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Step 3 Initial Testing Program and Step 4 Site Classification Using the NCSCS
Former USAF Weather Station
Cape Harrison
NL17AS01

Contract Number: 65745

GEMTEC Project: 10550.04.03-R01 (Final)

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Submitted to:

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

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experience • knowledge • integrity

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November 23, 2018

File: 10550.04.03 (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 Step 4 Site Classification Using the NCSCS, Former USAF Weather Station, Cape Harrison, Labrador, DCC Project Number: NL17AS01, Contract Number 65745

Please find enclosed the Final Report: Step 3 Initial Testing Program and Step 4 Site Classification Using the National Classification System for Contaminated Sites (NCSCS), Former United States Air Force (USAF) Weather Station, Cape Harrison, 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 at abigail.garnett@gemtec.ca. This report was prepared by Melanie Langille, M.Env.Sc. and Shaun Pelkey, M.Sc.E., P.Eng., 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.

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Enclosures
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EXECUTIVE SUMMARY

GEMTEC Consulting Engineers and Scientists Limited (GEMTEC) was retained by Defence Construction Canada (DCC) to conduct a Federal Approach to Contaminated Sites Step 3 Initial Testing Program and a Step 4 Site Classification for a former United States Air Force (USAF) Weather Station located on Cape Harrison, Labrador (herein referred to as the "Site"). The objectives of the work were to complete Steps 3 and 4 of the Federal Approach to Contaminated Sites (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 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).

Very little is known about the weather station operations at Cape Harrison. It has been presumed by others that United States (US) military personnel were stationed at Cape Harrison between 1943 and 1951. In 1951, the property ownership was transferred to Canada for use as a radio range station and was deactivated and closed shortly thereafter. The property was subsequently transferred to the Province of Newfoundland and Labrador (GHD, 2016).

A 1980 inspection report indicated general environmental mis-management at the Site, stating that thousands of 170 Litre (L) (45 gallon) drums were littered throughout a 1 kilometre (km) area (GHD, 2016). The area in which the drums were found was not indicated in the inspection report. In 1987, the Site was included in a contract for decommissioning, which 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 work at the Site. A site visit (aerial flyover) conducted by the Newfoundland and Labrador Department of Environment and Labour in 1996 revealed a number of propane cylinders, felled towers, sunken barges and equipment were still present on the Site.

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

APECs:

- Based on the document review, eight preliminary APECs were identified for field investigation.
- Following a Site reconnaissance, the extent of APEC #4 (Former tower structure #2) and APEC #6 (Former tower structure #4) were expanded. Additionally, furans and dioxin-like compounds, pesticides, and herbicides were added as Chemicals of Potential Concern (COPCs) for APEC # 7 (presumed landfill).
- The suspected drum cache was not apparent during the aerial flyover or Site walkover. Dense vegetation along the eastern portion of the cape, limited the identification of potential drums in this area during the aerial observations. Investigation on land into the densely vegetated areas was limited during this mandate due to health and safety concerns related to abundant evidence of wildlife such as bear within the dense vegetation. The wildlife monitor would not allow the field team to go into the densely vegetated areas as he could not ensure their safety with the limited visibility through the vegetation. Additionally, the former water supply or septic field was not identified in either the aerial flyover or the Site walkover. As a result, it was not possible for GEMTEC to assess either of these during the current assessment.
- The suspected historical road leading inland (south) from the Site was not evident from the ground.
- Given the topography, and proximity to the sea, the potential for historical disposal of material and/or equipment into the Labrador Sea during Site decommissioning cannot be ruled out.
- Scattered wood debris was encountered at APEC #2, metal, porcelain, and glass was encountered at APEC #4, and debris including cement board, concrete pieces, wood, nails, and glass was identified at APEC #7.
- Remaining structures consist primarily of concrete pillars/tower supports and the remnants of a barge. No building remains of suitable size for housing personnel were identified.

Field Program/Testing Program:

- Prior to commencing the sampling portion of the field program, an aerial flyover of the Site was completed, to confirm APECs, natural and anthropogenic features and to confirm the presence/absence of formerly reported drums and water/septic infrastructure.
- A total of 37 surface soil (0-0.05 m) samples were collected from the Site in September, 2017.
- Concentrations of COPCs were compared to the applicable Provincial (Petroleum Hydrocarbons (PHCs) only) and Federal screening levels. The regulatory framework includes commercial guidelines, non-potable groundwater use, 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 exceedances of the screening levels were identified:

- PHC fractions and/or modified TPH at APEC #6 and APEC #7; and
- Metals (arsenic, cadmium, chromium, copper, silver, lead, and zinc) at APEC #4, and zinc at APEC #3.

Additionally, the laboratory detection limits were above either the human health and/or ecological screening levels for the following, which were treated as exceedances for the purposes of this assessment:

- One PAH parameter in one soil sample at APEC #7;
- Arsenic, beryllium, and selenium in one soil sample at APEC #4; and
- One or more pesticide/herbicide parameters the analyzed soil sample at APEC #7.

This uncertainty can be resolved in future study in consultation with the laboratory to determine the logistical implications of achieving lower detection limits in subsequent sampling.

Delineation of each of these impacts in soil has generally not been achieved based on the Step 3 Initial Testing Program.

NCSCS Scoring and GIS Database:

- The calculated NCSCS score for the Site is 46.4 Based on this score, the Site is classified as Class 3, indicating a low priority for action.
- 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 assessment, preliminary estimates of the area and volume of impacts at each of the confirmed APECs are provided in Table E.1-1. Areas provided below include both human and ecological exceedances, when compared to both federal and provincial guidelines, and are considered preliminary estimates, as delineation was generally not achieved.

Table E.1-1 Estimated Area and Volume of Impacts

APEC		Estimated Depth[1,4] (m)	Estimated Area[2,4] (m^2)	Estimated Volume[3,4] (m^3)
Number	**Description**			
3	Former tower structure #1	1	250	250
4	Former tower structures #2	1	850	850
6	Former tower structure #4	1	250	250
7	Presumed landfill	1	250	250
			Total Volume of Impacted Soil at the Site	1,600

Note:
1. Estimated depth of 1 m is based on information collected during the field program (a test pit in each APEC was extended to a maximum depth of 0.3 m and no bedrock was encountered) and based on surficial geology mapping for the Site.
2. Estimated area based on a number of assumptions Section 7.1.5.
3. Volume estimates are preliminary at this stage as delineation was not achieved during the Step 3 Initial Testing Program.
4. All estimates presented herein should be revised following completion of a Step 5 Detailed Testing Program.

Taking into consideration the anticipated land use (vacant, with no municipal infrastructure), additional environmental site assessment is recommended to further delineate and characterize the APECs to 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. This would include completion of a sampling program including the collection of surface and subsurface soil samples. Finally, an assessment of areas that were inaccessible during this field program is recommended, including forested areas (during early spring or late fall in absence of dense foliage associated with the observed deciduous alders and willows, and herbaceous vegetation (up to 1 m high)) where potential drums storage occurred historically. Assessment of these areas may identify new APECs at the Site.

The Step 5 Detailed Testing Program will serve to identify the vertical and lateral extent of the impacts identified in the Step 3 Initial Testing Program, and provide the basis for an Ecological and/or Human Health Risk Assessment, to determine if risk management and/or remediation is required at the Site.

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

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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 Step 4 Site Classification for a former United States Air Force (USAF) Weather Station located at Cape Harrison, 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) 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 (Phase I Environmental Site Assessment (ESA)) 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 an aerial flyover of the Site, prior to completing the Step 3 Initial Testing Program;
- Conducting the Step 3 Initial Testing Program including surface soil sampling and analysis;
- Conducting a site inventory including documenting Site infrastructure, Site 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 Preliminary 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 written work plan for additional environmental site assessment work required (if any), to delineate and characterize the 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 Weather Station. Cape Harrison, 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

Cape Harrison is situated along the eastern coast of Labrador and is the northernmost tip of a peninsula. It is located approximately 60 kilometres (km) southeast of Makkovik. Bear Island is located approximately 2.7 kilometres to the north of Cape Harrison. Lucyville, an unincorporated place (NRC, 2016), is located approximately two kilometres upgradient (south/southeast) of the Site, in a mountainous area. Based on a review of aerial photographs of the area obtained from Google Earth®, no development is obvious in this area. It is unknown if people reside in this area. A North Warning System radar station (United States and Canada air defense system) is located approximately 3.5 kilometres to the southeast of the Site, in an area of high elevation. This area was observed during the fly-over; it appears that two large tanks are located on this property.

Very little is known about the weather station operations at Cape Harrison. It has been presumed by others that United States (US) military personnel were stationed at Cape Harrison between 1943 and 1951. In 1951, the property ownership was transferred to Canada for use as a radio range station and was deactivated and closed shortly thereafter. The property was subsequently transferred to the Province of Newfoundland and Labrador (GHD, 2016), who are the current Site owners.

It is anticipated that a manned weather station would have consisted of a main Site building, an unlined landfill, communication antennae, a water pumping station/building, a helicopter pad, drum caches, and docking and barge facilities, all connected via gravel access roadways/paths. It is inferred that water would have been pumped to the Site from a nearby surface water supply, and septic waste would have been discharged via an above ground pipeline to a septic tank. The locations of the water supply and septic infrastructure are unknown. Despite these assumptions, no information about any buildings or former on-site infrastructure was revealed in the historical review. Inferred former Site features are shown on Drawing 3 (Appendix A).

A 1980 inspection report indicated general environmental mis-management, stating that thousands of 170 Litre (L) (45 gallon) drums were littered throughout a 1 km area (GHD, 2016). The area in which the drums were found was not indicated in the inspection report. In 1987, the Site was included in a contract for decommissioning, which 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 work at the Site. A site visit (aerial flyover) conducted by the Newfoundland and Labrador Department of Environment and Labour in 1996 revealed a number of propane cylinders, felled towers, sunken barges and equipment remaining at the Site.

Selected Site photographs are presented in Appendix B.

2.0 DOCUMENTATION REVIEW

2.1 Preliminary Identification of Areas of Potential Environmental Concern

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 in 2016; and
- High-resolution aerial imagery, purchased from Sikumiat Environmental Management Limited.

Based on the document review completed by GEMTEC, eight Areas of Potential Environmental Concern (APECs) were identified (GEMTEC, 2017). A summary of preliminary APECs, presumed activities historically conducted at these APECs and the associated Chemicals of Potential Concern (COPCs) is provided in Table 2-1.

Table 2-1 Preliminary APECs and COPCs

APEC (Preliminary)		Historical Activities (Presumed)	COPCs
#	Description		
1	Helicopter Pad	Fueling helicopters, storage of fuel	PHCs (fuel stored) Metals (from metal drums)
		Burning of Site structures	PAHs
2	Former structure (assumed)	Potential lead or mercury-based paint on exterior of building	Metals
		Burning of Site structures	PAHs
		Fuel Storage	PHCs
3	Former structure (assumed)	Potential lead or mercury-based paint on exterior of building	Metals
		Burning of Site structures	PAHs
		Fuel Storage	PHCs

Table 2-1 Preliminary APECs and COPCs

APEC (Preliminary)		Historical Activities (Presumed)	COPCs
#	Description		
4	Former structure (assumed)	Potential lead or mercury-based paint on exterior of building	Metals
		Burning of Site structures	PAHs
		Fuel Storage	PHCs
5	Former structure (assumed)	Potential lead or mercury-based paint on exterior of building	Metals
		Burning of Site structures	PAHs
		Fuel Storage	PHCs
6	Former structure (assumed)	Potential lead or mercury-based paint on exterior of building	Metals
		Burning of Site structures	PAHs
		Fuel Storage	PHCs
7	Landfill (Location unknown)	Potential for any Site materials to be buried/disposed in a landfill/bury site	PHC, PAHs, Metals, PCBs
8	Barge	Potential for any Site materials to have been transported by barge	PHC, PAHs, Metals, PCBs

APEC = Area of Potential Environmental Concern
COPCs = Chemicals of Potential Concern
PHCs = petroleum hydrocarbons (or petroleum, oil, and lubricants (POL))), including benzene, ethylbenzene, toluene, and xylenes (BTEX) and modified Total Petroleum Hydrocarbons (modified TPH)
PCBs = polychlorinated biphenyls
PAHs = polycyclic aromatic hydrocarbons

Based on the information presented in the documents reviewed and aerial photography interpretation, the potential location of: previously identified drums (reportedly thousands; presumed to have contained petroleum products), and the presumed location of a former surface water supply and septic location, could not be determined. Therefore, it was not possible to mark out these areas, or determine proposed sampling locations on a Site plan. As a result, the completion of an aerial flyover of the Site, prior to commencing the Step 3 Initial Testing Program, was proposed in the updated Work Plan prepared by GEMTEC, to aid in the identification of these areas.

The document review was supplemented by Site Reconnaissance by air and on land, as discussed in the following sections.

2.2 Geology and Hydrogeology

Surficial geology mapping (Map 1620 A Cartwright Labrador Newfoundland; Fulton, 1986), indicates that Cape Harrison 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. However, according to Klassen, R.A., *et al.* (1992a), overburden material in the area of the Site generally consists of a discontinuous veneer of glacial till with thickness generally less than 1 m. Along with glacial units, local deposits of organic and peaty soils are scattered throughout the Site, overlying either till or bedrock.

Bedrock geology mapping for (Mount Benedict Map 80298; Gower, 1979), identifies the entire Site area as “Area of thick overburden”. No additional information for the area of Cape Harrison is provided in this map. Based on a footnote presented on this map, the geology of the area of Cape Harrison was determined via helicopter and boat traverses and was not field verified.

Based on the information presented by AECOM in the “Hydrogeology of Labrador”, 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, which consists of high grade metamorphic rocks (i.e., gneiss, formed by the metamorphosis of granite or sedimentary rock) and associated intrusive rocks; granite-type pultons are also present (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. No information regarding water levels was presented in the AECOM (2013) report. Based on the type of bedrock at the Site, it is anticipated that the depth to groundwater would be well below the ground surface (it is anticipated that the groundwater table would be located at depth) and would generally follow the local topography.

Based on test pits completed by GEMTEC in September, 2017 (discussed in Section 5.3), bedrock was not encountered at any of the APECs (one test pit was completed at each APEC to a depth of 0.3 metres below ground surface) and bedrock outcrops were generally not observed on the Site in the APEC areas. Soil was found to be sandy and gravelly in all locations (Appendix C), below the root mat, in areas with vegetation.

2.3 Permafrost

The southern portion of Labrador has isolated patches of permafrost (ground that remains frozen for more than one year) (AECOM, 2013). Permafrost was not encountered at the Site during the manual test pitting. Based on the location of the Site and the conditions encountered at the Site, permafrost is not likely to be present.

2.4 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).

The topography of the Site according to Natural Resources Canada (NRC; 2017); is depicted on Drawing 1 (Appendix A). According to NRC mapping, the Site is situated at approximately 20 metres above sea level (masl). However, based on actual site conditions encountered during the Step 3 Initial Testing Program (discussed in subsequent sections of the report), the Site topography is much steeper than depicted on the NRC mapping. Based on conditions encountered in the field, the centre of the Site is generally flat and is located at the top of a plateau. There is a steep slope (approximately 15%) from the top of the plateau to the cobble or sand beaches along the coast, located to the east, north and west of the plateau.

Based on the limited debris and concrete remaining at the Site (discussed in Section 5.0), precipitation is expected to infiltrate pervious surfaces. Based on the high grade metamorphic rock at the Site, the permeability of the bedrock is anticipated to be low and as such precipitation is expected to remain in near surface sediments before travelling downhill towards the sea. It is anticipated that groundwater recharge in the area will be minimal.

Groundwater, which is presumed to be at depth based on the rock type in the area, is expected to flow radially to the east, north and west of the Site, toward the Labrador Sea.

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

The nearest surface water body (lake) is located approximately 260 metres to the southeast of APEC #4. This surface water body is located upgradient of the previously developed portion of the Site. Additional surface water bodies (four or more) are present approximately one kilometer upgradient (south) of the Site. The Labrador Sea (marine environment) surrounds the Site to the west, north, and east.

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 150 km east of the Site. No unique or special habitat was identified at the Site.

2.6 Climate

The closest weather station to the Site is in Cartwright, which is located approximately 150 km to the southeast of the Site. As the Site is further north, information presented in this section may be slightly different at the Site; however, it provides a general overview of climate in this area of Labrador.

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).

2.7 Neighbouring Land Use

The Site is bordered to the west, north, and east by the Labrador Sea. Forested land is present immediately south of the Site. The nearest apparent landmark, Lucyville, is located over 2 km south of the Site. According to Natural Resources Canada (NRC, 2018), Lucyville is an unincorporated place. No development is evident in aerial photography. It is inferred that the area may historically have been a community, but no community is currently present.

3.0 SITE DESCRIPTION

3.1 Site Characterization

The Site is remotely located in a mountainous area of Labrador. There are currently no buildings or structures on the Site; the only indication of relatively recent human use of the Site, is the presence of ATV or snowmobile tracks along the northern portion of the Site, near the coast. Based on the thick vegetation, presence of surface water bodies and a mountain range to the south of the Site (inland), it is very unlikely (almost impossible) that humans would visit the Site from the south. Lucyville, located approximately 2 km from the Site, is located in the mountainous area to the south of the Site. It is highly unlikely that the Site would be developed in the future for residential use; and the soil conditions at the Site (sandy, gravely soils) and the topography of the land would preclude agricultural development in the future. As a result, the Site is only accessible by boat and air, or by snowmobile over ice. It is not unreasonable that toddlers may visit the Site. It is anticipated that any such visiting would be 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 is classified as commercial.

There is no water supply infrastructure, including water supply wells at the Site or in the surrounding area. Based on the topography, geology and hydrogeology characteristics of the Site, groundwater resources would be expected to be limited at the Site. Additionally due to the Site's proximity to the Labrador Sea, sea water intrusion would be a concern for water supply wells. As a result, it is unlikely that groundwater at the Site will be used as a potable water resource in the future. As a result, the Site as classified as non-potable.

Based on the Sites proximity to the coast and the geology in the area of the Site, and Site observations (Appendix C), soil at the Site is expected to be coarse grained. As a result, the Site has been classified as coarse-grained.

Bear travel paths were observed in the thick vegetation near APEC #7, and wolf tracks were observed on the sandy beach, in the area of APEC #8. Herbaceous and woody vegetation, moss, and trees (primarily alders and spruce) are present at the Site. With the exception of the central portion of the Site (the flat area on the top of the plateau) and along the shoreline (in areas), vegetation is thick and well established. 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. However, given that the site is located adjacent to a large undeveloped/forested area, and is not considered to represent unique or special ecological habitat, it is not assumed that wildlife would spend their entire life restricted to the previously developed areas of the site. Based on the above, the commercial land use scenario is applicable to the Site, which considers the main route of exposure to be direct contact for soil-dependent biota (invertebrates and plants). This scenario is

consistent with the Human Health screening scenario. There are no surface water bodies located on the Site; therefore, freshwater aquatic life receptors are not expected to be present.

3.2 Contaminant Sources

Potential sources of contamination and 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 (metals);
- Disposed electrical equipment (PCBs);
- Waste incineration (Furans and dioxin-like compounds); and
- Pesticide or herbicide use (Organophosphorus Pesticides, Organochlorinated Pesticides, and Phenoxy Acid Herbicides).

3.3 Potential Receptors

3.3.1 Human Receptors

Human receptors on the Site include:

- Adults;
- Children; and
- Toddlers.

3.3.2 Ecological Receptors

Ecological receptors at the Site include:

- Mammals;
- Birds;
- Plants and Invertebrates; 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 3-1.

Table 3-1 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 is not currently used for agricultural purposes. The Site location/topography and presence of sandy soil would preclude agricultural use of the Site 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.	**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. Construction of new buildings/structures are not anticipated in the foreseeable future.	Incomplete

Table 3-1 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. Construction of new buildings/structures are not anticipated in the foreseeable future.	Incomplete
		Groundwater Incidental Ingestion	Groundwater is not used as a source of drinking water and groundwater does not daylight at the Site. It is very unlikely that groundwater resources at the Site would be developed. Note, however that this pathway is considered complete in the development of the generic Alberta Environment (2016) guidelines referenced for pesticides and herbicides.	Incomplete
		Groundwater Dermal Contact		Incomplete
Surface Water /Sediment	-	Surface Water/Sediment Incidental Ingestion	There are no surface water bodies and therefore no sediment at the Site.	Incomplete
		Surface Water/Sediment Dermal Contact		

3.4.1.1 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 3-2. The potential for SAR in the area has not been ruled out as part of this mandate.

Table 3-2 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 small concrete pad at APEC #2, and various concrete pillars/cradles, Site surfaces are generally uncovered. Invertebrates and plants are likely to be in direct contact with impacted surface soil.	**Complete**
		Wildlife (mammals/birds)	Incidental ingestion of soil by wildlife is 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.	Incomplete
Groundwater	Ingestion/Plant Uptake	Plants/ invertebrates	Although it is unlikely based on the geology of the Site and soil conditions encountered at the Site, 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

Table 3-2 Ecological Health Exposure Pathway Assessment

Source Media	Exposure Media	Potential Exposure Pathway	Ecological Health Pathway Assessment	Exposure Pathway Complete or Incomplete?
Surface Water/ Sediment	Surface Water and Freshwater Sediment	Direct Exposure and/or Ingestion	There are no surface water bodies on the Site; therefore, there is no habitat for freshwater aquatic life.	Incomplete

4.0 APPLICABLE SCREENING LEVELS (REGULATORY FRAMEWORK)

4.1.1 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 receptors for this Site are described above 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.

For the assessment of phenoxy acid herbicides, organochlorinated pesticides, and organophosphorus pesticides, the following jurisdictions were also referenced, in order of preference:

- Alberta Environment. 2016. Tier I Soil Remediation Guidelines; and
- Ontario Ministry of Environment and Climate Change (MOECC) 2011. Soil, Ground Water and Sediment Standards for Use Under, Part XV.1 of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition.

4.1.2 Comparison of Provincial and Federal Guidelines for Petroleum Hydrocarbons

Samples collected as part of this Step 3 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

Reporting	Atlantic RBCA[1]	CCME CWS
Tier I Reporting	$C_{>6}$-C_{10} (aromatic + aliphatic, minus BTEX) $C_{>10}$-C_{16} (aromatic + aliphatic) $C_{>16}$-C_{21} (aromatic + aliphatic) $C_{>21}$-C_{32} (aromatic + aliphatic) modified TPH (equals all TPH less BTEX)	F1 = $C_{>6}$-C_{10} (aromatic + aliphatic) F2 = $C_{>10}$-C_{16} (aromatic + aliphatic) F3 = $C_{>16}$-C_{34} (aromatic + aliphatic) F4 = $C_{>34}$ (aromatic + aliphatic) (Note: BTEX is covered under other CCME methods)
Note: 1. RBCA = Risk Based Corrective Action		

For comparison of the laboratory results to the Provincial guidelines (modified TPH - $C_{>6}$-C_{32}), GEMTEC has summed the detected concentrations of petroleum hydrocarbon fractions F1, F2, and F3 (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.

4.1.3 Selected Criteria

The applicable provincial and federal soil criteria for the Site are summarized in Table 4-2.

Table 4-2 Applicable Soil Criteria

Parameter	Criteria	
	Ecological Health	**Human Health**
Federal		
Petroleum Hydrocarbons (PHCs)	Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX compounds): CCME SQG_E (1999, accessed online November 2017). Commercial land use, non-potable water environment	BTEX compounds: CCME SQG_{HH} (1999, accessed online November 2017). Commercial land use. Incremental cancer risk: 10^{-5} (benzene)
PHCs	PHC Fractions F1, F2, F3, and F4: Canada-Wide Standards (CWS) for coarse-grained surface soil (2008) - Ecological Health Standards. Commercial land use. Most conservative exposure pathway.	PHC Fractions F1, F2, F3, and F4: CWS for coarse-grained surface soil (2008) - Human Health Standards. Commercial land use. Most conservative exposure pathway.
	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 ($C_{>34}$).	
Polycyclic Aromatic Hydrocarbons (PAHs)	CCME SQG_E (1999, accessed online November 2017). Commercial land use.	Carcinogenic PAH compounds: CCME SQG_{HH} (2010) for Benzo(a)pyrene Total Potency Equivalent (B(a)P TPE)
		Non-carcinogenic PAH compounds: No guidelines provided by CCME: however CCME recommends referencing other Canadian jurisdictions. Thus, Nova Scotia Environment (NSE) Tier 1 Environmental Quality Standards (EQS) for Commercial, non-potable site (2013).
VOCs	CCME SQG_E (1999, accessed online May 2018). Commercial land use.	CCME SQG_{HH} (1999, accessed online May 2018). Commercial land use.
Furans and dioxin-like compounds	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). The generic guideline provided by CCME is assumed to be protective of both ecological and human health receptors	

Table 4-2 Applicable Soil Criteria

Parameter	Criteria	
	Ecological Health	**Human Health**
Federal		
Phenoxy acid herbicides, organochlorinated pesticides, and organophosphorus pesticides	Alberta Environment. 2016. Tier I Soil Remediation Guidelines; and Ontario Ministry of Environment and Climate Change (MOECC) 2011. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition. The generic guideline was referenced and is assumed to be protective of both ecological and human health receptors.	
Metals PCBs	CCME SQG_E (1999, accessed online May 2017). Commercial land use.	CCME SQG_{HH} (1999, accessed online May 2017). Commercial land use.
	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.	
Provincial		
PHCs	Atlantic RBCA Tier I Ecological Screening Levels (ESLs) for the direct contact pathway for a property with coarse-grained soil. (2015). Commercial land use.	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 land use.

5.0 SITE RECONNAISSANCE AND SITE CHARACTERISTICS

Based on the scope of the work plan (GEMTEC, 2017), GEMTEC prepared a Site-Specific Health and Safety Plan for this contract (which also included two former Pinetree Line Radar Stations). The Health and Safety Plan was provided to DCC on August 8, 2017, and a copy was carried with GEMTEC personnel in the field. Site-specific considerations included travel by helicopter, and the presence of wildlife (such as polar bears) in the area, and the need for a full-time wildlife monitor during Site work.

GEMTEC personnel conducted an aerial reconnaissance on September 12, 2017 and were on-site on September 16, 2017 to conduct a Site walkover and sampling program. 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. It was anticipated that the reported discarded drums and former water supply/septic would be visible in the flyover, and thus could be added as APECs for the Site investigation. Site features and details from the Site flyover and visit are presented in the following subsections.

5.1 Aerial Observations

Cape Harrison is located at the northern tip of a Peninsula. Much of the northwestern coast has limited vegetation, presumably as a result of the harsh coastal setting. The approach to the peninsula from the water (looking south) is a rocky/sandy beach, and as such, it is expected that the area may reasonably be accessed by recreational boats, and by snowmobile (across ice) during the winter.

Recreational vehicle (all-terrain vehicle and/or snowmobile) tracks were noted near the northeastern shoreline, and were limited to this area. The tracks extended from the coast up to the base of the escarpment and to the edge of the thick vegetated area. The tracks are such that it appears a person or people were completing loops in this area. Based on the rugged topography of the general area of the Site, it is safe to assume that the tracks are the result of activities of people who accessed the Site by water (or ice).

Topographical mapping referenced during the document review suggested that the peninsula was relatively flat. However, it was apparent during the flyover and subsequent site walkover, that the actual topography of the Site was much steeper than depicted in topographic mapping. The central portion of the Site (at the top of the plateau) is relatively flat, however, the escarpment to the east, north and west of the plateau slopes steeply (approximately 15% grade) downward then leading to a gentle slope toward the sea.

Evidence of anthropogenic influence on the Site was minimal from the sky. Isolated remains of concrete pillars (tower supports) were visible from the air, and what was presumed to be the remains of a historical road leading inland (south) from the previously developed area (APEC #1

and APEC #4). It is important to note, while on-site, the roadway was not distinguishable. No distinguishable former helicopter pad or foundation remains were evident.

Dense vegetation flanks the Site along its southern and eastern edges. The remains of a steel barge was observed along the northeastern shore on a sandy beach.

Although thousands of drums were reportedly historically present on the Site, no drums were identified during the aerial reconnaissance, nor were any depressions in the thick vegetation in or around the Site observed from the air. In the absence of a visible plausible location for the drum cache, it has been assumed that drums, if present, may be located within the dense vegetation and could be significantly degraded and near to ground surface as observed at the other Sites assessed as part of this overall mandate. Additionally, no evidence of a former water supply or septic field were identified during the aerial flyover of the Site.

Based on the aerial observations, and the absence of anthropogenic features south of APEC #4, the Site was defined as the entirely of the northern tip of the peninsula, with the southernmost Site boundary at the south edge of APEC #4.

Given the topography, and proximity to the sea, the potential for historical disposal of material and/or equipment into the sea, is possible.

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: Helicopter Pad

APEC #1 is a flat, open area with no trees. The surface is completely covered with moss and near surface vegetation such as Labrador Tea, juniper, and laurels. Soil beneath the root mat of the vegetation was primarily gravel, indicating that the area may historically been gravel covered. Although GHD (2016) indicated a historical road leading south of the helicopter pad, no such road was apparent during the walkover.

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: Former Structure

APEC #2 is located northeast of APEC #1. Access to this area (APEC #2 and APEC #7) is limited to a small cleared path that descends the slope (approximately 15%) and passes through dense vegetation. The dense vegetation consists primarily of alders and willows, with some scattered mature spruce trees. While accessing this APEC, evidence of wildlife (*e.g.,* droppings, paths through the vegetation *etc.*) was abundant.

The cleared area of APEC #2 is generally vegetated with low-lying alpine cranberry and various grasses and forbs, and exposed gravel. A concrete pad (approximately 2.4 m by 4.8 m) remains in poor/deteriorated condition, vegetation has overgrown it. The thickness of the slab could not been determined with certainly, it is estimated that it is approximately 0.3 metres thick. Scattered wood debris was noted at surface in the western portion of APEC #2. Due to safety concerns, the wildlife monitor did not allow GEMTEC staff to enter areas of thick vegetation at the Site. As a result, these areas could not be assessed.

Neither PHC odours nor surface staining was observed at APEC #2.

The boundaries of APEC #2 were modified (extended) to the west (as compared to the initial proposed area) to encompass the entire cleared/accessible area in this location.

5.2.3 APEC #3: Former Tower Structure #1

Three concrete pillars each approximately 0.6 m wide by 0.6 m long by 0.9 m high are located at APEC #3 and are spaced approximately 3 m apart in a triangle configuration. The estimated volume of concrete is approximately 0.36 cubic metres (m^3). The area appears as though it may have been cleared in the past, as there are no trees adjacent to the pillars, but trees are present approximately 10 m to both the north and west of the pillars. Vegetation has re-established and the area is now densely vegetated with up to 1 m high mixed shrubs and grasses.

Neither PHC odours nor surface staining was observed in APEC #3.

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

5.2.4 APEC # 4: Former Tower Structure #2

APEC #4 is a generally flat area with low to medium height vegetation (up to 1 m), including mixed shrubs, mosses, and immature spruce. Three concrete pillars, each approximately 0.6 m wide by 0.6 m long by 0.6 m high, are located in low to medium height vegetation, and spaced approximately 3 m apart in a triangle configuration. Adjacent to the pillars are the remains of a concrete cradle (approximately 2 m wide by 2 m long by 1 m high) with rebar protruding. Further southeast of the original APEC boundary, the remains of a large overturned concrete pillar (approximately 1.5 m wide by 1.5 m long by 1.5 m high) was found, and as such the extent of APEC #4 was modified (extended) to the southeast. The total estimated volume of concrete in this area is approximate 8.5 m^3.

Scattered debris, including metal, porcelain, and glass was observed in the northwest portion of APEC #4. All the debris in this area is approximated to be less than 1 m^3 in volume.

Although GHD (2016) indicated a historical road leading south of APEC #4, no such road was apparent during the walkover.

Neither PHC odours nor surface staining was observed at APEC #4; however, thick vegetation obscured much of the surface soil and limited visual observations.

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

5.2.5 APEC #5: Former Tower Structure #3

Four concrete pillars, each approximately 0.6 m wide by 0.6 long x 0.9 m high were identified in a raised area (approximately 2 m above the surrounding area), spaced approximately 3 m apart, in a square configuration at APEC #5. Beyond the raised area, vegetation was sparse and the surface gravelly. One piece of metal debris (part of a fence) was located in this area. The total volume of concrete in this area is estimated to be 1.3 m^3.

Neither PHC odours nor surface staining was observed in APEC #5.

Modifications to APEC #5 were not required based on the Site reconnaissance.

5.2.6 APEC #6: Former Tower Structure #4

APEC #6 is primarily located along the western edge of the plateau of Cape Harrison, adjacent to the escarpment (approximately 15% slope toward the Labrador Sea from the plateau). The remains of two large concrete pillars (overturned), each approximately 1.5 m wide by 1.5 m long by 1.5 - 3 m high are present. Additionally to the west, a scoured area approximately 0.45 m deep is present and it is presumed to be the former location of a pillar. The original extent of APEC #6 was modified (extended) to the west to encompass both pillars and the scoured area. The total volume of concrete in APEC #6 is estimated to be approximately 17 m^3.

Neither PHC odours nor staining was observed in APEC #6.

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

5.2.7 APEC #7: Presumed Landfill

The area of APEC #7 is partially vegetated with moss, grasses, willows, alders and some mature spruce trees. However, an area of stunted vegetation/no vegetation (i.e., stressed vegetation) was observed in the area of sample SS_CH_26. Additionally, debris was found at surface and some protruding from the subsurface which included wood, nails, cement board, concrete piping, conduit and electrical wires. Based on these observations, it was inferred that the area could be a former dumping site; however, when a test pit was advanced at the Site, debris was not encountered at depth. Pesticides, herbicides, furans, and dioxin-like compounds were added as COPCs for this area. Petroleum hydrocarbon odours were noted upon disturbing soil in the northwest corner of the cleared area; however, due to the dense vegetation and evidence of wildlife in the area, the wildlife monitor would not allow the GEMTEC crew to investigate the vegetated areas beyond the cleared boundaries of APEC #7, due to safety concerns.

Modifications to APEC #7 were not required based on the Site reconnaissance.

5.2.8 APEC #8: Remains of a Barge

The remains of a steel barge (heavily rusted and degraded) are present along the northeastern shore of Cape Harrison, on a sandy beach. Due to the rugged terrain (approximately 15% slope from the plateau, down the escarpment to the shore) and unpassable dense vegetation between APEC #7 and the barge, access to this area was by helicopter only. The remains of the barge are in two pieces in the intertidal zone: one piece is approximately 5 m by 9 m nearest the water, and the other piece is approximately 5 m by 13 m further inland. Seaweed was observed to be stuck within the steel structure, suggesting that the barge is at least partially submerged during high tides. Neither PHC odours nor staining was observed.

The steel barge was heavily degraded/rusted. Iron was identified as the only COPC in this area. As there are no CCME Marine Aquatic Life guidelines or CCME Sediment Quality Guidelines for iron, no samples were collected. This does not represent a data gap.

5.2.9 Other

No areas consistent with discarded drums or with the former location of a water supply and septic field were identified during the on-site work. As indicated above, these areas were also not identified during the aerial flyover of the Site. As these areas, if present, could not be identified at the Site, it was not possible to assess them. Although it has been assumed that military personnel would have been housed at the Cape Harrison weather station, the anthropogenic structures identified at the Site consisted generally of concrete tower supports, and no building foundation of a size suitable for personnel housing was identified.

5.3 Test Pitting

One test pit was completed at each APEC to a depth of 0.3 m below ground surface during the completion of the Step 3 Initial Testing Program. Test pits and samples were completed and collected, respectively, in the same locations. Details of the test pits are provided in Appendix C. Bedrock was not encountered at any of the APECs. Surficial soil was found to be sand and gravel and despite the soil type, it was challenging to dig to 0.3 metres at most locations as test pits had to be advanced below the root mat of the 1 m high vegetation in most places. Permafrost was not encountered at any of the test pit locations.

5.4 On-Site Habitat and Natural Environnent

The Site consists of four primary habitat types:

- Shrubs/moss: much of the site is covered with a combination of mosses, lichens, and low shrubs such as alpine cranberry, willows, alders, and laurels;
- Sand, gravel, and cobbles: areas of gravel remain around some Site structures. Isolated areas of natural cobbles and sand, likely exposed by wind and/or water erosion;
- Forest: patches of dense trees including alders and mature spruce; and
- Beach: Sandy or rocky beaches along the Labrador Sea, with beach tolerant grasses generally forming a transition between the beach and the upland vegetation.

Evidence of the presence of large mammals was observed during the Site visit (bear scat, wolf tracks).

6.0 DETAILED TESTING PROGRAM RESULTS

6.1 Scope of Field Program

The APECs and the scope of Step 3 Initial Testing Program/Step 4 Site Classification are summarized in Table 6-1.

Table 6-1 Field Program

APEC		COPCs	Sample IDs
#	Description		Soil
1	Helicopter pad (presumed)	PHCs Metals PAHs	SS_CH_21 SS_CH_22 SS_CH_23 SS_CH_24
2	Former structure	PHCs Metals PAHs	SS_CH_29 SS_CH_30 SS_CH_31 SS_CH_32 SS_CH_33
3	Former tower structure #1	PHCs Metals PAHs	SS_CH_16 SS_CH_17 SS_CH_18 SS_CH_19 SS_CH_20
4	Former tower structure #2	PHCs Metals PAHs	SS_CH_11 SS_CH_12 SS_CH_13 SS_CH_14 SS_CH_15
5	Former tower structure #3	PHC Metals PAHs	SS_CH_06 SS_CH_07 SS_CH_08 SS_CH_09 SS_CH_10
6	Former tower structure #4	PHCs Metals PAHs	SS_CH_01 SS_CH_02 SS_CH_03 SS_CH_04 SS_CH_05
7	Presumed landfill	PHCs Metals PAHs Furans and dioxin like compounds Pesticides and herbicides	SS_CH_25 SS_CH_26 SS_CH_27 SS_CH_28
8	Barge	PHCs Metals PAHs PCBs	SS_CH_34 SS_CH_35 SS_CH_36 SS_CH_37

Table 6-1 Field Program

APEC		COPCs	Sample IDs
#	Description		Soil
BG	Background (Cut Throat Island)	PHCs Metals PAHs PCBs	SS_CT_20_BG
BG	Background (Spotted Island)	PHCs Metals PAHs PCBs	SS_SP_28_BG

COPCs = chemicals of potential concern
PHCs = petroleum hydrocarbons (PHCs) (or petroleum, oil, and lubricants (POL) (including Benzene, Toluene, Ethylbenzene and Xylene (BTEX)
PAH = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
BG = Background

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, in areas of stressed vegetation and/or in suspected landfill locations).

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. When recovery amounts made it possible, subsurface samples were collected in duplicate in the field. The soil sample jar was

completely filled to eliminate headspace losses of potential volatile contaminants in the sample. The 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.

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 (20 of the 49 samples analyzed), additional analysis (F4 Gravimetric method) was conducted to quantify hydrocarbons in the $C_{>50}$ range.

6.3 Field Observations

Samples were logged in the field during the September 2017 field program. Soil color, texture, odours, presence of debris, and headspace vapour readings were recorded.

In general, the soil conditions at the sampling locations consisted of brown sand with peat or gravel in the upland area of the Site, and sand along the beach. Bedrock was not apparent during the sampling (0 - 0.3 m investigated). Petroleum hydrocarbon odours were observed in samples SS_CH_25 and SS_CH_27 (APEC #7, presumed landfill) 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 provided DND/DCC Contaminated Sites Sampling Databases were 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:

- PCBs (4 samples);
- Furans and dioxin-like compounds (1 sample);
- organophosphorus pesticides (1 sample);
- organochlorinated pesticides(1 sample); and
- phenoxy acid herbicides (1 sample).

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 D9 (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	23	0[4]	4	0-9%	100%
	PAH	20	0[4]	-	-	100%
	Metals	41	0-1.5 x RDL	40	1-36%	100%
Field	PHC	21	0[4]	8	3-70%	100%
	PAH	40	0[4]	-	-	100%
	Metals	34	0[4]	47	2-37%	100%

Notes:

1) Reportable detection limit
2) For values within 5 time 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. 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

All duplicate samples are within the acceptable ranges of variability. 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 Step 3 Initial Testing Program and Step 4 Site Classification are shown on Drawings 3 - 5 (Appendix A). Analytical data were compiled, compared to the screening levels identified in Section 4.0, and presented in tables in Appendix D. Laboratory certificates of analysis are provided in Appendix E.

6.6.1 Background Sampling Program

Background samples (that measure background concentrations of analytical parameters) were not collected at Cape Harrison based on the final work plan. As an alternate, background samples collected at the other two Labrador island sites as part of this mandate (Cut Throat Island (GEMTEC project 10550.04.01) and Spotted Island (GEMTEC project 10550.04.02), were assumed to be representative of background conditions at the Site. 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 on 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.

Cut Throat Island and Spotted Island are located approximately 90 km and 230 km east of Cape Harrison, respectively. It should be noted that all three Sites are in the geological based Grenville Province which consists of Proterozoic age high grade gnessic rocks (AECOM, 2013). As a result, it is reasonable to conclude that the background soil samples collected at Spotted Island and Cut Throat Island would be similar to soil conditions at Cape Harrison.

