(b/j)fluoranthene | mg/kg | <0.010 | <0.010 | <0.010 | <0.010 | 5170394 | <0.010 | 0.010 | 5170588 |
| Benzo(g,h,i)perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Benzo(j)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Benzo(k)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Chrysene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Dibenz(a,h)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Fluorene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Indeno(1,2,3-cd)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Naphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Phenanthrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| Pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | 0.0050 | 5180475 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| D10-Anthracene | % | 57 | 65 | 56 | 86 | 5180475 | 86 | | 5180475 |
| D14-Terphenyl | % | 79 | 63 | 73 | 90 | 5180475 | 89 | | 5180475 |
| D8-Acenaphthylene | % | 77 | 71 | 86 | 89 | 5180475 | 87 | | 5180475 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

| **Maxxam ID** | | FDL069 | FDL069 | FDL070 | FDL071 | FDL072 | FDL073 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_44** | **SS_CT_44 Lab-Dup** | **SS_CT_45** | **SS_CT_45_FD** | **SS_CT_46** | **SS_CT_47** | **RDL** | **QC Batch** |
| **Polyaromatic Hydrocarbons** | | | | | | | | | |
| 1-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| 2-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Acenaphthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Acenaphthylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(a)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(a)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(b)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(b/j)fluoranthene | mg/kg | <0.010 | | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | 5170588 |
| Benzo(g,h,i)perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(j)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(k)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Chrysene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Dibenz(a,h)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Fluorene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Indeno(1,2,3-cd)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Naphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Phenanthrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| D10-Anthracene | % | 85 | 87 | 58 | 75 | 73 | 84 | | 5180475 |
| D14-Terphenyl | % | 87 | 89 | 75 | 73 | 74 | 83 | | 5180475 |
| D8-Acenaphthylene | % | 89 | 88 | 87 | 92 | 87 | 87 | | 5180475 |

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

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

| Maxxam ID | | FDL074 | | FDL077 | FDL078 | FDL079 | FDL080 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_48 | RDL | SS_CT_50 | SS_CT_51 | SS_CT_52 | SS_CT_53 | RDL | QC Batch |
| **Polyaromatic Hydrocarbons** | | | | | | | | | |
| 1-Methylnaphthalene | mg/kg | <0.018 (1) | 0.018 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| 2-Methylnaphthalene | mg/kg | <0.018 (1) | 0.018 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Acenaphthene | mg/kg | <0.0050 | 0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Acenaphthylene | mg/kg | <0.025 (1) | 0.025 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Anthracene | mg/kg | <0.010 (1) | 0.010 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(a)anthracene | mg/kg | <0.0050 | 0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(a)pyrene | mg/kg | <0.0050 | 0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(b)fluoranthene | mg/kg | <0.0050 | 0.0050 | 0.014 | <0.0050 | <0.0050 | 0.0088 | 0.0050 | 5180475 |
| Benzo(b/j)fluoranthene | mg/kg | <0.010 | 0.010 | 0.014 | <0.010 | <0.010 | <0.010 | 0.010 | 5170588 |
| Benzo(g,h,i)perylene | mg/kg | <0.0050 | 0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(j)fluoranthene | mg/kg | <0.0050 | 0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Benzo(k)fluoranthene | mg/kg | <0.0050 | 0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Chrysene | mg/kg | <0.0050 | 0.0050 | 0.022 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Dibenz(a,h)anthracene | mg/kg | <0.0050 | 0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Fluoranthene | mg/kg | <0.0050 | 0.0050 | 0.014 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Fluorene | mg/kg | <0.0050 | 0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Indeno(1,2,3-cd)pyrene | mg/kg | <0.0050 | 0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Naphthalene | mg/kg | <0.0050 | 0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Perylene | mg/kg | <0.0050 | 0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Phenanthrene | mg/kg | <0.013 (1) | 0.013 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| Pyrene | mg/kg | <0.0050 | 0.0050 | 0.012 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180475 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| D10-Anthracene | % | 85 | | 84 | 85 | 87 | 89 | | 5180475 |
| D14-Terphenyl | % | 87 | | 87 | 87 | 88 | 92 | | 5180475 |
| D8-Acenaphthylene | % | 120 | | 88 | 86 | 89 | 88 | | 5180475 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

| **Maxxam ID** | | FDL082 | FDL083 | FDL084 | | FDL085 | FDL086 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/12 | 2017/09/12 | 2017/09/12 | | 2017/09/12 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | 627212-01-01 | | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_55** | **SS_CT_56** | **SS_CT_57** | **QC Batch** | **SS_CT_58** | **SD_CT_01** | **RDL** | **QC Batch** |
| **Polyaromatic Hydrocarbons** | | | | | | | | | |
| 1-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| 2-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Acenaphthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Acenaphthylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Benzo(a)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5180475 | 0.011 | <0.0050 | 0.0050 | 5180479 |
| Benzo(a)pyrene | mg/kg | 0.013 | <0.0050 | <0.0050 | 5180475 | 0.032 | <0.0050 | 0.0050 | 5180479 |
| Benzo(b)fluoranthene | mg/kg | 0.013 | <0.0050 | <0.0050 | 5180475 | 0.044 | <0.0050 | 0.0050 | 5180479 |
| Benzo(b/j)fluoranthene | mg/kg | 0.019 | <0.010 | <0.010 | 5170588 | 0.062 | <0.010 | 0.010 | 5170588 |
| Benzo(g,h,i)perylene | mg/kg | 0.039 | <0.0050 | 0.0071 | 5180475 | 0.088 | <0.0050 | 0.0050 | 5180479 |
| Benzo(j)fluoranthene | mg/kg | 0.0056 | <0.0050 | <0.0050 | 5180475 | 0.018 | <0.0050 | 0.0050 | 5180479 |
| Benzo(k)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5180475 | 0.017 | <0.0050 | 0.0050 | 5180479 |
| Chrysene | mg/kg | 0.012 | <0.0050 | <0.0050 | 5180475 | 0.038 | <0.0050 | 0.0050 | 5180479 |
| Dibenz(a,h)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5180475 | 0.0071 | <0.0050 | 0.0050 | 5180479 |
| Fluoranthene | mg/kg | 0.0069 | <0.0050 | <0.0050 | 5180475 | 0.032 | <0.0050 | 0.0050 | 5180479 |
| Fluorene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.0089 | <0.0050 | <0.0050 | 5180475 | 0.025 | <0.0050 | 0.0050 | 5180479 |
| Naphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5180475 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5180475 | 0.0068 | <0.0050 | 0.0050 | 5180479 |
| Phenanthrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | 5180475 | 0.010 | <0.0050 | 0.0050 | 5180479 |
| Pyrene | mg/kg | 0.0088 | <0.0050 | <0.0050 | 5180475 | 0.032 | <0.0050 | 0.0050 | 5180479 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| D10-Anthracene | % | 89 | 72 | 68 | 5180475 | 90 | 64 | | 5180479 |
| D14-Terphenyl | % | 87 | 71 | 87 | 5180475 | 91 | 86 | | 5180479 |
| D8-Acenaphthylene | % | 90 | 89 | 88 | 5180475 | 93 | 77 | | 5180479 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

| Maxxam ID | | FDL087 | FDL089 | FDL090 | FDL090 | FDL091 | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SD_CT_02** | **SD_CT_03** | **SD_CT_04** | **SD_CT_04 Lab-Dup** | **SD_CT_05_BG** | **RDL** | **QC Batch** |
| **Polyaromatic Hydrocarbons** | | | | | | | | |
| 1-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| 2-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Acenaphthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Acenaphthylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Benzo(a)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Benzo(a)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Benzo(b)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Benzo(b/j)fluoranthene | mg/kg | <0.010 | <0.010 | <0.010 | | <0.010 | 0.010 | 5170588 |
| Benzo(g,h,i)perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Benzo(j)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Benzo(k)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Chrysene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Dibenz(a,h)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Fluorene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Indeno(1,2,3-cd)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Naphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Phenanthrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| Pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | 5180479 |
| **Surrogate Recovery (%)** | | | | | | | | |
| D10-Anthracene | % | 71 | 84 | 80 | 80 | 61 | | 5180479 |
| D14-Terphenyl | % | 82 | 89 | 98 | 88 | 95 | | 5180479 |
| D8-Acenaphthylene | % | 60 | 89 | 87 | 83 | 88 | | 5180479 |

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

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## PETROLEUM HYDROCARBONS (CCME)

| Maxxam ID | | FDL030 | | FDL031 | FDL031 | | FDL032 | FDL033 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | | 2017/09/12 | 2017/09/12 | | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | | 627212-01-01 | 627212-01-01 | | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_07** | **RDL** | **SS_CT_07 FD** | **SS_CT_07 FD Lab-Dup** | **RDL** | **SS_CT_08** | **SS_CT_09** | **RDL** | **QC Batch** |
| **F2-F4 Hydrocarbons** | | | | | | | | | | |
| F4G-sg (Grav. Heavy Hydrocarbons) | ug/g | 2400 | 250 | 810 | 720 | 100 | 4900 | 9100 | 400 | 5188959 |

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

| Maxxam ID | | FDL034 | | FDL036 | FDL037 | FDL039 | FDL040 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_10** | **RDL** | **SS_CT_12** | **SS_CT_13** | **SS_CT_15** | **SS_CT_16** | **RDL** | **QC Batch** |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F4G-sg (Grav. Heavy Hydrocarbons) | ug/g | 290 | 210 | <100 | 150 | 660 | 240 | 100 | 5188959 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

| Maxxam ID | | FDL043 | FDL049 | FDL053 | FDL054 | | FDL061 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | 2017/09/13 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | 627212-01-01 | | |
| | **UNITS** | **SS_CT_19** | **SS_CT_24** | **SS_CT_28** | **SS_CT_29** | **RDL** | **SS_CT_36** | **RDL** | **QC Batch** |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F4G-sg (Grav. Heavy Hydrocarbons) | ug/g | 330 | 4500 | 270 | 750 | 100 | 4800 | 200 | 5188959 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

| Maxxam ID | | FDL062 | | FDL063 | | FDL064 | | FDL069 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | 2017/09/13 | | 2017/09/13 | | 2017/09/13 | | |
| COC Number | | 627212-01-01 | | 627212-01-01 | | 627212-01-01 | | 627212-01-01 | | |
| | **UNITS** | **SS_CT_37** | **RDL** | **SS_CT_38** | **RDL** | **SS_CT_39** | **RDL** | **SS_CT_44** | **RDL** | **QC Batch** |
| **F2-F4 Hydrocarbons** | | | | | | | | | | |
| F4G-sg (Grav. Heavy Hydrocarbons) | ug/g | 480 | 350 | 170 | 100 | 2000 | 410 | 150 | 100 | 5188959 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## PETROLEUM HYDROCARBONS (CCME)

| **Maxxam ID** | | FDL075 | FDL076 | | | FDL079 | FDL080 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | | | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | | | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_49** | **SS_CT_49_FD** | **RDL** | **QC Batch** | **SS_CT_52** | **SS_CT_53** | **RDL** | **QC Batch** |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F4G-sg (Grav. Heavy Hydrocarbons) | ug/g | 1200 | 830 | 250 | 5188959 | 160 | 480 | 100 | 5189073 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

| **Maxxam ID** | | FDL080 | FDL081 | | | FDL087 | FDL087 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/12 | | | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | | | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_53 Lab-Dup** | **SS_CT_54** | **RDL** | **QC Batch** | **SD_CT_02** | **SD_CT_02 Lab-Dup** | **RDL** | **QC Batch** |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F4G-sg (Grav. Heavy Hydrocarbons) | ug/g | 390 | 410 | 100 | 5189073 | 2200 | 2600 | 300 | 5184457 |

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

| **Maxxam ID** | | FDL088 | FDL089 | | |
|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | | |
| **COC Number** | | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SD_CT_02_FD** | **SD_CT_03** | **RDL** | **QC Batch** |
| **F2-F4 Hydrocarbons** | | | | | |
| F4G-sg (Grav. Heavy Hydrocarbons) | ug/g | <100 | 440 | 100 | 5184457 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

| Maxxam ID | | FDL030 | FDL030 | FDL031 | FDL032 | FDL033 | FDL034 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | 2017/09/12 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_07** | **SS_CT_07 Lab-Dup** | **SS_CT_07 FD** | **SS_CT_08** | **SS_CT_09** | **SS_CT_10** | **RDL** | **QC Batch** |
| **PCBs** | | | | | | | | | |
| Aroclor 1016 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1221 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1232 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1248 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1242 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1254 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1260 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Calculated Total PCB | ug/g | <0.050 | | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5170591 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| Decachlorobiphenyl | % | 94 | 94 | 98 | 76 | 70 | 114 | | 5174986 |

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

| Maxxam ID | | FDL044 | FDL055 | FDL058 | FDL061 | FDL062 | FDL063 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/12 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | **UNITS** | **SS_CT_20 BG** | **SS_CT_30** | **SS_CT_33** | **SS_CT_36** | **SS_CT_37** | **SS_CT_38** | **RDL** | **QC Batch** |
| **PCBs** | | | | | | | | | |
| Aroclor 1016 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1221 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1232 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1248 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1242 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1254 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1260 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Calculated Total PCB | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5170591 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| Decachlorobiphenyl | % | 87 | 97 | 93 | 96 | 96 | 97 | | 5174986 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

| Maxxam ID | | FDL064 | FDL066 | FDL067 | FDL068 | FDL069 | FDL087 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | |
| COC Number | | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | 627212-01-01 | | |
| | UNITS | SS_CT_39 | SS_CT_41 | SS_CT_42 | SS_CT_43 | SS_CT_44 | SD_CT_02 | RDL | QC Batch |
| PCBs | | | | | | | | | |
| Aroclor 1016 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1221 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1232 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1248 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1242 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1254 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Aroclor 1260 | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5174986 |
| Calculated Total PCB | ug/g | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | 5170591 |
| Surrogate Recovery (%) | | | | | | | | | |
| Decachlorobiphenyl | % | 88 | 100 | 99 | 101 | 96 | 99 | | 5174986 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

| Maxxam ID | | FDL090 | | |
|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | |
| COC Number | | 627212-01-01 | | |
| | UNITS | SD_CT_04 | RDL | QC Batch |
| PCBs | | | | |
| Aroclor 1016 | ug/g | <0.050 | 0.050 | 5174986 |
| Aroclor 1221 | ug/g | <0.050 | 0.050 | 5174986 |
| Aroclor 1232 | ug/g | <0.050 | 0.050 | 5174986 |
| Aroclor 1248 | ug/g | <0.050 | 0.050 | 5174986 |
| Aroclor 1242 | ug/g | <0.050 | 0.050 | 5174986 |
| Aroclor 1254 | ug/g | <0.050 | 0.050 | 5174986 |
| Aroclor 1260 | ug/g | <0.050 | 0.050 | 5174986 |
| Calculated Total PCB | ug/g | <0.050 | 0.050 | 5170591 |
| Surrogate Recovery (%) | | | | |
| Decachlorobiphenyl | % | 96 | | 5174986 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

## GENERAL COMMENTS

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

| | |
|---|---|
| Package 1 | 5.4°C |

Revised report: issued report including lab duplicates as per request from Melanie. HM Oct 17/17

Sample FDL024 [SS_CT_02] : VOC Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.

Sample FDL030 [SS_CT_07] : F2-F4 Analysis: Detection limits were adjusted for high moisture content.

F4G Analysis: Due to high moisture content the detection limit was adjusted.

Sample FDL032 [SS_CT_08] : F2-F4 Analysis: Detection limits were adjusted for high moisture content.
VOC/F1 Analysis: Detection limits were raised due to high moisture content.
F4G Analysis: Due to high moisture content the detection limit was adjusted.

Sample FDL033 [SS_CT_09] : VOC/F1 Analysis: Detection limits were raised due to high moisture content.
F4G Analysis: Due to high moisture content the detection limit was adjusted.

Sample FDL034 [SS_CT_10] : F2-F4 Analysis: Detection limits were adjusted for high moisture content.
F4G Analysis: Due to high moisture content the detection limit was adjusted.

Sample FDL051 [SS_CT_26] : VOCF1 Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.

Sample FDL061 [SS_CT_36] : F2-F4 Analysis: Detection limits were adjusted for high moisture content

F4G Analysis: Due to high moisture content the detection limit was adjusted.

Sample FDL062 [SS_CT_37] : VOCF1 Analysis: Detection limits were raised due to high moisture content of soil provided.
F2-F4 Analysis: Detection limits were adjusted for high moisture content

F4G Analysis: Due to high moisture content the detection limit was adjusted.

Sample FDL064 [SS_CT_39] : VOC-F1 Analysis: Detection limits were raised due to high moisture content of soil provided.

F2-F4 Analysis: Detection limits were adjusted for high moisture content.

F4G Analysis: Due to high moisture content the detection limit was adjusted.

Sample FDL075 [SS_CT_49] : VOC-F1 Analysis: Detection limits were raised due to high moisture content and low weight of soil provided.

F2-F4 Analysis: Detection limits were adjusted for high moisture content.

F4G Analysis: Due to high moisture content the detection limit was adjusted.

Sample FDL076 [SS_CT_49_FD] : VOC-F1 Analysis: Detection limits were raised due to high moisture content and low weight of soil provided.

F2-F4 Analysis: Detection limits were adjusted for high moisture content.

F4G Analysis: Due to high moisture content the detection limit was adjusted.

Sample FDL086 [SD_CT_01] : VOCF1 Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Sample FDL087 [SD_CT_02] : VOCF1 Analysis: Detection limits were raised due to high moisture content.

F4G Analysis: Due to high moisture content the detection limit was adjusted.

Sample FDL089 [SD_CT_03] : VOCF1 Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.

Sample FDL090 [SD_CT_04] : VOCF1 Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.

Sample FDL091 [SD_CT_05_BG] : F2-F4: Detection limits were adjusted for high moisture content.

**Results relate only to the items tested.**



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company



Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| 5170876 | DBF | RPD [FDL023-02] | Moisture | 2017/09/20 | 4.3 | | % | 25 |
| 5172674 | ASL | Matrix Spike | 4-Bromofluorobenzene | 2017/09/20 | | 104 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/20 | | 97 (1) | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/20 | | 96 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/20 | | 100 | % | 60 - 140 |
| | | | 1,1,1-Trichloroethane | 2017/09/20 | | 105 | % | 60 - 140 |
| | | | 1,1,2,2-Tetrachloroethane | 2017/09/20 | | 90 | % | 60 - 140 |
| | | | 1,1,2-Trichloroethane | 2017/09/20 | | 90 | % | 60 - 140 |
| | | | 1,1-Dichloroethane | 2017/09/20 | | 104 | % | 60 - 140 |
| | | | 1,1-Dichloroethylene | 2017/09/20 | | 108 | % | 60 - 140 |
| | | | 1,2-Dichlorobenzene | 2017/09/20 | | 90 | % | 60 - 140 |
| | | | 1,2-Dichloroethane | 2017/09/20 | | 94 | % | 60 - 140 |
| | | | 1,2-Dichloropropane | 2017/09/20 | | 93 | % | 60 - 140 |
| | | | 1,3-Dichlorobenzene | 2017/09/20 | | 90 | % | 60 - 140 |
| | | | 1,4-Dichlorobenzene | 2017/09/20 | | 89 | % | 60 - 140 |
| | | | Benzene | 2017/09/20 | | 97 | % | 60 - 140 |
| | | | Bromodichloromethane | 2017/09/20 | | 96 | % | 60 - 140 |
| | | | Bromoform | 2017/09/20 | | 96 | % | 60 - 140 |
| | | | Bromomethane | 2017/09/20 | | 90 | % | 60 - 140 |
| | | | Carbon Tetrachloride | 2017/09/20 | | 103 | % | 60 - 140 |
| | | | Chlorobenzene | 2017/09/20 | | 98 | % | 60 - 140 |
| | | | Chloroethane | 2017/09/20 | | 91 | % | 60 - 140 |
| | | | Chloroform | 2017/09/20 | | 94 | % | 60 - 140 |
| | | | cis-1,2-Dichloroethylene | 2017/09/20 | | 101 | % | 60 - 140 |
| | | | cis-1,3-Dichloropropene | 2017/09/20 | | 95 | % | 60 - 140 |
| | | | Dibromochloromethane | 2017/09/20 | | 94 | % | 60 - 140 |
| | | | Ethylbenzene | 2017/09/20 | | 105 | % | 60 - 140 |
| | | | Ethylene Dibromide | 2017/09/20 | | 89 | % | 60 - 140 |
| | | | Methyl t-butyl ether (MTBE) | 2017/09/20 | | 105 | % | 60 - 140 |
| | | | Methylene Chloride(Dichloromethane) | 2017/09/20 | | 99 | % | 60 - 140 |
| | | | o-Xylene | 2017/09/20 | | 101 | % | 60 - 140 |
| | | | p+m-Xylene | 2017/09/20 | | 103 | % | 60 - 140 |
| | | | Styrene | 2017/09/20 | | 104 | % | 60 - 140 |
| | | | Tetrachloroethylene | 2017/09/20 | | 102 | % | 60 - 140 |
| | | | Toluene | 2017/09/20 | | 100 | % | 60 - 140 |
| | | | trans-1,2-Dichloroethylene | 2017/09/20 | | 104 | % | 60 - 140 |
| | | | trans-1,3-Dichloropropene | 2017/09/20 | | 81 | % | 60 - 140 |
| | | | Trichloroethylene | 2017/09/20 | | 103 | % | 60 - 140 |
| | | | Trichlorofluoromethane (FREON 11) | 2017/09/20 | | 95 | % | 60 - 140 |
| | | | Vinyl Chloride | 2017/09/20 | | 96 | % | 60 - 140 |
| 5172674 | ASL | Spiked Blank | 4-Bromofluorobenzene | 2017/09/20 | | 100 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/20 | | 99 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/20 | | 99 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/20 | | 100 | % | 60 - 140 |
| | | | 1,1,1-Trichloroethane | 2017/09/20 | | 108 | % | 60 - 130 |
| | | | 1,1,2,2-Tetrachloroethane | 2017/09/20 | | 95 | % | 60 - 130 |
| | | | 1,1,2-Trichloroethane | 2017/09/20 | | 98 | % | 60 - 130 |
| | | | 1,1-Dichloroethane | 2017/09/20 | | 108 | % | 60 - 130 |
| | | | 1,1-Dichloroethylene | 2017/09/20 | | 111 | % | 60 - 130 |
| | | | 1,2-Dichlorobenzene | 2017/09/20 | | 94 | % | 60 - 130 |
| | | | 1,2-Dichloroethane | 2017/09/20 | | 101 | % | 60 - 130 |
| | | | 1,2-Dichloropropane | 2017/09/20 | | 100 | % | 60 - 130 |
| | | | 1,3-Dichlorobenzene | 2017/09/20 | | 96 | % | 60 - 130 |

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | 1,4-Dichlorobenzene | 2017/09/20 | | 95 | % | 60 - 130 |
| | | | Benzene | 2017/09/20 | | 102 | % | 60 - 130 |
| | | | Bromodichloromethane | 2017/09/20 | | 102 | % | 60 - 130 |
| | | | Bromoform | 2017/09/20 | | 98 | % | 60 - 130 |
| | | | Bromomethane | 2017/09/20 | | 94 | % | 60 - 140 |
| | | | Carbon Tetrachloride | 2017/09/20 | | 106 | % | 60 - 130 |
| | | | Chlorobenzene | 2017/09/20 | | 101 | % | 60 - 130 |
| | | | Chloroethane | 2017/09/20 | | 93 | % | 60 - 140 |
| | | | Chloroform | 2017/09/20 | | 99 | % | 60 - 130 |
| | | | cis-1,2-Dichloroethylene | 2017/09/20 | | 105 | % | 60 - 130 |
| | | | cis-1,3-Dichloropropene | 2017/09/20 | | 105 | % | 60 - 130 |
| | | | Dibromochloromethane | 2017/09/20 | | 101 | % | 60 - 130 |
| | | | Ethylbenzene | 2017/09/20 | | 106 | % | 60 - 130 |
| | | | Ethylene Dibromide | 2017/09/20 | | 97 | % | 60 - 130 |
| | | | Methyl t-butyl ether (MTBE) | 2017/09/20 | | 112 | % | 60 - 130 |
| | | | Methylene Chloride(Dichloromethane) | 2017/09/20 | | 105 | % | 60 - 130 |
| | | | o-Xylene | 2017/09/20 | | 104 | % | 60 - 130 |
| | | | p+m-Xylene | 2017/09/20 | | 105 | % | 60 - 130 |
| | | | Styrene | 2017/09/20 | | 104 | % | 60 - 130 |
| | | | Tetrachloroethylene | 2017/09/20 | | 108 | % | 60 - 130 |
| | | | Toluene | 2017/09/20 | | 106 | % | 60 - 130 |
| | | | trans-1,2-Dichloroethylene | 2017/09/20 | | 107 | % | 60 - 130 |
| | | | trans-1,3-Dichloropropene | 2017/09/20 | | 92 | % | 60 - 130 |
| | | | Trichloroethylene | 2017/09/20 | | 107 | % | 60 - 130 |
| | | | Trichlorofluoromethane (FREON 11) | 2017/09/20 | | 98 | % | 60 - 140 |
| | | | Vinyl Chloride | 2017/09/20 | | 98 | % | 60 - 140 |
| 5172674 | ASL | Method Blank | 4-Bromofluorobenzene | 2017/09/20 | | 100 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/20 | | 101 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/20 | | 95 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/20 | | 101 | % | 60 - 140 |
| | | | 1,1,1-Trichloroethane | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,1,2,2-Tetrachloroethane | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,1,2-Trichloroethane | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,1-Dichloroethane | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,1-Dichloroethylene | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,2-Dichlorobenzene | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,2-Dichloroethane | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,2-Dichloropropane | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,3-Dichlorobenzene | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,4-Dichlorobenzene | 2017/09/20 | <25 | | ug/kg | |
| | | | Benzene | 2017/09/20 | <25 | | ug/kg | |
| | | | Bromodichloromethane | 2017/09/20 | <25 | | ug/kg | |
| | | | Bromoform | 2017/09/20 | <25 | | ug/kg | |
| | | | Bromomethane | 2017/09/20 | <50 | | ug/kg | |
| | | | Carbon Tetrachloride | 2017/09/20 | <25 | | ug/kg | |
| | | | Chlorobenzene | 2017/09/20 | <25 | | ug/kg | |
| | | | Chloroethane | 2017/09/20 | <200 | | ug/kg | |
| | | | Chloroform | 2017/09/20 | <25 | | ug/kg | |
| | | | cis-1,2-Dichloroethylene | 2017/09/20 | <25 | | ug/kg | |
| | | | cis-1,3-Dichloropropene | 2017/09/20 | <25 | | ug/kg | |
| | | | Dibromochloromethane | 2017/09/20 | <25 | | ug/kg | |
| | | | Ethylbenzene | 2017/09/20 | <25 | | ug/kg | |
| | | | Ethylene Dibromide | 2017/09/20 | <25 | | ug/kg | |

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Methyl t-butyl ether (MTBE) | 2017/09/20 | <25 | | ug/kg | |
| | | | Methylene Chloride(Dichloromethane) | 2017/09/20 | <50 | | ug/kg | |
| | | | o-Xylene | 2017/09/20 | <25 | | ug/kg | |
| | | | p+m-Xylene | 2017/09/20 | <25 | | ug/kg | |
| | | | Styrene | 2017/09/20 | <25 | | ug/kg | |
| | | | Tetrachloroethylene | 2017/09/20 | <25 | | ug/kg | |
| | | | Toluene | 2017/09/20 | <25 | | ug/kg | |
| | | | Total Xylenes | 2017/09/20 | <50 | | ug/kg | |
| | | | trans-1,2-Dichloroethylene | 2017/09/20 | <25 | | ug/kg | |
| | | | trans-1,3-Dichloropropene | 2017/09/20 | <25 | | ug/kg | |
| | | | Trichloroethylene | 2017/09/20 | <10 | | ug/kg | |
| | | | Trichlorofluoromethane (FREON 11) | 2017/09/20 | <25 | | ug/kg | |
| | | | Vinyl Chloride | 2017/09/20 | <20 | | ug/kg | |
| 5172674 | ASL | RPD | 1,1,1-Trichloroethane | 2017/09/20 | NC | | % | 50 |
| | | | 1,1,2,2-Tetrachloroethane | 2017/09/20 | NC | | % | 50 |
| | | | 1,1,2-Trichloroethane | 2017/09/20 | NC | | % | 50 |
| | | | 1,1-Dichloroethane | 2017/09/20 | NC | | % | 50 |
| | | | 1,1-Dichloroethylene | 2017/09/20 | NC | | % | 50 |
| | | | 1,2-Dichlorobenzene | 2017/09/20 | NC | | % | 50 |
| | | | 1,2-Dichloroethane | 2017/09/20 | NC | | % | 50 |
| | | | 1,2-Dichloropropane | 2017/09/20 | NC | | % | 50 |
| | | | 1,3-Dichlorobenzene | 2017/09/20 | NC | | % | 50 |
| | | | 1,4-Dichlorobenzene | 2017/09/20 | NC | | % | 50 |
| | | | Benzene | 2017/09/20 | NC | | % | 50 |
| | | | Bromodichloromethane | 2017/09/20 | NC | | % | 50 |
| | | | Bromoform | 2017/09/20 | NC | | % | 50 |
| | | | Bromomethane | 2017/09/20 | NC | | % | 50 |
| | | | Carbon Tetrachloride | 2017/09/20 | NC | | % | 50 |
| | | | Chlorobenzene | 2017/09/20 | NC | | % | 50 |
| | | | Chloroethane | 2017/09/20 | NC | | % | 50 |
| | | | Chloroform | 2017/09/20 | NC | | % | 50 |
| | | | cis-1,2-Dichloroethylene | 2017/09/20 | NC | | % | 50 |
| | | | cis-1,3-Dichloropropene | 2017/09/20 | NC | | % | 50 |
| | | | Dibromochloromethane | 2017/09/20 | NC | | % | 50 |
| | | | Ethylbenzene | 2017/09/20 | NC | | % | 50 |
| | | | Ethylene Dibromide | 2017/09/20 | NC | | % | 50 |
| | | | Methyl t-butyl ether (MTBE) | 2017/09/20 | NC | | % | 50 |
| | | | Methylene Chloride(Dichloromethane) | 2017/09/20 | NC | | % | 50 |
| | | | o-Xylene | 2017/09/20 | NC | | % | 50 |
| | | | p+m-Xylene | 2017/09/20 | NC | | % | 50 |
| | | | Styrene | 2017/09/20 | NC | | % | 50 |
| | | | Tetrachloroethylene | 2017/09/20 | NC | | % | 50 |
| | | | Toluene | 2017/09/20 | NC | | % | 50 |
| | | | Total Xylenes | 2017/09/20 | NC | | % | 50 |
| | | | trans-1,2-Dichloroethylene | 2017/09/20 | NC | | % | 50 |
| | | | trans-1,3-Dichloropropene | 2017/09/20 | NC | | % | 50 |
| | | | Trichloroethylene | 2017/09/20 | NC | | % | 50 |
| | | | Trichlorofluoromethane (FREON 11) | 2017/09/20 | NC | | % | 50 |
| | | | Vinyl Chloride | 2017/09/20 | NC | | % | 50 |
| 5172699 | DBF | RPD | Moisture | 2017/09/20 | 3.1 | | % | 25 |
| 5172886 | DBF | RPD [FDL028-02] | Moisture | 2017/09/20 | 9.8 | | % | 25 |
| 5173520 | DBF | RPD [FDL063-02] | Moisture | 2017/09/21 | 5.1 | | % | 25 |
| 5174913 | DBF | RPD [FDL073-02] | Moisture | 2017/09/21 | 21 | | % | 25 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| 5174986 | CBR | Matrix Spike [FDL030-02] | Decachlorobiphenyl | 2017/09/26 | | 90 | % | 30 - 130 |
| | | | Aroclor 1254 | 2017/09/26 | | 85 | % | 30 - 130 |
| 5174986 | CBR | Spiked Blank | Decachlorobiphenyl | 2017/09/26 | | 92 | % | 30 - 130 |
| | | | Aroclor 1254 | 2017/09/26 | | 84 | % | 30 - 130 |
| 5174986 | CBR | Method Blank | Decachlorobiphenyl | 2017/09/26 | | 97 | % | 30 - 130 |
| | | | Aroclor 1016 | 2017/09/26 | <0.050 | | ug/g | |
| | | | Aroclor 1221 | 2017/09/26 | <0.050 | | ug/g | |
| | | | Aroclor 1232 | 2017/09/26 | <0.050 | | ug/g | |
| | | | Aroclor 1248 | 2017/09/26 | <0.050 | | ug/g | |
| | | | Aroclor 1242 | 2017/09/26 | <0.050 | | ug/g | |
| | | | Aroclor 1254 | 2017/09/26 | <0.050 | | ug/g | |
| | | | Aroclor 1260 | 2017/09/26 | <0.050 | | ug/g | |
| 5174986 | CBR | RPD [FDL030-02] | Aroclor 1016 | 2017/09/26 | NC | | % | 50 |
| | | | Aroclor 1221 | 2017/09/26 | NC | | % | 50 |
| | | | Aroclor 1232 | 2017/09/26 | NC | | % | 50 |
| | | | Aroclor 1248 | 2017/09/26 | NC | | % | 50 |
| | | | Aroclor 1242 | 2017/09/26 | NC | | % | 50 |
| | | | Aroclor 1254 | 2017/09/26 | NC | | % | 50 |
| | | | Aroclor 1260 | 2017/09/26 | NC | | % | 50 |
| 5175707 | DR1 | Matrix Spike | 4-Bromofluorobenzene | 2017/09/23 | | 100 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/23 | | 99 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/23 | | 121 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/23 | | 104 | % | 60 - 140 |
| | | | Benzene | 2017/09/23 | | 111 | % | 60 - 140 |
| | | | Ethylbenzene | 2017/09/23 | | 83 | % | 60 - 140 |
| | | | Toluene | 2017/09/23 | | 93 | % | 60 - 140 |
| | | | p+m-Xylene | 2017/09/23 | | 88 | % | 60 - 140 |
| | | | o-Xylene | 2017/09/23 | | 93 | % | 60 - 140 |
| | | | F1 (C6-C10) | 2017/09/23 | | NC | % | 60 - 140 |
| 5175707 | DR1 | Spiked Blank | 4-Bromofluorobenzene | 2017/09/22 | | 92 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/22 | | 84 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/22 | | 118 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/22 | | 105 | % | 60 - 140 |
| | | | Benzene | 2017/09/22 | | 108 | % | 60 - 130 |
| | | | Ethylbenzene | 2017/09/22 | | 81 | % | 60 - 130 |
| | | | Toluene | 2017/09/22 | | 96 | % | 60 - 130 |
| | | | p+m-Xylene | 2017/09/22 | | 81 | % | 60 - 130 |
| | | | o-Xylene | 2017/09/22 | | 84 | % | 60 - 130 |
| | | | F1 (C6-C10) | 2017/09/22 | | 100 | % | 80 - 120 |
| 5175707 | DR1 | Method Blank | 4-Bromofluorobenzene | 2017/09/22 | | 85 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/22 | | 75 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/22 | | 118 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/22 | | 96 | % | 60 - 140 |
| | | | Benzene | 2017/09/22 | <0.0060 | | ug/g | |
| | | | Ethylbenzene | 2017/09/22 | <0.010 | | ug/g | |
| | | | Toluene | 2017/09/22 | <0.020 | | ug/g | |
| | | | p+m-Xylene | 2017/09/22 | <0.020 | | ug/g | |
| | | | o-Xylene | 2017/09/22 | <0.020 | | ug/g | |
| | | | Total Xylenes | 2017/09/22 | <0.020 | | ug/g | |
| | | | F1 (C6-C10) | 2017/09/22 | <10 | | ug/g | |
| | | | F1 (C6-C10) - BTEX | 2017/09/22 | <10 | | ug/g | |
| 5175707 | DR1 | RPD | Benzene | 2017/09/23 | NC | | % | 50 |
| | | | Ethylbenzene | 2017/09/23 | NC | | % | 50 |

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Toluene | 2017/09/23 | NC | | % | 50 |
| | | | p+m-Xylene | 2017/09/23 | NC | | % | 50 |
| | | | o-Xylene | 2017/09/23 | NC | | % | 50 |
| | | | Total Xylenes | 2017/09/23 | NC | | % | 50 |
| | | | F1 (C6-C10) | 2017/09/23 | 7.9 | | % | 30 |
| | | | F1 (C6-C10) - BTEX | 2017/09/23 | 7.9 | | % | 30 |
| 5176461 | KH2 | Matrix Spike [FDL025-05] | 4-Bromofluorobenzene | 2017/09/25 | | 96 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/25 | | 95 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/25 | | 100 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/25 | | 101 | % | 60 - 140 |
| | | | Benzene | 2017/09/25 | | 98 | % | 60 - 140 |
| | | | Ethylbenzene | 2017/09/25 | | 89 | % | 60 - 140 |
| | | | Toluene | 2017/09/25 | | 90 | % | 60 - 140 |
| | | | p+m-Xylene | 2017/09/25 | | 87 | % | 60 - 140 |
| | | | o-Xylene | 2017/09/25 | | 87 | % | 60 - 140 |
| | | | F1 (C6-C10) | 2017/09/25 | | 96 | % | 60 - 140 |
| 5176461 | KH2 | Spiked Blank | 4-Bromofluorobenzene | 2017/09/25 | | 96 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/25 | | 89 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/25 | | 100 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/25 | | 101 | % | 60 - 140 |
| | | | Benzene | 2017/09/25 | | 100 | % | 60 - 130 |
| | | | Ethylbenzene | 2017/09/25 | | 92 | % | 60 - 130 |
| | | | Toluene | 2017/09/25 | | 92 | % | 60 - 130 |
| | | | p+m-Xylene | 2017/09/25 | | 90 | % | 60 - 130 |
| | | | o-Xylene | 2017/09/25 | | 90 | % | 60 - 130 |
| | | | F1 (C6-C10) | 2017/09/25 | | 91 | % | 80 - 120 |
| 5176461 | KH2 | Method Blank | 4-Bromofluorobenzene | 2017/09/25 | | 91 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/25 | | 84 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/25 | | 99 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/25 | | 98 | % | 60 - 140 |
| | | | Benzene | 2017/09/25 | <0.0060 | | ug/g | |
| | | | Ethylbenzene | 2017/09/25 | <0.010 | | ug/g | |
| | | | Toluene | 2017/09/25 | <0.020 | | ug/g | |
| | | | p+m-Xylene | 2017/09/25 | <0.020 | | ug/g | |
| | | | o-Xylene | 2017/09/25 | <0.020 | | ug/g | |
| | | | Total Xylenes | 2017/09/25 | <0.020 | | ug/g | |
| | | | F1 (C6-C10) | 2017/09/25 | <10 | | ug/g | |
| | | | F1 (C6-C10) - BTEX | 2017/09/25 | <10 | | ug/g | |
| 5176461 | KH2 | RPD [FDL025-05] | Benzene | 2017/09/25 | NC | | % | 50 |
| | | | Ethylbenzene | 2017/09/25 | NC | | % | 50 |
| | | | Toluene | 2017/09/25 | NC | | % | 50 |
| | | | p+m-Xylene | 2017/09/25 | NC | | % | 50 |
| | | | o-Xylene | 2017/09/25 | NC | | % | 50 |
| | | | Total Xylenes | 2017/09/25 | NC | | % | 50 |
| | | | F1 (C6-C10) | 2017/09/25 | NC | | % | 30 |
| | | | F1 (C6-C10) - BTEX | 2017/09/25 | NC | | % | 30 |
| 5177171 | BAN | Matrix Spike [FDL029-03] | Acid Extractable Antimony (Sb) | 2017/09/25 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Arsenic (As) | 2017/09/25 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Barium (Ba) | 2017/09/25 | | NC | % | 75 - 125 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/25 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/25 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Boron (B) | 2017/09/25 | | 97 | % | 75 - 125 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/25 | | 103 | % | 75 - 125 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Acid Extractable Chromium (Cr) | 2017/09/25 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/25 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Copper (Cu) | 2017/09/25 | | 97 | % | 75 - 125 |
| | | | Acid Extractable Lead (Pb) | 2017/09/25 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Lithium (Li) | 2017/09/25 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/25 | | NC | % | 75 - 125 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/25 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/25 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/25 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/25 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Selenium (Se) | 2017/09/25 | | 107 | % | 75 - 125 |
| | | | Acid Extractable Silver (Ag) | 2017/09/25 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/25 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/25 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Tin (Sn) | 2017/09/25 | | 108 | % | 75 - 125 |
| | | | Acid Extractable Uranium (U) | 2017/09/25 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Vanadium (V) | 2017/09/25 | | 95 | % | 75 - 125 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/25 | | NC | % | 75 - 125 |
| 5177171 | BAN | Spiked Blank | Acid Extractable Antimony (Sb) | 2017/09/22 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Boron (B) | 2017/09/22 | | 109 | % | 75 - 125 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | | 107 | % | 75 - 125 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | | 108 | % | 75 - 125 |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | | 108 | % | 75 - 125 |
| 5177171 | BAN | Method Blank | Acid Extractable Aluminum (Al) | 2017/09/22 | <10 | | mg/kg | |
| | | | Acid Extractable Antimony (Sb) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | <5.0 | | mg/kg | |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Boron (B) | 2017/09/22 | <50 | | mg/kg | |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | <0.30 | | mg/kg | |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | <1.0 | | mg/kg | |

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Iron (Fe) | 2017/09/22 | <50 | | mg/kg | |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | <0.50 | | mg/kg | |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | <0.10 | | mg/kg | |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | <1.0 | | mg/kg | |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | <0.50 | | mg/kg | |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | <5.0 | | mg/kg | |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | <0.10 | | mg/kg | |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | <0.10 | | mg/kg | |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | <5.0 | | mg/kg | |
| 5177171 | BAN | RPD [FDL029-03] | Acid Extractable Aluminum (Al) | 2017/09/22 | 2.7 | | % | 35 |
| | | | Acid Extractable Antimony (Sb) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | 5.3 | | % | 35 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Boron (B) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | 4.2 | | % | 35 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | 0.29 | | % | 35 |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | 0.39 | | % | 35 |
| | | | Acid Extractable Iron (Fe) | 2017/09/22 | 6.7 | | % | 35 |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | 36 (2) | | % | 35 |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | 3.8 | | % | 35 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | 6.8 | | % | 35 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | 26 | | % | 35 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | 12 | | % | 35 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | 6.3 | | % | 35 |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | 6.7 | | % | 35 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | 0.74 | | % | 35 |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | 4.5 | | % | 35 |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | 5.2 | | % | 35 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | 7.8 | | % | 35 |
| 5177173 | BAN | Matrix Spike [FDL091-03] | Acid Extractable Antimony (Sb) | 2017/09/22 | | NC | % | 75 - 125 |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | | NC | % | 75 - 125 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | | 107 | % | 75 - 125 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | | 109 | % | 75 - 125 |
| | | | Acid Extractable Boron (B) | 2017/09/22 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | | 102 | % | 75 - 125 |

