



GOLDER

REPORT

Phase II Environmental Site Assessment

Former Retail Fuel Outlet
2 Montreal Road, Ottawa, Ontario
SAP No: 88005740

Submitted to:

Imperial Oil Limited

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THE SCOPE OF THE REPORT AND THIRD-PARTY RELIANCE***

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Executive Summary

Site Background

Site location	2 Montreal Road Ottawa, Ontario
Type of facility	Former Retail Fuel Outlet
Current site condition	Vacant
Site zoning	Traditional Mainstreet (TM3 H[42])
Adjacent land use	North: Montreal Road, commercial and residential (including a service station) East: Montgomery Road, commercial (including a service station) South: Retail and commercial West: North River Road, parkland followed by the Rideau River approximately 40 m away

Field Work

Dates of field work	May 13 to 21; May 27 to 30, 2019; November 11, 2019
Number of boreholes drilled	12 boreholes; 4 completed as soil vapour probes (SV19-01 to SV19-04), and 9 completed as monitoring wells (MW19-01 to MW19-09). One monitoring well and soil vapour probe were completed as a nested pair (MW19-06 with SV19-04)
Number of soil vapour probes sampled	4 (2 events)
Number of monitoring wells sampled	15
Hydraulic conductivity tests completed	3

Site Stratigraphy and Hydrogeology

Predominant soil type	Coarse-grained
Depth to shallow groundwater	6.36 to 7.33 mbgs
Groundwater flow direction	Northwest
Light non-aqueous phase liquid	Not detected

Hydraulic conductivity	Undetermined due to relatively high rate of groundwater recharge in the monitoring wells
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Nearby Receptors

Groundwater use within 500 m	The Site and surrounding properties are municipally serviced; the water supply is sourced from the Ottawa River.
Surface water body within 500 m	The Rideau River is approximately 40 m west.

Selected Guidelines

Petroleum hydrocarbons, benzene, toluene, ethylbenzene, xylenes, volatile organic compounds, polycyclic aromatic hydrocarbons, metals, polychlorinated biphenyls, and glycols	<p>Soil:</p> <ul style="list-style-type: none"> MECP Table 3: Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition. <p>Groundwater:</p> <ul style="list-style-type: none"> MECP Table 3: Full Depth Generic Site Condition Standards in a non-potable ground water condition, for all property uses, coarse textured soils. <p>Soil Vapour:</p> <ul style="list-style-type: none"> Industrial Health-Based Indoor Air Criteria provided by MECP Modified Generic Risk Assessment (Tier 2) Spreadsheet Model (November 1, 2016) SVSL for an industrial building with basement (probe depth 0 to 30 cm below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.004.
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Soil Analytical Results Exceeding Selected Criteria

Petroleum hydrocarbons, benzene, toluene, ethylbenzene, xylenes	Exceedances were identified at north, central and east portions of the Site
Volatile organic compounds	No exceedances identified
Polycyclic aromatic hydrocarbons	No exceedances identified
Metals	No exceedances identified
Polychlorinated biphenyls, and glycols	No exceedances identified

Groundwater Analytical Results

Petroleum hydrocarbons, benzene, toluene, ethylbenzene, xylenes	Exceedances were identified at central and south portions of the Site
Volatile organic compounds	No exceedances identified
Polycyclic aromatic hydrocarbons	No exceedances identified
Metals	No exceedances identified
Polychlorinated biphenyls, and glycols	No exceedances identified

Soil Vapour Analytical Results

Petroleum hydrocarbons, benzene, toluene, ethylbenzene, xylenes	Exceedances were identified at central and north portions of the Site during the spring event. No exceedances were identified for the fall event.
Volatile organic compounds	No exceedances identified
Aromatics and aliphatics	No exceedances identified
Polycyclic aromatic hydrocarbons (naphthalene)	No exceedances identified

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List of Abbreviations

°C	degrees Celsius
APECS	areas of potential environmental concern
BTEX	benzene, toluene, ethylbenzene, xylenes
BVL	Bureau Veritas Laboratories
cm	centimetre
EC	electrical conductivity
ESA	Environmental Site Assessment
HDPE	high density polyethylene
kPa	kilopascal
km	kilometre
L	litre
L/min	litre per minute
LEL	lower explosive limit
LNAPL	light non-aqueous phase liquid
m	metre
mbgs	metres below ground surface
MECP	Ministry of the Environment, Conservation and Parks
MGRA	modified generic risk assessment
µm	micrometres
mm	millimetre
m/m	metres per metre
MNRF	Ministry of Natural Resources and Forestry
m/s	metres per second
O.Reg.	Ontario Regulation
OVM	organic vapour monitor
PAH	polycyclic aromatic hydrocarbon

PCB	polychlorinated biphenyl
PCOCs	potential contaminants of concern
PHC	petroleum hydrocarbon
PIN	parcel identification number
PVC	polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
SCC	Standards Council of Canada
SSI	Supplemental Site Investigation
SVSL	soil vapour screening levels
TCLP	Toxicity Characteristic Leachate Procedure
TOC	top of casing
UST	underground storage tank
VOC	volatile organic compound

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Imperial Oil Limited (Imperial) to conduct an SSI at Imperial's former retail fuel outlet, 2 Montreal Road, Ottawa, Ontario (the Site). The Site location is presented in Figure 1.

This report documents the methods and results of the SSI conducted between May 13 and November 11, 2019.

1.1 Objective

The objective of the investigation was to assess and delineate soil, groundwater, and soil vapour quality for contaminants of concern within the APECs previously identified in Phase I and Phase II ESAs.

1.2 Scope of Work

The scope of work for this SSI program consisted of the following activities:

- Drilling 12 boreholes to a maximum depth of 9.4 mbgs and completing nine of the boreholes as monitoring wells, and three as soil vapour probes with one soil vapour probe nested in a monitoring well;
- Collecting soil samples from the 12 boreholes for analysis of one or more of BTEX, PHC Fractions F1 to F4, VOCs, PAHs, select metals, PCBs, glycol parameters, fraction organic carbon, and physical parameters;
- Collecting one composite soil sample for TCLP;
- Surveying the newly-installed monitoring wells;
- Monitoring the nine newly-installed monitoring wells and seven existing monitoring wells;
- Collecting groundwater samples from new and existing monitoring wells for one or more of BTEX, PHC Fractions F1 to F4, VOCs, PAHs, select metals, PCBs, and glycol parameters;
- Monitoring four newly-installed soil vapour probes for soil vapour conditions;
- Collecting soil vapour samples for analysis of BTEX, PHC Fractions F1 and F2, Aromatic/Aliphatic Hydrocarbon Fractions, VOCs, and naphthalene using laboratory supplied Summa canisters during two separate events in May and November;
- Performing hydraulic conductivity testing on three newly-installed monitoring wells;
- Conducting QA/QC sampling; and
- Preparing this SSI report and detailing the methods and results of the investigation activities.

1.3 Summary of Previous Work

Previous environmental assessments were reviewed by Golder in order to assess the Site conditions and as a source of information for reporting. A summary of the relevant information follows.

Phase I ESA:

- The Site was a former service station that operated from 1928 to 1989. Circa 1989 to 1997 the service station became a retail fuel outlet. All facilities associated with the service station were removed in 1997 (Parsons 2014).

- APECs were identified to be the USTs and the former pump islands, vehicle repair garage and associated equipment (e.g., hoists and service bays, oil-water separator, etc.) and the imported backfill during Site demolition and excavation (Parsons 2014).
- BTEX, PHC fractions F1 to F4, select VOCs, specifically ethylene dibromide, 1,2-dichloroethylene, 1,4-dioxane, 1,1-dichloroethane, tetrachloroethylene, trichloroethylene, 1,1-dichloroethylene, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, vinyl chloride 1,1,1-trichloroethane, 1,1,2-trichloroethane, methyl-t-butyl ether, n-hexane, trichlorofluoromethane, and dichlorodifluoromethane, PAHs, PCBs, and metals, specifically arsenic, barium, chromium, copper, lead and zinc, were identified to be PCOCs associated with the Site (Parsons 2014).

Phase II ESAs:

- Previous studies identified petroleum parameters in soil exceeded the applicable Table 3 commercial standards at multiple areas of the Site (exp 2014).
- Groundwater monitoring and sampling in 2014 reported concentrations above the applicable Regulation 153/04 Table 3 standards (exp 2014).

2.0 SITE BACKGROUND

2.1 Site Description

The Site is a former retail fuel outlet at 2 Montreal Road in Ottawa, Ontario and the PIN is 042370003. The Site is approximately 0.19 hectares in size and is currently vacant, with ground surface consisting of grass, asphalt and/or gravel.

General features of the Site are illustrated in Figure 2. Site photographs are presented in Appendix A.

2.2 Land Use

The Site is zoned as Traditional Mainstreet (TM3 H[42]) and is currently commercial land use. Land to the north and east is zoned as Traditional Mainstreet (TM3) and is currently commercial land use; to the south is General Mixed use (GM11) and is currently commercial land use; and to the west, beyond North River Road is Parks and Open Space (O1) (City of Ottawa 2019, internet site) and is currently parkland land use.

2.3 Areas of Potential Environmental Concern

Based on a review of previous environmental assessments, the APECs associated with the Site include the following.

APECs	Location	PCoC
Former service station	Central portion of Site	BTEX, PHC Fractions F1 to F4, PAHs, VOCs, metals, PCBs, and glycols
Former tank nest	West portion of Site	BTEX, PHC Fractions F1 to F4, metals

APECs	Location	PCoC
Former pump islands	Central and north portions of Site	BTEX, PHC Fractions F1 to F4, PAHs, VOCs, metals, PCBs, and glycols
Off-site APECs	North, south and east portions of Site	BTEX, PHC Fractions F1 to F4, PAHs, VOCs, metals, and glycols

3.0 REGULATORY FRAMEWORK AND SELECTED STANDARDS

The MECP standards considered to be applicable at the Site are those specified in Table 3 of the MECP document titled “Soil, Ground Water, and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act,” dated April 15, 2011 (hereafter referred to as the Table 3 Standards) for a non-potable groundwater condition, industrial/commercial/community property use and coarse textured soil. The rationale behind the selection of these applicable standards follows.

3.1 Site Sensitivity

The Site would not be considered environmentally sensitive, based on the following:

- No part of the Site is on or within 30 m of an area of natural significance (MNRF 2019, internet site).

3.2 Groundwater Condition

The groundwater condition is considered non-potable based on the following:

- The Site is located within an area of Ottawa that is serviced with municipally treated water sourced from the Ottawa River (Mississippi-Rideau Source Protection Region 2014, internet site).

3.3 Shallow Soil Property

The Site is not considered a shallow soil property, based on the following:

- The available borehole logs and geologic records indicate that more than one-third of the area of the Site consists of soil greater than 2 m in depth beneath the ground surface, excluding any non-soil surface treatment greater than 0.5 m thick.

3.4 Nearby Water Body

Closest surface water body is the Rideau River, which is located approximately 40 m west of the Site boundary (MNRF 2019, internet site).

3.5 Soil Texture

The applicable soil texture for the Site is coarse textured soils based on the following:

- Coarse textured soils, as determined by borehole logs, geological maps for the area of the Site and grain size distribution analysis testing collectively indicated that at least one-third of the soil at the property, measured by volume, consisted of more than 50% of particles that are larger than 75 µm in diameter.

3.6 Property Use

The applicable property use is as follows:

- Industrial/commercial/community property use, as the Site is currently zoned Traditional Mainstreet (TM3) (City of Ottawa 2019, internet site)

3.7 Full Depth or Stratified Site Condition Standards

The full depth rather than the stratified generic site condition standards were selected.

3.8 Soil Vapour Assessment Criteria

Based on the proposed property use, soil vapour results were compared against SVSL in a commercial/industrial setting with a basement. In order to derive soil vapour screening criteria, MECP's MGRA "Approved Model" Industrial Health Based Indoor Air Criteria (November 1, 2016) were divided by the MECP generic industrial attenuation factor of 0.004. The generic attenuation factor is a reasonably conservative vapour attenuation factor based on empirical information and assuming that biodegradation between the groundwater and the basement is not occurring.

4.0 FIELD WORK AND METHODS

4.1 Pre-Investigation Activities

Prior to any drilling, public and private utility locates were conducted to identify and avoid underground facilities during the subsurface activities.

4.2 Borehole Drilling, Monitoring Well and Probe Installation

Twelve boreholes were drilled across the Site; four soil vapour probes were installed (SV19-01 to SV19-04), and nine monitoring wells were installed (MW19-01 to MW19-09). One location was completed as a nested pair (MW19-06 with SV19-04). Prior to drilling, each borehole was daylighted to 1.5 mbgs in non-critical zones and 2.4 mbgs in critical zones. The hydrovac was operated by Badger Daylighting LP out of Ottawa, Ontario. Borehole drilling was completed using a track-mounted Geomachine 100 with direct push and air rotary tooling, and disposable sample tubes. Each sample tube was disposed of into soil drum after a single use. The drill rig was operated by Strata Drilling Group out of Carleton Place, Ontario.

Soil samples were collected at intervals of 0.75 m and following the methodology described in subsection 4.3. The monitoring wells were constructed of 50 mm diameter, Schedule 40 PVC screen and solid riser. All well completion zones consisted of 0.010 inch slot screens, and 10-20 silica sand was placed around the screen to a level of approximately 0.3 m below the screen and 0.3 m above the top of the screen. Well annuli above the sand pack were sealed with hydrated bentonite chips. All monitoring wells were completed with lockable aboveground steel casings set in concrete.

The soil vapour probes were constructed of 15-mm diameter, 0.10 m long metal screens that were connected to polyamide, with polyester yarn reinforcement, sampling tubing. During the installation a temporary well casing, constructed of 50 mm diameter PVC Scheduled 40 pipe, was lowered to the installation depth. The soil vapour probe was lowered inside the temporary casing to centre the probe in the borehole. The temporary casing was raised while 10-20 silica sand was placed around the screen to a level of approximately 0.1 m below the screen and 0.1 m above the top of the screen. Well annuli above the sand pack were sealed with hydrated bentonite chips. Hydrated bentonite at the surface was mounded around the probe casings to create an airtight seal. The

probes were finished with a flushmount casing protector cemented in place over the probes. The probes were sealed to prevent ambient air intrusion.

Borehole and monitoring well locations are presented in Figure 3. Boreholes logs and well completion details are presented in Appendix B.

4.3 Soil Sampling

Soil conditions identified during the subsurface investigations were recorded on Golder's standard field logs. The soil was logged consistent with the Unified Soil Classification System (ASTM 2009).

Each soil sample collected was split, with half being placed in laboratory-supplied sample jars for analysis and half placed into resealable plastic bags for organic vapour measurements. Organic vapour measurements were completed by allowing a quarter-filled soil bag to equilibrate for about 30 minutes at a temperature at or above 15°C. Soil in the bag was broken apart and the probe of a combustible RKI Eagle Organic Vapour Monitor (OVM) with methane elimination was inserted into the bag. The peak headspace reading was then recorded for the sample. The OVM readings are provided on the borehole logs.

The OVM was bump tested daily to 15% LEL using a hexane standard. If the bump test differed more than 10% from the known concentration, the OVM was adjusted to match the exact concentration of the calibration gas. Calibrations were logged at the start of each day.

Soil samples for laboratory analysis were selected based on physical observations (e.g., evidence of staining, soil colour and/or texture, evidence of odours), field screening results (e.g., highest readings), and/or bottom of investigation to confirm vertical delineation. The selected soil samples were submitted for analysis of one or more of BTEX, PHC Fractions F1 to F4, VOCs, PAHs, metals, PCBs, glycols, fraction organic carbon, and physical parameters. All samples were submitted under chain-of-custody to BVL in Mississauga, Ontario. BVL is accredited by the SCC.

4.4 Groundwater Monitoring Well Development

Following drilling and prior to groundwater sampling, each newly-installed monitoring well was developed by removing the equivalent of up to three well volumes of water from the well. HDPE tubing and surge blocks were used to develop the monitoring wells. Surge blocking was used for developing the monitoring wells in order to set the sand pack and to reduce the amount of sediment in the groundwater. Purged water was retained on-site in a 205-L barrel. Monitoring well development occurred on May 27, 2019. Once the field program was completed, the barrel was transported off Site and properly disposed of at an approved facility in accordance to O.Reg. 347.

4.5 Groundwater Monitoring and Sampling

Groundwater monitoring was completed on all nine new monitoring wells and seven existing monitoring wells. A summary of the well monitoring is provided in Table 1. A Site plan showing monitoring well locations is provided in Figures 2 and 3.

Groundwater monitoring activities included:

- Measuring depth to groundwater and, if present, the thickness of LNAPL using a Heron oil/water interface probe. If LNAPL was detected, the presence is visually confirmed using a bailer. Prior to use in each well, the interface probe was cleaned using a phosphate-free detergent and water solution and rinsed with

deionized water to minimize the potential for cross contamination. Depth measurements were taken from the TOC.

Groundwater samples were collected using the low-flow sampling technique. Water was pumped from each monitoring well at a rate of 0.1 to 1 L/min, using a peristaltic pump with a portion of silicone tubing. Routine water quality indicator parameters were measured during the pumping using a multimeter system and flow-through cell. The parameters measured included EC, pH, temperature, dissolved oxygen, and redox potential. Calibration of the instrument was completed as per the manufacturer's instructions. Purged water was collected in pails for removal from Site.

During the May sampling event, 19 samples, including two duplicates, one field blank, one trip blank and 15 groundwater samples were collected and submitted to BVL for analysis of one or more of the following: BTEX, PHC Fractions F1 to F4, VOCs, PAHs, metals, PCBs and glycols. Monitoring well MW19-06 was not able to be sampled due to a blockage in the monitoring well above the screen.

All groundwater samples were placed in laboratory-supplied containers prefilled, when applicable, with the appropriate preservative. All sample containers were properly filled, placed in an ice-filled cooler and submitted under chain-of-custody to BVL for analysis.

4.6 Hydraulic Conductivity Testing

Hydraulic conductivity testing was conducted at three monitoring wells (MW19-02, MW19-04 and MW19-07) by removing a volume of water (rising head test) from each monitoring well and allowing the water level to recover. Measurement of the recovery was documented using a pressure transducer and datalogger. Measurements were recorded at predetermined intervals.

4.7 Soil Vapour Sampling

4.7.1 Weather Conditions During Sampling

Weather conditions¹ on May 28, 2019 (one day prior to soil vapour sampling) indicated that outdoor temperatures ranged from 8.6 to 13.4 °C, relative humidity ranged from 72 to 86%, the barometric pressure ranged from 99.86 to 100.13 kPa, total precipitation was 3.5 mm (Government of Canada 2019, internet site).

Weather conditions on the day of sampling (May 29, 2019) were overcast. The air temperatures ranged from 9.3 to 19.4°C, the relative humidity ranged from 55 to 85%, the barometric pressure ranged from 99.51 to 99.85 kPa in the evening, total precipitation was 0 mm (Government of Canada 2019, internet site).

Weather conditions on November 10, 2019 (one day prior to soil vapour sampling) indicated that outdoor temperatures ranged from -4.4 to 5.5 °C, relative humidity ranged from 68 to 91%, the barometric pressure ranged from 99.55 to 100.51 kPa, total precipitation was 0 mm (Government of Canada 2019, internet site).

Weather conditions on the day of sampling (November 11, 2019) were overcast. The air temperatures ranged from -7.3 to -4.4°C, the relative humidity ranged from 46 to 89%, the barometric pressure ranged from 100.46 to 101.21 kPa in the evening, total precipitation was 6.5 mm (Government of Canada 2019, internet site).

¹ Weather information was taken from the meteorological station (Ottawa CDA RCS) located closest to the Site.

4.7.2 Soil Vapour Field Screening

Field screening of headspace vapour concentrations was completed on May 29 and November 11, 2019 using a combustible OVM with methane elimination. The OVM was calibrated by the supplier prior to use. Vapour concentrations were taken by connecting the OVM to soil vapour collected in a tedlar bag. The peak OVM reading was recorded. The probe was purged by removing three well volumes (approximately 1.5 L) by directly connecting the well tubing to the SKC pump located within the soil vapour kit. The SKC pump flow rate was 0.20 L/min as confirmed through the use of a BIOS Defender 310 digital flow reader. Maximum combustible vapour concentrations of the extracted vapours were recorded during the purging process.

4.7.3 Probe Leak Testing

The soil vapour probes were leak tested on May 29 and November 11, 2019 to determine if ambient air was penetrating the ground surface (e.g., along the outside of the tubing) and mixing with soil vapours during sampling, also known as short circuiting.

A plastic shroud was placed over the probe and HDPE tubing from the probe exited through a sealed hole in the top of the shroud. The shroud was then filled with helium from a cylinder. The helium concentration inside the shroud was measured using an MGD 2000 helium detector. Once helium concentrations inside the shroud reached at least 14% helium by volume, the helium flow was turned off. The helium detector was then connected to the HDPE tubing from the soil vapour probe. The helium detector sampling flow rate was 0.5 L/min as confirmed through the use of a BIOS Defender 310 digital flow reader. The helium detector was used to sample the soil vapour collected in a tedlar bag and the maximum helium concentrations were recorded.

4.7.4 Soil Vapour Sampling

After field screening was completed, the soil vapour samples were collected with 1.4 L SUMMA canisters. Each sample was collected during a 10-minute period at a flow rate of approximately 0.14 L/min. In May, six soil vapour samples were collected, including one duplicate sample, one field blank, and four soil vapour samples. In November, six soil vapour sample were collected, including one duplicate sample, one field blank, and four soil vapour samples.

The soil vapour samples were submitted to BVL for chemical analysis of BTEX, PHC Fractions F1 and F2, Aromatic/Aliphatic Hydrocarbon Fractionations, VOCs, and naphthalene.

4.8 Survey

After the drilling program was completed, the new monitoring wells were surveyed by Golder field technicians using a survey level and rod. A vertical survey of the newly-installed monitoring well locations was completed. Elevations were referenced to a local benchmark (the catch basin on the western portion of the Site) assigned an elevation of 100.00 m as per previous investigations (exp 2014).

5.0 RESULTS

5.1 Site Stratigraphy

A description of the stratigraphy for the 12 boreholes advanced at the Site is presented in the borehole logs provided in Appendix B.

Stratigraphy at the Site generally consists of the following:

- Coarse-grained material (Fill - gravelly sand, and sand) generally to a depth of 3 to 5.5 mbgs, overlying shale bedrock to 9.4 mbgs, the maximum depth of investigation.

Based on field observations and grain size analysis, coarse-grained soils represent the dominant soil type at the Site. Two of the five grain size analysis samples reported fine-grained material (Table 2). However, fine-grained material is not considered to be a significant portion of the on-site material.

5.2 Site Hydrogeology

Groundwater monitoring results are presented in Table 1 and summarized below.

Field Parameters	Minimum	Maximum
LNAPL (mm)	Not detected	Not detected
Depth to groundwater (mbgs)	6.36	7.33

Groundwater elevations are illustrated in Figure 4 and presented in Table 1. The groundwater flow direction was unable to be determined due to inconsistent water levels across the Site. No flow direction or contour lines are shown on Figure 4.

The results of the hydraulic conductivity (K) analysis were unable to be determined due to high conductivity in the range of 1×10^{-3} m/s. An alternate method, such as a pumping test, would need to be completed to accurately determine the hydraulic conductivity.

Monitoring Well	Screen Interval (mbgs)	Soil Lithology within Screen	K (m/s)
MW19-02	6.1 to 9.1	Bedrock	Undetermined
MW19-04	6.1 to 9.1	Bedrock	Undetermined
MW19-07	6.1 to 9.1	Bedrock	Undetermined
Average			Undetermined

5.3 Soil Analytical Results

Soil analytical results are illustrated in Figures 5 to 9 and summarized in Tables 2 to 9. Copies of the laboratory certificates of analysis are included in Appendix C.

A summary of the SSI results is provided in the following table.

APECs	Location	Sample Location and Depth	Exceedance Parameter
Former service station	Central portion of Site	MW19-06	No exceedances identified
		MW19-07	
Former tank nest	West portion of Site	MW19-01	No exceedances identified
		SV19-02 (6.0 to 6.7 mbgs)	Benzene, xylenes, and PHC Fraction F1 and F2
Former pump islands	Central and north portions of Site	MW19-02	No exceedances identified
		MW19-03 (3.0 to 4.0 mbgs)	Benzene, xylenes, and PHC Fraction F1
		MW19-06	No exceedances identified
		MW19-07	No exceedances identified
		SV19-01 (4.6 to 5.5 mbgs)	Benzene and PHC Fraction F1
		SV19-03 (3.75 to 4.3 mbgs)	Benzene
Off-site APECs	North, south and east portions of Site	MW19-04	No exceedances identified
		MW19-05	No exceedances identified
		MW19-08 (3.0 to 4.0 mbgs)	PHC Fraction F1
		MW19-09 (3.0 to 4.0 mbgs)	PHC Fraction F1

5.4 Toxicity Characteristic Leachate Procedure

A TCLP analysis was completed during this investigation for select O.Reg. 347 Schedule 4 leachate parameters and ignitibility. Sample results were within the Schedule 4 criteria for all parameters analyzed. Results are shown in Table 9. Based on these results, the soil was considered non-hazardous and was disposed of at an approved waste facility.

5.5 Groundwater Analytical Results

Groundwater analytical results are illustrated in Figures 10 to 14 and summarized in Table 10 to 14. Copies of the laboratory certificates of analysis are included in Appendix C.

A summary of the SSI results is provided in the following table.

APECs	Location	Sample Location	Exceedance Parameter
Former service station	Central portion of Site	MW19-06	No exceedances identified
		MW19-07	No exceedances identified
		TH210	No exceedances identified
		TH212	No exceedances identified
Former tank nest	West portion of Site	MW19-01	No exceedances identified
		TH201	No exceedances identified
		TH205A	No exceedances identified
		TH206	No exceedances identified
		TH207	No exceedances identified
Former pump islands	Central and north portions of Site	MW19-02	No exceedances identified
		MW19-03	Benzene
		MW19-06	No exceedances identified
		MW19-07	No exceedances identified
		TH203A	No exceedances identified
Off-site APECs	East of Site	MW19-04	Benzene
		MW19-05	No exceedances identified
		MW19-08	No exceedances identified
		MW19-09	No exceedances identified

5.6 Soil Vapour Analytical Results

5.6.1 Field Soil Vapour Analysis Results

Soil vapour samples collected from the soil vapour probes were monitored in the field for organic vapour, methane, carbon dioxide, and oxygen concentrations. The field screening results are summarized in Table 15.

5.6.2 Probe Leak Test Results

A leak test is generally considered to pass if the concentration of helium in the soil vapour probe is less than 1% of the concentration within the shroud at ground surface (CCME 2016). Sample locations SV19-02, SV19-03, and

SV19-04 passed the leak test with a recorded concentration ratio of 0.0%. Sample location SV19-01 could not be tested due to an insufficient flow rate for screening. Leak test results are summarized in Table 15.

5.6.3 Soil Vapour Analytical Results

The soil vapour analytical results are summarized in Table 16 and illustrated in Figure 15. Copies of the associated laboratory certificates of analysis are provided in Appendix C.

A summary of the SSI results is provided in the following table.

APECs	Location	Sample Location and Depth	Exceedance Parameter
Former service station	Central portion of Site	SV19-04	May 2019 - No exceedances identified
			November 2019 - No exceedances identified
Former tank nest	West portion of Site	SV19-02	May 2019 - Benzene
			November 2019 - No exceedances identified
Former pump islands	Central and north portions of Site	SV19-01	May 2019 - No exceedances identified
			November 2019 - No exceedances identified
		SV19-03	May 2019 - Benzene
			November 2019 - No exceedances identified

6.0 FIELD LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

A QA/QC program was followed to manage and quantify the quality of the investigation results. The program included field procedures, laboratory procedures and the use of QC samples to quantify the results of the program. Two duplicate soil samples, two duplicate groundwater samples, two duplicate soil vapour samples, one water trip blank, one water field blank, and two soil vapour field blanks were submitted as part of this program. A discussion of the QA/QC program is included in Appendix D.

The analytical results of the soil, groundwater, and soil vapour samples collected by Golder field staff between May 15 and November 11, 2019, as part of the SSI are considered reliable.

7.0 CONCLUSIONS

A summary of the results for the Supplemental Site Investigation follows.

- Coarse-grained material (Fill - gravelly sand, and sand) was generally observed to a depth of 3 to 5.5 mbgs, overlying shale bedrock to 9.4 mbgs, the maximum depth of investigation.
- LNAPL was not identified in any of the monitoring wells monitored.
- Depth to groundwater ranged between 6.36 and 7.33 mbgs.
- An accurate hydraulic conductivity (K) could not be determined due to high conductivity in the range of 1×10^{-3} m/s.
- The standards for soil and groundwater parameters, were considered to be the MECP Table 3, Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition.
- In order to derive soil vapour screening criteria, MECP's MGRA "Approved Model" Industrial Health Based Indoor Air Criteria (November 2016) were divided by the MECP generic industrial attenuation factor of 0.004.
- Six soil samples collected from the area of the former pump islands, former tank nest, and east property line reported concentrations of benzene, xylenes, PHC Fraction F1 and/or F2 above the applied standards. Other parameters analyzed reported concentrations below the applied standards.
- Two groundwater samples collected in the area of the former pump islands and south property line reported concentrations of benzene above the applied standards. Other parameters analyzed reported concentrations below the applied standards.
- Two soil vapours samples collected in the area of the former pump islands and former tank nest in May 2019 reported concentrations of benzene above the applied screening levels. Other parameters analyzed reported concentrations below the applied standards. Soil vapour samples collected in November 2019 reported concentrations below the applied screening levels.
- Based on the review of the QA/QC results, the data presented in this report are considered to be reliable.

8.0 REFERENCES

Literature Cited

- ASTM (American Society for Testing and Materials). 2009. Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). ASTM D248809.
- CCME (Canadian Council for Ministers of the Environment). 2016. Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment. Volume 1 Guidance Manual. PN 1551. ISBN 978-1-77202-026-7 PDF.
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9.0 LIMITATIONS OF LIABILITY, SCOPE OF REPORT AND THIRD-PARTY RELIANCE

This report has been prepared and the work referred to in this report has been undertaken by Golder Associates Ltd. for Imperial Oil Limited. It is intended for the sole and exclusive use of Imperial Oil Limited, its affiliated companies and partners and their respective insurers, agents, employees and advisors (collectively, "Imperial Oil"). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and Golder Associates Ltd. make no representation or warranty to any other person with regard to this report and the work referred to in this report, and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, or reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by Golder Associates Ltd. with respect to this report and any conclusions or recommendations made in this report reflect Golder Associates Ltd.'s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report, and on information available at the

time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report.

Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

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Signature Page

Golder Associates Ltd.