Background sampling locations at Cut Throat Island and Spotted Island were selected based on aerial imagery, and located in an area that did not appear to have been part of the former USAF operations. However, at both Island sites detectable concentrations of PHCs were present in the background samples, at concentrations below the referenced screening levels. PHCs were also detected in other soil samples collected in various APECs across the island Sites with similar concentrations (*i.e.* on the same order of magnitude). Various metals parameters were detected in the background soil samples, generally at concentrations below the referenced guidelines, with the exception of nickel and selenium (Spotted Island) and chromium (Cut Throat Island), which exceeded the referenced $SQG_{E.}$ No other COPCs were detected in the background samples.

Based on the initial testing programs at these Sites, background sources of PHCs, nickel, selenium, and/or chromium cannot be ruled out at this time. Additional background sampling is required to determine background concentrations of the identified COPC at the Site.

6.6.2 PHCs in Soil

Concentrations of PHCs in soil are presented in Table D1. 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	
F2	7	SS_CH_27	0.0-0.05	3300	1000[3]	260[2,3]	**No**
F3	6	SS_CH_04	0.0-0.05	2700	3500[3]	1700[2,3]	**No**
	7	SS_CH_27	0.0-0.05	6500			**No**
F4	6	SS_CH_04	0.0-0.05	4600	10000[3]	3300[2,3]	**No**
Modified TPH	7	SS_CH_27	0.0-0.05	9800	4000[2]	-	**No**

Notes:
HH = Human Health; Eco = Ecological
1.) Refers to horizontal delineation. Samples were generally collected at one depth per sample location as part of this mandate and as such, the vertical extent of impacts has not been determined
2.) Atlantic RBCA Tier I RBSL (HH) and ESL (Eco)
3.) CCME Canada-Wide Standard for Petroleum Hydrocarbons in soil

6.6.3 PAHs in Soil

Concentrations of PAHs in soil are presented in Table D2. Samples with concentrations exceeding the referenced screening levels are summarized in Table 6-5.

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	
Acenaphthene	7	SS_CH_27	0.0-0.05	<0.35	8000[2]	0.28[3]	**No**

Notes:
HH = Human Health; Eco = Ecological
1.) Refers to horizontal delineation. Samples were generally collected at one depth per sample location as part of this mandate and as such, the vertical extent of impacts has not been determined
2.) NSE Tier 1 EQS, protective of human health
3.) CCME SQG_E for the protection of ecological receptors.

The analytical laboratory reported that the detection limits of several parameters (including acenaphthene) in sample SS_CH_27, were elevated due to matrix/co-extractive interference. Based on correspondence with the analytical laboratory, this interference is most likely a result of elevated organic matter in the sample that was not eliminated using the industry standard solid phase extraction column cleaning process that is used prior to analysis. The elevated organic carbon content was not anticipated during the field sampling, nor can it be controlled. The elevated detection limits and the detected concentrations for all other PAH parameters in sample SS_CH_27, were below their respective screening levels. Additionally, the raised detection limit for acenaphthene presented in Table 6-5, is below the human health screening level.

This elevated detection limit represents an uncertainty that can be resolved in future assessments by completing additional cleaning procedures (such as a silica gel wash) at this location.

To be conservative, acenaphthene in SS_CH_27 has been identified as an “exceedance” for the remainder of this assessment.

6.6.4 Metals in Soil

Concentrations of Metals in soil are presented in Table D3. 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]	
Arsenic	4	SS_CH_15	0.0-0.05	<20	12	26	**No**
Beryllium	4	SS_CH_15	0.0-0.05	<20	110	8	**No**
Cadmium	4	SS_CH_15	0.0-0.05	48	49	22	**No**
Chromium	4	SS_CH_15	0.0-0.05	140	630	87	**No**
Copper	4	SS_CH_15	0.0-0.05	88000	4000	91	**No**
Lead	4	SS_CH_15	0.0-0.05	3800	260	600	**No**
Selenium	4	SS_CH_15	0.0-0.05	<10	125	2.9	**No**
Silver	4	SS_CH_15	0.0-0.05	53	-	40	**No**
Zinc	3	SS_CH_18	0.0-0.05	290	-	200	Yes
	3	SS_CH_18 LD	0.0-0.05	360	-		Yes
	4	SS_CH_11	0.0-0.05	1100	1		**No**
	4	SS_CH_13	0.0-0.05	1200	-		**No**
	4	SS_CH_15	0.0-0.05	3900	-		**No**

Notes:
HH = Human Health; Eco = Ecological
FD = Field Duplicate
1.) CCME SQG_{HH}
2.) CCME SQG_{E}
3.) Refers to horizontal delineation. Samples were generally collected at one depth per sample location as part of this mandate and as such, the vertical extent of impacts has not been determined

The analytical laboratory reported that the detection limits of several parameters (including arsenic, beryllium, and selenium) in sample SS_CH_15, were elevated due to the sample matrix. Based on correspondence with the analytical laboratory, this interference was the result of elevated concentrations of aluminum and copper in the sample, which caused interference for the remaining metals analyzed. Elevated metals concentrations in a sample cannot be detected/anticipated in the field and as such, the elevated detection limit could not be avoided.

These elevated detection limits represent an uncertainty that can be resolved in future assessments by collecting additional sample volume at this location.

To be conservative, arsenic, beryllium, and selenium in SS_CH_15 have been identified as "exceedances" for the remainder of this assessment.

6.6.5 PCBs in Soil

Concentrations of PCBs in soil are presented in Table D4. PCBs were not detected in soil samples and the detection limits were below the referenced guidelines.

6.6.6 Furans, and Dioxin-like Compounds in Soil

Concentrations of furans, and dioxin-like compounds in soil are presented in Table D5. A Toxic Equivalency Quotient (TEQ) was calculated for the analyzed sample by summing the concentration of each parameter, and multiplying it by its respective Toxic Equivalency Factor (TEF). The calculated TEQ for SS_CH_29 was 3.094 ng/kg, which is below the human health screening level of 1000 ng/kg, and below the ecological screening level of 4 ng/kg.

6.6.7 Pesticides and Herbicides in Soil

Concentrations of Organophosphorus Pesticides, Organochlorinated Pesticides, and Phenoxy Acid Herbicides are presented in Tables D6, D7, and D8, respectively. Samples with concentrations exceeding the referenced screening levels are summarized in Table 6-7.

Table 6-7 Concentrations of Pesticides and Herbicides in Soil above Referenced Screening Levels

Parameter	APEC	Sample Details			Screening Level (mg/kg)	Were Impacts Delineated?[1]
		ID	Depth (m)	Result (mg/kg)		
Bendiocarb	7	SS_CH_27	0.0-0.05	<50	0.21[2]	No
Dimethoate	7	SS_CH_27	0.0-0.05	<50	0.0055[2]	No
Metolachlor	7	SS_CH_27	0.0-0.05	<100	0.055[2]	No
Triallate	7	SS_CH_27	0.0-0.05	<50	0.0092[2]	No

Table 6-7 Concentrations of Pesticides and Herbicides in Soil above Referenced Screening Levels

Parameter	APEC	Sample Details			Screening Level (mg/kg)	Were Impacts Delineated?[1]
		ID	Depth (m)	Result (mg/kg)		
Trifluralin	7	SS_CH_27	0.0-0.05	<50	0.045[2]	No
Phorate	7	SS_CH_27	0.0-0.05	<50	0.14[2]	No
Terbufos	7	SS_CH_27	0.0-0.05	<50	0.15[2]	No
Aldicarb	7	SS_CH_27	0.0-0.05	<50	0.065[2]	No
Atrazine	7	SS_CH_27	0.0-0.05	<50	0.01[2]	No
Carbaryl	7	SS_CH_27	0.0-0.05	<50	3.6[2]	No
Carbofuran	7	SS_CH_27	0.0-0.05	<50	1.2[2]	No
Cyanazine (Bladex)	7	SS_CH_27	0.0-0.05	<50	0.21[2]	No
Diazinon	7	SS_CH_27	0.0-0.05	<50	4.2[2]	No
Malathion	7	SS_CH_27	0.0-0.05	<50	1.3[2]	No
Simazine	7	SS_CH_27	0.0-0.05	<50	0.038[2]	No
Total Endosulfan	7	SS_CH_27	0.0-0.05	<0.020	0.0015[2] / 0.3[3]	No
2,4-D	7	SS_CH_27	0.0-0.05	<1.0	0.67[2]	No
Dicamba	7	SS_CH_27	0.0-0.05	<2.0	0.79[2]	No
MCPA	7	SS_CH_27	0.0-0.05	<2.0	0.66[2]	No
Picloram	7	SS_CH_27	0.0-0.05	<2.0	0.022[2]	No

Notes:
1.) Only one sample analyzed as part of this mandate, thus, delineation was not achieved.
2.) Alberta's Tier 1 Soil Remediation Guidelines for a Commercial receptor, coarse grained soils. Generic guideline deemed protection of human health and ecological receptors.
3.) Ontario Ministry of Environment and Climate Change Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition (industrial/commercial/community property use, coarse grained soil). Generic guideline deemed protective of human health and ecological receptors.

The standard detection limit of several parameters of pesticides/herbicides exceeded the referenced generic screening levels. The intention of pesticides/herbicides sampling was to

investigate whether the stressed vegetation observed during the Site visit was the result of pesticides/herbicides in the soil. Although the detection limits are high when compared to the generic guidelines, the data nonetheless are an indication that significantly high concentrations of pesticides/herbicides are not present in the Site soil. As the initial intent of the analytical program completed for this mandate did not include comparison to Alberta and Ontario guidelines, the detection limits requested and presented by the laboratory met the federal screening levels. During future assessment, the laboratory should be notified that a comparison to Alberta and Ontario screening levels is required. As the analysis to meet these screening levels might be completed out of province, logistical implications (i.e., sample hold time versus the time to get the sample to the laboratory in question from Labrador), will have to be considered to determine if achieving these screening levels is feasible or not.

For the purposes of this assessment, detection limits exceeding the guidelines have been carried forward as a potential exceedance, and have been included in the figures and preliminary estimates of impacted areas as exceedances.

7.0 DISCUSSION

7.1 Conceptual Site Model

7.1.1 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 and enclosed space accumulation; and soil leaching to groundwater.

7.1.2 Ecological Receptors and Exposure Pathways

Ecological receptors identified at the Site include mammals, birds, plants and invertebrates 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; and ingestion/plant uptake of groundwater.

7.1.3 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:

- PHC fractions and/or modified TPH;
- Metals;
- PAHs; and
- Pesticide/herbicides.

7.1.4 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 APECs

APEC		Assessment Results	Conclusion
Number	**Description**		
1	Helicopter Pad	Four surface soil samples were analyzed for PHCs, metals and PAHs. Concentrations were below the applied screening levels.	No environmental concerns.
2	Former Structure	Four surface soil samples were analyzed for PHCs, PAHs, and metals. Concentrations were below the applied screening levels.	No environmental concerns.

Table 7-1 Confirmation/Refutation of APECs

APEC		Assessment Results	Conclusion
Number	**Description**		
3	Former tower structure #1	Four surface soil samples were analyzed for PHCs, PAHs, and metals. Concentrations of PHCs and PAHs were below the applied screening levels.	**Confirmed APEC (zinc in soil).**
4	Former tower structure #2	Four surface soil samples were analyzed for PHCs, PAHs, and metals. Concentrations of PHCs and PAHs were below the applied screening levels.	**Confirmed APEC (cadmium, chromium, copper, lead, silver, and zinc) in soil. Elevated detection limits for arsenic, beryllium and selenium exceeded the guidelines.**
5	Former tower structure #3	Four surface soil samples were analyzed for PHCs, metals and PAHs. Concentrations were below the applied screening levels.	No environmental concern.
6	Former tower structure #4	Four surface soil samples were analyzed for PHCs, PAHs, and metals, and PCBs. Soil sample SS_CH_04 exceeded the PHC applied screening levels.	**Confirmed APEC (F3 and F4 in soil).**
7	Presumed landfill	Four samples were analyzed for PHCs, Metals, PAHs, PCBs, furans, and dioxin like compounds. Measured concentrations were below the applied screening levels with the exception of PHCs in SS_CH_27. Elevated detection limit of acenaphthene in SS_CH_27 exceeds SQG_E. Detection limits of numerous pesticides and herbicides exceed the referenced screening levels.	**Confirmed APEC (F2, and F3 in soil. Detection limit of acenaphthene and numerous pesticides and herbicides exceed the screening levels).**
8	Barge	Four surface soil samples were analyzed for PHCs, PAHs, metals, and PCBs. Concentrations were below the applied screening levels.	No environmental concern.

7.1.5 Estimated Area and Volume of Impacts

Chemicals of Concern (COCs) have been identified in soil at concentrations exceeding the applied Provincial and/or Federal screening levels. Based on the observations of this Step 3 Initial Testing Program and Step 4 Site Classification using the NCSCS, preliminary estimates of the area and volume of impacts at each of the APECs is provided in Table 7-2 and shown on

Drawing 6 (Appendix A). Estimates are based on exceedances of human health and/or ecological based guidelines and consider exceedances of all parameters. These estimates should be considered as preliminary, as the depth of the investigation was limited to soil samples collected from 0-0.05 m and horizontal delineation has generally not been achieved. Test pits were completed to a depth of 0.3 m at each APEC and bedrock was not encountered. Additionally, geological mapping indicates that the overburden at the Site is less than or equal to 1.0 m. As a result, a depth of 1 m was selected to determine the area and volume of impacts at each APEC.

The aerial extent of contamination within each APEC was determined to be halfway between an impacted sample and the next clean sample, in a straight line. In the absence of impacted and clean samples at each APEC, the area of impacts was determined to be 10 m from the impacted sample. 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 outcrop/foundation remains;
- Distance to the nearest clean sample within the same APEC;
- Distance to the edge of the APEC; or
- 10 m from the impacted sample.

A summary of sample results that exceeded human health and/or ecological health screening levels (Provincial and/or Federal) for one or more COC is presented in Table 7-2.

Table 7-2 Preliminary Estimates of Impacted Areas

Sample ID	COC	Matrix	Preliminary Estimates		
			Estimated Depth (m)[1]	Area (m^2)	Volume (m^3)
APEC #3 (Former tower structure #1)					
SS_CH_18	Zinc	Soil	1	250	250
APEC #4 (Former tower structure #2)					
SS_CH_13, SS_CH_15	Arsenic, beryllium, cadmium, chromium, copper, lead, selenium, silver, zinc	Soil	1	550	550
SS_CH_11	zinc	Soil	1	300	300

Table 7-2 Preliminary Estimates of Impacted Areas

Sample ID	COC	Matrix	Preliminary Estimates		
			Estimated Depth (m)[1]	Area (m^2)	Volume (m^3)
APEC #6 (Former tower structure #4)					
SS_CH_04	F3, F4	Soil	1	250	250
APEC #7 (Presumed Landfill)					
SS_CH_27	F2, F3 Numerous pesticides/herbicides below the laboratory detection limit, however the detection limit exceeds the referenced guidelines	Soil	1	250	250
				Total Volume of Impacted Soil at the Site	1,600

Notes:
1. Depth of impacts at each APEC, were estimated to be 1 metre.

8.0 NCSCS CLASSIFICATION

The NCSCS process provides a uniform approach to evaluating the 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; however, 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 Step 3 Investigation, a NCSCS score was calculated for the Site. The calculated NCSCS score is 46.4, a breakdown of the score is presented in Table 8-2. Based on this score, the Site is classified as Class 3, indicating a low priority for action. The detailed NCSCS evaluation form is presented in Appendix F.

Table 8-2 NCSCS Score Breakdown

Category	Score
Contaminant Characteristics	20.6
Migration Potential	9.5
Exposure	16.3
Certainty Percentage	81%
Total NCSCS Score	**46.4**

9.0 SUMMARY

GEMTEC conducted a Step 3 Initial Testing Program and Step 4 Site Classification using the NCSCS at the former USAF manned weather station at Cape Harrison, Labrador; the following is a summary of the results of this assessment:

APECs:

- Based on the document review, eight preliminary APECs were identified for field investigation.
- Following a Site reconnaissance, the extent of APEC #4 (Former tower structure #2) and APEC #6 (Former tower structure #4) were expanded. Additionally, furans and dioxin-like compounds, pesticides, and herbicides were added as Chemicals of Potential Concern (COPCs) for APEC # 7 (presumed landfill).
- The suspected drum cache was not apparent during the aerial flyover or Site walkover. Dense vegetation along of the eastern portion of the site limited the identification of potential drums in this area during the aerial flyover. Investigation on land into the densely vegetated areas was limited during this mandate due to health and safety concerns related to abundant evidence of wildlife such as bear within the dense vegetation. The wildlife monitor would not allow the field team to go into the densely vegetated areas as he could not ensure their safety with the limited visibility through the vegetation. Additionally, the former water supply or septic field was not identified in either the aerial flyover or the Site walkover. As a result, it was not possible for GEMTEC to assess either of these during the current assessment.
- The suspected historical road leading inland (south) from the Site was not evident from the ground.
- Given the topography, and proximity to the sea, the potential for historical disposal of material and/or equipment into the Labrador Sea during Site decommissioning cannot be ruled out.
- Scattered wood debris was encountered at APEC #2, metal, porcelain, and glass was encountered at APEC #4, and debris including cement board, concrete pieces, wood, nails, and glass was identified at APEC #7.
- Remaining structures consist primarily of concrete pillars/tower supports and the remnants of a barge. No building remains of suitable size for housing personnel were identified.

Field Program/Testing Program:

- Prior to commencing the sampling portion of the field program, an aerial flyover of the Site was completed, to confirm APECs, natural and anthropogenic features and to confirm the presence/absence of formerly reported drums and water/septic infrastructure.

- A total of 37 surface soil (0-0.05 m) samples were collected from the Site in September, 2017.
- Concentrations of COPCs were compared to the applicable Provincial (Petroleum Hydrocarbons (PHCs) only) and Federal screening levels. The regulatory framework includes commercial guidelines, non-potable groundwater use, 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 exceedances of the screening levels were identified:

- PHC fractions and/or modified TPH at APEC #6 and APEC #7; and
- Metals (arsenic, cadmium, chromium, copper, silver, lead, and zinc) at APEC #4, and zinc at APEC #3.

Additionally, the laboratory detection limits were above either the human health and/or ecological screening levels for the following, which were treated as exceedances for the purposes of this assessment:

- One PAH parameter in one soil sample at APEC #7;
- Arsenic, beryllium, and selenium in one soil sample at APEC #4; and
- One or more pesticide/herbicide parameters the analyzed soil sample at APEC #7.

This uncertainty can be resolved in future study in consultation with the laboratory to determine the logistical implications of achieving lower detection limits in subsequent sampling.

Delineation of each of these impacts in soil has generally not been achieved based on the Step 3 Initial Testing Program.

NCSCS Scoring and GIS Database:

- The calculated NCSCS score for the Site is 46.4. Based on this score, the Site is classified as Class 3, indicating a low priority for action.
- 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 using the NCSCS, and taking into consideration the anticipated land use (vacant, with no municipal infrastructure), the following work plan is recommended to further delineate and characterize the APECs to refine and prioritize the contaminant risk:

- Complete additional environmental site assessment (i.e., a FACS Step 5 Detailed Testing Program) which could include:
    - Conducting an additional site reconnaissance early in the spring or late fall (if weather is favourable), when vegetation (such as the deciduous alders and willows, and herbaceous vegetation (up to 1 m high) observed on the Site) is expected to be less dense, in an effort to locate the reported thousands of discarded drums and the presumed water supply/septic field (i.e., to investigate the areas that were inaccessible during this mandate due to safety concerns raised by the wildlife monitor); and
    - Collecting surface and subsurface soil samples to characterize and delineate the impacts on the Site, both laterally and vertically.
- Complete data analysis and evaluation:
    - Analyze the degree of contamination on the Site (i.e., compare data to applicable pathway specific provincial and federal guidelines for human health and ecological health);
    - Complete background samples at the Site for PHCs, metals, PAHs and pesticides/herbicides;
    - Update the DND Environmental GIS Data Template with all data collected as part of the mandate;
    - Refine/update the preliminary CSMs for human and ecological receptors, as required;
    - Re-Classify the Site using the NCSCS (Step 6);
    - 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 using the CCME NCSCS 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 work, and market values (for professional fees, analytical testing and transportation).

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 This report was prepared by Melanie Langille, M.Env.Sc., and was reviewed by Abigail Garnett, M.Sc.Eng., P.Eng., on behalf of GEMTEC Consulting Engineers and Scientists Limited.

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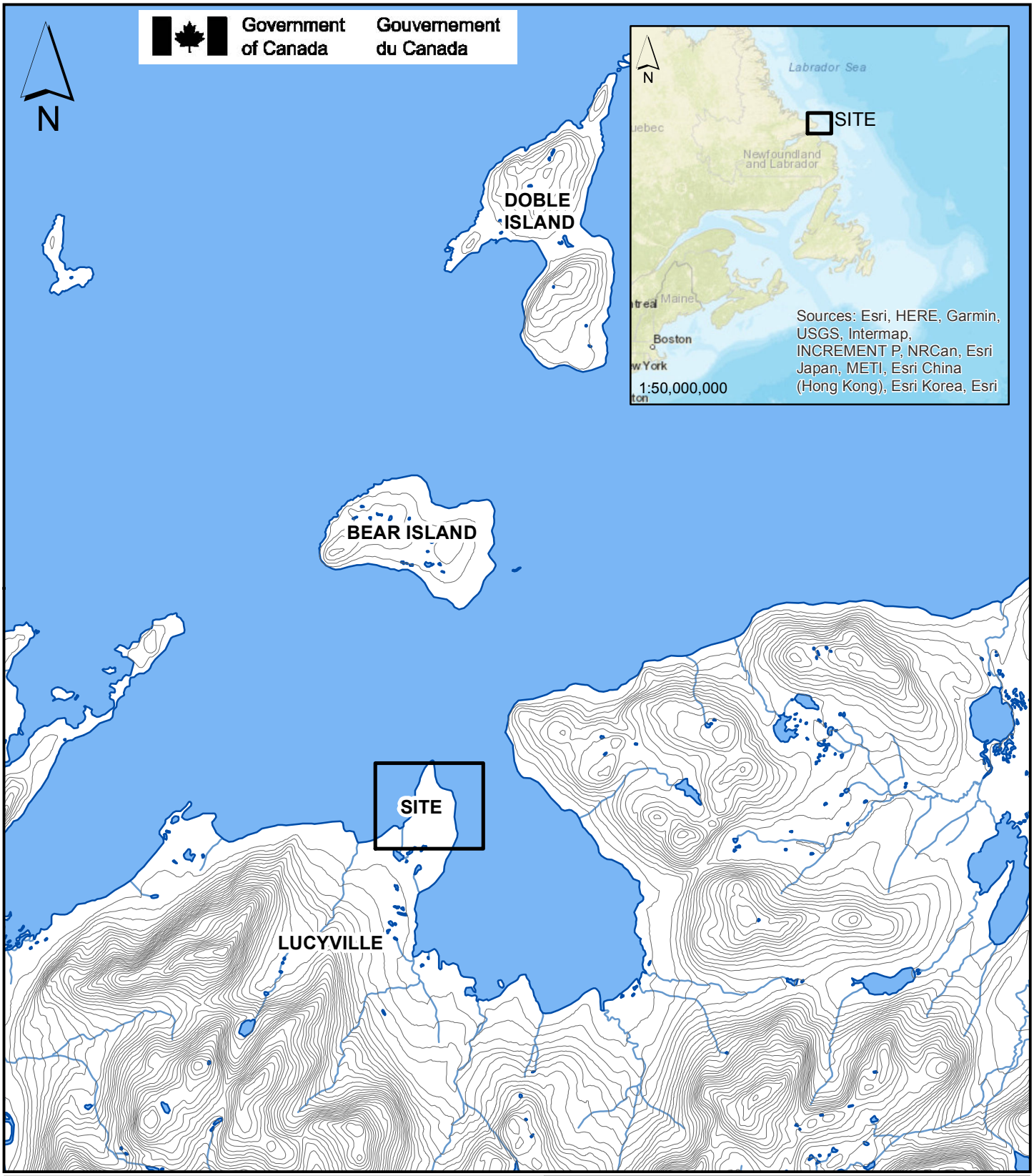
APPENDIX A

Drawings



PROJECT: INITIAL TESTING PROGRAM PROJET: AND NCSCS CLASSIFICATION FORMER WEATHER STATION CAPE HARRISON, LABRADOR, NL.	APPROVED:	MC
	APPROUVÉ PAR:	ML
SUBJECT: SITE LOCATION PLAN SUJET:	SCALE: ÉCHELLE:	1:100,000
	WBS NO.: NO. OTP:	NL17AS01
	PF NO.: NO. DP:	65745
DATE: OCTOBER 2018	DWG NO.: NO. DESSIN:	10550.04.03 - Drawing 1

GEMTEC
Consulting Engineers and Scientists

Government of Canada / Gouvernement du Canada

N

ATV Tracks

DRAWING 3, 4, 5 and 6

APEC #8
APEC #7
APEC #2
APEC #5
APEC #3
APEC #1
APEC #6
APEC #4

20

40

Notes
Coordinate System: NAD_1983_CSRS_UTM_Zone_21N
WKID: 2962 Authority: EPSG
Contour source: Data extrated from "Geospatial Data Extraction" of Natural Resources Canada, Goverment of Canada. (http://maps.canada.ca/czs/index-en.html)

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PROJECT: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER WEATHER STATION CAPE HARRISON ISLAND, LABRADOR, NL.
PROJET:

SUBJECT: SITE OVERVIEW
SUJET:

DATE: OCTOBER 2018

APPROVED: APPROUVÉ PAR:	MC	
	ML	
SCALE: ÉCHELLE:		1:10,000
WBS NO.: NO. OTP:		NL17AS01
PF NO.: NO. DP:		65745
DWG NO.: NO. DESSIN:		10550.04.03 - Drawing 2

Government of Canada / Gouvernement du Canada

N

ATV Tracks

Beach

Beach

Top of Enscarpment (~15%)

APEC #8
SS_CH_35
Steel Barge
SS_CH_34
SS_CH_37
SS_CH_36

APEC #7
SS_CH_25
SS_CH_27
SS_CH_26
SS_CH_28
SS_CH_29
SS_CH_30
SS_CH_32
SS_CH_31
SS_CH_33

APEC #2
Former Structure

INACCESSIBLE AREA
(Dense Vegetation)

Former Tower Structure
APEC #5
SS_CH_06
SS_CH_07
SS_CH_08
Former Pillars
SS_CH_09
SS_CH_10

Former Tower Structure
APEC #3
SS_CH_16
SS_CH_17
Former Pillars
SS_CH_18
SS_CH_19
SS_CH_20

Scoured Area
Slope
APEC #6
SS_CH_03
SS_CH_01
SS_CH_02
SS_CH_05
SS_CH_04
Former Tower Structure

Former Tower Structure
APEC #4
SS_CH_12
SS_CH_13
SS_CH_15
Former Pillars
SS_CH_14
SS_CH_11

APEC #1
SS_CH_21
SS_CH_21
SS_CH_24
SS_CH_22
SS_CH_23
Helicopter Pad

INACCESSIBLE AREA
(Dense Vegetation)

0 12.5 25 50
Meters

Legend

- Surface Soil
- Pillars
- Enscarpment Line
- Slope
- Contour - 10m
- Scoured Area and Helicopter Pad
- Inaccessible
- Concrete Structure
- APEC

PROJECT: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER WEATHER STATION CAPE HARRISON, LABRADOR, NL.
PROJET:

SUBJECT: SOIL SAMPLE LOCATION PLAN
SUJET:

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:		10550.04.03 - Drawing 3

Government of Canada / Gouvernement du Canada

N

ATV Tracks

Beach

Top of Escarpment (~15%)

APEC #8

SS_CH_35 — Steel Barge

SS_CH_34

SS_CH_37

SS_CH_36

APEC #7

SS_CH_25

SS_CH_27

SS_CH_26

SS_CH_28

SS_CH_30

SS_CH_29

SS_CH_32

SS_CH_31

SS_CH_33

APEC #2
Former Structure

SS_CH_27

Parameter	Unit	Result	Screening Level
F2	mg/kg	3300	260
F3	mg/kg	6500	1700
Acenaphthene	mg/kg	< 3.5	0.28
Bendiocarb	mg/kg	< 50	0.21
Dimethoate	mg/kg	< 50	0.0055
Metolachlor	mg/kg	< 100	0.055
Triallate	mg/kg	< 50	0.0092
Trifluralin	mg/kg	< 50	0.045
Phorate	mg/kg	< 50	0.14
Terbufos	mg/kg	< 50	0.15
Aldicarb	mg/kg	< 50	0.065
Atrazine	mg/kg	< 50	0.01
Carbaryl	mg/kg	< 50	3.6
Carbofuran	mg/kg	< 50	1.2
Cyanazine (Bladex)	mg/kg	< 50	0.21
Diazinon	mg/kg	< 50	4.2
Malathion	mg/kg	< 50	1.3
Simazine	mg/kg	< 50	0.038
Total Endosulfan	mg/kg	< 0.020	0.0015
2,4-D	mg/kg	< 1.0	0.67
Dicamba	mg/kg	< 2.0	0.79
MCPA	mg/kg	< 2.0	0.66
Picloram	mg/kg	< 2.0	0.022

INACCESSIBLE AREA
(Dense Vegetation)

Former Tower Structure
APEC #5

Scoured Area

Slope

SS_CH_06

SS_CH_07

SS_CH_08

SS_CH_09

SS_CH_10

APEC #6

SS_CH_03

SS_CH_01

SS_CH_02

SS_CH_04

SS_CH_05

Former Pillars

Former Tower Structure
APEC #3

Former Pillars

SS_CH_16

SS_CH_17

SS_CH_18

SS_CH_19

SS_CH_20

SS_CH_18

Parameter	Unit	Result	Screening Level
Zinc	mg/kg	360	200

Former Tower Structure
APEC #4

SS_CH_12

SS_CH_13

SS_CH_15

SS_CH_14

Former Pillars

APEC #1

SS_CH_21

SS_CH_24

SS_CH_22

SS_CH_23

Helicopter Pad

SS_CH_11

SS_CH_11

Parameter	Unit	Result	Screening Level
Zinc	mg/kg	1100	200

Former Tower Structure

SS_CH_04

Parameter	Unit	Result	Screening Level
F3	mg/kg	2700	1700
F4	mg/kg	4600	3300

SS_CH_13

Parameter	Unit	Result	Screening Level
Zinc	mg/kg	1200	200

SS_CH_15

Parameter	Unit	Result	Screening Level
Cadmium	mg/kg	48	22
Chromium	mg/kg	140	87
Copper	mg/kg	88000	91
Lead	mg/kg	3800	600
Silver	mg/kg	53	40
Zinc	mg/kg	3900	200
Beryllium	mg/kg	< 20	8
Selenium	mg/kg	< 10	2.9

INACCESSIBLE AREA
(Dense Vegetation)

0 12.5 25 50 Meters

Samples Analyzed For:

- PHC, PAH, Metals
- PHC, PAH, Metals, PCBs
- PHC, PAH, Metals, PCB, Dioxins/Furans, Pesticides

Red Text = Exceedance

* 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.

Legend

- Enscarpment Line
- Slope
- Contour - 10m
- Scoured Area and Helicopter Pad
- Inaccessible Area
- Concrete Structure
- APEC
- Pillars

PROJECT: / PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER WEATHER STATION CAPE HARRISON, LABRADOR, NL.

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

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:		10550.04.03 - Drawing 4

Government of Canada / Gouvernement du Canada

N

ATV Tracks

Beach

Top of Escarpment (~15%)

APEC #8
SS_CH_35
Steel Barge
SS_CH_34
SS_CH_37
SS_CH_36

APEC #7
SS_CH_25
SS_CH_27
SS_CH_26
SS_CH_28
SS_CH_30
SS_CH_29
SS_CH_32
SS_CH_31
SS_CH_33

APEC #2
Former Structure

SS_CH_27			
Parameter	Unit	Result	Screening Level
F2	mg/kg	3300	1000
F3	mg/kg	6500	3500
Modified TPH	mg/kg	9800	4000
Bendiocarb	mg/kg	< 50	0.21
Dimethoate	mg/kg	< 50	0.0055
Metolachlor	mg/kg	< 100	0.055
Triallate	mg/kg	< 50	0.0092
Trifluralin	mg/kg	< 50	0.045
Phorate	mg/kg	< 50	0.14
Terbufos	mg/kg	< 50	0.15
Aldicarb	mg/kg	< 50	0.065
Atrazine	mg/kg	< 50	0.01
Carbaryl	mg/kg	< 50	3.6
Carbofuran	mg/kg	< 50	1.2
Cyanazine (Bladex)	mg/kg	< 50	0.21
Diazinon	mg/kg	< 50	4.2
Malathion	mg/kg	< 50	1.3
Simazine	mg/kg	< 50	0.038
Total Endosulfan	mg/kg	< 0.020	0.0015
2,4-D	mg/kg	< 1.0	0.67
Dicamba	mg/kg	< 2.0	0.79
MCPA	mg/kg	< 2.0	0.66
Picloram	mg/kg	< 2.0	0.022

INACCESSIBLE AREA
(Dense Vegetation)

Former Tower Structure
APEC #5
SS_CH_06
SS_CH_07
SS_CH_08
SS_CH_09
SS_CH_10

Scoured Area
Slope

APEC #6
SS_CH_03
SS_CH_01
SS_CH_02
SS_CH_04
SS_CH_05

Concrete Pillars

Former Tower Structure
APEC #3
Former Pillars
SS_CH_16
SS_CH_17
SS_CH_18
SS_CH_19
SS_CH_20

Former Tower Structure
APEC #4
SS_CH_12
SS_CH_13
SS_CH_15
SS_CH_14
SS_CH_11

Concrete Pillars

SS_CH_15			
Parameter	Unit	Result	Screening Level
Copper	mg/kg	88000	4000
Lead	mg/kg	3800	260
Arsenic	mg/kg	< 20	12

APEC #1
SS_CH_21
SS_CH_24
SS_CH_22
SS_CH_23

Helicopter Pad

Former Tower Structure

INACCESSIBLE AREA
(Dense Vegetation)

0 12.5 25 50 Meters

Samples Analyzed For:
- PHC, PAH, Metals
- PHC, PAH, Metals, PCBs
- PHC, PAH, Metals, PCB, Dioxins/Furans, Pesticides

Red Text = Exceedance

* 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.

Legend
- Enscarpment Line
- Slope
- Contour - 10m
- Scoured Area and Helicopter Pad
- Inaccessible Area
- Concrete Structure
- APEC
- Pillars

PROJECT: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER WEATHER STATION CAPE HARRISON, LABRADOR, NL.
PROJET:

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

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:		10550.04.03 - Drawing 5

Government of Canada / Gouvernement du Canada

N

ATV Tracks

Beach

Top of Escarpment (~15%)

Beach

APEC #8
SS_CH_35
Steel Barge
SS_CH_34
SS_CH_37
SS_CH_36

APEC #7
SS_CH_25
SS_CH_27
SS_CH_26
SS_CH_28
SS_CH_30
SS_CH_29
SS_CH_32
SS_CH_31
SS_CH_33

APEC #2
Former Structure

INACCESSIBLE AREA
(Dense Vegetation)

Former Tower Structure
APEC #5
SS_CH_06
SS_CH_07
SS_CH_08
SS_CH_09
SS_CH_10

Former Tower Structure
APEC #3
SS_CH_16
SS_CH_17
Former Pillars
SS_CH_18
SS_CH_19
SS_CH_20

Scoured Area
Slope
APEC #6
SS_CH_03
SS_CH_01
SS_CH_02
SS_CH_04
SS_CH_05
Concrete Pillars
Former Tower Structure

Former Tower Structure
APEC #4
SS_CH_12
SS_CH_13
SS_CH_15
Concrete Pillars
SS_CH_14
SS_CH_11

APEC #1
SS_CH_21
SS_CH_24
SS_CH_22
SS_CH_23
Helicopter Pad

INACCESSIBLE AREA
(Dense Vegetation)

0 12.5 25 50
Meters

Samples Analyzed For:
- PHC, PAH, Metals
- PHC, PAH, Metals, PCBs
- PHC, PAH, Metals, PCB, Dioxins/Furans, Pesticides

* Estimated area based on a number of assumptions presented in the report, in areas where horizontal delineation was not achieved.

Legend
- Enscarpment Line
- Slope
- Contour - 10m
- Contaminated Site Areas
- Scoured Area and Helicopter Pad
- Inaccessible Area
- Concrete Structure
- APEC
- Pillars

PROJECT: / PROJET: INITIAL TESTING PROGRAM AND NCSCS CLASSIFICATION FORMER WEATHER STATION CAPE HARRISON, LABRADOR, NL.

SUBJECT: / SUJET: ESTIMATED AREAS OF IMPACT

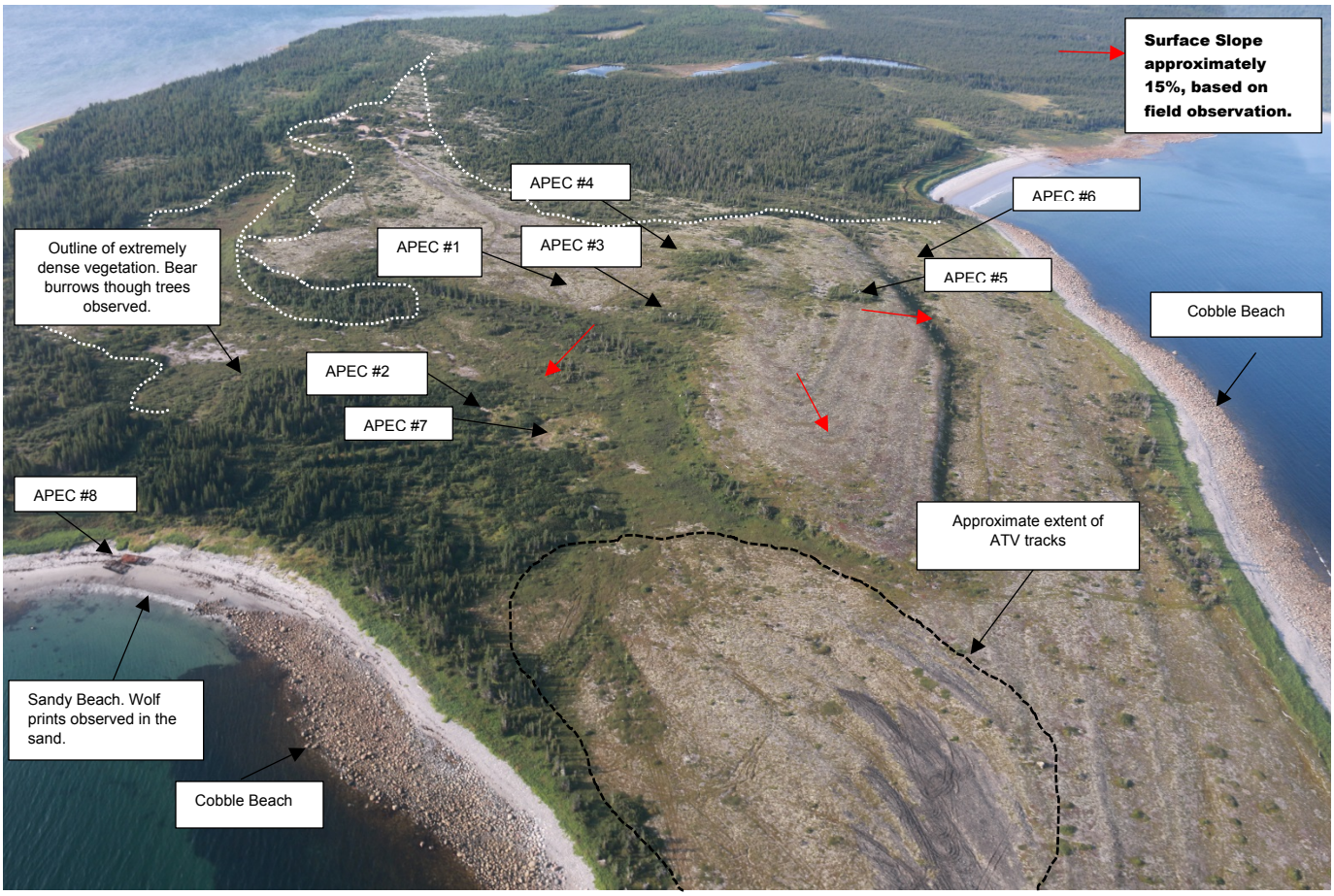
DATE: OCTOBER 2018

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:		10550.04.03 - Drawing 6

APPENDIX B

Selected Site Photographs



Approximate location of all eight APECs on the Site; aerial fly over photograph (September, 2017).