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | | NC | % | 75 - 125 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | | 97 | % | 75 - 125 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | | 110 | % | 75 - 125 |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | | 108 | % | 75 - 125 |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | | NC | % | 75 - 125 |
| 5177173 | BAN | Spiked Blank | Acid Extractable Antimony (Sb) | 2017/09/22 | | 107 | % | 75 - 125 |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | | 107 | % | 75 - 125 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | | 107 | % | 75 - 125 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | | 107 | % | 75 - 125 |
| | | | Acid Extractable Boron (B) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | | 109 | % | 75 - 125 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | | 114 | % | 75 - 125 |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | | 108 | % | 75 - 125 |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | | 104 | % | 75 - 125 |
| 5177173 | BAN | Method Blank | Acid Extractable Aluminum (Al) | 2017/09/22 | <10 | | mg/kg | |
| | | | Acid Extractable Antimony (Sb) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | <5.0 | | mg/kg | |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Boron (B) | 2017/09/22 | <50 | | mg/kg | |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | <0.30 | | mg/kg | |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | <1.0 | | mg/kg | |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Iron (Fe) | 2017/09/22 | <50 | | mg/kg | |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | <0.50 | | mg/kg | |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | <0.10 | | mg/kg | |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | <1.0 | | mg/kg | |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | <0.50 | | mg/kg | |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | <5.0 | | mg/kg | |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | <0.10 | | mg/kg | |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | <0.10 | | mg/kg | |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | <5.0 | | mg/kg | |
| 5177173 | BAN | RPD [FDL091-03] | Acid Extractable Aluminum (Al) | 2017/09/22 | 8.7 | | % | 35 |
| | | | Acid Extractable Antimony (Sb) | 2017/09/22 | 3.5 | | % | 35 |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | 8.0 | | % | 35 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Boron (B) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | 11 | | % | 35 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | 19 | | % | 35 |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | 9.2 | | % | 35 |
| | | | Acid Extractable Iron (Fe) | 2017/09/22 | 11 | | % | 35 |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | 4.7 | | % | 35 |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | 6.9 | | % | 35 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | 8.2 | | % | 35 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | 6.0 | | % | 35 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | 6.3 | | % | 35 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | 17 | | % | 35 |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | 6.6 | | % | 35 |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | 16 | | % | 35 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | 8.9 | | % | 35 |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | 0.51 | | % | 35 |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | 8.5 | | % | 35 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | 9.5 | | % | 35 |
| 5177372 | BAN | Matrix Spike | Acid Extractable Antimony (Sb) | 2017/09/22 | | 93 | % | 75 - 125 |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | | 95 | % | 75 - 125 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Boron (B) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | | 92 | % | 75 - 125 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | | 98 | % | 75 - 125 |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | | 96 | % | 75 - 125 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | | NC | % | 75 - 125 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | | 98 | % | 75 - 125 |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | | 97 | % | 75 - 125 |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | | 85 | % | 75 - 125 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | | 98 | % | 75 - 125 |
| 5177372 | BAN | Spiked Blank | Acid Extractable Antimony (Sb) | 2017/09/22 | | 98 | % | 75 - 125 |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | | 96 | % | 75 - 125 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Boron (B) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | | 98 | % | 75 - 125 |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | | 110 | % | 75 - 125 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | | 108 | % | 75 - 125 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | | 98 | % | 75 - 125 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | | 98 | % | 75 - 125 |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | | 102 | % | 75 - 125 |
| 5177372 | BAN | Method Blank | Acid Extractable Aluminum (Al) | 2017/09/25 | <10 | | mg/kg | |
| | | | Acid Extractable Antimony (Sb) | 2017/09/25 | <2.0 | | mg/kg | |
| | | | Acid Extractable Arsenic (As) | 2017/09/25 | <2.0 | | mg/kg | |
| | | | Acid Extractable Barium (Ba) | 2017/09/25 | <5.0 | | mg/kg | |
| | | | Acid Extractable Beryllium (Be) | 2017/09/25 | <2.0 | | mg/kg | |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/25 | <2.0 | | mg/kg | |
| | | | Acid Extractable Boron (B) | 2017/09/25 | <50 | | mg/kg | |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/25 | <0.30 | | mg/kg | |
| | | | Acid Extractable Chromium (Cr) | 2017/09/25 | <2.0 | | mg/kg | |
| | | | Acid Extractable Cobalt (Co) | 2017/09/25 | <1.0 | | mg/kg | |
| | | | Acid Extractable Copper (Cu) | 2017/09/25 | <2.0 | | mg/kg | |
| | | | Acid Extractable Iron (Fe) | 2017/09/25 | <50 | | mg/kg | |
| | | | Acid Extractable Lead (Pb) | 2017/09/25 | <0.50 | | mg/kg | |
| | | | Acid Extractable Lithium (Li) | 2017/09/25 | <2.0 | | mg/kg | |

Maxxam
A Bureau Veritas Group Company



Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Acid Extractable Manganese (Mn) | 2017/09/25 | <2.0 | | mg/kg | |
| | | | Acid Extractable Mercury (Hg) | 2017/09/25 | <0.10 | | mg/kg | |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/25 | <2.0 | | mg/kg | |
| | | | Acid Extractable Nickel (Ni) | 2017/09/25 | <2.0 | | mg/kg | |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/25 | <2.0 | | mg/kg | |
| | | | Acid Extractable Selenium (Se) | 2017/09/25 | <1.0 | | mg/kg | |
| | | | Acid Extractable Silver (Ag) | 2017/09/25 | <0.50 | | mg/kg | |
| | | | Acid Extractable Strontium (Sr) | 2017/09/25 | <5.0 | | mg/kg | |
| | | | Acid Extractable Thallium (Tl) | 2017/09/25 | <0.10 | | mg/kg | |
| | | | Acid Extractable Tin (Sn) | 2017/09/25 | <2.0 | | mg/kg | |
| | | | Acid Extractable Uranium (U) | 2017/09/25 | <0.10 | | mg/kg | |
| | | | Acid Extractable Vanadium (V) | 2017/09/25 | <2.0 | | mg/kg | |
| | | | Acid Extractable Zinc (Zn) | 2017/09/25 | <5.0 | | mg/kg | |
| 5177372 | BAN | RPD | Acid Extractable Aluminum (Al) | 2017/09/22 | 0.37 | | % | 35 |
| | | | Acid Extractable Antimony (Sb) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | 11 | | % | 35 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Boron (B) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | 12 | | % | 35 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | 3.0 | | % | 35 |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | 12 | | % | 35 |
| | | | Acid Extractable Iron (Fe) | 2017/09/22 | 20 | | % | 35 |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | 5.9 | | % | 35 |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | 10 | | % | 35 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | 5.8 | | % | 35 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | 3.1 | | % | 35 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | 12 | | % | 35 |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | 3.7 | | % | 35 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | 3.7 | | % | 35 |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | 19 | | % | 35 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | 2.4 | | % | 35 |
| 5177768 | XJI | Matrix Spike [FDL044-04] | 4-Bromofluorobenzene | 2017/09/25 | | 95 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/25 | | 83 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/25 | | 100 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/25 | | 102 | % | 60 - 140 |
| | | | Benzene | 2017/09/25 | | 105 | % | 60 - 140 |
| | | | Ethylbenzene | 2017/09/25 | | 97 | % | 60 - 140 |
| | | | Toluene | 2017/09/25 | | 98 | % | 60 - 140 |
| | | | p+m-Xylene | 2017/09/25 | | 94 | % | 60 - 140 |
| | | | o-Xylene | 2017/09/25 | | 94 | % | 60 - 140 |
| | | | F1 (C6-C10) | 2017/09/25 | | 91 | % | 60 - 140 |
| 5177768 | XJI | Spiked Blank | 4-Bromofluorobenzene | 2017/09/25 | | 96 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/25 | | 84 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/25 | | 103 | % | 60 - 140 |

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | D8-Toluene | 2017/09/25 | | 96 | % | 60 - 140 |
| | | | Benzene | 2017/09/25 | | 103 | % | 60 - 130 |
| | | | Ethylbenzene | 2017/09/25 | | 90 | % | 60 - 130 |
| | | | Toluene | 2017/09/25 | | 91 | % | 60 - 130 |
| | | | p+m-Xylene | 2017/09/25 | | 88 | % | 60 - 130 |
| | | | o-Xylene | 2017/09/25 | | 88 | % | 60 - 130 |
| | | | F1 (C6-C10) | 2017/09/25 | | 97 | % | 80 - 120 |
| 5177768 | XJI | Method Blank | 4-Bromofluorobenzene | 2017/09/25 | | 91 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/25 | | 82 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/25 | | 98 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/25 | | 99 | % | 60 - 140 |
| | | | Benzene | 2017/09/25 | <0.0060 | | ug/g | |
| | | | Ethylbenzene | 2017/09/25 | <0.010 | | ug/g | |
| | | | Toluene | 2017/09/25 | <0.020 | | ug/g | |
| | | | p+m-Xylene | 2017/09/25 | <0.020 | | ug/g | |
| | | | o-Xylene | 2017/09/25 | <0.020 | | ug/g | |
| | | | Total Xylenes | 2017/09/25 | <0.020 | | ug/g | |
| | | | F1 (C6-C10) | 2017/09/25 | <10 | | ug/g | |
| | | | F1 (C6-C10) - BTEX | 2017/09/25 | <10 | | ug/g | |
| 5177768 | XJI | RPD [FDL044-04] | Benzene | 2017/09/25 | NC | | % | 50 |
| | | | Ethylbenzene | 2017/09/25 | NC | | % | 50 |
| | | | Toluene | 2017/09/25 | NC | | % | 50 |
| | | | p+m-Xylene | 2017/09/25 | NC | | % | 50 |
| | | | o-Xylene | 2017/09/25 | NC | | % | 50 |
| | | | Total Xylenes | 2017/09/25 | NC | | % | 50 |
| | | | F1 (C6-C10) | 2017/09/25 | NC | | % | 30 |
| | | | F1 (C6-C10) - BTEX | 2017/09/25 | NC | | % | 30 |
| 5178025 | YY | Matrix Spike [FDL065-03] | 4-Bromofluorobenzene | 2017/09/25 | | 101 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/25 | | 96 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/25 | | 90 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/25 | | 104 | % | 60 - 140 |
| | | | Benzene | 2017/09/25 | | 102 | % | 60 - 140 |
| | | | Ethylbenzene | 2017/09/25 | | 95 | % | 60 - 140 |
| | | | Toluene | 2017/09/25 | | 101 | % | 60 - 140 |
| | | | p+m-Xylene | 2017/09/25 | | 99 | % | 60 - 140 |
| | | | o-Xylene | 2017/09/25 | | 97 | % | 60 - 140 |
| | | | F1 (C6-C10) | 2017/09/25 | | 100 | % | 60 - 140 |
| 5178025 | YY | Spiked Blank | 4-Bromofluorobenzene | 2017/09/25 | | 102 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/25 | | 106 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/25 | | 90 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/25 | | 104 | % | 60 - 140 |
| | | | Benzene | 2017/09/25 | | 101 | % | 60 - 130 |
| | | | Ethylbenzene | 2017/09/25 | | 96 | % | 60 - 130 |
| | | | Toluene | 2017/09/25 | | 100 | % | 60 - 130 |
| | | | p+m-Xylene | 2017/09/25 | | 100 | % | 60 - 130 |
| | | | o-Xylene | 2017/09/25 | | 98 | % | 60 - 130 |
| | | | F1 (C6-C10) | 2017/09/25 | | 89 | % | 80 - 120 |
| 5178025 | YY | Method Blank | 4-Bromofluorobenzene | 2017/09/25 | | 95 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/25 | | 82 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/25 | | 93 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/25 | | 94 | % | 60 - 140 |
| | | | Benzene | 2017/09/25 | <0.0060 | | ug/g | |
| | | | Ethylbenzene | 2017/09/25 | <0.010 | | ug/g | |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Toluene | 2017/09/25 | <0.020 | | ug/g | |
| | | | p+m-Xylene | 2017/09/25 | <0.020 | | ug/g | |
| | | | o-Xylene | 2017/09/25 | <0.020 | | ug/g | |
| | | | Total Xylenes | 2017/09/25 | <0.020 | | ug/g | |
| | | | F1 (C6-C10) | 2017/09/25 | <10 | | ug/g | |
| | | | F1 (C6-C10) - BTEX | 2017/09/25 | <10 | | ug/g | |
| 5178025 | YY | RPD [FDL065-03] | Benzene | 2017/09/26 | NC | | % | 50 |
| | | | Ethylbenzene | 2017/09/26 | NC | | % | 50 |
| | | | Toluene | 2017/09/26 | NC | | % | 50 |
| | | | p+m-Xylene | 2017/09/26 | NC | | % | 50 |
| | | | o-Xylene | 2017/09/26 | NC | | % | 50 |
| | | | Total Xylenes | 2017/09/26 | NC | | % | 50 |
| | | | F1 (C6-C10) | 2017/09/26 | NC | | % | 30 |
| | | | F1 (C6-C10) - BTEX | 2017/09/26 | NC | | % | 30 |
| 5178035 | GTH | Matrix Spike | D10-Anthracene | 2017/09/27 | | 103 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/27 | | 110 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/27 | | 101 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/27 | | 90 | % | 30 - 130 |
| | | | 2-Methylnaphthalene | 2017/09/27 | | 96 | % | 30 - 130 |
| | | | Acenaphthene | 2017/09/27 | | 97 | % | 30 - 130 |
| | | | Acenaphthylene | 2017/09/27 | | 106 | % | 30 - 130 |
| | | | Anthracene | 2017/09/27 | | 90 | % | 30 - 130 |
| | | | Benzo(a)anthracene | 2017/09/27 | | NC | % | 30 - 130 |
| | | | Benzo(a)pyrene | 2017/09/27 | | 105 | % | 30 - 130 |
| | | | Benzo(b)fluoranthene | 2017/09/27 | | 107 | % | 30 - 130 |
| | | | Benzo(g,h,i)perylene | 2017/09/27 | | 104 | % | 30 - 130 |
| | | | Benzo(j)fluoranthene | 2017/09/27 | | 106 | % | 30 - 130 |
| | | | Benzo(k)fluoranthene | 2017/09/27 | | 108 | % | 30 - 130 |
| | | | Chrysene | 2017/09/27 | | 97 | % | 30 - 130 |
| | | | Dibenz(a,h)anthracene | 2017/09/27 | | 104 | % | 30 - 130 |
| | | | Fluoranthene | 2017/09/27 | | NC | % | 30 - 130 |
| | | | Fluorene | 2017/09/27 | | 107 | % | 30 - 130 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/27 | | 103 | % | 30 - 130 |
| | | | Naphthalene | 2017/09/27 | | 92 | % | 30 - 130 |
| | | | Perylene | 2017/09/27 | | 107 | % | 30 - 130 |
| | | | Phenanthrene | 2017/09/27 | | NC | % | 30 - 130 |
| | | | Pyrene | 2017/09/27 | | NC | % | 30 - 130 |
| 5178035 | GTH | Spiked Blank | D10-Anthracene | 2017/09/27 | | 119 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/27 | | 98 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/27 | | 91 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/27 | | 85 | % | 30 - 130 |
| | | | 2-Methylnaphthalene | 2017/09/27 | | 91 | % | 30 - 130 |
| | | | Acenaphthene | 2017/09/27 | | 92 | % | 30 - 130 |
| | | | Acenaphthylene | 2017/09/27 | | 95 | % | 30 - 130 |
| | | | Anthracene | 2017/09/27 | | 106 | % | 30 - 130 |
| | | | Benzo(a)anthracene | 2017/09/27 | | 98 | % | 30 - 130 |
| | | | Benzo(a)pyrene | 2017/09/27 | | 87 | % | 30 - 130 |
| | | | Benzo(b)fluoranthene | 2017/09/27 | | 91 | % | 30 - 130 |
| | | | Benzo(g,h,i)perylene | 2017/09/27 | | 80 | % | 30 - 130 |
| | | | Benzo(j)fluoranthene | 2017/09/27 | | 89 | % | 30 - 130 |
| | | | Benzo(k)fluoranthene | 2017/09/27 | | 84 | % | 30 - 130 |
| | | | Chrysene | 2017/09/27 | | 93 | % | 30 - 130 |
| | | | Dibenz(a,h)anthracene | 2017/09/27 | | 80 | % | 30 - 130 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Fluoranthene | 2017/09/27 | | 106 | % | 30 - 130 |
| | | | Fluorene | 2017/09/27 | | 94 | % | 30 - 130 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/27 | | 79 | % | 30 - 130 |
| | | | Naphthalene | 2017/09/27 | | 92 | % | 30 - 130 |
| | | | Perylene | 2017/09/27 | | 88 | % | 30 - 130 |
| | | | Phenanthrene | 2017/09/27 | | 98 | % | 30 - 130 |
| | | | Pyrene | 2017/09/27 | | 101 | % | 30 - 130 |
| 5178035 | GTH | Method Blank | D10-Anthracene | 2017/09/27 | | 90 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/27 | | 87 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/27 | | 92 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | 2-Methylnaphthalene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Acenaphthene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Acenaphthylene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Anthracene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Benzo(a)anthracene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Benzo(a)pyrene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Benzo(b)fluoranthene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Benzo(g,h,i)perylene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Benzo(j)fluoranthene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Benzo(k)fluoranthene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Chrysene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Dibenz(a,h)anthracene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Fluoranthene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Fluorene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Naphthalene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Perylene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Phenanthrene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Pyrene | 2017/09/27 | <0.0050 | | mg/kg | |
| 5178035 | GTH | RPD | 1-Methylnaphthalene | 2017/09/27 | NC | | % | 50 |
| | | | 2-Methylnaphthalene | 2017/09/27 | 35 | | % | 50 |
| | | | Acenaphthene | 2017/09/27 | 7.6 | | % | 50 |
| | | | Acenaphthylene | 2017/09/27 | NC | | % | 50 |
| | | | Anthracene | 2017/09/27 | 37 | | % | 50 |
| | | | Benzo(a)anthracene | 2017/09/27 | 36 | | % | 50 |
| | | | Benzo(a)pyrene | 2017/09/27 | 41 | | % | 50 |
| | | | Benzo(b)fluoranthene | 2017/09/27 | 48 | | % | 50 |
| | | | Benzo(g,h,i)perylene | 2017/09/27 | 46 | | % | 50 |
| | | | Benzo(j)fluoranthene | 2017/09/27 | 36 | | % | 50 |
| | | | Benzo(k)fluoranthene | 2017/09/27 | 49 | | % | 50 |
| | | | Chrysene | 2017/09/27 | 40 | | % | 50 |
| | | | Dibenz(a,h)anthracene | 2017/09/27 | NC | | % | 50 |
| | | | Fluoranthene | 2017/09/27 | 6.1 | | % | 50 |
| | | | Fluorene | 2017/09/27 | 13 | | % | 50 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/27 | 51 (3) | | % | 50 |
| | | | Naphthalene | 2017/09/27 | NC | | % | 50 |
| | | | Perylene | 2017/09/27 | 29 | | % | 50 |
| | | | Phenanthrene | 2017/09/27 | 20 | | % | 50 |
| | | | Pyrene | 2017/09/27 | 11 | | % | 50 |
| 5178865 | AKS | Matrix Spike | o-Terphenyl | 2017/09/23 | | 99 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/23 | | 92 | % | 50 - 130 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/23 | | 95 | % | 50 - 130 |

Maxxam
A Bureau Veritas Group Company



Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/23 | | 104 | % | 50 - 130 |
| 5178865 | AKS | Spiked Blank | o-Terphenyl | 2017/09/23 | | 93 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/23 | | 88 | % | 80 - 120 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/23 | | 94 | % | 80 - 120 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/23 | | 97 | % | 80 - 120 |
| 5178865 | AKS | Method Blank | o-Terphenyl | 2017/09/23 | | 97 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/23 | <10 | | ug/g | |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/23 | <50 | | ug/g | |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/23 | <50 | | ug/g | |
| 5178865 | AKS | RPD | F2 (C10-C16 Hydrocarbons) | 2017/09/23 | NC | | % | 30 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/23 | NC | | % | 30 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/23 | NC | | % | 30 |
| 5179389 | GG2 | RPD [FDL053-01] | Moisture | 2017/09/23 | 3.6 | | % | 20 |
| 5179748 | GTH | Matrix Spike [FDL034-02] | D10-Anthracene | 2017/09/29 | | 82 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/29 | | 103 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/29 | | 98 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/29 | | 99 | % | 30 - 130 |
| | | | 2-Methylnaphthalene | 2017/09/29 | | 107 | % | 30 - 130 |
| | | | Acenaphthene | 2017/09/29 | | 104 | % | 30 - 130 |
| | | | Acenaphthylene | 2017/09/29 | | 102 | % | 30 - 130 |
| | | | Anthracene | 2017/09/29 | | 94 | % | 30 - 130 |
| | | | Benzo(a)anthracene | 2017/09/29 | | 92 | % | 30 - 130 |
| | | | Benzo(a)pyrene | 2017/09/29 | | 71 | % | 30 - 130 |
| | | | Benzo(b)fluoranthene | 2017/09/29 | | 86 | % | 30 - 130 |
| | | | Benzo(g,h,i)perylene | 2017/09/29 | | 52 | % | 30 - 130 |
| | | | Benzo(j)fluoranthene | 2017/09/29 | | 85 | % | 30 - 130 |
| | | | Benzo(k)fluoranthene | 2017/09/29 | | 89 | % | 30 - 130 |
| | | | Chrysene | 2017/09/29 | | 84 | % | 30 - 130 |
| | | | Dibenz(a,h)anthracene | 2017/09/29 | | 67 | % | 30 - 130 |
| | | | Fluoranthene | 2017/09/29 | | 96 | % | 30 - 130 |
| | | | Fluorene | 2017/09/29 | | 106 | % | 30 - 130 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/29 | | 60 | % | 30 - 130 |
| | | | Naphthalene | 2017/09/29 | | 104 | % | 30 - 130 |
| | | | Perylene | 2017/09/29 | | 67 | % | 30 - 130 |
| | | | Phenanthrene | 2017/09/29 | | 95 | % | 30 - 130 |
| | | | Pyrene | 2017/09/29 | | 91 | % | 30 - 130 |
| 5179748 | GTH | Spiked Blank | D10-Anthracene | 2017/09/29 | | 91 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/29 | | 95 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/29 | | 103 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/29 | | 99 | % | 30 - 130 |
| | | | 2-Methylnaphthalene | 2017/09/29 | | 107 | % | 30 - 130 |
| | | | Acenaphthene | 2017/09/29 | | 104 | % | 30 - 130 |
| | | | Acenaphthylene | 2017/09/29 | | 103 | % | 30 - 130 |
| | | | Anthracene | 2017/09/29 | | 100 | % | 30 - 130 |
| | | | Benzo(a)anthracene | 2017/09/29 | | 93 | % | 30 - 130 |
| | | | Benzo(a)pyrene | 2017/09/29 | | 103 | % | 30 - 130 |
| | | | Benzo(b)fluoranthene | 2017/09/29 | | 111 | % | 30 - 130 |
| | | | Benzo(g,h,i)perylene | 2017/09/29 | | 105 | % | 30 - 130 |
| | | | Benzo(j)fluoranthene | 2017/09/29 | | 112 | % | 30 - 130 |
| | | | Benzo(k)fluoranthene | 2017/09/29 | | 110 | % | 30 - 130 |
| | | | Chrysene | 2017/09/29 | | 88 | % | 30 - 130 |
| | | | Dibenz(a,h)anthracene | 2017/09/29 | | 103 | % | 30 - 130 |
| | | | Fluoranthene | 2017/09/29 | | 97 | % | 30 - 130 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Fluorene | 2017/09/29 | | 106 | % | 30 - 130 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/29 | | 100 | % | 30 - 130 |
| | | | Naphthalene | 2017/09/29 | | 104 | % | 30 - 130 |
| | | | Perylene | 2017/09/29 | | 107 | % | 30 - 130 |
| | | | Phenanthrene | 2017/09/29 | | 104 | % | 30 - 130 |
| | | | Pyrene | 2017/09/29 | | 96 | % | 30 - 130 |
| 5179748 | GTH | Method Blank | D10-Anthracene | 2017/09/29 | | 93 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/29 | | 96 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/29 | | 101 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | 2-Methylnaphthalene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Acenaphthene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Acenaphthylene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Anthracene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Benzo(a)anthracene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Benzo(a)pyrene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Benzo(b)fluoranthene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Benzo(g,h,i)perylene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Benzo(j)fluoranthene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Benzo(k)fluoranthene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Chrysene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Dibenz(a,h)anthracene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Fluoranthene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Fluorene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Naphthalene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Perylene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Phenanthrene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Pyrene | 2017/09/29 | <0.0050 | | mg/kg | |
| 5179748 | GTH | RPD [FDL034-02] | 1-Methylnaphthalene | 2017/09/29 | NC | | % | 50 |
| | | | 2-Methylnaphthalene | 2017/09/29 | NC | | % | 50 |
| | | | Acenaphthene | 2017/09/29 | NC | | % | 50 |
| | | | Acenaphthylene | 2017/09/29 | NC | | % | 50 |
| | | | Anthracene | 2017/09/29 | NC | | % | 50 |
| | | | Benzo(a)anthracene | 2017/09/29 | NC | | % | 50 |
| | | | Benzo(a)pyrene | 2017/09/29 | NC | | % | 50 |
| | | | Benzo(b)fluoranthene | 2017/09/29 | NC | | % | 50 |
| | | | Benzo(g,h,i)perylene | 2017/09/29 | NC | | % | 50 |
| | | | Benzo(j)fluoranthene | 2017/09/29 | NC | | % | 50 |
| | | | Benzo(k)fluoranthene | 2017/09/29 | NC | | % | 50 |
| | | | Chrysene | 2017/09/29 | NC | | % | 50 |
| | | | Dibenz(a,h)anthracene | 2017/09/29 | NC | | % | 50 |
| | | | Fluoranthene | 2017/09/29 | NC | | % | 50 |
| | | | Fluorene | 2017/09/29 | NC | | % | 50 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/29 | NC | | % | 50 |
| | | | Naphthalene | 2017/09/29 | NC | | % | 50 |
| | | | Perylene | 2017/09/29 | NC | | % | 50 |
| | | | Phenanthrene | 2017/09/29 | NC | | % | 50 |
| | | | Pyrene | 2017/09/29 | NC | | % | 50 |
| 5180367 | MKS | Matrix Spike [FDL042-01] | o-Terphenyl | 2017/09/26 | | 86 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/26 | | 91 | % | 50 - 130 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/26 | | 91 | % | 50 - 130 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/26 | | 81 | % | 50 - 130 |

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| 5180367 | MKS | Spiked Blank | o-Terphenyl | 2017/09/26 | | 97 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/26 | | 98 | % | 80 - 120 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/26 | | 98 | % | 80 - 120 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/26 | | 88 | % | 80 - 120 |
| 5180367 | MKS | Method Blank | o-Terphenyl | 2017/09/26 | | 100 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/26 | <10 | | ug/g | |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/26 | <50 | | ug/g | |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/26 | <50 | | ug/g | |
| 5180367 | MKS | RPD [FDL042-01] | F2 (C10-C16 Hydrocarbons) | 2017/09/26 | NC | | % | 30 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/26 | NC | | % | 30 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/26 | NC | | % | 30 |
| 5180371 | ZZ | Matrix Spike [FDL044-01] | o-Terphenyl | 2017/09/25 | | 95 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/25 | | 95 | % | 50 - 130 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/25 | | 93 | % | 50 - 130 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/25 | | 91 | % | 50 - 130 |
| 5180371 | ZZ | Spiked Blank | o-Terphenyl | 2017/09/25 | | 93 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/25 | | 95 | % | 80 - 120 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/25 | | 93 | % | 80 - 120 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/25 | | 90 | % | 80 - 120 |
| 5180371 | ZZ | Method Blank | o-Terphenyl | 2017/09/25 | | 98 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/25 | <10 | | ug/g | |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/25 | <50 | | ug/g | |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/25 | <50 | | ug/g | |
| 5180371 | ZZ | RPD [FDL044-01] | F2 (C10-C16 Hydrocarbons) | 2017/09/25 | NC | | % | 30 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/25 | 14 | | % | 30 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/25 | NC | | % | 30 |
| 5180399 | KLI | Matrix Spike [FDL065-01] | o-Terphenyl | 2017/09/26 | | 94 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/26 | | 96 | % | 50 - 130 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/26 | | 88 | % | 50 - 130 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/26 | | 92 | % | 50 - 130 |
| 5180399 | KLI | Spiked Blank | o-Terphenyl | 2017/09/26 | | 91 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/26 | | 93 | % | 80 - 120 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/26 | | 90 | % | 80 - 120 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/26 | | 89 | % | 80 - 120 |
| 5180399 | KLI | Method Blank | o-Terphenyl | 2017/09/26 | | 122 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/26 | <10 | | ug/g | |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/26 | <50 | | ug/g | |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/26 | <50 | | ug/g | |
| 5180399 | KLI | RPD [FDL065-01] | F2 (C10-C16 Hydrocarbons) | 2017/09/26 | NC | | % | 30 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/26 | NC | | % | 30 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/26 | NC | | % | 30 |
| 5180475 | GTH | Matrix Spike [FDL069-02] | D10-Anthracene | 2017/09/29 | | 86 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/29 | | 87 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/29 | | 92 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/29 | | 84 | % | 30 - 130 |
| | | | 2-Methylnaphthalene | 2017/09/29 | | 90 | % | 30 - 130 |
| | | | Acenaphthene | 2017/09/29 | | 91 | % | 30 - 130 |
| | | | Acenaphthylene | 2017/09/29 | | 87 | % | 30 - 130 |
| | | | Anthracene | 2017/09/29 | | 83 | % | 30 - 130 |
| | | | Benzo(a)anthracene | 2017/09/29 | | 97 | % | 30 - 130 |
| | | | Benzo(a)pyrene | 2017/09/29 | | 87 | % | 30 - 130 |
| | | | Benzo(b)fluoranthene | 2017/09/29 | | 92 | % | 30 - 130 |
| | | | Benzo(g,h,i)perylene | 2017/09/29 | | 92 | % | 30 - 130 |

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Benzo(j)fluoranthene | 2017/09/29 | | 91 | % | 30 - 130 |
| | | | Benzo(k)fluoranthene | 2017/09/29 | | 92 | % | 30 - 130 |
| | | | Chrysene | 2017/09/29 | | 90 | % | 30 - 130 |
| | | | Dibenz(a,h)anthracene | 2017/09/29 | | 91 | % | 30 - 130 |
| | | | Fluoranthene | 2017/09/29 | | 96 | % | 30 - 130 |
| | | | Fluorene | 2017/09/29 | | 91 | % | 30 - 130 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/29 | | 88 | % | 30 - 130 |
| | | | Naphthalene | 2017/09/29 | | 87 | % | 30 - 130 |
| | | | Perylene | 2017/09/29 | | 87 | % | 30 - 130 |
| | | | Phenanthrene | 2017/09/29 | | 106 | % | 30 - 130 |
| | | | Pyrene | 2017/09/29 | | 94 | % | 30 - 130 |
| 5180475 | GTH | Spiked Blank | D10-Anthracene | 2017/09/29 | | 85 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/29 | | 84 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/29 | | 91 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/29 | | 83 | % | 30 - 130 |
| | | | 2-Methylnaphthalene | 2017/09/29 | | 90 | % | 30 - 130 |
| | | | Acenaphthene | 2017/09/29 | | 91 | % | 30 - 130 |
| | | | Acenaphthylene | 2017/09/29 | | 85 | % | 30 - 130 |
| | | | Anthracene | 2017/09/29 | | 92 | % | 30 - 130 |
| | | | Benzo(a)anthracene | 2017/09/29 | | 81 | % | 30 - 130 |
| | | | Benzo(a)pyrene | 2017/09/29 | | 67 | % | 30 - 130 |
| | | | Benzo(b)fluoranthene | 2017/09/29 | | 77 | % | 30 - 130 |
| | | | Benzo(g,h,i)perylene | 2017/09/29 | | 60 | % | 30 - 130 |
| | | | Benzo(j)fluoranthene | 2017/09/29 | | 76 | % | 30 - 130 |
| | | | Benzo(k)fluoranthene | 2017/09/29 | | 71 | % | 30 - 130 |
| | | | Chrysene | 2017/09/29 | | 77 | % | 30 - 130 |
| | | | Dibenz(a,h)anthracene | 2017/09/29 | | 50 | % | 30 - 130 |
| | | | Fluoranthene | 2017/09/29 | | 96 | % | 30 - 130 |
| | | | Fluorene | 2017/09/29 | | 89 | % | 30 - 130 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/29 | | 50 | % | 30 - 130 |
| | | | Naphthalene | 2017/09/29 | | 87 | % | 30 - 130 |
| | | | Perylene | 2017/09/29 | | 70 | % | 30 - 130 |
| | | | Phenanthrene | 2017/09/29 | | 90 | % | 30 - 130 |
| | | | Pyrene | 2017/09/29 | | 96 | % | 30 - 130 |
| 5180475 | GTH | Method Blank | D10-Anthracene | 2017/09/29 | | 86 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/29 | | 88 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/29 | | 89 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | 2-Methylnaphthalene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Acenaphthene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Acenaphthylene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Anthracene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Benzo(a)anthracene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Benzo(a)pyrene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Benzo(b)fluoranthene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Benzo(g,h,i)perylene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Benzo(j)fluoranthene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Benzo(k)fluoranthene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Chrysene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Dibenz(a,h)anthracene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Fluoranthene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Fluorene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/29 | <0.0050 | | mg/kg | |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Naphthalene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Perylene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Phenanthrene | 2017/09/29 | <0.0050 | | mg/kg | |
| | | | Pyrene | 2017/09/29 | <0.0050 | | mg/kg | |
| 5180475 | GTH | RPD [FDL069-02] | 1-Methylnaphthalene | 2017/09/29 | NC | | % | 50 |
| | | | 2-Methylnaphthalene | 2017/09/29 | NC | | % | 50 |
| | | | Acenaphthene | 2017/09/29 | NC | | % | 50 |
| | | | Acenaphthylene | 2017/09/29 | NC | | % | 50 |
| | | | Anthracene | 2017/09/29 | NC | | % | 50 |
| | | | Benzo(a)anthracene | 2017/09/29 | NC | | % | 50 |
| | | | Benzo(a)pyrene | 2017/09/29 | NC | | % | 50 |
| | | | Benzo(b)fluoranthene | 2017/09/29 | NC | | % | 50 |
| | | | Benzo(g,h,i)perylene | 2017/09/29 | NC | | % | 50 |
| | | | Benzo(j)fluoranthene | 2017/09/29 | NC | | % | 50 |
| | | | Benzo(k)fluoranthene | 2017/09/29 | NC | | % | 50 |
| | | | Chrysene | 2017/09/29 | NC | | % | 50 |
| | | | Dibenz(a,h)anthracene | 2017/09/29 | NC | | % | 50 |
| | | | Fluoranthene | 2017/09/29 | NC | | % | 50 |
| | | | Fluorene | 2017/09/29 | NC | | % | 50 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/29 | NC | | % | 50 |
| | | | Naphthalene | 2017/09/29 | NC | | % | 50 |
| | | | Perylene | 2017/09/29 | NC | | % | 50 |
| | | | Phenanthrene | 2017/09/29 | NC | | % | 50 |
| | | | Pyrene | 2017/09/29 | NC | | % | 50 |
| 5180479 | GTH | Matrix Spike [FDL090-02] | D10-Anthracene | 2017/09/30 | | 88 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/30 | | 91 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/30 | | 89 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/30 | | 81 | % | 30 - 130 |
| | | | 2-Methylnaphthalene | 2017/09/30 | | 88 | % | 30 - 130 |
| | | | Acenaphthene | 2017/09/30 | | 90 | % | 30 - 130 |
| | | | Acenaphthylene | 2017/09/30 | | 86 | % | 30 - 130 |
| | | | Anthracene | 2017/09/30 | | 98 | % | 30 - 130 |
| | | | Benzo(a)anthracene | 2017/09/30 | | 99 | % | 30 - 130 |
| | | | Benzo(a)pyrene | 2017/09/30 | | 90 | % | 30 - 130 |
| | | | Benzo(b)fluoranthene | 2017/09/30 | | 94 | % | 30 - 130 |
| | | | Benzo(g,h,i)perylene | 2017/09/30 | | 98 | % | 30 - 130 |
| | | | Benzo(j)fluoranthene | 2017/09/30 | | 92 | % | 30 - 130 |
| | | | Benzo(k)fluoranthene | 2017/09/30 | | 93 | % | 30 - 130 |
| | | | Chrysene | 2017/09/30 | | 92 | % | 30 - 130 |
| | | | Dibenz(a,h)anthracene | 2017/09/30 | | 94 | % | 30 - 130 |
| | | | Fluoranthene | 2017/09/30 | | 98 | % | 30 - 130 |
| | | | Fluorene | 2017/09/30 | | 89 | % | 30 - 130 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/30 | | 93 | % | 30 - 130 |
| | | | Naphthalene | 2017/09/30 | | 84 | % | 30 - 130 |
| | | | Perylene | 2017/09/30 | | 90 | % | 30 - 130 |
| | | | Phenanthrene | 2017/09/30 | | 89 | % | 30 - 130 |
| | | | Pyrene | 2017/09/30 | | 97 | % | 30 - 130 |
| 5180479 | GTH | Spiked Blank | D10-Anthracene | 2017/09/30 | | 83 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/30 | | 87 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/30 | | 91 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/30 | | 81 | % | 30 - 130 |
| | | | 2-Methylnaphthalene | 2017/09/30 | | 87 | % | 30 - 130 |
| | | | Acenaphthene | 2017/09/30 | | 90 | % | 30 - 130 |

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Acenaphthylene | 2017/09/30 | | 84 | % | 30 - 130 |
| | | | Anthracene | 2017/09/30 | | 95 | % | 30 - 130 |
| | | | Benzo(a)anthracene | 2017/09/30 | | 94 | % | 30 - 130 |
| | | | Benzo(a)pyrene | 2017/09/30 | | 84 | % | 30 - 130 |
| | | | Benzo(b)fluoranthene | 2017/09/30 | | 89 | % | 30 - 130 |
| | | | Benzo(g,h,i)perylene | 2017/09/30 | | 88 | % | 30 - 130 |
| | | | Benzo(j)fluoranthene | 2017/09/30 | | 87 | % | 30 - 130 |
| | | | Benzo(k)fluoranthene | 2017/09/30 | | 87 | % | 30 - 130 |
| | | | Chrysene | 2017/09/30 | | 87 | % | 30 - 130 |
| | | | Dibenz(a,h)anthracene | 2017/09/30 | | 81 | % | 30 - 130 |
| | | | Fluoranthene | 2017/09/30 | | 96 | % | 30 - 130 |
| | | | Fluorene | 2017/09/30 | | 88 | % | 30 - 130 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/30 | | 81 | % | 30 - 130 |
| | | | Naphthalene | 2017/09/30 | | 75 | % | 30 - 130 |
| | | | Perylene | 2017/09/30 | | 85 | % | 30 - 130 |
| | | | Phenanthrene | 2017/09/30 | | 77 | % | 30 - 130 |
| | | | Pyrene | 2017/09/30 | | 94 | % | 30 - 130 |
| 5180479 | GTH | Method Blank | D10-Anthracene | 2017/09/30 | | 88 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/30 | | 88 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/30 | | 93 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | 2-Methylnaphthalene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Acenaphthene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Acenaphthylene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Anthracene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Benzo(a)anthracene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Benzo(a)pyrene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Benzo(b)fluoranthene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Benzo(g,h,i)perylene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Benzo(j)fluoranthene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Benzo(k)fluoranthene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Chrysene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Dibenz(a,h)anthracene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Fluoranthene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Fluorene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Naphthalene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Perylene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Phenanthrene | 2017/09/30 | <0.0050 | | mg/kg | |
| | | | Pyrene | 2017/09/30 | <0.0050 | | mg/kg | |
| 5180479 | GTH | RPD [FDL090-02] | 1-Methylnaphthalene | 2017/09/30 | NC | | % | 50 |
| | | | 2-Methylnaphthalene | 2017/09/30 | NC | | % | 50 |
| | | | Acenaphthene | 2017/09/30 | NC | | % | 50 |
| | | | Acenaphthylene | 2017/09/30 | NC | | % | 50 |
| | | | Anthracene | 2017/09/30 | NC | | % | 50 |
| | | | Benzo(a)anthracene | 2017/09/30 | NC | | % | 50 |
| | | | Benzo(a)pyrene | 2017/09/30 | NC | | % | 50 |
| | | | Benzo(b)fluoranthene | 2017/09/30 | NC | | % | 50 |
| | | | Benzo(g,h,i)perylene | 2017/09/30 | NC | | % | 50 |
| | | | Benzo(j)fluoranthene | 2017/09/30 | NC | | % | 50 |
| | | | Benzo(k)fluoranthene | 2017/09/30 | NC | | % | 50 |
| | | | Chrysene | 2017/09/30 | NC | | % | 50 |
| | | | Dibenz(a,h)anthracene | 2017/09/30 | NC | | % | 50 |

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Fluoranthene | 2017/09/30 | NC | | % | 50 |
| | | | Fluorene | 2017/09/30 | NC | | % | 50 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/30 | NC | | % | 50 |
| | | | Naphthalene | 2017/09/30 | NC | | % | 50 |
| | | | Perylene | 2017/09/30 | NC | | % | 50 |
| | | | Phenanthrene | 2017/09/30 | NC | | % | 50 |
| | | | Pyrene | 2017/09/30 | NC | | % | 50 |
| 5182130 | BAN | Matrix Spike | Acid Extractable Antimony (Sb) | 2017/09/27 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Arsenic (As) | 2017/09/27 | | NC | % | 75 - 125 |
| | | | Acid Extractable Barium (Ba) | 2017/09/27 | | NC | % | 75 - 125 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/27 | | 109 | % | 75 - 125 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/27 | | 108 | % | 75 - 125 |
| | | | Acid Extractable Boron (B) | 2017/09/27 | | 90 | % | 75 - 125 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/27 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/27 | | 107 | % | 75 - 125 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/27 | | 108 | % | 75 - 125 |
| | | | Acid Extractable Copper (Cu) | 2017/09/27 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Lead (Pb) | 2017/09/27 | | NC | % | 75 - 125 |
| | | | Acid Extractable Lithium (Li) | 2017/09/27 | | 115 | % | 75 - 125 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/27 | | NC | % | 75 - 125 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/27 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/27 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/27 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/27 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Selenium (Se) | 2017/09/27 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Silver (Ag) | 2017/09/27 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/27 | | 109 | % | 75 - 125 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/27 | | 109 | % | 75 - 125 |
| | | | Acid Extractable Tin (Sn) | 2017/09/27 | | 111 | % | 75 - 125 |
| | | | Acid Extractable Uranium (U) | 2017/09/27 | | 111 | % | 75 - 125 |
| | | | Acid Extractable Vanadium (V) | 2017/09/27 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/27 | | NC | % | 75 - 125 |
| 5182130 | BAN | Spiked Blank | Acid Extractable Antimony (Sb) | 2017/09/26 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Arsenic (As) | 2017/09/26 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Barium (Ba) | 2017/09/26 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/26 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/26 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Boron (B) | 2017/09/26 | | 108 | % | 75 - 125 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/26 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/26 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/26 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Copper (Cu) | 2017/09/26 | | 97 | % | 75 - 125 |
| | | | Acid Extractable Lead (Pb) | 2017/09/26 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Lithium (Li) | 2017/09/26 | | 107 | % | 75 - 125 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/26 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/26 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/26 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/26 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/26 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Selenium (Se) | 2017/09/26 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Silver (Ag) | 2017/09/26 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/26 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/26 | | 106 | % | 75 - 125 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Acid Extractable Tin (Sn) | 2017/09/26 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Uranium (U) | 2017/09/26 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Vanadium (V) | 2017/09/26 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/26 | | 104 | % | 75 - 125 |
| 5182130 | BAN | Method Blank | Acid Extractable Aluminum (Al) | 2017/09/26 | <10 | | mg/kg | |
| | | | Acid Extractable Antimony (Sb) | 2017/09/26 | <2.0 | | mg/kg | |
| | | | Acid Extractable Arsenic (As) | 2017/09/26 | <2.0 | | mg/kg | |
| | | | Acid Extractable Barium (Ba) | 2017/09/26 | <5.0 | | mg/kg | |
| | | | Acid Extractable Beryllium (Be) | 2017/09/26 | <2.0 | | mg/kg | |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/26 | <2.0 | | mg/kg | |
| | | | Acid Extractable Boron (B) | 2017/09/26 | <50 | | mg/kg | |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/26 | <0.30 | | mg/kg | |
| | | | Acid Extractable Chromium (Cr) | 2017/09/26 | <2.0 | | mg/kg | |
| | | | Acid Extractable Cobalt (Co) | 2017/09/26 | <1.0 | | mg/kg | |
| | | | Acid Extractable Copper (Cu) | 2017/09/26 | <2.0 | | mg/kg | |
| | | | Acid Extractable Iron (Fe) | 2017/09/26 | <50 | | mg/kg | |
| | | | Acid Extractable Lead (Pb) | 2017/09/26 | <0.50 | | mg/kg | |
| | | | Acid Extractable Lithium (Li) | 2017/09/26 | <2.0 | | mg/kg | |
| | | | Acid Extractable Manganese (Mn) | 2017/09/26 | <2.0 | | mg/kg | |
| | | | Acid Extractable Mercury (Hg) | 2017/09/26 | <0.10 | | mg/kg | |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/26 | <2.0 | | mg/kg | |
| | | | Acid Extractable Nickel (Ni) | 2017/09/26 | <2.0 | | mg/kg | |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/26 | <2.0 | | mg/kg | |
| | | | Acid Extractable Selenium (Se) | 2017/09/26 | <1.0 | | mg/kg | |
| | | | Acid Extractable Silver (Ag) | 2017/09/26 | <0.50 | | mg/kg | |
| | | | Acid Extractable Strontium (Sr) | 2017/09/26 | <5.0 | | mg/kg | |
| | | | Acid Extractable Thallium (Tl) | 2017/09/26 | <0.10 | | mg/kg | |
| | | | Acid Extractable Tin (Sn) | 2017/09/26 | <2.0 | | mg/kg | |
| | | | Acid Extractable Uranium (U) | 2017/09/26 | <0.10 | | mg/kg | |
| | | | Acid Extractable Vanadium (V) | 2017/09/26 | <2.0 | | mg/kg | |
| | | | Acid Extractable Zinc (Zn) | 2017/09/26 | <5.0 | | mg/kg | |
| 5182130 | BAN | RPD | Acid Extractable Aluminum (Al) | 2017/09/27 | 0.77 | | % | 35 |
| | | | Acid Extractable Antimony (Sb) | 2017/09/27 | NC | | % | 35 |
| | | | Acid Extractable Arsenic (As) | 2017/09/27 | 11 | | % | 35 |
| | | | Acid Extractable Barium (Ba) | 2017/09/27 | 0.21 | | % | 35 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/27 | NC | | % | 35 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/27 | NC | | % | 35 |
| | | | Acid Extractable Boron (B) | 2017/09/27 | NC | | % | 35 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/27 | NC | | % | 35 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/27 | 0.12 | | % | 35 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/27 | 1.4 | | % | 35 |
| | | | Acid Extractable Copper (Cu) | 2017/09/27 | 0.63 | | % | 35 |
| | | | Acid Extractable Iron (Fe) | 2017/09/27 | 3.0 | | % | 35 |
| | | | Acid Extractable Lead (Pb) | 2017/09/27 | 4.2 | | % | 35 |
| | | | Acid Extractable Lithium (Li) | 2017/09/27 | 1.5 | | % | 35 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/27 | 0.94 | | % | 35 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/27 | 18 | | % | 35 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/27 | NC | | % | 35 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/27 | 3.3 | | % | 35 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/27 | 1.2 | | % | 35 |
| | | | Acid Extractable Selenium (Se) | 2017/09/27 | NC | | % | 35 |
| | | | Acid Extractable Silver (Ag) | 2017/09/27 | NC | | % | 35 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/27 | 5.9 | | % | 35 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Acid Extractable Thallium (Tl) | 2017/09/27 | NC | | % | 35 |
| | | | Acid Extractable Tin (Sn) | 2017/09/27 | 15 | | % | 35 |
| | | | Acid Extractable Uranium (U) | 2017/09/27 | 4.7 | | % | 35 |
| | | | Acid Extractable Vanadium (V) | 2017/09/27 | 5.0 | | % | 35 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/27 | 34 | | % | 35 |
| 5184457 | DDS | Matrix Spike | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/27 | | NC | % | 65 - 135 |
| 5184457 | DDS | Spiked Blank | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/27 | | 101 | % | 65 - 135 |
| 5184457 | DDS | Method Blank | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/27 | <100 | | ug/g | |
| 5184457 | DDS | RPD [FDL087-01] | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/27 | 15 | | % | 50 |
| 5188959 | DDS | Matrix Spike [FDL030-01] | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/29 | | NC | % | 65 - 135 |
| 5188959 | DDS | Spiked Blank | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/29 | | 100 | % | 65 - 135 |
| 5188959 | DDS | Method Blank | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/29 | <100 | | ug/g | |
| 5188959 | DDS | RPD [FDL031-01] | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/29 | 12 | | % | 50 |
| 5189073 | DDS | Matrix Spike [FDL079-01] | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/29 | | 106 | % | 65 - 135 |
| 5189073 | DDS | Spiked Blank | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/29 | | 100 | % | 65 - 135 |
| 5189073 | DDS | Method Blank | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/29 | <100 | | ug/g | |
| 5189073 | DDS | RPD [FDL080-01] | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/29 | 22 | | % | 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 spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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

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

(2) Poor RPD due to sample inhomogeneity. < 10 % of compounds in multi-component analysis in violation.