Chris Vettorazzo, B.Eng
Project Manager

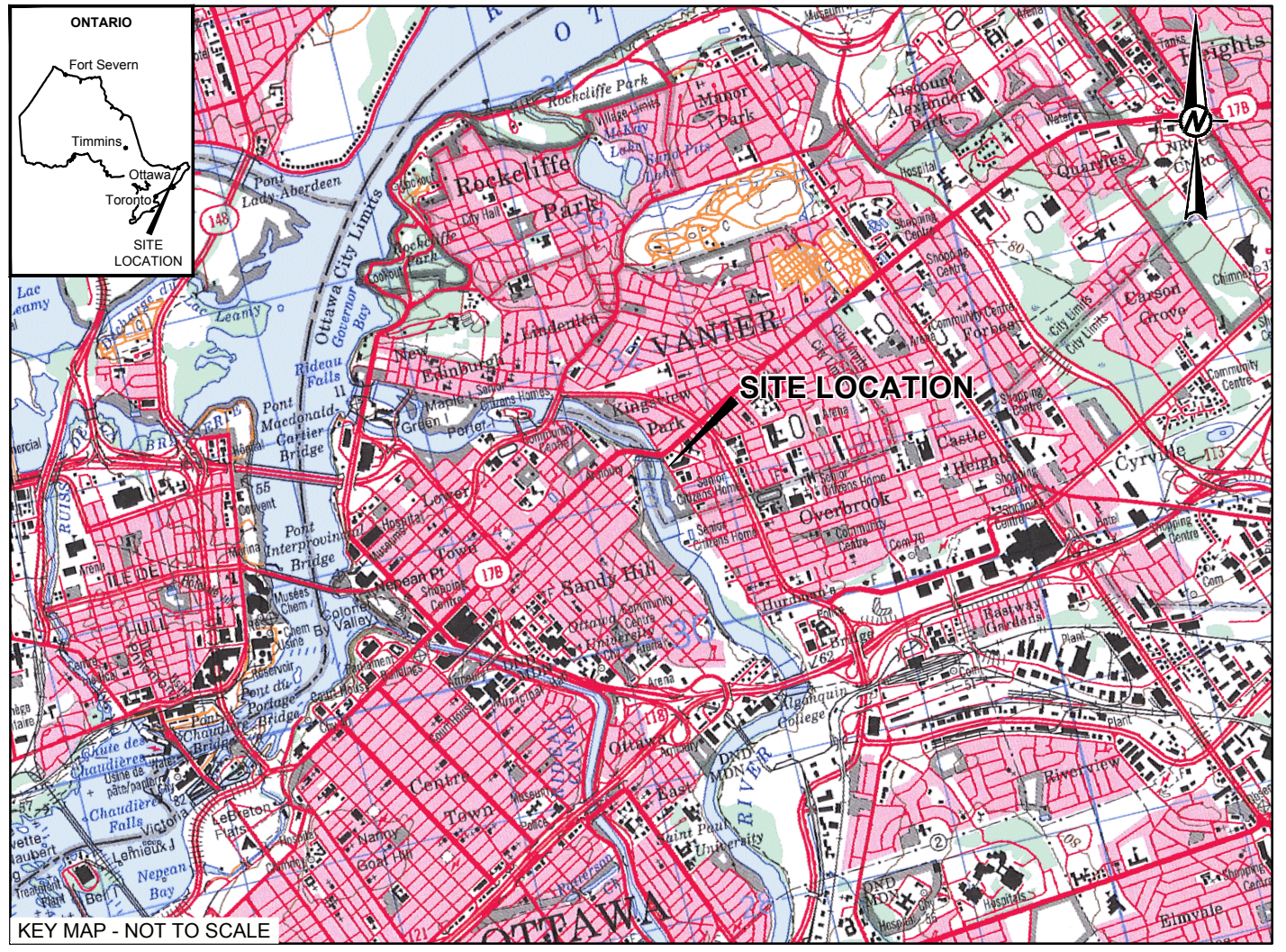


Sandra Carrelas, M.E.Sc., P.Eng.
Principal, Senior Geo-Environmental Engineer

LM/CV/SC/hf

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LEGEND

--- PROPERTY BOUNDARY

REFERENCE

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 IMAGE OBTAINED FROM GOOGLE EARTH © 2019 GOOGLE INC. USED WITH PERMISSION. GOOGLE AND GOOGLE LOGO ARE REGISTERED TRADEMARKS OF GOOGLE INC. IMAGERY DATE: SEPTEMBER 5, 2016. GOOGLE EARTH IMAGE IS NOT TO SCALE. DATUM: NAD83, PROJECTION: UTM ZONE 18.
 TOPOGRAPHIC MAP 31G/05 OBTAINED FROM Canmatrix. © 1975 HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES. PROJECTION: TRANSVERSE MERCATOR; DATUM: NAD27; COORDINATE SYSTEM: UTM ZONE 18.



CLIENT
 IMPERIAL OIL LIMITED

PROJECT
 FORMER RETAIL FUEL OUTLET
 2 MONTREAL ROAD
 OTTAWA, ONTARIO

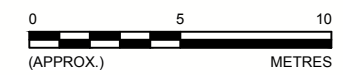
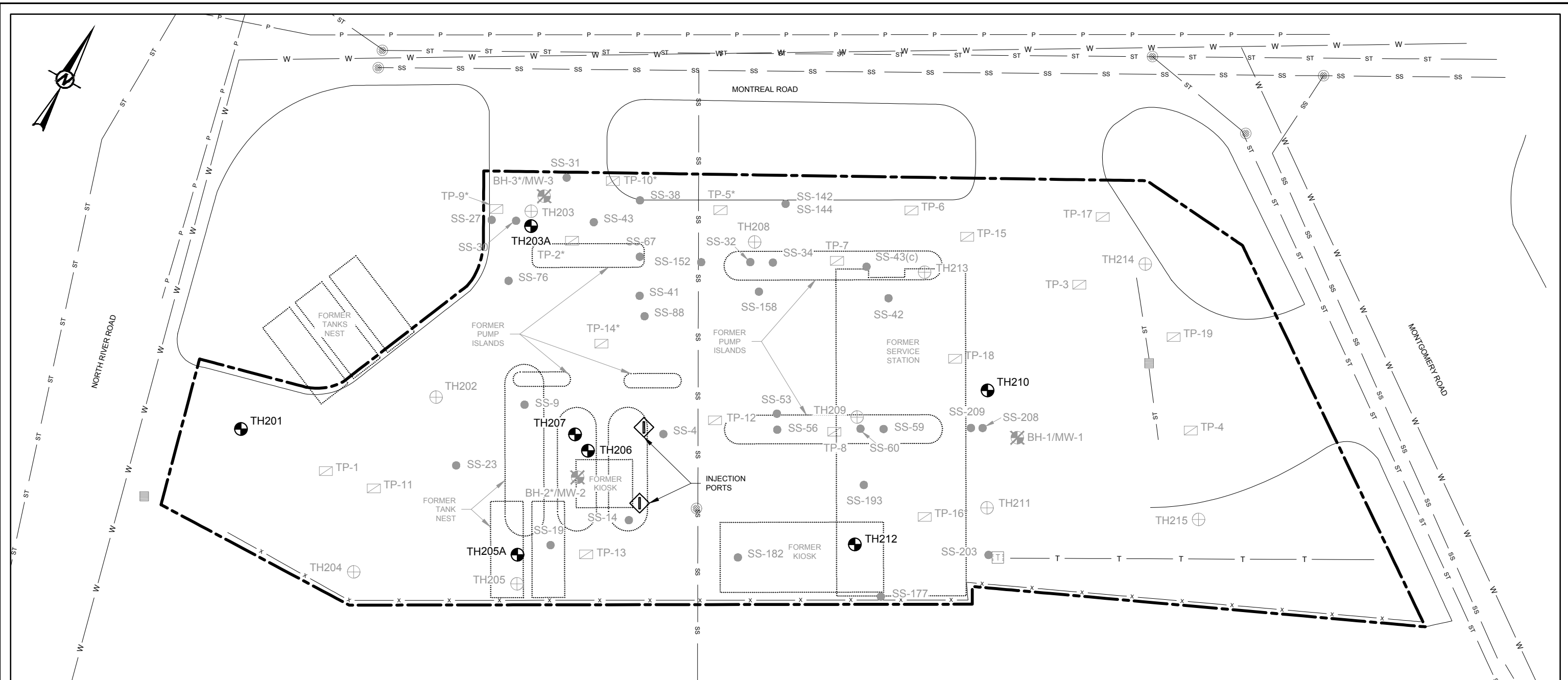
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DESIGNED	LMariani	
PREPARED	SBietola	
REVIEWED	CVettorazzo	
APPROVED	SCarrelas	



PROJECT NO.	PHASE-TASK	REV.	FIGURE
18113796	1485-1916C	1	1

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LEGEND

- PROPERTY BOUNDARY
- FENCELINE
- FORMER FACILITY
- UNDERGROUND POWER LINE
- UNDERGROUND SANITARY LINE
- UNDERGROUND STORM SEWER LINE
- UNDERGROUND TELEPHONE LINE
- UNDERGROUND WATERLINE
- BOREHOLE LOCATION (FORMER)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DESTROYED)
- SOIL SAMPLE LOCATION (FORMER)
- TEST PIT LOCATION (FORMER)
- CATCH BASIN
- MANHOLE
- TELEPHONE PEDESTAL

REFERENCE

ORIGINAL DRAWING OBTAINED FROM EXP ENERGY SERVICES LTD.; PROJECT No.: 14004; SCALE: UNKNOWN; DATE: NOVEMBER, 2014.

CLIENT
IMPERIAL OIL LIMITED

PROJECT
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2 MONTREAL ROAD
OTTAWA, ONTARIO**

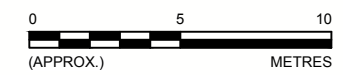
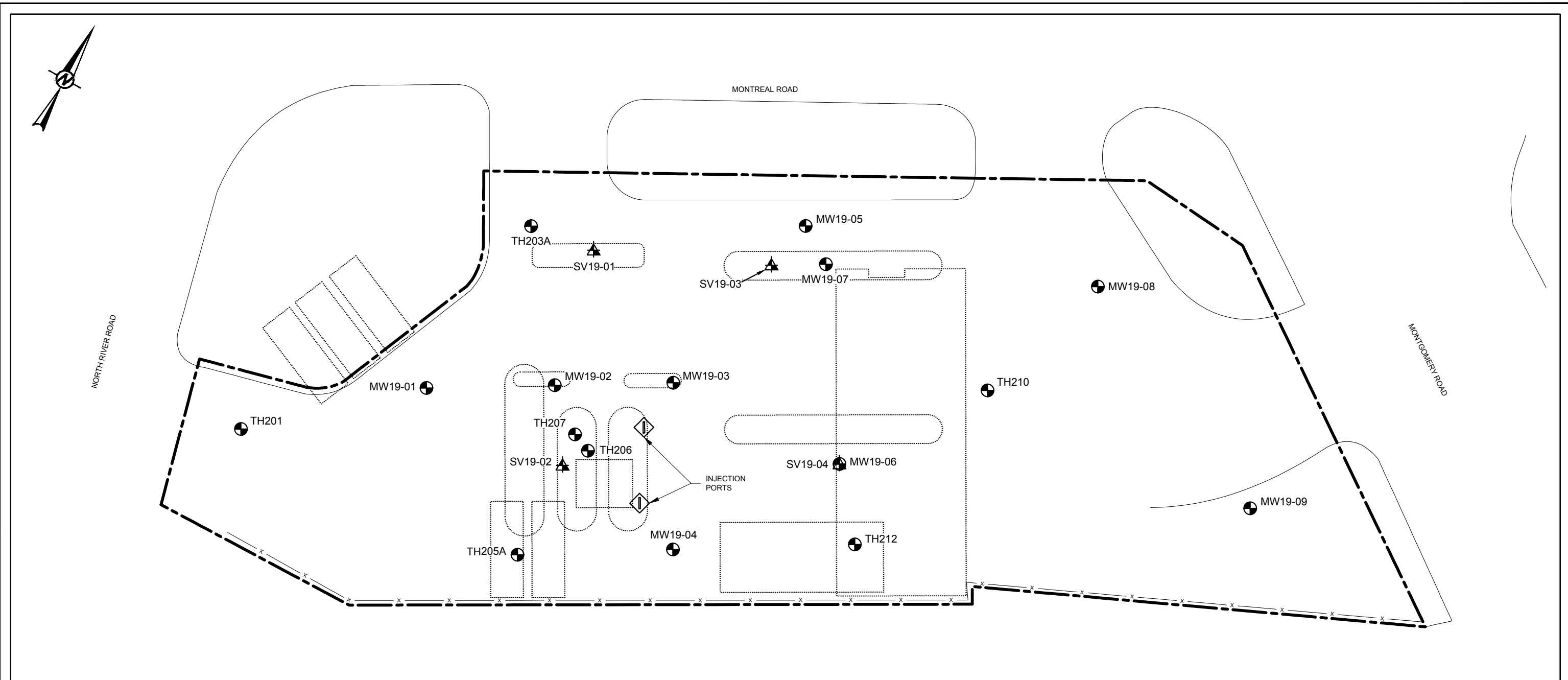
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SITE PLAN WITH HISTORICAL FACILITIES

CONSULTANT	YYYY-MM-DD	2020-01-13
DESIGNED		LMariani
PREPARED		SBietola
REVIEWED		CVettorazzo
APPROVED		SCarrelas

PROJECT NO.	PHASE-TASK	REV.	FIGURE
18113796	1485-1916C	1	2

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LEGEND

- PROPERTY BOUNDARY
- FENCELINE
- FORMER FACILITY
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- SOIL VAPOUR PROBE LOCATION

REFERENCE

ORIGINAL DRAWING OBTAINED FROM EXP ENERGY SERVICES LTD.; PROJECT No.: 14004; SCALE: UNKNOWN; DATE: NOVEMBER, 2014.

CLIENT
IMPERIAL OIL LIMITED

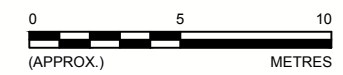
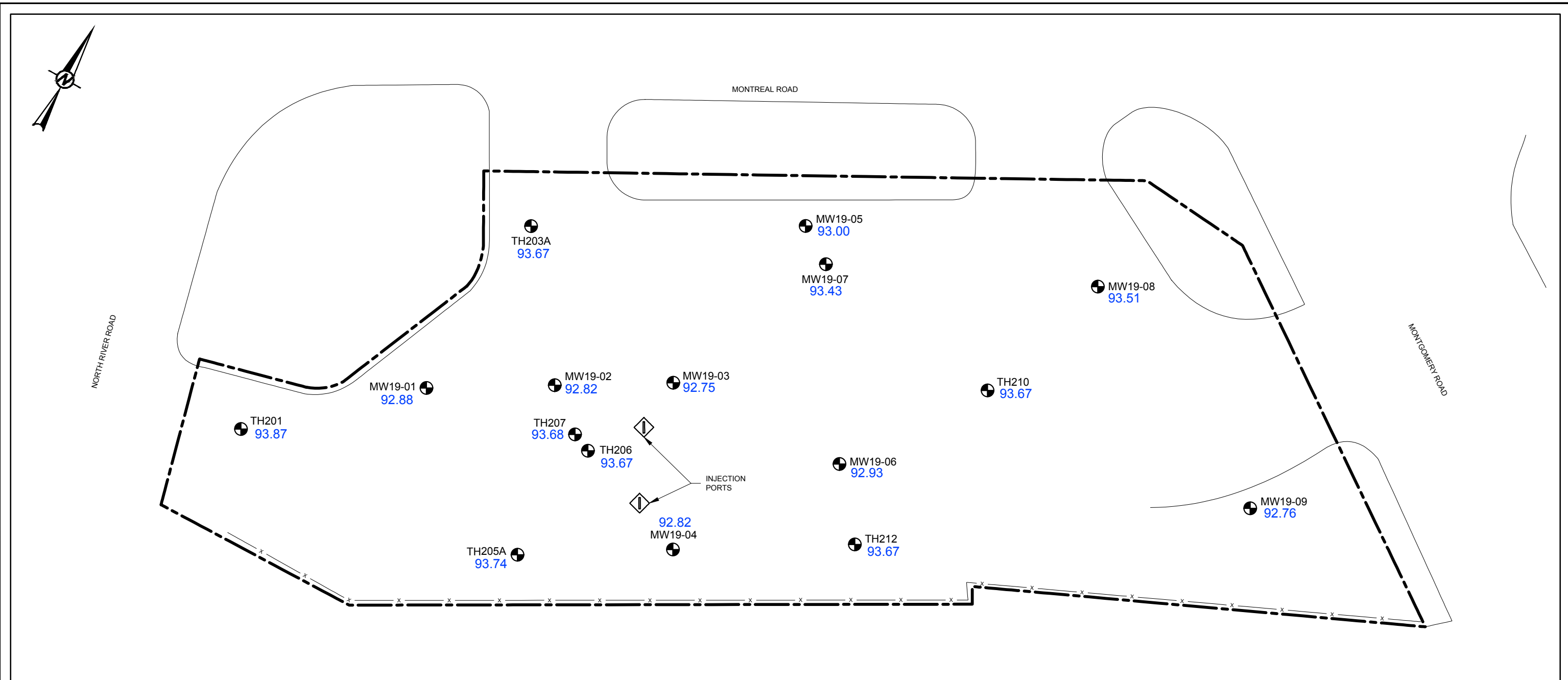
PROJECT
FORMER RETAIL FUEL OUTLET
2 MONTREAL ROAD
OTTAWA, ONTARIO

TITLE
SITE PLAN WITH MONITORING WELL AND SOIL VAPOUR LOCATIONS

CONSULTANT	YYYY-MM-DD	2020-01-13
DESIGNED	LMariani	
PREPARED	SBietola	
REVIEWED	CVetorazzo	
APPROVED	SCarrelas	

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A3/B

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- LEGEND**
- PROPERTY BOUNDARY
 - FENCELINE
 - BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
 - GROUNDWATER ELEVATION (m)

NOTE
 ELEVATIONS ARE SHOWN RELATIVE TO A LOCAL BENCHMARK (CATCH BASIN ON THE WESTERN PORTION OF THE SITE), ELEVATION 100.00 m (TAKEN FROM PREVIOUS CONSULTANT'S REPORT [EXP, 2014]).

REFERENCE
 ORIGINAL DRAWING OBTAINED FROM EXP ENERGY SERVICES LTD.; PROJECT No.: 14004; SCALE: UNKNOWN; DATE: NOVEMBER, 2014.

LIST OF APPLICABLE ABBREVIATIONS
 m METRE

CLIENT
 IMPERIAL OIL LIMITED

PROJECT
 FORMER RETAIL FUEL OUTLET
 2 MONTREAL ROAD
 OTTAWA, ONTARIO

TITLE
GROUNDWATER ELEVATIONS
 May 28, 2019

CONSULTANT	YYYY-MM-DD	2020-01-13
DESIGNED	LMariani	
PREPARED	SBietola	
REVIEWED	CVetorazzo	
APPROVED	SCarrelas	

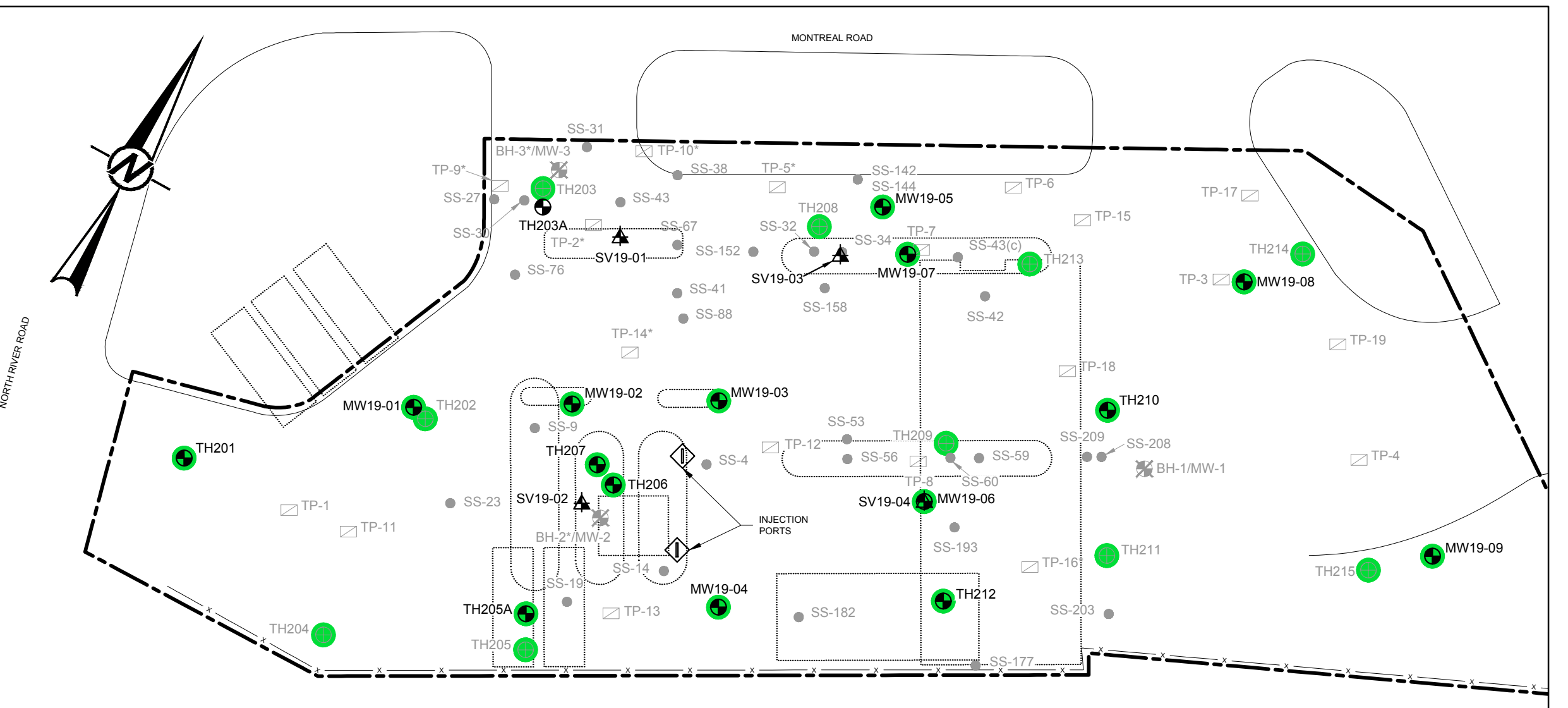


PROJECT NO.	PHASE-TASK	REV.	FIGURE
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A3/B

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LEGEND: PROPERTY BOUNDARY, FENCE LINE, FORMER FACILITY, BOREHOLE LOCATION (FORMER), BOREHOLE LOCATION COMPLETED AS A MONITORING WELL, SOIL SAMPLE LOCATION (FORMER), SOIL VAPOUR PROBE LOCATION, TEST PIT LOCATION (FORMER), INTERIM SOIL SAMPLES, BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DESTROYED).

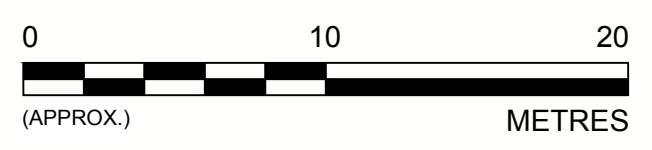
LIST OF APPLICABLE ABBREVIATIONS: LESS THAN, MICROGRAMS PER GRAM, 1,3-DCE, MI, 1,3-DICHLOROPROPENE, TOTAL, MEK, METHYL ETHYL KETONE (2-BUTANONE), 1,4-DCB, 1,4-DICHLOROBENZENE, MBK, METHYL 2-PENTANONE OR METHYL ISOBUTYL KETONE, ACTN, ACETONE, MTBE, METHYL TERTIARY BUTYL ETHER, NO STANDARD, 1,1,1-TRICHLOROETHANE, na, NOT ANALYZED, 1,1,2-TCA, 1,1,2,2-TETRACHLOROETHANE, BFCMA, BROMOFORM, BF, BROMOFORM, BMA, BROMOMETHANE, O REG, ONTARIO REGULATION, c-1,2-DCE, c-1,3-DCE, c-1,3-DICHLOROPROPENE, RDL, REPORTABLE DETECTION LIMIT, 1,1-DCB, CARBON TETRACHLORIDE, ST, STYRENE, 1,2-DBA, 1,2-DIBROMOETHANE OR ETHYLENE DIIBROMIDE, 1,2-CCA, 1,2-DICHLOROETHANE, 1,2-DCE, 1,2-DICHLOROETHANE, DCFDMA, DIBROMOCHLOROMETHANE, 1,2-DCB, 1,2-DICHLOROBENZENE, DCM, DCM, DCA, DICHLOROMETHANE, TCE, TRICHLOROETHENE, 1,3-DCB, n-HEXANE, TCFMA, TRICHLOROFUORMETHANE, mbg, METRES BELOW GROUND SURFACE, TOM, CHLOROFORM, VC, VINYL CHLORIDE.

Table with columns for Depth (mbs), ACTN, BDCMA, BF, BMA, CT, MCB, TCM, DBCM, 1,2-DCB, 1,3-DCB, 1,4-DCB, DCFDMA, 1,1-DCA, 1,2-CCA, 1,1-DCE, c-1,2-DCE, 1,1,1,2-TCA, 1,1,2,2-TCA, 1,1,1-TCA, 1,1,2-TCA, TCE, VC, TCFMA. Rows include MW19-01 through MW19-09.

NOTES: 1. LOCATIONS WHERE ALL SOIL SAMPLES MEET APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN GREEN. 2. LOCATIONS WHERE AT LEAST ONE SOIL SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN RED. 3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN RED.

ONTARIO STANDARDS: TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE FOR COARSE TEXTURED SOIL IN A NON-PORTABLE GROUNDWATER CONDITION. Columns include PARAMETERS, ACTN, BDCMA, BF, BMA, CT, MCB, TCM, DBCM, 1,2-DCB, 1,3-DCB, 1,4-DCB, DCFDMA, 1,1-DCA, 1,2-CCA, 1,1-DCE, c-1,2-DCE, 1,1,1,2-TCA, 1,1,2,2-TCA, 1,1,1-TCA, 1,1,2-TCA, TCE, VC, TCFMA, VC.

REFERENCE: ORIGINAL DRAWING OBTAINED FROM EXP ENERGY SERVICES LTD., PROJECT NO. 14004, SCALE UNKNOWN, DATE: NOVEMBER, 2014.



CLIENT: IMPERIAL OIL LIMITED



CONSULTANT: YYYY-MM-DD 2020-01-13, DESIGNED: LMariani, PREPARED: SBietola, REVIEWED: CVettorazzo, APPROVED: SCarelas

PROJECT: FORMER RETAIL FUEL OUTLET, 2 MONTREAL ROAD, OTTAWA, ONTARIO

TITLE: SOIL ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS

PROJECT NO. 18113796, PHASE-TASK 1485-1916C, REV. 1, FIGURE 6

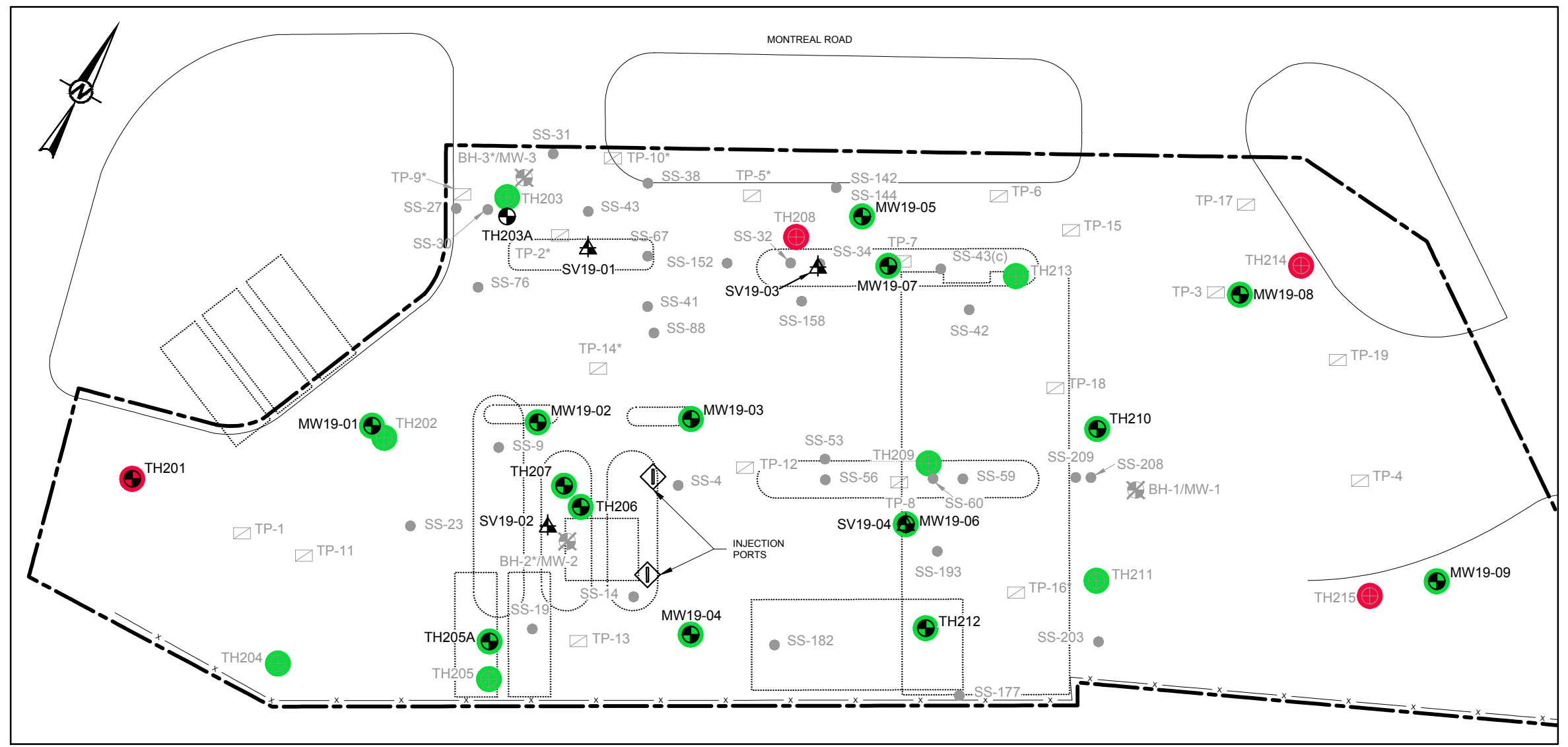
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LEGEND

— x —	PROPERTY BOUNDARY	⊗	BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DESTROYED)
— x —	FENCELINE	●	SOIL SAMPLE LOCATION (FORMER)
⊕	FORMER FACILITY	▲	SOIL VAPOUR PROBE LOCATION
⊕	BOREHOLE LOCATION (FORMER)	□	TEST PIT LOCATION (FORMER)
⊗	BOREHOLE LOCATION COMPLETED AS A MONITORING WELL	•	INTERIM SOIL SAMPLES

LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN	CHRY	CHRYSENE
μg/g	MICROGRAMS PER GRAM	D(a,h)A	DIBENZ(a,h)ANTHRACENE
1-MNPT	1-METHYLNAPHTHALENE	FLATH	FLUORANTHENE
1,2-MNPT	1,2-METHYLNAPHTHALENE	FLR	FLUORENE
2-MNPT	2-METHYLNAPHTHALENE	I(1,2,3-cd)P	INDENO(1,2,3-CD)PYRENE
ANPTH	ACENAPHTHENE	mbgs	METRES BELOW GROUND SURFACE
ANPTHL	ACENAPHTHYLENE	mg/kg	MILLIGRAMS PER KILOGRAM
ATRC	ANTHRACENE	n/s	NO STANDARD
B(a)A	BENZO(a)ANTHRACENE	NPT	NAPHTHALENE
B(a)P	BENZO(a)PYRENE	O.REG	ONTARIO REGULATION
B(b)F	BENZO(b)FLUORANTHENE	PHNTR	PHENANTHRENE
B(g,h)P	BENZO(g,h)PERYLENE	PYR	PYRENE
B(k)F	BENZO(k)FLUORANTHENE	RDL	REPORTABLE DETECTION LIMIT



TH201 Date Sampled - September 25 & 30/14

Depth (mbgs)	ANPTH	ANPTHL	ATRC	B(a)A	B(a)P	B(b)F	B(g,h)P	B(k)F	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	1,2-MNPT	NPT	PYR	PHNTR
0.50 - 1.10	0.013	0.11	0.066	0.23	0.31	0.41	0.24	0.12	0.28	0.057	0.40	0.012	0.24	<0.0050	<0.0050	<0.0071	0.0067	0.43	0.055
6.10 - 6.70	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0089	0.011	<0.0050	0.023	<0.0050	0.023	<0.0050	0.22	0.42	0.64	0.40	0.024	0.11	
8.40 - 9.00	0.037	<0.0050	0.040	0.011	0.0075	0.012	0.015	<0.0050	0.023	<0.0050	0.035	0.091	<0.0050	0.62	0.27	0.89	0.44	0.057	0.13

TH202 Date Sampled - September 25 & October 01/14

Depth (mbgs)	ANPTH	ANPTHL	ATRC	B(a)A	B(a)P	B(b)F	B(g,h)P	B(k)F	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	1,2-MNPT	NPT	PYR	PHNTR
1.10 - 1.20	<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	<0.0050	<0.0071	<0.0050	<0.0050	<0.0050
1.10 - 1.20 (DUP)	<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	<0.0050	<0.0071	<0.0050	<0.0050	<0.0050
6.90 - 7.20	0.051	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.12	<0.0050	3.8	5.8	9.6	8.0	<0.0050	0.21

TH203 Date Sampled - September 25 & October 01/14

Depth (mbgs)	ANPTH	ANPTHL	ATRC	B(a)A	B(a)P	B(b)F	B(g,h)P	B(k)F	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	1,2-MNPT	NPT	PYR	PHNTR
0.50 - 0.60	<0.0050	<0.0050	0.0059	0.015	0.013	0.018	0.0085	0.0064	0.018	<0.0050	0.032	<0.0050	0.0085	<0.0050	<0.0050	<0.0071	<0.0050	0.026	0.019
6.90 - 7.20	<0.0050	<0.0050	0.018	0.0066	0.0076	0.014	0.012	<0.0050	0.024	<0.0050	0.028	0.028	<0.0050	0.31	0.62	0.92	0.80	0.030	0.12
6.90 - 7.20 (DUP)	<0.0050	<0.0050	0.025	0.0051	0.0077	0.012	0.012	<0.0050	0.023	<0.0050	0.020	0.037	<0.0050	0.37	0.70	1.1	0.98	0.027	0.13

TH204 Date Sampled - September 25 & October 02/14

Depth (mbgs)	ANPTH	ANPTHL	ATRC	B(a)A	B(a)P	B(b)F	B(g,h)P	B(k)F	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	1,2-MNPT	NPT	PYR	PHNTR
0.50 - 0.60	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0057	<0.0050	<0.0050	<0.0050	<0.0050	<0.0071	<0.0050	0.0052	<0.0050
7.60 - 7.80	<0.0050	<0.0050	0.022	0.0079	0.0085	0.010	0.011	<0.0050	0.015	<0.0050	0.030	0.027	<0.0050	0.075	0.12	0.20	0.18	0.030	0.089

TH205 Date Sampled - September 25/14

Depth (mbgs)	ANPTH	ANPTHL	ATRC	B(a)A	B(a)P	B(b)F	B(g,h)P	B(k)F	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	1,2-MNPT	NPT	PYR	PHNTR
0.50 - 0.60	<0.0050	<0.0050	<0.0050	0.0053	0.0053	0.0074	<0.0050	<0.0050	0.0068	<0.0050	0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0071	<0.0050	0.0089	0.0053

TH205A Date Sampled - October 06/14

Depth (mbgs)	ANPTH	ANPTHL	ATRC	B(a)A	B(a)P	B(b)F	B(g,h)P	B(k)F	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	1,2-MNPT	NPT	PYR	PHNTR
6.90 - 7.20	0.014	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0054	<0.0050	0.016	<0.0050	0.066	<0.020	<0.0050	0.20	0.12	0.32	0.24	0.014	0.058
6.90 - 7.20 (DUP)	<0.0050	<0.0050	0.018	<0.0050	<0.0050	0.0063	0.0073	<0.0050	0.024	<0.0050	0.011	0.033	<0.0050	0.32	0.17	0.49	0.35	0.020	0.092

TH206 Date Sampled - September 25 & October 02/14

Depth (mbgs)	ANPTH	ANPTHL	ATRC	B(a)A	B(a)P	B(b)F	B(g,h)P	B(k)F	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	1,2-MNPT	NPT	PYR	PHNTR
0.50 - 0.60	<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	<0.0050	<0.0071	<0.0050	<0.0050	<0.0050
6.90 - 7.20	0.022	<0.0050	0.026	<0.0050	<0.0050	0.0086	0.0091	<0.0050	0.010	<0.0050	0.019	0.068	<0.0050	1.6	1.5	3.1	3.3	0.028	0.14

TH207 Date Sampled - September 24&29/14

Depth (mbgs)	ANPTH	ANPTHL	ATRC	B(a)A	B(a)P	B(b)F	B(g,h)P	B(k)F	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	1,2-MNPT	NPT	PYR	PHNTR
1.10 - 1.20	<0.0050	<0.0050	<0.0050	0.0093	0.0077	0.011	0.0057	<0.0050	0.0098	<0.0050	0.018	<0.0050	0.0052	<0.0050	<0.0050	<0.0071	<0.0050	0.016	0.015
6.10 - 6.30	<0.0050	<0.0050	0.0067	0.0082	0.0082	0.012	0.0077	<0.0050	0.012	<0.0050	0.020	0.0067	0.0053	0.043	0.037	0.080	0.059	0.022	0.039

TH208 Date Sampled - September 25 & October 01/14

Depth (mbgs)	ANPTH	ANPTHL	ATRC	B(a)A	B(a)P	B(b)F	B(g,h)P	B(k)F	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	1,2-MNPT	NPT	PYR	PHNTR
1.10 - 1.20	0.068	0.094	0.19	0.57	0.48	0.62	0.25	0.21	0.59	0.078	1.2	0.060	<0.0050	<0.0050	<0.0071	<0.0050	0.90	0.59	
6.10 - 6.30	<0.0050	<0.0050	0.019	0.0086	0.010	0.016	0.013	0.0051	0.024	<0.0050	0.025	0.034	0.0051	0.26	0.45	0.70	0.50	0.035	0.12

TH209 Date Sampled - September 24 & October 02/14

Depth (mbgs)	ANPTH	ANPTHL	ATRC	B(a)A	B(a)P	B(b)F	B(g,h)P	B(k)F	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	1,2-MNPT	NPT	PYR	PHNTR
1.40 - 1.50	<0.0050	0.011	0.0068	0.028	0.032	0.052	0.030	0.017	0.028	0.0062	0.048	<0.0050	0.027	<0.0050	<0.0050	<0.0071	<0.0050	0.042	0.023
6.10 - 6.40	<0.0050	<0.0050	0.014	<0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.011	<0.0050	<0.010	0.020	<0.0050	0.049	0.071	0.12	0.055	0.014	0.090
9.10 - 9.30	<0.0050	<0.0050	0.0091	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.010	<0.0050	0.016	<0.030	<0.030	0.013	0.0054	0.030

TH210 Date Sampled - September 25 & October 03/14

Depth (mbgs)	ANPTH	ANPTHL	ATRC	B(a)A	B(a)P	B(b)F	B(g,h)P	B(k)F	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	1,2-MNPT	NPT	PYR	PHNTR
1.40 - 1.50	0.047	0.012	0.11	0.20	0.14	0.20	0.070	0.021	0.023	0.49	0.066	0.082	<0.0050	<0.0050	<0.0071	<0.0050	0.36	0.42	
7.60 - 8.10	<0.020	<0.0050	0.016	0.0089	0.011	0.011	0.016	<0.0050	0.017	<0.0050	0.028	0.019	<0.0050	0.017	0.017	0.033	0.0078	0.042	0.046

TH211 Date Sampled - September 24 & October 06/14

Depth (mbgs)	ANPTH	ANPTHL	ATRC	B(a)A	B(a)P	B(b)F	B(g,h)P	B(k)F	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	1,2-MNPT	NPT	PYR	PHNTR
1.10 - 1.20	<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	<0.0050	<0.0071	<0.0050	<0.0050	<0.0050
7.60 - 7.80	<0.020	<0.0050	0.012	<0.0050	<0.0050	<0.0050	0.0075	<0.0050	0.014	<0.0050	0.0075	0.020	<0.0050	0.027	0.038	0.064	0.017	0.018	0.053

TH212 Date Sampled - September 24 & September 30/14

Depth (mbgs)	ANPTH	ANPTHL	ATRC	B(a)A	B(a)P	B(b)F	B(g,h)P	B(k)F	CHRY	D(a,h)A	FLATH	FLR	I(1,2,3-cd)P	1-MNPT	2-MNPT	1,2-MNPT	NPT	PYR	PHNTR
1.10 - 1.20	<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	<0.0050	<0.0071	<0.0050	<0.0050	<0.0050
5.30 - 5.60	<0.0050	<0.0050	0.021	0.0068	<0.0050	0.0083	0.017	<0.0050	0.018	<0.0050	0.023	0.031	<0.0050	0.011	0.038	0.068	0.034	0.042	0.11

TH213 Date Sampled - September 25 & October 06/14

Depth (mbgs)	ANPTH
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BH-1																		Date Sampled - April 24-25/97																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
3.81 - 4.42	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												

BH-2*																		Date Sampled - April 24-25/97																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
5.94 - 6.55	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												

BH-3*																		Date Sampled - April 24-25/97																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
2.29 - 2.89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
2.29 - 2.89 (DUP)	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
5.33 - 5.94	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												

SS-4*																		Date Sampled - April 15-17/97																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
4.30	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												

SS-9*																		Date Sampled - April 15-17/97																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
4.30	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												

SS-14*																		Date Sampled - April 15-17/97																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
5.30	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												

SS-19*																		Date Sampled - April 15-17/97																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
3.00	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												

SS-23*																		Date Sampled - April 15-17/97																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
4.30	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												

TH201																		Date Sampled - September 25 & 30/14																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
0.90 - 1.10	<0.20	2.6	150	0.57	<5.0	0.12	27	9.1	15	37	na	0.79	23	<0.50	<0.20	0.14	na	0.65	36	55	1.9	0.36													
6.10 - 6.70	1.2	14	120	1.0	0.8	0.47	23	23	64	37	na	14	86	2.3	<0.20	0.60	na	6.0	36	72	na	na													
8.40 - 9.00	0.32	5.1	130	0.65	11	0.21	30	8.6	38	11	na	6.7	39	0.63	<0.20	0.11	na	2.6	23	63	na	na													

TH202																		Date Sampled - September 25 & October 01/14																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
1.10 - 1.20	<0.20	<1.0	73	0.27	<5.0	<0.10	16	6.1	12	3.7	na	<0.50	11	<0.50	<0.20	0.11	na	0.44	28	25	0.32	0.12													
1.10 - 1.20 (DUP)	<0.20	<1.0	31	<0.20	<5.0	<0.10	7.9	3.6	7.1	2.3	na	<0.50	5.9	<0.50	<0.20	0.051	na	0.33	16	12	0.33	0.11													
6.90 - 7.20	0.22	5.1	80	0.78	11	0.27	20	7.9	38	15	na	3.0	36	0.84	<0.20	0.085	na	2.5	22	52	na	na													

TH203																		Date Sampled - September 25 & October 01/14																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
0.50 - 0.60	<0.20	1.5	87	0.25	<5.0	<0.10	10	6.4	11	9.5	na	1.0	12	<0.50	<0.20	0.15	na	0.48	17	21	0.26	0.19													
6.90 - 7.20	0.24	4.7	170	0.79	10	0.24	21	10	44	19	na	3.8	44	1.2	<0.20	0.20	na	2.1	25	47	na	na													
6.90 - 7.20 (DUP)	0.30	5.1	200	0.86	11	0.27	21	10	49	14	na	3.8	46	1.1	<0.20	0.16	na	2.1	24	53	na	na													

TH204																		Date Sampled - September 25 & October 02/14																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
0.50 - 0.60	<0.20	<1.0	66	0.27	5.0	<0.10	14	8.2	15	6.3	na	<0.50	12	<0.50	<0.20	0.13	na	0.38	21	17	1.7	0.28													
7.60 - 7.80	0.34	7.6	220	0.82	11	0.32	36	10	59	21	na	7.5	51	1.2	0.28	0.12	na	2.8	24	69	na	na													

TH205																		Date Sampled - September 25/14																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
0.50 - 0.60	<0.20	1.2	82	0.31	6.6	<0.10	16	8.4	16	11	na	0.59	14	<0.50	<0.20	0.16	na	0.49	23	21	7.2	0.21													

TH205A																		Date Sampled - October 06/14																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
6.90 - 7.20	0.86	10	220	0.84	12	0.43	24	16	49	24	na	8.4	66	1.5	<0.20	0.51	na	3.8	30	61	na	na													
6.90 - 7.20 (DUP)	0.62	11	210	0.86	13	0.32	23	15	50	24	na	8.7	65	1.3	<0.20	0.49	na	4.3	29	56	na	na													

TH206																		Date Sampled - September 25 & October 02/14																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
0.50 - 0.60	<0.20	<1.0	23	<0.20	<5.0	<0.10	6.7	3.5	8.1	2.5	na	<0.50	6.1	<0.50	<0.20	0.053	na	0.56	16	12	0.36	0.089													
6.90 - 7.20	0.28	4.1	94	0.53	7.1	0.23	18	8.8	34	16	na	3.4	32	0.65	0.25	0.17	na	1.7	21	55	na	na													

TH207																		Date Sampled - September 24&29/14																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
1.10 - 1.20	<0.20	1.2	80	0.28	<5.0	<0.10	14	6.7	13	5.4	na	0.59	13	<0.50	<0.20	0.14	na	0.49	24	26	0.29	0.13													
6.10 - 6.30	0.21	6.7	76	0.34	7.4	0.11	21	11	18	18	na	6.3	24	<0.50	<0.20	0.26	na	0.93	18	27	na	na													

TH208																		Date Sampled - September 25 & October 01/14																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
1.10 - 1.20	0.39	3.5	130	0.47	5.4	0.21	22	11	21	34	na	1.9	26	<0.50	<0.20	0.31	na	1.0	31	59	0.41	0.19													
6.10 - 6.30	0.88	13	88	0.97	10	0.65	25	22	62	26	na	12	86	2.0	<0.20	0.78	na	4.5	36	84	na	na													

TH209																		Date Sampled - September 24 & October 02/14																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
1.40 - 1.50	0.26	4.0	120	0.43	5.4	0.19	19	11	24	25	na	2.6	26	<0.50	<0.20	0.32	na	1.1	26	60	0.086	1.9													
6.10 - 6.40	0.48	7.2	150	0.78	10	0.38	29	12	41	13	na	6.0	49	0.79	0.36	0.20	na	3.0	26	80	na	na													
9.10 - 9.30	0.25	3.3	280	0.58	12	0.25	19	6.3	20	5.2	na	1.8	25	<0.50	0.42	0.072	na	2.3	19	62	na	na													

TH210																		Date Sampled - September 25 & October 03/14																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
1.40 - 1.50	<0.20	<1.0	27	<0.20	<5.0	<0.10	7.6	4.2	9.0	4.5	na	<0.50	7.7	<0.50	<0.20	0.077	na	0.40	17	15	0.25	0.20													
7.60 - 8.10	na	na	91	0.59	na	<0.50	21	8.5	32	18	na	3.8	36	na	<1.0	na	na	na	na	22	81	na													

TH211																		Date Sampled - September 24 & October 06/14																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
1.10 - 1.20	<0.20	<1.0	20	<0.20	<5.0	<0.10	7.9	3.7	8.2	2.7	na	<0.50	6.0	<0.50	<0.20	<0.050	na	0.64	20	11	1.2	0.081													
7.60 - 8.10	0.33	6.1	140	0.65	14	0.21	20	8.0	29	17	na	3.4	35	0.59	<0.20	0.18	na	2.6	19	66	na	na													

TH212																		Date Sampled - September 24 & September 30/14																	
Depth (mbgs)	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Ti	Sn	U	V	Zn	SAR	EC													
1.10 - 1.20	<0.20	<1.0	22	<0.20	<5.0	<0.10	6.9	3.3	8.4	2.3	na	<0.50	5.9																						

LEGEND	
	PROPERTY BOUNDARY
	FENCELINE
	FORMER FACILITY
	BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
	BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DESTROYED)
	SOIL VAPOUR PROBE LOCATION

LIST OF APPLICABLE ABBREVIATIONS

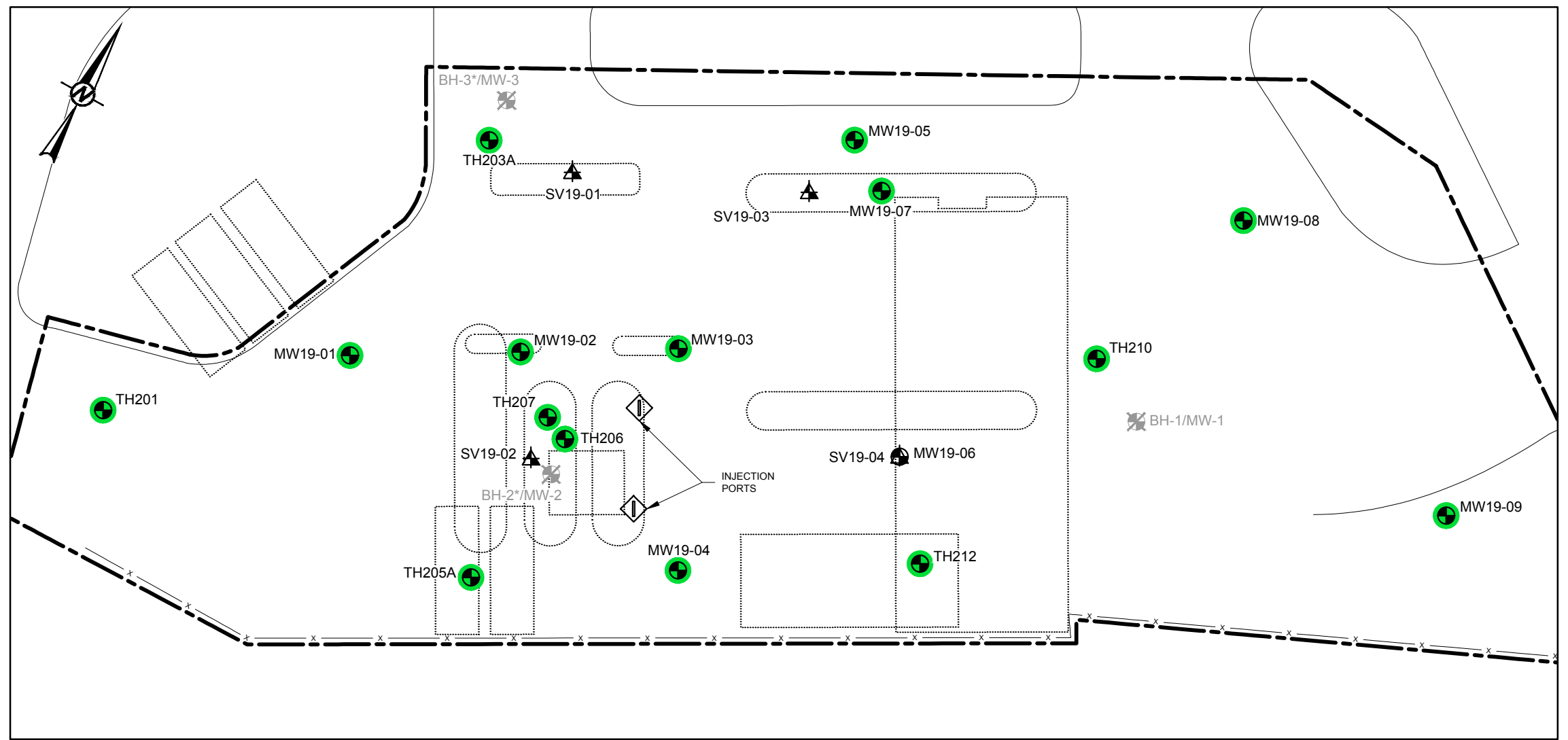
<	LESS THAN	1,4-DCB	1,4-DICHLOROBENZENE	MBK	4-METHYL-2-PENTANONE OR METHYL ISOBUTYL KETONE
µg/L	MICROGRAMS PER LITRE	ACTN	ACETONE	MTBE	METHYL TERTIARY BUTYL ETHER
1,1,1,2-TCA	1,1,1,2-TETRACHLOROETHANE	BDCMA	BROMODICHLOROMETHANE	n/s	NO STANDARD
1,1,1-TCA	1,1,1-TRICHLOROETHANE	BF	BROMOFORM	na	NOT ANALYZED
1,1,2-TCA	1,1,2-TETRACHLOROETHANE	BMA	BROMOMETHAN	O.REG	ONTARIO REGULATION
1,1,2-TCA	1,1,2-TRICHLOROETHANE	c-1,2-DCE	CIS-1,2-DICHLOROETHENE	PCE	TETRACHLOROETHENE
1,1-DCA	1,1-DICHLOROETHANE	c-1,3-DCPE	CIS-1,3-DICHLOROPROPENE	RDL	REPORTABLE DETECTION LIMIT
1,1-DCE	1,1-DICHLOROETHENE	CT	CARBON TETRACHLORIDE	ST	STYRENE
1,2-DBA	1,2-DIBROMOETHANE OR ETHYLENE DIBROMIDE	DCBM	DIBROMOCHLOROMETHANE	t-1,2-DCE	TRANS-1,2-DICHLOROETHENE
1,2-DCA	1,2-DICHLOROETHANE	DCDFMA	DICHLORODIFLUOROMETHANE	t-1,3-DCPE	TRANS-1,3-DICHLOROPROPENE
1,2-DCB	1,2-DICHLOROBENZENE	DCM	DICHLOROMETHANE	TCE	TRICHLOROETHENE
1,2-DCPA	1,2-DICHLOROPROPANE	HA	n-HEXANE	TCFMA	TRICHLOROFUOROMETHANE
1,3-DCB	1,3-DICHLOROBENZENE	mbs	METRES BELOW GROUND SURFACE	TCM	CHLOROFORM
1,3-DCPA	1,3-DICHLOROPROPANE	MCB	CHLOROBENZENE	VC	VINYL CHLORIDE
1,3-DCPE, tot	1,3-DICHLOROPROPENE, TOTAL	MEK	METHYL ETHYL KETONE (2-BUTANONE)		

NOTES

- LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN GREEN.
- LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN RED.
- EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN RED.
- LOCATION WHERE NO SAMPLES WERE TAKEN IN THE MOST RECENT SAMPLING EVENT SHOWN IN BLACK.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM EXP ENERGY SERVICES LTD.; PROJECT No.: 14004; SCALE: UNKNOWN; DATE: NOVEMBER, 2014.



MW19-01		Screen Interval: 5.95 - 8.95 mbgs																																					
Date	ACTN	BDCMA	BF	BMA	CT	MCB	TCM	DBCM	1,2-DCB	1,3-DCB	1,4-DCB	DCDFMA	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	1,2-DCPA	c-1,3-DCPE	t-1,3-DCPE	1,3-DCPE, tot	1,3-DCPA	1,2-DBA	HA	DCM	MEK	MBK	MTBE	ST	1,1,1,2-TCA	1,1,2,2-TCA	PCE	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	VC		
28-May-19	<10	<0.50	<1.0	<0.50	<0.20	<0.20	<0.20	<0.50	<0.50	<0.50	<0.50	<1.0	<0.20	<0.50	<0.20	<0.50	<0.50	<0.20	<0.30	<0.40	<0.50	na	<0.20	<1.0	<2.0	<1.0	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.50	<0.20
MW19-02		Screen Interval: 6.1 - 9.1 mbgs																																					
28-May-19	<10	<0.50	<1.0	<0.50	<0.20	<0.20	<0.20	<0.50	<0.50	<0.50	<0.50	<1.0	<0.20	<0.50	<0.20	<0.50	<0.50	<0.20	<0.30	<0.40	<0.50	na	<0.20	1.1	<2.0	<1.0	<5.0	2.3	<0.50	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.50	<0.20		
MW19-03		Screen Interval: 6.1 - 9.1 mbgs																																					
28-May-19	<10	<0.50	<1.0	<0.50	<0.20	<0.20	<0.20	<0.50	<0.50	<0.50	<0.50	<1.0	<0.20	<0.50	<0.20	<0.50	<0.50	<0.20	<0.30	<0.40	<0.50	na	<0.20	1.8	<2.0	<1.0	<5.0	33	<0.50	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.50	<0.20		
MW19-04		Screen Interval: 6.1 - 9.1 mbgs																																					
28-May-19	<10	<0.50	<1.0	<0.50	<0.20	<0.20	<0.20	<0.50	<0.50	<0.50	<0.50	<1.0	<0.20	<0.50	<0.20	<0.50	<0.50	<0.20	<0.30	<0.40	<0.50	na	<0.20	1.6	<2.0	<1.0	<5.0	3.6	<0.50	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.50	<0.20		
28-May-19 (DUP)	<10	<0.50	<1.0	<0.50	<0.20	<0.20	<0.20	<0.50	<0.50	<0.50	<0.50	<1.0	<0.20	<0.50	<0.20	<0.50	<0.50	<0.20	<0.30	<0.40	<0.50	na	<0.20	1.7	<2.0	<1.0	<5.0	3.6	<0.50	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.50	<0.20		
MW19-05		Screen Interval: 6.1 - 9.1 mbgs																																					
28-May-19	<10	<0.50	<1.0	<0.50	<0.20	<0.20	<0.20	<0.50	<0.50	<0.50	<0.50	<1.0	<0.20	<0.50	<0.20	<0.50	<0.50	<0.20	<0.30	<0.40	<0.50	na	<0.20	1.0	<2.0	<1.0	<5.0	15	<0.50	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.50	<0.20		
MW19-07		Screen Interval: 6.1 - 9.1 mbgs																																					
28-May-19	<10	<0.50	<1.0	<0.50	<0.20	<0.20	<0.20	<0.50	<0.50	<0.50	<0.50	<1.0	<0.20	<0.50	<0.20	<0.50	<0.50	<0.20	<0.30	<0.40	<0.50	na	<0.20	<1.0	<2.0	<1.0	<5.0	12	<0.50	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.50	<0.20		
MW19-08		Screen Interval: 5.8 - 8.8 mbgs																																					
28-May-19	<10	<0.50	<1.0	<0.50	<0.20	<0.20	<0.20	<0.50	<0.50	<0.50	<0.50	<1.0	<0.20	<0.50	<0.20	<0.50	<0.50	<0.20	<0.30	<0.40	<0.50	na	<0.20	<1.0	<2.0	<1.0	<5.0	43	<0.50	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.50	<0.20		
MW19-09		Screen Interval: 5.5 - 8.5 mbgs																																					
28-May-19	<10	<0.50	<1.0	<0.50	<0.20	<0.20	<0.20	<0.50	<0.50	<0.50	<0.50	<1.0	<0.20	<0.50	<0.20	<0.50	<0.50	<0.20	<0.30	<0.40	<0.50	na	<0.20	<1.0	<2.0	<1.0	<5.0	20	<0.50	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.50	<0.20		
TH212		Screen Interval: 6.1 - 9.1 mbgs																																					
28-May-19	<10	<0.50	<1.0	<0.50	<0.20	<0.20	<0.20	<0.50	<0.50	<0.50	<0.50	<1.0	<0.20	<0.50	<0.20	<0.50	<0.50	<0.20	<0.30	<0.40	<0.50	na	<0.20	<1.0	<2.0	<1.0	<5.0	5.7	<0.50	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.50	<0.20		
TH201		Screen Interval: 6.1 - 9.1 mbgs																																					
15-Oct-14	<10	<0.10	<0.20	<0.50	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.50	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	na	na	na	<0.28	<0.20	0.72	<0.50	<5.0	<5.0	<0.20	<0.20	<0.20	<0.10	<0.10	<0.20	<0.10	<0.20	<0.10			
TH203A		Screen Interval: 6.1 - 9.1 mbgs																																					
15-Oct-14	<10	<0.10	<0.20	<0.50	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.50	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	na	na	na	<0.28	<0.20	0.77	<0.50	<5.0	<5.0	<0.20	<0.20	<0.20	<0.10	<0.10	<0.20	<0.10	<0.20	<0.10			
TH205A		Screen Interval: 6.1 - 9.1 mbgs																																					
15-Oct-14	<20	<0.20	<0.40	<1.0	<0.20	<0.20	<0.20	<0.40	<0.40	<0.40	<0.40	<1.0	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	na	na	na	<0.57	<0.40 ^m	2.1	<1.0	<1.0	<1.0	<0.40	<0.40	<0.40	<0.20	<0.20	<0.40	<0.20	<0.20	<0.40	<0.40		
TH206		Screen Interval: 6.1 - 9.1 mbgs																																					
15-Oct-14	<250	<2.5	<5.0	<13 ^m	<2.5 ^m	<2.5	<2.5 ^m	<5.0	<5.0	<5.0	<13	<2.5	<5.0 ^m	<2.5 ^m	<2.5 ^m	<2.5 ^m	<2.5 ^m	<2.5	na	na	na	<7.1 ^m	<5.0 ^m	<13	<13	<130	<130	<5.0	<5.0	<2.5 ^m	<2.5	<5.0 ^m	<2.5 ^m	<2.5	<5.0 ^m	<2.5 ^m	<5.0		
15-Oct-14 (DUP)	<250	<2.5	<5.0	<13 ^m	<2.5 ^m	<2.5	<2.5 ^m	<5.0	<5.0	<5.0	<13	<2.5	<5.0 ^m	<2.5 ^m	<2.5 ^m	<2.5 ^m	<2.5 ^m	<2.5	na	na	na	<7.1 ^m	<5.0 ^m	<13	<13	<130	<130	<5.0	<5.0	<2.5 ^m	<2.5	<5.0 ^m	<2.5 ^m	<2.5	<5.0 ^m	<2.5 ^m	<5.0		
TH207		Screen Interval: 10.1 - 11.6 mbgs																																					
15-Oct-14	<250	<2.5	<5.0	<13 ^m	<2.5 ^m	<2.5	<2.5 ^m	<5.0	<5.0	<5.0	<13	<2.5	<5.0 ^m	<2.5 ^m	<2.5 ^m	<2.5 ^m	<2.5 ^m	<2.5	na	na	na	<7.1 ^m	<5.0 ^m	<13	<13	<130	<130	<5.0	<5.0	<2.5 ^m	<2.5	<5.0 ^m	<2.5 ^m	<2.5	<5.0 ^m	<2.5 ^m	<5.0		
TH210		Screen Interval: 6.1 - 9.1 mbgs																																					
14-Oct-14	<100	<1.0	<2.0	<5.0	<1.0 ^m	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<5.0	<1.0	<2.0 ^m	<1.0	<1.0	<1.0	<1.0	na	na	na	<2.8	<2.0 ^m	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<1.0	<2.0 ^m	<2.0		
TH212		Screen Interval: 7.3 - 9.1 mbgs																																					
15-Oct-14	<50	<0.50	<1.0	<2.5	<0.50	<0.50	<0.50	<1.0	<1.0	<1.0	<1.0	<2.5	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	na	na	na	<1.4	<1.0 ^m	<2.5	<2.5	<2.5	<2.5	<2.5	<1.0	<1.0	<0.50	<0.50	<1.0	<0.50	<1.0 ^m	<1.0			
28-May-19	<10	<0.50	<1.0	<0.50	<0.20	<0.20	<0.20	<0.50	<0.50	<0.50	<0.50	<1.0	<0.20	<0.50	<0.20	<0.50	<0.50	<0.20	<0.30	<0.40	<0.50	na	<0.20	<1.0	<2.0	<1.0	<5.0	5.7	<0.50	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.50	<0.20		