PHOTO 1 - Aerial view of Cape Harrison, approaching from the southwest. (September, 2017)

PHOTO 2 - APEC #1: (Presumed helicopter pad) showing moss, lichen, and small shrub vegetation. (September, 2017)

PHOTO 3 - APEC #1: Aerial view uphill. (September, 2017)

PHOTO 4 - APEC #1: View with mountains in the background. (September, 2017)

PHOTO 5 - APEC #2: (Former structure) showing remains of concrete foundation. (September, 2017)

PHOTO 6 - APEC #2: Vegetated area. (September, 2017)

PHOTO 7 - APEC #2: Vegetated area. (September, 2017)

PHOTO 8 - APEC #2: Gravel area. (September, 2017)

PHOTO 9 - APEC #3: (Former tower structure #1) showing two of the remaining four concrete pillars. (September, 2017)

PHOTO 10 - APEC #3: Vegetated area. (September, 2017)

PHOTO 11 - APEC #3: View with mountains in the background. (September, 2017)

PHOTO 12 - APEC #3: Vegetated area. (September, 2017)

PHOTO 13 - APEC #4: (Former tower structures #2) showing concrete pads. (September, 2017)

PHOTO 14 - APEC #4: (Former tower structures #2) showing remains of concrete cradle. (September, 2017)

PHOTO 15 - APEC #4: Piece of debris identified. (September, 2017)

PHOTO 16 - APEC #4: View of gravel area. (September, 2017)

PHOTO 17 - APEC #4: View of upland area. (September, 2017)

PHOTO 18 - APEC #4: Small piece of metal debris. (September, 2017)

PHOTO 19 - APEC #4: View of metal debris. (September, 2017)

PHOTO 20 - APEC #4: Pipe going through a concrete block. (September, 2017)

PHOTO 21 - APEC #4: (Former tower structures #2) showing three concrete pillars. (September, 2017)

PHOTO 22 - APEC #5: (Former tower structures #3) showing remains of concrete pillars. (September, 2017)

PHOTO 23 - APEC #5: View of dense vegetation. (September, 2017)

PHOTO 24 - APEC #5: View of gravel area. (September, 2017)

PHOTO 25 - APEC #5: View of concrete block. (September, 2017)

PHOTO 26 - APEC #5: View of gravel area. (September, 2017)

PHOTO 27 - APEC #5: View of debris. (September, 2017)

PHOTO 28 - APEC #6: (Former tower structures #3) showing scoured area looking towards Labrador Sea. (September, 2017)

PHOTO 29 - APEC #6: View looking uphill. (September, 2017)

PHOTO 30 - APEC #6: View of ground surface. (September, 2017)

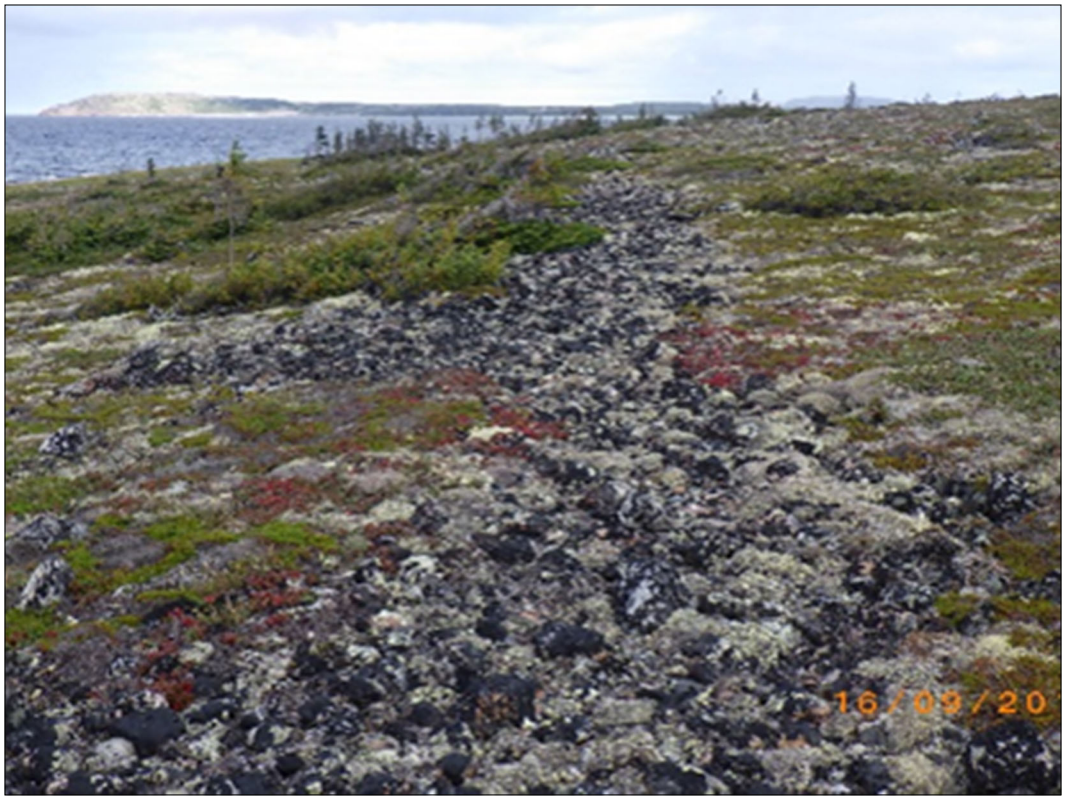


PHOTO 31 - APEC #6: View of ground surface. (September, 2017)

PHOTO 32 - APEC #6: View of ground surface. (September, 2017)

PHOTO 33 - APEC #6: Overturned concrete pillar. (September, 2017)

PHOTO 34 - APEC #6: View showing remains of overturned concrete pillars. (September, 2017)

PHOTO 35 - APEC #7: Transite board. (September, 2017)

PHOTO 36 - APEC #7: Asphalt debris. (September, 2017)

PHOTO 37 - APEC #7: Wood debris board. (September, 2017)

PHOTO 38 - APEC #7: Rebar coming out of the ground. (September, 2017)

PHOTO 39 - APEC #7: Pieces of debris. (September, 2017)

PHOTO 40 - APEC #7: Rebar coming out of the ground. (September, 2017)

PHOTO 41 - APEC #7: (Presumed landfill) showing buried debris. (September, 2017)

PHOTO 42 - APEC #8: View of barge located on the sandy beach, looking toward the cobbly beach. (September, 2017)

PHOTO 43 - APEC #8: View of remains of barge sitting on beach sand. Based on the presence of seaweed, the barge is partially submerged at high tide. (September, 2017)

PHOTO 44 - APEC #8: Close-up view of the degraded steel barge on the sandy beach. (September, 2017)

PHOTO 45 - APEC #8: Close-up view of the degraded steel barge on the sandy beach.

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 Hydrocarbon Odours Y/N	VOC Reading (ppm)	Debris Type Present / Comment
SS_CH_01	0.05	407290.39	6070407.71	21N	Brown	Sand, silt, and organics	N	N	N	0.0	Organics
SS_CH_02	0.05	407309.20	6070407.36	21N	Brown	Sand, silt, and organics	N	N	N	0.0	Organics
SS_CH_03	0.05	407233.00	6070413.00	21N	Brown	Gravel and silty sand	N	N	N	0.0	
SS_CH_04	0.05	407288.00	6070383.00	21N	Black	Sand and heavy organics	N	N	N	0.0	Organics
SS_CH_05	0.05	407308.50	6070387.73	21N	Black	Organics and sand	N	N	N	0.0	Organics
SS_CH_06	0.05	407338.81	6070444.82	21N	Brown	Sand	N	N	N	0.0	Organics
SS_CH_07	0.05	407358.02	6070445.16	21N	Light brown-gray	Sand and gravel	N	N	N	0.0	Organics
SS_CH_08	0.05	407348.66	6070433.40	21N	Brown	Sand, heavy organics	N	N	N	0.0	Organics
SS_CH_09	0.05	407339.50	6070423.23	21N	Brown	Sand, heavy organics	N	N	N	0.0	Organics
SS_CH_10	0.05	407358.40	6070422.75	21N	Brown-dark brown	Sand and gravel, with organics	N	N	N	0.0	Organics
SS_CH_11	0.05	407485.43	6070310.94	21N	Dark brown-black	Sand and organics	N	N	N	0.0	Organics
SS_CH_12	0.05	407427.98	6070387.91	21N	Brown	Sand and gravel	N	N	N	0.0	Organics
SS_CH_13	0.05	407419.38	6070378.32	21N	Brown	Sand and gravel	N	N	N	0.0	Organics
SS_CH_14	0.05	407455.92	6070347.16	21N	White/ gray	Sand	N	N	N	0.0	
SS_CH_15	0.05	407429.30	6070368.73	21N	Green	Sand, metal debris present	N	N	N	0.0	Organics
SS_CH_16	0.05	407468.63	6070447.84	21N	Brown	Sand and gravel	N	N	N	0.0	Organics
SS_CH_17	0.05	407488.20	6070447.88	21N	Brown	Sand	N	N	N	0.0	Organics
SS_CH_18	0.05	407479.00	6070437.39	21N	Brown	Sand and gravel	N	N	N	0.0	Organics
SS_CH_19	0.05	407468.38	6070427.45	21N	Brown	Peat	N	N	N	0.0	Organics
SS_CH_20	0.05	407489.36	6070427.58	21N	Brown	Sand and gravel, with organics	N	N	N	0.0	Organics
SS_CH_21	0-0.05	407520.25	6070401.14	21N	Brown	Sand and Peat	N	N	N	0.0	Organics
SS_CH_22	0-0.05	407535.46	6070384.27	21N	Brown	Sand and Peat	N	N	N	0.0	Organics

Table C1 - Soil Descriptions

Sample Location	Depth (mbgs)	Easting NAD83 (CSRS)	Northing NAD83 (CSRS)	Zone	Colour	Description	Fill Y/N	Stains Y/N	Petroleum Hydrocarbon Odours Y/N	VOC Reading (ppm)	Debris Type Present / Comment
SS_CH_23	0-0.05	407521.57	6070366.74	21N	Brown	Sand and Peat	N	N	N	0.0	Organics
SS_CH_24	0-0.05	407501.40	6070383.61	21N	Brown	Sand and Peat	N	N	N	0.0	Organics
SS_CH_25	0.05	407562.25	6070556.91	21N	Brown	Sand	N	N	Y	0.0	Organics
SS_CH_26	0.05	407562.25	6070534.75	21N	Brown	Sand	N	N	N	0.0	Organics
SS_CH_27	0.05	407601.28	6070556.25	21N	Brown	Sand	N	N	Y	0.0	Organics
SS_CH_28	0.05	407600.95	6070535.75	21N	Brown	Sand	N	N	N	0.0	Organics
SS_CH_29	0.05	407600.55	6070514.51	21N	Brown	Sand and gravel	N	N	N	0.0	Organics
SS_CH_30	0.05	407616.00	6070515.00	21N	Brown	Sand	N	N	N	0.0	Organics
SS_CH_31	0.05	407602.00	6070504.00	21N	Brown	Sand, trace gravel	N	N	N	0.0	Organics
SS_CH_32	0.05	407608.00	6070509.00	21N	Brown	Sand	N	N	N	0.0	Organics
SS_CH_33	0.05	407570.00	6070495.00	21N	Brown	Sand	N	N	N	0.0	Organics
SS_CH_34	0-0.05	407774.25	6070582.38	21N	Beige	Sand	N	N	N	0.0	Beach sand
SS_CH_35	0-0.05	407781.53	6070590.32	21N	Beige	Sand	N	N	N	0.0	Beach sand
SS_CH_36	0-0.05	407780.53	6070575.10	21N	Beige	Sand	N	N	N	0.0	Beach sand
SS_CH_37	0-0.05	407788.47	6070583.04	21N	Beige	Sand	N	N	N	0.0	Beach sand

Table C2 - Test Pit Logs

APEC	Sample Location	Depth (mbgs)	Easting NAD83 (CSRS)	Northing NAD83 (CSRS)	Zone	Colour	Description	Fill Y/N	Stains Y/N	Odours Y/N	VOC Reading (ppm)	Debris Type Present / Comment
APEC #1	SS_CH_21	0-0.30	407520.25	6070401.14	21N	Brown	Sand and Peat	N	N	N	0.0	Organics
APEC #2	SS_CH_31	0-0.30	407602.00	6070504.00	21N	Brown	Sand, trace gravel	N	N	N	0.0	Organics
APEC #3	SS_CH_16	0-0.30	407468.63	6070447.84	21N	Brown	Sand and gravel with some peat	N	N	N	0.0	Organics
APEC #4	SS_CH_11	0-0.30	407485.43	6070310.94	21N	Dark brown-black	Sand and organics	N	N	N	0.0	Organics
APEC #5	SS_CH_08	0-0.30	407348.66	6070433.40	21N	Brown	Sand, heavy organics	N	N	N	0.0	Organics
APEC #6	SS_CH_04	0-0.30	407288.00	6070383.00	21N	Black	Sand and heavy organics	N	N	N	0.0	Organics
APEC #7	SS_CH_25	0-0.30	407562.25	6070556.91	21N	Brown	Sand	N	N	Y	0.0	Organics
APEC #8	SS_CH_34	0-0.30	407774.25	6070582.38	21N	Beige	Sand	N	N	N	0.0	Beach sand

APPENDIX D

Analytical Tables

Table D1 Petroleum Hydrocarbons in Soil (mg/kg)

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				**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_CH_01		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<20	520	370	1300	1300	520
SS_CH_02		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	11	420	370	690	690	431
SS_CH_02	LD	0-0.05	16-Sep-17	-	-	-	-	-	-	-	-	690	690	-
SS_CH_03		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_04		0-0.05	16-Sep-17	<0.012	<0.040	<0.020	<0.040	<20	120	**2700**	2300	4600	**4600**	2820
SS_CH_05		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	22	650	560	1600	1600	672
SS_CH_05	LD	0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	-	-	-	-	-	-
SS_CH_06		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<20	580	550	750	750	580
SS_CH_07		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_08		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	100	78	300	300	100
SS_CH_08	FD	0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	140	100	390	390	140
SS_CH_09		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	160	120	150	150	160
SS_CH_10		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_11		0-0.05	16-Sep-17	0.006	0.028	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_12		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	86	67	490	490	86
SS_CH_13		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_14		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_14	LD	0-0.05	16-Sep-17	-	-	-	-	-	<10	<50	<50	-	<50	-
SS_CH_15		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_16		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	120	82	<100	82	120
SS_CH_17		0-0.05	16-Sep-17	<0.012	<0.040	<0.020	<0.040	<20	46	700	500	720	720	746

Table D1 Petroleum Hydrocarbons in Soil (mg/kg)

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				**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_CH_18		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	150	95	150	150	150
SS_CH_18	FD	0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	140	92	310	310	140
SS_CH_19		0-0.05	16-Sep-17	0.012	0.036	<0.010	<0.020	<10	17	440	310	840	840	457
SS_CH_20		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_21		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_21	LD	0-0.05	16-Sep-17	-	-	-	-	-	<10	<50	<50	-	<50	-
SS_CH_22		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_22	LD	0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	-	-	-	-	-	-
SS_CH_23		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	48	620	480	1200	1200	668
SS_CH_23	LD	0-0.05	16-Sep-17	-	-	-	-	-	-	-	-	1100	1100	-
SS_CH_24		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	22	210	170	250	250	232
SS_CH_25		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_26		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	79	180	93	<100	93	259
SS_CH_27		0-0.05	16-Sep-17	0.0081	0.082	0.014	0.08	<10	**3300**	**6500**	410	-	410	9800
SS_CH_28		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	24	150	150	710	710	174
SS_CH_29		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	28	87	<50	<100	0	115
SS_CH_30		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	16	<50	<50	-	<50	16
SS_CH_30	FD	0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_31		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	28	190	89	130	130	218
SS_CH_32		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	11	120	89	150	150	131
SS_CH_33		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_34		0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50

Table D1 Petroleum Hydrocarbons in Soil (mg/kg)

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			**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_CH_35	0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_36	0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
SS_CH_37	0-0.05	16-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	<10	<50	<50	-	<50	<50
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_SP_28_BG	0-0.05	14-Sep-17	<0.0060	<0.020	<0.010	<0.020	<10	11	130	140	200	200	141

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.
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 analysis (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.
LD = laboratory duplicate
FD = field duplicate
NA = not applicable
"-" = Not available/ Not analyzed.

Table D2: PAH Concentrations in Soil (mg/kg)

Parameter	Concentration (mg/kg)								
	Human Health			Sample Identification					
	NSE TIER 1 EQS (Commercial)	B(a)P PEF	CCME Ecological Guideline	SS_CH_01	SS_CH_02	SS_CH_03	SS_CH_04	SS_CH_05	SS_CH_06
Non-Carcinogenic PAHs									
Acenaphthene	8000	-	0.28	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	66	-	320	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	37000	-	32	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	5300	-	180	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene	4100	-	0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	25	-	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	17	-	0.046	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	3200	-	100	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
1-Methylnaphthalene	560	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	560	-	-	<0.0050	<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	<0.0050
Benzo[a]pyrene	-	1	72	<0.0050	<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	<0.0050
Benzo[ghi]perylene	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo[j]fluoranthene	-	0.1	10 [2]	<0.0050	<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	<0.0050
Chrysene	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dibenz[a,h]anthracene	-	1	10	<0.0050	<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	<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				16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-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 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.

LD = laboratory duplicate

FD = field duplicate

" -" = no guideline available, not analysed

Table D2: PAH Concentrations in Soil (mg/kg)

Parameter	Concentration (mg/kg)								
	Human Health		CCME Ecological Guideline	Sample Identification					
	NSE TIER 1 EQS (Commercial)	B(a)P PEF		SS_CH_06_LD	SS_CH_07	SS_CH_08	SS_CH_08_FD	SS_CH_09	SS_CH_10
Non-Carcinogenic PAHs									
Acenaphthene	8000	-	0.28	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	66	-	320	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	37000	-	32	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	5300	-	180	0.006	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene	4100	-	0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	25	-	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	17	-	0.046	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	3200	-	100	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
1-Methylnaphthalene	560	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	560	-	-	<0.0050	<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	<0.0050
Benzo[a]pyrene	-	1	72	<0.0050	<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	<0.0050
Benzo[ghi]perylene	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo[j]fluoranthene	-	0.1	10 [2]	<0.0050	<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	<0.0050
Chrysene	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dibenz[a,h]anthracene	-	1	10	<0.0050	<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	<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				16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-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 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.

LD = laboratory duplicate

FD = field duplicate

" -" = no guideline available, not analysed

Table D2: PAH Concentrations in Soil (mg/kg)

Parameter	Human Health		CCME Ecological Guideline	Concentration (mg/kg) Sample Identification					
	NSE TIER 1 EQS (Commercial)	B(a)P PEF		SS_CH_11	SS_CH_12	SS_CH_13	SS_CH_14	SS_CH_15	SS_CH_16
Non-Carcinogenic PAHs									
Acenaphthene	8000	-	0.28	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	66	-	320	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	37000	-	32	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	5300	-	180	0.0083	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene	4100	-	0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	25	-	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	17	-	0.046	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	3200	-	100	0.0063	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
1-Methylnaphthalene	560	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	560	-	-	<0.0050	<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	<0.0050
Benzo[a]pyrene	-	1	72	<0.0050	<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	<0.0050
Benzo[ghi]perylene	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo[j]fluoranthene	-	0.1	10 [2]	<0.0050	<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	<0.0050
Chrysene	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dibenz[a,h]anthracene	-	1	10	<0.0050	<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	<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				16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-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 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.

LD = laboratory duplicate

FD = field duplicate

" -" = no guideline available, not analysed

Table D2: PAH Concentrations in Soil (mg/kg)

Parameter	Human Health		CCME Ecological Guideline	Concentration (mg/kg) Sample Identification					
	NSE TIER 1 EQS (Commercial)	B(a)P PEF		SS_CH_17	SS_CH_18	SS_CH_18_FD	SS_CH_19	SS_CH_20	SS_CH_21
Non-Carcinogenic PAHs									
Acenaphthene	8000	-	0.28	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	66	-	320	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	37000	-	32	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	5300	-	180	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene	4100	-	0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	25	-	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	17	-	0.046	<0.0050	<0.0050	<0.0050	0.0065	<0.0050	<0.0050
Pyrene	3200	-	100	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
1-Methylnaphthalene	560	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	560	-	-	<0.0050	<0.0050	<0.0050	0.0065	<0.0050	<0.0050
Carcinogenic PAHs									
Benzo[a]anthracene	-	0.1	10	<0.0050	<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	<0.0050
Benzo[b]fluoranthene	-	0.1	10 [2]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo[ghi]perylene	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo[j]fluoranthene	-	0.1	10 [2]	<0.0050	<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	<0.0050
Chrysene	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dibenz[a,h]anthracene	-	1	10	<0.0050	<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	<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				16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-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 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.

LD = laboratory duplicate

FD = field duplicate

" -" = no guideline available, not analysed

Table D2: PAH Concentrations in Soil (mg/kg)

Parameter	Human Health		CCME Ecological Guideline	Concentration (mg/kg) Sample Identification					
	NSE TIER 1 EQS (Commercial)	B(a)P PEF		SS_CH_22	SS_CH_23	SS_CH_24	SS_CH_24_LD	SS_CH_25	SS_CH_26
Non-Carcinogenic PAHs									
Acenaphthene	8000	-	0.28	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	66	-	320	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	37000	-	32	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	5300	-	180	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene	4100	-	0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	25	-	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	17	-	0.046	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	3200	-	100	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
1-Methylnaphthalene	560	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	560	-	-	<0.0050	<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	<0.0050
Benzo[a]pyrene	-	1	72	<0.0050	<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	<0.0050
Benzo[ghi]perylene	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo[j]fluoranthene	-	0.1	10 [2]	<0.0050	<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	<0.0050
Chrysene	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dibenz[a,h]anthracene	-	1	10	<0.0050	<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	<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				16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-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 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.

LD = laboratory duplicate

FD = field duplicate

" -" = no guideline available, not analysed

Table D2: PAH Concentrations in Soil (mg/kg)

Parameter	Human Health		CCME Ecological Guideline	Concentration (mg/kg)						
				Sample Identification						
	NSE TIER 1 EQS (Commercial)	B(a)P PEF		SS_CH_27	SS_CH_28	SS_CH_29	SS_CH_30	SS_CH_30_FD	SS_CH_31	SS_CH_32
Non-Carcinogenic PAHs										
Acenaphthene	8000	-	0.28	**<0.35**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	66	-	320	<0.44	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	37000	-	32	<0.066	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	5300	-	180	0.018	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene	4100	-	0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	25	-	0.013	<0.0080	<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	<0.0050
Phenanthrene	17	-	0.046	<0.039	0.0072	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	3200	-	100	0.33	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
1-Methylnaphthalene	560	-	-	<0.020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	560	-	-	<0.021	<0.0050	<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	<0.0050	<0.0050
Benzo[a]pyrene	-	1	72	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo[b]fluoranthene	-	0.1	10 [2]	0.02	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo[ghi]perylene	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo[j]fluoranthene	-	0.1	10 [2]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo[k]fluoranthene	-	0.1	10 [2]	0.0084	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	-	0.01	-	0.16	<0.0050	<0.0050	<0.0050	<0.0050	0.0062	<0.0050
Dibenz[a,h]anthracene	-	1	10	<0.0050	<0.0050	<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	<0.0050	<0.0050
B(a)P TPE	**-**	**-**	5.3	0.03 [1]	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	0-0.05
			Sample Date	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-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

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

LD = laboratory duplicate

FD = field duplicate

" -" = no guideline available, not analysed

Table D2: PAH Concentrations in Soil (mg/kg)

Parameter	Human Health		CCME Ecological Guideline	Concentration (mg/kg)						
				Sample Identification						
	NSE TIER 1 EQS (Commercial)	B(a)P PEF		SS_CH_33	SS_CH_34	SS_CH_35	SS_CH_36	SS_CH_37	SS_CT_20 BG	SS_SP_28_BG
Non-Carcinogenic PAHs										
Acenaphthene	8000	-	0.28	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	66	-	320	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	37000	-	32	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	5300	-	180	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene	4100	-	0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	25	-	0.013	<0.0050	<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	<0.0050
Phenanthrene	17	-	0.046	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	3200	-	100	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
1-Methylnaphthalene	560	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	560	-	-	<0.0050	<0.0050	<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	<0.0050	<0.0050
Benzo[a]pyrene	-	1	72	<0.0050	<0.0050	<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	<0.0050	<0.0050
Benzo[ghi]perylene	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo[j]fluoranthene	-	0.1	10 [2]	<0.0050	<0.0050	<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	<0.0050	<0.0050
Chrysene	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dibenz[a,h]anthracene	-	1	10	<0.0050	<0.0050	<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	<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]	0.02 [1]
Sample Depth (mbgs)				0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
Sample Date				16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	12-Sep-17	14-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 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.

LD = laboratory duplicate

FD = field duplicate

" -" = no guideline available, not analysed

Table D3 Metals in Soil (mg/kg)

	CCME[1]							
Parameter	**Human Health**	**Ecological Health**	**Generic[2]**	**SS_CH_01**	**SS_CH_02**	**SS_CH_02_LD**	**SS_CH_03**	**SS_CH_04**
Aluminum	-	-	-	1900	5800	5700	4100	3400
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	-	18	35	35	41	15
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	-	<2.0	<2.0	<2.0	6.7	4.6
Cobalt	-	-	300	1	<1.0	<1.0	4.7	1.1
Copper	4000	91	-	<2.0	<2.0	<2.0	11	<2.0
Iron	-	-	-	4600	24000	23000	11000	7500
Lead	260	600	-	3.1	4.7	3.6	6.4	3.5
Lithium	-	-	-	2.5	15	16	12	<2.0
Manganese	-	-	-	67	410	410	180	33
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	-	7.2	<2.0	<2.0	5.2	<2.0
Rubidium	-	-	-	11	97	93	16	7.3
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	-	-	-	<5.0	5.6	<5.0	7.9	28
Thallium	1	3.6	-	<0.10	0.28	0.29	<0.10	<0.10
Tin	-	-	300	<2.0	<2.0	<2.0	<2.0	<2.0
Uranium	33	2000	-	0.81	0.41	0.26	1.6	0.89
Vanadium	-	130	-	9.3	2.5	2.2	20	11
Zinc	-	200	-	10	97	96	25	6.6
			depth (m)	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
			Sample Date	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17

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Table D3 Metals in Soil (mg/kg)

	CCME[1]							
Parameter	**Human Health**	**Ecological Health**	**Generic[2]**	**SS_CH_05**	**SS_CH_06**	**SS_CH_07**	**SS_CH_08**	**SS_CH_08_FD**
Aluminum	-	-	-	2100	1300	4100	4700	4800
Antimony	-	-	40	<2.0	<2.0	<2.0	<2.0	<2.0
Arsenic	12	26	-	<2.0	<2.0	2.1	<2.0	<2.0
Barium	10000	2000	-	19	8.2	20	29	27
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	-	2.4	4.9	5.3	9.2	8.5
Cobalt	-	-	300	<1.0	<1.0	3.6	3.3	3.3
Copper	4000	91	-	2.7	2.6	12	5.4	6
Iron	-	-	-	3800	6000	10000	13000	14000
Lead	260	600	-	4.7	6.5	13	18	17
Lithium	-	-	-	<2.0	<2.0	9.8	8.6	8.3
Manganese	-	-	-	12	32	150	130	140
Mercury	24	50	-	0.12	<0.10	<0.10	<0.10	<0.10
Molybdenum	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0
Nickel	310	89	-	<2.0	<2.0	3.9	4.6	4.6
Rubidium	-	-	-	3.7	8.4	17	18	17
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	-	-	-	17	10	11	14	16
Thallium	1	3.6	-	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	-	-	300	2.4	<2.0	<2.0	<2.0	<2.0
Uranium	33	2000	-	1.8	0.66	1.8	0.98	1.2
Vanadium	-	130	-	6.6	14	16	24	24
Zinc	-	200	-	6.8	13	26	70	68
			depth (m)	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
			Sample Date	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17

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Table D3 Metals in Soil (mg/kg)

	CCME[1]							
Parameter	**Human Health**	**Ecological Health**	**Generic[2]**	**SS_CH_09**	**SS_CH_10**	**SS_CH_11**	**SS_CH_12**	**SS_CH_12_LD**
Aluminum	-	-	-	5000	6100	4800	7600	6600
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	-	27	43	31	65	45
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	1.5	<0.30	<0.30
Chromium	630	87	-	8.3	9	12	22	15
Cobalt	-	-	300	3.2	3.9	3.8	5.4	4.5
Copper	4000	91	-	4.3	8.2	13	22	19
Iron	-	-	-	16000	14000	13000	19000	17000
Lead	260	600	-	6.5	15	71	34	31
Lithium	-	-	-	7.5	12	11	11	9.9
Manganese	-	-	-	190	190	170	160	150
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	-	4	4.8	4.5	8.4	6.5
Rubidium	-	-	-	16	22	18	21	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	-	-	-	8.9	12	12	14	12
Thallium	1	3.6	-	<0.10	0.12	<0.10	0.12	<0.10
Tin	-	-	300	<2.0	<2.0	3.8	<2.0	<2.0
Uranium	33	2000	-	1.2	1.4	2.1	1.6	1.5
Vanadium	-	130	-	25	25	24	42	34
Zinc	-	200	-	31	31	**1100**	78	72
			depth (m)	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
			Sample Date	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17

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Table D3 Metals in Soil (mg/kg)

	CCME[1]							
Parameter	**Human Health**	**Ecological Health**	**Generic[2]**	**SS_CH_13**	**SS_CH_14**	**SS_CH_15**	**SS_CH_16**	**SS_CH_17**
Aluminum	-	-	-	6900	670	260000	4500	1900
Antimony	-	-	40	<2.0	<2.0	<20	<2.0	<2.0
Arsenic	12	26	-	<2.0	<2.0	<20	<2.0	<2.0
Barium	10000	2000	-	54	<5.0	53	44	16
Beryllium	110	8	-	<2.0	<2.0	**<20**	<2.0	<2.0
Bismuth	-	-	-	<2.0	<2.0	<20	<2.0	<2.0
Boron	-	-	-	<50	<50	<500	<50	<50
Cadmium	49	22	-	2.6	<0.30	**48**	<0.30	<0.30
Chromium	630	87	-	16	3.5	**140**	27	3.9
Cobalt	-	-	300	5.6	<1.0	<10	3.8	<1.0
Copper	4000	91	-	19	<2.0	88000	4	12
Iron	-	-	-	17000	3700	3300	14000	4300
Lead	260	600	-	28	0.83	3800	7.5	5.5
Lithium	-	-	-	13	<2.0	<20	6.5	<2.0
Manganese	-	-	-	180	22	2500	100	28
Mercury	24	50	-	<0.10	<0.10	<1.0	<0.10	<0.10
Molybdenum	-	-	-	<2.0	<2.0	<20	<2.0	<2.0
Nickel	310	89	-	7.9	<2.0	23	7	<2.0
Rubidium	-	-	-	19	2.2	<20	25	3.3
Selenium	125	2.9	-	<1.0	<1.0	**<10**	<1.0	<1.0
Silver	-	40	-	<0.50	<0.50	**53**	<0.50	<0.50
Strontium	-	-	-	13	<5.0	<50	17	44
Thallium	1	3.6	-	<0.10	<0.10	<1.0	0.11	<0.10
Tin	-	-	300	<2.0	<2.0	100	<2.0	<2.0
Uranium	33	2000	-	1.4	0.12	<1.0	0.71	0.67
Vanadium	-	130	-	35	8.3	<20	34	7.8
Zinc	-	200	-	**1200**	<5.0	**3900**	17	31
			depth (m)	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
			Sample Date	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17

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Table D3 Metals in Soil (mg/kg)

	CCME[1]							
Parameter	**Human Health**	**Ecological Health**	**Generic[2]**	**SS_CH_18**	**SS_CH_18_FD**	**SS_CH_19**	**SS_CH_20**	**SS_CH_21**
Aluminum	-	-	-	3000	3900	2000	5800	1800
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	-	24	35	20	39	12
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	-	1.2	1.7	<0.30	<0.30	<0.30
Chromium	630	87	-	8.5	12	3.8	13	11
Cobalt	-	-	300	2.1	2.8	1.4	4.5	1.4
Copper	4000	91	-	4.9	7.1	11	7.4	<2.0
Iron	-	-	-	11000	13000	6300	15000	10000
Lead	260	600	-	18	16	34	8.8	2.6
Lithium	-	-	-	4.6	5.1	<2.0	11	2
Manganese	-	-	-	95	100	44	170	55
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	-	3.5	4.2	2.3	5.8	2.2
Rubidium	-	-	-	15	18	10	16	9.7
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	-	-	-	24	29	22	14	12
Thallium	1	3.6	-	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	-	-	300	3.1	2.5	<2.0	<2.0	<2.0
Uranium	33	2000	-	0.75	0.71	1.1	1.5	0.61
Vanadium	-	130	-	22	29	9.1	29	31
Zinc	-	200	-	**290**	**360**	25	24	6.3
			depth (m)	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
			Sample Date	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17

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Table D3 Metals in Soil (mg/kg)

	CCME[1]							
Parameter	**Human Health**	**Ecological Health**	**Generic[2]**	**SS_CH_22**	**SS_CH_23**	**SS_CH_24**	**SS_CH_25**	**SS_CH_26**
Aluminum	-	-	-	370	760	460	2500	5200
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	-	<5.0	5.2	<5.0	11	92
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	-	7	9.2	7.6	4.8	6
Cobalt	-	-	300	<1.0	<1.0	<1.0	1.4	4
Copper	4000	91	-	<2.0	2.1	<2.0	2.7	10
Iron	-	-	-	7000	4800	6800	7200	11000
Lead	260	600	-	<0.50	0.94	0.6	3.9	6.3
Lithium	-	-	-	<2.0	<2.0	<2.0	4.2	8.6
Manganese	-	-	-	16	11	18	72	110
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	-	<2.0	<2.0	<2.0	2	4.8
Rubidium	-	-	-	<2.0	<2.0	2.4	10	14
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	-	-	-	<5.0	9.4	<5.0	15	14
Thallium	1	3.6	-	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	-	-	300	<2.0	<2.0	<2.0	<2.0	<2.0
Uranium	33	2000	-	0.22	0.4	0.26	0.83	0.66
Vanadium	-	130	-	18	9.1	19	15	26
Zinc	-	200	-	<5.0	<5.0	<5.0	10	28
			depth (m)	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
			Sample Date	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17

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Table D3 Metals in Soil (mg/kg)

	CCME[1]							
Parameter	**Human Health**	**Ecological Health**	**Generic[2]**	**SS_CH_27**	**SS_CH_28**	**SS_CH_29**	**SS_CH_30**	**SS_CH_30_LD**
Aluminum	-	-	-	2900	3300	4100	3300	3200
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	-	25	55	30	17	18
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	-	8.5	9	7.7	4.8	5
Cobalt	-	-	300	1.7	2.2	3.2	2.2	2.1
Copper	4000	91	-	26	24	4.2	3	3.5
Iron	-	-	-	9500	9500	11000	8500	8300
Lead	260	600	-	43	150	8.1	4	4.9
Lithium	-	-	-	3.6	4.7	7.5	8.4	7.2
Manganese	-	-	-	73	95	120	110	100
Mercury	24	50	-	0.24	<0.10	<0.10	<0.10	<0.10
Molybdenum	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0
Nickel	310	89	-	3.6	3.1	4.1	2.8	2.8
Rubidium	-	-	-	9	9.9	9.6	11	8.7
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	-	-	-	17	14	12	11	10
Thallium	1	3.6	-	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	-	-	300	2.7	<2.0	<2.0	<2.0	<2.0
Uranium	33	2000	-	0.74	0.72	1.3	1.4	1.4
Vanadium	-	130	-	15	20	19	13	14
Zinc	-	200	-	37	36	20	17	15
			depth (m)	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
			Sample Date	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17

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Table D3 Metals in Soil (mg/kg)

	CCME[1]							
Parameter	**Human Health**	**Ecological Health**	**Generic[2]**	**SS_CH_30_FD**	**SS_CH_31**	**SS_CH_32**	**SS_CH_33**	**SS_CH_34**
Aluminum	-	-	-	3700	3800	3600	1000	1300
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	-	24	24	26	5.3	6.9
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	-	6.9	8.7	6.3	4.7	5.2
Cobalt	-	-	300	2.7	2.7	2.3	<1.0	1.1
Copper	4000	91	-	4	4	7.2	<2.0	2.2
Iron	-	-	-	10000	10000	9500	4300	8600
Lead	260	600	-	4.5	13	26	1.5	2.1
Lithium	-	-	-	9.4	9.6	6.8	<2.0	2.1
Manganese	-	-	-	120	140	120	28	62
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	-	3.8	3.6	3.3	<2.0	<2.0
Rubidium	-	-	-	12	12	10	6.6	2.8
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	-	-	-	11	12	15	7	9
Thallium	1	3.6	-	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	-	-	300	<2.0	<2.0	<2.0	<2.0	<2.0
Uranium	33	2000	-	1.6	1.3	1.1	0.48	0.99
Vanadium	-	130	-	17	16	15	10	16
Zinc	-	200	-	20	21	25	<5.0	7.2
			depth (m)	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
			Sample Date	16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	16-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**.

Where the concentration of a parameter exceeds both the Human Health and Ecological screening level, the value is highlighted here in the context of the Human Health framework only.

LD = laboratory duplicate
FD = field duplicate
- = no guideline, not applicable or parameter not analyzed

Table D3 Metals in Soil (mg/kg)

	CCME[1]							
Parameter	**Human Health**	**Ecological Health**	**Generic[2]**	**SS_CH_35**	**SS_CH_36**	**SS_CH_37**	**SS_CT_20 BG**	**SS_SP_28_BG**
Aluminum	-	-	-	1200	1200	980	14000	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	-	6	7.6	5.5	67	70
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	-	3	2.6	<2.0	68	7.3
Cobalt	-	-	300	<1.0	<1.0	<1.0	16	10
Copper	4000	91	-	<2.0	2.1	<2.0	17	58
Iron	-	-	-	4000	3600	2100	28000	26000
Lead	260	600	-	1.4	1.9	1.1	2.7	4.1
Lithium	-	-	-	<2.0	2.6	<2.0	15	14
Manganese	-	-	-	47	46	33	270	83
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	-	<2.0	<2.0	<2.0	32.0	51.0
Rubidium	-	-	-	2.6	3.7	2.4	25	13
Selenium	125	2.9	-	<1.0	<1.0	<1.0	<1.0	2.2
Silver	-	40	-	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium	-	-	-	10	7.7	7.2	13	24
Thallium	1	3.6	-	<0.10	<0.10	<0.10	0.21	<0.10
Tin	-	-	300	<2.0	<2.0	<2.0	<2.0	<2.0
Uranium	33	2000	-	0.89	0.69	0.62	0.53	0.89
Vanadium	-	130	-	7.6	6.2	3.9	43	76
Zinc	-	200	-	5	7	<5.0	42	20
			depth (m)	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
			Sample Date	16-Sep-17	16-Sep-17	16-Sep-17	12-Sep-17	14-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**.

Where the concentration of a parameter exceeds both the Human Health and Ecological screening level, the value is highlighted here in the context of the Human Health framework only.

LD = laboratory duplicate
FD = field duplicate
- = no guideline, not applicable or parameter not analyzed

Table D4 PCBs in Soil (mg/kg)

Parameter	CCME SQG[1]	SS_CH_34	SS_CH_35	SS_CH_36	SS_CH_37	SS_CT_20 BG	SS_SP_28_BG
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	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		16-Sep-17	16-Sep-17	16-Sep-17	16-Sep-17	12-Sep-17	14-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 Concentrations of Dioxins and Furans in Soil (ng/kg)

Parameter	CCME SQG[1]	TEF[2]	SS_CH_27
2,3,7,8-Tetra CDD *	-	1	<0.108
1,2,3,7,8-Penta CDD *	-	1	0.877
1,2,3,4,7,8-Hexa CDD *	-	0.1	1.4
1,2,3,6,7,8-Hexa CDD *	-	0.1	3.31
1,2,3,7,8,9-Hexa CDD *	-	0.1	3.51
1,2,3,4,6,7,8-Hepta CDD *	-	0.01	72.2
Octa CDD *	-	0.0003	486
Total Tetra CDD *	-	-	0.744
Total Penta CDD *	-	-	3.87
Total Hexa CDD *	-	-	22.9
Total Hepta CDD *	-	-	134
2,3,7,8-Tetra CDF **	-	0.1	0.562
1,2,3,7,8-Penta CDF **	-	0.03	0.139
2,3,4,7,8-Penta CDF **	-	0.3	0.304
1,2,3,4,7,8-Hexa CDF **	-	0.1	0.705
1,2,3,6,7,8-Hexa CDF **	-	0.1	0.509
2,3,4,6,7,8-Hexa CDF **	-	0.1	0.527
1,2,3,7,8,9-Hexa CDF **	-	0.1	<0.110
1,2,3,4,6,7,8-Hepta CDF **	-	0.01	12.9
1,2,3,4,7,8,9-Hepta CDF **	-	0.01	0.649
Octa CDF **	-	0.0003	21.7
Total Tetra CDF **	-	-	8.97
Total Penta CDF **	-	-	6.52
Total Hexa CDF **	-	-	18.6
Total Hepta CDF **	-	-	39
Toxic Equivalency Quotient (TEQ)	4	-	3.094
		Sample Date	16-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 (commercial 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 D6 Organophosphorus Pesticides in Soil (mg/kg)

Parameter	CCME [1] (SQG)	Alberta Tier 1[2]	MOECC[3]	SS_CH_27
Bendiocarb	-	0.21	-	<50
Demeton-S	-	-	-	<50
Dichlorvos	-	-	-	<50
Dimethoate	-	0.0055	-	<50
Fenchlorphos (Ronnel)	-	-	-	<50
Fonofos	-	-	-	<50
Metolachlor	-	0.055	-	<100
Mevinphos	-	-	-	<50
Phosmet	-	-	-	<50
Triallate	-	0.0092	-	<50
Trifluralin	-	0.045	-	<50
Fenthion	-	-	-	<50
Ethion	-	-	-	<50
Guthion (Azinphos-methyl)	-	-	-	<50
Phorate	-	0.14	-	<50
Terbufos	-	0.15	-	<50
Aldicarb	-	0.065	-	<50
Atrazine	-	0.01	-	<50
Carbaryl	-	3.6	-	<50
Carbofuran	-	1.2	-	<50
Cyanazine (Bladex)	-	0.21	-	<50
Diazinon	-	4.2	-	<50
Parathion Ethyl	-	-	-	<50
Parathion Methyl	-	-	-	<50
Prometryne	-	-	-	<50
Malathion	-	1.3	-	<50
Simazine	-	0.038	-	<50
Chlorpyrifos (Dursban)	-	95	-	<50
			depth (m)	0-0.05
			Sample Date	16-Sep-17

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

2. Alberta Environmental and Parks (AEP), 2016. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Land Policy Branch, Policy and Planning Division. 197 pp., Table 1: Alberta Tier 1 Soil Remediation Guidelines (course grained soil, commercial)

3. Soil, Ground Water and Sediment Standards for Use Under, Part XV.1 of the Environmental Protection Act, Ontario Minsity of Environment and Climate Change (MOECC), April 15, 2011, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition (industrial/commercial/community property use, coarse grained soil)

Laboratory detection limit is higher than Alberta Tier 1 guideline and are shaded purple.