(3) Duplicate: < 10 % of compounds in multi-component analysis in violation.

Maxxam Job #: B7K3259
Report Date: 2017/10/17

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISALND

## VALIDATION SIGNATURE PAGE

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

Brad Newman, Scientific Service Specialist

Eric Dearman, Scientific Specialist

Phil Deveau, 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.



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your Project #: 10550.04
Site Location: CUT THROAT ISLAND
Your C.O.C. #: 627211-01-01

**Attention:Abigail Garnett**
GEMTEC LIMITED
191 Doak Rd
Fredericton, NB
Canada E3C 2E6

**Report Date: 2017/11/02**
Report #: R4819279
Version: 4 - Final

# CERTIFICATE OF ANALYSIS

**MAXXAM JOB #: B7K2737**
**Received: 2017/09/18, 09:09**

Sample Matrix: Soil
# Samples Received: 4

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Reference |
|---|---|---|---|---|---|
| Benzo(b/j)fluoranthene Sum (LL soil) | 4 | N/A | 2017/09/28 | N/A | Auto Calc. |
| Dioxins/Furans in Soil (EPS 1/RM/23) (1, 2) | 1 | 2017/10/25 | 2017/10/30 | BRL SOP-00410 | EPS 1/RM/23 m |
| Petroleum Hydrocarbons F2-F4 in Soil (1, 3) | 3 | 2017/09/22 | 2017/09/23 | CAM SOP-00316 | CCME CWS m |
| Petroleum Hydrocarbons F2-F4 in Soil (1, 3) | 1 | 2017/09/22 | 2017/09/25 | CAM SOP-00316 | CCME CWS m |
| F4G (CCME Hydrocarbons Gravimetric) (1) | 1 | 2017/09/27 | 2017/09/27 | CAM SOP-00316 | CCME PHC-CWS m |
| Metals Solids Acid Extr. ICPMS | 3 | 2017/09/22 | 2017/09/22 | ATL SOP 00058 | EPA 6020A R1 m |
| Moisture | 4 | N/A | 2017/09/18 | ATL SOP 00001 | OMOE Handbook 1983 m |
| PAH in sediment by GC/MS (Low Level) (4) | 2 | 2017/09/22 | 2017/09/27 | ATL SOP 00102 | EPA 8270D 2014 m |
| PAH in sediment by GC/MS (Low Level) (4) | 2 | 2017/09/22 | 2017/09/28 | ATL SOP 00102 | EPA 8270D 2014 m |
| PCBs in soil by GC/ECD (4) | 3 | 2017/09/19 | 2017/09/20 | ATL SOP 00106 | EPA 8082A 2007 m |
| PCB Aroclor sum (soil) | 3 | N/A | 2017/09/20 | N/A | Auto Calc. |
| Volatile Organic Compounds and F1 PHCs (1) | 3 | N/A | 2017/09/23 | CAM SOP-00230 | EPA 8260 m |
| Volatile Organic Compounds and F1 PHCs (1) | 1 | N/A | 2017/09/26 | CAM SOP-00230 | EPA 8260 m |
| VOCs in Soil - Field Preserved (5) | 1 | N/A | 2017/09/20 | ATL SOP 00133 | EPA 8260C R3 m |

Sample Matrix: Water
# Samples Received: 6

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Reference |
|---|---|---|---|---|---|
| Carbonate, Bicarbonate and Hydroxide | 2 | N/A | 2017/09/20 | N/A | SM 22 4500-CO2 D |
| Carbonate, Bicarbonate and Hydroxide | 3 | N/A | 2017/09/21 | N/A | SM 22 4500-CO2 D |
| Alkalinity | 1 | N/A | 2017/09/25 | ATL SOP 00013 | EPA 310.2 R1974 m |
| Alkalinity | 4 | N/A | 2017/09/26 | ATL SOP 00013 | EPA 310.2 R1974 m |
| Benzo(b/j)fluoranthene Sum (water) | 1 | N/A | 2017/09/26 | N/A | Auto Calc. |
| Benzo(b/j)fluoranthene Sum (water) | 4 | N/A | 2017/09/28 | N/A | Auto Calc. |
| Chloride | 1 | N/A | 2017/09/25 | ATL SOP 00014 | SM 22 4500-Cl- E m |
| Chloride | 4 | N/A | 2017/09/26 | ATL SOP 00014 | SM 22 4500-Cl- E m |
| Colour | 1 | N/A | 2017/09/26 | ATL SOP 00020 | SM 22 2120C m |
| Colour | 4 | N/A | 2017/09/27 | ATL SOP 00020 | SM 22 2120C m |
| Conductance - water | 2 | N/A | 2017/09/20 | ATL SOP 00004 | SM 22 2510B m |
| Conductance - water | 3 | N/A | 2017/09/21 | ATL SOP 00004 | SM 22 2510B m |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your Project #: 10550.04
Site Location: CUT THROAT ISLAND
Your C.O.C. #: 627211-01-01

**Attention:Abigail Garnett**

GEMTEC LIMITED
191 Doak Rd
Fredericton, NB
Canada E3C 2E6

**Report Date: 2017/11/02**
Report #: R4819279
Version: 4 - Final

## CERTIFICATE OF ANALYSIS

**MAXXAM JOB #: B7K2737**
**Received: 2017/09/18, 09:09**

Sample Matrix: Water
# Samples Received: 6

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Reference |
|---|---|---|---|---|---|
| Petroleum Hydro. CCME F1 & BTEX in Water (1) | 6 | N/A | 2017/09/26 | CAM SOP-00315 | CCME PHC-CWS m |
| Petroleum Hydrocarbons F2-F4 in Water (1, 3) | 6 | 2017/09/25 | 2017/09/26 | CAM SOP-00316 | CCME PHC-CWS m |
| Hardness (calculated as CaCO3) | 5 | N/A | 2017/09/21 | ATL SOP 00048 | SM 22 2340 B |
| Mercury - Total (CVAA,LL) | 2 | 2017/09/22 | 2017/09/25 | ATL SOP 00026 | EPA 245.1 R3 m |
| Mercury - Total (CVAA,LL) | 3 | 2017/09/22 | 2017/09/26 | ATL SOP 00026 | EPA 245.1 R3 m |
| Metals Water Total MS | 5 | 2017/09/20 | 2017/09/20 | ATL SOP 00058 | EPA 6020A R1 m |
| Ion Balance (% Difference) | 5 | N/A | 2017/09/27 | N/A | Auto Calc. |
| Anion and Cation Sum | 5 | N/A | 2017/09/27 | N/A | Auto Calc. |
| Nitrogen Ammonia - water | 5 | N/A | 2017/09/26 | ATL SOP 00015 | EPA 350.1 R2 m |
| Nitrogen - Nitrate + Nitrite | 1 | N/A | 2017/09/25 | ATL SOP 00016 | USGS SOPINCF0452.2 m |
| Nitrogen - Nitrate + Nitrite | 4 | N/A | 2017/09/26 | ATL SOP 00016 | USGS SOPINCF0452.2 m |
| Nitrogen - Nitrite | 1 | N/A | 2017/09/25 | ATL SOP 00017 | SM 22 4500-NO2- B m |
| Nitrogen - Nitrite | 4 | N/A | 2017/09/27 | ATL SOP 00017 | SM 22 4500-NO2- B m |
| Nitrogen - Nitrate (as N) | 1 | N/A | 2017/09/26 | ATL SOP 00018 | ASTM D3867-16 |
| Nitrogen - Nitrate (as N) | 4 | N/A | 2017/09/27 | ATL SOP 00018 | ASTM D3867-16 |
| PAH (FWAL) in Water (A/Q) by GC/MS (SIM) (6) | 1 | 2017/09/20 | 2017/09/26 | ATL SOP 00103 | EPA 8270D 2007 m |
| PAH (FWAL) in Water (A/Q) by GC/MS (SIM) (6) | 4 | 2017/09/20 | 2017/09/28 | ATL SOP 00103 | EPA 8270D 2007 m |
| PCBs in water by GC/ECD | 2 | 2017/09/20 | 2017/09/21 | ATL SOP 00107 | EPA 8082A m |
| PCB Aroclor sum (water) | 2 | N/A | 2017/09/21 | N/A | Auto Calc. |
| pH (7) | 2 | N/A | 2017/09/20 | ATL SOP 00003 | SM 22 4500-H+ B m |
| pH (7) | 3 | N/A | 2017/09/21 | ATL SOP 00003 | SM 22 4500-H+ B m |
| Phosphorus - ortho | 1 | N/A | 2017/09/25 | ATL SOP 00021 | SM 22 4500-P E m |
| Phosphorus - ortho | 4 | N/A | 2017/09/26 | ATL SOP 00021 | SM 22 4500-P E m |
| Sat. pH and Langelier Index (@ 20C) | 5 | N/A | 2017/09/27 | ATL SOP 00049 | Auto Calc. |
| Sat. pH and Langelier Index (@ 4C) | 5 | N/A | 2017/09/27 | ATL SOP 00049 | Auto Calc. |
| Reactive Silica | 5 | N/A | 2017/09/26 | ATL SOP 00022 | EPA 366.0 m |
| Sulphate | 1 | N/A | 2017/09/25 | ATL SOP 00023 | ASTM D516-16 m |
| Sulphate | 4 | N/A | 2017/09/26 | ATL SOP 00023 | ASTM D516-16 m |
| Total Dissolved Solids (TDS calc) | 5 | N/A | 2017/09/27 | N/A | Auto Calc. |
| Organic carbon - Total (TOC) (8) | 5 | N/A | 2017/09/27 | ATL SOP 00037 | SM 22 5310C m |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Your Project #: 10550.04
Site Location: CUT THROAT ISLAND
Your C.O.C. #: 627211-01-01

**Attention:Abigail Garnett**

GEMTEC LIMITED
191 Doak Rd
Fredericton, NB
Canada E3C 2E6

**Report Date: 2017/11/02**
Report #: R4819279
Version: 4 - Final

# CERTIFICATE OF ANALYSIS

**MAXXAM JOB #: B7K2737**
**Received: 2017/09/18, 09:09**

Sample Matrix: Water
# Samples Received: 6

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Reference |
|---|---|---|---|---|---|
| Turbidity | 1 | N/A | 2017/09/20 | ATL SOP 00011 | EPA 180.1 R2 m |
| Turbidity | 4 | N/A | 2017/09/21 | ATL SOP 00011 | EPA 180.1 R2 m |

**Remarks:**

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your Project #: 10550.04
Site Location: CUT THROAT ISLAND
Your C.O.C. #: 627211-01-01

**Attention:Abigail Garnett**

GEMTEC LIMITED
191 Doak Rd
Fredericton, NB
Canada E3C 2E6

**Report Date: 2017/11/02**
Report #: R4819279
Version: 4 - Final

# CERTIFICATE OF ANALYSIS

**MAXXAM JOB #: B7K2737**

**Received: 2017/09/18, 09:09**

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

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.
(3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.
(4) Soils are reported on a dry weight basis unless otherwise specified.
(5) No lab extraction date is given for C6-C10/BTEX and VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.
(6) Acridine and Quinoline parameters are not accredited.
(7) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(8) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Encryption Key

Maxxam
Project Manager Assistant
02 Nov 2017 17:55:17

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

==================================================================

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

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

| **Maxxam ID** | | FDH273 | | FDH274 | | FDH276 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | | 2017/09/13 | | 2017/09/13 | | | |
| **COC Number** | | 627211-01-01 | | 627211-01-01 | | 627211-01-01 | | | |
| | **UNITS** | **SW_CT_01** | **QC Batch** | **SW_CT_02** | **QC Batch** | **SW_CT_03** | **RDL** | **MDL** | **QC Batch** |
| **Calculated Parameters** | | | | | | | | | |
| Anion Sum | me/L | 0.580 | 5168553 | 0.620 | 5168553 | 0.600 | N/A | N/A | 5168553 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 7.1 | 5168550 | 8.7 | 5168550 | 8.9 | 1.0 | 0.20 | 5168550 |
| Calculated TDS | mg/L | 33 | 5168558 | 36 | 5168558 | 35 | 1.0 | 0.20 | 5168558 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | <1.0 | 5168550 | <1.0 | 5168550 | <1.0 | 1.0 | 0.20 | 5168550 |
| Cation Sum | me/L | 0.640 | 5168553 | 0.620 | 5168553 | 0.620 | N/A | N/A | 5168553 |
| Hardness (CaCO3) | mg/L | 8.9 | 5168551 | 12 | 5168551 | 12 | 1.0 | 1.0 | 5168551 |
| Ion Balance (% Difference) | % | 4.92 | 5168552 | 0.00 | 5168552 | 1.64 | N/A | N/A | 5168552 |
| Langelier Index (@ 20C) | N/A | -3.24 | 5168556 | -3.06 | 5168556 | -2.68 | | | 5168556 |
| Langelier Index (@ 4C) | N/A | -3.50 | 5168557 | -3.31 | 5168557 | -2.93 | | | 5168557 |
| Nitrate (N) | mg/L | <0.050 | 5168554 | 0.079 | 5168554 | <0.050 | 0.050 | N/A | 5168554 |
| Saturation pH (@ 20C) | N/A | 10.3 | 5168556 | 9.93 | 5168556 | 9.93 | | | 5168556 |
| Saturation pH (@ 4C) | N/A | 10.6 | 5168557 | 10.2 | 5168557 | 10.2 | | | 5168557 |
| **Inorganics** | | | | | | | | | |
| Total Alkalinity (Total as CaCO3) | mg/L | 7.1 | 5182179 | 8.8 | 5177495 | 8.9 | 5.0 | N/A | 5182179 |
| Dissolved Chloride (Cl) | mg/L | 16 | 5182181 | 12 | 5177498 | 12 | 1.0 | N/A | 5182181 |
| Colour | TCU | 66 (1) | 5182183 | 73 (1) | 5177507 | 70 (1) | 25 | N/A | 5182183 |
| Nitrate + Nitrite (N) | mg/L | <0.050 | 5182187 | 0.079 | 5177513 | <0.050 | 0.050 | N/A | 5182187 |
| Nitrite (N) | mg/L | <0.010 | 5182190 | <0.010 | 5177516 | <0.010 | 0.010 | N/A | 5182190 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.096 | 5182405 | <0.050 | 5182405 | <0.050 | 0.050 | N/A | 5182405 |
| Total Organic Carbon (C) | mg/L | 8.1 | 5184415 | 8.3 | 5185065 | 8.6 | 0.50 | N/A | 5185065 |
| Orthophosphate (P) | mg/L | <0.010 | 5182186 | <0.010 | 5177512 | <0.010 | 0.010 | N/A | 5182186 |
| pH | pH | 7.08 | 5172648 | 6.88 | 5174860 | 7.25 | N/A | N/A | 5172648 |
| Reactive Silica (SiO2) | mg/L | <0.50 | 5182184 | 0.83 | 5177504 | 0.70 | 0.50 | N/A | 5182184 |
| Dissolved Sulphate (SO4) | mg/L | <2.0 | 5182182 | 4.4 | 5177502 | 4.2 | 2.0 | N/A | 5182182 |
| Turbidity | NTU | 0.61 | 5172696 | 5.2 | 5174921 | 1.6 | 0.10 | 0.10 | 5174924 |
| Conductivity | uS/cm | 71 | 5172649 | 72 | 5174861 | 70 | 1.0 | N/A | 5172649 |
| **Metals** | | | | | | | | | |
| Total Aluminum (Al) | ug/L | 120 | 5172924 | 200 | 5172924 | 180 | 5.0 | N/A | 5172924 |
| Total Antimony (Sb) | ug/L | <1.0 | 5172924 | <1.0 | 5172924 | <1.0 | 1.0 | N/A | 5172924 |
| Total Arsenic (As) | ug/L | <1.0 | 5172924 | <1.0 | 5172924 | <1.0 | 1.0 | N/A | 5172924 |
| Total Barium (Ba) | ug/L | 4.4 | 5172924 | 6.3 | 5172924 | 6.1 | 1.0 | N/A | 5172924 |
| Total Beryllium (Be) | ug/L | <1.0 | 5172924 | <1.0 | 5172924 | <1.0 | 1.0 | N/A | 5172924 |
| Total Bismuth (Bi) | ug/L | <2.0 | 5172924 | <2.0 | 5172924 | <2.0 | 2.0 | N/A | 5172924 |
| Total Boron (B) | ug/L | <50 | 5172924 | <50 | 5172924 | <50 | 50 | N/A | 5172924 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Elevated reporting limit due to sample matrix.



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

## ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

| **Maxxam ID** | | FDH273 | | FDH274 | | FDH276 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | | 2017/09/13 | | 2017/09/13 | | | |
| **COC Number** | | 627211-01-01 | | 627211-01-01 | | 627211-01-01 | | | |
| | **UNITS** | **SW_CT_01** | **QC Batch** | **SW_CT_02** | **QC Batch** | **SW_CT_03** | **RDL** | **MDL** | **QC Batch** |
| Total Cadmium (Cd) | ug/L | <0.010 | 5172924 | <0.010 | 5172924 | <0.010 | 0.010 | N/A | 5172924 |
| Total Calcium (Ca) | ug/L | 1300 | 5172924 | 2700 | 5172924 | 2600 | 100 | N/A | 5172924 |
| Total Chromium (Cr) | ug/L | <1.0 | 5172924 | <1.0 | 5172924 | <1.0 | 1.0 | N/A | 5172924 |
| Total Cobalt (Co) | ug/L | <0.40 | 5172924 | <0.40 | 5172924 | <0.40 | 0.40 | N/A | 5172924 |
| Total Copper (Cu) | ug/L | <2.0 | 5172924 | <2.0 | 5172924 | 2.0 | 2.0 | N/A | 5172924 |
| Total Iron (Fe) | ug/L | 380 | 5172924 | 510 | 5172924 | 530 | 50 | N/A | 5172924 |
| Total Lead (Pb) | ug/L | <0.50 | 5172924 | <0.50 | 5172924 | <0.50 | 0.50 | N/A | 5172924 |
| Total Magnesium (Mg) | ug/L | 1400 | 5172924 | 1400 | 5172924 | 1400 | 100 | N/A | 5172924 |
| Total Manganese (Mn) | ug/L | 2.4 | 5172924 | 6.0 | 5172924 | 6.1 | 2.0 | N/A | 5172924 |
| Total Molybdenum (Mo) | ug/L | <2.0 | 5172924 | <2.0 | 5172924 | <2.0 | 2.0 | N/A | 5172924 |
| Total Nickel (Ni) | ug/L | <2.0 | 5172924 | <2.0 | 5172924 | <2.0 | 2.0 | N/A | 5172924 |
| Total Phosphorus (P) | ug/L | <100 | 5172924 | <100 | 5172924 | <100 | 100 | N/A | 5172924 |
| Total Potassium (K) | ug/L | 590 | 5172924 | 790 | 5172924 | 810 | 100 | N/A | 5172924 |
| Total Selenium (Se) | ug/L | <1.0 | 5172924 | <1.0 | 5172924 | <1.0 | 1.0 | N/A | 5172924 |
| Total Silver (Ag) | ug/L | <0.10 | 5172924 | <0.10 | 5172924 | <0.10 | 0.10 | N/A | 5172924 |
| Total Sodium (Na) | ug/L | 9800 | 5172924 | 7700 | 5172924 | 7600 | 100 | N/A | 5172924 |
| Total Strontium (Sr) | ug/L | 9.3 | 5172924 | 14 | 5172924 | 13 | 2.0 | N/A | 5172924 |
| Total Thallium (Tl) | ug/L | <0.10 | 5172924 | <0.10 | 5172924 | <0.10 | 0.10 | N/A | 5172924 |
| Total Tin (Sn) | ug/L | <2.0 | 5172924 | <2.0 | 5172924 | <2.0 | 2.0 | N/A | 5172924 |
| Total Titanium (Ti) | ug/L | <2.0 | 5172924 | 11 | 5172924 | 5.8 | 2.0 | N/A | 5172924 |
| Total Uranium (U) | ug/L | <0.10 | 5172924 | <0.10 | 5172924 | <0.10 | 0.10 | N/A | 5172924 |
| Total Vanadium (V) | ug/L | <2.0 | 5172924 | <2.0 | 5172924 | <2.0 | 2.0 | N/A | 5172924 |
| Total Zinc (Zn) | ug/L | <5.0 | 5172924 | <5.0 | 5172924 | <5.0 | 5.0 | N/A | 5172924 |

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

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

| Maxxam ID | | FDH277 | | | FDH278 | FDH278 | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | | 2017/09/13 | 2017/09/13 | | | |
| COC Number | | 627211-01-01 | | | 627211-01-01 | 627211-01-01 | | | |
| | UNITS | SW_CT_04 | RDL | QC Batch | SW_CT_05_BG | SW_CT_05_BG Lab-Dup | RDL | MDL | QC Batch |
| **Calculated Parameters** | | | | | | | | | |
| Anion Sum | me/L | 0.650 | N/A | 5168553 | 0.700 | | N/A | N/A | 5168553 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 15 | 1.0 | 5168550 | 9.8 | | 1.0 | 0.20 | 5168550 |
| Calculated TDS | mg/L | 37 | 1.0 | 5168558 | 41 | | 1.0 | 0.20 | 5168558 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | <1.0 | 1.0 | 5168550 | <1.0 | | 1.0 | 0.20 | 5168550 |
| Cation Sum | me/L | 0.700 | N/A | 5168553 | 0.730 | | N/A | N/A | 5168553 |
| Hardness (CaCO3) | mg/L | 14 | 1.0 | 5168551 | 13 | | 1.0 | 1.0 | 5168551 |
| Ion Balance (% Difference) | % | 3.70 | N/A | 5168552 | 2.10 | | N/A | N/A | 5168552 |
| Langelier Index (@ 20C) | N/A | -2.39 | | 5168556 | -2.71 | | | | 5168556 |
| Langelier Index (@ 4C) | N/A | -2.64 | | 5168557 | -2.96 | | | | 5168557 |
| Nitrate (N) | mg/L | <0.050 | 0.050 | 5168554 | <0.050 | | 0.050 | N/A | 5168554 |
| Saturation pH (@ 20C) | N/A | 9.68 | | 5168556 | 9.84 | | | | 5168556 |
| Saturation pH (@ 4C) | N/A | 9.94 | | 5168557 | 10.1 | | | | 5168557 |
| **Inorganics** | | | | | | | | | |
| Total Alkalinity (Total as CaCO3) | mg/L | 15 | 5.0 | 5182179 | 9.8 | | 5.0 | N/A | 5182179 |
| Dissolved Chloride (Cl) | mg/L | 13 | 1.0 | 5182181 | 15 | | 1.0 | N/A | 5182181 |
| Colour | TCU | 86 (1) | 25 | 5182183 | 45 (1) | | 10 | N/A | 5182183 |
| Nitrate + Nitrite (N) | mg/L | <0.050 | 0.050 | 5182187 | <0.050 | | 0.050 | N/A | 5182187 |
| Nitrite (N) | mg/L | <0.010 | 0.010 | 5182190 | <0.010 | | 0.010 | N/A | 5182190 |
| Nitrogen (Ammonia Nitrogen) | mg/L | <0.050 | 0.050 | 5182405 | 0.24 | | 0.050 | N/A | 5182405 |
| Total Organic Carbon (C) | mg/L | 9.5 | 0.50 | 5185065 | 9.5 | 9.9 | 0.50 | N/A | 5185065 |
| Orthophosphate (P) | mg/L | <0.010 | 0.010 | 5182186 | <0.010 | | 0.010 | N/A | 5182186 |
| pH | pH | 7.29 | N/A | 5174860 | 7.13 | | N/A | N/A | 5174860 |
| Reactive Silica (SiO2) | mg/L | 1.3 | 0.50 | 5182184 | 0.58 | | 0.50 | N/A | 5182184 |
| Dissolved Sulphate (SO4) | mg/L | <2.0 | 2.0 | 5182182 | 4.0 | | 2.0 | N/A | 5182182 |
| Turbidity | NTU | 1.8 | 0.10 | 5174921 | 1.1 | | 0.10 | 0.10 | 5174914 |
| Conductivity | uS/cm | 74 | 1.0 | 5174861 | 77 | | 1.0 | N/A | 5174861 |
| **Metals** | | | | | | | | | |
| Total Aluminum (Al) | ug/L | 270 | 5.0 | 5172924 | 400 | | 5.0 | N/A | 5172924 |
| Total Antimony (Sb) | ug/L | <1.0 | 1.0 | 5172924 | 4.4 | | 1.0 | N/A | 5172924 |
| Total Arsenic (As) | ug/L | <1.0 | 1.0 | 5172924 | <1.0 | | 1.0 | N/A | 5172924 |
| Total Barium (Ba) | ug/L | 9.0 | 1.0 | 5172924 | 7.5 | | 1.0 | N/A | 5172924 |
| Total Beryllium (Be) | ug/L | <1.0 | 1.0 | 5172924 | <1.0 | | 1.0 | N/A | 5172924 |
| Total Bismuth (Bi) | ug/L | <2.0 | 2.0 | 5172924 | <2.0 | | 2.0 | N/A | 5172924 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Elevated reporting limit due to sample matrix.



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

| **Maxxam ID** | | FDH277 | | | FDH278 | FDH278 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | | | 2017/09/13 | 2017/09/13 | | | |
| **COC Number** | | 627211-01-01 | | | 627211-01-01 | 627211-01-01 | | | |
| | **UNITS** | **SW_CT_04** | **RDL** | **QC Batch** | **SW_CT_05_BG** | **SW_CT_05_BG Lab-Dup** | **RDL** | **MDL** | **QC Batch** |
| Total Boron (B) | ug/L | <50 | 50 | 5172924 | <50 | | 50 | N/A | 5172924 |
| Total Cadmium (Cd) | ug/L | <0.010 | 0.010 | 5172924 | 0.013 | | 0.010 | N/A | 5172924 |
| Total Calcium (Ca) | ug/L | 2800 | 100 | 5172924 | 3000 | | 100 | N/A | 5172924 |
| Total Chromium (Cr) | ug/L | 1.1 | 1.0 | 5172924 | <1.0 | | 1.0 | N/A | 5172924 |
| Total Cobalt (Co) | ug/L | <0.40 | 0.40 | 5172924 | <0.40 | | 0.40 | N/A | 5172924 |
| Total Copper (Cu) | ug/L | 4.3 | 2.0 | 5172924 | 3.1 | | 2.0 | N/A | 5172924 |
| Total Iron (Fe) | ug/L | 250 | 50 | 5172924 | 620 | | 50 | N/A | 5172924 |
| Total Lead (Pb) | ug/L | <0.50 | 0.50 | 5172924 | 1.7 | | 0.50 | N/A | 5172924 |
| Total Magnesium (Mg) | ug/L | 1700 | 100 | 5172924 | 1400 | | 100 | N/A | 5172924 |
| Total Manganese (Mn) | ug/L | <2.0 | 2.0 | 5172924 | 10 | | 2.0 | N/A | 5172924 |
| Total Molybdenum (Mo) | ug/L | <2.0 | 2.0 | 5172924 | <2.0 | | 2.0 | N/A | 5172924 |
| Total Nickel (Ni) | ug/L | 2.1 | 2.0 | 5172924 | <2.0 | | 2.0 | N/A | 5172924 |
| Total Phosphorus (P) | ug/L | <100 | 100 | 5172924 | <100 | | 100 | N/A | 5172924 |
| Total Potassium (K) | ug/L | 740 | 100 | 5172924 | 900 | | 100 | N/A | 5172924 |
| Total Selenium (Se) | ug/L | <1.0 | 1.0 | 5172924 | <1.0 | | 1.0 | N/A | 5172924 |
| Total Silver (Ag) | ug/L | <0.10 | 0.10 | 5172924 | <0.10 | | 0.10 | N/A | 5172924 |
| Total Sodium (Na) | ug/L | 8900 | 100 | 5172924 | 9400 | | 100 | N/A | 5172924 |
| Total Strontium (Sr) | ug/L | 12 | 2.0 | 5172924 | 16 | | 2.0 | N/A | 5172924 |
| Total Thallium (Tl) | ug/L | <0.10 | 0.10 | 5172924 | <0.10 | | 0.10 | N/A | 5172924 |
| Total Tin (Sn) | ug/L | <2.0 | 2.0 | 5172924 | <2.0 | | 2.0 | N/A | 5172924 |
| Total Titanium (Ti) | ug/L | 3.1 | 2.0 | 5172924 | 15 | | 2.0 | N/A | 5172924 |
| Total Uranium (U) | ug/L | <0.10 | 0.10 | 5172924 | <0.10 | | 0.10 | N/A | 5172924 |
| Total Vanadium (V) | ug/L | <2.0 | 2.0 | 5172924 | <2.0 | | 2.0 | N/A | 5172924 |
| Total Zinc (Zn) | ug/L | <5.0 | 5.0 | 5172924 | <5.0 | | 5.0 | N/A | 5172924 |

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


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## ATLANTIC VOC IN SOIL (FIELD PRES.)

| Maxxam ID | | FDH279 | | | |
|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | | |
| COC Number | | 627211-01-01 | | | |
| | UNITS | SS_CT_60 | RDL | MDL | QC Batch |
| **Volatile Organics** | | | | | |
| 1,1,1-Trichloroethane | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| 1,1,2,2-Tetrachloroethane | ug/kg | <25 | 25 | 0.00040 | 5172674 |
| 1,1,2-Trichloroethane | ug/kg | <25 | 25 | 0.00040 | 5172674 |
| 1,1-Dichloroethane | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| 1,1-Dichloroethylene | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| 1,2-Dichlorobenzene | ug/kg | <25 | 25 | 0.00020 | 5172674 |
| 1,2-Dichloroethane | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| 1,2-Dichloropropane | ug/kg | <25 | 25 | 0.00020 | 5172674 |
| 1,3-Dichlorobenzene | ug/kg | <25 | 25 | 0.00020 | 5172674 |
| 1,4-Dichlorobenzene | ug/kg | <25 | 25 | 0.00030 | 5172674 |
| Benzene | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| Bromodichloromethane | ug/kg | <25 | 25 | 0.00020 | 5172674 |
| Bromoform | ug/kg | <25 | 25 | 0.00030 | 5172674 |
| Bromomethane | ug/kg | <50 | 50 | 0.00040 | 5172674 |
| Carbon Tetrachloride | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| Chlorobenzene | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| Chloroethane | ug/kg | <200 | 200 | 0.00030 | 5172674 |
| Chloroform | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| cis-1,2-Dichloroethylene | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| cis-1,3-Dichloropropene | ug/kg | <25 | 25 | 0.00020 | 5172674 |
| Dibromochloromethane | ug/kg | <25 | 25 | 0.00030 | 5172674 |
| Ethylbenzene | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| Ethylene Dibromide | ug/kg | <25 | 25 | 0.00040 | 5172674 |
| Methyl t-butyl ether (MTBE) | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| Methylene Chloride(Dichloromethane) | ug/kg | <50 | 50 | 0.00040 | 5172674 |
| o-Xylene | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| p+m-Xylene | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| Styrene | ug/kg | <25 | 25 | 0.00020 | 5172674 |
| Tetrachloroethylene | ug/kg | <25 | 25 | 0.00030 | 5172674 |
| Toluene | ug/kg | <25 | 25 | 0.00010 | 5172674 |
| Total Xylenes | ug/kg | <50 | 50 | N/A | 5172674 |
| trans-1,2-Dichloroethylene | ug/kg | <25 | 25 | 0.00020 | 5172674 |
| trans-1,3-Dichloropropene | ug/kg | <25 | 25 | 0.00030 | 5172674 |
| Trichloroethylene | ug/kg | <10 | 10 | 0.00020 | 5172674 |

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



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## ATLANTIC VOC IN SOIL (FIELD PRES.)

| Maxxam ID | | FDH279 | | | |
|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | | |
| COC Number | | 627211-01-01 | | | |
| | UNITS | SS_CT_60 | RDL | MDL | QC Batch |
| Trichlorofluoromethane (FREON 11) | ug/kg | <25 | 25 | 0.00030 | 5172674 |
| Vinyl Chloride | ug/kg | <20 | 20 | 0.00020 | 5172674 |
| **Surrogate Recovery (%)** | | | | | |
| 4-Bromofluorobenzene | % | 98 | | | 5172674 |
| D10-o-Xylene | % | 110 | | | 5172674 |
| D4-1,2-Dichloroethane | % | 95 | | | 5172674 |
| D8-Toluene | % | 101 | | | 5172674 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

| **Maxxam ID** | | FDH279 | FDH280 | FDH281 | FDH282 | | | |
|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | | |
| **COC Number** | | 627211-01-01 | 627211-01-01 | 627211-01-01 | 627211-01-01 | | | |
| | **UNITS** | **SS_CT_60** | **SS_CT_61** | **SS_CT_62** | **SS_CT_63** | **RDL** | **MDL** | **QC Batch** |
| **Volatile Organics** | | | | | | | | |
| Benzene | ug/g | <0.0060 | <0.0060 | <0.0060 | <0.0060 | 0.0060 | 0.0060 | 5175707 |
| Ethylbenzene | ug/g | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | 0.010 | 5175707 |
| Toluene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 0.020 | 5175707 |
| p+m-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 0.020 | 5175707 |
| o-Xylene | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 0.020 | 5175707 |
| Total Xylenes | ug/g | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | 0.020 | 5175707 |
| F1 (C6-C10) | ug/g | <10 | <10 | <10 | <10 | 10 | N/A | 5175707 |
| F1 (C6-C10) - BTEX | ug/g | <10 | <10 | <10 | <10 | 10 | N/A | 5175707 |
| **F2-F4 Hydrocarbons** | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | 610 | <10 | 400 | <10 | 10 | 5.0 | 5178585 |
| F3 (C16-C34 Hydrocarbons) | ug/g | 5600 | <50 | 9000 | 64 | 50 | 5.0 | 5178585 |
| F4 (C34-C50 Hydrocarbons) | ug/g | 2400 | <50 | 4900 | <50 | 50 | 10 | 5178585 |
| Reached Baseline at C50 | ug/g | Yes | Yes | No | Yes | | | 5178585 |
| **Surrogate Recovery (%)** | | | | | | | | |
| o-Terphenyl | % | 104 | 92 | 103 | 91 | | | 5178585 |
| 4-Bromofluorobenzene | % | 86 | 89 | 90 | 88 | | | 5175707 |
| D10-o-Xylene | % | 87 | 109 | 90 | 124 | | | 5175707 |
| D4-1,2-Dichloroethane | % | 119 | 117 | 117 | 104 | | | 5175707 |
| D8-Toluene | % | 95 | 96 | 96 | 102 | | | 5175707 |

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



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## CCME PETROLEUM HYDROCARBONS IN WATER (WATER)

| Maxxam ID | | FDH273 | FDH274 | FDH275 | FDH276 | FDH277 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | | |
| **COC Number** | | 627211-01-01 | 627211-01-01 | 627211-01-01 | 627211-01-01 | 627211-01-01 | | | |
| | **UNITS** | **SW_CT_01** | **SW_CT_02** | **SW_CT_02_FD** | **SW_CT_03** | **SW_CT_04** | **RDL** | **MDL** | **QC Batch** |
| **BTEX & F1 Hydrocarbons** | | | | | | | | | |
| Benzene | mg/L | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | 0.00020 | 0.000040 | 5180469 |
| Toluene | mg/L | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | 0.00020 | 0.000040 | 5180469 |
| Ethylbenzene | mg/L | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | 0.00020 | 0.000040 | 5180469 |
| o-Xylene | mg/L | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | 0.00020 | 0.000040 | 5180469 |
| p+m-Xylene | mg/L | <0.00040 | <0.00040 | <0.00040 | <0.00040 | <0.00040 | 0.00040 | 0.000080 | 5180469 |
| Total Xylenes | mg/L | <0.00040 | <0.00040 | <0.00040 | <0.00040 | <0.00040 | 0.00040 | 0.000080 | 5180469 |
| F1 (C6-C10) | mg/L | <0.025 | <0.025 | <0.025 | <0.025 | <0.025 | 0.025 | 0.020 | 5180469 |
| F1 (C6-C10) - BTEX | mg/L | <0.025 | <0.025 | <0.025 | <0.025 | <0.025 | 0.025 | 0.020 | 5180469 |
| **F2-F4 Hydrocarbons** | | | | | | | | | |
| F2 (C10-C16 Hydrocarbons) | mg/L | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | 0.050 | 5181282 |
| F3 (C16-C34 Hydrocarbons) | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.20 | 0.070 | 5181282 |
| F4 (C34-C50 Hydrocarbons) | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.20 | 0.050 | 5181282 |
| Reached Baseline at C50 | mg/L | Yes | Yes | Yes | Yes | Yes | | | 5181282 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| 1,4-Difluorobenzene | % | 100 | 102 | 102 | 103 | 104 | | | 5180469 |
| 4-Bromofluorobenzene | % | 97 | 97 | 94 | 96 | 96 | | | 5180469 |
| D10-Ethylbenzene | % | 84 | 84 | 84 | 86 | 86 | | | 5180469 |
| D4-1,2-Dichloroethane | % | 96 | 99 | 94 | 97 | 98 | | | 5180469 |
| o-Terphenyl | % | 102 | 102 | 102 | 102 | 103 | | | 5181282 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