ONTARIO STANDARDS

PARAMETERS	ACTN	BDCMA	BF	BMA	CT	MCB	TCM	DBCM	1,2-DCB	1,3-DCB	1,4-DCB	DCDFMA	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	1,2-DCPA	c-1,3-DCPE	t-1,3-DCPE	1,3-DCPE, tot	1,3-DCPA	1,2-DBA	HA	DCM	MEK	MBK	MTBE	ST	1,1,1,2-TCA	1,1,2,2-TCA	PCE	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	VC
CRITERIA ^a	130,000	85,000	380	5.6	0.79	630	2.4	82,000	4,600	9,600	8	4,400	320	1.6	1.6	1.6																					

LEGEND

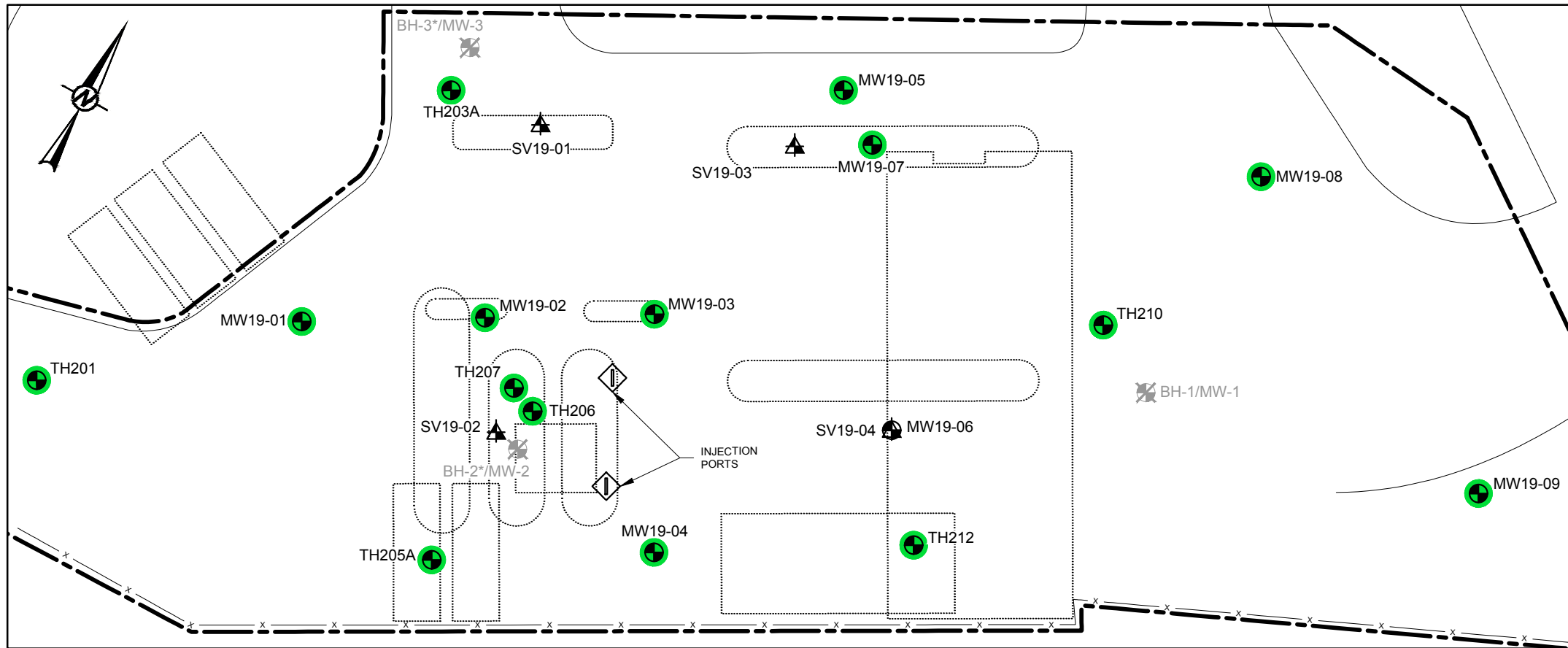
	PROPERTY BOUNDARY		BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
	FENCELINE		BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DESTROYED)
	FORMER FACILITY		SOIL VAPOUR PROBE LOCATION

LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN	Mo	MOLYBDENUM
µg/L	MICROGRAMS PER LITRE	na	NOT ANALYZED
Ag	SILVER	Na	SODIUM
As	ARSENIC	Ni	NICKEL
B	BORON	O.REG	ONTARIO REGULATION
Ba	BARIUM	Pb	LEAD
Be	BERYLLIUM	RDL	REPORTABLE DETECTION LIMIT
Cd	CADMIUM	Sb	ANTIMONY
Cl	CHLORIDE	Se	SELENIUM
Co	COBALT	Tl	THALLIUM
Cr	CHROMIUM	U	URANIUM
Cu	COPPER	V	VANADIUM
mbgs	METRES BELOW GROUND SURFACE	Zn	ZINC

NOTES

- LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN**.
- LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED**.
- EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED**.
- LOCATION WHERE NO SAMPLES WERE TAKEN IN THE MOST RECENT SAMPLING EVENT SHOWN IN **BLACK**.



MW19-01 Screen Interval: 6.1 - 9.1 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
28-May-19	<0.50	<1.0	62	<0.50	44	<0.10	<5.0	<0.50	<1.0	<0.50	3.3	6.4	<2.0	<0.10	350,000	<0.050	8.3	<0.50	<5.0	na

MW19-02 Screen Interval: 6.1 - 9.1 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
28-May-19	<0.50	<1.0	69	<0.50	63	<0.10	<5.0	<0.50	<1.0	<0.50	3.2	1.4	<2.0	<0.10	280,000	<0.050	12	<0.50	<5.0	na

MW19-03 Screen Interval: 6.1 - 9.1 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
28-May-19	<0.50	1.0	52	<0.50	62	<0.10	<5.0	<0.50	<1.0	<0.50	<0.50	1.1	<2.0	<0.10	200,000	<0.050	11	<0.50	<5.0	na

MW19-04 Screen Interval: 6.1 - 9.1 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
28-May-19	<0.50	1.7	60	<0.50	53	<0.10	<5.0	<0.50	<1.0	<0.50	<0.50	24	<2.0	<0.10	180,000	<0.050	13	<0.50	<5.0	na
28-May-19 (DUP)	<0.50	1.8	58	<0.50	51	<0.10	<5.0	<0.50	<1.0	<0.50	<0.50	1.3	<2.0	<0.10	180,000	<0.050	13	<0.50	<5.0	na

MW19-05 Screen Interval: 6.1 - 9.1 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
28-May-19	<0.50	1.5	72	<0.50	75	<0.10	<5.0	<0.50	<1.0	<0.50	<0.50	1.3	2.1	<0.10	840,000	<0.050	7.1	<0.50	<5.0	na

MW19-07 Screen Interval: 6.1 - 9.1 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
28-May-19	<0.50	<1.0	68	<0.50	73	<0.10	<5.0	<0.50	<1.0	<0.50	<0.50	1.4	4.1	<0.10	1,100,000	<0.050	5.5	<0.50	<5.0	na

MW19-08 Screen Interval: 5.8 - 8.8 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
28-May-19	<0.50	2.0	35	<0.50	110	<0.10	<5.0	<0.50	<1.0	<0.50	1.9	3.5	<2.0	<0.10	190,000	<0.050	25	<0.50	<5.0	na

MW19-09 Screen Interval: 5.5 - 8.5 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
28-May-19	<0.50	<1.0	26	<0.50	90	<0.10	<5.0	1.7	<1.0	<0.50	2.4	14	2.5	<0.10	370,000	<0.050	14	<0.50	6.1	na

TH201 Screen Interval: 6.1 - 9.1 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
15-Oct-14	0.7	<1.0	30	<0.50	170	<0.10	<5.0	1.9	<1.0	<0.50	6.6	20	<2.0	<0.10	300,000	<0.050	17	<0.50	8.2	na

TH203A Screen Interval: 6.1 - 9.1 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
15-Oct-14	<0.50	<1.0	40	<0.50	87	<0.10	<5.0	<0.50	<1.0	<0.50	1.8	<1.0	<2.0	<0.10	230,000	<0.050	3.9	<0.50	<5.0	380,000

TH205A Screen Interval: 6.1 - 9.1 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
15-Oct-14	<0.50	<1.0	54	<0.50	67	<0.10	<5.0	<0.50	<1.0	<0.50	0.85	<1.0	<2.0	<0.10	180,000	<0.050	4.2	<0.50	5	270,000

TH206 Screen Interval: 6.1 - 9.1 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
15-Oct-14	<0.50	<1.0	45	<0.50	83	<0.10	<5.0	<0.50	<1.0	<0.50	<0.50	<1.0	<2.0	<0.10	190,000	<0.050	4.0	<0.50	<5.0	300,000
15-Oct-14 (DUP)	<0.50	<1.0	45	<0.50	80	<0.10	<5.0	<0.50	<1.0	<0.50	<0.50	<1.0	<2.0	<0.10	190,000	<0.050	4.0	<0.50	<5.0	290,000

TH207 Screen Interval: 10.1 - 11.6 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
15-Oct-14	<0.50	<1.0	67	<0.50	87	<0.10	<5.0	<0.50	<2.0	<0.50	0.51	1.1	<2.0	<0.10	570,000	<0.050	3.9	<1.0	<5.0	940,000

TH210 Screen Interval: 6.1 - 9.1 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
14-Oct-14	<0.50	<1.0	33	<0.50	95	<0.10	<5.0	<0.50	<1.0	<0.50	<0.50	<1.0	<2.0	<0.10	160,000	<0.050	2.4	<0.50	<5.0	240,000

TH212 Screen Interval: 7.3 - 9.1 mbgs

Date	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
15-Oct-14	<0.50	<1.0	49	<0.50	52	<0.10	<5.0	<0.50	<1.0	<0.50	1.1	3.7	<2.0	<0.10	140,000	<0.050	6.5	<0.50	<5.0	180,000
28-May-19	<0.50	<1.0	43	<0.50	37	<0.10	<5.0	<0.50	<1.0	<0.50	0.68	1.7	3.7	<0.10	150,000	<0.050	9.1	<0.50	<5.0	na

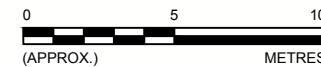
ONTARIO STANDARDS

PARAMETERS	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Na	Tl	U	V	Zn	Cl
CRITERIA ^(a)	20,000	1,900	29,000	67	45,000	2.7	810	66	87	25	9,200	490	63	1.5	2,300,000	510	420	250	1,100	2,300,000
RDL	0.50	1.0	2.0	0.50	10	0.10	5.0	0.50	1.0	0.50	0.50	1.0	2.0	0.10	100	0.050	0.10	0.50	5.0	10
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

(a) O.REG 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN COARSE TEXTURED SOIL IN A NON-POTABLE GROUNDWATER CONDITION.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM EXP ENERGY SERVICES LTD.; PROJECT No.: 14004; SCALE: UNKNOWN; DATE: NOVEMBER, 2014.



CLIENT
IMPERIAL OIL LIMITED

CONSULTANT



YYYY-MM-DD 2020-01-13
DESIGNED BDrieschner
PREPARED GSingh
REVIEWED CVettorazzo
APPROVED SCarrelas

PROJECT
FORMER RETAIL FUEL OUTLET
2 MONTREAL ROAD
OTTAWA, ONTARIO
TITLE
GROUNDWATER ANALYTICAL RESULTS - DISSOLVED METALS

PROJECT NO. 18113796 PHASE-TASK 1485-1916C REV. 1 FIGURE 13

P:\18113796\GIS\CALM\CAD\IMPERIAL_OIL_2\MONTREAL_ROAD\09_PROJECTS\18113796_02_PRODUCTION\1485-19_1916\DWG\1 - Final_Editor By: jswang Date: 2020-01-13 Time: 3:38:44 PM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

Table 1
Summary of Groundwater Field Monitoring Results
Former Retail Fuel Station - 2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Well name	Top of Casing Elevation ^(a) (mald)	Ground Elevation ^(a) (mald)	Screen Interval (mbgs)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation ^(a) (mald)	Product Thickness (mm)	Headspace Vapours (ppmv)
MW19-01	100.76	99.99	5.95 - 8.95	28-May-19	7.88	7.11	92.88	n/d	nm
MW19-02	100.82	99.98	6.1 - 9.1	28-May-19	7.94	7.11	92.82	n/d	nm
MW19-03	100.89	99.92	6.1 - 9.1	28-May-19	8.02	7.04	92.75	n/d	nm
MW19-04	100.82	99.91	6.1 - 9.1	28-May-19	7.94	7.04	92.82	n/d	nm
MW19-05	100.64	99.83	6.1 - 9.1	28-May-19	7.77	6.95	93.00	n/d	nm
MW19-06	100.58	99.78	6.1 - 9.1	28-May-19	7.83	7.04	92.93	n/d	nm
MW19-07	100.71	99.73	6.1 - 9.1	28-May-19	7.33	6.36	93.43	n/d	nm
MW19-08	100.20	99.32	5.8 - 8.8	28-May-19	7.26	6.37	93.51	n/d	nm
MW19-09	100.12	99.44	5.5 - 8.5	28-May-19	8.01	7.33	92.76	n/d	nm
TH201	101.68	100.93	6.1 - 9.1	19-Dec-16	8.33	7.58	93.35	n/d	n/d
				24-Mar-17	8.15	7.40	93.54	n/d	25
				22-Nov-17	8.15	7.40	93.53	n/d	n/d
				15-Nov-18	8.33	7.58	93.35	n/d	n/d
				28-May-19	7.81	7.06	93.87	n/d	nm
TH203A	101.68	100.86	6.1 - 9.1	19-Dec-16	8.33	7.51	93.35	n/d	10
				24-Mar-17	8.14	7.32	93.54	n/d	10
				22-Nov-17	8.16	7.34	93.52	n/d	10
				15-Nov-18	8.32	7.49	93.37	n/d	n/d
				28-May-19	8.01	7.19	93.67	n/d	nm
TH205A	101.49	100.85	6.1 - 9.1	19-Dec-16	8.15	7.51	93.35	n/d	n/d
				24-Mar-17	7.96	7.32	93.54	n/d	n/d
				22-Nov-17	7.97	7.33	93.52	n/d	n/d
				15-Nov-18	8.13	7.49	93.36	n/d	n/d
				28-May-19	7.76	7.12	93.74	n/d	nm
TH206	101.54	100.80	6.1 - 9.1	19-Dec-16	8.20	7.45	93.35	n/d	n/d
				24-Mar-17	8.01	7.27	93.53	n/d	5
				22-Nov-17	8.01	7.27	93.53	n/d	n/d
				15-Nov-18	8.19	7.45	93.35	n/d	5
				28-May-19	7.87	7.13	93.67	n/d	nm
TH207	101.43	100.78	10.1 - 11.6	19-Dec-16	8.09	7.44	93.34	n/d	n/d
				24-Mar-17	7.90	7.25	93.53	n/d	n/d
				22-Nov-17	7.91	7.26	93.52	n/d	5
				15-Nov-18	8.07	7.42	93.36	n/d	n/d
				28-May-19	7.76	7.10	93.68	n/d	nm
TH210	100.99	100.36	6.1 - 9.1	19-Dec-16	7.66	7.03	93.33	n/d	10
				24-Mar-17	7.47	6.84	93.52	n/d	n/d
				22-Nov-17	7.48	6.85	93.51	n/d	10
				15-Nov-18	7.64	7.01	93.35	n/d	n/d
				28-May-19	7.33	6.70	93.67	n/d	nm
TH212	101.31	100.65	7.3 - 9.1	19-Dec-16	7.97	7.31	93.34	n/d	10
				24-Mar-17	7.78	7.12	93.53	n/d	5
				22-Nov-17	7.79	7.13	93.52	n/d	15
				15-Nov-18	7.97	7.31	93.35	n/d	n/d
				28-May-19	7.64	6.98	93.67	n/d	nm

Notes:

^(a) Elevations are shown relative to a local benchmark (catch basin on the western portion of the Site), Elevation = 100.00 m (taken from previous consultant's report [exp, 2014]).

mbgs - metres below ground surface

mald - metres above local datum

mbtoc - metres below top of casing

mm - millimetres

n/a - well could not be located, or well not accessible

n/d - not detected

n/m - well not monitored

nm - not measured

ppmv or % LEL - parts per million by volume, or percent lower explosive limit (where indicated)

Table 2
Summary of Soil Analytical Results - Grain Size, Fraction of Organic Carbon, pH, and Dry Bulk Density
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location				MW19-01		MW19-02		MW19-03	MW19-05
				Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
BVL Sample ID				JTI647	JTI648	JTI649	JTI650	JTI651	JTI652
BVL Job Number				B9D4005	B9D4005	B9D4005	B9D4005	B9D4005	B9D4005
Sample Date				13-May-19	15-May-19	13-May-19	15-May-19	16-May-19	16-May-19
Sample Depth (mbgs)				0.3 - 0.5	3.80 - 4.40	1.40 - 1.60	5.30 - 6.00	3.00 - 4.00	3.00 - 3.50
Parameters	Units	RDL	Criteria ^(a)						
Sieve Pan	%	n/a	n/a	na	na	15	25	66	na
Sieve - #200 (>0.075 mm)	%	n/a	n/a	na	na	85	75	34	na
Grain Size	%	n/a	n/a	na	na	COARSE	COARSE	FINE	na
Fraction Organic Carbon	g/g	0.00050	n/s	na	0.022	na	na	na	na
Total Organic Carbon	mg/kg	500	n/s	na	22,000	na	na	na	na
pH	pH units	n/a	n/s	7.66	na	7.84	na	7.73	7.68
Dry Bulk Density	g/cm ³	0.010	n/s	na	na	NA	na	na	1.8
Conductivity	mS/cm	0.002	0.7	0.10	na	0.18	na	0.38	0.7
Sodium Adsorption Ratio	n/a	n/a	5	0.32	na	0.25	na	0.23	0.33

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition

Bold/Underlined - value exceeds criteria

BVL - Bureau Veritas Laboratories

g/cm³ - grams per cubic centimetre

g/g - grams per gram

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

mm - millimetres

mS/cm - millisiemens per centimetre

n/a - not applicable

n/s - no standard

na - not analyzed

RDL - reportable detection limit

< - less than

Table 2
Summary of Soil Analytical Results - Grain Size, Fraction of Organic Carbon, pH, and Dry Bulk Density
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location			MW19-06		MW19-07		MW19-08
				Sample ID	MW19-06-01	MW19-06-04	DUPA	MW19-07-01	MW19-07-05	MW19-08-01	
				BVL Sample ID	JTI625	JTI626	JTI627	JTI628	JTI629	JTI653	
				BVL Job Number	B9D4002	B9D4002	B9D4002	B9D4002	B9D4002	B9D4005	
				Sample Date	14-May-19	16-May-19	16-May-19	14-May-19	16-May-19	14-May-19	
				Sample Depth (mbgs)	0.3 - 0.5	2.10 - 2.70	2.10 - 2.70	0.3 - 0.5	3.00 - 3.50	0.3 - 0.5	
Parameters	Units	RDL	Criteria ^(a)								
Sieve Pan	%	n/a	n/a	na	na	na	na	na	na	na	
Sieve - #200 (>0.075 mm)	%	n/a	n/a	na	na	na	na	na	na	na	
Grain Size	%	n/a	n/a	na	na	na	na	na	na	na	
Fraction Organic Carbon	g/g	0.00050	n/s	<0.00050	0.018	0.020	0.0034	0.028	0.015		
Total Organic Carbon	mg/kg	500	n/s	<500	18,000	20,000	3,400	28,000	15,000		
pH	pH units	n/a	n/s	na	7.13	7.35	na	7.72	na		
Dry Bulk Density	g/cm ³	0.010	n/s	na	na	na	na	na	na		
Conductivity	mS/cm	0.002	0.7	na	0.18	0.21	na	1.1	na		
Sodium Adsorption Ratio	n/a	n/a	5	na	0.76	0.77	na	0.68	na		

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition

Bold/Underlined - value exceeds criteria

BVL - Bureau Veritas Laboratories

g/cm³ - grams per cubic centimetre

g/g - grams per gram

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

mm - millimetres

mS/cm - millisiemens per centimetre

n/a - not applicable

n/s - no standard

na - not analyzed

RDL - reportable detection limit

< - less than

Table 2
Summary of Soil Analytical Results - Grain Size, Fraction of Organic Carbon, pH, and Dry Bulk Density
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location	MW19-09	SV19-01		SV19-02	
				Sample ID	MW19-09-02	SV19-01-04	SV19-01-07	SV19-02-09	DUP B
				BVL Sample ID	JTI630	JUM799	JUM796	JUM797	JUM800
				BVL Job Number	B9D4002	B9D9093	B9D9093	B9D9093	B9D9093
				Sample Date	14-May-19	22-May-19	22-May-19	22-May-19	22-May-19
				Sample Depth (mbgs)	1.3 - 1.5	2.3 - 3.0	4.60 - 5.50	6.0 - 6.7	6.0 - 6.7
Parameters	Units	RDL	Criteria ^(a)						
Sieve Pan	%	n/a	n/a	73	26	na	na	na	na
Sieve - #200 (>0.075 mm)	%	n/a	n/a	27	74	na	na	na	na
Grain Size	%	n/a	n/a	FINE	COARSE	na	na	na	na
Fraction Organic Carbon	g/g	0.00050	n/s	na	na	na	na	na	na
Total Organic Carbon	mg/kg	500	n/s	na	na	na	na	na	na
pH	pH units	n/a	n/s	na	na	7.69	na	na	na
Dry Bulk Density	g/cm ³	0.010	n/s	na	na	na	1.4	1.6	na
Conductivity	mS/cm	0.002	0.7	na	na	2.4	na	na	na
Sodium Adsorption Ratio	n/a	n/a	5	na	na	0.38	na	na	na

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition

Bold/Underlined - value exceeds criteria

BVL - Bureau Veritas Laboratories

g/cm³ - grams per cubic centimetre

g/g - grams per gram

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

mm - millimetres

mS/cm - millisiemens per centimetre

n/a - not applicable

n/s - no standard

na - not analyzed

RDL - reportable detection limit

< - less than

Table 3
Summary of Soil Analytical Results - Petroleum Hydrocarbons
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location				MW19-01		MW19-02		MW19-03	MW19-04	MW19-05	MW19-06/SV19-04		
Sample ID				MW19-01-01	MW19-01-06	MW19-02-02	MW19-02-08	MW19-03-05	MW19-04-05	MW19-05-05	MW19-06-01	MW19-06-04	DUPA
BVL Sample ID				JTI647	JTI648	JTI649	JTI650	JTI651	JTU250	JTI652	JTI625	JTI626	JTI627
BVL Job Number				B9D4005	B9D4005	B9D4005	B9D4005	B9D4005	B9D5790	B9D4005	B9D4002	B9D4002	B9D4002
Sample Date				13-May-19	15-May-19	13-May-19	15-May-19	16-May-19	17-May-19	16-May-19	14-May-19	16-May-19	16-May-19
Sample Depth (mbgs)				0.30 - 0.50	3.80 - 4.40	1.40 - 1.60	5.30 - 6.00	3.00 - 4.00	3.00 - 3.70	3.00 - 3.50	0.30 - 0.50	2.10 - 2.70	2.10 - 2.70
Parameters	Units	RDL	Criteria ^(a)										
Benzene	µg/g	0.020	0.32	<0.020	<0.020	na	<0.020	2.1	<0.020	<0.020	<0.020	<0.020	<0.020
Toluene	µg/g	0.020	68	<0.020	0.025	na	<0.020	9.8	0.022	0.021	<0.020	<0.020	<0.020
Ethylbenzene	µg/g	0.020	9.5	<0.020	<0.020	na	<0.020	6.9	<0.020	0.023	<0.020	<0.020	<0.020
Xylenes	µg/g	0.020	26	<0.040	0.027	na	0.046	28	<0.020	0.16	<0.040	<0.020	<0.020
F1 (C ₆ -C ₁₀) - BTEX	µg/g	10	55 ^(b)	<10	<10	na	<10	140	21	53	<10	14	28
F2 (C ₁₀ -C ₁₆)	µg/g	10	230	<10	58	<10	36	110	41	120	<10	56	41
F3 (C ₁₆ -C ₃₄)	µg/g	50	1,700	<50	86	<50	58	93	82	140	<50	56	<50
F4 (C ₃₄ -C ₅₀)	µg/g	50	3,300	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition

^(b) F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

mbgs - metres below ground surface

n/a - not applicable

na - not analyzed

RDL - reportable detection limit

µg/g - micrograms per gram

> - greater than

< - less than

Table 3
Summary of Soil Analytical Results - Petroleum Hydrocarbons
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location				MW19-07		MW19-08	MW19-09	SV19-01	SV19-02		SV19-03
Sample ID				MW19-07-01	MW19-07-05	MW19-08-05	MW19-09-05	SV19-01-07	SV19-02-09	DUP B	SV19-03-06
BVL Sample ID				JTI628	JTI629	JTU252	JTU251	JUM796	JUM797	JUM800	JUM798
BVL Job Number				B9D4002	B9D4002	B9D5790	B9D5790	B9D9093	B9D9093	B9D9093	B9D9093
Sample Date				14-May-19	16-May-19	21-May-19	17-May-19	22-May-19	22-May-19	22-May-19	22-May-19
Sample Depth (mbgs)				0.30 - 0.50	3.00 - 3.50	3.00 - 4.00	3.00 - 4.00	4.60 - 5.50	6.0 - 6.7	6.0 - 6.7	3.75 - 4.3
Parameters	Units	RDL	Criteria ^(a)								
Benzene	µg/g	0.020	0.32	<0.020	0.24	<0.020	<0.020	3.4	8.7	1.2	3.5
Toluene	µg/g	0.020	68	<0.020	0.33	<0.020	<0.020	3.8	7.6	0.61	1.2
Ethylbenzene	µg/g	0.020	9.5	<0.020	0.33	<0.020	<0.020	0.51	6.8	1.4	0.10
Xylenes	µg/g	0.020	26	<0.040	1.3	<0.020	0.061	3.3	27	3.6	0.43
F1 (C ₆ -C ₁₀) - BTEX	µg/g	10	55 ^(b)	<10	29	140	62	76	1,200	710	24
F2 (C ₁₀ -C ₁₆)	µg/g	10	230	<10	87	78	51	32	450	430	110
F3 (C ₁₆ -C ₃₄)	µg/g	50	1,700	<50	95	120	62	65	280	280	130
F4 (C ₃₄ -C ₅₀)	µg/g	50	3,300	<50	<50	<50	<50	<50	<50	<50	<50