- = no guideline

Table D7 Organochlorinated Pesticides in Soil (mg/kg)

Parameter	CCME [1] (SQG)	Alberta Tier 1[2]	MOECC[3]	SS_CH_27
Aldrin + Dieldrin	-	-	-	<0.020
Chlordane (Total)	-	-	0.05	<0.020
DDT+ Metabolites	12	-	-	<0.020
Heptachlor + Heptachlor epoxide	-	-	-	<0.020
o,p-DDD + p,p-DDD	-	-	-	<0.020
o,p-DDE + p,p-DDE	-	-	-	<0.020
o,p-DDT + p,p-DDT	-	-	-	<0.020
Total Endosulfan	-	0.0015	0.3	<0.020
Total PCB	33	33	-	<0.20
Aldrin	-	5.1	0.088	<0.020
a-Chlordane	-	-	-	<0.020
g-Chlordane	-	-	-	<0.020
o,p-DDD	-	-	-	<0.020
p,p-DDD	-	-	-	<0.020
o,p-DDE	-	-	-	<0.020
p,p-DDE	-	-	-	<0.020
o,p-DDT	-	-	-	<0.020
p,p-DDT	-	-	-	<0.020
Dieldrin	-	1.1	0.088	<0.020
Lindane	-	0.6	-	<0.020
Endosulfan I (alpha)	-	-	-	<0.020
Endosulfan II (beta)	-	-	-	<0.020
Endrin	-	4.7	0.04	<0.020
Heptachlor	-	-	0.19	<0.020
Heptachlor epoxide	-	0.076	0.05	<0.020
Hexachlorobenzene	10	-	0.66	<0.020
Methoxychlor	-	0.056	1.6	<0.050
Aroclor 1016	-	-	-	<0.20
Aroclor 1221	-	-	-	<0.20
Aroclor 1232	-	-	-	<0.20
Aroclor 1242	-	-	-	<0.20
Aroclor 1248	-	-	-	<0.20
Aroclor 1254	-	-	-	<0.20
Aroclor 1260	-	-	-	<0.20
Aroclor 1262	-	-	-	<0.20
Aroclor 1268	-	-	-	<0.20
alpha-BHC	-	-	-	<0.020
beta-BHC	-	-	-	<0.020
delta-BHC	-	-	-	<0.020
Endosulfan sulfate	-	-	-	<0.020
Endrin aldehyde	-	-	-	<0.020
Endrin ketone	-	-	-	<0.020
Mirex	-	-	-	<0.020
Octachlorostyrene	-	-	-	<0.020
Toxaphene	-	6.3	-	<0.80
			depth (m)	0-0.05
			Sample Date	16-Sep-17

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

2. Alberta Environmental and Parks (AEP), 2016. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Land Policy Branch, Policy and Planning Division. 197 pp., Table 1: Alberta Tier 1 Soil Remediation Guidelines (course grained soil,

3. Soil, Ground Water and Sediment Standards for Use Under, Part XV.1 of the Environmental Protection Act, Ontario Minsity of Environment and Climate Change (MOECC), April 15, 2011, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition (industrial/commercial/community property use, coarse grained soil)

Laboratory detection limit is higher than Alberta Tier 1 guideline and are shaded purple.

- = no guideline

Table D8 Phenoxy Acid Herbicides in Soil (mg/kg)

Parameter	CCME [1] (SQG)	Alberta Tier 1[2]	MOECC[3]	SS_CH_27
2,4,5-T	-	-	-	<1.0
2,4,5-TP (Silvex)	-	-	-	<1.0
2,4-D	-	0.67	-	<1.0
2,4-D (BEE)	-	-	-	<2.0
2,4-DB	-	-	-	<1.0
2,4-DP (Dichlorprop)	-	-	-	<1.0
Dicamba	-	0.79	-	<2.0
MCPA	-	0.66	-	<2.0
MCPP	-	-	-	<2.0
Picloram	-	0.022	-	<2.0
			depth (m)	0-0.05
			Sample Date	16-Sep-17

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

2. Alberta Environmental and Parks (AEP), 2016. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Land Policy Branch, Policy and Planning Division. 197 pp., Table 1: Alberta Tier 1 Soil Remediation Guidelines (course grained soil, commercial)

3. Soil, Ground Water and Sediment Standards for Use Under, Part XV.1 of the Environmental Protection Act, Ontario Minsity of Environment and Climate Change (MOECC), April 15, 2011, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition (industrial/commercial/community property use, coarse grained soil)

Laboratory detection limit is higher than Alberta Tier 1 guideline and are shaded purple.

- = no guideline

Table D9 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

Your Project #: 10550.04
Site Location: Cape Harrison

Attention:Abigail Garnett

GEMTEC LIMITED
191 Doak Rd
Fredericton, NB
Canada E3C 2E6

Your C.O.C. #: 627098-01-01, 627098-02-01, 627098-03-01, 627098-04-01

Report Date: 2017/10/25
Report #: R4802761
Version: 4 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B7K7449
Received: 2017/09/20, 10:26

Sample Matrix: Soil
Samples Received: 40

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Benzo(b/j)fluoranthene Sum (LL soil) (1)	20	N/A	2017/10/02	N/A	Auto Calc.
Benzo(b/j)fluoranthene Sum (LL soil) (1)	20	N/A	2017/10/03	N/A	Auto Calc.
Dioxins/Furans in Soil (EPS 1/RM/23) (2, 3)	1	2017/09/30	2017/10/08	BRL SOP-00410	EPS 1/RM/23 m
Petroleum Hydrocarbons F2-F4 in Soil (2, 4)	12	2017/09/26	2017/09/27	CAM SOP-00316	CCME CWS m
Petroleum Hydrocarbons F2-F4 in Soil (2, 4)	28	2017/09/26	2017/09/28	CAM SOP-00316	CCME CWS m
F4G (CCME Hydrocarbons Gravimetric) (2)	18	2017/10/17	2017/10/17	CAM SOP-00316	CCME PHC-CWS m
F4G (CCME Hydrocarbons Gravimetric) (2)	3	2017/10/19	2017/10/19	CAM SOP-00316	CCME PHC-CWS m
Metals Solids Acid Extr. ICPMS (1)	6	2017/09/25	2017/09/25	ATL SOP 00058	EPA 6020A R1 m
Metals Solids Acid Extr. ICPMS (1)	6	2017/09/27	2017/09/27	ATL SOP 00058	EPA 6020A R1 m
Metals Solids Acid Extr. ICPMS (1)	7	2017/09/27	2017/09/28	ATL SOP 00058	EPA 6020A R1 m
Metals Solids Acid Extr. ICPMS (1)	1	2017/09/27	2017/09/29	ATL SOP 00058	EPA 6020A R1 m
Metals Solids Acid Extr. ICPMS (1)	12	2017/09/28	2017/09/28	ATL SOP 00058	EPA 6020A R1 m
Metals Solids Acid Extr. ICPMS (1)	8	2017/09/28	2017/09/29	ATL SOP 00058	EPA 6020A R1 m
Moisture (1)	40	N/A	2017/09/25	ATL SOP 00001	OMOE Handbook 1983 m
OC Pesticides (Selected) & PCB (2, 5)	1	2017/09/30	2017/10/02	CAM SOP-00307	SW846 8081, 8082
OC Pesticides Summed Parameters (2)	1	N/A	2017/09/29	CAM SOP-00307	EPA 8081/8082 m
GC/MS Analysis of OP Pesticides (2)	1	2017/09/30	2017/10/02	CAM SOP-00301	EPA 8270 m
PAH in sediment by GC/MS (Low Level) (1, 6)	1	2017/09/22	2017/09/30	ATL SOP 00102	EPA 8270D 2014 m
PAH in sediment by GC/MS (Low Level) (1, 6)	1	2017/09/25	2017/10/02	ATL SOP 00102	EPA 8270D 2014 m
PAH in sediment by GC/MS (Low Level) (1, 6)	14	2017/09/26	2017/09/30	ATL SOP 00102	EPA 8270D 2014 m
PAH in sediment by GC/MS (Low Level) (1, 6)	5	2017/09/26	2017/10/01	ATL SOP 00102	EPA 8270D 2014 m
PAH in sediment by GC/MS (Low Level) (1, 6)	14	2017/09/26	2017/10/02	ATL SOP 00102	EPA 8270D 2014 m
PAH in sediment by GC/MS (Low Level) (1, 6)	5	2017/09/26	2017/10/03	ATL SOP 00102	EPA 8270D 2014 m
Phenoxy Acid Herbicides (2)	1	2017/09/30	2017/10/02	CAM SOP-00330	EPA 8270 m
PCBs in soil by GC/ECD (1, 6)	4	2017/09/26	2017/09/28	ATL SOP 00106	EPA 8082A 2007 m
PCB Aroclor sum (soil) (1)	4	N/A	2017/09/28	N/A	Auto Calc.
Volatile Organic Compounds and F1 PHCs (2)	4	N/A	2017/09/27	CAM SOP-00230	EPA 8260 m

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Your Project #: 10550.04
Site Location: Cape Harrison

Attention:Abigail Garnett

GEMTEC LIMITED
191 Doak Rd
Fredericton, NB
Canada E3C 2E6

Your C.O.C. #: 627098-01-01, 627098-02-01, 627098-03-01, 627098-04-01

Report Date: 2017/10/25
Report #: R4802761
Version: 4 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B7K7449
Received: 2017/09/20, 10:26

Sample Matrix: Soil
Samples Received: 40

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Volatile Organic Compounds and F1 PHCs (2)	36	N/A	2017/09/28	CAM SOP-00230	EPA 8260 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.

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 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Your Project #: 10550.04
Site Location: Cape Harrison

Attention:Abigail Garnett

GEMTEC LIMITED
191 Doak Rd
Fredericton, NB
Canada E3C 2E6

Your C.O.C. #: 627098-01-01, 627098-02-01, 627098-03-01, 627098-04-01

Report Date: 2017/10/25
Report #: R4802761
Version: 4 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B7K7449
Received: 2017/09/20, 10:26

(1) This test was performed by Maxxam Bedford
(2) This test was performed by Maxxam Analytics Mississauga
(3) 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.
(4) 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.
(5) Chlordane (Total) = Alpha Chlordane + Gamma Chlordane
(6) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Heather Macumber, 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 #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

Maxxam ID		FEE484			FEE486	FEE487			
Sampling Date		2017/09/16 10:59			2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-01-01			627098-01-01	627098-01-01			
	UNITS	SS_CH_01	RDL	MDL	SS_CH_02	SS_CH_03	RDL	MDL	QC Batch
Volatile Organics									
Benzene	ug/g	<0.0060	0.0060	0.0060	<0.0060	<0.0060	0.0060	0.0060	5180654
Ethylbenzene	ug/g	<0.010	0.010	0.010	<0.010	<0.010	0.010	0.010	5180654
Toluene	ug/g	<0.020	0.020	0.020	<0.020	<0.020	0.020	0.020	5180654
p+m-Xylene	ug/g	<0.020	0.020	0.020	<0.020	<0.020	0.020	0.020	5180654
o-Xylene	ug/g	<0.020	0.020	0.020	<0.020	<0.020	0.020	0.020	5180654
Total Xylenes	ug/g	<0.020	0.020	0.020	<0.020	<0.020	0.020	0.020	5180654
F1 (C6-C10)	ug/g	<10	10	N/A	<10	<10	10	N/A	5180654
F1 (C6-C10) - BTEX	ug/g	<10	10	N/A	<10	<10	10	N/A	5180654
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	<20	20	10	11	<10	10	5.0	5182050
F3 (C16-C34 Hydrocarbons)	ug/g	520	100	10	420	<50	50	5.0	5182050
F4 (C34-C50 Hydrocarbons)	ug/g	370	100	20	370	<50	50	10	5182050
Reached Baseline at C50	ug/g	No			No	Yes			5182050
Surrogate Recovery (%)									
o-Terphenyl	%	85			88	85			5182050
4-Bromofluorobenzene	%	90			91	91			5180654
D10-o-Xylene	%	107			85	98			5180654
D4-1,2-Dichloroethane	%	112			112	112			5180654
D8-Toluene	%	95			96	95			5180654

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

Maxxam ID		FEE488			FEE490	FEE490	FEE491			
Sampling Date		2017/09/16 10:59			2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-01-01			627098-01-01	627098-01-01	627098-01-01			
	UNITS	SS_CH_04	RDL	MDL	SS_CH_05	SS_CH_05 Lab-Dup	SS_CH_06	RDL	MDL	QC Batch
Volatile Organics										
Benzene	ug/g	<0.012	0.012	0.012	<0.0060	<0.0060	<0.0060	0.0060	0.0060	5180654
Ethylbenzene	ug/g	<0.020	0.020	0.020	<0.010	<0.010	<0.010	0.010	0.010	5180654
Toluene	ug/g	<0.040	0.040	0.040	<0.020	<0.020	<0.020	0.020	0.020	5180654
p+m-Xylene	ug/g	<0.040	0.040	0.040	<0.020	<0.020	<0.020	0.020	0.020	5180654
o-Xylene	ug/g	<0.040	0.040	0.040	<0.020	<0.020	<0.020	0.020	0.020	5180654
Total Xylenes	ug/g	<0.040	0.040	0.040	<0.020	<0.020	<0.020	0.020	0.020	5180654
F1 (C6-C10)	ug/g	<20	20	N/A	<10	<10	<10	10	N/A	5180654
F1 (C6-C10) - BTEX	ug/g	<20	20	N/A	<10	<10	<10	10	N/A	5180654
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/g	120	30	15	22		<20	20	10	5182050
F3 (C16-C34 Hydrocarbons)	ug/g	2700	150	15	650		580	100	10	5182050
F4 (C34-C50 Hydrocarbons)	ug/g	2300	150	30	560		550	100	20	5182050
Reached Baseline at C50	ug/g	No			No		No			5182050
Surrogate Recovery (%)										
o-Terphenyl	%	89			83		86			5182050
4-Bromofluorobenzene	%	90			90	89	89			5180654
D10-o-Xylene	%	99			74	73	94			5180654
D4-1,2-Dichloroethane	%	112			112	114	116			5180654
D8-Toluene	%	95			96	94	95			5180654

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

Maxxam ID		FEE492	FEE493	FEE494	FEE495	FEE505			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-01-01	627098-01-01	627098-01-01	627098-01-01	627098-02-01			
	UNITS	SS_CH_07	SS_CH_08	SS_CH_08_FD	SS_CH_09	SS_CH_10	RDL	MDL	QC Batch
Volatile Organics									
Benzene	ug/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.0060	0.0060	5180654
Ethylbenzene	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	0.010	5180654
Toluene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.020	5180654
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.020	5180654
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.020	5180654
Total Xylenes	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.020	5180654
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	10	N/A	5180654
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	10	N/A	5180654
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	<10	<10	10	5.0	5182050
F3 (C16-C34 Hydrocarbons)	ug/g	<50	100	140	160	<50	50	5.0	5182050
F4 (C34-C50 Hydrocarbons)	ug/g	<50	78	100	120	<50	50	10	5182050
Reached Baseline at C50	ug/g	Yes	No	No	No	Yes			5182050
Surrogate Recovery (%)									
o-Terphenyl	%	80	81	81	86	80			5182050
4-Bromofluorobenzene	%	90	89	91	89	90			5180654
D10-o-Xylene	%	111	99	99	98	109			5180654
D4-1,2-Dichloroethane	%	114	116	116	114	115			5180654
D8-Toluene	%	96	94	94	95	95			5180654

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

Maxxam ID		FEE506	FEE507	FEE508	FEE509	FEE509			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-02-01	627098-02-01	627098-02-01	627098-02-01	627098-02-01			
	UNITS	SS_CH_11	SS_CH_12	SS_CH_13	SS_CH_14	SS_CH_14 Lab-Dup	RDL	MDL	QC Batch
Volatile Organics									
Benzene	ug/g	0.0060	<0.0060	<0.0060	<0.0060		0.0060	0.0060	5180654
Ethylbenzene	ug/g	<0.010	<0.010	<0.010	<0.010		0.010	0.010	5180654
Toluene	ug/g	0.028	<0.020	<0.020	<0.020		0.020	0.020	5180654
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020		0.020	0.020	5180654
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020		0.020	0.020	5180654
Total Xylenes	ug/g	<0.020	<0.020	<0.020	<0.020		0.020	0.020	5180654
F1 (C6-C10)	ug/g	<10	<10	<10	<10		10	N/A	5180654
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10		10	N/A	5180654
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	<10	<10	10	5.0	5182050
F3 (C16-C34 Hydrocarbons)	ug/g	<50	86	<50	<50	<50	50	5.0	5182050
F4 (C34-C50 Hydrocarbons)	ug/g	<50	67	<50	<50	<50	50	10	5182050
Reached Baseline at C50	ug/g	Yes	No	Yes	Yes	Yes			5182050
Surrogate Recovery (%)									
o-Terphenyl	%	80	84	82	84	85			5182050
4-Bromofluorobenzene	%	89	89	89	90				5180654
D10-o-Xylene	%	115	106	122	93				5180654
D4-1,2-Dichloroethane	%	114	116	119	118				5180654
D8-Toluene	%	94	96	94	93				5180654

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

Maxxam ID		FEE510	FEE511			FEE512			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59			2017/09/16 10:59			
COC Number		627098-02-01	627098-02-01			627098-02-01			
	UNITS	SS_CH_15	SS_CH_16	RDL	MDL	SS_CH_17	RDL	MDL	QC Batch
Volatile Organics									
Benzene	ug/g	<0.0060	<0.0060	0.0060	0.0060	<0.012	0.012	0.012	5180654
Ethylbenzene	ug/g	<0.010	<0.010	0.010	0.010	<0.020	0.020	0.020	5180654
Toluene	ug/g	<0.020	<0.020	0.020	0.020	<0.040	0.040	0.040	5180654
p+m-Xylene	ug/g	<0.020	<0.020	0.020	0.020	<0.040	0.040	0.040	5180654
o-Xylene	ug/g	<0.020	<0.020	0.020	0.020	<0.040	0.040	0.040	5180654
Total Xylenes	ug/g	<0.020	<0.020	0.020	0.020	<0.040	0.040	0.040	5180654
F1 (C6-C10)	ug/g	<10	<10	10	N/A	<20	20	N/A	5180654
F1 (C6-C10) - BTEX	ug/g	<10	<10	10	N/A	<20	20	N/A	5180654
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	10	5.0	46	40	20	5182050
F3 (C16-C34 Hydrocarbons)	ug/g	<50	120	50	5.0	700	200	20	5182050
F4 (C34-C50 Hydrocarbons)	ug/g	<50	82	50	10	500	200	40	5182050
Reached Baseline at C50	ug/g	Yes	No			No			5182050
Surrogate Recovery (%)									
o-Terphenyl	%	79	79			83			5182050
4-Bromofluorobenzene	%	90	89			89			5180654
D10-o-Xylene	%	101	105			90			5180654
D4-1,2-Dichloroethane	%	116	116			118			5180654
D8-Toluene	%	93	93			95			5180654

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

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CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

Maxxam ID		FEE513	FEE514		FEE522	FEE523	FEE524			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-02-01	627098-02-01		627098-03-01	627098-03-01	627098-03-01			
	UNITS	**SS_CH_18**	**SS_CH_18_FD**	**QC Batch**	**SS_CH_19**	**SS_CH_20**	**SS_CH_21**	**RDL**	**MDL**	**QC Batch**
Volatile Organics										
Benzene	ug/g	<0.0060	<0.0060	5180654	0.012	<0.0060	<0.0060	0.0060	0.0060	5180694
Ethylbenzene	ug/g	<0.010	<0.010	5180654	<0.010	<0.010	<0.010	0.010	0.010	5180694
Toluene	ug/g	<0.020	<0.020	5180654	0.036	<0.020	<0.020	0.020	0.020	5180694
p+m-Xylene	ug/g	<0.020	<0.020	5180654	<0.020	<0.020	<0.020	0.020	0.020	5180694
o-Xylene	ug/g	<0.020	<0.020	5180654	<0.020	<0.020	<0.020	0.020	0.020	5180694
Total Xylenes	ug/g	<0.020	<0.020	5180654	<0.020	<0.020	<0.020	0.020	0.020	5180694
F1 (C6-C10)	ug/g	<10	<10	5180654	<10	<10	<10	10	N/A	5180694
F1 (C6-C10) - BTEX	ug/g	<10	<10	5180654	<10	<10	<10	10	N/A	5180694
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	5182050	17	<10	<10	10	5.0	5182042
F3 (C16-C34 Hydrocarbons)	ug/g	150	140	5182050	440	<50	<50	50	5.0	5182042
F4 (C34-C50 Hydrocarbons)	ug/g	95	92	5182050	310	<50	<50	50	10	5182042
Reached Baseline at C50	ug/g	No	No	5182050	No	Yes	Yes			5182042
Surrogate Recovery (%)										
o-Terphenyl	%	83	82	5182050	83	84	83			5182042
4-Bromofluorobenzene	%	91	89	5180654	90	91	89			5180694
D10-o-Xylene	%	104	101	5180654	91	100	108			5180694
D4-1,2-Dichloroethane	%	119	118	5180654	105	105	102			5180694
D8-Toluene	%	95	94	5180654	101	102	102			5180694

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

Maxxam ID		FEE524	FEE525	FEE525			FEE526			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			2017/09/16 10:59			
COC Number		627098-03-01	627098-03-01	627098-03-01			627098-03-01			
	UNITS	SS_CH_21 Lab-Dup	SS_CH_22	SS_CH_22 Lab-Dup	RDL	MDL	SS_CH_23	RDL	MDL	QC Batch
Volatile Organics										
Benzene	ug/g		<0.0060	<0.0060	0.0060	0.0060	<0.0060	0.0060	0.0060	5180694
Ethylbenzene	ug/g		<0.010	<0.010	0.010	0.010	<0.010	0.010	0.010	5180694
Toluene	ug/g		<0.020	<0.020	0.020	0.020	<0.020	0.020	0.020	5180694
p+m-Xylene	ug/g		<0.020	<0.020	0.020	0.020	<0.020	0.020	0.020	5180694
o-Xylene	ug/g		<0.020	<0.020	0.020	0.020	<0.020	0.020	0.020	5180694
Total Xylenes	ug/g		<0.020	<0.020	0.020	0.020	<0.020	0.020	0.020	5180694
F1 (C6-C10)	ug/g		<10	<10	10	N/A	<10	10	N/A	5180694
F1 (C6-C10) - BTEX	ug/g		<10	<10	10	N/A	<10	10	N/A	5180694
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10		10	5.0	48	20	10	5182042
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50		50	5.0	620	100	10	5182042
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50		50	10	480	100	20	5182042
Reached Baseline at C50	ug/g	Yes	Yes				No			5182042
Surrogate Recovery (%)										
o-Terphenyl	%	83	86				84			5182042
4-Bromofluorobenzene	%		91	91			90			5180694
D10-o-Xylene	%		101	100			92			5180694
D4-1,2-Dichloroethane	%		105	104			104			5180694
D8-Toluene	%		101	101			102			5180694

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

Maxxam ID		FEE527	FEE528	FEE529	FEE530	FEE531			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-03-01	627098-03-01	627098-03-01	627098-03-01	627098-03-01			
	UNITS	SS_CH_24	SS_CH_25	SS_CH_26	SS_CH_27	SS_CH_28	RDL	MDL	QC Batch
Volatile Organics									
Benzene	ug/g	<0.0060	<0.0060	<0.0060	0.0081	<0.0060	0.0060	0.0060	5180694
Ethylbenzene	ug/g	<0.010	<0.010	<0.010	0.014	<0.010	0.010	0.010	5180694
Toluene	ug/g	<0.020	<0.020	<0.020	0.082	<0.020	0.020	0.020	5180694
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	0.080	<0.020	0.020	0.020	5180694
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.020	5180694
Total Xylenes	ug/g	<0.020	<0.020	<0.020	0.080	<0.020	0.020	0.020	5180694
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	10	N/A	5180694
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	10	N/A	5180694
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	22	<10	79	3300	24	10	5.0	5182042
F3 (C16-C34 Hydrocarbons)	ug/g	210	<50	180	6500	150	50	5.0	5182042
F4 (C34-C50 Hydrocarbons)	ug/g	170	<50	93	410	150	50	10	5182042
Reached Baseline at C50	ug/g	No	Yes	No	Yes	No			5182042
Surrogate Recovery (%)									
o-Terphenyl	%	84	85	87	125	88			5182042
4-Bromofluorobenzene	%	89	92	91	91	90			5180694
D10-o-Xylene	%	99	88	93	111	106			5180694
D4-1,2-Dichloroethane	%	104	104	104	104	103			5180694
D8-Toluene	%	101	102	102	102	102			5180694

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

Maxxam ID		FEE537	FEE538	FEE539	FEE540	FEE541			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-04-01	627098-04-01	627098-04-01	627098-04-01	627098-04-01			
	UNITS	**SS_CH_29**	**SS_CH_30**	**SS_CH_30_FD**	**SS_CH_31**	**SS_CH_32**	**RDL**	**MDL**	**QC Batch**
Volatile Organics									
Benzene	ug/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.0060	0.0060	5180694
Ethylbenzene	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	0.010	5180694
Toluene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.020	5180694
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.020	5180694
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.020	5180694
Total Xylenes	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.020	5180694
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	10	N/A	5180694
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	10	N/A	5180694
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	28	16	<10	28	11	10	5.0	5182042
F3 (C16-C34 Hydrocarbons)	ug/g	87	<50	<50	190	120	50	5.0	5182042
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	89	89	50	10	5182042
Reached Baseline at C50	ug/g	Yes	Yes	Yes	No	No			5182042
Surrogate Recovery (%)									
o-Terphenyl	%	87	85	92	93	82			5182042
4-Bromofluorobenzene	%	89	89	92	92	92			5180694
D10-o-Xylene	%	90	109	94	87	108			5180694
D4-1,2-Dichloroethane	%	104	103	105	104	95			5180694
D8-Toluene	%	102	103	101	100	93			5180694

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

Maxxam ID		FEE542	FEE543	FEE544	FEE545	FEE546			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-04-01	627098-04-01	627098-04-01	627098-04-01	627098-04-01			
	UNITS	SS_CH_33	SS_CH_34	SS_CH_35	SS_CH_36	SS_CH_37	RDL	MDL	QC Batch
Volatile Organics									
Benzene	ug/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.0060	0.0060	5180694
Ethylbenzene	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	0.010	5180694
Toluene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.020	5180694
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.020	5180694
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.020	5180694
Total Xylenes	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.020	5180694
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	10	N/A	5180694
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	10	N/A	5180694
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	<10	<10	10	5.0	5182042
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	<50	<50	<50	50	5.0	5182042
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	<50	<50	50	10	5182042
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes			5182042
Surrogate Recovery (%)									
o-Terphenyl	%	86	86	84	87	87			5182042
4-Bromofluorobenzene	%	91	91	90	91	91			5180694
D10-o-Xylene	%	106	95	99	98	88			5180694
D4-1,2-Dichloroethane	%	103	102	103	103	103			5180694
D8-Toluene	%	102	103	102	102	102			5180694

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

RESULTS OF ANALYSES OF SOIL

Maxxam ID		FEE484	FEE486	FEE487	FEE488	FEE490	FEE491			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-01-01	627098-01-01	627098-01-01	627098-01-01	627098-01-01	627098-01-01			
	UNITS	SS_CH_01	SS_CH_02	SS_CH_03	SS_CH_04	SS_CH_05	SS_CH_06	RDL	MDL	QC Batch
Inorganics										
Moisture	%	40	11	3.0	67	47	37	1.0	0.20	5177711

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		FEE492	FEE493	FEE494	FEE495	FEE505	FEE506			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-01-01	627098-01-01	627098-01-01	627098-01-01	627098-02-01	627098-02-01			
	UNITS	SS_CH_07	SS_CH_08	SS_CH_08_FD	SS_CH_09	SS_CH_10	SS_CH_11	RDL	MDL	QC Batch
Inorganics										
Moisture	%	16	13	14	14	21	19	1.0	0.20	5177711

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		FEE507	FEE507	FEE508	FEE509	FEE510	FEE511			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-02-01	627098-02-01	627098-02-01	627098-02-01	627098-02-01	627098-02-01			
	UNITS	SS_CH_12	SS_CH_12 Lab-Dup	SS_CH_13	SS_CH_14	SS_CH_15	SS_CH_16	RDL	MDL	QC Batch
Inorganics										
Moisture	%	19	17	13	15	36	16	1.0	0.20	5177711

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

Maxxam ID		FEE512	FEE513	FEE514		FEE522	FEE523			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59		2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-02-01	627098-02-01	627098-02-01		627098-03-01	627098-03-01			
	UNITS	SS_CH_17	SS_CH_18	SS_CH_18_FD	QC Batch	SS_CH_19	SS_CH_20	RDL	MDL	QC Batch
Inorganics										
Moisture	%	72	21	18	5177711	22	19	1.0	0.20	5180491

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

RESULTS OF ANALYSES OF SOIL

Maxxam ID		FEE524	FEE525	FEE526	FEE527	FEE527	FEE528			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-03-01	627098-03-01	627098-03-01	627098-03-01	627098-03-01	627098-03-01			
	UNITS	SS_CH_21	SS_CH_22	SS_CH_23	SS_CH_24	SS_CH_24 Lab-Dup	SS_CH_25	RDL	MDL	QC Batch
Inorganics										
Moisture	%	7.1	34	44	27	28	4.8	1.0	0.20	5180491

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

Maxxam ID		FEE529	FEE530	FEE531	FEE537	FEE538	FEE539			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-03-01	627098-03-01	627098-03-01	627098-04-01	627098-04-01	627098-04-01			
	UNITS	SS_CH_26	SS_CH_27	SS_CH_28	SS_CH_29	SS_CH_30	SS_CH_30_FD	RDL	MDL	QC Batch
Inorganics										
Moisture	%	13	16	28	4.3	21	4.4	1.0	0.20	5180491

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		FEE540	FEE541	FEE542	FEE543	FEE544	FEE545			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-04-01	627098-04-01	627098-04-01	627098-04-01	627098-04-01	627098-04-01			
	UNITS	SS_CH_31	SS_CH_32	SS_CH_33	SS_CH_34	SS_CH_35	SS_CH_36	RDL	MDL	QC Batch
Inorganics										
Moisture	%	4.4	17	27	5.9	20	3.8	1.0	0.20	5180491

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		FEE546			
Sampling Date		2017/09/16 10:59			
COC Number		627098-04-01			
	UNITS	SS_CH_37	RDL	MDL	QC Batch
Inorganics					
Moisture	%	21	1.0	0.20	5180491

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEE484	FEE486	FEE486		FEE487			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59		2017/09/16 10:59			
COC Number		627098-01-01	627098-01-01	627098-01-01		627098-01-01			
	UNITS	SS_CH_01	SS_CH_02	SS_CH_02 Lab-Dup	QC Batch	SS_CH_03	RDL	MDL	QC Batch
Metals									
Acid Extractable Aluminum (Al)	mg/kg	1900	5800	5700	5180382	4100	10	N/A	5184265
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	5180382	<2.0	2.0	N/A	5184265
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	5180382	<2.0	2.0	N/A	5184265
Acid Extractable Barium (Ba)	mg/kg	18	35	35	5180382	41	5.0	N/A	5184265
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	5180382	<2.0	2.0	N/A	5184265
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	5180382	<2.0	2.0	N/A	5184265
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	5180382	<50	50	N/A	5184265
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	5180382	<0.30	0.30	N/A	5184265
Acid Extractable Chromium (Cr)	mg/kg	<2.0	<2.0	<2.0	5180382	6.7	2.0	N/A	5184265
Acid Extractable Cobalt (Co)	mg/kg	1.0	<1.0	<1.0	5180382	4.7	1.0	N/A	5184265
Acid Extractable Copper (Cu)	mg/kg	<2.0	<2.0	<2.0	5180382	11	2.0	N/A	5184265
Acid Extractable Iron (Fe)	mg/kg	4600	24000	23000	5180382	11000	50	N/A	5184265
Acid Extractable Lead (Pb)	mg/kg	3.1	4.7	3.6	5180382	6.4	0.50	N/A	5184265
Acid Extractable Lithium (Li)	mg/kg	2.5	15	16	5180382	12	2.0	N/A	5184265
Acid Extractable Manganese (Mn)	mg/kg	67	410	410	5180382	180	2.0	N/A	5184265
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	5180382	<0.10	0.10	N/A	5184265
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	5180382	<2.0	2.0	N/A	5184265
Acid Extractable Nickel (Ni)	mg/kg	7.2	<2.0	<2.0	5180382	5.2	2.0	N/A	5184265
Acid Extractable Rubidium (Rb)	mg/kg	11	97	93	5180382	16	2.0	N/A	5184265
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	5180382	<1.0	1.0	N/A	5184265
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	5180382	<0.50	0.50	N/A	5184265
Acid Extractable Strontium (Sr)	mg/kg	<5.0	5.6	<5.0	5180382	7.9	5.0	N/A	5184265
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.28	0.29	5180382	<0.10	0.10	N/A	5184265
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	<2.0	5180382	<2.0	2.0	N/A	5184265
Acid Extractable Uranium (U)	mg/kg	0.81	0.41	0.26	5180382	1.6	0.10	N/A	5184265
Acid Extractable Vanadium (V)	mg/kg	9.3	2.5	2.2	5180382	20	2.0	N/A	5184265
Acid Extractable Zinc (Zn)	mg/kg	10	97	96	5180382	25	5.0	N/A	5184265

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEE488		FEE490	FEE491		FEE492			
Sampling Date		2017/09/16 10:59		2017/09/16 10:59	2017/09/16 10:59		2017/09/16 10:59			
COC Number		627098-01-01		627098-01-01	627098-01-01		627098-01-01			
	UNITS	SS_CH_04	QC Batch	SS_CH_05	SS_CH_06	QC Batch	SS_CH_07	RDL	MDL	QC Batch
Metals										
Acid Extractable Aluminum (Al)	mg/kg	3400	5184265	2100	1300	5184651	4100	10	N/A	5184265
Acid Extractable Antimony (Sb)	mg/kg	<2.0	5184265	<2.0	<2.0	5184651	<2.0	2.0	N/A	5184265
Acid Extractable Arsenic (As)	mg/kg	<2.0	5184265	<2.0	<2.0	5184651	2.1	2.0	N/A	5184265
Acid Extractable Barium (Ba)	mg/kg	15	5184265	19	8.2	5184651	20	5.0	N/A	5184265
Acid Extractable Beryllium (Be)	mg/kg	<2.0	5184265	<2.0	<2.0	5184651	<2.0	2.0	N/A	5184265
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	5184265	<2.0	<2.0	5184651	<2.0	2.0	N/A	5184265
Acid Extractable Boron (B)	mg/kg	<50	5184265	<50	<50	5184651	<50	50	N/A	5184265
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	5184265	<0.30	<0.30	5184651	<0.30	0.30	N/A	5184265
Acid Extractable Chromium (Cr)	mg/kg	4.6	5184265	2.4	4.9	5184651	5.3	2.0	N/A	5184265
Acid Extractable Cobalt (Co)	mg/kg	1.1	5184265	<1.0	<1.0	5184651	3.6	1.0	N/A	5184265
Acid Extractable Copper (Cu)	mg/kg	<2.0	5184265	2.7	2.6	5184651	12	2.0	N/A	5184265
Acid Extractable Iron (Fe)	mg/kg	7500	5184265	3800	6000	5184651	10000	50	N/A	5184265
Acid Extractable Lead (Pb)	mg/kg	3.5	5184265	4.7	6.5	5184651	13	0.50	N/A	5184265
Acid Extractable Lithium (Li)	mg/kg	<2.0	5184265	<2.0	<2.0	5184651	9.8	2.0	N/A	5184265
Acid Extractable Manganese (Mn)	mg/kg	33	5184265	12	32	5184651	150	2.0	N/A	5184265
Acid Extractable Mercury (Hg)	mg/kg	<0.10	5184265	0.12	<0.10	5184651	<0.10	0.10	N/A	5184265
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	5184265	<2.0	<2.0	5184651	<2.0	2.0	N/A	5184265
Acid Extractable Nickel (Ni)	mg/kg	<2.0	5184265	<2.0	<2.0	5184651	3.9	2.0	N/A	5184265
Acid Extractable Rubidium (Rb)	mg/kg	7.3	5184265	3.7	8.4	5184651	17	2.0	N/A	5184265
Acid Extractable Selenium (Se)	mg/kg	<1.0	5184265	<1.0	<1.0	5184651	<1.0	1.0	N/A	5184265
Acid Extractable Silver (Ag)	mg/kg	<0.50	5184265	<0.50	<0.50	5184651	<0.50	0.50	N/A	5184265
Acid Extractable Strontium (Sr)	mg/kg	28	5184265	17	10	5184651	11	5.0	N/A	5184265
Acid Extractable Thallium (Tl)	mg/kg	<0.10	5184265	<0.10	<0.10	5184651	<0.10	0.10	N/A	5184265
Acid Extractable Tin (Sn)	mg/kg	<2.0	5184265	2.4	<2.0	5184651	<2.0	2.0	N/A	5184265
Acid Extractable Uranium (U)	mg/kg	0.89	5184265	1.8	0.66	5184651	1.8	0.10	N/A	5184265
Acid Extractable Vanadium (V)	mg/kg	11	5184265	6.6	14	5184651	16	2.0	N/A	5184265
Acid Extractable Zinc (Zn)	mg/kg	6.6	5184265	6.8	13	5184651	26	5.0	N/A	5184265

RDL = Reportable Detection Limit
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N/A = Not Applicable

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEE493		FEE494	FEE495	FEE505			
Sampling Date		2017/09/16 10:59		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-01-01		627098-01-01	627098-01-01	627098-02-01			
	UNITS	SS_CH_08	QC Batch	SS_CH_08_FD	SS_CH_09	SS_CH_10	RDL	MDL	QC Batch
Metals									
Acid Extractable Aluminum (Al)	mg/kg	4700	5184265	4800	5000	6100	10	N/A	5184651
Acid Extractable Antimony (Sb)	mg/kg	<2.0	5184265	<2.0	<2.0	<2.0	2.0	N/A	5184651
Acid Extractable Arsenic (As)	mg/kg	<2.0	5184265	<2.0	<2.0	<2.0	2.0	N/A	5184651
Acid Extractable Barium (Ba)	mg/kg	29	5184265	27	27	43	5.0	N/A	5184651
Acid Extractable Beryllium (Be)	mg/kg	<2.0	5184265	<2.0	<2.0	<2.0	2.0	N/A	5184651
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	5184265	<2.0	<2.0	<2.0	2.0	N/A	5184651
Acid Extractable Boron (B)	mg/kg	<50	5184265	<50	<50	<50	50	N/A	5184651
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	5184265	<0.30	<0.30	<0.30	0.30	N/A	5184651
Acid Extractable Chromium (Cr)	mg/kg	9.2	5184265	8.5	8.3	9.0	2.0	N/A	5184651
Acid Extractable Cobalt (Co)	mg/kg	3.3	5184265	3.3	3.2	3.9	1.0	N/A	5184651
Acid Extractable Copper (Cu)	mg/kg	5.4	5184265	6.0	4.3	8.2	2.0	N/A	5184651
Acid Extractable Iron (Fe)	mg/kg	13000	5184265	14000	16000	14000	50	N/A	5184651
Acid Extractable Lead (Pb)	mg/kg	18	5184265	17	6.5	15	0.50	N/A	5184651
Acid Extractable Lithium (Li)	mg/kg	8.6	5184265	8.3	7.5	12	2.0	N/A	5184651
Acid Extractable Manganese (Mn)	mg/kg	130	5184265	140	190	190	2.0	N/A	5184651
Acid Extractable Mercury (Hg)	mg/kg	<0.10	5184265	<0.10	<0.10	<0.10	0.10	N/A	5184651
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	5184265	<2.0	<2.0	<2.0	2.0	N/A	5184651
Acid Extractable Nickel (Ni)	mg/kg	4.6	5184265	4.6	4.0	4.8	2.0	N/A	5184651
Acid Extractable Rubidium (Rb)	mg/kg	18	5184265	17	16	22	2.0	N/A	5184651
Acid Extractable Selenium (Se)	mg/kg	<1.0	5184265	<1.0	<1.0	<1.0	1.0	N/A	5184651
Acid Extractable Silver (Ag)	mg/kg	<0.50	5184265	<0.50	<0.50	<0.50	0.50	N/A	5184651
Acid Extractable Strontium (Sr)	mg/kg	14	5184265	16	8.9	12	5.0	N/A	5184651
Acid Extractable Thallium (Tl)	mg/kg	<0.10	5184265	<0.10	<0.10	0.12	0.10	N/A	5184651
Acid Extractable Tin (Sn)	mg/kg	<2.0	5184265	<2.0	<2.0	<2.0	2.0	N/A	5184651
Acid Extractable Uranium (U)	mg/kg	0.98	5184265	1.2	1.2	1.4	0.10	N/A	5184651
Acid Extractable Vanadium (V)	mg/kg	24	5184265	24	25	25	2.0	N/A	5184651
Acid Extractable Zinc (Zn)	mg/kg	70	5184265	68	31	31	5.0	N/A	5184651

