



**FINAL REPORT**

**Steps 1 to 4 of the Federal Approach to  
Contaminated Sites at the Former Burgeo Range, NL**  
*DCC Project #GR082101, Contract #74033*

Submitted to:

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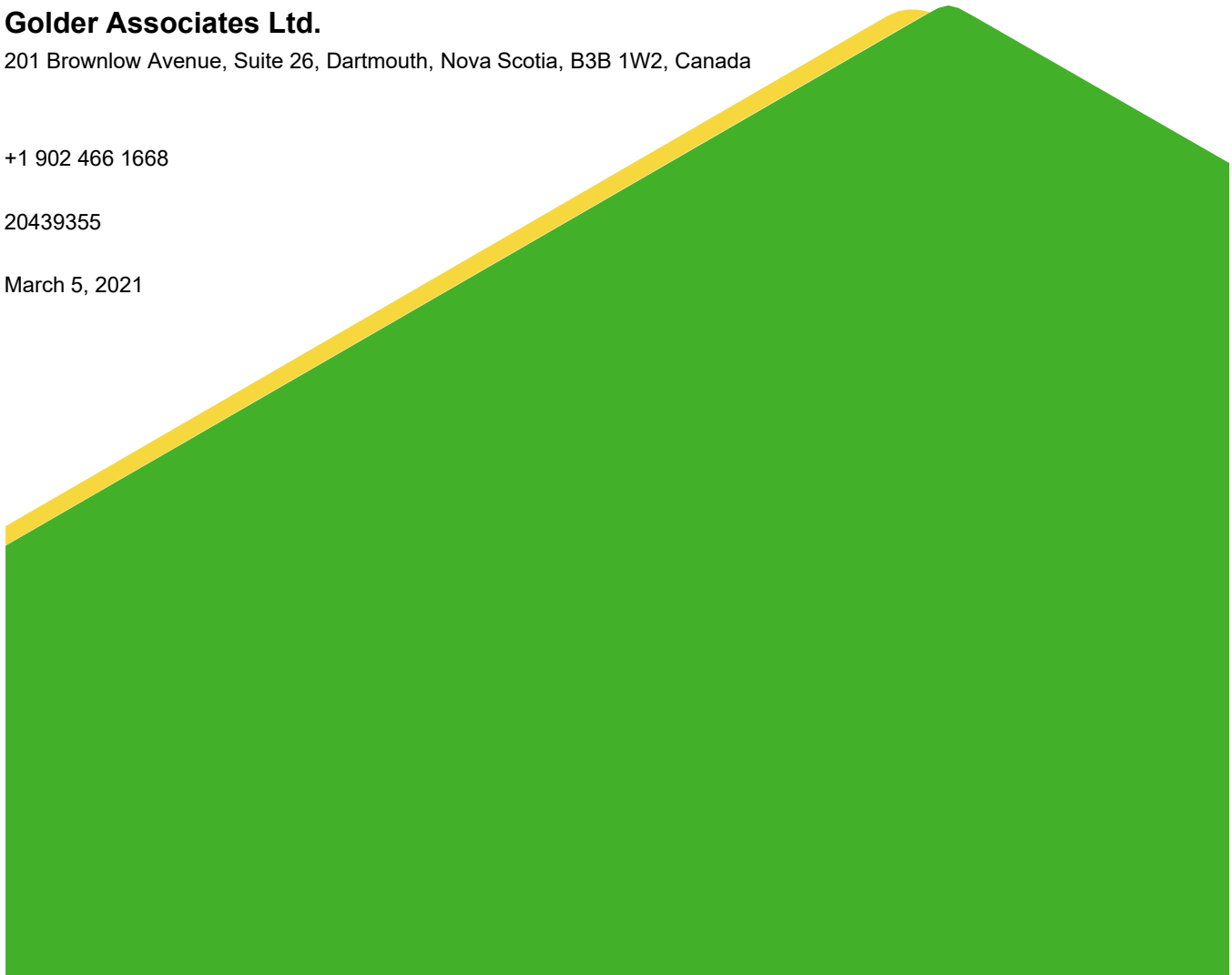
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## 1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Defence Construction Canada (DCC), on behalf of the Department of National Defence (DND), to provide consulting services for completing Environmental Site Assessment (ESA) Steps 1 to 4 of the Federal Approach to Contaminated Sites (FACS) at the Former Burgeo Range, Burgeo, NL, in accordance with the Contaminated Site Management Working Group's A FACS, including ESAs and the National Classification System (NCS) for Contaminated Sites (CS). This report is based on the Statement of Work (SOW) provided by DCC, dated October 27, 2020, and Golder's proposal dated November 16, 2020.

## 2.0 BACKGROUND

### 2.1 Site Description

DND is responsible for a former small arms rifle range set up near the Town of Burgeo (the Site). The property was leased from the Government of Newfoundland and Labrador (Crown Lands) for use by the 5<sup>th</sup> Canadian Ranger Patrol Group (5CRPG) in 2008. Use of the Site was discontinued by 5CRPG approximately 10 years ago. DND was recently contacted by the Province of NL (Water Resources Management Division [WRMD]) when it became apparent that part of this leased land encroached on the provincially protected watershed that forms part of the Town of Burgeo's municipal water supply. It is DND's intent to decommission the range and obtain closure from the Province, if required.

### 2.2 Document Review and Interviews

Historical information is limited to anecdotal correspondence between Real Property Operations Detachment Gander (RPOD (GD)) with 5CRPG and some community members who indicate that the range is still used by local hunters and community members as a target practice area even though 'No Trespassing' and 'Range Closed' signs have been installed at the Site. There is limited infrastructure on the Site and no engineered controls. There are several waterbodies on the Site. Based on information available at present, potential contaminants of concern (COC) include petroleum hydrocarbons (PHC), polycyclic aromatic hydrocarbons (PAH), and metals with possible impacts to the soil, sediment, and surface water.

Golder conducted interviews with four DND personnel associated with the Site to gather additional information. The interviews indicated that the Site was leased for approximately five years in the late 2000s and generally used as a firing range one to two times per year during that period. No buildings or structures were reportedly present at the time or any time prior as per available information; however, Burgeo residents are known to access the Site as a firing range prior to DND's lease period as well as at present. During DND's use of the Site as a firing range, a backstop or bullet catch, located on the southwest corner of the Site (approximately 250 m east of Highway 480), was constructed from imported grade A stone on a raised platform that used sand and gravel from the Site. The firing spot was located along the current pathway, providing access to the Site off Highway 480, on the southwest corner of the Site. Both the firing spot and the bullet catch area are indicated on Figure 1. During the interviews, Golder was provided with a DND source water data table containing water quality data from 1988 to 2018 for the Burgeo municipal water supply, Long Pond. This table, along with source water data for Long Pond from the WRMD's Newfoundland and Labrador Water Resources Portal, were referenced during the analysis of the surface water analytical results. The questionnaires documenting the interview information have been included in Appendix A.

## 2.3 Site Visit

Golder completed a site visit at the former Burgeo range on November 30, 2020. The field team, consisting of Golder's Site Supervisor/Intermediate Professional and two field technologists with Golder's subcontractor, Sikumiut Environmental Management (SEM), met onsite with local 5CRPG representative, Cpl. Cyril Warren. During the Site visit, the existing site conditions were observed and documented. Cpl. Warren identified areas of interest onsite including the backstop, the 5CRPG firing spot, the former location of targets used by Burgeo residents prior to DND's lease period, the location where Burgeo residents have been known to fire across a waterbody onsite for target practice, and the location where Burgeo residents have been known to fire at clay targets and setup a clay target launcher. Cpl. Warren indicated that Burgeo residents also access the Site for activities such as berry picking. Cpl. Warren also indicated that the Site was likely used as a firing range prior to 1998.

The sampling locations for the field program were also identified and confirmed during the Site visit.

## 2.4 Sampling Plan

A sampling and analytical plan (SAP) was developed in support of the ESA to collect environmental media (surface soil, sediment, and surface water) to determine the presence or absence of suspected contaminants at the Site. An initial SAP was developed prior to the Site visit and, upon completion of the Site visit, the SAP was confirmed and finalized based on information gathered during the Site visit. The SAP included details of the proposed media to be sampled and proposed sample locations including sample IDs and associated figures. The SAP also outlined the technical procedures associated with the proposed sample collection methods (and backup collection methods should the first method not be used due to unforeseen circumstances), the analytical methods and laboratory detection limits, and the number and type of quality control (QC) samples (i.e., blind duplicates). The SAP identified a total of 50 soil samples at 25 locations, surface water samples at 25 locations, and sediment samples at 25 locations to be collected and analyzed for PHCs, PAHs, and metals. Twelve (12) of the surface water samples were also identified to be analyzed for general chemistry.

## 3.0 REGULATORY FRAMEWORK

The Site land use classification is based on current land use as a protected water conservation area and future use as Crown Land. Federal guidance (CCME A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines, 2006), considers agricultural land use classification appropriate for sensitive land use scenarios for natural areas. Non-potable groundwater conditions are considered to be applicable to the Site as no potable wells are located in the vicinity of the Site; however, surface water from the Site likely discharges to the protected water conservation area (Long Pond provides a water supply to the Town of Burgeo, 1.2 km south of the Site) located on the south portion of the Site and south of the Site.

Guidelines associated with agricultural land use, non-potable groundwater, and coarse-grained soil (refer to Section 6.1 for grain size analysis summary) were used for screening purposes. The Site is leased from Crown Lands and DCC/DND requested the most recent provincial guidelines should be considered as the applicable screening criteria.

### 3.1 Soil

For identifying COCs in soil, the Canadian Council of Ministers of the Environment (CCME) guidelines were considered as applicable screening criteria. The CCME Soil Quality Guidelines (SQGs) were used to screen soil quality for human and ecological health effects for non-hydrocarbon parameters such as mercury, metals, and PAHs (CCME, 1999). The CCME SQGs consider human health-related pathways including direct contact and inhalation, and ecological-related pathways including direct soil contact by plants and soil invertebrates, soil and food ingestion by birds and mammals, and protection of aquatic life should soil contaminants migrate towards surface water. The Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for PHCs were used to screen for the protection of plants and soil invertebrates and direct soil contact (RBCA ESL, 2015). In addition, Atlantic RBCA Tier I Risk-Based Screening Levels (RBSL) were used to screen for benzene, toluene, ethylbenzene, and xylene (BTEX).

### 3.2 Sediment

For identifying COCs in sediment, the CCME guidelines will be considered as applicable screening criteria. The concentration of each parameter was compared to the CCME Sediment Quality Guidelines – Probable Effect Levels (PELs) and Interim freshwater sediment quality guidelines (ISQGs); however, the PELs were considered for screening purposes and the ISQGs are only presented for informational purposes. The Atlantic RBCA Sediment ESL was used for screening of PHCs in the protection of freshwater and marine aquatic life for typical sediments (2015).

### 3.3 Surface water

For identifying COCs in surface water, the CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater, Long Term were considered as applicable screening criteria. The CCME Aquatic Life - Freshwater criteria consider pathways such as vapour intrusion for human health, direct contact by plants and soil invertebrates, and aquatic life. The Atlantic RBCA Surface Water and Groundwater ESL for the protection of freshwater and marine aquatic life was used for screening COCs in surface water (2015).

## 4.0 METHODOLOGY

The field sampling program was completed from December 1, 2020 to December 4, 2020. The objective of the field program was to determine the presence or absence of suspected contaminants based on the historical activities at the Site – primarily used as a shooting range. All sampling locations and sample IDs of the sampled media were in accordance with industry accepted field methods and sampling protocols. The Site was divided into three zones based on expected risk rating resulting from former/current activities at the Site – high (zone 1), medium (zone 2), and low (zone 3). The high-risk area (zone 1) included more sampling locations compared to the medium and low risk zones. Zone 3 is located approximately 1150 m away from the zone 1 high-risk area and is considered to be representative of background conditions. All sample locations on the Site are shown on Figures 2A to 2C.

The sampling program was completed in compliance with guidelines provided in Golder's Standard Operating Procedures (SOP), which maintain the industry standards and provincial/federal requirements. Golder's SOPs have been included in Appendix B. Throughout the program, the Site characteristics, weather conditions, and field observations were recorded. Spatial coordinates of all sampling locations were taken with a Geneq SXBlue II handheld global positioning system (GPS), which has an accuracy of 0.6 m, and photographs were taken of all samples and sampling locations. A photo log is included in Appendix C.



## 4.1 Soil Sampling

As mentioned in Section 2.4, 50 soil samples were collected from 25 locations throughout the Site (Figures 2A to 2C). At each location, a sample was collected at depths of 0 to 0.15 metres below ground surface (mbgs) and 0.15 to 0.3 mbgs, hereafter referred to as “shallow” and “deep” samples, respectively. Three field duplicates were also collected at the Site. Soil samples were obtained using a stainless-steel trowel and shovel. The trowel and shovel were decontaminated prior to sampling activities and before each subsequent sample location, in accordance with Golder’s SOPs, using Simple Green biodegradable all-purpose cleaner. Care was taken to exclude any deleterious materials (i.e., grass, roots, and foreign materials) from the sample. When handling the soil samples a pair of clean, disposable nitrile gloves were worn to minimize the potential for cross-contamination, with a new pair of gloves worn for each sample location. Using the shovel, a hole was dug at each sample location to a depth of approximately 0.3 mbgs. Using the trowel, the samples were collected from the sidewall of each hole, over the depth intervals mentioned above of 0 to 0.15 mbgs and 0.15 to 0.3 mbgs.

Each of the samples was split into two components upon collection. One component of each sample was placed into labelled, pre-cleaned, laboratory-supplied sample containers and stored in a cooler with ice along with a completed chain of custody form and maintained under chain of custody until released to the analytical laboratory for analysis. The second component of the sample was placed in a labelled plastic bag for subsequent field headspace measurement for organic combustible vapours. Soil descriptions, including visual and olfactory observations, and results of the soil headspace measurements were recorded in the field.

Table 1 appended to this report details the soil samples that were collected, including their spatial coordinates, depth, headspace reading, description, and location information.

## 4.2 Sediment Sampling

As mentioned in Section 2.4, sediment samples were collected from 25 locations throughout the Site (Figures 2A to 2C). At each location, a sample was collected from the top 0.15 m of sediment within the watercourse/waterbody. Three field duplicates were also collected at the Site. Seven of the sediment samples (including one field duplicate) were collected from a boat using an Ekman sampler, while the remaining sediment samples were collected from the shoreline of the watercourses/waterbodies using a stainless-steel trowel and shovel. The Ekman sampler, trowel, and shovel were decontaminated prior to sampling activities and before each subsequent sample location, in accordance with Golder’s SOPs, using Simple Green biodegradable all-purpose cleaner. Care was taken to exclude any deleterious materials (i.e., leaves, roots, organics, and foreign materials) from the sample and free water was allowed to flow out of the sampler or trowel once retrieved. When handling the sediment samples a pair of clean, disposable nitrile gloves were worn to minimize the potential for cross-contamination, with a new pair of gloves worn for each sample location. It should be noted that it was initially planned to collect all sediment samples from the middle of stream channels or from selected sampling stations within larger waterbodies. However, the terrain across most of the Site (most of zone 1 and all of zones 2 and 3) was only suitable to be traversed by foot and therefore the boat was not able to be transported to most locations. At these locations, the samples were collected from an appropriate location along the shoreline of the watercourse/waterbody.

Each of the samples was placed directly into labelled, pre-cleaned, laboratory-supplied sample containers upon collection and stored in a cooler with ice along with a completed chain of custody form and maintained under chain of custody until released to the analytical laboratory for analysis. Sediment descriptions, including visual (i.e., sediment material, texture, and colour) and olfactory observations were recorded in the field.

Table 2 appended to this report details the sediment samples that were collected, including their spatial coordinates and description.

### 4.3 Surface Water Sampling

As mentioned in Section 2.4, surface water samples were collected from 25 locations throughout the Site (Figures 2A to 2C). Three field duplicates were also collected at the Site. At each location, the surface water sample was collected, followed directly by the measurement of field parameters consisting of temperature, pH, and electrical conductivity in water. These parameters were measured using a Hanna Instruments HI98130 Combo pH and electrical conductivity tester. In general, the sediment samples were collected from the same locations and were collected after the measurement of field parameters.

The grab surface water samples were collected by submerging pre-cleaned, laboratory-supplied sample bottles in the water while wearing a pair of clean, disposable nitrile gloves to minimize the potential for cross-contamination, with a new pair of gloves worn for each sample location. In cases where a sample bottle contained a preservative, a similar, clean, laboratory-supplied bottle with no preservative was used to collect the sample and it was then immediately transferred to the bottle with the preservative. The samples were collected just below the water surface to avoid excessive introduction of re-suspended solids from the sediment bed. Once the sample bottle was resealed and labelled, it was placed in a cooler with ice along with a completed chain of custody form and maintained under chain of custody until released to the analytical laboratory for analysis. Field observations, including color, odor, turbidity, and sheen were recorded in the field along with the measured field parameters.

Table 3 appended to this report details the surface water samples that were collected, including their spatial coordinates, measured field parameters, and description.

### 4.4 Analytical Program

The laboratory analyses of the soil, sediment, and surface water samples collected during the field program were completed by Bureau Veritas Laboratories (BV Labs) in Bedford, NS. BV Labs is ISO 9001 registered and accredited by the Standards Council of Canada (SCC) and the Canadian Association for Laboratory Accreditation (CALA).

#### 4.4.1 Soil

All 25 shallow (0 to 0.15 mbgs) soil samples and two of the field duplicates were analyzed for PHCs, PAHs, and metals. Three of the shallow samples were analyzed for grain size as well. Six of the deep (0.15 to 0.3 mbgs) samples were also analyzed for metals after their respective shallow samples were identified to be impacted, requiring vertical delineation. The remaining deep samples and field duplicate were sent to the laboratory but were not analyzed. Table 4 appended to this report summarizes the analyses completed on each soil sample.

#### 4.4.2 Sediment

All 25 sediment samples and two of the field duplicates were analyzed for PHCs, PAHs, and metals. The remaining field duplicate was sent to the laboratory but was not analyzed. Table 5 appended to this report summarizes the analyses completed on each sediment sample.

### 4.4.3 Surface Water

All 25 surface water samples and two of the field duplicates were analyzed for PHCs, PAHs, and metals. 14 of these samples (including the two duplicates) were also analyzed for general chemistry. The remaining field duplicate was sent to the laboratory but was not analyzed as only two duplicates were needed to satisfy QA/QC requirements. Table 6 appended to this report summarizes the analyses completed on each surface water sample.

## 4.5 Survey

A drone survey of the Site was completed using a Sensefly eBee+ survey grade, autonomous fixed wing unmanned aerial vehicle (UAV), operated by SEM, on November 30, 2020. The survey area was input into the drone flight software and a flight plan was created automatically. After take-off, the UAV flew in a gridded pattern taking still images at a pre-defined interval, ensuring coverage for the entire Site. Four individual flights were required for the survey, incorporating a total imagery capture time of approximately 160 minutes capturing 827 high-resolution images. The images captured during the flight as well as the flight data from the GPS and inertial measurement unit (IMU) of the UAV were used as inputs in eMotion and Pix4D software packages to produce georeferenced, orthomosaic imagery with a resolution of 5cm/pixel (drone survey plan). The drone survey plan is included in Appendix D.

A legal survey and description of the current License to Occupy (LTO) was completed by the land surveyor, Yates & Woods Ltd. The survey identified the current lease boundary of the Site to encompass an area of 318.569 Ha. Upon completion of the survey, it became apparent that the portion of the Site to the southwest containing the access road, Rangers firing location, and backstop were not actually a part of the lease area. The survey highlights this portion as proposed additional land to be included in the lease area. The legal survey plan is included in Appendix D. The additional land proposed to be included in the lease is highlighted in pink on the survey plan. DND is in communication with Crown Lands to have this additional land included in the lease boundary.

## 4.6 Quality Assurance / Quality Control (QA / QC)

Golder uses an internal quality management program (GAIMS) which controls the quality of each step of the project. Specific quality control measures applied include:

- Sampling was performed according to Golder's written SOPs (Appendix B). The purpose of these procedures is to minimize uncertainties and biases by obtaining representative samples.
- Field notes were recorded throughout the field program (Tables 1 to 3 appended to this report).

As well, to ensure that the samples and analytical results can be considered valid, representative, and reproducible, the field QA/QC program includes the collection of field duplicate samples for soil and groundwater. In addition, the analytical laboratory (BV Labs) has its own quality assurance program, including laboratory replicate samples and control standards. The laboratory QA/QC results are included in the laboratory analytical reports provided in Appendix E.

## 5.0 GEOLOGY

Details of the subsurface conditions encountered during the field program are provided in Table 1 appended to this report. It should be noted that the subsurface conditions encountered may vary between and beyond soil sampling locations.

Based on area mapping, the surficial geology in the vicinity of the Site is expected to consist predominantly of exposed bedrock with little or no sediment or vegetation cover and with rare patches of till and other surficial sediment (Liverman and Taylor, 1994). The bedrock geology in the vicinity of the Site consists of weakly foliated to massive, coarse grained, variably K-feldspar porphyritic, biotite granite and adamellite (Gander Zone, Burgeo Granite) (O'Brien and Dickson, 1986).

Based on observations made during the field program, the subsurface stratigraphy at the Site mainly consists of organic peat overlying bedrock. Exposed bedrock outcrops were visible throughout the Site and at one sample location bedrock was encountered at approximately 0.25 mbgs. Sand and silty sand with varying amounts of gravel was encountered at the three sampling locations near the access road and the backstop (BFR\_SS1, BFR\_SS2, and BFR\_SS3). These are the only sampling locations in which organic peat was not encountered. It is believed that the material encountered at these three locations is fill associated with the construction of the access road and the backstop, due to their proximity to these features.

## 6.0 RESULTS

The analytical results for soil, sediment, and groundwater at the Site are discussed in the following sections.

### 6.1 Soil Results

The laboratory results for the soil samples collected are compiled in Tables 7 to 9 appended to this report. The laboratory analytical results reports are provided in Appendix E. As mentioned in Sections 2.4 and 4.4.1, the soil samples were analyzed for PHCs, PAHs, and metals. Three samples were also analyzed for grain size to classify the soil and determine the proper screening level guidelines to be used for the Site. Two of the analyzed samples were determined to be coarse grained soil, while the third sample was determined to be fine grained soil. However, the results of the third sample indicated that it was comprised of 50% fine grained material and 50% coarse grained material.

Exceedances of modified total petroleum hydrocarbons (mTPH) were reported in 21 of the 25 samples analyzed. All the 21 samples with mTPH exceedances contained organic peat (i.e., natural hydrocarbons) which can contribute to elevated mTPH. Upon recommendation from BV Labs, a silica gel cleanup was performed on the soil samples and re-analyzed. The silica gel cleanup serves to remove biogenic organics from the sample, in turn providing more accurate results. The mTPH concentrations in the re-analyzed samples are all below the Atlantic RBCA Tier I RBSL for the lube oil/no. 6 oil range. BV Labs indicated that the concentrations remaining in the samples do not appear to resemble any petroleum products, but rather appear to be of natural and organic origin and not petrogenic in nature; they appear to mainly be a mixture of peaks around the C32 marker that is normally attributed to highly organic detections. BV Labs also indicated that there are still a few detections for higher molecular weight alkanes, but these levels could not be attributed to any petroleum product as there is no pattern resemblance and there is a lack of secondary indicators (biomarkers). The BTEX concentrations in all of the 25 samples are below the reportable detection limit (RDL).

The PAH concentrations in all 25 samples analyzed are low and below the CCME SQGs, with most below the RDL.

Several of the shallow soil samples have total metals concentrations which exceed the CCME SQGs.

These include:

- Tin in BFR\_SS6\_SA1
- Zinc and lead in BFR\_SS7\_SA1

- Cadmium in BFR\_SS8\_SA1, BFR\_SS23\_SS1, and BFR\_SS24\_SA1
- Lead in BFR\_SS13\_SA1
- Selenium in all samples except BFR\_SS1\_SA1, BFR\_SS2\_SA1, BFR\_SS3\_SA1, and BFR\_SS17\_SA1

The respective deep samples were then analyzed for vertical delineation. The concentrations in each of these samples are all below the CCME SQGs, except for BFR\_SS7\_SA2 in which the lead concentration is higher in the deeper sample than in the shallow sample, as well as BFR\_SS8\_SA2, BFR\_SS13\_SA2, and BFR\_SS24\_SA2 in which the selenium concentration is higher in the deeper sample than in the shallow sample.

Dillon's (2011) report discusses the background concentrations for soils in the Atlantic Region to allow for the comparison of data from a specific site to the background concentrations for that region. If a chemical concentration exceeded the relevant CCME guideline but is within the background concentration range for that parameter in that region, then it may not be considered as a COC. The chemicals with background concentrations that were found to have exceeded CCME SQGs in Newfoundland and Labrador included arsenic, chromium, copper, lead, nickel, thallium, zinc, pH, naphthalene, fluorene, phenanthrene, pyrene, benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, indeno[1,2,3-cd]pyrene, and dibenz[a,h]anthracene. However, the list does not contain cadmium and selenium which are considered to be naturally occurring at the Site, as discussed below.

Cadmium concentrations in samples BFR\_SS23\_SA1 and BFR\_SS24\_SA1 exceeded the CCME SQGs although these were collected from remote areas of the Site, approximately 1500 m from the general area of the firing spot. As such, it is considered that the firing activities likely did not contribute to these cadmium concentrations. The cadmium concentration in sample BFR\_SS8\_SA1 exceeds the guidelines, however, it is less than concentrations found in the above-mentioned remote samples. As such, all three cadmium exceedances are considered elevated background concentrations and not associated with historical activities at the Site including the former firing range. Similarly, Selenium exceedances are also considered elevated background concentrations given that the majority of the samples with selenium exceedances are in remote areas (zone 2 and 3), between 1200 m and 3000 m from the firing spot. Zone 3 is located approximately 1150 m away from zone 1 and is considered representative of background conditions.

Lead is considered a COC with the firing range and associated activities. In addition, lead exceedances are located in the vicinity of the former firing spot and bullet catch area in zone 1. In addition, tin and zinc exceedances were also identified on the southwest portion of the Site. As such, lead, tin and zinc exceedances are likely associated with bullets and casings from former firing activities which includes the former DND firing range as well as use of the Site by local hunters and community members as a target practice area. Discussion on further investigation associated with lead exceedances is presented in Section 8.0.

The soil concentrations exceeding applicable guidelines are presented on Figures 3A to 3C.

## 6.2 Sediment Results

The laboratory results for the sediment samples collected are compiled in Tables 10 to 12 appended to this report. The laboratory analytical results reports are provided in Appendix E. As mentioned in Sections 2.4 and 4.4.2, the sediment samples were analyzed for PHCs, PAHs, and metals.

Exceedances of mTPH were reported in 20 of the 25 samples analyzed. However, like the soil samples, these elevated concentrations are attributed to organic material present in the samples. Upon recommendation from BV Labs, a silica gel cleanup was performed on these samples and they were then re-analyzed. The silica gel cleanup serves to remove biogenic organics from the sample, in turn providing more accurate results. The mTPH concentrations in 16 of the re-analyzed samples are still above the Atlantic RBCA ESL for the diesel/no. 2 fuel oil or lube oil/no. 6 oil range. The other four re-analyzed samples also still have mTPH concentrations, but they are below the ESL. BV Labs indicated that the concentrations remaining in the samples do not appear to resemble any petroleum products, but rather appear to be of natural and organic origin and not petrogenic in nature; they appear to mainly be a mixture of peaks around the C32 marker that is normally attributed to highly organic detections. BV Labs also indicated that there are still a few detections for higher molecular weight alkanes, but these levels could not be attributed to any petroleum product as there is no pattern resemblance and there is a lack of secondary indicators (biomarkers). The coarser sediment samples that were re-analyzed have lower mTPH concentrations after the silica gel cleanup compared to the finer sediment samples. This would appear to indicate the silica gel cleanup is more effective with a coarse-grained material than a fine-grained material. The mTPH concentrations in the sediment samples from the areas of the Site considered to be background (i.e., zones 2 and 3) range from <15 to 690 mg/kg. The sediment samples with the highest concentrations in these areas are BFR\_SED22 in the northeast corner of zone 3 and BFR\_SED25 in the northwest corner of zone 2. The mTPH concentrations in the sediment samples from zone 1 range from <15 to 540 mg/kg, except for BFR\_SED13 which has a concentration of 790 mg/kg. The BTEX concentrations in all 25 samples are below the RDL.

The PAH concentrations in all 25 samples analyzed are below the CCME PELs, however two of the samples, BFR\_SED6 and BFR\_SED13 have concentrations above the CCME ISQGs.

Three of the sediment samples have metals concentrations which exceed the CCME PELs and CCME ISQGs. These include lead in BFR\_SED4, BFR\_SED6, and BFR\_SED12. Several of the samples also have total metals concentrations which only exceed the CCME ISQGs and not the PELs. These include:

- Mercury in BFR\_SED2, BFR\_SED3, BFR\_SED4, and BFR\_SED12
- Cadmium and mercury in BFR\_SED6
- Chromium in BFR\_SED8 and BFR\_SED18
- Lead and mercury in BFR\_SED13
- Lead in BFR\_SED16

Given CCME PELs is the applicable guidelines criteria, only lead exceedances in samples BFR\_SED4, BFR\_SED6, and BFR\_SED12 are considered as exceedances and are discussed below. Lead concentrations in sediment samples appear to decrease with distance from the firing spot, i.e., sample collected (BFR\_SED4) between the former firing spot and bullet catch has the highest concentrations, whereas sample (BFR\_SED12) located farthest away from the former firing range has the lowest lead concentration of the three samples that exceeded.

The sediment concentrations exceeding applicable guidelines are presented on Figures 3A to 3C.

## 6.3 Surface Water

The laboratory results for the surface water samples collected are compiled in Tables 13 to 16 appended to this report. The laboratory analytical results reports are provided in Appendix E. As mentioned in Sections 2.4 and 4.4.3, the surface water samples were analyzed for PHCs, PAHs, and metals. 12 of the surface water samples were also analyzed for general chemistry.

The PHC concentrations in all 25 samples analyzed are below the RDL, which is also below the Atlantic RBCA ESL.

The PAH concentrations in all 25 samples analyzed are below the RDL, which is also below the CCME WQGs.

All 25 samples analyzed have total aluminum concentrations which exceed the CCME WQGs; this is attributed to background concentration levels at the Site. Following samples exceeded the CCME WQGs for other metals (total):

- Iron in BFR\_SW1, BFR\_SW2, BFR\_SW18
- Copper and lead in BFR\_SW4
- Iron and lead in BFR\_SW5

All 25 samples analyzed have total phosphorous concentrations below the RDL, however the RDL is above the CCME WQG value. Phosphorus is not considered a contaminant of concern for the Site and likely results from the presence of nutrients. Hence, elevated RDLs above the CCME WQG for phosphorus is not considered to be an issue of potential environmental concern for the Site.

All 12 samples analyzed for general chemistry have a pH outside of the acceptable range in the CCME WQGs (6.5 to 9); however, this is understood to be consistent with surface water data from the region based on the review of source water data for Long Pond from the WRMD's Newfoundland and Labrador Water Resources Portal. All 27 samples collected between 1988 and 2018 from Long Pond (water supply source for the Town of Burgeo), located approximately 1 km south of the Site (hydraulically downgradient), had pH values below 6.5.

Several iron exceedances identified are also considered as background concentrations for the region based on the source water data for Long Pond from the WRMD's Newfoundland and Labrador Water Resources Portal, where 14 out of 28 samples between 1988 and 2018 exceeded the CCME WQG for iron. In addition, the highest iron concentration was observed in a sample (BFR\_SW18) from a remote location in zone 2, approximately 1800 m from the firing spot. Other samples from the vicinity of the former firing range in zone 1 had equal or lower iron concentrations compared to BFR\_SW18. As such, the elevated iron concentrations cannot be directly attributed to the former firing range at the Site. Furthermore, copper concentration in one sample collected between the firing spot and bullet catch (backstop) exceeds the CCME WQGs.

The exceedances of lead and copper, collected from waterbodies between the firing spot and bullet catch, are considered to have resulted from firing activities associated with the former DND firing range as well as use of the Site by local hunters and community members for target practice. Discussion on potential mitigation of the lead exceedances is presented in Section 8.0.

The surface water concentrations exceeding applicable guidelines are presented on Figures 3A to 3C.

## 6.4 Quality Assurance/Quality Control Results

### 6.4.1 Blind Field Duplicates

Field duplicate samples were collected as part of the sampling program (soil, sediment, and surface water). Analytical results for the field duplicate samples are provided in the analytical tables following this report, where the duplicate information is presented along with the primary sample data for comparison. The purpose was to assess the integrity of the samples. The relative percent difference (RPD) between the sample and its duplicate is expressed as an absolute value and is calculated using the following formula:

$$RPD (\%) = \frac{|C_o - C_{dup}|}{\frac{(C_o + C_{dup})}{2}} \times 100$$

Where:

$C_o$  = Detected concentration in the original sample

$C_{dup}$  = Detected concentration in the field duplicate sample

Acceptable limits for RPD (i.e., high vs. low degree of correlation) are based on BV Labs National QA/QC Interpretation Guide. The acceptable RPD between sample and duplicate for this field program is 25%. It is important to note that RPD calculations are only applicable when both the concentrations are greater than five times the laboratory RDL. When one, or both, values are less than the RDL, the RPD is not calculated.

A summary of RPDs for samples and their corresponding duplicate samples are provided in Table 1.

**Table 1 – Relative Percent Differences between the Original and Duplicate Samples**

Field Duplicate Sample ID	Original Sample ID	Relative percent difference (RPD)			
		PHC	PAH	Metals	Inorganics
<b>Soil</b>					
BFR_SS_DUP1	BFR_SS1_SA1	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	0 - 25 %	n/a
BFR_SS_DUP2	BFR_SS7_SA1	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	29 - 110 %	n/a
<b>Sediment</b>					
BFR_SED_DUP1	BFR_SED4	29 %	Not calculated due to parameters being equal or less than 5 times RDL	0 - 102%	n/a
BFR_SED_DUP2	BFR_SED5	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	6 - 21%	n/a



Field Duplicate Sample ID	Original Sample ID	Relative percent difference (RPD)			
		PHC	PAH	Metals	Inorganics
<b>Surface water</b>					
BFR_SW_DUP1	BFR_SW4	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	3 - 10%	3 - 10%
BFR_SW_DUP2	BFR_SW5	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	0 - 10%	3 - 15%

RPDs for several metals in soil were above the 25% including aluminium, barium, copper, iron, lead, manganese, strontium, and zinc. However, only the zinc concentration in the original sample exceeded the applicable guidelines whereas the duplicate's concentration was below. As a conservative approach, this was considered an exceedance and delineation was confirmed in the subsequent deeper sample (BFR\_SS7\_SA2). All other metals with a RPD greater than 25%, in BFR\_SS7 and BFR\_SED4, either had both samples exceeding applicable guidelines (lead) or were significantly lower than applicable guidelines. In addition, petroleum hydrocarbon (>C21-<C32 Hydrocarbons) had a RPD of 29%; however, both the original and duplicate samples were well above the applicable criteria.

As such, the results obtained from the Golder and the laboratory QA/QC programs are acceptable and the data collected during this investigation are considered acceptable for the purposes of this project.

#### 6.4.2 Laboratory QA/QC

The laboratory QA/QC includes internal checks such as analytical duplicates, reference materials, analytical blanks, spiked standards, surrogate recoveries, etc. The results are provided in the Laboratory Certificates of Analysis provided in Appendix E. The calculated RPDs and recoveries for the internal laboratory QA/QC sample results are within the laboratory defined QC limits.

Based on the above, the laboratory analytical results are considered to be valid and reliable.

## 7.0 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) for potential sources of contamination to the surface soil, sediment, and surface water at the Site is summarized and discussed below.

### 7.1 Potential Sources of Contamination

As discussed in Sections 2.1 and 2.2, DND leased the Site from Crown Lands in 2008 and it was used as a small arms rifle range by 5CRPG until approximately ten years ago. Based on the interviews completed by Golder, it is known that Burgeo residents accessed the Site as a firing range prior to DND's lease period. Also, based on anecdotal correspondence between RPOD (GD) with 5CRPG and some community members, it has been indicated that the range is still used by local hunters and community members as a target practice area even though 'No Trespassing' and 'Range Closed' signs have been installed at the Site. There is limited infrastructure

on the Site and no engineered controls. There are several waterbodies on the Site. Based on information available at present, potential COCs include PHCs, PAHs and metals with possible impacts to the soil, sediment, and surface water.

## 7.2 Identification of Potential Receptors

Potential human and ecological receptors that may spend time on the Site and be exposed to potential contamination of metals, PAHs, and PHCs/BTEX, in surface soil, sediment and/or surface water are considered.

Access to the Site is restricted to DND personnel and contractors, and other visitors or children are not permitted on the Site. However, it is understood that locals make unauthorized use of the Site as a firing range (“trespassers”). Hence, human receptors considered for the Site include a DND Worker, and Trespassers.

Terrestrial ecological receptors can occur at the Site. The Site is predominantly grass covered sub-tundra terrain with varying elevation changes. Terrestrial receptors such as plants, soil invertebrates, mammals and birds could be exposed to contaminated soil. Terrestrial receptors such as plants and soil invertebrates can be exposed to contaminated surface water, given several waterbodies onsite. The wetland areas can provide aquatic habitat and therefore aquatic receptors were considered. Aquatic receptors would include aquatic plants, invertebrates, birds, and fish. It should be noted that there are two small waterbodies immediately northwest of the backstop, however, these waterbodies appear to be man-made and not naturally occurring, due to their straight edges and rectangular shape.

Amphibians and reptiles can exist at the Site, although there is generally a lack of data regarding exposure and effects of contaminants.

## 7.3 Identification of Potential Exposure Pathways

Exposure pathways are used to describe how a COC in the impacted media (i.e., surface soil, sediment, and surface water) may come in contact with a receptor. For an exposure pathway to exist, a contaminant source, a release mechanism, transport media, and a receptor must be present. Inoperable and/or negligible pathways were not evaluated. Only those pathways that are complete and significant were considered.

### 7.3.1 Human Health

Exposure pathways to contaminated soil considered in this assessment include:

- Direct contact with soil (i.e., ingestion of soil and dermal contact with soil).
- Direct contact with sediment and surface water.

Several exposure pathways were not considered for soil and surface water. The pathways and rationale for their exclusion from the assessment are provided below:

- Inhalation of soil particulates was considered to be negligible for the DND Worker and Trespassers as these receptors would not be expected to conduct soil moving activities while on the Site; therefore, generation of soil dusts during their work is expected to be negligible and as a result this pathway was considered to be insignificant.
- Direct exposure by ingestion and dermal contact with surface water by the DND Worker and Trespassers is expected to be negligible given that these receptors would not be expected to engage in activities that would result in exposure to surface water.

- Inhalation of volatiles in indoor air was not evaluated given there are no buildings or structures at the Site.
- Human receptors may be exposed to COCs in outdoor air. However, it is assumed that vapours in outdoor air would rapidly mix with ambient air and be diluted such that exposure associated with this pathway would be negligible. Furthermore, exposure information associated with this pathway is subject to a high degree of uncertainty. As such, this pathway is considered to be complete but insignificant.

In the event of future remediation activities undertaken at the Site, inhalation as a possible exposure pathway for construction workers involved in the excavation and removal of soil will need to be considered. Soil dust and particulates from such activities can present potential health risks to workers on-Site and will need to be managed through appropriate health and safety measures.

### 7.3.2 Ecological Health

Exposure pathways to contaminated soil considered in this assessment include:

- Terrestrial plants: Direct contact with soil.
- Terrestrial soil invertebrates: Direct contact with soil.
- Mammals and birds: Incidental ingestion of soil and ingestion of prey.

Exposure pathways associated with contaminated sediment and surface water discharge to off-Site surface water/sediment include:

- Aquatic plants and invertebrates: Direct contact/uptake with surface water and direct contact with sediment.
- Fish: Direct contact with surface water and sediment.
- Aquatic mammals and birds: Ingestion of surface water, sediment, and prey.

Several exposure pathways were not considered for soil, surface water, and off-Site surface water and sediment. The pathways and rationale for their exclusion from the assessment are provided below:

- Soil invertebrates may be exposed to COCs in surface water; however, soil invertebrates tend to avoid the saturated zone. As such, exposure to surface water for soil invertebrates was not considered complete.
- Terrestrial plants may be exposed to COCs via stem and foliar uptake of ambient air. However, it is assumed that vapours in outdoor air would rapidly mix with ambient air and be diluted such that exposure associated with this pathway would be negligible. Furthermore, exposure information associated with this pathway is subject to a high degree of uncertainty. As such, this pathway was considered to be complete but insignificant.
- Dermal contact with soil for terrestrial mammals and birds and sediment for aquatic mammals and birds is not considered a significant pathway as the presence of fur on mammals and feathers on birds limits dermal contact with contaminated soil and sediment (US EPA, 2005; Sample and Suter, 1994). Furthermore, the data necessary to evaluate dermal contact exposure is often lacking (US EPA, 1993; Sample and Suter, 1994), or if available, based on studies in which the chemical is applied directly to the skin by shaving the fur from laboratory rodents (US EPA, 2005), a type of exposure that would not occur in the natural environment.

## 7.4 Conceptual Site Model Summary

A CSM identifies contaminant sources, release mechanisms, transport/residency media, exposure pathways and receptors (on-Site). Based on the information provided above, complete human health pathways associated with soil and surface water, and ecological health pathways associated with soil and surface water are considered to exist for the Site.

## 7.5 CCME National Classification System for Contaminated Sites

The CCME National Classification System for Contaminated Sites (NCSCS) ranks sites based on their individual characteristics. The descriptions of each class as described in the NCSCS Guideline Document (CCME NCSCS Guidance Document, 2008) are as follows:

**Class 1 – High Priority for Action:** Available information indicates that action (e.g., further site characterisation, risk management remediation, etc.) is required to address existing concerns. Typically, Class 1 sites show a propensity to high concern for several factors, and measured or observed impacts have been documented.

**Class 2 – Medium Priority for Action:** The available information indicates that there is a high potential for adverse offsite impacts, although the threat to human health and the environment is generally not imminent. There is probably no indication of offsite contamination; however, the potential for this was rated high and therefore some action is likely required.

**Class 3 – Low Priority for Action:** The available information indicates that this site is currently not a high concern. However additional investigation may be carried out to confirm the site classification, and some degree of action may be required.

**Class N – Not a Priority for Action:** The available information indicates there is probably no significant environmental impact of human health threats. There is likely no need for action unless new information becomes available indicating greater concerns, in which case the site should be re-examined.

**Class INS – Insufficient Information:** There is insufficient information to classify the site. In this event, additional information is required to address data gaps.

Based on the findings of the assessment, a NCSCS score of 58.8 was calculated for the Former Burgeo Range. As such, the Former Burgeo Range is identified as Site Letter Grade D Class 2 site with a medium priority for action. The NCSCS calculation sheet is provided in Appendix F.

## 8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of the analytical program, petroleum hydrocarbons exceedances were identified in soil and sediment at the Site. However, additional analyses conducted by the lab indicated that these exceedances did not resemble any petroleum products and appeared to be of natural and organic origin. Several metal exceedances in soil, sediment, and surface water were identified and considered to have resulted due to elevated background concentrations common to the Site and surrounding area. The concentrations of selenium and cadmium in the soil samples were fairly consistent across the Site, with some of the higher concentrations located in zone 3. The concentrations of aluminum and iron in surface water were also fairly consistent across the Site. Analytical data suggests the elevated concentrations of these metals are common to the Site and suggest that zone 3 can be considered representative of background conditions. However, presence of lead, tin and zinc in soil, lead in sediment, and lead and copper in surface water at the Site, all in Zone 1 of the Site, were attributed to bullets and casings from firing activities which includes the former DND firing range and shooting practice by town residents. It is understood that the Site was used by community members as an informal firing range even prior to the 2000s, when it was leased by DND.

Soil, surface water and sediment data exceedances on the Site are located in the area of the former firing range. Lead and iron concentrations in surface water are present in the pond adjacent to the former firing range and the pond discharges to the south toward Long Pond (a drinking water source for the Town of Burgeo), located approximately 1.2 km hydraulically down-gradient of the Site. Elevated iron concentrations are noted in the source water database for Long Pond from the WRMD's Newfoundland and Labrador Water Resources Portal (collected from 1998 to 2018) suggesting iron is associated with background concentrations in the region. Lead concentrations in Long Pond source water data have been below the Guidelines for Canadian Drinking Water Quality. Although there are lead concentrations in the pond located on the south portion of the Site and there is a potential for migration to the south it appears that it is localized and not migrating to Long Pond.

Data gaps remain with regards to site-specific background concentrations, potential leachate from soil to groundwater (which can accumulate at Long Pond) and delineation of localized metals contamination in soil, sediment, and surface water. As such, additional assessment is recommended to mitigate the identified impacts at the Site including collection of soil samples to laterally delineate the identified impacts and evaluate potential leachate into groundwater. In order to evaluate groundwater quality at the Site, installation of monitoring wells may be required as part of subsequent site characterization. Additional soil, sediment and surface water samples need to be completed to establish Site-specific background concentrations. Species at risk public registry search should be completed to confirm if species at risk are documented on or near the Site and identify if the Site is considered critical habitat. Mitigation measures may also involve risk assessment followed by remedial option evaluation.

## 9.0 LIMITATIONS

This letter report (the “Report”) was prepared for the exclusive use of DCC and DND for the express purpose of providing advice with respect to the environmental condition of the Site. In evaluating the Site, Golder Associates Ltd. has relied in good faith on information provided by others as noted in the Report. We have assumed that the information provided is factual and accurate. We accept no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or fraudulent acts of persons interviewed or contacted.

Any use which a third party makes of this Report, or any reliance on or decisions to be made based on it, are the sole responsibility of the third parties. If a third party require reliance on this Report, written authorization from Golder is required. Failing such authorization, Golder disclaims responsibility to third parties of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The scope and the period of Golder’s assessment are described in this Report, and are subject to the restrictions, assumptions and limitations described herein. Except as noted herein, the work was conducted in accordance with the scope of work and terms and conditions within Golder’s proposal. Golder did not perform a complete assessment of all possible conditions or circumstances that may exist at the Site referenced in the Report. Conditions may therefore exist which were not detected given the limited nature of the assessment Golder was retained to undertake with respect to the Site and additional environmental studies and actions may be required. In addition, it is recognized that the passage of time affects the information provided in the Report. Golder’s opinions are based upon information that existed at the time of the writing of the Report. It is understood that the services provided for in the scope of work allowed Golder to form no more than an opinion of the actual conditions at the Site at the time the Site was visited, and cannot be used to assess the effect of any subsequent changes in any laws, regulations, the environmental quality of the Site or its surroundings. If a service is not expressly indicated, do not assume it has been provided.

The results of an assessment of this nature should in no way be construed as a warranty that the Site is free from any and all contamination from past or current practices.

## 10.0 REFERENCES

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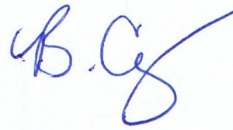
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## Signature Page

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**TABLES**



**TABLE 1**  
**Soil Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Date	Coordinates <sup>(a)</sup>	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_SS1	Dec 1/20	451668.18 E, 5277431.50 N	BFR_SS1_SA1	0 - 0.15	19.75	(SW) SAND, some silt, trace gravel and organics; light brown to grey, odorless; moist.	Surrounded by bedrock. Possible to step out to the north, east, or south.
			BFR_SS_DUP1		8.83		
			BFR_SS1_SA2		8.93		
BFR_SS2	Dec 1/20	451678.51 E, 5277402.03 N	BFR_SS2_SA1	0 - 0.15	10.68	(SW) gravelly SAND, some silt and organics; dark brown, odorless, contains cobbles; moist.	At the top of a hill. Possible to step out in any direction.
			BFR_SS2_SA2	0.15 - 0.30	19.91	(SW) gravelly SAND, some silt, trace organics; dark brown, odorless, contains cobbles and boulders; moist.	
BFR_SS3	Dec 1/20	451767.10 E, 5277399.78 N	BFR_SS3_SA1	0 - 0.15	7.79	(SM) SILTY SAND, trace gravel and organics; light brown to light grey, odorless, contains cobbles; moist.	In front of backstop. Possible to step out in any direction, easiest to the south.
			BFR_SS3_SA2	0.15 - 0.30	9.58	(SM) gravelly SILTY SAND; brown, odorless, contains cobbles; moist.	
BFR_SS4	Dec 1/20	451713.46 E, 5277423.55 N	BFR_SS4_SA1	0 - 0.15	9.18	(PT) PEAT; black to brown, odorless; wet.	Open area with bedrock outcrop to south. Possible to step out in any direction.
			BFR_SS4_SA2	0.15 - 0.30	8.36		
BFR_SS5	Dec 1/20	451771.09 E, 5277489.13 N	BFR_SS5_SA1	0 - 0.15	9.34	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless, boulder at bottom of hole; moist.	Boggy area with bedrock outcrops. Possible to step out.
			BFR_SS5_SA2	0.15 - 0.30	7.95		
BFR_SS6	Dec 1/20	451770.37 E, 5277369.42 N	BFR_SS6_SA1	0 - 0.15	11.61	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless; moist to wet.	Boggy area with bedrock outcrop to east.
			BFR_SS6_SA2	0.15 - 0.30	9.37		
BFR_SS7	Dec 1/20	451851.07 E, 5277395.04 N	BFR_SS7_SA1	0 - 0.15	8.43	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless, contains broken dinner plate fragments; wet.	In front of rock wall where former wooden targets were located. Possible to step out to south, east, or west.
			BFR_SS_DUP2		10.63		
			BFR_SS7_SA2		0.15 - 0.30		
BFR_SS8	Dec 1/20	452003.45 E, 5277375.31 N	BFR_SS8_SA1	0 - 0.15	16.27	(PT) PEAT; orange to dark brown, 0.1 m of moss/rootlets at surface, odorless; moist.	Open boggy area with some small bedrock outcrops in the vicinity.
			BFR_SS8_SA2	0.15 - 0.30	11.44		
BFR_SS9	Dec 1/20	451935.37 E, 5277533.75 N	BFR_SS9_SA1	0 - 0.15	28.17	(PT) PEAT; reddish brown to dark brown, 0.1 m of moss/rootlets at surface, odorless; moist to wet.	Open boggy area.
			BFR_SS9_SA2	0.15 - 0.30	14.51		
BFR_SS10	Dec 1/20	452007.60 E, 5277686.97 N	BFR_SS10_SA1	0 - 0.15	11.94	(PT) PEAT; dark brown to black, 0.1 m of moss/rootlets at surface, odorless, boulder at bottom of hole; wet.	Open boggy area with some small bedrock outcrops in the vicinity.
			BFR_SS10_SA2	0.15 - 0.30	16.73		
BFR_SS11	Dec 1/20	451932.91 E, 5277824.57 N	BFR_SS11_SA1	0 - 0.15	8.7	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless; moist to wet.	Open boggy area.
			BFR_SS11_SA2	0.15 - 0.30	13.41		
BFR_SS12	Dec 2/20	452229.33 E, 5277818.33 N	BFR_SS12_SA1	0 - 0.15	226	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; wet.	Low lying boggy area near waterbody.
			BFR_SS12_SA2	0.15 - 0.30	344.3	Water seeping into and filling hole.	
BFR_SS13	Dec 2/20	452507.40 E, 5277898.05 N	BFR_SS13_SA1	0 - 0.15	226	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless; wet.	Open boggy area, small bedrock outcrop adjacent to hole.
			BFR_SS13_SA2	0.15 - 0.30	252.2		
BFR_SS14	Dec 2/20	452654.37 E, 5277558.82 N	BFR_SS14_SA1	0 - 0.15	391.5	(PT) PEAT; orange brown to dark brown, 0.1 m of moss/rootlets at surface, odorless; wet.	Boggy area near bottom of hill.
			BFR_SS14_SA2	0.15 - 0.30	5.24		
BFR_SS15	Dec 2/20	452313.20 E, 5277348.96 N	BFR_SS15_SA1	0 - 0.15	241.3	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, earthy odor; wet.	Open boggy area.
			BFR_SS15_SA2	0.15 - 0.30	335.5		
BFR_SS16	Dec 2/20	452190.51 E, 5277571.06 N	BFR_SS16_SA1	0 - 0.15	196.2	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, earthy odor, boulder at bottom of hole; wet.	Open boggy area.
			BFR_SS16_SA2	0.15 - 0.30	5.13		
BFR_SS17	Dec 4/20	453069.75 E, 5277435.93 N	BFR_SS17_SA1	0 - 0.15	20.6	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; moist.	On top of and amongst area of bedrock outcrops.
			BFR_SS17_SA2	0.15 - 0.30	40.84	(PT) PEAT; some sand; dark brown to gray, 0.1 m of moss/rootlets at surface, odorless; moist. Bedrock encountered at 0.25 m.	
BFR_SS18	Dec 4/20	452926.99 E, 5277450.02 N	BFR_SS18_SA1	0 - 0.15	42.78	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; moist.	Boggy area with some bedrock outcrops in vicinity.
			BFR_SS_DUP3		44.75		
BFR_SS19	Dec 4/20	453751.56 E, 5277540.57 N	BFR_SS19_SA1	0 - 0.15	34.84	(PT) PEAT; dark brown, 0.1 m of red/orange moss/rootlets at surface, odorless; wet.	Open boggy area near waterbody. Difficult to access – surrounded by dense tree cover.
			BFR_SS19_SA2	0.15 - 0.30	27.67	Water seeping into hole at bottom.	
BFR_SS20	Dec 3/20	454105.10 E, 5277584.29 N	BFR_SS20_SA1	0 - 0.15	9.62	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; moist to wet.	Open boggy area on hill, small bedrock outcrops nearby.
			BFR_SS20_SA2	0.15 - 0.30	16.96	Water seeping into and filling hole.	
BFR_SS21	Dec 3/20	455114.92 E, 5277739.31 N	BFR_SS21_SA1	0 - 0.15	15.9	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; moist.	Open boggy area on hill, small bedrock outcrops nearby.
			BFR_SS21_SA2	0.15 - 0.30	15.75	(OL) ORGANIC SILT; black, layer of gravelly silty sand at bottom of hole, odorless; moist.	
BFR_SS22	Dec 3/20	454989.61 E, 5278636.23 N	BFR_SS22_SA1	0 - 0.15	15.18	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; wet.	Boggy area between two large bedrock outcrops.
			BFR_SS22_SA2	0.15 - 0.30	12.43	(OL) ORGANIC SILT; black, odorless; wet. Water seeping into and filling hole.	
BFR_SS23	Dec 3/20	454157.57 E, 5278495.27 N	BFR_SS23_SA1	0 - 0.15	16.75	(PT) PEAT; dark brown to black, 0.1 m of moss/rootlets at surface, odorless; wet.	Open boggy area.
			BFR_SS23_SA2	0.15 - 0.30	7.98		
BFR_SS24	Dec 4/20	453860.43 E, 5278426.56 N	BFR_SS24_SA1	0 - 0.15	25.15	(PT) PEAT; dark brown to black, 0.1 m of orange moss/rootlets at surface, odorless; wet.	Open boggy area.
			BFR_SS24_SA2	0.15 - 0.30	27.93		
BFR_SS25	Dec 4/20	453002.91 E, 5278242.03 N	BFR_SS25_SA1	0 - 0.15	38.1	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; wet.	Open boggy area.
			BFR_SS25_SA2	0.15 - 0.30	46.57	Water seeping into and filling hole.	

**Notes:**

<sup>(a)</sup> All coordinates are in UTM NAD83 Zone 21

**TABLE 2**  
**Sediment Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Date	Coordinates <sup>(a)</sup>	Collected from Boat or Shore	Description
BFR_SED1	Dec 1/20	451696.77 E, 5277481.98 N <sup>(b)</sup>	Boat	Dark brown, muddy/silty, earthy odor, no sheen.
BFR_SED2	Dec 1/20	451756.45 E, 5277569.38 N <sup>(b)</sup>	Boat	Dark brown, muddy/silty, odorless, no sheen.
BFR_SED3	Dec 1/20	451870.22 E, 5277557.07 N <sup>(b)</sup>	Boat	Dark brown, muddy/silty, earthy odor, no sheen.
BFR_SED4	Dec 1/20	451758.98 E, 5277420.43 N <sup>(b)</sup>	Boat	Dark brown, muddy/silty, earthy odor, no sheen.
BFR_SED_DUP1				
BFR_SED5	Dec 2/20	451860.87 E, 5277343.06 N	Shore	Light brown fine and coarse grain sand with fine and coarse grain quartz and some black organics, odorless, no sheen. Moved sample location near river outlet because there were too many rocks near the shore to get a sample.
BFR_SED_DUP2				
BFR_SED6	Dec 1/20	451970.76 E, 5277648.35 N <sup>(b)</sup>	Boat	Dark brown, muddy/silty, odorless, no sheen.
BFR_SED7	Dec 2/20	452765.48 E, 5277405.30 N	Shore	Dark brown, muddy/silty with coarse and fine grain white sand and quartz, odorless, no sheen.
BFR_SED8	Dec 2/20	452360.81 E, 5277462.07 N	Shore	Brown and white fine grain sand mixed with light brown silty sand, dark brown mud/silt, and some organics/roots, odorless, no sheen.
BFR_SED9	Dec 2/20	452362.85 E, 5277345.31 N	Shore	Dark brown, muddy/silty, odorless, no sheen.
BFR_SED10	Dec 1/20	452101.09 E, 5278004.86 N	Shore	Coarse and fine grain orange sand with brown silty sand, some quartz and larger (~1") black and orange and white and black rocks, odorless, no sheen.
BFR_SED11	Dec 1/20	452406.29 E, 5277825.93 N	Shore	Coarse and fine grain white and black sand mixed with dark brown muddy/silty sand, trace organic roots and one large rock with black and white grains, odorless, no sheen. Moved sample location away from surface water sample location because there were too many boulders to get a sample.
BFR_SED12	Dec 1/20	452610.74 E, 5277853.83 N	Shore	Dark brown, muddy/silty, odorless, no sheen.
BFR_SED13	Dec 2/20	452654.52 E, 5277447.53 N	Shore	Dark brown, muddy/silty, some organics/roots, odorless, no sheen.
BFR_SED14	Dec 2/20	452679.50 E, 5278117.72 N	Shore	Dark brown, muddy/silty with fine and trace coarse grain sand (mostly white, but some rare orange fine grain bits), trace quartz (very fine grain), some organics/roots, odorless, no sheen.
BFR_SED15	Dec 2/20	452798.11 E, 5277878.77 N	Shore	Dark brown, muddy/silty with organics and fine grain white sandy bits, odorless, no sheen.
BFR_SED16	Dec 1/20	451743.18 E, 5277431.34 N <sup>(b)</sup>	Boat	Dark brown, muddy/silty, earthy odor, no sheen.
BFR_SED17	Dec 4/20	453159.43 E, 5277434.22 N	Shore	Fine and coarse grain sand, mostly white with some pale orange, dark brown mud/silt, some organics/roots and quartz, odorless, no sheen.
BFR_SED_DUP3				
BFR_SED18	Dec 4/20	453741.99 E, 5277532.60 N	Shore	Fine grain with very little coarse grain sand, mostly white with some pale orange, dark brown muddy with some organics, odorless, no sheen. Moved sample location down shoreline because a tree grove prevented access to get a sample.
BFR_SED19	Dec 4/20	454016.48 E, 5277538.41 N	Shore	Dark brown muddy/silty with white coarse and fine grain sand, some quartz and organics/roots, odorless, no sheen.
BFR_SED20	Dec 3/20	454559.72 E, 5277750.44 N	Shore	Light brown fine and coarse grain sand with orange and black fine grain sand mixed in, some fine grain quartz, trace organics, odorless, no sheen.
BFR_SED21	Dec 3/20	455044.99 E, 5277705.31 N	Shore	Fine grain sand with coarse grain mixed in (light brown and white), dark brown silty/muddy with some organics/roots, odorless, no sheen. Moved sample location because cliff along waterline prevented access to get a sample. Stayed within site boundary.
BFR_SED22	Dec 3/20	454983.11 E, 5278619.48 N	Shore	Dark brown muddy/silty with minimal fine grain white sand, earthy odor, no sheen. Coordinates provided on map were not in a waterbody in the field – took sample from a small waterbody nearby.
BFR_SED23	Dec 3/20	454115.62 E, 5278512.37 N	Shore	Dark brown muddy/silty with organics/roots, fine grain white sand mixed in throughout, odorless, no sheen.
BFR_SED24	Dec 4/20	453881.19 E, 5278415.01 N	Shore	White, grey, yellow, orange fine and coarse grain sand, larger (~1/2" – 1") rocks with white and black spots and some minor orange staining on them, small amount of dark brown mud and organic roots, odorless, no sheen.
BFR_SED25	Dec 4/20	452959.88 E, 5278219.03 N	Shore	Dark brown muddy/silty with organics/roots, odorless, no sheen.

**Notes:**

<sup>(a)</sup> All coordinates are in UTM NAD83 Zone 21

<sup>(b)</sup> Point taken at shoreline from closest point to sample location.

**TABLE 3**  
**Surface Water Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Date	Coordinates <sup>(a)</sup>	Collected from Boat or Shore	Temperature (°C)	pH	Electrical Conductivity (mS/cm)	Description
BFR_SW1	Dec 1/20	451696.77 E, 5277481.98 N <sup>(b)</sup>	Boat	3.1	6.64	0.08	Slight yellow hue, odorless, clear, no sheen.
BFR_SW2	Dec 1/20	451756.45 E, 5277569.38 N <sup>(b)</sup>	Boat	3.4	6.54	0.08	Slight yellow hue, odorless, clear, no sheen.
BFR_SW3	Dec 1/20	451870.22 E, 5277557.07 N <sup>(b)</sup>	Boat	3.2	6.35	0.06	Slight yellow hue, odorless, clear, no sheen.
BFR_SW4 BFR_SW_DUP1	Dec 1/20	451758.98 E, 5277420.43 N <sup>(b)</sup>	Boat	2.7	8.65	0.07	Slight yellow hue, odorless, clear, no sheen.
BFR_SW5 BFR_SW_DUP2	Dec 2/20	451861.75 E, 5277340.03 N	Shore	5.4	5.27	0.05	Yellow hue, odorless, clear, no sheen. Moved sample location near river outlet to coincide with sediment sample location.
BFR_SW6	Dec 1/20	451970.76 E, 5277648.35 N <sup>(b)</sup>	Boat	3.4	6.70	0.04	Yellow hue, odorless, clear, no sheen.
BFR_SW7	Dec 2/20	452762.45 E, 5277406.64 N	Shore	7.3	4.94	0.06	Yellow hue, odorless, clear, no sheen.
BFR_SW8	Dec 2/20	452361.10 E, 5277463.78 N	Shore	6.4	5.49	0.04	Yellow hue, odorless, clear, no sheen.
BFR_SW9	Dec 2/20	452359.92 E, 5277344.95 N	Shore	6.1	6.15	0.06	Slight yellow hue, odorless, clear, no sheen.
BFR_SW10	Dec 1/20	452102.05 E, 5278001.93 N	Shore	3.4	5.84	0.06	Slight yellow hue, odorless, clear, no sheen.
BFR_SW11	Dec 1/20	452406.56 E, 5277818.31 N	Shore	3.6	5.44	0.06	Yellow hue, odorless, clear, no sheen.
BFR_SW12	Dec 1/20	452614.55 E, 5277852.42 N	Shore	4.1	4.80	0.06	Yellow hue, odorless, clear, no sheen.
BFR_SW13	Dec 2/20	452656.03 E, 5277445.33 N	Shore	6.1	5.20	0.06	Yellow hue, odorless, clear, no sheen.
BFR_SW14	Dec 2/20	452678.93 E, 5278119.35 N	Shore	5.3	5.20	0.05	Yellow hue, odorless, clear, no sheen.
BFR_SW15	Dec 2/20	452796.83 E, 5277878.59 N	Shore	5.5	5.40	0.05	Dull yellow hue, odorless, clear, no sheen.
BFR_SW16	Dec 1/20	451743.18 E, 5277431.34 N <sup>(b)</sup>	Boat	2.9	6.82	0.06	Slight yellow hue, odorless, clear, no sheen.
BFR_SW17 BFR_SW_DUP3	Dec 4/20	453154.94 E, 5277432.32 N	Shore	5.9	5.00	0.07	Slight yellow hue, odorless, clear, no sheen.
BFR_SW18	Dec 4/20	453737.62 E, 5277536.07 N	Shore	5.2	5.29	0.06	Yellow hue, odorless, clear, no sheen. Moved sample location down shoreline because a tree grove prevented access to get a sample.
BFR_SW19	Dec 4/20	454011.41 E, 5277541.00 N	Shore	4.7	5.06	0.08	Slight yellow hue, odorless, clear, no sheen.
BFR_SW20	Dec 3/20	454557.35 E, 5277753.10 N	Shore	7.4	5.79	0.07	Yellow hue, odorless, clear, no sheen.
BFR_SW21	Dec 3/20	455046.66 E, 5277701.19 N	Shore	7.3	5.65	0.07	Yellow hue, odorless, clear, no sheen. Moved sample location because cliff along waterline prevented access to get a sample. Stayed within site boundary.
BFR_SW22	Dec 3/20	454980.19 E, 5278620.97 N	Shore	7.7	5.04	0.07	Slight yellow hue, odorless, clear, no sheen. Coordinates provided on map were not in a waterbody in the field – took sample from a small waterbody nearby.
BFR_SW23	Dec 3/20	454111.56 E, 5278513.50 N	Shore	7.2	4.89	0.06	Yellow hue, odorless, clear, no sheen.
BFR_SW24	Dec 4/20	453883.12 E, 5278416.35 N	Shore	5.6	5.54	0.06	Slight yellow hue, odorless, clear, no sheen.
BFR_SW25	Dec 4/20	452963.04 E, 5278221.17 N	Shore	6.2	5.75	0.07	Yellow hue, odorless, clear, no sheen.

**Notes:**

<sup>(a)</sup> All coordinates are in UTM NAD83 Zone 21.

<sup>(b)</sup> Point taken at shoreline from closest point to sample location.

**TABLE 4**  
**Soil Sample Analyses Completed**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Sample ID	Depth (mbgs)	Risk Ranking	Field Parameters	Required Analysis			
				Organic/ Combustible Vapors	Petroleum Hydrocarbons + BTEX <sup>(a)</sup>	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)	
BFR_SS1	BFR_SS1_SA1	0 - 0.15	High (zone 1)	X	X	X	X	
	BFR_SS1_SA2	0.15 - 0.30	High (zone 1)	X				on-hold
BFR_SS2	BFR_SS2_SA1	0 - 0.15	High (zone 1)	X	X	X	X	
	BFR_SS2_SA2	0.15 - 0.30	High (zone 1)	X				on-hold
BFR_SS3	BFR_SS3_SA1	0 - 0.15	High (zone 1)	X	X	X	X	
	BFR_SS3_SA2	0.15 - 0.30	High (zone 1)	X				on-hold
BFR_SS4	BFR_SS4_SA1	0 - 0.15	High (zone 1)	X	X	<b>X</b>	X	
	BFR_SS4_SA2	0.15 - 0.30	High (zone 1)	X				on-hold
BFR_SS5	BFR_SS5_SA1	0 - 0.15	High (zone 1)	X	X	<b>X</b>	X	
	BFR_SS5_SA2	0.15 - 0.30	High (zone 1)	X				on-hold
BFR_SS6	BFR_SS6_SA1	0 - 0.15	High (zone 1)	X	X	<b>X</b>	X	
	BFR_SS6_SA2	0.15 - 0.30	High (zone 1)	X		<b>X</b>		
BFR_SS7	BFR_SS7_SA1	0 - 0.15	High (zone 1)	X	X	<b>X</b>	X	
	BFR_SS7_SA2	0.15 - 0.30	High (zone 1)	X		<b>X</b>		
BFR_SS8	BFR_SS8_SA1	0 - 0.15	High (zone 1)	X	X	<b>X</b>	X	
	BFR_SS8_SA2	0.15 - 0.30	High (zone 1)	X		<b>X</b>		
BFR_SS9	BFR_SS9_SA1	0 - 0.15	High (zone 1)	X	X	<b>X</b>	X	
	BFR_SS9_SA2	0.15 - 0.30	High (zone 1)	X				on-hold
BFR_SS10	BFR_SS10_SA1	0 - 0.15	High (zone 1)	X	X	<b>X</b>	X	
	BFR_SS10_SA2	0.15 - 0.30	High (zone 1)	X				on-hold
BFR_SS11	BFR_SS11_SA1	0 - 0.15	High (zone 1)	X	X	<b>X</b>	X	
	BFR_SS11_SA2	0.15 - 0.30	High (zone 1)	X				on-hold
BFR_SS12	BFR_SS12_SA1	0 - 0.15	High (zone 1)	X	X	<b>X</b>	X	
	BFR_SS12_SA2	0.15 - 0.30	High (zone 1)	X				on-hold
BFR_SS13	BFR_SS13_SA1	0 - 0.15	High (zone 1)	X	X	<b>X</b>	X	
	BFR_SS13_SA2	0.15 - 0.30	High (zone 1)	X		<b>X</b>		
BFR_SS14	BFR_SS14_SA1	0 - 0.15	High (zone 1)	X	X	<b>X</b>	X	
	BFR_SS14_SA2	0.15 - 0.30	High (zone 1)	X				on-hold
BFR_SS15	BFR_SS15_SA1	0 - 0.15	High (zone 1)	X	X	<b>X</b>	X	
	BFR_SS15_SA2	0.15 - 0.30	High (zone 1)	X				on-hold
BFR_SS16	BFR_SS16_SA1	0 - 0.15	High (zone 1)	X	X	<b>X</b>	X	
	BFR_SS16_SA2	0.15 - 0.30	High (zone 1)	X				on-hold
BFR_SS17	BFR_SS17_SA1	0 - 0.15	Medium (zone 2)	X	X	X	X	
	BFR_SS17_SA2	0.15 - 0.30	Medium (zone 2)	X				on-hold
BFR_SS18	BFR_SS18_SA1	0 - 0.15	Medium (zone 2)	X	X	<b>X</b>	X	
	BFR_SS18_SA2	0.15 - 0.30	Medium (zone 2)	X				on-hold
BFR_SS19	BFR_SS19_SA1	0 - 0.15	Medium (zone 2)	X	X	<b>X</b>	X	
	BFR_SS19_SA2	0.15 - 0.30	Medium (zone 2)	X				on-hold
BFR_SS20	BFR_SS20_SA1	0 - 0.15	Low (zone 3)	X	X	<b>X</b>	X	
	BFR_SS20_SA2	0.15 - 0.30	Low (zone 3)	X				on-hold
BFR_SS21	BFR_SS21_SA1	0 - 0.15	Low (zone 3)	X	<b>X</b>	<b>X</b>	X	
	BFR_SS21_SA2	0.15 - 0.30	Low (zone 3)	X				on-hold
BFR_SS22	BFR_SS22_SA1	0 - 0.15	Low (zone 3)	X	X	<b>X</b>	X	
	BFR_SS22_SA2	0.15 - 0.30	Low (zone 3)	X				on-hold
BFR_SS23	BFR_SS23_SA1	0 - 0.15	Low (zone 3)	X	X	<b>X</b>	X	
	BFR_SS23_SA2	0.15 - 0.30	Low (zone 3)	X		<b>X</b>		
BFR_SS24	BFR_SS24_SA1	0 - 0.15	Medium (zone 2)	X	X	<b>X</b>	X	
	BFR_SS24_SA2	0.15 - 0.30	Medium (zone 2)	X		<b>X</b>		
BFR_SS25	BFR_SS25_SA1	0 - 0.15	Medium (zone 2)	X	X	<b>X</b>	X	
	BFR_SS25_SA2	0.15 - 0.30	Medium (zone 2)	X				on-hold
n/a	BFR_SS_DUP1	0 - 0.15	n/a	X	X	X	X	
n/a	BFR_SS_DUP2	0 - 0.15	n/a	X	X	<b>X</b>	X	
n/a	BFR_SS_DUP3	0 - 0.15	n/a	X				on-hold

**Notes:**

<sup>(a)</sup> Petroleum Hydrocarbons + BTEX exceedances are due to organic peat content

**Exceedance Identification:**

**Bold and shaded = Exceedance of applicable guidelines**

**TABLE 5**  
**Sediment Sample Analyses Completed**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Risk Ranking	Field Parameters	Required Analysis			
		Moisture	Petroleum Hydrocarbons + BTEX <sup>(a)</sup>	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)	
BFR_SED1	High (zone 1)	X	<b>X</b>	X	X	
BFR_SED2	High (zone 1)	X	<b>X</b>	X	X	
BFR_SED3	High (zone 1)	X	<b>X</b>	X	X	
BFR_SED4	High (zone 1)	X	<b>X</b>	<b>X</b>	X	
BFR_SED5	High (zone 1)	X	X	X	X	
BFR_SED6	High (zone 1)	X	<b>X</b>	<b>X</b>	X	
BFR_SED7	High (zone 1)	X	<b>X</b>	X	X	
BFR_SED8	High (zone 1)	X	X	X	X	
BFR_SED9	High (zone 1)	X	<b>X</b>	X	X	
BFR_SED10	High (zone 1)	X	X	X	X	
BFR_SED11	High (zone 1)	X	X	X	X	
BFR_SED12	High (zone 1)	X	<b>X</b>	<b>X</b>	X	
BFR_SED13	High (zone 1)	X	<b>X</b>	X	X	
BFR_SED14	High (zone 1)	X	<b>X</b>	X	X	
BFR_SED15	High (zone 1)	X	<b>X</b>	X	X	
BFR_SED16	High (zone 1)	X	<b>X</b>	X	X	
BFR_SED17	Medium (zone 2)	X	X	X	X	
BFR_SED18	Medium (zone 2)	X	X	X	X	
BFR_SED19	Medium (zone 2)	X	<b>X</b>	X	X	
BFR_SED20	Low (zone 3)	X	X	X	X	
BFR_SED21	Low (zone 3)	X	X	X	X	
BFR_SED22	Low (zone 3)	X	<b>X</b>	X	X	
BFR_SED23	Low (zone 3)	X	<b>X</b>	X	X	
BFR_SED24	Medium (zone 2)	X	X	X	X	
BFR_SED25	Medium (zone 2)	X	<b>X</b>	X	X	
BFR_SED_DUP1	n/a	X	<b>X</b>	<b>X</b>	X	
BFR_SED_DUP2	n/a	X	X	X	X	
BFR_SED_DUP3	n/a	X				on-hold

**Notes:**

<sup>(a)</sup> Petroleum Hydrocarbons + BTEX exceedances are due to organic peat content

**Exceedance Identification:**

**Bold and shaded = Exceedance of applicable guidelines**

**TABLE 6**  
**Surface Water Sample Analyses**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Risk Ranking	Field Parameters	Required Analysis				
		pH, Temperature, Electrical Conductivity	Petroleum Hydrocarbons +BTEX	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)	General Chemistry	
BFR_SW1	High (zone 1)	X	X	<b>X</b>	X		
BFR_SW2	High (zone 1)	X	X	<b>X</b>	X		
BFR_SW3	High (zone 1)	X	X	<b>X</b>	X		
BFR_SW4	High (zone 1)	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW5	High (zone 1)	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW6	High (zone 1)	X	X	<b>X</b>	X		
BFR_SW7	High (zone 1)	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW8	High (zone 1)	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW9	High (zone 1)	X	X	<b>X</b>	X		
BFR_SW10	High (zone 1)	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW11	High (zone 1)	X	X	<b>X</b>	X		
BFR_SW12	High (zone 1)	X	X	<b>X</b>	X		
BFR_SW13	High (zone 1)	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW14	High (zone 1)	X	X	<b>X</b>	X		
BFR_SW15	High (zone 1)	X	X	<b>X</b>	X		
BFR_SW16	High (zone 1)	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW17	Medium (zone 2)	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW18	Medium (zone 2)	X	X	<b>X</b>	X		
BFR_SW19	Medium (zone 2)	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW20	Low (zone 3)	X	X	<b>X</b>	X		
BFR_SW21	Low (zone 3)	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW22	Low (zone 3)	X	X	<b>X</b>	X		
BFR_SW23	Low (zone 3)	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW24	Medium (zone 2)	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW25	Medium (zone 2)	X	X	<b>X</b>	X		
BFR_SW_DUP1	n/a	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW_DUP2	n/a	X	X	<b>X</b>	X	<b>X</b>	
BFR_SW_DUP3	n/a	X					on-hold

**Exceedance Identification:**

**Bold and shaded = Exceedance of applicable guidelines**

**TABLE 7**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Soil**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Atlantic RBCA ESL <sup>(a)</sup>	Atlantic RBCA Tier I RBSL <sup>(b)</sup>	Units	BFR_SS1		BFR_SS2	BFR_SS3	BFR_SS4		BFR_SS5		BFR_SS6		BFR_SS7			
				BFR_SS1_SA1	BFR_SS_DUP1	BFR_SS2_SA1	BFR_SS3_SA1	BFR_SS4_SA1 (original)	BFR_SS4_SA1 (revised)	BFR_SS5_SA1 (original)	BFR_SS5_SA1 (revised)	BFR_SS6_SA1 (original)	BFR_SS6_SA1 (revised)	BFR_SS7_SA1 (original)	BFR_SS7_SA1 (revised)	BFR_SS_DUP2 (original)	BFR_SS_DUP2 (revised)
				0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Benzene	31	0.042	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	75	0.35	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	55	0.043	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes	95	0.73	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
C6 - C10 (less BTEX)	210	NGA	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
>C10-C16 Hydrocarbons	150	NGA	mg/kg	<10	<10	<10	<10	94	<10	85	<10	120	<10	76	<10	61	<10
>C16-C21 Hydrocarbons	300	NGA	mg/kg	<10	<10	<10	<10	190	<10	190	<10	200	<10	190	<10	200	<10
>C21-<C32 Hydrocarbons	2,800	NGA	mg/kg	<15	<15	56	<15	1900	240	1000	43	1200	47	850	37	1300	270
Modified TPH	Gasoline	NGA	74*	<15	<15	56***	<15	<u>2200**</u>	240***	<u>1300**</u>	43***	<u>1500**</u>	47***	<u>1100**</u>	37***	<u>1500**</u>	270***
	Diesel/No. 2 Fuel Oil	NGA	270**														
	Lube oil/No. 6 Oil	NGA	1100***														
Reached Baseline at C32				NA	NA	Yes	NA	No	No	No	Yes	No	Yes	No	Yes	Yes	Yes
Hydrocarbon Resemblance				NA	NA	Possible lube oil fraction.	NA	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.

**Notes:**  
 NA = not applicable  
 NGA = guideline is not available  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
<sup>(a)</sup> Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)  
<sup>(b)</sup> Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, potable groundwater, coarse-grained soil  
<sup>(c)</sup> Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.  
 \*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**  
**Bold and shaded = Exceedance of Atlantic RBCA RBSL ESL<sup>(a)</sup>**  
**Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA Tier I RBSL<sup>(b)</sup> (background concentration)**

**TABLE 7**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Soil**  
**Burge Firing Range, 9 Wing Gander, NL**

Sample ID	Atlantic RBCA ESL <sup>(a)</sup>	Atlantic RBCA Tier I RBSL <sup>(b)</sup>	Units	BFR_SS8		BFR_SS9		BFR_SS10		BFR_SS11		BFR_SS12	BFR_SS13		BFR_SS14	
				BFR_SS8_SA1 (original)	BFR_SS8_SA1 (revised)	BFR_SS9_SA1 (original)	BFR_SS9_SA1 (revised)	BFR_SS10_SA1 (original)	BFR_SS10_SA1 (revised)	BFR_SS11_SA1 (original)	BFR_SS11_SA1 (revised)	BFR_SS12_SA1	BFR_SS13_SA1 (original)	BFR_SS13_SA1 (revised)	BFR_SS14_SA1 (original)	BFR_SS14_SA1 (revised)
				0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected				2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-02
Benzene	31	0.042	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	75	0.35	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.050	<0.050	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	55	0.043	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes	95	0.73	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.050	<0.050	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.10
C6 - C10 (less BTEX)	210	NGA	mg/kg	<5.0	<5.0	<5.0	<5.0	<2.5	<2.5	<5.0	<5.0	<2.5	<5.0	<5.0	<5.0	<5.0
>C10-C16 Hydrocarbons	150	NGA	mg/kg	<10	<10	<10	<10	65	<10	130	<10	<10	<b>160</b>	<10	<10	<10
>C16-C21 Hydrocarbons	300	NGA	mg/kg	230	<10	140	<10	120	<10	290	<10	<10	240	<10	190	<10
>C21-<C32 Hydrocarbons	2,800	NGA	mg/kg	1300	34	720	17	810	51	1600	38	590	1300	33	1300	250
Modified TPH	Gasoline	NGA	74*	<u>1500**</u>	34***	<u>860**</u>	17***	<u>990**</u>	51***	<u>2000**</u>	38***	590***	<u>1700**</u>	33***	<u>1500***</u>	250***
	Diesel/No. 2 Fuel Oil	NGA	270**													
	Lube oil/No. 6 Oil	NGA	1100***													
Reached Baseline at C32				No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	No	Yes
Hydrocarbon Resemblance				Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Possible lube oil fraction.	Fuel/lube oil range. Possible lube oil fraction. <sup>(c)</sup>	Lube oil range. <sup>(c)</sup>	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Possible lube oil fraction.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Lube oil range. Possible lube oil fraction.	Lube oil range.