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition

^(b) F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

mbgs - metres below ground surface

n/a - not applicable

na - not analyzed

RDL - reportable detection limit

µg/g - micrograms per gram

> - greater than

< - less than

Table 4
Summary of Soil Analytical Results - Volatile Organic Compounds
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location				MW19-01	MW19-02	MW19-03	MW19-04	MW19-05	MW19-06		MW19-07	MW19-08	MW19-09
Sample ID				MW19-01-06	MW19-02-08	MW19-03-05	MW19-04-05	MW19-05-05	MW19-06-04	DUPA	MW19-07-05	MW19-08-05	MW19-09-05
BVL Sample ID				JTI648	JTI650	JTI651	JTU250	JTI652	JTI626	JTI627	JTI629	JTU252	JTU251
BVL Job Number				B9D4005	B9D4005	B9D4005	B9D5790	B9D4005	B9D4002	B9D4002	B9D4002	B9D5790	B9D5790
Sample Date				15-May-19	15-May-19	16-May-19	17-May-19	16-May-19	16-May-19	16-May-19	16-May-19	21-May-19	17-May-19
Sample Depth (mbgs)				3.80 - 4.40	5.30 - 6.00	3.00 - 4.00	3.00 - 3.70	3.00 - 3.50	2.10 - 2.70	2.10 - 2.70	3.00 - 3.50	3.00 - 4.00	3.00 - 4.00
Parameters	Units	RDL	Criteria ^(a)										
Acetone	µg/g	0.50	16	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	µg/g	0.050	18	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromoform	µg/g	0.050	0.61	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromomethane	µg/g	0.050	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Carbon Tetrachloride	µg/g	0.050	0.21	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	µg/g	0.050	2.4	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloroform	µg/g	0.050	0.47	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	µg/g	0.050	13	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	µg/g	0.050	6.8	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	µg/g	0.050	9.6	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	µg/g	0.050	0.2	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorodifluoromethane	µg/g	0.050	16	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethane	µg/g	0.050	17	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloroethane	µg/g	0.050	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethylene	µg/g	0.050	0.064	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
cis-1,2-Dichloroethylene	µg/g	0.050	55	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
trans-1,2-Dichloroethylene	µg/g	0.050	1.3	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloropropane	µg/g	0.050	0.16	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

n/s - no standard

RDL - reportable detection limit

µg/g - micrograms per gram

< - less than

Table 4
Summary of Soil Analytical Results - Volatile Organic Compounds
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location				MW19-01	MW19-02	MW19-03	MW19-04	MW19-05	MW19-06		MW19-07	MW19-08	MW19-09
Sample ID				MW19-01-06	MW19-02-08	MW19-03-05	MW19-04-05	MW19-05-05	MW19-06-04	DUPA	MW19-07-05	MW19-08-05	MW19-09-05
BVL Sample ID				JTI648	JTI650	JTI651	JTU250	JTI652	JTI626	JTI627	JTI629	JTU252	JTU251
BVL Job Number				B9D4005	B9D4005	B9D4005	B9D5790	B9D4005	B9D4002	B9D4002	B9D4002	B9D5790	B9D5790
Sample Date				15-May-19	15-May-19	16-May-19	17-May-19	16-May-19	16-May-19	16-May-19	16-May-19	21-May-19	17-May-19
Sample Depth (mbgs)				3.80 - 4.40	5.30 - 6.00	3.00 - 4.00	3.00 - 3.70	3.00 - 3.50	2.10 - 2.70	2.10 - 2.70	3.00 - 3.50	3.00 - 4.00	3.00 - 4.00
Parameters	Units	RDL	Criteria ^(a)										
cis-1,3-Dichloropropene	µg/g	0.030	n/s	<0.030	<0.030	<0.060	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
trans-1,3-Dichloropropene	µg/g	0.040	n/s	<0.040	<0.040	<0.080	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,3-Dichloropropene, Total	µg/g	0.050	0.18	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylene Dibromide	µg/g	0.050	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
n-Hexane	µg/g	0.050	46	0.13	0.10	1.7	0.065	0.44	<0.050	<0.050	0.59	2.8	0.10
Methylene Chloride (Dichloromethane)	µg/g	0.050	1.6	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl Isobutyl Ketone	µg/g	0.50	31	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl Ethyl Ketone (2-Butanone)	µg/g	0.50	70	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-Butyl Ether (MTBE)	µg/g	0.050	11	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Styrene	µg/g	0.050	34	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	µg/g	0.050	0.087	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	µg/g	0.050	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene (PCE)	µg/g	0.050	4.5	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,1-Trichloroethane	µg/g	0.050	6.1	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	µg/g	0.050	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethylene (TCE)	µg/g	0.050	0.91	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichlorofluoromethane	µg/g	0.050	4	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Vinyl Chloride	µg/g	0.020	0.032	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

n/s - no standard

RDL - reportable detection limit

µg/g - micrograms per gram

< - less than

Table 5
Summary of Soil Analytical Results - Polycyclic Aromatic Hydrocarbons
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location	MW19-01	MW19-02	MW19-03	MW19-04	MW19-05	MW19-06		MW19-07	MW19-08	MW19-09
				Sample ID	MW19-01-06	MW19-02-08	MW19-03-05	MW19-04-05	MW19-05-05	MW19-06-04	DUPA	MW19-07-05	MW19-08-05	MW19-09-05
				BVL Sample ID	JTI648	JTI650	JTI651	JTU250	JTI652	JTI626	JTI627	JTI629	JTU252	JTU251
				BVL Job Number	B9D4005	B9D4005	B9D4005	B9D5790	B9D4005	B9D4002	B9D4002	B9D4002	B9D5790	B9D5790
				Sample Date	15-May-19	15-May-19	16-May-19	17-May-19	16-May-19	16-May-19	16-May-19	16-May-19	21-May-19	17-May-19
				Sample Depth (mbgs)	3.80 - 4.40	5.30 - 6.00	3.00 - 4.00	3.00 - 3.70	3.00 - 3.50	2.10 - 2.70	2.10 - 2.70	3.00 - 3.50	3.00 - 4.00	3.00 - 4.00
Parameters	Units	RDL	Criteria ^(a)											
Acenaphthene	µg/g	0.0050	96	<0.0050	<0.0050	0.013	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0065	<0.0050
Acenaphthylene	µg/g	0.0050	0.15	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0070	<0.0050
Anthracene	µg/g	0.0050	0.67	0.0088	0.012	0.022	<0.0050	0.016	<0.0050	<0.0050	<0.0050	0.012	<0.0050	<0.0050
Benzo[a]anthracene	µg/g	0.0050	0.96	<0.0050	0.025	0.018	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0058	0.0082
Benzo[a]pyrene	µg/g	0.0050	0.3	<0.0050	0.024	0.013	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0065	0.0082
Benzo[b,j]fluoranthene	µg/g	0.0050	n/s	<0.0050	0.034	0.021	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.011	0.013
Benzo[g,h,i]perylene	µg/g	0.0050	9.6	0.0055	0.017	0.016	0.0056	0.0058	<0.0050	<0.0050	<0.0050	0.0050	0.011	0.0093
Benzo[k]fluoranthene	µg/g	0.0050	0.96	<0.0050	0.012	0.0064	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	µg/g	0.0050	9.6	0.014	0.028	0.026	0.015	0.017	0.011	0.0076	0.013	0.013	0.027	0.016
Dibenzo[a,h]anthracene	µg/g	0.0050	0.1	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	µg/g	0.0050	9.6	0.0051	0.054	0.035	<0.0050	0.0067	<0.0050	<0.0050	<0.0050	0.0058	0.0098	0.015
Fluorene	µg/g	0.0050	62	0.011	0.012	0.029	<0.0060	0.021	<0.0050	<0.0050	<0.0050	0.015	<0.030	<0.0070
Indeno[1,2,3-cd]pyrene	µg/g	0.0050	0.76	<0.0050	0.015	0.0071	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0064
1-Methylnaphthalene	µg/g	0.0050	76 ^(b)	0.011	0.019	0.48	0.0077	0.039	0.019	0.013	0.023	0.023	0.033	0.011
2-Methylnaphthalene	µg/g	0.0050	76 ^(b)	0.013	0.024	0.61	<0.0080	0.047	0.019	0.015	0.031	0.031	<0.040	<0.020
1- & 2-Methylnaphthalene	µg/g	0.0071	n/s	0.024	0.044	1.1	<0.0094	0.086	0.039	0.028	0.054	0.054	<0.040	<0.021
Naphthalene	µg/g	0.0050	9.6	<0.0050	0.0092	0.65	<0.0050	<0.020	<0.0070	<0.0050	<0.0090	<0.0090	0.015	<0.0050
Phenanthrene	µg/g	0.0050	12	0.066	0.074	0.11	0.080	0.083	0.053	0.036	0.061	0.061	0.14	0.044
Pyrene	µg/g	0.0050	96	0.011	0.048	0.063	0.012	0.012	0.012	0.0062	<0.0050	0.0093	0.024	0.018

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition

^(b) The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2-methyl naphthalene, with the provision that if both are detected the sum of the two must not exceed the standard.

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

n/s - no standard

RDL - reportable detection limit

µg/g - micrograms per gram

< - less than

Table 6
Summary of Soil Analytical Results - Metals
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location	MW19-01	MW19-02	MW19-03	MW19-04	MW19-05	MW19-06		MW19-07	MW19-08	MW19-09	SV19-01
				Sample ID	MW19-01-01	MW19-02-02	MW19-03-05	MW19-04-05	MW19-05-05	MW19-06-04	DUPA	MW19-07-05	MW19-08-05	MW19-09-05	SV19-01-07
				BVL Sample ID	JTI647	JTI649	JTI651	JTU250	JTI652	JTI626	JTI627	JTI629	JTU252	JTU251	JUM796
				BVL Job Number	B9D4005	B9D4005	B9D4005	B9D5790	B9D4005	B9D4002	B9D4002	B9D4002	B9D5790	B9D5790	B9D9093
				Sample Date	13-May-19	13-May-19	16-May-19	17-May-19	16-May-19	16-May-19	16-May-19	16-May-19	21-May-19	17-May-19	22-May-19
				Sample Depth (mbgs)	0.30 - 0.50	1.40 - 1.60	3.00 - 4.00	3.00 - 3.70	3.00 - 3.50	2.10 - 2.70	2.10 - 2.70	3.00 - 3.50	3.00 - 4.00	3.00 - 4.00	4.60 - 5.50
Parameters	Units	RDL	Criteria ^(a)												
Antimony	µg/g	0.20	40	<0.20	<0.20	0.64	1.2	0.70	0.63	0.78	0.47	0.99	0.49	0.52	
Arsenic	µg/g	1.0	18	<1.0	2.8	8.9	18	12	14	15	8.5	16	8.1	6.3	
Barium	µg/g	0.50	670	86	140	76	84	76	100	100	90	92	180	100	
Beryllium	µg/g	0.20	8	0.29	0.41	0.96	1.1	1.1	1.1	1.1	0.88	0.94	0.93	0.55	
Boron	µg/g	5.0	120	<5.0	8.2	9.2	10	9.9	6.2	6.4	7.6	9.8	9.5	6.6	
Cadmium	µg/g	0.10	1.9	<0.10	0.10	0.46	0.69	0.47	0.68	0.64	0.52	0.77	0.68	0.35	
Chromium	µg/g	1.0	160	18	16	23	25	24	28	27	22	23	22	18	
Cobalt	µg/g	0.10	80	6.5	11	19	36	24	27	28	18	22	18	13	
Copper	µg/g	0.50	230	12	19	48	65	57	57	58	46	54	43	31	
Lead	µg/g	1.0	120	3.2	13	16	33	21	21	22	16	25	25	25	
Mercury	µg/g	0.050	3.9	na	na	na	0.15	na	na	na	na	0.10	0.055	0.15	
Molybdenum	µg/g	0.50	40	<0.50	1.4	8.4	16	10	6.8	6.3	8.4	11	7.6	5.1	
Nickel	µg/g	0.50	270	11	21	63	150	80	92	95	56	94	59	45	
Selenium	µg/g	0.50	5.5	<0.50	<0.50	1.9	2.5	2.6	0.70	0.74	1.2	2.1	1.1	0.73	
Silver	µg/g	0.20	40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Thallium	µg/g	0.050	3.3	0.12	0.26	0.34	1.2	0.27	0.81	0.83	0.21	0.52	0.27	0.55	
Tin	µg/g	1.0	n/s	na	na	na	<1.0	na	na	na	na	<1.0	<1.0	na	
Uranium	µg/g	0.050	33	0.50	0.85	3.4	7.1	3.7	2.8	2.9	3.4	5.9	3.3	2.3	
Vanadium	µg/g	5.0	86	33	27	39	42	40	43	44	35	38	39	28	
Zinc	µg/g	5.0	340	26	31	76	83	74	94	92	77	83	85	66	

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

n/s - no standard

na - not analyzed

RDL - reportable detection limit

µg/g - micrograms per gram

< - less than

Table 7
Summary of Soil Analytical Results - Polychlorinated Biphenyls and Glycols
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location				MW19-04	MW19-05	MW19-06		MW19-07	MW19-08	MW19-09
Sample ID				MW19-04-05	MW19-05-05	MW19-06-04	DUPA	MW19-07-05	MW19-08-05	MW19-09-05
BVL Sample ID				JTU250	JTI652	JTI626	JTI627	JTI629	JTU252	JTU251
BVL Job Number				B9D5790	B9D4005	B9D4002	B9D4002	B9D4002	B9D5790	B9D5790
Sample Date				17-May-19	16-May-19	16-May-19	16-May-19	16-May-19	21-May-19	17-May-19
Sample Depth (mbgs)				3.00 - 3.70	3.00 - 3.50	2.10 - 2.70	2.10 - 2.70	3.00 - 3.50	3.00 - 4.00	3.00 - 4.00
Parameters	Units	RDL	Criteria ^(a)							
Aroclor 1242	µg/g	0.010	n/s	<0.015	na	<0.010	<0.010	<0.010	na	na
Aroclor 1248	µg/g	0.010	n/s	<0.015	na	<0.010	<0.010	<0.010	na	na
Aroclor 1254	µg/g	0.010	n/s	<0.015	na	<0.010	<0.010	<0.010	na	na
Aroclor 1260	µg/g	0.010	n/s	<0.015	na	<0.010	<0.010	<0.010	na	na
Polychlorinated Biphenyls	µg/g	0.010	1.1	<0.015	na	<0.010	<0.010	<0.010	na	na
Diethylene Glycol	µg/g	10	n/s	<10	<10	<10	<10	<10	<10	<10
Ethylene Glycol	µg/g	10	n/s	<10	<10	<10	<10	<10	<10	<10
Propylene Glycol	µg/g	10	n/s	<10	<10	<10	<10	<10	<10	<10
Total Glycols	µg/g	10	n/s	<10	<10	<10	<10	<10	<10	<10

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

n/s - no standard

na - not analyzed

RDL - reportable detection limit

µg/g - micrograms per gram

< - less than

Table 8
Summary of Soil Analytical Results - Pesticides
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location	MW19-04
				Sample ID	MW19-04-05
				BVL Sample ID	JTU250
				BVL Job Number	B9D5790
				Sample Date	17-May-19
				Sample Depth (mbgs)	3.00 - 3.70
Parameters	Units	RDL	Criteria ^(a)		
Chlordane (Total)	µg/g	0.0020	n/s		<0.0020
o,p-DDD + p,p-DDD	µg/g	0.0020	3.3 ^(b)		<0.0020
o,p-DDE + p,p-DDE	µg/g	0.0020	0.26 ^(c)		<0.0020
o,p-DDT + p,p-DDT	µg/g	0.0020	1.4 ^(d)		<0.0020
Total Endosulfan	µg/g	0.0020	0.04		<0.0020
Total PCB	µg/g	0.0150	0.35		<0.0150
Aldrin	µg/g	0.0020	0.05		<0.0020
a-Chlordane	µg/g	0.0020	0.05 ^(e)		<0.0020
g-Chlordane	µg/g	0.0020	0.05 ^(e)		<0.0020
o,p-DDD	µg/g	0.0020	3.3 ^(b)		<0.0020
p,p-DDD	µg/g	0.0020	3.3 ^(b)		<0.0020
o,p-DDE	µg/g	0.0020	0.26 ^(c)		<0.0020
p,p-DDE	µg/g	0.0020	0.26 ^(c)		<0.0020
o,p-DDT	µg/g	0.0020	1.4 ^(d)		<0.0020
p,p-DDT	µg/g	0.0020	1.4 ^(d)		<0.0020
Dieldrin	µg/g	0.0020	0.05		<0.0020
Lindane	µg/g	0.0020	n/s		<0.0020
Endosulfan I (alpha)	µg/g	0.0020	0.04 ^(f)		<0.0020
Endosulfan II (beta)	µg/g	0.0020	0.04 ^(f)		<0.0020
Endrin	µg/g	0.0020	0.04		<0.0020
Hepachlor	µg/g	0.0020	0.15		<0.0020
Hepachlor epoxide	µg/g	0.0020	0.05		<0.0020
Hexachlorobenzene	µg/g	0.0020	0.52		<0.0020
Hexachlorobutadiene	µg/g	0.0020	0.012		<0.0020
Hexachloroethane	µg/g	0.0020	0.089		<0.0020
Metoxychlor	µg/g	0.0050	0.13		<0.0020

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition

^(b) Standard shown is for dichlorodiphenyldichloroethane (DDD).

^(c) Standard shown is for dichlorodiphenyldichloroethylene (DDE).

^(d) Standard shown is for dichlorodiphenyltrichloroethane (DDT).

^(e) Standard shown is for chlordane.

^(f) Standard shown is for endosulfan.

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

n/s - no standard

RDL - reportable detection limit

µg/g - micrograms per gram

< - less than

Table 9
Summary of Soil Analytical Results - Toxicity Characteristic Leaching Procedure
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location	TCLP
				Sample ID	TCLP
				BVL Sample ID	JUM819
				BVL Job Number	B9D9104
				Sample Date	22-May-19
Parameters	Units	RDL	Standard ^(a)		
Ignitability	n/a	n/s	n/s	NF/NI	
Final pH	n/a	n/s	n/s	6.14	
Initial pH	n/a	n/s	n/s	8.75	
Parameters (Volatile Organic Compounds)					
Leachable Benzene	mg/L	0.020	0.50	<0.020	
Leachable Carbon Tetrachloride	mg/L	0.020	0.50	<0.020	
Leachable Chlorobenzene	mg/L	0.020	8.0	<0.020	
Leachable Chloroform	mg/L	0.020	10	<0.020	
Leachable 1,2-Dichlorobenzene	mg/L	0.050	20	<0.050	
Leachable 1,4-Dichlorobenzene	mg/L	0.050	0.50	<0.050	
Leachable 1,2-Dichloroethane	mg/L	0.050	0.50	<0.050	
Leachable 1,1-Dichloroethylene	mg/L	0.020	1.4	<0.020	
Leachable Methylene Chloride(Dichloromethane)	mg/L	0.20	5.0	<0.20	
Leachable Methyl Ethyl Ketone (2-Butanone)	mg/L	1.0	200	<1.0	
Leachable Tetrachloroethylene	mg/L	0.020	3.0	<0.020	
Leachable Trichloroethylene	mg/L	0.020	5.0	<0.020	
Leachable Vinyl Chloride	mg/L	0.020	0.20	<0.020	
Parameters (Metals)					
Leachable Arsenic (AS)	mg/L	0.2	2.5	<0.2	
Leachable Barium (Ba)	mg/L	0.2	100	0.5	
Leachable Boron (B)	mg/L	0.1	500	0.2	
Leachable Cadmium (Cd)	mg/L	0.05	0.5	<0.05	
Leachable Chromium (Cr)	mg/L	0.1	5	<0.1	
Leachable Lead (Pb)	mg/L	0.1	5	<0.1	
Leachable Mercury (Hg)	mg/L	0.0010	0.1	<0.0010	
Leachable Selenium (Se)	mg/L	0.1	1	<0.1	
Leachable Silver (Ag)	mg/L	0.01	5	<0.01	
Leachable Uranium (U)	mg/L	0.01	10	<0.01	

Notes:

^(a) Ontario Regulation 558, Schedule 4 Leachate Quality Criteria

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

mg/L - micrograms per litre

n/a - not applicable

n/s - no standard

NF/NI - non flammable and non ignitable

RDL - reportable detection limit

TCLP - toxicity characteristic leaching procedure

> - greater than

< - less than

Table 10
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location	MW19-01	MW19-02	MW19-03	MW19-04		MW19-05	MW19-07	MW19-08	MW19-09	TH201	TH203A
				Sample ID	MW19-01	MW19-02	MW19-03	MW19-04	DUPA	MW19-05	MW19-07	MW19-08	MW19-09	TH201	TH203A
				BVL Sample ID	JVY214	JVY215	JVY216	JVY217	JVY218	JVX997	JVX998	JVX999	JVY000	JVW419	JVW420
				BVL Job Number	B9E5637	B9E5637	B9E5637	B9E5637	B9E5637	B9E5580	B9E5580	B9E5580	B9E5580	B9E5321	B9E5321
				Sample Date	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19
Parameters	Units	RDL	Criteria ^(a)												
Benzene	µg/L	0.20	44	0.41	27	180	45	46	13	7.2	24	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L	0.20	18,000	0.23	9.3	14	2.1	2.1	0.53	0.42	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	µg/L	0.20	2,300	0.23	11	23	2.4	2.3	0.49	0.47	<0.20	<0.20	<0.20	<0.20	<0.20
Xylenes	µg/L	0.20	4,200	0.87	39	46	5.1	5.0	1.1	1.4	<0.20	<0.20	<0.40	<0.40	<0.40
F1 (C ₆ -C ₁₀) - BTEX	µg/L	25	750 ^(b)	<25	68	120	62	48	<25	<25	<25	<25	<25	<25	<25
F2 (C ₁₀ -C ₁₆)	µg/L	100	150	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F3 (C ₁₆ -C ₃₄)	µg/L	200	500	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	210
F4 (C ₃₄ -C ₅₀)	µg/L	200	500	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in coarse textured soil in a non-potable ground water condition

^(b) F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 10
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

				TH205A	TH206	TH207	TH210		TH212
Sample Location				TH205A	TH206	TH207	TH210	DUP B	TH212
Sample ID				TH205A	TH206	TH207	TH210	DUP B	TH212
BVL Sample ID				JVW418	JVW416	JVW417	JVW413	JVW414	JVW415
BVL Job Number				B9E5321	B9E5321	B9E5321	B9E5321	B9E5321	B9E5321
Sample Date				28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19
Parameters	Units	RDL	Criteria ^(a)						
Benzene	µg/L	0.20	44	<0.20	4.0	0.71	37	37	24
Toluene	µg/L	0.20	18,000	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	µg/L	0.20	2,300	<0.20	<0.20	0.30	<0.20	<0.20	<0.20
Xylenes	µg/L	0.20	4,200	<0.40	<0.40	<0.40	<0.40	<0.40	<0.20
F1 (C ₆ -C ₁₀) - BTEX	µg/L	25	750 ^(b)	<25	<25	<25	<25	<25	31
F2 (C ₁₀ -C ₁₆)	µg/L	100	150	<100	<100	<100	<100	<100	<100
F3 (C ₁₆ -C ₃₄)	µg/L	200	500	<200	<200	<200	<200	<200	<200
F4 (C ₃₄ -C ₅₀)	µg/L	200	500	<200	<200	<200	<200	<200	<200

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in coarse textured soil in a non-potable ground water condition

^(b) F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 11
Summary of Groundwater Analytical Results - Volatile Organic Compounds
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Parameters	Units	RDL	Criteria ^(a)	Sample Location	MW19-01	MW19-02	MW19-03	MW19-04		MW19-05	MW19-07	MW19-08	MW19-09	TH212
				Sample ID	MW19-01	MW19-02	MW19-03	MW19-04	DUPA	MW19-05	MW19-07	MW19-08	MW19-09	TH212
				BVL Sample ID	JVY214	JVY215	JVY216	JVY217	JVY218	JVX997	JVX998	JVX999	JVY000	JVW415
				BVL Job Number	B9E5637	B9E5637	B9E5637	B9E5637	B9E5637	B9E5580	B9E5580	B9E5580	B9E5580	B9E5321
				Sample Date	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19
Acetone	µg/L	10	130,000		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bromodichloromethane	µg/L	0.50	85,000		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	µg/L	1.0	380		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	µg/L	0.50	5.6		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon Tetrachloride	µg/L	0.20	0.79		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chlorobenzene	µg/L	0.20	630		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	µg/L	0.20	2.4		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibromochloromethane	µg/L	0.50	82,000		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	µg/L	0.50	4,600		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	µg/L	0.50	9,600		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	µg/L	0.50	8		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	µg/L	1.0	4,400		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	µg/L	0.20	320		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane	µg/L	0.50	1.6		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	µg/L	0.20	1.6		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
cis-1,2-Dichloroethylene	µg/L	0.50	1.6		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethylene	µg/L	0.50	1.6		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	µg/L	0.20	16		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in coarse textured soil in a non-potable ground water condition

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

n/s - no standard

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 11
Summary of Groundwater Analytical Results - Volatile Organic Compounds
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location	MW19-01	MW19-02	MW19-03	MW19-04		MW19-05	MW19-07	MW19-08	MW19-09	TH212
				Sample ID	MW19-01	MW19-02	MW19-03	MW19-04	DUPA	MW19-05	MW19-07	MW19-08	MW19-09	TH212
				BVL Sample ID	JVY214	JVY215	JVY216	JVY217	JVY218	JVX997	JVX998	JVX999	JVY000	JVW415
				BVL Job Number	B9E5637	B9E5637	B9E5637	B9E5637	B9E5637	B9E5580	B9E5580	B9E5580	B9E5580	B9E5321
				Sample Date	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19
Parameters	Units	RDL	Criteria ^(a)											
cis-1,3-Dichloropropene	µg/L	0.30	n/s	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
trans-1,3-Dichloropropene	µg/L	0.40	n/s	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,3-Dichloropropene, Total	µg/L	0.50	5.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylene Dibromide	µg/L	0.20	0.25	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
n-Hexane	µg/L	1.0	51	<1.0	1.1	1.8	1.6	1.7	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride (Dichloromethane)	µg/L	2.0	610	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Methyl Ethyl Ketone (2-Butanone)	µg/L	10	470,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Methyl Isobutyl Ketone	µg/L	5.0	140,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl tert-Butyl Ether (MTBE)	µg/L	0.50	190	<0.50	2.3	33	3.6	3.6	15	12	43	20	5.7	
Styrene	µg/L	0.50	1,300	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	µg/L	0.50	3.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	µg/L	0.50	3.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethylene (PCE)	µg/L	0.20	1.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	0.20	640	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane	µg/L	0.50	4.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethylene (TCE)	µg/L	0.20	1.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	0.50	2,500	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl Chloride	µg/L	0.20	0.5	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Notes:
^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in coarse textured soil in a non-potable ground water condition

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

n/s - no standard

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 12
Summary of Groundwater Analytical Results - Polycyclic Aromatic Hydrocarbons
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location				MW19-01	MW19-02	MW19-03	MW19-04		MW19-05	MW19-07	MW19-08	MW19-09	TH212
Sample ID				MW19-01	MW19-02	MW19-03	DUPA	MW19-04	MW19-05	MW19-07	MW19-08	MW19-09	TH212
BVL Sample ID				JVY214	JVY215	JVY216	JVY218	JVY217	JVX997	JVX998	JVX999	JVY000	JVW415
BVL Job Number				B9E5637	B9E5637	B9E5637	B9E5637	B9E5637	B9E5580	B9E5580	B9E5580	B9E5580	B9E5321
Sample Date				28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19
Parameters	Units	RDL	Criteria ^(a)										
Acenaphthene	µg/L	0.050	600	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	µg/L	0.050	1.8	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	µg/L	0.050	2.4	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo[a]anthracene	µg/L	0.050	4.7	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo[a]pyrene	µg/L	0.010	0.81	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo[b,j]fluoranthene	µg/L	0.050	n/s	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo[g,h,i]perylene	µg/L	0.050	0.2	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo[k]fluoranthene	µg/L	0.050	0.4	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/L	0.050	1	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenzo[a,h]anthracene	µg/L	0.050	0.52	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/L	0.050	130	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/L	0.050	400	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno[1,2,3-cd]pyrene	µg/L	0.050	0.2	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1-Methylnaphthalene	µg/L	0.050	1,800 ^(b)	<0.050	0.26	0.38	0.072	0.070	<0.050	<0.050	<0.050	<0.050	<0.050
2-Methylnaphthalene	µg/L	0.050	1,800 ^(b)	<0.050	0.095	0.075	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1- & 2-Methylnaphthalene	µg/L	0.071	n/s	<0.071	0.36	0.45	0.072	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071
Naphthalene	µg/L	0.050	1,400	<0.050	0.86	0.51	0.078	0.076	<0.050	0.056	<0.050	<0.050	<0.050
Phenanthrene	µg/L	0.030	580	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Pyrene	µg/L	0.050	68	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in coarse textured soil in a non-potable ground water condition

^(b) The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2-methyl naphthalene, with the provision that if both are detected the sum of the two must not exceed the standard.

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

n/s - no standard

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 13
Summary of Groundwater Analytical Results - Dissolved Metals
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location	MW19-01	MW19-02	MW19-03	MW19-04		MW19-05	MW19-07	MW19-08	MW19-09	TH212
				Sample ID	MW19-01	MW19-02	MW19-03	DUPA	MW19-04	MW19-05	MW19-07	MW19-08	MW19-09	TH212
				BVL Sample ID	JVY214	JVY215	JVY216	JVY218	JVY217	JVX997	JVX998	JVX999	JVY000	JVW415
				BVL Job Number	B9E5637	B9E5637	B9E5637	B9E5637	B9E5637	B9E5580	B9E5580	B9E5580	B9E5580	B9E5321
				Sample Date	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19	28-May-19
Parameters	Units	RDL	Criteria ^(a)											
Antimony	µg/L	0.50	20,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	µg/L	1.0	1,900	<1.0	<1.0	1.0	1.8	1.7	1.5	<1.0	2.0	<1.0	<1.0	<1.0
Barium	µg/L	2.0	29,000	62	69	52	58	60	72	68	35	26	43	43
Beryllium	µg/L	0.50	67	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Boron	µg/L	10	45,000	44	63	62	51	53	75	73	110	90	37	37
Cadmium	µg/L	0.10	2.7	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium	µg/L	5.0	810	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cobalt	µg/L	0.50	66	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.7	<0.50
Copper	µg/L	1.0	87	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Lead	µg/L	0.50	25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Molybdenum	µg/L	0.50	9,200	3.3	3.2	<0.50	<0.50	<0.50	<0.50	<0.50	1.9	2.4	0.68	0.68
Nickel	µg/L	1.0	490	6.4	1.4	1.1	1.3	24	1.3	1.4	3.5	14	1.7	1.7
Selenium	µg/L	2.0	63	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	4.1	<2.0	2.5	3.7	3.7
Silver	µg/L	0.10	1.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium	µg/L	100	2,300,000	350,000	280,000	200,000	180,000	180,000	840,000	1,100,000	190,000	370,000	150,000	150,000
Thallium	µg/L	0.050	510	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Uranium	µg/L	0.10	420	8.3	12	11	13	13	7.1	5.5	25	14	9.1	9.1
Vanadium	µg/L	0.50	250	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc	µg/L	5.0	1,100	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.1	<5.0	<5.0

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in coarse textured soil in a non-potable ground water condition

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 14
Summary of Groundwater Analytical Results - Polychlorinated Biphenyls and Glycols
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location		MW19-04	MW19-05	MW19-07	MW19-08	MW19-09	TH212
				Sample ID	BVL Sample ID	BVL Job Number	Sample Date	DUPA	MW19-04	MW19-05	MW19-07
Parameters	Units	RDL	Criteria ^(a)								
Aroclor 1242	µg/L	0.5	n/s	<0.5	<0.5	na	na	na	na	na	na
Aroclor 1248	µg/L	0.5	n/s	<0.5	<0.5	na	na	na	na	na	na
Aroclor 1254	µg/L	0.5	n/s	<0.5	<0.5	na	na	na	na	na	na
Aroclor 1260	µg/L	0.5	n/s	<0.5	<0.5	na	na	na	na	na	na
Polychlorinated Biphe	µg/L	0.5	7.8	<0.5	<0.5	na	na	na	na	na	na
Diethylene Glycol	µg/L	5	n/s	<5	<5	<5	<5	<5	<5	<5	<5
Ethylene Glycol	µg/L	5	n/s	<5	<5	<5	<5	<5	<5	<5	<5
Propylene Glycol	µg/L	5	n/s	<5	<5	<5	<5	<5	<5	<5	<5
Total Glycols	µg/L	5	n/s	<5	<5	<5	<5	<5	<5	<5	<5

Notes:

^(a) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in coarse textured soil in a non-potable ground water condition

Bold/Underlined - value exceeds criteria/standard

BVL - Bureau Veritas Laboratories

mg/L - milligram per litre

n/s - no standard

na - not analyzed

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 15
Field Screening and Leak Test Measurements
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sampling Location	Sampling Date	Organic Vapour Concentration (ppbv)	Methane Concentration (%)	Carbon Dioxide Concentration (%)	Oxygen Concentration (%)	Helium Concentration Inside Shroud (%)	Helium Concentration Detected Below Grade Surface In Soil Gas (%)	Helium Ratio of Below Grade/Shroud Concentration (%)	Pass Leak Test ^(a) (Y/N)
SV19-01	11-Nov-19	8	n/d	0.3	22.2	n/m	n/m	n/c	n/a
		9	n/d	0.2	22.3				
		11	n/d	0.2	22.3				
SV19-02	29-May-19	>50,000,000	n/d	1.1	20.5	15	0	0.00	Y
		>50,000,000	n/d	1.9	10.6				
		>50,000,000	n/d	0.6	20.9				
	11-Nov-19	250	n/d	2.8	18.6	n/m	n/m	n/c	n/a
		85	n/d	3.0	19.1				
		52	n/d	3	19.3				
SV19-03	29-May-19	9,700	n/d	0.5	12.4	15	0	0.00	Y
	11-Nov-19	n/d	n/d	0.2	21.5	10	0	n/c	Y
		n/d	n/d	0.2	21.8				
SV19-04	29-May-19	329	n/d	0.1	20.9	15	0	0.00	Y
		298	n/d	0.1	21.0				
		348	n/d	0.1	20.8				
	11-Nov-19	n/d	n/d	0.2	22.0	n/m	n/m	n/c	n/a
		n/d	0.2	0.2	22.1				
		n/d	n/d	0.2	22.0				
		n/d	n/d	7.7	11.2				