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEE506	FEE507	FEE507		FEE508			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59		2017/09/16 10:59			
COC Number		627098-02-01	627098-02-01	627098-02-01		627098-02-01			
	UNITS	SS_CH_11	SS_CH_12	SS_CH_12 Lab-Dup	QC Batch	SS_CH_13	RDL	MDL	QC Batch
Metals									
Acid Extractable Aluminum (Al)	mg/kg	4800	7600	6600	5184265	6900	10	N/A	5184651
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	5184265	<2.0	2.0	N/A	5184651
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	5184265	<2.0	2.0	N/A	5184651
Acid Extractable Barium (Ba)	mg/kg	31	65	45 (1)	5184265	54	5.0	N/A	5184651
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	5184265	<2.0	2.0	N/A	5184651
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	5184265	<2.0	2.0	N/A	5184651
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	5184265	<50	50	N/A	5184651
Acid Extractable Cadmium (Cd)	mg/kg	1.5	<0.30	<0.30	5184265	2.6	0.30	N/A	5184651
Acid Extractable Chromium (Cr)	mg/kg	12	22	15 (1)	5184265	16	2.0	N/A	5184651
Acid Extractable Cobalt (Co)	mg/kg	3.8	5.4	4.5	5184265	5.6	1.0	N/A	5184651
Acid Extractable Copper (Cu)	mg/kg	13	22	19	5184265	19	2.0	N/A	5184651
Acid Extractable Iron (Fe)	mg/kg	13000	19000	17000	5184265	17000	50	N/A	5184651
Acid Extractable Lead (Pb)	mg/kg	71	34	31	5184265	28	0.50	N/A	5184651
Acid Extractable Lithium (Li)	mg/kg	11	11	9.9	5184265	13	2.0	N/A	5184651
Acid Extractable Manganese (Mn)	mg/kg	170	160	150	5184265	180	2.0	N/A	5184651
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	5184265	<0.10	0.10	N/A	5184651
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	5184265	<2.0	2.0	N/A	5184651
Acid Extractable Nickel (Ni)	mg/kg	4.5	8.4	6.5	5184265	7.9	2.0	N/A	5184651
Acid Extractable Rubidium (Rb)	mg/kg	18	21	19	5184265	19	2.0	N/A	5184651
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	5184265	<1.0	1.0	N/A	5184651
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	5184265	<0.50	0.50	N/A	5184651
Acid Extractable Strontium (Sr)	mg/kg	12	14	12	5184265	13	5.0	N/A	5184651
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.12	<0.10	5184265	<0.10	0.10	N/A	5184651
Acid Extractable Tin (Sn)	mg/kg	3.8	<2.0	<2.0	5184265	<2.0	2.0	N/A	5184651
Acid Extractable Uranium (U)	mg/kg	2.1	1.6	1.5	5184265	1.4	0.10	N/A	5184651
Acid Extractable Vanadium (V)	mg/kg	24	42	34	5184265	35	2.0	N/A	5184651
Acid Extractable Zinc (Zn)	mg/kg	1100	78	72	5184265	1200	5.0	N/A	5184651

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Poor RPD due to sample inhomogeneity. < 10 % of compounds in multi-component analysis in violation.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEE509		FEE510			FEE511	FEE512			
Sampling Date		2017/09/16 10:59		2017/09/16 10:59			2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-02-01		627098-02-01			627098-02-01	627098-02-01			
	UNITS	SS_CH_14	RDL	SS_CH_15	RDL	QC Batch	SS_CH_16	SS_CH_17	RDL	MDL	QC Batch
Metals											
Acid Extractable Aluminum (Al)	mg/kg	670	10	260000	100	5184651	4500	1900	10	N/A	5180382
Acid Extractable Antimony (Sb)	mg/kg	<2.0	2.0	<20	20	5184651	<2.0	<2.0	2.0	N/A	5180382
Acid Extractable Arsenic (As)	mg/kg	<2.0	2.0	<20	20	5184651	<2.0	<2.0	2.0	N/A	5180382
Acid Extractable Barium (Ba)	mg/kg	<5.0	5.0	53	50	5184651	44	16	5.0	N/A	5180382
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<20	20	5184651	<2.0	<2.0	2.0	N/A	5180382
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<20	20	5184651	<2.0	<2.0	2.0	N/A	5180382
Acid Extractable Boron (B)	mg/kg	<50	50	<500	500	5184651	<50	<50	50	N/A	5180382
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	48	3.0	5184651	<0.30	<0.30	0.30	N/A	5180382
Acid Extractable Chromium (Cr)	mg/kg	3.5	2.0	140	20	5184651	27	3.9	2.0	N/A	5180382
Acid Extractable Cobalt (Co)	mg/kg	<1.0	1.0	<10	10	5184651	3.8	<1.0	1.0	N/A	5180382
Acid Extractable Copper (Cu)	mg/kg	<2.0	2.0	88000	200	5184651	4.0	12	2.0	N/A	5180382
Acid Extractable Iron (Fe)	mg/kg	3700	50	3300	500	5184651	14000	4300	50	N/A	5180382
Acid Extractable Lead (Pb)	mg/kg	0.83	0.50	3800	5.0	5184651	7.5	5.5	0.50	N/A	5180382
Acid Extractable Lithium (Li)	mg/kg	<2.0	2.0	<20	20	5184651	6.5	<2.0	2.0	N/A	5180382
Acid Extractable Manganese (Mn)	mg/kg	22	2.0	2500	20	5184651	100	28	2.0	N/A	5180382
Acid Extractable Mercury (Hg)	mg/kg	<0.10	0.10	<1.0	1.0	5184651	<0.10	<0.10	0.10	N/A	5180382
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<20	20	5184651	<2.0	<2.0	2.0	N/A	5180382
Acid Extractable Nickel (Ni)	mg/kg	<2.0	2.0	23	20	5184651	7.0	<2.0	2.0	N/A	5180382
Acid Extractable Rubidium (Rb)	mg/kg	2.2	2.0	<20	20	5184651	25	3.3	2.0	N/A	5180382
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	<10	10	5184651	<1.0	<1.0	1.0	N/A	5180382
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	53	5.0	5184651	<0.50	<0.50	0.50	N/A	5180382
Acid Extractable Strontium (Sr)	mg/kg	<5.0	5.0	<50	50	5184651	17	44	5.0	N/A	5180382
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	<1.0	1.0	5184651	0.11	<0.10	0.10	N/A	5180382
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.0	100	20	5184651	<2.0	<2.0	2.0	N/A	5180382
Acid Extractable Uranium (U)	mg/kg	0.12	0.10	<1.0	1.0	5184651	0.71	0.67	0.10	N/A	5180382
Acid Extractable Vanadium (V)	mg/kg	8.3	2.0	<20	20	5184651	34	7.8	2.0	N/A	5180382
Acid Extractable Zinc (Zn)	mg/kg	<5.0	5.0	3900	50	5184651	17	31	5.0	N/A	5180382

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEE513	FEE514		FEE522	FEE523			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59		2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-02-01	627098-02-01		627098-03-01	627098-03-01			
	UNITS	SS_CH_18	SS_CH_18_FD	QC Batch	SS_CH_19	SS_CH_20	RDL	MDL	QC Batch
Metals									
Acid Extractable Aluminum (Al)	mg/kg	3000	3900	5180382	2000	5800	10	N/A	5186437
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	5180382	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	5180382	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Barium (Ba)	mg/kg	24	35	5180382	20	39	5.0	N/A	5186437
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	5180382	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	5180382	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Boron (B)	mg/kg	<50	<50	5180382	<50	<50	50	N/A	5186437
Acid Extractable Cadmium (Cd)	mg/kg	1.2	1.7	5180382	<0.30	<0.30	0.30	N/A	5186437
Acid Extractable Chromium (Cr)	mg/kg	8.5	12	5180382	3.8	13	2.0	N/A	5186437
Acid Extractable Cobalt (Co)	mg/kg	2.1	2.8	5180382	1.4	4.5	1.0	N/A	5186437
Acid Extractable Copper (Cu)	mg/kg	4.9	7.1	5180382	11	7.4	2.0	N/A	5186437
Acid Extractable Iron (Fe)	mg/kg	11000	13000	5180382	6300	15000	50	N/A	5186437
Acid Extractable Lead (Pb)	mg/kg	18	16	5180382	34	8.8	0.50	N/A	5186437
Acid Extractable Lithium (Li)	mg/kg	4.6	5.1	5180382	<2.0	11	2.0	N/A	5186437
Acid Extractable Manganese (Mn)	mg/kg	95	100	5180382	44	170	2.0	N/A	5186437
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	5180382	<0.10	<0.10	0.10	N/A	5186437
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	5180382	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Nickel (Ni)	mg/kg	3.5	4.2	5180382	2.3	5.8	2.0	N/A	5186437
Acid Extractable Rubidium (Rb)	mg/kg	15	18	5180382	10	16	2.0	N/A	5186437
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	5180382	<1.0	<1.0	1.0	N/A	5186437
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	5180382	<0.50	<0.50	0.50	N/A	5186437
Acid Extractable Strontium (Sr)	mg/kg	24	29	5180382	22	14	5.0	N/A	5186437
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	5180382	<0.10	<0.10	0.10	N/A	5186437
Acid Extractable Tin (Sn)	mg/kg	3.1	2.5	5180382	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Uranium (U)	mg/kg	0.75	0.71	5180382	1.1	1.5	0.10	N/A	5186437
Acid Extractable Vanadium (V)	mg/kg	22	29	5180382	9.1	29	2.0	N/A	5186437
Acid Extractable Zinc (Zn)	mg/kg	290	360	5180382	25	24	5.0	N/A	5186437

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEE524	FEE525	FEE526	FEE527	FEE528			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-03-01	627098-03-01	627098-03-01	627098-03-01	627098-03-01			
	UNITS	SS_CH_21	SS_CH_22	SS_CH_23	SS_CH_24	SS_CH_25	RDL	MDL	QC Batch
Metals									
Acid Extractable Aluminum (Al)	mg/kg	1800	370	760	460	2500	10	N/A	5186437
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Barium (Ba)	mg/kg	12	<5.0	5.2	<5.0	11	5.0	N/A	5186437
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	50	N/A	5186437
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	N/A	5186437
Acid Extractable Chromium (Cr)	mg/kg	11	7.0	9.2	7.6	4.8	2.0	N/A	5186437
Acid Extractable Cobalt (Co)	mg/kg	1.4	<1.0	<1.0	<1.0	1.4	1.0	N/A	5186437
Acid Extractable Copper (Cu)	mg/kg	<2.0	<2.0	2.1	<2.0	2.7	2.0	N/A	5186437
Acid Extractable Iron (Fe)	mg/kg	10000	7000	4800	6800	7200	50	N/A	5186437
Acid Extractable Lead (Pb)	mg/kg	2.6	<0.50	0.94	0.60	3.9	0.50	N/A	5186437
Acid Extractable Lithium (Li)	mg/kg	2.0	<2.0	<2.0	<2.0	4.2	2.0	N/A	5186437
Acid Extractable Manganese (Mn)	mg/kg	55	16	11	18	72	2.0	N/A	5186437
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	N/A	5186437
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Nickel (Ni)	mg/kg	2.2	<2.0	<2.0	<2.0	2.0	2.0	N/A	5186437
Acid Extractable Rubidium (Rb)	mg/kg	9.7	<2.0	<2.0	2.4	10	2.0	N/A	5186437
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	N/A	5186437
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	N/A	5186437
Acid Extractable Strontium (Sr)	mg/kg	12	<5.0	9.4	<5.0	15	5.0	N/A	5186437
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	N/A	5186437
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Uranium (U)	mg/kg	0.61	0.22	0.40	0.26	0.83	0.10	N/A	5186437
Acid Extractable Vanadium (V)	mg/kg	31	18	9.1	19	15	2.0	N/A	5186437
Acid Extractable Zinc (Zn)	mg/kg	6.3	<5.0	<5.0	<5.0	10	5.0	N/A	5186437

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEE529	FEE530	FEE531	FEE537	FEE538			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-03-01	627098-03-01	627098-03-01	627098-04-01	627098-04-01			
	UNITS	SS_CH_26	SS_CH_27	SS_CH_28	SS_CH_29	SS_CH_30	RDL	MDL	QC Batch
Metals									
Acid Extractable Aluminum (Al)	mg/kg	5200	2900	3300	4100	3300	10	N/A	5186437
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Barium (Ba)	mg/kg	92	25	55	30	17	5.0	N/A	5186437
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	50	N/A	5186437
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	N/A	5186437
Acid Extractable Chromium (Cr)	mg/kg	6.0	8.5	9.0	7.7	4.8	2.0	N/A	5186437
Acid Extractable Cobalt (Co)	mg/kg	4.0	1.7	2.2	3.2	2.2	1.0	N/A	5186437
Acid Extractable Copper (Cu)	mg/kg	10	26	24	4.2	3.0	2.0	N/A	5186437
Acid Extractable Iron (Fe)	mg/kg	11000	9500	9500	11000	8500	50	N/A	5186437
Acid Extractable Lead (Pb)	mg/kg	6.3	43	150	8.1	4.0	0.50	N/A	5186437
Acid Extractable Lithium (Li)	mg/kg	8.6	3.6	4.7	7.5	8.4	2.0	N/A	5186437
Acid Extractable Manganese (Mn)	mg/kg	110	73	95	120	110	2.0	N/A	5186437
Acid Extractable Mercury (Hg)	mg/kg	<0.10	0.24	<0.10	<0.10	<0.10	0.10	N/A	5186437
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Nickel (Ni)	mg/kg	4.8	3.6	3.1	4.1	2.8	2.0	N/A	5186437
Acid Extractable Rubidium (Rb)	mg/kg	14	9.0	9.9	9.6	11	2.0	N/A	5186437
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	N/A	5186437
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	N/A	5186437
Acid Extractable Strontium (Sr)	mg/kg	14	17	14	12	11	5.0	N/A	5186437
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	N/A	5186437
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.7	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Uranium (U)	mg/kg	0.66	0.74	0.72	1.3	1.4	0.10	N/A	5186437
Acid Extractable Vanadium (V)	mg/kg	26	15	20	19	13	2.0	N/A	5186437
Acid Extractable Zinc (Zn)	mg/kg	28	37	36	20	17	5.0	N/A	5186437

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEE538	FEE539	FEE540	FEE541	FEE542			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-04-01	627098-04-01	627098-04-01	627098-04-01	627098-04-01			
	UNITS	SS_CH_30 Lab-Dup	SS_CH_30_FD	SS_CH_31	SS_CH_32	SS_CH_33	RDL	MDL	QC Batch
Metals									
Acid Extractable Aluminum (Al)	mg/kg	3200	3700	3800	3600	1000	10	N/A	5186437
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Barium (Ba)	mg/kg	18	24	24	26	5.3	5.0	N/A	5186437
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	50	N/A	5186437
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	N/A	5186437
Acid Extractable Chromium (Cr)	mg/kg	5.0	6.9	8.7	6.3	4.7	2.0	N/A	5186437
Acid Extractable Cobalt (Co)	mg/kg	2.1	2.7	2.7	2.3	<1.0	1.0	N/A	5186437
Acid Extractable Copper (Cu)	mg/kg	3.5	4.0	4.0	7.2	<2.0	2.0	N/A	5186437
Acid Extractable Iron (Fe)	mg/kg	8300	10000	10000	9500	4300	50	N/A	5186437
Acid Extractable Lead (Pb)	mg/kg	4.9	4.5	13	26	1.5	0.50	N/A	5186437
Acid Extractable Lithium (Li)	mg/kg	7.2	9.4	9.6	6.8	<2.0	2.0	N/A	5186437
Acid Extractable Manganese (Mn)	mg/kg	100	120	140	120	28	2.0	N/A	5186437
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	N/A	5186437
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Nickel (Ni)	mg/kg	2.8	3.8	3.6	3.3	<2.0	2.0	N/A	5186437
Acid Extractable Rubidium (Rb)	mg/kg	8.7	12	12	10	6.6	2.0	N/A	5186437
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	N/A	5186437
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	N/A	5186437
Acid Extractable Strontium (Sr)	mg/kg	10	11	12	15	7.0	5.0	N/A	5186437
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	N/A	5186437
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Uranium (U)	mg/kg	1.4	1.6	1.3	1.1	0.48	0.10	N/A	5186437
Acid Extractable Vanadium (V)	mg/kg	14	17	16	15	10	2.0	N/A	5186437
Acid Extractable Zinc (Zn)	mg/kg	15	20	21	25	<5.0	5.0	N/A	5186437

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEE543	FEE544	FEE545	FEE546			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-04-01	627098-04-01	627098-04-01	627098-04-01			
	UNITS	SS_CH_34	SS_CH_35	SS_CH_36	SS_CH_37	RDL	MDL	QC Batch
Metals								
Acid Extractable Aluminum (Al)	mg/kg	1300	1200	1200	980	10	N/A	5186437
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Barium (Ba)	mg/kg	6.9	6.0	7.6	5.5	5.0	N/A	5186437
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	50	N/A	5186437
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	<0.30	0.30	N/A	5186437
Acid Extractable Chromium (Cr)	mg/kg	5.2	3.0	2.6	<2.0	2.0	N/A	5186437
Acid Extractable Cobalt (Co)	mg/kg	1.1	<1.0	<1.0	<1.0	1.0	N/A	5186437
Acid Extractable Copper (Cu)	mg/kg	2.2	<2.0	2.1	<2.0	2.0	N/A	5186437
Acid Extractable Iron (Fe)	mg/kg	8600	4000	3600	2100	50	N/A	5186437
Acid Extractable Lead (Pb)	mg/kg	2.1	1.4	1.9	1.1	0.50	N/A	5186437
Acid Extractable Lithium (Li)	mg/kg	2.1	<2.0	2.6	<2.0	2.0	N/A	5186437
Acid Extractable Manganese (Mn)	mg/kg	62	47	46	33	2.0	N/A	5186437
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	<0.10	0.10	N/A	5186437
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Nickel (Ni)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Rubidium (Rb)	mg/kg	2.8	2.6	3.7	2.4	2.0	N/A	5186437
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	<1.0	1.0	N/A	5186437
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	0.50	N/A	5186437
Acid Extractable Strontium (Sr)	mg/kg	9.0	10	7.7	7.2	5.0	N/A	5186437
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	<0.10	0.10	N/A	5186437
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	N/A	5186437
Acid Extractable Uranium (U)	mg/kg	0.99	0.89	0.69	0.62	0.10	N/A	5186437
Acid Extractable Vanadium (V)	mg/kg	16	7.6	6.2	3.9	2.0	N/A	5186437
Acid Extractable Zinc (Zn)	mg/kg	7.2	5.0	7.0	<5.0	5.0	N/A	5186437

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

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SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		FEE484	FEE486	FEE487	FEE488	FEE490			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-01-01	627098-01-01	627098-01-01	627098-01-01	627098-01-01			
	UNITS	SS_CH_01	SS_CH_02	SS_CH_03	SS_CH_04	SS_CH_05	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons									
1-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
2-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Acenaphthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Acenaphthylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(a)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(a)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(b)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(b/j)fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	N/A	5177588
Benzo(g,h,i)perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(j)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(k)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Chrysene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Dibenz(a,h)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Fluorene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Naphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Phenanthrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Surrogate Recovery (%)									
D10-Anthracene	%	84	87	90	70	71			5181993
D14-Terphenyl	%	94	93	95	79	83			5181993
D8-Acenaphthylene	%	83	88	95	75	77			5181993

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

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SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		FEE491	FEE491	FEE492	FEE493	FEE494			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-01-01	627098-01-01	627098-01-01	627098-01-01	627098-01-01			
	UNITS	SS_CH_06	SS_CH_06 Lab-Dup	SS_CH_07	SS_CH_08	SS_CH_08_FD	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons									
1-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
2-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Acenaphthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Acenaphthylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(a)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(a)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(b)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(b/j)fluoranthene	mg/kg	<0.010		<0.010	<0.010	<0.010	0.010	N/A	5177588
Benzo(g,h,i)perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(j)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(k)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Chrysene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Dibenz(a,h)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Fluoranthene	mg/kg	<0.0050	0.0060	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Fluorene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Naphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Phenanthrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Surrogate Recovery (%)									
D10-Anthracene	%	84	85	89	82	87			5181993
D14-Terphenyl	%	90	93	97	89	91			5181993
D8-Acenaphthylene	%	84	82	91	86	84			5181993

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		FEE495	FEE505	FEE506	FEE507	FEE508			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-01-01	627098-02-01	627098-02-01	627098-02-01	627098-02-01			
	UNITS	SS_CH_09	SS_CH_10	SS_CH_11	SS_CH_12	SS_CH_13	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons									
1-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
2-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Acenaphthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Acenaphthylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(a)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(a)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(b)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(b/j)fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	N/A	5177588
Benzo(g,h,i)perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(j)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(k)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Chrysene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Dibenz(a,h)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Fluoranthene	mg/kg	<0.0050	<0.0050	0.0083	<0.0050	<0.0050	0.0050	N/A	5181993
Fluorene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Naphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Phenanthrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Pyrene	mg/kg	<0.0050	<0.0050	0.0063	<0.0050	<0.0050	0.0050	N/A	5181993
Surrogate Recovery (%)									
D10-Anthracene	%	86	89	91	90	86			5181993
D14-Terphenyl	%	94	99	96	92	89			5181993
D8-Acenaphthylene	%	93	87	90	89	86			5181993

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

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SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		FEE509	FEE510	FEE511	FEE512	FEE513			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-02-01	627098-02-01	627098-02-01	627098-02-01	627098-02-01			
	UNITS	SS_CH_14	SS_CH_15	SS_CH_16	SS_CH_17	SS_CH_18	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons									
1-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
2-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Acenaphthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Acenaphthylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(a)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(a)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(b)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(b/j)fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	N/A	5177588
Benzo(g,h,i)perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(j)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Benzo(k)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Chrysene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Dibenz(a,h)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Fluorene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Naphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Phenanthrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5181993
Surrogate Recovery (%)									
D10-Anthracene	%	88	80	86	71	86			5181993
D14-Terphenyl	%	91	93	91	83	91			5181993
D8-Acenaphthylene	%	85	87	84	77	84			5181993

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

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SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		FEE514		FEE522	FEE523	FEE524	FEE525			
Sampling Date		2017/09/16 10:59		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-02-01		627098-03-01	627098-03-01	627098-03-01	627098-03-01			
	UNITS	SS_CH_18_FD	QC Batch	SS_CH_19	SS_CH_20	SS_CH_21	SS_CH_22	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons										
1-Methylnaphthalene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
2-Methylnaphthalene	mg/kg	<0.0050	5181993	0.0065	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Acenaphthene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Acenaphthylene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Anthracene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(a)anthracene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(a)pyrene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(b)fluoranthene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(b/j)fluoranthene	mg/kg	<0.010	5177588	<0.010	<0.010	<0.010	<0.010	0.010	N/A	5177588
Benzo(g,h,i)perylene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(j)fluoranthene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(k)fluoranthene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Chrysene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Dibenz(a,h)anthracene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Fluoranthene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Fluorene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Naphthalene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Perylene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Phenanthrene	mg/kg	<0.0050	5181993	0.0065	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Pyrene	mg/kg	<0.0050	5181993	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Surrogate Recovery (%)										
D10-Anthracene	%	86	5181993	79	86	90	85			5182235
D14-Terphenyl	%	92	5181993	92	95	101	98			5182235
D8-Acenaphthylene	%	87	5181993	80	83	92	90			5182235

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

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SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		FEE526	FEE527	FEE527	FEE528	FEE529			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-03-01	627098-03-01	627098-03-01	627098-03-01	627098-03-01			
	UNITS	SS_CH_23	SS_CH_24	SS_CH_24 Lab-Dup	SS_CH_25	SS_CH_26	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons									
1-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
2-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Acenaphthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Acenaphthylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(a)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(a)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(b)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(b/j)fluoranthene	mg/kg	<0.010	<0.010		<0.010	<0.010	0.010	N/A	5177588
Benzo(g,h,i)perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(j)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(k)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Chrysene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Dibenz(a,h)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Fluorene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Naphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Phenanthrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Surrogate Recovery (%)									
D10-Anthracene	%	73	82	79	88	81			5182235
D14-Terphenyl	%	93	98	94	96	94			5182235
D8-Acenaphthylene	%	78	90	79	91	85			5182235

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		FEE530		FEE531	FEE537	FEE538	FEE539			
Sampling Date		2017/09/16 10:59		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-03-01		627098-03-01	627098-04-01	627098-04-01	627098-04-01			
	UNITS	SS_CH_27	RDL	SS_CH_28	SS_CH_29	SS_CH_30	SS_CH_30_FD	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons										
1-Methylnaphthalene	mg/kg	<0.020 (1)	0.020	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
2-Methylnaphthalene	mg/kg	<0.021 (1)	0.021	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Acenaphthene	mg/kg	<0.35 (1)	0.35	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Acenaphthylene	mg/kg	<0.44 (1)	0.44	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Anthracene	mg/kg	<0.066 (1)	0.066	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(a)anthracene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(a)pyrene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(b)fluoranthene	mg/kg	0.020	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(b/j)fluoranthene	mg/kg	0.020	0.010	<0.010	<0.010	<0.010	<0.010	0.010	N/A	5177588
Benzo(g,h,i)perylene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(j)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(k)fluoranthene	mg/kg	0.0084	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Chrysene	mg/kg	0.16	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Dibenz(a,h)anthracene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Fluoranthene	mg/kg	0.018	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Fluorene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Naphthalene	mg/kg	<0.0080 (1)	0.0080	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Perylene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Phenanthrene	mg/kg	<0.039 (1)	0.039	0.0072	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Pyrene	mg/kg	0.33	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Surrogate Recovery (%)										
D10-Anthracene	%	93		84	89	85	85			5182235
D14-Terphenyl	%	120		95	97	94	97			5182235
D8-Acenaphthylene	%	90		87	89	85	91			5182235

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.

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SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		FEE540	FEE541	FEE542	FEE543	FEE544			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-04-01	627098-04-01	627098-04-01	627098-04-01	627098-04-01			
	UNITS	SS_CH_31	SS_CH_32	SS_CH_33	SS_CH_34	SS_CH_35	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons									
1-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
2-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Acenaphthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Acenaphthylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(a)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(a)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(b)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(b/j)fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	N/A	5177588
Benzo(g,h,i)perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(j)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(k)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Chrysene	mg/kg	0.0062	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Dibenz(a,h)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Fluorene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Naphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Phenanthrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	N/A	5182235
Surrogate Recovery (%)									
D10-Anthracene	%	85	88	86	94	87			5182235
D14-Terphenyl	%	97	96	92	102	105			5182235
D8-Acenaphthylene	%	85	93	87	91	86			5182235

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

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SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		FEE545	FEE546			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-04-01	627098-04-01			
	UNITS	SS_CH_36	SS_CH_37	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons						
1-Methylnaphthalene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
2-Methylnaphthalene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Acenaphthene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Acenaphthylene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Anthracene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(a)anthracene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(a)pyrene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(b)fluoranthene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(b/j)fluoranthene	mg/kg	<0.010	<0.010	0.010	N/A	5177588
Benzo(g,h,i)perylene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(j)fluoranthene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Benzo(k)fluoranthene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Chrysene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Dibenz(a,h)anthracene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Fluoranthene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Fluorene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Naphthalene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Perylene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Phenanthrene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Pyrene	mg/kg	<0.0050	<0.0050	0.0050	N/A	5182235
Surrogate Recovery (%)						
D10-Anthracene	%	83	79			5182235
D14-Terphenyl	%	97	100			5182235
D8-Acenaphthylene	%	85	83			5182235

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

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PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		FEE484	FEE486	FEE486			FEE488			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			2017/09/16 10:59			
COC Number		627098-01-01	627098-01-01	627098-01-01			627098-01-01			
	UNITS	SS_CH_01	SS_CH_02	SS_CH_02 Lab-Dup	RDL	MDL	SS_CH_04	RDL	MDL	QC Batch
F2-F4 Hydrocarbons										
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	1300	690	690	100	100	4600	300	300	5215307

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

Maxxam ID		FEE490			FEE491	FEE493		FEE494			
Sampling Date		2017/09/16 10:59			2017/09/16 10:59	2017/09/16 10:59		2017/09/16 10:59			
COC Number		627098-01-01			627098-01-01	627098-01-01		627098-01-01			
	UNITS	SS_CH_05	RDL	MDL	SS_CH_06	SS_CH_08	QC Batch	SS_CH_08_FD	RDL	MDL	QC Batch
F2-F4 Hydrocarbons											
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	1600	200	200	750	300	5215307	390	100	100	5220055

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		FEE495	FEE507	FEE511			FEE512			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			2017/09/16 10:59			
COC Number		627098-01-01	627098-02-01	627098-02-01			627098-02-01			
	UNITS	SS_CH_09	SS_CH_12	SS_CH_16	RDL	MDL	SS_CH_17	RDL	MDL	QC Batch
F2-F4 Hydrocarbons										
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	150	490	<100	100	100	720	300	300	5215307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		FEE513	FEE514	FEE522				FEE526			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59				2017/09/16 10:59			
COC Number		627098-02-01	627098-02-01	627098-03-01				627098-03-01			
	UNITS	SS_CH_18	SS_CH_18_FD	SS_CH_19	RDL	MDL	QC Batch	SS_CH_23	RDL	MDL	QC Batch
F2-F4 Hydrocarbons											
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	150	310	840	100	100	5215307	1200	200	200	5220055

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		FEE526				FEE527	FEE529			
Sampling Date		2017/09/16 10:59				2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-03-01				627098-03-01	627098-03-01			
	UNITS	SS_CH_23 Lab-Dup	RDL	MDL	QC Batch	SS_CH_24	SS_CH_26	RDL	MDL	QC Batch
F2-F4 Hydrocarbons										
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	1100	200	200	5220055	250	<100	100	100	5215307

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

Maxxam ID		FEE531		FEE537	FEE540		FEE541			
Sampling Date		2017/09/16 10:59		2017/09/16 10:59	2017/09/16 10:59		2017/09/16 10:59			
COC Number		627098-03-01		627098-04-01	627098-04-01		627098-04-01			
	UNITS	SS_CH_28	QC Batch	SS_CH_29	SS_CH_31	QC Batch	SS_CH_32	RDL	MDL	QC Batch
F2-F4 Hydrocarbons										
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	710	5220055	<100	130	5215307	150	100	100	5215304

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		FEE543	FEE544	FEE545	FEE546			
Sampling Date		2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59	2017/09/16 10:59			
COC Number		627098-04-01	627098-04-01	627098-04-01	627098-04-01			
	UNITS	SS_CH_34	SS_CH_35	SS_CH_36	SS_CH_37	RDL	MDL	QC Batch
PCBs								
Aroclor 1016	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	N/A	5182128
Aroclor 1221	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	N/A	5182128
Aroclor 1232	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	N/A	5182128
Aroclor 1248	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	N/A	5182128
Aroclor 1242	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	N/A	5182128
Aroclor 1254	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	N/A	5182128
Aroclor 1260	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	N/A	5182128
Calculated Total PCB	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	N/A	5177533
Surrogate Recovery (%)								
Decachlorobiphenyl	%	90	95	89	78			5182128

RDL = Reportable Detection Limit
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N/A = Not Applicable

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ORGANOPHOSPHORUS PESTICIDES BY GC-MS (SOIL)

Maxxam ID		FEE530			
Sampling Date		2017/09/16 10:59			
COC Number		627098-03-01			
	UNITS	SS_CH_27	RDL	MDL	QC Batch
Pesticides & Herbicides					
Bendiocarb	ug/g	<50	50	N/A	5191385
Demeton-S	ug/g	<50	50	N/A	5191385
Dichlorvos	ug/g	<50	50	N/A	5191385
Dimethoate	ug/g	<50	50	N/A	5191385
Fenchlorphos (Ronnel)	ug/g	<50	50	N/A	5191385
Fonofos	ug/g	<50	50	N/A	5191385
Metolachlor	ug/g	<100	100	N/A	5191385
Mevinphos	ug/g	<50	50	N/A	5191385
Phosmet	ug/g	<50	50	N/A	5191385
Triallate	ug/g	<50	50	N/A	5191385
Trifluralin	ug/g	<50	50	N/A	5191385
Fenthion	ug/g	<50	50	N/A	5191385
Ethion	ug/g	<50	50	N/A	5191385
Guthion (Azinphos-methyl)	ug/g	<50	50	N/A	5191385
Phorate	ug/g	<50	50	N/A	5191385
Terbufos	ug/g	<50	50	N/A	5191385
Aldicarb	ug/g	<50	50	N/A	5191385
Atrazine	ug/g	<50	50	N/A	5191385
Carbaryl	ug/g	<50	50	N/A	5191385
Carbofuran	ug/g	<50	50	N/A	5191385
Cyanazine (Bladex)	ug/g	<50	50	N/A	5191385
Diazinon	ug/g	<50	50	N/A	5191385
Parathion Ethyl	ug/g	<50	50	N/A	5191385
Parathion Methyl	ug/g	<50	50	N/A	5191385
Prometryne	ug/g	<50	50	N/A	5191385
Malathion	ug/g	<50	50	N/A	5191385
Simazine	ug/g	<50	50	N/A	5191385
Chlorpyrifos (Dursban)	ug/g	<50	50	N/A	5191385
Surrogate Recovery (%)					
2-Fluorobiphenyl	%	75			5191385
D14-Terphenyl (FS)	%	80			5191385
D5-Nitrobenzene	%	58			5191385

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

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PHENOXY ACID HERBICIDES BY GC-MS (SOIL)

Maxxam ID		FEE530			
Sampling Date		2017/09/16 10:59			
COC Number		627098-03-01			
	UNITS	SS_CH_27	RDL	MDL	QC Batch
Pesticides & Herbicides					
2,4,5-T	ug/g	<1.0	1.0	N/A	5191394
2,4,5-TP (Silvex)	ug/g	<1.0	1.0	N/A	5191394
2,4-D	ug/g	<1.0	1.0	N/A	5191394
2,4-D (BEE)	ug/g	<2.0	2.0	N/A	5191394
2,4-DB	ug/g	<1.0	1.0	N/A	5191394
2,4-DP (Dichlorprop)	ug/g	<1.0	1.0	N/A	5191394
Dicamba	ug/g	<2.0	2.0	N/A	5191394
MCPA	ug/g	<2.0	2.0	N/A	5191394
MCPP	ug/g	<2.0	2.0	N/A	5191394
Picloram	ug/g	<2.0	2.0	N/A	5191394
Surrogate Recovery (%)					
2,4-Dichlorophenyl Acetic Acid	%	93			5191394
2,5-Dibromobenzoic Acid	%	82			5191394
4,4-Dibromobiphenyl	%	87			5191394

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

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ORGANOCHLORINATED PESTICIDES BY GC-ECD (SOIL)

Maxxam ID		FEE530			
Sampling Date		2017/09/16 10:59			
COC Number		627098-03-01			
	UNITS	SS_CH_27	RDL	MDL	QC Batch
Calculated Parameters					
Aldrin + Dieldrin	ug/g	<0.020	0.020	N/A	5189768
Chlordane (Total)	ug/g	<0.020	0.020	N/A	5189768
DDT+ Metabolites	ug/g	<0.020	0.020	N/A	5189768
Heptachlor + Heptachlor epoxide	ug/g	<0.020	0.020	N/A	5189768
o,p-DDD + p,p-DDD	ug/g	<0.020	0.020	N/A	5189768
o,p-DDE + p,p-DDE	ug/g	<0.020	0.020	N/A	5189768
o,p-DDT + p,p-DDT	ug/g	<0.020	0.020	N/A	5189768
Total Endosulfan	ug/g	<0.020	0.020	N/A	5189768
Total PCB	ug/g	<0.20	0.20	N/A	5189768
Pesticides & Herbicides					
Aldrin	ug/g	<0.020	0.020	0.0040	5191083
a-Chlordane	ug/g	<0.020	0.020	0.0040	5191083
g-Chlordane	ug/g	<0.020	0.020	0.0040	5191083
o,p-DDD	ug/g	<0.020	0.020	0.0040	5191083
p,p-DDD	ug/g	<0.020	0.020	0.0040	5191083
o,p-DDE	ug/g	<0.020	0.020	0.0040	5191083
p,p-DDE	ug/g	<0.020	0.020	0.0040	5191083
o,p-DDT	ug/g	<0.020	0.020	0.0040	5191083
p,p-DDT	ug/g	<0.020	0.020	0.0040	5191083
Dieldrin	ug/g	<0.020	0.020	0.0040	5191083
Lindane	ug/g	<0.020	0.020	0.0040	5191083
Endosulfan I (alpha)	ug/g	<0.020	0.020	0.0040	5191083
Endosulfan II (beta)	ug/g	<0.020	0.020	0.0040	5191083
Endrin	ug/g	<0.020	0.020	0.0040	5191083
Heptachlor	ug/g	<0.020	0.020	0.0040	5191083
Heptachlor epoxide	ug/g	<0.020	0.020	0.0040	5191083
Hexachlorobenzene	ug/g	<0.020	0.020	0.0040	5191083
Methoxychlor	ug/g	<0.050	0.050	0.016	5191083
Aroclor 1016	ug/g	<0.20	0.20	0.040	5191083
Aroclor 1221	ug/g	<0.20	0.20	0.040	5191083
Aroclor 1232	ug/g	<0.20	0.20	0.040	5191083
Aroclor 1242	ug/g	<0.20	0.20	0.040	5191083
Aroclor 1248	ug/g	<0.20	0.20	0.040	5191083

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

ORGANOCHLORINATED PESTICIDES BY GC-ECD (SOIL)

Maxxam ID		FEE530			
Sampling Date		2017/09/16 10:59			
COC Number		627098-03-01			
	UNITS	**SS_CH_27**	**RDL**	**MDL**	**QC Batch**
Aroclor 1254	ug/g	<0.20	0.20	0.040	5191083
Aroclor 1260	ug/g	<0.20	0.20	0.040	5191083
Aroclor 1262	ug/g	<0.20	0.20	0.040	5191083
Aroclor 1268	ug/g	<0.20	0.20	0.040	5191083
alpha-BHC	ug/g	<0.020	0.020	0.0040	5191083
beta-BHC	ug/g	<0.020	0.020	0.0040	5191083
delta-BHC	ug/g	<0.020	0.020	0.0040	5191083
Endosulfan sulfate	ug/g	<0.020	0.020	0.0040	5191083
Endrin aldehyde	ug/g	<0.020	0.020	0.0040	5191083
Endrin ketone	ug/g	<0.020	0.020	0.0040	5191083
Mirex	ug/g	<0.020	0.020	0.0040	5191083
Octachlorostyrene	ug/g	<0.020	0.020	0.0040	5191083
Toxaphene	ug/g	<0.80	0.80	0.20	5191083
Surrogate Recovery (%)					
2,4,5,6-Tetrachloro-m-xylene	%	100			5191083
Decachlorobiphenyl	%	127			5191083

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		FEE530							
Sampling Date		2017/09/16 10:59							
COC Number		627098-03-01				TOXIC EQUIVALENCY		# of	
	UNITS	SS_CH_27	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Dioxins & Furans									
2,3,7,8-Tetra CDD *	pg/g	<0.108	0.108	0.998	N/A	1.00	0.108		5196177
1,2,3,7,8-Penta CDD *	pg/g	0.877	0.109	0.998	N/A	1.00	0.877		5196177
1,2,3,4,7,8-Hexa CDD *	pg/g	1.40	0.0942	0.998	N/A	0.100	0.140		5196177
1,2,3,6,7,8-Hexa CDD *	pg/g	3.31	0.0922	0.998	N/A	0.100	0.331		5196177
1,2,3,7,8,9-Hexa CDD *	pg/g	3.51	0.0836	0.998	N/A	0.100	0.351		5196177
1,2,3,4,6,7,8-Hepta CDD *	pg/g	72.2	0.115	0.998	N/A	0.0100	0.722		5196177
Octa CDD *	pg/g	486	0.112	9.98	N/A	0.000300	0.146		5196177
Total Tetra CDD *	pg/g	0.744	0.108	0.998	N/A			2	5196177
Total Penta CDD *	pg/g	3.87	0.109	0.998	N/A			8	5196177
Total Hexa CDD *	pg/g	22.9	0.0898	0.998	N/A			7	5196177
Total Hepta CDD *	pg/g	134	0.115	0.998	N/A			2	5196177
2,3,7,8-Tetra CDF **	pg/g	0.562	0.109	0.998	N/A	0.100	0.0562		5196177
1,2,3,7,8-Penta CDF **	pg/g	0.139	0.105	0.998	N/A	0.0300	0.00417		5196177
2,3,4,7,8-Penta CDF **	pg/g	0.304	0.104	0.998	N/A	0.300	0.0912		5196177
1,2,3,4,7,8-Hexa CDF **	pg/g	0.705	0.101	0.998	N/A	0.100	0.0705		5196177
1,2,3,6,7,8-Hexa CDF **	pg/g	0.509	0.0960	0.998	N/A	0.100	0.0509		5196177
2,3,4,6,7,8-Hexa CDF **	pg/g	0.527	0.102	0.998	N/A	0.100	0.0527		5196177
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.110	0.110	0.998	N/A	0.100	0.0110		5196177
1,2,3,4,6,7,8-Hepta CDF **	pg/g	12.9	0.0857	0.998	N/A	0.0100	0.129		5196177
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.649	0.118	0.998	N/A	0.0100	0.00649		5196177
Octa CDF **	pg/g	21.7	0.0992	9.98	N/A	0.000300	0.00651		5196177
Total Tetra CDF **	pg/g	8.97	0.109	0.998	N/A			11	5196177
Total Penta CDF **	pg/g	6.52	0.104	0.998	N/A			6	5196177
Total Hexa CDF **	pg/g	18.6	0.102	0.998	N/A			7	5196177
Total Hepta CDF **	pg/g	39.0	0.0992	0.998	N/A			3	5196177
TOTAL TOXIC EQUIVALENCY	pg/g						3.15		