**Notes:**  
 NA = not applicable  
 NGA = guideline is not available  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
<sup>(a)</sup> Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)  
<sup>(b)</sup> Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, potable groundwater, coarse-grained soil  
<sup>(c)</sup> Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.  
 \*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**  
**Bold and shaded = Exceedance of Atlantic RBCA RBSL ESL<sup>(a)</sup>**  
**Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA Tier I RBSL<sup>(b)</sup> (background concentration)**



**TABLE 7**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Soil**  
**Burge Firing Range, 9 Wing Gander, NL**

Sample ID	Atlantic RBCA ESL <sup>(a)</sup>	Atlantic RBCA Tier I RBSL <sup>(b)</sup>	Units	BFR_SS15		BFR_SS16		BFR_SS17		BFR_SS18		BFR_SS19		BFR_SS20	
				BFR_SS15_SA1 (original)	BFR_SS15_SA1 (revised)	BFR_SS16_SA1 (original)	BFR_SS16_SA1 (revised)	BFR_SS17_SA1 (original)	BFR_SS17_SA1 (revised)	BFR_SS18_SA1 (original)	BFR_SS18_SA1 (revised)	BFR_SS19_SA1 (original)	BFR_SS19_SA1 (revised)	BFR_SS20_SA1 (original)	BFR_SS20_SA1 (revised)
				0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected				2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03
Benzene	31	0.042	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	75	0.35	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	55	0.043	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes	95	0.73	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10
C6 - C10 (less BTEX)	210	NGA	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.5	<2.5	<5.0	<5.0	<5.0	<5.0
>C10-C16 Hydrocarbons	150	NGA	mg/kg	<10	<10	120	<10	110	61	57	<10	91	<10	98	<10
>C16-C21 Hydrocarbons	300	NGA	mg/kg	230	<10	290	<10	140	<10	150	<10	270	<10	290	<10
>C21-<C32 Hydrocarbons	2,800	NGA	mg/kg	2200	550	<b>3400</b>	850	1200	160	1100	120	2500	450	2200	480
Modified TPH	Gasoline	NGA	74*												
	Diesel/No. 2 Fuel Oil	NGA	270**	<u>2400***</u>	550***	<u>3900**</u>	850***	<u>1500**</u>	220**	<u>1300**</u>	120***	<u>2900**</u>	450***	<u>2600**</u>	480***
	Lube oil/No. 6 Oil	NGA	1100***												
Reached Baseline at C32				No	Yes	No	No	No	Yes	No	Yes	No	Yes	No	Yes
Hydrocarbon Resemblance				Lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Fuel/lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.

**Notes:**  
 NA = not applicable  
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<sup>(a)</sup> Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)  
<sup>(b)</sup> Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, potable groundwater, coarse-grained soil  
<sup>(c)</sup> Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.  
 \*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**  
**Bold and shaded = Exceedance of Atlantic RBCA RBSL ESL<sup>(a)</sup>**  
**Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA Tier I RBSL<sup>(b)</sup> (background concentration)**

**TABLE 7**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Soil**  
**Burge Firing Range, 9 Wing Gander, NL**

Sample ID	Atlantic RBCA ESL <sup>(a)</sup>	Atlantic RBCA Tier I RBSL <sup>(b)</sup>	Units	BFR_SS21		BFR_SS22		BFR_SS23		BFR_SS24		BFR_SS25	
				BFR_SS21_SA1 (original)	BFR_SS21_SA1 (revised)	BFR_SS22_SA1 (original)	BFR_SS22_SA1 (revised)	BFR_SS23_SA1 (original)	BFR_SS23_SA1 (revised)	BFR_SS24_SA1 (original)	BFR_SS24_SA1 (revised)	BFR_SS25_SA1 (original)	BFR_SS25_SA1 (revised)
				0 - 0.15		0 - 0.15		0 - 0.15		0 - 0.15		0 - 0.15	
Date Collected	2020-12-03		2020-12-03		2020-12-03		2020-12-03		2020-12-04		2020-12-04		
Benzene	31	0.042	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	75	0.35	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	55	0.043	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes	95	0.73	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
C6 - C10 (less BTEX)	210	NGA	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
>C10-C16 Hydrocarbons	150	NGA	mg/kg	100	56	66	<10	<10	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons	300	NGA	mg/kg	190	<10	120	<10	250	<10	<10	<10	230	<10
>C21-<C32 Hydrocarbons	2,800	NGA	mg/kg	1200	240	980	140	2100	410	500	<15	1900	470
Modified TPH	Gasoline	NGA	74*	<u>1500**</u>	<u>300**</u>	<u>1200**</u>	140***	<u>2300**</u>	410***	<u>500***</u>	<15	<u>2100**</u>	470***
	Diesel/No. 2 Fuel Oil	NGA	270**										
	Lube oil/No. 6 Oil	NGA	1100***										
Reached Baseline at C32				Yes	Yes	No	Yes	Yes	Yes	Yes	NA	Yes	Yes
Hydrocarbon Resemblance				Fuel/lube oil range. Possible lube oil fraction.	Fuel/lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Lube oil range.	NA	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.

**Notes:**  
 NA = not applicable  
 NGA = guideline is not available  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
<sup>(a)</sup> Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)  
<sup>(b)</sup> Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, potable groundwater, coarse-grained soil  
<sup>(c)</sup> Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.  
 \*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**  
**Bold and shaded = Exceedance of Atlantic RBCA RBSL ESL<sup>(a)</sup>**  
**Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA Tier I RBSL<sup>(b)</sup> (background concentration)**

**TABLE 8**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	CCME SQG <sup>(a)</sup>	Units	BFR_SS1	BFR_SS2	BFR_SS3	BFR_SS4	BFR_SS5	BFR_SS6	BFR_SS7		BFR_SS8	BFR_SS9	BFR_SS10	BFR_SS11	BFR_SS12	
			BFR_SS1_SA1	BFR_SS_DUP1	BFR_SS2_SA1	BFR_SS3_SA1	BFR_SS4_SA1	BFR_SS5_SA1	BFR_SS6_SA1	BFR_SS7_SA1	BFR_SS_DUP2	BFR_SS8_SA1	BFR_SS9_SA1	BFR_SS10_SA1	BFR_SS11_SA1	BFR_SS12_SA1
			0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected			2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	
1-Methylnaphthalene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
2-Methylnaphthalene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene	2.5	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)anthracene	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	20	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b,j)fluoranthene	0.1	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo(g,h,i)perylene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(j)fluoranthene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	0.036	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dibenzo(a,h)anthracene	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluoranthene	50	mg/kg	<0.010	<0.010	<0.010	<0.010	0.047	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.041	<0.010	<0.010
Naphthalene	0.013	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Perylene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	0.078	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	0.046	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.060	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Index of Additive Cancer Risk (IACR) <sup>(b)</sup>	1.0		0.15	0.15	0.15	0.15	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15

**Notes:**

NGA = guideline is not available

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use

<sup>(b)</sup> The Index of Additive Cancer Risk (IACR) assesses potential threats to potable groundwater water quality from leaching of carcinogenic PAH mixtures from soil. It is used for the protection of potable water. IACR = [Benzo(a)anthracene / 0.33 mg/kg] + [Benzo(b,j,k)fluoranthene / 0.16 mg/kg] + [Benzo(g,h,i)perylene / 6.8 mg/kg] + [Benzo(a)pyrene / 0.37 mg/kg] + [Chrysene / 2.1 mg/kg] + [Dibenzo(a,h)anthracene / 0.23 mg/kg] + [Indeno(1,2,3-c,d)pyrene / 2.7 mg/kg]. Where values are below the detection limit, half the detection limit is used.

**Exceedance Identification:**

**Bold and shaded = Exceedance of CCME SQG<sup>(a)</sup>**

**TABLE 8**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	CCME SQG <sup>(a)</sup>	Units	BFR_SS13	BFR_SS14	BFR_SS15	BFR_SS16	BFR_SS17	BFR_SS18	BFR_SS19	BFR_SS20	BFR_SS21	BFR_SS22	BFR_SS23	BFR_SS24	BFR_SS25
			BFR_SS13_SA1	BFR_SS14_SA1	BFR_SS15_SA1	BFR_SS16_SA1	BFR_SS17_SA1	BFR_SS18_SA1	BFR_SS19_SA1	BFR_SS20_SA1	BFR_SS21_SA1	BFR_SS22_SA1	BFR_SS23_SA1	BFR_SS24_SA1	BFR_SS25_SA1
Sample Depth (mbgs)			0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected			2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04
1-Methylnaphthalene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
2-Methylnaphthalene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.060	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene	2.5	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)anthracene	0.1	mg/kg	<0.010	<0.010	<0.010	<0.070	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	20	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b,j)fluoranthene	0.1	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo(g,h,i)perylene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.32	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(j)fluoranthene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dibenzo(a,h)anthracene	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluoranthene	50	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.054	<0.010	<0.010	<0.010
Naphthalene	0.013	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Perylene	NGA	mg/kg	<0.010	<0.010	<0.010	1.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	0.046	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Index of Additive Cancer Risk (IACR) <sup>(b)</sup>	1.0		0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.17	0.15	0.15	0.15

**Notes:**

NGA = guideline is not available

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use

<sup>(b)</sup> The Index of Additive Cancer Risk (IACR) assesses potential threats to potable groundwater water quality from leaching of carcinogenic PAH mixtures from soil. It is used for the protection of potable water. IACR = [Benzo(a)anthracene / 0.33 mg/kg] + [Benzo(b,j,k)fluoranthene / 0.16 mg/kg] + [Benzo(g,h,i)perylene / 6.8 mg/kg] + [Benzo(a)pyrene / 0.37 mg/kg] + [Chrysene / 2.1 mg/kg] + [Dibenzo(a,h)anthracene / 0.23 mg/kg] + [Indeno(1,2,3-c,d)pyrene / 2.7 mg/kg]. Where values are below the detection limit, half the detection limit is used.

**Exceedance Identification:**

**Bold and shaded = Exceedance of CCME SQG<sup>(a)</sup>**

**TABLE 9**  
**Analytical Results - Metals in Soil**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	CCME SQG <sup>(a)</sup>	Units	BFR_SS1		BFR_SS2	BFR_SS3	BFR_SS4	BFR_SS5	BFR_SS6		BFR_SS7			BFR_SS8	
			BFR_SS1_SA1	BFR_SS_DUP1	BFR_SS2_SA1	BFR_SS3_SA1	BFR_SS4_SA1	BFR_SS5_SA1	BFR_SS6_SA1	BFR_SS6_SA2	BFR_SS7_SA1	BFR_SS_DUP2	BFR_SS7_SA2	BFR_SS8_SA1	BFR_SS8_SA2
			0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0.15 - 0.3	0 - 0.15	0 - 0.15	0.15 - 0.3	0 - 0.15	0.15 - 0.3
Date Collected			2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01
Acid Extractable Aluminum (Al)	NGA	mg/kg	5500	5700	7800	6000	13000	840	5800	9700	1600	1200	2500	700	2600
Acid Extractable Antimony (Sb)	20	mg/kg	<2.0	<2.0	<2.0	2.8	<2.0	<2.0	<2.0	<2.0	9.3	5.9	20	<2.0	<2.0
Acid Extractable Arsenic (As)	12	mg/kg	2.5	3.2	5.7	3.5	<2.0	<2.0	<2.0	<2.0	2.8	2.1	<2.0	2.7	<2.0
Acid Extractable Barium (Ba)	750	mg/kg	21	21	34	24	15	33	19	6.3	220	63	44	17	7.9
Acid Extractable Beryllium (Be)	4	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	NGA	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	1.4	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.42	<0.30	0.85	0.64	0.42	<b>1.5</b>	<0.30
Acid Extractable Chromium (Cr)	64	mg/kg	10	10	20	10	13	<2.0	3.8	5.7	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Cobalt (Co)	40	mg/kg	2.8	3.1	5.6	2.9	1.0	<1.0	<1.0	<1.0	2.6	1.3	1.2	<1.0	<1.0
Acid Extractable Copper (Cu)	63	mg/kg	4.5	4.9	12	8.7	4.2	2.4	6.2	2.3	42	31	46	2.5	2.5
Acid Extractable Iron (Fe)	NGA	mg/kg	8700	9500	16000	8700	5000	690	4600	1500	2000	1200	1800	1600	130
Acid Extractable Lead (Pb)	70	mg/kg	3.8	4.1	17	13	52	17	16	8.9	<b>640</b>	<b>420</b>	<b>780</b>	28	1.4
Acid Extractable Lithium (Li)	NGA	mg/kg	8.6	9.3	12	8.3	3.8	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Manganese (Mn)	NGA	mg/kg	130	130	330	140	47	13	26	18	22	14	24	7.9	<2.0
Acid Extractable Mercury (Hg)	6.6	mg/kg	<0.10	<0.10	<0.10	<0.10	0.17	0.25	0.31	0.15	0.49	0.32	0.29	0.23	0.12
Acid Extractable Molybdenum (Mo)	5	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	45	mg/kg	6.6	7.3	11	5.6	4.5	<2.0	2.7	<2.0	5.5	3.8	4.4	<2.0	<2.0
Acid Extractable Rubidium (Rb)	NGA	mg/kg	8.0	8.9	17	9.7	5.3	<2.0	2.8	3.2	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Selenium (Se)	1	mg/kg	<0.50	<0.50	<0.50	<0.50	<b>2.2</b>	<b>1.8</b>	<b>2.3</b>	<b>1.9</b>	<b>1.7</b>	<b>1.4</b>	<b>1.7</b>	<b>1.8</b>	<b>2.6</b>
Acid Extractable Silver (Ag)	20	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	mg/kg	<5.0	<5.0	9.3	<5.0	<5.0	36	12	<5.0	76	110	57	46	7.0
Acid Extractable Thallium (Tl)	1	mg/kg	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	0.15	<0.10	0.15	0.11	0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	5	mg/kg	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	<b>16</b>	<1.0	2.2	<1.0	<1.0	1.9	<1.0
Acid Extractable Uranium (U)	23	mg/kg	0.68	0.52	0.95	1.2	2.5	0.11	0.70	1.30	0.17	0.10	0.18	<0.10	0.88
Acid Extractable Vanadium (V)	130	mg/kg	18	20	34	17	25	2.5	7.5	8.8	8.1	3.9	4.9	2.8	<2.0
Acid Extractable Zinc (Zn)	200	mg/kg	14	14	38	15	25	27	18	<5.0	<b>270</b>	90	110	33	<5.0

**Notes:**

NGA = guideline is not available

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs)

for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use

**Exceedance Identification:**

**Bold and shaded = Exceedance of CCME SQG<sup>(a)</sup>**

**Underlined and shaded = Naturally occurring exceedance of CCME SQG<sup>(a)</sup> (background concentration)**

Created by: LR

Checked by: SAC

**TABLE 9**  
**Analytical Results - Metals in Soil**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	CCME SQG <sup>(a)</sup>	Units	BFR_SS9	BFR_SS10	BFR_SS11	BFR_SS12	BFR_SS13		BFR_SS14	BFR_SS15	BFR_SS16	BFR_SS17	BFR_SS18	BFR_SS19
			BFR_SS9_SA1	BFR_SS10_SA1	BFR_SS11_SA1	BFR_SS12_SA1	BFR_SS13_SA1	BFR_SS13_SA2	BFR_SS14_SA1	BFR_SS15_SA1	BFR_SS16_SA1	BFR_SS17_SA1	BFR_SS18_SA1	BFR_SS19_SA1
Sample Depth (mbgs)			0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0.15 - 0.3	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected			2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-04	2020-12-04	2020-12-04
Acid Extractable Aluminum (Al)	NGA	mg/kg	5800	3700	1000	6700	9800	13000	860	2900	8400	640	5700	1800
Acid Extractable Antimony (Sb)	20	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)	12	mg/kg	2.3	<2.0	<2.0	2.7	2.9	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Barium (Ba)	750	mg/kg	23	7.9	16	27	34	17	16	33	9.0	8.1	15	31
Acid Extractable Beryllium (Be)	4	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	NGA	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	1.4	mg/kg	0.42	<0.30	0.48	0.36	0.54	<0.30	0.78	0.54	0.46	<0.30	<0.30	0.70
Acid Extractable Chromium (Cr)	64	mg/kg	<2.0	5.8	<2.0	3.7	3.0	11	<2.0	<2.0	9.2	<2.0	5.6	<2.0
Acid Extractable Cobalt (Co)	40	mg/kg	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Copper (Cu)	63	mg/kg	3.1	<2.0	2.1	7.4	7.1	2.7	<2.0	3.7	3.4	2.8	<2.0	3.2
Acid Extractable Iron (Fe)	NGA	mg/kg	2800	1100	930	12000	4900	3400	880	770	350	1100	1900	960
Acid Extractable Lead (Pb)	70	mg/kg	58	7.3	5.9	45	<b>120</b>	9.6	17	8.0	37	19	13	34
Acid Extractable Lithium (Li)	NGA	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Manganese (Mn)	NGA	mg/kg	8.2	4.4	5.0	32	27	6.0	4.2	2.6	5.8	15	22	6.0
Acid Extractable Mercury (Hg)	6.6	mg/kg	0.16	0.12	0.15	0.26	0.31	0.21	0.15	0.20	0.16	0.16	0.18	0.22
Acid Extractable Molybdenum (Mo)	5	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	45	mg/kg	2.1	<2.0	<2.0	3.3	3.8	2.8	<2.0	2.6	<2.0	<2.0	<2.0	2.3
Acid Extractable Rubidium (Rb)	NGA	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.5	<2.0
Acid Extractable Selenium (Se)	1	mg/kg	<u>1.5</u>	<u>1.1</u>	<u>2.3</u>	<u>3.3</u>	<u>3.4</u>	<u>3.7</u>	<u>1.8</u>	<u>1.9</u>	<u>3.7</u>	0.80	<u>1.4</u>	<u>2.0</u>
Acid Extractable Silver (Ag)	20	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	mg/kg	23	<5.0	27	22	17	6.1	36	26	<5.0	13	6.6	24
Acid Extractable Thallium (Tl)	1	mg/kg	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	5	mg/kg	1.2	1.5	4.1	1.3	1.5	<1.0	1.2	<1.0	<1.0	<1.0	1.1	<1.0
Acid Extractable Uranium (U)	23	mg/kg	0.22	0.97	0.19	1.4	1.1	2.3	0.11	0.20	10	0.28	0.94	0.39
Acid Extractable Vanadium (V)	130	mg/kg	<2.0	6.4	<2.0	11	5.0	8.6	2.1	<2.0	15	4.7	12	2.6
Acid Extractable Zinc (Zn)	200	mg/kg	16	<5.0	15	19	15	<5.0	31	11	<5.0	12	6.2	16

**Notes:**

NGA = guideline is not available

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs)

for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use

**Exceedance Identification:**

**Bold and shaded = Exceedance of CCME SQG<sup>(a)</sup>**

**Underlined and shaded = Naturally occurring exceedance of CCME SQG<sup>(a)</sup> (background concentration)**

Created by: LR

Checked by: SAC

**TABLE 9**  
**Analytical Results - Metals in Soil**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	CCME SQG <sup>(a)</sup>	Units	BFR_SS20	BFR_SS21	BFR_SS22	BFR_SS23		BFR_SS24		BFR_SS25
			BFR_SS20_SA1	BFR_SS21_SA1	BFR_SS22_SA1	BFR_SS23_SA1	BFR_SS23_SA2	BFR_SS24_SA1	BFR_SS24_SA2	BFR_SS25_SA1
Sample Depth (mbgs)			0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0.15 - 0.3	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected			2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04	2020-12-04
Acid Extractable Aluminum (Al)	NGA	mg/kg	3000	720	6600	1100	8200	1100	12000	8100
Acid Extractable Antimony (Sb)	20	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)	12	mg/kg	<2.0	<2.0	<2.0	2.5	<2.0	2.0	<2.0	4.3
Acid Extractable Barium (Ba)	750	mg/kg	27	20	10	24	13	37	15	17
Acid Extractable Beryllium (Be)	4	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	NGA	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	1.4	mg/kg	0.45	0.38	<0.30	<b>3.1</b>	<0.30	<b>1.8</b>	<0.30	0.33
Acid Extractable Chromium (Cr)	64	mg/kg	<2.0	<2.0	4.1	<2.0	4.4	<2.0	3.2	2.6
Acid Extractable Cobalt (Co)	40	mg/kg	<1.0	<1.0	<1.0	1.2	<1.0	2.4	<1.0	<1.0
Acid Extractable Copper (Cu)	63	mg/kg	4.4	2.7	<2.0	4.6	2.3	4.3	7.1	4.6
Acid Extractable Iron (Fe)	NGA	mg/kg	1300	820	3700	2400	550	3500	210	29000
Acid Extractable Lead (Pb)	70	mg/kg	18	5.3	7.7	57	4.2	29	3.9	41
Acid Extractable Lithium (Li)	NGA	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Manganese (Mn)	NGA	mg/kg	6.0	5.8	19	25	5.3	13	<2.0	11
Acid Extractable Mercury (Hg)	6.6	mg/kg	0.38	0.18	0.13	0.25	0.17	0.15	0.17	0.24
Acid Extractable Molybdenum (Mo)	5	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	45	mg/kg	2.0	<2.0	<2.0	2.3	<2.0	2.1	2.9	2.1
Acid Extractable Rubidium (Rb)	NGA	mg/kg	<2.0	<2.0	2.3	2.7	<2.0	2.6	<2.0	<2.0
Acid Extractable Selenium (Se)	1	mg/kg	<b>2.0</b>	<b>2.2</b>	<b>1.5</b>	<b>2.0</b>	<b>1.8</b>	<b>1.5</b>	<b>3.4</b>	<b>2.8</b>
Acid Extractable Silver (Ag)	20	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	mg/kg	13	63	<5.0	32	5.4	33	<5.0	12
Acid Extractable Thallium (Tl)	1	mg/kg	<0.10	<0.10	<0.10	0.23	<0.10	0.46	<0.10	<0.10
Acid Extractable Tin (Sn)	5	mg/kg	<1.0	<1.0	<1.0	1.4	<1.0	1.7	<1.0	1.4
Acid Extractable Uranium (U)	23	mg/kg	0.79	0.12	0.60	0.20	0.82	<0.10	5.6	0.81
Acid Extractable Vanadium (V)	130	mg/kg	5.0	2.7	10	3.5	11	<2.0	6.4	11
Acid Extractable Zinc (Zn)	200	mg/kg	11	27	<5.0	28	6.0	31	<5.0	13

**Notes:**

NGA = guideline is not available

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs)

for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use

**Exceedance Identification:**

**Bold and shaded = Exceedance of CCME SQG<sup>(a)</sup>**

**Underlined and shaded = Naturally occurring exceedance of CCME SQG<sup>(a)</sup> (background concentration)**

Created by: LR

Checked by: SAC

**TABLE 10**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Atlantic RBCA ESL (a)	Units	BFR_SED1		BFR_SED2		BFR_SED3		BFR_SED4				BFR_SED5				
			BFR_SED1 (original)	BFR_SED1 (revised)	BFR_SED2 (original)	BFR_SED2 (revised)	BFR_SED3 (original)	BFR_SED3 (revised)	BFR_SED4 (original)	BFR_SED4 (revised)	BFR_SED_DUP1 (original)	BFR_SED_DUP1 (revised)	BFR_SED5 (original)	BFR_SED5 (revised)	BFR_SED_DUP2 (original)	BFR_SED_DUP2 (revised)	
Date Collected			2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-02	
Benzene	1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	
Toluene	1.4	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10	<0.050	<0.050	<0.050	<0.050	
Ethylbenzene	1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	
Total Xylenes	1.3	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10	<0.050	<0.050	<0.050	<0.050	
C6 - C10 (less BTEX)	NGA	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0	<5.0	<5.0	7.9	7.9	<2.5	<2.5	
>C10-C16 Hydrocarbons	NGA	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
>C16-C21 Hydrocarbons	NGA	mg/kg	<10	<10	110	<10	170	<10	170	<10	<10	<10	18	<10	23	<10	
>C21-<C32 Hydrocarbons	NGA	mg/kg	510	160	880	300	2300	640	950	390	880	290	120	26	120	23	
Modified TPH	Gasoline	15	mg/kg														
	Diesel/No. 2 Fuel Oil	25	mg/kg	<u>510**</u>	<u>160***</u>	<u>990**</u>	<u>300***</u>	<u>2500**</u>	<u>640***</u>	<u>1100**</u>	<u>390***</u>	<u>880***</u>	<u>290***</u>	<u>150**</u>	34***	<u>140**</u>	23***
	Lube oil/No. 6 Oil	43	mg/kg														
Reached Baseline at C32			Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No	Yes	
Hydrocarbon Resemblance			Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range <sup>(b)</sup> .	Lube oil range.	Lube oil range.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	

**Notes:**  
 NGA = guideline is not available  
 < = concentration is below Reportable Detection Limit (RDL)  
 (a) Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments <sup>(2015)</sup>  
 (b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

**Exceedance Identification:**  
 Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA ESL<sup>(a)</sup> (background concentration)



**TABLE 10**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Atlantic RBCA ESL (a)	Units	BFR_SED6		BFR_SED7		BFR_SED8	BFR_SED9		BFR_SED10	BFR_SED11		BFR_SED12		BFR_SED13	
			BFR_SED6 (original)	BFR_SED6 (revised)	BFR_SED7 (original)	BFR_SED7 (revised)	BFR_SED8	BFR_SED9 (original)	BFR_SED9 (revised)	BFR_SED10	BFR_SED11 (original)	BFR_SED11 (revised)	BFR_SED12 (original)	BFR_SED12 (revised)	BFR_SED13 (original)	BFR_SED13 (revised)
Date Collected			2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02
Benzene	1.2	mg/kg	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	1.4	mg/kg	<0.10	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes	1.3	mg/kg	<0.10	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)	NGA	mg/kg	<5.0	<5.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
>C10-C16 Hydrocarbons	NGA	mg/kg	<10	<10	<10	<10	<10	55	<10	<10	<10	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons	NGA	mg/kg	<10	<10	190	<10	<10	170	<10	<10	17	<10	160	<10	210	<10
>C21-<C32 Hydrocarbons	NGA	mg/kg	1000	290	1300	370	36	2300	550	<15	160	42	1700	540	2800	790
Modified TPH	Gasoline	15														
	Diesel/No. 2 Fuel Oil	25	<u>1000***</u>	<u>290***</u>	<u>1400**</u>	<u>370***</u>	36***	<u>2500**</u>	<u>550***</u>	<15	<u>180**</u>	42***	<u>1800**</u>	<u>540***</u>	<u>3000**</u>	<u>790***</u>
	Lube oil/No. 6 Oil	43														
Reached Baseline at C32			Yes	Yes	Yes	Yes	Yes	No	No	NA	Yes	Yes	Yes	Yes	Yes	No
Hydrocarbon Resemblance			Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	NA	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.

**Notes:**  
 NGA = guideline is not available  
 < = concentration is below Reportable Detection Limit (RDL)  
 (a) Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments (2015)  
 (b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

**Exceedance Identification:**  
 Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA ESL (a) (background concentration)

**TABLE 10**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Atlantic RBCA ESL (a)	Units	BFR_SED14		BFR_SED15		BFR_SED16		BFR_SED17	BFR_SED18	BFR_SED19		BFR_SED20	BFR_SED21		BFR_SED22	
			BFR_SED14 (original)	BFR_SED14 (revised)	BFR_SED15 (original)	BFR_SED15 (revised)	BFR_SED16 (original)	BFR_SED16 (revised)	BFR_SED17	BFR_SED18	BFR_SED19 (original)	BFR_SED19 (revised)	BFR_SED20	BFR_SED21 (original)	BFR_SED21 (revised)	BFR_SED22 (original)	BFR_SED22 (revised)
Date Collected			2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01	2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-03
Benzene	1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	1.4	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes	1.3	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)	NGA	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
>C10-C16 Hydrocarbons	NGA	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons	NGA	mg/kg	25	<10	110	<10	230	<10	<10	<10	44	<10	<10	<10	<10	<10	52
>C21-<C32 Hydrocarbons	NGA	mg/kg	210	54	1100	310	900	370	34	<15	270	85	<15	120	32	2000	630
Modified TPH	Gasoline	15															
	Diesel/No. 2 Fuel Oil	25	<u>240**</u>	<u>54***</u>	<u>1200**</u>	<u>310***</u>	<u>1100**</u>	<u>370***</u>	34***	<15	<u>320**</u>	<u>85***</u>	<15	<u>120***</u>	32***	<u>2200**</u>	<u>690**</u>
	Lube oil/No. 6 Oil	43															
Reached Baseline at C32			No	Yes	No	Yes	No	Yes	Yes	NA	No	Yes	NA	No	Yes	No	Yes
Hydrocarbon Resemblance			Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range.	Lube oil range.	Lube oil range.	NA	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	NA	Lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Lube oil fraction.	Fuel/lube range.

**Notes:**  
 NGA = guideline is not available  
 < = concentration is below Reportable Detection Limit (RDL)  
 (a) Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments (2015)  
 (b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

**Exceedance Identification:**  
 Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA ESL (a) (background concentration)

**TABLE 10**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Atlantic RBCA ESL (a)	Units	BFR_SED23		BFR_SED24		BFR_SED25	
			BFR_SED23 (original)	BFR_SED23 (revised)	BFR_SED24 (original)	BFR_SED24 (revised)	BFR_SED25 (original)	BFR_SED25 (revised)
Date Collected			2020-12-03	2020-12-03	2020-12-04	2020-12-04	2020-12-04	2020-12-04
Benzene	1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	1.4	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes	1.3	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)	NGA	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
>C10-C16 Hydrocarbons	NGA	mg/kg	62	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons	NGA	mg/kg	110	<10	<10	<10	220	<10
>C21-<C32 Hydrocarbons	NGA	mg/kg	1000	280	69	27	2700	690
Modified TPH	Gasoline	15						
	Diesel/No. 2 Fuel Oil	25	<u>1200**</u>	<u>280***</u>	<u>69***</u>	27***	<u>2900**</u>	<u>690***</u>
	Lube oil/No. 6 Oil	43						
Reached Baseline at C32			No	Yes	Yes	Yes	No	Yes
Hydrocarbon Resemblance			Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Lube oil range.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.

**Notes:**

NGA = guideline is not available

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments (2015)

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

**Exceedance Identification:**

Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA

ESL (a) (background concentration)

**TABLE 11**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	CCME ISQGs <sup>(a)</sup>	CCME PELs <sup>(b)</sup>	Units	BFR_SED1	BFR_SED2	BFR_SED3	BFR_SED4		BFR_SED5		BFR_SED6	BFR_SED7	BFR_SED8	BFR_SED9	BFR_SED10	BFR_SED11
				BFR_SED1	BFR_SED2	BFR_SED3	BFR_SED4	BFR_SED_DUP1	BFR_SED5	BFR_SED_DUP2	BFR_SED6	BFR_SED7	BFR_SED8	BFR_SED9	BFR_SED10	BFR_SED11
Date Collected				2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01
1-Methylnaphthalene	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	0.0202	0.201	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthene	0.00671	0.0889	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.00587	0.128	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.0469	0.245	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)anthracene	0.0317	0.385	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)pyrene	0.0319	0.782	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b)fluoranthene	NGA	NGA	mg/kg	<0.0050	<0.0050	0.038	<0.0050	<0.0050	<0.0050	<0.0050	0.18	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b/j)fluoranthene	NGA	NGA	mg/kg	<0.010	<0.010	0.038	<0.010	<0.010	<0.010	<0.010	0.18	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(g,h,i)perylene	NGA	NGA	mg/kg	<0.0050	<0.080	<0.19	<0.0050	<0.0050	<0.0080	<0.0050	<0.15	<0.80	<0.0050	<0.030	<0.0050	<0.040
Benzo(j)fluoranthene	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(k)fluoranthene	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	0.0571	0.862	mg/kg	<0.0050	<0.0050	0.042	<0.0050	<0.0050	<0.0050	<0.0050	0.12	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dibenzo(a,h)anthracene	0.00622	0.135	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	0.111	2.355	mg/kg	<0.0050	<0.0050	0.077	<0.0050	<0.0050	<0.0050	<0.0050	0.15	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene	0.0212	0.144	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.13	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	0.0346	0.391	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Perylene	NGA	NGA	mg/kg	1	1.2	0.7	<0.0050	0.081	0.028	0.028	1.8	2	<0.0050	0.58	<0.0050	0.041
Phenanthrene	0.0419	0.515	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	0.053	0.875	mg/kg	<0.0050	<0.0050	0.05	<0.0050	<0.0050	<0.0050	<0.0050	0.11	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

**Notes:**

NGA = guideline is not available

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only

<sup>(b)</sup> Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

**Exceedance Identification:**

*Italicised and shaded = Exceedance of CCME ISQGs <sup>(a)</sup>*

**Bold and shaded = Exceedance of CCME PELs <sup>(b)</sup>**

**TABLE 11**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	CCME ISQGs <sup>(a)</sup>	CCME PELs <sup>(b)</sup>	Units	BFR_SED12	BFR_SED13	BFR_SED14	BFR_SED15	BFR_SED16	BFR_SED17	BFR_SED18	BFR_SED19	BFR_SED20	BFR_SED21	BFR_SED22	BFR_SED23	BFR_SED24	BFR_SED25
				BFR_SED12	BFR_SED13	BFR_SED14	BFR_SED15	BFR_SED16	BFR_SED17	BFR_SED18	BFR_SED19	BFR_SED20	BFR_SED21	BFR_SED22	BFR_SED23	BFR_SED24	BFR_SED25
Date Collected				2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04
1-Methylnaphthalene	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	0.0202	0.201	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthene	0.00671	0.0889	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.00587	0.128	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.0469	0.245	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)anthracene	0.0317	0.385	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)pyrene	0.0319	0.782	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b)fluoranthene	NGA	NGA	mg/kg	0.082	0.053	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b)jfluoranthene	NGA	NGA	mg/kg	0.082	0.053	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(g,h,i)perylene	NGA	NGA	mg/kg	<0.0050	<0.19	<0.050	<1.2	<0.0050	<0.0050	<0.0050	<0.040	<0.0050	<0.0050	<0.050	<0.0050	<0.020	<0.88
Benzo(j)fluoranthene	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(k)fluoranthene	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	0.0571	0.862	mg/kg	<0.0050	<i>0.059</i>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dibenzo(a,h)anthracene	0.00622	0.135	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	0.111	2.355	mg/kg	0.063	0.094	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene	0.0212	0.144	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	0.0346	0.391	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Perylene	NGA	NGA	mg/kg	<0.0050	<0.16	0.35	1.3	0.17	<0.0050	0.022	0.084	<0.0050	<0.0050	0.17	0.11	<0.0050	1.4
Phenanthrene	0.0419	0.515	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	0.053	0.875	mg/kg	<0.0050	<i>0.061</i>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

**Notes:**

NGA = guideline is not available

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only

<sup>(b)</sup> Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

**Exceedance Identification:**

*Italicised and shaded = Exceedance of CCME ISQGs <sup>(a)</sup>*

**Bold and shaded = Exceedance of CCME PELs <sup>(b)</sup>**

**TABLE 12**  
**Analytical Results - Metals in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	CCME ISQGs <sup>(a)</sup>	CCME PELs <sup>(b)</sup>	Units	BFR_SED1	BFR_SED2	BFR_SED3	BFR_SED4		BFR_SED5		BFR_SED6	BFR_SED7	BFR_SED8	BFR_SED9	BFR_SED10	BFR_SED11
				BFR_SED1	BFR_SED2	BFR_SED3	BFR_SED4	BFR_SED_DUP1	BFR_SED5	BFR_SED_DUP2	BFR_SED6	BFR_SED7	BFR_SED8	BFR_SED9	BFR_SED10	BFR_SED11
Date Collected				2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01
Acid Extractable Aluminum (Al)	NGA	NGA	mg/kg	7300	8000	11000	5800	6000	2100	2400	14000	7700	17000	7800	2500	9400
Acid Extractable Antimony (Sb)	NGA	NGA	mg/kg	<2.0	<2.0	<2.0	2.7	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)	5.9	17.0	mg/kg	<2.0	2.2	<2.0	2.5	2.2	<2.0	<2.0	5.3	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Barium (Ba)	NGA	NGA	mg/kg	34	33	29	23	24	9.7	11	50	15	170	5.4	8.3	61
Acid Extractable Beryllium (Be)	NGA	NGA	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	NGA	NGA	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	0.60	3.50	mg/kg	0.42	0.52	0.60	<0.30	<0.30	<0.30	<0.30	<b>0.80</b>	<0.30	<0.30	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	37.30	90.00	mg/kg	10	9.3	5.4	4.8	4.4	3.1	2.9	12	3.9	<b>45</b>	6.0	3.3	13
Acid Extractable Cobalt (Co)	NGA	NGA	mg/kg	1.5	1.7	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	9.9	<1.0	2.5	5.0
Acid Extractable Copper (Cu)	35.70	197.00	mg/kg	8.4	9.6	9.1	19	16	<2.0	2.2	15	7.5	12	2.5	<2.0	<2.0
Acid Extractable Iron (Fe)	NGA	NGA	mg/kg	7500	8800	1900	2100	1800	6000	6400	3800	1400	25000	320	8600	12000
Acid Extractable Lead (Pb)	35.00	91.30	mg/kg	35	35	34	<b>770</b>	<b>250</b>	17	21	<b>140</b>	18	17	5.3	5.6	8.9
Acid Extractable Lithium (Li)	NGA	NGA	mg/kg	5.0	4.1	<2.0	<2.0	<2.0	3.0	2.9	4.2	<2.0	20	<2.0	4.7	16
Acid Extractable Manganese (Mn)	NGA	NGA	mg/kg	74	130	15	11	9.1	71	76	52	22	290	2.0	160	260
Acid Extractable Mercury (Hg)	0.17	0.49	mg/kg	0.15	<b>0.18</b>	<b>0.26</b>	<b>0.25</b>	<b>0.23</b>	<0.10	<0.10	<b>0.32</b>	0.13	<0.10	<0.10	<0.10	<0.10
Acid Extractable Molybdenum (Mo)	NGA	NGA	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	NGA	NGA	mg/kg	7.0	6.5	4.5	7.0	6.7	<2.0	2.1	9.9	3.3	19	<2.0	2.4	8.7
Acid Extractable Rubidium (Rb)	NGA	NGA	mg/kg	9.3	7.9	2.0	2.6	2.0	4.9	6.3	8.2	2.7	60	<2.0	7.4	40
Acid Extractable Selenium (Se)	NGA	NGA	mg/kg	1.9	2.7	5.6	4.5	4.4	<0.50	<0.50	4.9	2.1	<0.50	1.9	<0.50	<0.50
Acid Extractable Silver (Ag)	NGA	NGA	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	mg/kg	9.5	11	22	12	12	<5.0	<5.0	17	9.7	<5.0	<5.0	<5.0	<5.0
Acid Extractable Thallium (Tl)	NGA	NGA	mg/kg	<0.10	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	0.37	<0.10	<0.10	0.24
Acid Extractable Tin (Sn)	NGA	NGA	mg/kg	1.3	1.2	1.0	3.2	3.1	<1.0	1.0	5.9	1.5	1.2	1.3	<1.0	1.8
Acid Extractable Uranium (U)	NGA	NGA	mg/kg	1.9	2.4	1.3	0.74	0.76	0.36	0.65	1.8	3.4	1.6	1.2	0.66	1.2
Acid Extractable Vanadium (V)	NGA	NGA	mg/kg	28	32	8.4	17	16	13	15	36	12	95	18	22	44
Acid Extractable Zinc (Zn)	123.00	315.00	mg/kg	45	37	13	19	18	8.4	10	42	8.1	45	<5.0	10	34

**Notes:**

NGA = guideline is not available

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only

<sup>(b)</sup> Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

**Exceedance Identification:**

*Italicised and shaded = Exceedance of CCME ISQGs <sup>(a)</sup>*

**Bold and shaded = Exceedance of CCME PELs <sup>(b)</sup>**

**TABLE 12**  
**Analytical Results - Metals in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	CCME ISQGs <sup>(a)</sup>	CCME PELs <sup>(b)</sup>	Units	BFR_SED12	BFR_SED13	BFR_SED14	BFR_SED15	BFR_SED16	BFR_SED17	BFR_SED18	BFR_SED19	BFR_SED20	BFR_SED21	BFR_SED22	BFR_SED23	BFR_SED24	BFR_SED25
				BFR_SED12	BFR_SED13	BFR_SED14	BFR_SED15	BFR_SED16	BFR_SED17	BFR_SED18	BFR_SED19	BFR_SED20	BFR_SED21	BFR_SED22	BFR_SED23	BFR_SED24	BFR_SED25
Date Collected				2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04
Acid Extractable Aluminum (Al)	NGA	NGA	mg/kg	7400	4900	7500	6700	4900	4600	14000	11000	1100	8100	11000	6200	7000	7800
Acid Extractable Antimony (Sb)	NGA	NGA	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)	5.9	17.0	mg/kg	3.1	2.1	<2.0	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Barium (Ba)	NGA	NGA	mg/kg	19	24	33	22	27	16	210	58	6.6	38	32	40	74	15
Acid Extractable Beryllium (Be)	NGA	NGA	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	NGA	NGA	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	0.60	3.50	mg/kg	0.47	0.44	<0.30	0.37	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.45	<0.30
Acid Extractable Chromium (Cr)	37.30	90.00	mg/kg	5.5	4.5	8.4	6.2	4.3	4.7	<b>88</b>	13	<2.0	12	10	6.2	9.9	<2.0
Acid Extractable Cobalt (Co)	NGA	NGA	mg/kg	<1.0	<1.0	2.5	1.2	<1.0	2.6	6.8	3.2	<1.0	3.9	1.2	1.8	4.0	<1.0
Acid Extractable Copper (Cu)	35.70	197.00	mg/kg	10	8.7	2.3	5.4	10	<2.0	2.6	3.3	<2.0	<2.0	4.7	3.6	<2.0	4.8
Acid Extractable Iron (Fe)	NGA	NGA	mg/kg	3800	2400	7800	8400	2000	9900	13000	16000	1200	15000	3400	6800	12000	460
Acid Extractable Lead (Pb)	35.00	91.30	mg/kg	<b>100</b>	<b>63</b>	6.5	4.8	<b>79</b>	7.2	8.6	15	2.6	12	9.6	25	15	2.8
Acid Extractable Lithium (Li)	NGA	NGA	mg/kg	<2.0	<2.0	8.2	<2.0	<2.0	8.5	7.8	7.7	<2.0	7.5	3.7	3.6	8.5	<2.0
Acid Extractable Manganese (Mn)	NGA	NGA	mg/kg	7.8	10	170	100	18	120	180	170	42	240	57	95	200	3.0
Acid Extractable Mercury (Hg)	0.17	0.49	mg/kg	<i>0.24</i>	<i>0.23</i>	<0.10	<0.10	0.16	<0.10	<0.10	<0.10	<0.10	<0.10	0.13	0.12	<0.10	0.12
Acid Extractable Molybdenum (Mo)	NGA	NGA	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	NGA	NGA	mg/kg	5.2	4.6	4.4	2.6	7.8	4.8	36	6.9	<2.0	5.5	3.5	4.7	7.3	2.6
Acid Extractable Rubidium (Rb)	NGA	NGA	mg/kg	<2.0	<2.0	19	2.8	2.9	17	25	14	2.1	20	6.7	7.9	22	<2.0
Acid Extractable Selenium (Se)	NGA	NGA	mg/kg	5.3	5.1	0.52	1.6	3.0	<0.50	<0.50	0.99	<0.50	<0.50	2.9	1.2	<0.50	2.1
Acid Extractable Silver (Ag)	NGA	NGA	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	mg/kg	8.4	27	<5.0	14	11	<5.0	8.9	6.4	<5.0	<5.0	12	14	<5.0	10
Acid Extractable Thallium (Tl)	NGA	NGA	mg/kg	<0.10	<0.10	0.13	<0.10	<0.10	0.11	0.17	0.11	<0.10	0.16	<0.10	<0.10	0.16	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	mg/kg	3.4	1.7	1.1	<1.0	1.9	<1.0	1.3	1.1	<1.0	2.1	<1.0	1.4	2.1	<1.0
Acid Extractable Uranium (U)	NGA	NGA	mg/kg	1.4	0.78	0.55	1.3	0.69	0.23	0.25	1.4	0.25	1.7	1.4	0.84	0.86	1.4
Acid Extractable Vanadium (V)	NGA	NGA	mg/kg	22	10	28	24	16	19	50	48	4.3	54	16	23	42	5.0
Acid Extractable Zinc (Zn)	123.00	315.00	mg/kg	13	19	20	11	13	15	21	26	<5.0	25	9.1	18	24	5.3

**Notes:**

NGA = guideline is not available

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only

<sup>(b)</sup> Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

**Exceedance Identification:**

*Italicised and shaded = Exceedance of CCME ISQGs <sup>(a)</sup>*

**Bold and shaded = Exceedance of CCME PELs <sup>(b)</sup>**

**TABLE 13**  
**Analytical Results - Inorganics in Surface Water**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	CCME WQGs <sup>(a)</sup>	Units	BFR_SW4		BFR_SW5		BFR_SW7	BFR_SW8	BFR_SW10	BFR_SW13	BFR_SW16	BFR_SW17	BFR_SW19	BFR_SW21	BFR_SW23	BFR_SW24
			BFR_SW4	BFR_SW_DUP1	BFR_SW5	BFR_SW_DUP2	BFR_SW7	BFR_SW8	BFR_SW10	BFR_SW13	BFR_SW16	BFR_SW17	BFR_SW19	BFR_SW21	BFR_SW23	BFR_SW24
Date Collected			2020-12-04	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-04
Total Alkalinity (Total as CaCO3)	NGA	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Chloride (Cl-)	120	mg/L	12	11	10	10	13	9.3	12	12	11	14	14	14	12	12
Colour	NGA	TCU	79	91	110	110	79	85	91	100	75	87	85	92	110	80
Nitrate + Nitrite (N)	NGA	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.054	0.052	0.14	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrite (N)	0.197	mg/L	0.011	0.012	0.011	0.012	0.013	0.011	0.012	0.013	0.011	0.012	0.011	0.012	0.013	0.011
Nitrogen (Ammonia Nitrogen)	153 <sup>(b)</sup>	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.07	<0.050	<0.050	<0.050	<0.050
Total Organic Carbon (C)	NGA	mg/L						8.5			9					
Orthophosphate (P)	NGA	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
pH	6.5 - 9.0	pH	<u>5.3</u>	<u>5.46</u>	<u>6.2</u>	<u>5.94</u>	<u>1</u>	<u>6.11</u>	<u>6.05</u>	<u>5.3</u>	<u>5.19</u>	<u>5.23</u>	<u>5.08</u>	<u>5.34</u>	<u>5.27</u>	<u>5.48</u>
Reactive Silica (SiO2)	NGA	mg/L	1	1.1	1.7	1.7	2.6	1.1	1.9	0.7	1.1	2.9	2.1	2.1	1.8	1.5
Dissolved Sulphate (SO4)	NGA	mg/L	2	2.6	2.8	2.2	<2.0	2.1	<2.0	<2.0	<2.0	4.6	3.1	3.1	3.4	3.4
Turbidity	<2 NTU above background levels	NTU	0.57	0.61	4.3	3.7	0.26	0.57	1.3	2.7	1.1	0.55	0.64	0.44	1	0.68
Conductivity	NGA	uS/cm	47	45	40	39	50	37	45	49	48	63	61	53	50	45

**Notes:**

NGA = guideline is not available

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term

<sup>(b)</sup> Average temperature (5.2 °C) and pH (5.7 units) used for lookup table

**Exceedance Identification:**

Underlined and shaded = Naturally occurring exceedance of CCME WQG<sup>(a)</sup> (background pH)



**TABLE 14**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Surface Water**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Atlantic RBCA ESL <sup>(a)</sup>	Units	BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4		BFR_SW5		BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9	BFR_SW10	BFR_SW11	BFR_SW12	BFR_SW13
			BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4	BFR_SW_DUP1	BFR_SW5	BFR_SW_DUP2	BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9	BFR_SW10	BFR_SW11	BFR_SW12	BFR_SW13
Date Collected			2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01	2020-12-01	2020-12-02
Benzene	2.1	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Toluene	0.77	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethylbenzene	0.32	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Xylenes	0.33	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
C6 - C10 (less BTEX)	NGA	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
>C10-C16 Hydrocarbons	NGA	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C16-C21 Hydrocarbons	NGA	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C21-<C32 Hydrocarbons	NGA	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
Modified TPH	Gasoline	1.5*															
	Diesel/No. 2 Fuel Oil	0.10**	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
	Lube oil/No. 6 Oil	0.10***															
Reached Baseline at C32			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hydrocarbon Resemblance			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

**Notes:**  
 NA = not applicable  
 NGA = guideline is not available  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
<sup>(a)</sup> Atlantic Risk-Based Corrective Action (RBCA) Surface Water and Groundwater Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for surface water (2015)  
<sup>(b)</sup> Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.  
 \*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**  
**Bold and shaded = Exceedance of Atlantic RBCA ESL<sup>(a)</sup>**

**TABLE 14**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Surface Water**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Atlantic RBCA ESL <sup>(a)</sup>	Units	BFR_SW14	BFR_SW15	BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19	BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	BFR_SW25
			BFR_SW14	BFR_SW15	BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19	BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	BFR_SW25
Date Collected			2020-12-02	2020-12-02	2020-12-01	2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04
Benzene	2.1	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Toluene	0.77	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethylbenzene	0.32	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Xylenes	0.33	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
C6 - C10 (less BTEX)	NGA	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
>C10-C16 Hydrocarbons	NGA	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C16-C21 Hydrocarbons	NGA	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C21-<C32 Hydrocarbons	NGA	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
Modified TPH	Gasoline	1.5*												
	Diesel/No. 2 Fuel Oil	0.10**	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
	Lube oil/No. 6 Oil	0.10***												
Reached Baseline at C32			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hydrocarbon Resemblance			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

**Notes:**  
 NA = not applicable  
 NGA = guideline is not available  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
<sup>(a)</sup> Atlantic Risk-Based Corrective Action (RBCA) Surface Water and Groundwater Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for surface water (2015)  
<sup>(b)</sup> Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.  
 \*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**  
**Bold and shaded = Exceedance of Atlantic RBCA ESL<sup>(a)</sup>**

**TABLE 15**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	CCME WQGs <sup>(a)</sup>	Units	BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4		BFR_SW5		BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9	BFR_SW10	BFR_SW11	BFR_SW12	BFR_SW13
			BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4	BFR_SW_DUP1	BFR_SW5	BFR_SW_DUP2	BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9	BFR_SW10	BFR_SW11	BFR_SW12	BFR_SW13
Date Collected			2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01	2020-12-01	2020-12-02
1-Methylnaphthalene	NGA	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
2-Methylnaphthalene	NGA	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthene	5.8	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acridine	4.4	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	0.012	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)anthracene	0.018	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	0.015	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)jfluoranthene	NGA	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo(g,h,i)perylene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(j)fluoranthene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dibenzo(a,h)anthracene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluoranthene	0.04	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	3	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	1.1	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Perylene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	0.4	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	0.025	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Quinoline	3.4	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Flags			(b)	(b)	(b)	(b)			(c)	(b)				(b)	(b)	(b)	

**Notes:**

NGA = guideline is not available

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term

<sup>(b)</sup> D14-Terphenyl surrogate recovery sample analysed past recommended hold time

<sup>(c)</sup> D10-Anthracene, D14-Terphenyl, and D8-Acenaphthylene PAH surrogates not within acceptance limits

**Exceedance Identification:**

**Bold and shaded = Exceedance of CCME WQGs<sup>(a)</sup>**

**TABLE 15**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	CCME WQGs <sup>(a)</sup>	Units	BFR_SW14	BFR_SW15	BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19	BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	BFR_SW25
			BFR_SW14	BFR_SW15	BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19	BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	BFR_SW25
Date Collected			2020-12-02	2020-12-02	2020-12-01	2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04
1-Methylnaphthalene	NGA	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
2-Methylnaphthalene	NGA	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthene	5.8	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acridine	4.4	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	0.012	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)anthracene	0.018	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	0.015	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)jfluoranthene	NGA	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo(g,h,i)perylene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(j)fluoranthene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dibenzo(a,h)anthracene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluoranthene	0.04	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	3	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	1.1	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Perylene	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	0.4	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	0.025	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Quinoline	3.4	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Flags					(b)									

**Notes:**

NGA = guideline is not available

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term

<sup>(b)</sup> D14-Terphenyl surrogate recovery sample analysed past recommended hold time

<sup>(c)</sup> D10-Anthracene, D14-Terphenyl, and D8-Acenaphthylene PAH surrogates not within acceptance limits

**Exceedance Identification:**

**Bold and shaded = Exceedance of CCME WQGs<sup>(a)</sup>**

**TABLE 16**  
**Analytical Results - Metals in Surface Water**  
**Burge Firing Range, 9 Wing Gander, NL**

Sample ID	CCME WQGs <sup>(a)</sup>	Units	BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4		BFR_SW5		BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9	BFR_SW10	BFR_SW11	BFR_SW12	BFR_SW13	BFR_SW14
			BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4	BFR_SW_DUP1	BFR_SW5	BFR_SW_DUP2	BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9	BFR_SW10	BFR_SW11	BFR_SW12	BFR_SW13	BFR_SW14
Date Collected			2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02
Total Aluminum (Al)	5 <sup>(b)</sup>	ug/L	<b>270</b>	<b>250</b>	<b>300</b>	<b>160</b>	<b>170</b>	<b>270</b>	<b>250</b>	<b>260</b>	<b>180</b>	<b>200</b>	<b>100</b>	<b>210</b>	<b>230</b>	<b>170</b>	<b>120</b>	<b>200</b>
Total Antimony (Sb)	NGA	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Arsenic (As)	5	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Barium (Ba)	NGA	ug/L	3.7	4.0	3.0	2.4	2.2	2.3	2.3	1.9	2.7	2.2	1.4	2.3	2.4	1.9	1.9	1.6
Total Beryllium (Be)	NGA	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Bismuth (Bi)	NGA	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	ug/L	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Total Cadmium (Cd)	0.04 <sup>(c)</sup>	ug/L	0.020	0.017	0.017	0.014	0.015	0.013	0.020	0.016	0.018	0.018	0.015	0.017	0.017	0.020	0.017	0.014
Total Calcium (Ca)	NGA	ug/L	1400	1700	550	510	430	800	820	310	1100	740	400	780	710	480	450	600
Total Chromium (Cr)	1 <sup>(d)</sup>	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	NGA	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Total Copper (Cu)	2 <sup>(c)</sup>	ug/L	0.57	0.56	<0.50	<b>2.2</b>	1.9	1.5	1.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Iron (Fe)	300	ug/L	<b>310</b>	<b>370</b>	270	140	140	<b>330</b>	<b>300</b>	110	200	160	83	260	260	150	140	110
Total Lead (Pb)	1 <sup>(c)</sup>	ug/L	0.61	0.52	0.80	<b>8.6</b>	<b>8.3</b>	<b>2.7</b>	<b>2.6</b>	0.60	<0.50	0.61	0.61	0.69	0.64	0.61	0.77	<0.50
Total Magnesium (Mg)	NGA	ug/L	850	820	780	720	690	640	610	520	800	570	760	720	710	760	760	570
Total Manganese (Mn)	190 <sup>(c,d)</sup>	ug/L	14	14	5.9	2.9	3.0	18	18	4.4	11	8.4	<2.0	10	9.2	3.6	2.3	5.0
Total Mercury (Hg)	0.026	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Total Molybdenum (Mo)	73	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Nickel (Ni)	25 <sup>(c)</sup>	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Phosphorus (P)	10 - 20 <sup>(e)</sup>	ug/L	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Total Potassium (K)	NGA	ug/L	400	420	180	120	110	220	230	150	190	240	150	180	230	170	150	190
Total Selenium (Se)	1	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Silver (Ag)	0.25	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	ug/L	7900	8500	5500	5200	4700	4900	5500	4000	5600	4700	5700	5100	5400	5500	5500	4900
Total Strontium (Sr)	NGA	ug/L	7.9	7.6	6.4	5.7	4.9	4.9	5.5	4.4	6.8	4.7	5.5	6.1	6.0	5.6	5.9	4.8
Total Thallium (Tl)	0.8	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Titanium (Ti)	NGA	ug/L	4.4	5.5	4.0	2.6	<2.0	5.0	5.2	2.6	2.4	3.5	<2.0	2.5	3.7	2.1	3.1	2.5
Total Uranium (U)	15	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Vanadium (V)	NGA	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	NGA <sup>(f)</sup>	ug/L	<5.0	<5.0	<5.0	6.4	5.9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.2	<5.0	<5.0

**Notes:**  
 NGA = guideline is not available  
 < = concentration is below Reportable Detection Limit (RDL)  
<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term  
<sup>(b)</sup> Average temperature (5.2 °C) and pH (5.7 units) used for lookup table  
<sup>(c)</sup> Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL  
<sup>(d)</sup> Value for hexavalent chromium used  
<sup>(e)</sup> value for mesotrophic freshwater used  
<sup>(f)</sup> Water chemistry parameters outside of valid range for CCME equation

**Exceedance Identification:**  
**Bold and shaded = Exceedance of CCME WQS<sup>(a)</sup>**  
Underlined and shaded = Naturally occurring exceedance of CCME WQS<sup>(a)</sup> (background concentrations)  
**Shaded = below RDL; RDL above CCME WQS<sup>(a)</sup>**

**TABLE 16**  
**Analytical Results - Metals in Surface Water**  
**Burge Firing Range, 9 Wing Gander, NL**

Sample ID	CCME WQGs <sup>(a)</sup>	Units	BFR_SW15	BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19	BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	BFR_SW25
			2020-12-02	2020-12-01	2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04
Total Aluminum (Al)	5 <sup>(b)</sup>	ug/L	<b>130</b>	<b>170</b>	<b>210</b>	<b>390</b>	<b>180</b>	<b>210</b>	<b>230</b>	<b>110</b>	<b>240</b>	<b>190</b>	<b>190</b>
Total Antimony (Sb)	NGA	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Arsenic (As)	5	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Barium (Ba)	NGA	ug/L	2.8	2.1	3.6	5.4	4.2	4.4	4.2	2.4	4.5	3.1	2.6
Total Beryllium (Be)	NGA	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Bismuth (Bi)	NGA	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	ug/L	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Total Cadmium (Cd)	0.04 <sup>(c)</sup>	ug/L	0.018	0.013	0.015	0.020	0.017	0.021	0.020	0.019	0.025	0.018	0.018
Total Calcium (Ca)	NGA	ug/L	650	470	1000	950	680	890	940	370	810	780	480
Total Chromium (Cr)	1 <sup>(d)</sup>	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	NGA	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Total Copper (Cu)	2 <sup>(c)</sup>	ug/L	0.99	1.6	<0.50	0.54	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Iron (Fe)	300	ug/L	210	140	230	<b>370</b>	200	200	220	73	240	170	140
Total Lead (Pb)	1 <sup>(c)</sup>	ug/L	<0.50	3.4	<0.50	0.70	0.57	0.59	<0.50	<0.50	0.65	<0.50	0.57
Total Magnesium (Mg)	NGA	ug/L	630	770	880	870	910	860	940	750	830	760	700
Total Manganese (Mn)	190 <sup>(c,d)</sup>	ug/L	7.3	2.8	18	11	5.1	10	11	<2.0	11	7.2	2.7
Total Mercury (Hg)	0.026	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Total Molybdenum (Mo)	73	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Nickel (Ni)	25 <sup>(c)</sup>	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Phosphorus (P)	10 - 20 <sup>(e)</sup>	ug/L	<b>&lt;100</b>	<b>&lt;100</b>	<b>&lt;100</b>	<b>&lt;100</b>	<b>&lt;100</b>	<b>&lt;100</b>	<b>&lt;100</b>	<b>&lt;100</b>	<b>&lt;100</b>	<b>&lt;100</b>	<b>&lt;100</b>
Total Potassium (K)	NGA	ug/L	210	110	190	320	150	230	230	<100	290	220	160
Total Selenium (Se)	1	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Silver (Ag)	0.25	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	ug/L	4800	5400	6200	6100	6000	5700	6200	5300	5300	5300	5300
Total Strontium (Sr)	NGA	ug/L	5.3	5.7	7.8	7.3	6.9	7.1	7.5	5.4	6.7	6.2	5.8
Total Thallium (Tl)	0.8	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Titanium (Ti)	NGA	ug/L	<2.0	2.6	3.1	9.0	3.1	4.2	4.0	<2.0	4.9	3.0	2.6
Total Uranium (U)	15	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Vanadium (V)	NGA	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	NGA <sup>(f)</sup>	ug/L	<5.0	6.9	<5.0	<5.0	6.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

**Notes:**  
 NGA = guideline is not available  
 < = concentration is below Reportable Detection Limit (RDL)  
<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term  
<sup>(b)</sup> Average temperature (5.2 °C) and pH (5.7 units) used for lookup table  
<sup>(c)</sup> Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL  
<sup>(d)</sup> Value for hexavalent chromium used  
<sup>(e)</sup> value for mesotrophic freshwater used  
<sup>(f)</sup> Water chemistry parameters outside of valid range for CCME equation

**Exceedance Identification:**  
**Bold and shaded = Exceedance of CCME WQS<sup>(a)</sup>**  
Underlined and shaded = Naturally occurring exceedance of CCME WQS<sup>(a)</sup> (background concentrations)  
**Shaded = below RDL; RDL above CCME WQS<sup>(a)</sup>**

**TABLE 17a**  
**RPDs - Petroleum Hydrocarbons (PHCs) in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	BFR_SS1		RPD	BFR_SS7		RPD
	BFR_SS1_SA1	BFR_SS_DUP1		BFR_SS7_SA1 (revised)	BFR_SS_DUP2 (revised)	
Sample Depth (mbgs)	0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15	
Date Collected	2020-12-01	2020-12-01		2020-12-01	2020-12-01	
Benzene	<0.025	<0.025	-	<0.025	<0.025	-
Toluene	<0.050	<0.050	-	<0.10	<0.10	-
Ethylbenzene	<0.025	<0.025	-	<0.025	<0.025	-
Total Xylenes	<0.050	<0.050	-	<0.10	<0.10	-
C6 - C10 (less BTEX)	<2.5	<2.5	-	<5.0	<5.0	-
>C10-C16 Hydrocarbons	<10	<10	-	<10	<1	-
>C16-C21 Hydrocarbons	<10	<10	-	<10	<10	-
>C21-<C32 Hydrocarbons	<15	<15	-	37	270	-
Modified TPH	Gasoline					
	Diesel/No. 2 Fuel Oil	<15	<15	37***	270***	-
	Lube oil/No. 6 Oil					
Reached Baseline at C32	NA	NA	-	Yes	Yes	
Hydrocarbon Resemblance	NA	NA	-	Lube oil range.	Lube oil range.	

**Notes:**

NA = not applicable

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

**TABLE 17b**  
**RPDs - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	BFR_SS1		RPD	BFR_SS7		RPD
	BFR_SS1_SA1	BFR_SS_DUP1		BFR_SS7_SA1	BFR_SS_DUP2	
Sample Depth (mbgs)	0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15	
Date Collected	2020-12-01	2020-12-01		2020-12-01	2020-12-01	
1-Methylnaphthalene	<0.010	<0.010	-	<0.010	<0.010	-
2-Methylnaphthalene	<0.010	<0.010	-	<0.010	<0.010	-
Acenaphthene	<0.010	<0.010	-	<0.010	<0.010	-
Acenaphthylene	<0.010	<0.010	-	<0.010	<0.010	-
Anthracene	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(a)anthracene	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(a)pyrene	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(b)fluoranthene	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(b/j)fluoranthene	<0.020	<0.020	-	<0.020	<0.020	-
Benzo(g,h,i)perylene	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(j)fluoranthene	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(k)fluoranthene	<0.010	<0.010	-	<0.010	<0.010	-
Chrysene	<0.010	<0.010	-	<0.010	<0.010	-
Dibenzo(a,h)anthracene	<0.010	<0.010	-	<0.010	<0.010	-
Fluoranthene	<0.010	<0.010	-	<0.010	<0.010	-
Fluorene	<0.010	<0.010	-	<0.010	<0.010	-
Indeno(1,2,3-cd)pyrene	<0.010	<0.010	-	<0.010	<0.010	-
Naphthalene	<0.010	<0.010	-	<0.010	<0.010	-
Perylene	<0.010	<0.010	-	<0.010	<0.010	-
Phenanthrene	<0.010	<0.010	-	<0.010	<0.010	-
Pyrene	<0.010	<0.010	-	<0.010	<0.010	-
Index of Additive Cancer Risk (IACR) <sup>(b)</sup>	0.15	0.15	-	0.15	0.15	-

**Notes:**

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)



**TABLE 17c**  
**RPDs - Metals in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	BFR_SS1		RPD	BFR_SS7		RPD
	BFR_SS1_SA1	BFR_SS_DUP1		BFR_SS7_SA1	BFR_SS_DUP2	
Sample Depth (mbgs)	0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15	
Date Collected	2020-12-01	2020-12-01		2020-12-01	2020-12-01	
Acid Extractable Aluminum (Al)	5500	5700	3.571428571	1600	1200	28.57142857
Acid Extractable Antimony (Sb)	<2.0	<2.0	-	9.3	5.9	-
Acid Extractable Arsenic (As)	2.5	3.2	24.56140351	2.8	2.1	-
Acid Extractable Barium (Ba)	21	21	0	220	63	110.9540636
Acid Extractable Beryllium (Be)	<2.0	<2.0	-	<2.0	<2.0	-
Acid Extractable Bismuth (Bi)	<2.0	<2.0	-	<2.0	<2.0	-
Acid Extractable Boron (B)	<50	<50	-	<50	<50	-
Acid Extractable Cadmium (Cd)	<0.30	<0.30	-	0.85	0.64	-
Acid Extractable Chromium (Cr)	10	10	0	<2.0	<2.0	-
Acid Extractable Cobalt (Co)	2.8	3.1	10.16949153	2.6	1.3	-
Acid Extractable Copper (Cu)	4.5	4.9	8.510638298	42	31	30.1369863
Acid Extractable Iron (Fe)	8700	9500	8.791208791	2000	1200	50
Acid Extractable Lead (Pb)	3.8	4.1	7.594936709	<b>640</b>	<b>420</b>	41.50943396
Acid Extractable Lithium (Li)	8.6	9.3	7.82122905	<2.0	<2.0	-
Acid Extractable Manganese (Mn)	130	130	0	22	14	44.44444444
Acid Extractable Mercury (Hg)	<0.10	<0.10	-	0.49	0.32	-
Acid Extractable Molybdenum (Mo)	<2.0	<2.0	-	<2.0	<2.0	-
Acid Extractable Nickel (Ni)	6.6	7.3	-	5.5	3.8	-
Acid Extractable Rubidium (Rb)	8.0	8.9	10.65088757	<2.0	<2.0	-
Acid Extractable Selenium (Se)	<0.50	<0.50	-	<b>1.7</b>	<b>1.4</b>	-
Acid Extractable Silver (Ag)	<0.50	<0.50	-	<0.50	<0.50	-
Acid Extractable Strontium (Sr)	<5.0	<5.0	-	76	110	36.55913978
Acid Extractable Thallium (Tl)	<0.10	<0.10	-	0.15	0.11	-
Acid Extractable Tin (Sn)	<1.0	<1.0	-	2.2	<1.0	-
Acid Extractable Uranium (U)	0.68	0.52	-	0.17	0.10	-
Acid Extractable Vanadium (V)	18	20	10.52631579	8.1	3.9	-
Acid Extractable Zinc (Zn)	14	14	0	<b>270</b>	90	100

**Notes:**

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use

**Exceedance Identification:**

**Bold and shaded = Exceedance of CCME SQG**

**TABLE 17d**  
**RPDs - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	BFR_SED4		RPD	BFR_SED5		RPD
	BFR_SED4 (revised)	BFR_SED_DUP1 (revised)		BFR_SED5 (revised)	BFR_SED_DUP2 (revised)	
Date Collected	2020-12-01	2020-12-01		2020-12-02	2020-12-02	
Benzene	<0.050	<0.050	-	<0.025	<0.025	-
Toluene	<0.10	<0.10	-	<0.050	<0.050	-
Ethylbenzene	<0.025	<0.025	-	<0.025	<0.025	-
Total Xylenes	<0.10	<0.10	-	<0.050	<0.050	-
C6 - C10 (less BTEX)	<5.0	<5.0	-	7.9	<2.5	-
>C10-C16 Hydrocarbons	<10	<10	-	<10	<10	-
>C16-C21 Hydrocarbons	<10	<10	-	<10	<10	-
>C21-<C32 Hydrocarbons	390	290	29.41176471	26	23	-
Modified TPH	Gasoline					
	Diesel/No. 2 Fuel Oil	<b>390***</b>	<b>290***</b>	<b>29</b>	<b>34***</b>	<b>23***</b>
	Lube oil/No. 6 Oil					
Reached Baseline at C32	Yes	Yes	NA	Yes	Yes	NA
Hydrocarbon Resemblance	Lube oil range.	Lube oil range.	NA	Lube oil range.	Lube oil range.	NA

**Notes:**

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

NA = not applicable

< = concentration is below Reportable Detection Limit (RDL)

Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments <sup>(2015)</sup>.

<sup>(b)</sup> Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

**Exceedance Identification:**

**Bold and shaded = Exceedance of Atlantic RBCA ESL <sup>(a)</sup>**

**TABLE 17e**  
**RPDs - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	BFR_SED4			BFR_SED5		
	BFR_SED4	BFR_SED_DUP1	RPD	BFR_SED5	BFR_SED_DUP2	RPD
Date Collected	2020-12-01	2020-12-01		2020-12-02	2020-12-02	
1-Methylnaphthalene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
2-Methylnaphthalene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Acenaphthene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Acenaphthylene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Anthracene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Benzo(a)anthracene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Benzo(a)pyrene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Benzo(b)fluoranthene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Benzo(b/j)fluoranthene	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(g,h,i)perylene	<0.0050	<0.0050	-	<0.0080	<0.0050	-
Benzo(j)fluoranthene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Benzo(k)fluoranthene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Chrysene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Dibenzo(a,h)anthracene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Fluoranthene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Fluorene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Indeno(1,2,3-cd)pyrene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Naphthalene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Perylene	<0.0050	0.081	-	0.028	0.028	0
Phenanthrene	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Pyrene	<0.0050	<0.0050	-	<0.0050	<0.0050	-

**Notes:**

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

NGA = guideline is not available

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only.