Notes:

^(a) A leak test passes if the helium ratio of below grade to shroud concentration is less than 1%

n/a - not applicable

n/c - not calculated

n/d - not detected

n/m - not measured

ppbv - parts per billion by volume

> - greater than

Table 16
Summary of Soil Vapour Analytical Results
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location Sample ID BVL Sample ID BVL Job Number Sample Collection Date	Units	RDL	SV19-01		SV19-02			SV19-03			SV19-04		Health-Based Indoor Air Criteria ^(a)	SVSL ^(b)
			SV19-01 JWF065 B9E6836 29-May-19	SV19-01 LHI603 B9V9704 11-Nov-19	SV19-02 JWF068 B9E6836 29-May-19	SV19-02 LHI604 B9V9704 11-Nov-19	DUPA LHI605 B9V9704 11-Nov-19	SV19-03 JWF066 B9E6836 29-May-19	DUPA JWF067 B9E6836 29-May-19	SV19-03 LHI606 B9V9704 11-Nov-19	SV19-04 JWF069 B9E6836 29-May-19	SV19-04 LHI607 B9V9704 11-Nov-19		
Aliphatic >C5-C6	µg/m ³	10	<5.0	<5.0	12,200	5.1	<5.0	3,390	2,690	<5.0	1,620	<5.0	n/s	n/c
Aliphatic >C6-C8	µg/m ³	10	6.6	<5.0	74,200	25.6	27.4	18,300	14,100	<5.0	5,520	11.5	3,290	822,500
Aliphatic >C8-C10	µg/m ³	10	8.6	<5.0	32,900	64.3	69.7	363	297	<5.0	671	<5.0	1,790	447,500
Aliphatic >C10-C12	µg/m ³	10	43.6	<5.0	3,180	14.5	15.7	214	179	<5.0	89	<5.0	1,790	447,500
Aliphatic >C12-C16	µg/m ³	10	53.7	<5.0	<290	<5.0	<5.0	<50	<50	<5.0	21	<5.0	1,790	447,500
Aromatic >C7-C8 (TEX Excluded)	µg/m ³	10	<5.0	<5.0	<290	<5.0	<5.0	<50	<50	<5.0	<10	<5.0	n/s	n/c
Aromatic >C8-C10	µg/m ³	10	<5.0	<5.0	2,490	8.6	8.8	62	<50	<5.0	39	<5.0	358	89,500
Aromatic >C10-C12	µg/m ³	10	<5.0	<5.0	2,050	6.8	6.6	<50	<50	<5.0	39	<5.0	358	89,500
Aromatic >C12-C16	µg/m ³	10	<5.0	<5.0	<290	<5.0	<5.0	<50	<50	<5.0	<10	<5.0	358	89,500
Benzene	µg/m ³	0.32	0.55	0.41	1,330	0.81	0.79	611	482	<0.32	280	0.64	1.63	408
Benzyl chloride	µg/m ³	150	<2.6	<2.6	<150	<2.6	<2.6	<26	<26	<2.6	<5.2	<2.6	n/s	n/c
Bromodichloromethane	µg/m ³	1.3	<1.3	<1.3	<79	<1.3	<1.3	<13	<13	<1.3	<2.7	<1.3	n/s	n/c
Bromoform	µg/m ³	120	<2.1	<2.1	<120	<2.1	<2.1	<21	<21	<2.1	<4.1	<2.1	n/s	n/c
Bromomethane	µg/m ³	0.39	<0.39	<0.39	<23	<0.39	<0.39	<3.9	<3.9	<0.39	<0.78	<0.39	3.58	894
1,3-Butadiene	µg/m ³	1.1	<1.1	<1.1	<65	<1.1	<1.1	<11	<11	<1.1	<2.2	<1.1	n/s	n/c
Carbon Disulfide	µg/m ³	1.6	<1.6	<1.6	130	<1.6	<1.6	<16	<16	<1.6	23.0	<1.6	n/s	n/c
Carbon Tetrachloride	µg/m ³	0.63	<0.63	<0.63	<37	<0.63	<0.63	<6.3	<6.3	<0.63	<1.3	<0.63	1.43	358
Chlorobenzene	µg/m ³	0.46	<0.46	<0.46	<27	<0.46	<0.46	<4.6	<4.6	<0.46	<0.92	<0.46	715	178,750
Chloroethane	µg/m ³	0.79	<0.79	<0.79	<46	<0.79	<0.79	<7.9	<7.9	<0.79	<1.6	<0.79	n/s	n/c
Chloroform	µg/m ³	0.49	<0.49	<0.49	<29	<0.49	<0.49	<25	<21	<0.49	<14	<0.49	72	17,875
Chloromethane	µg/m ³	0.62	1.01	0.70	<36	<0.62	<0.62	<6.2	<6.2	<0.62	<1.2	<0.62	n/s	n/c
Cyclohexane	µg/m ³	0.69	<0.69	<0.69	8,210	<1.2	<1.2	395	313	<0.69	252	<0.69	n/s	n/c

Notes:

^(a) Industrial Health-Based Indoor Air Criteria provided in the MECP Modified Generic Risk Assessment (Tier 2) Spreadsheet Model (November 1, 2016).

^(b) Soil Vapour Screening Levels (SVSL) for an industrial building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.004.

Bold/Underlined - value exceeds SVSL criteria

n/c - not calculated

n/s - no criteria/standard

RDL - reportable detection limit

µg/m³ - micrograms per cubic metre

< - less than

%v/v - volume per volume

Table 16
Summary of Soil Vapour Analytical Results
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location Sample ID BVL Sample ID BVL Job Number Sample Collection Date	Units	RDL	SV19-01		SV19-02			SV19-03			SV19-04		Health-Based Indoor Air Criteria ^(a)	SVSL ^(b)
			SV19-01 JWF065 B9E6836 29-May-19	SV19-01 LHI603 B9V9704 11-Nov-19	SV19-02 JWF068 B9E6836 29-May-19	SV19-02 LHI604 B9V9704 11-Nov-19	DUPA LHI605 B9V9704 11-Nov-19	SV19-03 JWF066 B9E6836 29-May-19	DUPA JWF067 B9E6836 29-May-19	SV19-03 LHI606 B9V9704 11-Nov-19	SV19-04 JWF069 B9E6836 29-May-19	SV19-04 LHI607 B9V9704 11-Nov-19		
Dibromochloromethane	µg/m ³	1.7	<1.7	<1.7	<100	<1.7	<1.7	<17	<17	<1.7	<3.4	<1.7	n/s	n/c
1,2-Dibromoethane (Ethylene Dibromide)	µg/m ³	0.77	<0.77	<0.77	<45	<0.77	<0.77	<7.7	<7.7	<0.77	<1.5	<0.77	0	1.5
1,2-Dichlorobenzene	µg/m ³	0.60	<0.60	<0.60	<35	<0.60	<0.60	<6.0	<6.0	<0.60	<1.2	<0.60	429	107,250
1,3-Dichlorobenzene	µg/m ³	140	<2.4	<2.4	<140	<2.4	<2.4	<24	<24	<2.4	<4.8	<2.4	n/s	n/c
1,4-Dichlorobenzene	µg/m ³	0.60	<0.60	<0.60	<35	<0.60	<0.60	<6.0	<6.0	<0.60	<1.2	<0.60	0.90	225
Dichlorodifluoromethane (FREON 12)	µg/m ³	0.99	2.35	2.29	<58	24.4	26.1	13.4	10.6	2.78	119	145	n/s	n/c
1,1-Dichloroethane	µg/m ³	0.40	<0.40	<0.40	<24	<0.40	<0.40	<4.0	<4.0	<0.40	<0.81	<0.40	118	29,500
1,2-Dichloroethane	µg/m ³	0.40	<0.40	<0.40	<40	<0.40	<0.40	15.3	12.6	<0.40	7.39	<0.40	138	34,500
1,1-Dichloroethylene	µg/m ³	0.40	<0.40	<0.40	<24	<0.40	<0.40	<4.0	<4.0	<0.40	<0.81	<0.40	50.1	12,525
cis-1,2-Dichloroethylene	µg/m ³	0.40	<0.40	<0.40	<23	<0.40	<0.40	<4.0	<4.0	<0.40	<0.79	<0.40	107	26,750
trans-1,2-Dichloroethylene	µg/m ³	0.40	<0.40	<0.40	<23	<0.40	<0.40	<4.0	<4.0	<0.40	<0.79	<0.40	42.9	10,725
1,2-Dichloropropane	µg/m ³	0.46	<0.46	<0.46	<27	<0.46	<0.46	<4.6	<4.6	<0.46	<0.92	<0.46	2.86	715
cis-1,3-Dichloropropene	µg/m ³	0.45	<0.45	<0.45	<27	<0.45	<0.45	<4.5	<4.5	<0.45	<0.91	<0.45	n/s	n/c
trans-1,3-Dichloropropene	µg/m ³	0.45	<0.45	<0.45	<27	<0.45	<0.45	<4.5	<4.5	<0.45	<0.91	<0.45	n/s	n/c
1,2-Dichlorotetrafluoroethane	µg/m ³	1.2	<1.2	<1.2	<70	<1.2	<1.2	<12	<12	<1.2	<2.4	<1.2	257	64,250
1,4-Dioxane	µg/m ³	210	<3.6	<3.6	<210	<3.6	<3.6	<36	<36	<3.6	<7.2	<3.6	n/s	n/c
Ethanol (ethyl alcohol)	µg/m ³	1.9	4.1	3.8	<110	2.7	<1.9	<19	<19	<1.9	4.1	3.6	n/s	n/c
Ethyl Acetate	µg/m ³	210	<3.6	<3.6	<210	<3.6	<3.6	<36	<36	<3.6	<7.2	<3.6	n/s	n/c
Ethylbenzene	µg/m ³	0.43	<0.43	<0.43	1,040	<0.43	<0.43	43.1	33.3	<0.43	29.1	0.49	715	178,750
4-ethyltoluene	µg/m ³	140	<2.5	<2.5	292	<2.5	<2.5	<25	<25	<2.5	<4.9	<2.5	n/s	n/c

Notes:

^(a) Industrial Health-Based Indoor Air Criteria provided in the MECP Modified Generic Risk Assessment (Tier 2) Spreadsheet Model (November 1, 2016).

^(b) Soil Vapour Screening Levels (SVSL) for an industrial building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.004.

Bold/Underlined - value exceeds SVSL criteria

n/c - not calculated

n/s - no criteria/standard

RDL - reportable detection limit

µg/m³ - micrograms per cubic metre

< - less than

%v/v - volume per volume

Table 16
Summary of Soil Vapour Analytical Results
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location Sample ID BVL Sample ID BVL Job Number Sample Collection Date	Units	RDL	SV19-01		SV19-02			SV19-03			SV19-04		Health-Based Indoor Air Criteria ^(a)	SVSL ^(b)
			SV19-01 JWF065 B9E6836 29-May-19	SV19-01 LHI603 B9V9704 11-Nov-19	SV19-02 JWF068 B9E6836 29-May-19	SV19-02 LHI604 B9V9704 11-Nov-19	DUPA LHI605 B9V9704 11-Nov-19	SV19-03 JWF066 B9E6836 29-May-19	DUPA JWF067 B9E6836 29-May-19	SV19-03 LHI606 B9V9704 11-Nov-19	SV19-04 JWF069 B9E6836 29-May-19	SV19-04 LHI607 B9V9704 11-Nov-19		
F1-BTEX, C6-C10 (as Toluene)	µg/m ³	10	53.0	21.8	257,000	431	473	11,800	9,160	29.2	5,710	62.3	8,539	2,134,799
F2, C10-C16 (as Decane)	µg/m ³	10	114	9.9	8,930	103	110	158	102	<5.0	185	6.3	1,613	403,374
Heptane	µg/m ³	1.2	<1.2	<1.2	9,030	1.4	1.4	189	146	<1.2	227	<1.2	n/s	n/c
Hexachlorobutadiene	µg/m ³	11	<5.3	<5.3	<310	<5.3	<5.3	<53	<53	<5.3	<11	<5.3	n/s	n/c
Hexane	µg/m ³	0.70	<0.70	0.82	9,870	1.08	1.27	809	646	<0.70	547	0.82	1,790	447,500
Methyl Butyl Ketone (2-Hexanone)	µg/m ³	240	<4.1	<4.1	<240	<4.1	<4.1	<41	<41	<4.1	<8.2	<4.1	n/s	n/c
Methyl Ethyl Ketone (2-Butanone)	µg/m ³	0.59	3.00	1.06	<35	<0.59	<0.59	<5.9	<5.9	<0.59	<35	<0.59	1,003	250,687
Methyl Isobutyl Ketone	µg/m ³	0.82	<0.82	<0.82	<48	<0.82	<0.82	<8.2	<8.2	<0.82	3.6	<0.82	602	150,500
Methyl t-butyl ether (MTBE)	µg/m ³	0.72	<0.72	<0.72	<42	<0.72	<0.72	<280	<220	<0.72	<14	<0.72	14	3,450
Methylene Chloride(Dichloromethane)	µg/m ³	120	<2.1	<2.1	<120	<2.1	<2.1	<21	<21	<2.1	<5.2	<2.1	155	38,864
Naphthalene	µg/m ³	1.0	<1.0	<1.0	<62	<1.0	<1.0	<10	<10	<1.0	<2.1	<1.0	2.65	663
2-propanol (Isopropanol)	µg/m ³	140	<2.5	<2.5	<140	<2.5	<2.5	<25	<25	<2.5	<4.9	<2.5	n/s	n/c
2-Propanone (Acetone)	µg/m ³	1.4	8.7	4.6	<84	2.6	2.4	<22	<21	<1.4	44.9	3.8	8,581	2,145,306
Propene (Propylene)	µg/m ³	0.86	<0.86	<0.86	<51	<1.1	<1.1	<1,300	<1,100	<0.86	<220	<1.5	n/s	n/c
Styrene	µg/m ³	0.43	<0.43	<0.43	<51	<0.43	<0.43	<4.3	<4.3	<0.43	<1.7	<0.43	186	46,500
1,1,1,2-Tetrachloroethane	µg/m ³	0.69	<0.69	<0.69	<40	<0.69	<0.69	<6.9	<6.9	<0.69	<1.4	<0.69	0.48	121
1,1,1,2,2-Tetrachloroethane	µg/m ³	0.69	<0.69	<0.69	<40	<1.7	<1.7	<6.9	<6.9	<0.69	<1.4	<0.69	0.06	15
Tetrachloroethylene	µg/m ³	0.68	1.85	<0.68	<40	<0.68	<0.68	<6.8	<6.8	<0.68	2.1	<0.68	14	3,450
Tetrahydrofuran	µg/m ³	1.2	<1.2	<1.2	<69	<2.1	<2.1	<12	<12	<1.2	<2.4	<1.2	n/s	n/c
Toluene	µg/m ³	0.38	0.96	1.72	2,360	1.10	1.15	238	183	<0.38	112	2.12	3,580	895,000
1,2,4-Trichlorobenzene	µg/m ³	220	<3.7	<3.7	<220	<3.7	<3.7	<37	<37	<3.7	<7.4	<3.7	5.72	1,430

Notes:

^(a) Industrial Health-Based Indoor Air Criteria provided in the MECP Modified Generic Risk Assessment (Tier 2) Spreadsheet Model (November 1, 2016).

^(b) Soil Vapour Screening Levels (SVSL) for an industrial building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.004.

Bold/Underlined - value exceeds SVSL criteria

n/c - not calculated

n/s - no criteria/standard

RDL - reportable detection limit

µg/m³ - micrograms per cubic metre

< - less than

%v/v - volume per volume

Table 16
Summary of Soil Vapour Analytical Results
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location Sample ID BVL Sample ID BVL Job Number Sample Collection Date	Units	RDL	SV19-01		SV19-02			SV19-03			SV19-04		Health-Based Indoor Air Criteria ^(a)	SVSL ^(b)
			SV19-01 JWF065 B9E6836 29-May-19	SV19-01 LHI603 B9V9704 11-Nov-19	SV19-02 JWF068 B9E6836 29-May-19	SV19-02 LHI604 B9V9704 11-Nov-19	DUPA LHI605 B9V9704 11-Nov-19	SV19-03 JWF066 B9E6836 29-May-19	DUPA JWF067 B9E6836 29-May-19	SV19-03 LHI606 B9V9704 11-Nov-19	SV19-04 JWF069 B9E6836 29-May-19	SV19-04 LHI607 B9V9704 11-Nov-19		
1,2,4-Trimethylbenzene	µg/m ³	140	<2.5	<2.5	627	<2.5	<2.5	<25	<25	<2.5	15.1	<2.5	n/s	n/c
1,1,1-Trichloroethane	µg/m ³	0.55	<0.55	<0.55	<32	<0.55	<0.55	<5.5	<5.5	<0.55	<1.1	<0.55	715	178,750
1,1,2-Trichloroethane	µg/m ³	0.55	<0.55	<0.55	<32	<0.55	<0.55	<5.5	<5.5	<0.55	<1.1	<0.55	0.22	56
Trichloroethylene	µg/m ³	0.54	<0.54	<0.54	<32	<0.54	<0.54	<5.4	<5.4	<0.54	<1.1	<0.54	0.40	100
Trichlorofluoromethane (FREON 11)	µg/m ³	1.1	1.2	1.2	<66	1.4	1.3	<11	<11	<1.1	<2.2	<1.1	n/s	n/c
Trichlorotrifluoroethane (FREON 113)	µg/m ³	1.2	<1.2	<1.2	<67	<1.2	<1.2	<12	<12	<1.2	<2.3	<1.2	n/s	n/c
1,3,5-Trimethylbenzene	µg/m ³	140	<2.5	<2.5	358	<2.5	<2.5	<25	<25	<2.5	<4.9	<2.5	n/s	n/c
2,2,4-Trimethylpentane	µg/m ³	0.93	<0.93	<0.93	<2,300	<0.93	0.98	4,260	3,290	<0.93	740	<0.93	n/s	n/c
Vinyl Acetate	µg/m ³	0.70	<0.70	<0.70	<41	<0.70	<0.70	<7.0	<7.0	<0.70	<1.4	<0.70	n/s	n/c
Vinyl Bromide	µg/m ³	0.87	<0.87	<0.87	<51	<0.87	<0.87	<8.7	<8.7	<0.87	<1.8	<0.87	n/s	n/c
Vinyl Chloride	µg/m ³	0.26	<0.26	<0.26	<15	<0.26	<0.26	<2.6	<2.6	<0.26	<0.51	<0.26	0.41	102
Xylenes, Total	µg/m ³	1.3	<1.3	<1.3	4,750	2.1	2.2	141	107	<1.3	75.9	<1.3	1,860	465,000

Notes:

^(a) Industrial Health-Based Indoor Air Criteria provided in the MECP Modified Generic Risk Assessment (Tier 2) Spreadsheet Model (November 1, 2016).

^(b) Soil Vapour Screening Levels (SVSL) for an industrial building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.004.

Bold/Underlined - value exceeds SVSL criteria

n/c - not calculated

n/s - no criteria/standard

RDL - reportable detection limit

µg/m³ - micrograms per cubic metre

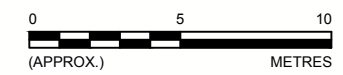
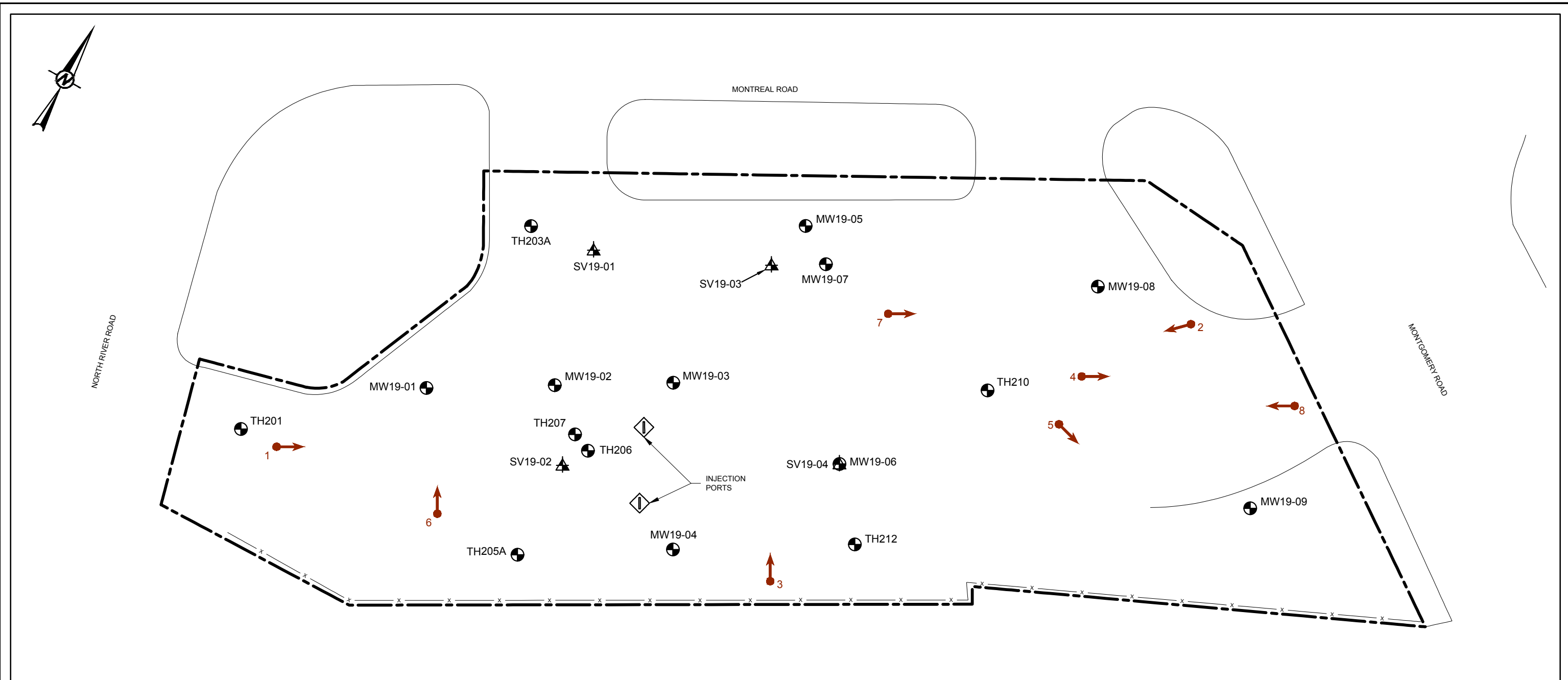
< - less than

%v/v - volume per volume

APPENDIX A

Site Photographs

Path: \\golder\gpc\CALM\CAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_2\MONTREAL_ROAD\09_PROJECTS\1813796_1485-1916C\DWG\1 | File Name: 1813796-1485-1916C\DWG\1 | Printed By: YWang | Date: 2020-01-13 | Time: 3:35:51 PM



LEGEND

	PROPERTY BOUNDARY
	FENCELINE
	BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
	SOIL VAPOUR PROBE LOCATION
	PHOTOGRAPH LOCATION AND DIRECTION

REFERENCE
 ORIGINAL DRAWING OBTAINED FROM EXP ENERGY SERVICES LTD.; PROJECT No.: 14004; SCALE: UNKNOWN; DATE: NOVEMBER, 2014.

CLIENT
 IMPERIAL OIL LIMITED

PROJECT
 FORMER RETAIL FUEL OUTLET
 2 MONTREAL ROAD
 OTTAWA, ONTARIO

TITLE
 PHOTOGRAPH LOCATIONS

CONSULTANT	YYYY-MM-DD	2020-01-13
	DESIGNED	LMariani
	PREPARED	RCavala
	REVIEWED	CVetorazzo
	APPROVED	SCarrelas

PROJECT NO. 18113796	PHASE-TASK 1485-1916C	REV. 1	FIGURE A.1
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A1S1B 28 mm



Photo 1 Looking east from southwest corner of Site (May 13, 2019).



Photo 2 Looking west from eastern property boundary (May 13, 2019).



Photo 3 Looking north from southern property boundary of the Site (May 13, 2019).



Photo 4 Facing east at Site entrance (May 13, 2019).



Photo 5 Looking southeast from east central portion of Site (May 13, 2019).



Photo 6 Looking north during drilling of MW19-01 (May 13, 2019).



Photo 7 Looking east during drilling of MW19-08 (May 21, 2019).





















Photo 8 Looking west from Site entrance (May 22, 2019).

APPENDIX B








Borehole Logs

LEGEND


STRATIGRAPHY

	ASPHALT		COBBLES and GRAVEL		SAND		SILTY SAND
	BEDROCK		COBBLES and SAND		SAND and GRAVEL		TILL
	CLAY		FILL		SHALE		TOPSOIL
	CLAYEY SILT		PEAT		SILT		
	COAL		SANDY SILT		SILTY CLAY		

WELL CONSTRUCTION DETAILS

	RISER IN BENTONITE		SLOTTED SECTION		FLUSHMOUNT ROADBOX		BENTONITE
	RISER IN SAND		STICKUP PIPE		SLOUGH		

LIST OF APPLICABLE ABBREVIATIONS

	GROUNDWATER LEVEL	LEPH	LIGHT EXTRACTABLE PETROLEUM HYDROCARBONS
%LEL	LOWER EXPLOSIVE LIMIT	m	METRE
µS/cm	MICROSIEMENS PER CENTIMETRE	mg/L	MILLIGRAMS PER LITRE
1,2-DBA	1,2-DIBROMOETHANE	mald	METRES ABOVE LOCAL DATUM
1,2-DCA	1,2-DICHLOROETHANE	mard	METRES ABOVE RELATIVE DATUM
ARS	AIR RETURN SAMPLE	masl	METRES ABOVE SEA LEVEL
As	ARSENIC	mS/cm	MILLISIEMENS PER CENTIMETRE
AS	AUGER SAMPLE	MTBE	METHYL TERT-BUTYL ETHER
B-hws	BORON, HOT WATER SOLUBLE	mTPH	MODIFIED TOTAL PETROLEUM HYDROCARBONS
Ba	BARIUM	n/a	NOT APPLICABLE
Bsp	SATURATED PASTE BORON	n/d	NOT DETECTED
B	BENZENE	NA	NOT AVAILABLE
T	TOLUENE	Na	SODIUM
E	ETHYLBENZENE	OMV	ORGANIC VAPOUR MONITOR
X	XYLENES	PAH	POLYCYCLIC AROMATIC HYDROCARBONS
Cl	CHLORIDE	Pb	LEAD
Cr	CHROMIUM	PCB	POLYCHLORINATED BIPHENYL
CS	CORE SAMPLE	pH	CaCl (2:1) WET pH
Cu	COPPER	PHC	PETROLEUM HYDROCARBONS
DP	DIRECT PUSH	PJ	PION JAR
dS/m	DECISIEMENS PER METRE	ppmv	PARTS PER MILLION BY VOLUME
EC	ELECTRICAL CONDUCTIVITY	SAL	SALINITY
EPH	EXTRACTABLE PETROLEUM HYDROCARBONS	SPT	STANDARD PENETRATION TEST
ELEV.	ELEVATION	SS	SPLIT SPOON
F1-F4	PETROLEUM HYDROCARBON FRACTION 1 TO FRACTION 4	VPH	VOLATILE PETROLEUM HYDROCARBONS
FOC	FRACTION ORGANIC CARBON	VOC	VOLATILE ORGANIC COMPOUNDS
GRAB	GRAB SAMPLE	WS	WET SAMPLE
HEPH	HEAVY EXTRACTABLE PETROLEUM HYDROCARBONS	Zn	ZINC

LOCATION: 2 Montreal Road, Ottawa, Ontario
 CONTRACTOR: Badger Daylighting Ltd./ Strata Drilling Group
 EQUIPMENT USED: Hydrovac, Geomachine GM 100 - Direct Push, Air Rotary
 OVM TYPE: RKI Eagle
 BORING DATE: May 13 and 15, 2019
 DATUM: Local (referenced to the catch basin on the Western portion of the site with an assumed elevation of 100.00 mald. Exp, 2014.)

RECORD OF MONITORING WELL: MW19-02

DEPTH SCALE METRES	SOIL PROFILE		SAMPLES			Soil Vapour Concentration (ppmv) ⊕				ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	RECOVERY %	50	100	150	200		
						Soil Vapour Concentration (%LEL) □					
		ELEV. DEPTH (m)				20	40	60	80		
0	Ground Surface	99.98									Stickup = 0.84 m
	Sandy LOAM, moist, brown FILL (SAND), moist, brown	0.10									
		99.28	1	GRAB	n/a ⊕						BTEX, F1-F4, GRAIN SIZE, METALS
	FILL (GRAVEL, trace sand, trace cobbles), moist, brown	0.70									
1		98.33	2	GRAB	n/a ⊕						
	FILL (SAND, some gravel), moist, brown	1.65									
2			3	DP	30						
			4	DP	30 ⊕						
3			5	DP	53						
			6	DP	53 ⊕						
4			7	DP	27						
			8	DP	27 ⊕						
5		94.28									BTEX, F1-F4, GRAIN SIZE, PAH, VOC
	Fractured SHALE and SAND, trace gravel, brown-black	5.70									
6	BEDROCK	93.97									
		6.01									
7											28-May-2019 ▽
8											
9											
10	End of MONITORING WELL.	90.58									
		9.40									

IOL (AUTO) 18113796-1485_BH_LOGS.GPJ IOLGDT 1-13-20

LOCATION: 2 Montreal Road, Ottawa, Ontario
 CONTRACTOR: Badger Daylighting Ltd./ Strata Drilling Group
 EQUIPMENT USED: Hydrovac, Geomachine GM 100 - Direct Push, Air Rotary
 OVM TYPE: RKI Eagle
 BORING DATE: May 14 and 16, 2019
 DATUM: Local (referenced to the catch basin on the Western portion of the site with an assumed elevation of 100.00 mald. Exp, 2014.)

RECORD OF MONITORING WELL: MW19-03

DEPTH SCALE METRES	SOIL PROFILE			SAMPLES			Soil Vapour Concentration (ppmv) ⊕				ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	RECOVERY %	50	100	150	200		
							Soil Vapour Concentration (%LEL) □					
0	Ground Surface		99.92									Stickup = 0.97 m
	Sandy LOAM, moist, brown		0.10									
	FILL (SAND), moist, brown		99.42									
	FILL (sandy GRAVEL), moist, brown		0.50	1	GRAB	n/a	⊕					
1				2	GRAB	n/a	⊕					
2				3	DP	25						
				4	DP	25	⊕					
3	Fractured SHALE, some sand, trace gravel, dry, brown		97.12									
			2.80	5	DP	33	⊕					
4	BEDROCK		95.91									
			4.01									
5												
6												
7												
8												
9												
	End of MONITORING WELL.		90.52									
10			9.40									

BTEX, F1-F4, GRAIN SIZE METALS, PAH, VOC

28-May-2019

IOL (AUTO) 18113796-1485_BH_LOGS.GPJ IOLGDT 1-13-20

LOCATION: 2 Montreal Road, Ottawa, Ontario
 CONTRACTOR: Badger Daylighting Ltd./ Strata Drilling Group
 EQUIPMENT USED: Hydrovac, Geomachine GM 100 - Direct Push, Air Rotary
 OVM TYPE: RKI Eagle
 BORING DATE: May 13 and 17, 2019
 DATUM: Local (referenced to the catch basin on the Western portion of the site with an assumed elevation of 100.00 mald. Exp, 2014.)