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		FEE530							
Sampling Date		2017/09/16 10:59							
COC Number		627098-03-01				TOXIC EQUIVALENCY		# of	
	UNITS	SS_CH_27	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	101							5196177
C13-1234678 HeptaCDF **	%	85							5196177
C13-123678 HexaCDD *	%	100							5196177
C13-123678 HexaCDF **	%	81							5196177
C13-12378 PentaCDD *	%	105							5196177
C13-12378 PentaCDF **	%	91							5196177
C13-2378 TetraCDD *	%	105							5196177
C13-2378 TetraCDF **	%	91							5196177
C13-OCDD *	%	127							5196177

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

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

TEST SUMMARY

Maxxam ID: FEE484
Sample ID: SS_CH_01
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/27	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5180382	2017/09/25	2017/09/25	Mike Leblanc
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/22	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE486
Sample ID: SS_CH_02
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/27	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5180382	2017/09/25	2017/09/25	Mike Leblanc
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE486 Dup
Sample ID: SS_CH_02
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5180382	2017/09/25	2017/09/25	Mike Leblanc

Maxxam ID: FEE487
Sample ID: SS_CH_03
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/27	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5184265	2017/09/27	2017/09/27	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

TEST SUMMARY

Maxxam ID: FEE488
Sample ID: SS_CH_04
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/27	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5184265	2017/09/27	2017/09/27	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE490
Sample ID: SS_CH_05
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/27	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5184651	2017/09/27	2017/09/28	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE490 Dup
Sample ID: SS_CH_05
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE491
Sample ID: SS_CH_06
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/27	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5184651	2017/09/27	2017/09/28	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

TEST SUMMARY

Maxxam ID: FEE491 Dup
Sample ID: SS_CH_06
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson

Maxxam ID: FEE492
Sample ID: SS_CH_07
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/27	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5184265	2017/09/27	2017/09/27	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE493
Sample ID: SS_CH_08
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/27	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5184265	2017/09/27	2017/09/27	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE494
Sample ID: SS_CH_08_FD
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5220055	2017/10/19	2017/10/19	Debra Deslandes
Metals Solids Acid Extr. ICPMS	ICP/MS	5184651	2017/09/27	2017/09/28	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE495
Sample ID: SS_CH_09
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

TEST SUMMARY

Maxxam ID: FEE495
Sample ID: SS_CH_09
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5184651	2017/09/27	2017/09/28	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE505
Sample ID: SS_CH_10
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5184651	2017/09/27	2017/09/28	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE506
Sample ID: SS_CH_11
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5184265	2017/09/27	2017/09/27	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE507
Sample ID: SS_CH_12
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5184265	2017/09/27	2017/09/27	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

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TEST SUMMARY

Maxxam ID: FEE507 Dup
Sample ID: SS_CH_12
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	5184265	2017/09/27	2017/09/27	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour

Maxxam ID: FEE508
Sample ID: SS_CH_13
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5184651	2017/09/27	2017/09/28	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE509
Sample ID: SS_CH_14
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5184651	2017/09/27	2017/09/28	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/09/30	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE509 Dup
Sample ID: SS_CH_14
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko

Maxxam ID: FEE510
Sample ID: SS_CH_15
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5184651	2017/09/27	2017/09/29	Bryon Angevine
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/10/01	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

TEST SUMMARY

Maxxam ID: FEE511
Sample ID: SS_CH_16
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5180382	2017/09/25	2017/09/25	Mike Leblanc
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/10/01	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE512
Sample ID: SS_CH_17
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5180382	2017/09/25	2017/09/25	Mike Leblanc
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/10/01	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE513
Sample ID: SS_CH_18
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5180382	2017/09/25	2017/09/25	Mike Leblanc
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/10/01	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE514
Sample ID: SS_CH_18_FD
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/02	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182050	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5180382	2017/09/25	2017/09/25	Mike Leblanc
Moisture	BAL	5177711	N/A	2017/09/25	David Balfour
PAH in sediment by GC/MS (Low Level)	GC/MS	5181993	2017/09/26	2017/10/01	Gina Thompson

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

TEST SUMMARY

Maxxam ID: FEE514 **Collected:** 2017/09/16
Sample ID: SS_CH_18_FD **Shipped:**
Matrix: Soil **Received:** 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds and F1 PHCs	GC/MS	5180654	N/A	2017/09/28	Denis Reid

Maxxam ID: FEE522 **Collected:** 2017/09/16
Sample ID: SS_CH_19 **Shipped:**
Matrix: Soil **Received:** 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/27	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/28	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/27	Manpreet Sarao

Maxxam ID: FEE523 **Collected:** 2017/09/16
Sample ID: SS_CH_20 **Shipped:**
Matrix: Soil **Received:** 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/27	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/28	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/27	Manpreet Sarao

Maxxam ID: FEE524 **Collected:** 2017/09/16
Sample ID: SS_CH_21 **Shipped:**
Matrix: Soil **Received:** 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/28	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/27	Manpreet Sarao

Maxxam ID: FEE524 Dup **Collected:** 2017/09/16
Sample ID: SS_CH_21 **Shipped:**
Matrix: Soil **Received:** 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/27	Margaret Kulczyk-Stanko

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

TEST SUMMARY

Maxxam ID: FEE525
Sample ID: SS_CH_22
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/27	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/28	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/27	Manpreet Sarao

Maxxam ID: FEE525 Dup
Sample ID: SS_CH_22
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/27	Manpreet Sarao

Maxxam ID: FEE526
Sample ID: SS_CH_23
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/27	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5220055	2017/10/19	2017/10/19	Debra Deslandes
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/28	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

Maxxam ID: FEE526 Dup
Sample ID: SS_CH_23
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
F4G (CCME Hydrocarbons Gravimetric)	BAL	5220055	2017/10/19	2017/10/19	Debra Deslandes

Maxxam ID: FEE527
Sample ID: SS_CH_24
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/28	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

TEST SUMMARY

Maxxam ID: FEE527 Dup
Sample ID: SS_CH_24
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson

Maxxam ID: FEE528
Sample ID: SS_CH_25
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/28	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

Maxxam ID: FEE529
Sample ID: SS_CH_26
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/28	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

Maxxam ID: FEE530
Sample ID: SS_CH_27
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Dioxins/Furans in Soil (EPS 1/RM/23)	HRMS/MS	5196177	2017/09/30	2017/10/08	Owen Cosby
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/28	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
OC Pesticides (Selected) & PCB	GC/ECD	5191083	2017/09/30	2017/10/02	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	5189768	N/A	2017/09/29	Automated Statchk
GC/MS Analysis of OP Pesticides	GC/MS	5191385	2017/09/30	2017/10/02	May Yin Mak
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Phenoxy Acid Herbicides	GC/MS	5191394	2017/09/30	2017/10/02	May Yin Mak
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

TEST SUMMARY

Maxxam ID: FEE531
Sample ID: SS_CH_28
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5220055	2017/10/19	2017/10/19	Debra Deslandes
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/28	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

Maxxam ID: FEE537
Sample ID: SS_CH_29
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/28	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

Maxxam ID: FEE538
Sample ID: SS_CH_30
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/28	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/25	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

Maxxam ID: FEE538 Dup
Sample ID: SS_CH_30
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/29	Bryon Angevine

Maxxam ID: FEE539
Sample ID: SS_CH_30_FD
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

TEST SUMMARY

Maxxam ID: FEE539
Sample ID: SS_CH_30_FD
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/29	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

Maxxam ID: FEE540
Sample ID: SS_CH_31
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215307	2017/10/17	2017/10/17	Yeldho Mathai
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/29	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

Maxxam ID: FEE541
Sample ID: SS_CH_32
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	5215304	2017/10/17	2017/10/17	Debra Deslandes
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/29	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/02	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

Maxxam ID: FEE542
Sample ID: SS_CH_33
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/29	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/03	Gina Thompson
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

TEST SUMMARY

Maxxam ID: FEE543
Sample ID: SS_CH_34
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/29	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/03	Gina Thompson
PCBs in soil by GC/ECD	GC/ECD	5182128	2017/09/26	2017/09/28	Chloe Bramble
PCB Aroclor sum (soil)	CALC	5177533	N/A	2017/09/28	Automated Statchk
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

Maxxam ID: FEE544
Sample ID: SS_CH_35
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/29	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/03	Gina Thompson
PCBs in soil by GC/ECD	GC/ECD	5182128	2017/09/26	2017/09/28	Chloe Bramble
PCB Aroclor sum (soil)	CALC	5177533	N/A	2017/09/28	Automated Statchk
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

Maxxam ID: FEE545
Sample ID: SS_CH_36
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/29	Bryon Angevine
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/03	Gina Thompson
PCBs in soil by GC/ECD	GC/ECD	5182128	2017/09/26	2017/09/28	Chloe Bramble
PCB Aroclor sum (soil)	CALC	5177533	N/A	2017/09/28	Automated Statchk
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

Maxxam ID: FEE546
Sample ID: SS_CH_37
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Benzo(b/j)fluoranthene Sum (LL soil)	CALC	5177588	N/A	2017/10/03	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5182042	2017/09/26	2017/09/28	Margaret Kulczyk-Stanko
Metals Solids Acid Extr. ICPMS	ICP/MS	5186437	2017/09/28	2017/09/29	Bryon Angevine

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Maxxam Job #: B7K7449
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GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

TEST SUMMARY

Maxxam ID: FEE546
Sample ID: SS_CH_37
Matrix: Soil

Collected: 2017/09/16
Shipped:
Received: 2017/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5180491	N/A	2017/09/25	Jacob Henley
PAH in sediment by GC/MS (Low Level)	GC/MS	5182235	2017/09/26	2017/10/03	Gina Thompson
PCBs in soil by GC/ECD	GC/ECD	5182128	2017/09/26	2017/09/28	Chloe Bramble
PCB Aroclor sum (soil)	CALC	5177533	N/A	2017/09/28	Automated Statchk
Volatile Organic Compounds and F1 PHCs	GC/MS	5180694	N/A	2017/09/28	Manpreet Sarao

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GENERAL COMMENTS

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

Package 1	4.3°C

Revised report: Below samples analyzed for F4G as per request from Abigail. HM Oct 13/17

SS_CH_06 – FEE491
SS_CH_01 – FEE484
SS_CH_02 – FEE486
SS_CH_04 – FEE488
SS_CH_05 – FEE490
SS_CH_08_FD – FEE494
SS_CH_09 – FEE495
SS_CH_23 – FEE526
SS_CH_24 – FEE527
SS_CH_28 – FEE531
SS_CH_08 – FEE493
SS_CH_12 – FEE507
SS_CH_16 – FEE511
SS_CH_17 – FEE512
SS_CH_18 – FEE513
SS_CH_18_FD – FEE514
SS_CH_19 – FEE522
SS_CH_26 – FEE529
SS_CH_29 – FEE537
SS_CH_31 – FEE540
SS_CH_32 – FEE541

Sample FEE484 [SS_CH_01] : F2-F4 Analysis: Detection limits were adjusted for high moisture content

Sample FEE488 [SS_CH_04] : VOCF1 Analysis: Detection limits were raised due to high moisture content and/or low weight 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 FEE490 [SS_CH_05] : F4GGRAV-S:Due to high moisture content in the sample matrix, the DL is adjusted accordingly due to lower dry weight.

Sample FEE491 [SS_CH_06] : F2-F4 Analysis: Detection limits were adjusted for high moisture content

Sample FEE494 [SS_CH_08_FD] : F4G Analysis: Sample did not meet holding time

Sample FEE510 [SS_CH_15] : Elevated reporting limits for trace metals due to sample matrix.

Sample FEE512 [SS_CH_17] : VOCF1 Analysis: Detection limits were raised due to high moisture content and/or low weight 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 FEE526 [SS_CH_23] : F4G Analysis: Sample did not meet holding time.
Due to high moisture content in the sample matrix,the DL is adjusted according due to lower dry weight.

Sample FEE530 [SS_CH_27] : OP Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

PA Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

OC Pesticide Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample FEE531 [SS_CH_28] : F4G Analysis: Sample did not meet holding time

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Sample FEE541 [SS_CH_32] : F4G Analysis: Sample did not meet holding time

Sample FEE546 [SS_CH_37] : 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.

Results relate only to the items tested.

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5177711	DBF	RPD - Sample/Sample Dup	Moisture	2017/09/25	10		%	25
5180382	MLB	Matrix Spike(FEE486)	Acid Extractable Antimony (Sb)	2017/09/25		93	%	75 - 125
			Acid Extractable Arsenic (As)	2017/09/25		98	%	75 - 125
			Acid Extractable Barium (Ba)	2017/09/25		99	%	75 - 125
			Acid Extractable Beryllium (Be)	2017/09/25		100	%	75 - 125
			Acid Extractable Bismuth (Bi)	2017/09/25		102	%	75 - 125
			Acid Extractable Boron (B)	2017/09/25		97	%	75 - 125
			Acid Extractable Cadmium (Cd)	2017/09/25		100	%	75 - 125
			Acid Extractable Chromium (Cr)	2017/09/25		99	%	75 - 125
			Acid Extractable Cobalt (Co)	2017/09/25		99	%	75 - 125
			Acid Extractable Copper (Cu)	2017/09/25		98	%	75 - 125
			Acid Extractable Lead (Pb)	2017/09/25		95	%	75 - 125
			Acid Extractable Lithium (Li)	2017/09/25		109	%	75 - 125
			Acid Extractable Manganese (Mn)	2017/09/25		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2017/09/25		95	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2017/09/25		97	%	75 - 125
			Acid Extractable Nickel (Ni)	2017/09/25		100	%	75 - 125
			Acid Extractable Rubidium (Rb)	2017/09/25		93	%	75 - 125
			Acid Extractable Selenium (Se)	2017/09/25		100	%	75 - 125
			Acid Extractable Silver (Ag)	2017/09/25		102	%	75 - 125
			Acid Extractable Strontium (Sr)	2017/09/25		101	%	75 - 125
			Acid Extractable Thallium (Tl)	2017/09/25		100	%	75 - 125
			Acid Extractable Tin (Sn)	2017/09/25		101	%	75 - 125
			Acid Extractable Uranium (U)	2017/09/25		96	%	75 - 125
			Acid Extractable Vanadium (V)	2017/09/25		96	%	75 - 125
			Acid Extractable Zinc (Zn)	2017/09/25		NC	%	75 - 125
5180382	MLB	Spiked Blank	Acid Extractable Antimony (Sb)	2017/09/25		99	%	75 - 125
			Acid Extractable Arsenic (As)	2017/09/25		100	%	75 - 125
			Acid Extractable Barium (Ba)	2017/09/25		97	%	75 - 125
			Acid Extractable Beryllium (Be)	2017/09/25		98	%	75 - 125
			Acid Extractable Bismuth (Bi)	2017/09/25		104	%	75 - 125
			Acid Extractable Boron (B)	2017/09/25		100	%	75 - 125
			Acid Extractable Cadmium (Cd)	2017/09/25		101	%	75 - 125
			Acid Extractable Chromium (Cr)	2017/09/25		97	%	75 - 125
			Acid Extractable Cobalt (Co)	2017/09/25		98	%	75 - 125
			Acid Extractable Copper (Cu)	2017/09/25		99	%	75 - 125
			Acid Extractable Lead (Pb)	2017/09/25		97	%	75 - 125
			Acid Extractable Lithium (Li)	2017/09/25		102	%	75 - 125
			Acid Extractable Manganese (Mn)	2017/09/25		101	%	75 - 125
			Acid Extractable Mercury (Hg)	2017/09/25		110	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2017/09/25		99	%	75 - 125
			Acid Extractable Nickel (Ni)	2017/09/25		101	%	75 - 125
			Acid Extractable Rubidium (Rb)	2017/09/25		101	%	75 - 125
			Acid Extractable Selenium (Se)	2017/09/25		101	%	75 - 125
			Acid Extractable Silver (Ag)	2017/09/25		101	%	75 - 125
			Acid Extractable Strontium (Sr)	2017/09/25		103	%	75 - 125
			Acid Extractable Thallium (Tl)	2017/09/25		102	%	75 - 125
			Acid Extractable Tin (Sn)	2017/09/25		107	%	75 - 125
			Acid Extractable Uranium (U)	2017/09/25		96	%	75 - 125
			Acid Extractable Vanadium (V)	2017/09/25		97	%	75 - 125
			Acid Extractable Zinc (Zn)	2017/09/25		102	%	75 - 125
5180382	MLB	Method Blank	Acid Extractable Aluminum (Al)	2017/09/25	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2017/09/25	<2.0		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			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	
			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	
5180382	MLB	RPD - Sample/Sample Dup	Acid Extractable Aluminum (Al)	2017/09/25	0.84		%	35
			Acid Extractable Antimony (Sb)	2017/09/25	NC		%	35
			Acid Extractable Arsenic (As)	2017/09/25	NC		%	35
			Acid Extractable Barium (Ba)	2017/09/25	0.33		%	35
			Acid Extractable Beryllium (Be)	2017/09/25	NC		%	35
			Acid Extractable Bismuth (Bi)	2017/09/25	NC		%	35
			Acid Extractable Boron (B)	2017/09/25	NC		%	35
			Acid Extractable Cadmium (Cd)	2017/09/25	NC		%	35
			Acid Extractable Chromium (Cr)	2017/09/25	NC		%	35
			Acid Extractable Cobalt (Co)	2017/09/25	NC		%	35
			Acid Extractable Copper (Cu)	2017/09/25	NC		%	35
			Acid Extractable Iron (Fe)	2017/09/25	1.7		%	35
			Acid Extractable Lead (Pb)	2017/09/25	27		%	35
			Acid Extractable Lithium (Li)	2017/09/25	9.6		%	35
			Acid Extractable Manganese (Mn)	2017/09/25	0.098		%	35
			Acid Extractable Mercury (Hg)	2017/09/25	NC		%	35
			Acid Extractable Molybdenum (Mo)	2017/09/25	NC		%	35
			Acid Extractable Nickel (Ni)	2017/09/25	NC		%	35
			Acid Extractable Rubidium (Rb)	2017/09/25	4.1		%	35
			Acid Extractable Selenium (Se)	2017/09/25	NC		%	35
			Acid Extractable Silver (Ag)	2017/09/25	NC		%	35
			Acid Extractable Strontium (Sr)	2017/09/25	12		%	35
			Acid Extractable Thallium (Tl)	2017/09/25	2.9		%	35
			Acid Extractable Tin (Sn)	2017/09/25	NC		%	35
			Acid Extractable Uranium (U)	2017/09/25	NC		%	35
			Acid Extractable Vanadium (V)	2017/09/25	15		%	35
			Acid Extractable Zinc (Zn)	2017/09/25	1.3		%	35
5180491	JHY	RPD - Sample/Sample Dup	Moisture	2017/09/25	4.0		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5180654	DR1	Matrix Spike(FEE490)	4-Bromofluorobenzene	2017/09/28		97	%	60 - 140
			D10-o-Xylene	2017/09/28		83	%	60 - 130
			D4-1,2-Dichloroethane	2017/09/28		110	%	60 - 140
			D8-Toluene	2017/09/28		102	%	60 - 140
			Benzene	2017/09/28		108	%	60 - 140
			Ethylbenzene	2017/09/28		96	%	60 - 140
			Toluene	2017/09/28		96	%	60 - 140
			p+m-Xylene	2017/09/28		96	%	60 - 140
			o-Xylene	2017/09/28		95	%	60 - 140
			F1 (C6-C10)	2017/09/28		106	%	60 - 140
5180654	DR1	Spiked Blank	4-Bromofluorobenzene	2017/09/28		99	%	60 - 140
			D10-o-Xylene	2017/09/28		104	%	60 - 130
			D4-1,2-Dichloroethane	2017/09/28		107	%	60 - 140
			D8-Toluene	2017/09/28		105	%	60 - 140
			Benzene	2017/09/28		101	%	60 - 130
			Ethylbenzene	2017/09/28		94	%	60 - 130
			Toluene	2017/09/28		94	%	60 - 130
			p+m-Xylene	2017/09/28		95	%	60 - 130
			o-Xylene	2017/09/28		95	%	60 - 130
			F1 (C6-C10)	2017/09/28		105	%	80 - 120
5180654	DR1	Method Blank	4-Bromofluorobenzene	2017/09/28		90	%	60 - 140
			D10-o-Xylene	2017/09/28		88	%	60 - 130
			D4-1,2-Dichloroethane	2017/09/28		109	%	60 - 140
			D8-Toluene	2017/09/28		95	%	60 - 140
			Benzene	2017/09/28	<0.0060		ug/g	
			Ethylbenzene	2017/09/28	<0.010		ug/g	
			Toluene	2017/09/28	<0.020		ug/g	
			p+m-Xylene	2017/09/28	<0.020		ug/g	
			o-Xylene	2017/09/28	<0.020		ug/g	
			Total Xylenes	2017/09/28	<0.020		ug/g	
			F1 (C6-C10)	2017/09/28	<10		ug/g	
			F1 (C6-C10) - BTEX	2017/09/28	<10		ug/g	
5180654	DR1	RPD - Sample/Sample Dup	Benzene	2017/09/28	NC		%	50
			Ethylbenzene	2017/09/28	NC		%	50
			Toluene	2017/09/28	NC		%	50
			p+m-Xylene	2017/09/28	NC		%	50
			o-Xylene	2017/09/28	NC		%	50
			Total Xylenes	2017/09/28	NC		%	50
			F1 (C6-C10)	2017/09/28	NC		%	30
			F1 (C6-C10) - BTEX	2017/09/28	NC		%	30
5180694	MS4	Matrix Spike(FEE525)	4-Bromofluorobenzene	2017/09/27		96	%	60 - 140
			D10-o-Xylene	2017/09/27		106	%	60 - 130
			D4-1,2-Dichloroethane	2017/09/27		104	%	60 - 140
			D8-Toluene	2017/09/27		104	%	60 - 140
			Benzene	2017/09/27		93	%	60 - 140
			Ethylbenzene	2017/09/27		89	%	60 - 140
			Toluene	2017/09/27		88	%	60 - 140
			p+m-Xylene	2017/09/27		88	%	60 - 140
			o-Xylene	2017/09/27		88	%	60 - 140
			F1 (C6-C10)	2017/09/27		104	%	60 - 140
5180694	MS4	Spiked Blank	4-Bromofluorobenzene	2017/09/27		96	%	60 - 140
			D10-o-Xylene	2017/09/27		96	%	60 - 130
			D4-1,2-Dichloroethane	2017/09/27		104	%	60 - 140

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D8-Toluene	2017/09/27		104	%	60 - 140
			Benzene	2017/09/27		97	%	60 - 130
			Ethylbenzene	2017/09/27		93	%	60 - 130
			Toluene	2017/09/27		91	%	60 - 130
			p+m-Xylene	2017/09/27		92	%	60 - 130
			o-Xylene	2017/09/27		92	%	60 - 130
			F1 (C6-C10)	2017/09/27		90	%	80 - 120
5180694	MS4	Method Blank	4-Bromofluorobenzene	2017/09/27		92	%	60 - 140
			D10-o-Xylene	2017/09/27		83	%	60 - 130
			D4-1,2-Dichloroethane	2017/09/27		104	%	60 - 140
			D8-Toluene	2017/09/27		102	%	60 - 140
			Benzene	2017/09/27	<0.0060		ug/g	
			Ethylbenzene	2017/09/27	<0.010		ug/g	
			Toluene	2017/09/27	<0.020		ug/g	
			p+m-Xylene	2017/09/27	<0.020		ug/g	
			o-Xylene	2017/09/27	<0.020		ug/g	
			Total Xylenes	2017/09/27	<0.020		ug/g	
			F1 (C6-C10)	2017/09/27	<10		ug/g	
			F1 (C6-C10) - BTEX	2017/09/27	<10		ug/g	
5180694	MS4	RPD - Sample/Sample Dup	Benzene	2017/09/27	NC		%	50
			Ethylbenzene	2017/09/27	NC		%	50
			Toluene	2017/09/27	NC		%	50
			p+m-Xylene	2017/09/27	NC		%	50
			o-Xylene	2017/09/27	NC		%	50
			Total Xylenes	2017/09/27	NC		%	50
			F1 (C6-C10)	2017/09/27	NC		%	30
			F1 (C6-C10) - BTEX	2017/09/27	NC		%	30
5181993	GTH	Matrix Spike(FEE491)	D10-Anthracene	2017/09/30		84	%	50 - 130
			D14-Terphenyl	2017/09/30		89	%	50 - 130
			D8-Acenaphthylene	2017/09/30		87	%	50 - 130
			1-Methylnaphthalene	2017/09/30		79	%	30 - 130
			2-Methylnaphthalene	2017/09/30		84	%	30 - 130
			Acenaphthene	2017/09/30		91	%	30 - 130
			Acenaphthylene	2017/09/30		78	%	30 - 130
			Anthracene	2017/09/30		92	%	30 - 130
			Benzo(a)anthracene	2017/09/30		88	%	30 - 130
			Benzo(a)pyrene	2017/09/30		65	%	30 - 130
			Benzo(b)fluoranthene	2017/09/30		74	%	30 - 130
			Benzo(g,h,i)perylene	2017/09/30		51	%	30 - 130
			Benzo(j)fluoranthene	2017/09/30		76	%	30 - 130
			Benzo(k)fluoranthene	2017/09/30		76	%	30 - 130
			Chrysene	2017/09/30		75	%	30 - 130
			Dibenz(a,h)anthracene	2017/09/30		63	%	30 - 130
			Fluoranthene	2017/09/30		91	%	30 - 130
			Fluorene	2017/09/30		84	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2017/09/30		57	%	30 - 130
			Naphthalene	2017/09/30		82	%	30 - 130
			Perylene	2017/09/30		61	%	30 - 130
			Phenanthrene	2017/09/30		86	%	30 - 130
			Pyrene	2017/09/30		88	%	30 - 130
5181993	GTH	Spiked Blank	D10-Anthracene	2017/09/30		86	%	50 - 130
			D14-Terphenyl	2017/09/30		95	%	50 - 130
			D8-Acenaphthylene	2017/09/30		88	%	50 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1-Methylnaphthalene	2017/09/30		77	%	30 - 130
			2-Methylnaphthalene	2017/09/30		84	%	30 - 130
			Acenaphthene	2017/09/30		88	%	30 - 130
			Acenaphthylene	2017/09/30		80	%	30 - 130
			Anthracene	2017/09/30		95	%	30 - 130
			Benzo(a)anthracene	2017/09/30		98	%	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		93	%	30 - 130
			Benzo(j)fluoranthene	2017/09/30		91	%	30 - 130
			Benzo(k)fluoranthene	2017/09/30		92	%	30 - 130
			Chrysene	2017/09/30		90	%	30 - 130
			Dibenz(a,h)anthracene	2017/09/30		90	%	30 - 130
			Fluoranthene	2017/09/30		95	%	30 - 130
			Fluorene	2017/09/30		83	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2017/09/30		88	%	30 - 130
			Naphthalene	2017/09/30		82	%	30 - 130
			Perylene	2017/09/30		91	%	30 - 130
			Phenanthrene	2017/09/30		88	%	30 - 130
			Pyrene	2017/09/30		92	%	30 - 130
5181993	GTH	Method Blank	D10-Anthracene	2017/09/30		91	%	50 - 130
			D14-Terphenyl	2017/09/30		98	%	50 - 130
			D8-Acenaphthylene	2017/09/30		90	%	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	
5181993	GTH	RPD - Sample/Sample Dup	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

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Benzo(k)fluoranthene	2017/09/30	NC		%	50
			Chrysene	2017/09/30	NC		%	50
			Dibenz(a,h)anthracene	2017/09/30	NC		%	50
			Fluoranthene	2017/09/30	19		%	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
5182042	MKS	Matrix Spike(FEE524)	o-Terphenyl	2017/09/27		85	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/09/27		88	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2017/09/27		85	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2017/09/27		83	%	50 - 130
5182042	MKS	Spiked Blank	o-Terphenyl	2017/09/27		86	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/09/27		89	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2017/09/27		86	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2017/09/27		83	%	80 - 120
5182042	MKS	Method Blank	o-Terphenyl	2017/09/27		86	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/09/27	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2017/09/27	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2017/09/27	<50		ug/g	
5182042	MKS	RPD - Sample/Sample Dup	F2 (C10-C16 Hydrocarbons)	2017/09/27	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2017/09/27	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2017/09/27	NC		%	30
5182050	MKS	Matrix Spike(FEE509)	o-Terphenyl	2017/09/27		81	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/09/27		95	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2017/09/27		87	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2017/09/27		81	%	50 - 130
5182050	MKS	Spiked Blank	o-Terphenyl	2017/09/28		93	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/09/28		97	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2017/09/28		90	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2017/09/28		82	%	80 - 120
5182050	MKS	Method Blank	o-Terphenyl	2017/09/27		87	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/09/27	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2017/09/27	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2017/09/27	<50		ug/g	
5182050	MKS	RPD - Sample/Sample Dup	F2 (C10-C16 Hydrocarbons)	2017/09/28	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2017/09/28	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2017/09/28	NC		%	30
5182128	CBR	Matrix Spike	Decachlorobiphenyl	2017/09/28		85	%	30 - 130
			Aroclor 1254	2017/09/28		97	%	30 - 130
5182128	CBR	Spiked Blank	Decachlorobiphenyl	2017/09/28		96	%	30 - 130
			Aroclor 1254	2017/09/28		100	%	30 - 130
5182128	CBR	Method Blank	Decachlorobiphenyl	2017/09/28		91	%	30 - 130
			Aroclor 1016	2017/09/28	<0.050		ug/g	
			Aroclor 1221	2017/09/28	<0.050		ug/g	
			Aroclor 1232	2017/09/28	<0.050		ug/g	
			Aroclor 1248	2017/09/28	<0.050		ug/g	
			Aroclor 1242	2017/09/28	<0.050		ug/g	
			Aroclor 1254	2017/09/28	<0.050		ug/g	
			Aroclor 1260	2017/09/28	<0.050		ug/g	
5182128	CBR	RPD - Sample/Sample Dup	Aroclor 1016	2017/09/28	NC		%	50