## CCME PETROLEUM HYDROCARBONS IN WATER (WATER)

| **Maxxam ID** | | FDH278 | | | |
|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | | | |
| **COC Number** | | 627211-01-01 | | | |
| | **UNITS** | **SW_CT_05_BG** | **RDL** | **MDL** | **QC Batch** |
| **BTEX & F1 Hydrocarbons** | | | | | |
| Benzene | mg/L | <0.00020 | 0.00020 | 0.000040 | 5180469 |
| Toluene | mg/L | <0.00020 | 0.00020 | 0.000040 | 5180469 |
| Ethylbenzene | mg/L | <0.00020 | 0.00020 | 0.000040 | 5180469 |
| o-Xylene | mg/L | <0.00020 | 0.00020 | 0.000040 | 5180469 |
| p+m-Xylene | mg/L | <0.00040 | 0.00040 | 0.000080 | 5180469 |
| Total Xylenes | mg/L | <0.00040 | 0.00040 | 0.000080 | 5180469 |
| F1 (C6-C10) | mg/L | <0.025 | 0.025 | 0.020 | 5180469 |
| F1 (C6-C10) - BTEX | mg/L | <0.025 | 0.025 | 0.020 | 5180469 |
| **F2-F4 Hydrocarbons** | | | | | |
| F2 (C10-C16 Hydrocarbons) | mg/L | <0.10 | 0.10 | 0.050 | 5181282 |
| F3 (C16-C34 Hydrocarbons) | mg/L | <0.20 | 0.20 | 0.070 | 5181282 |
| F4 (C34-C50 Hydrocarbons) | mg/L | <0.20 | 0.20 | 0.050 | 5181282 |
| Reached Baseline at C50 | mg/L | Yes | | | 5181282 |
| **Surrogate Recovery (%)** | | | | | |
| 1,4-Difluorobenzene | % | 101 | | | 5180469 |
| 4-Bromofluorobenzene | % | 95 | | | 5180469 |
| D10-Ethylbenzene | % | 84 | | | 5180469 |
| D4-1,2-Dichloroethane | % | 96 | | | 5180469 |
| o-Terphenyl | % | 105 | | | 5181282 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## RESULTS OF ANALYSES OF SOIL

| **Maxxam ID** | | FDH279 | FDH280 | FDH281 | FDH282 | | | |
|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | | |
| **COC Number** | | 627211-01-01 | 627211-01-01 | 627211-01-01 | 627211-01-01 | | | |
| | **UNITS** | **SS_CT_60** | **SS_CT_61** | **SS_CT_62** | **SS_CT_63** | **RDL** | **MDL** | **QC Batch** |
| **Inorganics** | | | | | | | | |
| Moisture | % | 19 | 19 | 22 | 19 | 1.0 | 0.20 | 5168858 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

| Maxxam ID | | FDH279 | | FDH280 | FDH281 | | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | 2017/09/13 | 2017/09/13 | | | |
| COC Number | | 627211-01-01 | | 627211-01-01 | 627211-01-01 | | | |
| | UNITS | SS_CT_60 | QC Batch | SS_CT_61 | SS_CT_62 | RDL | MDL | QC Batch |
| **Metals** | | | | | | | | |
| Acid Extractable Aluminum (Al) | mg/kg | 8000 | 5177365 | 9200 | 15000 | 10 | N/A | 5177171 |
| Acid Extractable Antimony (Sb) | mg/kg | <2.0 | 5177365 | <2.0 | <2.0 | 2.0 | N/A | 5177171 |
| Acid Extractable Arsenic (As) | mg/kg | <2.0 | 5177365 | <2.0 | <2.0 | 2.0 | N/A | 5177171 |
| Acid Extractable Barium (Ba) | mg/kg | 18 | 5177365 | 23 | 160 | 5.0 | N/A | 5177171 |
| Acid Extractable Beryllium (Be) | mg/kg | <2.0 | 5177365 | <2.0 | <2.0 | 2.0 | N/A | 5177171 |
| Acid Extractable Bismuth (Bi) | mg/kg | <2.0 | 5177365 | <2.0 | <2.0 | 2.0 | N/A | 5177171 |
| Acid Extractable Boron (B) | mg/kg | <50 | 5177365 | <50 | <50 | 50 | N/A | 5177171 |
| Acid Extractable Cadmium (Cd) | mg/kg | <0.30 | 5177365 | <0.30 | <0.30 | 0.30 | N/A | 5177171 |
| Acid Extractable Chromium (Cr) | mg/kg | 200 | 5177365 | 430 | 310 | 2.0 | N/A | 5177171 |
| Acid Extractable Cobalt (Co) | mg/kg | 97 | 5177365 | 120 | 19 | 1.0 | N/A | 5177171 |
| Acid Extractable Copper (Cu) | mg/kg | 130 | 5177365 | 170 | 14 | 2.0 | N/A | 5177171 |
| Acid Extractable Iron (Fe) | mg/kg | 65000 | 5177365 | 79000 | 18000 | 50 | N/A | 5177171 |
| Acid Extractable Lead (Pb) | mg/kg | 1.4 | 5177365 | 1.9 | 1.8 | 0.50 | N/A | 5177171 |
| Acid Extractable Lithium (Li) | mg/kg | 2.4 | 5177365 | 3.1 | 11 | 2.0 | N/A | 5177171 |
| Acid Extractable Manganese (Mn) | mg/kg | 870 | 5177365 | 1100 | 230 | 2.0 | N/A | 5177171 |
| Acid Extractable Mercury (Hg) | mg/kg | <0.10 | 5177365 | <0.10 | <0.10 | 0.10 | N/A | 5177171 |
| Acid Extractable Molybdenum (Mo) | mg/kg | <2.0 | 5177365 | <2.0 | <2.0 | 2.0 | N/A | 5177171 |
| Acid Extractable Nickel (Ni) | mg/kg | 460 | 5177365 | 560 | 24 | 2.0 | N/A | 5177171 |
| Acid Extractable Rubidium (Rb) | mg/kg | <2.0 | 5177365 | <2.0 | 19 | 2.0 | N/A | 5177171 |
| Acid Extractable Selenium (Se) | mg/kg | <1.0 | 5177365 | <1.0 | <1.0 | 1.0 | N/A | 5177171 |
| Acid Extractable Silver (Ag) | mg/kg | <0.50 | 5177365 | <0.50 | <0.50 | 0.50 | N/A | 5177171 |
| Acid Extractable Strontium (Sr) | mg/kg | 26 | 5177365 | 25 | 14 | 5.0 | N/A | 5177171 |
| Acid Extractable Thallium (Tl) | mg/kg | <0.10 | 5177365 | <0.10 | 0.14 | 0.10 | N/A | 5177171 |
| Acid Extractable Tin (Sn) | mg/kg | <2.0 | 5177365 | <2.0 | <2.0 | 2.0 | N/A | 5177171 |
| Acid Extractable Uranium (U) | mg/kg | <0.10 | 5177365 | <0.10 | <0.10 | 0.10 | N/A | 5177171 |
| Acid Extractable Vanadium (V) | mg/kg | 12 | 5177365 | 11 | 39 | 2.0 | N/A | 5177171 |
| Acid Extractable Zinc (Zn) | mg/kg | 58 | 5177365 | 66 | 32 | 5.0 | N/A | 5177171 |

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



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

| Maxxam ID | | FDH279 | FDH280 | FDH281 | FDH282 | | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | | |
| COC Number | | 627211-01-01 | 627211-01-01 | 627211-01-01 | 627211-01-01 | | | |
| | UNITS | SS_CT_60 | SS_CT_61 | SS_CT_62 | SS_CT_63 | RDL | MDL | QC Batch |
| **Polyaromatic Hydrocarbons** | | | | | | | | |
| 1-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| 2-Methylnaphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Acenaphthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Acenaphthylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Benzo(a)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Benzo(a)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Benzo(b)fluoranthene | mg/kg | 0.014 | <0.0050 | 0.030 | <0.0050 | 0.0050 | N/A | 5178035 |
| Benzo(b/j)fluoranthene | mg/kg | 0.014 | <0.010 | 0.039 | <0.010 | 0.010 | N/A | 5168848 |
| Benzo(g,h,i)perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Benzo(j)fluoranthene | mg/kg | <0.0050 | <0.0050 | 0.0085 | <0.0050 | 0.0050 | N/A | 5178035 |
| Benzo(k)fluoranthene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Chrysene | mg/kg | 0.090 | <0.0050 | 0.22 | <0.0050 | 0.0050 | N/A | 5178035 |
| Dibenz(a,h)anthracene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Fluoranthene | mg/kg | <0.0050 | <0.0050 | 0.022 | <0.0050 | 0.0050 | N/A | 5178035 |
| Fluorene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Indeno(1,2,3-cd)pyrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Naphthalene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Perylene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Phenanthrene | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | N/A | 5178035 |
| Pyrene | mg/kg | 0.028 | <0.0050 | 0.042 | <0.0050 | 0.0050 | N/A | 5178035 |
| **Surrogate Recovery (%)** | | | | | | | | |
| D10-Anthracene | % | 115 | 128 | 117 | 130 | | | 5178035 |
| D14-Terphenyl | % | 112 | 104 | 128 | 104 | | | 5178035 |
| D8-Acenaphthylene | % | 85 | 97 | 85 | 99 | | | 5178035 |

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

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## PETROLEUM HYDROCARBONS (CCME)

| Maxxam ID | | FDH281 | | | |
|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | | |
| COC Number | | 627211-01-01 | | | |
| | UNITS | SS_CT_62 | RDL | MDL | QC Batch |
| **F2-F4 Hydrocarbons** | | | | | |
| F4G-sg (Grav. Heavy Hydrocarbons) | ug/g | 15000 | 100 | 100 | 5184457 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

| Maxxam ID | | FDH279 | FDH280 | FDH281 | | | |
|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | 2017/09/13 | 2017/09/13 | | | |
| COC Number | | 627211-01-01 | 627211-01-01 | 627211-01-01 | | | |
| | UNITS | SS_CT_60 | SS_CT_61 | SS_CT_62 | RDL | MDL | QC Batch |
| **PCBs** | | | | | | | |
| Aroclor 1016 | ug/g | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5170405 |
| Aroclor 1221 | ug/g | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5170405 |
| Aroclor 1232 | ug/g | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5170405 |
| Aroclor 1248 | ug/g | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5170405 |
| Aroclor 1242 | ug/g | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5170405 |
| Aroclor 1254 | ug/g | 2.3 | <0.050 | 6.0 | 0.050 | N/A | 5170405 |
| Aroclor 1260 | ug/g | 1.4 | <0.050 | 3.7 | 0.050 | N/A | 5170405 |
| Calculated Total PCB | ug/g | 3.6 | <0.050 | 9.7 | 0.050 | N/A | 5168850 |
| **Surrogate Recovery (%)** | | | | | | | |
| Decachlorobiphenyl | % | 77 | 96 | 80 | | | 5170405 |

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

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## DIOXINS AND FURANS BY HRMS (SOIL)

| **Maxxam ID** | | FDH282 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | | | | | | | |
| **COC Number** | | 627211-01-01 | | | | **TOXIC EQUIVALENCY** | | # of | |
| | **UNITS** | **SS_CT_63** | **EDL** | **RDL** | **MDL** | **TEF (2005 WHO)** | **TEQ(DL)** | **Isomers** | **QC Batch** |
| **Dioxins & Furans** | | | | | | | | | |
| 2,3,7,8-Tetra CDD * | pg/g | <0.107 | 0.107 | 0.996 | N/A | 1.00 | 0.107 | | 5238099 |
| 1,2,3,7,8-Penta CDD * | pg/g | <0.117 | 0.117 | 0.996 | N/A | 1.00 | 0.117 | | 5238099 |
| 1,2,3,4,7,8-Hexa CDD * | pg/g | <0.113 | 0.113 | 0.996 | N/A | 0.100 | 0.0113 | | 5238099 |
| 1,2,3,6,7,8-Hexa CDD * | pg/g | 0.209 | 0.117 | 0.996 | N/A | 0.100 | 0.0209 | | 5238099 |
| 1,2,3,7,8,9-Hexa CDD * | pg/g | <0.116 (1) | 0.116 | 0.996 | N/A | 0.100 | 0.0116 | | 5238099 |
| 1,2,3,4,6,7,8-Hepta CDD * | pg/g | 2.69 | 0.0846 | 0.996 | N/A | 0.0100 | 0.0269 | | 5238099 |
| Octa CDD * | pg/g | 22.3 | 0.116 | 9.96 | N/A | 0.000300 | 0.00669 | | 5238099 |
| Total Tetra CDD * | pg/g | <0.107 | 0.107 | 0.996 | N/A | | | 0 | 5238099 |
| Total Penta CDD * | pg/g | <0.141 (1) | 0.141 | 0.996 | N/A | | | 0 | 5238099 |
| Total Hexa CDD * | pg/g | 1.35 | 0.108 | 0.996 | N/A | | | 4 | 5238099 |
| Total Hepta CDD * | pg/g | 5.67 | 0.0846 | 0.996 | N/A | | | 2 | 5238099 |
| 2,3,7,8-Tetra CDF ** | pg/g | <0.143 (1) | 0.143 | 0.996 | N/A | 0.100 | 0.0143 | | 5238099 |
| 1,2,3,7,8-Penta CDF ** | pg/g | <0.0992 | 0.0992 | 0.996 | N/A | 0.0300 | 0.00298 | | 5238099 |
| 2,3,4,7,8-Penta CDF ** | pg/g | 0.233 | 0.0979 | 0.996 | N/A | 0.300 | 0.0699 | | 5238099 |
| 1,2,3,4,7,8-Hexa CDF ** | pg/g | 0.156 | 0.0953 | 0.996 | N/A | 0.100 | 0.0156 | | 5238099 |
| 1,2,3,6,7,8-Hexa CDF ** | pg/g | 0.344 | 0.0936 | 0.996 | N/A | 0.100 | 0.0344 | | 5238099 |
| 2,3,4,6,7,8-Hexa CDF ** | pg/g | 0.327 | 0.102 | 0.996 | N/A | 0.100 | 0.0327 | | 5238099 |
| 1,2,3,7,8,9-Hexa CDF ** | pg/g | <0.100 | 0.100 | 0.996 | N/A | 0.100 | 0.0100 | | 5238099 |
| 1,2,3,4,6,7,8-Hepta CDF ** | pg/g | 1.95 | 0.0862 | 0.996 | N/A | 0.0100 | 0.0195 | | 5238099 |
| 1,2,3,4,7,8,9-Hepta CDF ** | pg/g | <0.0967 | 0.0967 | 0.996 | N/A | 0.0100 | 0.000967 | | 5238099 |
| Octa CDF ** | pg/g | 2.46 | 0.112 | 9.96 | N/A | 0.000300 | 0.000738 | | 5238099 |
| Total Tetra CDF ** | pg/g | 6.68 | 0.104 | 0.996 | N/A | | | 5 | 5238099 |
| Total Penta CDF ** | pg/g | 13.5 | 0.0985 | 0.996 | N/A | | | 6 | 5238099 |
| Total Hexa CDF ** | pg/g | 5.07 | 0.0977 | 0.996 | N/A | | | 6 | 5238099 |
| Total Hepta CDF ** | pg/g | 3.29 | 0.0911 | 0.996 | N/A | | | 2 | 5238099 |
| TOTAL TOXIC EQUIVALENCY | pg/g | | | | | | 0.502 | | |

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## DIOXINS AND FURANS BY HRMS (SOIL)

| Maxxam ID | | FDH282 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | | | | | | | |
| COC Number | | 627211-01-01 | | | | TOXIC EQUIVALENCY | | # of | |
| | UNITS | SS_CT_63 | EDL | RDL | MDL | TEF (2005 WHO) | TEQ(DL) | Isomers | QC Batch |
| **Surrogate Recovery (%)** | | | | | | | | | |
| C13-1234678 HeptaCDD * | % | 97 | | | | | | | 5238099 |
| C13-1234678 HeptaCDF ** | % | 109 | | | | | | | 5238099 |
| C13-123678 HexaCDD * | % | 94 | | | | | | | 5238099 |
| C13-123678 HexaCDF ** | % | 107 | | | | | | | 5238099 |
| C13-12378 PentaCDD * | % | 90 | | | | | | | 5238099 |
| C13-12378 PentaCDF ** | % | 98 | | | | | | | 5238099 |
| C13-2378 TetraCDD * | % | 89 | | | | | | | 5238099 |
| C13-2378 TetraCDF ** | % | 128 | | | | | | | 5238099 |
| C13-OCDD * | % | 95 | | | | | | | 5238099 |

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## MERCURY BY COLD VAPOUR AA (WATER)

| Maxxam ID | | FDH273 | FDH274 | | FDH276 | FDH277 | FDH278 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2017/09/13 | 2017/09/13 | | 2017/09/13 | 2017/09/13 | 2017/09/13 | | | |
| COC Number | | 627211-01-01 | 627211-01-01 | | 627211-01-01 | 627211-01-01 | 627211-01-01 | | | |
| | UNITS | SW_CT_01 | SW_CT_02 | QC Batch | SW_CT_03 | SW_CT_04 | SW_CT_05_BG | RDL | MDL | QC Batch |
| **Metals** | | | | | | | | | | |
| Total Mercury (Hg) | ug/L | <0.013 | <0.013 | 5177332 | <0.013 | <0.013 | <0.013 | 0.013 | N/A | 5180636 |

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



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

| **Maxxam ID** | | FDH273 | FDH274 | FDH276 | FDH277 | FDH278 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | 2017/09/13 | | | |
| **COC Number** | | 627211-01-01 | 627211-01-01 | 627211-01-01 | 627211-01-01 | 627211-01-01 | | | |
| | **UNITS** | **SW_CT_01** | **SW_CT_02** | **SW_CT_03** | **SW_CT_04** | **SW_CT_05_BG** | **RDL** | **MDL** | **QC Batch** |
| **Polyaromatic Hydrocarbons** | | | | | | | | | |
| 1-Methylnaphthalene | ug/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5180356 |
| 2-Methylnaphthalene | ug/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5180356 |
| Acenaphthene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Acenaphthylene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Acridine | ug/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5180356 |
| Anthracene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Benzo(a)anthracene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Benzo(a)pyrene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Benzo(b)fluoranthene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Benzo(b/j)fluoranthene | ug/L | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | N/A | 5168849 |
| Benzo(g,h,i)perylene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Benzo(j)fluoranthene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Benzo(k)fluoranthene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Chrysene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Dibenz(a,h)anthracene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Fluoranthene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Fluorene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Indeno(1,2,3-cd)pyrene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Naphthalene | ug/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.20 | N/A | 5180356 |
| Perylene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Phenanthrene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Pyrene | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | N/A | 5180356 |
| Quinoline | ug/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5180356 |
| **Surrogate Recovery (%)** | | | | | | | | | |
| D10-Anthracene | % | 64 | 80 | 84 | 83 | 70 | | | 5180356 |
| D14-Terphenyl | % | 62 | 88 | 82 | 92 | 79 | | | 5180356 |
| D8-Acenaphthylene | % | 59 | 78 | 80 | 83 | 87 | | | 5180356 |

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

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

| **Maxxam ID** | | FDH274 | FDH274 | FDH277 | | | |
|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2017/09/13 | 2017/09/13 | 2017/09/13 | | | |
| **COC Number** | | 627211-01-01 | 627211-01-01 | 627211-01-01 | | | |
| | **UNITS** | **SW_CT_02** | **SW_CT_02 Lab-Dup** | **SW_CT_04** | **RDL** | **MDL** | **QC Batch** |
| **PCBs** | | | | | | | |
| Aroclor 1016 | ug/L | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5172679 |
| Aroclor 1221 | ug/L | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5172679 |
| Aroclor 1232 | ug/L | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5172679 |
| Aroclor 1248 | ug/L | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5172679 |
| Aroclor 1242 | ug/L | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5172679 |
| Aroclor 1254 | ug/L | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5172679 |
| Aroclor 1260 | ug/L | <0.050 | <0.050 | <0.050 | 0.050 | N/A | 5172679 |
| Calculated Total PCB | ug/L | <0.050 | | <0.050 | 0.050 | N/A | 5168851 |
| **Surrogate Recovery (%)** | | | | | | | |
| Decachlorobiphenyl | % | 70 | 67 | 77 | | | 5172679 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## TEST SUMMARY

**Maxxam ID:** FDH273
**Sample ID:** SW_CT_01
**Matrix:** Water

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Carbonate, Bicarbonate and Hydroxide | CALC | 5168550 | N/A | 2017/09/20 | Automated Statchk |
| Alkalinity | KONE | 5182179 | N/A | 2017/09/26 | Nancy Rogers |
| Benzo(b/j)fluoranthene Sum (water) | CALC | 5168849 | N/A | 2017/09/26 | Automated Statchk |
| Chloride | KONE | 5182181 | N/A | 2017/09/26 | Nancy Rogers |
| Colour | KONE | 5182183 | N/A | 2017/09/27 | Nancy Rogers |
| Conductance - water | AT | 5172649 | N/A | 2017/09/20 | Julia McGovern |
| Petroleum Hydro. CCME F1 & BTEX in Water | HSGC/MSFD | 5180469 | N/A | 2017/09/26 | Ravinder Gaidhu |
| Petroleum Hydrocarbons F2-F4 in Water | GC/FID | 5181282 | 2017/09/25 | 2017/09/26 | Zhiyue (Frank) Zhu |
| Hardness (calculated as CaCO3) | | 5168551 | N/A | 2017/09/21 | Automated Statchk |
| Mercury - Total (CVAA,LL) | CV/AA | 5177332 | 2017/09/22 | 2017/09/25 | Arlene Rossiter |
| Metals Water Total MS | CICP/MS | 5172924 | 2017/09/20 | 2017/09/20 | Mike Leblanc |
| Ion Balance (% Difference) | CALC | 5168552 | N/A | 2017/09/27 | Automated Statchk |
| Anion and Cation Sum | CALC | 5168553 | N/A | 2017/09/27 | Automated Statchk |
| Nitrogen Ammonia - water | KONE | 5182405 | N/A | 2017/09/26 | Nancy Rogers |
| Nitrogen - Nitrate + Nitrite | KONE | 5182187 | N/A | 2017/09/26 | Nancy Rogers |
| Nitrogen - Nitrite | KONE | 5182190 | N/A | 2017/09/27 | Nancy Rogers |
| Nitrogen - Nitrate (as N) | CALC | 5168554 | N/A | 2017/09/27 | Automated Statchk |
| PAH (FWAL) in Water (A/Q) by GC/MS (SIM) | GC/MS | 5180356 | 2017/09/20 | 2017/09/26 | Gina Thompson |
| pH | AT | 5172648 | N/A | 2017/09/20 | Julia McGovern |
| Phosphorus - ortho | KONE | 5182186 | N/A | 2017/09/26 | Nancy Rogers |
| Sat. pH and Langelier Index (@ 20C) | CALC | 5168556 | N/A | 2017/09/27 | Automated Statchk |
| Sat. pH and Langelier Index (@ 4C) | CALC | 5168557 | N/A | 2017/09/27 | Automated Statchk |
| Reactive Silica | KONE | 5182184 | N/A | 2017/09/26 | Nancy Rogers |
| Sulphate | KONE | 5182182 | N/A | 2017/09/26 | Cecilia (Kate) Barrett |
| Total Dissolved Solids (TDS calc) | CALC | 5168558 | N/A | 2017/09/27 | Automated Statchk |
| Organic carbon - Total (TOC) | TECH | 5184415 | N/A | 2017/09/27 | Soraya Merchant - Inactive |
| Turbidity | TURB | 5172696 | N/A | 2017/09/20 | Julia McGovern |

**Maxxam ID:** FDH274
**Sample ID:** SW_CT_02
**Matrix:** Water

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Carbonate, Bicarbonate and Hydroxide | CALC | 5168550 | N/A | 2017/09/21 | Automated Statchk |
| Alkalinity | KONE | 5177495 | N/A | 2017/09/25 | Nancy Rogers |
| Benzo(b/j)fluoranthene Sum (water) | CALC | 5168849 | N/A | 2017/09/28 | Automated Statchk |
| Chloride | KONE | 5177498 | N/A | 2017/09/25 | Nancy Rogers |
| Colour | KONE | 5177507 | N/A | 2017/09/26 | Nancy Rogers |
| Conductance - water | AT | 5174861 | N/A | 2017/09/21 | Julia McGovern |
| Petroleum Hydro. CCME F1 & BTEX in Water | HSGC/MSFD | 5180469 | N/A | 2017/09/26 | Ravinder Gaidhu |
| Petroleum Hydrocarbons F2-F4 in Water | GC/FID | 5181282 | 2017/09/25 | 2017/09/26 | Zhiyue (Frank) Zhu |
| Hardness (calculated as CaCO3) | | 5168551 | N/A | 2017/09/21 | Automated Statchk |
| Mercury - Total (CVAA,LL) | CV/AA | 5177332 | 2017/09/22 | 2017/09/25 | Arlene Rossiter |
| Metals Water Total MS | CICP/MS | 5172924 | 2017/09/20 | 2017/09/20 | Mike Leblanc |
| Ion Balance (% Difference) | CALC | 5168552 | N/A | 2017/09/27 | Automated Statchk |

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

# TEST SUMMARY

**Maxxam ID:** FDH274
**Sample ID:** SW_CT_02
**Matrix:** Water

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Anion and Cation Sum | CALC | 5168553 | N/A | 2017/09/27 | Automated Statchk |
| Nitrogen Ammonia - water | KONE | 5182405 | N/A | 2017/09/26 | Nancy Rogers |
| Nitrogen - Nitrate + Nitrite | KONE | 5177513 | N/A | 2017/09/25 | Nancy Rogers |
| Nitrogen - Nitrite | KONE | 5177516 | N/A | 2017/09/25 | Nancy Rogers |
| Nitrogen - Nitrate (as N) | CALC | 5168554 | N/A | 2017/09/26 | Automated Statchk |
| PAH (FWAL) in Water (A/Q) by GC/MS (SIM) | GC/MS | 5180356 | 2017/09/20 | 2017/09/28 | Gina Thompson |
| PCBs in water by GC/ECD | GC/ECD | 5172679 | 2017/09/20 | 2017/09/21 | Chloe Bramble |
| PCB Aroclor sum (water) | CALC | 5168851 | N/A | 2017/09/21 | Automated Statchk |
| pH | AT | 5174860 | N/A | 2017/09/21 | Julia McGovern |
| Phosphorus - ortho | KONE | 5177512 | N/A | 2017/09/25 | Nancy Rogers |
| Sat. pH and Langelier Index (@ 20C) | CALC | 5168556 | N/A | 2017/09/27 | Automated Statchk |
| Sat. pH and Langelier Index (@ 4C) | CALC | 5168557 | N/A | 2017/09/27 | Automated Statchk |
| Reactive Silica | KONE | 5177504 | N/A | 2017/09/26 | Nancy Rogers |
| Sulphate | KONE | 5177502 | N/A | 2017/09/25 | Nancy Rogers |
| Total Dissolved Solids (TDS calc) | CALC | 5168558 | N/A | 2017/09/27 | Automated Statchk |
| Organic carbon - Total (TOC) | TECH | 5185065 | N/A | 2017/09/27 | Soraya Merchant - Inactive |
| Turbidity | TURB | 5174921 | N/A | 2017/09/21 | Julia McGovern |

**Maxxam ID:** FDH274 Dup
**Sample ID:** SW_CT_02
**Matrix:** Water

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| PCBs in water by GC/ECD | GC/ECD | 5172679 | 2017/09/20 | 2017/09/21 | Chloe Bramble |

**Maxxam ID:** FDH275
**Sample ID:** SW_CT_02_FD
**Matrix:** Water

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Petroleum Hydro. CCME F1 & BTEX in Water | HSGC/MSFD | 5180469 | N/A | 2017/09/26 | Ravinder Gaidhu |
| Petroleum Hydrocarbons F2-F4 in Water | GC/FID | 5181282 | 2017/09/25 | 2017/09/26 | Zhiyue (Frank) Zhu |

**Maxxam ID:** FDH276
**Sample ID:** SW_CT_03
**Matrix:** Water

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Carbonate, Bicarbonate and Hydroxide | CALC | 5168550 | N/A | 2017/09/20 | Automated Statchk |
| Alkalinity | KONE | 5182179 | N/A | 2017/09/26 | Nancy Rogers |
| Benzo(b/j)fluoranthene Sum (water) | CALC | 5168849 | N/A | 2017/09/28 | Automated Statchk |
| Chloride | KONE | 5182181 | N/A | 2017/09/26 | Nancy Rogers |
| Colour | KONE | 5182183 | N/A | 2017/09/27 | Nancy Rogers |
| Conductance - water | AT | 5172649 | N/A | 2017/09/20 | Julia McGovern |
| Petroleum Hydro. CCME F1 & BTEX in Water | HSGC/MSFD | 5180469 | N/A | 2017/09/26 | Ravinder Gaidhu |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## TEST SUMMARY

**Maxxam ID:** FDH276
**Sample ID:** SW_CT_03
**Matrix:** Water

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Petroleum Hydrocarbons F2-F4 in Water | GC/FID | 5181282 | 2017/09/25 | 2017/09/26 | Zhiyue (Frank) Zhu |
| Hardness (calculated as CaCO3) | | 5168551 | N/A | 2017/09/21 | Automated Statchk |
| Mercury - Total (CVAA,LL) | CV/AA | 5180636 | 2017/09/22 | 2017/09/26 | Arlene Rossiter |
| Metals Water Total MS | CICP/MS | 5172924 | 2017/09/20 | 2017/09/20 | Mike Leblanc |
| Ion Balance (% Difference) | CALC | 5168552 | N/A | 2017/09/27 | Automated Statchk |
| Anion and Cation Sum | CALC | 5168553 | N/A | 2017/09/27 | Automated Statchk |
| Nitrogen Ammonia - water | KONE | 5182405 | N/A | 2017/09/26 | Nancy Rogers |
| Nitrogen - Nitrate + Nitrite | KONE | 5182187 | N/A | 2017/09/26 | Nancy Rogers |
| Nitrogen - Nitrite | KONE | 5182190 | N/A | 2017/09/27 | Nancy Rogers |
| Nitrogen - Nitrate (as N) | CALC | 5168554 | N/A | 2017/09/27 | Automated Statchk |
| PAH (FWAL) in Water (A/Q) by GC/MS (SIM) | GC/MS | 5180356 | 2017/09/20 | 2017/09/28 | Gina Thompson |
| pH | AT | 5172648 | N/A | 2017/09/20 | Julia McGovern |
| Phosphorus - ortho | KONE | 5182186 | N/A | 2017/09/26 | Nancy Rogers |
| Sat. pH and Langelier Index (@ 20C) | CALC | 5168556 | N/A | 2017/09/27 | Automated Statchk |
| Sat. pH and Langelier Index (@ 4C) | CALC | 5168557 | N/A | 2017/09/27 | Automated Statchk |
| Reactive Silica | KONE | 5182184 | N/A | 2017/09/26 | Nancy Rogers |
| Sulphate | KONE | 5182182 | N/A | 2017/09/26 | Cecilia (Kate) Barrett |
| Total Dissolved Solids (TDS calc) | CALC | 5168558 | N/A | 2017/09/27 | Automated Statchk |
| Organic carbon - Total (TOC) | TECH | 5185065 | N/A | 2017/09/27 | Soraya Merchant - Inactive |
| Turbidity | TURB | 5174924 | N/A | 2017/09/21 | Julia McGovern |

**Maxxam ID:** FDH277
**Sample ID:** SW_CT_04
**Matrix:** Water

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Carbonate, Bicarbonate and Hydroxide | CALC | 5168550 | N/A | 2017/09/21 | Automated Statchk |
| Alkalinity | KONE | 5182179 | N/A | 2017/09/26 | Nancy Rogers |
| Benzo(b/j)fluoranthene Sum (water) | CALC | 5168849 | N/A | 2017/09/28 | Automated Statchk |
| Chloride | KONE | 5182181 | N/A | 2017/09/26 | Nancy Rogers |
| Colour | KONE | 5182183 | N/A | 2017/09/27 | Nancy Rogers |
| Conductance - water | AT | 5174861 | N/A | 2017/09/21 | Julia McGovern |
| Petroleum Hydro. CCME F1 & BTEX in Water | HSGC/MSFD | 5180469 | N/A | 2017/09/26 | Ravinder Gaidhu |
| Petroleum Hydrocarbons F2-F4 in Water | GC/FID | 5181282 | 2017/09/25 | 2017/09/26 | Zhiyue (Frank) Zhu |
| Hardness (calculated as CaCO3) | | 5168551 | N/A | 2017/09/21 | Automated Statchk |
| Mercury - Total (CVAA,LL) | CV/AA | 5180636 | 2017/09/22 | 2017/09/26 | Arlene Rossiter |
| Metals Water Total MS | CICP/MS | 5172924 | 2017/09/20 | 2017/09/20 | Mike Leblanc |
| Ion Balance (% Difference) | CALC | 5168552 | N/A | 2017/09/27 | Automated Statchk |
| Anion and Cation Sum | CALC | 5168553 | N/A | 2017/09/27 | Automated Statchk |
| Nitrogen Ammonia - water | KONE | 5182405 | N/A | 2017/09/26 | Nancy Rogers |
| Nitrogen - Nitrate + Nitrite | KONE | 5182187 | N/A | 2017/09/26 | Nancy Rogers |
| Nitrogen - Nitrite | KONE | 5182190 | N/A | 2017/09/27 | Nancy Rogers |
| Nitrogen - Nitrate (as N) | CALC | 5168554 | N/A | 2017/09/27 | Automated Statchk |
| PAH (FWAL) in Water (A/Q) by GC/MS (SIM) | GC/MS | 5180356 | 2017/09/20 | 2017/09/28 | Gina Thompson |
| PCBs in water by GC/ECD | GC/ECD | 5172679 | 2017/09/20 | 2017/09/21 | Chloe Bramble |

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## TEST SUMMARY

**Maxxam ID:** FDH277
**Sample ID:** SW_CT_04
**Matrix:** Water

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| PCB Aroclor sum (water) | CALC | 5168851 | N/A | 2017/09/21 | Automated Statchk |
| pH | AT | 5174860 | N/A | 2017/09/21 | Julia McGovern |
| Phosphorus - ortho | KONE | 5182186 | N/A | 2017/09/26 | Nancy Rogers |
| Sat. pH and Langelier Index (@ 20C) | CALC | 5168556 | N/A | 2017/09/27 | Automated Statchk |
| Sat. pH and Langelier Index (@ 4C) | CALC | 5168557 | N/A | 2017/09/27 | Automated Statchk |
| Reactive Silica | KONE | 5182184 | N/A | 2017/09/26 | Nancy Rogers |
| Sulphate | KONE | 5182182 | N/A | 2017/09/26 | Cecilia (Kate) Barrett |
| Total Dissolved Solids (TDS calc) | CALC | 5168558 | N/A | 2017/09/27 | Automated Statchk |
| Organic carbon - Total (TOC) | TECH | 5185065 | N/A | 2017/09/27 | Soraya Merchant - Inactive |
| Turbidity | TURB | 5174921 | N/A | 2017/09/21 | Julia McGovern |

**Maxxam ID:** FDH278
**Sample ID:** SW_CT_05_BG
**Matrix:** Water

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Carbonate, Bicarbonate and Hydroxide | CALC | 5168550 | N/A | 2017/09/21 | Automated Statchk |
| Alkalinity | KONE | 5182179 | N/A | 2017/09/26 | Nancy Rogers |
| Benzo(b/j)fluoranthene Sum (water) | CALC | 5168849 | N/A | 2017/09/28 | Automated Statchk |
| Chloride | KONE | 5182181 | N/A | 2017/09/26 | Nancy Rogers |
| Colour | KONE | 5182183 | N/A | 2017/09/27 | Nancy Rogers |
| Conductance - water | AT | 5174861 | N/A | 2017/09/21 | Julia McGovern |
| Petroleum Hydro. CCME F1 & BTEX in Water | HSGC/MSFD | 5180469 | N/A | 2017/09/26 | Ravinder Gaidhu |
| Petroleum Hydrocarbons F2-F4 in Water | GC/FID | 5181282 | 2017/09/25 | 2017/09/26 | Zhiyue (Frank) Zhu |
| Hardness (calculated as CaCO3) | | 5168551 | N/A | 2017/09/21 | Automated Statchk |
| Mercury - Total (CVAA,LL) | CV/AA | 5180636 | 2017/09/22 | 2017/09/26 | Arlene Rossiter |
| Metals Water Total MS | CICP/MS | 5172924 | 2017/09/20 | 2017/09/20 | Mike Leblanc |
| Ion Balance (% Difference) | CALC | 5168552 | N/A | 2017/09/27 | Automated Statchk |
| Anion and Cation Sum | CALC | 5168553 | N/A | 2017/09/27 | Automated Statchk |
| Nitrogen Ammonia - water | KONE | 5182405 | N/A | 2017/09/26 | Nancy Rogers |
| Nitrogen - Nitrate + Nitrite | KONE | 5182187 | N/A | 2017/09/26 | Nancy Rogers |
| Nitrogen - Nitrite | KONE | 5182190 | N/A | 2017/09/27 | Nancy Rogers |
| Nitrogen - Nitrate (as N) | CALC | 5168554 | N/A | 2017/09/27 | Automated Statchk |
| PAH (FWAL) in Water (A/Q) by GC/MS (SIM) | GC/MS | 5180356 | 2017/09/20 | 2017/09/28 | Gina Thompson |
| pH | AT | 5174860 | N/A | 2017/09/21 | Julia McGovern |
| Phosphorus - ortho | KONE | 5182186 | N/A | 2017/09/26 | Nancy Rogers |
| Sat. pH and Langelier Index (@ 20C) | CALC | 5168556 | N/A | 2017/09/27 | Automated Statchk |
| Sat. pH and Langelier Index (@ 4C) | CALC | 5168557 | N/A | 2017/09/27 | Automated Statchk |
| Reactive Silica | KONE | 5182184 | N/A | 2017/09/26 | Nancy Rogers |
| Sulphate | KONE | 5182182 | N/A | 2017/09/26 | Cecilia (Kate) Barrett |
| Total Dissolved Solids (TDS calc) | CALC | 5168558 | N/A | 2017/09/27 | Automated Statchk |
| Organic carbon - Total (TOC) | TECH | 5185065 | N/A | 2017/09/27 | Soraya Merchant - Inactive |
| Turbidity | TURB | 5174914 | N/A | 2017/09/21 | Julia McGovern |


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

## TEST SUMMARY

**Maxxam ID:** FDH278 Dup
**Sample ID:** SW_CT_05_BG
**Matrix:** Water

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Organic carbon - Total (TOC) | TECH | 5185065 | N/A | 2017/09/27 | Soraya Merchant - Inactive |

**Maxxam ID:** FDH279
**Sample ID:** SS_CT_60
**Matrix:** Soil

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Benzo(b/j)fluoranthene Sum (LL soil) | CALC | 5168848 | N/A | 2017/09/28 | Automated Statchk |
| Petroleum Hydrocarbons F2-F4 in Soil | GC/FID | 5178585 | 2017/09/22 | 2017/09/23 | Zhiyue (Frank) Zhu |
| Metals Solids Acid Extr. ICPMS | ICP/MS | 5177365 | 2017/09/22 | 2017/09/22 | Mike Leblanc |
| Moisture | BAL | 5168858 | N/A | 2017/09/18 | Jacob Henley |
| PAH in sediment by GC/MS (Low Level) | GC/MS | 5178035 | 2017/09/22 | 2017/09/27 | Gina Thompson |
| PCBs in soil by GC/ECD | GC/ECD | 5170405 | 2017/09/19 | 2017/09/20 | Chloe Bramble |
| PCB Aroclor sum (soil) | CALC | 5168850 | N/A | 2017/09/20 | Automated Statchk |
| Volatile Organic Compounds and F1 PHCs | GC/MS | 5175707 | N/A | 2017/09/23 | Denis Reid |
| VOCs in Soil - Field Preserved | HS/MS | 5172674 | N/A | 2017/09/20 | Amanda Swales |

**Maxxam ID:** FDH280
**Sample ID:** SS_CT_61
**Matrix:** Soil

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Benzo(b/j)fluoranthene Sum (LL soil) | CALC | 5168848 | N/A | 2017/09/28 | Automated Statchk |
| Petroleum Hydrocarbons F2-F4 in Soil | GC/FID | 5178585 | 2017/09/22 | 2017/09/23 | Zhiyue (Frank) Zhu |
| Metals Solids Acid Extr. ICPMS | ICP/MS | 5177171 | 2017/09/22 | 2017/09/22 | Bryon Angevine |
| Moisture | BAL | 5168858 | N/A | 2017/09/18 | Jacob Henley |
| PAH in sediment by GC/MS (Low Level) | GC/MS | 5178035 | 2017/09/22 | 2017/09/27 | Gina Thompson |
| PCBs in soil by GC/ECD | GC/ECD | 5170405 | 2017/09/19 | 2017/09/20 | Chloe Bramble |
| PCB Aroclor sum (soil) | CALC | 5168850 | N/A | 2017/09/20 | Automated Statchk |
| Volatile Organic Compounds and F1 PHCs | GC/MS | 5175707 | N/A | 2017/09/23 | Denis Reid |

**Maxxam ID:** FDH281
**Sample ID:** SS_CT_62
**Matrix:** Soil

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Benzo(b/j)fluoranthene Sum (LL soil) | CALC | 5168848 | N/A | 2017/09/28 | Automated Statchk |
| Petroleum Hydrocarbons F2-F4 in Soil | GC/FID | 5178585 | 2017/09/22 | 2017/09/23 | Zhiyue (Frank) Zhu |
| F4G (CCME Hydrocarbons Gravimetric) | BAL | 5184457 | 2017/09/27 | 2017/09/27 | Debra Deslandes |
| Metals Solids Acid Extr. ICPMS | ICP/MS | 5177171 | 2017/09/22 | 2017/09/22 | Bryon Angevine |
| Moisture | BAL | 5168858 | N/A | 2017/09/18 | Jacob Henley |
| PAH in sediment by GC/MS (Low Level) | GC/MS | 5178035 | 2017/09/22 | 2017/09/28 | Gina Thompson |
| PCBs in soil by GC/ECD | GC/ECD | 5170405 | 2017/09/19 | 2017/09/20 | Chloe Bramble |
| PCB Aroclor sum (soil) | CALC | 5168850 | N/A | 2017/09/20 | Automated Statchk |
| Volatile Organic Compounds and F1 PHCs | GC/MS | 5175707 | N/A | 2017/09/23 | Denis Reid |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## TEST SUMMARY

**Maxxam ID:** FDH282
**Sample ID:** SS_CT_63
**Matrix:** Soil

**Collected:** 2017/09/13
**Shipped:**
**Received:** 2017/09/18

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Benzo(b/j)fluoranthene Sum (LL soil) | CALC | 5168848 | N/A | 2017/09/28 | Automated Statchk |
| Dioxins/Furans in Soil (EPS 1/RM/23) | HRMS/MS | 5238099 | 2017/10/25 | 2017/10/30 | Cathy Xu |
| Petroleum Hydrocarbons F2-F4 in Soil | GC/FID | 5178585 | 2017/09/22 | 2017/09/25 | Zhiyue (Frank) Zhu |
| Moisture | BAL | 5168858 | N/A | 2017/09/18 | Jacob Henley |
| PAH in sediment by GC/MS (Low Level) | GC/MS | 5178035 | 2017/09/22 | 2017/09/28 | Gina Thompson |
| Volatile Organic Compounds and F1 PHCs | GC/MS | 5175707 | N/A | 2017/09/26 | Denis Reid |