RECORD OF MONITORING WELL: MW19-04

DEPTH SCALE METRES	SOIL PROFILE			SAMPLES			Soil Vapour Concentration (ppmv) ⊕				ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	RECOVERY %	50	100	150	200		
							Soil Vapour Concentration (%LEL) □					
0	Ground Surface		99.91									Stickup = 0.91 m
	Sandy LOAM, moist, brown FILL (SAND), moist, brown --- Roots at 0.2 m		0.05	1	GRAB	n/a						
1				2	GRAB	n/a						
	FILL (sandy GRAVEL, trace gravel), moist, brown		98.31	3	DP	27						
2			1.60	4	DP	27						
	Fractured SHALE, dry, black		97.11	5	DP	100						
3			2.80									
	BEDROCK		96.20									
4			3.71									
5												
6												
7												
8												
9												
	End of MONITORING WELL.		90.51									
10			9.40									

BTEX, F1-F4, GLYCOLS, METALS, PAH, PESTICIDES, VOC

28-May-2019

IOL (AUTO) 18113796-1485.BH_LOGS.GPJ IOLGDT 1-13-20

LOCATION: 2 Montreal Road, Ottawa, Ontario
 CONTRACTOR: Badger Daylighting Ltd./ Strata Drilling Group
 EQUIPMENT USED: Hydrovac, Geomachine GM 100 - Direct Push, Air Rotary
 OVM TYPE: RKI Eagle
 BORING DATE: May 14 and 16, 2019
 DATUM: Local (referenced to the catch basin on the Western portion of the site with an assumed elevation of 100.00 mald. Exp, 2014.)

RECORD OF MONITORING WELL: MW19-05

DEPTH SCALE METRES	SOIL PROFILE			SAMPLES			Soil Vapour Concentration (ppmv) ⊕				ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
	DESCRIPTION	STRATA PLOT	ELEV.	NUMBER	TYPE	RECOVERY %	50	100	150	200		
			DEPTH (m)				Soil Vapour Concentration (%LEL) □					
							20	40	60	80		
0	Ground Surface		99.83									Stickup = 0.81 m
	TOPSOIL		0.10									
	FILL (SAND), moist, brown											
	FILL (sandy GRAVEL), moist, brown		99.23	1	GRAB	n/a	⊕					
1			0.60									
				2	GRAB	n/a	⊕					
2												
	Fractured SHALE, some sand, trace gravel, moist, brown		97.53	3	GRAB	n/a	⊕					
			2.30									
				4	DP	16	⊕					
3												
				5	DP	20	⊕					
4	BEDROCK		96.28									BTEX, F1-F4 DRY BULK DENSITY GLYCOLS, METALS PAH, PCB, VOC
			3.55									
5												
6												
7												
8												
9	End of MONITORING WELL.		90.43									
			9.40									
10												


28-May-2019

IOL (AUTO) 18113796-1485_BH_LOGS.GPJ IOLGDT 1-13-20

LOCATION: 2 Montreal Road, Ottawa, Ontario
 CONTRACTOR: Badger Daylighting Ltd./ Strata Drilling Group
 EQUIPMENT USED: Hydrovac, Geomachine GM 100 - Direct Push, Air Rotary
 OVM TYPE: RKI Eagle
 BORING DATE: May 14 and 16, 2019
 DATUM: Local (referenced to the catch basin on the Western portion of the site with an assumed elevation of 100.00 mald. Exp, 2014.)

RECORD OF MONITORING WELL: MW19-06/SV19-04

DEPTH SCALE METRES	SOIL PROFILE			SAMPLES			Soil Vapour Concentration (ppmv) ⊕				ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	RECOVERY %	50	100	150	200		
							Soil Vapour Concentration (%LEL) □					
							20	40	60	80		
0	Ground Surface		99.78									Stickup = 0.80 m
	Sandy LOAM, moist, brown FILL (SAND), moist, brown		0.10	1	GRAB	n/a	⊕					
			98.28	2	GRAB	n/a	⊕					
	Fractured SHALE, some sand, trace gravel, moist, black-brown		1.50	3	DP	43						BTEX, F1-F4, FOC, GLYCOLS, METALS, PAH, PCB, VOC
				4	DP	43						
			97.07									
	BEDROCK		2.71									
			90.68									
			9.10									
	End of MONITORING WELL.											

28-May-2019


IOL (AUTO) 18113796-1485_BH_LOGS.GPJ IOLGDT 1-13-20



LOCATION: 2 Montreal Road, Ottawa, Ontario
 CONTRACTOR: Badger Daylighting Ltd./ Strata Drilling Group
 EQUIPMENT USED: Hydrovac, Geomachine GM 100 - Direct Push, Air Rotary
 OVM TYPE: RKI Eagle
 BORING DATE: May 14 and 16, 2019
 DATUM: Local (referenced to the catch basin on the Western portion of the site with an assumed elevation of 100.00 mald. Exp, 2014.)

RECORD OF MONITORING WELL: MW19-07

DEPTH SCALE METRES	SOIL PROFILE			SAMPLES			Soil Vapour Concentration (ppmv) ⊕				ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	RECOVERY %	50	100	150	200			
							Soil Vapour Concentration (%LEL) □						
							20	40	60	80			
0	Ground Surface		99.73									Stickup = 0.98 m	
	Sandy LOAM, moist, brown										BTEX, F1-F4, FOC		
	FILL (SAND), moist, brown		0.20	1	GRAB	n/a	⊕						
	FILL (sandy GRAVEL, trace cobbles), moist, brown			2	GRAB	n/a	⊕						
1				3	DP	33							
2				4	DP	33	⊕						
3	Fractured SHALE, some sand, trace gravel, dry, brown-black		96.83 2.90	5	DP	33	⊕					BTEX, F1-F4, FOC, GLYCOLS, METALS, PAH, PCB, VOC	
	BEDROCK		96.18 3.55										
4													
5													
6													
7													
8													
9													
10	End of MONITORING WELL.		90.33 9.40										

28-May-2019
▽

IOL (AUTO) 18113796-1485_BH_LOGS.GPJ IOLGDT 1-13-20



LOCATION: 2 Montreal Road, Ottawa, Ontario
 CONTRACTOR: Badger Daylighting Ltd./ Strata Drilling Group
 EQUIPMENT USED: Hydrovac, Geomachine GM 100 - Direct Push, Air Rotary
 OVM TYPE: RKI Eagle
 BORING DATE: May 14 and 21, 2019
 DATUM: Local (referenced to the catch basin on the Western portion of the site with an assumed elevation of 100.00 mald. Exp, 2014.)

RECORD OF MONITORING WELL: MW19-08

DEPTH SCALE METRES	SOIL PROFILE			SAMPLES			Soil Vapour Concentration (ppmv) ⊕				ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	RECOVERY %	50	100	150	200			
							Soil Vapour Concentration (%LEL) □						
							20	40	60	80			
0	Ground Surface		99.32									Stickup = 0.88 m	
	FILL (COBBLES and CONSTRUCTION DEBRIS, some sand)		0.00										
1				1	GRAB	n/a	⊕						FOC
2				2	DP	5	⊕						
3				3	DP	30	⊕						
4	Fractured SHALE, some sand, some clay, moist, black		95.77 3.55	5	DP	60	⊕					BTEX, F1-F4, GLYCOLS, METALS, PAH, VOC	
5	BEDROCK		95.22 4.10										
6													
7													
8													
9	End of MONITORING WELL.		90.52 8.80									28-May-2019 ▽	
10													

IOL (AUTO) 18113796-1485_BH_LOGS.GPJ IOLGDT 1-13-20

LOCATION: 2 Montreal Road, Ottawa, Ontario

CONTRACTOR: Badger Daylighting Ltd./ Strata Drilling Group

EQUIPMENT USED: Hydrovac, Geomachine 2006 GM 100 - Direct Push, Air Rotary

OVN TYPE: RKI Eagle

BORING DATE: May 14 and 17, 2019

RECORD OF MONITORING WELL: MW19-09

DATUM: Local (referenced to the catch basin on the Western portion of the site with an assumed elevation of 100.00 mald. Exp, 2014.)

DEPTH SCALE METRES	SOIL PROFILE		SAMPLES			Soil Vapour Concentration (ppmv) ⊕				ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	RECOVERY %	50	100	150	200		
						Soil Vapour Concentration (%LEL) □					
						20	40	60	80		
0	Ground Surface	99.44									Stickup = 0.68 m
	Sandy LOAM, some organics, moist, brown	0.00									
	FILL (SAND), moist, brown	99.14									
		0.30	1	GRAB	n/a	⊕					
1	--- Roots at 0.8 m	98.63									
	FILL (sandy GRAVEL), moist, brown	0.81	2	GRAB	n/a	⊕					
2			3	DP	60						
			4	DP	60	⊕					
3			5	DP	68	⊕					
4	Fractured SHALE, dry, brown	95.64									
	BEDROCK	3.80									
		95.43									
		4.01									
5											
6											
7											
8											
9	End of MONITORING WELL.	90.94									
		8.50									

BTEX, F1-F4, GLYCOLS, METALS, PAH, VOC

28-May-2019

IOL (AUTO) 18113796-1485_BH_LOGS.GPJ IOLGDT 1-13-20

LOCATION: 2 Montreal Road, Ottawa, Ontario
 CONTRACTOR: Badger Daylighting Ltd./ Strata Drilling Group
 EQUIPMENT USED: Hydrovac, Geomachine GM 100 - Direct Push, Air Rotary
 OVM TYPE: RKI Eagle
 BORING DATE: May 13 and 22, 2019

RECORD OF SOIL VAPOUR PROBE: SV19-01

DEPTH SCALE METRES	SOIL PROFILE		SAMPLES			Soil Vapour Concentration (ppmv) ⊕				ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	RECOVERY %	50	100	150	200		
						Soil Vapour Concentration (%LEL) □					
		ELEV. DEPTH (m)				20	40	60	80		
0	Ground Surface										
	TOPSOIL, moist, brown										
	FILL (SAND), moist, brown	0.10	1	GRAB	n/a	⊕					
	FILL (GRAVEL, trace sand, trace cobbles), moist, brown	0.40									
1			2	GRAB	n/a	⊕					
2			3	DP	33						
			4	DP	33	⊕				GRAIN SIZE	
3			5	DP	19						
4			6	DP	19	⊕					
5			7	DP	23	⊕				BTEX, F1-F4, METALS	
	Fractured SHALE, dry, brown	5.35									
	BEDROCK	5.51									
6											
	End of SOIL VAPOUR PROBE.	6.40									
7											
8											
9											
10											

IOL (AUTO) 18113796-1485_BH_LOGS.GPJ IOLGDT 1-13-20

LOCATION: 2 Montreal Road, Ottawa, Ontario
 CONTRACTOR: Badger Daylighting Ltd./ Strata Drilling Group
 EQUIPMENT USED: Hydrovac, Geomachine GM 100 - Direct Push, Air Rotary
 OVM TYPE: RKI Eagle
 BORING DATE: May 13 and 22, 2019

RECORD OF SOIL VAPOUR PROBE: SV19-02

DEPTH SCALE METRES	SOIL PROFILE		SAMPLES			Soil Vapour Concentration (ppmv) ⊕				ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	RECOVERY %	50	100	150	200		
						Soil Vapour Concentration (%LEL) □					
		ELEV. DEPTH (m)				20	40	60	80		
0	Ground Surface TOPSOIL										
	FILL (SAND), moist, brown	0.10	1	GRAB	n/a	⊕					
1	FILL (GRAVELLY SAND, trace cobbles), moist, brown	0.80	2	GRAB	n/a	⊕					
			3	DP	20						
			4	DP	20	⊕					
			5	DP	31						
			6	DP	31	⊕					
			7	DP	3						
			8	DP	3						
	Fractured SHALE, dry, brown	6.24	9	DP	77	□					BTEX, F1-F4, DRY BULK DENSITY
	End of SOIL VAPOUR PROBE.	6.70									
7											
8											
9											
10											

IOL (AUTO) 18113796-1485_BH_LOGS.GPJ IOLGDT 1-13-20

LOCATION: 2 Montreal Road, Ottawa, Ontario
 CONTRACTOR: Badger Daylighting Ltd./ Strata Drilling Group
 EQUIPMENT USED: Hydrovac, Geomachine GM 100 - Direct Push, Air Rotary
 OVM TYPE: RKI Eagle
 BORING DATE: May 13 and 22, 2019

RECORD OF SOIL VAPOUR PROBE: SV19-03

DEPTH SCALE METRES	SOIL PROFILE		SAMPLES			Soil Vapour Concentration (ppmv) ⊕				ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	RECOVERY %	50	100	150	200		
						Soil Vapour Concentration (%LEL) □					
		ELEV. DEPTH (m)				20	40	60	80		
0	Ground Surface										
	TOPSOIL										
	FILL (SAND), moist, brown										
	FILL (GRAVELLY SAND, trace cobbles), moist, brown	0.15	1	GRAB	n/a						
	--- Asphalt debris at 0.4 m										
1			2	GRAB	n/a						
2	NO RECOVERY	1.70	3	DP	37						
			4	DP	37						
3			5	DP	30						
4			6	DP	30						
	Fractured SHALE, dry, brown	4.10								BTEX, F1-F4	
	BEDROCK	4.31									
5											
6											
7	End of SOIL VAPOUR PROBE.	6.55									
8											
9											
10											

IOL (AUTO) 18113796-1485_BH_LOGS.GPJ IOLGDT 1-13-20

APPENDIX C

**Laboratory Certificates of Analysis
and Data Quality Review Checklists**

Attention: Chris Vettorazzo

Golder Associates Ltd
300 - 2920 Virtual Way
Vancouver, BC
Canada V5M 0C4

Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1906
Your C.O.C. #: 716854-02-01

Report Date: 2019/05/28
Report #: R5728723
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9D4002
Received: 2019/05/18, 15:22

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Laboratory Method	Primary Reference
Methylnaphthalene Sum	3	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum	3		EPA 8260C m
Conductivity	3	CAM SOP-00414	OMOE E3530 v1 m
Petroleum Hydro. CCME F1 & BTEX in Soil (1)	5	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (2)	5	CAM SOP-00316	CCME CWS m
Fraction Organic Carbon in Soil	5	CAM SOP-00468	Lloyd Kahn Method
Glycols in Soil by GC-FID	3	CAM SOP-00322	EPA 8015 m
Strong Acid Leachable Metals by ICPMS	3	CAM SOP-00447	EPA 6020B m
Moisture	5	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM)	3	CAM SOP-00318	EPA 8270D m
Polychlorinated Biphenyl in Soil	3	CAM SOP-00309	EPA 8082A m
pH CaCl ₂ EXTRACT	3	CAM SOP-00413	EPA 9045 D m
Sieve, 75um	1	CAM SOP-00467	Carter 2nd ed m
Sodium Adsorption Ratio (SAR)	3	CAM SOP-00102	EPA 6010C
SAR - ICP Metals	3	CAM SOP-00408	EPA 6010D m
Total Organic Carbon in Soil	5	CAM SOP-00468	BCMOE TOC Aug 2014
Volatile Organic Compounds in Soil	3	CAM SOP-00228	EPA 8260C m

Remarks:

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

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

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

Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1906
Your C.O.C. #: 716854-02-01

Attention: Chris Vettorazzo

Golder Associates Ltd
300 - 2920 Virtual Way
Vancouver, BC
Canada V5M 0C4

Report Date: 2019/05/28
Report #: R5728723
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9D4002
Received: 2019/05/18, 15:22

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

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

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

Encryption Key



Kyle Reinhart
Project Manager
28 May 2019 15:40:33

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

Kyle Reinhart, Project Manager
Email: kreinhart@maxxam.ca
Phone# (905)817-5802

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

O.REG 153 PHCS IN SOIL (SOIL)

Maxxam ID		JTI625				JTI626				JTI627	
Sampling Date		2019/05/14 10:00				2019/05/14 10:00				2019/05/16 14:00	
COC Number		716854-02-01				716854-02-01				716854-02-01	
	UNITS	MW19-06-01	RDL	QC Batch	MW19-06-01 Lab-Dup	RDL	QC Batch	MW19-06-04	DUPA	RDL	QC Batch
Moisture	%	8.8	1.0	6133617	9.2	1.0	6133617	10	9.5	1.0	6133617
Benzene	ug/g	<0.020	0.020	6135458	<0.020	0.020	6135458				
Toluene	ug/g	<0.020	0.020	6135458	<0.020	0.020	6135458				
Ethylbenzene	ug/g	<0.020	0.020	6135458	<0.020	0.020	6135458				
o-Xylene	ug/g	<0.020	0.020	6135458	<0.020	0.020	6135458				
p+m-Xylene	ug/g	<0.040	0.040	6135458	<0.040	0.040	6135458				
Total Xylenes	ug/g	<0.040	0.040	6135458	<0.040	0.040	6135458				
F1 (C6-C10)	ug/g	<10	10	6135458	<10	10	6135458	14	28	10	6135458
F1 (C6-C10) - BTEX	ug/g	<10	10	6135458	<10	10	6135458	14	28	10	6135458
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	6137808				56	41	10	6137808
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	6137808				56	<50	50	6137808
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	6137808				<50	<50	50	6137808
Reached Baseline at C50	ug/g	Yes		6137808				Yes	Yes		6137808
Extraction Surrogate Recovery (%)											
D10-Ethylbenzene	%	94		6135458	94		6135458	92	92		6135458
o-Terphenyl	%	93		6137808				88	86		6137808
Instrument Surrogate Recovery (%)											
1,4-Difluorobenzene	%	101		6135458	101		6135458	101	101		6135458
4-Bromofluorobenzene	%	97		6135458	99		6135458	97	97		6135458
D4-1,2-Dichloroethane	%	98		6135458	100		6135458	98	98		6135458

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

O.REG 153 PHCS IN SOIL (SOIL)

Maxxam ID		JTI628			JTI629		
Sampling Date		2019/05/14 11:00			2019/05/16 12:00		
COC Number		716854-02-01			716854-02-01		
	UNITS	MW19-07-01	RDL	QC Batch	MW19-07-05	RDL	QC Batch
Moisture	%	13	1.0	6134086	6.2	1.0	6133617
Benzene	ug/g	<0.020	0.020	6135458			
Toluene	ug/g	<0.020	0.020	6135458			
Ethylbenzene	ug/g	<0.020	0.020	6135458			
o-Xylene	ug/g	<0.020	0.020	6135458			
p+m-Xylene	ug/g	<0.040	0.040	6135458			
Total Xylenes	ug/g	<0.040	0.040	6135458			
F1 (C6-C10)	ug/g	<10	10	6135458	29	10	6135458
F1 (C6-C10) - BTEX	ug/g	<10	10	6135458	29	10	6135458
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	6137808	87	10	6137808
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	6137808	95	50	6137808
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	6137808	<50	50	6137808
Reached Baseline at C50	ug/g	Yes		6137808	Yes		6137808
Extraction Surrogate Recovery (%)							
D10-Ethylbenzene	%	101		6135458	92		6135458
o-Terphenyl	%	86		6137808	89		6137808
Instrument Surrogate Recovery (%)							
1,4-Difluorobenzene	%	100		6135458	101		6135458
4-Bromofluorobenzene	%	97		6135458	98		6135458
D4-1,2-Dichloroethane	%	97		6135458	101		6135458
RDL = Reportable Detection Limit QC Batch = Quality Control Batch							

O.REG 153 PAHS (SOIL)

Maxxam ID		JTI626		JTI627		JTI629		
Sampling Date		2019/05/16 14:00		2019/05/16 14:00		2019/05/16 12:00		
COC Number		716854-02-01		716854-02-01		716854-02-01		
	UNITS	MW19-06-04	RDL	DUPA	RDL	MW19-07-05	RDL	QC Batch
Methylnaphthalene, 2-(1-)	ug/g	0.039	0.0071	0.028	0.0071	0.054	0.0071	6131874
Acenaphthene	ug/g	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6137815
Acenaphthylene	ug/g	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6137815
Anthracene	ug/g	<0.0050	0.0050	<0.0050	0.0050	0.012	0.0050	6137815
Benzo(a)anthracene	ug/g	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6137815
Benzo(a)pyrene	ug/g	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6137815
Benzo(b/j)fluoranthene	ug/g	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6137815
Benzo(g,h,i)perylene	ug/g	<0.0050	0.0050	<0.0050	0.0050	0.0050	0.0050	6137815
Benzo(k)fluoranthene	ug/g	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6137815
Chrysene	ug/g	0.011	0.0050	0.0076	0.0050	0.013	0.0050	6137815
Dibenz(a,h)anthracene	ug/g	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6137815
Fluoranthene	ug/g	<0.0050	0.0050	<0.0050	0.0050	0.0058	0.0050	6137815
Fluorene	ug/g	<0.0050	0.0050	<0.0050	0.0050	0.015	0.0050	6137815
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6137815
1-Methylnaphthalene	ug/g	0.019	0.0050	0.013	0.0050	0.023	0.0050	6137815
2-Methylnaphthalene	ug/g	0.019	0.0050	0.015	0.0050	0.031	0.0050	6137815
Naphthalene	ug/g	<0.0070 (1)	0.0070	<0.0050	0.0050	<0.0090 (1)	0.0090	6137815
Phenanthrene	ug/g	0.053	0.0050	0.036	0.0050	0.061	0.0050	6137815
Pyrene	ug/g	0.0062	0.0050	<0.0050	0.0050	0.0093	0.0050	6137815
Extraction Surrogate Recovery (%)								
D10-Anthracene	%	106		111		110		6137815
D14-Terphenyl (FS)	%	98		103		95		6137815
D8-Acenaphthylene	%	91		95		93		6137815
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) DL was raised due to matrix interference.								

O.REG 153 PCBS (SOIL)

Maxxam ID		JTI626	JTI627	JTI629		
Sampling Date		2019/05/16 14:00	2019/05/16 14:00	2019/05/16 12:00		
COC Number		716854-02-01	716854-02-01	716854-02-01		
	UNITS	MW19-06-04	DUPA	MW19-07-05	RDL	QC Batch
Aroclor 1242	ug/g	<0.010	<0.010	<0.010	0.010	6134794
Aroclor 1248	ug/g	<0.010	<0.010	<0.010	0.010	6134794
Aroclor 1254	ug/g	<0.010	<0.010	<0.010	0.010	6134794
Aroclor 1260	ug/g	<0.010	<0.010	<0.010	0.010	6134794
Total PCB	ug/g	<0.010	<0.010	<0.010	0.010	6134794
Extraction Surrogate Recovery (%)						
Decachlorobiphenyl	%	91	92	84		6134794
RDL = Reportable Detection Limit QC Batch = Quality Control Batch						

O.REG 153 VOCs BY HS (SOIL)

Maxxam ID		JTI626	JTI627	JTI629		
Sampling Date		2019/05/16 14:00	2019/05/16 14:00	2019/05/16 12:00		
COC Number		716854-02-01	716854-02-01	716854-02-01		
	UNITS	MW19-06-04	DUPA	MW19-07-05	RDL	QC Batch
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	<0.050	<0.050	0.050	6131875
Acetone (2-Propanone)	ug/g	<0.50	<0.50	<0.50	0.50	6133043
Benzene	ug/g	<0.020	<0.020	0.24	0.020	6133043
Bromodichloromethane	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Bromoform	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Bromomethane	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Carbon Tetrachloride	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Chlorobenzene	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Chloroform	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Dibromochloromethane	ug/g	<0.050	<0.050	<0.050	0.050	6133043
1,2-Dichlorobenzene	ug/g	<0.050	<0.050	<0.050	0.050	6133043
1,3-Dichlorobenzene	ug/g	<0.050	<0.050	<0.050	0.050	6133043
1,4-Dichlorobenzene	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	<0.050	<0.050	0.050	6133043
1,1-Dichloroethane	ug/g	<0.050	<0.050	<0.050	0.050	6133043
1,2-Dichloroethane	ug/g	<0.050	<0.050	<0.050	0.050	6133043
1,1-Dichloroethylene	ug/g	<0.050	<0.050	<0.050	0.050	6133043
cis-1,2-Dichloroethylene	ug/g	<0.050	<0.050	<0.050	0.050	6133043
trans-1,2-Dichloroethylene	ug/g	<0.050	<0.050	<0.050	0.050	6133043
1,2-Dichloropropane	ug/g	<0.050	<0.050	<0.050	0.050	6133043
cis-1,3-Dichloropropene	ug/g	<0.030	<0.030	<0.030	0.030	6133043
trans-1,3-Dichloropropene	ug/g	<0.040	<0.040	<0.040	0.040	6133043
Ethylbenzene	ug/g	<0.020	<0.020	0.33	0.020	6133043
Ethylene Dibromide	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Hexane	ug/g	<0.050	<0.050	0.59	0.050	6133043
Methylene Chloride(Dichloromethane)	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	<0.50	<0.50	0.50	6133043
Methyl Isobutyl Ketone	ug/g	<0.50	<0.50	<0.50	0.50	6133043
Methyl t-butyl ether (MTBE)	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Styrene	ug/g	<0.050	<0.050	<0.050	0.050	6133043
1,1,1,2-Tetrachloroethane	ug/g	<0.050	<0.050	<0.050	0.050	6133043
1,1,2,2-Tetrachloroethane	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Tetrachloroethylene	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Toluene	ug/g	<0.020	<0.020	0.33	0.020	6133043
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

O.REG 153 VOCs BY HS (SOIL)

Maxxam ID		JTI626	JTI627	JTI629		
Sampling Date		2019/05/16 14:00	2019/05/16 14:00	2019/05/16 12:00		
COC Number		716854-02-01	716854-02-01	716854-02-01		
	UNITS	MW19-06-04	DUPA	MW19-07-05	RDL	QC Batch
1,1,1-Trichloroethane	ug/g	<0.050	<0.050	<0.050	0.050	6133043
1,1,2-Trichloroethane	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Trichloroethylene	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	<0.050	<0.050	0.050	6133043
Vinyl Chloride	ug/g	<0.020	<0.020	<0.020	0.020	6133043
p+m-Xylene	ug/g	<0.020	<0.020	0.84	0.020	6133043
o-Xylene	ug/g	<0.020	<0.020	0.42	0.020	6133043
Total Xylenes	ug/g	<0.020	<0.020	1.3	0.020	6133043
Extraction Surrogate Recovery (%)						
D10-o-Xylene	%	99	98	106		6133043
Instrument Surrogate Recovery (%)						
4-Bromofluorobenzene	%	94	94	96		6133043
D4-1,2-Dichloroethane	%	96	95	93		6133043
D8-Toluene	%	99	98	104		6133043
RDL = Reportable Detection Limit QC Batch = Quality Control Batch						

RESULTS OF ANALYSES OF SOIL

Maxxam ID		JTI625			JTI625			JTI626		
Sampling Date		2019/05/14 10:00			2019/05/14 10:00			2019/05/16 14:00		
COC Number		716854-02-01			716854-02-01			716854-02-01		
	UNITS	MW19-06-01	RDL	QC Batch	MW19-06-01 Lab-Dup	RDL	QC Batch	MW19-06-04	RDL	QC Batch
Fraction of Organic Carbon	g/g	<0.00050	0.00050	6131331				0.018	0.00050	6131331
Sodium Adsorption Ratio	N/A							0.76		6132150
Conductivity	mS/cm							0.18	0.002	6138121
Total Organic Carbon	mg/kg	<500	500	6139139	<500	500	6139139	18000	500	6139139
Available (CaCl2) pH	pH							7.13		6135911
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										

Maxxam ID		JTI627			JTI628			JTI629		
Sampling Date		2019/05/16 14:00			2019/05/14 11:00			2019/05/16 12:00		
COC Number		716854-02-01			716854-02-01			716854-02-01		
	UNITS	DUPA	RDL	QC Batch	MW19-07-01	RDL	QC Batch	MW19-07-05	RDL	QC Batch
Fraction of Organic Carbon	g/g	0.020	0.00050	6131331	0.0034	0.00050	6131331	0.028	0.00050	6131331
Sodium Adsorption Ratio	N/A	0.77		6132150				0.68		6132150
Conductivity	mS/cm	0.21	0.002	6138121				1.1	0.002	6138121
Total Organic Carbon	mg/kg	20000	500	6139139	3400	500	6139139	28000	500	6139139
Available (CaCl2) pH	pH	7.35		6135911				7.72		6135911
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										

Maxxam ID		JTI629			JTI630		
Sampling Date		2019/05/16 12:00			2019/05/14 10:30		
COC Number		716854-02-01			716854-02-01		
	UNITS	MW19-07-05 Lab-Dup	QC Batch	MW19-09-02	RDL	QC Batch	
Available (CaCl2) pH	pH	7.70	6135911				
Grain Size	%			FINE	N/A	6135575	
Sieve - #200 (<0.075mm)	%			73	1	6135575	
Sieve - #200 (>0.075mm)	%			27	1	6135575	
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable							

GLYCOLS BY GC-FID (SOIL)

Maxxam ID		JTI626	JTI627	JTI629	JTI629		
Sampling Date		2019/05/16 14:00	2019/05/16 14:00	2019/05/16 12:00	2019/05/16 12:00		
COC Number		716854-02-01	716854-02-01	716854-02-01	716854-02-01		
	UNITS	MW19-06-04	DUPA	MW19-07-05	MW19-07-05 Lab-Dup	RDL	QC Batch
Propylene Glycol	mg/kg	<10	<10	<10	<10	10	6134964
Ethylene Glycol	mg/kg	<10	<10	<10	<10	10	6134964
Diethylene Glycol	mg/kg	<10	<10	<10	<10	10	6134964
Total Glycol	mg/kg	<10	<10	<10	<10	10	6134964
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							
Lab-Dup = Laboratory Initiated Duplicate							

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JTI626	JTI627	JTI629		
Sampling Date		2019/05/16 14:00	2019/05/16 14:00	2019/05/16 12:00		
COC Number		716854-02-01	716854-02-01	716854-02-01		
	UNITS	MW19-06-04	DUPA	MW19-07-05	RDL	QC Batch
Acid Extractable Antimony (Sb)	ug/g	0.63	0.78	0.47	0.20	6138274
Acid Extractable Arsenic (As)	ug/g	14	15	8.5	1.0	6138274
Acid Extractable Barium (Ba)	ug/g	100	100	90	0.50	6138274
Acid Extractable Beryllium (Be)	ug/g	1.1	1.1	0.88	0.20	6138274
Acid Extractable Boron (B)	ug/g	6.2	6.4	7.6	5.0	6138274
Acid Extractable Cadmium (Cd)	ug/g	0.68	0.64	0.52	0.10	6138274
Acid Extractable Chromium (Cr)	ug/g	28	27	22	1.0	6138274
Acid Extractable Cobalt (Co)	ug/g	27	28	18	0.10	6138274
Acid Extractable Copper (Cu)	ug/g	57	58	46	0.50	6138274
Acid Extractable Lead (Pb)	ug/g	21	22	16	1.0	6138274
Acid Extractable Molybdenum (Mo)	ug/g	6.8	6.3	8.4	0.50	6138274
Acid Extractable Nickel (Ni)	ug/g	92	95	56	0.50	6138274
Acid Extractable Selenium (Se)	ug/g	0.70	0.74	1.2	0.50	6138274
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	<0.20	0.20	6138274
Acid Extractable Thallium (Tl)	ug/g	0.81	0.83	0.21	0.050	6138274
Acid Extractable Uranium (U)	ug/g	2.8	2.9	3.4	0.050	6138274
Acid Extractable Vanadium (V)	ug/g	43	44	35	5.0	6138274
Acid Extractable Zinc (Zn)	ug/g	94	92	77	5.0	6138274
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