<sup>(b)</sup> Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

**Exceedance Identification:**

*Italicised and shaded = Exceedance of CCME ISQGs <sup>(a)</sup>*

**Bold and shaded = Exceedance of CCME PELs <sup>(b)</sup>**

**TABLE 17f**  
**RPDs - Metals in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	BFR_SED4			BFR_SED5		
	BFR_SED4 2020-12-01	BFR_SED_DUP1 2020-12-01	RPD	BFR_SED5 2020-12-02	BFR_SED_DUP2 2020-12-02	RPD
Acid Extractable Aluminum (Al)	5800	6000	3.389830508	2100	2400	13.33333333
Acid Extractable Antimony (Sb)	2.7	<2.0	-	<2.0	<2.0	-
Acid Extractable Arsenic (As)	2.5	2.2	-	<2.0	<2.0	-
Acid Extractable Barium (Ba)	23	24	-	9.7	11	-
Acid Extractable Beryllium (Be)	<2.0	<2.0	-	<2.0	<2.0	-
Acid Extractable Bismuth (Bi)	<2.0	<2.0	-	<2.0	<2.0	-
Acid Extractable Boron (B)	<50	<50	-	<50	<50	-
Acid Extractable Cadmium (Cd)	<0.30	<0.30	-	<0.30	<0.30	-
Acid Extractable Chromium (Cr)	4.8	4.4	-	3.1	2.9	-
Acid Extractable Cobalt (Co)	<1.0	<1.0	-	<1.0	<1.0	-
Acid Extractable Copper (Cu)	19	16	17.14285714	<2.0	2.2	-
Acid Extractable Iron (Fe)	2100	1800	15.38461538	6000	6400	6.451612903
Acid Extractable Lead (Pb)	<b>770</b>	<b>250</b>	101.9607843	17	21	21.05263158
Acid Extractable Lithium (Li)	<2.0	<2.0	-	3.0	2.9	-
Acid Extractable Manganese (Mn)	11	9.1	-	71	76	6.802721088
Acid Extractable Mercury (Hg)	<i>0.25</i>	<i>0.23</i>	-	<0.10	<0.10	-
Acid Extractable Molybdenum (Mo)	<2.0	<2.0	-	<2.0	<2.0	-
Acid Extractable Nickel (Ni)	7.0	6.7	-	<2.0	2.1	-
Acid Extractable Rubidium (Rb)	2.6	2.0	-	4.9	6.3	-
Acid Extractable Selenium (Se)	4.5	4.4	2.247191011	<0.50	<0.50	-
Acid Extractable Silver (Ag)	<0.50	<0.50	-	<0.50	<0.50	-
Acid Extractable Strontium (Sr)	12	12	0	<5.0	<5.0	-
Acid Extractable Thallium (Tl)	<0.10	<0.10	-	<0.10	<0.10	-
Acid Extractable Tin (Sn)	3.2	3.1	3.174603175	<1.0	1.0	-
Acid Extractable Uranium (U)	0.74	0.76	2.666666667	0.36	0.65	-
Acid Extractable Vanadium (V)	17	16	6.060606061	13	15	14.28571429
Acid Extractable Zinc (Zn)	19	18	-	8.4	10	-

**Notes:**

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

NGA = guideline is not available

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only

<sup>(b)</sup> Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

**Exceedance Identification:**

*Italicised and shaded* = Exceedance of CCME ISQGs <sup>(a)</sup>

**Bold and shaded** = Exceedance of CCME PELs <sup>(b)</sup>

**TABLE 17g**  
**RPDs - Inorganics in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	BFR_SW4			BFR_SW5		
	BFR_SW4	BFR_SW_DUP1	RPD	BFR_SW5	BFR_SW_DUP2	RPD
Date Collected	2020-12-04	2020-12-01		2020-12-02	2020-12-02	
Total Alkalinity (Total as CaCO <sub>3</sub> )	<5.0	<5.0	-	<5.0	<5.0	-
Dissolved Chloride (Cl <sup>-</sup> )	12	11	8.695652174	10	10	0
Colour	79	91	-	110	110	0
Nitrate + Nitrite (N)	<0.050	<0.050	-	<0.050	<0.050	-
Nitrite (N)	0.011	0.012	8.695652174	0.011	0.012	8.695652174
Nitrogen (Ammonia Nitrogen)	<0.050	<0.050	-	<0.050	<0.050	-
Total Organic Carbon (C)	-	-	-	-	-	-
Orthophosphate (P)	<0.010	<0.010	-	<0.010	<0.010	-
pH	<b>5.3</b>	<b>5.46</b>	2.973977695	<b>6.2</b>	<b>5.94</b>	4.283360791
Reactive Silica (SiO <sub>2</sub> )	1	1.1	9.523809524	1.7	1.7	0
Dissolved Sulphate (SO <sub>4</sub> )	2	2.6	-	2.8	2.2	-
Turbidity	0.57	0.61	6.779661017	4.3	3.7	15
Conductivity	47	45	4.347826087	40	39	2.53164557

**Notes:**

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

NGA = guideline is not available

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term

<sup>(b)</sup> Average temperature (5.2 °C) and pH (5.7 units) used for lookup table

**Exceedance Identification:**

**Bold and shaded = Exceedance of CCME WQG <sup>(a)</sup>**

**TABLE 17h**  
**RPDs - Petroleum Hydrocarbons (PHCs) in Surface Water**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	BFR_SW4			BFR_SW5		
	BFR_SW4	BFR_SW_DUP1	RPD	BFR_SW5	BFR_SW_DUP2	RPD
Date Collected	2020-12-01	2020-12-01		2020-12-02	2020-12-02	
Benzene	<0.0010	<0.0010	-	<0.0010	<0.0010	-
Toluene	<0.0010	<0.0010	-	<0.0010	<0.0010	-
Ethylbenzene	<0.0010	<0.0010	-	<0.0010	<0.0010	-
Total Xylenes	<0.0020	<0.0020	-	<0.0020	<0.0020	-
C6 - C10 (less BTEX)	<0.090	<0.090	-	<0.090	<0.090	-
>C10-C16 Hydrocarbons	<0.050	<0.050	-	<0.050	<0.050	-
>C16-C21 Hydrocarbons	<0.050	<0.050	-	<0.050	<0.050	-
>C21-<C32 Hydrocarbons	<0.090	<0.090	-	<0.090	<0.090	-
Modified TPH	Gasoline		-			-
	Diesel/No. 2 Fuel Oil	<0.090	<0.090	<0.090	<0.090	-
	Lube oil/No. 6 Oil					-
Reached Baseline at C32	NA	NA	NA	NA	NA	NA
Hydrocarbon Resemblance	NA	NA	NA	NA	NA	NA

**Notes:**

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

NA = not applicable

NGA = guideline is not available

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

<sup>(a)</sup> Atlantic Risk-Based Corrective Action (RBCA) Surface Water and Groundwater Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for surface water (2015)

<sup>(b)</sup> Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

**Bold and shaded = Exceedance of Atlantic RBCA ESL <sup>(a)</sup>**

**TABLE 17i**  
**RPDs - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	BFR_SW4			BFR_SW5		
	BFR_SW4	BFR_SW_DUP1	RPD	BFR_SW5	BFR_SW_DUP2	RPD
Date Collected	2020-12-01	2020-12-01		2020-12-02	2020-12-02	
1-Methylnaphthalene	<0.050	<0.050	-	<0.050	<0.050	-
2-Methylnaphthalene	<0.050	<0.050	-	<0.050	<0.050	-
Acenaphthene	<0.010	<0.010	-	<0.010	<0.010	-
Acenaphthylene	<0.010	<0.010	-	<0.010	<0.010	-
Acridine	<0.050	<0.050	-	<0.050	<0.050	-
Anthracene	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(a)anthracene	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(a)pyrene	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(b)fluoranthene	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(b/j)fluoranthene	<0.020	<0.020	-	<0.020	<0.020	-
Benzo(g,h,i)perylene	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(j)fluoranthene	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(k)fluoranthene	<0.010	<0.010	-	<0.010	<0.010	-
Chrysene	<0.010	<0.010	-	<0.010	<0.010	-
Dibenzo(a,h)anthracene	<0.010	<0.010	-	<0.010	<0.010	-
Fluoranthene	<0.010	<0.010	-	<0.010	<0.010	-
Fluorene	<0.010	<0.010	-	<0.010	<0.010	-
Indeno(1,2,3-cd)pyrene	<0.010	<0.010	-	<0.010	<0.010	-
Naphthalene	<0.20	<0.20	-	<0.20	<0.20	-
Perylene	<0.010	<0.010	-	<0.010	<0.010	-
Phenanthrene	<0.010	<0.010	-	<0.010	<0.010	-
Pyrene	<0.010	<0.010	-	<0.010	<0.010	-
Quinoline	<0.050	<0.050	-	<0.050	<0.050	-
Flags	(b)				(c)	

**Notes:**

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

NGA = guideline is not available

< = concentration is below Reportable Detection Limit (RDL)

(a) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term

(b) D14-Terphenyl surrogate recovery sample analysed past recommended hold time

(c) D10-Anthracene, D14-Terphenyl, and D8-Acenaphthylene PAHs

**Exceedance Identification:**

**Bold and shaded = Exceedance of CCME WQGs<sup>(a)</sup>**

**TABLE 17j**  
**RPDs - Metals in Surface Water**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	BFR_SW4			BFR_SW5		
	BFR_SW4 2020-12-01	BFR_SW_DUP1 2020-12-01	RPD	BFR_SW5 2020-12-02	BFR_SW_DUP2 2020-12-02	RPD
Total Aluminum (Al)	<b>160</b>	<b>170</b>	6.060606061	<b>270</b>	<b>250</b>	7.692307692
Total Antimony (Sb)	<1.0	<1.0	-	<1.0	<1.0	-
Total Arsenic (As)	<1.0	<1.0	-	<1.0	<1.0	-
Total Barium (Ba)	2.4	2.2	-	2.3	2.3	-
Total Beryllium (Be)	<1.0	<1.0	-	<1.0	<1.0	-
Total Bismuth (Bi)	<2.0	<2.0	-	<2.0	<2.0	-
Total Boron (B)	<50	<50	-	<50	<50	-
Total Cadmium (Cd)	0.014	0.015	-	0.013	0.020	-
Total Calcium (Ca)	510	430	-	800	820	2.469135802
Total Chromium (Cr)	<1.0	<1.0	-	<1.0	<1.0	-
Total Cobalt (Co)	<0.40	<0.40	-	<0.40	<0.40	-
Total Copper (Cu)	<b>2.2</b>	1.9	-	1.5	1.3	-
Total Iron (Fe)	140	140	-	<b>330</b>	<b>300</b>	9.523809524
Total Lead (Pb)	<b>8.6</b>	<b>8.3</b>	3.550295858	<b>2.7</b>	<b>2.6</b>	3.773584906
Total Magnesium (Mg)	720	690	4.255319149	640	610	4.8
Total Manganese (Mn)	2.9	3.0	-	18	18	0
Total Mercury (Hg)	<0.013	<0.013	-	<0.013	<0.013	-
Total Molybdenum (Mo)	<2.0	<2.0	-	<2.0	<2.0	-
Total Nickel (Ni)	<2.0	<2.0	-	<2.0	<2.0	-
Total Phosphorus (P)	<100	<100	-	<100	<100	-
Total Potassium (K)	120	110	-	220	230	-
Total Selenium (Se)	<0.50	<0.50	-	<0.50	<0.50	-
Total Silver (Ag)	<0.10	<0.10	-	<0.10	<0.10	-
Total Sodium (Na)	5200	4700	10.1010101	4900	4900	0
Total Strontium (Sr)	5.7	4.9	-	4.9	5.5	-
Total Thallium (Tl)	<0.10	<0.10	-	<0.10	<0.10	-
Total Tin (Sn)	<2.0	<2.0	-	<2.0	<2.0	-
Total Titanium (Ti)	2.6	<2.0	-	5.0	5.2	-
Total Uranium (U)	<0.10	<0.10	-	<0.10	<0.10	-
Total Vanadium (V)	<2.0	<2.0	-	<2.0	<2.0	-
Total Zinc (Zn)	6.4	5.9	-	<5.0	<5.0	-

**Notes:**

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

NGA = guideline is not available

< = concentration is below Reportable Detection Limit

(a) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term

(b) Average temperature (5.2 °C) and pH (5.7 units) used for lookup table

(c) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL

(d) Value for hexavalent chromium used

(e) value for mesotrophic freshwater used

(f) Water chemistry parameters outside of valid range for CCME equation

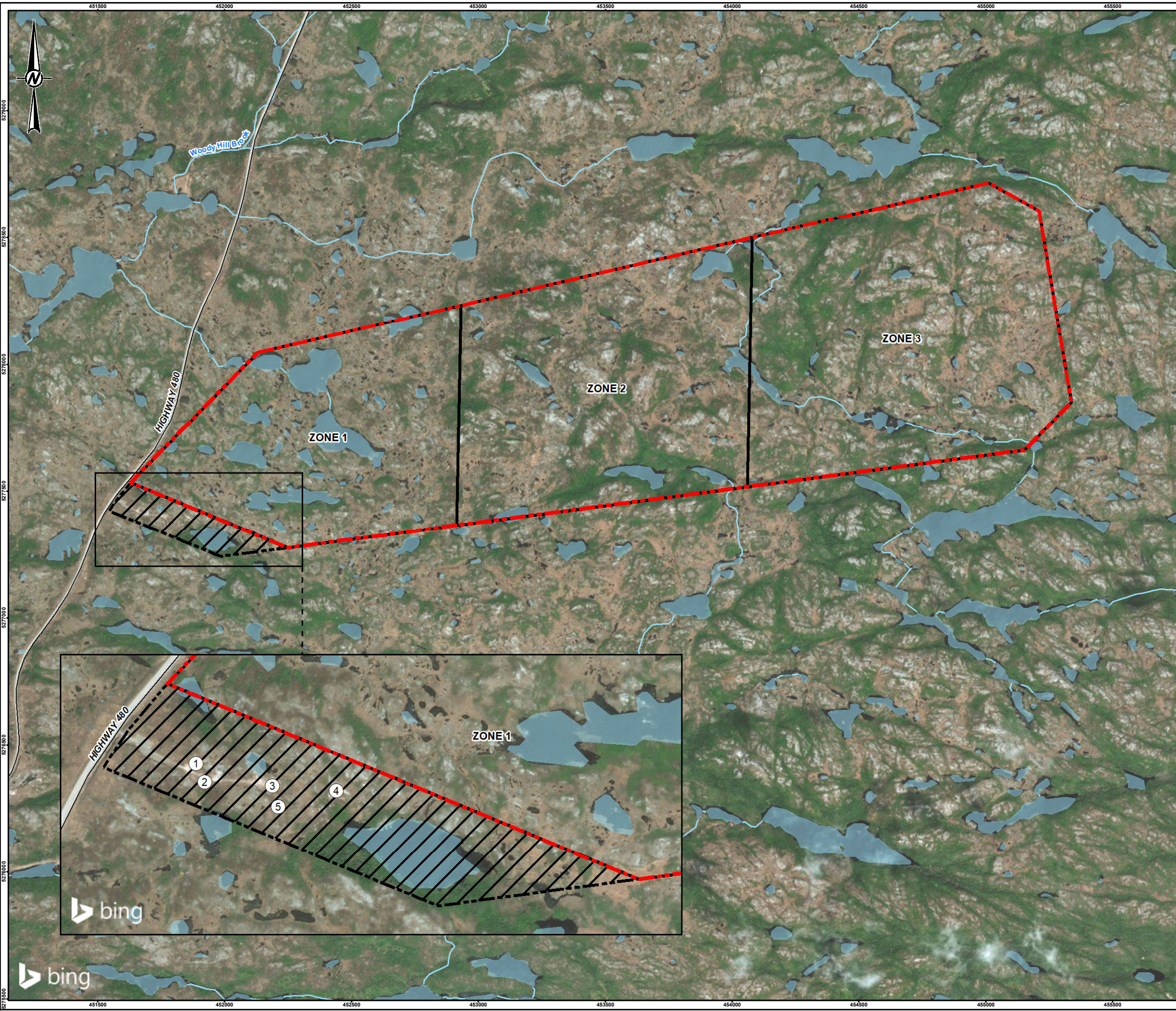
**Exceedance Identification:**

**Bold and shaded = Exceedance of CCME WQS<sup>(a)</sup>**

**Highlighted = below RDL; RDL above CCME WQS<sup>(a)</sup>**



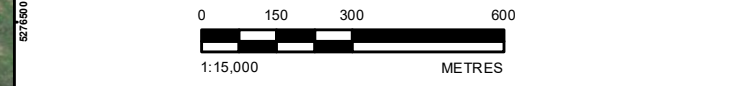
**FIGURES**



- LEGEND**
- ① APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
  - ② APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
  - ③ APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
  - ④ APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
  - ⑤ APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY
- ROADWAY
  - WATERCOURSE
  - WATERBODY
  - PROPOSED ADDITIONAL LEASE AREA
  - ZONE BOUNDARY
  - SITE

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
 1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
 2. KEY MAP: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY  
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 3. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
 4. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
 DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
 BURGEO FIRING RANGE  
 9 WING GANDER, NL

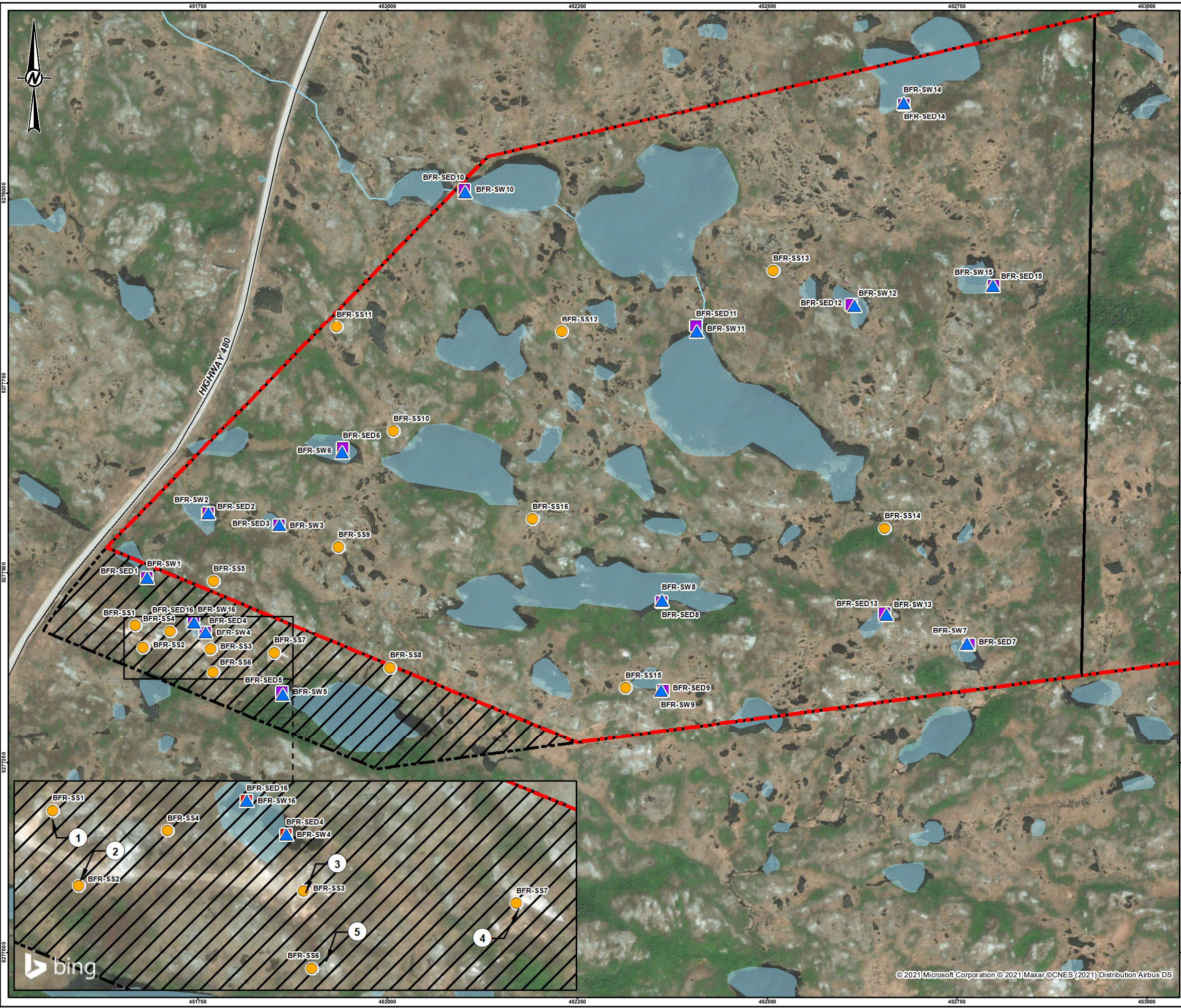
TITLE  
**SITE PLAN**

CONSULTANT	YYYY-MM-DD	2021-02-04
DESIGNED	---	
PREPARED	JEM	
REVIEWED	SAC	
APPROVED	BMC	

PROJECT NO. 20439355 CONTROL 0001 REV. 0 FIGURE 1

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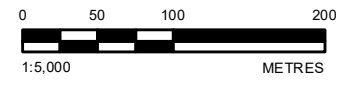


**LEGEND**

- ① APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
- ② APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
- ③ APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
- ④ APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
- ⑤ APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY
- APPROXIMATE SOIL SAMPLE LOCATION
- APPROXIMATE SEDIMENT SAMPLE LOCATION
- ▲ APPROXIMATE SURFACE WATER SAMPLE LOCATION
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▨ PROPOSED ADDITIONAL LEASE AREA
- ▭ ZONE BOUNDARY
- ▭ SITE

**NOTE(S)**  
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**REFERENCE(S)**  
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2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

TITLE  
**SAMPLE LOCATIONS IN ZONE 1**

CONSULTANT	YYYY-MM-DD	2021-02-04
DESIGNED	---	
PREPARED	JEM	
REVIEWED	SAC	
APPROVED	BMC	

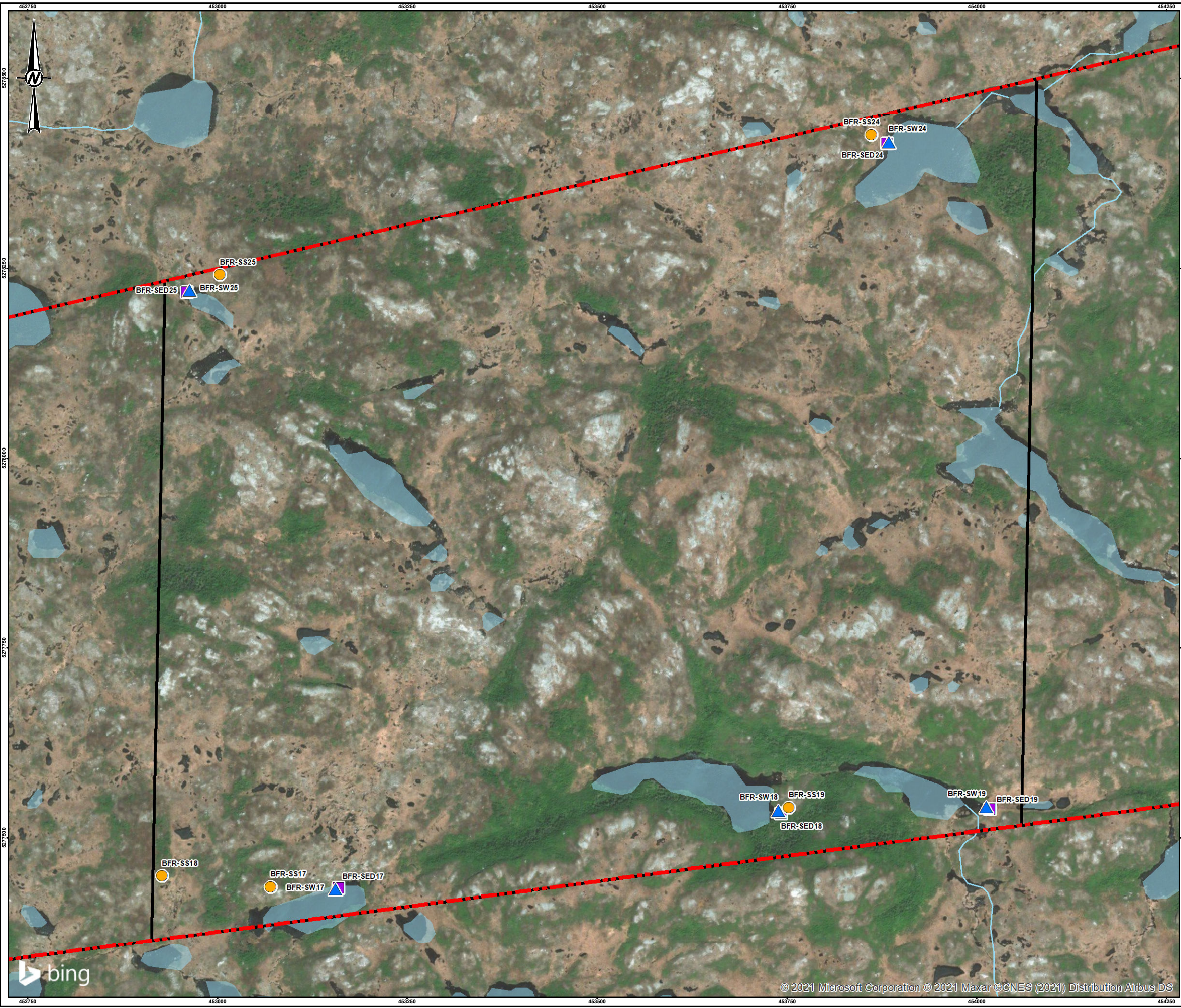
PROJECT NO. 20439355	CONTROL 0001	REV. 0	FIGURE <b>2A</b>
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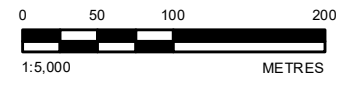


**LEGEND**

- APPROXIMATE SOIL SAMPLE LOCATION
- APPROXIMATE SEDIMENT SAMPLE LOCATION
- ▲ APPROXIMATE SURFACE WATER SAMPLE LOCATION
- WATERCOURSE
- WATERBODY
- ZONE BOUNDARY
- SITE

**NOTE(S)**  
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**REFERENCE(S)**  
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 2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
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 COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
 DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
 BURGIO FIRING RANGE  
 9 WING GANDER, NL

TITLE  
**SAMPLE LOCATIONS IN ZONE 2**

CONSULTANT	YYYY-MM-DD	2021-02-04
	DESIGNED	---
	PREPARED	JEM
	REVIEWED	SAC
	APPROVED	BMC

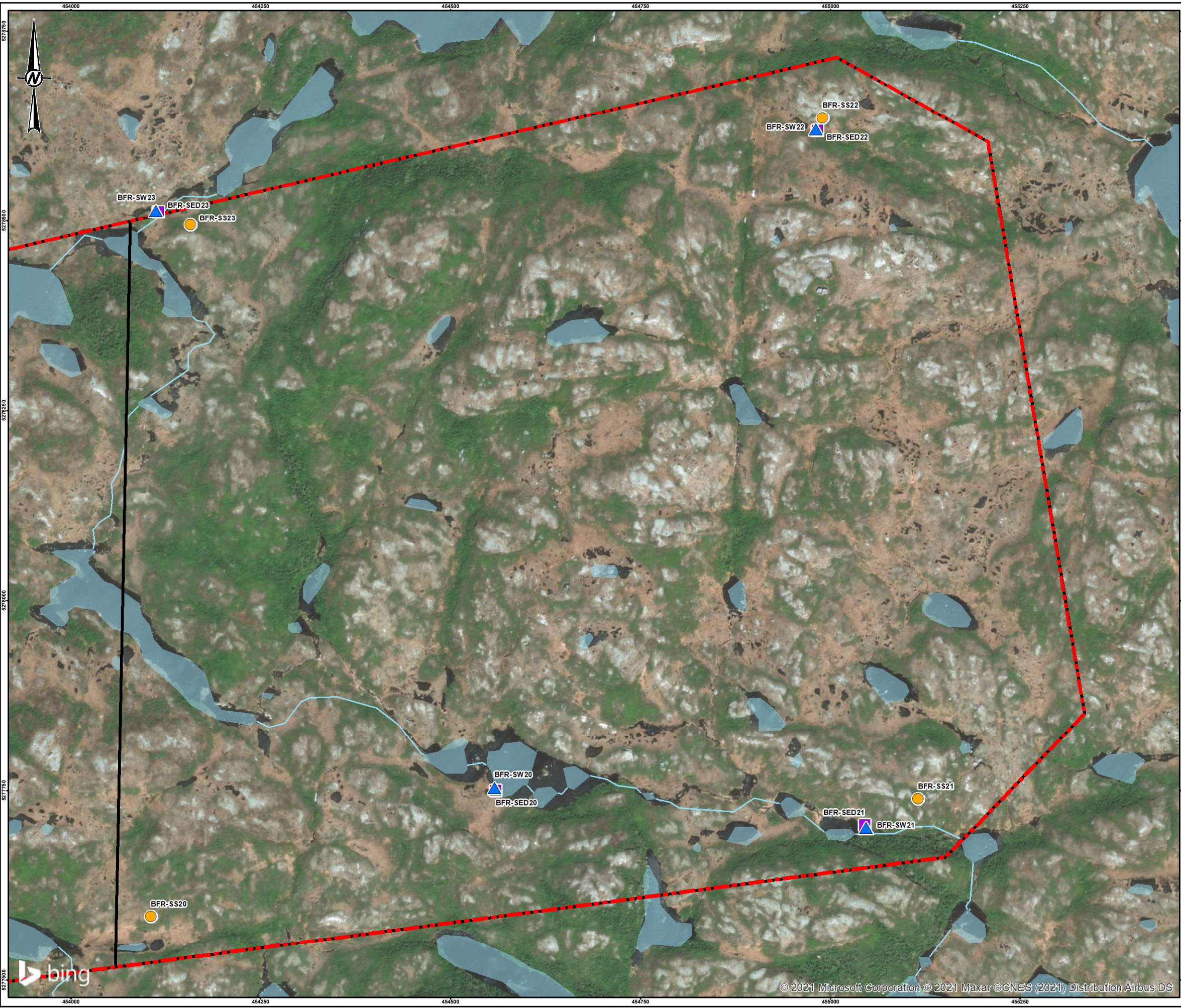
PROJECT NO. 20439355 CONTROL 0001 REV. 0

FIGURE **2B**

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 26mm



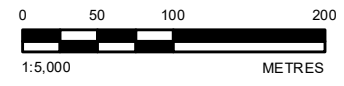


**LEGEND**

- APPROXIMATE SOIL SAMPLE LOCATION
- APPROXIMATE SEDIMENT SAMPLE LOCATION
- ▲ APPROXIMATE SURFACE WATER SAMPLE LOCATION
- WATERCOURSE
- WATERBODY
- ZONE BOUNDARY
- SITE

**NOTE(S)**  
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**REFERENCE(S)**  
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 2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
 3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
 DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
 BURGIO FIRING RANGE  
 9 WING GANDER, NL

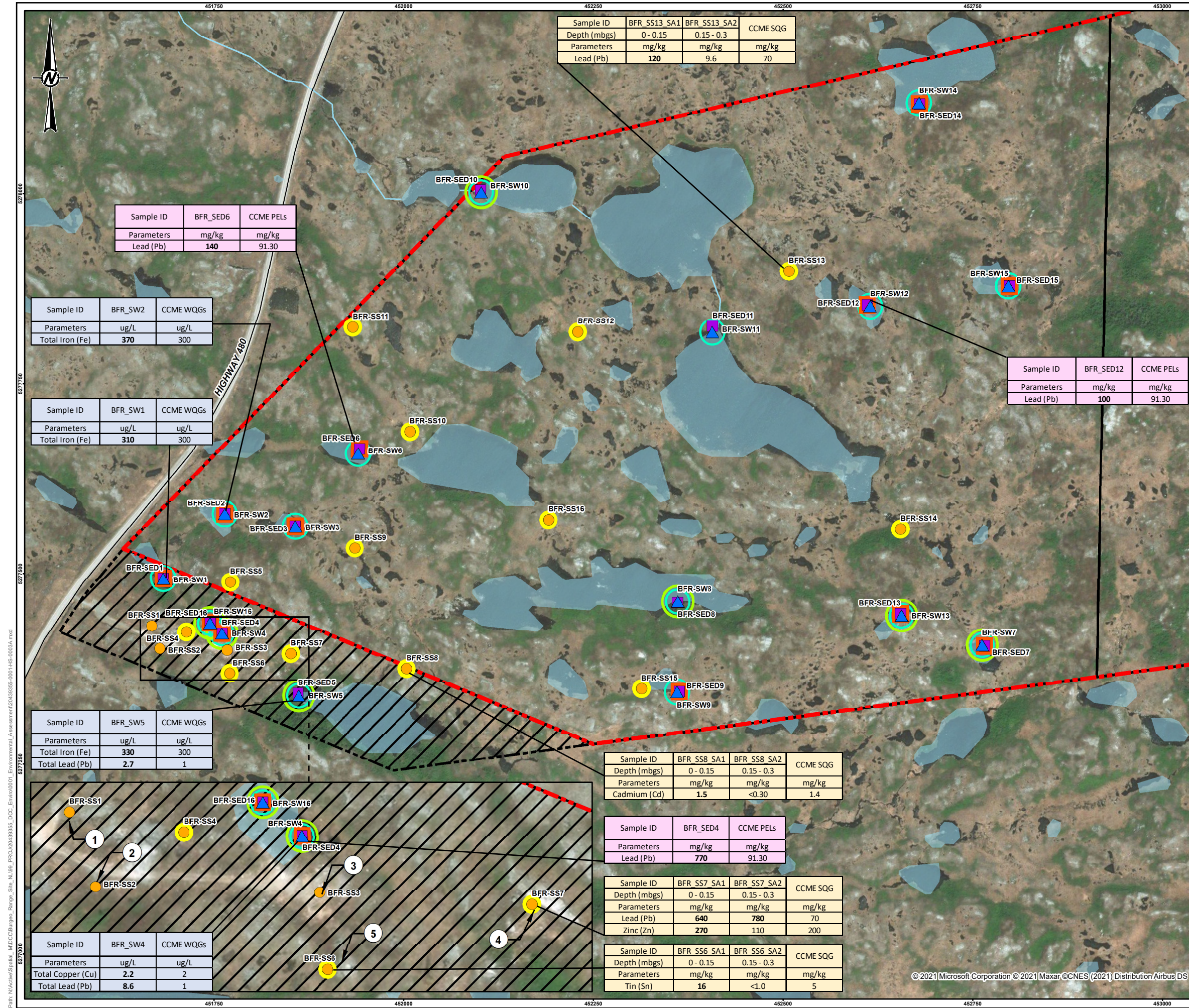
TITLE  
**SAMPLE LOCATIONS IN ZONE 3**

CONSULTANT	YYYY-MM-DD	2021-02-04
	DESIGNED	---
	PREPARED	JEM
	REVIEWED	SAC
	APPROVED	BMC

PROJECT NO. 20439355 CONTROL 0001 REV. 0 FIGURE 2C

Path: N:\Active\Spatial\_MDC\Burgio\_Range\_Site\_NL\90\_PROJ\2021\3035E\_DCC\_Environ\001\_Environmental\_Assessment\2021\3035E-0001-HS-002C.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 26mm



Sample ID	BFR_SS13_SA1	BFR_SS13_SA2	CCME SQG
Depth (mbgs)	0 - 0.15	0.15 - 0.3	
Parameters	mg/kg	mg/kg	mg/kg
Lead (Pb)	120	9.6	70

Sample ID	BFR_SED6	CCME PELs
Parameters	mg/kg	mg/kg
Lead (Pb)	140	91.30

Sample ID	BFR_SW2	CCME WQGs
Parameters	ug/L	ug/L
Total Iron (Fe)	370	300

Sample ID	BFR_SW1	CCME WQGs
Parameters	ug/L	ug/L
Total Iron (Fe)	310	300

Sample ID	BFR_SW5	CCME WQGs
Parameters	ug/L	ug/L
Total Iron (Fe)	330	300
Total Lead (Pb)	2.7	1

Sample ID	BFR_SW4	CCME WQGs
Parameters	ug/L	ug/L
Total Copper (Cu)	2.2	2
Total Lead (Pb)	8.6	1

Sample ID	BFR_SS8_SA1	BFR_SS8_SA2	CCME SQG
Depth (mbgs)	0 - 0.15	0.15 - 0.3	
Parameters	mg/kg	mg/kg	mg/kg
Cadmium (Cd)	1.5	<0.30	1.4

Sample ID	BFR_SED4	CCME PELs
Parameters	mg/kg	mg/kg
Lead (Pb)	770	91.30

Sample ID	BFR_SS7_SA1	BFR_SS7_SA2	CCME SQG
Depth (mbgs)	0 - 0.15	0.15 - 0.3	
Parameters	mg/kg	mg/kg	mg/kg
Lead (Pb)	640	780	70
Zinc (Zn)	270	110	200

Sample ID	BFR_SS6_SA1	BFR_SS6_SA2	CCME SQG
Depth (mbgs)	0 - 0.15	0.15 - 0.3	
Parameters	mg/kg	mg/kg	mg/kg
Tin (Sn)	16	<1.0	5

**LEGEND**

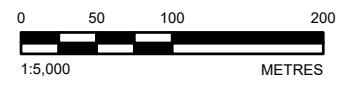
- ① APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
- ② APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
- ③ APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
- ④ APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
- ⑤ APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY
- APPROXIMATE SOIL SAMPLE LOCATION
- APPROXIMATE SEDIMENT SAMPLE LOCATION
- ▲ APPROXIMATE SURFACE WATER SAMPLE LOCATION
- SELENIUM EXCEEDANCE ABOVE CCME SQG
- MODIFIED TPH EXCEEDANCE ABOVE ATLANTIC RBCA ESL
- TOTAL ALUMINIUM EXCEEDANCE ABOVE CCME WQG
- pH BELOW ACCEPTABLE RANGE OF CCME WQG
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▨ PROPOSED ADDITIONAL LEASE AREA
- ▭ ZONE BOUNDARY
- ▭ SITE

**NOTE(S)**

- ALL LOCATIONS ARE APPROXIMATE
- mTPH EXCEEDANCES ARE DUE TO ORGANIC PEAT CONTENT
- ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) SOIL ECOLOGICAL SCREENING LEVELS (ESL) FOR THE PROTECTION OF PLANTS AND SOIL INVERTEBRATES; DIRECT SOIL CONTACT, COARSE AGRICULTURAL SOILS (2015)
- ATLANTIC RBCA TIER 1 RISK-BASED SCREENING LEVELS (RBSL) FOR SOIL, AGRICULTURAL LAND USE, POTABLE GROUNDWATER, COARSE-GRAINED SOIL
- CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) SOIL QUALITY GUIDELINES (SQGs) FOR THE PROTECTION OF ENVIRONMENTAL AND HUMAN HEALTH, 2010, FOR POTABLE AND COARSE GRAINED SOIL WITH AGRICULTURAL LAND USE
- CCME PROBABLE EFFECT LEVELS (PELs) FOR THE PROTECTION OF AQUATIC LIFE, 2010, FOR FRESHWATER
- CCME WATER QUALITY GUIDELINES (WQGs) FOR THE PROTECTION OF AQUATIC LIFE (2010) - FRESHWATER, LONG TERM

**REFERENCE(S)**

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- BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
- PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

TITLE  
EXCEEDANCES AND ANALYTICAL RESULTS IN ZONE 1

CONSULTANT	DATE
	YYYY-MM-DD 2021-02-04
	DESIGNED ----
	PREPARED JEM
	REVIEWED SAC
APPROVED BMC	

PROJECT NO. 20439355 CONTROL 0001 REV. 0 FIGURE 3A

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Sample ID	BFR_SS24_SA1	BFR_SS24_SA2
Depth (mbgs)	0 - 0.15	0.15 - 0.3
Parameters	mg/kg	mg/kg
Cadmium (Cd)	1.8	<0.30

Sample ID	BFR_SW18	CCME WQGs
Parameters	ug/L	ug/L
Total Iron (Fe)	370	300

**LEGEND**

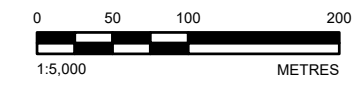
- APPROXIMATE SOIL SAMPLE LOCATION
- APPROXIMATE SEDIMENT SAMPLE LOCATION
- ▲ APPROXIMATE SURFACE WATER SAMPLE LOCATION
- SELENIUM EXCEEDANCE ABOVE CCME SQG
- MODIFIED TPH EXCEEDANCE ABOVE ATLANTIC RBCA ESL
- TOTAL ALUMINIUM EXCEEDANCE ABOVE CCME WQG
- pH BELOW ACCEPTABLE RANGE OF CCME WQG
- WATERCOURSE
- WATERBODY
- ZONE BOUNDARY
- SITE

**NOTE(S)**

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- ATLANTIC RBCA TIER 1 RISK-BASED SCREENING LEVELS (RBSL) FOR SOIL, AGRICULTURAL LAND USE, POTABLE GROUNDWATER, COARSE-GRAINED SOIL
- CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) SOIL QUALITY GUIDELINES (SQGs) FOR THE PROTECTION OF ENVIRONMENTAL AND HUMAN HEALTH, 2010, FOR POTABLE AND COARSE GRAINED SOIL WITH AGRICULTURAL LAND USE
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- PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

---

PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

---

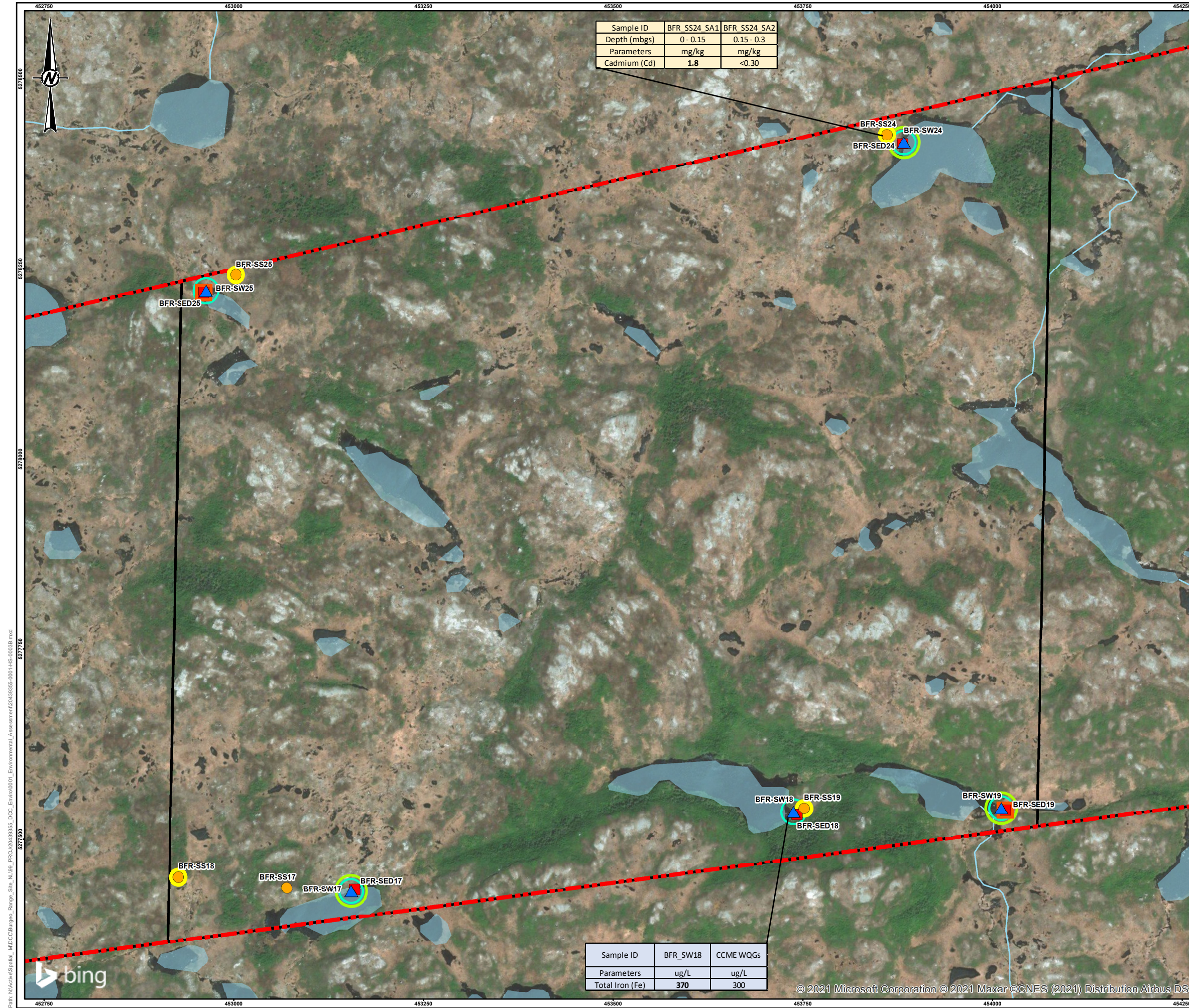
TITLE  
**EXCEEDANCES AND ANALYTICAL RESULTS IN ZONE 2**

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CONSULTANT	YYYY-MM-DD	2021-02-04
	DESIGNED	---
	PREPARED	JEM
	REVIEWED	SAC
	APPROVED	BMC

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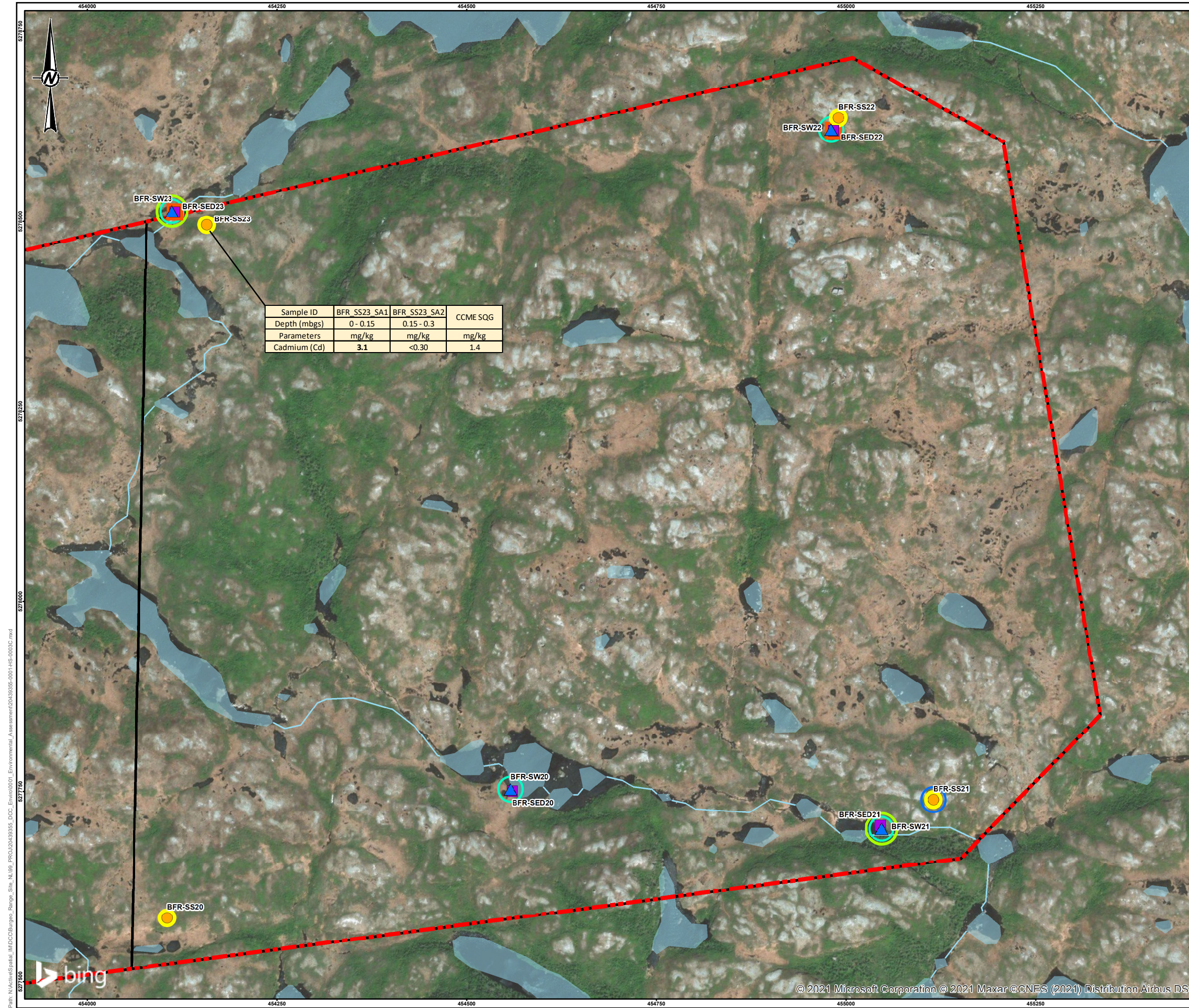
PROJECT NO. 20439355	CONTROL 0001	REV. 0	FIGURE <b>3B</b>
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25mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:





**LEGEND**

- APPROXIMATE SOIL SAMPLE LOCATION
- APPROXIMATE SEDIMENT SAMPLE LOCATION
- ▲ APPROXIMATE SURFACE WATER SAMPLE LOCATION
- SELENIUM EXCEEDANCE ABOVE CCME SQG
- MODIFIED TPH EXCEEDANCE ABOVE ATLANTIC RBCA ESL
- MODIFIED TPH EXCEEDANCE ABOVE ATLANTIC RBCA TIER I RBSL
- TOTAL ALUMINIUM EXCEEDANCE ABOVE CCME WQG
- pH BELOW ACCEPTABLE RANGE OF CCME WQG
- WATERCOURSE
- WATERBODY
- ZONE BOUNDARY
- SITE

**NOTE(S)**

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- CCME WATER QUALITY GUIDELINES (WQGs) FOR THE PROTECTION OF AQUATIC LIFE (2010) - FRESHWATER, LONG TERM

**REFERENCE(S)**

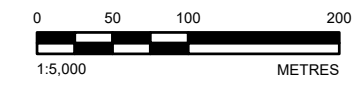
- BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
- BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
- PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

**REFERENCE(S)**

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3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28




CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

TITLE  
**EXCEEDANCES AND ANALYTICAL RESULTS IN ZONE 3**

CONSULTANT	YYYY-MM-DD	2021-02-04
DESIGNED	----	
PREPARED	JEM	
REVIEWED	SAC	
APPROVED	BMC	



PROJECT NO. 20439355 CONTROL 0001 REV. 0

FIGURE 3C

Path: \\ukelive\spatial\IMDCC\Burgoe\_Firing\_Range\_Site\_NL\99\_PROJ\20439355\_DCC\_Env\0001\_Environmental\_Assessment\20439355\_0001\_HIS\_0003C.mxd

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**APPENDIX A**

**Site Interview Questionnaires**

# SITE VISIT QUESTIONNAIRE AND RECORD OF SITE OBSERVATIONS

## 1.0 INTRODUCTION TO SITE

### 1.1 Details

Date	Nov 24, 2020
Site Representative's name and title	Lori Whalen, M.A.Sc. Senior Project Manager, Directorate of Contaminated Sites Department of National Defence / Government of Canada lori.whalen@forces.gc.ca / Office: 709-351-1929
Site Representative's role and number of years associated with the Site	DND for 18 years (1 year on this project); visited the Site in Sep. 2020
Site name	Burgeo Firing Range
Site address	n/a
Are there any Site-specific health and safety requirements?	<input type="checkbox"/> Yes ( <i>describe</i> ) <input checked="" type="checkbox"/> No

### 1.2 Site Overview

General Site Information	Findings and Assessor Comments
Briefly describe the current use of the Site (e.g., "vacant, agricultural, rural")	Vacant site with no buildings/structures/sheds DND is not using the Site currently Local residents make unauthorized use of the property as shooting range
Who owns the Site? When was the Site purchased?	Crown and DND lease period 2005 -201 (officially)
Who is the current occupant of the Site?	Unknown
Who manages the Site?	DND responsible for managing any issues from the former use of the Site
What is the Site area (hectares/acres)?	Unknown
What is the approximate Site shape (e.g., rectangular, square)	Unknown
What is the approximate proportion of the Site occupied by buildings, asphalt, unpaved areas, etc. (e.g., 1/2 paved parking, 1/2 buildings).	Western portion has most activity due to access road off the regional highway; Can be accessed from any direction; however, commonly accessed of the entrance point

## 2.0 PAST SITE USES

### 2.1 Overview

Briefly describe past Site operations (including date of first developed use):

<input type="checkbox"/> No information was available from the Site Representative Prior to 2005, also used a rifle range for a few years      
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### 2.2 Specific Past Uses

To the knowledge of the Site Representative:

Past Uses	Finding	Details and/or Site Assessor Comments <i>(Note types of equipment, period of operation, means of waste disposal, etc.)</i>
Has the Site ever been used for fuel storage?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	
Has the Site ever been occupied by a retail fuel outlet or vehicle service garage?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	
Has the Site ever been used for landfilling or placement of fill at or below ground surface?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	Natural landscape used as a backstop for firing (will confirm with Steven Warren or Anthony DuBourdieu)
Has the Site ever been used for storage of waste water in impoundments?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	portable toilets associated with overnight exercises may have been present
Has the Site ever been used for solid or liquid waste storage or disposal?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
Are there any wells or evidence of drilling on or near the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Not completed or installed by DND Surface water data from nearby waterbody (off-Site) used for potable water supply by municipality (annual sampling program for past 20 years) Waterbody may be located partially on-site and/or receives surface run-off from the Site

### 3.0 PRESENT SITE USES

#### 3.1 Overview

Briefly describe current (not past) operations at the Site

Open and no restriction on point of entry.
Provincial authority requested DND to post signs.
Backstop for firing likely used natural landscape.
Western portion has highest activity.

#### 3.2 Uses of Buildings, Other Structures, and Areas

Building/Structure or Area	Uses at Time of Site Visit, Spills, Staining, Stressed Vegetation
Area name 1:	n/a
Area name 2:	n/a
Area name 3:	n/a
Area name 4:	n/a
Watercourses, ditches or standing water (including wetlands) (include for every site)	Present across the Site. <hr/> <hr/> <hr/>

### 4.0 SITE BUILDINGS AND EQUIPMENT

Are there buildings at the Site?  Yes  No (skip to Section 3.0)

Building 1	Findings and Assessor Comments
Name of building (e.g., "Warehouse")	
Building construction date	
Renovation date(s) (if any)	
Building footprint area (sq. ft. or m <sup>2</sup> )	
Total building area (sq. ft. or m <sup>2</sup> )	
Number of above-ground floors	
Number of below-ground floors (describe uses)	<hr/> <hr/>

Building 1	Findings and Assessor Comments
Are there frequently occupied rooms in contact with the ground (describe locations and uses)? If yes, is there a pathway to the subsurface?	<hr/> <hr/> <hr/> <hr/>
Number of tenant units (if any)	<hr/> <hr/> <hr/> <hr/>
Describe the construction of the building exterior	<hr/> <hr/> <hr/> <hr/>
Describe the construction of the building interior (including flooring, paint)	<hr/> <hr/> <hr/> <hr/>
Describe the building's heating system	<hr/> <hr/> <hr/> <hr/>
Describe the building's cooling system)	<hr/> <hr/> <hr/> <hr/>
Is there a backup power supply for the building (describe location and fuel source)?	<hr/> <hr/> <hr/> <hr/>
What is the source of the Site's potable water supply?	<input type="checkbox"/> <i>Municipal supply</i> <input type="checkbox"/> <i>Drilled well</i> <input type="checkbox"/> <i>Other</i> _____ <input type="checkbox"/> <i>Unknown</i>
Other services (e.g., municipal electrical grid)	<hr/> <hr/> <hr/> <hr/>
Hydraulic lift equipment (elevators, in-ground vehicle hoists, dock levellers)	<hr/> <hr/> <hr/> <hr/>
Other mechanical equipment	<hr/> <hr/> <hr/> <hr/>
X-ray equipment	<hr/> <hr/> <hr/> <hr/>
Is there any evidence of staining on floors, walls and ceilings (include areal extent and likely spill source)? Are there any pathways for contaminants to migrate from the likely source?	<i>If yes, include the details in the appropriate row of this table above.</i> <hr/> <hr/> <hr/> <hr/>

## 5.0 CHEMICAL AND FUEL STORAGE

Identify processes that use chemicals, fuel, or compressed gases.

None – only rifles

No grenades or other bigger ammunition were used at this Site.

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Complete the following table. Include reported or observed evidence of spills or staining for each line item.

Item	Finding	Details, including Evidence of Spills or Staining
Are typical janitorial products (e.g., cleaners, waxes) present in small quantities?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Locations, approx. quantity and examples of types, manufacturer's containers?</i> ----- -----
Are typical building maintenance products (e.g., paint, lubricating oil, paint thinner) present in small quantities?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Locations, approx. quantity and examples of types, manufacturer's containers?</i> ----- -----
Are process chemicals or products used or generated at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of purpose, type, approx. amounts, locations.</i> ----- -----
Are ASTs present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, fill out the detailed form in Attachment B.</i> ----- -----
Are USTs present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, fill out the detailed form in Attachment B.</i> ----- -----
Are storage drums present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, fill out the detailed form in Attachment B.</i> ----- -----

Item	Finding	Details, including Evidence of Spills or Staining
Are chlorinated solvents used at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of purpose, type, approx. amounts, locations.</i>
Are compressed gases used at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of purpose, type, approx. amounts, locations.</i>
Are any other chemicals or fuels stored or used at the Site (excluding waste)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details.</i>
Are any unidentified substances present on the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details.</i>
Have any spills occurred at the Site associated with any of the above items?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, place the details in the relevant line item(s) above.</i>

## 6.0 WASTE GENERATION AND HANDLING

To the knowledge of the Site Representative:

Item	Finding	Details and Assessor Comments
Does the Site generate solid waste typical of commercial operations?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the waste, including recyclables, and how it is handled.</i>
Does the Site generate or store any other solid waste or sludge?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the waste and how it is handled.</i>
How does the Site handle sewage and/or grey water?	<input type="checkbox"/> Municipal <input type="checkbox"/> Septic <input type="checkbox"/> Cesspool <input type="checkbox"/> Other	<i>State location. If septic tank, state whether drainage tiles exist.</i> None
Does the Site generate or store other wastewater or liquid waste?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Details</i>
Does the Site generate or store hazardous waste?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the waste and how it is handled.</i>

Item	Finding	Details and Assessor Comments
Does the Site have any lagoons, drains, sumps, pits, or oil-water separators?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe them and state location and what they are used for. Describe any stains or spills or stressed vegetation.</i> <hr/> <hr/> <hr/>
Are process vents present on the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of location and discharges.</i> <hr/> <hr/> <hr/>
Are other air emissions present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the air discharges generated.</i> <hr/> <hr/> <hr/>
Are strong, noxious, or pungent odours present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of odour(s) and location(s), including source, if possible.</i> <hr/> <hr/> <hr/>

## 7.0 SPECIAL ATTENTION ITEMS

To the knowledge of the Site Representative, are any of the following special attention items present? Incorporate your own Site observations where applicable.

Designated Substance	Finding	Assessor Comments
Polychlorinated biphenyls (PCBs)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/>
Asbestos-containing materials (ACMs)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/>
Lead or lead-containing surface coatings (e.g., paints)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/>
Ozone-depleting substances (ODSs)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/>
Urea formaldehyde foam insulation (UFFI)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/>



Designated Substance	Finding	Assessor Comments
Radon or other radioactive substances	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Mercury	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Mould or water damage	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Sources of significant noise	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Sources of significant vibrations	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Sources of significant electromagnetic radiation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Have surveys and/or management plans for any of these substances been completed?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Describe findings of management plan</i> <hr/> <hr/> <hr/> <hr/>

## 8.0 OTHER OBSERVATIONS

### 8.1 Topographic, Geologic and Hydrogeologic Conditions

*Note observations of dramatic slopes, evidence of elevated/depressed surface grades in relation to adjacent properties, surface water bodies on or near the Site, obvious groundwater discharges in swampy areas.*

Condition	Assessor Findings and Comments
Observe and describe the topography of the Site and surrounding area	<p><i>See note above.</i></p> <p>Minor slope from west to east – prominent enough to influence over-ground water discharge to the east</p> <p>Infiltration - unknown</p> <p>Shallow bedrock</p> <p>Vertical and horizontal delineation will be required for provincial closure – if impacts are found.</p>
Is subsurface soil exposed (e.g., in an excavation)? <input type="checkbox"/> No <input type="checkbox"/> Yes (describe geologic and hydrogeologic conditions)	Not known

## 8.2 Exterior Conditions

Identify and describe the following infrastructure and conditions at the Site and any evidence of contamination associated with them:

Infrastructure	Present	Description and Assessor Comments
Stained materials (e.g., soil, asphalt)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p><i>If yes, estimate area of staining.</i></p> <p>Not observed</p>
For the above, is there a pathway to the subsurface?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Primarily through infiltration
Stressed vegetation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	None – geology does not support dense vegetation growth
Fill (including soil, rock, and other inert materials)	<input type="checkbox"/> Yes <input type="checkbox"/> No	May be brought to Site as part of internal licensing (expand horizontally, elevation changes) but natural landscape likely provided enough
Watercourses, ditches or standing water (including wetlands)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Roads, parking areas, and	<input type="checkbox"/> Yes	

utility rights-of-way (e.g., gas lines)	<input checked="" type="checkbox"/> No	<hr/> <hr/>
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# SITE VISIT QUESTIONNAIRE AND RECORD OF SITE OBSERVATIONS

## 1.0 INTRODUCTION TO SITE

### 1.1 Details

Date	November 25, 2020
Site Representative's name and title	WO, Roger Hann Engineering Officer, Real Property Operations Detachment (Gander) Canadian Armed Forces Roger.Hann@forces.gc.ca / Tel: 709-256-1703 ext 1434 / CSN: 622-1434/ BB: 709-422-1053
Site Representative's role and number of years associated with the Site	1 year
Site name	Burgeo Firing Range
Site address	n/a
Are there any Site-specific health and safety requirements?	<input checked="" type="checkbox"/> Yes ( <i>describe</i> ) <input type="checkbox"/> No Cell reception poor around Deer Lake and Georges Lake (before Stephenvile) No cell reception on Hwy 480 (from Hwy 1 to the Site) Road construction ongoing in Sep – poor road condition for low level cars – recommend getting a SUV/truck

### 1.2 Site Overview

General Site Information	Findings and Assessor Comments
Briefly describe the current use of the Site (e.g., "vacant, agricultural, rural")	Former firing range for DND – currently vacant; signs posted for closure
Who owns the Site? When was the Site purchased?	Unknown – leased to DND
Who is the current occupant of the Site?	none
Who manages the Site?	DND
What is the Site area (hectares/acres)?	unknown
What is the approximate Site shape (e.g., rectangular, square)	unknown
What is the approximate proportion of the Site occupied by buildings, asphalt, unpaved areas, etc. (e.g., 1/2 paved parking, 1/2 buildings).	No buildings/structures May be wooden structure to support firing activities

General Site Information	Findings and Assessor Comments

## 2.0 PAST SITE USES

### 2.1 Overview

Briefly describe past Site operations (including date of first developed use):

<input type="checkbox"/> No information was available from the Site Representative <hr/> <hr/> Only used as firing range by DND <hr/> No other previous uses known <hr/> <hr/> <hr/> <hr/> <hr/>
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### 2.2 Specific Past Uses

To the knowledge of the Site Representative:

Past Uses	Finding	Details and/or Site Assessor Comments <i>(Note types of equipment, period of operation, means of waste disposal, etc.)</i>
Has the Site ever been used for fuel storage?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/>
Has the Site ever been occupied by a retail fuel outlet or vehicle service garage?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	<hr/> <hr/>
Has the Site ever been used for landfilling or placement of fill at or below ground surface?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Backstop using gravel and sand built up, with a wooden sign for a target <hr/> <hr/>
Has the Site ever been used for storage of waste water in impoundments?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/>
Has the Site ever been used for solid or liquid waste storage or disposal?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/>
Are there any wells or evidence of	<input type="checkbox"/> Yes	



<b>Building/Structure or Area</b>	<b>Uses at Time of Site Visit, Spills, Staining, Stressed Vegetation</b>
	----- -----
Area name 3:	n/a ----- -----
Area name 4:	n/a ----- -----
Watercourses, ditches or standing water (including wetlands) <i>(include for every site)</i>	Southern portion of the Site is located within the Town of Burgeo watershed ----- -----

#### 4.0 SITE BUILDINGS AND EQUIPMENT

Are there buildings at the Site?       Yes       No *(skip to Section 3.0)*

<b>Building 1</b>	<b>Findings and Assessor Comments</b>
Name of building (e.g., "Warehouse")	
Building construction date	
Renovation date(s) (if any)	
Building footprint area (sq. ft. or m <sup>2</sup> )	
Total building area (sq. ft. or m <sup>2</sup> )	
Number of above-ground floors	
Number of below-ground floors (describe uses)	----- -----
Are there frequently occupied rooms in contact with the ground (describe locations and uses)? If yes, is there a pathway to the subsurface?	----- -----
Number of tenant units (if any)	
Describe the construction of the building exterior	----- -----
Describe the construction of the building interior (including flooring, paint)	----- -----
Describe the building's heating system	----- -----

Building 1	Findings and Assessor Comments
Describe the building's cooling system)	<hr/> <hr/> <hr/>
Is there a backup power supply for the building (describe location and fuel source)?	<hr/> <hr/> <hr/>
What is the source of the Site's potable water supply?	<input type="checkbox"/> <i>Municipal supply</i> <input type="checkbox"/> <i>Drilled well</i> <input type="checkbox"/> <i>Other</i> _____ <input type="checkbox"/> <i>Unknown</i>
Other services (e.g., municipal electrical grid)	<hr/> <hr/> <hr/>
Hydraulic lift equipment (elevators, in-ground vehicle hoists, dock levellers)	<hr/> <hr/> <hr/>
Other mechanical equipment	<hr/> <hr/> <hr/>
X-ray equipment	<hr/> <hr/> <hr/>
Is there any evidence of staining on floors, walls and ceilings (include areal extent and likely spill source)? Are there any pathways for contaminants to migrate from the likely source?	<i>If yes, include the details in the appropriate row of this table above.</i> <hr/> <hr/> <hr/>

## 5.0 CHEMICAL AND FUEL STORAGE

Identify processes that use chemicals, fuel, or compressed gases.

No <hr/> <hr/> <hr/> <hr/> <hr/>
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Complete the following table. Include reported or observed evidence of spills or staining for each line item.

Item	Finding	Details, including Evidence of Spills or Staining
Are typical janitorial products (e.g., cleaners, waxes)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Locations, approx. quantity and examples of types, manufacturer's containers?</i> <hr/>



Item	Finding	Details, including Evidence of Spills or Staining
present in small quantities?		----- -----
Are typical building maintenance products (e.g., paint, lubricating oil, paint thinner) present in small quantities?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Locations, approx. quantity and examples of types, manufacturer's containers?</i> ----- ----- -----
Are process chemicals or products used or generated at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of purpose, type, approx. amounts, locations.</i> ----- -----
Are ASTs present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, fill out the detailed form in Attachment B.</i> ----- -----
Are USTs present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, fill out the detailed form in Attachment B.</i> ----- -----
Are storage drums present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, fill out the detailed form in Attachment B.</i> ----- -----
Are chlorinated solvents used at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of purpose, type, approx. amounts, locations.</i> ----- -----
Are compressed gases used at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of purpose, type, approx. amounts, locations.</i> ----- -----
Are any other chemicals or fuels stored or used at the Site (excluding waste)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details.</i> ----- -----
Are any unidentified substances present on the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details.</i> ----- -----
Have any spills occurred at the Site associated with any of the above items?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	<i>If yes, place the details in the relevant line item(s) above.</i> Burning of garbage including tv, tires may be associated with use of Site by local residents -----

## 6.0 WASTE GENERATION AND HANDLING

To the knowledge of the Site Representative:

Item	Finding	Details and Assessor Comments
Does the Site generate solid waste typical of commercial operations?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the waste, including recyclables, and how it is handled.</i>
Does the Site generate or store any other solid waste or sludge?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the waste and how it is handled.</i>
How does the Site handle sewage and/or grey water?	<input type="checkbox"/> Municipal <input type="checkbox"/> Septic <input type="checkbox"/> Cesspool <input type="checkbox"/> Other	<i>State location. If septic tank, state whether drainage tiles exist.</i> None
Does the Site generate or store other wastewater or liquid waste?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Details</i>
Does the Site generate or store hazardous waste?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the waste and how it is handled.</i>
Does the Site have any lagoons, drains, sumps, pits, or oil-water separators?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe them and state location and what they are used for. Describe any stains or spills or stressed vegetation.</i>
Are process vents present on the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of location and discharges.</i>
Are other air emissions present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the air discharges generated.</i>
Are strong, noxious, or pungent odours present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of odour(s) and location(s), including source, if possible.</i>

## 7.0 SPECIAL ATTENTION ITEMS

To the knowledge of the Site Representative, are any of the following special attention items present? Incorporate your own Site observations where applicable.

Designated Substance	Finding	Assessor Comments
Polychlorinated biphenyls (PCBs)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	

Designated Substance	Finding	Assessor Comments
Asbestos-containing materials (ACMs)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Lead or lead-containing surface coatings (e.g., paints)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Ozone-depleting substances (ODSs)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Urea formaldehyde foam insulation (UFFI)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Radon or other radioactive substances	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Mercury	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Mould or water damage	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Sources of significant noise	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Sources of significant vibrations	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Sources of significant electromagnetic radiation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Have surveys and/or management plans for any of these substances been completed?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Describe findings of management plan</i> <hr/> <hr/> <hr/> <hr/>

## 8.0 OTHER OBSERVATIONS

### 8.1 Topographic, Geologic and Hydrogeologic Conditions

Note observations of dramatic slopes, evidence of elevated/depressed surface grades in relation to adjacent properties, surface water bodies on or near the Site, obvious groundwater discharges in swampy areas.

Condition	Assessor Findings and Comments
Observe and describe the topography of the Site and surrounding area	<p>See note above.</p> <p>Elevation changes but not more than 60m at a time</p> <p>Generally slopes down leading to the backstop (2-5 m lower) and then inclines upwards to the east</p>
Is subsurface soil exposed (e.g., in an excavation)? <input type="checkbox"/> No <input type="checkbox"/> Yes (describe geologic and hydrogeologic conditions)	<p>Exposed rock with some class A used to maintain road</p> <p>Sand and gravel for the backstop</p> <p>Two man-made ponds (~2ft deep)</p>

### 8.2 Exterior Conditions

Identify and describe the following infrastructure and conditions at the Site and any evidence of contamination associated with them:

Infrastructure	Present	Description and Assessor Comments
Stained materials (e.g., soil, asphalt)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p><i>If yes, estimate area of staining.</i></p>
For the above, is there a pathway to the subsurface?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>Only through infiltration</p>
Stressed vegetation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Fill (including soil, rock, and other inert materials)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>unknown</p>
Watercourses, ditches or standing water	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>Waterbodies more than approx. 1000 m from the firing sport (~1200 m from Hwy 480) is unlikely to have received impacts from the firing range activities</p>

(including wetlands)		----- -----
Roads, parking areas, and utility rights-of-way (e.g., gas lines)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	----- ----- -----

# SITE VISIT QUESTIONNAIRE AND RECORD OF SITE OBSERVATIONS

## 1.0 INTRODUCTION TO SITE

### 1.1 Details

Date	November 25, 2020
Site Representative's name and title	Stephen Warren Property Officer, Real Property Operations Detachment (Gander) Department of National Defence / Government of Canada Stephen.Warren2@forces.gc.ca / Tel: 709-256-1703 ext 1436
Site Representative's role and number of years associated with the Site	4 years with the Site
Site name	Burgeo Firing Range
Site address	n/a
Are there any Site-specific health and safety requirements?	<input type="checkbox"/> Yes ( <i>describe</i> ) <input checked="" type="checkbox"/> No

### 1.2 Site Overview

General Site Information	Findings and Assessor Comments
Briefly describe the current use of the Site (e.g., "vacant, agricultural, rural")	Used a firing range; Sep 2019 – signs put up to not use and that 'range is closed'.
Who owns the Site? When was the Site purchased?	Leased for 5 years; likely used for approx. 2-3 years
Who is the current occupant of the Site?	None – no buildings/sheds/structure
Who manages the Site?	DND responsible for managing any issues from the former use of the Site - No regular maintenance required
What is the Site area (hectares/acres)?	300 hectares approx.
What is the approximate Site shape (e.g., rectangular, square)	
What is the approximate proportion of the Site occupied by buildings, asphalt, unpaved areas, etc. (e.g., 1/2 paved parking, 1/2 buildings).	Water bodies present across Site – water available year round  Not many trees, sub-tundra type of forest, low bush trees

## 2.0 PAST SITE USES

### 2.1 Overview

Briefly describe past Site operations (including date of first developed use):

<input type="checkbox"/> No information was available from the Site Representative Prior to DND, likely used as firing range by local residents East of the backstop – firing into pond/brook so likely lead contamination - focus sediment and surface water sampling

### 2.2 Specific Past Uses

To the knowledge of the Site Representative:

Past Uses	Finding	Details and/or Site Assessor Comments <i>(Note types of equipment, period of operation, means of waste disposal, etc.)</i>
Has the Site ever been used for fuel storage?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	
Has the Site ever been occupied by a retail fuel outlet or vehicle service garage?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	
Has the Site ever been used for landfilling or placement of fill at or below ground surface?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	Excavator may have been used to make backstop from natural
Has the Site ever been used for storage of waste water in impoundments?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	
Has the Site ever been used for solid or liquid waste storage or disposal?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	
Are there any wells or evidence of drilling on or near the Site?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Unknown

### 3.0 PRESENT SITE USES

#### 3.1 Overview

Briefly describe current (not past) operations at the Site

DND used only western portion of the Site (max 1000m off the highway) including backstop
Possible location for wildlife hunting – similar ammunition power as used by DND (no grenades or heavy ammunition)

#### 3.2 Uses of Buildings, Other Structures, and Areas

Building/Structure or Area	Uses at Time of Site Visit, Spills, Staining, Stressed Vegetation
Area name 1:	n/a
Area name 2:	n/a
Area name 3:	n/a
Area name 4:	n/a
Watercourses, ditches or standing water (including wetlands) (include for every site)	Pond located behind the backstop Few little water lagoons in the western portion

### 4.0 SITE BUILDINGS AND EQUIPMENT

Are there buildings at the Site?  Yes  No (skip to Section 3.0)

Building 1	Findings and Assessor Comments
Name of building (e.g., "Warehouse")	
Building construction date	
Renovation date(s) (if any)	
Building footprint area (sq. ft. or m <sup>2</sup> )	
Total building area (sq. ft. or m <sup>2</sup> )	
Number of above-ground floors	
Number of below-ground floors (describe uses)	



Building 1	Findings and Assessor Comments
Are there frequently occupied rooms in contact with the ground (describe locations and uses)? If yes, is there a pathway to the subsurface?	<hr/> <hr/> <hr/> <hr/>
Number of tenant units (if any)	<hr/> <hr/> <hr/> <hr/>
Describe the construction of the building exterior	<hr/> <hr/> <hr/> <hr/>
Describe the construction of the building interior (including flooring, paint)	<hr/> <hr/> <hr/> <hr/>
Describe the building's heating system	<hr/> <hr/> <hr/> <hr/>
Describe the building's cooling system)	<hr/> <hr/> <hr/> <hr/>
Is there a backup power supply for the building (describe location and fuel source)?	<hr/> <hr/> <hr/> <hr/>
What is the source of the Site's potable water supply?	<input type="checkbox"/> <i>Municipal supply</i> <input type="checkbox"/> <i>Drilled well</i> <input type="checkbox"/> <i>Other</i> _____ <input type="checkbox"/> <i>Unknown</i>
Other services (e.g., municipal electrical grid)	<hr/> <hr/> <hr/> <hr/>
Hydraulic lift equipment (elevators, in-ground vehicle hoists, dock levellers)	<hr/> <hr/> <hr/> <hr/>
Other mechanical equipment	<hr/> <hr/> <hr/> <hr/>
X-ray equipment	<hr/> <hr/> <hr/> <hr/>
Is there any evidence of staining on floors, walls and ceilings (include areal extent and likely spill source)? Are there any pathways for contaminants to migrate from the likely source?	<i>If yes, include the details in the appropriate row of this table above.</i> <hr/> <hr/> <hr/> <hr/>

## 5.0 CHEMICAL AND FUEL STORAGE

Identify processes that use chemicals, fuel, or compressed gases.

None

Complete the following table. Include reported or observed evidence of spills or staining for each line item.

Item	Finding	Details, including Evidence of Spills or Staining
Are typical janitorial products (e.g., cleaners, waxes) present in small quantities?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Locations, approx. quantity and examples of types, manufacturer's containers?</i> <hr/> <hr/>
Are typical building maintenance products (e.g., paint, lubricating oil, paint thinner) present in small quantities?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Locations, approx. quantity and examples of types, manufacturer's containers?</i> <hr/> <hr/>
Are process chemicals or products used or generated at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of purpose, type, approx. amounts, locations.</i> <hr/> <hr/>
Are ASTs present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, fill out the detailed form in Attachment B.</i> <hr/> <hr/>
Are USTs present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, fill out the detailed form in Attachment B.</i> <hr/> <hr/>
Are storage drums present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, fill out the detailed form in Attachment B.</i> <hr/> <hr/>
Are chlorinated solvents used at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of purpose, type, approx. amounts, locations.</i> <hr/> <hr/>
Are compressed gases used at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of purpose, type, approx. amounts, locations.</i> <hr/> <hr/>
Are any other chemicals or fuels stored or used at the	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<i>If yes, provide details.</i> <hr/> <hr/>

Item	Finding	Details, including Evidence of Spills or Staining
Site (excluding waste)?	<input type="checkbox"/> Unknown	
Are any unidentified substances present on the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details.</i>
Have any spills occurred at the Site associated with any of the above items?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	<i>If yes, place the details in the relevant line item(s) above.</i>

## 6.0 WASTE GENERATION AND HANDLING

To the knowledge of the Site Representative:

Item	Finding	Details and Assessor Comments
Does the Site generate solid waste typical of commercial operations?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the waste, including recyclables, and how it is handled.</i>
Does the Site generate or store any other solid waste or sludge?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the waste and how it is handled.</i>
How does the Site handle sewage and/or grey water?	<input type="checkbox"/> Municipal <input type="checkbox"/> Septic <input type="checkbox"/> Cesspool <input type="checkbox"/> Other	<i>State location. If septic tank, state whether drainage tiles exist.</i> none
Does the Site generate or store other wastewater or liquid waste?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	<i>Details</i>
Does the Site generate or store hazardous waste?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the waste and how it is handled.</i>
Does the Site have any lagoons, drains, sumps, pits, or oil-water separators?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe them and state location and what they are used for. Describe any stains or spills or stressed vegetation.</i>
Are process vents present on the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of location and discharges.</i>
Are other air emissions present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the air discharges generated.</i>

Item	Finding	Details and Assessor Comments
Are strong, noxious, or pungent odours present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of odour(s) and location(s), including source, if possible.</i> <hr/> <hr/>

## 7.0 SPECIAL ATTENTION ITEMS

To the knowledge of the Site Representative, are any of the following special attention items present? Incorporate your own Site observations where applicable.

Designated Substance	Finding	Assessor Comments
Polychlorinated biphenyls (PCBs)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/>
Asbestos-containing materials (ACMs)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/>
Lead or lead-containing surface coatings (e.g., paints)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/>
Ozone-depleting substances (ODSs)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/>
Urea formaldehyde foam insulation (UFFI)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/>
Radon or other radioactive substances	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/>
Mercury	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/>
Mould or water damage	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/>

Designated Substance	Finding	Assessor Comments
Sources of significant noise	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	
Sources of significant vibrations	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	
Sources of significant electromagnetic radiation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	
Have surveys and/or management plans for any of these substances been completed?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Describe findings of management plan</i>

## 8.0 OTHER OBSERVATIONS

### 8.1 Topographic, Geologic and Hydrogeologic Conditions

Note observations of dramatic slopes, evidence of elevated/depressed surface grades in relation to adjacent properties, surface water bodies on or near the Site, obvious groundwater discharges in swampy areas.

Condition	Assessor Findings and Comments
Observe and describe the topography of the Site and surrounding area	<i>See note above.</i>  Not even terrain or flat land – variable elevations typical of NL region
Is subsurface soil exposed (e.g., in an excavation)? <input type="checkbox"/> No <input type="checkbox"/> Yes (describe geologic and hydrogeologic conditions)	Only where the road was built - coming in off the highway (Highway 480)

### 8.2 Exterior Conditions

Identify and describe the following infrastructure and conditions at the Site and any evidence of contamination associated with them:

Infrastructure	Present	Description and Assessor Comments
Stained materials (e.g., soil, asphalt)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<i>If yes, estimate area of staining.</i> Around firing range – disturbed soil

<p>For the above, is there a pathway to the subsurface?</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<hr/> <hr/> <hr/>
<p>Stressed vegetation</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<hr/> <hr/> <hr/>
<p>Fill (including soil, rock, and other inert materials)</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<hr/> <hr/> <hr/>
<p>Watercourses, ditches or standing water (including wetlands)</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>Several waterbodies present on the western portion; may be standing/seasonal water or streams</p> <hr/> <hr/>
<p>Roads, parking areas, and utility rights-of-way (e.g., gas lines)</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<hr/> <hr/> <hr/>

# SITE VISIT QUESTIONNAIRE AND RECORD OF SITE OBSERVATIONS

## 1.0 INTRODUCTION TO SITE

### 1.1 Details

Date	November 25, 2020
Site Representative's name and title	Sergeant Tony DuBourdieu, CD2 Enhanced Training Sergeant 5th Canadian Ranger Patrol Group Canadian Armed Forces <a href="mailto:anthony.dubourdieu@forces.gc.ca">anthony.dubourdieu@forces.gc.ca</a> Tel: 709-256-1703 1415 / TTY: 709-256-1766
Site Representative's role and number of years associated with the Site	15 years at the unit Last visited Site in 2007 (still active under DND lease then)
Site name	Burgeon Firing Range
Site address	n/a
Are there any Site-specific health and safety requirements?	<input type="checkbox"/> Yes ( <i>describe</i> ) <input checked="" type="checkbox"/> No

### 1.2 Site Overview

General Site Information	Findings and Assessor Comments
Briefly describe the current use of the Site (e.g., "vacant, agricultural, rural")	No use for DND Open area (historically, likely an old gravel pit) - some ground areas raised a few metres to act as a backstop (bullet catch) using gravel from the site - load (16 tonnes) of class A stone brought to Site on Nov 29, 2005 to construct the backstop with some sod over the class A stone
Who owns the Site? When was the Site purchased?	Leased by DND – approx. Nov 2004 to Nov. 2009 Has not been officially handed back to Crown – neither has the lease been extended Only used max of twice a year (stopped in 2008-09)
Who is the current occupant of the Site?	vacant
Who manages the Site?	DND – no regular maintenance required
What is the Site area (hectares/acres)?	Range is 100 m in length and 50 m in width Site – 3.5km by 1 km
What is the approximate Site shape (e.g., rectangular, square)	Not known
What is the approximate proportion of the Site occupied by buildings, asphalt, unpaved	No buildings

General Site Information	Findings and Assessor Comments
areas, etc. (e.g., 1/2 paved parking, 1/2 buildings).	

## 2.0 PAST SITE USES

### 2.1 Overview

Briefly describe past Site operations (including date of first developed use):

<input type="checkbox"/> No information was available from the Site Representative ----- Prior to 2005, also used as a rifle range by locals ----- Approx. 100 m from Hwy 480 is the firing spot ----- Approx. 250 m from Hwy 480 is the backstop ----- Potentially can travel up to 3km if weapon aimed at 45 deg ----- ----- -----
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### 2.2 Specific Past Uses

To the knowledge of the Site Representative:

Past Uses	Finding	Details and/or Site Assessor Comments <i>(Note types of equipment, period of operation, means of waste disposal, etc.)</i>
Has the Site ever been used for fuel storage?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	----- ----- -----
Has the Site ever been occupied by a retail fuel outlet or vehicle service garage?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	----- ----- -----
Has the Site ever been used for landfilling or placement of fill at or below ground surface?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	----- ----- -----
Has the Site ever been used for storage of waste water in impoundments?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	----- ----- -----
Has the Site ever been used for solid or liquid waste storage or disposal?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	----- ----- -----
Are there any wells or evidence of	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	----- -----



Past Uses	Finding	Details and/or Site Assessor Comments <i>(Note types of equipment, period of operation, means of waste disposal, etc.)</i>
Has the Site ever been used for fuel storage?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/>
Has the Site ever been occupied by a retail fuel outlet or vehicle service garage?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/>
drilling on or near the Site?		

### 3.0 PRESENT SITE USES

#### 3.1 Overview

Briefly describe current (not past) operations at the Site

<hr/> <hr/> <hr/> Open and no restriction on point of entry No signs from DND posted <hr/> <hr/> <hr/> Locals use for firing range Wild life available and hunting could be pertain <hr/> <hr/> <hr/> Not serviced by any utilities <hr/> <hr/> <hr/>
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#### 3.2 Uses of Buildings, Other Structures, and Areas

Building/Structure or Area	Uses at Time of Site Visit, Spills, Staining, Stressed Vegetation
Area name 1:	
Area name 2:	
Area name 3:	
Area name 4:	
Watercourses, ditches or standing water (including wetlands) <i>(include for every site)</i>	Stagnant water throughout the area - <hr/> <hr/> <hr/>

### 4.0 SITE BUILDINGS AND EQUIPMENT

Are there buildings at the Site?       Yes       No *(skip to Section 3.0)*

Building 1	Findings and Assessor Comments
Name of building (e.g., "Warehouse")	
Building construction date	
Renovation date(s) (if any)	
Building footprint area (sq. ft. or m <sup>2</sup> )	
Total building area (sq. ft. or m <sup>2</sup> )	
Number of above-ground floors	
Number of below-ground floors (describe uses)	<hr/> <hr/> <hr/>
Are there frequently occupied rooms in contact with the ground (describe locations and uses)? If yes, is there a pathway to the subsurface?	<hr/> <hr/> <hr/>
Number of tenant units (if any)	
Describe the construction of the building exterior	<hr/> <hr/> <hr/>
Describe the construction of the building interior (including flooring, paint)	<hr/> <hr/> <hr/>
Describe the building's heating system	<hr/> <hr/> <hr/>
Describe the building's cooling system)	<hr/> <hr/> <hr/>
Is there a backup power supply for the building (describe location and fuel source)?	<hr/> <hr/> <hr/>
What is the source of the Site's potable water supply?	<input type="checkbox"/> <i>Municipal supply</i> <input type="checkbox"/> <i>Drilled well</i> <input type="checkbox"/> <i>Other</i> _____ <input type="checkbox"/> <i>Unknown</i>
Other services (e.g., municipal electrical grid)	<hr/> <hr/> <hr/>
Hydraulic lift equipment (elevators, in-ground vehicle hoists, dock levellers)	<hr/> <hr/> <hr/>
Other mechanical equipment	<hr/> <hr/> <hr/>

Building 1	Findings and Assessor Comments
X-ray equipment	<hr/> <hr/> <hr/>
Is there any evidence of staining on floors, walls and ceilings (include areal extent and likely spill source)? Are there any pathways for contaminants to migrate from the likely source?	<i>If yes, include the details in the appropriate row of this table above.</i> <hr/> <hr/> <hr/>

## 5.0 CHEMICAL AND FUEL STORAGE

Identify processes that use chemicals, fuel, or compressed gases.

Not applicable <hr/> <hr/> <hr/>
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Complete the following table. Include reported or observed evidence of spills or staining for each line item.

Item	Finding	Details, including Evidence of Spills or Staining
Are typical janitorial products (e.g., cleaners, waxes) present in small quantities?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Locations, approx. quantity and examples of types, manufacturer's containers?</i> <hr/> <hr/> <hr/>
Are typical building maintenance products (e.g., paint, lubricating oil, paint thinner) present in small quantities?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Locations, approx. quantity and examples of types, manufacturer's containers?</i> <hr/> <hr/> <hr/>
Are process chemicals or products used or generated at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of purpose, type, approx. amounts, locations.</i> <hr/> <hr/> <hr/>
Are ASTs present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, fill out the detailed form in Attachment B.</i> <hr/> <hr/> <hr/>
Are USTs present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, fill out the detailed form in Attachment B.</i> <hr/> <hr/> <hr/>
Are storage drums present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, fill out the detailed form in Attachment B.</i> <hr/> <hr/> <hr/>

Item	Finding	Details, including Evidence of Spills or Staining
Are chlorinated solvents used at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of purpose, type, approx. amounts, locations.</i>
Are compressed gases used at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of purpose, type, approx. amounts, locations.</i>
Are any other chemicals or fuels stored or used at the Site (excluding waste)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details.</i>
Are any unidentified substances present on the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details.</i>
Have any spills occurred at the Site associated with any of the above items?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	<i>If yes, place the details in the relevant line item(s) above.</i>

## 6.0 WASTE GENERATION AND HANDLING

To the knowledge of the Site Representative:

Item	Finding	Details and Assessor Comments
Does the Site generate solid waste typical of commercial operations?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the waste, including recyclables, and how it is handled.</i>
Does the Site generate or store any other solid waste or sludge?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the waste and how it is handled.</i>
How does the Site handle sewage and/or grey water?	<input type="checkbox"/> Municipal <input type="checkbox"/> Septic <input type="checkbox"/> Cesspool <input type="checkbox"/> Other	<i>State location. If septic tank, state whether drainage tiles exist.</i> none
Does the Site generate or store other wastewater or liquid waste?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	<i>Details</i>
Does the Site generate or store hazardous waste?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the waste and how it is handled.</i>

Item	Finding	Details and Assessor Comments
Does the Site have any lagoons, drains, sumps, pits, or oil-water separators?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe them and state location and what they are used for. Describe any stains or spills or stressed vegetation.</i> <hr/> <hr/> <hr/>
Are process vents present on the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of location and discharges.</i> <hr/> <hr/> <hr/>
Are other air emissions present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, describe the air discharges generated.</i> <hr/> <hr/> <hr/>
Are strong, noxious, or pungent odours present at the Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>If yes, provide details of odour(s) and location(s), including source, if possible.</i> <hr/> <hr/> <hr/>

## 7.0 SPECIAL ATTENTION ITEMS

To the knowledge of the Site Representative, are any of the following special attention items present? Incorporate your own Site observations where applicable.

Designated Substance	Finding	Assessor Comments
Polychlorinated biphenyls (PCBs)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/>
Asbestos-containing materials (ACMs)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/>
Lead or lead-containing surface coatings (e.g., paints)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/>
Ozone-depleting substances (ODSs)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/>
Urea formaldehyde foam insulation (UFFI)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/>

Designated Substance	Finding	Assessor Comments
Radon or other radioactive substances	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Mercury	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Mould or water damage	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Sources of significant noise	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Sources of significant vibrations	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Sources of significant electromagnetic radiation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<hr/> <hr/> <hr/> <hr/>
Have surveys and/or management plans for any of these substances been completed?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	<i>Describe findings of management plan</i> <hr/> <hr/> <hr/> <hr/>

## 8.0 OTHER OBSERVATIONS

### 8.1 Topographic, Geologic and Hydrogeologic Conditions

*Note observations of dramatic slopes, evidence of elevated/depressed surface grades in relation to adjacent properties, surface water bodies on or near the Site, obvious groundwater discharges in swampy areas.*

Condition	Assessor Findings and Comments
Observe and describe the topography of the Site and surrounding area	<p><i>See note above.</i></p> <p>Rises up and down - North slopes down to the south</p> <p>Firing point at lower elevation compared to the backstop – area in between has a minor dip</p>
Is subsurface soil exposed (e.g., in an excavation)? <input type="checkbox"/> No <input type="checkbox"/> Yes (describe geologic and hydrogeologic conditions)	<hr/> <hr/> <hr/> <hr/> <hr/>

## 8.2 Exterior Conditions

Identify and describe the following infrastructure and conditions at the Site and any evidence of contamination associated with them:

Infrastructure	Present	Description and Assessor Comments
Stained materials (e.g., soil, asphalt)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p><i>If yes, estimate area of staining.</i></p> <p>Not at the time of last site visit</p> <hr/> <hr/> <hr/>
For the above, is there a pathway to the subsurface?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<hr/> <hr/> <hr/>
Stressed vegetation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<hr/> <hr/> <hr/>
Fill (including soil, rock, and other inert materials)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<hr/> <hr/> <hr/>
Watercourses, ditches or standing water (including wetlands)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<hr/> <hr/> <hr/>
Roads, parking areas, and utility rights-of-way (e.g., gas lines)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<hr/> <hr/> <hr/>

**APPENDIX B**

**Golder's Standard Operating  
Procedures**





### PURPOSE

Soil headspace vapour screening (headspace screening) measures relative concentrations of volatile organic compounds in the headspaces of soil sample containers as an indicator of volatile contaminants in the soil sample. Headspace screening is carried out on any environmental project where soil samples are collected. After the headspace screening is done, the relative concentrations are evaluated for indications of possible impacts and to provide guidance on which soil samples are to be submitted to an analytical laboratory.