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## GENERAL COMMENTS

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

| | |
|---|---|
| Package 1 | 5.4°C |

**Results relate only to the items tested.**



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## QUALITY ASSURANCE REPORT

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| 5168858 | JHY | RPD - Sample/Sample Dup | Moisture | 2017/09/18 | 6.2 | | % | 25 |
| 5170405 | CBR | Matrix Spike | Decachlorobiphenyl | 2017/09/20 | | 107 | % | 30 - 130 |
| | | | Aroclor 1254 | 2017/09/20 | | 80 | % | 30 - 130 |
| 5170405 | CBR | Spiked Blank | Decachlorobiphenyl | 2017/09/20 | | 99 | % | 30 - 130 |
| | | | Aroclor 1254 | 2017/09/20 | | 91 | % | 30 - 130 |
| 5170405 | CBR | Method Blank | Decachlorobiphenyl | 2017/09/20 | | 100 | % | 30 - 130 |
| | | | Aroclor 1016 | 2017/09/20 | <0.050 | | ug/g | |
| | | | Aroclor 1221 | 2017/09/20 | <0.050 | | ug/g | |
| | | | Aroclor 1232 | 2017/09/20 | <0.050 | | ug/g | |
| | | | Aroclor 1248 | 2017/09/20 | <0.050 | | ug/g | |
| | | | Aroclor 1242 | 2017/09/20 | <0.050 | | ug/g | |
| | | | Aroclor 1254 | 2017/09/20 | <0.050 | | ug/g | |
| | | | Aroclor 1260 | 2017/09/20 | <0.050 | | ug/g | |
| 5170405 | CBR | RPD - Sample/Sample Dup | Aroclor 1016 | 2017/09/20 | NC | | % | 50 |
| | | | Aroclor 1221 | 2017/09/20 | NC | | % | 50 |
| | | | Aroclor 1232 | 2017/09/20 | NC | | % | 50 |
| | | | Aroclor 1248 | 2017/09/20 | NC | | % | 50 |
| | | | Aroclor 1242 | 2017/09/20 | NC | | % | 50 |
| | | | Aroclor 1254 | 2017/09/20 | NC | | % | 50 |
| | | | Aroclor 1260 | 2017/09/20 | NC | | % | 50 |
| 5172648 | JMV | QC Standard | pH | 2017/09/20 | | 101 | % | 97 - 103 |
| 5172648 | JMV | RPD - Sample/Sample Dup | pH | 2017/09/20 | 1.2 | | % | N/A |
| 5172649 | JMV | Spiked Blank | Conductivity | 2017/09/20 | | 100 | % | 80 - 120 |
| 5172649 | JMV | Method Blank | Conductivity | 2017/09/20 | 1.2, RDL=1.0 | | uS/cm | |
| 5172649 | JMV | RPD - Sample/Sample Dup | Conductivity | 2017/09/20 | 0.33 | | % | 25 |
| 5172674 | ASL | Matrix Spike | 4-Bromofluorobenzene | 2017/09/20 | | 104 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/20 | | 97 (1) | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/20 | | 96 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/20 | | 100 | % | 60 - 140 |
| | | | 1,1,1-Trichloroethane | 2017/09/20 | | 105 | % | 60 - 140 |
| | | | 1,1,2,2-Tetrachloroethane | 2017/09/20 | | 90 | % | 60 - 140 |
| | | | 1,1,2-Trichloroethane | 2017/09/20 | | 90 | % | 60 - 140 |
| | | | 1,1-Dichloroethane | 2017/09/20 | | 104 | % | 60 - 140 |
| | | | 1,1-Dichloroethylene | 2017/09/20 | | 108 | % | 60 - 140 |
| | | | 1,2-Dichlorobenzene | 2017/09/20 | | 90 | % | 60 - 140 |
| | | | 1,2-Dichloroethane | 2017/09/20 | | 94 | % | 60 - 140 |
| | | | 1,2-Dichloropropane | 2017/09/20 | | 93 | % | 60 - 140 |
| | | | 1,3-Dichlorobenzene | 2017/09/20 | | 90 | % | 60 - 140 |
| | | | 1,4-Dichlorobenzene | 2017/09/20 | | 89 | % | 60 - 140 |
| | | | Benzene | 2017/09/20 | | 97 | % | 60 - 140 |
| | | | Bromodichloromethane | 2017/09/20 | | 96 | % | 60 - 140 |
| | | | Bromoform | 2017/09/20 | | 96 | % | 60 - 140 |
| | | | Bromomethane | 2017/09/20 | | 90 | % | 60 - 140 |
| | | | Carbon Tetrachloride | 2017/09/20 | | 103 | % | 60 - 140 |
| | | | Chlorobenzene | 2017/09/20 | | 98 | % | 60 - 140 |
| | | | Chloroethane | 2017/09/20 | | 91 | % | 60 - 140 |
| | | | Chloroform | 2017/09/20 | | 94 | % | 60 - 140 |
| | | | cis-1,2-Dichloroethylene | 2017/09/20 | | 101 | % | 60 - 140 |
| | | | cis-1,3-Dichloropropene | 2017/09/20 | | 95 | % | 60 - 140 |
| | | | Dibromochloromethane | 2017/09/20 | | 94 | % | 60 - 140 |
| | | | Ethylbenzene | 2017/09/20 | | 105 | % | 60 - 140 |
| | | | Ethylene Dibromide | 2017/09/20 | | 89 | % | 60 - 140 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Methyl t-butyl ether (MTBE) | 2017/09/20 | | 105 | % | 60 - 140 |
| | | | Methylene Chloride(Dichloromethane) | 2017/09/20 | | 99 | % | 60 - 140 |
| | | | o-Xylene | 2017/09/20 | | 101 | % | 60 - 140 |
| | | | p+m-Xylene | 2017/09/20 | | 103 | % | 60 - 140 |
| | | | Styrene | 2017/09/20 | | 104 | % | 60 - 140 |
| | | | Tetrachloroethylene | 2017/09/20 | | 102 | % | 60 - 140 |
| | | | Toluene | 2017/09/20 | | 100 | % | 60 - 140 |
| | | | trans-1,2-Dichloroethylene | 2017/09/20 | | 104 | % | 60 - 140 |
| | | | trans-1,3-Dichloropropene | 2017/09/20 | | 81 | % | 60 - 140 |
| | | | Trichloroethylene | 2017/09/20 | | 103 | % | 60 - 140 |
| | | | Trichlorofluoromethane (FREON 11) | 2017/09/20 | | 95 | % | 60 - 140 |
| | | | Vinyl Chloride | 2017/09/20 | | 96 | % | 60 - 140 |
| 5172674 | ASL | Spiked Blank | 4-Bromofluorobenzene | 2017/09/20 | | 100 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/20 | | 99 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/20 | | 99 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/20 | | 100 | % | 60 - 140 |
| | | | 1,1,1-Trichloroethane | 2017/09/20 | | 108 | % | 60 - 130 |
| | | | 1,1,2,2-Tetrachloroethane | 2017/09/20 | | 95 | % | 60 - 130 |
| | | | 1,1,2-Trichloroethane | 2017/09/20 | | 98 | % | 60 - 130 |
| | | | 1,1-Dichloroethane | 2017/09/20 | | 108 | % | 60 - 130 |
| | | | 1,1-Dichloroethylene | 2017/09/20 | | 111 | % | 60 - 130 |
| | | | 1,2-Dichlorobenzene | 2017/09/20 | | 94 | % | 60 - 130 |
| | | | 1,2-Dichloroethane | 2017/09/20 | | 101 | % | 60 - 130 |
| | | | 1,2-Dichloropropane | 2017/09/20 | | 100 | % | 60 - 130 |
| | | | 1,3-Dichlorobenzene | 2017/09/20 | | 96 | % | 60 - 130 |
| | | | 1,4-Dichlorobenzene | 2017/09/20 | | 95 | % | 60 - 130 |
| | | | Benzene | 2017/09/20 | | 102 | % | 60 - 130 |
| | | | Bromodichloromethane | 2017/09/20 | | 102 | % | 60 - 130 |
| | | | Bromoform | 2017/09/20 | | 98 | % | 60 - 130 |
| | | | Bromomethane | 2017/09/20 | | 94 | % | 60 - 140 |
| | | | Carbon Tetrachloride | 2017/09/20 | | 106 | % | 60 - 130 |
| | | | Chlorobenzene | 2017/09/20 | | 101 | % | 60 - 130 |
| | | | Chloroethane | 2017/09/20 | | 93 | % | 60 - 140 |
| | | | Chloroform | 2017/09/20 | | 99 | % | 60 - 130 |
| | | | cis-1,2-Dichloroethylene | 2017/09/20 | | 105 | % | 60 - 130 |
| | | | cis-1,3-Dichloropropene | 2017/09/20 | | 105 | % | 60 - 130 |
| | | | Dibromochloromethane | 2017/09/20 | | 101 | % | 60 - 130 |
| | | | Ethylbenzene | 2017/09/20 | | 106 | % | 60 - 130 |
| | | | Ethylene Dibromide | 2017/09/20 | | 97 | % | 60 - 130 |
| | | | Methyl t-butyl ether (MTBE) | 2017/09/20 | | 112 | % | 60 - 130 |
| | | | Methylene Chloride(Dichloromethane) | 2017/09/20 | | 105 | % | 60 - 130 |
| | | | o-Xylene | 2017/09/20 | | 104 | % | 60 - 130 |
| | | | p+m-Xylene | 2017/09/20 | | 105 | % | 60 - 130 |
| | | | Styrene | 2017/09/20 | | 104 | % | 60 - 130 |
| | | | Tetrachloroethylene | 2017/09/20 | | 108 | % | 60 - 130 |
| | | | Toluene | 2017/09/20 | | 106 | % | 60 - 130 |
| | | | trans-1,2-Dichloroethylene | 2017/09/20 | | 107 | % | 60 - 130 |
| | | | trans-1,3-Dichloropropene | 2017/09/20 | | 92 | % | 60 - 130 |
| | | | Trichloroethylene | 2017/09/20 | | 107 | % | 60 - 130 |
| | | | Trichlorofluoromethane (FREON 11) | 2017/09/20 | | 98 | % | 60 - 140 |
| | | | Vinyl Chloride | 2017/09/20 | | 98 | % | 60 - 140 |
| 5172674 | ASL | Method Blank | 4-Bromofluorobenzene | 2017/09/20 | | 100 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/20 | | 101 | % | 60 - 130 |

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | D4-1,2-Dichloroethane | 2017/09/20 | | 95 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/20 | | 101 | % | 60 - 140 |
| | | | 1,1,1-Trichloroethane | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,1,2,2-Tetrachloroethane | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,1,2-Trichloroethane | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,1-Dichloroethane | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,1-Dichloroethylene | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,2-Dichlorobenzene | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,2-Dichloroethane | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,2-Dichloropropane | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,3-Dichlorobenzene | 2017/09/20 | <25 | | ug/kg | |
| | | | 1,4-Dichlorobenzene | 2017/09/20 | <25 | | ug/kg | |
| | | | Benzene | 2017/09/20 | <25 | | ug/kg | |
| | | | Bromodichloromethane | 2017/09/20 | <25 | | ug/kg | |
| | | | Bromoform | 2017/09/20 | <25 | | ug/kg | |
| | | | Bromomethane | 2017/09/20 | <50 | | ug/kg | |
| | | | Carbon Tetrachloride | 2017/09/20 | <25 | | ug/kg | |
| | | | Chlorobenzene | 2017/09/20 | <25 | | ug/kg | |
| | | | Chloroethane | 2017/09/20 | <200 | | ug/kg | |
| | | | Chloroform | 2017/09/20 | <25 | | ug/kg | |
| | | | cis-1,2-Dichloroethylene | 2017/09/20 | <25 | | ug/kg | |
| | | | cis-1,3-Dichloropropene | 2017/09/20 | <25 | | ug/kg | |
| | | | Dibromochloromethane | 2017/09/20 | <25 | | ug/kg | |
| | | | Ethylbenzene | 2017/09/20 | <25 | | ug/kg | |
| | | | Ethylene Dibromide | 2017/09/20 | <25 | | ug/kg | |
| | | | Methyl t-butyl ether (MTBE) | 2017/09/20 | <25 | | ug/kg | |
| | | | Methylene Chloride(Dichloromethane) | 2017/09/20 | <50 | | ug/kg | |
| | | | o-Xylene | 2017/09/20 | <25 | | ug/kg | |
| | | | p+m-Xylene | 2017/09/20 | <25 | | ug/kg | |
| | | | Styrene | 2017/09/20 | <25 | | ug/kg | |
| | | | Tetrachloroethylene | 2017/09/20 | <25 | | ug/kg | |
| | | | Toluene | 2017/09/20 | <25 | | ug/kg | |
| | | | Total Xylenes | 2017/09/20 | <50 | | ug/kg | |
| | | | trans-1,2-Dichloroethylene | 2017/09/20 | <25 | | ug/kg | |
| | | | trans-1,3-Dichloropropene | 2017/09/20 | <25 | | ug/kg | |
| | | | Trichloroethylene | 2017/09/20 | <10 | | ug/kg | |
| | | | Trichlorofluoromethane (FREON 11) | 2017/09/20 | <25 | | ug/kg | |
| | | | Vinyl Chloride | 2017/09/20 | <20 | | ug/kg | |
| 5172674 | ASL | RPD - Sample/Sample Dup | 1,1,1-Trichloroethane | 2017/09/20 | NC | | % | 50 |
| | | | 1,1,2,2-Tetrachloroethane | 2017/09/20 | NC | | % | 50 |
| | | | 1,1,2-Trichloroethane | 2017/09/20 | NC | | % | 50 |
| | | | 1,1-Dichloroethane | 2017/09/20 | NC | | % | 50 |
| | | | 1,1-Dichloroethylene | 2017/09/20 | NC | | % | 50 |
| | | | 1,2-Dichlorobenzene | 2017/09/20 | NC | | % | 50 |
| | | | 1,2-Dichloroethane | 2017/09/20 | NC | | % | 50 |
| | | | 1,2-Dichloropropane | 2017/09/20 | NC | | % | 50 |
| | | | 1,3-Dichlorobenzene | 2017/09/20 | NC | | % | 50 |
| | | | 1,4-Dichlorobenzene | 2017/09/20 | NC | | % | 50 |
| | | | Benzene | 2017/09/20 | NC | | % | 50 |
| | | | Bromodichloromethane | 2017/09/20 | NC | | % | 50 |
| | | | Bromoform | 2017/09/20 | NC | | % | 50 |
| | | | Bromomethane | 2017/09/20 | NC | | % | 50 |
| | | | Carbon Tetrachloride | 2017/09/20 | NC | | % | 50 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Chlorobenzene | 2017/09/20 | NC | | % | 50 |
| | | | Chloroethane | 2017/09/20 | NC | | % | 50 |
| | | | Chloroform | 2017/09/20 | NC | | % | 50 |
| | | | cis-1,2-Dichloroethylene | 2017/09/20 | NC | | % | 50 |
| | | | cis-1,3-Dichloropropene | 2017/09/20 | NC | | % | 50 |
| | | | Dibromochloromethane | 2017/09/20 | NC | | % | 50 |
| | | | Ethylbenzene | 2017/09/20 | NC | | % | 50 |
| | | | Ethylene Dibromide | 2017/09/20 | NC | | % | 50 |
| | | | Methyl t-butyl ether (MTBE) | 2017/09/20 | NC | | % | 50 |
| | | | Methylene Chloride(Dichloromethane) | 2017/09/20 | NC | | % | 50 |
| | | | o-Xylene | 2017/09/20 | NC | | % | 50 |
| | | | p+m-Xylene | 2017/09/20 | NC | | % | 50 |
| | | | Styrene | 2017/09/20 | NC | | % | 50 |
| | | | Tetrachloroethylene | 2017/09/20 | NC | | % | 50 |
| | | | Toluene | 2017/09/20 | NC | | % | 50 |
| | | | Total Xylenes | 2017/09/20 | NC | | % | 50 |
| | | | trans-1,2-Dichloroethylene | 2017/09/20 | NC | | % | 50 |
| | | | trans-1,3-Dichloropropene | 2017/09/20 | NC | | % | 50 |
| | | | Trichloroethylene | 2017/09/20 | NC | | % | 50 |
| | | | Trichlorofluoromethane (FREON 11) | 2017/09/20 | NC | | % | 50 |
| | | | Vinyl Chloride | 2017/09/20 | NC | | % | 50 |
| 5172679 | CBR | Matrix Spike(FDH277) | Decachlorobiphenyl | 2017/09/21 | | 73 | % | 30 - 130 |
| | | | Aroclor 1254 | 2017/09/21 | | 92 | % | 30 - 130 |
| 5172679 | CBR | Spiked Blank | Decachlorobiphenyl | 2017/09/21 | | 90 | % | 30 - 130 |
| | | | Aroclor 1254 | 2017/09/21 | | 95 | % | 30 - 130 |
| 5172679 | CBR | Method Blank | Decachlorobiphenyl | 2017/09/21 | | 88 | % | 30 - 130 |
| | | | Aroclor 1016 | 2017/09/21 | <0.050 | | ug/L | |
| | | | Aroclor 1221 | 2017/09/21 | <0.050 | | ug/L | |
| | | | Aroclor 1232 | 2017/09/21 | <0.050 | | ug/L | |
| | | | Aroclor 1248 | 2017/09/21 | <0.050 | | ug/L | |
| | | | Aroclor 1242 | 2017/09/21 | <0.050 | | ug/L | |
| | | | Aroclor 1254 | 2017/09/21 | <0.050 | | ug/L | |
| | | | Aroclor 1260 | 2017/09/21 | <0.050 | | ug/L | |
| 5172679 | CBR | RPD - Sample/Sample Dup | Aroclor 1016 | 2017/09/21 | NC | | % | 40 |
| | | | Aroclor 1221 | 2017/09/21 | NC | | % | 40 |
| | | | Aroclor 1232 | 2017/09/21 | NC | | % | 40 |
| | | | Aroclor 1248 | 2017/09/21 | NC | | % | 40 |
| | | | Aroclor 1242 | 2017/09/21 | NC | | % | 40 |
| | | | Aroclor 1254 | 2017/09/21 | NC | | % | 40 |
| | | | Aroclor 1260 | 2017/09/21 | NC | | % | 40 |
| 5172696 | JMV | QC Standard | Turbidity | 2017/09/20 | | 97 | % | 80 - 120 |
| 5172696 | JMV | Spiked Blank | Turbidity | 2017/09/20 | | 92 | % | 80 - 120 |
| 5172696 | JMV | Method Blank | Turbidity | 2017/09/20 | <0.10 | | NTU | |
| 5172696 | JMV | RPD - Sample/Sample Dup | Turbidity | 2017/09/20 | 2.7 | | % | 20 |
| 5172924 | MLB | Matrix Spike | Total Aluminum (Al) | 2017/09/20 | | 102 | % | 80 - 120 |
| | | | Total Antimony (Sb) | 2017/09/20 | | 100 | % | 80 - 120 |
| | | | Total Arsenic (As) | 2017/09/20 | | 96 | % | 80 - 120 |
| | | | Total Barium (Ba) | 2017/09/20 | | 95 | % | 80 - 120 |
| | | | Total Beryllium (Be) | 2017/09/20 | | 97 | % | 80 - 120 |
| | | | Total Bismuth (Bi) | 2017/09/20 | | 100 | % | 80 - 120 |
| | | | Total Boron (B) | 2017/09/20 | | 101 | % | 80 - 120 |
| | | | Total Cadmium (Cd) | 2017/09/20 | | 98 | % | 80 - 120 |
| | | | Total Calcium (Ca) | 2017/09/20 | | 102 | % | 80 - 120 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Chromium (Cr) | 2017/09/20 | | 97 | % | 80 - 120 |
| | | | Total Cobalt (Co) | 2017/09/20 | | 99 | % | 80 - 120 |
| | | | Total Copper (Cu) | 2017/09/20 | | NC | % | 80 - 120 |
| | | | Total Iron (Fe) | 2017/09/20 | | 102 | % | 80 - 120 |
| | | | Total Lead (Pb) | 2017/09/20 | | 97 | % | 80 - 120 |
| | | | Total Magnesium (Mg) | 2017/09/20 | | 105 | % | 80 - 120 |
| | | | Total Manganese (Mn) | 2017/09/20 | | 100 | % | 80 - 120 |
| | | | Total Molybdenum (Mo) | 2017/09/20 | | 102 | % | 80 - 120 |
| | | | Total Nickel (Ni) | 2017/09/20 | | 98 | % | 80 - 120 |
| | | | Total Phosphorus (P) | 2017/09/20 | | 103 | % | 80 - 120 |
| | | | Total Potassium (K) | 2017/09/20 | | 105 | % | 80 - 120 |
| | | | Total Selenium (Se) | 2017/09/20 | | 100 | % | 80 - 120 |
| | | | Total Silver (Ag) | 2017/09/20 | | 98 | % | 80 - 120 |
| | | | Total Sodium (Na) | 2017/09/20 | | 103 | % | 80 - 120 |
| | | | Total Strontium (Sr) | 2017/09/20 | | 98 | % | 80 - 120 |
| | | | Total Thallium (Tl) | 2017/09/20 | | 101 | % | 80 - 120 |
| | | | Total Tin (Sn) | 2017/09/20 | | 103 | % | 80 - 120 |
| | | | Total Titanium (Ti) | 2017/09/20 | | 101 | % | 80 - 120 |
| | | | Total Uranium (U) | 2017/09/20 | | 103 | % | 80 - 120 |
| | | | Total Vanadium (V) | 2017/09/20 | | 99 | % | 80 - 120 |
| | | | Total Zinc (Zn) | 2017/09/20 | | 98 | % | 80 - 120 |
| 5172924 | MLB | Spiked Blank | Total Aluminum (Al) | 2017/09/20 | | 102 | % | 80 - 120 |
| | | | Total Antimony (Sb) | 2017/09/20 | | 99 | % | 80 - 120 |
| | | | Total Arsenic (As) | 2017/09/20 | | 96 | % | 80 - 120 |
| | | | Total Barium (Ba) | 2017/09/20 | | 96 | % | 80 - 120 |
| | | | Total Beryllium (Be) | 2017/09/20 | | 96 | % | 80 - 120 |
| | | | Total Bismuth (Bi) | 2017/09/20 | | 101 | % | 80 - 120 |
| | | | Total Boron (B) | 2017/09/20 | | 98 | % | 80 - 120 |
| | | | Total Cadmium (Cd) | 2017/09/20 | | 98 | % | 80 - 120 |
| | | | Total Calcium (Ca) | 2017/09/20 | | 102 | % | 80 - 120 |
| | | | Total Chromium (Cr) | 2017/09/20 | | 99 | % | 80 - 120 |
| | | | Total Cobalt (Co) | 2017/09/20 | | 100 | % | 80 - 120 |
| | | | Total Copper (Cu) | 2017/09/20 | | 99 | % | 80 - 120 |
| | | | Total Iron (Fe) | 2017/09/20 | | 103 | % | 80 - 120 |
| | | | Total Lead (Pb) | 2017/09/20 | | 96 | % | 80 - 120 |
| | | | Total Magnesium (Mg) | 2017/09/20 | | 105 | % | 80 - 120 |
| | | | Total Manganese (Mn) | 2017/09/20 | | 99 | % | 80 - 120 |
| | | | Total Molybdenum (Mo) | 2017/09/20 | | 104 | % | 80 - 120 |
| | | | Total Nickel (Ni) | 2017/09/20 | | 99 | % | 80 - 120 |
| | | | Total Phosphorus (P) | 2017/09/20 | | 102 | % | 80 - 120 |
| | | | Total Potassium (K) | 2017/09/20 | | 104 | % | 80 - 120 |
| | | | Total Selenium (Se) | 2017/09/20 | | 97 | % | 80 - 120 |
| | | | Total Silver (Ag) | 2017/09/20 | | 98 | % | 80 - 120 |
| | | | Total Sodium (Na) | 2017/09/20 | | 104 | % | 80 - 120 |
| | | | Total Strontium (Sr) | 2017/09/20 | | 99 | % | 80 - 120 |
| | | | Total Thallium (Tl) | 2017/09/20 | | 100 | % | 80 - 120 |
| | | | Total Tin (Sn) | 2017/09/20 | | 103 | % | 80 - 120 |
| | | | Total Titanium (Ti) | 2017/09/20 | | 100 | % | 80 - 120 |
| | | | Total Uranium (U) | 2017/09/20 | | 103 | % | 80 - 120 |
| | | | Total Vanadium (V) | 2017/09/20 | | 99 | % | 80 - 120 |
| | | | Total Zinc (Zn) | 2017/09/20 | | 99 | % | 80 - 120 |
| 5172924 | MLB | Method Blank | Total Aluminum (Al) | 2017/09/20 | <5.0 | | ug/L | |
| | | | Total Antimony (Sb) | 2017/09/20 | <1.0 | | ug/L | |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Arsenic (As) | 2017/09/20 | <1.0 | | ug/L | |
| | | | Total Barium (Ba) | 2017/09/20 | <1.0 | | ug/L | |
| | | | Total Beryllium (Be) | 2017/09/20 | <1.0 | | ug/L | |
| | | | Total Bismuth (Bi) | 2017/09/20 | <2.0 | | ug/L | |
| | | | Total Boron (B) | 2017/09/20 | <50 | | ug/L | |
| | | | Total Cadmium (Cd) | 2017/09/20 | <0.010 | | ug/L | |
| | | | Total Calcium (Ca) | 2017/09/20 | <100 | | ug/L | |
| | | | Total Chromium (Cr) | 2017/09/20 | <1.0 | | ug/L | |
| | | | Total Cobalt (Co) | 2017/09/20 | <0.40 | | ug/L | |
| | | | Total Copper (Cu) | 2017/09/20 | <2.0 | | ug/L | |
| | | | Total Iron (Fe) | 2017/09/20 | <50 | | ug/L | |
| | | | Total Lead (Pb) | 2017/09/20 | <0.50 | | ug/L | |
| | | | Total Magnesium (Mg) | 2017/09/20 | <100 | | ug/L | |
| | | | Total Manganese (Mn) | 2017/09/20 | <2.0 | | ug/L | |
| | | | Total Molybdenum (Mo) | 2017/09/20 | <2.0 | | ug/L | |
| | | | Total Nickel (Ni) | 2017/09/20 | <2.0 | | ug/L | |
| | | | Total Phosphorus (P) | 2017/09/20 | <100 | | ug/L | |
| | | | Total Potassium (K) | 2017/09/20 | <100 | | ug/L | |
| | | | Total Selenium (Se) | 2017/09/20 | <1.0 | | ug/L | |
| | | | Total Silver (Ag) | 2017/09/20 | <0.10 | | ug/L | |
| | | | Total Sodium (Na) | 2017/09/20 | <100 | | ug/L | |
| | | | Total Strontium (Sr) | 2017/09/20 | <2.0 | | ug/L | |
| | | | Total Thallium (Tl) | 2017/09/20 | <0.10 | | ug/L | |
| | | | Total Tin (Sn) | 2017/09/20 | <2.0 | | ug/L | |
| | | | Total Titanium (Ti) | 2017/09/20 | <2.0 | | ug/L | |
| | | | Total Uranium (U) | 2017/09/20 | <0.10 | | ug/L | |
| | | | Total Vanadium (V) | 2017/09/20 | <2.0 | | ug/L | |
| | | | Total Zinc (Zn) | 2017/09/20 | <5.0 | | ug/L | |
| 5172924 | MLB | RPD - Sample/Sample Dup | Total Aluminum (Al) | 2017/09/20 | NC | | % | 20 |
| | | | Total Antimony (Sb) | 2017/09/20 | NC | | % | 20 |
| | | | Total Arsenic (As) | 2017/09/20 | 3.8 | | % | 20 |
| | | | Total Barium (Ba) | 2017/09/20 | 0.54 | | % | 20 |
| | | | Total Boron (B) | 2017/09/20 | NC | | % | 20 |
| | | | Total Cadmium (Cd) | 2017/09/20 | NC | | % | 20 |
| | | | Total Calcium (Ca) | 2017/09/20 | 0.0037 | | % | 20 |
| | | | Total Chromium (Cr) | 2017/09/20 | NC | | % | 20 |
| | | | Total Copper (Cu) | 2017/09/20 | 0.62 | | % | 20 |
| | | | Total Iron (Fe) | 2017/09/20 | NC | | % | 20 |
| | | | Total Lead (Pb) | 2017/09/20 | NC | | % | 20 |
| | | | Total Magnesium (Mg) | 2017/09/20 | 0.13 | | % | 20 |
| | | | Total Manganese (Mn) | 2017/09/20 | 0.64 | | % | 20 |
| | | | Total Nickel (Ni) | 2017/09/20 | NC | | % | 20 |
| | | | Total Potassium (K) | 2017/09/20 | 3.4 | | % | 20 |
| | | | Total Selenium (Se) | 2017/09/20 | NC | | % | 20 |
| | | | Total Sodium (Na) | 2017/09/20 | 0.99 | | % | 20 |
| | | | Total Strontium (Sr) | 2017/09/20 | 0.51 | | % | 20 |
| | | | Total Uranium (U) | 2017/09/20 | NC | | % | 20 |
| | | | Total Zinc (Zn) | 2017/09/20 | 0.56 | | % | 20 |
| 5174860 | JMV | QC Standard | pH | 2017/09/21 | | 101 | % | 97 - 103 |
| 5174860 | JMV | RPD - Sample/Sample Dup | pH | 2017/09/21 | 0.83 | | % | N/A |
| 5174861 | JMV | Spiked Blank | Conductivity | 2017/09/21 | | 103 | % | 80 - 120 |
| 5174861 | JMV | Method Blank | Conductivity | 2017/09/21 | 1.3, RDL=1.0 | | uS/cm | |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| 5174861 | JMV | RPD - Sample/Sample Dup | Conductivity | 2017/09/21 | 1.2 | | % | 25 |
| 5174914 | JMV | QC Standard | Turbidity | 2017/09/21 | | 97 | % | 80 - 120 |
| 5174914 | JMV | Spiked Blank | Turbidity | 2017/09/21 | | 92 | % | 80 - 120 |
| 5174914 | JMV | Method Blank | Turbidity | 2017/09/21 | <0.10 | | NTU | |
| 5174914 | JMV | RPD - Sample/Sample Dup | Turbidity | 2017/09/21 | 2.1 | | % | 20 |
| 5174921 | JMV | QC Standard | Turbidity | 2017/09/21 | | 97 | % | 80 - 120 |
| 5174921 | JMV | Spiked Blank | Turbidity | 2017/09/21 | | 92 | % | 80 - 120 |
| 5174921 | JMV | Method Blank | Turbidity | 2017/09/21 | <0.10 | | NTU | |
| 5174921 | JMV | RPD - Sample/Sample Dup | Turbidity | 2017/09/21 | 18 | | % | 20 |
| 5174924 | JMV | QC Standard | Turbidity | 2017/09/21 | | 96 | % | 80 - 120 |
| 5174924 | JMV | Spiked Blank | Turbidity | 2017/09/21 | | 92 | % | 80 - 120 |
| 5174924 | JMV | Method Blank | Turbidity | 2017/09/21 | <0.10 | | NTU | |
| 5174924 | JMV | RPD - Sample/Sample Dup | Turbidity | 2017/09/21 | 3.2 | | % | 20 |
| 5175707 | DR1 | Matrix Spike | 4-Bromofluorobenzene | 2017/09/23 | | 100 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/23 | | 99 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/23 | | 121 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/23 | | 104 | % | 60 - 140 |
| | | | Benzene | 2017/09/23 | | 111 | % | 60 - 140 |
| | | | Ethylbenzene | 2017/09/23 | | 83 | % | 60 - 140 |
| | | | Toluene | 2017/09/23 | | 93 | % | 60 - 140 |
| | | | p+m-Xylene | 2017/09/23 | | 88 | % | 60 - 140 |
| | | | o-Xylene | 2017/09/23 | | 93 | % | 60 - 140 |
| | | | F1 (C6-C10) | 2017/09/23 | | NC | % | 60 - 140 |
| 5175707 | DR1 | Spiked Blank | 4-Bromofluorobenzene | 2017/09/22 | | 92 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/22 | | 84 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/22 | | 118 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/22 | | 105 | % | 60 - 140 |
| | | | Benzene | 2017/09/22 | | 108 | % | 60 - 130 |
| | | | Ethylbenzene | 2017/09/22 | | 81 | % | 60 - 130 |
| | | | Toluene | 2017/09/22 | | 96 | % | 60 - 130 |
| | | | p+m-Xylene | 2017/09/22 | | 81 | % | 60 - 130 |
| | | | o-Xylene | 2017/09/22 | | 84 | % | 60 - 130 |
| | | | F1 (C6-C10) | 2017/09/22 | | 100 | % | 80 - 120 |
| 5175707 | DR1 | Method Blank | 4-Bromofluorobenzene | 2017/09/22 | | 85 | % | 60 - 140 |
| | | | D10-o-Xylene | 2017/09/22 | | 75 | % | 60 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/22 | | 118 | % | 60 - 140 |
| | | | D8-Toluene | 2017/09/22 | | 96 | % | 60 - 140 |
| | | | Benzene | 2017/09/22 | <0.0060 | | ug/g | |
| | | | Ethylbenzene | 2017/09/22 | <0.010 | | ug/g | |
| | | | Toluene | 2017/09/22 | <0.020 | | ug/g | |
| | | | p+m-Xylene | 2017/09/22 | <0.020 | | ug/g | |
| | | | o-Xylene | 2017/09/22 | <0.020 | | ug/g | |
| | | | Total Xylenes | 2017/09/22 | <0.020 | | ug/g | |
| | | | F1 (C6-C10) | 2017/09/22 | <10 | | ug/g | |
| | | | F1 (C6-C10) - BTEX | 2017/09/22 | <10 | | ug/g | |
| 5175707 | DR1 | RPD - Sample/Sample Dup | Benzene | 2017/09/23 | NC | | % | 50 |
| | | | Ethylbenzene | 2017/09/23 | NC | | % | 50 |
| | | | Toluene | 2017/09/23 | NC | | % | 50 |
| | | | p+m-Xylene | 2017/09/23 | NC | | % | 50 |
| | | | o-Xylene | 2017/09/23 | NC | | % | 50 |
| | | | Total Xylenes | 2017/09/23 | NC | | % | 50 |
| | | | F1 (C6-C10) | 2017/09/23 | 7.9 | | % | 30 |
| | | | F1 (C6-C10) - BTEX | 2017/09/23 | 7.9 | | % | 30 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| 5177171 | BAN | Matrix Spike | Acid Extractable Antimony (Sb) | 2017/09/25 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Arsenic (As) | 2017/09/25 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Barium (Ba) | 2017/09/25 | | NC | % | 75 - 125 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/25 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/25 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Boron (B) | 2017/09/25 | | 97 | % | 75 - 125 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/25 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/25 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/25 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Copper (Cu) | 2017/09/25 | | 97 | % | 75 - 125 |
| | | | Acid Extractable Lead (Pb) | 2017/09/25 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Lithium (Li) | 2017/09/25 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/25 | | NC | % | 75 - 125 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/25 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/25 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/25 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/25 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Selenium (Se) | 2017/09/25 | | 107 | % | 75 - 125 |
| | | | Acid Extractable Silver (Ag) | 2017/09/25 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/25 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/25 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Tin (Sn) | 2017/09/25 | | 108 | % | 75 - 125 |
| | | | Acid Extractable Uranium (U) | 2017/09/25 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Vanadium (V) | 2017/09/25 | | 95 | % | 75 - 125 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/25 | | NC | % | 75 - 125 |
| 5177171 | BAN | Spiked Blank | Acid Extractable Antimony (Sb) | 2017/09/22 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Boron (B) | 2017/09/22 | | 109 | % | 75 - 125 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | | 107 | % | 75 - 125 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | | 108 | % | 75 - 125 |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | | 108 | % | 75 - 125 |
| 5177171 | BAN | Method Blank | Acid Extractable Aluminum (Al) | 2017/09/22 | <10 | | mg/kg | |
| | | | Acid Extractable Antimony (Sb) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | <2.0 | | mg/kg | |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | <5.0 | | mg/kg | |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Boron (B) | 2017/09/22 | <50 | | mg/kg | |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | <0.30 | | mg/kg | |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | <1.0 | | mg/kg | |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Iron (Fe) | 2017/09/22 | <50 | | mg/kg | |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | <0.50 | | mg/kg | |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | <0.10 | | mg/kg | |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | <1.0 | | mg/kg | |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | <0.50 | | mg/kg | |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | <5.0 | | mg/kg | |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | <0.10 | | mg/kg | |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | <0.10 | | mg/kg | |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | <5.0 | | mg/kg | |
| 5177171 | BAN | RPD - Sample/Sample Dup | Acid Extractable Aluminum (Al) | 2017/09/22 | 2.7 | | % | 35 |
| | | | Acid Extractable Antimony (Sb) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | 5.3 | | % | 35 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Boron (B) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | 4.2 | | % | 35 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | 0.29 | | % | 35 |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | 0.39 | | % | 35 |
| | | | Acid Extractable Iron (Fe) | 2017/09/22 | 6.7 | | % | 35 |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | 36 (2) | | % | 35 |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | 3.8 | | % | 35 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | 6.8 | | % | 35 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | 26 | | % | 35 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | 12 | | % | 35 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | 6.3 | | % | 35 |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | 6.7 | | % | 35 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | 0.74 | | % | 35 |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | 4.5 | | % | 35 |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | 5.2 | | % | 35 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | 7.8 | | % | 35 |
| 5177332 | ARS | Matrix Spike | Total Mercury (Hg) | 2017/09/25 | | 104 | % | 80 - 120 |
| 5177332 | ARS | Spiked Blank | Total Mercury (Hg) | 2017/09/25 | | 104 | % | 80 - 120 |

Maxxam
A Bureau Veritas Group Company



Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| 5177332 | ARS | Method Blank | Total Mercury (Hg) | 2017/09/25 | <0.013 | | ug/L | |
| 5177332 | ARS | RPD - Sample/Sample Dup | Total Mercury (Hg) | 2017/09/25 | NC | | % | 20 |
| 5177365 | MLB | Matrix Spike | Acid Extractable Antimony (Sb) | 2017/09/22 | | 97 | % | 75 - 125 |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | | 97 | % | 75 - 125 |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | | NC | % | 75 - 125 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Boron (B) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | | 111 | % | 75 - 125 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | | NC | % | 75 - 125 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | | 105 | % | 75 - 125 |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | | 125 | % | 75 - 125 |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | | 98 | % | 75 - 125 |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | | NC | % | 75 - 125 |
| 5177365 | MLB | Spiked Blank | Acid Extractable Antimony (Sb) | 2017/09/22 | | 92 | % | 75 - 125 |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | | 97 | % | 75 - 125 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | | 101 | % | 75 - 125 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Boron (B) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | | 99 | % | 75 - 125 |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | | 98 | % | 75 - 125 |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | | 95 | % | 75 - 125 |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | | 102 | % | 75 - 125 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | | 106 | % | 75 - 125 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | | 103 | % | 75 - 125 |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | | 96 | % | 75 - 125 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | | 100 | % | 75 - 125 |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | | 104 | % | 75 - 125 |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | | 96 | % | 75 - 125 |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | | 98 | % | 75 - 125 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | | 98 | % | 75 - 125 |
| 5177365 | MLB | Method Blank | Acid Extractable Aluminum (Al) | 2017/09/22 | <10 | | mg/kg | |

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Acid Extractable Antimony (Sb) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | <5.0 | | mg/kg | |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Boron (B) | 2017/09/22 | <50 | | mg/kg | |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | <0.30 | | mg/kg | |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | <1.0 | | mg/kg | |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Iron (Fe) | 2017/09/22 | <50 | | mg/kg | |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | <0.50 | | mg/kg | |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | <0.10 | | mg/kg | |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | <1.0 | | mg/kg | |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | <0.50 | | mg/kg | |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | <5.0 | | mg/kg | |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | <0.10 | | mg/kg | |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | <0.10 | | mg/kg | |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | <2.0 | | mg/kg | |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | <5.0 | | mg/kg | |
| 5177365 | MLB | RPD - Sample/Sample Dup | Acid Extractable Aluminum (Al) | 2017/09/22 | 6.3 | | % | 35 |
| | | | Acid Extractable Antimony (Sb) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Arsenic (As) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Barium (Ba) | 2017/09/22 | 8.1 | | % | 35 |
| | | | Acid Extractable Beryllium (Be) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Bismuth (Bi) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Boron (B) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Cadmium (Cd) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Chromium (Cr) | 2017/09/22 | 7.2 | | % | 35 |
| | | | Acid Extractable Cobalt (Co) | 2017/09/22 | 8.7 | | % | 35 |
| | | | Acid Extractable Copper (Cu) | 2017/09/22 | 2.6 | | % | 35 |
| | | | Acid Extractable Iron (Fe) | 2017/09/22 | 13 | | % | 35 |
| | | | Acid Extractable Lead (Pb) | 2017/09/22 | 5.3 | | % | 35 |
| | | | Acid Extractable Lithium (Li) | 2017/09/22 | 2.6 | | % | 35 |
| | | | Acid Extractable Manganese (Mn) | 2017/09/22 | 13 | | % | 35 |
| | | | Acid Extractable Mercury (Hg) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Molybdenum (Mo) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Nickel (Ni) | 2017/09/22 | 6.9 | | % | 35 |
| | | | Acid Extractable Rubidium (Rb) | 2017/09/22 | 9.7 | | % | 35 |
| | | | Acid Extractable Selenium (Se) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Silver (Ag) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Strontium (Sr) | 2017/09/22 | 6.9 | | % | 35 |
| | | | Acid Extractable Thallium (Tl) | 2017/09/22 | NC | | % | 35 |
| | | | Acid Extractable Tin (Sn) | 2017/09/22 | 8.0 | | % | 35 |
| | | | Acid Extractable Uranium (U) | 2017/09/22 | 13 | | % | 35 |
| | | | Acid Extractable Vanadium (V) | 2017/09/22 | 11 | | % | 35 |
| | | | Acid Extractable Zinc (Zn) | 2017/09/22 | 8.2 | | % | 35 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| 5177495 | NRG | Matrix Spike | Total Alkalinity (Total as CaCO3) | 2017/09/26 | | NC | % | 80 - 120 |
| 5177495 | NRG | Spiked Blank | Total Alkalinity (Total as CaCO3) | 2017/09/25 | | 113 | % | 80 - 120 |
| 5177495 | NRG | Method Blank | Total Alkalinity (Total as CaCO3) | 2017/09/25 | <5.0 | | mg/L | |
| 5177495 | NRG | RPD - Sample/Sample Dup | Total Alkalinity (Total as CaCO3) | 2017/09/25 | 1.6 | | % | 25 |
| 5177498 | NRG | Matrix Spike | Dissolved Chloride (Cl) | 2017/09/25 | | 100 | % | 80 - 120 |
| 5177498 | NRG | QC Standard | Dissolved Chloride (Cl) | 2017/09/25 | | 108 | % | 80 - 120 |
| 5177498 | NRG | Spiked Blank | Dissolved Chloride (Cl) | 2017/09/25 | | 102 | % | 80 - 120 |
| 5177498 | NRG | Method Blank | Dissolved Chloride (Cl) | 2017/09/25 | <1.0 | | mg/L | |
| 5177498 | NRG | RPD - Sample/Sample Dup | Dissolved Chloride (Cl) | 2017/09/25 | 8.9 | | % | 25 |
| 5177502 | NRG | Matrix Spike | Dissolved Sulphate (SO4) | 2017/09/25 | | 99 | % | 80 - 120 |
| 5177502 | NRG | Spiked Blank | Dissolved Sulphate (SO4) | 2017/09/25 | | 96 | % | 80 - 120 |
| 5177502 | NRG | Method Blank | Dissolved Sulphate (SO4) | 2017/09/25 | <2.0 | | mg/L | |
| 5177502 | NRG | RPD - Sample/Sample Dup | Dissolved Sulphate (SO4) | 2017/09/25 | 2.1 | | % | 25 |
| 5177504 | NRG | Matrix Spike | Reactive Silica (SiO2) | 2017/09/26 | | 95 | % | 80 - 120 |
| 5177504 | NRG | Spiked Blank | Reactive Silica (SiO2) | 2017/09/25 | | 90 | % | 80 - 120 |
| 5177504 | NRG | Method Blank | Reactive Silica (SiO2) | 2017/09/25 | <0.50 | | mg/L | |
| 5177504 | NRG | RPD - Sample/Sample Dup | Reactive Silica (SiO2) | 2017/09/26 | 1.3 | | % | 25 |
| 5177507 | NRG | Spiked Blank | Colour | 2017/09/26 | | 93 | % | 80 - 120 |
| 5177507 | NRG | Method Blank | Colour | 2017/09/26 | <5.0 | | TCU | |
| 5177507 | NRG | RPD - Sample/Sample Dup | Colour | 2017/09/26 | NC | | % | 20 |
| 5177512 | NRG | Matrix Spike | Orthophosphate (P) | 2017/09/25 | | 96 | % | 80 - 120 |
| 5177512 | NRG | Spiked Blank | Orthophosphate (P) | 2017/09/25 | | 99 | % | 80 - 120 |
| 5177512 | NRG | Method Blank | Orthophosphate (P) | 2017/09/25 | <0.010 | | mg/L | |
| 5177512 | NRG | RPD - Sample/Sample Dup | Orthophosphate (P) | 2017/09/25 | NC | | % | 25 |
| 5177513 | NRG | Matrix Spike | Nitrate + Nitrite (N) | 2017/09/25 | | 106 | % | 80 - 120 |
| 5177513 | NRG | Spiked Blank | Nitrate + Nitrite (N) | 2017/09/25 | | 104 | % | 80 - 120 |
| 5177513 | NRG | Method Blank | Nitrate + Nitrite (N) | 2017/09/25 | <0.050 | | mg/L | |
| 5177513 | NRG | RPD - Sample/Sample Dup | Nitrate + Nitrite (N) | 2017/09/25 | 3.2 | | % | 25 |
| 5177516 | NRG | Matrix Spike | Nitrite (N) | 2017/09/25 | | 102 | % | 80 - 120 |
| 5177516 | NRG | Spiked Blank | Nitrite (N) | 2017/09/25 | | 103 | % | 80 - 120 |
| 5177516 | NRG | Method Blank | Nitrite (N) | 2017/09/25 | <0.010 | | mg/L | |
| 5177516 | NRG | RPD - Sample/Sample Dup | Nitrite (N) | 2017/09/25 | NC | | % | 25 |
| 5178035 | GTH | Matrix Spike | D10-Anthracene | 2017/09/27 | | 103 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/27 | | 110 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/27 | | 101 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/27 | | 90 | % | 30 - 130 |
| | | | 2-Methylnaphthalene | 2017/09/27 | | 96 | % | 30 - 130 |
| | | | Acenaphthene | 2017/09/27 | | 97 | % | 30 - 130 |
| | | | Acenaphthylene | 2017/09/27 | | 106 | % | 30 - 130 |
| | | | Anthracene | 2017/09/27 | | 90 | % | 30 - 130 |
| | | | Benzo(a)anthracene | 2017/09/27 | | NC | % | 30 - 130 |
| | | | Benzo(a)pyrene | 2017/09/27 | | 105 | % | 30 - 130 |
| | | | Benzo(b)fluoranthene | 2017/09/27 | | 107 | % | 30 - 130 |
| | | | Benzo(g,h,i)perylene | 2017/09/27 | | 104 | % | 30 - 130 |
| | | | Benzo(j)fluoranthene | 2017/09/27 | | 106 | % | 30 - 130 |
| | | | Benzo(k)fluoranthene | 2017/09/27 | | 108 | % | 30 - 130 |
| | | | Chrysene | 2017/09/27 | | 97 | % | 30 - 130 |
| | | | Dibenz(a,h)anthracene | 2017/09/27 | | 104 | % | 30 - 130 |
| | | | Fluoranthene | 2017/09/27 | | NC | % | 30 - 130 |
| | | | Fluorene | 2017/09/27 | | 107 | % | 30 - 130 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/27 | | 103 | % | 30 - 130 |
| | | | Naphthalene | 2017/09/27 | | 92 | % | 30 - 130 |
| | | | Perylene | 2017/09/27 | | 107 | % | 30 - 130 |