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Aroclor 1221	2017/09/28	NC		%	50
			Aroclor 1232	2017/09/28	NC		%	50
			Aroclor 1248	2017/09/28	NC		%	50
			Aroclor 1242	2017/09/28	NC		%	50
			Aroclor 1254	2017/09/28	NC		%	50
			Aroclor 1260	2017/09/28	NC		%	50
5182235	GTH	Matrix Spike(FEE527)	D10-Anthracene	2017/10/02		85	%	50 - 130
			D14-Terphenyl	2017/10/02		95	%	50 - 130
			D8-Acenaphthylene	2017/10/02		87	%	50 - 130
			1-Methylnaphthalene	2017/10/02		77	%	30 - 130
			2-Methylnaphthalene	2017/10/02		84	%	30 - 130
			Acenaphthene	2017/10/02		90	%	30 - 130
			Acenaphthylene	2017/10/02		75	%	30 - 130
			Anthracene	2017/10/02		94	%	30 - 130
			Benzo(a)anthracene	2017/10/02		86	%	30 - 130
			Benzo(a)pyrene	2017/10/02		68	%	30 - 130
			Benzo(b)fluoranthene	2017/10/02		74	%	30 - 130
			Benzo(g,h,i)perylene	2017/10/02		52	%	30 - 130
			Benzo(j)fluoranthene	2017/10/02		73	%	30 - 130
			Benzo(k)fluoranthene	2017/10/02		77	%	30 - 130
			Chrysene	2017/10/02		79	%	30 - 130
			Dibenz(a,h)anthracene	2017/10/02		69	%	30 - 130
			Fluoranthene	2017/10/02		88	%	30 - 130
			Fluorene	2017/10/02		85	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2017/10/02		59	%	30 - 130
			Naphthalene	2017/10/02		79	%	30 - 130
			Perylene	2017/10/02		63	%	30 - 130
			Phenanthrene	2017/10/02		85	%	30 - 130
			Pyrene	2017/10/02		88	%	30 - 130
5182235	GTH	Spiked Blank	D10-Anthracene	2017/10/02		84	%	50 - 130
			D14-Terphenyl	2017/10/02		96	%	50 - 130
			D8-Acenaphthylene	2017/10/02		84	%	50 - 130
			1-Methylnaphthalene	2017/10/02		79	%	30 - 130
			2-Methylnaphthalene	2017/10/02		85	%	30 - 130
			Acenaphthene	2017/10/02		91	%	30 - 130
			Acenaphthylene	2017/10/02		74	%	30 - 130
			Anthracene	2017/10/02		92	%	30 - 130
			Benzo(a)anthracene	2017/10/02		93	%	30 - 130
			Benzo(a)pyrene	2017/10/02		89	%	30 - 130
			Benzo(b)fluoranthene	2017/10/02		91	%	30 - 130
			Benzo(g,h,i)perylene	2017/10/02		93	%	30 - 130
			Benzo(j)fluoranthene	2017/10/02		89	%	30 - 130
			Benzo(k)fluoranthene	2017/10/02		90	%	30 - 130
			Chrysene	2017/10/02		87	%	30 - 130
			Dibenz(a,h)anthracene	2017/10/02		90	%	30 - 130
			Fluoranthene	2017/10/02		91	%	30 - 130
			Fluorene	2017/10/02		86	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2017/10/02		88	%	30 - 130
			Naphthalene	2017/10/02		83	%	30 - 130
			Perylene	2017/10/02		88	%	30 - 130
			Phenanthrene	2017/10/02		88	%	30 - 130
			Pyrene	2017/10/02		93	%	30 - 130
5182235	GTH	Method Blank	D10-Anthracene	2017/10/02		87	%	50 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D14-Terphenyl	2017/10/02		98	%	50 - 130
			D8-Acenaphthylene	2017/10/02		81	%	50 - 130
			1-Methylnaphthalene	2017/10/02	<0.0050		mg/kg	
			2-Methylnaphthalene	2017/10/02	<0.0050		mg/kg	
			Acenaphthene	2017/10/02	<0.0050		mg/kg	
			Acenaphthylene	2017/10/02	<0.0050		mg/kg	
			Anthracene	2017/10/02	<0.0050		mg/kg	
			Benzo(a)anthracene	2017/10/02	<0.0050		mg/kg	
			Benzo(a)pyrene	2017/10/02	<0.0050		mg/kg	
			Benzo(b)fluoranthene	2017/10/02	<0.0050		mg/kg	
			Benzo(g,h,i)perylene	2017/10/02	<0.0050		mg/kg	
			Benzo(j)fluoranthene	2017/10/02	<0.0050		mg/kg	
			Benzo(k)fluoranthene	2017/10/02	<0.0050		mg/kg	
			Chrysene	2017/10/02	<0.0050		mg/kg	
			Dibenz(a,h)anthracene	2017/10/02	<0.0050		mg/kg	
			Fluoranthene	2017/10/02	<0.0050		mg/kg	
			Fluorene	2017/10/02	<0.0050		mg/kg	
			Indeno(1,2,3-cd)pyrene	2017/10/02	<0.0050		mg/kg	
			Naphthalene	2017/10/02	<0.0050		mg/kg	
			Perylene	2017/10/02	<0.0050		mg/kg	
			Phenanthrene	2017/10/02	<0.0050		mg/kg	
			Pyrene	2017/10/02	<0.0050		mg/kg	
5182235	GTH	RPD - Sample/Sample Dup	1-Methylnaphthalene	2017/10/02	NC		%	50
			2-Methylnaphthalene	2017/10/02	NC		%	50
			Acenaphthene	2017/10/02	NC		%	50
			Acenaphthylene	2017/10/02	NC		%	50
			Anthracene	2017/10/02	NC		%	50
			Benzo(a)anthracene	2017/10/02	NC		%	50
			Benzo(a)pyrene	2017/10/02	NC		%	50
			Benzo(b)fluoranthene	2017/10/02	NC		%	50
			Benzo(g,h,i)perylene	2017/10/02	NC		%	50
			Benzo(j)fluoranthene	2017/10/02	NC		%	50
			Benzo(k)fluoranthene	2017/10/02	NC		%	50
			Chrysene	2017/10/02	NC		%	50
			Dibenz(a,h)anthracene	2017/10/02	NC		%	50
			Fluoranthene	2017/10/02	NC		%	50
			Fluorene	2017/10/02	NC		%	50
			Indeno(1,2,3-cd)pyrene	2017/10/02	NC		%	50
			Naphthalene	2017/10/02	NC		%	50
			Perylene	2017/10/02	NC		%	50
			Phenanthrene	2017/10/02	NC		%	50
			Pyrene	2017/10/02	NC		%	50
5184265	BAN	Matrix Spike(FEE507)	Acid Extractable Antimony (Sb)	2017/09/27		97	%	75 - 125
			Acid Extractable Arsenic (As)	2017/09/27		100	%	75 - 125
			Acid Extractable Barium (Ba)	2017/09/27		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2017/09/27		103	%	75 - 125
			Acid Extractable Bismuth (Bi)	2017/09/27		104	%	75 - 125
			Acid Extractable Boron (B)	2017/09/27		101	%	75 - 125
			Acid Extractable Cadmium (Cd)	2017/09/27		101	%	75 - 125
			Acid Extractable Chromium (Cr)	2017/09/27		77	%	75 - 125
			Acid Extractable Cobalt (Co)	2017/09/27		97	%	75 - 125
			Acid Extractable Copper (Cu)	2017/09/27		84	%	75 - 125
			Acid Extractable Lead (Pb)	2017/09/27		80	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Acid Extractable Lithium (Li)	2017/09/27		95	%	75 - 125
			Acid Extractable Manganese (Mn)	2017/09/27		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2017/09/27		97	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2017/09/27		98	%	75 - 125
			Acid Extractable Nickel (Ni)	2017/09/27		94	%	75 - 125
			Acid Extractable Rubidium (Rb)	2017/09/27		97	%	75 - 125
			Acid Extractable Selenium (Se)	2017/09/27		103	%	75 - 125
			Acid Extractable Silver (Ag)	2017/09/27		102	%	75 - 125
			Acid Extractable Strontium (Sr)	2017/09/27		101	%	75 - 125
			Acid Extractable Thallium (Tl)	2017/09/27		102	%	75 - 125
			Acid Extractable Tin (Sn)	2017/09/27		93	%	75 - 125
			Acid Extractable Uranium (U)	2017/09/27		103	%	75 - 125
			Acid Extractable Vanadium (V)	2017/09/27		67 (1)	%	75 - 125
			Acid Extractable Zinc (Zn)	2017/09/27		NC	%	75 - 125
5184265	BAN	Spiked Blank	Acid Extractable Antimony (Sb)	2017/09/27		100	%	75 - 125
			Acid Extractable Arsenic (As)	2017/09/27		102	%	75 - 125
			Acid Extractable Barium (Ba)	2017/09/27		102	%	75 - 125
			Acid Extractable Beryllium (Be)	2017/09/27		103	%	75 - 125
			Acid Extractable Bismuth (Bi)	2017/09/27		106	%	75 - 125
			Acid Extractable Boron (B)	2017/09/27		104	%	75 - 125
			Acid Extractable Cadmium (Cd)	2017/09/27		101	%	75 - 125
			Acid Extractable Chromium (Cr)	2017/09/27		100	%	75 - 125
			Acid Extractable Cobalt (Co)	2017/09/27		101	%	75 - 125
			Acid Extractable Copper (Cu)	2017/09/27		101	%	75 - 125
			Acid Extractable Lead (Pb)	2017/09/27		104	%	75 - 125
			Acid Extractable Lithium (Li)	2017/09/27		105	%	75 - 125
			Acid Extractable Manganese (Mn)	2017/09/27		102	%	75 - 125
			Acid Extractable Mercury (Hg)	2017/09/27		105	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2017/09/27		98	%	75 - 125
			Acid Extractable Nickel (Ni)	2017/09/27		103	%	75 - 125
			Acid Extractable Rubidium (Rb)	2017/09/27		101	%	75 - 125
			Acid Extractable Selenium (Se)	2017/09/27		104	%	75 - 125
			Acid Extractable Silver (Ag)	2017/09/27		101	%	75 - 125
			Acid Extractable Strontium (Sr)	2017/09/27		101	%	75 - 125
			Acid Extractable Thallium (Tl)	2017/09/27		105	%	75 - 125
			Acid Extractable Tin (Sn)	2017/09/27		105	%	75 - 125
			Acid Extractable Uranium (U)	2017/09/27		107	%	75 - 125
			Acid Extractable Vanadium (V)	2017/09/27		101	%	75 - 125
			Acid Extractable Zinc (Zn)	2017/09/27		101	%	75 - 125
5184265	BAN	Method Blank	Acid Extractable Aluminum (Al)	2017/09/27	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2017/09/27	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2017/09/27	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2017/09/27	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2017/09/27	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2017/09/27	<2.0		mg/kg	
			Acid Extractable Boron (B)	2017/09/27	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2017/09/27	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2017/09/27	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2017/09/27	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2017/09/27	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2017/09/27	<50		mg/kg	
			Acid Extractable Lead (Pb)	2017/09/27	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2017/09/27	<2.0		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Acid Extractable Manganese (Mn)	2017/09/27	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2017/09/27	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2017/09/27	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2017/09/27	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2017/09/27	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2017/09/27	<1.0		mg/kg	
			Acid Extractable Silver (Ag)	2017/09/27	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2017/09/27	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2017/09/27	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2017/09/27	<2.0		mg/kg	
			Acid Extractable Uranium (U)	2017/09/27	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2017/09/27	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2017/09/27	<5.0		mg/kg	
5184265	BAN	RPD - Sample/Sample Dup	Acid Extractable Aluminum (Al)	2017/09/27	13		%	35
			Acid Extractable Antimony (Sb)	2017/09/27	NC		%	35
			Acid Extractable Arsenic (As)	2017/09/27	NC		%	35
			Acid Extractable Barium (Ba)	2017/09/27	36 (2)		%	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	41 (2)		%	35
			Acid Extractable Cobalt (Co)	2017/09/27	20		%	35
			Acid Extractable Copper (Cu)	2017/09/27	15		%	35
			Acid Extractable Iron (Fe)	2017/09/27	14		%	35
			Acid Extractable Lead (Pb)	2017/09/27	9.3		%	35
			Acid Extractable Lithium (Li)	2017/09/27	9.7		%	35
			Acid Extractable Manganese (Mn)	2017/09/27	6.4		%	35
			Acid Extractable Mercury (Hg)	2017/09/27	NC		%	35
			Acid Extractable Molybdenum (Mo)	2017/09/27	NC		%	35
			Acid Extractable Nickel (Ni)	2017/09/27	25		%	35
			Acid Extractable Rubidium (Rb)	2017/09/27	12		%	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	16		%	35
			Acid Extractable Thallium (Tl)	2017/09/27	16		%	35
			Acid Extractable Tin (Sn)	2017/09/27	NC		%	35
			Acid Extractable Uranium (U)	2017/09/27	7.7		%	35
			Acid Extractable Vanadium (V)	2017/09/27	22		%	35
			Acid Extractable Zinc (Zn)	2017/09/27	9.0		%	35
5184651	BAN	Matrix Spike	Acid Extractable Antimony (Sb)	2017/09/28		92	%	75 - 125
			Acid Extractable Arsenic (As)	2017/09/28		100	%	75 - 125
			Acid Extractable Barium (Ba)	2017/09/28		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2017/09/28		106	%	75 - 125
			Acid Extractable Bismuth (Bi)	2017/09/28		102	%	75 - 125
			Acid Extractable Boron (B)	2017/09/28		105	%	75 - 125
			Acid Extractable Cadmium (Cd)	2017/09/28		102	%	75 - 125
			Acid Extractable Chromium (Cr)	2017/09/28		100	%	75 - 125
			Acid Extractable Cobalt (Co)	2017/09/28		100	%	75 - 125
			Acid Extractable Copper (Cu)	2017/09/28		99	%	75 - 125
			Acid Extractable Lead (Pb)	2017/09/28		100	%	75 - 125
			Acid Extractable Lithium (Li)	2017/09/28		104	%	75 - 125
			Acid Extractable Manganese (Mn)	2017/09/28		NC	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Acid Extractable Mercury (Hg)	2017/09/28		99	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2017/09/28		104	%	75 - 125
			Acid Extractable Nickel (Ni)	2017/09/28		97	%	75 - 125
			Acid Extractable Rubidium (Rb)	2017/09/28		98	%	75 - 125
			Acid Extractable Selenium (Se)	2017/09/28		102	%	75 - 125
			Acid Extractable Silver (Ag)	2017/09/28		103	%	75 - 125
			Acid Extractable Strontium (Sr)	2017/09/28		NC	%	75 - 125
			Acid Extractable Thallium (Tl)	2017/09/28		101	%	75 - 125
			Acid Extractable Tin (Sn)	2017/09/28		103	%	75 - 125
			Acid Extractable Uranium (U)	2017/09/28		105	%	75 - 125
			Acid Extractable Vanadium (V)	2017/09/28		101	%	75 - 125
			Acid Extractable Zinc (Zn)	2017/09/28		NC	%	75 - 125
5184651	BAN	Spiked Blank	Acid Extractable Antimony (Sb)	2017/09/28		100	%	75 - 125
			Acid Extractable Arsenic (As)	2017/09/28		99	%	75 - 125
			Acid Extractable Barium (Ba)	2017/09/28		97	%	75 - 125
			Acid Extractable Beryllium (Be)	2017/09/28		102	%	75 - 125
			Acid Extractable Bismuth (Bi)	2017/09/28		100	%	75 - 125
			Acid Extractable Boron (B)	2017/09/28		103	%	75 - 125
			Acid Extractable Cadmium (Cd)	2017/09/28		101	%	75 - 125
			Acid Extractable Chromium (Cr)	2017/09/28		98	%	75 - 125
			Acid Extractable Cobalt (Co)	2017/09/28		99	%	75 - 125
			Acid Extractable Copper (Cu)	2017/09/28		99	%	75 - 125
			Acid Extractable Lead (Pb)	2017/09/28		99	%	75 - 125
			Acid Extractable Lithium (Li)	2017/09/28		103	%	75 - 125
			Acid Extractable Manganese (Mn)	2017/09/28		98	%	75 - 125
			Acid Extractable Mercury (Hg)	2017/09/28		102	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2017/09/28		103	%	75 - 125
			Acid Extractable Nickel (Ni)	2017/09/28		99	%	75 - 125
			Acid Extractable Rubidium (Rb)	2017/09/28		101	%	75 - 125
			Acid Extractable Selenium (Se)	2017/09/28		104	%	75 - 125
			Acid Extractable Silver (Ag)	2017/09/28		100	%	75 - 125
			Acid Extractable Strontium (Sr)	2017/09/28		101	%	75 - 125
			Acid Extractable Thallium (Tl)	2017/09/28		101	%	75 - 125
			Acid Extractable Tin (Sn)	2017/09/28		100	%	75 - 125
			Acid Extractable Uranium (U)	2017/09/28		103	%	75 - 125
			Acid Extractable Vanadium (V)	2017/09/28		97	%	75 - 125
			Acid Extractable Zinc (Zn)	2017/09/28		105	%	75 - 125
5184651	BAN	Method Blank	Acid Extractable Aluminum (Al)	2017/09/28	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2017/09/28	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Boron (B)	2017/09/28	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2017/09/28	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2017/09/28	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2017/09/28	<50		mg/kg	
			Acid Extractable Lead (Pb)	2017/09/28	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2017/09/28	<0.10		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Acid Extractable Molybdenum (Mo)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2017/09/28	<1.0		mg/kg	
			Acid Extractable Silver (Ag)	2017/09/28	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2017/09/28	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2017/09/28	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Uranium (U)	2017/09/28	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2017/09/28	<5.0		mg/kg	
5184651	BAN	RPD - Sample/Sample Dup	Acid Extractable Aluminum (Al)	2017/09/28	0.57		%	35
			Acid Extractable Antimony (Sb)	2017/09/28	NC		%	35
			Acid Extractable Arsenic (As)	2017/09/28	0.24		%	35
			Acid Extractable Barium (Ba)	2017/09/28	3.1		%	35
			Acid Extractable Beryllium (Be)	2017/09/28	NC		%	35
			Acid Extractable Bismuth (Bi)	2017/09/28	NC		%	35
			Acid Extractable Boron (B)	2017/09/28	NC		%	35
			Acid Extractable Cadmium (Cd)	2017/09/28	NC		%	35
			Acid Extractable Chromium (Cr)	2017/09/28	1.2		%	35
			Acid Extractable Cobalt (Co)	2017/09/28	1.5		%	35
			Acid Extractable Copper (Cu)	2017/09/28	0.44		%	35
			Acid Extractable Iron (Fe)	2017/09/28	0.71		%	35
			Acid Extractable Lead (Pb)	2017/09/28	0.84		%	35
			Acid Extractable Lithium (Li)	2017/09/28	1.4		%	35
			Acid Extractable Manganese (Mn)	2017/09/28	0.31		%	35
			Acid Extractable Mercury (Hg)	2017/09/28	NC		%	35
			Acid Extractable Molybdenum (Mo)	2017/09/28	NC		%	35
			Acid Extractable Nickel (Ni)	2017/09/28	4.1		%	35
			Acid Extractable Rubidium (Rb)	2017/09/28	2.2		%	35
			Acid Extractable Selenium (Se)	2017/09/28	NC		%	35
			Acid Extractable Silver (Ag)	2017/09/28	NC		%	35
			Acid Extractable Strontium (Sr)	2017/09/28	0.87		%	35
			Acid Extractable Thallium (Tl)	2017/09/28	1.8		%	35
			Acid Extractable Tin (Sn)	2017/09/28	NC		%	35
			Acid Extractable Uranium (U)	2017/09/28	0.014		%	35
			Acid Extractable Vanadium (V)	2017/09/28	0.72		%	35
			Acid Extractable Zinc (Zn)	2017/09/28	2.3		%	35
5186437	BAN	Matrix Spike(FEE538)	Acid Extractable Antimony (Sb)	2017/09/29		103	%	75 - 125
			Acid Extractable Arsenic (As)	2017/09/29		100	%	75 - 125
			Acid Extractable Barium (Ba)	2017/09/29		111	%	75 - 125
			Acid Extractable Beryllium (Be)	2017/09/29		103	%	75 - 125
			Acid Extractable Bismuth (Bi)	2017/09/29		105	%	75 - 125
			Acid Extractable Boron (B)	2017/09/29		101	%	75 - 125
			Acid Extractable Cadmium (Cd)	2017/09/29		100	%	75 - 125
			Acid Extractable Chromium (Cr)	2017/09/29		101	%	75 - 125
			Acid Extractable Cobalt (Co)	2017/09/29		100	%	75 - 125
			Acid Extractable Copper (Cu)	2017/09/29		97	%	75 - 125
			Acid Extractable Lead (Pb)	2017/09/29		99	%	75 - 125
			Acid Extractable Lithium (Li)	2017/09/29		103	%	75 - 125
			Acid Extractable Manganese (Mn)	2017/09/29		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2017/09/29		101	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2017/09/29		105	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Acid Extractable Nickel (Ni)	2017/09/29		99	%	75 - 125
			Acid Extractable Rubidium (Rb)	2017/09/29		104	%	75 - 125
			Acid Extractable Selenium (Se)	2017/09/29		103	%	75 - 125
			Acid Extractable Silver (Ag)	2017/09/29		103	%	75 - 125
			Acid Extractable Strontium (Sr)	2017/09/29		107	%	75 - 125
			Acid Extractable Thallium (Tl)	2017/09/29		107	%	75 - 125
			Acid Extractable Tin (Sn)	2017/09/29		104	%	75 - 125
			Acid Extractable Uranium (U)	2017/09/29		100	%	75 - 125
			Acid Extractable Vanadium (V)	2017/09/29		99	%	75 - 125
			Acid Extractable Zinc (Zn)	2017/09/29		97	%	75 - 125
5186437	BAN	Spiked Blank	Acid Extractable Antimony (Sb)	2017/09/28		102	%	75 - 125
			Acid Extractable Arsenic (As)	2017/09/28		98	%	75 - 125
			Acid Extractable Barium (Ba)	2017/09/28		100	%	75 - 125
			Acid Extractable Beryllium (Be)	2017/09/28		101	%	75 - 125
			Acid Extractable Bismuth (Bi)	2017/09/28		99	%	75 - 125
			Acid Extractable Boron (B)	2017/09/28		100	%	75 - 125
			Acid Extractable Cadmium (Cd)	2017/09/28		98	%	75 - 125
			Acid Extractable Chromium (Cr)	2017/09/28		97	%	75 - 125
			Acid Extractable Cobalt (Co)	2017/09/28		96	%	75 - 125
			Acid Extractable Copper (Cu)	2017/09/28		94	%	75 - 125
			Acid Extractable Lead (Pb)	2017/09/28		96	%	75 - 125
			Acid Extractable Lithium (Li)	2017/09/28		100	%	75 - 125
			Acid Extractable Manganese (Mn)	2017/09/28		101	%	75 - 125
			Acid Extractable Mercury (Hg)	2017/09/28		101	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2017/09/28		106	%	75 - 125
			Acid Extractable Nickel (Ni)	2017/09/28		98	%	75 - 125
			Acid Extractable Rubidium (Rb)	2017/09/28		104	%	75 - 125
			Acid Extractable Selenium (Se)	2017/09/28		101	%	75 - 125
			Acid Extractable Silver (Ag)	2017/09/28		100	%	75 - 125
			Acid Extractable Strontium (Sr)	2017/09/28		100	%	75 - 125
			Acid Extractable Thallium (Tl)	2017/09/28		103	%	75 - 125
			Acid Extractable Tin (Sn)	2017/09/28		101	%	75 - 125
			Acid Extractable Uranium (U)	2017/09/28		97	%	75 - 125
			Acid Extractable Vanadium (V)	2017/09/28		96	%	75 - 125
			Acid Extractable Zinc (Zn)	2017/09/28		98	%	75 - 125
5186437	BAN	Method Blank	Acid Extractable Aluminum (Al)	2017/09/28	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2017/09/28	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Boron (B)	2017/09/28	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2017/09/28	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2017/09/28	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2017/09/28	<50		mg/kg	
			Acid Extractable Lead (Pb)	2017/09/28	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2017/09/28	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2017/09/28	<2.0		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Acid Extractable Rubidium (Rb)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2017/09/28	<1.0		mg/kg	
			Acid Extractable Silver (Ag)	2017/09/28	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2017/09/28	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2017/09/28	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Uranium (U)	2017/09/28	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2017/09/28	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2017/09/28	<5.0		mg/kg	
5186437	BAN	RPD - Sample/Sample Dup	Acid Extractable Aluminum (Al)	2017/09/29	2.0		%	35
			Acid Extractable Antimony (Sb)	2017/09/29	NC		%	35
			Acid Extractable Arsenic (As)	2017/09/29	NC		%	35
			Acid Extractable Barium (Ba)	2017/09/29	7.7		%	35
			Acid Extractable Beryllium (Be)	2017/09/29	NC		%	35
			Acid Extractable Bismuth (Bi)	2017/09/29	NC		%	35
			Acid Extractable Boron (B)	2017/09/29	NC		%	35
			Acid Extractable Cadmium (Cd)	2017/09/29	NC		%	35
			Acid Extractable Chromium (Cr)	2017/09/29	4.1		%	35
			Acid Extractable Cobalt (Co)	2017/09/29	3.9		%	35
			Acid Extractable Copper (Cu)	2017/09/29	15		%	35
			Acid Extractable Iron (Fe)	2017/09/29	2.9		%	35
			Acid Extractable Lead (Pb)	2017/09/29	20		%	35
			Acid Extractable Lithium (Li)	2017/09/29	15		%	35
			Acid Extractable Manganese (Mn)	2017/09/29	4.5		%	35
			Acid Extractable Mercury (Hg)	2017/09/29	NC		%	35
			Acid Extractable Molybdenum (Mo)	2017/09/29	NC		%	35
			Acid Extractable Nickel (Ni)	2017/09/29	1.5		%	35
			Acid Extractable Rubidium (Rb)	2017/09/29	24		%	35
			Acid Extractable Selenium (Se)	2017/09/29	NC		%	35
			Acid Extractable Silver (Ag)	2017/09/29	NC		%	35
			Acid Extractable Strontium (Sr)	2017/09/29	6.2		%	35
			Acid Extractable Thallium (Tl)	2017/09/29	NC		%	35
			Acid Extractable Tin (Sn)	2017/09/29	NC		%	35
			Acid Extractable Uranium (U)	2017/09/29	3.8		%	35
			Acid Extractable Vanadium (V)	2017/09/29	8.1		%	35
			Acid Extractable Zinc (Zn)	2017/09/29	9.5		%	35
5191083	MAK	Matrix Spike	2,4,5,6-Tetrachloro-m-xylene	2017/10/01		79	%	50 - 130
			Decachlorobiphenyl	2017/10/01		105	%	50 - 130
			Aldrin	2017/10/01		86	%	50 - 130
			a-Chlordane	2017/10/01		95	%	50 - 130
			g-Chlordane	2017/10/01		91	%	50 - 130
			o,p-DDD	2017/10/01		109	%	50 - 130
			p,p-DDD	2017/10/01		113	%	50 - 130
			o,p-DDE	2017/10/01		104	%	50 - 130
			p,p-DDE	2017/10/01		117	%	50 - 130
			o,p-DDT	2017/10/01		87	%	50 - 130
			p,p-DDT	2017/10/01		112	%	50 - 130
			Dieldrin	2017/10/01		105	%	50 - 130
			Lindane	2017/10/01		98	%	50 - 130
			Endosulfan I (alpha)	2017/10/01		89	%	50 - 130
			Endosulfan II (beta)	2017/10/01		95	%	50 - 130
			Endrin	2017/10/01		110	%	50 - 130
			Heptachlor	2017/10/01		94	%	50 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Heptachlor epoxide	2017/10/01		95	%	50 - 130
			Hexachlorobenzene	2017/10/01		89	%	50 - 130
			Methoxychlor	2017/10/01		122	%	50 - 130
			alpha-BHC	2017/10/01		90	%	30 - 130
			beta-BHC	2017/10/01		105	%	30 - 130
			delta-BHC	2017/10/01		106	%	30 - 130
			Endosulfan sulfate	2017/10/01		119	%	30 - 130
			Endrin aldehyde	2017/10/01		98	%	30 - 130
			Endrin ketone	2017/10/01		105	%	30 - 130
			Mirex	2017/10/01		97	%	30 - 130
			Octachlorostyrene	2017/10/01		95	%	30 - 130
			Toxaphene	2017/10/01		115	%	30 - 130
5191083	MAK	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2017/10/01		80	%	50 - 130
			Decachlorobiphenyl	2017/10/01		137 (3)	%	50 - 130
			Aldrin	2017/10/01		97	%	50 - 130
			a-Chlordane	2017/10/01		111	%	50 - 130
			g-Chlordane	2017/10/01		99	%	50 - 130
			o,p-DDD	2017/10/01		118	%	50 - 130
			p,p-DDD	2017/10/01		112	%	50 - 130
			o,p-DDE	2017/10/01		107	%	50 - 130
			p,p-DDE	2017/10/01		128	%	50 - 130
			o,p-DDT	2017/10/01		117	%	50 - 130
			p,p-DDT	2017/10/01		115	%	50 - 130
			Dieldrin	2017/10/01		84	%	50 - 130
			Lindane	2017/10/01		90	%	50 - 130
			Endosulfan I (alpha)	2017/10/01		67	%	50 - 130
			Endosulfan II (beta)	2017/10/01		71	%	50 - 130
			Endrin	2017/10/01		84	%	50 - 130
			Heptachlor	2017/10/01		100	%	50 - 130
			Heptachlor epoxide	2017/10/01		73	%	50 - 130
			Hexachlorobenzene	2017/10/01		94	%	50 - 130
			Methoxychlor	2017/10/01		85	%	50 - 130
			alpha-BHC	2017/10/01		96	%	30 - 130
			beta-BHC	2017/10/01		79	%	30 - 130
			delta-BHC	2017/10/01		77	%	30 - 130
			Endosulfan sulfate	2017/10/01		87	%	30 - 130
			Endrin aldehyde	2017/10/01		78	%	30 - 130
			Endrin ketone	2017/10/01		77	%	30 - 130
			Mirex	2017/10/01		116	%	30 - 130
			Octachlorostyrene	2017/10/01		108	%	30 - 130
5191083	MAK	Spiked Blank DUP	2,4,5,6-Tetrachloro-m-xylene	2017/10/01		81	%	50 - 130
			Decachlorobiphenyl	2017/10/01		114	%	50 - 130
			Aroclor 1242	2017/10/01		97	%	60 - 130
			Toxaphene	2017/10/01		126	%	30 - 130
5191083	MAK	RPD	Aroclor 1242	2017/10/01	NC		%	40
			Toxaphene	2017/10/01	NC		%	50
5191083	MAK	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2017/10/01		77	%	50 - 130
			Decachlorobiphenyl	2017/10/01		101	%	50 - 130
			Aldrin	2017/10/01	<0.0020		ug/g	
			a-Chlordane	2017/10/01	<0.0020		ug/g	
			g-Chlordane	2017/10/01	<0.0020		ug/g	
			o,p-DDD	2017/10/01	<0.0020		ug/g	
			p,p-DDD	2017/10/01	<0.0020		ug/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			o,p-DDE	2017/10/01	<0.0020		ug/g	
			p,p-DDE	2017/10/01	<0.0020		ug/g	
			o,p-DDT	2017/10/01	<0.0020		ug/g	
			p,p-DDT	2017/10/01	<0.0020		ug/g	
			Dieldrin	2017/10/01	<0.0020		ug/g	
			Lindane	2017/10/01	<0.0020		ug/g	
			Endosulfan I (alpha)	2017/10/01	<0.0020		ug/g	
			Endosulfan II (beta)	2017/10/01	<0.0020		ug/g	
			Endrin	2017/10/01	<0.0020		ug/g	
			Heptachlor	2017/10/01	<0.0020		ug/g	
			Heptachlor epoxide	2017/10/01	<0.0020		ug/g	
			Hexachlorobenzene	2017/10/01	<0.0020		ug/g	
			Methoxychlor	2017/10/01	<0.0050		ug/g	
			Aroclor 1016	2017/10/01	<0.015		ug/g	
			Aroclor 1221	2017/10/01	<0.015		ug/g	
			Aroclor 1232	2017/10/01	<0.015		ug/g	
			Aroclor 1242	2017/10/01	<0.015		ug/g	
			Aroclor 1248	2017/10/01	<0.015		ug/g	
			Aroclor 1254	2017/10/01	<0.015		ug/g	
			Aroclor 1260	2017/10/01	<0.015		ug/g	
			Aroclor 1262	2017/10/01	<0.015		ug/g	
			Aroclor 1268	2017/10/01	<0.015		ug/g	
			alpha-BHC	2017/10/01	<0.0020		ug/g	
			beta-BHC	2017/10/01	<0.0020		ug/g	
			delta-BHC	2017/10/01	<0.0020		ug/g	
			Endosulfan sulfate	2017/10/01	<0.0020		ug/g	
			Endrin aldehyde	2017/10/01	<0.0020		ug/g	
			Endrin ketone	2017/10/01	<0.0020		ug/g	
			Mirex	2017/10/01	<0.0020		ug/g	
			Octachlorostyrene	2017/10/01	<0.0020		ug/g	
			Toxaphene	2017/10/01	<0.080		ug/g	
5191083	MAK	RPD - Sample/Sample Dup	Aldrin	2017/10/01	NC		%	40
			a-Chlordane	2017/10/01	NC		%	40
			g-Chlordane	2017/10/01	NC		%	40
			o,p-DDD	2017/10/01	NC		%	40
			p,p-DDD	2017/10/01	NC		%	40
			o,p-DDE	2017/10/01	NC		%	40
			p,p-DDE	2017/10/01	NC		%	40
			o,p-DDT	2017/10/01	NC		%	40
			p,p-DDT	2017/10/01	NC		%	40
			Dieldrin	2017/10/01	NC		%	40
			Lindane	2017/10/01	NC		%	40
			Endosulfan I (alpha)	2017/10/01	NC		%	40
			Endosulfan II (beta)	2017/10/01	NC		%	40
			Endrin	2017/10/01	NC		%	40
			Heptachlor	2017/10/01	NC		%	40
			Heptachlor epoxide	2017/10/01	NC		%	40
			Hexachlorobenzene	2017/10/01	NC		%	40
			Methoxychlor	2017/10/01	NC		%	40
			Aroclor 1016	2017/10/01	NC		%	40
			Aroclor 1221	2017/10/01	NC		%	40
			Aroclor 1232	2017/10/01	NC		%	40
			Aroclor 1242	2017/10/01	NC		%	40

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Aroclor 1248	2017/10/01	NC		%	40
			Aroclor 1254	2017/10/01	NC		%	40
			Aroclor 1260	2017/10/01	NC		%	40
			Aroclor 1262	2017/10/01	NC		%	40
			Aroclor 1268	2017/10/01	NC		%	40
			alpha-BHC	2017/10/01	NC		%	50
			beta-BHC	2017/10/01	NC		%	50
			delta-BHC	2017/10/01	NC		%	50
			Endosulfan sulfate	2017/10/01	NC		%	50
			Endrin aldehyde	2017/10/01	NC		%	50
			Endrin ketone	2017/10/01	NC		%	50
			Mirex	2017/10/01	NC		%	50
			Octachlorostyrene	2017/10/01	NC		%	50
			Toxaphene	2017/10/01	NC		%	50
5191385	MYI	Spiked Blank	2-Fluorobiphenyl	2017/10/02		91	%	30 - 130
			Bendiocarb	2017/10/02		80	%	30 - 130
			D14-Terphenyl (FS)	2017/10/02		93	%	30 - 130
			D5-Nitrobenzene	2017/10/02		91	%	30 - 130
			Dimethoate	2017/10/02		89	%	30 - 130
			Fenchlorphos (Ronnel)	2017/10/02		94	%	30 - 130
			Fonofos	2017/10/02		96	%	30 - 130
			Metolachlor	2017/10/02		98	%	30 - 130
			Mevinphos	2017/10/02		82	%	30 - 130
			Triallate	2017/10/02		94	%	30 - 130
			Trifluralin	2017/10/02		84	%	30 - 130
			Demeton-S	2017/10/02		85	%	30 - 130
			Dichlorvos	2017/10/02		89	%	30 - 130
			Phosmet	2017/10/02		73	%	30 - 130
			Fenthion	2017/10/02		86	%	30 - 130
			Ethion	2017/10/02		86	%	30 - 130
			Guthion (Azinphos-methyl)	2017/10/02		79	%	30 - 130
			Phorate	2017/10/02		88	%	30 - 130
			Terbufos	2017/10/02		86	%	30 - 130
			Aldicarb	2017/10/02		90	%	30 - 130
			Atrazine	2017/10/02		93	%	30 - 130
			Carbaryl	2017/10/02		66	%	30 - 130
			Carbofuran	2017/10/02		81	%	30 - 130
			Cyanazine (Bladex)	2017/10/02		90	%	30 - 130
			Diazinon	2017/10/02		91	%	30 - 130
			Parathion Ethyl	2017/10/02		89	%	30 - 130
			Parathion Methyl	2017/10/02		85	%	30 - 130
			Prometryne	2017/10/02		90	%	30 - 130
			Malathion	2017/10/02		91	%	30 - 130
			Simazine	2017/10/02		81	%	30 - 130
			Chlorpyrifos (Dursban)	2017/10/02		98	%	30 - 130
5191385	MYI	Spiked Blank DUP	2-Fluorobiphenyl	2017/10/02		92	%	30 - 130
			Bendiocarb	2017/10/02		81	%	30 - 130
			D14-Terphenyl (FS)	2017/10/02		91	%	30 - 130
			D5-Nitrobenzene	2017/10/02		92	%	30 - 130
			Dimethoate	2017/10/02		89	%	30 - 130
			Fenchlorphos (Ronnel)	2017/10/02		95	%	30 - 130
			Fonofos	2017/10/02		97	%	30 - 130
			Metolachlor	2017/10/02		98	%	30 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Mevinphos	2017/10/02		82	%	30 - 130
			Triallate	2017/10/02		95	%	30 - 130
			Trifluralin	2017/10/02		85	%	30 - 130
			Demeton-S	2017/10/02		86	%	30 - 130
			Dichlorvos	2017/10/02		90	%	30 - 130
			Phosmet	2017/10/02		72	%	30 - 130
			Fenthion	2017/10/02		87	%	30 - 130
			Ethion	2017/10/02		86	%	30 - 130
			Guthion (Azinphos-methyl)	2017/10/02		80	%	30 - 130
			Phorate	2017/10/02		89	%	30 - 130
			Terbufos	2017/10/02		87	%	30 - 130
			Aldicarb	2017/10/02		89	%	30 - 130
			Atrazine	2017/10/02		93	%	30 - 130
			Carbaryl	2017/10/02		67	%	30 - 130
			Carbofuran	2017/10/02		82	%	30 - 130
			Cyanazine (Bladex)	2017/10/02		90	%	30 - 130
			Diazinon	2017/10/02		93	%	30 - 130
			Parathion Ethyl	2017/10/02		89	%	30 - 130
			Parathion Methyl	2017/10/02		85	%	30 - 130
			Prometryne	2017/10/02		89	%	30 - 130
			Malathion	2017/10/02		91	%	30 - 130
			Simazine	2017/10/02		81	%	30 - 130
			Chlorpyrifos (Dursban)	2017/10/02		98	%	30 - 130
5191385	MYI	RPD	Bendiocarb	2017/10/02	1.7		%	40
			Dimethoate	2017/10/02	0.18		%	50
			Fenchlorphos (Ronnel)	2017/10/02	0.74		%	50
			Fonofos	2017/10/02	1.3		%	50
			Metolachlor	2017/10/02	0.18		%	50
			Mevinphos	2017/10/02	0.22		%	50
			Triallate	2017/10/02	0.91		%	50
			Trifluralin	2017/10/02	1.3		%	50
			Demeton-S	2017/10/02	1.1		%	50
			Dichlorvos	2017/10/02	0.91		%	50
			Phosmet	2017/10/02	1.4		%	50
			Fenthion	2017/10/02	0.30		%	50
			Ethion	2017/10/02	0.33		%	50
			Guthion (Azinphos-methyl)	2017/10/02	0.68		%	50
			Phorate	2017/10/02	0.86		%	50
			Terbufos	2017/10/02	1.6		%	50
			Aldicarb	2017/10/02	0.67		%	50
			Atrazine	2017/10/02	0.58		%	50
			Carbaryl	2017/10/02	2.2		%	50
			Carbofuran	2017/10/02	1.3		%	50
			Cyanazine (Bladex)	2017/10/02	0.066		%	50
			Diazinon	2017/10/02	1.3		%	50
			Parathion Ethyl	2017/10/02	0.70		%	50
			Parathion Methyl	2017/10/02	0.26		%	50
			Prometryne	2017/10/02	1.5		%	50
			Malathion	2017/10/02	0.044		%	50
			Simazine	2017/10/02	0		%	50
			Chlorpyrifos (Dursban)	2017/10/02	0.90		%	50
5191385	MYI	Method Blank	2-Fluorobiphenyl	2017/10/02		94	%	30 - 130
			Bendiocarb	2017/10/02	<5.0		ug/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D14-Terphenyl (FS)	2017/10/02		94	%	30 - 130
			D5-Nitrobenzene	2017/10/02		93	%	30 - 130
			Dimethoate	2017/10/02	<5.0		ug/g	
			Fenchlorphos (Ronnel)	2017/10/02	<5.0		ug/g	
			Fonofos	2017/10/02	<5.0		ug/g	
			Metolachlor	2017/10/02	<10		ug/g	
			Mevinphos	2017/10/02	<5.0		ug/g	
			Triallate	2017/10/02	<5.0		ug/g	
			Trifluralin	2017/10/02	<5.0		ug/g	
			Demeton-S	2017/10/02	<5.0		ug/g	
			Dichlorvos	2017/10/02	<5.0		ug/g	
			Phosmet	2017/10/02	<5.0		ug/g	
			Fenthion	2017/10/02	<5.0		ug/g	
			Ethion	2017/10/02	<5.0		ug/g	
			Guthion (Azinphos-methyl)	2017/10/02	<5.0		ug/g	
			Phorate	2017/10/02	<5.0		ug/g	
			Terbufos	2017/10/02	<5.0		ug/g	
			Aldicarb	2017/10/02	<5.0		ug/g	
			Atrazine	2017/10/02	<5.0		ug/g	
			Carbaryl	2017/10/02	<5.0		ug/g	
			Carbofuran	2017/10/02	<5.0		ug/g	
			Cyanazine (Bladex)	2017/10/02	<5.0		ug/g	
			Diazinon	2017/10/02	<5.0		ug/g	
			Parathion Ethyl	2017/10/02	<5.0		ug/g	
			Parathion Methyl	2017/10/02	<5.0		ug/g	
			Prometryne	2017/10/02	<5.0		ug/g	
			Malathion	2017/10/02	<5.0		ug/g	
			Simazine	2017/10/02	<5.0		ug/g	
			Chlorpyrifos (Dursban)	2017/10/02	<5.0		ug/g	
5191394	MYI	Spiked Blank	2,4,5-T	2017/10/02		112	%	10 - 130
			2,4,5-TP (Silvex)	2017/10/02		103	%	10 - 130
			2,4-D	2017/10/02		103	%	10 - 130
			2,4-D (BEE)	2017/10/02		112	%	10 - 130
			2,4-DB	2017/10/02		98	%	10 - 130
			2,4-Dichlorophenyl Acetic Acid	2017/10/02		82	%	10 - 130
			2,4-DP (Dichlorprop)	2017/10/02		95	%	10 - 130
			2,5-Dibromobenzoic Acid	2017/10/02		95	%	10 - 130
			4,4-Dibromobiphenyl	2017/10/02		96	%	10 - 130
			Dicamba	2017/10/02		95	%	10 - 130
			MCPA	2017/10/02		98	%	10 - 130
			MCPP	2017/10/02		106	%	10 - 130
			Picloram	2017/10/02		78	%	10 - 130
5191394	MYI	Spiked Blank DUP	2,4,5-T	2017/10/02		115	%	10 - 130
			2,4,5-TP (Silvex)	2017/10/02		105	%	10 - 130
			2,4-D	2017/10/02		104	%	10 - 130
			2,4-D (BEE)	2017/10/02		114	%	10 - 130
			2,4-DB	2017/10/02		99	%	10 - 130
			2,4-Dichlorophenyl Acetic Acid	2017/10/02		81	%	10 - 130
			2,4-DP (Dichlorprop)	2017/10/02		95	%	10 - 130
			2,5-Dibromobenzoic Acid	2017/10/02		95	%	10 - 130
			4,4-Dibromobiphenyl	2017/10/02		98	%	10 - 130
			Dicamba	2017/10/02		93	%	10 - 130
			MCPA	2017/10/02		99	%	10 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			MCPP	2017/10/02		106	%	10 - 130
			Picloram	2017/10/02		80	%	10 - 130
5191394	MYI	RPD	2,4,5-T	2017/10/02	2.0		%	50
			2,4,5-TP (Silvex)	2017/10/02	1.7		%	50
			2,4-D	2017/10/02	1.0		%	50
			2,4-D (BEE)	2017/10/02	1.8		%	50
			2,4-DB	2017/10/02	1.2		%	50
			2,4-DP (Dichlorprop)	2017/10/02	0.29		%	50
			Dicamba	2017/10/02	2.1		%	50
			MCPA	2017/10/02	1.6		%	50
			MCPP	2017/10/02	0.25		%	50
			Picloram	2017/10/02	2.7		%	50
5191394	MYI	Method Blank	2,4,5-T	2017/10/02	<0.10		ug/g	
			2,4,5-TP (Silvex)	2017/10/02	<0.10		ug/g	
			2,4-D	2017/10/02	<0.10		ug/g	
			2,4-D (BEE)	2017/10/02	<0.20		ug/g	
			2,4-DB	2017/10/02	<0.10		ug/g	
			2,4-Dichlorophenyl Acetic Acid	2017/10/02		83	%	10 - 130
			2,4-DP (Dichlorprop)	2017/10/02	<0.10		ug/g	
			2,5-Dibromobenzoic Acid	2017/10/02		94	%	10 - 130
			4,4-Dibromobiphenyl	2017/10/02		98	%	10 - 130
			Dicamba	2017/10/02	<0.20		ug/g	
			MCPA	2017/10/02	<0.20		ug/g	
			MCPP	2017/10/02	<0.20		ug/g	
			Picloram	2017/10/02	<0.20		ug/g	
5196177	OBC	Matrix Spike	C13-1234678 HeptaCDD	2017/10/09		92	%	30 - 130
			C13-1234678 HeptaCDF	2017/10/09		78	%	30 - 130
			C13-123678 HexaCDD	2017/10/09		87	%	30 - 130
			C13-123678 HexaCDF	2017/10/09		69	%	30 - 130
			C13-12378 PentaCDD	2017/10/09		95	%	30 - 130
			C13-12378 PentaCDF	2017/10/09		75	%	30 - 130
			C13-2378 TetraCDD	2017/10/09		86	%	30 - 130
			C13-2378 TetraCDF	2017/10/09		79	%	30 - 130
			C13-OCDD	2017/10/09		107	%	30 - 130
			2,3,7,8-Tetra CDD	2017/10/09		97	%	80 - 140
			1,2,3,7,8-Penta CDD	2017/10/09		96	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2017/10/09		103	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2017/10/09		102	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2017/10/09		102	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2017/10/09		98	%	80 - 140
			Octa CDD	2017/10/09		97	%	80 - 140
			2,3,7,8-Tetra CDF	2017/10/09		101	%	80 - 140
			1,2,3,7,8-Penta CDF	2017/10/09		101	%	80 - 140
			2,3,4,7,8-Penta CDF	2017/10/09		109	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2017/10/09		107	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2017/10/09		114	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2017/10/09		109	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2017/10/09		110	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2017/10/09		94	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2017/10/09		110	%	80 - 140
			Octa CDF	2017/10/09		90	%	80 - 140
5196177	OBC	Spiked Blank	C13-1234678 HeptaCDD	2017/10/08		94	%	30 - 130
			C13-1234678 HeptaCDF	2017/10/08		80	%	30 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123678 HexaCDD	2017/10/08		87	%	30 - 130
			C13-123678 HexaCDF	2017/10/08		71	%	30 - 130
			C13-12378 PentaCDD	2017/10/08		91	%	30 - 130
			C13-12378 PentaCDF	2017/10/08		81	%	30 - 130
			C13-2378 TetraCDD	2017/10/08		94	%	30 - 130
			C13-2378 TetraCDF	2017/10/08		80	%	30 - 130
			C13-OCDD	2017/10/08		110	%	30 - 130
			2,3,7,8-Tetra CDD	2017/10/08		92	%	80 - 140
			1,2,3,7,8-Penta CDD	2017/10/08		102	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2017/10/08		93	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2017/10/08		102	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2017/10/08		106	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2017/10/08		103	%	80 - 140
			Octa CDD	2017/10/08		99	%	80 - 140
			2,3,7,8-Tetra CDF	2017/10/08		100	%	80 - 140
			1,2,3,7,8-Penta CDF	2017/10/08		97	%	80 - 140
			2,3,4,7,8-Penta CDF	2017/10/08		99	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2017/10/08		99	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2017/10/08		107	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2017/10/08		104	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2017/10/08		105	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2017/10/08		97	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2017/10/08		108	%	80 - 140
			Octa CDF	2017/10/08		90	%	80 - 140
5196177	OBC	Spiked Blank DUP	C13-1234678 HeptaCDD	2017/10/08		95	%	30 - 130
			C13-1234678 HeptaCDF	2017/10/08		84	%	30 - 130
			C13-123678 HexaCDD	2017/10/08		96	%	30 - 130
			C13-123678 HexaCDF	2017/10/08		77	%	30 - 130
			C13-12378 PentaCDD	2017/10/08		99	%	30 - 130
			C13-12378 PentaCDF	2017/10/08		83	%	30 - 130
			C13-2378 TetraCDD	2017/10/08		94	%	30 - 130
			C13-2378 TetraCDF	2017/10/08		86	%	30 - 130
			C13-OCDD	2017/10/08		119	%	30 - 130
			2,3,7,8-Tetra CDD	2017/10/08		96	%	80 - 140
			1,2,3,7,8-Penta CDD	2017/10/08		98	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2017/10/08		90	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2017/10/08		106	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2017/10/08		99	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2017/10/08		103	%	80 - 140
			Octa CDD	2017/10/08		97	%	80 - 140
			2,3,7,8-Tetra CDF	2017/10/08		98	%	80 - 140
			1,2,3,7,8-Penta CDF	2017/10/08		103	%	80 - 140
			2,3,4,7,8-Penta CDF	2017/10/08		116	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2017/10/08		100	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2017/10/08		108	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2017/10/08		107	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2017/10/08		110	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2017/10/08		95	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2017/10/08		118	%	80 - 140
			Octa CDF	2017/10/08		91	%	80 - 140
5196177	OBC	RPD	2,3,7,8-Tetra CDD	2017/10/08	4.3		%	25
			1,2,3,7,8-Penta CDD	2017/10/08	4.0		%	25
			1,2,3,4,7,8-Hexa CDD	2017/10/08	3.3		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,6,7,8-Hexa CDD	2017/10/08	3.8		%	25
			1,2,3,7,8,9-Hexa CDD	2017/10/08	6.8		%	25
			1,2,3,4,6,7,8-Hepta CDD	2017/10/08	0		%	25
			Octa CDD	2017/10/08	2.0		%	25
			2,3,7,8-Tetra CDF	2017/10/08	2.0		%	25
			1,2,3,7,8-Penta CDF	2017/10/08	6.0		%	25
			2,3,4,7,8-Penta CDF	2017/10/08	16		%	25
			1,2,3,4,7,8-Hexa CDF	2017/10/08	1.0		%	25
			1,2,3,6,7,8-Hexa CDF	2017/10/08	0.93		%	25
			2,3,4,6,7,8-Hexa CDF	2017/10/08	2.8		%	25
			1,2,3,7,8,9-Hexa CDF	2017/10/08	4.7		%	25
			1,2,3,4,6,7,8-Hepta CDF	2017/10/08	2.1		%	25
			1,2,3,4,7,8,9-Hepta CDF	2017/10/08	8.8		%	25
			Octa CDF	2017/10/08	1.1		%	25
5196177	OBC	Method Blank	C13-1234678 HeptaCDD	2017/10/08		104	%	30 - 130
			C13-1234678 HeptaCDF	2017/10/08		79	%	30 - 130
			C13-123678 HexaCDD	2017/10/08		86	%	30 - 130
			C13-123678 HexaCDF	2017/10/08		71	%	30 - 130
			C13-12378 PentaCDD	2017/10/08		93	%	30 - 130
			C13-12378 PentaCDF	2017/10/08		82	%	30 - 130
			C13-2378 TetraCDD	2017/10/08		93	%	30 - 130
			C13-2378 TetraCDF	2017/10/08		86	%	30 - 130
			C13-OCDD	2017/10/08		102	%	30 - 130
			2,3,7,8-Tetra CDD	2017/10/08	<0.104, EDL=0.104		pg/g	
			1,2,3,7,8-Penta CDD	2017/10/08	<0.105, EDL=0.105		pg/g	
			1,2,3,4,7,8-Hexa CDD	2017/10/08	<0.0952, EDL=0.0952		pg/g	
			1,2,3,6,7,8-Hexa CDD	2017/10/08	<0.0932, EDL=0.0932		pg/g	
			1,2,3,7,8,9-Hexa CDD	2017/10/08	<0.0845, EDL=0.0845		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2017/10/08	<0.109, EDL=0.109 (4)		pg/g	
			Octa CDD	2017/10/08	1.88, EDL=0.102		pg/g	
			Total Tetra CDD	2017/10/08	<0.176, EDL=0.176 (4)		pg/g	
			Total Penta CDD	2017/10/08	<0.118, EDL=0.118 (4)		pg/g	
			Total Hexa CDD	2017/10/08	<0.199, EDL=0.199 (4)		pg/g	
			Total Hepta CDD	2017/10/08	<0.109, EDL=0.109 (4)		pg/g	
			2,3,7,8-Tetra CDF	2017/10/08	<0.104, EDL=0.104		pg/g	
			1,2,3,7,8-Penta CDF	2017/10/08	<0.118, EDL=0.118		pg/g	
			2,3,4,7,8-Penta CDF	2017/10/08	<0.118, EDL=0.118		pg/g	
			1,2,3,4,7,8-Hexa CDF	2017/10/08	<0.102, EDL=0.102		pg/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,6,7,8-Hexa CDF	2017/10/08	<0.0969, EDL=0.0969		pg/g	
			2,3,4,6,7,8-Hexa CDF	2017/10/08	<0.103, EDL=0.103		pg/g	
			1,2,3,7,8,9-Hexa CDF	2017/10/08	<0.111, EDL=0.111		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2017/10/08	<0.102, EDL=0.102		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2017/10/08	<0.141, EDL=0.141		pg/g	
			Octa CDF	2017/10/08	<0.117, EDL=0.117		pg/g	
			Total Tetra CDF	2017/10/08	<0.104, EDL=0.104		pg/g	
			Total Penta CDF	2017/10/08	<0.118, EDL=0.118		pg/g	
			Total Hexa CDF	2017/10/08	<0.103, EDL=0.103		pg/g	
			Total Hepta CDF	2017/10/08	<0.119, EDL=0.119		pg/g	
5196177	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2017/10/08	NC		%	25
			1,2,3,7,8-Penta CDD	2017/10/08	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2017/10/08	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2017/10/08	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2017/10/08	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2017/10/08	NC		%	25
			Octa CDD	2017/10/08	NC		%	25
			Total Tetra CDD	2017/10/08	NC (4)		%	25
			Total Penta CDD	2017/10/08	NC (4)		%	25
			Total Hexa CDD	2017/10/08	NC		%	25
			Total Hepta CDD	2017/10/08	1.1		%	25
			2,3,7,8-Tetra CDF	2017/10/08	NC		%	25
			1,2,3,7,8-Penta CDF	2017/10/08	NC		%	25
			2,3,4,7,8-Penta CDF	2017/10/08	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2017/10/08	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2017/10/08	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2017/10/08	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2017/10/08	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2017/10/08	NC		%	25
			1,2,3,4,7,8,9-Hepta CDF	2017/10/08	NC		%	25
			Octa CDF	2017/10/08	NC (4)		%	25
			Total Tetra CDF	2017/10/08	NC		%	25
			Total Penta CDF	2017/10/08	NC		%	25
			Total Hexa CDF	2017/10/08	NC		%	25
			Total Hepta CDF	2017/10/08	NC		%	25
5215304	DDS	Matrix Spike	F4G-sg (Grav. Heavy Hydrocarbons)	2017/10/17		NC	%	65 - 135
5215304	DDS	Spiked Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2017/10/17		101	%	65 - 135
5215304	DDS	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2017/10/17	<100		ug/g	
5215304	DDS	RPD - Sample/Sample Dup	F4G-sg (Grav. Heavy Hydrocarbons)	2017/10/17	0		%	50
5215307	YMA	Matrix Spike(FEE484)	F4G-sg (Grav. Heavy Hydrocarbons)	2017/10/17		111	%	65 - 135
5215307	YMA	Spiked Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2017/10/17		98	%	65 - 135
5215307	YMA	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2017/10/17	<100		ug/g	
5215307	YMA	RPD - Sample/Sample Dup	F4G-sg (Grav. Heavy Hydrocarbons)	2017/10/17	0		%	50

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5220055	DDS	Matrix Spike(FEE494)	F4G-sg (Grav. Heavy Hydrocarbons)	2017/10/19		104	%	65 - 135
5220055	DDS	Spiked Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2017/10/19		102	%	65 - 135
5220055	DDS	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2017/10/19	<100		ug/g	
5220055	DDS	RPD - Sample/Sample Dup	F4G-sg (Grav. Heavy Hydrocarbons)	2017/10/19	11		%	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) Low recovery due to sample matrix. Recovery confirmed with repeat digestion and analysis.