### LIMITATIONS

It is important to note that the headspace concentrations measured are relative rather than absolute. The actual concentrations of volatile compounds in soil are determined through laboratory testing. Also, the headspace measurement does not identify the compound(s) that may be in the soil but represents an aggregate of all volatile compounds.

Note that some combustible gas detectors can operate in a “methane elimination” mode that substantially excludes methane from the measurement; however in some instances naturally occurring methane can interfere with the headspace reading caused by the presence of volatile contaminants.

### EQUIPMENT AND MATERIAL SPECIFICATIONS

Soil headspace vapour can be measured using different instruments depending on the nature of the suspected contamination. If petroleum hydrocarbons are suspected, a combustible gas detector can be used. If volatile organic compounds are suspected, a photoionization detector can be used. Other instruments can also be considered, and the instrument used should be selected taking into account the best available information about site history and uses. Field instruments must be calibrated in accordance with the requirements of the Quality Assurance Program and Golder SOP No. 12 (Measurement of Field Parameters).

### FIELD PROCEDURE

To screen soil headspace for volatile compounds:

- 1) Collect the soil sample and place it in a secure container so as to minimize losses of volatile components during headspace screening.
- 2) Immediately place the soil sample in a plastic bag (0.5 L to 1 L), filling the bag about one-quarter full.
- 3) Seal the bag tightly leaving a minimal headspace.
- 4) While the sample is secure in the bag, knead any lumps of soil by hand within the closed bag to break them up.
- 5) Allow the soil sample to equilibrate for a minimum of 15 minutes and until it reaches a minimum temperature of 10°C, but complete all headspace measurements within two hours of sample collection.



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## STANDARD OPERATING PROCEDURE NO. 4: SOIL HEADSPACE VAPOUR SCREENING

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- 6) To measure the headspace vapours, insert the instrument probe(s) into the headspace above the soil sample, taking care to minimize potential vapour loss.
- 7) Agitate/manipulate the sample by hand as the measurement is taken.
- 8) Record on the field form or log the peak reading registered by the instrument during the first 15 seconds of measurement.

### REQUIRED DOCUMENTATION

Soil headspace readings should be recorded on the field form or log on which the soil sample is otherwise described, so that each headspace reading is clearly identified with the sample to which the results apply. There must be a notation on the field form or log that identifies the type of instrument used. Units of measurement must also appear with the reading. Include documentation of calibration and calibration checks in the field file.

### REFERENCES

MOEE Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario, dated May 1996. Version 1

### DOCUMENT CONTROL

**Author:** Keith Salt

Edit 1            Editor: Margaret Shaw            Edit Date: November 5, 2010

Edit 2            Editor: Dave Smyth            Edit Date: January 9, 2014

SOP4-Headspace Screening.docx



### PURPOSE

Where dedicated field sampling equipment cannot be used, sampling equipment must be decontaminated prior to retrieving samples of soil, water or sediment (O. Reg. 153/04). Decontamination is used to reduce the likelihood of cross-contamination between sampling locations.

### LIMITATIONS

This Standard Operating Procedure (SOP) applies to field equipment constructed of metallic and synthetic materials that comes in contact with samples that will be submitted for laboratory analysis. It is not intended for use at sites where PCBs, biohazards, or radioactive substances are present.

### EQUIPMENT AND MATERIAL SPECIFICATIONS

Equipment decontamination requires the following materials as appropriate to the task:

- Sample containers for the laboratory analysis of rinse water.
- Mechanical cleaning device(s) (e.g., paper towels, bottle brush, broom, pressure washer) to dislodge and remove gross contamination. The cleaning device should be appropriate to the equipment being decontaminated.
- Detergent Solution - laboratory-grade non-phosphate detergent solution (e.g., AlcoNox or LiquiNox) prepared using analyte-free water as per the detergent instructions (typically 1 part detergent to 100 parts water).
- Solvent Rinse Solution - isopropanol, acetone, or methanol (pesticide grade).
- Analyte-free Rinse Water - typically distilled water. To demonstrate that the rinse water is analyte free, a sample of the source water can be submitted for laboratory analysis.
- Labelled squeeze bottles containing prepared decontamination solutions (note: decontamination solutions will be prepared for each sample event and will not be reused at more than one site to avoid cross-contamination). For the decontamination of larger equipment, larger solution containers may be necessary.
- Waste-water collection containers (barrels or pails with sealable lids).

### FIELD PROCEDURE

- 1) Remove gross contamination using brushes or paper towel.
- 2) At a minimum, sample contacting equipment should be washed with a detergent solution and rinsed with analyte-free water.



## STANDARD OPERATING PROCEDURE NO. 11: EQUIPMENT DECONTAMINATION

- 3) Wash with detergent solution, using a brush made of inert material to remove any particles or surface film. For equipment that, because of internal mechanism or tubing cannot be adequately cleaned with a brush, the decontamination solutions should be circulated through the equipment.
- 4) Rinse thoroughly with analyte-free water.
- 5) If a non-aqueous phase is present, rinse with a solvent solution (may be deleted if samples will not undergo organic chemical analyses).
- 6) Thoroughly rinse with analyte-free water.
- 7) Allow equipment to air dry as much as practicable prior to next use.
- 8) Contain waste decontamination solutions and dispose of them using the same procedure as for other investigation-derived wastes.
- 9) Collect a rinsate blank for laboratory analysis (O.Reg. 153/04).

The probes of water level meters can be decontaminated using only a detergent wash and a thorough rinse using analyte-free water. If a non-aqueous phase liquid is present, a solvent rinse is required.

### REQUIRED DOCUMENTATION

In addition to the documentation requirements of the Golder Quality Assurance Program, the Field Team will document the decontamination procedures, the source and types of solution(s) used for decontamination, and the handling of rinse fluids and accumulated solids, if any.

### REFERENCES

ASTM D5088-02 (Reapproved 2008). Standard Practice for Decontamination of Field Equipment Used at Waste Sites.

Ontario Regulation 153/04 (Records of Site Condition) (as amended) under the Environmental Protection Act (Ontario).

### DOCUMENT CONTROL

Version 1.	<b>Author</b>	BRG	Date	May 26, 2010
Edit 1	Editor :	Margaret Shaw	Edit Date:	November 19, 2010
Edit 2	Editor :	Dave Smyth	Edit Date:	January 24, 2013

SOP11-Equipment Decontamination.docx



### PURPOSE

Field measurements of water quality parameters provides information about the basic geochemistry of the groundwater and may be used to assess the representativeness of groundwater samples submitted for laboratory analysis.

### LIMITATIONS

This Standard Operating Procedure (SOP) applies to the measurement of groundwater quality parameters in the field. This procedure applies to groundwater samples from monitoring wells that have been properly developed and purged (refer to Golder SOP No. 4, Golder SOP No. 9, and Golder SOP No. 10).

### EQUIPMENT AND MATERIAL SPECIFICATIONS

Field measurement of water quality parameters requires the following:

- Appropriate water quality field instrument(s), which can include meters, field spectrophotometers, field titration apparatus and other. The use of widely-available multi-parameter water quality meters for the measurement of temperature, pH and specific conductivity is recommended.
- Any necessary calibration materials.

### FIELD PROCEDURE

- 1) Set up the water quality instrument(s) in accordance with the manufacturer's instructions.
- 2) Calibrate the instrument(s) in accordance with the manufacturer's instructions and the requirements of the Quality Assurance Program. Document initial instrument calibration and calibration checks in the field file.
- 3) Collect a water sample and measure water quality parameters in accordance with the manufacturer's instructions.

### REQUIRED DOCUMENTATION

Record the results at the time of measurement on an appropriate field form (e.g., a monitoring well development field form, a groundwater sample collection field form, or other) in Appendix C.



## DOCUMENT CONTROL

**Author:** Eric Hood

Edit 1            Editor: Margaret Shaw            Edit Date: November 19, 2010

Edit 1            Editor: Dave Smyth            Edit Date: January 9, 2014

SOP12-Measurement of Field Parameters.docx

**APPENDIX C**

**Photographs**



Photo 1: View within Zone 1 looking at backstop, facing southwest from BFR\_SS7 location.



Photo 2: View of front side of backstop, facing east.





Photo 3: View of former location of wooden targets used by locals, facing southeast.



Photo 4: View of area where locals would setup to shoot across water, facing south.



Photo 5: View of area where locals would setup to shoot clay targets, facing east. Shell casings visible.



Photo 6: View of shell casings and debris on site between entrance and backstop, facing north.



Photo 7: View of BFR\_SS1 location in area of Rangers target practice shooting location, facing south. Backstop visible in top right corner of photo.



Photo 8: Close-up view of BFR\_SS1 test pit and spoil pile.



Photo 9: View of BFR\_SS3 location in front of backstop, facing east.



Photo 10: Close-up view of BFR\_SS3 test pit and spoil pile.



Photo 11: View of BFR\_SS21 location, facing east.



Photo 12: Close-up view of BFR\_SS21 test pit and spoil pile.



Photo 13: View of BFR\_SS25 location, facing east.



Photo 14: Close-up view of BFR\_SS25 test pit and spoil pile.



Photo 15: View of BFR\_SW5 and BFR\_SED5 location, facing east.



Photo 16: Close-up view of BFR\_SED5.



Photo 17: View of BFR\_SW16 and BFR\_SED16 location, facing southwest.



Photo 18: Close-up view of BFR\_SED16.





Photo 19: View of BFR\_SW19 and BFR\_SED19 location, facing northeast.



Photo 20: Close-up view of BFR\_SED19.



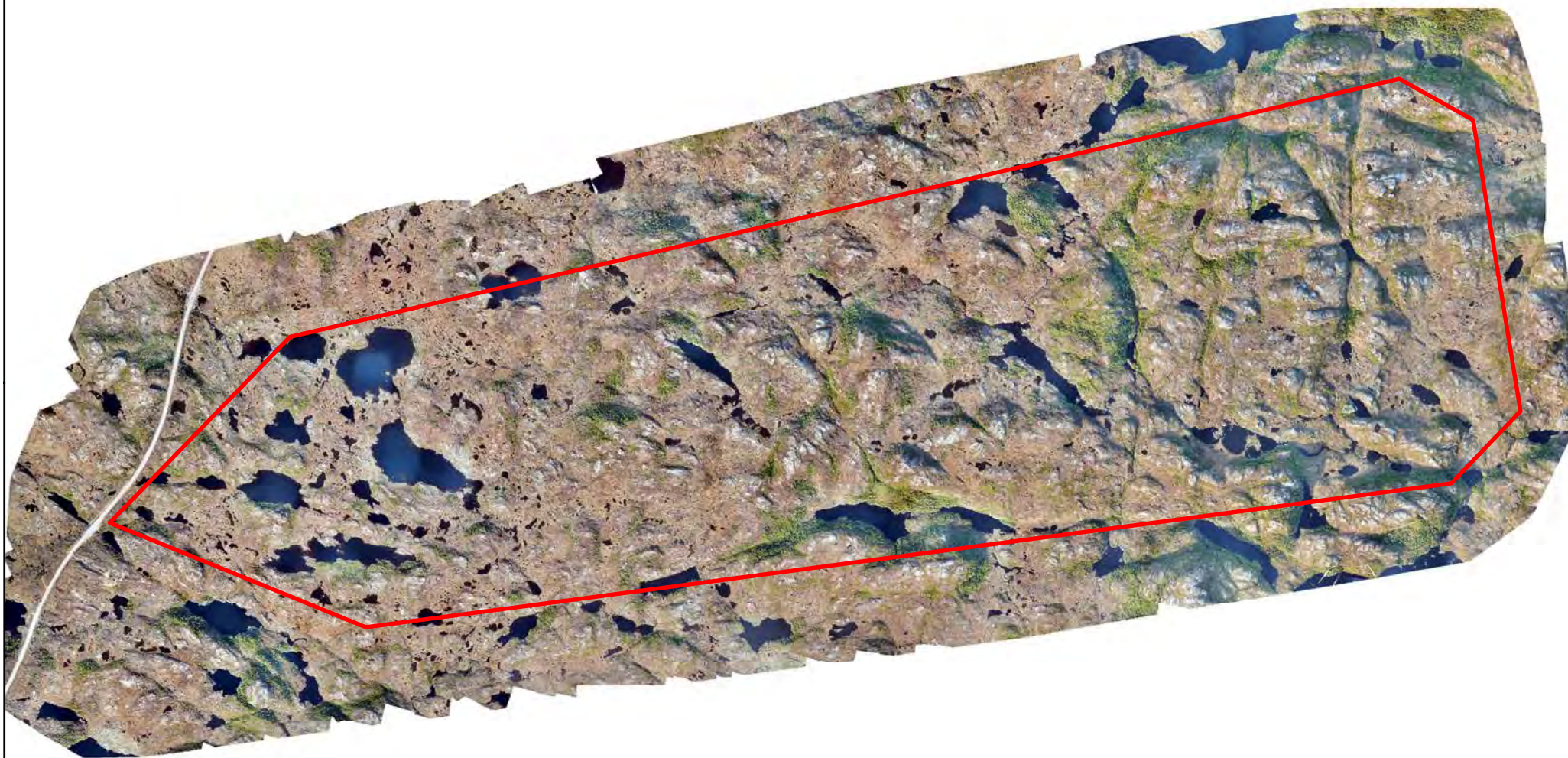
Photo 21: View of BFR\_SW23 and BFR\_SED23 location, facing northeast.



Photo 22: Close-up view of BFR\_SED23.

**APPENDIX D**

**Survey Plans**

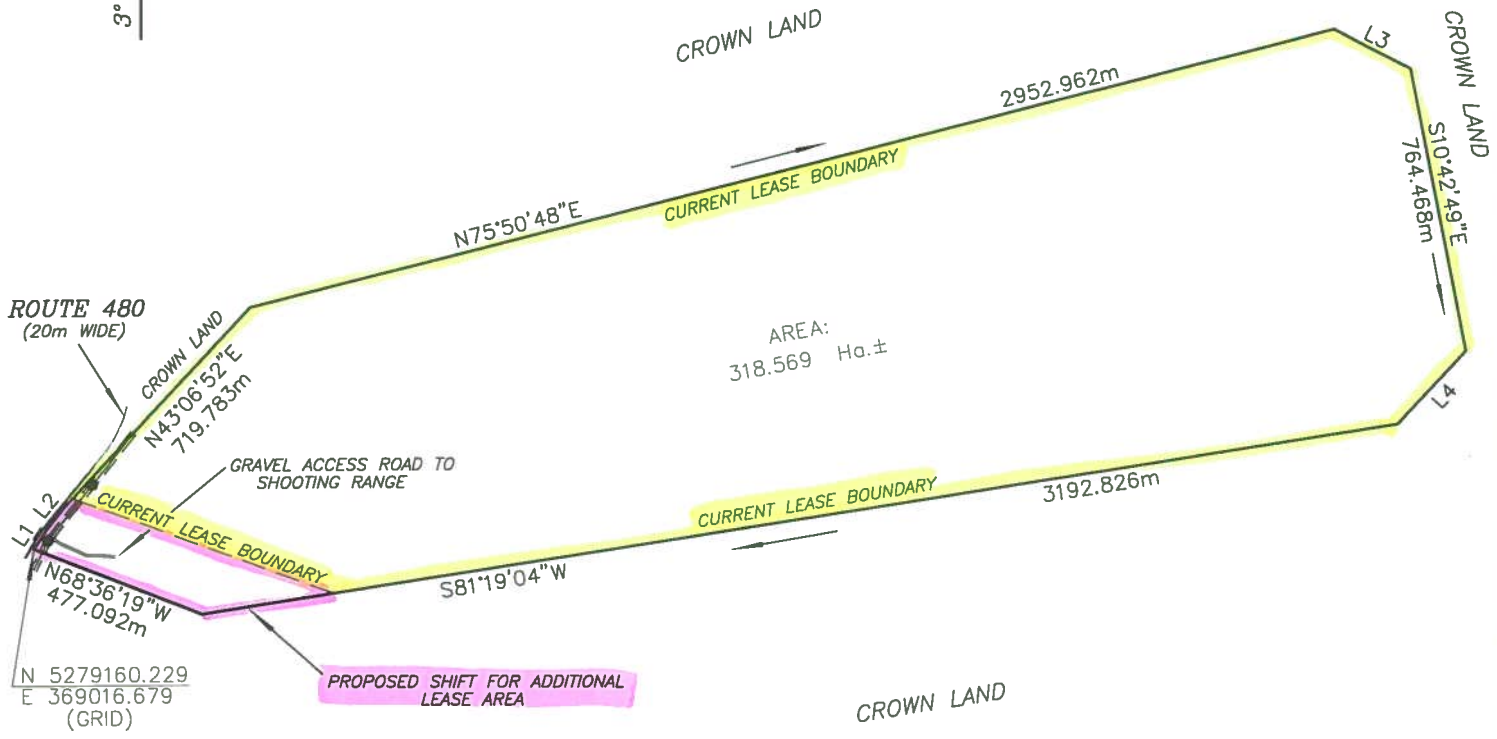


0 0.25 0.5 1 Kilometers

 Approximate Project Area Boundary

3° GRID NORTH ( NAD, 83 )  
 C.M. 58° 30' W . L .

PRELIMINARY



**LEGEND**

- CONTROL MONUMENT ..... (Symbol)
- CAPPED IRON PIN ..... (Symbol)
- FOUND IRON PIN ..... (Symbol)
- PK NAIL ..... (Symbol) PK
- BOUNDARY LINE ..... (Symbol)
- POLE OR LIGHT STANDARD ..... (Symbol)
- HYDRANT..... (Symbol)
- FENCE POST ..... (Symbol) FP
- FENCE LINES ..... (Symbol)
- GUY WIRE ..... (Symbol)
- POWER-TELEPHONE LINES ..... (Symbol)
- EASEMENTS ..... (Symbol)
- CENTERLINE ..... (Symbol)

NUM	BEARING	DISTANCE
L1	N32°56'11"E	58.806m
L2	N39°01'19"E	79.097m
L3	S62°03'15"E	227.749m
L4	S43°03'53"W	263.456m

REFERENCE MONUMENTS : 89G6154 N 5,276,532.059 E 368,548.649  
 ( COMBINED SCALE FACTOR : 0.999942 )  
 89G6155 N 5,275,849.512 E 369,991.205

ALL DISTANCES SHOWN ARE HORIZONTAL  
 DISTANCES MEASURED IN METERS .

**YATES AND WOODS LTD.**  
 NEWFOUNDLAND LAND SURVEYORS  
 53 CARIBOU ROAD CORNER BROOK, NL.  
 A2H 4W8 TEL. 639-9177 E-mail: yatesandwoods@bellaliant.com

**SURVEY PLAN SHOWING LEASE FOR  
 DEPARTMENT OF NATIONAL DEFENCE SHOOTING RANGE  
 ROUTE 480, BURGEO, NL.**

PRELIMINARY

SCALE: 1 : 20000      DWG. NO. 20456      DRAWN BY M.D.L      DATE: JAN. 15, 2021

**APPENDIX E**

**Laboratory Certificates of Analysis**



Your Project #: 20439355  
 Site Location: BURGEO  
 Your C.O.C. #: n/a

**Attention: Belinda Culgin**

Golder Associates Ltd  
 201 Brownlow Ave.  
 Suites 25-26  
 Dartmouth, NS  
 CANADA B3B 1W2

Report Date: 2021/01/19  
 Report #: R6485859  
 Version: 6 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**BV LABS JOB #: C0W8766**

**Received: 2020/12/09, 09:00**

Sample Matrix: Soil  
 # Samples Received: 27

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Benzo(b/j)fluoranthene Sum (soil)	22	N/A	2020/12/14	N/A	Auto Calc.
Benzo(b/j)fluoranthene Sum (soil)	5	N/A	2020/12/15	N/A	Auto Calc.
TEH in Soil (PIRI) (1)	22	2021/01/11	2021/01/11	ATL SOP 00111	Atl. RBCA v3.1 m
TEH in Soil (PIRI) (1)	4	2020/12/11	2020/12/11	ATL SOP 00111	Atl. RBCA v3.1 m
TEH in Soil (PIRI) (1)	1	2020/12/11	2020/12/12	ATL SOP 00111	Atl. RBCA v3.1 m
Metals Solids Acid Extr. ICPMS	6	2020/12/14	2020/12/14	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	19	2020/12/15	2020/12/15	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	2	2020/12/15	2020/12/16	ATL SOP 00058	EPA 6020B R2 m
Moisture	27	N/A	2020/12/14	ATL SOP 00001	OMOE Handbook 1983 m
PAH Compounds by GCMS (SIM) (1)	22	2020/12/11	2020/12/12	ATL SOP 00102	EPA 8270E R6 m
PAH Compounds by GCMS (SIM) (1)	5	2020/12/11	2020/12/14	ATL SOP 00102	EPA 8270E R6 m
Grain Size - Calculated	3	N/A	2020/12/14		
Particle Size (Sieve), Sieve/pan 75um	3	N/A	2020/12/14	ATL SOP 00053	ASTM D1140-17 m
ModTPH (T1) Calc. for Soil	22	N/A	2021/01/13	N/A	Atl. RBCA v3.1 m
ModTPH (T1) Calc. for Soil	5	N/A	2020/12/14	N/A	Atl. RBCA v3.1 m
VPH in Soil (PIRI) - Field Preserved (2)	27	N/A	2020/12/11	ATL SOP 00119	Atl. RBCA v3.1 m

Sample Matrix: Sediment  
 # Samples Received: 54

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Benzo(b/j)fluoranthene Sum (LL soil)	27	N/A	2020/12/18	N/A	Auto Calc.
TEH in Soil (PIRI) (1)	22	2021/01/11	2021/01/11	ATL SOP 00111	Atl. RBCA v3.1 m
TEH in Soil (PIRI) (1)	2	2020/12/11	2020/12/12	ATL SOP 00111	Atl. RBCA v3.1 m
TEH in Soil (PIRI) (1)	2	2020/12/14	2020/12/14	ATL SOP 00111	Atl. RBCA v3.1 m
TEH in Soil (PIRI) (1)	1	2020/12/14	2020/12/15	ATL SOP 00111	Atl. RBCA v3.1 m
Metals Solids Acid Extr. ICPMS	5	2020/12/14	2020/12/14	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	1	2020/12/15	2020/12/15	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	21	2020/12/15	2020/12/16	ATL SOP 00058	EPA 6020B R2 m
Moisture	54	N/A	2020/12/14	ATL SOP 00001	OMOE Handbook 1983 m
PAH in sediment by GC/MS (Low Level) (1)	10	2020/12/15	2020/12/17	ATL SOP 00102	EPA 8270E R6 m
PAH in sediment by GC/MS (Low Level) (1)	17	2020/12/15	2020/12/18	ATL SOP 00102	EPA 8270E R6 m



Your Project #: 20439355  
 Site Location: BURGEO  
 Your C.O.C. #: n/a

**Attention: Belinda Culgin**

Golder Associates Ltd  
 201 Brownlow Ave.  
 Suites 25-26  
 Dartmouth, NS  
 CANADA B3B 1W2

Report Date: 2021/01/19  
 Report #: R6485859  
 Version: 6 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**BV LABS JOB #: COW8766**

**Received: 2020/12/09, 09:00**

Sample Matrix: Sediment  
 # Samples Received: 54

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
ModTPH (T1) Calc. for Soil	22	N/A	2021/01/13	N/A	Atl. RBCA v3.1 m
ModTPH (T1) Calc. for Soil	2	N/A	2020/12/14	N/A	Atl. RBCA v3.1 m
ModTPH (T1) Calc. for Soil	3	N/A	2020/12/15	N/A	Atl. RBCA v3.1 m
VPH in Soil (PIRI) - Field Preserved (2)	9	N/A	2020/12/11	ATL SOP 00119	Atl. RBCA v3.1 m
VPH in Soil (PIRI) - Field Preserved (2)	18	N/A	2020/12/12	ATL SOP 00119	Atl. RBCA v3.1 m

Sample Matrix: Water  
 # Samples Received: 31

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Carbonate, Bicarbonate and Hydroxide	1	N/A	2020/12/14	N/A	SM 23 4500-CO2 D
Carbonate, Bicarbonate and Hydroxide	13	N/A	2020/12/15	N/A	SM 23 4500-CO2 D
Alkalinity	14	N/A	2020/12/15	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water)	27	N/A	2020/12/14	N/A	Auto Calc.
Chloride	14	N/A	2020/12/15	ATL SOP 00014	SM 23 4500-Cl- E m
Colour	14	N/A	2020/12/15	ATL SOP 00020	SM 23 2120C m
Conductance - water	1	N/A	2020/12/14	ATL SOP 00004	SM 23 2510B m
Conductance - water	13	N/A	2020/12/15	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	27	2020/12/11	2020/12/11	ATL SOP 00113	Atl. RBCA v3.1 m
Hardness (calculated as CaCO3)	8	N/A	2020/12/14	ATL SOP 00048	Auto Calc
Hardness (calculated as CaCO3)	6	N/A	2020/12/15	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL)	1	2020/12/11	2020/12/14	ATL SOP 00026	EPA 245.1 R3 m
Mercury - Total (CVAA,LL)	25	2020/12/15	2020/12/16	ATL SOP 00026	EPA 245.1 R3 m
Mercury - Total (CVAA,LL)	1	2020/12/16	2020/12/17	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS	17	2020/12/11	2020/12/12	ATL SOP 00058	EPA 6020B R2 m
Metals Water Total MS	7	2020/12/11	2020/12/14	ATL SOP 00058	EPA 6020B R2 m
Metals Water Total MS	3	2020/12/11	2020/12/15	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	14	N/A	2020/12/16	N/A	Auto Calc.
Anion and Cation Sum	14	N/A	2020/12/16	N/A	Auto Calc.
Nitrogen Ammonia - water	14	N/A	2020/12/15	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	14	N/A	2020/12/15	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	14	N/A	2020/12/15	ATL SOP 00017	SM 23 4500-NO2- B m





Your Project #: 20439355  
 Site Location: BURGEO  
 Your C.O.C. #: n/a

**Attention: Belinda Culgin**

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 201 Brownlow Ave.  
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 Dartmouth, NS  
 CANADA B3B 1W2

**Report Date: 2021/01/19**  
 Report #: R6485859  
 Version: 6 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**BV LABS JOB #: C0W8766**

**Received: 2020/12/09, 09:00**

Sample Matrix: Water  
 # Samples Received: 31

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Nitrogen - Nitrate (as N)	14	N/A	2020/12/16	ATL SOP 00018	ASTM D3867-16
PAH (FWAL) in Water (A/Q) by GC/MS (SIM)	4	2020/12/10	2020/12/13	ATL SOP 00103	EPA 8270E R6 m
PAH (FWAL) in Water (A/Q) by GC/MS (SIM)	5	2020/12/11	2020/12/13	ATL SOP 00103	EPA 8270E R6 m
PAH (FWAL) in Water (A/Q) by GC/MS (SIM)	18	2020/12/09	2020/12/13	ATL SOP 00103	EPA 8270E R6 m
pH (3)	1	N/A	2020/12/14	ATL SOP 00003	SM 23 4500-H+ B m
pH (3)	13	N/A	2020/12/15	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho	14	N/A	2020/12/15	ATL SOP 00021	SM 23 4500-P E m
Sat. pH and Langelier Index (@ 20C)	14	N/A	2020/12/16	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	14	N/A	2020/12/16	ATL SOP 00049	Auto Calc.
Reactive Silica	14	N/A	2020/12/15	ATL SOP 00022	EPA 366.0 m
Sulphate	14	N/A	2020/12/15	ATL SOP 00023	ASTM D516-16 m
Total Dissolved Solids (TDS calc)	14	N/A	2020/12/16	N/A	Auto Calc.
Organic carbon - Total (TOC) (4)	1	N/A	2020/12/15	ATL SOP 00203	SM 23 5310B m
Organic carbon - Total (TOC) (4)	9	N/A	2020/12/16	ATL SOP 00203	SM 23 5310B m
Organic carbon - Total (TOC) (4)	4	N/A	2020/12/17	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	25	N/A	2020/12/14	N/A	Atl. RBCA v3 m
ModTPH (T1) Calc. for Water	2	N/A	2020/12/15	N/A	Atl. RBCA v3 m
Turbidity	14	N/A	2020/12/11	ATL SOP 00011	EPA 180.1 R2 m
VPH in Water (PIRI)	16	N/A	2020/12/11	ATL SOP 00130	Atl. RBCA v3.1 m
VPH in Water (PIRI)	9	N/A	2020/12/12	ATL SOP 00130	Atl. RBCA v3.1 m
VPH in Water (PIRI)	2	N/A	2020/12/14	ATL SOP 00130	Atl. RBCA v3.1 m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

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



Your Project #: 20439355  
Site Location: BURGEO  
Your C.O.C. #: n/a

**Attention: Belinda Culgin**

Golder Associates Ltd  
201 Brownlow Ave.  
Suites 25-26  
Dartmouth, NS  
CANADA B3B 1W2

**Report Date: 2021/01/19**  
Report #: R6485859  
Version: 6 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**BV LABS JOB #: C0W8766**

**Received: 2020/12/09, 09:00**

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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

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

- (1) Soils are reported on a dry weight basis unless otherwise specified.
- (2) No lab extraction date is given for C6-C10/BTEX and VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.
- (3) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
- (4) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Encryption Key

Marie Muise  
Key Account Specialist  
19 Jan 2021 16:11:43

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Marie Muise, Key Account Specialist  
Email: Marie.MUISE@bureauveritas.com  
Phone# (902)420-0203 Ext:253

=====  
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: 20439355  
Site Location: BURGEO  
Your C.O.C. #: n/a

**Attention: Belinda Culgin**

Golder Associates Ltd  
201 Brownlow Ave.  
Suites 25-26  
Dartmouth, NS  
CANADA B3B 1W2

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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

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

(2) No lab extraction date is given for C6-C10/BTEX and VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.

(3) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.

(4) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Marie Muise, Key Account Specialist

Email: Marie.MUISE@bureauveritas.com

Phone# (902)420-0203 Ext:253

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**RESULTS OF ANALYSES OF SOIL**

<b>BV Labs ID</b>		OJL920	OJL920			OJL921			OJL921		
<b>Sampling Date</b>		2020/12/01	2020/12/01			2020/12/01			2020/12/01		
<b>COC Number</b>		n/a	n/a			n/a			n/a		
	<b>UNITS</b>	<b>BFR_SS1_SA1</b>	<b>BFR_SS1_SA1 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>	<b>BFR_SS2_SA1</b>	<b>RDL</b>	<b>QC Batch</b>	<b>BFR_SS2_SA1 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>											
Grain Size	N/A					COARSE	N/A	7102389			
Sieve - #200 (>0.075mm)	%					93	1	7107489	94	1	7107489
Sieve - Pan	%					7	1	7107489	6	1	7107489
<b>Inorganics</b>											
Moisture	%	12	12	1.0	7104279	16	1.0	7104279			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable											

<b>BV Labs ID</b>		OJL922	OJL923	OJL924	OJL925	OJL926	OJL927		
<b>Sampling Date</b>		2020/12/01	2020/12/01	2020/12/01	2020/12/01	2020/12/01	2020/12/01		
<b>COC Number</b>		n/a	n/a	n/a	n/a	n/a	n/a		
	<b>UNITS</b>	<b>BFR_SS3_SA1</b>	<b>BFR_SS4_SA1</b>	<b>BFR_SS5_SA1</b>	<b>BFR_SS6_SA1</b>	<b>BFR_SS7_SA1</b>	<b>BFR_SS8_SA1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Inorganics</b>									
Moisture	%	13	69	80	80	80	91	1.0	7104279
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

<b>BV Labs ID</b>		OJL928	OJL929	OJL930	OJL931	OJL932	OJL933		
<b>Sampling Date</b>		2020/12/01	2020/12/01	2020/12/01	2020/12/02	2020/12/02	2020/12/02		
<b>COC Number</b>		n/a	n/a	n/a	n/a	n/a	n/a		
	<b>UNITS</b>	<b>BFR_SS9_SA1</b>	<b>BFR_SS10_SA1</b>	<b>BFR_SS11_SA1</b>	<b>BFR_SS12_SA1</b>	<b>BFR_SS13_SA1</b>	<b>BFR_SS14_SA1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Inorganics</b>									
Moisture	%	93	68	88	95	89	89	1.0	7104279
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									



**RESULTS OF ANALYSES OF SOIL**

<b>BV Labs ID</b>		OJL934	OJL935			OJL936			OJL937		
<b>Sampling Date</b>		2020/12/02	2020/12/02			2020/12/04			2020/12/04		
<b>COC Number</b>		n/a	n/a			n/a			n/a		
	<b>UNITS</b>	<b>BFR_SS15_SA1</b>	<b>BFR_SS16_SA1</b>	<b>RDL</b>	<b>QC Batch</b>	<b>BFR_SS17_SA1</b>	<b>RDL</b>	<b>QC Batch</b>	<b>BFR_SS18_SA1</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>											
Grain Size	N/A					COARSE	N/A	7102389			
Sieve - #200 (>0.075mm)	%					96	1	7107489			
Sieve - Pan	%					4	1	7107489			

<b>Inorganics</b>											
Moisture	%	91	74	1.0	7104279	68	1.0	7104279	73	1.0	7104279
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable											

<b>BV Labs ID</b>		OJL938	OJL939			OJL940			OJL941		
<b>Sampling Date</b>		2020/12/04	2020/12/03			2020/12/03			2020/12/03		
<b>COC Number</b>		n/a	n/a			n/a			n/a		
	<b>UNITS</b>	<b>BFR_SS19_SA1</b>	<b>BFR_SS20_SA1</b>	<b>RDL</b>	<b>QC Batch</b>	<b>BFR_SS21_SA1</b>	<b>RDL</b>	<b>QC Batch</b>	<b>BFR_SS22_SA1</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>											
Grain Size	N/A					FINE	N/A	7102389			
Sieve - #200 (>0.075mm)	%					50	1	7107489			
Sieve - Pan	%					50	1	7107489			

<b>Inorganics</b>											
Moisture	%	88	85	1.0	7104279	81	1.0	7104409	69	1.0	7104409
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable											

<b>BV Labs ID</b>		OJL941	OJL942	OJL943	OJL944	OJL945	OJL946				
<b>Sampling Date</b>		2020/12/03	2020/12/03	2020/12/04	2020/12/04	2020/12/01	2020/12/01				
<b>COC Number</b>		n/a	n/a	n/a	n/a	n/a	n/a				
	<b>UNITS</b>	<b>BFR_SS22_SA1</b>	<b>BFR_SS23_SA1</b>	<b>BFR_SS24_SA1</b>	<b>BFR_SS25_SA1</b>	<b>BFR_SS_DUP1</b>	<b>BFR_SS_DUP2</b>	<b>RDL</b>	<b>QC Batch</b>		
		<b>Lab-Dup</b>									

<b>Inorganics</b>											
Moisture	%	66	93	93	92	10	81	1.0	7104409		
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate											



**ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)**

BV Labs ID		OJL920	OJL921	OJL922	OJL923	OJL924		
Sampling Date		2020/12/01	2020/12/01	2020/12/01	2020/12/01	2020/12/01		
COC Number		n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SS1_SA1	BFR_SS2_SA1	BFR_SS3_SA1	BFR_SS4_SA1	BFR_SS5_SA1	RDL	QC Batch
<b>Metals</b>								
Acid Extractable Aluminum (Al)	mg/kg	5500	7800	6000	13000	840	10	7107718
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	2.8	<2.0	<2.0	2.0	7107718
Acid Extractable Arsenic (As)	mg/kg	2.5	5.7	3.5	<2.0	<2.0	2.0	7107718
Acid Extractable Barium (Ba)	mg/kg	21	34	24	15	33	5.0	7107718
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7107718
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7107718
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	50	7107718
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	7107718
Acid Extractable Chromium (Cr)	mg/kg	10	20	10	13	<2.0	2.0	7107718
Acid Extractable Cobalt (Co)	mg/kg	2.8	5.6	2.9	1.0	<1.0	1.0	7107718
Acid Extractable Copper (Cu)	mg/kg	4.5	12	8.7	4.2	2.4	2.0	7107718
Acid Extractable Iron (Fe)	mg/kg	8700	16000	8700	5000	690	50	7107718
Acid Extractable Lead (Pb)	mg/kg	3.8	17	13	52	17	0.50	7107718
Acid Extractable Lithium (Li)	mg/kg	8.6	12	8.3	3.8	<2.0	2.0	7107718
Acid Extractable Manganese (Mn)	mg/kg	130	330	140	47	13	2.0	7107718
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	0.17	0.25	0.10	7107718
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7107718
Acid Extractable Nickel (Ni)	mg/kg	6.6	11	5.6	4.5	<2.0	2.0	7107718
Acid Extractable Rubidium (Rb)	mg/kg	8.0	17	9.7	5.3	<2.0	2.0	7107718
Acid Extractable Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	2.2	1.8	0.50	7107718
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7107718
Acid Extractable Strontium (Sr)	mg/kg	<5.0	9.3	<5.0	<5.0	36	5.0	7107718
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.12	<0.10	<0.10	<0.10	0.10	7107718
Acid Extractable Tin (Sn)	mg/kg	<1.0	<1.0	<1.0	1.4	<1.0	1.0	7107718
Acid Extractable Uranium (U)	mg/kg	0.68	0.95	1.2	2.5	0.11	0.10	7107718
Acid Extractable Vanadium (V)	mg/kg	18	34	17	25	2.5	2.0	7107718
Acid Extractable Zinc (Zn)	mg/kg	14	38	15	25	27	5.0	7107718
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								



BUREAU  
VERITAS

BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

BV Labs ID		OJL925	OJL926	OJL927	OJL928	OJL929		
Sampling Date		2020/12/01	2020/12/01	2020/12/01	2020/12/01	2020/12/01		
COC Number		n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SS6_SA1	BFR_SS7_SA1	BFR_SS8_SA1	BFR_SS9_SA1	BFR_SS10_SA1	RDL	QC Batch
<b>Metals</b>								
Acid Extractable Aluminum (Al)	mg/kg	5800	1600	700	5800	3700	10	7108396
Acid Extractable Antimony (Sb)	mg/kg	<2.0	9.3	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Arsenic (As)	mg/kg	<2.0	2.8	2.7	2.3	<2.0	2.0	7108396
Acid Extractable Barium (Ba)	mg/kg	19	220	17	23	7.9	5.0	7108396
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	50	7108396
Acid Extractable Cadmium (Cd)	mg/kg	0.42	0.85	1.5	0.42	<0.30	0.30	7108396
Acid Extractable Chromium (Cr)	mg/kg	3.8	<2.0	<2.0	<2.0	5.8	2.0	7108396
Acid Extractable Cobalt (Co)	mg/kg	<1.0	2.6	<1.0	<1.0	<1.0	1.0	7108396
Acid Extractable Copper (Cu)	mg/kg	6.2	42	2.5	3.1	<2.0	2.0	7108396
Acid Extractable Iron (Fe)	mg/kg	4600	2000	1600	2800	1100	50	7108396
Acid Extractable Lead (Pb)	mg/kg	16	640	28	58	7.3	0.50	7108396
Acid Extractable Lithium (Li)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Manganese (Mn)	mg/kg	26	22	7.9	8.2	4.4	2.0	7108396
Acid Extractable Mercury (Hg)	mg/kg	0.31	0.49	0.23	0.16	0.12	0.10	7108396
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Nickel (Ni)	mg/kg	2.7	5.5	<2.0	2.1	<2.0	2.0	7108396
Acid Extractable Rubidium (Rb)	mg/kg	2.8	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Selenium (Se)	mg/kg	2.3	1.7	1.8	1.5	1.1	0.50	7108396
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7108396
Acid Extractable Strontium (Sr)	mg/kg	12	76	46	23	<5.0	5.0	7108396
Acid Extractable Thallium (Tl)	mg/kg	0.15	0.15	<0.10	0.11	<0.10	0.10	7108396
Acid Extractable Tin (Sn)	mg/kg	16	2.2	1.9	1.2	1.5	1.0	7108396
Acid Extractable Uranium (U)	mg/kg	0.70	0.17	<0.10	0.22	0.97	0.10	7108396
Acid Extractable Vanadium (V)	mg/kg	7.5	8.1	2.8	<2.0	6.4	2.0	7108396
Acid Extractable Zinc (Zn)	mg/kg	18	270	33	16	<5.0	5.0	7108396
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								



**ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)**

BV Labs ID		OJL930	OJL931	OJL932	OJL933	OJL934		
Sampling Date		2020/12/01	2020/12/02	2020/12/02	2020/12/02	2020/12/02		
COC Number		n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SS11_SA1	BFR_SS12_SA1	BFR_SS13_SA1	BFR_SS14_SA1	BFR_SS15_SA1	RDL	QC Batch
<b>Metals</b>								
Acid Extractable Aluminum (Al)	mg/kg	1000	6700	9800	860	2900	10	7108396
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Arsenic (As)	mg/kg	<2.0	2.7	2.9	<2.0	<2.0	2.0	7108396
Acid Extractable Barium (Ba)	mg/kg	16	27	34	16	33	5.0	7108396
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	50	7108396
Acid Extractable Cadmium (Cd)	mg/kg	0.48	0.36	0.54	0.78	0.54	0.30	7108396
Acid Extractable Chromium (Cr)	mg/kg	<2.0	3.7	3.0	<2.0	<2.0	2.0	7108396
Acid Extractable Cobalt (Co)	mg/kg	<1.0	<1.0	1.0	<1.0	<1.0	1.0	7108396
Acid Extractable Copper (Cu)	mg/kg	2.1	7.4	7.1	<2.0	3.7	2.0	7108396
Acid Extractable Iron (Fe)	mg/kg	930	12000	4900	880	770	50	7108396
Acid Extractable Lead (Pb)	mg/kg	5.9	45	120	17	8.0	0.50	7108396
Acid Extractable Lithium (Li)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Manganese (Mn)	mg/kg	5.0	32	27	4.2	2.6	2.0	7108396
Acid Extractable Mercury (Hg)	mg/kg	0.15	0.26	0.31	0.15	0.20	0.10	7108396
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Nickel (Ni)	mg/kg	<2.0	3.3	3.8	<2.0	2.6	2.0	7108396
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Selenium (Se)	mg/kg	2.3	3.3	3.4	1.8	1.9	0.50	7108396
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7108396
Acid Extractable Strontium (Sr)	mg/kg	27	22	17	36	26	5.0	7108396
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7108396
Acid Extractable Tin (Sn)	mg/kg	4.1	1.3	1.5	1.2	<1.0	1.0	7108396
Acid Extractable Uranium (U)	mg/kg	0.19	1.4	1.1	0.11	0.20	0.10	7108396
Acid Extractable Vanadium (V)	mg/kg	<2.0	11	5.0	2.1	<2.0	2.0	7108396
Acid Extractable Zinc (Zn)	mg/kg	15	19	15	31	11	5.0	7108396
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								





**ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)**

BV Labs ID		OJL935	OJL936	OJL937	OJL938	OJL939		
Sampling Date		2020/12/02	2020/12/04	2020/12/04	2020/12/04	2020/12/03		
COC Number		n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SS16_SA1	BFR_SS17_SA1	BFR_SS18_SA1	BFR_SS19_SA1	BFR_SS20_SA1	RDL	QC Batch
<b>Metals</b>								
Acid Extractable Aluminum (Al)	mg/kg	8400	640	5700	1800	3000	10	7108396
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Barium (Ba)	mg/kg	9.0	8.1	15	31	27	5.0	7108396
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	50	7108396
Acid Extractable Cadmium (Cd)	mg/kg	0.46	<0.30	<0.30	0.70	0.45	0.30	7108396
Acid Extractable Chromium (Cr)	mg/kg	9.2	<2.0	5.6	<2.0	<2.0	2.0	7108396
Acid Extractable Cobalt (Co)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7108396
Acid Extractable Copper (Cu)	mg/kg	3.4	2.8	<2.0	3.2	4.4	2.0	7108396
Acid Extractable Iron (Fe)	mg/kg	350	1100	1900	960	1300	50	7108396
Acid Extractable Lead (Pb)	mg/kg	37	19	13	34	18	0.50	7108396
Acid Extractable Lithium (Li)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Manganese (Mn)	mg/kg	5.8	15	22	6.0	6.0	2.0	7108396
Acid Extractable Mercury (Hg)	mg/kg	0.16	0.16	0.18	0.22	0.38	0.10	7108396
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Nickel (Ni)	mg/kg	<2.0	<2.0	<2.0	2.3	2.0	2.0	7108396
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	<2.0	3.5	<2.0	<2.0	2.0	7108396
Acid Extractable Selenium (Se)	mg/kg	3.7	0.80	1.4	2.0	2.0	0.50	7108396
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7108396
Acid Extractable Strontium (Sr)	mg/kg	<5.0	13	6.6	24	13	5.0	7108396
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7108396
Acid Extractable Tin (Sn)	mg/kg	<1.0	<1.0	1.1	<1.0	<1.0	1.0	7108396
Acid Extractable Uranium (U)	mg/kg	10	0.28	0.94	0.39	0.79	0.10	7108396
Acid Extractable Vanadium (V)	mg/kg	15	4.7	12	2.6	5.0	2.0	7108396
Acid Extractable Zinc (Zn)	mg/kg	<5.0	12	6.2	16	11	5.0	7108396
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								



**ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)**

BV Labs ID		OJL940	OJL941	OJL942	OJL943		
Sampling Date		2020/12/03	2020/12/03	2020/12/03	2020/12/04		
COC Number		n/a	n/a	n/a	n/a		
	UNITS	BFR_SS21_SA1	BFR_SS22_SA1	BFR_SS23_SA1	BFR_SS24_SA1	RDL	QC Batch
<b>Metals</b>							
Acid Extractable Aluminum (Al)	mg/kg	720	6600	1100	1100	10	7108396
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	2.5	2.0	2.0	7108396
Acid Extractable Barium (Ba)	mg/kg	20	10	24	37	5.0	7108396
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	50	7108396
Acid Extractable Cadmium (Cd)	mg/kg	0.38	<0.30	3.1	1.8	0.30	7108396
Acid Extractable Chromium (Cr)	mg/kg	<2.0	4.1	<2.0	<2.0	2.0	7108396
Acid Extractable Cobalt (Co)	mg/kg	<1.0	<1.0	1.2	2.4	1.0	7108396
Acid Extractable Copper (Cu)	mg/kg	2.7	<2.0	4.6	4.3	2.0	7108396
Acid Extractable Iron (Fe)	mg/kg	820	3700	2400	3500	50	7108396
Acid Extractable Lead (Pb)	mg/kg	5.3	7.7	57	29	0.50	7108396
Acid Extractable Lithium (Li)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Manganese (Mn)	mg/kg	5.8	19	25	13	2.0	7108396
Acid Extractable Mercury (Hg)	mg/kg	0.18	0.13	0.25	0.15	0.10	7108396
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	7108396
Acid Extractable Nickel (Ni)	mg/kg	<2.0	<2.0	2.3	2.1	2.0	7108396
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	2.3	2.7	2.6	2.0	7108396
Acid Extractable Selenium (Se)	mg/kg	2.2	1.5	2.0	1.5	0.50	7108396
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	0.50	7108396
Acid Extractable Strontium (Sr)	mg/kg	63	<5.0	32	33	5.0	7108396
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	0.23	0.46	0.10	7108396
Acid Extractable Tin (Sn)	mg/kg	<1.0	<1.0	1.4	1.7	1.0	7108396
Acid Extractable Uranium (U)	mg/kg	0.12	0.60	0.20	<0.10	0.10	7108396
Acid Extractable Vanadium (V)	mg/kg	2.7	10	3.5	<2.0	2.0	7108396
Acid Extractable Zinc (Zn)	mg/kg	27	<5.0	28	31	5.0	7108396
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							



**ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)**

BV Labs ID		OJL944		OJL945		OJL946		
Sampling Date		2020/12/04		2020/12/01		2020/12/01		
COC Number		n/a		n/a		n/a		
	UNITS	BFR_SS25_SA1	QC Batch	BFR_SS_DUP1	QC Batch	BFR_SS_DUP2	RDL	QC Batch
<b>Metals</b>								
Acid Extractable Aluminum (Al)	mg/kg	8100	7108405	5700	7107718	1200	10	7108405
Acid Extractable Antimony (Sb)	mg/kg	<2.0	7108405	<2.0	7107718	5.9	2.0	7108405
Acid Extractable Arsenic (As)	mg/kg	4.3	7108405	3.2	7107718	2.1	2.0	7108405
Acid Extractable Barium (Ba)	mg/kg	17	7108405	21	7107718	63	5.0	7108405
Acid Extractable Beryllium (Be)	mg/kg	<2.0	7108405	<2.0	7107718	<2.0	2.0	7108405
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	7108405	<2.0	7107718	<2.0	2.0	7108405
Acid Extractable Boron (B)	mg/kg	<50	7108405	<50	7107718	<50	50	7108405
Acid Extractable Cadmium (Cd)	mg/kg	0.33	7108405	<0.30	7107718	0.64	0.30	7108405
Acid Extractable Chromium (Cr)	mg/kg	2.6	7108405	10	7107718	<2.0	2.0	7108405
Acid Extractable Cobalt (Co)	mg/kg	<1.0	7108405	3.1	7107718	1.3	1.0	7108405
Acid Extractable Copper (Cu)	mg/kg	4.6	7108405	4.9	7107718	31	2.0	7108405
Acid Extractable Iron (Fe)	mg/kg	29000	7108405	9500	7107718	1200	50	7108405
Acid Extractable Lead (Pb)	mg/kg	41	7108405	4.1	7107718	420	0.50	7108405
Acid Extractable Lithium (Li)	mg/kg	<2.0	7108405	9.3	7107718	<2.0	2.0	7108405
Acid Extractable Manganese (Mn)	mg/kg	11	7108405	130	7107718	14	2.0	7108405
Acid Extractable Mercury (Hg)	mg/kg	0.24	7108405	<0.10	7107718	0.32	0.10	7108405
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	7108405	<2.0	7107718	<2.0	2.0	7108405
Acid Extractable Nickel (Ni)	mg/kg	2.1	7108405	7.3	7107718	3.8	2.0	7108405
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	7108405	8.9	7107718	<2.0	2.0	7108405
Acid Extractable Selenium (Se)	mg/kg	2.8	7108405	<0.50	7107718	1.4	0.50	7108405
Acid Extractable Silver (Ag)	mg/kg	<0.50	7108405	<0.50	7107718	<0.50	0.50	7108405
Acid Extractable Strontium (Sr)	mg/kg	12	7108405	<5.0	7107718	110	5.0	7108405
Acid Extractable Thallium (Tl)	mg/kg	<0.10	7108405	<0.10	7107718	0.11	0.10	7108405
Acid Extractable Tin (Sn)	mg/kg	1.4	7108405	<1.0	7107718	<1.0	1.0	7108405
Acid Extractable Uranium (U)	mg/kg	0.81	7108405	0.52	7107718	0.10	0.10	7108405
Acid Extractable Vanadium (V)	mg/kg	11	7108405	20	7107718	3.9	2.0	7108405
Acid Extractable Zinc (Zn)	mg/kg	13	7108405	14	7107718	90	5.0	7108405
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								



**SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)**

BV Labs ID		OJL920			OJL920			OJL921	OJL922		
Sampling Date		2020/12/01			2020/12/01			2020/12/01	2020/12/01		
COC Number		n/a			n/a			n/a	n/a		
	UNITS	BFR_SS1_SA1	RDL	QC Batch	BFR_SS1_SA1 Lab-Dup	RDL	QC Batch	BFR_SS2_SA1	BFR_SS3_SA1	RDL	QC Batch

<b>Polyaromatic Hydrocarbons</b>											
1-Methylnaphthalene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
2-Methylnaphthalene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Acenaphthene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Acenaphthylene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Anthracene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Benzo(a)anthracene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Benzo(a)pyrene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Benzo(b)fluoranthene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Benzo(b,j)fluoranthene	mg/kg	<0.020	0.020	7102383				<0.020	<0.020	0.020	7102383
Benzo(g,h,i)perylene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Benzo(j)fluoranthene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Benzo(k)fluoranthene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Chrysene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Dibenzo(a,h)anthracene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Fluoranthene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Fluorene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Indeno(1,2,3-cd)pyrene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Naphthalene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Perylene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Phenanthrene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649
Pyrene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	7104649	<0.010	<0.010	0.010	7104649

<b>Surrogate Recovery (%)</b>											
D10-Anthracene	%	100		7104649	101		7104649	103	100		7104649
D14-Terphenyl (FS)	%	103		7104649	105		7104649	108	102		7104649
D8-Acenaphthylene	%	100		7104649	101		7104649	103	98		7104649

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



**SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)**

BV Labs ID		OJL923		OJL924	OJL925	OJL926	OJL927	OJL928		
Sampling Date		2020/12/01		2020/12/01	2020/12/01	2020/12/01	2020/12/01	2020/12/01		
COC Number		n/a		n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SS4_SA1	RDL	BFR_SS5_SA1	BFR_SS6_SA1	BFR_SS7_SA1	BFR_SS8_SA1	BFR_SS9_SA1	RDL	QC Batch

Polyaromatic Hydrocarbons										
1-Methylnaphthalene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
2-Methylnaphthalene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Acenaphthene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Acenaphthylene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Anthracene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Benzo(a)anthracene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Benzo(a)pyrene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Benzo(b)fluoranthene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Benzo(b/j)fluoranthene	mg/kg	<0.020	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7102383
Benzo(g,h,i)perylene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Benzo(j)fluoranthene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Benzo(k)fluoranthene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Chrysene	mg/kg	0.036	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Dibenzo(a,h)anthracene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Fluoranthene	mg/kg	0.047	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Fluorene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Indeno(1,2,3-cd)pyrene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Naphthalene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Perylene	mg/kg	0.078	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Phenanthrene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Pyrene	mg/kg	<0.060 (1)	0.060	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649

Surrogate Recovery (%)										
D10-Anthracene	%	97		84	94	94	103	105		7104649
D14-Terphenyl (FS)	%	102		98	103	106	107	108		7104649
D8-Acenaphthylene	%	95		84	96	96	102	102		7104649

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.



**SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)**

BV Labs ID		OJL929	OJL930	OJL931	OJL932	OJL933		
Sampling Date		2020/12/01	2020/12/01	2020/12/02	2020/12/02	2020/12/02		
COC Number		n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SS10_SA1	BFR_SS11_SA1	BFR_SS12_SA1	BFR_SS13_SA1	BFR_SS14_SA1	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>								
1-Methylnaphthalene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
2-Methylnaphthalene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Acenaphthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Acenaphthylene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Anthracene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Benzo(a)anthracene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Benzo(a)pyrene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Benzo(b)fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Benzo(b/j)fluoranthene	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7102383
Benzo(g,h,i)perylene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Benzo(j)fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Benzo(k)fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Chrysene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Dibenzo(a,h)anthracene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Fluorene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Indeno(1,2,3-cd)pyrene	mg/kg	0.041	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Naphthalene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Perylene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Phenanthrene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
Pyrene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104649
<b>Surrogate Recovery (%)</b>								
D10-Anthracene	%	101	96	107	96	96		7104649
D14-Terphenyl (FS)	%	107	102	109	103	103		7104649
D8-Acenaphthylene	%	102	96	103	99	97		7104649
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								



BV Labs Job #: COW8766  
 Report Date: 2021/01/19

Golder Associates Ltd  
 Client Project #: 20439355  
 Site Location: BURGEO  
 Sampler Initials: MM

**SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)**

BV Labs ID		OJL934			OJL935		OJL936		OJL937		
Sampling Date		2020/12/02			2020/12/02		2020/12/04		2020/12/04		
COC Number		n/a			n/a		n/a		n/a		
	UNITS	BFR_SS15_SA1	RDL	QC Batch	BFR_SS16_SA1	RDL	BFR_SS17_SA1	RDL	BFR_SS18_SA1	RDL	QC Batch

<b>Polyaromatic Hydrocarbons</b>											
1-Methylnaphthalene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
2-Methylnaphthalene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.060 (1)	0.060	<0.010	0.010	7104902
Acenaphthene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Acenaphthylene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Anthracene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Benzo(a)anthracene	mg/kg	<0.010	0.010	7104649	<0.070 (1)	0.070	<0.010	0.010	<0.010	0.010	7104902
Benzo(a)pyrene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Benzo(b)fluoranthene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Benzo(b/j)fluoranthene	mg/kg	<0.020	0.020	7102383	<0.020	0.020	<0.020	0.020	<0.020	0.020	7102383
Benzo(g,h,i)perylene	mg/kg	<0.010	0.010	7104649	<0.32 (1)	0.32	<0.010	0.010	<0.010	0.010	7104902
Benzo(j)fluoranthene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Benzo(k)fluoranthene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Chrysene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Dibenzo(a,h)anthracene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Fluoranthene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Fluorene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Indeno(1,2,3-cd)pyrene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Naphthalene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Perylene	mg/kg	<0.010	0.010	7104649	1.1	0.010	<0.010	0.010	<0.010	0.010	7104902
Phenanthrene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902
Pyrene	mg/kg	<0.010	0.010	7104649	<0.010	0.010	<0.010	0.010	<0.010	0.010	7104902

<b>Surrogate Recovery (%)</b>											
D10-Anthracene	%	102		7104649	89		94		92		7104902
D14-Terphenyl (FS)	%	107		7104649	102		102		95		7104902
D8-Acenaphthylene	%	102		7104649	91		93		93		7104902

RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 (1) Elevated PAH RDL(s) due to matrix / co-extractive interference.



**SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)**

BV Labs ID		OJL938	OJL939	OJL940	OJL941	OJL942		
Sampling Date		2020/12/04	2020/12/03	2020/12/03	2020/12/03	2020/12/03		
COC Number		n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SS19_SA1	BFR_SS20_SA1	BFR_SS21_SA1	BFR_SS22_SA1	BFR_SS23_SA1	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>								
1-Methylnaphthalene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
2-Methylnaphthalene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Acenaphthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Acenaphthylene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Anthracene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Benzo(a)anthracene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Benzo(a)pyrene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Benzo(b)fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Benzo(b/j)fluoranthene	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7102383
Benzo(g,h,i)perylene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Benzo(j)fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Benzo(k)fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Chrysene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Dibenzo(a,h)anthracene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Fluorene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Indeno(1,2,3-cd)pyrene	mg/kg	<0.010	<0.010	<0.010	0.054	<0.010	0.010	7104902
Naphthalene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Perylene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Phenanthrene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Pyrene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7104902
<b>Surrogate Recovery (%)</b>								
D10-Anthracene	%	100	92	87	104	95		7104902
D14-Terphenyl (FS)	%	102	99	99	112	103		7104902
D8-Acenaphthylene	%	98	95	88	95	95		7104902
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								





**SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)**

BV Labs ID		OJL943	OJL944	OJL945	OJL946		
Sampling Date		2020/12/04	2020/12/04	2020/12/01	2020/12/01		
COC Number		n/a	n/a	n/a	n/a		
	UNITS	BFR_SS24_SA1	BFR_SS25_SA1	BFR_SS_DUP1	BFR_SS_DUP2	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>							
1-Methylnaphthalene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
2-Methylnaphthalene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Acenaphthene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Acenaphthylene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Anthracene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Benzo(a)anthracene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Benzo(a)pyrene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Benzo(b)fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Benzo(b/j)fluoranthene	mg/kg	<0.020	<0.020	<0.020	<0.020	0.020	7102383
Benzo(g,h,i)perylene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Benzo(j)fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Benzo(k)fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Chrysene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Dibenzo(a,h)anthracene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Fluoranthene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Fluorene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Indeno(1,2,3-cd)pyrene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Naphthalene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Perylene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Phenanthrene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
Pyrene	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	7104902
<b>Surrogate Recovery (%)</b>							
D10-Anthracene	%	96	100	101	90		7104902
D14-Terphenyl (FS)	%	100	102	100	103		7104902
D8-Acenaphthylene	%	92	96	98	92		7104902
RDL = Reportable Detection Limit QC Batch = Quality Control Batch							



BV Labs Job #: COW8766  
 Report Date: 2021/01/19

Golder Associates Ltd  
 Client Project #: 20439355  
 Site Location: BURGEO  
 Sampler Initials: MM

**ATLANTIC RBCA HYDROCARBONS (SOIL)**

BV Labs ID		OJL920			OJL920			OJL921		
Sampling Date		2020/12/01			2020/12/01			2020/12/01		
COC Number		n/a			n/a			n/a		
	UNITS	BFR_SS1_SA1	RDL	QC Batch	BFR_SS1_SA1 Lab-Dup	RDL	QC Batch	BFR_SS2_SA1	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>										
Benzene	mg/kg	<0.025	0.025	7104434	<0.025	0.025	7104434	<0.025	0.025	7104434
Toluene	mg/kg	<0.050	0.050	7104434	<0.050	0.050	7104434	<0.050	0.050	7104434
Ethylbenzene	mg/kg	<0.025	0.025	7104434	<0.025	0.025	7104434	<0.025	0.025	7104434
Total Xylenes	mg/kg	<0.050	0.050	7104434	<0.050	0.050	7104434	<0.050	0.050	7104434
C6 - C10 (less BTEX)	mg/kg	<2.5	2.5	7104434	<2.5	2.5	7104434	<2.5	2.5	7104434
>C10-C16 Hydrocarbons	mg/kg	<10	10	7104565				<10	10	7104565
>C16-C21 Hydrocarbons	mg/kg	<10	10	7104565				<10	10	7104565
>C21-<C32 Hydrocarbons	mg/kg	<15	15	7104565				56	15	7104565
Modified TPH (Tier1)	mg/kg	<15	15	7102303				56	15	7102303
Reached Baseline at C32	mg/kg	NA	N/A	7104565				Yes	N/A	7104565
Hydrocarbon Resemblance	mg/kg	NA	N/A	7104565				COMMENT (1)	N/A	7104565
<b>Surrogate Recovery (%)</b>										
Isobutylbenzene - Extractable	%	98		7104565				97		7104565
n-Dotriacontane - Extractable	%	84		7104565				97		7104565
Isobutylbenzene - Volatile	%	104		7104434	101		7104434	92		7104434
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable (1) Possible lube oil fraction.										



**ATLANTIC RBCA HYDROCARBONS (SOIL)**

BV Labs ID		OJL922		OJL923		OJL924	OJL925		
Sampling Date		2020/12/01		2020/12/01		2020/12/01	2020/12/01		
COC Number		n/a		n/a		n/a	n/a		
	UNITS	BFR_SS3_SA1	QC Batch	BFR_SS4_SA1	RDL	BFR_SS5_SA1	BFR_SS6_SA1	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>									
Benzene	mg/kg	<0.025	7104434	<0.025	0.025	<0.025	<0.025	0.025	7104434
Toluene	mg/kg	<0.050	7104434	<0.050	0.050	<0.10	<0.10	0.10	7104434
Ethylbenzene	mg/kg	<0.025	7104434	<0.025	0.025	<0.025	<0.025	0.025	7104434
Total Xylenes	mg/kg	<0.050	7104434	<0.050	0.050	<0.10	<0.10	0.10	7104434
C6 - C10 (less BTEX)	mg/kg	<2.5	7104434	<2.5	2.5	<5.0	<5.0	5.0	7104434
>C10-C16 Hydrocarbons	mg/kg	<10	7104565	<10	10	<10	<10	10	7144029
>C16-C21 Hydrocarbons	mg/kg	<10	7104565	<10	10	<10	<10	10	7144029
>C21-<C32 Hydrocarbons	mg/kg	<15	7104565	240	15	43	47	15	7144029
Modified TPH (Tier1)	mg/kg	<15	7102303	240	15	43	47	15	7148527
Reached Baseline at C32	mg/kg	NA	7104565	No	N/A	Yes	Yes	N/A	7144029
Hydrocarbon Resemblance	mg/kg	NA	7104565	COMMENT (1)	N/A	COMMENT (2)	COMMENT (2)	N/A	7144029
<b>Surrogate Recovery (%)</b>									
Isobutylbenzene - Extractable	%	97	7104565	91		89	89		7144029
n-Dotriacontane - Extractable	%	85	7104565	94 (3)		108 (3)	106 (3)		7144029
Isobutylbenzene - Volatile	%	93	7104434	76		92 (4)	90 (4)		7104434
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) Lube oil fraction. Unidentified compound(s) in lube oil range. (2) Unidentified compound(s) in lube oil range. (3) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request. (4) Elevated VPH RDL(s) due to limited sample.									



### ATLANTIC RBCA HYDROCARBONS (SOIL)

BV Labs ID		OJL926	OJL927	OJL928		OJL929		
Sampling Date		2020/12/01	2020/12/01	2020/12/01		2020/12/01		
COC Number		n/a	n/a	n/a		n/a		
	UNITS	BFR_SS7_SA1	BFR_SS8_SA1	BFR_SS9_SA1	RDL	BFR_SS10_SA1	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>								
Benzene	mg/kg	<0.025	<0.025	<0.025	0.025	<0.025	0.025	7104434
Toluene	mg/kg	<0.10	<0.10	<0.10	0.10	<0.050	0.050	7104434
Ethylbenzene	mg/kg	<0.025	<0.025	<0.025	0.025	<0.025	0.025	7104434
Total Xylenes	mg/kg	<0.10	<0.10	<0.10	0.10	<0.050	0.050	7104434
C6 - C10 (less BTEX)	mg/kg	<5.0	<5.0	<5.0	5.0	<2.5	2.5	7104434
>C10-C16 Hydrocarbons	mg/kg	<10	<10	<10	10	<10	10	7144029
>C16-C21 Hydrocarbons	mg/kg	<10	<10	<10	10	<10	10	7144029
>C21-<C32 Hydrocarbons	mg/kg	37	34	17	15	51	15	7144029
Modified TPH (Tier1)	mg/kg	37	34	17	15	51	15	7148527
Reached Baseline at C32	mg/kg	Yes	Yes	Yes	N/A	Yes	N/A	7144029
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	COMMENT (1)	COMMENT (2)	N/A	COMMENT (1)	N/A	7144029
<b>Surrogate Recovery (%)</b>								
Isobutylbenzene - Extractable	%	86	97	87		89		7144029
n-Dotriacontane - Extractable	%	105 (3)	113 (3)	109 (3)		98 (3)		7144029
Isobutylbenzene - Volatile	%	88 (4)	99 (4)	92 (4)		58 (5)		7104434
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) Unidentified compound(s) in lube oil range. (2) Possible lube oil fraction. (3) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request. (4) Elevated VPH RDL(s) due to limited sample. (5) VPH surrogate not within acceptance limits due to matrix interference.								



**ATLANTIC RBCA HYDROCARBONS (SOIL)**

BV Labs ID		OJL930			OJL931			OJL932		
Sampling Date		2020/12/01			2020/12/02			2020/12/02		
COC Number		n/a			n/a			n/a		
	UNITS	BFR_SS11_SA1	RDL	QC Batch	BFR_SS12_SA1	RDL	QC Batch	BFR_SS13_SA1	RDL	QC Batch

Petroleum Hydrocarbons										
Benzene	mg/kg	<0.025	0.025	7104434	<0.025	0.025	7104434	<0.025	0.025	7104434
Toluene	mg/kg	<0.10	0.10	7104434	<0.050	0.050	7104434	<0.10	0.10	7104434
Ethylbenzene	mg/kg	<0.025	0.025	7104434	<0.025	0.025	7104434	<0.025	0.025	7104434
Total Xylenes	mg/kg	<0.10	0.10	7104434	<0.050	0.050	7104434	<0.10	0.10	7104434
C6 - C10 (less BTEX)	mg/kg	<5.0	5.0	7104434	<2.5	2.5	7104434	<5.0	5.0	7104434
>C10-C16 Hydrocarbons	mg/kg	<10	10	7144029	<10	10	7104565	<10	10	7144029
>C16-C21 Hydrocarbons	mg/kg	<10	10	7144029	<10	10	7104565	<10	10	7144029
>C21-<C32 Hydrocarbons	mg/kg	38	15	7144029	590	15	7104565	33	15	7144029
Modified TPH (Tier1)	mg/kg	38	15	7148527	590	15	7102303	33	15	7148527
Reached Baseline at C32	mg/kg	Yes	N/A	7144029	Yes	N/A	7104565	Yes	N/A	7144029
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	N/A	7144029	COMMENT (2)	N/A	7104565	COMMENT (1)	N/A	7144029
Surrogate Recovery (%)										
Isobutylbenzene - Extractable	%	97		7144029	97		7104565	105		7144029
n-Dotriacontane - Extractable	%	108 (3)		7144029	84		7104565	112 (3)		7144029
Isobutylbenzene - Volatile	%	87 (4)		7104434	95		7104434	87 (4)		7104434

RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 N/A = Not Applicable  
 (1) Unidentified compound(s) in lube oil range.  
 (2) Possible lube oil fraction.  
 (3) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.  
 (4) Elevated VPH RDL(s) due to limited sample.



BUREAU  
VERITAS

BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

**ATLANTIC RBCA HYDROCARBONS (SOIL)**

BV Labs ID		OJL933	OJL934	OJL935	OJL936		OJL937		
Sampling Date		2020/12/02	2020/12/02	2020/12/02	2020/12/04		2020/12/04		
COC Number		n/a	n/a	n/a	n/a		n/a		
	UNITS	BFR_SS14_SA1	BFR_SS15_SA1	BFR_SS16_SA1	BFR_SS17_SA1	RDL	BFR_SS18_SA1	RDL	QC Batch

Petroleum Hydrocarbons									
Benzene	mg/kg	<0.025	<0.025	<0.025	<0.025	0.025	<0.025	0.025	7104434
Toluene	mg/kg	<0.10	<0.10	<0.10	<0.10	0.10	<0.050	0.050	7104434
Ethylbenzene	mg/kg	<0.025	<0.025	<0.025	<0.025	0.025	<0.025	0.025	7104434
Total Xylenes	mg/kg	<0.10	<0.10	<0.10	<0.10	0.10	<0.050	0.050	7104434
C6 - C10 (less BTEX)	mg/kg	<5.0	<5.0	<5.0	<5.0	5.0	<2.5	2.5	7104434
>C10-C16 Hydrocarbons	mg/kg	<10	<10	<10	61	10	<10	10	7144018
>C16-C21 Hydrocarbons	mg/kg	<10	<10	<10	<10	10	<10	10	7144018
>C21-<C32 Hydrocarbons	mg/kg	250	550	850	160	15	120	15	7144018
Modified TPH (Tier1)	mg/kg	250	550	850	220	15	120	15	7148527
Reached Baseline at C32	mg/kg	Yes	Yes	No	Yes	N/A	Yes	N/A	7144018
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	COMMENT (1)	COMMENT (1)	COMMENT (2)	N/A	COMMENT (1)	N/A	7144018
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	89	88	91	89		91		7144018
n-Dotriacontane - Extractable	%	99 (3)	99 (3)	85 (3)	101 (3)		104 (3)		7144018
Isobutylbenzene - Volatile	%	97 (4)	93 (4)	75 (4)	84 (4)		80		7104434

RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 N/A = Not Applicable  
 (1) Unidentified compound(s) in lube oil range.  
 (2) Unidentified compound(s) in fuel / lube range.  
 (3) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.  
 (4) Elevated VPH RDL(s) due to limited sample.



**ATLANTIC RBCA HYDROCARBONS (SOIL)**

BV Labs ID		OJL938		OJL939		OJL940		
Sampling Date		2020/12/04		2020/12/03		2020/12/03		
COC Number		n/a		n/a		n/a		
	UNITS	BFR_SS19_SA1	QC Batch	BFR_SS20_SA1	QC Batch	BFR_SS21_SA1	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>								
Benzene	mg/kg	<0.025	7104434	<0.025	7104436	<0.025	0.025	7104436
Toluene	mg/kg	<0.10	7104434	<0.10	7104436	<0.10	0.10	7104436
Ethylbenzene	mg/kg	<0.025	7104434	<0.025	7104436	<0.025	0.025	7104436
Total Xylenes	mg/kg	<0.10	7104434	<0.10	7104436	<0.10	0.10	7104436
C6 - C10 (less BTEX)	mg/kg	<5.0	7104434	<5.0	7104436	<5.0	5.0	7104436
>C10-C16 Hydrocarbons	mg/kg	<10	7144018	<10	7144018	56	10	7144244
>C16-C21 Hydrocarbons	mg/kg	<10	7144018	<10	7144018	<10	10	7144244
>C21-<C32 Hydrocarbons	mg/kg	450	7144018	480	7144018	240	15	7144244
Modified TPH (Tier1)	mg/kg	450	7148527	480	7148527	300	15	7148527
Reached Baseline at C32	mg/kg	Yes	7144018	Yes	7144018	Yes	N/A	7144244
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	7144018	COMMENT (1)	7144018	COMMENT (2)	N/A	7144244
<b>Surrogate Recovery (%)</b>								
Isobutylbenzene - Extractable	%	89	7144018	90	7144018	87		7144244
n-Dotriacontane - Extractable	%	106 (3)	7144018	95 (3)	7144018	112 (3)		7144244
Isobutylbenzene - Volatile	%	84 (4)	7104434	103 (4)	7104436	112 (4)		7104436
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) Unidentified compound(s) in lube oil range. (2) Unidentified compound(s) in fuel / lube range. (3) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request. (4) Elevated VPH RDL(s) due to limited sample.								



**ATLANTIC RBCA HYDROCARBONS (SOIL)**

BV Labs ID		OJL941			OJL941			OJL942		
Sampling Date		2020/12/03			2020/12/03			2020/12/03		
COC Number		n/a			n/a			n/a		
	UNITS	BFR_SS22_SA1	RDL	QC Batch	BFR_SS22_SA1 Lab-Dup	RDL	QC Batch	BFR_SS23_SA1	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>										
Benzene	mg/kg	<0.025	0.025	7104436				<0.025	0.025	7104436
Toluene	mg/kg	<0.10	0.10	7104436				<0.10	0.10	7104436
Ethylbenzene	mg/kg	<0.025	0.025	7104436				<0.025	0.025	7104436
Total Xylenes	mg/kg	<0.10	0.10	7104436				<0.10	0.10	7104436
C6 - C10 (less BTEX)	mg/kg	<5.0	5.0	7104436				<5.0	5.0	7104436
>C10-C16 Hydrocarbons	mg/kg	<10	10	7144270	<10	10	7144270	<10	10	7144244
>C16-C21 Hydrocarbons	mg/kg	<10	10	7144270	<10	10	7144270	<10	10	7144244
>C21-<C32 Hydrocarbons	mg/kg	140	15	7144270	120	15	7144270	410	15	7144244
Modified TPH (Tier1)	mg/kg	140	15	7148527				410	15	7148527
Reached Baseline at C32	mg/kg	Yes	N/A	7144270				Yes	N/A	7144244
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	N/A	7144270				COMMENT (1)	N/A	7144244
<b>Surrogate Recovery (%)</b>										
Isobutylbenzene - Extractable	%	86		7144270	85		7144270	91		7144244
n-Dotriacontane - Extractable	%	108 (2)		7144270	110 (2)		7144270	101 (2)		7144244
Isobutylbenzene - Volatile	%	112 (3)		7104436				119 (3)		7104436
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable (1) Unidentified compound(s) in lube oil range. (2) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request. (3) Elevated VPH RDL(s) due to limited sample.										





**ATLANTIC RBCA HYDROCARBONS (SOIL)**

BV Labs ID		OJL943	OJL944			OJL945		
Sampling Date		2020/12/04	2020/12/04			2020/12/01		
COC Number		n/a	n/a			n/a		
	UNITS	BFR_SS24_SA1	BFR_SS25_SA1	RDL	QC Batch	BFR_SS_DUP1	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>								
Benzene	mg/kg	<0.025	<0.025	0.025	7104436	<0.025	0.025	7104436
Toluene	mg/kg	<0.10	<0.10	0.10	7104436	<0.050	0.050	7104436
Ethylbenzene	mg/kg	<0.025	<0.025	0.025	7104436	<0.025	0.025	7104436
Total Xylenes	mg/kg	<0.10	<0.10	0.10	7104436	<0.050	0.050	7104436
C6 - C10 (less BTEX)	mg/kg	<5.0	<5.0	5.0	7104436	<2.5	2.5	7104436
>C10-C16 Hydrocarbons	mg/kg	<10	<10	10	7144244	<10	10	7105008
>C16-C21 Hydrocarbons	mg/kg	<10	<10	10	7144244	<10	10	7105008
>C21-<C32 Hydrocarbons	mg/kg	<15	470	15	7144244	<15	15	7105008
Modified TPH (Tier1)	mg/kg	<15	470	15	7148527	<15	15	7102303
Reached Baseline at C32	mg/kg	NA	Yes	N/A	7144244	NA	N/A	7105008
Hydrocarbon Resemblance	mg/kg	NA	COMMENT (1)	N/A	7144244	NA	N/A	7105008
<b>Surrogate Recovery (%)</b>								
Isobutylbenzene - Extractable	%	99	93		7144244	92		7105008
n-Dotriacontane - Extractable	%	102 (2)	109 (2)		7144244	96		7105008
Isobutylbenzene - Volatile	%	115 (3)	114 (3)		7104436	109		7104436
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) Unidentified compound(s) in lube oil range. (2) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request. (3) Elevated VPH RDL(s) due to limited sample.								



**ATLANTIC RBCA HYDROCARBONS (SOIL)**

BV Labs ID		OJL945			OJL946		
Sampling Date		2020/12/01			2020/12/01		
COC Number		n/a			n/a		
	UNITS	BFR_SS_DUP1 Lab-Dup	RDL	QC Batch	BFR_SS_DUP2	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>							
Benzene	mg/kg	<0.025	0.025	7104436	<0.025	0.025	7104436
Toluene	mg/kg	<0.050	0.050	7104436	<0.10	0.10	7104436
Ethylbenzene	mg/kg	<0.025	0.025	7104436	<0.025	0.025	7104436
Total Xylenes	mg/kg	<0.050	0.050	7104436	<0.10	0.10	7104436
C6 - C10 (less BTEX)	mg/kg	<2.5	2.5	7104436	<5.0	5.0	7104436
>C10-C16 Hydrocarbons	mg/kg				<10	10	7144244
>C16-C21 Hydrocarbons	mg/kg				<10	10	7144244
>C21-<C32 Hydrocarbons	mg/kg				270	15	7144244
Modified TPH (Tier1)	mg/kg				270	15	7148527
Reached Baseline at C32	mg/kg				Yes	N/A	7144244
Hydrocarbon Resemblance	mg/kg				COMMENT (1)	N/A	7144244
<b>Surrogate Recovery (%)</b>							
Isobutylbenzene - Extractable	%				94		7144244
n-Dotriacontane - Extractable	%				106 (2)		7144244
Isobutylbenzene - Volatile	%	109		7104436	112 (3)		7104436
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable (1) Unidentified compound(s) in lube oil range. (2) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request. (3) Elevated VPH RDL(s) due to limited sample.							