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Phenanthrene | 2017/09/27 | | NC | % | 30 - 130 |
| | | | Pyrene | 2017/09/27 | | NC | % | 30 - 130 |
| 5178035 | GTH | Spiked Blank | D10-Anthracene | 2017/09/27 | | 119 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/27 | | 98 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/27 | | 91 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/27 | | 85 | % | 30 - 130 |
| | | | 2-Methylnaphthalene | 2017/09/27 | | 91 | % | 30 - 130 |
| | | | Acenaphthene | 2017/09/27 | | 92 | % | 30 - 130 |
| | | | Acenaphthylene | 2017/09/27 | | 95 | % | 30 - 130 |
| | | | Anthracene | 2017/09/27 | | 106 | % | 30 - 130 |
| | | | Benzo(a)anthracene | 2017/09/27 | | 98 | % | 30 - 130 |
| | | | Benzo(a)pyrene | 2017/09/27 | | 87 | % | 30 - 130 |
| | | | Benzo(b)fluoranthene | 2017/09/27 | | 91 | % | 30 - 130 |
| | | | Benzo(g,h,i)perylene | 2017/09/27 | | 80 | % | 30 - 130 |
| | | | Benzo(j)fluoranthene | 2017/09/27 | | 89 | % | 30 - 130 |
| | | | Benzo(k)fluoranthene | 2017/09/27 | | 84 | % | 30 - 130 |
| | | | Chrysene | 2017/09/27 | | 93 | % | 30 - 130 |
| | | | Dibenz(a,h)anthracene | 2017/09/27 | | 80 | % | 30 - 130 |
| | | | Fluoranthene | 2017/09/27 | | 106 | % | 30 - 130 |
| | | | Fluorene | 2017/09/27 | | 94 | % | 30 - 130 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/27 | | 79 | % | 30 - 130 |
| | | | Naphthalene | 2017/09/27 | | 92 | % | 30 - 130 |
| | | | Perylene | 2017/09/27 | | 88 | % | 30 - 130 |
| | | | Phenanthrene | 2017/09/27 | | 98 | % | 30 - 130 |
| | | | Pyrene | 2017/09/27 | | 101 | % | 30 - 130 |
| 5178035 | GTH | Method Blank | D10-Anthracene | 2017/09/27 | | 90 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/27 | | 87 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/27 | | 92 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | 2-Methylnaphthalene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Acenaphthene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Acenaphthylene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Anthracene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Benzo(a)anthracene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Benzo(a)pyrene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Benzo(b)fluoranthene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Benzo(g,h,i)perylene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Benzo(j)fluoranthene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Benzo(k)fluoranthene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Chrysene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Dibenz(a,h)anthracene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Fluoranthene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Fluorene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Naphthalene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Perylene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Phenanthrene | 2017/09/27 | <0.0050 | | mg/kg | |
| | | | Pyrene | 2017/09/27 | <0.0050 | | mg/kg | |
| 5178035 | GTH | RPD - Sample/Sample Dup | 1-Methylnaphthalene | 2017/09/27 | NC | | % | 50 |
| | | | 2-Methylnaphthalene | 2017/09/27 | 35 | | % | 50 |
| | | | Acenaphthene | 2017/09/27 | 7.6 | | % | 50 |
| | | | Acenaphthylene | 2017/09/27 | NC | | % | 50 |
| | | | Anthracene | 2017/09/27 | 37 | | % | 50 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Benzo(a)anthracene | 2017/09/27 | 36 | | % | 50 |
| | | | Benzo(a)pyrene | 2017/09/27 | 41 | | % | 50 |
| | | | Benzo(b)fluoranthene | 2017/09/27 | 48 | | % | 50 |
| | | | Benzo(g,h,i)perylene | 2017/09/27 | 46 | | % | 50 |
| | | | Benzo(j)fluoranthene | 2017/09/27 | 36 | | % | 50 |
| | | | Benzo(k)fluoranthene | 2017/09/27 | 49 | | % | 50 |
| | | | Chrysene | 2017/09/27 | 40 | | % | 50 |
| | | | Dibenz(a,h)anthracene | 2017/09/27 | NC | | % | 50 |
| | | | Fluoranthene | 2017/09/27 | 6.1 | | % | 50 |
| | | | Fluorene | 2017/09/27 | 13 | | % | 50 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/27 | 51 (3) | | % | 50 |
| | | | Naphthalene | 2017/09/27 | NC | | % | 50 |
| | | | Perylene | 2017/09/27 | 29 | | % | 50 |
| | | | Phenanthrene | 2017/09/27 | 20 | | % | 50 |
| | | | Pyrene | 2017/09/27 | 11 | | % | 50 |
| 5178585 | ZZ | Matrix Spike | o-Terphenyl | 2017/09/23 | | 88 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/23 | | 93 | % | 50 - 130 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/23 | | 91 | % | 50 - 130 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/23 | | 99 | % | 50 - 130 |
| 5178585 | ZZ | Spiked Blank | o-Terphenyl | 2017/09/23 | | 89 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/23 | | 89 | % | 80 - 120 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/23 | | 89 | % | 80 - 120 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/23 | | 94 | % | 80 - 120 |
| 5178585 | ZZ | Method Blank | o-Terphenyl | 2017/09/23 | | 91 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/23 | <10 | | ug/g | |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/23 | <50 | | ug/g | |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/23 | <50 | | ug/g | |
| 5178585 | ZZ | RPD - Sample/Sample Dup | F2 (C10-C16 Hydrocarbons) | 2017/09/23 | NC | | % | 30 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/23 | 15 | | % | 30 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/23 | NC | | % | 30 |
| 5180356 | GTH | Matrix Spike(FDH273) | Benzo(j)fluoranthene | 2017/09/26 | | 71 | % | 30 - 130 |
| | | | D10-Anthracene | 2017/09/26 | | 81 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/26 | | 74 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/26 | | 70 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/26 | | 63 | % | 30 - 130 |
| | | | 2-Methylnaphthalene | 2017/09/26 | | 66 | % | 30 - 130 |
| | | | Acenaphthene | 2017/09/26 | | 63 | % | 30 - 130 |
| | | | Acenaphthylene | 2017/09/26 | | 80 | % | 30 - 130 |
| | | | Acridine | 2017/09/26 | | 94 | % | 30 - 130 |
| | | | Anthracene | 2017/09/26 | | 83 | % | 30 - 130 |
| | | | Benzo(a)anthracene | 2017/09/26 | | 86 | % | 30 - 130 |
| | | | Benzo(a)pyrene | 2017/09/26 | | 68 | % | 30 - 130 |
| | | | Benzo(b)fluoranthene | 2017/09/26 | | 64 | % | 30 - 130 |
| | | | Benzo(g,h,i)perylene | 2017/09/26 | | 56 | % | 30 - 130 |
| | | | Benzo(k)fluoranthene | 2017/09/26 | | 71 | % | 30 - 130 |
| | | | Chrysene | 2017/09/26 | | 82 | % | 30 - 130 |
| | | | Dibenz(a,h)anthracene | 2017/09/26 | | 51 | % | 30 - 130 |
| | | | Fluoranthene | 2017/09/26 | | 85 | % | 30 - 130 |
| | | | Fluorene | 2017/09/26 | | 71 | % | 30 - 130 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/26 | | 52 | % | 30 - 130 |
| | | | Naphthalene | 2017/09/26 | | 59 | % | 30 - 130 |
| | | | Perylene | 2017/09/26 | | 67 | % | 30 - 130 |
| | | | Phenanthrene | 2017/09/26 | | 70 | % | 30 - 130 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Pyrene | 2017/09/26 | | 83 | % | 30 - 130 |
| | | | Quinoline | 2017/09/26 | | 70 | % | 30 - 130 |
| 5180356 | GTH | Spiked Blank | Benzo(j)fluoranthene | 2017/09/26 | | 78 | % | 30 - 130 |
| | | | D10-Anthracene | 2017/09/26 | | 63 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/26 | | 71 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/26 | | 73 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/26 | | 66 | % | 30 - 130 |
| | | | 2-Methylnaphthalene | 2017/09/26 | | 68 | % | 30 - 130 |
| | | | Acenaphthene | 2017/09/26 | | 71 | % | 30 - 130 |
| | | | Acenaphthylene | 2017/09/26 | | 81 | % | 30 - 130 |
| | | | Acridine | 2017/09/26 | | 92 | % | 30 - 130 |
| | | | Anthracene | 2017/09/26 | | 79 | % | 30 - 130 |
| | | | Benzo(a)anthracene | 2017/09/26 | | 81 | % | 30 - 130 |
| | | | Benzo(a)pyrene | 2017/09/26 | | 75 | % | 30 - 130 |
| | | | Benzo(b)fluoranthene | 2017/09/26 | | 67 | % | 30 - 130 |
| | | | Benzo(g,h,i)perylene | 2017/09/26 | | 76 | % | 30 - 130 |
| | | | Benzo(k)fluoranthene | 2017/09/26 | | 78 | % | 30 - 130 |
| | | | Chrysene | 2017/09/26 | | 77 | % | 30 - 130 |
| | | | Dibenz(a,h)anthracene | 2017/09/26 | | 76 | % | 30 - 130 |
| | | | Fluoranthene | 2017/09/26 | | 80 | % | 30 - 130 |
| | | | Fluorene | 2017/09/26 | | 77 | % | 30 - 130 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/26 | | 72 | % | 30 - 130 |
| | | | Naphthalene | 2017/09/26 | | 64 | % | 30 - 130 |
| | | | Perylene | 2017/09/26 | | 77 | % | 30 - 130 |
| | | | Phenanthrene | 2017/09/26 | | 72 | % | 30 - 130 |
| | | | Pyrene | 2017/09/26 | | 77 | % | 30 - 130 |
| | | | Quinoline | 2017/09/26 | | 65 | % | 30 - 130 |
| 5180356 | GTH | Method Blank | Benzo(j)fluoranthene | 2017/09/26 | <0.010 | | ug/L | |
| | | | D10-Anthracene | 2017/09/26 | | 88 | % | 50 - 130 |
| | | | D14-Terphenyl | 2017/09/26 | | 89 | % | 50 - 130 |
| | | | D8-Acenaphthylene | 2017/09/26 | | 79 | % | 50 - 130 |
| | | | 1-Methylnaphthalene | 2017/09/26 | <0.050 | | ug/L | |
| | | | 2-Methylnaphthalene | 2017/09/26 | <0.050 | | ug/L | |
| | | | Acenaphthene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Acenaphthylene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Acridine | 2017/09/26 | <0.050 | | ug/L | |
| | | | Anthracene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Benzo(a)anthracene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Benzo(a)pyrene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Benzo(b)fluoranthene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Benzo(g,h,i)perylene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Benzo(k)fluoranthene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Chrysene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Dibenz(a,h)anthracene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Fluoranthene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Fluorene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Naphthalene | 2017/09/26 | <0.20 | | ug/L | |
| | | | Perylene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Phenanthrene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Pyrene | 2017/09/26 | <0.010 | | ug/L | |
| | | | Quinoline | 2017/09/26 | <0.050 | | ug/L | |
| 5180356 | GTH | RPD - Sample/Sample Dup | 1-Methylnaphthalene | 2017/09/26 | 7.3 | | % | 40 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company



Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | 2-Methylnaphthalene | 2017/09/26 | NC | | % | 40 |
| | | | Acenaphthene | 2017/09/26 | NC | | % | 40 |
| | | | Acenaphthylene | 2017/09/26 | NC | | % | 40 |
| | | | Acridine | 2017/09/26 | NC | | % | 40 |
| | | | Anthracene | 2017/09/26 | NC | | % | 40 |
| | | | Benzo(a)anthracene | 2017/09/26 | NC | | % | 40 |
| | | | Benzo(a)pyrene | 2017/09/26 | NC | | % | 40 |
| | | | Benzo(b)fluoranthene | 2017/09/26 | NC | | % | 40 |
| | | | Benzo(g,h,i)perylene | 2017/09/26 | NC | | % | 40 |
| | | | Benzo(k)fluoranthene | 2017/09/26 | NC | | % | 40 |
| | | | Chrysene | 2017/09/26 | NC | | % | 40 |
| | | | Dibenz(a,h)anthracene | 2017/09/26 | NC | | % | 40 |
| | | | Fluoranthene | 2017/09/26 | NC | | % | 40 |
| | | | Fluorene | 2017/09/26 | 9.9 | | % | 40 |
| | | | Indeno(1,2,3-cd)pyrene | 2017/09/26 | NC | | % | 40 |
| | | | Naphthalene | 2017/09/26 | NC | | % | 40 |
| | | | Perylene | 2017/09/26 | NC | | % | 40 |
| | | | Phenanthrene | 2017/09/26 | 15 | | % | 40 |
| | | | Pyrene | 2017/09/26 | NC | | % | 40 |
| | | | Quinoline | 2017/09/26 | NC | | % | 40 |
| 5180469 | RGA | Matrix Spike | 1,4-Difluorobenzene | 2017/09/26 | | 103 | % | 70 - 130 |
| | | | 4-Bromofluorobenzene | 2017/09/26 | | 97 | % | 70 - 130 |
| | | | D10-Ethylbenzene | 2017/09/26 | | 83 | % | 70 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/26 | | 94 | % | 70 - 130 |
| | | | Benzene | 2017/09/26 | | 94 | % | 70 - 130 |
| | | | Toluene | 2017/09/26 | | 89 | % | 70 - 130 |
| | | | Ethylbenzene | 2017/09/26 | | 88 | % | 70 - 130 |
| | | | o-Xylene | 2017/09/26 | | 91 | % | 70 - 130 |
| | | | p+m-Xylene | 2017/09/26 | | 87 | % | 70 - 130 |
| | | | F1 (C6-C10) | 2017/09/26 | | 81 | % | 70 - 130 |
| 5180469 | RGA | Spiked Blank | 1,4-Difluorobenzene | 2017/09/26 | | 101 | % | 70 - 130 |
| | | | 4-Bromofluorobenzene | 2017/09/26 | | 96 | % | 70 - 130 |
| | | | D10-Ethylbenzene | 2017/09/26 | | 80 | % | 70 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/26 | | 95 | % | 70 - 130 |
| | | | Benzene | 2017/09/26 | | 90 | % | 70 - 130 |
| | | | Toluene | 2017/09/26 | | 87 | % | 70 - 130 |
| | | | Ethylbenzene | 2017/09/26 | | 87 | % | 70 - 130 |
| | | | o-Xylene | 2017/09/26 | | 89 | % | 70 - 130 |
| | | | p+m-Xylene | 2017/09/26 | | 85 | % | 70 - 130 |
| | | | F1 (C6-C10) | 2017/09/26 | | 102 | % | 70 - 130 |
| 5180469 | RGA | Method Blank | 1,4-Difluorobenzene | 2017/09/26 | | 101 | % | 70 - 130 |
| | | | 4-Bromofluorobenzene | 2017/09/26 | | 96 | % | 70 - 130 |
| | | | D10-Ethylbenzene | 2017/09/26 | | 84 | % | 70 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/26 | | 95 | % | 70 - 130 |
| | | | Benzene | 2017/09/26 | <0.00020 | | mg/L | |
| | | | Toluene | 2017/09/26 | <0.00020 | | mg/L | |
| | | | Ethylbenzene | 2017/09/26 | <0.00020 | | mg/L | |
| | | | o-Xylene | 2017/09/26 | <0.00020 | | mg/L | |
| | | | p+m-Xylene | 2017/09/26 | <0.00040 | | mg/L | |
| | | | Total Xylenes | 2017/09/26 | <0.00040 | | mg/L | |
| | | | F1 (C6-C10) | 2017/09/26 | <0.025 | | mg/L | |
| | | | F1 (C6-C10) - BTEX | 2017/09/26 | <0.025 | | mg/L | |
| 5180469 | RGA | RPD - Sample/Sample Dup | Benzene | 2017/09/26 | NC | | % | 30 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Toluene | 2017/09/26 | NC | | % | 30 |
| | | | Ethylbenzene | 2017/09/26 | NC | | % | 30 |
| | | | o-Xylene | 2017/09/26 | NC | | % | 30 |
| | | | p+m-Xylene | 2017/09/26 | NC | | % | 30 |
| | | | Total Xylenes | 2017/09/26 | NC | | % | 30 |
| | | | F1 (C6-C10) | 2017/09/26 | NC | | % | 30 |
| | | | F1 (C6-C10) - BTEX | 2017/09/26 | NC | | % | 30 |
| 5180636 | ARS | Matrix Spike | Total Mercury (Hg) | 2017/09/26 | | 100 | % | 80 - 120 |
| 5180636 | ARS | Spiked Blank | Total Mercury (Hg) | 2017/09/26 | | 102 | % | 80 - 120 |
| 5180636 | ARS | Method Blank | Total Mercury (Hg) | 2017/09/26 | <0.013 | | ug/L | |
| 5180636 | ARS | RPD - Sample/Sample Dup | Total Mercury (Hg) | 2017/09/26 | NC | | % | 20 |
| 5181282 | ZZ | Matrix Spike | o-Terphenyl | 2017/09/26 | | 105 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/26 | | 98 | % | 50 - 130 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/26 | | 103 | % | 50 - 130 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/26 | | 102 | % | 50 - 130 |
| 5181282 | ZZ | Spiked Blank | o-Terphenyl | 2017/09/26 | | 106 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/26 | | 102 | % | 60 - 130 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/26 | | 104 | % | 60 - 130 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/26 | | 104 | % | 60 - 130 |
| 5181282 | ZZ | Method Blank | o-Terphenyl | 2017/09/26 | | 100 | % | 60 - 130 |
| | | | F2 (C10-C16 Hydrocarbons) | 2017/09/26 | <0.10 | | mg/L | |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/26 | <0.20 | | mg/L | |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/26 | <0.20 | | mg/L | |
| 5181282 | ZZ | RPD - Sample/Sample Dup | F2 (C10-C16 Hydrocarbons) | 2017/09/26 | NC | | % | 30 |
| | | | F3 (C16-C34 Hydrocarbons) | 2017/09/26 | NC | | % | 30 |
| | | | F4 (C34-C50 Hydrocarbons) | 2017/09/26 | NC | | % | 30 |
| 5182179 | NRG | Matrix Spike | Total Alkalinity (Total as CaCO3) | 2017/09/26 | | NC | % | 80 - 120 |
| 5182179 | NRG | Spiked Blank | Total Alkalinity (Total as CaCO3) | 2017/09/26 | | 114 | % | 80 - 120 |
| 5182179 | NRG | Method Blank | Total Alkalinity (Total as CaCO3) | 2017/09/26 | <5.0 | | mg/L | |
| 5182179 | NRG | RPD - Sample/Sample Dup | Total Alkalinity (Total as CaCO3) | 2017/09/26 | 1.7 (4) | | % | 25 |
| 5182181 | NRG | Matrix Spike | Dissolved Chloride (Cl) | 2017/09/26 | | 97 | % | 80 - 120 |
| 5182181 | NRG | QC Standard | Dissolved Chloride (Cl) | 2017/09/26 | | 106 | % | 80 - 120 |
| 5182181 | NRG | Spiked Blank | Dissolved Chloride (Cl) | 2017/09/26 | | 100 | % | 80 - 120 |
| 5182181 | NRG | Method Blank | Dissolved Chloride (Cl) | 2017/09/26 | <1.0 | | mg/L | |
| 5182181 | NRG | RPD - Sample/Sample Dup | Dissolved Chloride (Cl) | 2017/09/26 | 1.2 | | % | 25 |
| 5182182 | KBT | Matrix Spike | Dissolved Sulphate (SO4) | 2017/09/26 | | 105 | % | 80 - 120 |
| 5182182 | KBT | Spiked Blank | Dissolved Sulphate (SO4) | 2017/09/26 | | 98 | % | 80 - 120 |
| 5182182 | KBT | Method Blank | Dissolved Sulphate (SO4) | 2017/09/26 | <2.0 | | mg/L | |
| 5182182 | KBT | RPD - Sample/Sample Dup | Dissolved Sulphate (SO4) | 2017/09/26 | 0.23 | | % | 25 |
| 5182183 | NRG | Spiked Blank | Colour | 2017/09/27 | | 96 | % | 80 - 120 |
| 5182183 | NRG | Method Blank | Colour | 2017/09/27 | <5.0 | | TCU | |
| 5182183 | NRG | RPD - Sample/Sample Dup | Colour | 2017/09/27 | 0.86 | | % | 20 |
| 5182184 | NRG | Matrix Spike | Reactive Silica (SiO2) | 2017/09/26 | | NC | % | 80 - 120 |
| 5182184 | NRG | Spiked Blank | Reactive Silica (SiO2) | 2017/09/26 | | 98 | % | 80 - 120 |
| 5182184 | NRG | Method Blank | Reactive Silica (SiO2) | 2017/09/26 | <0.50 | | mg/L | |
| 5182186 | NRG | Matrix Spike | Orthophosphate (P) | 2017/09/26 | | 99 | % | 80 - 120 |
| 5182186 | NRG | Spiked Blank | Orthophosphate (P) | 2017/09/26 | | 101 | % | 80 - 120 |
| 5182186 | NRG | Method Blank | Orthophosphate (P) | 2017/09/26 | <0.010 | | mg/L | |
| 5182187 | NRG | Matrix Spike | Nitrate + Nitrite (N) | 2017/09/26 | | 88 | % | 80 - 120 |
| 5182187 | NRG | Spiked Blank | Nitrate + Nitrite (N) | 2017/09/26 | | 92 | % | 80 - 120 |
| 5182187 | NRG | Method Blank | Nitrate + Nitrite (N) | 2017/09/26 | <0.050 | | mg/L | |
| 5182190 | NRG | Matrix Spike | Nitrite (N) | 2017/09/27 | | 98 | % | 80 - 120 |
| 5182190 | NRG | Spiked Blank | Nitrite (N) | 2017/09/27 | | 99 | % | 80 - 120 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| 5182190 | NRG | Method Blank | Nitrite (N) | 2017/09/27 | <0.010 | | mg/L | |
| 5182190 | NRG | RPD - Sample/Sample Dup | Nitrite (N) | 2017/09/27 | NC | | % | 25 |
| 5182405 | NRG | Matrix Spike | Nitrogen (Ammonia Nitrogen) | 2017/09/26 | | 103 | % | 80 - 120 |
| 5182405 | NRG | Spiked Blank | Nitrogen (Ammonia Nitrogen) | 2017/09/26 | | 105 | % | 80 - 120 |
| 5182405 | NRG | Method Blank | Nitrogen (Ammonia Nitrogen) | 2017/09/26 | <0.050 | | mg/L | |
| 5182405 | NRG | RPD - Sample/Sample Dup | Nitrogen (Ammonia Nitrogen) | 2017/09/26 | NC | | % | 20 |
| 5184415 | SMT | Matrix Spike | Total Organic Carbon (C) | 2017/09/27 | | 100 | % | 80 - 120 |
| 5184415 | SMT | Spiked Blank | Total Organic Carbon (C) | 2017/09/27 | | 103 | % | 80 - 120 |
| 5184415 | SMT | Method Blank | Total Organic Carbon (C) | 2017/09/27 | <0.50 | | mg/L | |
| 5184415 | SMT | RPD - Sample/Sample Dup | Total Organic Carbon (C) | 2017/09/27 | 4.6 | | % | 20 |
| 5184457 | DDS | Matrix Spike(FDH281) | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/27 | | NC | % | 65 - 135 |
| 5184457 | DDS | Spiked Blank | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/27 | | 101 | % | 65 - 135 |
| 5184457 | DDS | Method Blank | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/27 | <100 | | ug/g | |
| 5184457 | DDS | RPD - Sample/Sample Dup | F4G-sg (Grav. Heavy Hydrocarbons) | 2017/09/27 | 15 | | % | 50 |
| 5185065 | SMT | Matrix Spike | Total Organic Carbon (C) | 2017/09/27 | | 95 | % | 80 - 120 |
| 5185065 | SMT | Spiked Blank | Total Organic Carbon (C) | 2017/09/27 | | 99 | % | 80 - 120 |
| 5185065 | SMT | Method Blank | Total Organic Carbon (C) | 2017/09/27 | <0.50 | | mg/L | |
| 5185065 | SMT | RPD - Sample/Sample Dup | Total Organic Carbon (C) | 2017/09/27 | 4.7 | | % | 20 |
| 5238099 | CXU | Matrix Spike | C13-1234678 HeptaCDD | 2017/10/31 | | 88 | % | 30 - 130 |
| | | | C13-1234678 HeptaCDF | 2017/10/31 | | 89 | % | 30 - 130 |
| | | | C13-123678 HexaCDD | 2017/10/31 | | 88 | % | 30 - 130 |
| | | | C13-123678 HexaCDF | 2017/10/31 | | 91 | % | 30 - 130 |
| | | | C13-12378 PentaCDD | 2017/10/31 | | 110 | % | 30 - 130 |
| | | | C13-12378 PentaCDF | 2017/10/31 | | 109 | % | 30 - 130 |
| | | | C13-2378 TetraCDD | 2017/10/31 | | 84 | % | 30 - 130 |
| | | | C13-2378 TetraCDF | 2017/10/31 | | 121 | % | 30 - 130 |
| | | | C13-OCDD | 2017/10/31 | | 81 | % | 30 - 130 |
| | | | 2,3,7,8-Tetra CDD | 2017/10/31 | | 112 | % | 80 - 140 |
| | | | 1,2,3,7,8-Penta CDD | 2017/10/31 | | 101 | % | 80 - 140 |
| | | | 1,2,3,4,7,8-Hexa CDD | 2017/10/31 | | 122 | % | 80 - 140 |
| | | | 1,2,3,6,7,8-Hexa CDD | 2017/10/31 | | 126 | % | 80 - 140 |
| | | | 1,2,3,7,8,9-Hexa CDD | 2017/10/31 | | 122 | % | 80 - 140 |
| | | | 1,2,3,4,6,7,8-Hepta CDD | 2017/10/31 | | 102 | % | 80 - 140 |
| | | | Octa CDD | 2017/10/31 | | 112 | % | 80 - 140 |
| | | | 2,3,7,8-Tetra CDF | 2017/10/31 | | 77 (5) | % | 80 - 140 |
| | | | 1,2,3,7,8-Penta CDF | 2017/10/31 | | 98 | % | 80 - 140 |
| | | | 2,3,4,7,8-Penta CDF | 2017/10/31 | | 101 | % | 80 - 140 |
| | | | 1,2,3,4,7,8-Hexa CDF | 2017/10/31 | | 112 | % | 80 - 140 |
| | | | 1,2,3,6,7,8-Hexa CDF | 2017/10/31 | | 114 | % | 80 - 140 |
| | | | 2,3,4,6,7,8-Hexa CDF | 2017/10/31 | | 114 | % | 80 - 140 |
| | | | 1,2,3,7,8,9-Hexa CDF | 2017/10/31 | | 109 | % | 80 - 140 |
| | | | 1,2,3,4,6,7,8-Hepta CDF | 2017/10/31 | | 110 | % | 80 - 140 |
| | | | 1,2,3,4,7,8,9-Hepta CDF | 2017/10/31 | | 103 | % | 80 - 140 |
| | | | Octa CDF | 2017/10/31 | | 104 | % | 80 - 140 |
| 5238099 | CXU | Spiked Blank | C13-1234678 HeptaCDD | 2017/10/30 | | 84 | % | 30 - 130 |
| | | | C13-1234678 HeptaCDF | 2017/10/30 | | 97 | % | 30 - 130 |
| | | | C13-123678 HexaCDD | 2017/10/30 | | 85 | % | 30 - 130 |
| | | | C13-123678 HexaCDF | 2017/10/30 | | 100 | % | 30 - 130 |
| | | | C13-12378 PentaCDD | 2017/10/30 | | 95 | % | 30 - 130 |
| | | | C13-12378 PentaCDF | 2017/10/30 | | 104 | % | 30 - 130 |
| | | | C13-2378 TetraCDD | 2017/10/30 | | 92 | % | 30 - 130 |
| | | | C13-2378 TetraCDF | 2017/10/30 | | 128 | % | 30 - 130 |
| | | | C13-OCDD | 2017/10/30 | | 83 | % | 30 - 130 |

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | 2,3,7,8-Tetra CDD | 2017/10/30 | | 106 | % | 80 - 140 |
| | | | 1,2,3,7,8-Penta CDD | 2017/10/30 | | 105 | % | 80 - 140 |
| | | | 1,2,3,4,7,8-Hexa CDD | 2017/10/30 | | 132 | % | 80 - 140 |
| | | | 1,2,3,6,7,8-Hexa CDD | 2017/10/30 | | 137 | % | 80 - 140 |
| | | | 1,2,3,7,8,9-Hexa CDD | 2017/10/30 | | 137 | % | 80 - 140 |
| | | | 1,2,3,4,6,7,8-Hepta CDD | 2017/10/30 | | 101 | % | 80 - 140 |
| | | | Octa CDD | 2017/10/30 | | 116 | % | 80 - 140 |
| | | | 2,3,7,8-Tetra CDF | 2017/10/30 | | 86 | % | 80 - 140 |
| | | | 1,2,3,7,8-Penta CDF | 2017/10/30 | | 96 | % | 80 - 140 |
| | | | 2,3,4,7,8-Penta CDF | 2017/10/30 | | 120 | % | 80 - 140 |
| | | | 1,2,3,4,7,8-Hexa CDF | 2017/10/30 | | 111 | % | 80 - 140 |
| | | | 1,2,3,6,7,8-Hexa CDF | 2017/10/30 | | 114 | % | 80 - 140 |
| | | | 2,3,4,6,7,8-Hexa CDF | 2017/10/30 | | 121 | % | 80 - 140 |
| | | | 1,2,3,7,8,9-Hexa CDF | 2017/10/30 | | 114 | % | 80 - 140 |
| | | | 1,2,3,4,6,7,8-Hepta CDF | 2017/10/30 | | 101 | % | 80 - 140 |
| | | | 1,2,3,4,7,8,9-Hepta CDF | 2017/10/30 | | 89 | % | 80 - 140 |
| | | | Octa CDF | 2017/10/30 | | 110 | % | 80 - 140 |
| 5238099 | CXU | Spiked Blank DUP | C13-1234678 HeptaCDD | 2017/10/30 | | 90 | % | 30 - 130 |
| | | | C13-1234678 HeptaCDF | 2017/10/30 | | 101 | % | 30 - 130 |
| | | | C13-123678 HexaCDD | 2017/10/30 | | 95 | % | 30 - 130 |
| | | | C13-123678 HexaCDF | 2017/10/30 | | 107 | % | 30 - 130 |
| | | | C13-12378 PentaCDD | 2017/10/30 | | 95 | % | 30 - 130 |
| | | | C13-12378 PentaCDF | 2017/10/30 | | 105 | % | 30 - 130 |
| | | | C13-2378 TetraCDD | 2017/10/30 | | 95 | % | 30 - 130 |
| | | | C13-2378 TetraCDF | 2017/10/30 | | 130 | % | 30 - 130 |
| | | | C13-OCDD | 2017/10/30 | | 88 | % | 30 - 130 |
| | | | 2,3,7,8-Tetra CDD | 2017/10/30 | | 102 | % | 80 - 140 |
| | | | 1,2,3,7,8-Penta CDD | 2017/10/30 | | 102 | % | 80 - 140 |
| | | | 1,2,3,4,7,8-Hexa CDD | 2017/10/30 | | 123 | % | 80 - 140 |
| | | | 1,2,3,6,7,8-Hexa CDD | 2017/10/30 | | 135 | % | 80 - 140 |
| | | | 1,2,3,7,8,9-Hexa CDD | 2017/10/30 | | 122 | % | 80 - 140 |
| | | | 1,2,3,4,6,7,8-Hepta CDD | 2017/10/30 | | 98 | % | 80 - 140 |
| | | | Octa CDD | 2017/10/30 | | 111 | % | 80 - 140 |
| | | | 2,3,7,8-Tetra CDF | 2017/10/30 | | 84 | % | 80 - 140 |
| | | | 1,2,3,7,8-Penta CDF | 2017/10/30 | | 93 | % | 80 - 140 |
| | | | 2,3,4,7,8-Penta CDF | 2017/10/30 | | 108 | % | 80 - 140 |
| | | | 1,2,3,4,7,8-Hexa CDF | 2017/10/30 | | 106 | % | 80 - 140 |
| | | | 1,2,3,6,7,8-Hexa CDF | 2017/10/30 | | 110 | % | 80 - 140 |
| | | | 2,3,4,6,7,8-Hexa CDF | 2017/10/30 | | 117 | % | 80 - 140 |
| | | | 1,2,3,7,8,9-Hexa CDF | 2017/10/30 | | 107 | % | 80 - 140 |
| | | | 1,2,3,4,6,7,8-Hepta CDF | 2017/10/30 | | 98 | % | 80 - 140 |
| | | | 1,2,3,4,7,8,9-Hepta CDF | 2017/10/30 | | 88 | % | 80 - 140 |
| | | | Octa CDF | 2017/10/30 | | 105 | % | 80 - 140 |
| 5238099 | CXU | RPD | 2,3,7,8-Tetra CDD | 2017/10/30 | 3.8 | | % | 25 |
| | | | 1,2,3,7,8-Penta CDD | 2017/10/30 | 2.9 | | % | 25 |
| | | | 1,2,3,4,7,8-Hexa CDD | 2017/10/30 | 7.1 | | % | 25 |
| | | | 1,2,3,6,7,8-Hexa CDD | 2017/10/30 | 1.5 | | % | 25 |
| | | | 1,2,3,7,8,9-Hexa CDD | 2017/10/30 | 12 | | % | 25 |
| | | | 1,2,3,4,6,7,8-Hepta CDD | 2017/10/30 | 3.0 | | % | 25 |
| | | | Octa CDD | 2017/10/30 | 4.4 | | % | 25 |
| | | | 2,3,7,8-Tetra CDF | 2017/10/30 | 2.4 | | % | 25 |
| | | | 1,2,3,7,8-Penta CDF | 2017/10/30 | 3.2 | | % | 25 |
| | | | 2,3,4,7,8-Penta CDF | 2017/10/30 | 11 | | % | 25 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | 1,2,3,4,7,8-Hexa CDF | 2017/10/30 | 4.6 | | % | 25 |
| | | | 1,2,3,6,7,8-Hexa CDF | 2017/10/30 | 3.6 | | % | 25 |
| | | | 2,3,4,6,7,8-Hexa CDF | 2017/10/30 | 3.4 | | % | 25 |
| | | | 1,2,3,7,8,9-Hexa CDF | 2017/10/30 | 6.3 | | % | 25 |
| | | | 1,2,3,4,6,7,8-Hepta CDF | 2017/10/30 | 3.0 | | % | 25 |
| | | | 1,2,3,4,7,8,9-Hepta CDF | 2017/10/30 | 1.1 | | % | 25 |
| | | | Octa CDF | 2017/10/30 | 4.7 | | % | 25 |
| 5238099 | CXU | Method Blank | C13-1234678 HeptaCDD | 2017/10/30 | | 98 | % | 30 - 130 |
| | | | C13-1234678 HeptaCDF | 2017/10/30 | | 111 | % | 30 - 130 |
| | | | C13-123678 HexaCDD | 2017/10/30 | | 95 | % | 30 - 130 |
| | | | C13-123678 HexaCDF | 2017/10/30 | | 104 | % | 30 - 130 |
| | | | C13-12378 PentaCDD | 2017/10/30 | | 96 | % | 30 - 130 |
| | | | C13-12378 PentaCDF | 2017/10/30 | | 103 | % | 30 - 130 |
| | | | C13-2378 TetraCDD | 2017/10/30 | | 89 | % | 30 - 130 |
| | | | C13-2378 TetraCDF | 2017/10/30 | | 142 (6) | | 30 - 130 |
| | | | C13-OCDD | 2017/10/30 | | 99 | % | 30 - 130 |
| | | | 2,3,7,8-Tetra CDD | 2017/10/30 | <0.102, EDL=0.102 | | pg/g | |
| | | | 1,2,3,7,8-Penta CDD | 2017/10/30 | <0.107, EDL=0.107 | | pg/g | |
| | | | 1,2,3,4,7,8-Hexa CDD | 2017/10/30 | <0.112, EDL=0.112 | | pg/g | |
| | | | 1,2,3,6,7,8-Hexa CDD | 2017/10/30 | <0.116, EDL=0.116 | | pg/g | |
| | | | 1,2,3,7,8,9-Hexa CDD | 2017/10/30 | <0.0955, EDL=0.0955 | | pg/g | |
| | | | 1,2,3,4,6,7,8-Hepta CDD | 2017/10/30 | 0.121, EDL=0.110 | | pg/g | |
| | | | Octa CDD | 2017/10/30 | 0.836, EDL=0.115 | | pg/g | |
| | | | Total Tetra CDD | 2017/10/30 | <0.107, EDL=0.107 (7) | | pg/g | |
| | | | Total Penta CDD | 2017/10/30 | <0.107, EDL=0.107 | | pg/g | |
| | | | Total Hexa CDD | 2017/10/30 | <0.107, EDL=0.107 (7) | | pg/g | |
| | | | Total Hepta CDD | 2017/10/30 | 0.121, EDL=0.110 | | pg/g | |
| | | | 2,3,7,8-Tetra CDF | 2017/10/30 | <0.0568, EDL=0.0568 | | pg/g | |
| | | | 1,2,3,7,8-Penta CDF | 2017/10/30 | <0.117, EDL=0.117 | | pg/g | |
| | | | 2,3,4,7,8-Penta CDF | 2017/10/30 | <0.116, EDL=0.116 | | pg/g | |
| | | | 1,2,3,4,7,8-Hexa CDF | 2017/10/30 | <0.0785, EDL=0.0785 | | pg/g | |
| | | | 1,2,3,6,7,8-Hexa CDF | 2017/10/30 | <0.0771, EDL=0.0771 | | pg/g | |
| | | | 2,3,4,6,7,8-Hexa CDF | 2017/10/30 | <0.0841, EDL=0.0841 | | pg/g | |
| | | | 1,2,3,7,8,9-Hexa CDF | 2017/10/30 | <0.0828, EDL=0.0828 | | pg/g | |

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | 1,2,3,4,6,7,8-Hepta CDF | 2017/10/30 | <0.103, EDL=0.103 | | pg/g | |
| | | | 1,2,3,4,7,8,9-Hepta CDF | 2017/10/30 | <0.116, EDL=0.116 | | pg/g | |
| | | | Octa CDF | 2017/10/30 | <0.134, EDL=0.134 (7) | | pg/g | |
| | | | Total Tetra CDF | 2017/10/30 | <0.0568, EDL=0.0568 | | pg/g | |
| | | | Total Penta CDF | 2017/10/30 | <0.116, EDL=0.116 | | pg/g | |
| | | | Total Hexa CDF | 2017/10/30 | <0.0805, EDL=0.0805 | | pg/g | |
| | | | Total Hepta CDF | 2017/10/30 | <0.109, EDL=0.109 | | pg/g | |
| 5238099 | CXU | RPD - Sample/Sample Dup | 2,3,7,8-Tetra CDD | 2017/10/30 | NC | | % | 25 |
| | | | 1,2,3,7,8-Penta CDD | 2017/10/30 | NC | | % | 25 |
| | | | 1,2,3,4,7,8-Hexa CDD | 2017/10/30 | NC (7) | | % | 25 |
| | | | 1,2,3,6,7,8-Hexa CDD | 2017/10/30 | 24 | | % | 25 |
| | | | 1,2,3,7,8,9-Hexa CDD | 2017/10/30 | NC | | % | 25 |
| | | | 1,2,3,4,6,7,8-Hepta CDD | 2017/10/30 | 13 | | % | 25 |
| | | | Octa CDD | 2017/10/30 | 13 | | % | 25 |
| | | | Total Tetra CDD | 2017/10/30 | NC | | % | 25 |
| | | | Total Penta CDD | 2017/10/30 | 8.3 | | % | 25 |
| | | | Total Hexa CDD | 2017/10/30 | 9.6 | | % | 25 |
| | | | Total Hepta CDD | 2017/10/30 | 14 | | % | 25 |
| | | | 2,3,7,8-Tetra CDF | 2017/10/30 | NC | | % | 25 |
| | | | 1,2,3,7,8-Penta CDF | 2017/10/30 | NC | | % | 25 |
| | | | 2,3,4,7,8-Penta CDF | 2017/10/30 | NC | | % | 25 |
| | | | 1,2,3,4,7,8-Hexa CDF | 2017/10/30 | NC | | % | 25 |
| | | | 1,2,3,6,7,8-Hexa CDF | 2017/10/30 | NC (7) | | % | 25 |
| | | | 2,3,4,6,7,8-Hexa CDF | 2017/10/30 | NC | | % | 25 |
| | | | 1,2,3,7,8,9-Hexa CDF | 2017/10/30 | NC | | % | 25 |
| | | | 1,2,3,4,6,7,8-Hepta CDF | 2017/10/30 | 8.9 | | % | 25 |
| | | | 1,2,3,4,7,8,9-Hepta CDF | 2017/10/30 | 1.8 | | % | 25 |
| | | | Octa CDF | 2017/10/30 | 12 | | % | 25 |
| | | | Total Tetra CDF | 2017/10/30 | NC | | % | 25 |
| | | | Total Penta CDF | 2017/10/30 | NC | | % | 25 |
| | | | Total Hexa CDF | 2017/10/30 | 13 | | % | 25 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | % Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Hepta CDF | 2017/10/30 | 4.2 | | % | 25 |

N/A = Not Applicable

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

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

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

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

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

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

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

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

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

(2) Poor RPD due to sample inhomogeneity. < 10 % of compounds in multi-component analysis in violation.

(3) Duplicate: < 10 % of compounds in multi-component analysis in violation.

(4) Elevated reporting limit due to sample matrix.

(5) Native recovery is outside method limits.

(6) Recovery outside method acceptance criteria. No impact on data.

(7) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K2737
Report Date: 2017/11/02

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: CUT THROAT ISLAND

## VALIDATION SIGNATURE PAGE

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

Brad Newman, Scientific Service Specialist

Eric Dearman, Scientific Specialist

Kevin G. MacDonald

Kevin MacDonald, Inorganics Supervisor

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

Philippe Deveau

Phil Deveau, 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.



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your Project #: 10550.04
Site Location: LABRADOR

**Attention: Abigail Garnett**

GEMTEC LIMITED
191 Doak Rd
Fredericton, NB
Canada E3C 2E6

Your C.O.C. #: 627202-01-01, 627179-01-01, 627179-02-01, 627179-03-01, 627179-04-01, 627179-06-01, 627179-07-01

**Report Date: 2018/05/30**
Report #: R5183397
Version: 7 - Revision

# CERTIFICATE OF ANALYSIS – REVISED REPORT

**MAXXAM JOB #: B7K6270**
**Received: 2017/09/20, 10:26**

Sample Matrix: Water
# Samples Received: 1

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Reference |
|---|---|---|---|---|---|
| Volatile Organic Compounds in Water | 1 | N/A | 2017/09/22 | ATL SOP 00133 | EPA 8260C R3 m |

**Remarks:**

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.


Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Your Project #: 10550.04
Site Location: LABRADOR

**Attention: Abigail Garnett**

GEMTEC LIMITED
191 Doak Rd
Fredericton, NB
Canada E3C 2E6

Your C.O.C. #: 627202-01-01, 627179-01-01, 627179-02-01, 627179-03-01, 627179-04-01, 627179-06-01, 627179-07-01

**Report Date: 2018/05/30**
Report #: R5183397
Version: 7 - Revision

# CERTIFICATE OF ANALYSIS – REVISED REPORT

**MAXXAM JOB #: B7K6270**
**Received: 2017/09/20, 10:26**

Encryption Key

Heather Macumber
Senior Project Manager
30 May 2018 08:49:38

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

==================================================================

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



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K6270
Report Date: 2018/05/30



GEMTEC LIMITED
Client Project #: 10550.04
Site Location: LABRADOR

## ATLANTIC VOC IN WATER (WATER)

| Maxxam ID | | FDZ526 | | |
|---|---|---|---|---|
| Sampling Date | | 2017/09/15 | | |
| COC Number | | 627179-07-01 | | |
| | UNITS | TRIP BLANK | RDL | QC Batch |
| **Chlorobenzenes** | | | | |
| 1,2-Dichlorobenzene | ug/L | <0.50 | 0.50 | 5175677 |
| 1,3-Dichlorobenzene | ug/L | <1.0 | 1.0 | 5175677 |
| 1,4-Dichlorobenzene | ug/L | <1.0 | 1.0 | 5175677 |
| Chlorobenzene | ug/L | <1.0 | 1.0 | 5175677 |
| **Volatile Organics** | | | | |
| 1,1,1-Trichloroethane | ug/L | <1.0 | 1.0 | 5175677 |
| 1,1,2,2-Tetrachloroethane | ug/L | <0.50 | 0.50 | 5175677 |
| 1,1,2-Trichloroethane | ug/L | <1.0 | 1.0 | 5175677 |
| 1,1-Dichloroethane | ug/L | <2.0 | 2.0 | 5175677 |
| 1,1-Dichloroethylene | ug/L | <0.50 | 0.50 | 5175677 |
| 1,2-Dichloroethane | ug/L | <1.0 | 1.0 | 5175677 |
| 1,2-Dichloropropane | ug/L | <0.50 | 0.50 | 5175677 |
| Benzene | ug/L | <1.0 | 1.0 | 5175677 |
| Bromodichloromethane | ug/L | <1.0 | 1.0 | 5175677 |
| Bromoform | ug/L | <1.0 | 1.0 | 5175677 |
| Bromomethane | ug/L | <0.50 | 0.50 | 5175677 |
| Carbon Tetrachloride | ug/L | <0.50 | 0.50 | 5175677 |
| Chloroethane | ug/L | <8.0 | 8.0 | 5175677 |
| Chloroform | ug/L | <1.0 | 1.0 | 5175677 |
| Chloromethane | ug/L | <8.0 | 8.0 | 5175677 |
| cis-1,2-Dichloroethylene | ug/L | <0.50 | 0.50 | 5175677 |
| cis-1,3-Dichloropropene | ug/L | <0.50 | 0.50 | 5175677 |
| Dibromochloromethane | ug/L | <1.0 | 1.0 | 5175677 |
| Ethylbenzene | ug/L | <1.0 | 1.0 | 5175677 |
| Ethylene Dibromide | ug/L | <0.20 | 0.20 | 5175677 |
| Methyl t-butyl ether (MTBE) | ug/L | <2.0 | 2.0 | 5175677 |
| Methylene Chloride(Dichloromethane) | ug/L | <3.0 | 3.0 | 5175677 |
| o-Xylene | ug/L | <1.0 | 1.0 | 5175677 |
| p+m-Xylene | ug/L | <2.0 | 2.0 | 5175677 |
| Styrene | ug/L | <1.0 | 1.0 | 5175677 |
| Tetrachloroethylene | ug/L | <1.0 | 1.0 | 5175677 |
| Toluene | ug/L | <1.0 | 1.0 | 5175677 |
| Total Trihalomethanes | ug/L | <1.0 | 1.0 | 5175677 |
| Total Xylenes | ug/L | <1.0 | 1.0 | 5175677 |
| trans-1,2-Dichloroethylene | ug/L | <0.50 | 0.50 | 5175677 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K6270
Report Date: 2018/05/30

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: LABRADOR

## ATLANTIC VOC IN WATER (WATER)

| Maxxam ID | | FDZ526 | | |
|---|---|---|---|---|
| Sampling Date | | 2017/09/15 | | |
| COC Number | | 627179-07-01 | | |
| | UNITS | TRIP BLANK | RDL | QC Batch |
| trans-1,3-Dichloropropene | ug/L | <0.50 | 0.50 | 5175677 |
| Trichloroethylene | ug/L | <1.0 | 1.0 | 5175677 |
| Trichlorofluoromethane (FREON 11) | ug/L | <8.0 | 8.0 | 5175677 |
| Vinyl Chloride | ug/L | <0.50 | 0.50 | 5175677 |
| **Surrogate Recovery (%)** | | | | |
| 4-Bromofluorobenzene | % | 99 | | 5175677 |
| D4-1,2-Dichloroethane | % | 100 | | 5175677 |
| D8-Toluene | % | 98 | | 5175677 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

## GENERAL COMMENTS

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

| | |
|---|---|
| Package 1 | 3.2°C |

VOCF1 Analysis: The sample extracts were transferred from the soil before 14 days. Analysis was completed within the 40 day specified hold time.

F4G analysis added to FDZ403-01, FDZ407-03, FDZ420-02, FDZ425-02, FDZ426-03, FDZ439-03, FDZ442-03, FDZ444-03, FDZ446-02, FDZ447-02 and FDZ448-02 as per request from A. Garnett. SMS 2017/10/13

Revised Report: Below samples analyszed for F4G as per request from Abigail. HM Oct 13/17

SS_SP_60 – FDZ521
SS_SP_37 – FDZ453
SS_SP_41 – FDZ457
SS_SP_44 – FDZ460
SS_SP_44_FD – FDZ461
SS_SP_50 – FDZ509
SS_SP_14 – FDZ402
SD_SP_04 – FDZ520
SS_SP_46 – FDZ505
SS_SP_13 – FDZ401
SS_SP_16 – FDZ404

Revised Report - Changed units for CCME Hydrocarbon in water to mg/L as per request from Terri. HWS Nov 8/17

Revised Report - Split report to include only Trip Blank sample as per request from Terri. HWS May 29/18

Revised Report - Changed location from Spotted Island to Labrador as per request from Terri.
HWS May 30/18

Sample FDZ372 [SW_SP_04] : RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample FDZ401 [SS_SP_13] : F2-F4 Analysis: Detection limits were adjusted for high moisture content.

VOC-F1 Analysis: Detection limits were raised due to high moisture content of soil provided.
F4GGRAV-S:Due to high moisture content in the sample matrix, the DL is adjusted accordingly due to lower dry weight.

Sample FDZ402 [SS_SP_14] : F2-F4 Analysis: Detection limits were adjusted for high moisture content.

VOC-F1 Analysis: Detection limits were raised due to high moisture content of soil provided.
F4GGRAV-S:Due to high moisture content in the sample matrix, the DL is adjusted accordingly due to lower dry weight.

Sample FDZ403 [SS_SP_15] : F2-F4 Analysis: Detection limits were adjusted for high moisture content.

VOC-F1 Analysis: Detection limits were raised due to high moisture content of soil provided.
F4G Analysis: Due to high moisture the detection limit was adjusted.

Sample FDZ404 [SS_SP_16] : F2-F4 Analysis: Detection limits were adjusted for high moisture content.

VOC-F1 Analysis: Detection limits were raised due to high moisture content of soil provided.
F4GGRAV-S:Due to high moisture content in the sample matrix, the DL is adjusted accordingly due to lower dry weight.

Sample FDZ441 [SS_SP_30] : VOCF1 Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.

Sample FDZ443 [SS_SP_32] : VOCF1 Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.

Sample FDZ444 [SS_SP_33] : VOCF1 Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.

Sample FDZ445 [SS_SP_34] : VOCF1 Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.

Sample FDZ447 [SS_SP_35] : VOCF1 Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.

Sample FDZ455 [SS_SP_39] : VOCF1 Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.

Sample FDZ505 [SS_SP_46] : F24FID-S Analysis: Detection limits were adjusted for high moisture content.
F4GGRAV-S:Due to high moisture content in the sample matrix, the DL is adjusted accordingly due to lower dry weight.

Sample FDZ513 [SD_SP_01_BG] : VOCF1 Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.

Sample FDZ514 [SD_SP_02] : VOCF1 Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.

Sample FDZ520 [SD_SP_04] : VOC-F1 Analysis: Detection limits were raised due to high moisture content.
F4GGRAV-S:Due to high moisture content in the sample matrix, the DL is adjusted accordingly due to lower dry weight.

**Results relate only to the items tested.**

Maxxam Job #: B7K6270
Report Date: 2018/05/30

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: LABRADOR

## QUALITY ASSURANCE REPORT

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| 5175677 | ASL | Matrix Spike | 1,2-Dichlorobenzene | 2017/09/22 | | 91 | % | 70 - 130 |
| | | | 1,3-Dichlorobenzene | 2017/09/22 | | 91 | % | 70 - 130 |
| | | | 1,4-Dichlorobenzene | 2017/09/22 | | 89 | % | 70 - 130 |
| | | | Chlorobenzene | 2017/09/22 | | 96 | % | 70 - 130 |
| | | | 1,1,1-Trichloroethane | 2017/09/22 | | 104 | % | 70 - 130 |
| | | | 1,1,2,2-Tetrachloroethane | 2017/09/22 | | 101 | % | 70 - 130 |
| | | | 1,1,2-Trichloroethane | 2017/09/22 | | 102 | % | 70 - 130 |
| | | | 1,1-Dichloroethane | 2017/09/22 | | 106 | % | 70 - 130 |
| | | | 1,1-Dichloroethylene | 2017/09/22 | | 108 | % | 70 - 130 |
| | | | 1,2-Dichloroethane | 2017/09/22 | | 101 | % | 70 - 130 |
| | | | 1,2-Dichloropropane | 2017/09/22 | | 98 | % | 70 - 130 |
| | | | 4-Bromofluorobenzene | 2017/09/22 | | 100 | % | 70 - 130 |
| | | | Benzene | 2017/09/22 | | 97 | % | 70 - 130 |
| | | | Bromodichloromethane | 2017/09/22 | | 100 | % | 70 - 130 |
| | | | Bromoform | 2017/09/22 | | 103 | % | 70 - 130 |
| | | | Bromomethane | 2017/09/22 | | 100 | % | 60 - 140 |
| | | | Carbon Tetrachloride | 2017/09/22 | | 101 | % | 70 - 130 |
| | | | Chloroethane | 2017/09/22 | | 93 | % | 60 - 140 |
| | | | Chloroform | 2017/09/22 | | 96 | % | 70 - 130 |
| | | | Chloromethane | 2017/09/22 | | 78 | % | 60 - 140 |
| | | | cis-1,2-Dichloroethylene | 2017/09/22 | | 104 | % | 70 - 130 |
| | | | cis-1,3-Dichloropropene | 2017/09/22 | | 109 | % | 70 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/22 | | 101 | % | 70 - 130 |
| | | | D8-Toluene | 2017/09/22 | | 98 | % | 70 - 130 |
| | | | Dibromochloromethane | 2017/09/22 | | 103 | % | 70 - 130 |
| | | | Ethylbenzene | 2017/09/22 | | 99 | % | 70 - 130 |
| | | | Ethylene Dibromide | 2017/09/22 | | 101 | % | 70 - 130 |
| | | | Methyl t-butyl ether (MTBE) | 2017/09/22 | | 111 | % | 70 - 130 |
| | | | Methylene Chloride(Dichloromethane) | 2017/09/22 | | 105 | % | 70 - 130 |
| | | | o-Xylene | 2017/09/22 | | 99 | % | 70 - 130 |
| | | | p+m-Xylene | 2017/09/22 | | 99 | % | 70 - 130 |
| | | | Styrene | 2017/09/22 | | 103 | % | 70 - 130 |
| | | | Tetrachloroethylene | 2017/09/22 | | 101 | % | 70 - 130 |
| | | | Toluene | 2017/09/22 | | 101 | % | 70 - 130 |
| | | | trans-1,2-Dichloroethylene | 2017/09/22 | | 104 | % | 70 - 130 |
| | | | trans-1,3-Dichloropropene | 2017/09/22 | | 100 | % | 70 - 130 |
| | | | Trichloroethylene | 2017/09/22 | | 102 | % | 70 - 130 |
| | | | Trichlorofluoromethane (FREON 11) | 2017/09/22 | | 95 | % | 60 - 140 |
| | | | Vinyl Chloride | 2017/09/22 | | 101 | % | 60 - 140 |
| 5175677 | ASL | Spiked Blank | 1,2-Dichlorobenzene | 2017/09/22 | | 91 | % | 70 - 130 |
| | | | 1,3-Dichlorobenzene | 2017/09/22 | | 92 | % | 70 - 130 |
| | | | 1,4-Dichlorobenzene | 2017/09/22 | | 90 | % | 70 - 130 |
| | | | Chlorobenzene | 2017/09/22 | | 96 | % | 70 - 130 |
| | | | 1,1,1-Trichloroethane | 2017/09/22 | | 104 | % | 70 - 130 |
| | | | 1,1,2,2-Tetrachloroethane | 2017/09/22 | | 99 | % | 70 - 130 |
| | | | 1,1,2-Trichloroethane | 2017/09/22 | | 100 | % | 70 - 130 |
| | | | 1,1-Dichloroethane | 2017/09/22 | | 107 | % | 70 - 130 |
| | | | 1,1-Dichloroethylene | 2017/09/22 | | 109 | % | 70 - 130 |
| | | | 1,2-Dichloroethane | 2017/09/22 | | 100 | % | 70 - 130 |
| | | | 1,2-Dichloropropane | 2017/09/22 | | 97 | % | 70 - 130 |
| | | | 4-Bromofluorobenzene | 2017/09/22 | | 100 | % | 70 - 130 |
| | | | Benzene | 2017/09/22 | | 96 | % | 70 - 130 |
| | | | Bromodichloromethane | 2017/09/22 | | 100 | % | 70 - 130 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K6270
Report Date: 2018/05/30

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: LABRADOR

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Bromoform | 2017/09/22 | | 102 | % | 70 - 130 |
| | | | Bromomethane | 2017/09/22 | | 98 | % | 60 - 140 |
| | | | Carbon Tetrachloride | 2017/09/22 | | 102 | % | 70 - 130 |
| | | | Chloroethane | 2017/09/22 | | 94 | % | 60 - 140 |
| | | | Chloroform | 2017/09/22 | | 97 | % | 70 - 130 |
| | | | Chloromethane | 2017/09/22 | | 94 | % | 60 - 140 |
| | | | cis-1,2-Dichloroethylene | 2017/09/22 | | 105 | % | 70 - 130 |
| | | | cis-1,3-Dichloropropene | 2017/09/22 | | 106 | % | 70 - 130 |
| | | | D4-1,2-Dichloroethane | 2017/09/22 | | 101 | % | 70 - 130 |
| | | | D8-Toluene | 2017/09/22 | | 98 | % | 70 - 130 |
| | | | Dibromochloromethane | 2017/09/22 | | 102 | % | 70 - 130 |
| | | | Ethylbenzene | 2017/09/22 | | 100 | % | 70 - 130 |
| | | | Ethylene Dibromide | 2017/09/22 | | 100 | % | 70 - 130 |
| | | | Methyl t-butyl ether (MTBE) | 2017/09/22 | | 112 | % | 70 - 130 |
| | | | Methylene Chloride(Dichloromethane) | 2017/09/22 | | 106 | % | 70 - 130 |
| | | | o-Xylene | 2017/09/22 | | 99 | % | 70 - 130 |
| | | | p+m-Xylene | 2017/09/22 | | 99 | % | 70 - 130 |
| | | | Styrene | 2017/09/22 | | 104 | % | 70 - 130 |
| | | | Tetrachloroethylene | 2017/09/22 | | 101 | % | 70 - 130 |
| | | | Toluene | 2017/09/22 | | 101 | % | 70 - 130 |
| | | | trans-1,2-Dichloroethylene | 2017/09/22 | | 106 | % | 70 - 130 |
| | | | trans-1,3-Dichloropropene | 2017/09/22 | | 96 | % | 70 - 130 |
| | | | Trichloroethylene | 2017/09/22 | | 101 | % | 70 - 130 |
| | | | Trichlorofluoromethane (FREON 11) | 2017/09/22 | | 95 | % | 60 - 140 |
| | | | Vinyl Chloride | 2017/09/22 | | 102 | % | 60 - 140 |
| 5175677 | ASL | Method Blank | 1,2-Dichlorobenzene | 2017/09/22 | <0.50 | | ug/L | |
| | | | 1,3-Dichlorobenzene | 2017/09/22 | <1.0 | | ug/L | |
| | | | 1,4-Dichlorobenzene | 2017/09/22 | <1.0 | | ug/L | |
| | | | Chlorobenzene | 2017/09/22 | <1.0 | | ug/L | |
| | | | 1,1,1-Trichloroethane | 2017/09/22 | <1.0 | | ug/L | |
| | | | 1,1,2,2-Tetrachloroethane | 2017/09/22 | <0.50 | | ug/L | |
| | | | 1,1,2-Trichloroethane | 2017/09/22 | <1.0 | | ug/L | |
| | | | 1,1-Dichloroethane | 2017/09/22 | <2.0 | | ug/L | |
| | | | 1,1-Dichloroethylene | 2017/09/22 | <0.50 | | ug/L | |
| | | | 1,2-Dichloroethane | 2017/09/22 | <1.0 | | ug/L | |
| | | | 1,2-Dichloropropane | 2017/09/22 | <0.50 | | ug/L | |
| | | | 4-Bromofluorobenzene | 2017/09/22 | | 100 | % | 70 - 130 |
| | | | Benzene | 2017/09/22 | <1.0 | | ug/L | |
| | | | Bromodichloromethane | 2017/09/22 | <1.0 | | ug/L | |
| | | | Bromoform | 2017/09/22 | <1.0 | | ug/L | |
| | | | Bromomethane | 2017/09/22 | <0.50 | | ug/L | |
| | | | Carbon Tetrachloride | 2017/09/22 | <0.50 | | ug/L | |
| | | | Chloroethane | 2017/09/22 | <8.0 | | ug/L | |
| | | | Chloroform | 2017/09/22 | <1.0 | | ug/L | |
| | | | Chloromethane | 2017/09/22 | <8.0 | | ug/L | |
| | | | cis-1,2-Dichloroethylene | 2017/09/22 | <0.50 | | ug/L | |
| | | | cis-1,3-Dichloropropene | 2017/09/22 | <0.50 | | ug/L | |
| | | | D4-1,2-Dichloroethane | 2017/09/22 | | 97 | % | 70 - 130 |
| | | | D8-Toluene | 2017/09/22 | | 99 | % | 70 - 130 |
| | | | Dibromochloromethane | 2017/09/22 | <1.0 | | ug/L | |
| | | | Ethylbenzene | 2017/09/22 | <1.0 | | ug/L | |
| | | | Ethylene Dibromide | 2017/09/22 | <0.20 | | ug/L | |
| | | | Methyl t-butyl ether (MTBE) | 2017/09/22 | <2.0 | | ug/L | |

Maxxam Job #: B7K6270
Report Date: 2018/05/30

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: LABRADOR

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Methylene Chloride(Dichloromethane) | 2017/09/22 | <3.0 | | ug/L | |
| | | | o-Xylene | 2017/09/22 | <1.0 | | ug/L | |
| | | | p+m-Xylene | 2017/09/22 | <2.0 | | ug/L | |
| | | | Styrene | 2017/09/22 | <1.0 | | ug/L | |
| | | | Tetrachloroethylene | 2017/09/22 | <1.0 | | ug/L | |
| | | | Toluene | 2017/09/22 | <1.0 | | ug/L | |
| | | | Total Trihalomethanes | 2017/09/22 | <1.0 | | ug/L | |
| | | | Total Xylenes | 2017/09/22 | <1.0 | | ug/L | |
| | | | trans-1,2-Dichloroethylene | 2017/09/22 | <0.50 | | ug/L | |
| | | | trans-1,3-Dichloropropene | 2017/09/22 | <0.50 | | ug/L | |
| | | | Trichloroethylene | 2017/09/22 | <1.0 | | ug/L | |
| | | | Trichlorofluoromethane (FREON 11) | 2017/09/22 | <8.0 | | ug/L | |
| | | | Vinyl Chloride | 2017/09/22 | <0.50 | | ug/L | |
| 5175677 | ASL | RPD | 1,2-Dichlorobenzene | 2017/09/22 | NC | | % | 40 |
| | | | 1,3-Dichlorobenzene | 2017/09/22 | NC | | % | 40 |
| | | | 1,4-Dichlorobenzene | 2017/09/22 | NC | | % | 40 |
| | | | Chlorobenzene | 2017/09/22 | NC | | % | 40 |
| | | | 1,1,1-Trichloroethane | 2017/09/22 | NC | | % | 40 |
| | | | 1,1,2,2-Tetrachloroethane | 2017/09/22 | NC | | % | 40 |
| | | | 1,1,2-Trichloroethane | 2017/09/22 | NC | | % | 40 |
| | | | 1,1-Dichloroethane | 2017/09/22 | NC | | % | 40 |
| | | | 1,1-Dichloroethylene | 2017/09/22 | NC | | % | 40 |
| | | | 1,2-Dichloroethane | 2017/09/22 | NC | | % | 40 |
| | | | 1,2-Dichloropropane | 2017/09/22 | NC | | % | 40 |
| | | | Benzene | 2017/09/22 | NC | | % | 40 |
| | | | Bromodichloromethane | 2017/09/22 | NC | | % | 40 |
| | | | Bromoform | 2017/09/22 | NC | | % | 40 |
| | | | Bromomethane | 2017/09/22 | NC | | % | 40 |
| | | | Carbon Tetrachloride | 2017/09/22 | NC | | % | 40 |
| | | | Chloroethane | 2017/09/22 | NC | | % | 40 |
| | | | Chloroform | 2017/09/22 | NC | | % | 40 |
| | | | Chloromethane | 2017/09/22 | NC | | % | 40 |
| | | | cis-1,2-Dichloroethylene | 2017/09/22 | NC | | % | 40 |
| | | | cis-1,3-Dichloropropene | 2017/09/22 | NC | | % | 40 |
| | | | Dibromochloromethane | 2017/09/22 | NC | | % | 40 |
| | | | Ethylbenzene | 2017/09/22 | NC | | % | 40 |
| | | | Ethylene Dibromide | 2017/09/22 | NC | | % | 40 |
| | | | Methylene Chloride(Dichloromethane) | 2017/09/22 | NC | | % | 40 |
| | | | o-Xylene | 2017/09/22 | NC | | % | 40 |
| | | | p+m-Xylene | 2017/09/22 | NC | | % | 40 |
| | | | Styrene | 2017/09/22 | NC | | % | 40 |
| | | | Tetrachloroethylene | 2017/09/22 | NC | | % | 40 |
| | | | Toluene | 2017/09/22 | NC | | % | 40 |
| | | | trans-1,2-Dichloroethylene | 2017/09/22 | NC | | % | 40 |
| | | | trans-1,3-Dichloropropene | 2017/09/22 | NC | | % | 40 |
| | | | Trichloroethylene | 2017/09/22 | NC | | % | 40 |
| | | | Trichlorofluoromethane (FREON 11) | 2017/09/22 | NC | | % | 40 |



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K6270
Report Date: 2018/05/30

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: LABRADOR

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Vinyl Chloride | 2017/09/22 | 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 (absolute difference <= 2x RDL).



Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K6270
Report Date: 2018/05/30

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: LABRADOR

## VALIDATION SIGNATURE PAGE

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

Philippe Deveau

Phil Deveau, Scientific Specialist (Organics)

# APPENDIX F

National Classification System for Contaminated Sites

## CCME National Classification System for Contaminated Sites (2008, 2010 v 1.2)
## Pre-Screening Checklist

| Question | Response (yes / no) | Comment |
|---|---|---|
| 1. Are **Radioactive material**, **Bacterial contamination** or **Biological hazards** likely to be present at the site? | No | If yes, do not proceed through the NCSCS. Contact applicable regulatory agency immediately. |
| 2. Are there **no contamination exceedances** (known or suspected)? Determination of exceedances may be based on: 1) CCME environmental quality guidelines; 2) equivalent provincial guidelines/standards if no CCME guideline exists for a specific chemical in a relevant medium; or 3) toxicity benchmarks derived from the literature for chemicals not covered by CCME or provincial guidelines/standards. | No | If yes (i.e., there are no exceedances), do not proceed through the NCSCS. |
| 3. Have **partial/incompleted or no environmental site investigations** been conducted for the Site? | No | If yes, do not proceed through the NCSCS. |
| 4. Is there direct and signficant evidence of **impacts to humans** at the site, or off-site due to migration of contaminants from the site? | No | If yes, automatically rate the site as Class 1, a priority for remediation or risk management, regardless of the total score obtained should one be calculated (e.g., for comparison with other Class 1 sites). |
| 5. Is there direct and significant evidence of **impacts to ecological receptors** at the site, or off-site due to migration of contaminants from the site? | No | Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are considered to be severe, the site may be categorized as Class 1, regardless of the numerical total NCSCS score. For the purpose of application of the NCSCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction. |
| 6. Are there indicators of significant **adverse effects in the exposure zone** (i.e., the zone in which receptors may come into contact with contaminants)? Some examples are as follows:<br>-Hydrocarbon sheen or NAPL in the exposure zone<br>-Severely stressed biota or devoid of biota;<br>-Presence of material at ground surface or sediment with suspected high concentration of contaminants such as ore tailings, sandblasting grit, slag, and coal tar. | No | If yes, automatically rate the site as Class 1, a priority for remediation or risk management, regardless of the total score obtained should one be calculated (e.g., for comparison with other Class 1 sites). |
| 7. Do measured concentrations of volatiles or unexploded ordnances represent an **explosion hazard**? | No | If yes, automatically rate the site as Class 1, a priority for remediation or risk management, and do not continue until the safety risks have been addressed. Consult your jurisdiction's occupational health and safety guidance or legislation on exposive hazards and measurement of lower explosive limits. |

**If none of the above applies, proceed with the NCSCS scoring.**

# CCME National Classification System for Contaminated Sites (2008, 2010 v 1.2)
## Summary of Site Conditions

| | | |
|---|---|---|
| **Subject Site:** | **Cut Throat Island, Former United States Air Force (USAF Station), Former Pine Tree Line Radar Station, Labrador** | |
| Civic Address:<br>*(or other description of location)* | Cut Throat Island is approximately 88 kilometers north of Cartwright off the coast of Labrador. | |
| Site Common Name :<br>*(if applicable)* | | |
| Site Owner or Custodian:<br>*(Organization and Contact Person)* | Province of Newfoundland and Labrador | |
| Legal description *or* metes and bounds: | | |
| Approximate Site area: | 478,015 square meters, 118.12 acres | |
| PID(s) :<br>*(or Parcel Identification Numbers [PIN] if untitled Crown land)* | Not applicable to Newfoundland and Labrador | |
| Centre of site:<br>*(provide latitude/longitude or UTM coordinates)* | Latitude:<br>Longitude: | ______ degrees ______ min ______ secs<br>______ degrees ______ min ______ secs |
| | UTM Coordinate: | Northing _6038468.13_____________<br>Easting __491330.08____________ |
| Site Land Use: | Current: | Current-Vacant |
| | Proposed: | |
| **Site Plan** | **To delineate the bounds of the Site a site plan MUST be attached. The plan must be drawn to scale indicating the boundaries in relation to well-defined reference points and/or legal descriptions. Delineation of the contamination should also be indicated on the site plan.** | |
| Provide a brief description of the Site: | The Site is a former manned Pinetree Line Gap Filler Radar Station for the United States Air Force (USAF) Cartwright Air Station. The Radar Station on Cut Throat Island was established in 1957 and operated until 1961. Cut Throat Island is located approximately 88 kilometers north of the town of Cartwright in Labrador. The Site is located along the eastern coast of the island and comprises of four separate parcels of land covers approximately 478,015 square meters (GHD, 2016). The Site is identified as having an Upper site and a Lower site with approximately 1.5 km of gravel roadway separating the two sites. The Upper Site consisted of: main building; radome tower; two communication antennae; disaster shack; fuel pump house; water pumping station; storage shed; catch basin 1,578,000 litre AST holding diesel / fuel oil; and helicopter pad. A freshwater lake, east of the Upper site was used as a source of drinking water. Along the eastern side of the roadway was an above ground pipeline, which transferred fuel from the Lower site to the Upper site. An area of dumping / landfill associated with the USAF was identified in 2017 between the Upper site and the Lower site along the west side of the roadway. A former USAF quarry and dump used during Site operations was located southeast of the Upper site. The Lower site consisted of a 1,625,000 L AST and pump house. In 1987, the Site was decommissioned, the contract for which included the razing of on-site structures and the burning of all materials, followed by the burying and covering of all building materials. All material brought to the Radar Station during its construction and operation remains on-site, in landfills. | |

**CCME National Classification System for Contaminated Sites (2008, 2010 v 1.2)**
**Summary of Site Conditions**

| | |
|---|---|
| Affected media and Contaminants of Potential Concern (COPC): | Soil -<br>Metals<br>petroleum hydrocarbons (PHC) (or petroleum oil and lubricants (POL))<br>polychlorinated biphenyls (PCB)<br>polycyclic aromatic hydrocarbons (PAH)<br>volatile organic compounds (VOCs)<br><br>Sediment:<br>Metals, PHC (POL), PCB, PAH, VOCs<br><br>Surface Water:<br>Metals, General Chemistry, PHC (POL), PCB, PAH, VOCs |

Please fill in the "letter" that best describes the level of information available for the site being assessed:

Site Letter Grade **D**

If letter grade is F, do not continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent.

| | |
|---|---|
| Scoring Completed By: | GEMTEC Consulting Engineers and Scientists Limited |
| Date Scoring Completed: | 23-Nov-18 |

**CCME National Classification System (2008, 2010 v 1.2)**

## (I) Contaminant Characteristics

Cut Throat Island, Former United States Air Force (USAF Station), Former Pine Tree Line Radar Station, Labrador

| Definition | Score | Rationale for Score (document any assumptions, reports, or site-specific information; provide references) | Method of Evaluation | Notes |
|---|---|---|---|---|
| 1. Residency Media (replaces physical state) | | | | |
| Which of the following residency media are known (or strongly suspected) to have one or more exceedances of the applicable CCME guidelines?<br>**yes** = has an exceedance or strongly suspected to have an exceedance<br>**no** = does not have an exceedance or strongly suspected not to have an exceedance | | Exceedances of ecological guildelines petroleum hydrocarbons (PHCs), PAHs, and metals in soil, PHCs in sediment, PHC and metals in surface water were confirmed. Exceedances of Human Health guidelines for PHC, PAH and metals in soil (GEMTEC, 2018) - Intial Testing Program. | The overall score is calculated by adding the individual scores from each residency media (having one or more exceedance of the most conservative media specific and land-use appropriate CCME guideline).<br><br>Summary tables of the Canadian Environmental Quality Guidelines for soil, water (aquatic life, non-potable groundwater environments, and agricultural water uses) and sediment are available on the CCME website at http://www.ccme.ca/publications/ceqg_rcqe.html?category_id=124 .<br><br>For potable groundwater environments, guidelines for Canadian Drinking Water Quality (for comparison with groundwater monitoring data) are available on the Health Canada website at http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guide-res_recom/index_e.html. | An increasing number of residency media containing chemical exceedances often equates to a greater potential risk due to an increase in the number of potential exposure pathways. |
| A. Soil<br>Yes<br>No<br>Do Not Know | Yes | | | |
| B. Groundwater<br>Yes<br>No<br>Do Not Know | Do Not Know | | | |
| C. Surface water<br>Yes<br>No<br>Do Not Know | Yes | | | |
| D. Sediment<br>Yes<br>No<br>Do Not Know | Yes | | | |
| "Known" -score | 6 | | | |
| "Potential" - score | 1 | | | |
| 2. Chemical Hazard | | | | |
| What is the relative degree of chemical hazard of the contaminant in the list of hazard rankings proposed by the Federal Contaminated Sites Action Plan (FCSAP)?<br>High<br>Medium<br>Low<br>Do Not Know | High | Lead is rated as "High" by FCSAP. Lead concentrations confirmed in soil at concentrations exceeding CCME guidelines (GEMTEC, 2018) - Initial Testing Program | The relative degree of chemical hazard should be selected based on the most hazardous contaminant known or suspected to be present at the site.<br><br>The degree of hazard has been defined by the Federal Contaminated Sites Action Plan (FCSAP) and a list of substances with their associated hazard (Low, Medium and High) has been provided as a separate sheet in this file.<br><br>*See Attached Reference Material for Contaminant Hazard Rankings.* | Hazard as defined in the revised NCS pertains to the physical properties of a chemical which can cause harm. Properties can include toxic potency, propensity to biomagnify, persistence in the environment, etc. Although there is some overlap between hazard and contaminant exceedance factor below, it will not be possible to derive contaminant exceedance factors for many substances which have a designated chemical hazard designation, but don't have a CCME guideline. The purpose of this category is to avoid missing a measure of toxic potential. |
| "Known" -score | 8 | | | |
| "Potential" - score | --- | | | |
| 3. Contaminant Exceedence Factor | | | | |
| What is the ratio between the measured contaminant concentration and the applicable CCME guidelines (or other "standards")?<br>Mobile NAPL<br>High (>100x)<br>Medium (10x to 100x)<br>Low (1x to 10x)<br>Do Not Know | High (>100x) | Maximum measured lead concentration of 3200 mg/kg compared to CCME guideline of 260 mg/kg (GEMTEC, 2018) - Initial Testing Program. A few parameters exceeded >100x over, but the majority were 10x to 100x. | Ranking of contaminant "exceedance" is determined by comparing contaminant concentrations with the *most conservative media-specific and land-use appropriate CCME* environmental quality guidelines. **Ranking should be based on contaminant with greatest exceedance of CCME guidelines.**<br>Ranking of contaminant hazard as high, medium and low is as follows:<br>High = One or more measured contaminant concentration is greater than 100 X appropriate CCME guidelines<br>Medium = One or more measured contaminant concentration is 10 - 99.99 X appropriate CCME guidelines<br>Low = One or more measured contaminant concentration is 1 - 9.99 X appropriate CCME guidelines<br>Mobile NAPL = Contaminant is a non-aqueous phase liquid (i.e., due to its low solubility, it does not dissolve in water, but remains as a separate liquid) and is present at a sufficiently high saturation (i.e., greater than residual NAPL saturation) such that there is significant potential for mobility either downwards or laterally.<br>Other standards may include local background concentration or published toxicity benchmarks.<br><br>Results of toxicity testing with site samples can be used as an alternative.<br>This approach is only relevant for contaminants that do not biomagnify in the food web, since toxicity tests would not indicate potential effects at higher trophic levels.<br>High = lethality observed.<br>Medium = no lethality, but sub lethal effects observed.<br>Low = neither lethal nor sub lethal effects observed. | In the event that elevated levels of a material with no associated CCME guidelines are present, check provincial and USEPA environmental criteria.<br><br>Hazard Quotients (sometimes referred to as a screening quotient in risk assessments) refer to the ratio of measured concentration to the concentration believed to be the threshold for toxicity. A similar calculation is used here to determine the contaminant exceedance factor (CEF). Concentrations greater than one times the applicable CCME guideline (i.e., CEF=>1) indicate that risks are possible. Mobile NAPL has the highest associated score (8) because of its highly concentrated nature and potential for increase in the size of the impacted zone. |
| "Known" -score | 6 | | | |
| "Potential" - score | --- | | | |

**CCME National Classification System (2008, 2010 v 1.2)**

## (I) Contaminant Characteristics

Cut Throat Island, Former United States Air Force (USAF Station), Former Pine Tree Line Radar Station, Labrador

| Definition | Score | Rationale for Score (document any assumptions, reports, or site-specific information; provide references) | Method of Evaluation | Notes |
|---|---|---|---|---|
| 4. Contaminant Quantity (known or strongly suspected) | | | | |
| What is the known or strongly suspected quantity of all contaminants?<br>>10 hectare (ha) or 5000 $m^3$<br>2 to 10 ha or 1000 to 5000 $m^3$<br><2 ha or 1000 $m^3$<br>Do Not Know | 2 to 10 ha or 1000 to 5000 m3 | The delineated impacted soil volume from the Initial Testing Program is approximately 1,200 m3 (GEMTEC, 2018). | Measure or estimate the area or quantity of total contamination (i.e, all contaminants known or strongly suspected to be present on the site). The "Area of Contamination" is defined as the area or volume of contaminated media (soil, sediment, groundwater, surface water) exceeding appropriate environmental criteria. | A larger quantity of a potentially toxic substance can result in a larger frequency of exposure as well as a greater probability of migration, therefore, larger quantities of these substances earn a higher score. |
| "Known" -score | 6 | | | |
| "Potential" - score | --- | | | |
| 5. Modifying Factors | | | | |
| Does the chemical fall in the class of persistent chemicals based on its behavior in the environment?<br>Yes<br>No<br>Do Not Know | Yes | Lead does not degrade in the environment. | Persistent chemicals, e.g., PCBs, chlorinated pesticides etc. either do not degrade or take longer to degrade, and therefore may be available to cause effects for a longer period of time. Canadian Environmental Protection Act (CEPA) classifies a chemical as persistent when it has at least one of the following characteristics:<br>(a) in air,<br>(i) its half-life is equal to or greater than 2 days, or<br>(ii) it is subject to atmospheric transport from its source to a remote area;<br>(b) in water, its half-life is equal to or greater than 182 days;<br>(c) in sediments, its half-life is equal to or greater than 365 days; or<br>(d) in soil, its half-life is equal to or greater than 182 days.<br><br>This list does not include metals or metalloids, which in their elemental form do not degrade. However metals and metalloids form chemical species in the environment, many of which are not readily bioavailable. | *Examples of Persistent Substances are provided in attached Reference Materials* |
| Are there contaminants present that could cause damage to utilities and infrastructure, either now or in the future, given their location?<br>Yes<br>No<br>Do Not Know | No | No underground infrastructure currently present or foreseen (GEMTEC, 2018) - Initial Testing Program. | | Some contaminants may react or absorb into underground utilities and infrastructure. For example, organic solvents may degrade some plastics, and salts could cause corrosion of metal. |
| How many different contaminant classes have representative CCME guideline exceedances?<br>one<br>two to four<br>five or more<br>Do Not Know | two to four | 1. Inorganic substances (including metals) – Soil, Surface Water<br>2. light extractable petroleum hydrocarbons (PHC F2) – Soil<br>3. heavy extractable petroleum hydrocarbons (PHC F3) - Soil<br>4. PAHs – Soil<br>(GEMTEC, 2018) - Initial Testing Program. | For the purposes of the revised NCS ranking system, the following chemicals represent distinct chemical "classes": inorganic substances (including metals), volatile petroleum hydrocarbons, light extractable petroleum hydrocarbons, heavy extractable petroleum hydrocarbons, PAHs, phenolic substances, chlorinated hydrocarbons, halogenated methanes, phthalate esters, pesticides. | *Refer to the Reference Material sheet for a list of example substances that fall under the various chemical classes.* |
| "Known" - Score | 4 | | | |
| "Potential" - Score | --- | | | |

**Contaminant Characteristic Total**

| | |
|---|---|
| Raw Total Scores- "Known" | 30 |
| Raw Total Scores- "Potential" | 1 |
| Raw Combined Total Scores | 31 |
| **Total Score (Raw Combined / 40 * 33)** | **25.6** |

**CCME National Classification System (2008, 2010 v 1.2)**

**(II) Migration Potential** (Evaluation of contaminant migration pathways)

Cut Throat Island, Former United States Air Force (USAF Station), Former Pine Tree Line Radar Station, Labrador

| Definition | Score | Rationale for Score<br>(document any assumptions, reports, or site-specific information; provide references) | Method Of Evaluation | Notes |
|---|---|---|---|---|
| 1. Groundwater Movement | | | | |
| A. Known COPC exceedances and an operable groundwater pathway within and/or beyond the property boundary. | | | | |
| i) For **potable groundwater environments**, 1) groundwater concentrations exceed background concentrations and 1X the Guideline for Canadian Drinking Water Quality (GCDWQ) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater contamination.<br>For **non-potable environments** (typically urban environments with municipal services), 1) groundwater concentrations exceed 1X the applicable non potable guidelines or modified generic guidelines (which exclude ingestion of drinking water pathway) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater impacts.<br><br>ii) Same as (i) except the information is not known but strongly suspected based on indirect observations.<br><br>iii) Meets GCDWQ for **potable environments**; meets non-potable criteria or modified generic criteria (excludes ingestion of drinking water pathway) for **non-potable environments**<br>**or**<br>Absence of groundwater exposure pathway (i.e., there is no aquifer (see definition at right) at the site or there is an adequate isolating layer between the aquifer and the contamination, and within 5 km of the site there are no aquatic receiving environments and the groundwater does not daylight).<br><br>Score | 12<br><br>9<br><br>0<br><br>Go to Potential<br>--- | | Review chemical data and evaluate groundwater quality.<br><br>The evaluation method concentrates on 1) a potable or non-potable groundwater environment; 2) the groundwater flow system and its potential to be an exposure pathway to known or potential receptors<br><br>An aquifer is defined as a geologic unit that yields groundwater in usable quantities and drinking water quality. The aquifer can currently be used as a potable water supply or could have the potential for use in the future. Non-potable groundwater environments are defined as areas that are serviced with a reliable alternative water supply (most commonly provided in urban areas). The evaluation of a non-potable environment will be based on a site specific basis.<br><br>Physical evidence includes significant sheens, liquid phase contamination, or contaminant saturated soils.<br><br>Seeps and springs are considered part of the groundwater pathway.<br><br>In Arctic environments, the potability and evaluation of the seasonal active layer (above the permafrost) as a groundwater exposure pathway will be considered on a site-specific basis. | The 1992 NCS rationale evaluated the off-site migration as a regulatory issue. The exposure assessment and classification of hazards should be evaluated regardless of the property boundaries.<br><br>Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a groundwater supply source in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resources such as internet links.<br><br>Note that for potable groundwater that also daylights into a nearby surface water body, the more stringent guidelines for both drinking water and protection of aquatic life should be considered.<br><br>**Selected References**<br><br>Potable Environments<br><br>Guidelines for Canadian Drinking Water Quality:www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guide-res_recom/index_e.html<br><br>Non-Potable Environments<br><br>Canadian Water Quality Guidelines for Protection of Aquatic Life. CCME. 1999 www.ccme.ca<br><br>Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations. Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002. |
| **NOTE: If a score is assigned here for Known COPC Exceedances, then you can skip Part B (Potential for groundwater pathway) and go to Section 2 (Surface Water Pathway)** | | | | |
| B. Potential for groundwater pathway. | | | | |
| a. Relative Mobility<br>High<br>Moderate<br>Low<br>Insignificant<br>Do Not Know<br><br>Score | Moderate<br>2 | PHC and Metal impacts reported in soils -can leach to groundwater GEMTEC, 2018 | Organics / Koc (L/kg) — Metals with higher mobility at acidic conditions — Metals with higher mobility at alkaline conditions<br>Koc < 500 (i.e., log Koc < 2.7) — pH < 5 — pH > 8.5<br>Koc = 500 to 5000 (i.e., log Koc = 2.7 to 3.7) — pH = 5 to 6 — pH = 7.5 to 8.5<br>Koc = 5,000 to 100,000 (i.e., log Koc = 3.7 to 5) — pH > 6 — pH < 7.5<br>Koc > 100,000 (i.e., log Koc > 5) | Reference: US EPA Soil Screening Guidance (Part 5 - Table 39)<br><br>If a score of zero is assigned for relative mobility, it is still recommended that the following sections on potential for groundwater pathway be evaluated and scored. Although the Koc of an individual contaminant may suggest that it will be relatively immobile, it is possible that, with complex mixtures, there could be enhanced mobility due to co-solvent effects. Therefore, the Koc cannot be relied on solely as a measure of mobility. An evaluation of other factors such as containment, thickness of confining layer, hydraulic conductivities and precipitation infiltration rate are still useful in predicting potential for groundwater migration, even if a contaminant is expected to have insignificant mobility based on its chemistry alone. |
| b. Presence of engineered sub-surface containment?<br>No containment<br>Partial containment<br>Full containment<br>Do Not Know<br><br>Score | No containment<br>3 | No engineered containment at the Site | Review the existing engineered systems or natural attenuation processes for the site and determine if full or partial containment is achieved.<br>Full containment is defined as an engineered system or natural attenuation processes, monitored as being effective, which provide for full capture and/or treatment of contaminants. All chemicals of concern must be contained for "Full Containment" scoring. Natural attenuation must have sufficient data, and reports cited with monitoring data to support steady state conditions and the attenuation processes. If there is no containment or insufficient natural attenuation process, this category is evaluated as high. If there is less than full containment or if uncertain, then evaluate as medium. In Arctic environments, permafrost will be evaluated, as appropriate, based on detailed evaluations, effectiveness and reliability to contain/control contaminant migration. | Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links.<br><br>**Selected Resources:**<br>United States Environmental Protection Agency (USEPA) 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128.<br>Environment Canada – Ontario Region – Natural Attenuation Technical Assistance Bulletin (TABS) Number 19 –21. |
| c. Thickness of confining layer over aquifer of concern or groundwater exposure pathway<br>3 m or less including no confining layer or discontinuous confining layer<br>3 to 10 m<br>> 10 m<br>Do Not Know<br><br>Score | Do Not Know<br>0.5 | No deeper subsurface investigations have been completed at the Site | The term "confining layer" refers to geologic material with little or no permeability or hydraulic conductivity (such as unfractured clay); water does not pass through this layer or the rate of movement is extremely slow.<br><br>Measure the thickness and extent of materials that will impede the migration of contaminants to the groundwater exposure pathway.<br>The evaluation of this category is based on:<br>1) The presence and thickness of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as drinking water sources or<br>2) The presence and thickness of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated zone (e.g., water table aquifer, first hydrostratigraphic unit or other groundwater pathway). | |
| d. Hydraulic conductivity of confining layer<br>$>10^{-4}$ cm/s or no confining layer<br>$10^{-4}$ to $10^{-6}$ cm/s<br>$<10^{-6}$ cm/s<br>Do Not Know | | Discrete surface soil materials are coarse grained, but confining layer would be in the lower K bedrock. Lower hydraulic conductivities would apply | Determine the nature of geologic materials and estimate hydraulic conductivity from published material (or use "Range of Values of Hydraulic Conductivity and Permeability" figure in the Reference Material sheet). Unfractured clays should be scored low. Silts should be scored medium. Sand, gravel should be scored high. The evaluation of this category is based on:<br>1) The presence and hydraulic conductivity ("K") of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as a drinking water source, groundwater exposure pathway or<br>2) The presence and permeability ("k") of unsaturated subsurface materials that impede the vertica | |