(2) Poor RPD due to sample inhomogeneity. < 10 % of compounds in multi-component analysis in violation.

(3) Surrogate recovery was above the upper control limit due to matrix interference. This may represent a high bias in some results.

(4) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B7K7449
Report Date: 2017/10/25

GEMTEC LIMITED
Client Project #: 10550.04
Site Location: Cape Harrison

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

Cristina Carriere, Scientific Service Specialist

Eric Dearman, Scientific Specialist

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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.

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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.

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: 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

==========

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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

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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

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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.

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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.

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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

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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	

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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

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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).

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VALIDATION SIGNATURE PAGE

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

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.

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APPENDIX F

National Classification System for Contaminated Sites

CCME National Classification System for Contaminated Sites (2008) version 1.3
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; or 4) background concentration.	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 significant 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.
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: -Hydrocarbon sheen or NAPL in the exposure zone -Severely stressed biota or devoid of biota; -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	To answer "yes", two scenarios should be satisfied; (1) there has to be a high probability that receptors will be exposed to the contaminant source in the near future, and (2) the predicted impacts to ecological receptors after exposure must be significant (see question 5). A low probability of exposure resulting in significant impacts, or a high probability of exposure but with only low to moderate effects expected should not result in a Class 1 designation, neither would a low probability of exposure resulting in low-to-moderate effects. 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.
7. Do measured concentrations of volatiles or unexploded ordnances represent an **explosion hazard**?	No	If yes, do not proceed through the NCSCS. 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.

CCME National Classification System for Contaminated Sites (2008) version 1.3
Pre-Screening Checklist

Rationale for not proceeding with NCSCS
(document any assumptions, reports, or site-specific information to support selection of "Yes" in Pre-Screening checklist)

If none of the above applies, proceed with the NCSCS scoring.

CCME National Classification System for Contaminated Sites (2008) version 1.3
Summary of Site Conditions

Site:	Site will be identified by:	Civic Address
Civic Address: *(or other description of location)*	Former USAF manned weather station, Cape Harrison, Newfoundland	
Site Common Name: *(if applicable)*	Cape Harrison	
Code identifier: *(e.g., FCSI 8-digit identifier)*		
Site Owner or Custodian: *(Organization and Contact Person)*	Department of National Defence	
Legal description *or* metes and bounds:		
Approximate Site area:		
Parcel Identifier(s) [PID]: *(or Parcel Identification Numbers [PIN] if untitled Crown land)*		
Centre of site: *(provide latitude/longitude or UTM coordinates)*	Latitude:_____ degrees _____ min _____ secs; Longitude:_____ degrees _____ min _____ secs	
	UTM Coordinate: Northing _____6070321_____ Easting _____407488_____	
Site Land Use:	Current:	Vacant
	Proposed:	Vacant
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 US Air Force weather station. Based on a Phase I ESA (GHD Limited, 2017), very little is know about the operation of the facility. It has been presumed that military personnel were stationed at Cape Harrison between 1943-1951 and that operation of a manned weather station would have consisted of a main Site building, an unlined landfill, communication antennas, water pumping station / building, a helicopter pad, drum caches, and docking, and barge facilities all connected via gravel access roadways / paths. In 1987, the Site was included in a contract where facilities were decommissioned including the razing of on-site structures and the burning of all materials, followed by the burying and covering of all building materials. The Site is remote and there are no communities nearby. No access roads are apparent.	

CCME National Classification System for Contaminated Sites (2008) version 1.3
Summary of Site Conditions

Affected media and Contaminants of Potential Concern (COPC):	

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 Limited
Date Scoring Completed:	23-Nov-18

CCME National Classification System (2008) version 1.3

(I) Contaminant Characteristics

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

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? **yes** = has an exceedance or strongly suspected to have an exceedance **no** = does not have an exceedance or strongly suspected not to have an exceedance		Petroleum hydrocarbon, copper, and lead concentrations above CCME guidelines confirmed in surface soil samples (0.0 - 0.05 m) (GEMTEC, 2018). Groundwater was not encountered or investigated in the Initial Testing Program. Based on site soil chemistry, impacts to groundwater cannot be ruled out (GEMTEC, 2018). No surface water or sediment on the Site. Steel barge at APEC #8 was heavily degraded/rusted. Iron was identified as the only COPC in this area. There are no CCME Marine Aquatic Life guidelines for iron and there are no CCME Sediment Quality Guidelines for iron. As a result, no samples were collected. This does not represent a data gap. (GEMTEC, 2018).	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). 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://st-ts.ccme.ca/ 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://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php	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	Yes			
Yes No Do Not Know				
B. Groundwater	Do Not Know			
Yes No Do Not Know				
C. Surface water	No			
Yes No Do Not Know				
D. Sediment	No			
Yes No Do Not Know				
"Known" -score	2			
"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)?	High	Lead is rated as "High" by FCSAP. Lead concentrations confirmed in soil at concentrations exceeding CCME guidelines (GEMTEC, 2018)	The relative degree of chemical hazard should be selected based on the most hazardous contaminant known or suspected to be present at the site. 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. *See Attached Reference Material for Contaminant Hazard Rankings.*	Hazard as defined in the revised NCSCS 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.
High Medium Low Do Not Know				
"Known" -score	8			
"Potential" - score	---			

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(I) Contaminant Characteristics

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
3. Contaminant Exceedance Factor				
What is the ratio between the measured contaminant concentration and the applicable CCME guidelines (or other "standards")? NAPL (mobile or immobile) High (>100x) Medium (10x to 100x) Low (1x to 10x) Do Not Know	Medium (10x to 100x)	Maximum measured lead concentration of 3,800 mg/kg compared to CCME guideline of 140 mg/kg (GEMTEC, 2018).	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.** Ranking of contaminant hazard as high, medium and low is as follows: High = One or more measured contaminant concentration is greater than 100 X appropriate CCME guidelines Medium = One or more measured contaminant concentration is 10 - 99.99 X appropriate CCME guidelines Low = One or more measured contaminant concentration is 1 - 9.99 X appropriate CCME guidelines NAPL (LNAPL or DNAPL) = 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. Any amount of NAPL should be scored, *i.e* . small amounts and sheens cannot be ignored. The presence of a NAPL (mobile or immoblie or regardless of amount) may be considered unnaceptable by some jurisidcations. If NAPL is present, consult jurisdiction on how to proceed with NCSCS. Other standards may include local background concentration or published toxicity benchmarks. Results of toxicity testing with site samples can be used as an alternative. 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. High = lethality observed. Medium = no lethality, but sub lethal effects observed. 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. 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	4			
"Potential" - score	---			
4. Contaminant Quantity (known or strongly suspected)				
What is the known or strongly suspected quantity of all contaminants? >10 hectare (ha) or 5000 m^3 2 to 10 ha or 1000 to 5000 m^3 <2 ha or 1000 m^3 Do Not Know	2 to 10 ha or 1000 to 5000 m3	Total estimated volume is approximately 1,600 m3 (GEMTEC 2018) based on impacted soils at APECs 3, 4, 6 and 7	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	---			

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(I) Contaminant Characteristics

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
5. Modifying Factors				
Does the chemical fall in the class of persistent chemicals based on its behavior in the environment? Yes No 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: (a) in air, (i) its half-life is equal to or greater than 2 days, or (ii) it is subject to atmospheric transport from its source to a remote area; (b) in water, its half-life is equal to or greater than 182 days; (c) in sediments, its half-life is equal to or greater than 365 days; or (d) in soil, its half-life is equal to or greater than 182 days. Elements do not degrade, therefore treat any metal, metalloid, or halogen COPC as persistent.	*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? Yes No Do Not Know	No	No underground infrastructure currently present or foreseen (GEMTEC, 2018).	If answered Yes, in Rationale for Score column document the location and extent of the infrastructure that is/may be damaged, verify the mode of contact between contaminants of potential concern (COPCs) and infrastructure, list the specific COPCs that could cause damage, and note the expected effect on specific infrastructure.	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? one two to four five or more Do Not Know	two to four	Light extractable petroleum hydrocarbons (F2) Heavy extractable petroleum hydrocarbons (F3) Inorganic substances (Metals) PAHs	For the purposes of the revised NCSCS, 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 Score- "Known"	24	
Raw Total Score- "Potential"	1	
Raw Combined Total Score (Known + Potential)	25	
Adjusted Total Score (Raw Combined / 40 * 33)	**20.6**	maximum 33

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(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

Definition	Score	Rationale for Score (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. 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.	12	Based on the concentration of petroleum hydrocarbons in soil exceeding the Tier I CCME guidelines, the potential for groundwater impacts cannot be ruled out (GEMTEC, 2018).	Review chemical data and evaluate groundwater quality. 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 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. Physical evidence includes significant sheens, liquid phase contamination, or contaminant saturated soils. Seeps and springs are considered part of the groundwater pathway. 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. 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. 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. **Selected References** Potable Environments Guidelines for Canadian Drinking Water Quality: http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php Non-Potable Environments CCME. 1999. Canadian Water Quality Guidelines for Protection of Aquatic Life. http://ceqg-rcqe.ccme.ca/ Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations. Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002.
ii) Same as (i) except the information is not known but strongly suspected based on indirect observations.	9			
iii) Meets GCDWQ for potable environments; meets non-potable criteria or modified generic criteria (excludes ingestion of drinking water pathway) for non-potable environments or 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).	0			
	Go to Potential			
Score	---			
NOTE: If a score is assigned here for Known COPC Exceedances, then you should skip Part B (Potential for groundwater pathway) and go to Section 2 (Surface Water Pathway)				
B. Potential for groundwater pathway.				
a. Relative mobility of contaminant High Moderate Low Insignificant Do Not Know		PHC impacts	Organics Koc (L/kg) / Metals with higher mobility at acidic conditions / Metals with higher mobility at alkaline conditions Koc < 500 (*i.e.,* log Koc < 2.7) — pH < 5 — pH > 8.5 Koc = 500 to 5000 (*i.e.,* log Koc = 2.7 to 3.7) — pH = 5 to 6 — pH = 7.5 to 8.5 Koc = 5,000 to 100,000 (*i.e.,* log Koc = 3.7 to 5) — pH > 6 — pH < 7.5 Koc > 100,000 (*i.e.,* log Koc > 5) For PHC fractions; score F1 as Moderate, F2 as Low, and F3 and F4 as Insignificant.	Reference: US EPA Soil Screening Guidance (Part 5 - Table 39) 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.
	Moderate			
Score	2			
b. Presence of engineered sub-surface containment? No containment Partial containment Full containment Do Not Know		No barriers to entry of contaminants to the watertable and groundwater system	Review the existing engineered systems or natural attenuation processes for the site and determine if full or partial containment is achieved. 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. **Selected Resources:** United States Environmental Protection Agency (USEPA) 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128.
	No containment			
Score	3			
c. Thickness of confining layer over aquifer of concern or groundwater exposure pathway 3 m or less including no confining layer or discontinuous confining layer 3 to 10 m > 10 m Do Not Know		Deeper subsurface investigations have not been completed to date; however, based on bedrock geology and information presented in the Hydrogeology of Labrador (AECOM, 2013), groundwater is anticipated to be at depth.	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. Measure the thickness and extent of materials that will impede the migration of contaminants to the groundwater exposure pathway. The evaluation of this category is based on: 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 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).	
	3 to 10 m			
Score	0.5			
d. Hydraulic conductivity of confining layer >10^{-4} cm/s or no confining layer 10^{-4} to 10^{-6} cm/s <10^{-6} cm/s Do Not Know		Discrete 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: 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 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.	
	<10-6 cm/s			

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
Score	0			
B. Potential for groundwater pathway.				
e. Precipitation infiltration rate (Annual precipitation factor x surface soil relative permeability factor) High (infiltration score > 0.6) Moderate (0.4 < infiltration score ≤ 0.6) Low (0.2 < infiltration score ≤ 0.4) Very Low (0 < infiltration score ≤ 0.2) None (infiltration score = 0) Do Not Know	High	Based on Canadian Climate Normals (1981-2010) for Cartwright (closest station to Cape Harrison, at similar elevation): Total annual precipitation = 1050.1 mm 1050.1 mm / 1000 = 1.1 1.1 * 0.6 (sand - as observed by GEMTEC 2018)	Precipitation Refer to Environment Canada precipitation records for relevant areas (30 year average preferred). Divide annual precipitation (rainfall + snowfall) by 1000 and round to nearest tenth (*e.g.*, 667 mm = 0.7 score). Permeability For surface soil relative permeability (*i.e.* , infiltration) assume: gravel (1), sand (0.6), loam (0.3) and pavement or clay (0). Multiply the surface soil relative permeability factor with precipitation factor to obtain the score for precipitation infiltration rate (*e.g.*, precipitation factor of 0.7 from above x 0.6 (sand) = 0.42 or "Moderate").	Selected Sources: Environment Canada web page link: http://climate.weather.gc.ca/climate_normals/index_e.html Snow to rainfall conversion apply ratio of 10(snow):1(water) https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&n=108C6C74-1
Score	1			
f. Hydraulic conductivity of aquifer >10^{-2} cm/s 10^{-2} to 10^{-4} cm/s <10^{-4} cm/s Do Not Know	<10-4 cm/s	Estimated based 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).	
Score	0			
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: 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; or There is known contact of contaminants with surface water based on site observations. or 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	No surface water bodies on the Site and the nearest surface water bodies are located approximately 750 m upgradient of the Site (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: 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 resource such as internet links. Selected References: CCME. 1999. Canadian Water Quality Guidelines for the Protection of Aquatic Life http://ceqg-rcqe.ccme.ca/ CCME. 1999. Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses (Irrigation and Livestock Water) http://ceqg-rcqe.ccme.ca/ Health and Welfare Canada. 1992. Guidelines for Canadian Recreational Water Quality. http://www.hc-sc.gc.ca/ewh-semt/water-eau/recreat/index-eng.php
ii) Same as (i) except the information is not known but strongly suspected based on indirect observations.	8		Examples of indirect evidence may include observed staining of sediment and/or river banks, but surface water has not been tested.	
iii) Meets CWQG or absence of surface water exposure pathway (*e.g.*, Distance to nearest surface water is > 5 km.)	0			
Score	0			
NOTE: If a score is assigned here for Demonstrated Migration in Surface Water, then you should 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 No containment Partial containment Full containment Do Not Know	Do Not Know		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.	
Score	3			
b. Distance to Surface Water 0 to <100 m 100 - 300 m >300 m Do Not Know	Do Not Know		Review available mapping and survey data to determine distance to nearest surface water bodies.	
Score	2			
c. Topography Contaminants above ground level and slope is steep Contaminants at or below ground level and slope is steep Contaminants above ground level and slope is intermediate Contaminants at or below ground level and slope is intermediate Contaminants above ground level and slope is flat Contaminants at or below ground level and slope is flat Do Not Know			Review engineering documents on the topography of the site and the slope of surrounding terrain. Steep slope = >50% Intermediate slope = between 5 and 50% Flat slope = < 5% Note: Type of fill placement (*e.g.*, trench, above ground, etc.).	

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
	Do Not Know			
Score	1			
d. Run-off potential High (run-off score > 0.6) Moderate (0.4 < run-off score ≤ 0.6) Low (0.2 < run-off score ≤ 0.4) Very Low (0 < run-off score ≤ 0.2) None (run-off score = 0) Do Not Know			Precipitation Refer to Environment Canada precipitation records for relevant areas (30 year average preferred). Divide precipitation (rainfall + snowfall) by 1000 and round to nearest tenth (*e.g.* , 667 mm = 0.7 score). Permeability For infiltration assume: gravel (0), sand (0.3), loam (0.6) and pavement or clay (1). Multiply the permeability (infiltration) factor with precipitation factor to obtain Run-off potential score (*e.g.* , precipitation factor of 0.7 from above x 0.6 (loam) = 0.42 or "Moderate").	Selected Sources: Environment Canada web page link: http://climate.weather.gc.ca/climate_normals/index_e.html Snow to rainfall conversion apply ratio of 10(snow):1(water) https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&n=108C6C74-1
	Do Not Know			
Score	0.4			
e. Flood potential 1 in 2 years 1 in 10 years 1 in 50 years not in floodplain 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.	
	not in floodplain			
Score	0			
Potential surface water pathway total	6.4			
Allowed Potential score	---	Note: If a "known" score is provided, the "potential" score is disallowed.		
Surface water pathway total	**0**			
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	Concentrations of petroleum hydrocarbons and metals exceeding CCME guidelines confirmed in surface soil (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). Examples of strongly suspected exceedences of soil guidelines may include evidence of staining, odours, or significant debris infill materials.	Selected References: CCME. 1999. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health. http://ceqg-rcqe.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 should 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? Exposed Vegetated Landscaped Paved Do Not Know			Consult engineering or risk assessment reports for the site. Alternatively, review photographs or perform a site visit. 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 NCSCS 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.
	Do Not Know			
Score	4			
b. For what proportion of the year does the site remain covered by snow? 0 to 10% of the year 10 to 30% of the year More than 30% of the year 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).	
	Do Not Know			
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	The PHCs measure on site are heavy, less volatile carbon ranges. BTEX and F1 compounds were non-detectable. There are no on-site structures. The field soil vapour readings from the assessment program reported low to nondetectable vapour concentrations.	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 (i.e. not detected) and volatile hydrocarbons have not been found in site soils or groundwater, or vapour has been measured (indoor or outdoor) in concentrations not exceeding risk based concentrations.	0		Due to the potential for significant spatial and temporal variation in soil vapour concentrations, limited vapour monitoring studies (*e.g.,* single point in time "snap-shot") that do not detect vapour at sites where volatiles are suspected, does not necessarily mean that vapours are not an issue at the site. In this case, section B " Potential for COPCs in vapour" should be completed.	
	0			
Score	0			

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
NOTE: If a score is assigned here for Demonstrated COPCs in Vapour, then you should 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) High (H' > 1.0E-1) Moderate (H' = 1.0E-1 to 1.0E-3) Low (H' < 1.0E-3) Not Volatile Do Not Know	Do Not Know		Reference: US EPA Soil Screening Guidance (Part 5 - Table 36) *Provided in Attached Reference Materials* For PHC fractions; score F1 as High, F2 as Moderate, and F3 and F4 as Not Volatile. Substance is considered Not Volatile (*i.e.*, pathway not a concern) if the product of the water solubility and unitless Henry's law constant does not exceed published or derived tolerable concentration or risk-specific concentration. If NAPL is present, see Appendix D of the CCME soil vapour quality guideline protocol (CCME 2014) for further guidance.	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 Potential for COPCs will be automatically assigned scores of zero and you can skip to section 5. Selected References: CCME. 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours. Winnipeg, Manitoba. http://ceqg-rcqe.ccme.ca
Score	2.5			
b. What is the soil grain size? Fine Coarse 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. 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? Yes No Do Not Know	Do Not Know		Review groundwater depths below grade for the site.	
Score	1			
d. Are there any preferential pathways? Yes No Do Not Know	Do Not Know		Visit the site during dry summer conditions and/or review available photographs. 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	**0**			
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	No surface water bodies on the Site; therefore, no sediment is present on the Site. The nearest surface water bodies (and therefore sediment) are located approximately 750 m upgradient of the Site (GEMTEC, 2018).	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. or Sediment meets CCME sediment quality guidelines or absence of sediment exposure pathway (*i.e.*, within 5 km of the site there are no aquatic receiving environments, and therefore no sediments).	0			
Score	0			
NOTE: If a score is assigned here for Demonstrated Migration of Sediments, then you should skip Part B (Potential for Sediment Migration) and go to Section 6 (Modifying Factors)				
B. Potential for sediment migration				
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")? Yes No Do Not Know	Do Not Know 2		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? Yes No Do Not Know	Do Not Know 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? Yes No Do Not Know	Do Not Know 2		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 become scoured. If the sediments present at the site are in a lake or marine habitat, select "no" for this question.	
Potential sediment pathway total	6			
Allowed Potential score	---	Note: If a "known" score is provided, the "potential" score is disallowed.		
Sediment pathway total	**0**			

CCME National Classification System (2008) version 1.3

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
6. Modifying Factors				
Are there subsurface utility conduits in the area affected by contamination? Yes No Do Not Know	No	No utility conduits at the Site (GEMTEC, 2018).	Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration.	
Known	0			
Potential	---			

Migration Potential Total		
Raw Total Score- "Known"	12	Note: If "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore, the total "Potential" Score may not reflect the sum of the individual "Potential" scores.
Raw Total Score- "Potential"	6.5	
Raw Combined Total Score (Known + Potential)	18.5	
Adjusted Total Score (Raw Combined / 64 * 33)	**9.5**	maximum 33

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

Definition	Score	Rationale for Score (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*)	22		*Where adverse effects on humans are documented, the site should be automatically designated as a Class 1 site (*i.e.,* action required). Known impacts could include blood test results (*e.g.,* blood lead > 10 µg/dL) or results of other health based studies and tests. There is no need to proceed through the NCSCS in this case. However, a scoring guideline (22) is provided in case a numerical score for the site is still desired. A score of 22 can also be assigned when Hazard Quotients (or Hazard Index) >> 1.0 or incremental lifetime cancer risks considerably exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals.	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. 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.
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	10		The category, "Strongly suspected", can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients (or Hazard Index) > 0.2 (excluding the Estimated Daily Intake) or > 1.0 with Estimated Daily Intake and/or incremental lifetime cancer risks that exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals (for most jurisdictions this is typically either $>10^{-5}$ or $>10^{-6}$).	
No quantified or suspected exposures/impacts in humans.	0		The category, no exposure/impacts, can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients (or Hazard Index) of ≤ 0.2 (excluding the Estimated Daily Intake) or ≤ 1.0 with Estimated Daily Intake 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}).	**Selected References:** Health Canada – Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Heath Screening Level Risk Assessments, available at http://www.hc-sc.gc.ca/ewh-semt/pubs/contamsite/index-eng.php United States Environmental Protection Agency, Integrated Risk Information System (IRIS), available at http://toxnet.nlm.nih.gov
	Go to Potential			
Score	---			
NOTE: If a score is assigned here for Known Exposure, then you should 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) Agricultural Residential / Parkland Commercial Industrial Do Not Know		Nearest community is greater than 2 kilometers from the Site. There is no known road access. Residential landuse activities are not anticipated. It is anticipated that any such visiting would be 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 is "commercial".	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). Parkland includes campgrounds, but excludes wildlands such as national or provincial parks. 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).
	Commercial			
Score	1			
b) Indicate the level of accessibility to the contaminated portion of the site (*e.g.,* the potential for coming in contact with contamination) Limited barriers to prevent site access; contamination not covered Moderate access or no intervening barriers, contaminants are covered. Remote locations in which contaminants not covered. Controlled access or remote location and contaminants are covered Do Not Know		Site is considered remote due to no road access. Contaminants measured as part of this program are not covered: samples collected from 0.0 -0.05 m (GEMTEC, 2018).	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 that has no cover, fence, natural barriers or buffer.	
	Mod. access, covered			
Score	1			
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). i) direct contact Is dermal contact with contaminated surface water, groundwater, sediments or soils anticipated? Yes No Do Not Know		Concentrations of petroleum hydrocarbons, copper, cadmium, lead and tin identified in surface soil (GEMTEC, 2018). 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.
	Yes			
Score	3			
ii) inhalation (*i.e.,* inhalation of dust, vapour) 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)? Yes No Do Not Know		No buildings presently at the Site (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.	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. 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. General Notes; 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 contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links. Selected References; Canadian Council of Ministers of the Environment (CCME). 2006. Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. PN 1332. http://ceqg-rcqe.ccme.ca/ Golder, 2004. Soil Vapour Intrusion Guidance for Health Canada Screening Level Risk Assessment (SLRA) Submitted to Health Canada, Burnaby, BC
	No			
Score	0			
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. Fine Coarse Surface soil is not contaminated or absent (bedrock) Do Not Know Texture		Based on field observations (GEMTEC, 2018).	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.	
	Coarse			
Score	1			
inhalation total	1			

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

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.		No drinking water present- no community present and none planned for future	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. 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. For aquifers, examples of "No drinking water present" includes municipal bylaws prohibiting water wells for potable water use and naturally non-potable (*e.g.,* saline) shallow groundwater. Groundwater used for drinking water may not be at risk from contamination due to a lack of hydrological connection between contaminated soil or groundwater, or the drinking water is sufficiently up-gradient of the contamination source. Selection of "No potential for aquifer contamination" must be supported with sufficient documentation, *e.g.,* lithological and contaminant properties, well capture zones (map drawn to scale), and capture zone delineation methodology.	**Selected References:** Guidelines for Canadian Drinking Water Quality: http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php 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. 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.
Drinking Water: Choose a score based on the proximity to a drinking water supply, to indicate the potential for contamination (present or future).				
0 to 100 m 100 to 300 m 300 m to 1 km 1 to 5 km No drinking water present No potential for aquifer contamination Do Not Know	No drinking water present			
Score	0			
Is an alternative water supply readily available?		No known alternative water supply in the area (GEMTEC, 2018).		
Yes No Not Applicable Do Not Know	No		Answer Not Applicable if "No drinking water present" or "No potential for aquifer contamination" was selected in previous question.	
Score	1			
Is human ingestion of contaminated soils possible?		Concentrations of petroleum hydrocarbons, lead, and copper identified above CCME guidelines (GEMTEC, 2018).	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.	
Yes No Do Not Know	Yes			
Score	3			
Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings?		Consumption of plants or wildlife cannot be ruled out (GEMTEC, 2018).	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.	
Yes No Do Not Know	Yes			
Score	1			
Ingestion total	5			
Human Health Total "Potential" Score	11	Note if a "Known" Human Health score is provided, the "Potential" score is disallowed.		
Allowed "Potential" Score	11			
2. Human Exposure Modifying Factors				
a) Strong reliance of local people on natural resources for survival (*i.e.*, food, water, shelter, etc.) in contaminated area.	No	No communities evident in the area of the Site.		
Yes No Do Not Know				
Human Exposure Modifying Factors - "Known"	0			
Human Exposure Modifying Factors - "Potential"	---			
Raw Human "Known" total	0			
Raw Human "Potential" total	11			
Raw Combined Total Human Score	11			
Adjusted Total Human Score (max 22)	**11**			

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
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 site 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.	CCME, 1999: Canadian Water Quality Guidelines for the Protection of Aquatic Life. CCME, 1999: Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses. http://ceqg-rcqe.ccme.ca/ Sensitive receptors- review: Canadian Council on Ecological Areas; www.ccea.org 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). Notes: 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 should skip Part B (Potential for Ecological Exposure) and go to Section 4 (Ecological Exposure Modifying Factors)				
B. Potential for ecological exposure (for the contaminated portion of the site)				
a) Terrestrial i) Land use Agricultural (or Wild lands) Residential / Parkland Commercial Industrial Do Not Know	Commercial	Based on historical use and anticipated limited current / future use (vacant Site, remote, no development anticipated in the reasonably foreseeable future) (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). 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).	
Score	1			
ii) Uptake potential Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site? Yes No Do Not Know	Yes	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 is possible, but less likely.	
Score	1			
iii) Ingestion (*i.e.,* wildlife or domestic animals ingesting contaminated food items, soils or water) Are terrestrial animals likely to be ingesting contaminated water at the site? Yes No Do Not Know	No	No on-site water bodies or dugouts (GEMTEC, 2018).	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.	
Score	0			
Are terrestrial animals likely to be ingesting contaminated soils at the site? Yes No Do Not Know	Yes	However, ingestion anticipated to be low due to low residence time of wildlife 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.	
Score	1			
Can the contamination identified bioaccumulate? Yes No Do Not Know	No	PAHs identified at the Site (acenapthene) has a log KOW < 5 (Reference Material tab)	Substances can be considered bioaccumulative if; • There is a Tissue Residue Guideline (TRG) or Soil Quality Guideline for Soil and Food Ingestion for the protection of secondary (SQG_{2C}) and/or tertiary consumers (SQG_{3C}). • Bioaccumulation factor (BAF) or bioconcentration factor (BCF) greater than 5000. • If BAF or BCF is not available, or reliable, the log Kow is equal to or greater than 5. If a literature review indicates that a substance biomagnifies, it should be treated as biomagnifying regardless of whether or not it meets the criteria above. It should also be noted that some substances with a log Kow greater than 5 do not biomagnify. If studies on a substance with a high Kow demonstrate a lack of biomagnification in upper trophic levels, then the substance can be considered not bioaccumulative. Petroleum hydrocarbons F1 to F4 are not considered bioaccumulative.	*See attached Reference Material including log(Kow)* Consult *CEPA (1999) Persistence and Bioaccumulation Regulations* for additional guidance; http://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-107/page-1.html
Score	0			
Distance to sensitive terrestrial ecological area 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	> 5 km	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 150 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.

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
Score	0.5			
Raw Terrestrial "Potential" total	3.5	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
Allowed Terrestrial "Potential" total	3.5			

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

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)				
b) Aquatic i) Classification of aquatic environment Sensitive Typical Not Applicable (no aquatic environment present) Do Not Know	Typical	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. "Typical aquatic environments" include those in areas other than those listed above.	
Score	1			
ii) Uptake potential Does groundwater daylighting to an aquatic environment exceed the CCME water quality guidelines for the protection of aquatic life at the point of contact? Yes No (or Not Applicable) Do Not Know	Do Not Know		Groundwater concentrations of contaminants at the point of contact with an aquatic receiving environment can be estimated in three ways: 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). 2) by conducting groundwater modeling to estimate the concentration of groundwater immediately before discharge. 3) by installing water samplers, "peepers", in the sediments in the area of daylighting groundwater.	
Score	0.5			
Distance from the contaminated site to an important surface water resource 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	> 5 km	No communities are located within 5 km of the Site.	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 link: www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and fens and other aquatic environments.
Score	0.5			
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? Yes No Do Not Know	Do Not Know		Substances can be considered bioaccumulative if; • There is a Tissue Residue Guideline (TRG) • Bioaccumulation factor (BAF) or bioconcentration factor (BCF) greater than 5000. • If BAF or BCF is not available, or reliable, the log Kow is equal to or greater than 5. If a literature review indicates that a substance biomagnifies, it should be treated as biomagnifying regardless of whether or not it meets the criteria above. It should also be noted that some substances with a log Kow greater than 5 do not biomagnify. If studies on a substance with a high Kow demonstrate a lack of biomagnification in upper trophic levels, then the substance can be considered not bioaccumulative.	*See attached Reference Material including log(Kow)* Consult *CEPA (1999) Persistence and Bioaccumulation Regulations* for additional guidance; http://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-107/page-1.html
Score	0.5			
Raw Aquatic "Potential" total	2.5	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
Allowed Aquatic "Potential" total	2.5			
4. Ecological Exposure Modifying Factors				
a) Known, or potential, occurrence of a species at risk. Is there a potential for a species at risk to be present at the site, or a known presence? Yes No Do Not Know	Yes 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. The potential presence of species at risk at the Site has not been ruled out.	Consult any ecological risk assessment reports. If information is not present, utilize on-line databases such as NatureServe Explorer (http://explorer.natureserve.org/). Regional, Provincial (Environment Ministries), or Federal staff (Fisheries and Oceans or Environment Canada) should be able to provide some guidance. To assess the potential for a species at risk to be present, the site (or surroundings) should be located within range of a species at risk (using on-line resources and consultation with knowledgeable government departments or biologists, see above), and there should be an assessment of habitat suitability for any identified potential species at risk.	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, available at: 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://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk
b) Potential impact of aesthetics (*e.g.,* enrichment of a lake or tainting of food flavour). Is there evidence of aesthetic impact to receiving water bodies? Yes No Do Not Know	No 0 ---	No aquatic habitat within Site boundary (GEMTEC, 2018).	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)? Yes No Do Not Know	Yes 2 ---	Petroleum hydrocarbon odour in soil when disturbed (GEMTEC, 2018).	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? Yes No Do Not Know	No 0 ---		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? Yes No Do Not Know	Do Not Know --- 1		Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.	
Ecological Modifying Factors Total - Known	4			
Ecological Modifying Factors Total - Potential	1			
Raw Ecological "Known" total	4			
Raw Ecological "Potential" total	7			
Raw Combined Total Ecological Score	11			
Adjusted Total Ecological Score (Max 18)	**11**			

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
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?	No		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.	
Yes	0			
No				
Do Not Know	---			
Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment?	No		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.	
Yes	0			
No				
Do Not Know	---			
Other Potential Receptors Total - Known	0			
Other Potential Receptors Total - Potential	---			

Exposure Total		
Raw Human Health + Ecological Total + Other Receptors - "Known"	4	Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included.
Raw Human Health + Ecological Total + Other Receptors - "Potential"	18	
Raw Total Exposure Score (not adjusted)	22	HH or Eco Total score has not yet been capped at 22 and 18, respectively.
Adjusted Total Score (Adjusted Total Exposure / 46 * 34)	**16.3**	maximum 34

CCME National Classification System (2008) version 1.3
Score Summary

Site: Former USAF manned weather station, Cape Harrison, Newfoundland

Scores from individual worksheets are tallied in this worksheet.
Refer to this sheet after filling out the revised NCSCS completely.

I. Contaminant Characteristics	Known	Potential
1. Residency Media	2	1
2. Chemical Hazard	8	---
3. Contaminant Exceedance Factor	4	---
4. Contaminant Quantity	6	---
5. Modifying Factors	4	---
Raw Total Score	24	1
Raw Combined Total Score (Known + Potential)	25	
Adjusted Total Score (Raw Combined Total/40*33)	**20.6**	(max 33)

II. Migration Potential	Known	Potential
1. Groundwater Movement	---	6.5
2. Surface Water Movement	0	---
3. Soil	12	---
4. Vapour	0	---
5. Sediment Movement	0	---
6. Modifying Factors	0	---
Raw Total Score	12	6.5
Raw Combined Total Score (Known + Potential)	18.5	
Adjusted Total Score (Raw Combined Total/64*33)	**9.5**	(max 33)

III. Exposure	Known	Potential
1. Human Receptors		
A. Known Impact	---	
B Potential		
a. Land Use		1
b. Accessibility		1
c. Exposure Route		
i. Direct Contact		3
ii. Inhalation		1
iii. Ingestion		5
2. Human Receptors Modifying Factors	0	---
Raw Total Human Score	0	11
Raw Combined Total Human Score (Known + Potential)	11	
Adjusted Total Human Score	11	(maximum 22)
3. Ecological Receptors		
A. Known Impact	---	
B. Potential		
a. Terrestrial		3.5
b. Aquatic		2.5
4. Ecological Receptors Modifying Factors	4	1
Raw Total Ecological Score	4	7
Raw Combined Total Ecological Score (Known + Potential)	11	
Adjusted Total Ecological Score	11	(maximum 18)
5. Other Receptors	0	---
Total Other Receptors Score (Known + Potential)	0	
Total Exposure Score (Human + Ecological + Other)	**22**	
Adjusted Total Score (Total Exposure/46*34)	**16.3**	(maximum 34)

Site Score

Site Letter Grade	**D**
Certainty Percentage	**81%**
% Responses that are "Do Not Know"	**7%**
Total NCSCS Score for site	**46.4**
Site Classification Category	**3**

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", or a site letter grade of F has been assigned)

* 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
GEMTEC Project: 10550.04.03 (Final) (November 23, 2018)

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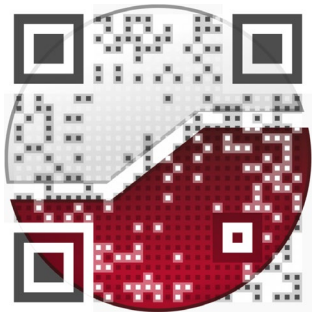

civil	civil
geotechnical	géotechnique
environmental	environnementale
field services	surveillance de chantier
materials testing	service de laboratoire des matériaux

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