**RESULTS OF ANALYSES OF SEDIMENT**

BV Labs ID		OJL974	OJL975	OJL976	OJL977	OJL978	OJL979	OJL980		
Sampling Date		2020/12/01	2020/12/01	2020/12/01	2020/12/01	2020/12/02	2020/12/01	2020/12/02		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SED1	BFR_SED2	BFR_SED3	BFR_SED4	BFR_SED5	BFR_SED6	BFR_SED7	RDL	QC Batch
<b>Inorganics</b>										
Moisture	%	88	84	85	94	33	93	89	1.0	7104409
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										

BV Labs ID		OJL981	OJL982	OJL983	OJL984	OJL985	OJL986		
Sampling Date		2020/12/02	2020/12/02	2020/12/01	2020/12/01	2020/12/01	2020/12/02		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SED8	BFR_SED9	BFR_SED10	BFR_SED11	BFR_SED12	BFR_SED13	RDL	QC Batch
<b>Inorganics</b>									
Moisture	%	45	73	13	27	91	88	1.0	7104409
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

BV Labs ID		OJL987	OJL988	OJL989	OJL990	OJL991	OJL992	OJL993		
Sampling Date		2020/12/02	2020/12/02	2020/12/01	2020/12/04	2020/12/04	2020/12/04	2020/12/03		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SED14	BFR_SED15	BFR_SED16	BFR_SED17	BFR_SED18	BFR_SED19	BFR_SED20	RDL	QC Batch
<b>Inorganics</b>										
Moisture	%	45	88	95	29	36	70	18	1.0	7104549
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										

BV Labs ID		OJL994		OJL995	OJL996	OJL997	OJL998	OJL999		
Sampling Date		2020/12/03		2020/12/03	2020/12/03	2020/12/04	2020/12/04	2020/12/01		
COC Number		n/a		n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SED21	QC Batch	BFR_SED22	BFR_SED23	BFR_SED24	BFR_SED25	BFR_SED_DUP1	RDL	QC Batch
<b>Inorganics</b>										
Moisture	%	42	7104549	67	83	25	89	94	1.0	7104783
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										

BV Labs ID		OJM000		OKG888	OKG926	OKG929	OKG935	OKG936		
Sampling Date		2020/12/02		2020/12/01	2020/12/01	2020/12/01	2020/12/01	2020/12/02		
COC Number		n/a		n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SED_DUP2	QC Batch	BFR_SED1	BFR_SED2	BFR_SED3	BFR_SED4	BFR_SED5	RDL	QC Batch
<b>Inorganics</b>										
Moisture	%	29	7104783	88	84	85	94	33	1.0	7104409
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										



**RESULTS OF ANALYSES OF SEDIMENT**

BV Labs ID		OKG938	OKG957	OKG958	OKG986	OKG987	OKH000	OKH035		
Sampling Date		2020/12/01	2020/12/02	2020/12/02	2020/12/02	2020/12/01	2020/12/01	2020/12/01		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SED6	BFR_SED7	BFR_SED8	BFR_SED9	BFR_SED10	BFR_SED11	BFR_SED12	RDL	QC Batch
<b>Inorganics</b>										
Moisture	%	93	89	45	73	13	27	91	1.0	7104409
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										

BV Labs ID		OKH048		OKH056	OKH061	OKH071	OKH074	OKH076		
Sampling Date		2020/12/02		2020/12/02	2020/12/02	2020/12/01	2020/12/04	2020/12/04		
COC Number		n/a		n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SED13	QC Batch	BFR_SED14	BFR_SED15	BFR_SED16	BFR_SED17	BFR_SED18	RDL	QC Batch
<b>Inorganics</b>										
Moisture	%	88	7104409	45	88	95	29	36	1.0	7104549
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										

BV Labs ID		OKH088	OKH094	OKH102		OKH108	OKH109	OKH113		
Sampling Date		2020/12/04	2020/12/03	2020/12/03		2020/12/03	2020/12/03	2020/12/04		
COC Number		n/a	n/a	n/a		n/a	n/a	n/a		
	UNITS	BFR_SED19	BFR_SED20	BFR_SED21	QC Batch	BFR_SED22	BFR_SED23	BFR_SED24	RDL	QC Batch
<b>Inorganics</b>										
Moisture	%	70	18	42	7104549	67	83	25	1.0	7104783
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										

BV Labs ID		OKH118	OKH120	OKH121		
Sampling Date		2020/12/04	2020/12/01	2020/12/02		
COC Number		n/a	n/a	n/a		
	UNITS	BFR_SED25	BFR_SED_DUP1	BFR_SED_DUP2	RDL	QC Batch
<b>Inorganics</b>						
Moisture	%	89	94	29	1.0	7104783
RDL = Reportable Detection Limit QC Batch = Quality Control Batch						



**ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)**

BV Labs ID		OJL974	OJL975		OJL976	OJL976		OJL977		
Sampling Date		2020/12/01	2020/12/01		2020/12/01	2020/12/01		2020/12/01		
COC Number		n/a	n/a		n/a	n/a		n/a		
	UNITS	BFR_SED1	BFR_SED2	QC Batch	BFR_SED3	BFR_SED3 Lab-Dup	QC Batch	BFR_SED4	RDL	QC Batch
<b>Metals</b>										
Acid Extractable Aluminum (Al)	mg/kg	7300	8000	7108405	11000	12000	7108396	5800	10	7108405
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	7108405	<2.0	<2.0	7108396	2.7	2.0	7108405
Acid Extractable Arsenic (As)	mg/kg	<2.0	2.2	7108405	<2.0	2.1	7108396	2.5	2.0	7108405
Acid Extractable Barium (Ba)	mg/kg	34	33	7108405	29	30	7108396	23	5.0	7108405
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	7108405	<2.0	<2.0	7108396	<2.0	2.0	7108405
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	7108405	<2.0	<2.0	7108396	<2.0	2.0	7108405
Acid Extractable Boron (B)	mg/kg	<50	<50	7108405	<50	<50	7108396	<50	50	7108405
Acid Extractable Cadmium (Cd)	mg/kg	0.42	0.52	7108405	0.60	0.59	7108396	<0.30	0.30	7108405
Acid Extractable Chromium (Cr)	mg/kg	10	9.3	7108405	5.4	5.6	7108396	4.8	2.0	7108405
Acid Extractable Cobalt (Co)	mg/kg	1.5	1.7	7108405	<1.0	<1.0	7108396	<1.0	1.0	7108405
Acid Extractable Copper (Cu)	mg/kg	8.4	9.6	7108405	9.1	9.0	7108396	19	2.0	7108405
Acid Extractable Iron (Fe)	mg/kg	7500	8800	7108405	1900	2000	7108396	2100	50	7108405
Acid Extractable Lead (Pb)	mg/kg	35	35	7108405	34	35	7108396	770	0.50	7108405
Acid Extractable Lithium (Li)	mg/kg	5.0	4.1	7108405	<2.0	<2.0	7108396	<2.0	2.0	7108405
Acid Extractable Manganese (Mn)	mg/kg	74	130	7108405	15	16	7108396	11	2.0	7108405
Acid Extractable Mercury (Hg)	mg/kg	0.15	0.18	7108405	0.26	0.25	7108396	0.25	0.10	7108405
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	7108405	<2.0	<2.0	7108396	<2.0	2.0	7108405
Acid Extractable Nickel (Ni)	mg/kg	7.0	6.5	7108405	4.5	4.3	7108396	7.0	2.0	7108405
Acid Extractable Rubidium (Rb)	mg/kg	9.3	7.9	7108405	2.0	2.0	7108396	2.6	2.0	7108405
Acid Extractable Selenium (Se)	mg/kg	1.9	2.7	7108405	5.6	5.8	7108396	4.5	0.50	7108405
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	7108405	<0.50	<0.50	7108396	<0.50	0.50	7108405
Acid Extractable Strontium (Sr)	mg/kg	9.5	11	7108405	22	22	7108396	12	5.0	7108405
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.13	7108405	<0.10	<0.10	7108396	<0.10	0.10	7108405
Acid Extractable Tin (Sn)	mg/kg	1.3	1.2	7108405	1.0	1.0	7108396	3.2	1.0	7108405
Acid Extractable Uranium (U)	mg/kg	1.9	2.4	7108405	1.3	1.3	7108396	0.74	0.10	7108405
Acid Extractable Vanadium (V)	mg/kg	28	32	7108405	8.4	8.8	7108396	17	2.0	7108405
Acid Extractable Zinc (Zn)	mg/kg	45	37	7108405	13	13	7108396	19	5.0	7108405
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										



**ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)**

BV Labs ID		OJL978		OJL979	OJL980		OJL981		
Sampling Date		2020/12/02		2020/12/01	2020/12/02		2020/12/02		
COC Number		n/a		n/a	n/a		n/a		
	UNITS	BFR_SED5	QC Batch	BFR_SED6	BFR_SED7	QC Batch	BFR_SED8	RDL	QC Batch
<b>Metals</b>									
Acid Extractable Aluminum (Al)	mg/kg	2100	7107718	14000	7700	7108405	17000	10	7107718
Acid Extractable Antimony (Sb)	mg/kg	<2.0	7107718	<2.0	<2.0	7108405	<2.0	2.0	7107718
Acid Extractable Arsenic (As)	mg/kg	<2.0	7107718	5.3	<2.0	7108405	<2.0	2.0	7107718
Acid Extractable Barium (Ba)	mg/kg	9.7	7107718	50	15	7108405	170	5.0	7107718
Acid Extractable Beryllium (Be)	mg/kg	<2.0	7107718	<2.0	<2.0	7108405	<2.0	2.0	7107718
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	7107718	<2.0	<2.0	7108405	<2.0	2.0	7107718
Acid Extractable Boron (B)	mg/kg	<50	7107718	<50	<50	7108405	<50	50	7107718
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	7107718	0.80	<0.30	7108405	<0.30	0.30	7107718
Acid Extractable Chromium (Cr)	mg/kg	3.1	7107718	12	3.9	7108405	45	2.0	7107718
Acid Extractable Cobalt (Co)	mg/kg	<1.0	7107718	1.1	<1.0	7108405	9.9	1.0	7107718
Acid Extractable Copper (Cu)	mg/kg	<2.0	7107718	15	7.5	7108405	12	2.0	7107718
Acid Extractable Iron (Fe)	mg/kg	6000	7107718	3800	1400	7108405	25000	50	7107718
Acid Extractable Lead (Pb)	mg/kg	17	7107718	140	18	7108405	17	0.50	7107718
Acid Extractable Lithium (Li)	mg/kg	3.0	7107718	4.2	<2.0	7108405	20	2.0	7107718
Acid Extractable Manganese (Mn)	mg/kg	71	7107718	52	22	7108405	290	2.0	7107718
Acid Extractable Mercury (Hg)	mg/kg	<0.10	7107718	0.32	0.13	7108405	<0.10	0.10	7107718
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	7107718	<2.0	<2.0	7108405	<2.0	2.0	7107718
Acid Extractable Nickel (Ni)	mg/kg	<2.0	7107718	9.9	3.3	7108405	19	2.0	7107718
Acid Extractable Rubidium (Rb)	mg/kg	4.9	7107718	8.2	2.7	7108405	60	2.0	7107718
Acid Extractable Selenium (Se)	mg/kg	<0.50	7107718	4.9	2.1	7108405	<0.50	0.50	7107718
Acid Extractable Silver (Ag)	mg/kg	<0.50	7107718	<0.50	<0.50	7108405	<0.50	0.50	7107718
Acid Extractable Strontium (Sr)	mg/kg	<5.0	7107718	17	9.7	7108405	<5.0	5.0	7107718
Acid Extractable Thallium (Tl)	mg/kg	<0.10	7107718	0.11	<0.10	7108405	0.37	0.10	7107718
Acid Extractable Tin (Sn)	mg/kg	<1.0	7107718	5.9	1.5	7108405	1.2	1.0	7107718
Acid Extractable Uranium (U)	mg/kg	0.36	7107718	1.8	3.4	7108405	1.6	0.10	7107718
Acid Extractable Vanadium (V)	mg/kg	13	7107718	36	12	7108405	95	2.0	7107718
Acid Extractable Zinc (Zn)	mg/kg	8.4	7107718	42	8.1	7108405	45	5.0	7107718
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									



**ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)**

BV Labs ID		OJL982	OJL983		OJL984	OJL985	OJL986		
Sampling Date		2020/12/02	2020/12/01		2020/12/01	2020/12/01	2020/12/02		
COC Number		n/a	n/a		n/a	n/a	n/a		
	UNITS	BFR_SED9	BFR_SED10	QC Batch	BFR_SED11	BFR_SED12	BFR_SED13	RDL	QC Batch
<b>Metals</b>									
Acid Extractable Aluminum (Al)	mg/kg	7800	2500	7108405	9400	7400	4900	10	7107718
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	7108405	<2.0	<2.0	<2.0	2.0	7107718
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	7108405	<2.0	3.1	2.1	2.0	7107718
Acid Extractable Barium (Ba)	mg/kg	5.4	8.3	7108405	61	19	24	5.0	7107718
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	7108405	<2.0	<2.0	<2.0	2.0	7107718
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	7108405	<2.0	<2.0	<2.0	2.0	7107718
Acid Extractable Boron (B)	mg/kg	<50	<50	7108405	<50	<50	<50	50	7107718
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	7108405	<0.30	0.47	0.44	0.30	7107718
Acid Extractable Chromium (Cr)	mg/kg	6.0	3.3	7108405	13	5.5	4.5	2.0	7107718
Acid Extractable Cobalt (Co)	mg/kg	<1.0	2.5	7108405	5.0	<1.0	<1.0	1.0	7107718
Acid Extractable Copper (Cu)	mg/kg	2.5	<2.0	7108405	<2.0	10	8.7	2.0	7107718
Acid Extractable Iron (Fe)	mg/kg	320	8600	7108405	12000	3800	2400	50	7107718
Acid Extractable Lead (Pb)	mg/kg	5.3	5.6	7108405	8.9	100	63	0.50	7107718
Acid Extractable Lithium (Li)	mg/kg	<2.0	4.7	7108405	16	<2.0	<2.0	2.0	7107718
Acid Extractable Manganese (Mn)	mg/kg	2.0	160	7108405	260	7.8	10	2.0	7107718
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	7108405	<0.10	0.24	0.23	0.10	7107718
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	7108405	<2.0	<2.0	<2.0	2.0	7107718
Acid Extractable Nickel (Ni)	mg/kg	<2.0	2.4	7108405	8.7	5.2	4.6	2.0	7107718
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	7.4	7108405	40	<2.0	<2.0	2.0	7107718
Acid Extractable Selenium (Se)	mg/kg	1.9	<0.50	7108405	<0.50	5.3	5.1	0.50	7107718
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	7108405	<0.50	<0.50	<0.50	0.50	7107718
Acid Extractable Strontium (Sr)	mg/kg	<5.0	<5.0	7108405	<5.0	8.4	27	5.0	7107718
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	7108405	0.24	<0.10	<0.10	0.10	7107718
Acid Extractable Tin (Sn)	mg/kg	1.3	<1.0	7108405	1.8	3.4	1.7	1.0	7107718
Acid Extractable Uranium (U)	mg/kg	1.2	0.66	7108405	1.2	1.4	0.78	0.10	7107718
Acid Extractable Vanadium (V)	mg/kg	18	22	7108405	44	22	10	2.0	7107718
Acid Extractable Zinc (Zn)	mg/kg	<5.0	10	7108405	34	13	19	5.0	7107718
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									



**ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)**

BV Labs ID		OJL987	OJL988	OJL989	OJL990	OJL990	OJL991		
Sampling Date		2020/12/02	2020/12/02	2020/12/01	2020/12/04	2020/12/04	2020/12/04		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SED14	BFR_SED15	BFR_SED16	BFR_SED17	BFR_SED17 Lab-Dup	BFR_SED18	RDL	QC Batch
<b>Metals</b>									
Acid Extractable Aluminum (Al)	mg/kg	7500	6700	4900	4600	5900	14000	10	7108405
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108405
Acid Extractable Arsenic (As)	mg/kg	<2.0	2.2	<2.0	<2.0	<2.0	<2.0	2.0	7108405
Acid Extractable Barium (Ba)	mg/kg	33	22	27	16	21	210	5.0	7108405
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108405
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108405
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	<50	50	7108405
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.37	<0.30	<0.30	<0.30	<0.30	0.30	7108405
Acid Extractable Chromium (Cr)	mg/kg	8.4	6.2	4.3	4.7	5.9	88	2.0	7108405
Acid Extractable Cobalt (Co)	mg/kg	2.5	1.2	<1.0	2.6	3.3	6.8	1.0	7108405
Acid Extractable Copper (Cu)	mg/kg	2.3	5.4	10	<2.0	<2.0	2.6	2.0	7108405
Acid Extractable Iron (Fe)	mg/kg	7800	8400	2000	9900	13000	13000	50	7108405
Acid Extractable Lead (Pb)	mg/kg	6.5	4.8	79	7.2	8.5	8.6	0.50	7108405
Acid Extractable Lithium (Li)	mg/kg	8.2	<2.0	<2.0	8.5	11	7.8	2.0	7108405
Acid Extractable Manganese (Mn)	mg/kg	170	100	18	120	160	180	2.0	7108405
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	0.16	<0.10	<0.10	<0.10	0.10	7108405
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7108405
Acid Extractable Nickel (Ni)	mg/kg	4.4	2.6	7.8	4.8	5.8	36	2.0	7108405
Acid Extractable Rubidium (Rb)	mg/kg	19	2.8	2.9	17	22	25	2.0	7108405
Acid Extractable Selenium (Se)	mg/kg	0.52	1.6	3.0	<0.50	<0.50	<0.50	0.50	7108405
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7108405
Acid Extractable Strontium (Sr)	mg/kg	<5.0	14	11	<5.0	<5.0	8.9	5.0	7108405
Acid Extractable Thallium (Tl)	mg/kg	0.13	<0.10	<0.10	0.11	0.14	0.17	0.10	7108405
Acid Extractable Tin (Sn)	mg/kg	1.1	<1.0	1.9	<1.0	<1.0	1.3	1.0	7108405
Acid Extractable Uranium (U)	mg/kg	0.55	1.3	0.69	0.23	0.27	0.25	0.10	7108405
Acid Extractable Vanadium (V)	mg/kg	28	24	16	19	24	50	2.0	7108405
Acid Extractable Zinc (Zn)	mg/kg	20	11	13	15	20	21	5.0	7108405
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
Lab-Dup = Laboratory Initiated Duplicate									





BUREAU  
VERITAS

BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

**ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)**

BV Labs ID		OJL992	OJL993	OJL994	OJL995	OJL996		OJL997		
Sampling Date		2020/12/04	2020/12/03	2020/12/03	2020/12/03	2020/12/03		2020/12/04		
COC Number		n/a	n/a	n/a	n/a	n/a		n/a		
	UNITS	BFR_SED19	BFR_SED20	BFR_SED21	BFR_SED22	BFR_SED23	QC Batch	BFR_SED24	RDL	QC Batch

Metals										
Acid Extractable Aluminum (Al)	mg/kg	11000	1100	8100	11000	6200	7108405	7000	10	7109896
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	7108405	<2.0	2.0	7109896
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	7108405	<2.0	2.0	7109896
Acid Extractable Barium (Ba)	mg/kg	58	6.6	38	32	40	7108405	74	5.0	7109896
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	7108405	<2.0	2.0	7109896
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	7108405	<2.0	2.0	7109896
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	7108405	<50	50	7109896
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	<0.30	0.45	7108405	<0.30	0.30	7109896
Acid Extractable Chromium (Cr)	mg/kg	13	<2.0	12	10	6.2	7108405	9.9	2.0	7109896
Acid Extractable Cobalt (Co)	mg/kg	3.2	<1.0	3.9	1.2	1.8	7108405	4.0	1.0	7109896
Acid Extractable Copper (Cu)	mg/kg	3.3	<2.0	<2.0	4.7	3.6	7108405	<2.0	2.0	7109896
Acid Extractable Iron (Fe)	mg/kg	16000	1200	15000	3400	6800	7108405	12000	50	7109896
Acid Extractable Lead (Pb)	mg/kg	15	2.6	12	9.6	25	7108405	15	0.50	7109896
Acid Extractable Lithium (Li)	mg/kg	7.7	<2.0	7.5	3.7	3.6	7108405	8.5	2.0	7109896
Acid Extractable Manganese (Mn)	mg/kg	170	42	240	57	95	7108405	200	2.0	7109896
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	0.13	0.12	7108405	<0.10	0.10	7109896
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	7108405	<2.0	2.0	7109896
Acid Extractable Nickel (Ni)	mg/kg	6.9	<2.0	5.5	3.5	4.7	7108405	7.3	2.0	7109896
Acid Extractable Rubidium (Rb)	mg/kg	14	2.1	20	6.7	7.9	7108405	22	2.0	7109896
Acid Extractable Selenium (Se)	mg/kg	0.99	<0.50	<0.50	2.9	1.2	7108405	<0.50	0.50	7109896
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	7108405	<0.50	0.50	7109896
Acid Extractable Strontium (Sr)	mg/kg	6.4	<5.0	<5.0	12	14	7108405	<5.0	5.0	7109896
Acid Extractable Thallium (Tl)	mg/kg	0.11	<0.10	0.16	<0.10	<0.10	7108405	0.16	0.10	7109896
Acid Extractable Tin (Sn)	mg/kg	1.1	<1.0	2.1	<1.0	1.4	7108405	2.1	1.0	7109896
Acid Extractable Uranium (U)	mg/kg	1.4	0.25	1.7	1.4	0.84	7108405	0.86	0.10	7109896
Acid Extractable Vanadium (V)	mg/kg	48	4.3	54	16	23	7108405	42	2.0	7109896
Acid Extractable Zinc (Zn)	mg/kg	26	<5.0	25	9.1	18	7108405	24	5.0	7109896

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch



**ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)**

BV Labs ID		OJL998	OJL999	OJM000		
Sampling Date		2020/12/04	2020/12/01	2020/12/02		
COC Number		n/a	n/a	n/a		
	UNITS	BFR_SED25	BFR_SED_DUP1	BFR_SED_DUP2	RDL	QC Batch
<b>Metals</b>						
Acid Extractable Aluminum (Al)	mg/kg	7800	6000	2400	10	7109896
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	2.0	7109896
Acid Extractable Arsenic (As)	mg/kg	<2.0	2.2	<2.0	2.0	7109896
Acid Extractable Barium (Ba)	mg/kg	15	24	11	5.0	7109896
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	2.0	7109896
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	2.0	7109896
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	50	7109896
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	0.30	7109896
Acid Extractable Chromium (Cr)	mg/kg	<2.0	4.4	2.9	2.0	7109896
Acid Extractable Cobalt (Co)	mg/kg	<1.0	<1.0	<1.0	1.0	7109896
Acid Extractable Copper (Cu)	mg/kg	4.8	16	2.2	2.0	7109896
Acid Extractable Iron (Fe)	mg/kg	460	1800	6400	50	7109896
Acid Extractable Lead (Pb)	mg/kg	2.8	250	21	0.50	7109896
Acid Extractable Lithium (Li)	mg/kg	<2.0	<2.0	2.9	2.0	7109896
Acid Extractable Manganese (Mn)	mg/kg	3.0	9.1	76	2.0	7109896
Acid Extractable Mercury (Hg)	mg/kg	0.12	0.23	<0.10	0.10	7109896
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	2.0	7109896
Acid Extractable Nickel (Ni)	mg/kg	2.6	6.7	2.1	2.0	7109896
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	2.0	6.3	2.0	7109896
Acid Extractable Selenium (Se)	mg/kg	2.1	4.4	<0.50	0.50	7109896
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	0.50	7109896
Acid Extractable Strontium (Sr)	mg/kg	10	12	<5.0	5.0	7109896
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	0.10	7109896
Acid Extractable Tin (Sn)	mg/kg	<1.0	3.1	1.0	1.0	7109896
Acid Extractable Uranium (U)	mg/kg	1.4	0.76	0.65	0.10	7109896
Acid Extractable Vanadium (V)	mg/kg	5.0	16	15	2.0	7109896
Acid Extractable Zinc (Zn)	mg/kg	5.3	18	10	5.0	7109896
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						



**SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)**

<b>BV Labs ID</b>		OKG888			OKG888			OKG926		
<b>Sampling Date</b>		2020/12/01			2020/12/01			2020/12/01		
<b>COC Number</b>		n/a			n/a			n/a		
	<b>UNITS</b>	<b>BFR_SED1</b>	<b>RDL</b>	<b>QC Batch</b>	<b>BFR_SED1 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>	<b>BFR_SED2</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Polyaromatic Hydrocarbons</b>										
1-Methylnaphthalene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
2-Methylnaphthalene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Acenaphthene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Acenaphthylene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Anthracene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Benzo(a)anthracene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Benzo(a)pyrene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Benzo(b)fluoranthene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Benzo(b/j)fluoranthene	mg/kg	<0.010	0.010	7108512				<0.010	0.010	7108512
Benzo(g,h,i)perylene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.080 (1)	0.080	7110095
Benzo(j)fluoranthene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Benzo(k)fluoranthene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Chrysene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Dibenzo(a,h)anthracene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Fluoranthene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Fluorene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Naphthalene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Perylene	mg/kg	1.0	0.0050	7110095	0.99	0.0050	7110095	1.2	0.0050	7110095
Phenanthrene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095
Pyrene	mg/kg	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095	<0.0050	0.0050	7110095

<b>Surrogate Recovery (%)</b>										
D10-Anthracene	%	95		7110095	93		7110095	92		7110095
D14-Terphenyl	%	99		7110095	96		7110095	96		7110095
D8-Acenaphthylene	%	94		7110095	97		7110095	83		7110095

RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 Lab-Dup = Laboratory Initiated Duplicate  
 (1) Elevated PAH RDL(s) due to matrix / co-extractive interference.



**SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)**

BV Labs ID		OKG929		OKG935		OKG936		OKG938		
Sampling Date		2020/12/01		2020/12/01		2020/12/02		2020/12/01		
COC Number		n/a		n/a		n/a		n/a		
	UNITS	BFR_SED3	RDL	BFR_SED4	RDL	BFR_SED5	RDL	BFR_SED6	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>										
1-Methylnaphthalene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
2-Methylnaphthalene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Acenaphthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Acenaphthylene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Anthracene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(a)anthracene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(a)pyrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(b)fluoranthene	mg/kg	0.038	0.0050	<0.0050	0.0050	<0.0050	0.0050	0.18	0.0050	7110095
Benzo(b/j)fluoranthene	mg/kg	0.038	0.010	<0.010	0.010	<0.010	0.010	0.18	0.010	7108512
Benzo(g,h,i)perylene	mg/kg	<0.19 (1)	0.19	<0.0050	0.0050	<0.0080 (1)	0.0080	<0.15 (1)	0.15	7110095
Benzo(j)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(k)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Chrysene	mg/kg	0.042	0.0050	<0.0050	0.0050	<0.0050	0.0050	0.12	0.0050	7110095
Dibenzo(a,h)anthracene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Fluoranthene	mg/kg	0.077	0.0050	<0.0050	0.0050	<0.0050	0.0050	0.15	0.0050	7110095
Fluorene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	0.13	0.0050	7110095
Naphthalene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Perylene	mg/kg	0.70	0.0050	<0.0050	0.0050	0.028	0.0050	1.8	0.0050	7110095
Phenanthrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Pyrene	mg/kg	0.050	0.0050	<0.0050	0.0050	<0.0050	0.0050	0.11	0.0050	7110095
<b>Surrogate Recovery (%)</b>										
D10-Anthracene	%	83		95		97		100		7110095
D14-Terphenyl	%	91		98		97		102		7110095
D8-Acenaphthylene	%	84		95		99		98		7110095
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) Elevated PAH RDL(s) due to matrix / co-extractive interference.										



**SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)**

BV Labs ID		OKG957		OKG958		OKG986		OKG987		
Sampling Date		2020/12/02		2020/12/02		2020/12/02		2020/12/01		
COC Number		n/a		n/a		n/a		n/a		
	UNITS	BFR_SED7	RDL	BFR_SED8	RDL	BFR_SED9	RDL	BFR_SED10	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>										
1-Methylnaphthalene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
2-Methylnaphthalene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Acenaphthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Acenaphthylene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Anthracene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(a)anthracene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(a)pyrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(b)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(b/j)fluoranthene	mg/kg	<0.010	0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	7108512
Benzo(g,h,i)perylene	mg/kg	<0.80 (1)	0.80	<0.0050	0.0050	<0.030 (1)	0.030	<0.0050	0.0050	7110095
Benzo(j)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(k)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Chrysene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Dibenzo(a,h)anthracene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Fluorene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Naphthalene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Perylene	mg/kg	2.0	0.0050	<0.0050	0.0050	0.58	0.0050	<0.0050	0.0050	7110095
Phenanthrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Pyrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
<b>Surrogate Recovery (%)</b>										
D10-Anthracene	%	94		98		79		99		7110095
D14-Terphenyl	%	99		100		91		98		7110095
D8-Acenaphthylene	%	95		102		86		103		7110095
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) Elevated PAH RDL(s) due to matrix / co-extractive interference.										



**SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)**

BV Labs ID		OKH000		OKH035		OKH048		OKH056		
Sampling Date		2020/12/01		2020/12/01		2020/12/02		2020/12/02		
COC Number		n/a		n/a		n/a		n/a		
	UNITS	BFR_SED11	RDL	BFR_SED12	RDL	BFR_SED13	RDL	BFR_SED14	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>										
1-Methylnaphthalene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
2-Methylnaphthalene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Acenaphthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Acenaphthylene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Anthracene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(a)anthracene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(a)pyrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(b)fluoranthene	mg/kg	<0.0050	0.0050	0.082	0.0050	0.053	0.0050	<0.0050	0.0050	7110095
Benzo(b/j)fluoranthene	mg/kg	<0.010	0.010	0.082	0.010	0.053	0.010	<0.010	0.010	7108512
Benzo(g,h,i)perylene	mg/kg	<0.040 (1)	0.040	<0.0050	0.0050	<0.19 (1)	0.19	<0.050 (1)	0.050	7110095
Benzo(j)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(k)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Chrysene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	0.059	0.0050	<0.0050	0.0050	7110095
Dibenzo(a,h)anthracene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Fluoranthene	mg/kg	<0.0050	0.0050	0.063	0.0050	0.094	0.0050	<0.0050	0.0050	7110095
Fluorene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Naphthalene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Perylene	mg/kg	0.041	0.0050	<0.0050	0.0050	<0.16 (1)	0.16	0.35	0.0050	7110095
Phenanthrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Pyrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	0.061	0.0050	<0.0050	0.0050	7110095
<b>Surrogate Recovery (%)</b>										
D10-Anthracene	%	94		94		83		93		7110095
D14-Terphenyl	%	99		100		95		101		7110095
D8-Acenaphthylene	%	98		95		77		95		7110095
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) Elevated PAH RDL(s) due to matrix / co-extractive interference.										



**SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)**

BV Labs ID		OKH061		OKH071	OKH074	OKH076		OKH088		
Sampling Date		2020/12/02		2020/12/01	2020/12/04	2020/12/04		2020/12/04		
COC Number		n/a		n/a	n/a	n/a		n/a		
	UNITS	BFR_SED15	RDL	BFR_SED16	BFR_SED17	BFR_SED18	RDL	BFR_SED19	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>										
1-Methylnaphthalene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
2-Methylnaphthalene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Acenaphthene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Acenaphthylene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Anthracene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(a)anthracene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(a)pyrene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(b)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(b/j)fluoranthene	mg/kg	<0.010	0.010	<0.010	<0.010	<0.010	0.010	<0.010	0.010	7108512
Benzo(g,h,i)perylene	mg/kg	<1.2 (1)	1.2	<0.0050	<0.0050	<0.0050	0.0050	<0.040 (1)	0.040	7110095
Benzo(j)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Benzo(k)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Chrysene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Dibenzo(a,h)anthracene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Fluorene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Naphthalene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Perylene	mg/kg	1.3	0.0050	0.17	<0.0050	0.022	0.0050	0.084	0.0050	7110095
Phenanthrene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
Pyrene	mg/kg	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	7110095
<b>Surrogate Recovery (%)</b>										
D10-Anthracene	%	91		97	98	96		91		7110095
D14-Terphenyl	%	100		102	100	99		100		7110095
D8-Acenaphthylene	%	84		99	100	98		91		7110095
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) Elevated PAH RDL(s) due to matrix / co-extractive interference.										



BUREAU  
VERITAS

BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)

BV Labs ID		OKH094		OKH102			OKH108		OKH109		
Sampling Date		2020/12/03		2020/12/03			2020/12/03		2020/12/03		
COC Number		n/a		n/a			n/a		n/a		
	UNITS	BFR_SED20	QC Batch	BFR_SED21	RDL	QC Batch	BFR_SED22	RDL	BFR_SED23	RDL	QC Batch

Polyaromatic Hydrocarbons											
1-Methylnaphthalene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
2-Methylnaphthalene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Acenaphthene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Acenaphthylene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Anthracene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Benzo(a)anthracene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Benzo(a)pyrene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Benzo(b)fluoranthene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Benzo(b/j)fluoranthene	mg/kg	<0.010	7108512	<0.010	0.010	7108512	<0.010	0.010	<0.010	0.010	7108512
Benzo(g,h,i)perylene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.050 (1)	0.050	<0.0050	0.0050	7110226
Benzo(j)fluoranthene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Benzo(k)fluoranthene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Chrysene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Dibenzo(a,h)anthracene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Fluoranthene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Fluorene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Naphthalene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Perylene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	0.17	0.0050	0.11	0.0050	7110226
Phenanthrene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226
Pyrene	mg/kg	<0.0050	7110226	<0.0050	0.0050	7110095	<0.0050	0.0050	<0.0050	0.0050	7110226

Surrogate Recovery (%)											
D10-Anthracene	%	98	7110226	96		7110095	74		88		7110226
D14-Terphenyl	%	97	7110226	100		7110095	84		93		7110226
D8-Acenaphthylene	%	98	7110226	98		7110095	77		90		7110226

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.





**SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)**

BV Labs ID		OKH113		OKH118		OKH120	OKH121		
Sampling Date		2020/12/04		2020/12/04		2020/12/01	2020/12/02		
COC Number		n/a		n/a		n/a	n/a		
	UNITS	BFR_SED24	RDL	BFR_SED25	RDL	BFR_SED_DUP1	BFR_SED_DUP2	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>									
1-Methylnaphthalene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
2-Methylnaphthalene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Acenaphthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Acenaphthylene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Anthracene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Benzo(a)anthracene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Benzo(a)pyrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Benzo(b)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Benzo(b/j)fluoranthene	mg/kg	<0.010	0.010	<0.010	0.010	<0.010	<0.010	0.010	7108512
Benzo(g,h,i)perylene	mg/kg	<0.020 (1)	0.020	<0.88 (1)	0.88	<0.0050	<0.0050	0.0050	7110226
Benzo(j)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Benzo(k)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Chrysene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Dibenzo(a,h)anthracene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Fluorene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Naphthalene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Perylene	mg/kg	<0.0050	0.0050	1.4	0.0050	0.081	0.028	0.0050	7110226
Phenanthrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
Pyrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	7110226
<b>Surrogate Recovery (%)</b>									
D10-Anthracene	%	92		82		94	96		7110226
D14-Terphenyl	%	91		90		89	100		7110226
D8-Acenaphthylene	%	95		89		96	95		7110226
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) Elevated PAH RDL(s) due to matrix / co-extractive interference.									



**ATLANTIC RBCA HYDROCARBONS (SEDIMENT)**

BV Labs ID		OJL974	OJL975	OJL976			OJL977		
Sampling Date		2020/12/01	2020/12/01	2020/12/01			2020/12/01		
COC Number		n/a	n/a	n/a			n/a		
	UNITS	BFR_SED1	BFR_SED2	BFR_SED3	RDL	QC Batch	BFR_SED4	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>									
Benzene	mg/kg	<0.025	<0.025	<0.025	0.025	7104436	<0.025	0.025	7104436
Toluene	mg/kg	<0.050	<0.050	<0.050	0.050	7104436	<0.10	0.10	7104436
Ethylbenzene	mg/kg	<0.025	<0.025	<0.025	0.025	7104436	<0.025	0.025	7104436
Total Xylenes	mg/kg	<0.050	<0.050	<0.050	0.050	7104436	<0.10	0.10	7104436
C6 - C10 (less BTEX)	mg/kg	<2.5	<2.5	<2.5	2.5	7104436	<5.0	5.0	7104436
>C10-C16 Hydrocarbons	mg/kg	<10	<10	<10	10	7144244	<10	10	7144270
>C16-C21 Hydrocarbons	mg/kg	<10	<10	<10	10	7144244	<10	10	7144270
>C21-<C32 Hydrocarbons	mg/kg	160	300	640	15	7144244	390	15	7144270
Modified TPH (Tier1)	mg/kg	160	300	640	15	7148527	390	15	7148527
Reached Baseline at C32	mg/kg	Yes	Yes	No	N/A	7144244	Yes	N/A	7144270
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	COMMENT (1)	COMMENT (1)	N/A	7144244	COMMENT (1)	N/A	7144270
<b>Surrogate Recovery (%)</b>									
Isobutylbenzene - Extractable	%	87	93	92		7144244	89		7144270
n-Dotriacontane - Extractable	%	115 (2)	107 (2)	93 (2)		7144244	108 (2)		7144270
Isobutylbenzene - Volatile	%	117	111	93		7104436	118 (3)		7104436

RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 N/A = Not Applicable  
 (1) Unidentified compound(s) in lube oil range.  
 (2) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.  
 (3) Elevated VPH RDL(s) due to limited sample.



**ATLANTIC RBCA HYDROCARBONS (SEDIMENT)**

BV Labs ID		OJL978		OJL979		OJL980		OJL981		
Sampling Date		2020/12/02		2020/12/01		2020/12/02		2020/12/02		
COC Number		n/a		n/a		n/a		n/a		
	UNITS	BFR_SED5	RDL	BFR_SED6	RDL	BFR_SED7	QC Batch	BFR_SED8	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>										
Benzene	mg/kg	<0.025	0.025	<0.025	0.025	<0.025	7104436	<0.025	0.025	7104436
Toluene	mg/kg	<0.050	0.050	<0.10	0.10	<0.050	7104436	<0.050	0.050	7104436
Ethylbenzene	mg/kg	<0.025	0.025	<0.025	0.025	<0.025	7104436	<0.025	0.025	7104436
Total Xylenes	mg/kg	<0.050	0.050	<0.10	0.10	<0.050	7104436	<0.050	0.050	7104436
C6 - C10 (less BTEX)	mg/kg	7.9	2.5	<5.0	5.0	<2.5	7104436	<2.5	2.5	7104436
>C10-C16 Hydrocarbons	mg/kg	<10	10	<10	10	<10	7144244	<10	10	7105008
>C16-C21 Hydrocarbons	mg/kg	<10	10	<10	10	<10	7144244	<10	10	7105008
>C21-<C32 Hydrocarbons	mg/kg	26	15	290	15	370	7144244	36	15	7105008
Modified TPH (Tier1)	mg/kg	34	15	290	15	370	7148527	36	15	7102303
Reached Baseline at C32	mg/kg	Yes	N/A	Yes	N/A	Yes	7144244	Yes	N/A	7105008
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	N/A	COMMENT (1)	N/A	COMMENT (1)	7144244	COMMENT (1)	N/A	7105008
<b>Surrogate Recovery (%)</b>										
Isobutylbenzene - Extractable	%	92		88		92	7144244	94		7105008
n-Dotriacontane - Extractable	%	108 (2)		107 (2)		110 (2)	7144244	98		7105008
Isobutylbenzene - Volatile	%	118		112 (3)		92	7104436	120		7104436

RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 N/A = Not Applicable  
 (1) Unidentified compound(s) in lube oil range.  
 (2) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.  
 (3) Elevated VPH RDL(s) due to limited sample.



BUREAU  
VERITAS

BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### ATLANTIC RBCA HYDROCARBONS (SEDIMENT)

BV Labs ID		OJL982		OJL983		OJL984	OJL985		
Sampling Date		2020/12/02		2020/12/01		2020/12/01	2020/12/01		
COC Number		n/a		n/a		n/a	n/a		
	UNITS	BFR_SED9	QC Batch	BFR_SED10	QC Batch	BFR_SED11	BFR_SED12	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>									
Benzene	mg/kg	<0.025	7104436	<0.025	7104436	<0.025	<0.025	0.025	7104436
Toluene	mg/kg	<0.050	7104436	<0.050	7104436	<0.050	<0.050	0.050	7104436
Ethylbenzene	mg/kg	<0.025	7104436	<0.025	7104436	<0.025	<0.025	0.025	7104436
Total Xylenes	mg/kg	<0.050	7104436	<0.050	7104436	<0.050	<0.050	0.050	7104436
C6 - C10 (less BTEX)	mg/kg	<2.5	7104436	<2.5	7104436	<2.5	<2.5	2.5	7104436
>C10-C16 Hydrocarbons	mg/kg	<10	7144244	<10	7105008	<10	<10	10	7144244
>C16-C21 Hydrocarbons	mg/kg	<10	7144244	<10	7105008	<10	<10	10	7144244
>C21-<C32 Hydrocarbons	mg/kg	550	7144244	<15	7105008	42	540	15	7144244
Modified TPH (Tier1)	mg/kg	550	7148527	<15	7102390	42	540	15	7148527
Reached Baseline at C32	mg/kg	No	7144244	NA	7105008	Yes	Yes	N/A	7144244
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	7144244	NA	7105008	COMMENT (1)	COMMENT (1)	N/A	7144244
<b>Surrogate Recovery (%)</b>									
Isobutylbenzene - Extractable	%	96	7144244	88	7105008	89	95		7144244
n-Dotriacontane - Extractable	%	91 (2)	7144244	97	7105008	105 (2)	114 (2)		7144244
Isobutylbenzene - Volatile	%	98	7104436	109	7104436	111	95		7104436

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

N/A = Not Applicable

(1) Unidentified compound(s) in lube oil range.

(2) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.



**ATLANTIC RBCA HYDROCARBONS (SEDIMENT)**

BV Labs ID		OJL986		OJL987	OJL988	OJL989		
Sampling Date		2020/12/02		2020/12/02	2020/12/02	2020/12/01		
COC Number		n/a		n/a	n/a	n/a		
	UNITS	BFR_SED13	QC Batch	BFR_SED14	BFR_SED15	BFR_SED16	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>								
Benzene	mg/kg	<0.025	7105001	<0.025	<0.025	<0.025	0.025	7105001
Toluene	mg/kg	<0.050	7105001	<0.050	<0.050	<0.050	0.050	7105001
Ethylbenzene	mg/kg	<0.025	7105001	<0.025	<0.025	<0.025	0.025	7105001
Total Xylenes	mg/kg	<0.050	7105001	<0.050	<0.050	<0.050	0.050	7105001
C6 - C10 (less BTEX)	mg/kg	<2.5	7105001	<2.5	<2.5	<2.5	2.5	7105001
>C10-C16 Hydrocarbons	mg/kg	<10	7144244	<10	<10	<10	10	7144270
>C16-C21 Hydrocarbons	mg/kg	<10	7144244	<10	<10	<10	10	7144270
>C21-<C32 Hydrocarbons	mg/kg	790	7144244	54	310	370	15	7144270
Modified TPH (Tier1)	mg/kg	790	7148527	54	310	370	15	7148527
Reached Baseline at C32	mg/kg	No	7144244	Yes	Yes	Yes	N/A	7144270
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	7144244	COMMENT (1)	COMMENT (1)	COMMENT (1)	N/A	7144270
<b>Surrogate Recovery (%)</b>								
Isobutylbenzene - Extractable	%	90	7144244	88	82	93		7144270
n-Dotriacontane - Extractable	%	100 (2)	7144244	107 (2)	112 (2)	112 (2)		7144270
Isobutylbenzene - Volatile	%	89	7105001	86	86	110		7105001

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

N/A = Not Applicable

(1) Unidentified compound(s) in lube oil range.

(2) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.



**ATLANTIC RBCA HYDROCARBONS (SEDIMENT)**

BV Labs ID		OJL990	OJL991		OJL992		OJL993		
Sampling Date		2020/12/04	2020/12/04		2020/12/04		2020/12/03		
COC Number		n/a	n/a		n/a		n/a		
	UNITS	BFR_SED17	BFR_SED18	QC Batch	BFR_SED19	QC Batch	BFR_SED20	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>									
Benzene	mg/kg	<0.025	<0.025	7105001	<0.025	7105001	<0.025	0.025	7105001
Toluene	mg/kg	<0.050	<0.050	7105001	<0.050	7105001	<0.050	0.050	7105001
Ethylbenzene	mg/kg	<0.025	<0.025	7105001	<0.025	7105001	<0.025	0.025	7105001
Total Xylenes	mg/kg	<0.050	<0.050	7105001	<0.050	7105001	<0.050	0.050	7105001
C6 - C10 (less BTEX)	mg/kg	<2.5	<2.5	7105001	<2.5	7105001	<2.5	2.5	7105001
>C10-C16 Hydrocarbons	mg/kg	<10	<10	7107549	<10	7144270	<10	10	7107549
>C16-C21 Hydrocarbons	mg/kg	<10	<10	7107549	<10	7144270	<10	10	7107549
>C21-<C32 Hydrocarbons	mg/kg	34	<15	7107549	85	7144270	<15	15	7107549
Modified TPH (Tier1)	mg/kg	34	<15	7102390	85	7148527	<15	15	7102390
Reached Baseline at C32	mg/kg	Yes	NA	7107549	Yes	7144270	NA	N/A	7107549
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	NA	7107549	COMMENT (1)	7144270	NA	N/A	7107549
<b>Surrogate Recovery (%)</b>									
Isobutylbenzene - Extractable	%	98	99	7107549	85	7144270	101		7107549
n-Dotriacontane - Extractable	%	96	99	7107549	108 (2)	7144270	109		7107549
Isobutylbenzene - Volatile	%	105	112	7105001	99	7105001	109		7105001

RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 N/A = Not Applicable  
 (1) Unidentified compound(s) in lube oil range.  
 (2) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.



**ATLANTIC RBCA HYDROCARBONS (SEDIMENT)**

BV Labs ID		OJL994		OJL995	OJL996		OJL997		
Sampling Date		2020/12/03		2020/12/03	2020/12/03		2020/12/04		
COC Number		n/a		n/a	n/a		n/a		
	UNITS	BFR_SED21	QC Batch	BFR_SED22	BFR_SED23	QC Batch	BFR_SED24	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>									
Benzene	mg/kg	<0.025	7105001	<0.025	<0.025	7105005	<0.025	0.025	7105005
Toluene	mg/kg	<0.050	7105001	<0.050	<0.050	7105005	<0.050	0.050	7105005
Ethylbenzene	mg/kg	<0.025	7105001	<0.025	<0.025	7105005	<0.025	0.025	7105005
Total Xylenes	mg/kg	<0.050	7105001	<0.050	<0.050	7105005	<0.050	0.050	7105005
C6 - C10 (less BTEX)	mg/kg	<2.5	7105001	<2.5	<2.5	7105005	<2.5	2.5	7105005
>C10-C16 Hydrocarbons	mg/kg	<10	7144270	<10	<10	7144270	<10	10	7144270
>C16-C21 Hydrocarbons	mg/kg	<10	7144270	52	<10	7144270	<10	10	7144270
>C21-<C32 Hydrocarbons	mg/kg	32	7144270	630	280	7144270	27	15	7144270
Modified TPH (Tier1)	mg/kg	32	7148527	690	280	7148527	27	15	7148534
Reached Baseline at C32	mg/kg	Yes	7144270	Yes	Yes	7144270	Yes	N/A	7144270
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	7144270	COMMENT (2)	COMMENT (1)	7144270	COMMENT (1)	N/A	7144270
<b>Surrogate Recovery (%)</b>									
Isobutylbenzene - Extractable	%	88	7144270	90	88	7144270	87		7144270
n-Dotriacontane - Extractable	%	104 (3)	7144270	91 (3)	114 (3)	7144270	107 (3)		7144270
Isobutylbenzene - Volatile	%	111	7105001	73	84	7105005	96		7105005

RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 N/A = Not Applicable  
 (1) Unidentified compound(s) in lube oil range.  
 (2) Unidentified compound(s) in fuel / lube range.  
 (3) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.



**ATLANTIC RBCA HYDROCARBONS (SEDIMENT)**

BV Labs ID		OJL998		OJL999		OJM000		
Sampling Date		2020/12/04		2020/12/01		2020/12/02		
COC Number		n/a		n/a		n/a		
	UNITS	BFR_SED25	RDL	BFR_SED_DUP1	RDL	BFR_SED_DUP2	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>								
Benzene	mg/kg	<0.025	0.025	<0.025	0.025	<0.025	0.025	7105005
Toluene	mg/kg	<0.050	0.050	<0.10	0.10	<0.050	0.050	7105005
Ethylbenzene	mg/kg	<0.025	0.025	<0.025	0.025	<0.025	0.025	7105005
Total Xylenes	mg/kg	<0.050	0.050	<0.10	0.10	<0.050	0.050	7105005
C6 - C10 (less BTEX)	mg/kg	<2.5	2.5	<5.0	5.0	<2.5	2.5	7105005
>C10-C16 Hydrocarbons	mg/kg	<10	10	<10	10	<10	10	7144270
>C16-C21 Hydrocarbons	mg/kg	<10	10	<10	10	<10	10	7144270
>C21-<C32 Hydrocarbons	mg/kg	690	15	290	15	23	15	7144270
Modified TPH (Tier1)	mg/kg	690	15	290	15	23	15	7148534
Reached Baseline at C32	mg/kg	Yes	N/A	Yes	N/A	Yes	N/A	7144270
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	N/A	COMMENT (1)	N/A	COMMENT (1)	N/A	7144270
<b>Surrogate Recovery (%)</b>								
Isobutylbenzene - Extractable	%	83		82		85		7144270
n-Dotriacontane - Extractable	%	112 (2)		103 (2)		107 (2)		7144270
Isobutylbenzene - Volatile	%	76		93 (3)		96		7105005

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

N/A = Not Applicable

(1) Unidentified compound(s) in lube oil range.

(2) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.

(3) Elevated VPH RDL(s) due to limited sample.





**RESULTS OF ANALYSES OF WATER**

<b>BV Labs ID</b>		OJL951			OJL953		OJL954		OJL963		
<b>Sampling Date</b>		2020/12/02			2020/12/02		2020/12/02		2020/12/04		
<b>COC Number</b>		n/a			n/a		n/a		n/a		
	<b>UNITS</b>	<b>BFR_SW5</b>	<b>RDL</b>	<b>QC Batch</b>	<b>BFR_SW7</b>	<b>QC Batch</b>	<b>BFR_SW8</b>	<b>QC Batch</b>	<b>BFR_SW17</b>	<b>RDL</b>	<b>QC Batch</b>

**Calculated Parameters**

Anion Sum	me/L	0.350	N/A	7101917	0.380	7101917	0.310	7101917	0.490	N/A	7101917
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	7101913	<1.0	7101913	<1.0	7101913	<1.0	1.0	7101913
Calculated TDS	mg/L	22	1.0	7101922	24	7101922	19	7101922	30	1.0	7101922
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	7101913	<1.0	7101913	<1.0	7101913	<1.0	1.0	7101913
Cation Sum	me/L	0.320	N/A	7101917	0.380	7101917	0.300	7101917	0.420	N/A	7101917
Hardness (CaCO3)	mg/L	4.6	1.0	7101915	6.1	7101915	4.2	7101915	6.2	1.0	7101915
Ion Balance (% Difference)	%	4.48	N/A	7101916	0.00	7101916	1.64	7101916	7.69	N/A	7101916
Langelier Index (@ 20C)	N/A	NC		7101920	NC	7101920	NC	7101920	NC		7101920
Langelier Index (@ 4C)	N/A	NC		7101921	NC	7101921	NC	7101921	NC		7101921
Nitrate (N)	mg/L	<0.050	0.050	7101918	<0.050	7101918	<0.050	7101918	<0.050	0.050	7101918
Saturation pH (@ 20C)	N/A	NC		7101920	NC	7101920	NC	7101920	NC		7101920
Saturation pH (@ 4C)	N/A	NC		7101921	NC	7101921	NC	7101921	NC		7101921

**Inorganics**

Total Alkalinity (Total as CaCO3)	mg/L	<5.0	5.0	7109675	<5.0	7109675	<5.0	7109687	<5.0	5.0	7109687
Dissolved Chloride (Cl-)	mg/L	10	1.0	7109677	13	7109677	9.3	7109688	14	1.0	7109688
Colour	TCU	110	25	7109680	79	7109680	85	7109691	87	25	7109691
Nitrate + Nitrite (N)	mg/L	<0.050	0.050	7109682	<0.050	7109682	0.054	7109693	<0.050	0.050	7109693
Nitrite (N)	mg/L	0.011	0.010	7109685	0.013	7109685	0.011	7109694	0.012	0.010	7109694
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.050	7109945	<0.050	7109945	<0.050	7109945	0.070	0.050	7109945
Total Organic Carbon (C)	mg/L	12 (1)	5.0	7112178	8.5	7112185	8.5	7110385	11	0.50	7112185
Orthophosphate (P)	mg/L	<0.010	0.010	7109681	<0.010	7109681	<0.010	7109692	<0.010	0.010	7109692
pH	pH	6.20		7109742	5.84	7109742	6.11	7109742	5.23		7109742
Reactive Silica (SiO2)	mg/L	1.7	0.50	7109679	2.6	7109679	1.1	7109690	2.9	0.50	7109690
Dissolved Sulphate (SO4)	mg/L	2.8	2.0	7109678	<2.0	7109678	2.1	7109689	4.6	2.0	7109689
Turbidity	NTU	4.3	0.10	7104463	0.26	7104463	0.57	7104463	0.55	0.10	7104463
Conductivity	uS/cm	40	1.0	7109740	50	7109740	37	7109740	63	1.0	7109740

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
N/A = Not Applicable  
(1) Elevated reporting limit due to turbidity.



**RESULTS OF ANALYSES OF WATER**

BV Labs ID		OJL965		OJL967	OJL969		OJL970		
Sampling Date		2020/12/04		2020/12/03	2020/12/03		2020/12/04		
COC Number		n/a		n/a	n/a		n/a		
	UNITS	BFR_SW19	QC Batch	BFR_SW21	BFR_SW23	QC Batch	BFR_SW24	RDL	QC Batch

Calculated Parameters									
Anion Sum	me/L	0.470	7101917	0.450	0.420	7101917	0.400	N/A	7101917
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	7101913	<1.0	<1.0	7101913	<1.0	1.0	7101913
Calculated TDS	mg/L	28	7101922	27	25	7101922	24	1.0	7101922
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	7101913	<1.0	<1.0	7101913	<1.0	1.0	7101913
Cation Sum	me/L	0.390	7101917	0.410	0.360	7101917	0.350	N/A	7101917
Hardness (CaCO3)	mg/L	5.4	7101915	6.2	5.4	7101915	5.1	1.0	7101915
Ion Balance (% Difference)	%	9.30	7101916	4.65	7.69	7101916	6.67	N/A	7101916
Langelier Index (@ 20C)	N/A	NC	7101920	NC	NC	7101920	NC		7101920
Langelier Index (@ 4C)	N/A	NC	7101921	NC	NC	7101921	NC		7101921
Nitrate (N)	mg/L	<0.050	7101918	<0.050	<0.050	7101918	<0.050	0.050	7101918
Saturation pH (@ 20C)	N/A	NC	7101920	NC	NC	7101920	NC		7101920
Saturation pH (@ 4C)	N/A	NC	7101921	NC	NC	7101921	NC		7101921

Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	<5.0	7109687	<5.0	<5.0	7109687	<5.0	5.0	7109687
Dissolved Chloride (Cl-)	mg/L	14	7109688	14	12	7109688	12	1.0	7109688
Colour	TCU	85	7109691	92	110	7109691	80	25	7109691
Nitrate + Nitrite (N)	mg/L	<0.050	7109693	<0.050	<0.050	7109693	<0.050	0.050	7109693
Nitrite (N)	mg/L	0.011	7109694	0.012	0.013	7109694	0.011	0.010	7109694
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	7109945	<0.050	<0.050	7109945	<0.050	0.050	7109952
Total Organic Carbon (C)	mg/L	11	7112178	11	12	7112185	8.9	0.50	7112185
Orthophosphate (P)	mg/L	<0.010	7109692	<0.010	<0.010	7109692	<0.010	0.010	7109692
pH	pH	5.08	7109742	5.34	5.27	7109742	5.48		7109742
Reactive Silica (SiO2)	mg/L	2.1	7109690	2.1	1.8	7109690	1.5	0.50	7109690
Dissolved Sulphate (SO4)	mg/L	3.1	7109689	3.1	3.4	7109689	3.4	2.0	7109689
Turbidity	NTU	0.64	7104463	0.44	1.0	7104463	0.68	0.10	7104463
Conductivity	uS/cm	61	7109740	53	50	7109740	45	1.0	7109740

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



**RESULTS OF ANALYSES OF WATER**

BV Labs ID		OJL970			OJL972			OJL972		
Sampling Date		2020/12/04			2020/12/01			2020/12/01		
COC Number		n/a			n/a			n/a		
	UNITS	BFR_SW24 Lab-Dup	RDL	QC Batch	BFR_SW_DUP1	RDL	QC Batch	BFR_SW_DUP1 Lab-Dup	RDL	QC Batch

Calculated Parameters										
Anion Sum	me/L				0.380	N/A	7101917			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L				<1.0	1.0	7101913			
Calculated TDS	mg/L				21	1.0	7101922			
Carb. Alkalinity (calc. as CaCO3)	mg/L				<1.0	1.0	7101913			
Cation Sum	me/L				0.290	N/A	7101917			
Hardness (CaCO3)	mg/L				3.9	1.0	7101915			
Ion Balance (% Difference)	%				13.4	N/A	7101916			
Langelier Index (@ 20C)	N/A				NC		7101920			
Langelier Index (@ 4C)	N/A				NC		7101921			
Nitrate (N)	mg/L				<0.050	0.050	7101918			
Saturation pH (@ 20C)	N/A				NC		7101920			
Saturation pH (@ 4C)	N/A				NC		7101921			

Inorganics										
Total Alkalinity (Total as CaCO3)	mg/L				<5.0	5.0	7109687			
Dissolved Chloride (Cl-)	mg/L				11	1.0	7109688			
Colour	TCU				91	25	7109691			
Nitrate + Nitrite (N)	mg/L				<0.050	0.050	7109693			
Nitrite (N)	mg/L				0.012	0.010	7109694			
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.050	7109952	<0.050	0.050	7109951			
Total Organic Carbon (C)	mg/L				11	0.50	7112178			
Orthophosphate (P)	mg/L				<0.010	0.010	7109692			
pH	pH				5.46		7109742	5.37		7109742
Reactive Silica (SiO2)	mg/L				1.1	0.50	7109690			
Dissolved Sulphate (SO4)	mg/L				2.6	2.0	7109689			
Turbidity	NTU				0.61	0.10	7104463			
Conductivity	uS/cm				45	1.0	7109740	45	1.0	7109740

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



BUREAU  
VERITAS

BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

**RESULTS OF ANALYSES OF WATER**

BV Labs ID		OJL973			OJM004		OJM005		
Sampling Date		2020/12/02			2020/12/04		2020/12/04		
COC Number		n/a			n/a		n/a		
	UNITS	BFR_SW_DUP2	RDL	QC Batch	BFR_SW4 (RCAP)	QC Batch	BFR_SW10 (RCAP)	RDL	QC Batch

Calculated Parameters									
Anion Sum	me/L	0.330	N/A	7101917	0.370	7101917	0.340	N/A	7101917
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	7101913	<1.0	7101913	<1.0	1.0	7101913
Calculated TDS	mg/L	21	1.0	7101922	21	7101922	21	1.0	7101922
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	7101913	<1.0	7101913	<1.0	1.0	7101913
Cation Sum	me/L	0.320	N/A	7101917	0.330	7101917	0.330	N/A	7101917
Hardness (CaCO3)	mg/L	4.6	1.0	7101915	4.3	7101915	4.9	1.0	7101915
Ion Balance (% Difference)	%	1.54	N/A	7101916	5.71	7101916	1.49	N/A	7101916
Langelier Index (@ 20C)	N/A	NC		7101920	NC	7101920	NC		7101920
Langelier Index (@ 4C)	N/A	NC		7101921	NC	7101921	NC		7101921
Nitrate (N)	mg/L	<0.050	0.050	7101918	<0.050	7101918	<0.050	0.050	7101918
Saturation pH (@ 20C)	N/A	NC		7101920	NC	7101920	NC		7101920
Saturation pH (@ 4C)	N/A	NC		7101921	NC	7101921	NC		7101921

Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	<5.0	5.0	7109687	<5.0	7109687	<5.0	5.0	7109687
Dissolved Chloride (Cl-)	mg/L	10	1.0	7109688	12	7109688	12	1.0	7109688
Colour	TCU	110	25	7109691	79	7109691	91	25	7109691
Nitrate + Nitrite (N)	mg/L	<0.050	0.050	7109693	<0.050	7109693	0.052	0.050	7109693
Nitrite (N)	mg/L	0.012	0.010	7109694	0.011	7109694	0.012	0.010	7109694
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.050	7109951	<0.050	7109951	<0.050	0.050	7109951
Total Organic Carbon (C)	mg/L	11 (1)	5.0	7112181	11	7112181	9.3	0.50	7112178
Orthophosphate (P)	mg/L	<0.010	0.010	7109692	<0.010	7109692	<0.010	0.010	7109692
pH	pH	5.94		7109744	5.30	7109742	6.05		7107553
Reactive Silica (SiO2)	mg/L	1.7	0.50	7109690	1.0	7109690	1.9	0.50	7109690
Dissolved Sulphate (SO4)	mg/L	2.2	2.0	7109689	2.0	7109689	<2.0	2.0	7109689
Turbidity	NTU	3.7	0.10	7104463	0.57	7104463	1.3	0.10	7104463
Conductivity	uS/cm	39	1.0	7109743	47	7109740	45	1.0	7107551

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
N/A = Not Applicable  
(1) Elevated reporting limit due to turbidity.



**RESULTS OF ANALYSES OF WATER**

BV Labs ID		OJM006			OJM007		
Sampling Date		2020/12/04			2020/12/04		
COC Number		n/a			n/a		
	UNITS	BFR_SW13 (RCAP)	RDL	QC Batch	BFR_SW16 (RCAP)	RDL	QC Batch
<b>Calculated Parameters</b>							
Anion Sum	me/L	0.350	N/A	7101917	0.300	N/A	7101917
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	7101913	<1.0	1.0	7101913
Calculated TDS	mg/L	20	1.0	7101922	19	1.0	7101922
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	7101913	<1.0	1.0	7101913
Cation Sum	me/L	0.340	N/A	7101917	0.340	N/A	7101917
Hardness (CaCO3)	mg/L	4.2	1.0	7101915	4.3	1.0	7101915
Ion Balance (% Difference)	%	1.45	N/A	7101916	6.25	N/A	7101916
Langelier Index (@ 20C)	N/A	NC		7101920	NC		7101920
Langelier Index (@ 4C)	N/A	NC		7101921	NC		7101921
Nitrate (N)	mg/L	0.12	0.050	7101918	<0.050	0.050	7101918
Saturation pH (@ 20C)	N/A	NC		7101920	NC		7101920
Saturation pH (@ 4C)	N/A	NC		7101921	NC		7101921
<b>Inorganics</b>							
Total Alkalinity (Total as CaCO3)	mg/L	<5.0	5.0	7109687	<5.0	5.0	7109687
Dissolved Chloride (Cl-)	mg/L	12	1.0	7109688	11	1.0	7109688
Colour	TCU	100	25	7109691	75	25	7109691
Nitrate + Nitrite (N)	mg/L	0.14	0.050	7109693	<0.050	0.050	7109693
Nitrite (N)	mg/L	0.013	0.010	7109694	0.011	0.010	7109694
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.050	7109951	<0.050	0.050	7109951
Total Organic Carbon (C)	mg/L	14 (1)	5.0	7112178	9.0	0.50	7110165
Orthophosphate (P)	mg/L	<0.010	0.010	7109692	<0.010	0.010	7109692
pH	pH	5.30		7109742	5.19		7109742
Reactive Silica (SiO2)	mg/L	0.70	0.50	7109690	1.1	0.50	7109690
Dissolved Sulphate (SO4)	mg/L	<2.0	2.0	7109689	<2.0	2.0	7109689
Turbidity	NTU	2.7	0.10	7104463	1.1	0.10	7104463
Conductivity	uS/cm	49	1.0	7109740	48	1.0	7109740
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) Elevated reporting limit due to turbidity.							



BV Labs Job #: COW8766  
 Report Date: 2021/01/19

Golder Associates Ltd  
 Client Project #: 20439355  
 Site Location: BURGEO  
 Sampler Initials: MM

**RESULTS OF ANALYSES OF WATER**

<b>BV Labs ID</b>		OJM007		
<b>Sampling Date</b>		2020/12/04		
<b>COC Number</b>		n/a		
	<b>UNITS</b>	<b>BFR_SW16 (RCAP) Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Inorganics</b>				
Total Organic Carbon (C)	mg/L	9.1	0.50	7110165
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate				



**MERCURY BY COLD VAPOUR AA (WATER)**

BV Labs ID		OJL947	OJL948		OJL949		OJL950	OJL951		
Sampling Date		2020/12/01	2020/12/01		2020/12/01		2020/12/01	2020/12/02		
COC Number		n/a	n/a		n/a		n/a	n/a		
	UNITS	BFR_SW1	BFR_SW2	QC Batch	BFR_SW3	QC Batch	BFR_SW4	BFR_SW5	RDL	QC Batch
<b>Metals</b>										
Total Mercury (Hg)	ug/L	<0.013	<0.013	7109794	<0.013	7104916	<0.013	<0.013	0.013	7109794
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										

BV Labs ID		OJL952		OJL953	OJL953	OJL954	OJL955	OJL956		
Sampling Date		2020/12/01		2020/12/02	2020/12/02	2020/12/02	2020/12/02	2020/12/01		
COC Number		n/a		n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SW6	QC Batch	BFR_SW7	BFR_SW7 Lab-Dup	BFR_SW8	BFR_SW9	BFR_SW10	RDL	QC Batch
<b>Metals</b>										
Total Mercury (Hg)	ug/L	<0.013	7109794	<0.013	<0.013	<0.013	<0.013	<0.013	0.013	7109819
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										

BV Labs ID		OJL957	OJL958	OJL959	OJL960	OJL961	OJL962	OJL963		
Sampling Date		2020/12/01	2020/12/01	2020/12/02	2020/12/02	2020/12/02	2020/12/01	2020/12/04		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SW11	BFR_SW12	BFR_SW13	BFR_SW14	BFR_SW15	BFR_SW16	BFR_SW17	RDL	QC Batch
<b>Metals</b>										
Total Mercury (Hg)	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.013	7109819
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										

BV Labs ID		OJL964	OJL965	OJL966	OJL967	OJL968	OJL969	OJL970		
Sampling Date		2020/12/04	2020/12/04	2020/12/03	2020/12/03	2020/12/03	2020/12/03	2020/12/04		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SW18	BFR_SW19	BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	RDL	QC Batch
<b>Metals</b>										
Total Mercury (Hg)	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.013	7109819
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										



BV Labs Job #: COW8766  
 Report Date: 2021/01/19

Golder Associates Ltd  
 Client Project #: 20439355  
 Site Location: BURGEO  
 Sampler Initials: MM

**MERCURY BY COLD VAPOUR AA (WATER)**

BV Labs ID		OJL971	OJL972		OJL973		
Sampling Date		2020/12/04	2020/12/01		2020/12/02		
COC Number		n/a	n/a		n/a		
	<b>UNITS</b>	<b>BFR_SW25</b>	<b>BFR_SW_DUP1</b>	<b>QC Batch</b>	<b>BFR_SW_DUP2</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Metals</b>							
Total Mercury (Hg)	ug/L	<0.013	<0.013	7109819	<0.013	0.013	7112184
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							





**ELEMENTS BY ICP/MS (WATER)**

BV Labs ID		OJL947	OJL948		OJL949	OJL951		OJL952		
Sampling Date		2020/12/01	2020/12/01		2020/12/01	2020/12/02		2020/12/01		
COC Number		n/a	n/a		n/a	n/a		n/a		
	UNITS	BFR_SW1	BFR_SW2	QC Batch	BFR_SW3	BFR_SW5	QC Batch	BFR_SW6	RDL	QC Batch
<b>Metals</b>										
Total Aluminum (Al)	ug/L	270	250	7104412	300	270	7104428	260	5.0	7104412
Total Antimony (Sb)	ug/L	<1.0	<1.0	7104412	<1.0	<1.0	7104428	<1.0	1.0	7104412
Total Arsenic (As)	ug/L	<1.0	<1.0	7104412	<1.0	<1.0	7104428	<1.0	1.0	7104412
Total Barium (Ba)	ug/L	3.7	4.0	7104412	3.0	2.3	7104428	1.9	1.0	7104412
Total Beryllium (Be)	ug/L	<1.0	<1.0	7104412	<1.0	<1.0	7104428	<1.0	1.0	7104412
Total Bismuth (Bi)	ug/L	<2.0	<2.0	7104412	<2.0	<2.0	7104428	<2.0	2.0	7104412
Total Boron (B)	ug/L	<50	<50	7104412	<50	<50	7104428	<50	50	7104412
Total Cadmium (Cd)	ug/L	0.020	0.017	7104412	0.017	0.013	7104428	0.016	0.010	7104412
Total Calcium (Ca)	ug/L	1400	1700	7104412	550	800	7104428	310	100	7104412
Total Chromium (Cr)	ug/L	<1.0	<1.0	7104412	<1.0	<1.0	7104428	<1.0	1.0	7104412
Total Cobalt (Co)	ug/L	<0.40	<0.40	7104412	<0.40	<0.40	7104428	<0.40	0.40	7104412
Total Copper (Cu)	ug/L	0.57	0.56	7104412	<0.50	1.5	7104428	<0.50	0.50	7104412
Total Iron (Fe)	ug/L	310	370	7104412	270	330	7104428	110	50	7104412
Total Lead (Pb)	ug/L	0.61	0.52	7104412	0.80	2.7	7104428	0.60	0.50	7104412
Total Magnesium (Mg)	ug/L	850	820	7104412	780	640	7104428	520	100	7104412
Total Manganese (Mn)	ug/L	14	14	7104412	5.9	18	7104428	4.4	2.0	7104412
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	7104412	<2.0	<2.0	7104428	<2.0	2.0	7104412
Total Nickel (Ni)	ug/L	<2.0	<2.0	7104412	<2.0	<2.0	7104428	<2.0	2.0	7104412
Total Phosphorus (P)	ug/L	<100	<100	7104412	<100	<100	7104428	<100	100	7104412
Total Potassium (K)	ug/L	400	420	7104412	180	220	7104428	150	100	7104412
Total Selenium (Se)	ug/L	<0.50	<0.50	7104412	<0.50	<0.50	7104428	<0.50	0.50	7104412
Total Silver (Ag)	ug/L	<0.10	<0.10	7104412	<0.10	<0.10	7104428	<0.10	0.10	7104412
Total Sodium (Na)	ug/L	7900	8500	7104412	5500	4900	7104428	4000	100	7104412
Total Strontium (Sr)	ug/L	7.9	7.6	7104412	6.4	4.9	7104428	4.4	2.0	7104412
Total Thallium (Tl)	ug/L	<0.10	<0.10	7104412	<0.10	<0.10	7104428	<0.10	0.10	7104412
Total Tin (Sn)	ug/L	<2.0	<2.0	7104412	<2.0	<2.0	7104428	<2.0	2.0	7104412
Total Titanium (Ti)	ug/L	4.4	5.5	7104412	4.0	5.0	7104428	2.6	2.0	7104412
Total Uranium (U)	ug/L	<0.10	<0.10	7104412	<0.10	<0.10	7104428	<0.10	0.10	7104412
Total Vanadium (V)	ug/L	<2.0	<2.0	7104412	<2.0	<2.0	7104428	<2.0	2.0	7104412
Total Zinc (Zn)	ug/L	<5.0	<5.0	7104412	<5.0	<5.0	7104428	<5.0	5.0	7104412
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										



BUREAU  
VERITAS

BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

**ELEMENTS BY ICP/MS (WATER)**

BV Labs ID		OJL953		OJL954	OJL955		OJL957		OJL958		
Sampling Date		2020/12/02		2020/12/02	2020/12/02		2020/12/01		2020/12/01		
COC Number		n/a		n/a	n/a		n/a		n/a		
	UNITS	BFR_SW7	QC Batch	BFR_SW8	BFR_SW9	QC Batch	BFR_SW11	QC Batch	BFR_SW12	RDL	QC Batch

<b>Metals</b>											
Total Aluminum (Al)	ug/L	180	7104723	200	100	7104428	230	7104412	170	5.0	7104428
Total Antimony (Sb)	ug/L	<1.0	7104723	<1.0	<1.0	7104428	<1.0	7104412	<1.0	1.0	7104428
Total Arsenic (As)	ug/L	<1.0	7104723	<1.0	<1.0	7104428	<1.0	7104412	<1.0	1.0	7104428
Total Barium (Ba)	ug/L	2.7	7104723	2.2	1.4	7104428	2.4	7104412	1.9	1.0	7104428
Total Beryllium (Be)	ug/L	<1.0	7104723	<1.0	<1.0	7104428	<1.0	7104412	<1.0	1.0	7104428
Total Bismuth (Bi)	ug/L	<2.0	7104723	<2.0	<2.0	7104428	<2.0	7104412	<2.0	2.0	7104428
Total Boron (B)	ug/L	<50	7104723	<50	<50	7104428	<50	7104412	<50	50	7104428
Total Cadmium (Cd)	ug/L	0.018	7104723	0.018	0.015	7104428	0.017	7104412	0.020	0.010	7104428
Total Calcium (Ca)	ug/L	1100	7104723	740	400	7104428	710	7104412	480	100	7104428
Total Chromium (Cr)	ug/L	<1.0	7104723	<1.0	<1.0	7104428	<1.0	7104412	<1.0	1.0	7104428
Total Cobalt (Co)	ug/L	<0.40	7104723	<0.40	<0.40	7104428	<0.40	7104412	<0.40	0.40	7104428
Total Copper (Cu)	ug/L	<0.50	7104723	<0.50	<0.50	7104428	<0.50	7104412	<0.50	0.50	7104428
Total Iron (Fe)	ug/L	200	7104723	160	83	7104428	260	7104412	150	50	7104428
Total Lead (Pb)	ug/L	<0.50	7104723	0.61	0.61	7104428	0.64	7104412	0.61	0.50	7104428
Total Magnesium (Mg)	ug/L	800	7104723	570	760	7104428	710	7104412	760	100	7104428
Total Manganese (Mn)	ug/L	11	7104723	8.4	<2.0	7104428	9.2	7104412	3.6	2.0	7104428
Total Molybdenum (Mo)	ug/L	<2.0	7104723	<2.0	<2.0	7104428	<2.0	7104412	<2.0	2.0	7104428
Total Nickel (Ni)	ug/L	<2.0	7104723	<2.0	<2.0	7104428	<2.0	7104412	<2.0	2.0	7104428
Total Phosphorus (P)	ug/L	<100	7104723	<100	<100	7104428	<100	7104412	<100	100	7104428
Total Potassium (K)	ug/L	190	7104723	240	150	7104428	230	7104412	170	100	7104428
Total Selenium (Se)	ug/L	<0.50	7104723	<0.50	<0.50	7104428	<0.50	7104412	<0.50	0.50	7104428
Total Silver (Ag)	ug/L	<0.10	7104723	<0.10	<0.10	7104428	<0.10	7104412	<0.10	0.10	7104428
Total Sodium (Na)	ug/L	5600	7104723	4700	5700	7104428	5400	7104412	5500	100	7104428
Total Strontium (Sr)	ug/L	6.8	7104723	4.7	5.5	7104428	6.0	7104412	5.6	2.0	7104428
Total Thallium (Tl)	ug/L	<0.10	7104723	<0.10	<0.10	7104428	<0.10	7104412	<0.10	0.10	7104428
Total Tin (Sn)	ug/L	<2.0	7104723	<2.0	<2.0	7104428	<2.0	7104412	<2.0	2.0	7104428
Total Titanium (Ti)	ug/L	2.4	7104723	3.5	<2.0	7104428	3.7	7104412	2.1	2.0	7104428
Total Uranium (U)	ug/L	<0.10	7104723	<0.10	<0.10	7104428	<0.10	7104412	<0.10	0.10	7104428
Total Vanadium (V)	ug/L	<2.0	7104723	<2.0	<2.0	7104428	<2.0	7104412	<2.0	2.0	7104428
Total Zinc (Zn)	ug/L	<5.0	7104723	<5.0	<5.0	7104428	<5.0	7104412	5.2	5.0	7104428

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch



**ELEMENTS BY ICP/MS (WATER)**

BV Labs ID		OJL960		OJL961		OJL963		OJL964	OJL965		
Sampling Date		2020/12/02		2020/12/02		2020/12/04		2020/12/04	2020/12/04		
COC Number		n/a		n/a		n/a		n/a	n/a		
	UNITS	BFR_SW14	QC Batch	BFR_SW15	QC Batch	BFR_SW17	QC Batch	BFR_SW18	BFR_SW19	RDL	QC Batch
<b>Metals</b>											
Total Aluminum (Al)	ug/L	200	7104412	130	7104428	210	7104412	390	180	5.0	7104428
Total Antimony (Sb)	ug/L	<1.0	7104412	<1.0	7104428	<1.0	7104412	<1.0	<1.0	1.0	7104428
Total Arsenic (As)	ug/L	<1.0	7104412	<1.0	7104428	<1.0	7104412	<1.0	<1.0	1.0	7104428
Total Barium (Ba)	ug/L	1.6	7104412	2.8	7104428	3.6	7104412	5.4	4.2	1.0	7104428
Total Beryllium (Be)	ug/L	<1.0	7104412	<1.0	7104428	<1.0	7104412	<1.0	<1.0	1.0	7104428
Total Bismuth (Bi)	ug/L	<2.0	7104412	<2.0	7104428	<2.0	7104412	<2.0	<2.0	2.0	7104428
Total Boron (B)	ug/L	<50	7104412	<50	7104428	<50	7104412	<50	<50	50	7104428
Total Cadmium (Cd)	ug/L	0.014	7104412	0.018	7104428	0.015	7104412	0.020	0.017	0.010	7104428
Total Calcium (Ca)	ug/L	600	7104412	650	7104428	1000	7104412	950	680	100	7104428
Total Chromium (Cr)	ug/L	<1.0	7104412	<1.0	7104428	<1.0	7104412	<1.0	<1.0	1.0	7104428
Total Cobalt (Co)	ug/L	<0.40	7104412	<0.40	7104428	<0.40	7104412	<0.40	<0.40	0.40	7104428
Total Copper (Cu)	ug/L	<0.50	7104412	0.99	7104428	<0.50	7104412	0.54	<0.50	0.50	7104428
Total Iron (Fe)	ug/L	110	7104412	210	7104428	230	7104412	370	200	50	7104428
Total Lead (Pb)	ug/L	<0.50	7104412	<0.50	7104428	<0.50	7104412	0.70	0.57	0.50	7104428
Total Magnesium (Mg)	ug/L	570	7104412	630	7104428	880	7104412	870	910	100	7104428
Total Manganese (Mn)	ug/L	5.0	7104412	7.3	7104428	18	7104412	11	5.1	2.0	7104428
Total Molybdenum (Mo)	ug/L	<2.0	7104412	<2.0	7104428	<2.0	7104412	<2.0	<2.0	2.0	7104428
Total Nickel (Ni)	ug/L	<2.0	7104412	<2.0	7104428	<2.0	7104412	<2.0	<2.0	2.0	7104428
Total Phosphorus (P)	ug/L	<100	7104412	<100	7104428	<100	7104412	<100	<100	100	7104428
Total Potassium (K)	ug/L	190	7104412	210	7104428	190	7104412	320	150	100	7104428
Total Selenium (Se)	ug/L	<0.50	7104412	<0.50	7104428	<0.50	7104412	<0.50	<0.50	0.50	7104428
Total Silver (Ag)	ug/L	<0.10	7104412	<0.10	7104428	<0.10	7104412	<0.10	<0.10	0.10	7104428
Total Sodium (Na)	ug/L	4900	7104412	4800	7104428	6200	7104412	6100	6000	100	7104428
Total Strontium (Sr)	ug/L	4.8	7104412	5.3	7104428	7.8	7104412	7.3	6.9	2.0	7104428
Total Thallium (Tl)	ug/L	<0.10	7104412	<0.10	7104428	<0.10	7104412	<0.10	<0.10	0.10	7104428
Total Tin (Sn)	ug/L	<2.0	7104412	<2.0	7104428	<2.0	7104412	<2.0	<2.0	2.0	7104428
Total Titanium (Ti)	ug/L	2.5	7104412	<2.0	7104428	3.1	7104412	9.0	3.1	2.0	7104428
Total Uranium (U)	ug/L	<0.10	7104412	<0.10	7104428	<0.10	7104412	<0.10	<0.10	0.10	7104428
Total Vanadium (V)	ug/L	<2.0	7104412	<2.0	7104428	<2.0	7104412	<2.0	<2.0	2.0	7104428
Total Zinc (Zn)	ug/L	<5.0	7104412	<5.0	7104428	<5.0	7104412	<5.0	6.1	5.0	7104428

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch



**ELEMENTS BY ICP/MS (WATER)**

BV Labs ID		OJL966		OJL967		OJL968	OJL969		OJL970		
Sampling Date		2020/12/03		2020/12/03		2020/12/03	2020/12/03		2020/12/04		
COC Number		n/a		n/a		n/a	n/a		n/a		
	UNITS	BFR_SW20	QC Batch	BFR_SW21	QC Batch	BFR_SW22	BFR_SW23	QC Batch	BFR_SW24	RDL	QC Batch
<b>Metals</b>											
Total Aluminum (Al)	ug/L	210	7104428	230	7104412	110	240	7104428	190	5.0	7104723
Total Antimony (Sb)	ug/L	<1.0	7104428	<1.0	7104412	<1.0	<1.0	7104428	<1.0	1.0	7104723
Total Arsenic (As)	ug/L	<1.0	7104428	<1.0	7104412	<1.0	<1.0	7104428	<1.0	1.0	7104723
Total Barium (Ba)	ug/L	4.4	7104428	4.2	7104412	2.4	4.5	7104428	3.1	1.0	7104723
Total Beryllium (Be)	ug/L	<1.0	7104428	<1.0	7104412	<1.0	<1.0	7104428	<1.0	1.0	7104723
Total Bismuth (Bi)	ug/L	<2.0	7104428	<2.0	7104412	<2.0	<2.0	7104428	<2.0	2.0	7104723
Total Boron (B)	ug/L	<50	7104428	<50	7104412	<50	<50	7104428	<50	50	7104723
Total Cadmium (Cd)	ug/L	0.021	7104428	0.020	7104412	0.019	0.025	7104428	0.018	0.010	7104723
Total Calcium (Ca)	ug/L	890	7104428	940	7104412	370	810	7104428	780	100	7104723
Total Chromium (Cr)	ug/L	<1.0	7104428	<1.0	7104412	<1.0	<1.0	7104428	<1.0	1.0	7104723
Total Cobalt (Co)	ug/L	<0.40	7104428	<0.40	7104412	<0.40	<0.40	7104428	<0.40	0.40	7104723
Total Copper (Cu)	ug/L	<0.50	7104428	<0.50	7104412	<0.50	<0.50	7104428	<0.50	0.50	7104723
Total Iron (Fe)	ug/L	200	7104428	220	7104412	73	240	7104428	170	50	7104723
Total Lead (Pb)	ug/L	0.59	7104428	<0.50	7104412	<0.50	0.65	7104428	<0.50	0.50	7104723
Total Magnesium (Mg)	ug/L	860	7104428	940	7104412	750	830	7104428	760	100	7104723
Total Manganese (Mn)	ug/L	10	7104428	11	7104412	<2.0	11	7104428	7.2	2.0	7104723
Total Molybdenum (Mo)	ug/L	<2.0	7104428	<2.0	7104412	<2.0	<2.0	7104428	<2.0	2.0	7104723
Total Nickel (Ni)	ug/L	<2.0	7104428	<2.0	7104412	<2.0	<2.0	7104428	<2.0	2.0	7104723
Total Phosphorus (P)	ug/L	<100	7104428	<100	7104412	<100	<100	7104428	<100	100	7104723
Total Potassium (K)	ug/L	230	7104428	230	7104412	<100	290	7104428	220	100	7104723
Total Selenium (Se)	ug/L	<0.50	7104428	<0.50	7104412	<0.50	<0.50	7104428	<0.50	0.50	7104723
Total Silver (Ag)	ug/L	<0.10	7104428	<0.10	7104412	<0.10	<0.10	7104428	<0.10	0.10	7104723
Total Sodium (Na)	ug/L	5700	7104428	6200	7104412	5300	5300	7104428	5300	100	7104723
Total Strontium (Sr)	ug/L	7.1	7104428	7.5	7104412	5.4	6.7	7104428	6.2	2.0	7104723
Total Thallium (Tl)	ug/L	<0.10	7104428	<0.10	7104412	<0.10	<0.10	7104428	<0.10	0.10	7104723
Total Tin (Sn)	ug/L	<2.0	7104428	<2.0	7104412	<2.0	<2.0	7104428	<2.0	2.0	7104723
Total Titanium (Ti)	ug/L	4.2	7104428	4.0	7104412	<2.0	4.9	7104428	3.0	2.0	7104723
Total Uranium (U)	ug/L	<0.10	7104428	<0.10	7104412	<0.10	<0.10	7104428	<0.10	0.10	7104723
Total Vanadium (V)	ug/L	<2.0	7104428	<2.0	7104412	<2.0	<2.0	7104428	<2.0	2.0	7104723
Total Zinc (Zn)	ug/L	<5.0	7104428	<5.0	7104412	<5.0	<5.0	7104428	<5.0	5.0	7104723

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch



**ELEMENTS BY ICP/MS (WATER)**

BV Labs ID		OJL971	OJL972	OJL973	OJM004	OJM005		
Sampling Date		2020/12/04	2020/12/01	2020/12/02	2020/12/04	2020/12/04		
COC Number		n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SW25	BFR_SW_DUP1	BFR_SW_DUP2	BFR_SW4 (RCAP)	BFR_SW10 (RCAP)	RDL	QC Batch
<b>Metals</b>								
Total Aluminum (Al)	ug/L	190	170	250	160	210	5.0	7104428
Total Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7104428
Total Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7104428
Total Barium (Ba)	ug/L	2.6	2.2	2.3	2.4	2.3	1.0	7104428
Total Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7104428
Total Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7104428
Total Boron (B)	ug/L	<50	<50	<50	<50	<50	50	7104428
Total Cadmium (Cd)	ug/L	0.018	0.015	0.020	0.014	0.017	0.010	7104428
Total Calcium (Ca)	ug/L	480	430	820	510	780	100	7104428
Total Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7104428
Total Cobalt (Co)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7104428
Total Copper (Cu)	ug/L	<0.50	1.9	1.3	2.2	<0.50	0.50	7104428
Total Iron (Fe)	ug/L	140	140	300	140	260	50	7104428
Total Lead (Pb)	ug/L	0.57	8.3	2.6	8.6	0.69	0.50	7104428
Total Magnesium (Mg)	ug/L	700	690	610	720	720	100	7104428
Total Manganese (Mn)	ug/L	2.7	3.0	18	2.9	10	2.0	7104428
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7104428
Total Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7104428
Total Phosphorus (P)	ug/L	<100	<100	<100	<100	<100	100	7104428
Total Potassium (K)	ug/L	160	110	230	120	180	100	7104428
Total Selenium (Se)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7104428
Total Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7104428
Total Sodium (Na)	ug/L	5300	4700	4900	5200	5100	100	7104428
Total Strontium (Sr)	ug/L	5.8	4.9	5.5	5.7	6.1	2.0	7104428
Total Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7104428
Total Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7104428
Total Titanium (Ti)	ug/L	2.6	<2.0	5.2	2.6	2.5	2.0	7104428
Total Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7104428
Total Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7104428
Total Zinc (Zn)	ug/L	<5.0	5.9	<5.0	6.4	<5.0	5.0	7104428

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch



**ELEMENTS BY ICP/MS (WATER)**

BV Labs ID		OJM006		OJM007		
Sampling Date		2020/12/04		2020/12/04		
COC Number		n/a		n/a		
	UNITS	BFR_SW13 (RCAP)	QC Batch	BFR_SW16 (RCAP)	RDL	QC Batch
<b>Metals</b>						
Total Aluminum (Al)	ug/L	120	7104723	170	5.0	7104428
Total Antimony (Sb)	ug/L	<1.0	7104723	<1.0	1.0	7104428
Total Arsenic (As)	ug/L	<1.0	7104723	<1.0	1.0	7104428
Total Barium (Ba)	ug/L	1.9	7104723	2.1	1.0	7104428
Total Beryllium (Be)	ug/L	<1.0	7104723	<1.0	1.0	7104428
Total Bismuth (Bi)	ug/L	<2.0	7104723	<2.0	2.0	7104428
Total Boron (B)	ug/L	<50	7104723	<50	50	7104428
Total Cadmium (Cd)	ug/L	0.017	7104723	0.013	0.010	7104428
Total Calcium (Ca)	ug/L	450	7104723	470	100	7104428
Total Chromium (Cr)	ug/L	<1.0	7104723	<1.0	1.0	7104428
Total Cobalt (Co)	ug/L	<0.40	7104723	<0.40	0.40	7104428
Total Copper (Cu)	ug/L	<0.50	7104723	1.6	0.50	7104428
Total Iron (Fe)	ug/L	140	7104723	140	50	7104428
Total Lead (Pb)	ug/L	0.77	7104723	3.4	0.50	7104428
Total Magnesium (Mg)	ug/L	760	7104723	770	100	7104428
Total Manganese (Mn)	ug/L	2.3	7104723	2.8	2.0	7104428
Total Molybdenum (Mo)	ug/L	<2.0	7104723	<2.0	2.0	7104428
Total Nickel (Ni)	ug/L	<2.0	7104723	<2.0	2.0	7104428
Total Phosphorus (P)	ug/L	<100	7104723	<100	100	7104428
Total Potassium (K)	ug/L	150	7104723	110	100	7104428
Total Selenium (Se)	ug/L	<0.50	7104723	<0.50	0.50	7104428
Total Silver (Ag)	ug/L	<0.10	7104723	<0.10	0.10	7104428
Total Sodium (Na)	ug/L	5500	7104723	5400	100	7104428
Total Strontium (Sr)	ug/L	5.9	7104723	5.7	2.0	7104428
Total Thallium (Tl)	ug/L	<0.10	7104723	<0.10	0.10	7104428
Total Tin (Sn)	ug/L	<2.0	7104723	<2.0	2.0	7104428
Total Titanium (Ti)	ug/L	3.1	7104723	2.6	2.0	7104428
Total Uranium (U)	ug/L	<0.10	7104723	<0.10	0.10	7104428
Total Vanadium (V)	ug/L	<2.0	7104723	<2.0	2.0	7104428
Total Zinc (Zn)	ug/L	<5.0	7104723	6.9	5.0	7104428
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						



**SEMI-VOLATILE ORGANICS BY GC-MS (WATER)**

BV Labs ID		OJL947	OJL948	OJL949	OJL950	OJL951	OJL952	OJL953		
Sampling Date		2020/12/01	2020/12/01	2020/12/01	2020/12/01	2020/12/02	2020/12/01	2020/12/02		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4	BFR_SW5	BFR_SW6	BFR_SW7	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>										
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7102577
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7102577
Acenaphthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Acenaphthylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7102577
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Benzo(b/j)fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7102386
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Chrysene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Dibenzo(a,h)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Fluorene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Naphthalene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7102577
Perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Phenanthrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Quinoline	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7102577
<b>Surrogate Recovery (%)</b>										
D10-Anthracene	%	91	96	92	90	96	97	90		7102577
D14-Terphenyl	%	95 (1)	101 (1)	98 (1)	94 (1)	101	100 (1)	96		7102577
D8-Acenaphthylene	%	84	90	89	84	90	89	85		7102577
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) PAH sample analysed past recommended hold time as per client request.										