## (II) Migration Potential (Evaluation of contaminant migration pathways)

Cut Throat Island, Former United States Air Force (USAF Station), Former Pine Tree Line Radar Station, Labrador

| Definition | Score | Rationale for Score (document any assumptions, reports, or site-specific information; provide references) | Method Of Evaluation | Notes |
|---|---|---|---|---|
| Score | <10-6 cm/s<br>0 | | 2) The presence and permeability ("K") of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated water table aquifer, first hydrostratigraphic unit or other groundwater pathway. | |
| B. Potential for groundwater pathway. | | | | |
| e. Precipitation infiltration rate<br>(Annual precipitation factor x surface soil relative permeability factor)<br>High<br>Moderate<br>Low<br>Very Low<br>None<br>Do Not Know<br>Score | High<br>1 | Based on Canadian Climate Normals (1981-2010) for Cartwright (closest station to Cape Harrison, at similar elevation):<br>Total annual precipitation = 1050.1 mm<br><br>1050.1 mm / 1000 = 1.1<br><br>1.1 * 0.6 (sand - as observed by GEMTEC 2018) | Precipitation<br>Refer to Environment Canada precipitation records for relevant areas. Divide annual precipitation by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score).<br><br>Permeability<br>For surface soil relative permeability (i.e., infiltration) assume: gravel (1), sand (0.6), loam (0.3) and pavement or clay (0).<br><br>Multiply the surface soil relative permeability factor with precipitation factor to obtain the score for precipitation infiltration rate. | |
| f. Hydraulic conductivity of aquifer<br>$>10^{-2}$ cm/s<br>$10^{-2}$ to $10^{-4}$ cm/s<br>$<10^{-4}$ cm/s<br>Do Not Know<br>Score | <10-4 cm/s<br>0 | Estimated based on unfractured grantic and granodioritic intrusive rocks | Determine the nature of geologic materials and estimate hydraulic conductivity of all aquifers of concern from published material (refer to "Range of Values of Hydraulic Conductivity and Permeability" in the Reference Material sheet). | |
| Potential groundwater pathway total | 6.5 | | | |
| Allowed Potential score | 6.5 | Note: If a "known" score is provided, the "potential" score is disallowed. | | |
| **Groundwater pathway total** | **6.5** | | | |
| 2. Surface Water Movement | | | | |
| A. Demonstrated migration of COPC in surface water above background conditions | | | | |
| Known concentrations of surface water:<br><br>i) Concentrations exceed background concentrations and exceed CCME CWQG for protection of aquatic life, irrigation, livestock water, and/or recreation (whichever uses are applicable at the site) by >1 X;<br>or<br>There is known contact of contaminants with surface water based on site observations.<br>or<br>In the absence of CWQG, chemicals have been proven to be toxic based on site specific testing (e.g. toxicity testing; or other indicator testing of exposure). | 12 | Concentrations of PHCs and metals exceeded ecological screening values, Initial Testing Program (GEMTEC 2018) | Collect all available information on quality of surface water near to site. Evaluate available data against Canadian Water Quality Guidelines (select appropriate guidelines based on local water use, e.g., recreation, irrigation, aquatic life, livestock watering, etc.). The evaluation method concentrates on the surface water flow system and its potential to be an exposure pathway. Contamination is present on the surface (above ground) and has the potential to impact surface water bodies. Surface water is defined as a water body that supports one of the following uses: recreation, irrigation, livestock watering, aquatic life. | General Notes:<br>Someone experienced must provide a thorough description of the sources researched to classify the surface water body in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resources such as internet links.<br><br>Selected References:<br><br>CCME. 1999. Canadian Water Quality Guidelines for the Protection of Aquatic Life<br>www.ccme.ca<br><br>CCME. 1999. Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses (Irrigation and Livestock Water)<br>www.ccme.ca<br><br>Health and Welfare Canada. 1992. Guidelines for Canadian Recreational Water Quality. |
| ii) Same as (i) except the information is not known but strongly suspected based on indirect observations. | 8 | | | |
| iii) Meets CWQG or absence of surface water exposure pathway (i.e., Distance to nearest surface water is > 5 km.) | 0 | | | |
| Score | 12<br>12 | | | |
| **NOTE: If a score is assigned here for Demonstrated Migration in Surface Water, then you can skip Part B (Potential for migration of COPCs in surface water) and go to Section 3 (Surface Soils)** | | | | |
| B. Potential for migration of COPCs in surface water | | | | |
| a. Presence of containment<br>No containment<br>Partial containment<br>Full containment<br>Do Not Know<br>Score | Do Not Know<br>3 | | Review the existing engineered systems and relate these structures to site conditions and proximity to surface water and determine if full containment is achieved: score low if there is full containment such as capping, berms, dikes; score medium if there is partial containment such as natural barriers, trees, ditches, sedimentation ponds; score high if there are no intervening barriers between the site and nearby surface water. Full containment must include containment of all chemicals. | |
| b. Distance to Surface Water<br>0 to <100 m<br>100 - 300 m<br>>300 m<br>Do Not Know<br>Score | Do Not Know<br>2 | | Review available mapping and survey data to determine distance to nearest surface water bodies. | |
| c. Topography<br>Contaminants above ground level and slope is steep<br>Contaminants at or below ground level and slope is steep<br>Contaminants above ground level and slope is intermediate<br>Contaminants at or below ground level and slope is intermediate<br>Contaminants above ground level and slope is flat | | | Review engineering documents on the topography of the site and the slope of surrounding terrain.<br>Steep slope = >50%<br>Intermediate slope = between 5 and 50%<br>Flat slope = < 5%<br>Note: Type of fill placement (e.g., trench, above ground, etc.). | |

## (II) Migration Potential (Evaluation of contaminant migration pathways)

Cut Throat Island, Former United States Air Force (USAF Station), Former Pine Tree Line Radar Station, Labrador

| Definition | Score | Rationale for Score (document any assumptions, reports, or site-specific information; provide references) | Method Of Evaluation | Notes |
|---|---|---|---|---|
| Contaminants at or below ground level and slope is flat<br>Do Not Know | Do Not Know | | | |
| Score | 1 | | | |
| d. Run-off potential<br>High (rainfall run-off score > 0.6)<br>Moderate (0.4 < rainfall run-off score <0.6)<br>Low (0.2 < rainfall run-off score <0.4)<br>Very Low (0 < rainfall run-off score < 0.2)<br>None (rainfall run-off score = 0)<br>Do Not Know | Do Not Know | | Rainfall<br>Refer to Environment Canada precipitation records for relevant areas. Divide rainfall by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score).<br>The former definition of "annual rainfall" did not include the precipitation as snow. This minor adjustment has been made. The second modification was the inclusion of permeability of surface materials as an evaluation factor.<br><br>Permeability<br>For infiltration assume: gravel (0), sand (0.3), loam (0.6) and pavement or clay (1).<br><br>Multiply the infiltration factor with precipitation factor to obtain rainfall run off score. | Selected Sources:<br>Environment Canada web page link:www.msc.ec.gc.ca<br>Snow to rainfall conversion apply ratio of 15 (snow):1(water) |
| Score | 0.4 | | | |
| e. Flood potential<br>1 in 2 years<br>1 in 10 years<br>1 in 50 years<br>Not in floodplain<br>Do Not Know | Do Not Know | | Review published data such as flood plain mapping or flood potential (e.g., spring or mountain run-off) and Conservation Authority records to evaluate flood potential of nearby water courses both up and down gradient. Rate zero if site not in flood plain. | |
| Score | 0.5 | | | |
| Potential surface water pathway total | 6.9 | | | |
| Allowed Potential score | --- | Note: If a "known" score is provided, the "potential" score is disallowed. | | |
| **Surface water pathway total** | **12** | | | |
| 3. Surface Soils (potential for dust, dermal and ingestion exposure) | | | | |
| A. Demonstrated concentrations of COPC in surface soils (top 1.5 m) | | | | |
| COPCs measured in surface soils exceed the CCME soil quality guideline. | 12 | PHC, PAH and Metals exceeded Ecological and / or Human Health Screening values, Initial Testing Program (GEMTEC 2018). | Collect all available information on quality of surface soils (i.e., top 1.5 metres) at the site. Evaluate available data against Canadian Soil Quality Guidelines. Select appropriate guidelines based on current (or proposed future) land use (i.e, agricultural, residential/parkland, commercial, or industrial), and soil texture if applicable (i.e., coarse or fine). | Selected References:<br>CCME. 1999. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health<br>www.ccme.ca |
| Strongly suspected that soils exceed guidelines | 9 | | | |
| COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock). | 0 | | | |
| | 12 | | | |
| Score | 12 | | | |
| **NOTE: If a score is assigned here for Demonstrated Concentrations in Surface Soils, then you can skip Part B (Potential for a surface soils migration pathway) and go to Section 4 (Vapour)** | | | | |
| B. Potential for a surface soils (top 1.5 m) migration pathway | | | | |
| a. Are the soils in question covered?<br>Exposed<br>Vegetated<br>Landscaped<br>Paved<br>Do Not Know | Do Not Know | | Consult engineering or risk assessment reports for the site. Alternatively, review photographs or perform a site visit.<br>Landscaped surface soils must include a minimum of 0.5 m of topsoil. | The possibility of contaminants in blowing snow have not been included in the revised NCS as it is difficult to assess what constitutes an unacceptable concentration and secondly, spills to snow or ice are most efficiently mitigated while freezing conditions remain. |
| Score | 4 | | | |
| b. For what proportion of the year does the site remain covered by snow?<br>0 to 10% of the year<br>10 to 30% of the year<br>More than 30% of the year<br>Do Not Know | Do Not Know | | Consult climatic information for the site. The increments represent the full span from soils which are always wet or covered with snow (and therefore less likely to generate dust) to those soils which are predominantly dry and not covered by snow (and therefore are more likely to generate dust). | |
| Score | 3 | | | |
| Potential surface soil pathway total | 7 | | | |
| Allowed Potential score | --- | **Note: If a "known" score is provided, the "potential" score is disallowed** | | |
| **Soil pathway total** | **12** | | | |
| 4. Vapour | | | | |
| A. Demonstrated COPCs in vapour. | | | | |
| Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations. | 12 | Exceedances of human health based guidelines for F2 and F3 hydrocarbons, Initial Testing Program (GEMTEC, 2018). Outdoor air pathway would apply. | Consult previous investigations, including human health risk assessments, for reports of vapours detected. | |
| Strongly suspected (based on observations and/or modelling) | 9 | | | |
| Vapour has not been measured and volatile hydrocarbons have not been found in site soils or groundwater. | 0 | | | |
| | 9 | | | |
| Score | 9 | | | |
| **NOTE: If a score is assigned here for Demonstrated COPCs in Vapour, then you can skip Part B (Potential for COPCs in vapour) and go to Section 5 (Sediment)** | | | | |
| B. Potential for COPCs in vapour | | | | |
| a. Relative Volatility based on Henry's Law Constant, H' (dimensionless) | | | | If the Henry's Law Constant for a substance indicates that it is not volatile, and a score of zero is assigned here for relative volatility, then the other three questions in this section on |

**(II) Migration Potential** (Evaluation of contaminant migration pathways)

Cut Throat Island, Former United States Air Force (USAF Station), Former Pine Tree Line Radar Station, Labrador

| Definition | Score | Rationale for Score (document any assumptions, reports, or site-specific information; provide references) | Method Of Evaluation | Notes |
|---|---|---|---|---|
| High (H' > 1.0E-1)<br>Moderate (H' = 1.0E-1 to 1.0E-3)<br>Low (H' < 1.0E-3)<br>Not Volatile<br>Do Not Know | Do Not Know | | Reference: US EPA Soil Screening Guidance (Part 5 - Table 36)<br><br>*Provided in Attached Reference Materials* | Potential for COPCs will be automatically assigned scores of zero and you can skip to section 5. |
| Score | 2.5 | | | |
| b. What is the soil grain size?<br>Fine<br>Coarse<br>Do Not Know | Do Not Know | | Review soil permeability data in engineering reports. The greater the permeability of soils, the greater the possible movement of vapours.<br><br>Fine-grained soils are defined as those which contain greater than 50% by mass particles less than 75 µm mean diameter (D50 < 75 µm). Coarse-grained soils are defined as those which contain greater than 50% by mass particles greater than 75 µm mean diameter (D50 > 75 µm). | |
| Score | 3 | | | |
| c. Is the depth to the source less than 10m?<br>Yes<br>No<br>Do Not Know | Do Not Know | | Review groundwater depths below grade for the site. | |
| Score | 1 | | | |
| d. Are there any preferential pathways?<br>Yes<br>No<br>Do Not Know | Do Not Know | | Visit the site during dry summer conditions and/or review available photographs.<br>Where bedrock is present, fractures would likely act as preferential pathyways. | Preferential pathways refer to areas where vapour migration is more likely to occur because there is lower resistance to flow than in the surrounding materials. For example, underground conduits such as sewer and utility lines, drains, or septic systems may serve as preferential pathways. Features of the building itself that may also be preferential pathways include earthen floors, expansion joints, wall cracks, or foundation perforations for subsurface features such as utility pipes, sumps, and drains. |
| Score | 1 | | | |
| Potential vapour pathway total | 7.5 | | | |
| Allowed Potential score | --- | Note: If a "known" score is provided, the "potential" score is disallowed. | | |
| **Vapour pathway total** | **9** | | | |
| 5. Sediment Movement | | | | |
| A. Demonstrated migration of sediments containing COPCs | | | | |
| There is evidence to suggest that sediments originally deposited to the site (exceeding the CCME sediment quality guidelines) have migrated. | 12 | | Review sediment assessment reports. Evidence of migration of contaminants in sediments must be reported by someone experienced in this area. | Usually not considered a significant concern in lakes/marine environments, but could be very important in rivers where transport downstream could be significant. |
| Strongly suspected (based on observations and/or modelling) | 9 | | | |
| Sediments have been contained and there is no indication that sediments will migrate in future.<br>**or**<br>Absence of sediment exposure pathway (i.e., within 5 km of the site there are no aquatic receiving environments, and therefore no sediments). | 0 | | | |
| | Go to Potential | | | |
| Score | --- | | | |
| **NOTE: If a score is assigned here for Demonstrated Migration of Sediments, then you can skip Part B (Potential for Sediment Migration) and go to Section 6 (Modifying Factors)** | | | | |
| B. Potential for sediment migration | | Initial Testing Program (GEMTEC, 2018) | | |
| a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")?<br>Yes<br>No<br>Do Not Know | No<br><br>4 | | Review existing sediment assessments. If sediment coring has been completed, it may indicate that historically contaminated sediments have been covered over by newer "clean" sediments. This assessment will require that cores collected demonstrate a low concentration near the top and higher concentration with sediment depth. | |
| b. For lakes and marine habitats, are the contaminated sediments in shallow water and therefore likely to be affected by tidal action, wave action or propeller wash?<br>Yes<br>No<br>Do Not Know | Do Not Know<br><br>2 | | Review existing sediment assessments. If the sediments present at the site are in a river, select "no" for this question. | |
| c. For rivers, are the contaminated sediments in an area prone to sediment scouring?<br>Yes<br>No<br>Do Not Know | No<br><br>0 | | Review existing sediment assessments. It is important that the assessment is made under worst case flows (high yearly flows). Under high yearly flows, areas which are commonly depositional may | |
| Potential sediment pathway total | 6 | | | |
| Allowed Potential score | 6 | Note: If a "known" score is provided, the "potential" score is disallowed. | | |
| **Sediment pathway total** | **6** | | | |
| 6. Modifying Factors | | | | |
| Are there subsurface utility conduits in the area affected by contamination?<br>Yes<br>No<br>Do Not Know | No | No subsurface utility conduits known. Historical utilities were above ground (GEMTEC, 2018). | Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration. | |

**(II) Migration Potential** (Evaluation of contaminant migration pathways)

Cut Throat Island, Former United States Air Force (USAF Station), Former Pine Tree Line Radar Station, Labrador

| Definition | Score | Rationale for Score (document any assumptions, reports, or site-specific information; provide references) | Method Of Evaluation | Notes |
|---|---|---|---|---|
| Known | 0 | | | |
| Potential | 0 | | | |

| Migration Potential Total | | |
|---|---|---|
| Raw "known" total | 33 | |
| Raw "potential" total | 12.5 | |
| Raw combined total | 45.5 | Note: If "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore, the |
| **Total (max 33)** | **23.5** | total "Potential" Score may not reflect the sum of the individual "Potential" scores. |

**CCME National Classification System (2008, 2010 v 1.2)**

## (III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Cut Throat Island, Former United States Air Force (USAF Station), Former Pine Tree Line Radar Station, Labrador

| Definition | Score | Rationale for Score<br>(document any assumptions, reports, or site-specific information; provide references) | Method Of Evaluation | Notes |
|---|---|---|---|---|
| 1. Human | | | | |
| A. Known exposure | | | | |
| Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to humans as a result of the contaminated site. (Class 1 Site*)<br><br>Same as above, but "Strongly Suspected" based on observations or indirect evidence.<br><br>No quantified or suspected exposures/impacts in humans.<br><br>Score | 22<br><br>10<br><br>0<br><br>Go to Potential<br><br>--- | Lead (highly toxic) and hydrocarbon concentrations exceeding CCME guidelines.(GEMTEC, 2018). | *Where adverse effects on humans are documented, the site should be automatically designated as a Class 1 site (i.e., action required). There is no need to proceed through the NCS in this case. However, a scoring guideline (22) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites).<br><br>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1 for noncarcinogenic chemicals and incremental cancer risks that exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals (for most jurisdictions this is typically either $>10^{5}$ or $>10^{-6}$). Known impacts can also be evaluated based on blood testing (e.g. blood lead >10 ug/dL) or other health based testing.<br><br>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 0.2 for non-carcinogenic chemicals and incremental lifetime cancer risks for carcinogenic chemicals that are within acceptable levels as defined by the jurisdiction (for most jurisdictions this is less than either $10^{6}$ or $10^{-5}$). | Known adverse impact includes domestic and traditional food sources. Adverse effects based on food chain transfer to humans and/or animals can be scored in this category. However, the weight of evidence must show a direct link of a contaminated food source/supply and subsequent ingestion/transfer to humans. Any associated adverse effects to the environment are scored separately later in this worksheet.<br>Someone experienced must provide a thorough description of the sources researched to evaluate and determine the quantified exposure/impact (adverse effect) in the vicinity of the contaminated site.<br><br>**Selected References:**<br>Health Canada – Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Heath Screening Level Risk Assessments (www.hc-sc.gc.ca/ewh-semt/pubs/contamsite/index_e.html)<br>United States Environmental Protection Agency, Integrated Risk Information System (IRIS) - http://toxnet.nml.nih.gov |
| **NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Human Exposure) and go to Section 2 (Human Exposure Modifying Factors)** | | | | |
| B. Potential for human exposure | | | | |
| a) Land use (provides an indication of potential human exposure scenarios)<br><br>Agricultural<br>Residential / Parkland<br>Commercial<br>Industrial<br>Do Not Know<br><br>Score | Res / Parkland<br><br>2 | Because there is commercial and residential land use, the most senstive was used (GEMTEC, 2018). | Review zoning and land use maps over the distances indicated. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place. Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial). | This is the main "receptor" factor used in site scoring. A higher score implies a greater exposure and/or exposure of more sensitive human receptors (e.g., children). |
| b. Indicate the level of accessibility to the contaminated portion of the site (e.g., the potential for coming in contact with contamination)<br><br>Limited barriers to prevent site access; contamination not covered<br><br>Moderate access or no intervening barriers, contaminants are covered. Remote locations in which contaminants not covered.<br><br>Controlled access or remote location and contaminants are covered<br><br>Do Not Know<br><br>Score | Mod. access, covered<br><br>1 | No barriers to accessing impacted surface soils, contaminants not covered | Review location and structures and contaminants at the site and determine if there are intervening barriers between the site and humans. A low rating should be assigned to a (covered) site surrounded by a fence or in a remote location, whereas a high score should be assigned to a site th has no cover, fence, natural barriers or buffer. | |
| B. Potential for human exposure | | | | |
| c) Potential for intake of contaminated soil, water, sediment or foods for operable or potentially operable pathways, as identified in Worksheet II (Migration Potential).<br>i) direct contact<br>Is dermal contact with contaminated surface water, groundwater, sediments or soils anticipated?<br>Yes<br>No<br>Do Not Know<br>Score | Yes<br><br>3 | As the impacted soils are near surface, direct contact and human exposure can occur. | If soils or potable groundwater are present exceeding their respective CCME guidelines, dermal contact is assumed. Exposure to surface water, non-potable groundwater or sediments exceeding their respective CCME guidelines will depend on the site. Select "Yes" if dermal exposure to surface water, non-potable groundwater or sediments is expected. For instance, dermal contact with sediments would not be expected in an active port. Only soils in the top 1.5 m are defined by CCME (2003) as surface soils. If contaminated soils are only located deeper than 1.5 m, direct contact with soils is not anticipated to be an operable contaminant exposure pathway. | Exposure via the skin is generally believed to be a minor exposure route. However for some organic contaminants, skin exposure can play a very important component of overall exposure. Dermal exposure can occur while swimming in contaminated waters, bathing with contaminated surface water/groundwater and digging in contaminated dirt, etc. |
| ii) inhalation (i.e., inhalation of dust, vapour)<br><br>Vapour - Are there inhabitable buildings on the site within 30 m of soils or groundwater with volatile contamination as determined in Worksheet II (Migration Potential)?<br><br>Yes<br>No<br>Do Not Know<br>Score<br><br>Dust - If there is contaminated surface soil (e.g. top 1.5 m) , indicate whether the soil is fine or coarse textured. If it is known that surface soil is not contaminated, enter a score of zero.<br>Fine<br>Coarse<br>Surface soil is not contaminated or absent (bedrock)<br>Do Not Know Texture<br><br>Score<br><br>inhalation total | No<br>0<br><br>Coarse<br>1<br><br>1 | No buildings on Site and nearest fishing shed is approx 300 m away<br><br>Coarse texture- as per Initial Testing program (GEMTEC, 2018) | If inhabitable buildings are on the site within 30 m of soils or groundwater exceeding their respective guidelines for volatile chemicals, there is a potential of risk to human health (Health Canada, 2004). Review site investigations for location of soil samples (having exceedances of volatile substances) relative to buildings. Refer to (II) Migration Potential worksheet, 4B.a) *Potential for COPCs in Vapour* for a definition of volatility.<br><br>Consult grain size data for the site. If soils (containing exceedances of the CCME soil quality guidelines) predominantly consist of fine material (having a median grain size of 75 microns; as defined by CCME (2006)) then these soils are more likely to generate dusts. | Exposure via the lungs (inhalation) can be a very important exposure pathway. Inhalation can be via both particulates (dust) and gas (vapours). Vapours can be a problem where buildings have been built on former industrial sites or where volatile contaminants have migrated below buildings resulting in the potential for vapour intrusion.<br><br>Assesses the potential for humans to be exposed to vapours originating from site soils. The closer the receptor is to a source of volatile chemicals in soil, the greater the potential of exposure. Also, coarser-grained soil will convey vapour much more efficiently in the soil than finer grained material such as clays and silts.<br><br>General Notes;<br>Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a vapour migration and/or dust generation in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including conta names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.<br><br>Selected References;<br>Canadian Council of Ministers of the Environment (CCME). 2006. Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. PN 1332 www.ccme.ca<br>Golder, 2004. Soil Vapour Intrusion Guidance for Health Canada Screening Level Risk Assessment (SLRA) Submitted to Health Canada, Burnaby, BC |

**(III) Exposure** (Demonstrates the presence of an exposure pathway and receptors)

Cut Throat Island, Former United States Air Force (USAF Station), Former Pine Tree Line Radar Station, Labrador

| Definition | Score | Rationale for Score (document any assumptions, reports, or site-specific information; provide references) | Method Of Evaluation | Notes |
|---|---|---|---|---|
| B. Potential for human exposure | | | | |
| iii) Ingestion (i.e., ingestion of food items, water and soils [for children]), including traditional foods.<br>Drinking Water: Choose a score based on the proximity to a drinking water supply, to indicate the potential for contamination (present or future).<br>0 to 100 m<br>100 to 300 m<br>300 m to 1 km<br>1 to 5 km<br>No drinking water present<br>Do Not Know | 300 m to 1 km | There is uncertainty regarding the location of the drinking water supply for the adjacent community | Review available site data to determine if drinking water (groundwater, surface water, private, commercial or municipal supply) is known or suspected to be contaminated above Guidelines for Canadian Drinking Water Quality. If drinking water supply is known to be contaminated, some immediate action (e.g., provision of alternate drinking water supply) should be initiated to reduce or eliminate exposure.<br><br>The evaluation of significant potential for exceedances of the water supply in the future may be based on the capture zones of the drinking water wells; contaminant travel times; computer modelling of flow and contaminant transport. | **Selected References:**<br>Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/hecs-sesc/water/publications/drinking_water_quality_guidelines/toc.htm<br><br>Drinking water can be an extremely important exposure pathway to humans. If site groundwater or surface water is not used for drinking, then this pathway is considered to be inoperable.<br><br>Consider both wild foods such as salmon, venison, caribou, as well as agricultural sources of food items if the contaminated site is on or adjacent to agricultural land uses. |
| Score | 2 | | | |
| Is an alternative water supply readily available?<br>Yes<br>No<br>Do Not Know | No | No municipal water infrastructure in place or anticipated | | |
| Score | 1 | | | |
| Is human ingestion of contaminated soils possible?<br>Yes<br>No<br>Do Not Know | Yes | Contaminated soils are at surface | If contaminated soils are located within the top 1.5 m, it is assumed that ingestion of soils is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely, and the duration is shorter. Refer to human health risk assessment reports for the site in question. | |
| Score | 3 | | | |
| Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings?<br>Yes<br>No<br>Do Not Know | Yes | Assumed that wildlife harvesting and consumption of plants/berries could occur | Use human health risk assessment reports (or others) to determine if there is significant reliance on traditional food sources associated with the site. Is the food item in question going to spend a large proportion of its time at the site (e.g., large mammals may spend a very small amount of time at a small contaminated site)? Human health risk assessment reports for the site in question will also provide information on potential bioaccumulation of the COPC in question. | |
| Score | 1 | | | |
| Ingestion total | 7 | | | |
| Human Health Total "Potential" Score | 14 | Note if a "Known" Human Health score is provided, the "Potential" score is disallowed. | | |
| Allowed "Potential" Score | 14 | | | |
| 2. Human Exposure Modifying Factors | | | | |
| a) Strong reliance of local people on natural resources for survival (i.e., food, water, shelter, etc.)<br>Yes<br>No<br>Do Not Know | Yes | Based on Phase I ESA (GHD March 2016) and site observations fishing shelters are located on southeastern portion of Cut Throat Island. | | |
| Known | 6 | | | |
| Potential | --- | | | |
| Raw Human "known" total | 6 | | | |
| Raw Human "potential" total | 14 | | | |
| Raw Human Exposure Total Score | 20 | | | |
| **Human Health Total (max 22)** | **20.0** | | | |
| 3. Ecological | | | | |
| A. Known exposure | | | | |
| Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to terrestrial or aquatic organisms as a result of the contaminated site. | 18 | | Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are deemed to be severe, the s may be categorized as class one (i.e., a priority for remediation or risk management), regardless of the numerical total NCS score. For the purpose of application of the NCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction. If ecological effects are determined to be severe and an automatic Class 1 is assigned, there is no need to proceed through the NCS. However, a scoring guideline (18) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites). | CCME, 1999: Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca<br>CCME, 1999: Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses www.ccme.ca<br>Sensitive receptors- review: Canadian Council on Ecological Areas www.ccea.org<br><br>Ecological effects should be evaluated at a population or community level, as opposed to at the level of individuals. For example, population-level effects could include reduced reproduction, growth or survival in a species. Community-level effects could include reduced species diversity or relative abundances. Further discussion of ecological assessment endpoints is provided in *A Framework for Ecological Risk Assessment: General Guidance* (CCME 1996).<br><br>Notes:<br>Someone experienced must provide a thorough description of the sources researched to classify the environmental receptors in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links. |
| Same as above, but "Strongly Suspected" based on observations or indirect evidence. | 12 | | This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1. Alternatively, known impacts can also be evaluated based on a weight of evidence assessment involving a combination of site observations, tissue testing, toxicity testing and quantitative community assessments. Scoring of adverse effects on individual rare or endangered species will be completed on a case-by-case basis with full scientific justification. | |
| No quantified or suspected exposures/impacts in terrestrial or aquatic organisms | 0 | | This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 1 and no other observable or measurable sign of impacts. Alternatively, it can be based on a combination of other lines of evidence showing no adverse effects, such as site observations, tissue testing, toxicity testing and quantitative community assessments. | |
| | Go to Potential | | | |
| Score | --- | | | |

**NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Ecological Exposure) and go to Section 4 (Ecological Exposure Modifying Factors)**

**(III) Exposure** (Demonstrates the presence of an exposure pathway and receptors)

Cut Throat Island, Former United States Air Force (USAF Station), Former Pine Tree Line Radar Station, Labrador

| Definition | Score | Rationale for Score (document any assumptions, reports, or site-specific information; provide references) | Method Of Evaluation | Notes |
|---|---|---|---|---|
| B. Potential for ecological exposure (for the contaminated portion of the site) | | | | |
| a) Terrestrial<br>i) Land use<br>Agricultural (or Wild lands)<br>Residential/Parkland<br>Commercial<br>Industrial<br>Do Not Know<br>Score | Residential/Parkland<br>2 | Because there are two land uses on Site the most senstive was selected (GEMTEC, 2018). | Review zoning and land use maps. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place (indicate in the worksheet that future land use is the consideration).<br><br>Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Wild lands are grouped with agricultural land due to the similarities in receptors that would be expected to occur there (e.g., herbivorous mammals and birds) and the similar need for a high level of protection to ensure ecological functioning. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial). | |
| ii) Uptake potential<br>Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site?<br>Yes<br>No<br>Do Not Know<br>Score | Yes<br>1 | Plants community at the Site is generally healthy, and thus the invertebrate community is inferred to be intact (GEMTEC, 2018). | If contaminated soils are located within the top 1.5 m, it is assumed that direct contact of soils with plants and soil invertebrates is an operable exposure pathway. Exposure to soils deeper than 1.5 m possible, but less likely. | |
| iii) Ingestion (i.e., wildlife or domestic animals ingesting contaminated food items, soils or water)<br>Are terrestrial animals likely to be ingesting contaminated water at the site?<br>Yes<br>No<br>Do Not Know<br>Score | Yes<br>1 | Many on-site waterbodies (GEMTEC, 2018). Surface water impacts at a number of APECs with Al, Cu and Fe exceedances above screening levels. | Refer to an Ecological Risk Assessment for the site. If there is contaminated surface water at the site, assume that terrestrial organisms will ingest it. | |
| Are terrestrial animals likely to be ingesting contaminated soils at the site?<br>Yes<br>No<br>Do Not Know<br>Score | Yes<br>1 | However, ingestion anticipated to be low due to low residence time of wildli on Site (previously developed areas) as an abundance of suitable habitat (undeveloped / shrub/moss lands) surrounds the Site and the Site does not represent unique or special habitat (GEMTEC, 2018). | Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates. | |
| Can the contamination identified bioaccumulate?<br>Yes<br>No<br>Do Not Know<br>Score | Yes<br>1 | Several PAHs in soil identified at concentrations exceeding the screening levels (GEMTEC, 2018). Based on the Reference Materials provided herei Log(KOW) is generally above 4 for these parameters. | Bioaccumulation of contaminants within food items is considered possible if:<br>1) The Log(Kow) of the contaminant is greater than 4 (as per the chemical characteristics work sheet) and concentrations in soils exceed the most conservative CCME soil quality guideline for the intended land use, or 2) The contaminant in collected tissue samples exceeds the Canadian Tissue Residue Guidelines. | |
| Distance to sensitive terrestrial ecological area<br>0 to 300 m<br>300 m to 1 km<br>1 to 5 km<br>> 5 km<br>Do Not Know<br>Score | > 5 km<br>0.5 | A review of ecologically significant areas (CCEA, 2017), revealed no area of ecological significance within 5 km of the Site. The nearest protected area is the Gannet Island Ecological Reserve, located approx 70 km east of the Site. No unique or special habitat was identified at the Site. Based on the above, species at risk are not anticipated at the Site. | It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor located within this area of the site will be subject to further evaluations. It is also considered that any environmental receptor located greater than 5 km will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link:www.ccea.org. | Environmental receptors include: local, regional or provincial species of interest or significance; arctic environments (on a site specific basis); nature preserves, habitats for species at risk, sensitive forests, natural parks or forests. |
| Raw Terrestrial Total Potential | 6.5 | Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed. | | |
| Allowed Terrestrial Total Potential | 6.5 | | | |
| B. Potential for ecological exposure (for the contaminated portion of the site) | | | | |
| b) Aquatic<br>i) Classification of aquatic environment<br>Sensitive<br>Typical<br>Not Applicable (no aquatic environment present)<br>Do Not Know<br>Score | Typical<br>1 | The aquatic environment is considered typical for this area | "Sensitive aquatic environments" include those in or adjacent to shellfish or fish harvesting areas, marine parks, ecological reserves and fish migration paths. Also includes those areas deemed to have ecological significance such as for fish food resources, spawning areas or having rare or endangered species.<br><br>"Typical aquatic environments" include those in areas other than those listed above. | |
| ii) Uptake potential<br>Does groundwater daylighting to an aquatic environment exceed th CCME water quality guidelines for the protection of aquatic life at the point of contact?<br>Yes<br>No (or Not Applicable)<br>Do Not Know<br>Score | Do Not Know<br>0.5 | | Groundwater concentrations of contaminants at the point of contact with an aquatic receiving environment can be estimated in three ways:<br>1) by comparing collected nearshore groundwater concentrations to the CCME water quality guidelines (this will be a conservative comparison, as contaminant concentrations in groundwater often decrease between nearshore wells and the point of discharge).<br>2) by conducting groundwater modeling to estimate the concentration of groundwater immediately before discharge.<br>3) by installing water samplers, "peepers", in the sediments in the area of daylighting groundwater. | |
| Distance from the contaminated site to an important surface water resource<br>0 to 300 m<br>300 m to 1 km<br>1 to 5 km<br>> 5 km<br>Do Not Know<br>Score | Do Not Know<br>1.5 | | It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor or important water resource located within this area of the site will be subject to further evaluation. It is also considered that any environmental receptor located greater than 5 km away will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas linkwww.ccea.org. | Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and fens and other aquatic environments |
| | | | Bioaccumulation of food items is possible if: | |

**CCME National Classification System (2008, 2010 v 1.2)**

**(III) Exposure** (Demonstrates the presence of an exposure pathway and receptors)

Cut Throat Island, Former United States Air Force (USAF Station), Former Pine Tree Line Radar Station, Labrador

| Definition | Score | Rationale for Score (document any assumptions, reports, or site-specific information; provide references) | Method Of Evaluation | Notes |
|---|---|---|---|---|
| Are aquatic species (i.e., forage fish, invertebrates or plants) that are consumed by predatory fish or wildlife consumers, such as mammals and birds, likely to accumulate contaminants in their tissues?<br>Yes<br>No<br>Do Not Know | Do Not Know | | 1) The Log(Kow) of the contaminant is greater than 4 (as per the chemical characteristics work sheet) and concentrations in sediments exceed the CCME ISQGs.<br>2) The contaminant in collected tissue samples exceeds the CCME tissue quality guidelines. | |
| Score | 0.5 | | | |
| Raw Aquatic Total Potential | 3.5 | Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed. | | |
| Allowed Aquatic Total Potential | 3.5 | | | |
| **4. Ecological Exposure Modifying Factors** | | | | |
| a) Known occurrence of a species at risk.<br>Is there a potential for a species at risk to be present at the site?<br>Yes<br>No<br>Do Not Know | Yes<br>2 | A review of ecologically significant areas (CCEA, 2017), revealed no area of ecological significance within 5 km of the Site. However, based on provincial resources (https://www.flr.gov.nl.ca/wildlife/endangeredspecies/index.html) the ranges of several species at risk, including polar bear and wolverine overlap the Site. Other SAR could potentially also be present on the Site. | Consult any ecological risk assessment reports. If information is not present, utilize on-line databases such as Eco Explorer. Regional, Provincial (Environment Ministries), or Federal staff (Fisheries and Oceans or Environment Canada) should be able to provide some guidance. | Species at risk include those that are extirpated, endangered, threatened, or of special concern. For a list of species at risk, consult Schedule 1 of the federal Species at Risk Act (http://www.sararegistry.gc.ca/species/schedules_e.cfm?id=1). Many provincial governments may also provide regionally applicable lists of species at risk. For example, in British Columbia, consult: BCMWLAP. 2005. Endangered Species and Ecosystems in British Columbia. Provincial red and blue lists. Ministry of Sustainable Resource Management and Water, Land and Air Protection http://srmwww.gov.bc.ca/atrisk/red-blue.htm |
| Score | --- | | | |
| b) Potential impact of aesthetics (e.g., enrichment of a lake or tainting of food flavor). | | None observed during the site investigation | | |
| Is there evidence of aesthetic impact to receiving water bodies?<br>Yes<br>No<br>Do Not Know | No<br>0<br>--- | | Documentation may consist of environmental investigation reports, press articles, petitions or other records. | This Item will require some level of documentation by user, including contact names, addresses, phone numbers, e-mail addresses. Evidence of changes must be documented, please attach copy of report containing relevant information. |
| Is there evidence of olfactory impact (i.e., unpleasant smell)?<br>Yes<br>No<br>Do Not Know | No<br>0<br>--- | None observed during the site investigation | Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat. | |
| Is there evidence of increase in plant growth in the lake or water body?<br>Yes<br>No<br>Do Not Know | No<br>0<br>--- | None observed during the site investigation | A distinct increase of plant growth in an aquatic environment may suggest enrichment. Nutrients e.g., nitrogen or phosphorous releases to an aquatic body can act as a fertilizer. | |
| Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different?<br>Yes<br>No<br>Do Not Know | Do Not Know<br>---<br>1 | | Some contaminants can result in a distinctive change in the way food gathered from the site tastes smells. | |
| **Ecological Modifying Factors Total - Known** | **2** | | | |
| **Ecological Modifying Factors Total - Potential** | **1** | | | |
| Raw Ecological Total - Known | 2 | | | |
| Raw Ecological Total - Potential | 11 | | | |
| Raw Ecological Total | 13 | | | |
| **Ecological Total (Max 18)** | **13.0** | | | |
| **5. Other Potential Contaminant Receptors** | | | | |
| a) Exposure of permafrost (leading to erosion and structural concerns) | | Site is not located in a permafrost zone (GEMTEC, 2018). | | Plants and lichens provide a natural insulating layer which will help prevent thawing of the permafrost during the summer. Plants and lichens may also absorb less solar radiation. Solar radiation is turned into heat which can also cause underlying permafrost to melt. |
| Are there improvements (roads, buildings) at the site dependant upon the permafrost for structural integrity?<br>Yes<br>No<br>Do Not Know | No<br>0<br>--- | | Consult engineering reports, site plans or air photos of the site. When permafrost melts, the stability of the soil decreases, leading to erosion. Human structures, such as roads and/or buildings are often dependent on the stability that the permafrost provides. | |
| Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment?<br>Yes<br>No<br>Do Not Know | No<br>0<br>--- | | Melting permafrost leads to a decreased stability of underlying soils. Wind or surface run-off erosion can carry soils into nearby aquatic habitats. The increased soil loadings into a river can cause an increase in total dissolved solids and a resulting decrease in aquatic habitat quality. In addition, the erosion can bring contaminants from soils to aquatic environments. | |
| **Other Potential Receptors Total - Known** | **0** | | | |
| **Other Potential Receptors Total - Potential** | **0** | | | |

| **Exposure Total** | | |
|---|---|---|
| Raw Human Health + Ecological Total - Known | 8 | |
| Raw Human Health + Ecological Total - Potential | 25 | Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included. |
| **Raw Total** | 33 | |
| **Exposure Total (max 34)** | **24.4** | |

**CCME National Classification System (2008, 2010 v 1.2)**
**Score Summary**

Scores from individual worksheets are tallied in this worksheet.
Refer to this sheet after filling out the revised NCS completely.

| I. Contaminant Characteristics | Known | Potential |
|---|---|---|
| 1. Residency Media | 6 | 1 |
| 2. Chemical Hazard | 8 | --- |
| 3. Contaminant Exceedance Factor | 6 | --- |
| 4. Contaminant Quantity | 6 | --- |
| 5. Modifying Factors | 4 | --- |
| **Raw Total Score** | 30 | 1 |
| **Raw Total Score (Known + Potential)** | 31 | |
| **Adjusted Total Score (Raw Total / 40 *33)** | 25.6 | (max 33) |

| II. Migration Potential | Known | Potential |
|---|---|---|
| 1. Groundwater Movement | --- | 6.5 |
| 2. Surface Water Movement | 12 | --- |
| 3. Soil | 12 | --- |
| 4. Vapour | 9 | --- |
| 5. Sediment Movement | --- | 6 |
| 6. Modifying Factors | 0 | 0 |
| **Raw Total Score** | 33 | 12.5 |
| **Raw Total Score (Known + Potential)** | 45.5 | |
| **Adjusted Total Score (Raw Total / 64 * 33)** | 23.5 | (max 33) |

| III. Exposure | Known | Potential |
|---|---|---|
| 1. Human Receptors | | |
| A. Known Impact | --- | |
| B Potential | | |
| a. Land Use | | 2 |
| b. Accessibility | | 1 |
| c. Exposure Route | | |
| i. Direct Contact | | 3 |
| ii. Inhalation | | 1 |
| iii. Ingestion | | 7 |
| 2. Human Receptors Modifying Factors | 6 | --- |
| **Raw Total Human Score** | 6 | 14 |
| Raw Total Human Score (Known + Potential) | 20 | |
| Adjusted Total Human Score | 20.0 | (maximum 22) |
| 3. Ecological Receptors | | |
| A. Known Impact | --- | |
| B. Potential | | |
| a. Terrestrial | | 6.5 |
| b. Aquatic | | 3.5 |
| 4. Ecological Receptors Modifying Factors | 2 | 1 |
| **Raw Total Ecological Score** | 2 | 11 |
| Raw Total Ecological Score (Known + Potential) | 13 | |
| Adjusted Total Ecological Score | 13.0 | (maximum 18) |
| 5. Other Receptors | 0 | 0 |
| Total Other Receptors Score (Known + Potential) | 0 | |
| **Total Exposure Score (Human + Ecological + Other)** | 33.0 | |
| **Adjusted Total Exposure Score (Total Exposure / 46 * 34)** | 24.4 | (max 34) |

## Site Score

Cut Throat Island, Former United States Air Force (USAF Station), Former Pine Tree Line Radar Station, Labrador

| | |
|---|---|
| **Site Letter Grade** | D |
| **Certainty Percentage** | 75% |
| **% Responses that are "Do Not Know"** | 12% |
| **Total NCSCS Score for site** | 73.4 |
| **Site Classification Category** | 1 |

Site Classification Categories*:

Class 1 - High Priority for Action (Total NCS Score >70)
Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)
Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)
Class N - Not a Priority for Action (Total NCS Score <37)
Class INS - Insufficient Information (>15% of responses are "Do Not Know")

* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

Report to: Defence Construction Canada
Project: 10550.04.01 (Final) (November 23, 2018)

experience • knowledge • integrity

| | |
|---|---|
| civil | civil |
| geotechnical | géotechnique |
| environmental | environnementale |
| field services | surveillance de chantier |
| materials testing | service de laboratoire des matériaux |

expérience • connaissance • intégrité