**SEMI-VOLATILE ORGANICS BY GC-MS (WATER)**

BV Labs ID		OJL954	OJL955	OJL956	OJL957	OJL958	OJL959	OJL960		
Sampling Date		2020/12/02	2020/12/02	2020/12/01	2020/12/01	2020/12/01	2020/12/02	2020/12/02		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SW8	BFR_SW9	BFR_SW10	BFR_SW11	BFR_SW12	BFR_SW13	BFR_SW14	RDL	QC Batch

Polyaromatic Hydrocarbons										
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7102577
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7102577
Acenaphthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Acenaphthylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7102577
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Benzo(b/j)fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7102386
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Chrysene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Dibenzo(a,h)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Fluorene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Naphthalene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7102577
Perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Phenanthrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7102577
Quinoline	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7102577

Surrogate Recovery (%)										
D10-Anthracene	%	100	93	93	91	91	93	93		7102577
D14-Terphenyl	%	104	96	96 (1)	92 (1)	90 (1)	98	93		7102577
D8-Acenaphthylene	%	92	88	90	89	88	88	87		7102577

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
(1) PAH sample analysed past recommended hold time as per client request.





**SEMI-VOLATILE ORGANICS BY GC-MS (WATER)**

BV Labs ID		OJL961	OJL962		OJL963			OJL963		
Sampling Date		2020/12/02	2020/12/01		2020/12/04			2020/12/04		
COC Number		n/a	n/a		n/a			n/a		
	UNITS	BFR_SW15	BFR_SW16	QC Batch	BFR_SW17	RDL	QC Batch	BFR_SW17 Lab-Dup	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>										
1-Methylnaphthalene	ug/L	<0.050	<0.050	7102577	<0.050	0.050	7104548	<0.050	0.050	7104548
2-Methylnaphthalene	ug/L	<0.050	<0.050	7102577	<0.050	0.050	7104548	<0.050	0.050	7104548
Acenaphthene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Acenaphthylene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Acridine	ug/L	<0.050	<0.050	7102577	<0.050	0.050	7104548	<0.050	0.050	7104548
Anthracene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Benzo(a)anthracene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Benzo(a)pyrene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Benzo(b/j)fluoranthene	ug/L	<0.020	<0.020	7102386	<0.020	0.020	7102386			
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Chrysene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Dibenzo(a,h)anthracene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Fluoranthene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Fluorene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Naphthalene	ug/L	<0.20	<0.20	7102577	<0.20	0.20	7104548	<0.20	0.20	7104548
Perylene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Phenanthrene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Pyrene	ug/L	<0.010	<0.010	7102577	<0.010	0.010	7104548	<0.010	0.010	7104548
Quinoline	ug/L	<0.050	<0.050	7102577	<0.050	0.050	7104548	<0.050	0.050	7104548
<b>Surrogate Recovery (%)</b>										
D10-Anthracene	%	94	88	7102577	83		7104548	72		7104548
D14-Terphenyl	%	98	95 (1)	7102577	87		7104548	83		7104548
D8-Acenaphthylene	%	89	85	7102577	83		7104548	79		7104548
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate (1) PAH sample analysed past recommended hold time as per client request.										



**SEMI-VOLATILE ORGANICS BY GC-MS (WATER)**

BV Labs ID		OJL964	OJL965		OJL966	OJL967	OJL968		
Sampling Date		2020/12/04	2020/12/04		2020/12/03	2020/12/03	2020/12/03		
COC Number		n/a	n/a		n/a	n/a	n/a		
	UNITS	BFR_SW18	BFR_SW19	QC Batch	BFR_SW20	BFR_SW21	BFR_SW22	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>									
1-Methylnaphthalene	ug/L	<0.050	<0.050	7104548	<0.050	<0.050	<0.050	0.050	7102577
2-Methylnaphthalene	ug/L	<0.050	<0.050	7104548	<0.050	<0.050	<0.050	0.050	7102577
Acenaphthene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Acenaphthylene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Acridine	ug/L	<0.050	<0.050	7104548	<0.050	<0.050	<0.050	0.050	7102577
Anthracene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Benzo(a)anthracene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Benzo(a)pyrene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Benzo(b/j)fluoranthene	ug/L	<0.020	<0.020	7102386	<0.020	<0.020	<0.020	0.020	7102386
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Chrysene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Dibenzo(a,h)anthracene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Fluoranthene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Fluorene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Naphthalene	ug/L	<0.20	<0.20	7104548	<0.20	<0.20	<0.20	0.20	7102577
Perylene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Phenanthrene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Pyrene	ug/L	<0.010	<0.010	7104548	<0.010	<0.010	<0.010	0.010	7102577
Quinoline	ug/L	<0.050	<0.050	7104548	<0.050	<0.050	<0.050	0.050	7102577
<b>Surrogate Recovery (%)</b>									
D10-Anthracene	%	65	82	7104548	87	80	82		7102577
D14-Terphenyl	%	73	85	7104548	88	79	88		7102577
D8-Acenaphthylene	%	73	81	7104548	89	84	83		7102577
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									



**SEMI-VOLATILE ORGANICS BY GC-MS (WATER)**

BV Labs ID		OJL968			OJL969		OJL970	OJL971	OJL972		
Sampling Date		2020/12/03			2020/12/03		2020/12/04	2020/12/04	2020/12/01		
COC Number		n/a			n/a		n/a	n/a	n/a		
	UNITS	BFR_SW22 Lab-Dup	RDL	QC Batch	BFR_SW23	QC Batch	BFR_SW24	BFR_SW25	BFR_SW_DUP1	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>											
1-Methylnaphthalene	ug/L	<0.050	0.050	7102577	<0.050	7102577	<0.050	<0.050	<0.050	0.050	7104548
2-Methylnaphthalene	ug/L	<0.050	0.050	7102577	<0.050	7102577	<0.050	<0.050	<0.050	0.050	7104548
Acenaphthene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Acenaphthylene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Acridine	ug/L	<0.050	0.050	7102577	<0.050	7102577	<0.050	<0.050	<0.050	0.050	7104548
Anthracene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Benzo(a)anthracene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Benzo(a)pyrene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Benzo(b)fluoranthene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Benzo(b/j)fluoranthene	ug/L				<0.020	7102386	<0.020	<0.020	<0.020	0.020	7102386
Benzo(g,h,i)perylene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Benzo(j)fluoranthene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Benzo(k)fluoranthene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Chrysene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Dibenzo(a,h)anthracene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Fluoranthene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Fluorene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Naphthalene	ug/L	<0.20	0.20	7102577	<0.20	7102577	<0.20	<0.20	<0.20	0.20	7104548
Perylene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Phenanthrene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Pyrene	ug/L	<0.010	0.010	7102577	<0.010	7102577	<0.010	<0.010	<0.010	0.010	7104548
Quinoline	ug/L	<0.050	0.050	7102577	<0.050	7102577	<0.050	<0.050	<0.050	0.050	7104548
<b>Surrogate Recovery (%)</b>											
D10-Anthracene	%	89		7102577	85	7102577	81	83	93		7104548
D14-Terphenyl	%	91		7102577	92	7102577	82	92	92 (1)		7104548
D8-Acenaphthylene	%	92		7102577	86	7102577	79	82	93		7104548
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate (1) PAH sample analysed past recommended hold time as per client request.											



**SEMI-VOLATILE ORGANICS BY GC-MS (WATER)**

BV Labs ID		OJL973		
Sampling Date		2020/12/02		
COC Number		n/a		
	UNITS	BFR_SW_DUP2	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>				
1-Methylnaphthalene	ug/L	<0.050	0.050	7104548
2-Methylnaphthalene	ug/L	<0.050	0.050	7104548
Acenaphthene	ug/L	<0.010	0.010	7104548
Acenaphthylene	ug/L	<0.010	0.010	7104548
Acridine	ug/L	<0.050	0.050	7104548
Anthracene	ug/L	<0.010	0.010	7104548
Benzo(a)anthracene	ug/L	<0.010	0.010	7104548
Benzo(a)pyrene	ug/L	<0.010	0.010	7104548
Benzo(b)fluoranthene	ug/L	<0.010	0.010	7104548
Benzo(b/j)fluoranthene	ug/L	<0.020	0.020	7102386
Benzo(g,h,i)perylene	ug/L	<0.010	0.010	7104548
Benzo(j)fluoranthene	ug/L	<0.010	0.010	7104548
Benzo(k)fluoranthene	ug/L	<0.010	0.010	7104548
Chrysene	ug/L	<0.010	0.010	7104548
Dibenzo(a,h)anthracene	ug/L	<0.010	0.010	7104548
Fluoranthene	ug/L	<0.010	0.010	7104548
Fluorene	ug/L	<0.010	0.010	7104548
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	0.010	7104548
Naphthalene	ug/L	<0.20	0.20	7104548
Perylene	ug/L	<0.010	0.010	7104548
Phenanthrene	ug/L	<0.010	0.010	7104548
Pyrene	ug/L	<0.010	0.010	7104548
Quinoline	ug/L	<0.050	0.050	7104548
<b>Surrogate Recovery (%)</b>				
D10-Anthracene	%	163 (1)		7104548
D14-Terphenyl	%	160 (1)		7104548
D8-Acenaphthylene	%	167 (1)		7104548
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) PAH surrogate(s) not within acceptance limits. Insufficient sample to repeat.				



BV Labs Job #: COW8766  
 Report Date: 2021/01/19

Golder Associates Ltd  
 Client Project #: 20439355  
 Site Location: BURGEO  
 Sampler Initials: MM

**ATLANTIC RBCA HYDROCARBONS (WATER)**

BV Labs ID		OJL947			OJL947			OJL948		
Sampling Date		2020/12/01			2020/12/01			2020/12/01		
COC Number		n/a			n/a			n/a		
	UNITS	BFR_SW1	RDL	QC Batch	BFR_SW1 Lab-Dup	RDL	QC Batch	BFR_SW2	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>										
Benzene	mg/L	<0.0010	0.0010	7104266				<0.0010	0.0010	7104266
Toluene	mg/L	<0.0010	0.0010	7104266				<0.0010	0.0010	7104266
Ethylbenzene	mg/L	<0.0010	0.0010	7104266				<0.0010	0.0010	7104266
Total Xylenes	mg/L	<0.0020	0.0020	7104266				<0.0020	0.0020	7104266
C6 - C10 (less BTEX)	mg/L	<0.090	0.090	7104266				<0.090	0.090	7104266
>C10-C16 Hydrocarbons	mg/L	<0.050	0.050	7104385	<0.050	0.050	7104385	<0.050	0.050	7104385
>C16-C21 Hydrocarbons	mg/L	<0.050	0.050	7104385	<0.050	0.050	7104385	<0.050	0.050	7104385
>C21-<C32 Hydrocarbons	mg/L	<0.090	0.090	7104385	<0.090	0.090	7104385	<0.090	0.090	7104385
Modified TPH (Tier1)	mg/L	<0.090	0.090	7102304				<0.090	0.090	7102304
Reached Baseline at C32	mg/L	NA	N/A	7104385				NA	N/A	7104385
Hydrocarbon Resemblance	mg/L	NA	N/A	7104385				NA	N/A	7104385
<b>Surrogate Recovery (%)</b>										
Isobutylbenzene - Extractable	%	94		7104385	98		7104385	97		7104385
n-Dotriacontane - Extractable	%	89		7104385	92		7104385	89		7104385
Isobutylbenzene - Volatile	%	99		7104266				99		7104266
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable										



BV Labs Job #: COW8766  
 Report Date: 2021/01/19

Golder Associates Ltd  
 Client Project #: 20439355  
 Site Location: BURGEO  
 Sampler Initials: MM

**ATLANTIC RBCA HYDROCARBONS (WATER)**

BV Labs ID		OJL949		OJL950		OJL951	OJL952	OJL953		
Sampling Date		2020/12/01		2020/12/01		2020/12/02	2020/12/01	2020/12/02		
COC Number		n/a		n/a		n/a	n/a	n/a		
	UNITS	BFR_SW3	QC Batch	BFR_SW4	QC Batch	BFR_SW5	BFR_SW6	BFR_SW7	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>										
Benzene	mg/L	<0.0010	7104266	<0.0010	7104266	<0.0010	<0.0010	<0.0010	0.0010	7104266
Toluene	mg/L	<0.0010	7104266	<0.0010	7104266	<0.0010	<0.0010	<0.0010	0.0010	7104266
Ethylbenzene	mg/L	<0.0010	7104266	<0.0010	7104266	<0.0010	<0.0010	<0.0010	0.0010	7104266
Total Xylenes	mg/L	<0.0020	7104266	<0.0020	7104266	<0.0020	<0.0020	<0.0020	0.0020	7104266
C6 - C10 (less BTEX)	mg/L	<0.090	7104266	<0.090	7104266	<0.090	<0.090	<0.090	0.090	7104266
>C10-C16 Hydrocarbons	mg/L	<0.050	7104381	<0.050	7104385	<0.050	<0.050	<0.050	0.050	7104852
>C16-C21 Hydrocarbons	mg/L	<0.050	7104381	<0.050	7104385	<0.050	<0.050	<0.050	0.050	7104852
>C21-<C32 Hydrocarbons	mg/L	<0.090	7104381	<0.090	7104385	<0.090	<0.090	<0.090	0.090	7104852
Modified TPH (Tier1)	mg/L	<0.090	7102304	<0.090	7102304	<0.090	<0.090	<0.090	0.090	7102304
Reached Baseline at C32	mg/L	NA	7104381	NA	7104385	NA	NA	NA	N/A	7104852
Hydrocarbon Resemblance	mg/L	NA	7104381	NA	7104385	NA	NA	NA	N/A	7104852
<b>Surrogate Recovery (%)</b>										
Isobutylbenzene - Extractable	%	98	7104381	95	7104385	98	103	104		7104852
n-Dotriacontane - Extractable	%	105	7104381	89	7104385	109	112	121		7104852
Isobutylbenzene - Volatile	%	99	7104266	99	7104266	100	100	99		7104266
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable										



BV Labs Job #: COW8766  
 Report Date: 2021/01/19

Golder Associates Ltd  
 Client Project #: 20439355  
 Site Location: BURGEO  
 Sampler Initials: MM

### ATLANTIC RBCA HYDROCARBONS (WATER)

BV Labs ID		OJL954			OJL954			OJL955		
Sampling Date		2020/12/02			2020/12/02			2020/12/02		
COC Number		n/a			n/a			n/a		
	UNITS	BFR_SW8	RDL	QC Batch	BFR_SW8 Lab-Dup	RDL	QC Batch	BFR_SW9	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>										
Benzene	mg/L	<0.0010	0.0010	7104267	<0.0010	0.0010	7104267	<0.0010	0.0010	7104267
Toluene	mg/L	<0.0010	0.0010	7104267	<0.0010	0.0010	7104267	<0.0010	0.0010	7104267
Ethylbenzene	mg/L	<0.0010	0.0010	7104267	<0.0010	0.0010	7104267	<0.0010	0.0010	7104267
Total Xylenes	mg/L	<0.0020	0.0020	7104267	<0.0020	0.0020	7104267	<0.0020	0.0020	7104267
C6 - C10 (less BTEX)	mg/L	<0.090	0.090	7104267	<0.090	0.090	7104267	<0.090	0.090	7104267
>C10-C16 Hydrocarbons	mg/L	<0.050	0.050	7104385				<0.050	0.050	7104385
>C16-C21 Hydrocarbons	mg/L	<0.050	0.050	7104385				<0.050	0.050	7104385
>C21-<C32 Hydrocarbons	mg/L	<0.090	0.090	7104385				<0.090	0.090	7104385
Modified TPH (Tier1)	mg/L	<0.090	0.090	7102304				<0.090	0.090	7102304
Reached Baseline at C32	mg/L	NA	N/A	7104385				NA	N/A	7104385
Hydrocarbon Resemblance	mg/L	NA	N/A	7104385				NA	N/A	7104385
<b>Surrogate Recovery (%)</b>										
Isobutylbenzene - Extractable	%	93		7104385				96		7104385
n-Dotriacontane - Extractable	%	87		7104385				90		7104385
Isobutylbenzene - Volatile	%	110		7104267	111		7104267	111		7104267
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable										



**ATLANTIC RBCA HYDROCARBONS (WATER)**

BV Labs ID		OJL956	OJL957	OJL958		OJL959	OJL960		
Sampling Date		2020/12/01	2020/12/01	2020/12/01		2020/12/02	2020/12/02		
COC Number		n/a	n/a	n/a		n/a	n/a		
	UNITS	BFR_SW10	BFR_SW11	BFR_SW12	QC Batch	BFR_SW13	BFR_SW14	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>									
Benzene	mg/L	<0.0010	<0.0010	<0.0010	7104267	<0.0010	<0.0010	0.0010	7104267
Toluene	mg/L	<0.0010	<0.0010	<0.0010	7104267	<0.0010	<0.0010	0.0010	7104267
Ethylbenzene	mg/L	<0.0010	<0.0010	<0.0010	7104267	<0.0010	<0.0010	0.0010	7104267
Total Xylenes	mg/L	<0.0020	<0.0020	<0.0020	7104267	<0.0020	<0.0020	0.0020	7104267
C6 - C10 (less BTEX)	mg/L	<0.090	<0.090	<0.090	7104267	<0.090	<0.090	0.090	7104267
>C10-C16 Hydrocarbons	mg/L	<0.050	<0.050	<0.050	7104852	<0.050	<0.050	0.050	7104385
>C16-C21 Hydrocarbons	mg/L	<0.050	<0.050	<0.050	7104852	<0.050	<0.050	0.050	7104385
>C21-<C32 Hydrocarbons	mg/L	<0.090	<0.090	<0.090	7104852	<0.090	<0.090	0.090	7104385
Modified TPH (Tier1)	mg/L	<0.090	<0.090	<0.090	7102304	<0.090	<0.090	0.090	7102304
Reached Baseline at C32	mg/L	NA	NA	NA	7104852	NA	NA	N/A	7104385
Hydrocarbon Resemblance	mg/L	NA	NA	NA	7104852	NA	NA	N/A	7104385
<b>Surrogate Recovery (%)</b>									
Isobutylbenzene - Extractable	%	103	99	98	7104852	94	97		7104385
n-Dotriacontane - Extractable	%	111	117	97	7104852	88	90		7104385
Isobutylbenzene - Volatile	%	113	112	110	7104267	110	108		7104267
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable									





**ATLANTIC RBCA HYDROCARBONS (WATER)**

BV Labs ID		OJL961	OJL962	OJL963	OJL964	OJL965	OJL966		
Sampling Date		2020/12/02	2020/12/01	2020/12/04	2020/12/04	2020/12/04	2020/12/03		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SW15	BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19	BFR_SW20	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>									
Benzene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7104267
Toluene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7104267
Ethylbenzene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7104267
Total Xylenes	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	7104267
C6 - C10 (less BTEX)	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	0.090	7104267
>C10-C16 Hydrocarbons	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7104385
>C16-C21 Hydrocarbons	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7104385
>C21-<C32 Hydrocarbons	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	0.090	7104385
Modified TPH (Tier1)	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	0.090	7102304
Reached Baseline at C32	mg/L	NA	NA	NA	NA	NA	NA	N/A	7104385
Hydrocarbon Resemblance	mg/L	NA	NA	NA	NA	NA	NA	N/A	7104385
<b>Surrogate Recovery (%)</b>									
Isobutylbenzene - Extractable	%	96	94	95	97	97	96		7104385
n-Dotriacontane - Extractable	%	90	90	90	91	93	90		7104385
Isobutylbenzene - Volatile	%	110	109	109	111	111	109		7104267
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable									



**ATLANTIC RBCA HYDROCARBONS (WATER)**

BV Labs ID		OJL967	OJL968	OJL969	OJL970	OJL971	OJL972		
Sampling Date		2020/12/03	2020/12/03	2020/12/03	2020/12/04	2020/12/04	2020/12/01		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	BFR_SW25	BFR_SW_DUP1	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>									
Benzene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7104267
Toluene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7104267
Ethylbenzene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7104267
Total Xylenes	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	7104267
C6 - C10 (less BTEX)	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	0.090	7104267
>C10-C16 Hydrocarbons	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7104385
>C16-C21 Hydrocarbons	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7104385
>C21-<C32 Hydrocarbons	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	0.090	7104385
Modified TPH (Tier1)	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	0.090	7102304
Reached Baseline at C32	mg/L	NA	NA	NA	NA	NA	NA	N/A	7104385
Hydrocarbon Resemblance	mg/L	NA	NA	NA	NA	NA	NA	N/A	7104385
<b>Surrogate Recovery (%)</b>									
Isobutylbenzene - Extractable	%	95	95	95	100	97	97		7104385
n-Dotriacontane - Extractable	%	90	92	91	95	91	94		7104385
Isobutylbenzene - Volatile	%	107	109	108	109	109	112		7104267
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable									



**ATLANTIC RBCA HYDROCARBONS (WATER)**

<b>BV Labs ID</b>		OJL973		
<b>Sampling Date</b>		2020/12/02		
<b>COC Number</b>		n/a		
	<b>UNITS</b>	<b>BFR_SW_DUP2</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Petroleum Hydrocarbons</b>				
Benzene	mg/L	<0.0010	0.0010	7104267
Toluene	mg/L	<0.0010	0.0010	7104267
Ethylbenzene	mg/L	<0.0010	0.0010	7104267
Total Xylenes	mg/L	<0.0020	0.0020	7104267
C6 - C10 (less BTEX)	mg/L	<0.090	0.090	7104267
>C10-C16 Hydrocarbons	mg/L	<0.050	0.050	7104385
>C16-C21 Hydrocarbons	mg/L	<0.050	0.050	7104385
>C21-<C32 Hydrocarbons	mg/L	<0.090	0.090	7104385
Modified TPH (Tier1)	mg/L	<0.090	0.090	7102304
Reached Baseline at C32	mg/L	NA	N/A	7104385
Hydrocarbon Resemblance	mg/L	NA	N/A	7104385
<b>Surrogate Recovery (%)</b>				
Isobutylbenzene - Extractable	%	94		7104385
n-Dotriacontane - Extractable	%	90		7104385
Isobutylbenzene - Volatile	%	112		7104267
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable				



### GENERAL COMMENTS

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

Package 1	2.3°C
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RCAp and metals results are from bottles collected on different days/times for samples OJM004, OJM005, OJM006 and OJM007. 2020/12/11 MMC

PAH samples collected on December 1st received at the Bedford lab past hold time. 2020/12/11 MMC

Revised Report: Re-issue report to lower ethylbenzene RDL as requested by Belinda Culgin. 2020/12/18 MMC

Revised Report: Silica gel clean-up added to samples OJL923-930, OJL932-44, OJL946, OJL974-980, OJL982, OJL984-89, OJL994-999 and OJM000 and TEH (C11-C32) and modified TPH re-run from silica gel cleaned sample aliquots as requested by Shihan Chowdhury. 2021/01/08 MMC

Revised Report: Benzene RDL lowered to 0.025 for all samples as requested by Belinda Culgin. 2021/01/19 MMC

Sample OJL951 [BFR\_SW5] : NOX < NO2 : Both values fall within the method uncertainty for duplicates and are likely equivalent.

Sample OJL953 [BFR\_SW7] : NOX < NO2 : Both values fall within the method uncertainty for duplicates and are likely equivalent.

Sample OJL963 [BFR\_SW17] : NOX < NO2 : Both values fall within the method uncertainty for duplicates and are likely equivalent. RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample OJL965 [BFR\_SW19] : NOX < NO2 : Both values fall within the method uncertainty for duplicates and are likely equivalent. RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample OJL967 [BFR\_SW21] : NOX < NO2 : Both values fall within the method uncertainty for duplicates and are likely equivalent.

Sample OJL969 [BFR\_SW23] : NOX < NO2 : Both values fall within the method uncertainty for duplicates and are likely equivalent. RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample OJL970 [BFR\_SW24] : NOX < NO2 : Both values fall within the method uncertainty for duplicates and are likely equivalent. RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample OJL972 [BFR\_SW\_DUP1] : NOX < NO2 : Both values fall within the method uncertainty for duplicates and are likely equivalent. RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample OJL973 [BFR\_SW\_DUP2] : NOX < NO2 : Both values fall within the method uncertainty for duplicates and are likely equivalent.

Sample OJM004 [BFR\_SW4 (RCAP)] : NOX < NO2 : Both values fall within the method uncertainty for duplicates and are likely equivalent. RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample OJM007 [BFR\_SW16 (RCAP)] : NOX < NO2 : Both values fall within the method uncertainty for duplicates and are likely equivalent. RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

**Results relate only to the items tested.**



BV Labs Job #: COW8766  
 Report Date: 2021/01/19

Golder Associates Ltd  
 Client Project #: 20439355  
 Site Location: BURGEO  
 Sampler Initials: MM

### QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits		
7102577	LGE	Matrix Spike [OJL969-05]	Benzo(j)fluoranthene	2020/12/13		83	%	50 - 130			
			D10-Anthracene	2020/12/13		82	%	50 - 130			
			D14-Terphenyl	2020/12/13		85	%	50 - 130			
			D8-Acenaphthylene	2020/12/13		87	%	50 - 130			
			1-Methylnaphthalene	2020/12/13		79	%	50 - 130			
			2-Methylnaphthalene	2020/12/13		83	%	50 - 130			
			Acenaphthene	2020/12/13		83	%	50 - 130			
			Acenaphthylene	2020/12/13		83	%	50 - 130			
			Acridine	2020/12/13		103	%	50 - 130			
			Anthracene	2020/12/13		87	%	50 - 130			
			Benzo(a)anthracene	2020/12/13		97	%	50 - 130			
			Benzo(a)pyrene	2020/12/13		76	%	50 - 130			
			Benzo(b)fluoranthene	2020/12/13		80	%	50 - 130			
			Benzo(g,h,i)perylene	2020/12/13		59	%	50 - 130			
			Benzo(k)fluoranthene	2020/12/13		77	%	50 - 130			
			Chrysene	2020/12/13		101	%	50 - 130			
			Dibenzo(a,h)anthracene	2020/12/13		57	%	50 - 130			
			Fluoranthene	2020/12/13		97	%	50 - 130			
			Fluorene	2020/12/13		90	%	50 - 130			
			Indeno(1,2,3-cd)pyrene	2020/12/13		59	%	50 - 130			
			Naphthalene	2020/12/13		83	%	50 - 130			
			Perylene	2020/12/13		79	%	50 - 130			
			Phenanthrene	2020/12/13		93	%	50 - 130			
			Pyrene	2020/12/13		99	%	50 - 130			
			Quinoline	2020/12/13		66	%	50 - 130			
			7102577	LGE	Spiked Blank	Benzo(j)fluoranthene	2020/12/13		98	%	50 - 130
						D10-Anthracene	2020/12/13		89	%	50 - 130
						D14-Terphenyl	2020/12/13		90	%	50 - 130
						D8-Acenaphthylene	2020/12/13		93	%	50 - 130
						1-Methylnaphthalene	2020/12/13		89	%	50 - 130
						2-Methylnaphthalene	2020/12/13		92	%	50 - 130
Acenaphthene	2020/12/13					94	%	50 - 130			
Acenaphthylene	2020/12/13					92	%	50 - 130			
Acridine	2020/12/13					109	%	50 - 130			
Anthracene	2020/12/13					96	%	50 - 130			
Benzo(a)anthracene	2020/12/13					105	%	50 - 130			
Benzo(a)pyrene	2020/12/13					92	%	50 - 130			
Benzo(b)fluoranthene	2020/12/13					96	%	50 - 130			
Benzo(g,h,i)perylene	2020/12/13					90	%	50 - 130			
Benzo(k)fluoranthene	2020/12/13					98	%	50 - 130			
Chrysene	2020/12/13					109	%	50 - 130			
Dibenzo(a,h)anthracene	2020/12/13					86	%	50 - 130			
Fluoranthene	2020/12/13					104	%	50 - 130			
Fluorene	2020/12/13					101	%	50 - 130			
Indeno(1,2,3-cd)pyrene	2020/12/13					89	%	50 - 130			
Naphthalene	2020/12/13					90	%	50 - 130			
Perylene	2020/12/13					97	%	50 - 130			
Phenanthrene	2020/12/13					108	%	50 - 130			
Pyrene	2020/12/13					105	%	50 - 130			
Quinoline	2020/12/13					88	%	50 - 130			
7102577	LGE	Method Blank				Benzo(j)fluoranthene	2020/12/13	<0.010		ug/L	
						D10-Anthracene	2020/12/13		93	%	50 - 130
						D14-Terphenyl	2020/12/13		92	%	50 - 130



BV Labs Job #: COW8766  
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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			D8-Acenaphthylene	2020/12/13		92	%	50 - 130
			1-Methylnaphthalene	2020/12/13	<0.050		ug/L	
			2-Methylnaphthalene	2020/12/13	<0.050		ug/L	
			Acenaphthene	2020/12/13	<0.010		ug/L	
			Acenaphthylene	2020/12/13	<0.010		ug/L	
			Acridine	2020/12/13	<0.050		ug/L	
			Anthracene	2020/12/13	<0.010		ug/L	
			Benzo(a)anthracene	2020/12/13	<0.010		ug/L	
			Benzo(a)pyrene	2020/12/13	<0.010		ug/L	
			Benzo(b)fluoranthene	2020/12/13	<0.010		ug/L	
			Benzo(g,h,i)perylene	2020/12/13	<0.010		ug/L	
			Benzo(k)fluoranthene	2020/12/13	<0.010		ug/L	
			Chrysene	2020/12/13	<0.010		ug/L	
			Dibenzo(a,h)anthracene	2020/12/13	<0.010		ug/L	
			Fluoranthene	2020/12/13	<0.010		ug/L	
			Fluorene	2020/12/13	<0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2020/12/13	<0.010		ug/L	
			Naphthalene	2020/12/13	<0.20		ug/L	
			Perylene	2020/12/13	<0.010		ug/L	
			Phenanthrene	2020/12/13	<0.010		ug/L	
			Pyrene	2020/12/13	<0.010		ug/L	
			Quinoline	2020/12/13	<0.050		ug/L	
7102577	LGE	RPD [OJL968-05]	Benzo(j)fluoranthene	2020/12/13	NC		%	40
			1-Methylnaphthalene	2020/12/13	NC		%	40
			2-Methylnaphthalene	2020/12/13	NC		%	40
			Acenaphthene	2020/12/13	NC		%	40
			Acenaphthylene	2020/12/13	NC		%	40
			Acridine	2020/12/13	NC		%	40
			Anthracene	2020/12/13	NC		%	40
			Benzo(a)anthracene	2020/12/13	NC		%	40
			Benzo(a)pyrene	2020/12/13	NC		%	40
			Benzo(b)fluoranthene	2020/12/13	NC		%	40
			Benzo(g,h,i)perylene	2020/12/13	NC		%	40
			Benzo(k)fluoranthene	2020/12/13	NC		%	40
			Chrysene	2020/12/13	NC		%	40
			Dibenzo(a,h)anthracene	2020/12/13	NC		%	40
			Fluoranthene	2020/12/13	NC		%	40
			Fluorene	2020/12/13	NC		%	40
			Indeno(1,2,3-cd)pyrene	2020/12/13	NC		%	40
			Naphthalene	2020/12/13	NC		%	40
			Perylene	2020/12/13	NC		%	40
			Phenanthrene	2020/12/13	NC		%	40
			Pyrene	2020/12/13	NC		%	40
			Quinoline	2020/12/13	NC		%	40
7104266	THL	Matrix Spike [OJL947-04]	Isobutylbenzene - Volatile	2020/12/11		100	%	70 - 130
			Benzene	2020/12/11		103	%	70 - 130
			Toluene	2020/12/11		97	%	70 - 130
			Ethylbenzene	2020/12/11		100	%	70 - 130
			Total Xylenes	2020/12/11		105	%	70 - 130
7104266	THL	Spiked Blank	Isobutylbenzene - Volatile	2020/12/11		101	%	70 - 130
			Benzene	2020/12/11		97	%	70 - 130
			Toluene	2020/12/11		96	%	70 - 130
			Ethylbenzene	2020/12/11		100	%	70 - 130



BV Labs Job #: COW8766  
 Report Date: 2021/01/19

Golder Associates Ltd  
 Client Project #: 20439355  
 Site Location: BURGEO  
 Sampler Initials: MM

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7104266	THL	Method Blank	Total Xylenes	2020/12/11		105	%	70 - 130
			Isobutylbenzene - Volatile	2020/12/11		100	%	70 - 130
			Benzene	2020/12/11	<0.0010		mg/L	
			Toluene	2020/12/11	<0.0010		mg/L	
			Ethylbenzene	2020/12/11	<0.0010		mg/L	
			Total Xylenes	2020/12/11	<0.0020		mg/L	
7104266	THL	RPD	C6 - C10 (less BTEX)	2020/12/11	<0.090		mg/L	
			Benzene	2020/12/11	NC		%	40
			Toluene	2020/12/11	NC		%	40
			Ethylbenzene	2020/12/11	NC		%	40
			Total Xylenes	2020/12/11	NC		%	40
			C6 - C10 (less BTEX)	2020/12/11	NC		%	40
7104267	THL	Matrix Spike [OJL955-04]	Isobutylbenzene - Volatile	2020/12/11		108	%	70 - 130
			Benzene	2020/12/11		104	%	70 - 130
			Toluene	2020/12/11		98	%	70 - 130
			Ethylbenzene	2020/12/11		97	%	70 - 130
			Total Xylenes	2020/12/11		99	%	70 - 130
			Isobutylbenzene - Volatile	2020/12/11		108	%	70 - 130
7104267	THL	Spiked Blank	Benzene	2020/12/11		97	%	70 - 130
			Toluene	2020/12/11		97	%	70 - 130
			Ethylbenzene	2020/12/11		98	%	70 - 130
			Total Xylenes	2020/12/11		96	%	70 - 130
			Isobutylbenzene - Volatile	2020/12/11		112	%	70 - 130
			Benzene	2020/12/11	<0.0010		mg/L	
7104267	THL	Method Blank	Toluene	2020/12/11	<0.0010		mg/L	
			Ethylbenzene	2020/12/11	<0.0010		mg/L	
			Total Xylenes	2020/12/11	<0.0020		mg/L	
			C6 - C10 (less BTEX)	2020/12/11	<0.090		mg/L	
			Benzene	2020/12/11	NC		%	40
			Toluene	2020/12/11	NC		%	40
7104267	THL	RPD [OJL954-04]	Ethylbenzene	2020/12/11	NC		%	40
			Total Xylenes	2020/12/11	NC		%	40
			C6 - C10 (less BTEX)	2020/12/11	NC		%	40
			Moisture	2020/12/14	0		%	25
			Isobutylbenzene - Extractable	2020/12/11		92	%	70 - 130
			n-Dotriacontane - Extractable	2020/12/11		98	%	70 - 130
7104381	BCD	Matrix Spike	>C10-C16 Hydrocarbons	2020/12/11		82	%	70 - 130
			>C16-C21 Hydrocarbons	2020/12/11		80	%	70 - 130
			>C21-<C32 Hydrocarbons	2020/12/11		75	%	70 - 130
			Isobutylbenzene - Extractable	2020/12/11		107	%	70 - 130
			n-Dotriacontane - Extractable	2020/12/11		114	%	70 - 130
			>C10-C16 Hydrocarbons	2020/12/11		103	%	70 - 130
7104381	BCD	Spiked Blank	>C16-C21 Hydrocarbons	2020/12/11		99	%	70 - 130
			>C21-<C32 Hydrocarbons	2020/12/11		94	%	70 - 130
			Isobutylbenzene - Extractable	2020/12/11		98	%	70 - 130
			n-Dotriacontane - Extractable	2020/12/11		113	%	70 - 130
			>C10-C16 Hydrocarbons	2020/12/11	<0.050		mg/L	
			>C16-C21 Hydrocarbons	2020/12/11	<0.050		mg/L	
7104381	BCD	Method Blank	>C21-<C32 Hydrocarbons	2020/12/11	<0.090		mg/L	
			>C10-C16 Hydrocarbons	2020/12/11	NC		%	40
			>C16-C21 Hydrocarbons	2020/12/11	NC		%	40
			>C21-<C32 Hydrocarbons	2020/12/11	NC		%	40
			Isobutylbenzene - Extractable	2020/12/11		93	%	70 - 130
			Isobutylbenzene - Extractable	2020/12/11		93	%	70 - 130



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits			
7104385	BCD	Spiked Blank	n-Dotriacontane - Extractable	2020/12/11		85	%	70 - 130			
			>C10-C16 Hydrocarbons	2020/12/11		70	%	70 - 130			
			>C16-C21 Hydrocarbons	2020/12/11		71	%	70 - 130			
			>C21-<C32 Hydrocarbons	2020/12/11		68 (1)	%	70 - 130			
			Isobutylbenzene - Extractable	2020/12/11		102	%	70 - 130			
			n-Dotriacontane - Extractable	2020/12/11		93	%	70 - 130			
			>C10-C16 Hydrocarbons	2020/12/11		97	%	70 - 130			
7104385	BCD	Method Blank	>C16-C21 Hydrocarbons	2020/12/11		100	%	70 - 130			
			>C21-<C32 Hydrocarbons	2020/12/11		97	%	70 - 130			
			Isobutylbenzene - Extractable	2020/12/11		96	%	70 - 130			
			n-Dotriacontane - Extractable	2020/12/11		92	%	70 - 130			
			>C10-C16 Hydrocarbons	2020/12/11	<0.050		mg/L				
			>C16-C21 Hydrocarbons	2020/12/11	<0.050		mg/L				
			>C21-<C32 Hydrocarbons	2020/12/11	<0.090		mg/L				
7104385	BCD	RPD [OJL947-03]	>C10-C16 Hydrocarbons	2020/12/11	NC		%	40			
			>C16-C21 Hydrocarbons	2020/12/11	NC		%	40			
			>C21-<C32 Hydrocarbons	2020/12/11	NC		%	40			
7104409	KKE	RPD [OJL941-01]	Moisture	2020/12/14	4.6		%	25			
7104412	MLB	Matrix Spike	Total Aluminum (Al)	2020/12/12		101	%	80 - 120			
			Total Antimony (Sb)	2020/12/12		103	%	80 - 120			
			Total Arsenic (As)	2020/12/12		96	%	80 - 120			
			Total Barium (Ba)	2020/12/12		99	%	80 - 120			
			Total Beryllium (Be)	2020/12/12		101	%	80 - 120			
			Total Bismuth (Bi)	2020/12/12		100	%	80 - 120			
			Total Boron (B)	2020/12/12		100	%	80 - 120			
			Total Cadmium (Cd)	2020/12/12		98	%	80 - 120			
			Total Calcium (Ca)	2020/12/12		102	%	80 - 120			
			Total Chromium (Cr)	2020/12/12		99	%	80 - 120			
			Total Cobalt (Co)	2020/12/12		98	%	80 - 120			
			Total Copper (Cu)	2020/12/12		95	%	80 - 120			
			Total Iron (Fe)	2020/12/12		109	%	80 - 120			
			Total Lead (Pb)	2020/12/12		99	%	80 - 120			
			Total Magnesium (Mg)	2020/12/12		107	%	80 - 120			
			Total Manganese (Mn)	2020/12/12		101	%	80 - 120			
			Total Molybdenum (Mo)	2020/12/12		104	%	80 - 120			
			Total Nickel (Ni)	2020/12/12		97	%	80 - 120			
			Total Phosphorus (P)	2020/12/12		105	%	80 - 120			
			Total Potassium (K)	2020/12/12		97	%	80 - 120			
			Total Selenium (Se)	2020/12/12		97	%	80 - 120			
			Total Silver (Ag)	2020/12/12		100	%	80 - 120			
			Total Sodium (Na)	2020/12/12		99	%	80 - 120			
			Total Strontium (Sr)	2020/12/12		101	%	80 - 120			
			Total Thallium (Tl)	2020/12/12		101	%	80 - 120			
			Total Tin (Sn)	2020/12/12		102	%	80 - 120			
			Total Titanium (Ti)	2020/12/12		102	%	80 - 120			
			Total Uranium (U)	2020/12/12		106	%	80 - 120			
			Total Vanadium (V)	2020/12/12		101	%	80 - 120			
			Total Zinc (Zn)	2020/12/12		100	%	80 - 120			
			7104412	MLB	Spiked Blank	Total Aluminum (Al)	2020/12/12		101	%	80 - 120
						Total Antimony (Sb)	2020/12/12		102	%	80 - 120
						Total Arsenic (As)	2020/12/12		96	%	80 - 120
Total Barium (Ba)	2020/12/12					100	%	80 - 120			
Total Beryllium (Be)	2020/12/12					100	%	80 - 120			





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BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Bismuth (Bi)	2020/12/12		99	%	80 - 120
			Total Boron (B)	2020/12/12		97	%	80 - 120
			Total Cadmium (Cd)	2020/12/12		97	%	80 - 120
			Total Calcium (Ca)	2020/12/12		99	%	80 - 120
			Total Chromium (Cr)	2020/12/12		97	%	80 - 120
			Total Cobalt (Co)	2020/12/12		97	%	80 - 120
			Total Copper (Cu)	2020/12/12		96	%	80 - 120
			Total Iron (Fe)	2020/12/12		103	%	80 - 120
			Total Lead (Pb)	2020/12/12		98	%	80 - 120
			Total Magnesium (Mg)	2020/12/12		106	%	80 - 120
			Total Manganese (Mn)	2020/12/12		99	%	80 - 120
			Total Molybdenum (Mo)	2020/12/12		102	%	80 - 120
			Total Nickel (Ni)	2020/12/12		99	%	80 - 120
			Total Phosphorus (P)	2020/12/12		103	%	80 - 120
			Total Potassium (K)	2020/12/12		97	%	80 - 120
			Total Selenium (Se)	2020/12/12		98	%	80 - 120
			Total Silver (Ag)	2020/12/12		99	%	80 - 120
			Total Sodium (Na)	2020/12/12		98	%	80 - 120
			Total Strontium (Sr)	2020/12/12		99	%	80 - 120
			Total Thallium (Tl)	2020/12/12		99	%	80 - 120
			Total Tin (Sn)	2020/12/12		100	%	80 - 120
			Total Titanium (Ti)	2020/12/12		99	%	80 - 120
			Total Uranium (U)	2020/12/12		106	%	80 - 120
			Total Vanadium (V)	2020/12/12		102	%	80 - 120
			Total Zinc (Zn)	2020/12/12		99	%	80 - 120
7104412	MLB	Method Blank	Total Aluminum (Al)	2020/12/12	<5.0		ug/L	
			Total Antimony (Sb)	2020/12/12	<1.0		ug/L	
			Total Arsenic (As)	2020/12/12	<1.0		ug/L	
			Total Barium (Ba)	2020/12/12	<1.0		ug/L	
			Total Beryllium (Be)	2020/12/12	<1.0		ug/L	
			Total Bismuth (Bi)	2020/12/12	<2.0		ug/L	
			Total Boron (B)	2020/12/12	<50		ug/L	
			Total Cadmium (Cd)	2020/12/12	<0.010		ug/L	
			Total Calcium (Ca)	2020/12/12	<100		ug/L	
			Total Chromium (Cr)	2020/12/12	<1.0		ug/L	
			Total Cobalt (Co)	2020/12/12	<0.40		ug/L	
			Total Copper (Cu)	2020/12/12	<0.50		ug/L	
			Total Iron (Fe)	2020/12/12	<50		ug/L	
			Total Lead (Pb)	2020/12/12	<0.50		ug/L	
			Total Magnesium (Mg)	2020/12/12	<100		ug/L	
			Total Manganese (Mn)	2020/12/12	<2.0		ug/L	
			Total Molybdenum (Mo)	2020/12/12	<2.0		ug/L	
			Total Nickel (Ni)	2020/12/12	<2.0		ug/L	
			Total Phosphorus (P)	2020/12/12	<100		ug/L	
			Total Potassium (K)	2020/12/12	<100		ug/L	
			Total Selenium (Se)	2020/12/12	<0.50		ug/L	
			Total Silver (Ag)	2020/12/12	<0.10		ug/L	
			Total Sodium (Na)	2020/12/12	<100		ug/L	
			Total Strontium (Sr)	2020/12/12	<2.0		ug/L	
			Total Thallium (Tl)	2020/12/12	<0.10		ug/L	
			Total Tin (Sn)	2020/12/12	<2.0		ug/L	
			Total Titanium (Ti)	2020/12/12	<2.0		ug/L	
			Total Uranium (U)	2020/12/12	<0.10		ug/L	



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Vanadium (V)	2020/12/12	<2.0		ug/L	
			Total Zinc (Zn)	2020/12/12	<5.0		ug/L	
7104412	MLB	RPD	Total Aluminum (Al)	2020/12/12	0.48		%	20
7104428	MLB	Matrix Spike	Total Aluminum (Al)	2020/12/12		100	%	80 - 120
			Total Antimony (Sb)	2020/12/12		102	%	80 - 120
			Total Arsenic (As)	2020/12/12		94	%	80 - 120
			Total Barium (Ba)	2020/12/12		98	%	80 - 120
			Total Beryllium (Be)	2020/12/12		101	%	80 - 120
			Total Bismuth (Bi)	2020/12/12		98	%	80 - 120
			Total Boron (B)	2020/12/12		99	%	80 - 120
			Total Cadmium (Cd)	2020/12/12		97	%	80 - 120
			Total Calcium (Ca)	2020/12/12		NC	%	80 - 120
			Total Chromium (Cr)	2020/12/12		95	%	80 - 120
			Total Cobalt (Co)	2020/12/12		95	%	80 - 120
			Total Copper (Cu)	2020/12/12		93	%	80 - 120
			Total Iron (Fe)	2020/12/12		NC	%	80 - 120
			Total Lead (Pb)	2020/12/12		97	%	80 - 120
			Total Magnesium (Mg)	2020/12/12		102	%	80 - 120
			Total Manganese (Mn)	2020/12/12		NC	%	80 - 120
			Total Molybdenum (Mo)	2020/12/12		108	%	80 - 120
			Total Nickel (Ni)	2020/12/12		94	%	80 - 120
			Total Phosphorus (P)	2020/12/12		101	%	80 - 120
			Total Potassium (K)	2020/12/12		96	%	80 - 120
			Total Selenium (Se)	2020/12/12		99	%	80 - 120
			Total Silver (Ag)	2020/12/12		98	%	80 - 120
			Total Sodium (Na)	2020/12/12		NC	%	80 - 120
			Total Strontium (Sr)	2020/12/12		97	%	80 - 120
			Total Thallium (Tl)	2020/12/12		99	%	80 - 120
			Total Tin (Sn)	2020/12/12		102	%	80 - 120
			Total Titanium (Ti)	2020/12/12		98	%	80 - 120
			Total Uranium (U)	2020/12/12		108	%	80 - 120
			Total Vanadium (V)	2020/12/12		99	%	80 - 120
			Total Zinc (Zn)	2020/12/12		96	%	80 - 120
7104428	MLB	Spiked Blank	Total Aluminum (Al)	2020/12/12		100	%	80 - 120
			Total Antimony (Sb)	2020/12/12		102	%	80 - 120
			Total Arsenic (As)	2020/12/12		94	%	80 - 120
			Total Barium (Ba)	2020/12/12		97	%	80 - 120
			Total Beryllium (Be)	2020/12/12		98	%	80 - 120
			Total Bismuth (Bi)	2020/12/12		99	%	80 - 120
			Total Boron (B)	2020/12/12		97	%	80 - 120
			Total Cadmium (Cd)	2020/12/12		96	%	80 - 120
			Total Calcium (Ca)	2020/12/12		100	%	80 - 120
			Total Chromium (Cr)	2020/12/12		95	%	80 - 120
			Total Cobalt (Co)	2020/12/12		95	%	80 - 120
			Total Copper (Cu)	2020/12/12		94	%	80 - 120
			Total Iron (Fe)	2020/12/12		103	%	80 - 120
			Total Lead (Pb)	2020/12/12		98	%	80 - 120
			Total Magnesium (Mg)	2020/12/12		104	%	80 - 120
			Total Manganese (Mn)	2020/12/12		98	%	80 - 120
			Total Molybdenum (Mo)	2020/12/12		103	%	80 - 120
			Total Nickel (Ni)	2020/12/12		98	%	80 - 120
			Total Phosphorus (P)	2020/12/12		101	%	80 - 120
			Total Potassium (K)	2020/12/12		94	%	80 - 120



BV Labs Job #: COW8766  
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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Selenium (Se)	2020/12/12		96	%	80 - 120
			Total Silver (Ag)	2020/12/12		97	%	80 - 120
			Total Sodium (Na)	2020/12/12		98	%	80 - 120
			Total Strontium (Sr)	2020/12/12		97	%	80 - 120
			Total Thallium (Tl)	2020/12/12		100	%	80 - 120
			Total Tin (Sn)	2020/12/12		101	%	80 - 120
			Total Titanium (Ti)	2020/12/12		100	%	80 - 120
			Total Uranium (U)	2020/12/12		106	%	80 - 120
			Total Vanadium (V)	2020/12/12		99	%	80 - 120
			Total Zinc (Zn)	2020/12/12		98	%	80 - 120
7104428	MLB	Method Blank	Total Aluminum (Al)	2020/12/12	<5.0		ug/L	
			Total Antimony (Sb)	2020/12/12	<1.0		ug/L	
			Total Arsenic (As)	2020/12/12	<1.0		ug/L	
			Total Barium (Ba)	2020/12/12	<1.0		ug/L	
			Total Beryllium (Be)	2020/12/12	<1.0		ug/L	
			Total Bismuth (Bi)	2020/12/12	<2.0		ug/L	
			Total Boron (B)	2020/12/12	<50		ug/L	
			Total Cadmium (Cd)	2020/12/12	<0.010		ug/L	
			Total Calcium (Ca)	2020/12/12	<100		ug/L	
			Total Chromium (Cr)	2020/12/12	<1.0		ug/L	
			Total Cobalt (Co)	2020/12/12	<0.40		ug/L	
			Total Copper (Cu)	2020/12/12	<0.50		ug/L	
			Total Iron (Fe)	2020/12/12	<50		ug/L	
			Total Lead (Pb)	2020/12/12	<0.50		ug/L	
			Total Magnesium (Mg)	2020/12/12	<100		ug/L	
			Total Manganese (Mn)	2020/12/12	<2.0		ug/L	
			Total Molybdenum (Mo)	2020/12/12	<2.0		ug/L	
			Total Nickel (Ni)	2020/12/12	<2.0		ug/L	
			Total Phosphorus (P)	2020/12/12	<100		ug/L	
			Total Potassium (K)	2020/12/12	<100		ug/L	
			Total Selenium (Se)	2020/12/12	<0.50		ug/L	
			Total Silver (Ag)	2020/12/12	<0.10		ug/L	
			Total Sodium (Na)	2020/12/12	<100		ug/L	
			Total Strontium (Sr)	2020/12/12	<2.0		ug/L	
			Total Thallium (Tl)	2020/12/12	<0.10		ug/L	
			Total Tin (Sn)	2020/12/12	<2.0		ug/L	
			Total Titanium (Ti)	2020/12/12	<2.0		ug/L	
			Total Uranium (U)	2020/12/12	<0.10		ug/L	
			Total Vanadium (V)	2020/12/12	<2.0		ug/L	
			Total Zinc (Zn)	2020/12/12	<5.0		ug/L	
7104428	MLB	RPD	Total Aluminum (Al)	2020/12/12	3.9		%	20
			Total Antimony (Sb)	2020/12/12	NC		%	20
			Total Arsenic (As)	2020/12/12	NC		%	20
			Total Barium (Ba)	2020/12/12	3.0		%	20
			Total Beryllium (Be)	2020/12/12	NC		%	20
			Total Bismuth (Bi)	2020/12/12	NC		%	20
			Total Boron (B)	2020/12/12	NC		%	20
			Total Cadmium (Cd)	2020/12/12	12		%	20
			Total Calcium (Ca)	2020/12/12	1.8		%	20
			Total Chromium (Cr)	2020/12/12	NC		%	20
			Total Cobalt (Co)	2020/12/12	4.8		%	20
			Total Copper (Cu)	2020/12/12	0.40		%	20
			Total Iron (Fe)	2020/12/12	2.7		%	20



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Lead (Pb)	2020/12/12	NC		%	20
			Total Magnesium (Mg)	2020/12/12	2.3		%	20
			Total Manganese (Mn)	2020/12/12	1.9		%	20
			Total Molybdenum (Mo)	2020/12/12	NC		%	20
			Total Nickel (Ni)	2020/12/12	5.4		%	20
			Total Phosphorus (P)	2020/12/12	NC		%	20
			Total Potassium (K)	2020/12/12	2.9		%	20
			Total Selenium (Se)	2020/12/12	NC		%	20
			Total Silver (Ag)	2020/12/12	NC		%	20
			Total Sodium (Na)	2020/12/12	2.0		%	20
			Total Strontium (Sr)	2020/12/12	0.31		%	20
			Total Thallium (Tl)	2020/12/12	NC		%	20
			Total Tin (Sn)	2020/12/12	NC		%	20
			Total Titanium (Ti)	2020/12/12	NC		%	20
			Total Uranium (U)	2020/12/12	11		%	20
			Total Vanadium (V)	2020/12/12	NC		%	20
			Total Zinc (Zn)	2020/12/12	NC		%	20
7104434	YXU	Matrix Spike [OJL920-02]	Isobutylbenzene - Volatile	2020/12/11		101	%	60 - 130
			Benzene	2020/12/11		102	%	60 - 130
			Toluene	2020/12/11		103	%	60 - 130
			Ethylbenzene	2020/12/11		100	%	60 - 130
			Total Xylenes	2020/12/11		98	%	60 - 130
7104434	YXU	Spiked Blank	Isobutylbenzene - Volatile	2020/12/11		97	%	60 - 130
			Benzene	2020/12/11		96	%	60 - 140
			Toluene	2020/12/11		102	%	60 - 140
			Ethylbenzene	2020/12/11		100	%	60 - 140
			Total Xylenes	2020/12/11		98	%	60 - 140
7104434	YXU	Method Blank	Isobutylbenzene - Volatile	2020/12/11		96	%	60 - 130
			Benzene	2020/12/11	<0.025		mg/kg	
			Toluene	2020/12/11	<0.025		mg/kg	
			Ethylbenzene	2020/12/11	<0.025		mg/kg	
			Total Xylenes	2020/12/11	<0.050		mg/kg	
			C6 - C10 (less BTEX)	2020/12/11	<2.5		mg/kg	
7104434	YXU	RPD [OJL920-02]	Benzene	2020/12/11	NC		%	50
			Toluene	2020/12/11	NC		%	50
			Ethylbenzene	2020/12/11	NC		%	50
			Total Xylenes	2020/12/11	NC		%	50
			C6 - C10 (less BTEX)	2020/12/11	NC		%	50
7104436	THL	Matrix Spike [OJL945-02]	Isobutylbenzene - Volatile	2020/12/11		108	%	60 - 130
			Benzene	2020/12/11		111	%	60 - 130
			Toluene	2020/12/11		108	%	60 - 130
			Ethylbenzene	2020/12/11		110	%	60 - 130
			Total Xylenes	2020/12/11		94	%	60 - 130
7104436	THL	Spiked Blank	Isobutylbenzene - Volatile	2020/12/11		99	%	60 - 130
			Benzene	2020/12/11		75	%	60 - 140
			Toluene	2020/12/11		71	%	60 - 140
			Ethylbenzene	2020/12/11		66	%	60 - 140
			Total Xylenes	2020/12/11		67	%	60 - 140
7104436	THL	Method Blank	Isobutylbenzene - Volatile	2020/12/11		101	%	60 - 130
			Benzene	2020/12/11	<0.025		mg/kg	
			Toluene	2020/12/11	<0.050		mg/kg	
			Ethylbenzene	2020/12/11	<0.025		mg/kg	
			Total Xylenes	2020/12/11	<0.050		mg/kg	



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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7104436	THL	RPD [OJL945-02]	C6 - C10 (less BTEX)	2020/12/11	<2.5		mg/kg	
			Benzene	2020/12/11	NC		%	50
			Toluene	2020/12/11	NC		%	50
			Ethylbenzene	2020/12/11	NC		%	50
			Total Xylenes	2020/12/11	NC		%	50
			C6 - C10 (less BTEX)	2020/12/11	NC		%	50
7104463	SHW	QC Standard	Turbidity	2020/12/11		105	%	80 - 120
7104463	SHW	Spiked Blank	Turbidity	2020/12/11		99	%	80 - 120
7104463	SHW	Method Blank	Turbidity	2020/12/11	<0.10		NTU	
7104463	SHW	RPD	Turbidity	2020/12/11	9.9		%	20
7104548	LGE	Matrix Spike [OJL964-05]	Benzo(j)fluoranthene	2020/12/13		62	%	50 - 130
			D10-Anthracene	2020/12/13		77	%	50 - 130
			D14-Terphenyl	2020/12/13		71	%	50 - 130
			D8-Acenaphthylene	2020/12/13		80	%	50 - 130
			1-Methylnaphthalene	2020/12/13		71	%	50 - 130
			2-Methylnaphthalene	2020/12/13		71	%	50 - 130
			Acenaphthene	2020/12/13		75	%	50 - 130
			Acenaphthylene	2020/12/13		75	%	50 - 130
			Acridine	2020/12/13		97	%	50 - 130
			Anthracene	2020/12/13		79	%	50 - 130
			Benzo(a)anthracene	2020/12/13		81	%	50 - 130
			Benzo(a)pyrene	2020/12/13		55	%	50 - 130
			Benzo(b)fluoranthene	2020/12/13		61	%	50 - 130
			Benzo(g,h,i)perylene	2020/12/13		37 (1)	%	50 - 130
			Benzo(k)fluoranthene	2020/12/13		58	%	50 - 130
			Chrysene	2020/12/13		85	%	50 - 130
			Dibenzo(a,h)anthracene	2020/12/13		36 (1)	%	50 - 130
			Fluoranthene	2020/12/13		86	%	50 - 130
			Fluorene	2020/12/13		80	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/12/13		37 (1)	%	50 - 130
			Naphthalene	2020/12/13		75	%	50 - 130
			Perylene	2020/12/13		58	%	50 - 130
			Phenanthrene	2020/12/13		85	%	50 - 130
			Pyrene	2020/12/13		87	%	50 - 130
			Quinoline	2020/12/13		66	%	50 - 130
7104548	LGE	Spiked Blank	Benzo(j)fluoranthene	2020/12/13		97	%	50 - 130
			D10-Anthracene	2020/12/13		90	%	50 - 130
			D14-Terphenyl	2020/12/13		94	%	50 - 130
			D8-Acenaphthylene	2020/12/13		93	%	50 - 130
			1-Methylnaphthalene	2020/12/13		80	%	50 - 130
			2-Methylnaphthalene	2020/12/13		81	%	50 - 130
			Acenaphthene	2020/12/13		88	%	50 - 130
			Acenaphthylene	2020/12/13		88	%	50 - 130
			Acridine	2020/12/13		103	%	50 - 130
			Anthracene	2020/12/13		93	%	50 - 130
			Benzo(a)anthracene	2020/12/13		103	%	50 - 130
			Benzo(a)pyrene	2020/12/13		89	%	50 - 130
			Benzo(b)fluoranthene	2020/12/13		99	%	50 - 130
			Benzo(g,h,i)perylene	2020/12/13		84	%	50 - 130
			Benzo(k)fluoranthene	2020/12/13		96	%	50 - 130
			Chrysene	2020/12/13		108	%	50 - 130
			Dibenzo(a,h)anthracene	2020/12/13		76	%	50 - 130
			Fluoranthene	2020/12/13		102	%	50 - 130



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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Fluorene	2020/12/13		95	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/12/13		82	%	50 - 130
			Naphthalene	2020/12/13		81	%	50 - 130
			Perylene	2020/12/13		94	%	50 - 130
			Phenanthrene	2020/12/13		103	%	50 - 130
			Pyrene	2020/12/13		104	%	50 - 130
			Quinoline	2020/12/13		81	%	50 - 130
7104548	LGE	Method Blank	Benzo(j)fluoranthene	2020/12/13	<0.010		ug/L	
			D10-Anthracene	2020/12/13		92	%	50 - 130
			D14-Terphenyl	2020/12/13		93	%	50 - 130
			D8-Acenaphthylene	2020/12/13		91	%	50 - 130
			1-Methylnaphthalene	2020/12/13	<0.050		ug/L	
			2-Methylnaphthalene	2020/12/13	<0.050		ug/L	
			Acenaphthene	2020/12/13	<0.010		ug/L	
			Acenaphthylene	2020/12/13	<0.010		ug/L	
			Acridine	2020/12/13	<0.050		ug/L	
			Anthracene	2020/12/13	<0.010		ug/L	
			Benzo(a)anthracene	2020/12/13	<0.010		ug/L	
			Benzo(a)pyrene	2020/12/13	<0.010		ug/L	
			Benzo(b)fluoranthene	2020/12/13	<0.010		ug/L	
			Benzo(g,h,i)perylene	2020/12/13	<0.010		ug/L	
			Benzo(k)fluoranthene	2020/12/13	<0.010		ug/L	
			Chrysene	2020/12/13	<0.010		ug/L	
			Dibenzo(a,h)anthracene	2020/12/13	<0.010		ug/L	
			Fluoranthene	2020/12/13	<0.010		ug/L	
			Fluorene	2020/12/13	<0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2020/12/13	<0.010		ug/L	
			Naphthalene	2020/12/13	<0.20		ug/L	
			Perylene	2020/12/13	<0.010		ug/L	
			Phenanthrene	2020/12/13	<0.010		ug/L	
			Pyrene	2020/12/13	<0.010		ug/L	
			Quinoline	2020/12/13	<0.050		ug/L	
7104548	LGE	RPD [OJL963-05]	Benzo(j)fluoranthene	2020/12/13	NC		%	40
			1-Methylnaphthalene	2020/12/13	NC		%	40
			2-Methylnaphthalene	2020/12/13	NC		%	40
			Acenaphthene	2020/12/13	NC		%	40
			Acenaphthylene	2020/12/13	NC		%	40
			Acridine	2020/12/13	NC		%	40
			Anthracene	2020/12/13	NC		%	40
			Benzo(a)anthracene	2020/12/13	NC		%	40
			Benzo(a)pyrene	2020/12/13	NC		%	40
			Benzo(b)fluoranthene	2020/12/13	NC		%	40
			Benzo(g,h,i)perylene	2020/12/13	NC		%	40
			Benzo(k)fluoranthene	2020/12/13	NC		%	40
			Chrysene	2020/12/13	NC		%	40
			Dibenzo(a,h)anthracene	2020/12/13	NC		%	40
			Fluoranthene	2020/12/13	NC		%	40
			Fluorene	2020/12/13	NC		%	40
			Indeno(1,2,3-cd)pyrene	2020/12/13	NC		%	40
			Naphthalene	2020/12/13	NC		%	40
			Perylene	2020/12/13	NC		%	40
			Phenanthrene	2020/12/13	NC		%	40
			Pyrene	2020/12/13	NC		%	40



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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Quinoline	2020/12/13	NC		%	40
7104549	KKE	RPD	Moisture	2020/12/14	2.3		%	25
7104565	MGN	Matrix Spike	Isobutylbenzene - Extractable	2020/12/11		99	%	60 - 130
			n-Dotriacontane - Extractable	2020/12/11		89	%	60 - 130
			>C10-C16 Hydrocarbons	2020/12/11		108	%	30 - 130
			>C16-C21 Hydrocarbons	2020/12/11		106	%	30 - 130
			>C21-<C32 Hydrocarbons	2020/12/11		111	%	30 - 130
7104565	MGN	Spiked Blank	Isobutylbenzene - Extractable	2020/12/11		106	%	60 - 130
			n-Dotriacontane - Extractable	2020/12/11		90	%	60 - 130
			>C10-C16 Hydrocarbons	2020/12/11		111	%	60 - 130
			>C16-C21 Hydrocarbons	2020/12/11		107	%	60 - 130
			>C21-<C32 Hydrocarbons	2020/12/11		103	%	60 - 130
7104565	MGN	Method Blank	Isobutylbenzene - Extractable	2020/12/11		99	%	60 - 130
			n-Dotriacontane - Extractable	2020/12/11		84	%	60 - 130
			>C10-C16 Hydrocarbons	2020/12/11	<10		mg/kg	
			>C16-C21 Hydrocarbons	2020/12/11	<10		mg/kg	
			>C21-<C32 Hydrocarbons	2020/12/11	<15		mg/kg	
7104565	MGN	RPD	>C10-C16 Hydrocarbons	2020/12/11	15		%	50
			>C16-C21 Hydrocarbons	2020/12/11	16		%	50
			>C21-<C32 Hydrocarbons	2020/12/11	6.6		%	50
7104649	LGE	Matrix Spike [OJL920-01]	D10-Anthracene	2020/12/12		95	%	50 - 130
			D14-Terphenyl (FS)	2020/12/12		99	%	50 - 130
			D8-Acenaphthylene	2020/12/12		100	%	50 - 130
			1-Methylnaphthalene	2020/12/12		93	%	50 - 130
			2-Methylnaphthalene	2020/12/12		98	%	50 - 130
			Acenaphthene	2020/12/12		95	%	50 - 130
			Acenaphthylene	2020/12/12		91	%	50 - 130
			Anthracene	2020/12/12		93	%	50 - 130
			Benzo(a)anthracene	2020/12/12		98	%	50 - 130
			Benzo(a)pyrene	2020/12/12		93	%	50 - 130
			Benzo(b)fluoranthene	2020/12/12		99	%	50 - 130
			Benzo(g,h,i)perylene	2020/12/12		95	%	50 - 130
			Benzo(j)fluoranthene	2020/12/12		98	%	50 - 130
			Benzo(k)fluoranthene	2020/12/12		93	%	50 - 130
			Chrysene	2020/12/12		101	%	50 - 130
			Dibenzo(a,h)anthracene	2020/12/12		97	%	50 - 130
			Fluoranthene	2020/12/12		102	%	50 - 130
			Fluorene	2020/12/12		98	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/12/12		96	%	50 - 130
			Naphthalene	2020/12/12		101	%	50 - 130
			Perylene	2020/12/12		98	%	50 - 130
			Phenanthrene	2020/12/12		104	%	50 - 130
			Pyrene	2020/12/12		99	%	50 - 130
7104649	LGE	Spiked Blank	D10-Anthracene	2020/12/12		98	%	50 - 130
			D14-Terphenyl (FS)	2020/12/12		101	%	50 - 130
			D8-Acenaphthylene	2020/12/12		103	%	50 - 130
			1-Methylnaphthalene	2020/12/12		96	%	50 - 130
			2-Methylnaphthalene	2020/12/12		101	%	50 - 130
			Acenaphthene	2020/12/12		98	%	50 - 130
			Acenaphthylene	2020/12/12		93	%	50 - 130
			Anthracene	2020/12/12		96	%	50 - 130
			Benzo(a)anthracene	2020/12/12		102	%	50 - 130
			Benzo(a)pyrene	2020/12/12		95	%	50 - 130



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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(b)fluoranthene	2020/12/12		104	%	50 - 130
			Benzo(g,h,i)perylene	2020/12/12		96	%	50 - 130
			Benzo(j)fluoranthene	2020/12/12		103	%	50 - 130
			Benzo(k)fluoranthene	2020/12/12		101	%	50 - 130
			Chrysene	2020/12/12		105	%	50 - 130
			Dibenzo(a,h)anthracene	2020/12/12		96	%	50 - 130
			Fluoranthene	2020/12/12		105	%	50 - 130
			Fluorene	2020/12/12		100	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/12/12		96	%	50 - 130
			Naphthalene	2020/12/12		104	%	50 - 130
			Perylene	2020/12/12		102	%	50 - 130
			Phenanthrene	2020/12/12		107	%	50 - 130
			Pyrene	2020/12/12		102	%	50 - 130
7104649	LGE	Method Blank	D10-Anthracene	2020/12/12		107	%	50 - 130
			D14-Terphenyl (FS)	2020/12/12		108	%	50 - 130
			D8-Acenaphthylene	2020/12/12		103	%	50 - 130
			1-Methylnaphthalene	2020/12/12	<0.010		mg/kg	
			2-Methylnaphthalene	2020/12/12	<0.010		mg/kg	
			Acenaphthene	2020/12/12	<0.010		mg/kg	
			Acenaphthylene	2020/12/12	<0.010		mg/kg	
			Anthracene	2020/12/12	<0.010		mg/kg	
			Benzo(a)anthracene	2020/12/12	<0.010		mg/kg	
			Benzo(a)pyrene	2020/12/12	<0.010		mg/kg	
			Benzo(b)fluoranthene	2020/12/12	<0.010		mg/kg	
			Benzo(g,h,i)perylene	2020/12/12	<0.010		mg/kg	
			Benzo(j)fluoranthene	2020/12/12	<0.010		mg/kg	
			Benzo(k)fluoranthene	2020/12/12	<0.010		mg/kg	
			Chrysene	2020/12/12	<0.010		mg/kg	
			Dibenzo(a,h)anthracene	2020/12/12	<0.010		mg/kg	
			Fluoranthene	2020/12/12	<0.010		mg/kg	
			Fluorene	2020/12/12	<0.010		mg/kg	
			Indeno(1,2,3-cd)pyrene	2020/12/12	<0.010		mg/kg	
			Naphthalene	2020/12/12	<0.010		mg/kg	
			Perylene	2020/12/12	<0.010		mg/kg	
			Phenanthrene	2020/12/12	<0.010		mg/kg	
			Pyrene	2020/12/12	<0.010		mg/kg	
7104649	LGE	RPD [OJL920-01]	1-Methylnaphthalene	2020/12/12	NC		%	50
			2-Methylnaphthalene	2020/12/12	NC		%	50
			Acenaphthene	2020/12/12	NC		%	50
			Acenaphthylene	2020/12/12	NC		%	50
			Anthracene	2020/12/12	NC		%	50
			Benzo(a)anthracene	2020/12/12	NC		%	50
			Benzo(a)pyrene	2020/12/12	NC		%	50
			Benzo(b)fluoranthene	2020/12/12	NC		%	50
			Benzo(g,h,i)perylene	2020/12/12	NC		%	50
			Benzo(j)fluoranthene	2020/12/12	NC		%	50
			Benzo(k)fluoranthene	2020/12/12	NC		%	50
			Chrysene	2020/12/12	NC		%	50
			Dibenzo(a,h)anthracene	2020/12/12	NC		%	50
			Fluoranthene	2020/12/12	NC		%	50
			Fluorene	2020/12/12	NC		%	50
			Indeno(1,2,3-cd)pyrene	2020/12/12	NC		%	50
			Naphthalene	2020/12/12	NC		%	50





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7104723	BAN	Matrix Spike	Perylene	2020/12/12	NC		%	50
			Phenanthrene	2020/12/12	NC		%	50
			Pyrene	2020/12/12	NC		%	50
			Total Aluminum (Al)	2020/12/15		98	%	80 - 120
			Total Antimony (Sb)	2020/12/15		108	%	80 - 120
			Total Arsenic (As)	2020/12/15		91	%	80 - 120
			Total Barium (Ba)	2020/12/15		96	%	80 - 120
			Total Beryllium (Be)	2020/12/15		97	%	80 - 120
			Total Bismuth (Bi)	2020/12/15		98	%	80 - 120
			Total Boron (B)	2020/12/15		98	%	80 - 120
			Total Cadmium (Cd)	2020/12/15		95	%	80 - 120
			Total Calcium (Ca)	2020/12/15		97	%	80 - 120
			Total Chromium (Cr)	2020/12/15		92	%	80 - 120
			Total Cobalt (Co)	2020/12/15		94	%	80 - 120
			Total Copper (Cu)	2020/12/15		93	%	80 - 120
			Total Iron (Fe)	2020/12/15		100	%	80 - 120
			Total Lead (Pb)	2020/12/15		96	%	80 - 120
			Total Magnesium (Mg)	2020/12/15		99	%	80 - 120
			Total Manganese (Mn)	2020/12/15		95	%	80 - 120
			Total Molybdenum (Mo)	2020/12/15		101	%	80 - 120
			Total Nickel (Ni)	2020/12/15		95	%	80 - 120
			Total Phosphorus (P)	2020/12/15		101	%	80 - 120
			Total Potassium (K)	2020/12/15		96	%	80 - 120
			Total Selenium (Se)	2020/12/15		98	%	80 - 120
			Total Silver (Ag)	2020/12/15		98	%	80 - 120
			Total Sodium (Na)	2020/12/15		93	%	80 - 120
			Total Strontium (Sr)	2020/12/15		97	%	80 - 120
			Total Thallium (Tl)	2020/12/15		99	%	80 - 120
			Total Tin (Sn)	2020/12/15		102	%	80 - 120
			Total Titanium (Ti)	2020/12/15		100	%	80 - 120
			Total Uranium (U)	2020/12/15		103	%	80 - 120
Total Vanadium (V)	2020/12/15		98	%	80 - 120			
Total Zinc (Zn)	2020/12/15		89	%	80 - 120			
7104723	BAN	Spiked Blank	Total Aluminum (Al)	2020/12/15		106	%	80 - 120
			Total Antimony (Sb)	2020/12/15		108	%	80 - 120
			Total Arsenic (As)	2020/12/15		93	%	80 - 120
			Total Barium (Ba)	2020/12/15		97	%	80 - 120
			Total Beryllium (Be)	2020/12/15		97	%	80 - 120
			Total Bismuth (Bi)	2020/12/15		99	%	80 - 120
			Total Boron (B)	2020/12/15		98	%	80 - 120
			Total Cadmium (Cd)	2020/12/15		94	%	80 - 120
			Total Calcium (Ca)	2020/12/15		103	%	80 - 120
			Total Chromium (Cr)	2020/12/15		94	%	80 - 120
			Total Cobalt (Co)	2020/12/15		95	%	80 - 120
			Total Copper (Cu)	2020/12/15		95	%	80 - 120
			Total Iron (Fe)	2020/12/15		103	%	80 - 120
			Total Lead (Pb)	2020/12/15		97	%	80 - 120
			Total Magnesium (Mg)	2020/12/15		103	%	80 - 120
Total Manganese (Mn)	2020/12/15		98	%	80 - 120			
Total Molybdenum (Mo)	2020/12/15		103	%	80 - 120			
Total Nickel (Ni)	2020/12/15		98	%	80 - 120			
Total Phosphorus (P)	2020/12/15		103	%	80 - 120			
Total Potassium (K)	2020/12/15		99	%	80 - 120			



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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Selenium (Se)	2020/12/15		97	%	80 - 120
			Total Silver (Ag)	2020/12/15		96	%	80 - 120
			Total Sodium (Na)	2020/12/15		96	%	80 - 120
			Total Strontium (Sr)	2020/12/15		98	%	80 - 120
			Total Thallium (Tl)	2020/12/15		99	%	80 - 120
			Total Tin (Sn)	2020/12/15		105	%	80 - 120
			Total Titanium (Ti)	2020/12/15		96	%	80 - 120
			Total Uranium (U)	2020/12/15		103	%	80 - 120
			Total Vanadium (V)	2020/12/15		99	%	80 - 120
			Total Zinc (Zn)	2020/12/15		95	%	80 - 120
7104723	BAN	Method Blank	Total Aluminum (Al)	2020/12/15	<5.0		ug/L	
			Total Antimony (Sb)	2020/12/15	<1.0		ug/L	
			Total Arsenic (As)	2020/12/15	<1.0		ug/L	
			Total Barium (Ba)	2020/12/15	<1.0		ug/L	
			Total Beryllium (Be)	2020/12/15	<1.0		ug/L	
			Total Bismuth (Bi)	2020/12/15	<2.0		ug/L	
			Total Boron (B)	2020/12/15	<50		ug/L	
			Total Cadmium (Cd)	2020/12/15	<0.010		ug/L	
			Total Calcium (Ca)	2020/12/15	<100		ug/L	
			Total Chromium (Cr)	2020/12/15	<1.0		ug/L	
			Total Cobalt (Co)	2020/12/15	<0.40		ug/L	
			Total Copper (Cu)	2020/12/15	<0.50		ug/L	
			Total Iron (Fe)	2020/12/15	<50		ug/L	
			Total Lead (Pb)	2020/12/15	<0.50		ug/L	
			Total Magnesium (Mg)	2020/12/15	<100		ug/L	
			Total Manganese (Mn)	2020/12/15	<2.0		ug/L	
			Total Molybdenum (Mo)	2020/12/15	<2.0		ug/L	
			Total Nickel (Ni)	2020/12/15	<2.0		ug/L	
			Total Phosphorus (P)	2020/12/15	<100		ug/L	
			Total Potassium (K)	2020/12/15	<100		ug/L	
			Total Selenium (Se)	2020/12/15	<0.50		ug/L	
			Total Silver (Ag)	2020/12/15	<0.10		ug/L	
			Total Sodium (Na)	2020/12/15	<100		ug/L	
			Total Strontium (Sr)	2020/12/15	<2.0		ug/L	
			Total Thallium (Tl)	2020/12/15	<0.10		ug/L	
			Total Tin (Sn)	2020/12/15	<2.0		ug/L	
			Total Titanium (Ti)	2020/12/15	<2.0		ug/L	
			Total Uranium (U)	2020/12/15	<0.10		ug/L	
			Total Vanadium (V)	2020/12/15	<2.0		ug/L	
			Total Zinc (Zn)	2020/12/15	<5.0		ug/L	
7104723	BAN	RPD	Total Aluminum (Al)	2020/12/15	15		%	20
			Total Antimony (Sb)	2020/12/15	NC		%	20
			Total Arsenic (As)	2020/12/15	3.8		%	20
			Total Barium (Ba)	2020/12/15	1.1		%	20
			Total Beryllium (Be)	2020/12/15	NC		%	20
			Total Bismuth (Bi)	2020/12/15	NC		%	20
			Total Boron (B)	2020/12/15	NC		%	20
			Total Cadmium (Cd)	2020/12/15	NC		%	20
			Total Calcium (Ca)	2020/12/15	1.8		%	20
			Total Chromium (Cr)	2020/12/15	NC		%	20
			Total Cobalt (Co)	2020/12/15	NC		%	20
			Total Copper (Cu)	2020/12/15	5.6		%	20
			Total Iron (Fe)	2020/12/15	NC		%	20



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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Lead (Pb)	2020/12/15	NC		%	20
			Total Magnesium (Mg)	2020/12/15	0.49		%	20
			Total Manganese (Mn)	2020/12/15	NC		%	20
			Total Molybdenum (Mo)	2020/12/15	NC		%	20
			Total Nickel (Ni)	2020/12/15	NC		%	20
			Total Phosphorus (P)	2020/12/15	NC		%	20
			Total Potassium (K)	2020/12/15	2.6		%	20
			Total Selenium (Se)	2020/12/15	NC		%	20
			Total Silver (Ag)	2020/12/15	NC		%	20
			Total Sodium (Na)	2020/12/15	1.1		%	20
			Total Strontium (Sr)	2020/12/15	0.62		%	20
			Total Thallium (Tl)	2020/12/15	NC		%	20
			Total Tin (Sn)	2020/12/15	NC		%	20
			Total Titanium (Ti)	2020/12/15	NC		%	20
			Total Uranium (U)	2020/12/15	0.38		%	20
			Total Vanadium (V)	2020/12/15	0.55		%	20
			Total Zinc (Zn)	2020/12/15	NC		%	20
7104783	KKE	RPD	Moisture	2020/12/14	3.4		%	25
7104852	MGN	Matrix Spike	Isobutylbenzene - Extractable	2020/12/11		103	%	70 - 130
			n-Dotriacontane - Extractable	2020/12/11		116	%	70 - 130
			>C10-C16 Hydrocarbons	2020/12/11		96	%	70 - 130
			>C16-C21 Hydrocarbons	2020/12/11		95	%	70 - 130
			>C21-<C32 Hydrocarbons	2020/12/11		104	%	70 - 130
7104852	MGN	Spiked Blank	Isobutylbenzene - Extractable	2020/12/12		100	%	70 - 130
			n-Dotriacontane - Extractable	2020/12/12		96	%	70 - 130
			>C10-C16 Hydrocarbons	2020/12/12		99	%	70 - 130
			>C16-C21 Hydrocarbons	2020/12/12		91	%	70 - 130
			>C21-<C32 Hydrocarbons	2020/12/12		97	%	70 - 130
7104852	MGN	Method Blank	Isobutylbenzene - Extractable	2020/12/11		99	%	70 - 130
			n-Dotriacontane - Extractable	2020/12/11		95	%	70 - 130
			>C10-C16 Hydrocarbons	2020/12/11	<0.050		mg/L	
			>C16-C21 Hydrocarbons	2020/12/11	<0.050		mg/L	
			>C21-<C32 Hydrocarbons	2020/12/11	<0.090		mg/L	
7104852	MGN	RPD	>C10-C16 Hydrocarbons	2020/12/11	NC		%	40
			>C16-C21 Hydrocarbons	2020/12/11	NC		%	40
			>C21-<C32 Hydrocarbons	2020/12/11	NC		%	40
7104902	LGE	Matrix Spike [OJL977-01]	D10-Anthracene	2020/12/11		100	%	50 - 130
			D14-Terphenyl (FS)	2020/12/11		101	%	50 - 130
			D8-Acenaphthylene	2020/12/11		96	%	50 - 130
			1-Methylnaphthalene	2020/12/11		83	%	50 - 130
			2-Methylnaphthalene	2020/12/11		84	%	50 - 130
			Acenaphthene	2020/12/11		85	%	50 - 130
			Acenaphthylene	2020/12/11		88	%	50 - 130
			Anthracene	2020/12/11		92	%	50 - 130
			Benzo(a)anthracene	2020/12/11		92	%	50 - 130
			Benzo(a)pyrene	2020/12/11		82	%	50 - 130
			Benzo(b)fluoranthene	2020/12/11		87	%	50 - 130
			Benzo(g,h,i)perylene	2020/12/11		77	%	50 - 130
			Benzo(j)fluoranthene	2020/12/11		80	%	50 - 130
			Benzo(k)fluoranthene	2020/12/11		80	%	50 - 130
			Chrysene	2020/12/11		98	%	50 - 130
			Dibenzo(a,h)anthracene	2020/12/11		79	%	50 - 130
			Fluoranthene	2020/12/11		89	%	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
7104902	LGE	Spiked Blank	Fluorene	2020/12/11		88	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/12/11		79	%	50 - 130
			Naphthalene	2020/12/11		95	%	50 - 130
			Perylene	2020/12/11		81	%	50 - 130
			Phenanthrene	2020/12/11		90	%	50 - 130
			Pyrene	2020/12/11		92	%	50 - 130
			D10-Anthracene	2020/12/11		104	%	50 - 130
			D14-Terphenyl (FS)	2020/12/11		103	%	50 - 130
			D8-Acenaphthylene	2020/12/11		102	%	50 - 130
			1-Methylnaphthalene	2020/12/11		90	%	50 - 130
			2-Methylnaphthalene	2020/12/11		90	%	50 - 130
			Acenaphthene	2020/12/11		92	%	50 - 130
			Acenaphthylene	2020/12/11		94	%	50 - 130
			Anthracene	2020/12/11		97	%	50 - 130
			Benzo(a)anthracene	2020/12/11		95	%	50 - 130
			Benzo(a)pyrene	2020/12/11		93	%	50 - 130
			Benzo(b)fluoranthene	2020/12/11		93	%	50 - 130
			Benzo(g,h,i)perylene	2020/12/11		94	%	50 - 130
			Benzo(j)fluoranthene	2020/12/11		91	%	50 - 130
			Benzo(k)fluoranthene	2020/12/11		93	%	50 - 130
			Chrysene	2020/12/11		102	%	50 - 130
			Dibenzo(a,h)anthracene	2020/12/11		90	%	50 - 130
			Fluoranthene	2020/12/11		95	%	50 - 130
Fluorene	2020/12/11		93	%	50 - 130			
Indeno(1,2,3-cd)pyrene	2020/12/11		91	%	50 - 130			
Naphthalene	2020/12/11		97	%	50 - 130			
Perylene	2020/12/11		93	%	50 - 130			
Phenanthrene	2020/12/11		96	%	50 - 130			
Pyrene	2020/12/11		99	%	50 - 130			
7104902	LGE	Method Blank	D10-Anthracene	2020/12/11		107	%	50 - 130
			D14-Terphenyl (FS)	2020/12/11		104	%	50 - 130
			D8-Acenaphthylene	2020/12/11		102	%	50 - 130
			1-Methylnaphthalene	2020/12/11	<0.010		mg/kg	
			2-Methylnaphthalene	2020/12/11	<0.010		mg/kg	
			Acenaphthene	2020/12/11	<0.010		mg/kg	
			Acenaphthylene	2020/12/11	<0.010		mg/kg	
			Anthracene	2020/12/11	<0.010		mg/kg	
			Benzo(a)anthracene	2020/12/11	<0.010		mg/kg	
			Benzo(a)pyrene	2020/12/11	<0.010		mg/kg	
			Benzo(b)fluoranthene	2020/12/11	<0.010		mg/kg	
			Benzo(g,h,i)perylene	2020/12/11	<0.010		mg/kg	
			Benzo(j)fluoranthene	2020/12/11	<0.010		mg/kg	
			Benzo(k)fluoranthene	2020/12/11	<0.010		mg/kg	
			Chrysene	2020/12/11	<0.010		mg/kg	
			Dibenzo(a,h)anthracene	2020/12/11	<0.010		mg/kg	
			Fluoranthene	2020/12/11	<0.010		mg/kg	
			Fluorene	2020/12/11	<0.010		mg/kg	
			Indeno(1,2,3-cd)pyrene	2020/12/11	<0.010		mg/kg	
			Naphthalene	2020/12/11	<0.010		mg/kg	
			Perylene	2020/12/11	<0.010		mg/kg	
			Phenanthrene	2020/12/11	<0.010		mg/kg	
			Pyrene	2020/12/11	<0.010		mg/kg	
7104916	NHU	Matrix Spike	Total Mercury (Hg)	2020/12/14		97	%	80 - 120



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7104916	NHU	Spiked Blank	Total Mercury (Hg)	2020/12/14		98	%	80 - 120
7104916	NHU	Method Blank	Total Mercury (Hg)	2020/12/14	<0.013		ug/L	
7104916	NHU	RPD	Total Mercury (Hg)	2020/12/14	NC		%	20
7105001	YXU	Matrix Spike	Isobutylbenzene - Volatile	2020/12/11		109	%	60 - 130
			Benzene	2020/12/11		98	%	60 - 130
			Toluene	2020/12/11		95	%	60 - 130
			Ethylbenzene	2020/12/11		94	%	60 - 130
			Total Xylenes	2020/12/11		107	%	60 - 130
7105001	YXU	Spiked Blank	Isobutylbenzene - Volatile	2020/12/11		102	%	60 - 130
			Benzene	2020/12/11		107	%	60 - 140
			Toluene	2020/12/11		108	%	60 - 140
			Ethylbenzene	2020/12/11		109	%	60 - 140
			Total Xylenes	2020/12/11		114	%	60 - 140
7105001	YXU	Method Blank	Isobutylbenzene - Volatile	2020/12/11		102	%	60 - 130
			Benzene	2020/12/11	<0.025		mg/kg	
			Toluene	2020/12/11	<0.050		mg/kg	
			Ethylbenzene	2020/12/11	<0.025		mg/kg	
			Total Xylenes	2020/12/11	<0.050		mg/kg	
			C6 - C10 (less BTEX)	2020/12/11	<2.5		mg/kg	
7105001	YXU	RPD	Benzene	2020/12/11	NC		%	50
			Toluene	2020/12/11	NC		%	50
			Ethylbenzene	2020/12/11	NC		%	50
			Total Xylenes	2020/12/11	NC		%	50
			C6 - C10 (less BTEX)	2020/12/11	NC		%	50
7105005	SHL	Matrix Spike	Isobutylbenzene - Volatile	2020/12/11		95	%	60 - 130
			Benzene	2020/12/11		105	%	60 - 130
			Toluene	2020/12/11		106	%	60 - 130
			Ethylbenzene	2020/12/11		105	%	60 - 130
			Total Xylenes	2020/12/11		102	%	60 - 130
7105005	SHL	Spiked Blank	Isobutylbenzene - Volatile	2020/12/11		94	%	60 - 130
			Benzene	2020/12/11		94	%	60 - 140
			Toluene	2020/12/11		99	%	60 - 140
			Ethylbenzene	2020/12/11		97	%	60 - 140
			Total Xylenes	2020/12/11		96	%	60 - 140
7105005	SHL	Method Blank	Isobutylbenzene - Volatile	2020/12/11		92	%	60 - 130
			Benzene	2020/12/11	<0.025		mg/kg	
			Toluene	2020/12/11	<0.050		mg/kg	
			Ethylbenzene	2020/12/11	<0.025		mg/kg	
			Total Xylenes	2020/12/11	<0.050		mg/kg	
			C6 - C10 (less BTEX)	2020/12/11	<2.5		mg/kg	
7105005	SHL	RPD	Benzene	2020/12/11	NC		%	50
			Toluene	2020/12/11	NC		%	50
			Ethylbenzene	2020/12/11	NC		%	50
			Total Xylenes	2020/12/11	NC		%	50
			C6 - C10 (less BTEX)	2020/12/11	NC		%	50
7105008	BCD	Matrix Spike	Isobutylbenzene - Extractable	2020/12/12		87	%	60 - 130
			n-Dotriacontane - Extractable	2020/12/12		92	%	60 - 130
			>C10-C16 Hydrocarbons	2020/12/12		96	%	30 - 130
			>C16-C21 Hydrocarbons	2020/12/12		94	%	30 - 130
			>C21-<C32 Hydrocarbons	2020/12/12		84	%	30 - 130
7105008	BCD	Spiked Blank	Isobutylbenzene - Extractable	2020/12/11		94	%	60 - 130
			n-Dotriacontane - Extractable	2020/12/11		95	%	60 - 130
			>C10-C16 Hydrocarbons	2020/12/11		107	%	60 - 130



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7105008	BCD	Method Blank	>C16-C21 Hydrocarbons	2020/12/11		103	%	60 - 130
			>C21-<C32 Hydrocarbons	2020/12/11		98	%	60 - 130
			Isobutylbenzene - Extractable	2020/12/11		92	%	60 - 130
			n-Dotriacontane - Extractable	2020/12/11		95	%	60 - 130
			>C10-C16 Hydrocarbons	2020/12/11	<10	mg/kg		
7105008	BCD	RPD	>C16-C21 Hydrocarbons	2020/12/11	<10		mg/kg	
			>C21-<C32 Hydrocarbons	2020/12/11	<15	mg/kg		
			>C10-C16 Hydrocarbons	2020/12/12	NC	%	50	
			>C16-C21 Hydrocarbons	2020/12/12	NC	%	50	
			>C21-<C32 Hydrocarbons	2020/12/12	14	%	50	
7107489	BBD	QC Standard	Sieve - #200 (>0.075mm)	2020/12/14		94	%	90 - 110
7107489	BBD	Method Blank	Sieve - #200 (>0.075mm)	2020/12/14	<1		%	
			Sieve - Pan	2020/12/14	100, RDL=1	%		
7107489	BBD	RPD [OJL921-01]	Sieve - #200 (>0.075mm)	2020/12/14	1.2		%	25
			Sieve - Pan	2020/12/14	17	%	25	
7107549	MSK	Matrix Spike [OJL941-01]	Isobutylbenzene - Extractable	2020/12/14		108	%	60 - 130
			n-Dotriacontane - Extractable	2020/12/14		93	%	60 - 130
			>C10-C16 Hydrocarbons	2020/12/14		113	%	30 - 130
			>C16-C21 Hydrocarbons	2020/12/14		103	%	30 - 130
			>C21-<C32 Hydrocarbons	2020/12/14		NC	%	30 - 130
7107549	MSK	Spiked Blank	Isobutylbenzene - Extractable	2020/12/14		102	%	60 - 130
			n-Dotriacontane - Extractable	2020/12/14		115	%	60 - 130
			>C10-C16 Hydrocarbons	2020/12/14		101	%	60 - 130
			>C16-C21 Hydrocarbons	2020/12/14		99	%	60 - 130
			>C21-<C32 Hydrocarbons	2020/12/14		111	%	60 - 130
7107549	MSK	Method Blank	Isobutylbenzene - Extractable	2020/12/14		97	%	60 - 130
			n-Dotriacontane - Extractable	2020/12/14		107	%	60 - 130
			>C10-C16 Hydrocarbons	2020/12/14	<10	mg/kg		
			>C16-C21 Hydrocarbons	2020/12/14	<10	mg/kg		
			>C21-<C32 Hydrocarbons	2020/12/14	<15	mg/kg		
7107551	SHW	Spiked Blank	Conductivity	2020/12/14		101	%	80 - 120
7107551	SHW	Method Blank	Conductivity	2020/12/14	1.0, RDL=1.0		uS/cm	
			Conductivity	2020/12/14	1.4	%	10	
7107553	SHW	Spiked Blank	pH	2020/12/14		100	%	97 - 103
7107553	SHW	RPD	pH	2020/12/14	2.1		%	N/A
7107718	BAN	Matrix Spike	Acid Extractable Antimony (Sb)	2020/12/14		102	%	75 - 125
			Acid Extractable Arsenic (As)	2020/12/14		99	%	75 - 125
			Acid Extractable Barium (Ba)	2020/12/14		102	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/12/14		100	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/12/14		103	%	75 - 125
			Acid Extractable Boron (B)	2020/12/14		83	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/12/14		98	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/12/14		100	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/12/14		99	%	75 - 125
			Acid Extractable Copper (Cu)	2020/12/14		99	%	75 - 125
			Acid Extractable Lead (Pb)	2020/12/14		101	%	75 - 125
			Acid Extractable Lithium (Li)	2020/12/14		105	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/12/14		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2020/12/14		98	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/12/14		98	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/12/14		99	%	75 - 125



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Golder Associates Ltd  
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Site Location: BURGEO  
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### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7107718	BAN	Spiked Blank	Acid Extractable Rubidium (Rb)	2020/12/14		96	%	75 - 125
			Acid Extractable Selenium (Se)	2020/12/14		97	%	75 - 125
			Acid Extractable Silver (Ag)	2020/12/14		103	%	75 - 125
			Acid Extractable Strontium (Sr)	2020/12/14		102	%	75 - 125
			Acid Extractable Thallium (Tl)	2020/12/14		101	%	75 - 125
			Acid Extractable Tin (Sn)	2020/12/14		102	%	75 - 125
			Acid Extractable Uranium (U)	2020/12/14		104	%	75 - 125
			Acid Extractable Vanadium (V)	2020/12/14		111	%	75 - 125
			Acid Extractable Zinc (Zn)	2020/12/14		98	%	75 - 125
			Acid Extractable Antimony (Sb)	2020/12/14		106	%	75 - 125
			Acid Extractable Arsenic (As)	2020/12/14		97	%	75 - 125
			Acid Extractable Barium (Ba)	2020/12/14		98	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/12/14		97	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/12/14		99	%	75 - 125
			Acid Extractable Boron (B)	2020/12/14		98	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/12/14		96	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/12/14		94	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/12/14		93	%	75 - 125
			Acid Extractable Copper (Cu)	2020/12/14		95	%	75 - 125
			Acid Extractable Lead (Pb)	2020/12/14		97	%	75 - 125
			Acid Extractable Lithium (Li)	2020/12/14		102	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/12/14		97	%	75 - 125
			Acid Extractable Mercury (Hg)	2020/12/14		107	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/12/14		103	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/12/14		98	%	75 - 125
			Acid Extractable Rubidium (Rb)	2020/12/14		95	%	75 - 125
			Acid Extractable Selenium (Se)	2020/12/14		100	%	75 - 125
			Acid Extractable Silver (Ag)	2020/12/14		98	%	75 - 125
			Acid Extractable Strontium (Sr)	2020/12/14		100	%	75 - 125
			Acid Extractable Thallium (Tl)	2020/12/14		97	%	75 - 125
			Acid Extractable Tin (Sn)	2020/12/14		107	%	75 - 125
			Acid Extractable Uranium (U)	2020/12/14		99	%	75 - 125
			Acid Extractable Vanadium (V)	2020/12/14		98	%	75 - 125
Acid Extractable Zinc (Zn)	2020/12/14		95	%	75 - 125			
7107718	BAN	Method Blank	Acid Extractable Aluminum (Al)	2020/12/14	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2020/12/14	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2020/12/14	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2020/12/14	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2020/12/14	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2020/12/14	<2.0		mg/kg	
			Acid Extractable Boron (B)	2020/12/14	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2020/12/14	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2020/12/14	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2020/12/14	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2020/12/14	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2020/12/14	<50		mg/kg	
			Acid Extractable Lead (Pb)	2020/12/14	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2020/12/14	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2020/12/14	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2020/12/14	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2020/12/14	<2.0		mg/kg	
Acid Extractable Nickel (Ni)	2020/12/14	<2.0		mg/kg				
Acid Extractable Rubidium (Rb)	2020/12/14	<2.0		mg/kg				



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BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Selenium (Se)	2020/12/14	<0.50		mg/kg	
			Acid Extractable Silver (Ag)	2020/12/14	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2020/12/14	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2020/12/14	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2020/12/14	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2020/12/14	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2020/12/14	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2020/12/14	<5.0		mg/kg	
7107718	BAN	RPD	Acid Extractable Aluminum (Al)	2020/12/14	1.6		%	35
			Acid Extractable Antimony (Sb)	2020/12/14	NC		%	35
			Acid Extractable Arsenic (As)	2020/12/14	1.4		%	35
			Acid Extractable Barium (Ba)	2020/12/14	0.56		%	35
			Acid Extractable Beryllium (Be)	2020/12/14	NC		%	35
			Acid Extractable Bismuth (Bi)	2020/12/14	NC		%	35
			Acid Extractable Boron (B)	2020/12/14	NC		%	35
			Acid Extractable Cadmium (Cd)	2020/12/14	NC		%	35
			Acid Extractable Chromium (Cr)	2020/12/14	0.12		%	35
			Acid Extractable Cobalt (Co)	2020/12/14	2.2		%	35
			Acid Extractable Copper (Cu)	2020/12/14	1.2		%	35
			Acid Extractable Iron (Fe)	2020/12/14	5.6		%	35
			Acid Extractable Lead (Pb)	2020/12/14	11		%	35
			Acid Extractable Lithium (Li)	2020/12/14	0.12		%	35
			Acid Extractable Manganese (Mn)	2020/12/14	4.7		%	35
			Acid Extractable Mercury (Hg)	2020/12/14	NC		%	35
			Acid Extractable Molybdenum (Mo)	2020/12/14	NC		%	35
			Acid Extractable Nickel (Ni)	2020/12/14	1.1		%	35
			Acid Extractable Rubidium (Rb)	2020/12/14	1.1		%	35
			Acid Extractable Selenium (Se)	2020/12/14	NC		%	35
			Acid Extractable Silver (Ag)	2020/12/14	NC		%	35
			Acid Extractable Strontium (Sr)	2020/12/14	11		%	35
			Acid Extractable Thallium (Tl)	2020/12/14	NC		%	35
			Acid Extractable Tin (Sn)	2020/12/14	NC		%	35
			Acid Extractable Uranium (U)	2020/12/14	4.8		%	35
			Acid Extractable Vanadium (V)	2020/12/14	15		%	35
			Acid Extractable Zinc (Zn)	2020/12/14	1.7		%	35
7108396	BAN	Matrix Spike [OJL976-01]	Acid Extractable Antimony (Sb)	2020/12/15		100	%	75 - 125
			Acid Extractable Arsenic (As)	2020/12/15		102	%	75 - 125
			Acid Extractable Barium (Ba)	2020/12/15		105	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/12/15		106	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/12/15		108	%	75 - 125
			Acid Extractable Boron (B)	2020/12/15		98	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/12/15		107	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/12/15		107	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/12/15		107	%	75 - 125
			Acid Extractable Copper (Cu)	2020/12/15		108	%	75 - 125
			Acid Extractable Lead (Pb)	2020/12/15		106	%	75 - 125
			Acid Extractable Lithium (Li)	2020/12/15		110	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/12/15		113	%	75 - 125
			Acid Extractable Mercury (Hg)	2020/12/15		102	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/12/15		108	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/12/15		110	%	75 - 125
			Acid Extractable Rubidium (Rb)	2020/12/15		108	%	75 - 125
			Acid Extractable Selenium (Se)	2020/12/15		101	%	75 - 125





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BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7108396	BAN	Spiked Blank	Acid Extractable Silver (Ag)	2020/12/15		105	%	75 - 125
			Acid Extractable Strontium (Sr)	2020/12/15		111	%	75 - 125
			Acid Extractable Thallium (Tl)	2020/12/15		105	%	75 - 125
			Acid Extractable Tin (Sn)	2020/12/15		110	%	75 - 125
			Acid Extractable Uranium (U)	2020/12/15		110	%	75 - 125
			Acid Extractable Vanadium (V)	2020/12/15		111	%	75 - 125
			Acid Extractable Zinc (Zn)	2020/12/15		106	%	75 - 125
			Acid Extractable Antimony (Sb)	2020/12/15		107	%	75 - 125
			Acid Extractable Arsenic (As)	2020/12/15		102	%	75 - 125
			Acid Extractable Barium (Ba)	2020/12/15		99	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/12/15		98	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/12/15		100	%	75 - 125
			Acid Extractable Boron (B)	2020/12/15		99	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/12/15		100	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/12/15		100	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/12/15		99	%	75 - 125
			Acid Extractable Copper (Cu)	2020/12/15		102	%	75 - 125
			Acid Extractable Lead (Pb)	2020/12/15		100	%	75 - 125
			Acid Extractable Lithium (Li)	2020/12/15		104	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/12/15		103	%	75 - 125
			Acid Extractable Mercury (Hg)	2020/12/15		103	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/12/15		104	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/12/15		103	%	75 - 125
			Acid Extractable Rubidium (Rb)	2020/12/15		100	%	75 - 125
			Acid Extractable Selenium (Se)	2020/12/15		100	%	75 - 125
			Acid Extractable Silver (Ag)	2020/12/15		102	%	75 - 125
			Acid Extractable Strontium (Sr)	2020/12/15		106	%	75 - 125
			Acid Extractable Thallium (Tl)	2020/12/15		101	%	75 - 125
			Acid Extractable Tin (Sn)	2020/12/15		99	%	75 - 125
			Acid Extractable Uranium (U)	2020/12/15		102	%	75 - 125
			Acid Extractable Vanadium (V)	2020/12/15		101	%	75 - 125
			Acid Extractable Zinc (Zn)	2020/12/15		100	%	75 - 125
			7108396	BAN	Method Blank	Acid Extractable Aluminum (Al)	2020/12/15	<10
Acid Extractable Antimony (Sb)	2020/12/15	<2.0					mg/kg	
Acid Extractable Arsenic (As)	2020/12/15	<2.0					mg/kg	
Acid Extractable Barium (Ba)	2020/12/15	<5.0					mg/kg	
Acid Extractable Beryllium (Be)	2020/12/15	<2.0					mg/kg	
Acid Extractable Bismuth (Bi)	2020/12/15	<2.0					mg/kg	
Acid Extractable Boron (B)	2020/12/15	<50					mg/kg	
Acid Extractable Cadmium (Cd)	2020/12/15	<0.30					mg/kg	
Acid Extractable Chromium (Cr)	2020/12/15	<2.0					mg/kg	
Acid Extractable Cobalt (Co)	2020/12/15	<1.0					mg/kg	
Acid Extractable Copper (Cu)	2020/12/15	<2.0					mg/kg	
Acid Extractable Iron (Fe)	2020/12/15	<50					mg/kg	
Acid Extractable Lead (Pb)	2020/12/15	<0.50					mg/kg	
Acid Extractable Lithium (Li)	2020/12/15	<2.0					mg/kg	
Acid Extractable Manganese (Mn)	2020/12/15	<2.0					mg/kg	
Acid Extractable Mercury (Hg)	2020/12/15	<0.10					mg/kg	
Acid Extractable Molybdenum (Mo)	2020/12/15	<2.0					mg/kg	
Acid Extractable Nickel (Ni)	2020/12/15	<2.0					mg/kg	
Acid Extractable Rubidium (Rb)	2020/12/15	<2.0		mg/kg				
Acid Extractable Selenium (Se)	2020/12/15	<0.50		mg/kg				
Acid Extractable Silver (Ag)	2020/12/15	<0.50		mg/kg				



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VERITAS

BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7108396	BAN	RPD [OJL976-01]	Acid Extractable Strontium (Sr)	2020/12/15	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2020/12/15	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2020/12/15	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2020/12/15	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2020/12/15	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2020/12/15	<5.0		mg/kg	
			Acid Extractable Aluminum (Al)	2020/12/15	1.3	%	35	
			Acid Extractable Antimony (Sb)	2020/12/15	NC	%	35	
			Acid Extractable Arsenic (As)	2020/12/15	4.7	%	35	
			Acid Extractable Barium (Ba)	2020/12/15	3.5	%	35	
			Acid Extractable Beryllium (Be)	2020/12/15	NC	%	35	
			Acid Extractable Bismuth (Bi)	2020/12/15	NC	%	35	
			Acid Extractable Boron (B)	2020/12/15	NC	%	35	
			Acid Extractable Cadmium (Cd)	2020/12/15	1.2	%	35	
			Acid Extractable Chromium (Cr)	2020/12/15	4.3	%	35	
			Acid Extractable Cobalt (Co)	2020/12/15	NC	%	35	
			Acid Extractable Copper (Cu)	2020/12/15	1.8	%	35	
			Acid Extractable Iron (Fe)	2020/12/15	3.7	%	35	
			Acid Extractable Lead (Pb)	2020/12/15	1.3	%	35	
			Acid Extractable Lithium (Li)	2020/12/15	NC	%	35	
			Acid Extractable Manganese (Mn)	2020/12/15	3.4	%	35	
			Acid Extractable Mercury (Hg)	2020/12/15	3.7	%	35	
			Acid Extractable Molybdenum (Mo)	2020/12/15	NC	%	35	
			Acid Extractable Nickel (Ni)	2020/12/15	4.8	%	35	
			Acid Extractable Rubidium (Rb)	2020/12/15	0.92	%	35	
			Acid Extractable Selenium (Se)	2020/12/15	4.5	%	35	
			Acid Extractable Silver (Ag)	2020/12/15	NC	%	35	
			Acid Extractable Strontium (Sr)	2020/12/15	2.5	%	35	
			Acid Extractable Thallium (Tl)	2020/12/15	NC	%	35	
			Acid Extractable Tin (Sn)	2020/12/15	2.3	%	35	
			Acid Extractable Uranium (U)	2020/12/15	1.5	%	35	
			Acid Extractable Vanadium (V)	2020/12/15	5.3	%	35	
			Acid Extractable Zinc (Zn)	2020/12/15	0.92	%	35	
7108405	BAN	Matrix Spike [OJL990-01]	Acid Extractable Antimony (Sb)	2020/12/16		112	%	75 - 125
			Acid Extractable Arsenic (As)	2020/12/16		100	%	75 - 125
			Acid Extractable Barium (Ba)	2020/12/16		112	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/12/16		106	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/12/16		107	%	75 - 125
			Acid Extractable Boron (B)	2020/12/16		100	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/12/16		106	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/12/16		106	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/12/16		104	%	75 - 125
			Acid Extractable Copper (Cu)	2020/12/16		107	%	75 - 125
			Acid Extractable Lead (Pb)	2020/12/16		110	%	75 - 125
			Acid Extractable Lithium (Li)	2020/12/16		112	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/12/16		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2020/12/16		102	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/12/16		104	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/12/16		107	%	75 - 125
			Acid Extractable Rubidium (Rb)	2020/12/16		108	%	75 - 125
			Acid Extractable Selenium (Se)	2020/12/16		101	%	75 - 125
Acid Extractable Silver (Ag)	2020/12/16		106	%	75 - 125			
Acid Extractable Strontium (Sr)	2020/12/16		110	%	75 - 125			



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BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7108405	BAN	Spiked Blank	Acid Extractable Thallium (Tl)	2020/12/16		108	%	75 - 125
			Acid Extractable Tin (Sn)	2020/12/16		113	%	75 - 125
			Acid Extractable Uranium (U)	2020/12/16		108	%	75 - 125
			Acid Extractable Vanadium (V)	2020/12/16		114	%	75 - 125
			Acid Extractable Zinc (Zn)	2020/12/16		107	%	75 - 125
			Acid Extractable Antimony (Sb)	2020/12/16		109	%	75 - 125
			Acid Extractable Arsenic (As)	2020/12/16		102	%	75 - 125
			Acid Extractable Barium (Ba)	2020/12/16		99	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/12/16		100	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/12/16		102	%	75 - 125
			Acid Extractable Boron (B)	2020/12/16		110	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/12/16		99	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/12/16		100	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/12/16		99	%	75 - 125
			Acid Extractable Copper (Cu)	2020/12/16		101	%	75 - 125
			Acid Extractable Lead (Pb)	2020/12/16		100	%	75 - 125
			Acid Extractable Lithium (Li)	2020/12/16		104	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/12/16		103	%	75 - 125
			Acid Extractable Mercury (Hg)	2020/12/16		105	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/12/16		101	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/12/16		105	%	75 - 125
			Acid Extractable Rubidium (Rb)	2020/12/16		100	%	75 - 125
			Acid Extractable Selenium (Se)	2020/12/16		100	%	75 - 125
			Acid Extractable Silver (Ag)	2020/12/16		103	%	75 - 125
			Acid Extractable Strontium (Sr)	2020/12/16		104	%	75 - 125
			Acid Extractable Thallium (Tl)	2020/12/16		101	%	75 - 125
			Acid Extractable Tin (Sn)	2020/12/16		95	%	75 - 125
Acid Extractable Uranium (U)	2020/12/16		102	%	75 - 125			
Acid Extractable Vanadium (V)	2020/12/16		103	%	75 - 125			
Acid Extractable Zinc (Zn)	2020/12/16		102	%	75 - 125			
7108405	BAN	Method Blank	Acid Extractable Aluminum (Al)	2020/12/16	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2020/12/16	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2020/12/16	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2020/12/16	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2020/12/16	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2020/12/16	<2.0		mg/kg	
			Acid Extractable Boron (B)	2020/12/16	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2020/12/16	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2020/12/16	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2020/12/16	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2020/12/16	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2020/12/16	<50		mg/kg	
			Acid Extractable Lead (Pb)	2020/12/16	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2020/12/16	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2020/12/16	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2020/12/16	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2020/12/16	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2020/12/16	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2020/12/16	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2020/12/16	<0.50		mg/kg	
			Acid Extractable Silver (Ag)	2020/12/16	<0.50		mg/kg	
Acid Extractable Strontium (Sr)	2020/12/16	<5.0		mg/kg				
Acid Extractable Thallium (Tl)	2020/12/16	<0.10		mg/kg				



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7108405	BAN	RPD [OJL990-01]	Acid Extractable Tin (Sn)	2020/12/16	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2020/12/16	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2020/12/16	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2020/12/16	<5.0		mg/kg	
			Acid Extractable Aluminum (Al)	2020/12/16	26		%	35
			Acid Extractable Antimony (Sb)	2020/12/16	NC		%	35
			Acid Extractable Arsenic (As)	2020/12/16	NC		%	35
			Acid Extractable Barium (Ba)	2020/12/16	28		%	35
			Acid Extractable Beryllium (Be)	2020/12/16	NC		%	35
			Acid Extractable Bismuth (Bi)	2020/12/16	NC		%	35
			Acid Extractable Boron (B)	2020/12/16	NC		%	35
			Acid Extractable Cadmium (Cd)	2020/12/16	NC		%	35
			Acid Extractable Chromium (Cr)	2020/12/16	22		%	35
			Acid Extractable Cobalt (Co)	2020/12/16	23		%	35
			Acid Extractable Copper (Cu)	2020/12/16	NC		%	35
			Acid Extractable Iron (Fe)	2020/12/16	25		%	35
			Acid Extractable Lead (Pb)	2020/12/16	16		%	35
			Acid Extractable Lithium (Li)	2020/12/16	28		%	35
			Acid Extractable Manganese (Mn)	2020/12/16	26		%	35
			Acid Extractable Mercury (Hg)	2020/12/16	NC		%	35
			Acid Extractable Molybdenum (Mo)	2020/12/16	NC		%	35
			Acid Extractable Nickel (Ni)	2020/12/16	18		%	35
			Acid Extractable Rubidium (Rb)	2020/12/16	29		%	35
			Acid Extractable Selenium (Se)	2020/12/16	NC		%	35
			Acid Extractable Silver (Ag)	2020/12/16	NC		%	35
			Acid Extractable Strontium (Sr)	2020/12/16	NC		%	35
			Acid Extractable Thallium (Tl)	2020/12/16	26		%	35
			Acid Extractable Tin (Sn)	2020/12/16	NC		%	35
			Acid Extractable Uranium (U)	2020/12/16	15		%	35
			Acid Extractable Vanadium (V)	2020/12/16	25		%	35
			Acid Extractable Zinc (Zn)	2020/12/16	26		%	35
			7109675	MCN	Matrix Spike	Total Alkalinity (Total as CaCO3)	2020/12/15	
7109675	MCN	Spiked Blank	Total Alkalinity (Total as CaCO3)	2020/12/15		109	%	80 - 120
7109675	MCN	Method Blank	Total Alkalinity (Total as CaCO3)	2020/12/15	<5.0		mg/L	
7109675	MCN	RPD	Total Alkalinity (Total as CaCO3)	2020/12/15	9.2		%	20
7109677	MCN	Matrix Spike	Dissolved Chloride (Cl-)	2020/12/15		89	%	80 - 120
7109677	MCN	Spiked Blank	Dissolved Chloride (Cl-)	2020/12/15		99	%	80 - 120
7109677	MCN	Method Blank	Dissolved Chloride (Cl-)	2020/12/15	<1.0		mg/L	
7109677	MCN	RPD	Dissolved Chloride (Cl-)	2020/12/15	4.0		%	20
7109678	MCN	Matrix Spike	Dissolved Sulphate (SO4)	2020/12/15		99	%	80 - 120
7109678	MCN	Spiked Blank	Dissolved Sulphate (SO4)	2020/12/15		102	%	80 - 120
7109678	MCN	Method Blank	Dissolved Sulphate (SO4)	2020/12/15	<2.0		mg/L	
7109678	MCN	RPD	Dissolved Sulphate (SO4)	2020/12/15	0.063		%	20
7109679	MCN	Matrix Spike	Reactive Silica (SiO2)	2020/12/15		101	%	80 - 120
7109679	MCN	Spiked Blank	Reactive Silica (SiO2)	2020/12/15		100	%	80 - 120
7109679	MCN	Method Blank	Reactive Silica (SiO2)	2020/12/15	<0.50		mg/L	
7109679	MCN	RPD	Reactive Silica (SiO2)	2020/12/15	8.6		%	20
7109680	MCN	Spiked Blank	Colour	2020/12/15		99	%	80 - 120
7109680	MCN	Method Blank	Colour	2020/12/15	<5.0		TCU	
7109680	MCN	RPD	Colour	2020/12/15	2.6		%	20
7109681	MCN	Matrix Spike	Orthophosphate (P)	2020/12/15		91	%	80 - 120
7109681	MCN	Spiked Blank	Orthophosphate (P)	2020/12/15		96	%	80 - 120
7109681	MCN	Method Blank	Orthophosphate (P)	2020/12/15	<0.010		mg/L	



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7109681	MCN	RPD	Orthophosphate (P)	2020/12/15	9.3		%	20
7109682	MCN	Matrix Spike	Nitrate + Nitrite (N)	2020/12/15		NC	%	80 - 120
7109682	MCN	Spiked Blank	Nitrate + Nitrite (N)	2020/12/15		102	%	80 - 120
7109682	MCN	Method Blank	Nitrate + Nitrite (N)	2020/12/15	<0.050		mg/L	
7109682	MCN	RPD	Nitrate + Nitrite (N)	2020/12/15	5.7		%	20
7109685	MCN	Matrix Spike	Nitrite (N)	2020/12/15		93	%	80 - 120
7109685	MCN	Spiked Blank	Nitrite (N)	2020/12/15		106	%	80 - 120
7109685	MCN	Method Blank	Nitrite (N)	2020/12/16	<0.010		mg/L	
7109685	MCN	RPD	Nitrite (N)	2020/12/15	0.054		%	20
7109687	MCN	Matrix Spike	Total Alkalinity (Total as CaCO3)	2020/12/15		96	%	80 - 120
7109687	MCN	Spiked Blank	Total Alkalinity (Total as CaCO3)	2020/12/15		111	%	80 - 120
7109687	MCN	Method Blank	Total Alkalinity (Total as CaCO3)	2020/12/15	<5.0		mg/L	
7109687	MCN	RPD	Total Alkalinity (Total as CaCO3)	2020/12/15	0.75		%	20
7109688	MCN	Matrix Spike	Dissolved Chloride (Cl-)	2020/12/15		88	%	80 - 120
7109688	MCN	Spiked Blank	Dissolved Chloride (Cl-)	2020/12/15		100	%	80 - 120
7109688	MCN	Method Blank	Dissolved Chloride (Cl-)	2020/12/15	<1.0		mg/L	
7109688	MCN	RPD	Dissolved Chloride (Cl-)	2020/12/15	2.1		%	20
7109689	MCN	Matrix Spike	Dissolved Sulphate (SO4)	2020/12/15		102	%	80 - 120
7109689	MCN	Spiked Blank	Dissolved Sulphate (SO4)	2020/12/15		103	%	80 - 120
7109689	MCN	Method Blank	Dissolved Sulphate (SO4)	2020/12/15	<2.0		mg/L	
7109689	MCN	RPD	Dissolved Sulphate (SO4)	2020/12/15	3.3		%	20
7109690	MCN	Matrix Spike	Reactive Silica (SiO2)	2020/12/15		101	%	80 - 120
7109690	MCN	Spiked Blank	Reactive Silica (SiO2)	2020/12/15		104	%	80 - 120
7109690	MCN	Method Blank	Reactive Silica (SiO2)	2020/12/16	<0.50		mg/L	
7109690	MCN	RPD	Reactive Silica (SiO2)	2020/12/15	1.8		%	20
7109691	MCN	Spiked Blank	Colour	2020/12/15		95	%	80 - 120
7109691	MCN	Method Blank	Colour	2020/12/15	<5.0		TCU	
7109691	MCN	RPD	Colour	2020/12/15	6.8		%	20
7109692	MCN	Matrix Spike	Orthophosphate (P)	2020/12/15		96	%	80 - 120
7109692	MCN	Spiked Blank	Orthophosphate (P)	2020/12/15		101	%	80 - 120
7109692	MCN	Method Blank	Orthophosphate (P)	2020/12/15	<0.010		mg/L	
7109692	MCN	RPD	Orthophosphate (P)	2020/12/15	3.0		%	20
7109693	MCN	Matrix Spike	Nitrate + Nitrite (N)	2020/12/15		107	%	80 - 120
7109693	MCN	Spiked Blank	Nitrate + Nitrite (N)	2020/12/15		102	%	80 - 120
7109693	MCN	Method Blank	Nitrate + Nitrite (N)	2020/12/15	<0.050		mg/L	
7109693	MCN	RPD	Nitrate + Nitrite (N)	2020/12/15	2.5		%	20
7109694	MCN	Matrix Spike	Nitrite (N)	2020/12/15		86	%	80 - 120
7109694	MCN	Spiked Blank	Nitrite (N)	2020/12/15		95	%	80 - 120
7109694	MCN	Method Blank	Nitrite (N)	2020/12/16	<0.010		mg/L	
7109694	MCN	RPD	Nitrite (N)	2020/12/15	4.4		%	20
7109740	SHW	Spiked Blank	Conductivity	2020/12/15		100	%	80 - 120
7109740	SHW	Method Blank	Conductivity	2020/12/15	<1.0		uS/cm	
7109740	SHW	RPD [OJL972-06]	Conductivity	2020/12/15	0.44		%	10
7109742	SHW	Spiked Blank	pH	2020/12/15		100	%	97 - 103
7109742	SHW	RPD [OJL972-06]	pH	2020/12/15	1.6		%	N/A
7109743	SHW	Spiked Blank	Conductivity	2020/12/15		100	%	80 - 120
7109743	SHW	Method Blank	Conductivity	2020/12/15	<1.0		uS/cm	
7109743	SHW	RPD	Conductivity	2020/12/15	0.39		%	10
7109744	SHW	Spiked Blank	pH	2020/12/15		100	%	97 - 103
7109744	SHW	RPD	pH	2020/12/15	1.0		%	N/A
7109794	NHU	Matrix Spike	Total Mercury (Hg)	2020/12/16		98	%	80 - 120
7109794	NHU	Spiked Blank	Total Mercury (Hg)	2020/12/16		101	%	80 - 120
7109794	NHU	Method Blank	Total Mercury (Hg)	2020/12/16	<0.013		ug/L	



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7109794	NHU	RPD	Total Mercury (Hg)	2020/12/16	19		%	20
7109819	NHU	Matrix Spike [OJL954-02]	Total Mercury (Hg)	2020/12/16		100	%	80 - 120
7109819	NHU	Spiked Blank	Total Mercury (Hg)	2020/12/16		102	%	80 - 120
7109819	NHU	Method Blank	Total Mercury (Hg)	2020/12/16	<0.013		ug/L	
7109819	NHU	RPD [OJL953-02]	Total Mercury (Hg)	2020/12/16	NC		%	20
7109896	MLB	Matrix Spike	Acid Extractable Antimony (Sb)	2020/12/16		111	%	75 - 125
			Acid Extractable Arsenic (As)	2020/12/16		108	%	75 - 125
			Acid Extractable Barium (Ba)	2020/12/16		109	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/12/16		107	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/12/16		107	%	75 - 125
			Acid Extractable Boron (B)	2020/12/16		82	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/12/16		105	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/12/16		107	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/12/16		104	%	75 - 125
			Acid Extractable Copper (Cu)	2020/12/16		107	%	75 - 125
			Acid Extractable Lead (Pb)	2020/12/16		107	%	75 - 125
			Acid Extractable Lithium (Li)	2020/12/16		111	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/12/16		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2020/12/16		105	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/12/16		109	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/12/16		108	%	75 - 125
			Acid Extractable Rubidium (Rb)	2020/12/16		101	%	75 - 125
			Acid Extractable Selenium (Se)	2020/12/16		103	%	75 - 125
			Acid Extractable Silver (Ag)	2020/12/16		108	%	75 - 125
			Acid Extractable Strontium (Sr)	2020/12/16		109	%	75 - 125
			Acid Extractable Thallium (Tl)	2020/12/16		109	%	75 - 125
			Acid Extractable Tin (Sn)	2020/12/16		104	%	75 - 125
			Acid Extractable Uranium (U)	2020/12/16		107	%	75 - 125
			Acid Extractable Vanadium (V)	2020/12/16		114	%	75 - 125
			Acid Extractable Zinc (Zn)	2020/12/16		NC	%	75 - 125
7109896	MLB	Spiked Blank	Acid Extractable Antimony (Sb)	2020/12/16		113	%	75 - 125
			Acid Extractable Arsenic (As)	2020/12/16		101	%	75 - 125
			Acid Extractable Barium (Ba)	2020/12/16		99	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/12/16		99	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/12/16		97	%	75 - 125
			Acid Extractable Boron (B)	2020/12/16		96	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/12/16		100	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/12/16		99	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/12/16		98	%	75 - 125
			Acid Extractable Copper (Cu)	2020/12/16		98	%	75 - 125
			Acid Extractable Lead (Pb)	2020/12/16		99	%	75 - 125
			Acid Extractable Lithium (Li)	2020/12/16		101	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/12/16		101	%	75 - 125
			Acid Extractable Mercury (Hg)	2020/12/16		106	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/12/16		102	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/12/16		101	%	75 - 125
			Acid Extractable Rubidium (Rb)	2020/12/16		99	%	75 - 125
			Acid Extractable Selenium (Se)	2020/12/16		97	%	75 - 125
			Acid Extractable Silver (Ag)	2020/12/16		99	%	75 - 125
			Acid Extractable Strontium (Sr)	2020/12/16		102	%	75 - 125
			Acid Extractable Thallium (Tl)	2020/12/16		102	%	75 - 125
			Acid Extractable Tin (Sn)	2020/12/16		96	%	75 - 125
			Acid Extractable Uranium (U)	2020/12/16		100	%	75 - 125



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7109896	MLB	Method Blank	Acid Extractable Vanadium (V)	2020/12/16		102	%	75 - 125
			Acid Extractable Zinc (Zn)	2020/12/16		102	%	75 - 125
			Acid Extractable Aluminum (Al)	2020/12/16	<10	mg/kg		
			Acid Extractable Antimony (Sb)	2020/12/16	<2.0	mg/kg		
			Acid Extractable Arsenic (As)	2020/12/16	<2.0	mg/kg		
			Acid Extractable Barium (Ba)	2020/12/16	<5.0	mg/kg		
			Acid Extractable Beryllium (Be)	2020/12/16	<2.0	mg/kg		
			Acid Extractable Bismuth (Bi)	2020/12/16	<2.0	mg/kg		
			Acid Extractable Boron (B)	2020/12/16	<50	mg/kg		
			Acid Extractable Cadmium (Cd)	2020/12/16	<0.30	mg/kg		
			Acid Extractable Chromium (Cr)	2020/12/16	<2.0	mg/kg		
			Acid Extractable Cobalt (Co)	2020/12/16	<1.0	mg/kg		
			Acid Extractable Copper (Cu)	2020/12/16	<2.0	mg/kg		
			Acid Extractable Iron (Fe)	2020/12/16	<50	mg/kg		
			Acid Extractable Lead (Pb)	2020/12/16	<0.50	mg/kg		
			Acid Extractable Lithium (Li)	2020/12/16	<2.0	mg/kg		
			Acid Extractable Manganese (Mn)	2020/12/16	<2.0	mg/kg		
			Acid Extractable Mercury (Hg)	2020/12/16	<0.10	mg/kg		
			Acid Extractable Molybdenum (Mo)	2020/12/16	<2.0	mg/kg		
			Acid Extractable Nickel (Ni)	2020/12/16	<2.0	mg/kg		
			Acid Extractable Rubidium (Rb)	2020/12/16	<2.0	mg/kg		
			Acid Extractable Selenium (Se)	2020/12/16	<0.50	mg/kg		
			Acid Extractable Silver (Ag)	2020/12/16	<0.50	mg/kg		
			Acid Extractable Strontium (Sr)	2020/12/16	<5.0	mg/kg		
			Acid Extractable Thallium (Tl)	2020/12/16	<0.10	mg/kg		
			Acid Extractable Tin (Sn)	2020/12/16	<1.0	mg/kg		
			Acid Extractable Uranium (U)	2020/12/16	<0.10	mg/kg		
Acid Extractable Vanadium (V)	2020/12/16	<2.0	mg/kg					
Acid Extractable Zinc (Zn)	2020/12/16	<5.0	mg/kg					
7109896	MLB	RPD	Acid Extractable Arsenic (As)	2020/12/16	4.1		%	35
			Acid Extractable Cadmium (Cd)	2020/12/16	3.1		%	35
			Acid Extractable Copper (Cu)	2020/12/16	1.1		%	35
			Acid Extractable Lead (Pb)	2020/12/16	0.18		%	35
			Acid Extractable Mercury (Hg)	2020/12/16	3.2		%	35
			Acid Extractable Tin (Sn)	2020/12/16	2.4		%	35
			Acid Extractable Zinc (Zn)	2020/12/16	2.7		%	35
7109945	MCN	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2020/12/15		NC	%	80 - 120
7109945	MCN	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2020/12/16		104	%	80 - 120
7109945	MCN	Method Blank	Nitrogen (Ammonia Nitrogen)	2020/12/16	<0.050		mg/L	
7109945	MCN	RPD	Nitrogen (Ammonia Nitrogen)	2020/12/15	5.0		%	20
7109951	MCN	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2020/12/15		109	%	80 - 120
7109951	MCN	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2020/12/15		102	%	80 - 120
7109951	MCN	Method Blank	Nitrogen (Ammonia Nitrogen)	2020/12/15	<0.050		mg/L	
7109951	MCN	RPD	Nitrogen (Ammonia Nitrogen)	2020/12/15	NC		%	20
7109952	MCN	Matrix Spike [OJL970-06]	Nitrogen (Ammonia Nitrogen)	2020/12/15		101	%	80 - 120
7109952	MCN	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2020/12/15		102	%	80 - 120
7109952	MCN	Method Blank	Nitrogen (Ammonia Nitrogen)	2020/12/15	<0.050		mg/L	
7109952	MCN	RPD [OJL970-06]	Nitrogen (Ammonia Nitrogen)	2020/12/15	NC		%	20
7110095	RST	Matrix Spike [OKG888-01]	D10-Anthracene	2020/12/17		92	%	50 - 130
			D14-Terphenyl	2020/12/17		95	%	50 - 130
			D8-Acenaphthylene	2020/12/17		92	%	50 - 130
			1-Methylnaphthalene	2020/12/17		92	%	50 - 130



BUREAU  
VERITAS

BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			2-Methylnaphthalene	2020/12/17		98	%	50 - 130
			Acenaphthene	2020/12/17		96	%	50 - 130
			Acenaphthylene	2020/12/17		84	%	50 - 130
			Anthracene	2020/12/17		96	%	50 - 130
			Benzo(a)anthracene	2020/12/17		95	%	50 - 130
			Benzo(a)pyrene	2020/12/17		80	%	50 - 130
			Benzo(b)fluoranthene	2020/12/17		83	%	50 - 130
			Benzo(g,h,i)perylene	2020/12/17		66	%	50 - 130
			Benzo(j)fluoranthene	2020/12/17		78	%	50 - 130
			Benzo(k)fluoranthene	2020/12/17		79	%	50 - 130
			Chrysene	2020/12/17		95	%	50 - 130
			Dibenzo(a,h)anthracene	2020/12/17		82	%	50 - 130
			Fluoranthene	2020/12/17		98	%	50 - 130
			Fluorene	2020/12/17		104	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/12/17		72	%	50 - 130
			Naphthalene	2020/12/17		93	%	50 - 130
			Perylene	2020/12/17		NC	%	50 - 130
			Phenanthrene	2020/12/17		101	%	50 - 130
			Pyrene	2020/12/17		97	%	50 - 130
7110095	RST	Spiked Blank	D10-Anthracene	2020/12/17		96	%	50 - 130
			D14-Terphenyl	2020/12/17		96	%	50 - 130
			D8-Acenaphthylene	2020/12/17		101	%	50 - 130
			1-Methylnaphthalene	2020/12/17		96	%	50 - 130
			2-Methylnaphthalene	2020/12/17		102	%	50 - 130
			Acenaphthene	2020/12/17		97	%	50 - 130
			Acenaphthylene	2020/12/17		93	%	50 - 130
			Anthracene	2020/12/17		103	%	50 - 130
			Benzo(a)anthracene	2020/12/17		103	%	50 - 130
			Benzo(a)pyrene	2020/12/17		97	%	50 - 130
			Benzo(b)fluoranthene	2020/12/17		97	%	50 - 130
			Benzo(g,h,i)perylene	2020/12/17		86	%	50 - 130
			Benzo(j)fluoranthene	2020/12/17		92	%	50 - 130
			Benzo(k)fluoranthene	2020/12/17		90	%	50 - 130
			Chrysene	2020/12/17		105	%	50 - 130
			Dibenzo(a,h)anthracene	2020/12/17		95	%	50 - 130
			Fluoranthene	2020/12/17		106	%	50 - 130
			Fluorene	2020/12/17		106	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/12/17		90	%	50 - 130
			Naphthalene	2020/12/17		100	%	50 - 130
			Perylene	2020/12/17		97	%	50 - 130
			Phenanthrene	2020/12/17		104	%	50 - 130
			Pyrene	2020/12/17		103	%	50 - 130
7110095	RST	Method Blank	D10-Anthracene	2020/12/17		104	%	50 - 130
			D14-Terphenyl	2020/12/17		101	%	50 - 130
			D8-Acenaphthylene	2020/12/17		102	%	50 - 130
			1-Methylnaphthalene	2020/12/17	<0.0050		mg/kg	
			2-Methylnaphthalene	2020/12/17	<0.0050		mg/kg	
			Acenaphthene	2020/12/17	<0.0050		mg/kg	
			Acenaphthylene	2020/12/17	<0.0050		mg/kg	
			Anthracene	2020/12/17	<0.0050		mg/kg	
			Benzo(a)anthracene	2020/12/17	<0.0050		mg/kg	
			Benzo(a)pyrene	2020/12/17	<0.0050		mg/kg	
			Benzo(b)fluoranthene	2020/12/17	<0.0050		mg/kg	





**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(g,h,i)perylene	2020/12/17	<0.0050		mg/kg	
			Benzo(j)fluoranthene	2020/12/17	<0.0050		mg/kg	
			Benzo(k)fluoranthene	2020/12/17	<0.0050		mg/kg	
			Chrysene	2020/12/17	<0.0050		mg/kg	
			Dibenzo(a,h)anthracene	2020/12/17	<0.0050		mg/kg	
			Fluoranthene	2020/12/17	<0.0050		mg/kg	
			Fluorene	2020/12/17	<0.0050		mg/kg	
			Indeno(1,2,3-cd)pyrene	2020/12/17	<0.0050		mg/kg	
			Naphthalene	2020/12/17	<0.0050		mg/kg	
			Perylene	2020/12/17	<0.0050		mg/kg	
			Phenanthrene	2020/12/17	<0.0050		mg/kg	
			Pyrene	2020/12/17	<0.0050		mg/kg	
7110095	RST	RPD [OKG888-01]	1-Methylnaphthalene	2020/12/17	NC		%	50
			2-Methylnaphthalene	2020/12/17	NC		%	50
			Acenaphthene	2020/12/17	NC		%	50
			Acenaphthylene	2020/12/17	NC		%	50
			Anthracene	2020/12/17	NC		%	50
			Benzo(a)anthracene	2020/12/17	NC		%	50
			Benzo(a)pyrene	2020/12/17	NC		%	50
			Benzo(b)fluoranthene	2020/12/17	NC		%	50
			Benzo(g,h,i)perylene	2020/12/17	NC		%	50
			Benzo(j)fluoranthene	2020/12/17	NC		%	50
			Benzo(k)fluoranthene	2020/12/17	NC		%	50
			Chrysene	2020/12/17	NC		%	50
			Dibenzo(a,h)anthracene	2020/12/17	NC		%	50
			Fluoranthene	2020/12/17	NC		%	50
			Fluorene	2020/12/17	NC		%	50
			Indeno(1,2,3-cd)pyrene	2020/12/17	NC		%	50
			Naphthalene	2020/12/17	NC		%	50
			Perylene	2020/12/17	3.0		%	50
			Phenanthrene	2020/12/17	NC		%	50
			Pyrene	2020/12/17	NC		%	50
7110165	YLG	Matrix Spike [OJM007-01]	Total Organic Carbon (C)	2020/12/15		110	%	85 - 115
7110165	YLG	Spiked Blank	Total Organic Carbon (C)	2020/12/15		106	%	80 - 120
7110165	YLG	Method Blank	Total Organic Carbon (C)	2020/12/15	<0.50		mg/L	
7110165	YLG	RPD [OJM007-01]	Total Organic Carbon (C)	2020/12/15	0.73		%	15
7110226	LGE	Matrix Spike	D10-Anthracene	2020/12/17		92	%	50 - 130
			D14-Terphenyl	2020/12/17		97	%	50 - 130
			D8-Acenaphthylene	2020/12/17		94	%	50 - 130
			1-Methylnaphthalene	2020/12/17		83	%	50 - 130
			2-Methylnaphthalene	2020/12/17		86	%	50 - 130
			Acenaphthene	2020/12/17		81	%	50 - 130
			Acenaphthylene	2020/12/17		83	%	50 - 130
			Anthracene	2020/12/17		91	%	50 - 130
			Benzo(a)anthracene	2020/12/17		85	%	50 - 130
			Benzo(a)pyrene	2020/12/17		81	%	50 - 130
			Benzo(b)fluoranthene	2020/12/17		84	%	50 - 130
			Benzo(g,h,i)perylene	2020/12/17		69	%	50 - 130
			Benzo(j)fluoranthene	2020/12/17		84	%	50 - 130
			Benzo(k)fluoranthene	2020/12/17		85	%	50 - 130
			Chrysene	2020/12/17		89	%	50 - 130
			Dibenzo(a,h)anthracene	2020/12/17		77	%	50 - 130



BUREAU  
VERITAS

BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7110226	LGE	Spiked Blank	Fluoranthene	2020/12/17		88	%	50 - 130
			Fluorene	2020/12/17		89	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/12/17		73	%	50 - 130
			Naphthalene	2020/12/17		91	%	50 - 130
			Perylene	2020/12/17		75	%	50 - 130
			Phenanthrene	2020/12/17		87	%	50 - 130
			Pyrene	2020/12/17		91	%	50 - 130
			D10-Anthracene	2020/12/17		97	%	50 - 130
			D14-Terphenyl	2020/12/17		96	%	50 - 130
			D8-Acenaphthylene	2020/12/17		98	%	50 - 130
			1-Methylnaphthalene	2020/12/17		83	%	50 - 130
			2-Methylnaphthalene	2020/12/17		85	%	50 - 130
			Acenaphthene	2020/12/17		88	%	50 - 130
			Acenaphthylene	2020/12/17		90	%	50 - 130
			Anthracene	2020/12/17		95	%	50 - 130
			Benzo(a)anthracene	2020/12/17		84	%	50 - 130
			Benzo(a)pyrene	2020/12/17		82	%	50 - 130
			Benzo(b)fluoranthene	2020/12/17		84	%	50 - 130
			Benzo(g,h,i)perylene	2020/12/17		78	%	50 - 130
			Benzo(j)fluoranthene	2020/12/17		84	%	50 - 130
			Benzo(k)fluoranthene	2020/12/17		85	%	50 - 130
			Chrysene	2020/12/17		90	%	50 - 130
			Dibenzo(a,h)anthracene	2020/12/17		81	%	50 - 130
			Fluoranthene	2020/12/17		89	%	50 - 130
Fluorene	2020/12/17		90	%	50 - 130			
Indeno(1,2,3-cd)pyrene	2020/12/17		79	%	50 - 130			
Naphthalene	2020/12/17		89	%	50 - 130			
Perylene	2020/12/17		84	%	50 - 130			
Phenanthrene	2020/12/17		90	%	50 - 130			
Pyrene	2020/12/17		94	%	50 - 130			
7110226	LGE	Method Blank	D10-Anthracene	2020/12/17		99	%	50 - 130
			D14-Terphenyl	2020/12/17		97	%	50 - 130
			D8-Acenaphthylene	2020/12/17		99	%	50 - 130
			1-Methylnaphthalene	2020/12/17	<0.0050		mg/kg	
			2-Methylnaphthalene	2020/12/17	<0.0050		mg/kg	
			Acenaphthene	2020/12/17	<0.0050		mg/kg	
			Acenaphthylene	2020/12/17	<0.0050		mg/kg	
			Anthracene	2020/12/17	<0.0050		mg/kg	
			Benzo(a)anthracene	2020/12/17	<0.0050		mg/kg	
			Benzo(a)pyrene	2020/12/17	<0.0050		mg/kg	
			Benzo(b)fluoranthene	2020/12/17	<0.0050		mg/kg	
			Benzo(g,h,i)perylene	2020/12/17	<0.0050		mg/kg	
			Benzo(j)fluoranthene	2020/12/17	<0.0050		mg/kg	
			Benzo(k)fluoranthene	2020/12/17	<0.0050		mg/kg	
			Chrysene	2020/12/17	<0.0050		mg/kg	
			Dibenzo(a,h)anthracene	2020/12/17	<0.0050		mg/kg	
			Fluoranthene	2020/12/17	<0.0050		mg/kg	
			Fluorene	2020/12/17	<0.0050		mg/kg	
			Indeno(1,2,3-cd)pyrene	2020/12/17	<0.0050		mg/kg	
			Naphthalene	2020/12/17	<0.0050		mg/kg	
			Perylene	2020/12/17	<0.0050		mg/kg	
			Phenanthrene	2020/12/17	<0.0050		mg/kg	
			Pyrene	2020/12/17	<0.0050		mg/kg	



BV Labs Job #: COW8766  
 Report Date: 2021/01/19

Golder Associates Ltd  
 Client Project #: 20439355  
 Site Location: BURGEO  
 Sampler Initials: MM

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	7110226	LGE	RPD	1-Methylnaphthalene	2020/12/17	NC		%	50
				2-Methylnaphthalene	2020/12/17	NC		%	50
				Acenaphthene	2020/12/17	NC		%	50
				Acenaphthylene	2020/12/17	NC		%	50
				Anthracene	2020/12/17	NC		%	50
				Benzo(a)anthracene	2020/12/17	NC		%	50
				Benzo(a)pyrene	2020/12/17	NC		%	50
				Benzo(b)fluoranthene	2020/12/17	NC		%	50
				Benzo(g,h,i)perylene	2020/12/17	NC		%	50
				Benzo(j)fluoranthene	2020/12/17	NC		%	50
				Benzo(k)fluoranthene	2020/12/17	NC		%	50
				Chrysene	2020/12/17	NC		%	50
				Dibenzo(a,h)anthracene	2020/12/17	NC		%	50
				Fluoranthene	2020/12/17	NC		%	50
				Fluorene	2020/12/17	NC		%	50
				Indeno(1,2,3-cd)pyrene	2020/12/17	NC		%	50
				Naphthalene	2020/12/17	NC		%	50
				Perylene	2020/12/17	7.3		%	50
				Phenanthrene	2020/12/17	NC		%	50
				Pyrene	2020/12/17	NC		%	50
	7110385	YLG	Matrix Spike	Total Organic Carbon (C)	2020/12/16		107	%	85 - 115
	7110385	YLG	Spiked Blank	Total Organic Carbon (C)	2020/12/16		109	%	80 - 120
	7110385	YLG	Method Blank	Total Organic Carbon (C)	2020/12/16	<0.50		mg/L	
	7110385	YLG	RPD	Total Organic Carbon (C)	2020/12/16	NC (2)		%	15
	7112178	YLG	Matrix Spike	Total Organic Carbon (C)	2020/12/16		104	%	85 - 115
	7112178	YLG	Spiked Blank	Total Organic Carbon (C)	2020/12/16		106	%	80 - 120
	7112178	YLG	Method Blank	Total Organic Carbon (C)	2020/12/16	<0.50		mg/L	
	7112178	YLG	RPD	Total Organic Carbon (C)	2020/12/16	NC (2)		%	15
	7112181	YLG	Matrix Spike	Total Organic Carbon (C)	2020/12/16		103	%	85 - 115
	7112181	YLG	Spiked Blank	Total Organic Carbon (C)	2020/12/16		107	%	80 - 120
	7112181	YLG	Method Blank	Total Organic Carbon (C)	2020/12/16	<0.50		mg/L	
	7112181	YLG	RPD	Total Organic Carbon (C)	2020/12/16	3.9 (2)		%	15
	7112184	NHU	Matrix Spike	Total Mercury (Hg)	2020/12/17		101	%	80 - 120
	7112184	NHU	Spiked Blank	Total Mercury (Hg)	2020/12/17		101	%	80 - 120
	7112184	NHU	Method Blank	Total Mercury (Hg)	2020/12/17	<0.013		ug/L	
	7112184	NHU	RPD	Total Mercury (Hg)	2020/12/17	NC		%	20
	7112185	YLG	Matrix Spike	Total Organic Carbon (C)	2020/12/16		107	%	85 - 115
	7112185	YLG	Spiked Blank	Total Organic Carbon (C)	2020/12/16		106	%	80 - 120
	7112185	YLG	Method Blank	Total Organic Carbon (C)	2020/12/16	<0.50		mg/L	
	7112185	YLG	RPD	Total Organic Carbon (C)	2020/12/16	0.19		%	15
	7144018	BCD	Spiked Blank	Isobutylbenzene - Extractable	2021/01/11		94	%	60 - 130
				n-Dotriacontane - Extractable	2021/01/11		102	%	60 - 130
				>C10-C16 Hydrocarbons	2021/01/11		109	%	60 - 130
				>C16-C21 Hydrocarbons	2021/01/11		110	%	60 - 130
				>C21-<C32 Hydrocarbons	2021/01/11		111	%	60 - 130
	7144018	BCD	Method Blank	Isobutylbenzene - Extractable	2021/01/11		94	%	60 - 130
				n-Dotriacontane - Extractable	2021/01/11		103	%	60 - 130
				>C10-C16 Hydrocarbons	2021/01/11	<10		mg/kg	
				>C16-C21 Hydrocarbons	2021/01/11	<10		mg/kg	
				>C21-<C32 Hydrocarbons	2021/01/11	<15		mg/kg	
	7144029	MGN	Spiked Blank	Isobutylbenzene - Extractable	2021/01/11		92	%	60 - 130
				n-Dotriacontane - Extractable	2021/01/11		106	%	60 - 130
				>C10-C16 Hydrocarbons	2021/01/11		109	%	60 - 130



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7144029	MGN	Method Blank	>C16-C21 Hydrocarbons	2021/01/11		108	%	60 - 130
			>C21-<C32 Hydrocarbons	2021/01/11		113	%	60 - 130
			Isobutylbenzene - Extractable	2021/01/11		89	%	60 - 130
			n-Dotriacontane - Extractable	2021/01/11		106	%	60 - 130
			>C10-C16 Hydrocarbons	2021/01/11	<10	mg/kg		
			>C16-C21 Hydrocarbons	2021/01/11	<10	mg/kg		
7144244	MGN	Spiked Blank	>C21-<C32 Hydrocarbons	2021/01/11	<15		mg/kg	
			Isobutylbenzene - Extractable	2021/01/11		90	%	60 - 130
			n-Dotriacontane - Extractable	2021/01/11		104	%	60 - 130
			>C10-C16 Hydrocarbons	2021/01/11		105	%	60 - 130
			>C16-C21 Hydrocarbons	2021/01/11		105	%	60 - 130
			>C21-<C32 Hydrocarbons	2021/01/11		109	%	60 - 130
7144244	MGN	Method Blank	Isobutylbenzene - Extractable	2021/01/11		95	%	60 - 130
			n-Dotriacontane - Extractable	2021/01/11		105	%	60 - 130
			>C10-C16 Hydrocarbons	2021/01/11	<10	mg/kg		
			>C16-C21 Hydrocarbons	2021/01/11	<10	mg/kg		
			>C21-<C32 Hydrocarbons	2021/01/11	<15	mg/kg		
			Isobutylbenzene - Extractable	2021/01/11		89	%	60 - 130
7144270	MGN	Matrix Spike [OJL941-01]	n-Dotriacontane - Extractable	2021/01/11		112	%	60 - 130
			>C10-C16 Hydrocarbons	2021/01/11		103	%	30 - 130
			>C16-C21 Hydrocarbons	2021/01/11		100	%	30 - 130
			>C21-<C32 Hydrocarbons	2021/01/11		91	%	30 - 130
			Isobutylbenzene - Extractable	2021/01/11		89	%	60 - 130
			n-Dotriacontane - Extractable	2021/01/11		103	%	60 - 130
7144270	MGN	Spiked Blank	>C10-C16 Hydrocarbons	2021/01/11		94	%	60 - 130
			>C16-C21 Hydrocarbons	2021/01/11		95	%	60 - 130
			>C21-<C32 Hydrocarbons	2021/01/11		103	%	60 - 130
			Isobutylbenzene - Extractable	2021/01/11		84	%	60 - 130
			n-Dotriacontane - Extractable	2021/01/11		100	%	60 - 130
			>C10-C16 Hydrocarbons	2021/01/11	<10	mg/kg		
7144270	MGN	RPD [OJL941-01]	>C16-C21 Hydrocarbons	2021/01/11	<10		mg/kg	
			>C21-<C32 Hydrocarbons	2021/01/11	<15		mg/kg	
			>C10-C16 Hydrocarbons	2021/01/11	NC	%	50	
			>C16-C21 Hydrocarbons	2021/01/11	NC	%	50	
			>C21-<C32 Hydrocarbons	2021/01/11	14	%	50	

N/A = Not Applicable

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

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

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

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

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

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

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

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

(1) Matrix Spike: results are outside acceptance limit due to probable matrix interference.

(2) Elevated reporting limit due to turbidity.



BUREAU  
VERITAS

BV Labs Job #: COW8766  
Report Date: 2021/01/19

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### VALIDATION SIGNATURE PAGE

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

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Alan Stewart, Organics Manager, Bedford

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Mike MacGillivray, Scientific Specialist (Inorganics)

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Phil Deveau, Scientific Specialist (Organics)

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Rosemarie MacDonald, Scientific Specialist (Organics)

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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**CHAIN OF CUSTODY RECORD**

COC #:

Page 1 of 12

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required																			
Company Name: <u>Golder Associates Ltd.</u>				Company Name: _____				Quotation #: <u>C04828</u>				<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses																			
Contact Name: <u>Belinda Culgin</u>				Contact Name: _____				Purchase Order#: _____				PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS																			
Address: <u>201 Brownlow Ave., Suite 26</u> <u>Dartmouth, NS</u> PC: <u>B3B 1W2</u>				Address: _____ PC: _____				Project #: <u>20439355</u>				IF RUSH please specify date (Surcharges will be applied)																			
Phone: <u>(902) 466-1668</u>				Phone: _____				Site Location: <u>Burgoe</u>				<b>DATE REQUIRED:</b>																			
Email: <u>belinda_culgin@golder.com</u>				Email: _____				Site Province: <u>NL</u>																							
Report Copies: _____				Report Copies: _____				Site #: _____																							
Report Copies: _____				Report Copies: _____				Sampled By: <u>MM</u>																							
Laboratory Use Only					Analysis Requested																										
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	ICAP-MS (Total Metals) Well / Surface water	ICAP-MS (Dissolved Metals) Ground waters	Metals (Water)		Metals (Soil)		Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest	Hot Water Soluble Benzene (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (BTEX, C6-C12)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL / CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	Grain Size Analysis	HOLD - DO NOT ANALYZE	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs		
Present	Intact																														
		2, 3, 2																													
COOLING MEDIA PRESENT Y / N																															
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																															
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED																										
1	BFR_SS1_SA1	01-12-20		Soil	3											X		X		X											
2	BFR_SS1_SA2	01-12-20		Soil	3																										X
3	BFR_SS2_SA1	01-12-20		Soil	3																										
4	BFR_SS2_SA2	01-12-20		Soil	3																										X
5	BFR_SS3_SA1	01-12-20		Soil	3											X		X		X											
6	BFR_SS3_SA2	01-12-20		Soil	3																										X
7	BFR_SS4_SA1	01-12-20		Soil	3											X		X		X											
8	BFR_SS4_SA2	01-12-20		Soil	3																										X
9	BFR_SS5_SA1	01-12-20		Soil	3											X		X		X											
10	BFR_SS5_SA2	01-12-20		Soil	3																										X
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																							
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>Michael Morris</i>		DEC 07 2020	3:15	COW 8766																							
Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to BV Labs standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms which are available for viewing at www.bvlabs.com																															

White: Maxxam

Pink: Client



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**CHAIN OF CUSTODY RECORD**

COC #:

Page 2 of 12

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required																																			
Company Name: <u>Golder Associates Ltd.</u>				Company Name: _____				Quotation #: <u>C04828</u>				<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses																																			
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Address: <u>201 Brownlow Ave., Suite 26</u> <u>Dartmouth, NS</u> PC: <u>B3B 1W2</u>				Address: _____ PC: _____				Project #: <u>20439355</u>				IF RUSH please specify date (Surcharges will be applied)																																			
Phone: <u>(902) 466-1668</u>				Phone: _____				Site Location: <u>Burgoe</u>				<b>DATE REQUIRED:</b>																																			
Email: <u>belinda_culgin@golder.com</u>				Email: _____				Site Province: <u>NL</u>																																							
Report Copies: _____				Report Copies: _____				Site #: _____																																							
Report Copies: _____				Report Copies: _____				Sampled By: <u>MM</u>																																							
Laboratory Use Only					Analysis Requested																																										
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface water	RCAP-MS (Dissolved Metals) Ground waters	Metals (Water)		Metals (Soil)		Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury	Hot Water Soluble Barium	Default Acid Extractable (Available) Digest (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (BTEX, C6-C13)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL /CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	Grain Size analysis	HOLD- DO NOT ANALYZE	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs																	
Present	Intact	<u>2, 3, 2</u>																																													
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1	BFR_SS6_SA1	01-12-20		Soil	3								X				X		X																												
2	BFR_SS6_SA2	01-12-20		Soil	3																					X																					
3	BFR_SS7_SA1	01-12-20		Soil	3								X				X		X																												
4	BFR_SS7_SA2	01-12-20		Soil	3																					X																					
5	BFR_SS8_SA1	01-12-20		Soil	3								X				X		X																												
6	BFR_SS8_SA2	01-12-20		Soil	3																					X																					
7	BFR_SS9_SA1	01-12-20		Soil	3								X				X		X																												
8	BFR_SS9_SA2	01-12-20		Soil	3																					X																					
9	BFR_SS10_SA1	01-12-20		Soil	3								X				X		X																												
10	BFR_SS10_SA2	01-12-20		Soil	3																					X																					
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																																								
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>[Signature]</i>	DEC 07 2020	3:15	COW 8766																																								
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 465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

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Address: <u>201 Brownlow Ave., Suite 26</u> <u>Dartmouth, NS</u> PC: <u>B3B 1W2</u>			Address: _____ PC: _____			Project #: <u>20489355</u>																								
Phone: <u>(902) 466-1668</u>			Phone: _____			Site Location: <u>Burgoe</u>																								
Email: <u>belinda_culgin@golder.com</u>			Email: _____			Site Province: <u>NL</u>																								
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CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS [Total Metals] Well / Surface water	RCAP-MS [Dissolved Metals] Ground waters	Metals (Water)		Metals (Soil)		Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury (Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (BTEX, C6-C12)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL/CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	Grain Site Analysis	HOLD- DO NOT ANALYZE	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs
Present	Intact																													
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1	BFR_SS11_SA1	01-12-20		Soil	3							X		X	X															
2	BFR_SS11_SA2	01-12-20		Soil	3																									X
3	BFR_SS12_SA1	02-12-20		Soil	3							X		X	X															X
4	BFR_SS12_SA2	02-12-20		Soil	3																									X
5	BFR_SS13_SA1	02-12-20		Soil	3							X		X	X															X
6	BFR_SS13_SA2	02-12-20		Soil	3																									X
7	BFR_SS14_SA1	02-12-20		Soil	3							X		X	X															X
8	BFR_SS14_SA2	02-12-20		Soil	3																									X
9	BFR_SS15_SA1	02-12-20		Soil	3							X		X	X															X
10	BFR_SS15_SA2	02-12-20		Soil	3																									X
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																						
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>Michael Morris</i>		DEC 07 2020	15:15	COW 8766																						

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Address: <u>201 Brownlow Ave., Suite 26</u> <u>Dartmouth, NS</u> PC: <u>B3B 1W2</u>			Address: _____ PC: _____			Project #: <u>20439355</u>								
Phone: <u>(902) 466-1668</u>			Phone: _____			Site Location: <u>Burgoe</u>								
Email: <u>belinda_culgin@golder.com</u>			Email: _____			Site Province: <u>NL</u>								
Report Copies: _____			Report Copies: _____			Site #: _____								
Report Copies: _____			Report Copies: _____			Sampled By: <u>MM</u>								
Laboratory Use Only				Analysis Requested										
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		FIELD FILTERED / PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface water	RCAP-MS (Dissolved Metals) Ground waters	Metals (Water)		Metals (Soil)		Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs
Present	Intact	<u>2, 3, 2</u>								Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest	
COOLING MEDIA PRESENT Y / N				SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS										COMMENTS
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED									
1	BFR_SS_DUP1	01-12-20		Soil	3					X	X	X		
2	BFR_SS_DUP2	01-12-20		Soil	3					X	X	X		
3	BFR_SS_DUP3	04-12-20		Soil	3									X
4														
5														
6														
7														
8														
9														
10														
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #							
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>[Signature]</i>	DEC 07 2020	3:15	COW 8766							

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Phone: <u>(902) 466-1668</u>				Phone: _____				Site Location: <u>Burgeo</u>																													
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CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) well / surface water	RCAP-MS (Dissolved Metals) Ground waters Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (Required for CCME Agricultural / Landfill)	RBCA Hydrocarbone (BTEX, G6-C12)	CCME Hydrocarbons (CM5-PHC-F)/BTEX-F2-F4	PAHs (Default for water/soil)	PAHs (FWAL /CCME sediment)	PCBs - Select One: Default or CCME sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	General Chemistry	HOLD- DO NOT ANALYZE	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs													
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1	BFR_SW1	01-12-20		SW	8				X	X					X										Total metals												
2	BFR_SW2	01-12-20		SW	8				X	X					X										Total metals												
3	BFR_SW3	01-12-20		SW	8				X	X					X										Total metals												
4	BFR_SW4	01-12-20		SW	9				X	X					X							X			Total metals, 1x250ml bottle (gen chem) dated Dec 4/20												
5	BFR_SW5	02-12-20		SW	9				X	X					X							X			Total metals												
6	BFR_SW6	01-12-20		SW	8				X	X					X										Total metals												
7	BFR_SW7	02-12-20		SW	9				X	X					X							X			Total metals												
8	BFR_SW8	02-12-20		SW	9				X	X					X							X			Total metals												
9	BFR_SW9	02-12-20		SW	8				X	X					X										Total metals												
10	BFR_SW10	01-12-20		SW	9				X	X					X							X			Total metals, 1x250ml bottle (gen chem) dated Dec 4/20												
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																														
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>R. [Signature]</i>	DEC 07 2020	3:17	8766																														
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CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	MAIL FILTRATION REQUIRED	RCAP-MS [Total Metals] <u>W</u> / surface water	RCAP-MS [Dissolved Metals] <u>W</u> Ground waters	Metals (Water)		Metals (Soil)		Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury	Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (BTEX, G5-C32)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL /CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	General Chemistry	HOLD - DO NOT ANALYZE	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs																	
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1	BFR_SW11	01-12-20		SW	8					X	X					X											Total metals																					
2	BFR_SW12	01-12-20		SW	8					X	X					X											Total metals																					
3	BFR_SW13	02-12-20		SW	9					X	X					X							X			Total metals, 1x250ml bottle (gen chem) dated Dec 4/20																						
4	BFR_SW14	02-12-20		SW	8					X	X					X										Total metals																						
5	BFR_SW15	02-12-20		SW	8					X	X					X										Total metals																						
6	BFR_SW16	01-12-20		SW	9					X	X					X							X			Total metals, 1x250ml bottle (gen chem) dated Dec 4/20																						
7	BFR_SW17	04-12-20		SW	9					X	X					X							X			Total metals																						
8	BFR_SW18	04-12-20		SW	8					X	X					X										Total metals																						
9	BFR_SW19	04-12-20		SW	9					X	X					X							X			Total metals																						
10	BFR_SW20	03-12-20		SW	8					X	X					X										Total metals																						
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																																									
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Page 9 of 12

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Contact Name: <u>Belinda Culgin</u>			Contact Name: _____			Purchase Order#: _____			PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS																
Address: <u>201 Brownlow Ave., Suite 26</u> <u>Dartmouth, NS</u> PC: <u>B3B 1W2</u>			Address: _____ PC: _____			Project #: <u>20439355</u>			IF RUSH please specify date (Surcharges will be applied)																
Phone: <u>(902) 466-1668</u>			Phone: _____			Site Location: <u>Burgoe</u>			<b>DATE REQUIRED:</b>																
Email: <u>belinda_culgin@golder.com</u>			Email: _____			Site Province: <u>NL</u>																			
Report Copies: _____			Report Copies: _____			Site #: _____																			
Report Copies: _____			Report Copies: _____			Sampled By: <u>MM</u>																			
Laboratory Use Only				Analysis Requested																					
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / surface water	RCAP-MS (Dissolved Metals) Ground waters Total Digest (Default Method) for well water & surface water Dissolved for ground water	Metals (Water)		Metals (Soil)		Hot Water Soluble Boron (required for CCME Agriculture/Landfill)	RBCA Hydrocarbons (BTEX, G6-C32)	CCME Hydrocarbons (CWS-PHC F1/BTEX F2-F4)	PAH (Default for water/soil)	PAH (FWAL /CCME sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	General Chemistry	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs
Present	Intact																								
		<u>2, 3, 2</u>																							
COOLING MEDIA PRESENT Y / N																									
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																									
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX																				COMMENTS	
1	BFR_SW21	03-12-20		SW	9					X	X				X								X	Total metals	
2	BFR_SW22	03-12-20		SW	8					X	X				X									Total metals	
3	BFR_SW23	03-12-20		SW	9					X	X				X								X	Total metals	
4	BFR_SW24	04-12-20		SW	9					X	X				X								X	Total metals	
5	BFR_SW25	04-12-20		SW	8					X	X				X									Total metals	
6	BFR_SW_DUP1	01-12-20		SW	8					X	X				X								X	Total metals, limited sample	
7	BFR_SW_DUP2	02-12-20		SW	8					X	X				X								X	Total metals, limited sample	
8	BFR_SW_DUP3	04-12-20		SW	8																		X		
9																									
10																									
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)							BV LABS JOB #												
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>[Signature]</i>	DEC 07 2020	15:15							COW 8766												
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 49-55 Elizabeth Avenue, St John's, NL A1A 1W9 Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227  
 465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

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Phone: <u>(902) 466-1668</u>			Phone: _____			Site Location: <u>Burgoe</u>																							
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CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) well / surface water	RCAP-MS (Dissolved Metals) Ground waters	Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals (Water)	Metals (Soil)	Hot Water Soluble Boron	Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (RTEX, G6-G32)	CCME Hydrocarbons (CWS-PHC F1/RTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL/CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	HOLD- DO NOT ANALYZE	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs		
Present	Intact	2, 3, 2																										COMMENTS	
COOLING MEDIA PRESENT Y / N				SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																									
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1	BFR_SED1	01-12-20		Sed	3								X	X	X														
2	BFR_SED2	01-12-20		Sed	3								X	X	X														
3	BFR_SED3	01-12-20		Sed	3								X	X	X														
4	BFR_SED4	01-12-20		Sed	3								X	X	X														
5	BFR_SED5	02-12-20		Sed	3								X	X	X														
6	BFR_SED6	01-12-20		Sed	3								X	X	X														
7	BFR_SED7	02-12-20		Sed	3								X	X	X														
8	BFR_SED8	02-12-20		Sed	3								X	X	X														
9	BFR_SED9	02-12-20		Sed	3								X	X	X														
10	BFR_SED10	01-12-20		Sed	3								X	X	X														
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)											BV LABS JOB #												
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>[Signature]</i>	DEC 07 2020	3:15											COW 8766												

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<u>Dartmouth, NS PC: B3B 1W2</u>			PC: _____			Site Location: <u>Burgoe</u>																							
Phone: <u>(902) 466-1668</u>			Phone: _____			Site Province: <u>NL</u>																							
Email: <u>belinda_culgin@golder.com</u>			Email: _____			Site #: _____																							
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1	BFR_SED11	01-12-20		Sed	3								X		X	X													
2	BFR_SED12	01-12-20		Sed	3								X		X	X													
3	BFR_SED13	02-12-20		Sed	3								X		X	X													
4	BFR_SED14	02-12-20		Sed	3								X		X	X													
5	BFR_SED15	02-12-20		Sed	3								X		X	X													
6	BFR_SED16	01-12-20		Sed	3								X		X	X													
7	BFR_SED17	04-12-20		Sed	3								X		X	X													
8	BFR_SED18	04-12-20		Sed	3								X		X	X													
9	BFR_SED19	04-12-20		Sed	3								X		X	X													
10	BFR_SED20	03-12-20		Sed	3								X		X	X													
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3	BFR_SED23	03-12-20		Sed	3								X		X	X										
4	BFR_SED24	04-12-20		Sed	3								X		X	X										
5	BFR_SED25	04-12-20		Sed	3								X		X	X										
6	BFR_SED_DUP1	01-12-20		Sed	3								X		X	X										
7	BFR_SED_DUP2	02-12-20		Sed	3								X		X	X										
8	BFR_SED_DUP3	04-12-20		Sed	3								X		X	X								X		
9																										
10																										
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Pink: Client



Your Project #: 20439355  
 Site Location: BURGEO  
 Your C.O.C. #: n/a

**Attention: Belinda Culgin**

Golder Associates Ltd  
 201 Brownlow Ave.  
 Suites 25-26  
 Dartmouth, NS  
 CANADA B3B 1W2

**Report Date: 2021/01/13**  
 Report #: R6479081  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: C106142**

**Received: 2021/01/11, 09:20**

Sample Matrix: Soil  
 # Samples Received: 6

<b>Analyses</b>	<b>Quantity</b>	<b>Date Extracted</b>	<b>Date Analyzed</b>	<b>Laboratory Method</b>	<b>Analytical Method</b>
Metals Solids Acid Extr. ICPMS	6	2021/01/12	2021/01/12	ATL SOP 00058	EPA 6020B R2 m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

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

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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

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



Your Project #: 20439355  
Site Location: BURGEO  
Your C.O.C. #: n/a

**Attention: Belinda Culgin**

Golder Associates Ltd  
201 Brownlow Ave.  
Suites 25-26  
Dartmouth, NS  
CANADA B3B 1W2

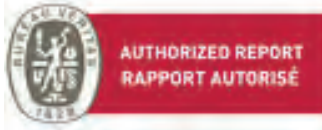
**Report Date: 2021/01/13**  
Report #: R6479081  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: C106142**

**Received: 2021/01/11, 09:20**

Encryption Key



Bureau Veritas Laboratories  
13 Jan 2021 15:34:32

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Marie Muise, Key Account Specialist  
Email: Marie.MUISE@bureauveritas.com  
Phone# (902)420-0203 Ext:253

=====

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**ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)**

BV Labs ID		OJP187	OJP188	OJP189	OJP194	OJP204		
Sampling Date		2020/12/01	2020/12/01	2020/12/01	2020/12/02	2020/12/03		
COC Number		n/a	n/a	n/a	n/a	n/a		
	UNITS	BFR_SS6_SA2	BFR_SS7_SA2	BFR_SS8_SA2	BFR_SS13_SA2	BFR_SS23_SA2	RDL	QC Batch
<b>Metals</b>								
Acid Extractable Aluminum (Al)	mg/kg	9700	2500	2600	13000	8200	10	7145490
Acid Extractable Antimony (Sb)	mg/kg	<2.0	20	<2.0	<2.0	<2.0	2.0	7145490
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7145490
Acid Extractable Barium (Ba)	mg/kg	6.3	44	7.9	17	13	5.0	7145490
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7145490
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7145490
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	50	7145490
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.42	<0.30	<0.30	<0.30	0.30	7145490
Acid Extractable Chromium (Cr)	mg/kg	5.7	<2.0	<2.0	11	4.4	2.0	7145490
Acid Extractable Cobalt (Co)	mg/kg	<1.0	1.2	<1.0	<1.0	<1.0	1.0	7145490
Acid Extractable Copper (Cu)	mg/kg	2.3	46	2.5	2.7	2.3	2.0	7145490
Acid Extractable Iron (Fe)	mg/kg	1500	1800	130	3400	550	50	7145490
Acid Extractable Lead (Pb)	mg/kg	8.9	780	1.4	9.6	4.2	0.50	7145490
Acid Extractable Lithium (Li)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7145490
Acid Extractable Manganese (Mn)	mg/kg	18	24	<2.0	6.0	5.3	2.0	7145490
Acid Extractable Mercury (Hg)	mg/kg	0.15	0.29	0.12	0.21	0.17	0.10	7145490
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7145490
Acid Extractable Nickel (Ni)	mg/kg	<2.0	4.4	<2.0	2.8	<2.0	2.0	7145490
Acid Extractable Rubidium (Rb)	mg/kg	3.2	<2.0	<2.0	<2.0	<2.0	2.0	7145490
Acid Extractable Selenium (Se)	mg/kg	1.9	1.7	2.6	3.7	1.8	0.50	7145490
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7145490
Acid Extractable Strontium (Sr)	mg/kg	<5.0	57	7.0	6.1	5.4	5.0	7145490
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7145490
Acid Extractable Tin (Sn)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7145490
Acid Extractable Uranium (U)	mg/kg	1.3	0.18	0.88	2.3	0.82	0.10	7145490
Acid Extractable Vanadium (V)	mg/kg	8.8	4.9	<2.0	8.6	11	2.0	7145490
Acid Extractable Zinc (Zn)	mg/kg	<5.0	110	<5.0	<5.0	6.0	5.0	7145490
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								



**ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)**

BV Labs ID		OJP205		
Sampling Date		2020/12/04		
COC Number		n/a		
	UNITS	BFR_SS24_SA2	RDL	QC Batch
<b>Metals</b>				
Acid Extractable Aluminum (Al)	mg/kg	12000	10	7145490
Acid Extractable Antimony (Sb)	mg/kg	<2.0	2.0	7145490
Acid Extractable Arsenic (As)	mg/kg	<2.0	2.0	7145490
Acid Extractable Barium (Ba)	mg/kg	15	5.0	7145490
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	7145490
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	7145490
Acid Extractable Boron (B)	mg/kg	<50	50	7145490
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	7145490
Acid Extractable Chromium (Cr)	mg/kg	3.2	2.0	7145490
Acid Extractable Cobalt (Co)	mg/kg	<1.0	1.0	7145490
Acid Extractable Copper (Cu)	mg/kg	7.1	2.0	7145490
Acid Extractable Iron (Fe)	mg/kg	210	50	7145490
Acid Extractable Lead (Pb)	mg/kg	3.9	0.50	7145490
Acid Extractable Lithium (Li)	mg/kg	<2.0	2.0	7145490
Acid Extractable Manganese (Mn)	mg/kg	<2.0	2.0	7145490
Acid Extractable Mercury (Hg)	mg/kg	0.17	0.10	7145490
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	7145490
Acid Extractable Nickel (Ni)	mg/kg	2.9	2.0	7145490
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	2.0	7145490
Acid Extractable Selenium (Se)	mg/kg	3.4	0.50	7145490
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	7145490
Acid Extractable Strontium (Sr)	mg/kg	<5.0	5.0	7145490
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	7145490
Acid Extractable Tin (Sn)	mg/kg	<1.0	1.0	7145490
Acid Extractable Uranium (U)	mg/kg	5.6	0.10	7145490
Acid Extractable Vanadium (V)	mg/kg	6.4	2.0	7145490
Acid Extractable Zinc (Zn)	mg/kg	<5.0	5.0	7145490
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BV Labs Job #: C106142  
Report Date: 2021/01/13

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### GENERAL COMMENTS

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

Package 1	2.3°C
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Mercury analyzed past recommended hold time for work sheet 7145490.

**Results relate only to the items tested.**



BUREAU  
VERITAS

BV Labs Job #: C106142  
Report Date: 2021/01/13

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7145490	BAN	Matrix Spike	Acid Extractable Antimony (Sb)	2021/01/12	101	%	75 - 125		
			Acid Extractable Arsenic (As)	2021/01/12	97	%	75 - 125		
			Acid Extractable Barium (Ba)	2021/01/12	99	%	75 - 125		
			Acid Extractable Beryllium (Be)	2021/01/12	101	%	75 - 125		
			Acid Extractable Bismuth (Bi)	2021/01/12	98	%	75 - 125		
			Acid Extractable Boron (B)	2021/01/12	100	%	75 - 125		
			Acid Extractable Cadmium (Cd)	2021/01/12	94	%	75 - 125		
			Acid Extractable Chromium (Cr)	2021/01/12	96	%	75 - 125		
			Acid Extractable Cobalt (Co)	2021/01/12	93	%	75 - 125		
			Acid Extractable Copper (Cu)	2021/01/12	81	%	75 - 125		
			Acid Extractable Lead (Pb)	2021/01/12	94	%	75 - 125		
			Acid Extractable Lithium (Li)	2021/01/12	105	%	75 - 125		
			Acid Extractable Manganese (Mn)	2021/01/12	NC	%	75 - 125		
			Acid Extractable Mercury (Hg)	2021/01/12	92	%	75 - 125		
			Acid Extractable Molybdenum (Mo)	2021/01/12	106	%	75 - 125		
			Acid Extractable Nickel (Ni)	2021/01/12	97	%	75 - 125		
			Acid Extractable Rubidium (Rb)	2021/01/12	97	%	75 - 125		
			Acid Extractable Selenium (Se)	2021/01/12	97	%	75 - 125		
			Acid Extractable Silver (Ag)	2021/01/12	98	%	75 - 125		
			Acid Extractable Strontium (Sr)	2021/01/12	NC	%	75 - 125		
			Acid Extractable Thallium (Tl)	2021/01/12	97	%	75 - 125		
			Acid Extractable Tin (Sn)	2021/01/12	98	%	75 - 125		
			Acid Extractable Uranium (U)	2021/01/12	96	%	75 - 125		
			Acid Extractable Vanadium (V)	2021/01/12	100	%	75 - 125		
			Acid Extractable Zinc (Zn)	2021/01/12	96	%	75 - 125		
			7145490	BAN	Spiked Blank	Acid Extractable Antimony (Sb)	2021/01/12	101	%
Acid Extractable Arsenic (As)	2021/01/12	98				%	75 - 125		
Acid Extractable Barium (Ba)	2021/01/12	97				%	75 - 125		
Acid Extractable Beryllium (Be)	2021/01/12	99				%	75 - 125		
Acid Extractable Bismuth (Bi)	2021/01/12	99				%	75 - 125		
Acid Extractable Boron (B)	2021/01/12	104				%	75 - 125		
Acid Extractable Cadmium (Cd)	2021/01/12	93				%	75 - 125		
Acid Extractable Chromium (Cr)	2021/01/12	97				%	75 - 125		
Acid Extractable Cobalt (Co)	2021/01/12	94				%	75 - 125		
Acid Extractable Copper (Cu)	2021/01/12	93				%	75 - 125		
Acid Extractable Lead (Pb)	2021/01/12	95				%	75 - 125		
Acid Extractable Lithium (Li)	2021/01/12	101				%	75 - 125		
Acid Extractable Manganese (Mn)	2021/01/12	96				%	75 - 125		
Acid Extractable Mercury (Hg)	2021/01/12	100				%	75 - 125		
Acid Extractable Molybdenum (Mo)	2021/01/12	96				%	75 - 125		
Acid Extractable Nickel (Ni)	2021/01/12	98				%	75 - 125		
Acid Extractable Rubidium (Rb)	2021/01/12	96				%	75 - 125		
Acid Extractable Selenium (Se)	2021/01/12	97				%	75 - 125		
Acid Extractable Silver (Ag)	2021/01/12	99				%	75 - 125		
Acid Extractable Strontium (Sr)	2021/01/12	96				%	75 - 125		
Acid Extractable Thallium (Tl)	2021/01/12	96				%	75 - 125		
Acid Extractable Tin (Sn)	2021/01/12	95				%	75 - 125		
Acid Extractable Uranium (U)	2021/01/12	98				%	75 - 125		
Acid Extractable Vanadium (V)	2021/01/12	97				%	75 - 125		
Acid Extractable Zinc (Zn)	2021/01/12	94				%	75 - 125		
7145490	BAN	Method Blank				Acid Extractable Aluminum (Al)	2021/01/12	<10	mg/kg
			Acid Extractable Antimony (Sb)	2021/01/12	<2.0	mg/kg			
			Acid Extractable Arsenic (As)	2021/01/12	<2.0	mg/kg			



BUREAU  
VERITAS

BV Labs Job #: C106142  
Report Date: 2021/01/13

Golder Associates Ltd  
Client Project #: 20439355  
Site Location: BURGEO  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Barium (Ba)	2021/01/12	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2021/01/12	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2021/01/12	<2.0		mg/kg	
			Acid Extractable Boron (B)	2021/01/12	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2021/01/12	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2021/01/12	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2021/01/12	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2021/01/12	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2021/01/12	<50		mg/kg	
			Acid Extractable Lead (Pb)	2021/01/12	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2021/01/12	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2021/01/12	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2021/01/12	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2021/01/12	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2021/01/12	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2021/01/12	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2021/01/12	<0.50		mg/kg	
			Acid Extractable Silver (Ag)	2021/01/12	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2021/01/12	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2021/01/12	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2021/01/12	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2021/01/12	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2021/01/12	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2021/01/12	<5.0		mg/kg	
7145490	BAN	RPD	Acid Extractable Aluminum (Al)	2021/01/12	13		%	35
			Acid Extractable Antimony (Sb)	2021/01/12	NC		%	35
			Acid Extractable Arsenic (As)	2021/01/12	NC		%	35
			Acid Extractable Barium (Ba)	2021/01/12	10		%	35
			Acid Extractable Beryllium (Be)	2021/01/12	NC		%	35
			Acid Extractable Bismuth (Bi)	2021/01/12	NC		%	35
			Acid Extractable Boron (B)	2021/01/12	NC		%	35
			Acid Extractable Cadmium (Cd)	2021/01/12	NC		%	35
			Acid Extractable Chromium (Cr)	2021/01/12	12		%	35
			Acid Extractable Cobalt (Co)	2021/01/12	5.3		%	35
			Acid Extractable Copper (Cu)	2021/01/12	NC		%	35
			Acid Extractable Iron (Fe)	2021/01/12	8.9		%	35
			Acid Extractable Lead (Pb)	2021/01/12	9.2		%	35
			Acid Extractable Lithium (Li)	2021/01/12	12		%	35
			Acid Extractable Manganese (Mn)	2021/01/12	6.6		%	35
			Acid Extractable Mercury (Hg)	2021/01/12	NC		%	35
			Acid Extractable Molybdenum (Mo)	2021/01/12	NC		%	35
			Acid Extractable Nickel (Ni)	2021/01/12	5.1		%	35
			Acid Extractable Rubidium (Rb)	2021/01/12	7.0		%	35
			Acid Extractable Selenium (Se)	2021/01/12	NC		%	35
			Acid Extractable Silver (Ag)	2021/01/12	NC		%	35
			Acid Extractable Strontium (Sr)	2021/01/12	0.98		%	35
			Acid Extractable Thallium (Tl)	2021/01/12	NC		%	35
			Acid Extractable Tin (Sn)	2021/01/12	NC		%	35
			Acid Extractable Uranium (U)	2021/01/12	9.3		%	35
			Acid Extractable Vanadium (V)	2021/01/12	11		%	35





BV Labs Job #: C106142  
 Report Date: 2021/01/13

Golder Associates Ltd  
 Client Project #: 20439355  
 Site Location: BURGEO  
 Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC								
Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Zinc (Zn)	2021/01/12	0.85		%	35

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

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

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

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

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  $\leq 2x$  RDL).



BV Labs Job #: C106142  
Report Date: 2021/01/13

Golder Associates Ltd  
Client Project #: 20439355  
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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).

A handwritten signature in black ink, appearing to read "Eric Dearman", written over a horizontal line.

Eric Dearman, Scientific Specialist

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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 49-55 Elizabeth Avenue, St John's, NL A1A 1W9 Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227  
 465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

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**CHAIN OF CUSTODY RECORD**

COC #:

Page 1 of 12

Invoice Information			Report Information (if differs from Invoice)			Project Information (where applicable)			Turnaround Time (TAT) Required																						
Company Name: <u>Golder Associates Ltd.</u>			Company Name: _____			Quotation #: <u>C04828</u>			<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS. IF RUSH please specify date (Surcharges will be applied) <b>DATE REQUIRED:</b> _____																						
Contact Name: <u>Belinda Culgin</u>			Contact Name: _____			Purchase Order#: _____																									
Address: <u>201 Brownlow Ave., Suite 26</u> <u>Dartmouth, NS</u> PC: <u>B3B 1W2</u>			Address: _____ PC: _____			Project #: <u>20439355</u>																									
Phone: <u>(902) 466-1668</u>			Phone: _____			Site Location: <u>Burgoe</u>																									
Email: <u>belinda_culgin@golder.com</u>			Email: _____			Site Province: <u>NL</u>																									
Report Copies: _____			Report Copies: _____			Site #: _____																									
Reported By: _____			Reported By: _____			Sampled By: <u>MM</u>																									
Laboratory Use Only				Analysis Requested																											
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface water	RCAP-MS (Dissolved Metals) Ground waters	Metals (Water)		Metals (Soil)		Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury	Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBGA Hydrocarbons (BTEX, G6-C32)	CCME Hydrocarbons (CWS-PHC F1) (BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL / CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E-coli (presence/absence)	Total Coliform/E-coli (count)	Grain-Size Analysis	HOLD- DO NOT ANALYZE	Regulatory Requirements (Specify): Atlantic RBGA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs	
Present	Intact	2, 3, 2																													
COOLING MEDIA PRESENT Y / N				SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																											
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED																									COMMENTS	
1	BFR_SS1_SA1	01-12-20		Soil	3						X	X	X																		
2	BFR_SS1_SA2	01-12-20		Soil	3																									X	
3	BFR_SS2_SA1	01-12-20		Soil	3						X	X	X																	X	
4	BFR_SS2_SA2	01-12-20		Soil	3																									X	
5	BFR_SS3_SA1	01-12-20		Soil	3						X	X	X																	X	
6	BFR_SS3_SA2	01-12-20		Soil	3																									X	
7	BFR_SS4_SA1	01-12-20		Soil	3						X	X	X																	X	
8	BFR_SS4_SA2	01-12-20		Soil	3																									X	
9	BFR_SS5_SA1	01-12-20		Soil	3						X	X	X																	X	
10	BFR_SS5_SA2	01-12-20		Soil	3																									X	
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																							
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>Michael Morris</i>		DEC 07 2020	3:15	COW 8766 C186142 COW 9360																							

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to BV Labs standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms which are available for viewing at www.bvlabs.com

White: Maxxam

Pink: Client





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CHAIN OF CUSTODY RECORD

COC #:

Page 3 of 12

Invoice Information				Report Information (If differs from Invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required																		
Company Name: <u>Golder Associates Ltd.</u>				Company Name: _____				Quotation #: <u>C04828</u>				<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses																		
Contact Name: <u>Belinda Culgin</u>				Contact Name: _____				Purchase Order#: _____				PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS																		
Address: <u>201 Brownlow Ave., Suite 26</u> <u>Dartmouth, NS</u> PC: <u>B3B 1W2</u>				Address: _____ PC: _____				Project #: <u>20439355</u>				IF RUSH please specify date (Surcharges will be applied)																		
Phone: <u>(902) 466-1668</u>				Phone: _____				Site Location: <u>Burgoe</u>				DATE REQUIRED:																		
Email: <u>belinda_culgin@golder.com</u>				Email: _____				Site Province: <u>NL</u>																						
Report Copies: _____				Report Copies: _____				Site #: _____																						
Report Copies: _____				Report Copies: _____				Sampled By: <u>MM</u>																						
Laboratory Use Only				Analysis Requested																										
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS [Total Metals] Well / surface water	RCAP-MS [Dissolved Metals] Ground waters	Metals (Water)		Metals (Soil)		Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agriculture / Landfill)	RBCA Hydrocarbons (BTEX, G6-C13)	CCME Hydrocarbons (CWS-PHC F1, BTEX, F2, F4)	PAHs (Default for water/soil)	PAHs (PMAL / CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	Grain Size Analysis	HOLD- DO NOT ANALYZE	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs	
Present	Intact	2, 3, 2																												
COOLING MEDIA PRESENT Y / N				SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																										
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS [Total Metals] Well / surface water	RCAP-MS [Dissolved Metals] Ground waters	Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agriculture / Landfill)	RBCA Hydrocarbons (BTEX, G6-C13)	CCME Hydrocarbons (CWS-PHC F1, BTEX, F2, F4)	PAHs (Default for water/soil)	PAHs (PMAL / CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	Grain Size Analysis	HOLD- DO NOT ANALYZE	COMMENTS					
1	BFR_SS11_SA1	01-12-20		Soil	3								X		X		X													
2	BFR_SS11_SA2	01-12-20		Soil	3								X		X		X									X				
3	BFR_SS12_SA1	02-12-20		Soil	3								X		X		X									X				
4	BFR_SS12_SA2	02-12-20		Soil	3								X		X		X									X				
5	BFR_SS13_SA1	02-12-20		Soil	3								X		X		X									X				
6	BFR_SS13_SA2	02-12-20		Soil	3								X		X		X									X				
7	BFR_SS14_SA1	02-12-20		Soil	3								X		X		X									X				
8	BFR_SS14_SA2	02-12-20		Soil	3								X		X		X									X				
9	BFR_SS15_SA1	02-12-20		Soil	3								X		X		X									X				
10	BFR_SS15_SA2	02-12-20		Soil	3								X		X		X									X				
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																						
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>Michael Morris</i>		DEC 07 2020	15:15	COW 8766 C106142 COW 9360																						
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**CHAIN OF CUSTODY RECORD**

COC #:

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Invoice Information				Report Information (If differs from Invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required																			
Company Name: <u>Golder Associates Ltd.</u>				Company Name: _____				Quotation #: <u>C04828</u>				<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses																			
Contact Name: <u>Belinda Culgin</u>				Contact Name: _____				Purchase Order#: _____				PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS																			
Address: <u>201 Brownlow Ave., Suite 26</u> <u>Dartmouth, NS PC: B3B 1W2</u>				Address: _____ PC: _____				Project #: <u>20439355</u>				IF RUSH please specify date (Surcharges will be applied)																			
Phone: <u>(902) 466-1668</u>				Phone: _____				Site Location: <u>Burgoeo</u>				<b>DATE REQUIRED:</b>																			
Email: <u>belinda_culgin@golder.com</u>				Email: _____				Site Province: <u>NL</u>																							
Report Copies: _____				Report Copies: _____				Site #: _____																							
Report Copies: _____				Report Copies: _____				Sampled By: <u>MM</u>																							
Laboratory Use Only				Analysis Requested																											
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) well / Surface water	RCAP-MS (Dissolved Metals) Ground waters	Metals (Water)		Metals (Soil)		Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury	Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (BTEX, C6-C13)	CCME Hydrocarbons (CYS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWA) / CCME sediment	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	Grain Size Analysis	HOLD- DO NOT ANALYZE	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs	
Present	Intact	<u>2, 3, 2</u>																													
COOLING MEDIA PRESENT Y / N																															
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SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) well / Surface water	RCAP-MS (Dissolved Metals) Ground waters	Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury	Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (BTEX, C6-C13)	CCME Hydrocarbons (CYS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWA) / CCME sediment	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	Grain Size Analysis	HOLD- DO NOT ANALYZE	COMMENTS					
1	BFR_SS16_SA1	02-12-20		Soil	3								X				X		X												
2	BFR_SS16_SA2	02-12-20		Soil	3																					X					
3	BFR_SS17_SA1	04-12-20		Soil	3								X				X		X					X							
4	BFR_SS17_SA2	04-12-20		Soil	3																					X					
5	BFR_SS18_SA1	04-12-20		Soil	3								X				X		X							X					
6	BFR_SS18_SA2	04-12-20		Soil	3																					X					
7	BFR_SS19_SA1	04-12-20		Soil	3								X				X		X							X					
8	BFR_SS19_SA2	04-12-20		Soil	3																					X					
9	BFR_SS20_SA1	03-12-20		Soil	3								X				X		X							X					
10	BFR_SS20_SA2	03-12-20		Soil	3																					X					
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																							
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>[Signature]</i>		DEC 07 2020	5:15	COW 8766 C106142 COW 9360																							
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Address: <u>201 Brownlow Ave., Suite 26</u> <u>Dartmouth, NS</u> PC: <u>B3B 1W2</u>				Address: _____ PC: _____				Project #: <u>20439355</u>																													
Phone: <u>(902) 466-1668</u>				Phone: _____				Site Location: <u>Burgoeo</u>																													
Email: <u>belinda_culgin@golder.com</u>				Email: _____				Site Province: <u>NL</u>																													
Report Copies: _____				Report Copies: _____				Site #: _____																													
Report Copies: _____				Report Copies: _____				Sampled By: <u>MM</u>																													
Laboratory Use Only				Analysis Requested																																	
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface water	RCAP-MS (Dissolved Metals) Ground waters	Metals (Water)		Metals (Soil)		Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural/Landfill)	RBCA Hydrocarbons (BTEX, C6-C32)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL/CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (presence/absence)	Total Coliform/E.Coli (count)	Grain Size Analysis	HOLD- DO NOT ANALYZE	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs							
Present	Intact	2, 1, 2																																			
COOLING MEDIA PRESENT Y / N																																					
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SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX																										COMMENTS							
1	BFR_SS21_SA1	03-12-20		Soil	3						X		X	X																							
2	BFR_SS21_SA2	03-12-20		Soil	3																									X							
3	BFR_SS22_SA1	03-12-20		Soil	3						X		X	X																X							
4	BFR_SS22_SA2	03-12-20		Soil	3																									X							
5	BFR_SS23_SA1	03-12-20		Soil	3						X		X	X																X							
6	BFR_SS23_SA2	03-12-20		Soil	3																									X							
7	BFR_SS24_SA1	04-12-20		Soil	3						X		X	X																X							
8	BFR_SS24_SA2	04-12-20		Soil	3																									X							
9	BFR_SS25_SA1	04-12-20		Soil	3						X		X	X																X							
10	BFR_SS25_SA2	04-12-20		Soil	3																									X							
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)													BV LABS JOB #																	
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>[Signature]</i>		DEC 07 2020	3:15													COW 8766 C146142 COW 9360																	
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COC #:

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Invoice Information			Report Information (if differs from Invoice)			Project Information (where applicable)			Turnaround Time (TAT) Required															
Company Name: <u>Golder Associates Ltd.</u>			Company Name: _____			Quotation #: <u>CD4828</u>			<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS IF RUSH please specify date (Surcharges will be applied) <b>DATE REQUIRED:</b> _____															
Contact Name: <u>Belinda Culgin</u>			Contact Name: _____			Purchase Order#: _____																		
Address: <u>201 Brownlow Ave., Suite 26</u> <u>Dartmouth, NS</u> PC: <u>B3B 1W2</u>			Address: _____ PC: _____			Project #: <u>ZD439355</u>																		
Phone: <u>(902) 466-1668</u>			Phone: _____			Site Location: <u>Burgoe</u>																		
Email: <u>belinda_culgin@golder.com</u>			Email: _____			Site Province: <u>NL</u>																		
Report Copies: _____			Report Copies: _____			Site #: _____																		
Report Copies: _____			Report Copies: _____			Sampled By: <u>MM</u>																		
Laboratory Use Only				Analysis Requested																				
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals)/ Well / Surface water	RCAP-MS (Dissolved Metals) Ground waters (Total Digest (Default Method) for well water & surface water Dissolved for ground water Mercury (CIRCLE) TOTAL / DISSOLVED	Metals (Water)		Metals (Soil)		Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs									
Present	Intact																							
		2, 3, 2																						
COOLING MEDIA PRESENT Y / N																								
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SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals)/ Well / Surface water	RCAP-MS (Dissolved Metals) Ground waters (Total Digest (Default Method) for well water & surface water Dissolved for ground water Mercury (CIRCLE) TOTAL / DISSOLVED	Metals (Water)	Metals (Soil)	Hot Water Soluble Boron (required for CCME Agricultural/ Landfill)	RBGA Hydrocarbons (BTEX, C6-C12)	CCME Hydrocarbons (CWS-PHC F1, BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWA, /CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	Grain Size Analysis	HOLD- DO NOT ANALYZE	COMMENTS	
1	BFR_SS_DUP1	01-12-20		Soil	3					X	X	X												
2	BFR_SS_DUP2	01-12-20		Soil	3					X	X	X												
3	BFR_SS_DUP3	04-12-20		Soil	3																	X		
4																								
5																								
6																								
7																								
8																								
9																								
10																								
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																	
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>[Signature]</i>	DEC 07 2020	3:15	CW 8766 C10 6142 CW 9360																	
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Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required													
Company Name: <u>Golder Associates Ltd.</u>				Company Name: _____				Quotation #: <u>C04828</u>				<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS IF RUSH please specify date (Surcharges will be applied) <b>DATE REQUIRED:</b> _____													
Contact Name: <u>Belinda Culgin</u>				Contact Name: _____				Purchase Order#: _____																	
Address: <u>201 Brownlow Ave., Suite 26</u> <u>Dartmouth, NS</u> PC: <u>B3B 1W2</u>				Address: _____ PC: _____				Project #: <u>20439355</u>																	
Phone: <u>(902) 466-1668</u>				Phone: _____				Site Location: <u>Burgeo</u>																	
Email: <u>belinda_culgin@golder.com</u>				Email: _____				Site Province: <u>NL</u>																	
Report Copies: _____				Report Copies: _____				Site #: _____																	
Reported By: _____				Reported By: _____				Sampled By: <u>MM</u>																	
Laboratory Use Only						Analysis Requested																			
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) well / surface water	RCAP-MS (Dissolved Metals) Ground waters Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest (required for CCME Agricultural / Landfill)	Hot Water Soluble Boron	RBCA Hydrocarbons (BTEX, G6-C12)	CCME Hydrocarbons (CWS-PHC F1/BTEX F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL / CCME sediment)	PCBs - Select One: Default or CCME sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	General Chemistry	HOLD- DO NOT ANALYZE	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs
Present	Intact																								
COOLING MEDIA PRESENT <input checked="" type="checkbox"/> / <input type="checkbox"/> N																									
SAMPLES MUST BE KEPT COOL (<10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																									
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX																				COMMENTS	
1	BFR_SW1	01-12-20		SW	8					X	X				X									Total metals	
2	BFR_SW2	01-12-20		SW	8					X	X				X									Total metals	
3	BFR_SW3	01-12-20		SW	8					X	X				X									Total metals	
4	BFR_SW4	01-12-20		SW	9					X	X				X							X		Total metals, 1x250ml bottle (gen chem) dated Dec 4/20	
5	BFR_SW5	02-12-20		SW	9					X	X				X							X		Total metals	
6	BFR_SW6	01-12-20		SW	8					X	X				X									Total metals	
7	BFR_SW7	02-12-20		SW	9					X	X				X							X		Total metals	
8	BFR_SW8	02-12-20		SW	9					X	X				X							X		Total metals	
9	BFR_SW9	02-12-20		SW	8					X	X				X									Total metals	
10	BFR_SW10	01-12-20		SW	9					X	X				X							X		Total metals, 1x250ml bottle (gen chem) dated Dec 4/20	
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																	
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>R. [Signature]</i>		DEC 07 2020	3:17	Cow 8766 CIP 6142 Cow 9360																	
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Contact Name: <u>Belinda Culgin</u>				Contact Name: _____				Purchase Order#: _____																			
Address: <u>201 Brownlow Ave., Suite 26</u>				Address: _____				Project #: <u>20439355</u>																			
<u>Dartmouth, NS PC: 838 1W2</u>				PC: _____				Site Location: <u>Burgoe</u>																			
Phone: <u>(902) 466-1668</u>				Phone: _____				Site Province: <u>NL</u>																			
Email: <u>belinda_culgin@golder.com</u>				Email: _____				Site #: _____																			
Report Copies: _____				Report Copies: _____				Sampled By: <u>MM</u>																			
Laboratory Use Only								Analysis Requested																			
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface water	RCAP-MS (Dissolved Metals) Ground waters	Metals (Water)		Metals (Soil)		Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (count)	General Chemistry	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs										
Present	Intact	2, 3, 2								Total Digest (Default Method) for well water & surface water	Disolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury					Default Acid Extractable (Available) Digest	Hot Water Soluble Boron	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (BTEX, G5-G32)	CCME Hydrocarbons (CWS-PHC F1/BTEX F2-F4)	PAHs (Default for water/soil)	PAHs (FWA) /CCME Sediment	PCBs - Select One: Default or CCME Sediment	VOCs	
COOLING MEDIA PRESENT Y / N																											
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																											
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface water	RCAP-MS (Dissolved Metals) Ground waters	Total Digest (Default Method) for well water & surface water	Disolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury	Default Acid Extractable (Available) Digest	Hot Water Soluble Boron	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (BTEX, G5-G32)	CCME Hydrocarbons (CWS-PHC F1/BTEX F2-F4)	PAHs (Default for water/soil)	PAHs (FWA) /CCME Sediment	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (count)	General Chemistry	REGULATORY REQUIREMENTS (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs	
1	BFR_SW11	01-12-20		SW	8					X	X						X										Total metals
2	BFR_SW12	01-12-20		SW	8					X	X						X										Total metals
3	BFR_SW13	02-12-20		SW	9					X	X						X							X			Total metals, 1x250ml bottle (gen chem) dated Dec 4/20
4	BFR_SW14	02-12-20		SW	8					X	X						X										Total metals
5	BFR_SW15	02-12-20		SW	8					X	X						X										Total metals
6	BFR_SW16	01-12-20		SW	9					X	X						X							X			Total metals, 1x250ml bottle (gen chem) dated Dec 4/20
7	BFR_SW17	04-12-20		SW	9					X	X						X										Total metals
8	BFR_SW18	04-12-20		SW	8					X	X						X										Total metals
9	BFR_SW19	04-12-20		SW	9					X	X						X										Total metals
10	BFR_SW20	03-12-20		SW	8					X	X						X										Total metals
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																			
Michael Morris <i>[Signature]</i>		07-12-20	14:30	<i>[Signature]</i>		DEC 07 2020	3:15	COW 8766 COW 9360 C106142																			

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 465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-8504 Toll Free: 1-888-535-7770

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Contact Name: <u>Belinda Culgin</u>			Contact Name: _____			Purchase Order#: _____																			
Address: <u>201 Brownlow Ave., Suite 26</u> <u>Dartmouth, NS</u> PC: <u>B3B 1W2</u>			Address: _____ PC: _____			Project #: <u>20489355</u>																			
Phone: <u>(902) 466-1668</u>			Phone: _____			Site Location: <u>Burgeo</u>																			
Email: <u>belinda_culgin@golder.com</u>			Email: _____			Site Province: <u>NL</u>																			
Report Copies: _____			Report Copies: _____			Site #: _____																			
Report Copies: _____			Report Copies: _____			Sampled By: <u>MM</u>																			
Laboratory Use Only				Analysis Requested																					
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / surface water	RCAP-MS (Dissolved Metals) Ground waters Total Digest (default Method) for well water & surface water Dissolved for ground water	Metals (Water)	Metals (Soil)	Hot Water Soluble Boron (required for CCME Agricultural/ Landfill)	RBCA Hydrocarbons (BTEX, G6-C32)	CCME Hydrocarbons (CWS-PHC F1/BTEX F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL /CCME sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	General Chemistry	HOLD- DO NOT ANALYZE	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs	
Present	Intact																								
		<u>2, 3, 2</u>								X	X			X											
COOLING MEDIA PRESENT Y / N																									
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																									
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	COMMENTS																				
1	BFR_SW21	03-12-20		SW						X	X			X											Total metals
2	BFR_SW22	03-12-20		SW						X	X			X											Total metals
3	BFR_SW23	03-12-20		SW						X	X			X											Total metals
4	BFR_SW24	04-12-20		SW						X	X			X											Total metals
5	BFR_SW25	04-12-20		SW						X	X			X											Total metals
6	BFR_SW_DUP1	01-12-20		SW						X	X			X											Total metals, limited sample
7	BFR_SW_DUP2	02-12-20		SW						X	X			X											Total metals, limited sample
8	BFR_SW_DUP3	04-12-20		SW																			X		
9																									
10																									
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																		
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>[Signature]</i>	DEC 07 2020	15:15	COW 8766 CIP 6142																		
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Address: <u>201 Brownlow Ave., Suite 26</u> <u>Dartmouth, NS</u> PC: <u>B3B 1W2</u>			Address: _____ PC: _____			Project #: <u>20439355</u>																				
Phone: <u>(902) 466-1668</u>			Phone: _____			Site Location: <u>Burgoe</u>																				
Email: <u>belinda_culgin@golder.com</u>			Email: _____			Site Province: <u>NL</u>																				
Report Copies: _____			Report Copies: _____			Site #: _____																				
Report Copies: _____			Report Copies: _____			Sampled By: <u>MM</u>																				
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CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface water	RCAP-MS (Dissolved Metals) Ground waters	Metals (Water)		Metals (Soil)		Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs												
Present	Intact	<u>2, 3, 2</u>								Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default: Acid Extractable (Available) Digest		Hot Water Soluble Boron (required for CCME Agricultural/ Landfill)	RBCA Hydrocarbons (BTEX, C6-C2)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	HOLD- DO NOT ANALYZE							
COOLING MEDIA PRESENT Y / N				SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS				# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface water	RCAP-MS (Dissolved Metals) Ground waters	Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default: Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural/ Landfill)	RBCA Hydrocarbons (BTEX, C6-C2)		CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL /CCME sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX																						
1	BFR_SED1	01-12-20		Sed	3					X		X	X													
2	BFR_SED2	01-12-20		Sed	3					X		X	X													
3	BFR_SED3	01-12-20		Sed	3					X		X	X													
4	BFR_SED4	01-12-20		Sed	3					X		X	X													
5	BFR_SED5	02-12-20		Sed	3					X		X	X													
6	BFR_SED6	01-12-20		Sed	3					X		X	X													
7	BFR_SED7	02-12-20		Sed	3					X		X	X													
8	BFR_SED8	02-12-20		Sed	3					X		X	X													
9	BFR_SED9	02-12-20		Sed	3					X		X	X													
10	BFR_SED10	01-12-20		Sed	3					X		X	X													
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																			
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>[Signature]</i>	DEC 07 2020	3:15	COW 8766 C106642 COW 9360																			
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Phone: <u>(902) 466-1668</u>			Phone: _____			Site Location: <u>Burgoe</u>																		
Email: <u>belinda_cuijn@golder.com</u>			Email: _____			Site Province: <u>NL</u>																		
Report Copies: _____			Report Copies: _____			Site #: _____																		
Report Copies: _____			Report Copies: _____			Sampled By: <u>MM</u>																		
Laboratory Use Only				Analysis Requested																				
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface water	RCAP-MS (Dissolved Metals) Ground waters	Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural/Landfill)	RBCA Hydrocarbons (BTEX, G5-C32)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL / CCME sediment)	PCBs - Select One: Default or CCME Sediment	VOCS	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	HOLD - DO NOT ANALYZE	Regulatory Requirements (Specify): Atlantic RBCA (agricultural land use) for PHCs; CCME (agricultural land use) for metals and PAHs
Present	Intact	<u>2, 3, 2</u>																						
COOLING MEDIA PRESENT Y / N																								
SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																								
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED																	COMMENTS		
1	BFR_SED21	03-12-20		Sed	3																			
2	BFR_SED22	03-12-20		Sed	3								X			X	X							
3	BFR_SED23	03-12-20		Sed	3								X			X	X							
4	BFR_SED24	04-12-20		Sed	3								X			X	X							
5	BFR_SED25	04-12-20		Sed	3								X			X	X							
6	BFR_SED_DUP1	01-12-20		Sed	3								X			X	X							
7	BFR_SED_DUP2	02-12-20		Sed	3								X			X	X							
8	BFR_SED_DUP3	04-12-20		Sed	3																		X	
9																								
10																								
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)						BV LABS JOB #												
Michael Morris <i>Michael Morris</i>		07-12-20	14:30	<i>A. Morris</i>	DEC 07 2020							COW 8766 COW 6142 COW 9360												
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ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

NC Coolers

CHAIN OF CUSTODY #	
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Page ___ of ___	

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

MAXXAM JOB#:			
CUSTODY SEAL	YES	NO	COOLER ID
PRESENT			
INTACT			TEMP 1 4 1
ICE PRESENT			1 2 3
PRESENT			
INTACT			TEMP 1 -1 -1
ICE PRESENT			1 2 3
PRESENT			
INTACT			TEMP 2 3 -1
ICE PRESENT			1 2 3
PRESENT			
INTACT			TEMP 3 1 3
ICE PRESENT			1 2 3
PRESENT			
INTACT			TEMP 4 3 1
ICE PRESENT			1 2 3
PRESENT			
INTACT			TEMP 1 0 -1
ICE PRESENT			1 2 3
PRESENT			
INTACT			TEMP 5 4 4
ICE PRESENT			1 2 3
PRESENT			
INTACT			TEMP -1 2 1
ICE PRESENT			1 2 3
PRESENT			
INTACT			TEMP 5 3 4
ICE PRESENT			1 2 3
PRESENT			
INTACT			TEMP -1 1 -1
ICE PRESENT			1 2 3

RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME (HH:MM)
<i>King</i>	2020/12/09	09:00





**APPENDIX F**

**NCSCS**

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

Question	Response (yes / no)	Comment
1. Are <b>Radioactive material, Bacterial contamination or Biological hazards</b> likely to be present at the site?	No	If yes, do not proceed through the NCSCS. Contact applicable regulatory agency immediately.
2. Are there <b>no contamination exceedances</b> (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>i.e.</i> , there are no exceedances), do not proceed through the NCSCS.
3. Have <b>partial/incompleted or no environmental site investigations</b> been conducted for the Site?	No	If yes, do not proceed through the NCSCS.
4. Is there direct and significant evidence of <b>impacts to humans</b> 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 <b>impacts to ecological receptors</b> 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 <b>adverse effects in the exposure zone</b> ( <i>i.e.</i> , 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 <b>explosion hazard</b> ?	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 explosive hazards and measurement of lower explosive limits.

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

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

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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**

<b>Site:</b>	Site will be identified by:	Site Common Name
Civic Address: <i>(or other description of location)</i>	Reach Road, Burgeo, NL	
Site Common Name: <i>(if applicable)</i>	Burgeo Range	
Code identifier: <i>(e.g., FCSI 8-digit identifier)</i>		
Site Owner or Custodian: <i>(Organization and Contact Person)</i>	Department of National Defence	
Legal description <i>or</i> metes and bounds:	Burgeo Range is located on the east side of Reach Road (Route 480), approximately 3.5 km north of the Town of Burgeo.	
Approximate Site area:	319 Ha	
Parcel Identifier(s) [PID]: <i>(or Parcel Identification Numbers [PIN] if untitled Crown land)</i>		
Centre of site: <i>(provide latitude/longitude or UTM coordinates)</i>	Latitude: _____ degrees _____ min _____ secs; Longitude: _____ degrees _____ min _____ secs	
	UTM Coordinate: Northing 5277505.16 Easting 452616.85	
Site Land Use:	Current:	Agricultural
	Proposed:	Agricultural
<b>Site Plan</b>	<b>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.</b>	
Provide a brief description of the Site:	<p>The Burgeo Range is located on the east side of Reach Road (Route 480), approximately 3.5 km north of the Town of Burgeo. There is a small, approximately 200 m long, gravel access road on the far west side of the Site extending from Reach Road. There are "No Trespassing" and "Range Closed" signs present at the entrance to the Range.</p> <p>The Site has a total approximate area of 319 Ha and is an open area comprised mostly of boggy terrain with exposed bedrock outcrops and several waterbodies. There are no buildings or structures onsite.</p>	

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

Affected media and Contaminants of Potential Concern (COPC):	Soil - PHCs, PAHs, metals Sediment - PHCs, PAHs, metals Surface water - PHCs, PAHs, metals
--	--

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:	Golder Associates Ltd.
Date Scoring Completed:	01-Feb-21

CCME National Classification System (2008) version 1.3  
(I) Contaminant Characteristics

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
<b>1. Residency Media (replaces physical state)</b>				
Which of the following residency media are known (or strongly suspected) to have one or more exceedances of the applicable CCME guidelines? <b>yes</b> = has an exceedance or strongly suspected to have an exceedance <b>no</b> = does not have an exceedance or strongly suspected not to have an exceedance		It should be noted that exceedances are generally based on CCME and Atlantic RBCA guidelines. Exceedances include:  Soil - metals Sediment - PHC, metals Surface water - metals  No groundwater sampling completed onsite.	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 <a href="http://st-ts.ccme.ca/">http://st-ts.ccme.ca/</a>  For potable groundwater environments, guidelines for Canadian Drinking Water Quality (for comparison with groundwater monitoring data) are available on the Health Canada website at <a href="http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php">http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php</a>	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	Yes			
Yes No Do Not Know				
D. Sediment	Yes			
Yes No Do Not Know				
"Known" -score	6			
"Potential" - score	1			
<b>2. Chemical Hazard</b>				
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	Exceedances reported include:  Soil - metals Sediment - PHC, metals Surface water - metals	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.  <i>See Attached Reference Material for Contaminant Hazard Rankings.</i>	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	---			

CCME National Classification System (2008) version 1.3

(I) Contaminant Characteristics

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
<b>3. Contaminant Exceedance Factor</b>				
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)	Soil: modified total petroleum hydrocarbons (mTPH) exceeded applicable guidelines by 1.11 times at BFR_SS21_SA1. Samples with mTPH exceedances contained organic peat (i.e., natural hydrocarbons) and the elevated concentrations are attributed to this as per communication with the laboratory. Cadmium exceeded applicable guidelines by 1.07 to 2.21 times at BFR_SS8_SA1, BFR_SS23_SA1, and BFR_SS24_SA1. Lead exceeded applicable guidelines by 1.71 to 11.14 times at BFR_SS7_SA1, BFR_SS7_SA2, and BFR_SS13_SA1. Selenium exceeded applicable guidelines by 1.10 to 3.70 times at all sample locations except BFR_SS1_SA1, BFR_SS2_SA, BFR_SS3_SA1 and BFR_SS17_SA1. Tin exceeded applicable guidelines by 3.20 times at BFR_SS6_SA1. Zinc exceeded applicable guidelines by 1.35 times at BFR_SS7_SA1.  Sediment: mTPH exceeded applicable guidelines by 1.25 to 69.77 times at all sample locations except BFR_SED5, BFR_SED8, BFR_SED10, BFR_SED11, BFR_SED17, BFR_SED18, BFR_SED20, BFR_SED21, and BFR_SED24. Exceedances of mTPH were reported in 20 of the 25 samples analyzed. However, like the soil samples, these elevated concentrations are attributed to organic material present in the samples. Lead exceeded applicable guidelines by 2.86 to 22.00 times at BFR_SED4, BFR_SED6, and BFR_SED12.  Surface water: Aluminum exceeded applicable guidelines by 22.00 to 78.00 times at all sample locations. Copper exceeded applicable guidelines by 1.10 times at BFR_SW4. Iron exceeded applicable guidelines by 1.00 to 1.23 times at BFR_SW1, BFR_SW2, BFR_SW5, and BFR_SW18. Lead exceeded applicable guidelines by 2.60 to 8.60 times at BFR_SW4 and BFR_SW5.	Ranking of contaminant "exceedance" is determined by comparing contaminant concentrations with the <i>most conservative media-specific and land-use appropriate CCME</i> environmental quality guidelines. <b>Ranking should be based on contaminant with greatest exceedance of CCME guidelines.</b> 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 immobile or regardless of amount) may be considered unacceptable by some jurisdictions. 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	---			
<b>4. Contaminant Quantity (known or strongly suspected)</b>				
What is the known or strongly suspected quantity of all contaminants?  >10 hectare (ha) or 5000 m <sup>3</sup> 2 to 10 ha or 1000 to 5000 m <sup>3</sup> <2 ha or 1000 m <sup>3</sup> Do Not Know	Do Not Know	Estimated areas of impact were not calculated as delineation was not completed.	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	---			
"Potential" - score	4			

(I) Contaminant Characteristics

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
<b>5. Modifying Factors</b>				
Does the chemical fall in the class of persistent chemicals based on its behavior in the environment?  Yes No Do Not Know	No		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.	<i>Examples of Persistent Substances are provided in attached Reference Materials</i>
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	Based on the known COCs for the Site, damage (corrosion, etc.) to utilities and infrastructure is not anticipated.	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	PHCs and metals.	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.	<i>Refer to the Reference Material sheet for a list of example substances that fall under the various chemical classes.</i>
"Known" - Score	2			
"Potential" - Score	---			

**Contaminant Characteristic Total**

Raw Total Score- "Known"	20	
Raw Total Score- "Potential"	5	
Raw Combined Total Score (Known + Potential)	25	
<b>Adjusted Total Score (Raw Combined / 40 * 33)</b>	<b>20.6</b>	maximum 33



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

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>1. Groundwater Movement</b>				
<b>A. Known COPC exceedances and an operable groundwater pathway within and/or beyond the property boundary.</b>				
i) For <b>potable groundwater environments</b> , 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 <b>non-potable environments</b> (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.  ii) Same as (i) except the information is not known but <b>strongly suspected</b> based on indirect observations.  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>i.e.</i> , 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).	12	Groundwater not characterized at the site.	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.  <b>Selected References</b>  <u>Potable Environments</u>  Guidelines for Canadian Drinking Water Quality: <a href="http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php">http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php</a>  <u>Non-Potable Environments</u>  CCME. 1999. Canadian Water Quality Guidelines for Protection of Aquatic Life. <a href="http://ceqg-rcqe.ccome.ca/">http://ceqg-rcqe.ccome.ca/</a>  Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations. Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002.
	9			
	0			
	Go to Potential			
Score	---			
<b>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>				
<b>B. Potential for groundwater pathway.</b>				
a. Relative mobility of contaminant High Moderate Low Insignificant Do Not Know	Do Not Know		Organics Koc (L/kg)  Koc < 500 ( <i>i.e.</i> , log Koc < 2.7) Koc = 500 to 5000 ( <i>i.e.</i> , log Koc = 2.7 to 3.7) Koc = 5,000 to 100,000 ( <i>i.e.</i> , log Koc = 3.7 to 5) Koc > 100,000 ( <i>i.e.</i> , 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.
	Score			
b. Presence of engineered sub-surface containment? No containment Partial containment Full containment Do Not Know	No containment		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.  <b>Selected Resources:</b> United States Environmental Protection Agency (USEPA) 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128.
	Score			
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	Do Not Know		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 ( <i>e.g.</i> , water table aquifer, first hydrostratigraphic unit or other groundwater pathway).	
	Score			

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

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
d. Hydraulic conductivity of confining layer >10 <sup>-4</sup> cm/s or no confining layer 10 <sup>-4</sup> to 10 <sup>-6</sup> cm/s <10 <sup>-6</sup> cm/s Do Not Know	Do Not Know		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.	
Score	0.5			
<b>B. Potential for groundwater pathway.</b>				
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 1	Burnt Pond Climate Station (1981-2010) used - closest to site. Avg. rainfall = 1087.9 mm Avg. snowfall = 362.4 cm = 3624 mm Total avg. precipitation = 4711.9 mm Score = 4711.9/1000 = 4.7  Permeability: assume 0.6 for sand  4.7 x 0.6 = 2.82	<u>Precipitation</u> 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).  <u>Permeability</u> 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: <a href="http://climate.weather.gc.ca/climate_normals/index_e.html">http://climate.weather.gc.ca/climate_normals/index_e.html</a>  Snow to rainfall conversion apply ratio of 10(snow):1(water) <a href="https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&amp;n=108C6C74-1">https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&amp;n=108C6C74-1</a>
f. Hydraulic conductivity of aquifer >10 <sup>-2</sup> cm/s 10 <sup>-2</sup> to 10 <sup>-4</sup> cm/s <10 <sup>-4</sup> cm/s Do Not Know	10-2 to 10-4 cm/s 1	Silty sand	Determine the nature of geologic materials and estimate hydraulic conductivity of all aquifers of concern from published material (refer to "Range of Values of Hydraulic Conductivity and Permeability" in the Reference Material sheet).	
Potential groundwater pathway total	8			
Allowed Potential score	8	Note: If a "known" score is provided, the "potential" score is disallowed.		
<b>Groundwater pathway total</b>	<b>8</b>			
<b>2. Surface Water Movement</b>				
<b>A. Demonstrated migration of COPC in surface water above background conditions</b>				
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).  ii) Same as (i) except the information is not known but <u>strongly suspected</u> based on indirect observations.  iii) Meets CWQG or absence of surface water exposure pathway (e.g., Distance to nearest surface water is > 5 km.)	12  8  0  12 12	Metals (aluminum, copper, iron, and lead) in surface water are >1x applicable guidelines.	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.  Examples of indirect evidence may include observed staining of sediment and/or river banks, but surface water has not been tested.	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 <a href="http://ceqg-rcqe.come.ca/">http://ceqg-rcqe.come.ca/</a>  CCME. 1999. Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses (Irrigation and Livestock Water) <a href="http://ceqg-rcqe.come.ca/">http://ceqg-rcqe.come.ca/</a>  Health and Welfare Canada. 1992. Guidelines for Canadian Recreational Water Quality. <a href="http://www.hc-sc.gc.ca/ewh-semt/water-eau/recreat/index-eng.php">http://www.hc-sc.gc.ca/ewh-semt/water-eau/recreat/index-eng.php</a>
<b>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>				

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

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>B. Potential for migration of COPCs in surface water</b>				
a. Presence of containment No containment Partial containment Full containment Do Not Know	Do Not Know 3		Review the existing engineered systems and relate these structures to site conditions and proximity to surface water and determine if full containment is achieved: score low if there is full containment such as capping, berms, dikes; score medium if there is partial containment such as natural barriers, trees, ditches, sedimentation ponds; score high if there are no intervening barriers between the site and nearby surface water. Full containment must include containment of all chemicals.	
b. Distance to Surface Water 0 to <100 m 100 - 300 m >300 m Do Not Know	Do Not Know 2		Review available mapping and survey data to determine distance to nearest surface water bodies.	
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	Do Not Know 1		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.).	
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	Do Not Know 0.4		<u>Precipitation</u> 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). <u>Permeability</u> 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: <a href="http://climate.weather.gc.ca/climate_normals/index_e.html">http://climate.weather.gc.ca/climate_normals/index_e.html</a> Snow to rainfall conversion apply ratio of 10(snow):1(water) <a href="https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&amp;n=108C6C74-1">https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&amp;n=108C6C74-1</a>
e. Flood potential 1 in 2 years 1 in 10 years 1 in 50 years not in floodplain Do Not Know	Do Not Know 0.5		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.	
Potential surface water pathway total	6.9			
Allowed Potential score	--	Note: If a "known" score is provided, the "potential" score is disallowed.		
<b>Surface water pathway total</b>	<b>12</b>			
<b>3. Surface Soils (potential for dust, dermal and ingestion exposure)</b>				
<b>A. Demonstrated concentrations of COPC in surface soils (top 1.5 m)</b>				
COPCs measured in surface soils exceed the CCME soil quality guideline.	12	Metals (cadmium, lead, selenium, tin, and zinc) exceed applicable criteria.	Collect all available information on quality of surface soils (i.e., top 1.5 metres) at the site. Evaluate available data against Canadian Soil Quality Guidelines. Select appropriate guidelines based on current (or proposed future) land use (i.e., agricultural, residential/parkland, commercial, or industrial), and soil texture if applicable (i.e., coarse or fine).	Selected References: CCME. 1999. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health. <a href="http://ceqg-rcqe.ccm.ca/">http://ceqg-rcqe.ccm.ca/</a>
Strongly suspected that soils exceed guidelines.	9		Examples of strongly suspected exceedences of soil guidelines may include evidence of staining, odours, or significant debris infill materials.	
COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock).	0			
	12			
Score	12			
<b>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>				

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

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>B. Potential for a surface soils (top 1.5 m) migration pathway</b>				
a. Are the soils in question covered? Exposed Vegetated Landscaped Paved Do Not Know  Score	Exposed		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.
	6			
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  Score	10-30% of year		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).	
	3			
Potential surface soil pathway total	9	Note: If a "known" score is provided, the "potential" score is disallowed.		
Allowed Potential score	---			
<b>Soil pathway total</b>	<b>12</b>			

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

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>4. Vapour</b>				
<b>A. Demonstrated COPCs in vapour.</b>				
Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations.	12	Data not available.	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			
Score	0			
<b>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>				
<b>B. Potential for COPCs in vapour</b>				
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	Not Volatile 0		Reference: US EPA Soil Screening Guidance (Part 5 - Table 36) <i>Provided in Attached Reference Materials</i>  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. <a href="http://cegg-rcqe.ccm.ca">http://cegg-rcqe.ccm.ca</a>
b. What is the soil grain size? Fine Coarse Do Not Know	Coarse 0	Lab grain size analysis determined predominantly coarse soil onsite.	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).	
c. Is the depth to the source less than 10m? Yes No Do Not Know	Do Not Know 0		Review groundwater depths below grade for the site.	
d. Are there any preferential pathways? Yes No Do Not Know	No 0	No preferential pathways were identified.	Visit the site during dry summer conditions and/or review available photographs. Where bedrock is present, fractures would likely act as preferential pathways.	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.
Potential vapour pathway total	0			
Allowed Potential score	---			
<b>Vapour pathway total</b>	<b>0</b>			
<b>5. Sediment Movement</b>				
<b>A. Demonstrated migration of sediments containing COPCs</b>				
There is evidence to suggest that sediments originally deposited to the site (exceeding the CCME sediment quality guidelines) have migrated.	12	Not assessed.	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	Go to Potential ---			
<b>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>				

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

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>B. Potential for sediment migration</b>				
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")? Yes No Do Not Know	No 4	Only small to very small waterbodies onsite.	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.  Review existing sediment assessments. If the sediments present at the site are in a river, select "no" for this question.  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.	
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	No 0			
c. For rivers, are the contaminated sediments in an area prone to sediment scouring? Yes No Do Not Know	No 0			
Potential sediment pathway total	4			
Allowed Potential score	4	Note: If a "known" score is provided, the "potential" score is disallowed.		
<b>Sediment pathway total</b>	<b>4</b>			
<b>6. Modifying Factors</b>				
Are there subsurface utility conduits in the area affected by contamination? Yes No Do Not Know	No		Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration.	
Known Potential	0 ---			

Migration Potential Total		
Raw Total Score- "Known"	24	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"	12	
Raw Combined Total Score (Known + Potential)	36	
<b>Adjusted Total Score (Raw Combined / 64 * 33)</b>	<b>18.6</b>	maximum 33

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

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>1. Human</b>				
<b>A. Known exposure</b>				
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	<p>*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 &gt; 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) &gt;&gt; 1.0 or incremental lifetime cancer risks considerably exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals.</p> <p>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) &gt; 0.2 (excluding the Estimated Daily Intake) or &gt; 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 &gt;10<sup>-5</sup> or &gt;10<sup>-6</sup>).</p> <p>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<sup>-6</sup> or 10<sup>-5</sup>).</p>	<p>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.</p> <p>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.</p> <p><b>Selected References:</b>                      Health Canada – Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Health Screening Level Risk Assessments, available at <a href="http://www.hc-sc.gc.ca/ewh-semt/pubs/contam/site/index-eng.php">http://www.hc-sc.gc.ca/ewh-semt/pubs/contam/site/index-eng.php</a>                      United States Environmental Protection Agency, Integrated Risk Information System (IRIS), available at <a href="http://toxnet.nlm.nih.gov">http://toxnet.nlm.nih.gov</a></p>	
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	10			
No quantified or suspected exposures/impacts in humans.	0			
Score	---			
<p><b>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></p>				
<b>B. Potential for human exposure</b>				
a) Land use (provides an indication of potential human exposure scenarios)  Agricultural Residential / Parkland Commercial Industrial Do Not Know	Agricultural  3	<p>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.</p> <p>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).</p>	<p>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).</p>	
Score	3			
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	Access, not covered  2	<p>Site is easily accessible although "Range Closed" and "No Trespassing" signs are erected at entrance. Site has vegetation cover.</p>	<p>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.</p>	
Score	2			
<b>B. Potential for human exposure</b>				
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	Yes  3	<p>Metals impacts in surface soils.</p>	<p>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.</p>	<p>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.</p>
Score	3			

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

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<p>ii) inhalation (i.e., inhalation of dust, vapour)</p> <p>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)?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>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.</p> <p>Fine Coarse Surface soil is not contaminated or absent (bedrock) Do Not Know Texture</p> <p>Score</p> <p>inhalation total</p>	<p>No</p> <p>0</p> <p>Coarse</p> <p>1</p> <p>1</p>	<p>Metals impacts in surface soils. Soils are coarse grained.</p>	<p>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), <i>Potential for COPCs in Vapour</i> for a definition of volatility.</p> <p>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.</p>	<p>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.</p> <p>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.</p> <p>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.</p> <p>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. <a href="http://ceag-rcqe.ccme.ca/">http://ceag-rcqe.ccme.ca/</a> Golder, 2004. Soil Vapour Intrusion Guidance for Health Canada Screening Level Risk Assessment (SLRA) Submitted to Health Canada, Burnaby, BC</p>
B. Potential for human exposure				
<p>iii) Ingestion (i.e., ingestion of food items, water and soils [for children]), including traditional foods.</p> <p>Drinking Water: Choose a score based on the proximity to a drinking water supply, to indicate the potential for contamination (present or future).</p> <p>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</p> <p>Score</p> <p>Is an alternative water supply readily available?</p> <p>Yes No Not Applicable Do Not Know</p> <p>Score</p> <p>Is human ingestion of contaminated soils possible?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Ingestion total</p>	<p>300 m to 1 km</p> <p>2</p> <p>No</p> <p>1</p> <p>Yes</p> <p>3</p> <p>Do Not Know</p> <p>0.5</p> <p>6.5</p>	<p>Town of Burgeo municipal water supply approx 1 km south of Site.</p> <p>Metals impacts in surface soils.</p> <p>Hunting wildlife from the site is potential however we do not have information to support this statement at this time.</p>	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>Answer Not Applicable if "No drinking water present" or "No potential for aquifer contamination" was selected in previous question.</p> <p>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.</p> <p>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.</p>	<p><b>Selected References:</b> Guidelines for Canadian Drinking Water Quality: <a href="http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php">http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php</a></p> <p>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.</p> <p>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.</p>
<p>Human Health Total "Potential" Score</p> <p>Allowed "Potential" Score</p>	<p>15.5</p> <p>15.5</p>	<p>Note if a "Known" Human Health score is provided, the "Potential" score is disallowed.</p>		



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

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>2. Human Exposure Modifying Factors</b>				
a) Strong reliance of local people on natural resources for survival (i.e., food, water, shelter, etc.) in contaminated area. Yes No Do Not Know	No	The Site is not intended for public access and has "No Trespassing" and "Range Closed" signs at entrance.		
Human Exposure Modifying Factors - "Known"	0			
Human Exposure Modifying Factors - "Potential"	---			
Raw Human "Known" total	0			
Raw Human "Potential" total	15.5			
Raw Combined Total Human Score	15.5			
<b>Adjusted Total Human Score (max 22)</b>	<b>15.5</b>			
<b>3. Ecological</b>				
<b>A. Known exposure</b>				
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. <a href="http://ceqg-rcqe.ccm.ca/">http://ceqg-rcqe.ccm.ca/</a> Sensitive receptors- review: Canadian Council on Ecological Areas; <a href="http://www.ccea.org">www.ccea.org</a>  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 <i>A Framework for Ecological Risk Assessment: General Guidance</i> (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			
No quantified or suspected exposures/impacts in terrestrial or aquatic organisms	0			
Score	---			
<b>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>				
<b>B. Potential for ecological exposure (for the contaminated portion of the site)</b>				
a) Terrestrial i) Land use Agricultural (or Wild lands) Residential / Parkland Commercial Industrial Do Not Know	Agricultural (or Wild lands) 3	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	3			
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  1	Metals impacts in surface soils.	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.	

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

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<p>iii) Ingestion (i.e., wildlife or domestic animals ingesting contaminated food items, soils or water)</p> <p>Are terrestrial animals likely to be ingesting contaminated water at the site?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Are terrestrial animals likely to be ingesting contaminated soils at the site?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Can the contamination identified bioaccumulate?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Distance to sensitive terrestrial ecological area</p> <p>0 to 300 m 300 m to 1 km 1 to 5 km &gt; 5 km Do Not Know</p> <p>Score</p>	<p>Yes</p> <p>1</p> <p>Yes</p> <p>1</p> <p>Do Not Know</p> <p>0.5</p> <p>1 to 5 km</p> <p>1</p> <p>7.5</p> <p>7.5</p>	<p>Metals impacts in surface soils.</p> <p>Petroleum hydrocarbons F1 to F4 are not considered bioaccumulative.</p> <p>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: <a href="http://www.ccea.org">www.ccea.org</a></p> <p>Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.</p>	<p>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.</p> <p>Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates.</p> <p>Substances can be considered bioaccumulative if;</p> <ul style="list-style-type: none"> <li>• There is a Tissue Residue Guideline (TRG) or Soil Quality Guideline for Soil and Food Ingestion for the protection of secondary (SQG<sub>2c</sub>) and/or tertiary consumers (SQG<sub>3c</sub>).</li> <li>• Bioaccumulation factor (BAF) or bioconcentration factor (BCF) greater than 5000.</li> <li>• If BAF or BCF is not available, or reliable, the log Kow is equal to or greater than 5.</li> </ul> <p>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.</p> <p>Petroleum hydrocarbons F1 to F4 are not considered bioaccumulative.</p>	<p>See attached Reference Material including log(Kow)</p> <p>Consult CEPA (1999) Persistence and Bioaccumulation Regulations for additional guidance; <a href="http://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-107/page-1.html">http://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-107/page-1.html</a></p> <p>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.</p>
<p>B. Potential for ecological exposure (for the contaminated portion of the site)</p>				
<p>b) Aquatic</p> <p>i) Classification of aquatic environment</p> <p>Sensitive Typical Not Applicable (no aquatic environment present) Do Not Know</p> <p>Score</p>	<p>Typical</p> <p>1</p>	<p>"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.</p> <p>"Typical aquatic environments" include those in areas other than those listed above.</p>		
<p>ii) Uptake potential</p> <p>Does groundwater daylighting to an aquatic environment exceed the CCME water quality guidelines for the protection of aquatic life at the point of contact?</p> <p>Yes No (or Not Applicable) Do Not Know</p> <p>Score</p> <p>Distance from the contaminated site to an important surface water resource</p> <p>0 to 300 m 300 m to 1 km 1 to 5 km &gt; 5 km Do Not Know</p> <p>Score</p> <p>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?</p> <p>Yes No Do Not Know</p> <p>Score</p>	<p>No</p> <p>0</p> <p>300 m to 1 km</p> <p>2</p> <p>Do Not Know</p> <p>0.5</p> <p>3.5</p> <p>3.5</p>	<p>Town of Burgeo municipal water supply approx 1 km south of Site.</p> <p>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: <a href="http://www.ccea.org">www.ccea.org</a></p> <p>Substances can be considered bioaccumulative if;</p> <ul style="list-style-type: none"> <li>• There is a Tissue Residue Guideline (TRG)</li> <li>• Bioaccumulation factor (BAF) or bioconcentration factor (BCF) greater than 5000.</li> <li>• If BAF or BCF is not available, or reliable, the log Kow is equal to or greater than 5.</li> </ul> <p>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.</p> <p>Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.</p>	<p>Groundwater concentrations of contaminants at the point of contact with an aquatic receiving environment can be estimated in three ways:</p> <ol style="list-style-type: none"> <li>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).</li> <li>2) by conducting groundwater modeling to estimate the concentration of groundwater immediately before discharge.</li> <li>3) by installing water samplers, "peepers", in the sediments in the area of daylighting groundwater.</li> </ol>	<p>Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and fens and other aquatic environments.</p> <p>See attached Reference Material including log(Kow)</p> <p>Consult CEPA (1999) Persistence and Bioaccumulation Regulations for additional guidance; <a href="http://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-107/page-1.html">http://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-107/page-1.html</a></p>

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

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>4. Ecological Exposure Modifying Factors</b>				
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	No 0 ---	SAR assessment has not been completed at the Site; however, based on the size and habitat present at the Site, it is unlikely to provide critical habitat for SAR.	Consult any ecological risk assessment reports. If information is not present, utilize on-line databases such as NatureServe Explorer ( <a href="http://explorer.natureserve.org/">http://explorer.natureserve.org/</a> ). 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: <a href="http://www.sararegistry.gc.ca/species/schedules_e.cfm?id=1">http://www.sararegistry.gc.ca/species/schedules_e.cfm?id=1</a> 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. <a href="http://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk">http://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk</a>
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  Is there evidence of olfactory impact (i.e., unpleasant smell)? Yes No Do Not Know  Is there evidence of increase in plant growth in the lake or water body? Yes No Do Not Know  Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different? Yes No Do Not Know	No 0 ---  No 0 ---  No 0 ---  No 0 ---	Hunting or fishing not allowed onsite.	Documentation may consist of environmental investigation reports, press articles, petitions or other records.  Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat.  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.  Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.	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.
Ecological Modifying Factors Total - Known	0			
Ecological Modifying Factors Total - Potential	---			
Raw Ecological "Known" total	0			
Raw Ecological "Potential" total	11			
Raw Combined Total Ecological Score	11			
<b>Adjusted Total Ecological Score (Max 18)</b>	<b>11</b>			
<b>5. Other Potential Contaminant Receptors</b>				
a) Exposure of permafrost (leading to erosion and structural concerns)  Are there improvements (roads, buildings) at the site dependant upon the permafrost for structural integrity? Yes No Do Not Know  Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment? Yes No Do Not Know	No 0 ---  No 0 ---		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.  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.	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.
<b>Other Potential Receptors Total - Known</b>	<b>0</b>			
<b>Other Potential Receptors Total - Potential</b>	<b>---</b>			
<b>Exposure Total</b>				
Raw Human Health + Ecological Total + Other Receptors - "Known"	0			
Raw Human Health + Ecological Total + Other Receptors - "Potential"	26.5	Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included.		
<b>Raw Total Exposure Score (not adjusted)</b>	<b>26.5</b>	HH or Eco Total score has not yet been capped at 22 and 18, respectively.		
<b>Adjusted Total Score (Adjusted Total Exposure / 46 * 34)</b>	<b>19.6</b>	maximum 34		

**CCME National Classification System (2008) version 1.3  
Score Summary**

Site: Burgeo Range

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	6	1
2. Chemical Hazard	8	---
3. Contaminant Exceedance Factor	4	---
4. Contaminant Quantity	---	4
5. Modifying Factors	2	---
<b>Raw Total Score</b>	<b>20</b>	<b>5</b>
<b>Raw Combined Total Score (Known + Potential)</b>	<b>25</b>	
<b>Adjusted Total Score (Raw Combined Total/40*33)</b>	<b>20.6</b> (max 33)	

II. Migration Potential	Known	Potential
1. Groundwater Movement	---	8
2. Surface Water Movement	12	---
3. Soil	12	---
4. Vapour	0	---
5. Sediment Movement	---	4
6. Modifying Factors	0	---
<b>Raw Total Score</b>	<b>24</b>	<b>12</b>
<b>Raw Combined Total Score (Known + Potential)</b>	<b>36</b>	
<b>Adjusted Total Score (Raw Combined Total/64*33)</b>	<b>18.6</b> (max 33)	

III. Exposure	Known	Potential
1. Human Receptors		
A. Known Impact	---	
B. Potential		
a. Land Use		3
b. Accessibility		2
c. Exposure Route		
i. Direct Contact		3
ii. Inhalation		1
iii. Ingestion		6.5
2. Human Receptors Modifying Factors	0	---
<b>Raw Total Human Score</b>	<b>0</b>	<b>15.5</b>
<b>Raw Combined Total Human Score (Known + Potential)</b>	<b>15.5</b>	
<b>Adjusted Total Human Score</b>	<b>15.5</b> (maximum 22)	
3. Ecological Receptors		
A. Known Impact	---	
B. Potential		
a. Terrestrial		7.5
b. Aquatic		3.5
4. Ecological Receptors Modifying Factors	0	---
<b>Raw Total Ecological Score</b>	<b>0</b>	<b>11</b>
<b>Raw Combined Total Ecological Score (Known + Potential)</b>	<b>11</b>	
<b>Adjusted Total Ecological Score</b>	<b>11</b> (maximum 18)	
5. Other Receptors	0	---
<b>Total Other Receptors Score (Known + Potential)</b>	<b>0</b>	
<b>Total Exposure Score (Human + Ecological + Other)</b>	<b>26.5</b>	
<b>Adjusted Total Score (Total Exposure/46*34)</b>	<b>19.6</b> (maximum 34)	

Site Score	
Site Letter Grade	<b>D</b>
Certainty Percentage	<b>69%</b>
% Responses that are "Do Not Know"	<b>14%</b>
<b>Total NCSCS Score for site</b>	<b>58.8</b>
<b>Site Classification Category</b>	<b>2</b>

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.



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