TEST SUMMARY

Maxxam ID: JTI625
Sample ID: MW19-06-01
Matrix: Soil

Collected: 2019/05/14
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6135458	N/A	2019/05/23	Ravinder Gaidhu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6137808	2019/05/23	2019/05/24	Prabhjot Gulati
Fraction Organic Carbon in Soil		6131331	N/A	2019/05/27	Automated Statchk
Moisture	BAL	6133617	N/A	2019/05/22	Min Yang
Total Organic Carbon in Soil	COMB	6139139	N/A	2019/05/27	Dhruvik Modh

Maxxam ID: JTI625 Dup
Sample ID: MW19-06-01
Matrix: Soil

Collected: 2019/05/14
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6135458	N/A	2019/05/23	Ravinder Gaidhu
Moisture	BAL	6133617	N/A	2019/05/22	Min Yang
Total Organic Carbon in Soil	COMB	6139139	N/A	2019/05/27	Dhruvik Modh

Maxxam ID: JTI626
Sample ID: MW19-06-04
Matrix: Soil

Collected: 2019/05/16
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6131874	N/A	2019/05/27	Automated Statchk
1,3-Dichloropropene Sum	CALC	6131875	N/A	2019/05/23	Automated Statchk
Conductivity	AT	6138121	2019/05/24	2019/05/24	Kazzandra Adeva
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6135458	N/A	2019/05/23	Ravinder Gaidhu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6137808	2019/05/23	2019/05/24	Prabhjot Gulati
Fraction Organic Carbon in Soil		6131331	N/A	2019/05/27	Automated Statchk
Glycols in Soil by GC-FID	GC/FID	6134964	N/A	2019/05/23	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6138274	2019/05/24	2019/05/24	Daniel Teclu
Moisture	BAL	6133617	N/A	2019/05/22	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6137815	2019/05/23	2019/05/25	Mitesh Raj
Polychlorinated Biphenyl in Soil	GC/ECD	6134794	2019/05/22	2019/05/23	Sarah Huang
pH CaCl2 EXTRACT	AT	6135911	2019/05/23	2019/05/23	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6132150	N/A	2019/05/24	Automated Statchk
Total Organic Carbon in Soil	COMB	6139139	N/A	2019/05/27	Dhruvik Modh
Volatile Organic Compounds in Soil	GC/MS	6133043	N/A	2019/05/23	Chandni Khawas

Maxxam ID: JTI627
Sample ID: DUPA
Matrix: Soil

Collected: 2019/05/16
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6131874	N/A	2019/05/27	Automated Statchk
1,3-Dichloropropene Sum	CALC	6131875	N/A	2019/05/23	Automated Statchk
Conductivity	AT	6138121	2019/05/24	2019/05/24	Kazzandra Adeva
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6135458	N/A	2019/05/23	Ravinder Gaidhu

TEST SUMMARY

Maxxam ID: JTI627
Sample ID: DUPA
Matrix: Soil

Collected: 2019/05/16
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6137808	2019/05/23	2019/05/24	Prabhjot Gulati
Fraction Organic Carbon in Soil		6131331	N/A	2019/05/27	Automated Statchk
Glycols in Soil by GC-FID	GC/FID	6134964	N/A	2019/05/23	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6138274	2019/05/24	2019/05/24	Daniel Teclu
Moisture	BAL	6133617	N/A	2019/05/22	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6137815	2019/05/23	2019/05/25	Mitesh Raj
Polychlorinated Biphenyl in Soil	GC/ECD	6134794	2019/05/22	2019/05/23	Sarah Huang
pH CaCl2 EXTRACT	AT	6135911	2019/05/23	2019/05/23	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6132150	N/A	2019/05/24	Automated Statchk
Total Organic Carbon in Soil	COMB	6139139	N/A	2019/05/27	Dhruvik Modh
Volatile Organic Compounds in Soil	GC/MS	6133043	N/A	2019/05/23	Chandni Khawas

Maxxam ID: JTI628
Sample ID: MW19-07-01
Matrix: Soil

Collected: 2019/05/14
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6135458	N/A	2019/05/23	Ravinder Gaidhu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6137808	2019/05/23	2019/05/24	Prabhjot Gulati
Fraction Organic Carbon in Soil		6131331	N/A	2019/05/27	Automated Statchk
Moisture	BAL	6134086	N/A	2019/05/22	Min Yang
Total Organic Carbon in Soil	COMB	6139139	N/A	2019/05/27	Dhruvik Modh

Maxxam ID: JTI629
Sample ID: MW19-07-05
Matrix: Soil

Collected: 2019/05/16
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6131874	N/A	2019/05/27	Automated Statchk
1,3-Dichloropropene Sum	CALC	6131875	N/A	2019/05/23	Automated Statchk
Conductivity	AT	6138121	2019/05/24	2019/05/24	Kazzandra Adeva
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6135458	N/A	2019/05/23	Ravinder Gaidhu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6137808	2019/05/23	2019/05/24	Prabhjot Gulati
Fraction Organic Carbon in Soil		6131331	N/A	2019/05/27	Automated Statchk
Glycols in Soil by GC-FID	GC/FID	6134964	N/A	2019/05/22	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6138274	2019/05/24	2019/05/24	Daniel Teclu
Moisture	BAL	6133617	N/A	2019/05/22	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6137815	2019/05/23	2019/05/26	Mitesh Raj
Polychlorinated Biphenyl in Soil	GC/ECD	6134794	2019/05/22	2019/05/23	Sarah Huang
pH CaCl2 EXTRACT	AT	6135911	2019/05/23	2019/05/23	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6132150	N/A	2019/05/24	Automated Statchk
Total Organic Carbon in Soil	COMB	6139139	N/A	2019/05/27	Dhruvik Modh
Volatile Organic Compounds in Soil	GC/MS	6133043	N/A	2019/05/23	Chandni Khawas

TEST SUMMARY

Maxxam ID: JT1629 Dup
Sample ID: MW19-07-05
Matrix: Soil

Collected: 2019/05/16
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Glycols in Soil by GC-FID	GC/FID	6134964	N/A	2019/05/23	Prabhjot Gulati
pH CaCl2 EXTRACT	AT	6135911	2019/05/23	2019/05/23	Gnana Thomas

Maxxam ID: JT1630
Sample ID: MW19-09-02
Matrix: Soil

Collected: 2019/05/14
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sieve, 75um	SIEV	6135575	N/A	2019/05/23	Min Yang

GENERAL COMMENTS

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

Package 1	4.0°C
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F1/ BTEX analysis:

-The BTEX results used for the F1/BTEX calculation were obtained from Headspace-GC analysis.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	6133043	CKH	Method Blank	4-Bromofluorobenzene	2019/05/22		97	%	60 - 140
				D10-o-Xylene	2019/05/22		97	%	60 - 130
				D4-1,2-Dichloroethane	2019/05/22		102	%	60 - 140
				D8-Toluene	2019/05/22		96	%	60 - 140
				Acetone (2-Propanone)	2019/05/22	<0.50		ug/g	
				Benzene	2019/05/22	<0.020		ug/g	
				Bromodichloromethane	2019/05/22	<0.050		ug/g	
				Bromoform	2019/05/22	<0.050		ug/g	
				Bromomethane	2019/05/22	<0.050		ug/g	
				Carbon Tetrachloride	2019/05/22	<0.050		ug/g	
				Chlorobenzene	2019/05/22	<0.050		ug/g	
				Chloroform	2019/05/22	<0.050		ug/g	
				Dibromochloromethane	2019/05/22	<0.050		ug/g	
				1,2-Dichlorobenzene	2019/05/22	<0.050		ug/g	
				1,3-Dichlorobenzene	2019/05/22	<0.050		ug/g	
				1,4-Dichlorobenzene	2019/05/22	<0.050		ug/g	
				Dichlorodifluoromethane (FREON 12)	2019/05/22	<0.050		ug/g	
				1,1-Dichloroethane	2019/05/22	<0.050		ug/g	
				1,2-Dichloroethane	2019/05/22	<0.050		ug/g	
				1,1-Dichloroethylene	2019/05/22	<0.050		ug/g	
				cis-1,2-Dichloroethylene	2019/05/22	<0.050		ug/g	
				trans-1,2-Dichloroethylene	2019/05/22	<0.050		ug/g	
				1,2-Dichloropropane	2019/05/22	<0.050		ug/g	
				cis-1,3-Dichloropropene	2019/05/22	<0.030		ug/g	
				trans-1,3-Dichloropropene	2019/05/22	<0.040		ug/g	
				Ethylbenzene	2019/05/22	<0.020		ug/g	
				Ethylene Dibromide	2019/05/22	<0.050		ug/g	
				Hexane	2019/05/22	<0.050		ug/g	
				Methylene Chloride(Dichloromethane)	2019/05/22	<0.050		ug/g	
				Methyl Ethyl Ketone (2-Butanone)	2019/05/22	<0.50		ug/g	
				Methyl Isobutyl Ketone	2019/05/22	<0.50		ug/g	
				Methyl t-butyl ether (MTBE)	2019/05/22	<0.050		ug/g	
				Styrene	2019/05/22	<0.050		ug/g	
				1,1,1,2-Tetrachloroethane	2019/05/22	<0.050		ug/g	
				1,1,2,2-Tetrachloroethane	2019/05/22	<0.050		ug/g	
				Tetrachloroethylene	2019/05/22	<0.050		ug/g	
				Toluene	2019/05/22	<0.020		ug/g	
				1,1,1-Trichloroethane	2019/05/22	<0.050		ug/g	
				1,1,2-Trichloroethane	2019/05/22	<0.050		ug/g	
				Trichloroethylene	2019/05/22	<0.050		ug/g	
				Trichlorofluoromethane (FREON 11)	2019/05/22	<0.050		ug/g	
				Vinyl Chloride	2019/05/22	<0.020		ug/g	
				p+m-Xylene	2019/05/22	<0.020		ug/g	
				o-Xylene	2019/05/22	<0.020		ug/g	
				Total Xylenes	2019/05/22	<0.020		ug/g	
	6134794	SHG	Method Blank	Decachlorobiphenyl	2019/05/23		94	%	60 - 130
				Aroclor 1242	2019/05/23	<0.010		ug/g	
				Aroclor 1248	2019/05/23	<0.010		ug/g	
				Aroclor 1254	2019/05/23	<0.010		ug/g	
				Aroclor 1260	2019/05/23	<0.010		ug/g	
				Total PCB	2019/05/23	<0.010		ug/g	
	6134964	GUL	Method Blank	Propylene Glycol	2019/05/22	<10		mg/kg	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6135458	RGA	Method Blank	Ethylene Glycol	2019/05/22	<10		mg/kg	
			Diethylene Glycol	2019/05/22	<10		mg/kg	
			Total Glycol	2019/05/22	<10		mg/kg	
			1,4-Difluorobenzene	2019/05/23		100	%	60 - 140
			4-Bromofluorobenzene	2019/05/23		98	%	60 - 140
			D10-Ethylbenzene	2019/05/23		84	%	60 - 140
			D4-1,2-Dichloroethane	2019/05/23		98	%	60 - 140
			Benzene	2019/05/23	<0.020		ug/g	
			Toluene	2019/05/23	<0.020		ug/g	
			Ethylbenzene	2019/05/23	<0.020		ug/g	
			o-Xylene	2019/05/23	<0.020		ug/g	
			p+m-Xylene	2019/05/23	<0.040		ug/g	
			Total Xylenes	2019/05/23	<0.040		ug/g	
			F1 (C6-C10)	2019/05/23	<10		ug/g	
6137808	GUL	Method Blank	F1 (C6-C10) - BTEX	2019/05/23	<10		ug/g	
			o-Terphenyl	2019/05/24		89	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/05/24	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2019/05/24	<50		ug/g	
6137815	RAJ	Method Blank	F4 (C34-C50 Hydrocarbons)	2019/05/24	<50		ug/g	
			D10-Anthracene	2019/05/25		104	%	50 - 130
			D14-Terphenyl (FS)	2019/05/25		92	%	50 - 130
			D8-Acenaphthylene	2019/05/25		88	%	50 - 130
			Acenaphthene	2019/05/25	<0.0050		ug/g	
			Acenaphthylene	2019/05/25	<0.0050		ug/g	
			Anthracene	2019/05/25	<0.0050		ug/g	
			Benzo(a)anthracene	2019/05/25	<0.0050		ug/g	
			Benzo(a)pyrene	2019/05/25	<0.0050		ug/g	
			Benzo(b/j)fluoranthene	2019/05/25	<0.0050		ug/g	
			Benzo(g,h,i)perylene	2019/05/25	<0.0050		ug/g	
			Benzo(k)fluoranthene	2019/05/25	<0.0050		ug/g	
			Chrysene	2019/05/25	<0.0050		ug/g	
			Dibenz(a,h)anthracene	2019/05/25	<0.0050		ug/g	
			Fluoranthene	2019/05/25	<0.0050		ug/g	
			Fluorene	2019/05/25	<0.0050		ug/g	
			Indeno(1,2,3-cd)pyrene	2019/05/25	<0.0050		ug/g	
			1-Methylnaphthalene	2019/05/25	<0.0050		ug/g	
			2-Methylnaphthalene	2019/05/25	<0.0050		ug/g	
			Naphthalene	2019/05/25	<0.0050		ug/g	
			Phenanthrene	2019/05/25	<0.0050		ug/g	
			Pyrene	2019/05/25	<0.0050		ug/g	
			6138121	KAD	Method Blank	Conductivity	2019/05/24	<0.002
6138274	DT1	Method Blank	Acid Extractable Antimony (Sb)	2019/05/24	<0.20		ug/g	
			Acid Extractable Arsenic (As)	2019/05/24	<1.0		ug/g	
			Acid Extractable Barium (Ba)	2019/05/24	<0.50		ug/g	
			Acid Extractable Beryllium (Be)	2019/05/24	<0.20		ug/g	
			Acid Extractable Boron (B)	2019/05/24	<5.0		ug/g	
			Acid Extractable Cadmium (Cd)	2019/05/24	<0.10		ug/g	
			Acid Extractable Chromium (Cr)	2019/05/24	<1.0		ug/g	
			Acid Extractable Cobalt (Co)	2019/05/24	<0.10		ug/g	
			Acid Extractable Copper (Cu)	2019/05/24	<0.50		ug/g	
			Acid Extractable Lead (Pb)	2019/05/24	<1.0		ug/g	
			Acid Extractable Molybdenum (Mo)	2019/05/24	<0.50		ug/g	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Nickel (Ni)	2019/05/24	<0.50		ug/g	
			Acid Extractable Selenium (Se)	2019/05/24	<0.50		ug/g	
			Acid Extractable Silver (Ag)	2019/05/24	<0.20		ug/g	
			Acid Extractable Thallium (Tl)	2019/05/24	<0.050		ug/g	
			Acid Extractable Uranium (U)	2019/05/24	<0.050		ug/g	
			Acid Extractable Vanadium (V)	2019/05/24	<5.0		ug/g	
			Acid Extractable Zinc (Zn)	2019/05/24	<5.0		ug/g	
6139139	DM1	Method Blank	Total Organic Carbon	2019/05/27	<500		mg/kg	
6133617	AUP	RPD [JTI625-02]	Moisture	2019/05/22	4.4		%	20
6135458	RGA	RPD [JTI625-03]	Benzene	2019/05/23	NC		%	50
			Toluene	2019/05/23	NC		%	50
			Ethylbenzene	2019/05/23	NC		%	50
			o-Xylene	2019/05/23	NC		%	50
			p+m-Xylene	2019/05/23	NC		%	50
			Total Xylenes	2019/05/23	NC		%	50
			F1 (C6-C10)	2019/05/23	NC		%	30
			F1 (C6-C10) - BTEX	2019/05/23	NC		%	30
6139139	DM1	RPD [JTI625-01]	Total Organic Carbon	2019/05/27	NC		%	35
6134964	GUL	RPD [JTI629-01]	Propylene Glycol	2019/05/23	NC		%	50
			Ethylene Glycol	2019/05/23	NC		%	50
			Diethylene Glycol	2019/05/23	NC		%	50
			Total Glycol	2019/05/23	NC		%	50
6135911	GTO	RPD [JTI629-01]	Available (CaCl2) pH	2019/05/23	0.30		%	N/A
6134964	GUL	Matrix Spike [JTI629-01]	Propylene Glycol	2019/05/23		92	%	60 - 140
			Ethylene Glycol	2019/05/23		92	%	60 - 140
			Diethylene Glycol	2019/05/23		91	%	60 - 140
6135458	RGA	Matrix Spike [JTI625-03]	1,4-Difluorobenzene	2019/05/23		101	%	60 - 140
			4-Bromofluorobenzene	2019/05/23		98	%	60 - 140
			D10-Ethylbenzene	2019/05/23		96	%	60 - 140
			D4-1,2-Dichloroethane	2019/05/23		98	%	60 - 140
			Benzene	2019/05/23		91	%	60 - 140
			Toluene	2019/05/23		95	%	60 - 140
			Ethylbenzene	2019/05/23		89	%	60 - 140
			o-Xylene	2019/05/23		89	%	60 - 140
			p+m-Xylene	2019/05/23		90	%	60 - 140
			F1 (C6-C10)	2019/05/23		96	%	60 - 140
6133043	CKH	LCS	4-Bromofluorobenzene	2019/05/22		99	%	60 - 140
			D10-o-Xylene	2019/05/22		96	%	60 - 130
			D4-1,2-Dichloroethane	2019/05/22		100	%	60 - 140
			D8-Toluene	2019/05/22		104	%	60 - 140
			Acetone (2-Propanone)	2019/05/22		92	%	60 - 140
			Benzene	2019/05/22		91	%	60 - 130
			Bromodichloromethane	2019/05/22		90	%	60 - 130
			Bromoform	2019/05/22		93	%	60 - 130
			Bromomethane	2019/05/22		94	%	60 - 140
			Carbon Tetrachloride	2019/05/22		90	%	60 - 130
			Chlorobenzene	2019/05/22		91	%	60 - 130
			Chloroform	2019/05/22		91	%	60 - 130
			Dibromochloromethane	2019/05/22		95	%	60 - 130
			1,2-Dichlorobenzene	2019/05/22		92	%	60 - 130
			1,3-Dichlorobenzene	2019/05/22		92	%	60 - 130
			1,4-Dichlorobenzene	2019/05/22		94	%	60 - 130

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dichlorodifluoromethane (FREON 12)	2019/05/22		93	%	60 - 140
			1,1-Dichloroethane	2019/05/22		92	%	60 - 130
			1,2-Dichloroethane	2019/05/22		92	%	60 - 130
			1,1-Dichloroethylene	2019/05/22		88	%	60 - 130
			cis-1,2-Dichloroethylene	2019/05/22		92	%	60 - 130
			trans-1,2-Dichloroethylene	2019/05/22		91	%	60 - 130
			1,2-Dichloropropane	2019/05/22		94	%	60 - 130
			cis-1,3-Dichloropropene	2019/05/22		95	%	60 - 130
			trans-1,3-Dichloropropene	2019/05/22		97	%	60 - 130
			Ethylbenzene	2019/05/22		92	%	60 - 130
			Ethylene Dibromide	2019/05/22		95	%	60 - 130
			Hexane	2019/05/22		92	%	60 - 130
			Methylene Chloride(Dichloromethane)	2019/05/22		100	%	60 - 130
			Methyl Ethyl Ketone (2-Butanone)	2019/05/22		98	%	60 - 140
			Methyl Isobutyl Ketone	2019/05/22		100	%	60 - 130
			Methyl t-butyl ether (MTBE)	2019/05/22		92	%	60 - 130
			Styrene	2019/05/22		95	%	60 - 130
			1,1,1,2-Tetrachloroethane	2019/05/22		93	%	60 - 130
			1,1,2,2-Tetrachloroethane	2019/05/22		95	%	60 - 130
			Tetrachloroethylene	2019/05/22		92	%	60 - 130
			Toluene	2019/05/22		93	%	60 - 130
			1,1,1-Trichloroethane	2019/05/22		90	%	60 - 130
			1,1,2-Trichloroethane	2019/05/22		95	%	60 - 130
			Trichloroethylene	2019/05/22		90	%	60 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/22		89	%	60 - 130
			Vinyl Chloride	2019/05/22		93	%	60 - 130
			p+m-Xylene	2019/05/22		92	%	60 - 130
			o-Xylene	2019/05/22		91	%	60 - 130
6134794	SHG	LCS	Decachlorobiphenyl	2019/05/23		97	%	60 - 130
			Aroclor 1260	2019/05/23		109	%	30 - 130
			Total PCB	2019/05/23		109	%	30 - 130
6134964	GUL	LCS	Propylene Glycol	2019/05/22		93	%	60 - 140
			Ethylene Glycol	2019/05/22		92	%	60 - 140
			Diethylene Glycol	2019/05/22		92	%	60 - 140
6135458	RGA	LCS	1,4-Difluorobenzene	2019/05/23		101	%	60 - 140
			4-Bromofluorobenzene	2019/05/23		99	%	60 - 140
			D10-Ethylbenzene	2019/05/23		84	%	60 - 140
			D4-1,2-Dichloroethane	2019/05/23		99	%	60 - 140
			Benzene	2019/05/23		86	%	60 - 140
			Toluene	2019/05/23		90	%	60 - 140
			Ethylbenzene	2019/05/23		86	%	60 - 140
			o-Xylene	2019/05/23		84	%	60 - 140
			p+m-Xylene	2019/05/23		87	%	60 - 140
			F1 (C6-C10)	2019/05/23		94	%	80 - 120
6135911	GTO	LCS	Available (CaCl2) pH	2019/05/23		100	%	97 - 103
6137808	GUL	LCS	o-Terphenyl	2019/05/24		87	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/05/24		91	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2019/05/24		89	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2019/05/24		89	%	80 - 120
6137815	RAJ	LCS	D10-Anthracene	2019/05/25		111	%	50 - 130
			D14-Terphenyl (FS)	2019/05/25		98	%	50 - 130
			D8-Acenaphthylene	2019/05/25		93	%	50 - 130

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acenaphthene	2019/05/25		100	%	50 - 130
			Acenaphthylene	2019/05/25		100	%	50 - 130
			Anthracene	2019/05/25		101	%	50 - 130
			Benzo(a)anthracene	2019/05/25		107	%	50 - 130
			Benzo(a)pyrene	2019/05/25		102	%	50 - 130
			Benzo(b/j)fluoranthene	2019/05/25		102	%	50 - 130
			Benzo(g,h,i)perylene	2019/05/25		70	%	50 - 130
			Benzo(k)fluoranthene	2019/05/25		99	%	50 - 130
			Chrysene	2019/05/25		86	%	50 - 130
			Dibenz(a,h)anthracene	2019/05/25		97	%	50 - 130
			Fluoranthene	2019/05/25		107	%	50 - 130
			Fluorene	2019/05/25		100	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/05/25		82	%	50 - 130
			1-Methylnaphthalene	2019/05/25		112	%	50 - 130
			2-Methylnaphthalene	2019/05/25		104	%	50 - 130
			Naphthalene	2019/05/25		96	%	50 - 130
			Phenanthrene	2019/05/25		103	%	50 - 130
			Pyrene	2019/05/25		107	%	50 - 130
6138121	KAD	LCS	Conductivity	2019/05/24		102	%	90 - 110
6138274	DT1	LCS	Acid Extractable Antimony (Sb)	2019/05/24		104	%	80 - 120
			Acid Extractable Arsenic (As)	2019/05/24		105	%	80 - 120
			Acid Extractable Barium (Ba)	2019/05/24		106	%	80 - 120
			Acid Extractable Beryllium (Be)	2019/05/24		104	%	80 - 120
			Acid Extractable Boron (B)	2019/05/24		104	%	80 - 120
			Acid Extractable Cadmium (Cd)	2019/05/24		103	%	80 - 120
			Acid Extractable Chromium (Cr)	2019/05/24		105	%	80 - 120
			Acid Extractable Cobalt (Co)	2019/05/24		105	%	80 - 120
			Acid Extractable Copper (Cu)	2019/05/24		104	%	80 - 120
			Acid Extractable Lead (Pb)	2019/05/24		108	%	80 - 120
			Acid Extractable Molybdenum (Mo)	2019/05/24		102	%	80 - 120
			Acid Extractable Nickel (Ni)	2019/05/24		105	%	80 - 120
			Acid Extractable Selenium (Se)	2019/05/24		109	%	80 - 120
			Acid Extractable Silver (Ag)	2019/05/24		103	%	80 - 120
			Acid Extractable Thallium (Tl)	2019/05/24		104	%	80 - 120
			Acid Extractable Uranium (U)	2019/05/24		108	%	80 - 120
			Acid Extractable Vanadium (V)	2019/05/24		105	%	80 - 120
			Acid Extractable Zinc (Zn)	2019/05/24		106	%	80 - 120
6135575	GYA	SRM	Sieve - #200 (>0.075mm)	2019/05/23		45	%	42 - 47
			Sieve - #200 (<0.075mm)	2019/05/23		55	%	53 - 58
6139139	DM1	SRM	Total Organic Carbon	2019/05/27		108	%	75 - 125

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.

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


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

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

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

VALIDATION SIGNATURE PAGE

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



Brad Newman, Scientific Service Specialist

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



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**EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED**

Page 1 of 1
C of C # 716854-02-01



716854

INVOICE INFORMATION

Company Name: Imperial Oil Ltd - Golder Associates Ltd
Contact Name: Chris Vettorazzo
Address: 41 Austin St. Suite 101, St. Johns
Newfoundland, A1B 4C1
Email: chris_vettorazzo@golder.com, IOL_1390@golde

REPORT INFORMATION

Company Name: Golder Associates Ltd
Contact Name: Chris Vettorazzo
Address: 41 Austin St. Suite 101, St. Johns
Newfoundland, A1B 4C1
Email: chris_vettorazzo@golder.com, IOL_1390@golde

FIELD INFORMATION

Sampler Name (Print): **Leandra Mariani, Jeremy Eckert**
Phone: (403) 299-5600
Consultant Project #: 18113796-1485-1908

FIELD SAMPLE ID	MATRIX			SAMPLING		LAB FILTRATION REQUIRED	FIELD FILTERED & PRESERVED (24 HR)	DATE (YYYYMMDD)	# CONTAINERS	OTHER		SPECIAL INSTRUCTIONS:	# TARS USED AND NOT SUBMITTED Enter N/A for Water	TURNAROUND TIME (2 days) (3 days) (2 days) (1 day) (same day)
	GROUND WATER	SURFACE WATER	SOL	OTHER	YES					NO				
1 MW19-06-01	X				4			2019/05/14 10:00						
2 MW19-06-04	X				6			2019/05/16 14:00						
3 DUPA	X				6			2019/05/16 14:00						
4 MW19-07-01	X				4			2019/05/14 11:00						
5 MW19-07-05	X				6			2019/05/16 14:00						
6 MW19-09-02	X				1			2019/05/14 10:30						
7														
8														
9														
10														

IOL SITE LOCATION:
2 Montreal Road, Ottawa, Ontario

IOL PROJECT # (if applicable):
N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
18113796-1485-7777-

REGULATORY CRITERIA / DETECTION LIMITS:
 REG 153 Table 3 2004 2011 RSC
(Please indicate which Reg. version and if RSC required)

ODWS PWOO Other

SPECIAL INSTRUCTIONS:
YES: A1601436
SAP: 88005740
Headspace end/or gravel may be present.

RELIQUISHED BY: **Jeremy Eckert** DATE: 2019/05/17 09:45
1. **Jeremy Eckert** 2019/05/17 09:45
2. **Leandra Mariani** 2019/05/18 15:22
3. **Chris Vettorazzo** 2019/05/18 15:22

SEAL PRESENT YES NO COOLER ID: 7
SEAL INTACT YES NO COOLER ID: 1
COOLING MEDIA PRESENT YES NO COOLER ID: 3

TEMP °C: 2 5 5
DATE: 2019/05/18 15:22
LAB USE ONLY: MAXXAM JOB # 8904002
SAMPLES: 3

LABELLED BY: **URC** VERIFIED BY: **SID**

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S 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.MAXXAM.CA/TENNIS.

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: May 14 and 16, 2019

Location: 2 Montreal Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 18113796-1485

Sample Submission Number: B9D4002

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits.
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:

Yes

Has lab warranted all tests were in statistical control in CoA (Yes/No)?:

Yes

Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:

Yes

Were all samples analyzed within hold times (Yes/No)?:

Yes

All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:

Yes

Is Chain of Custody completed and signed (Yes/No)?:

Yes

Were sample temperatures acceptable when they reached lab (Yes/No)?:

Yes

Is data considered to be reliable (Yes/No/Suspect)?:

Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): 

Date: May 30, 2019

Task Order#: 18113796-1485-7777
 Site#: N/A
 Site Location: 2 Montreal Road, Ottawa, Ontario
 Project #: 18113796-1485-1906
 Your C.O.C. #: 716854-01-01

Attention: Chris Vettorazzo

Golder Associates Ltd
 11 Austin St.
 Suite 101
 St. John's, NL
 Canada A1B 4C1

Report Date: 2019/05/30
 Report #: R5731739
 Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9D4005
Received: 2019/05/18, 15:22

Sample Matrix: Soil
 # Samples Received: 7

Analyses	Quantity	Laboratory Method	Primary Reference
Methylnaphthalene Sum	4	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum	4		EPA 8260C m
Conductivity	4	CAM SOP-00414	OMOE E3530 v1 m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	5	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	6	CAM SOP-00316	CCME CWS m
Fraction Organic Carbon in Soil	2	CAM SOP-00468	Lloyd Kahn Method
Glycols in Soil by GC-FID	1	CAM SOP-00322	EPA 8015 m
Strong Acid Leachable Metals by ICPMS	4	CAM SOP-00447	EPA 6020B m
Bulk Density (1)	1	AB SOP-00050	McKeague 2nd 2.21 m
Moisture	6	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM)	4	CAM SOP-00318	EPA 8270D m
pH CaCl2 EXTRACT	4	CAM SOP-00413	EPA 9045 D m
Sieve, 75um	3	CAM SOP-00467	Carter 2nd ed m
Sodium Adsorption Ratio (SAR)	4	CAM SOP-00102	EPA 6010C
SAR - ICP Metals	4	CAM SOP-00408	EPA 6010D m
Total Organic Carbon in Soil	2	CAM SOP-00468	BCMOE TOC Aug 2014
Volatile Organic Compounds in Soil	4	CAM SOP-00228	EPA 8260C m

Remarks:

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

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

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

Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1906
Your C.O.C. #: 716854-01-01

Attention: Chris Vettorazzo

Golder Associates Ltd
11 Austin St.
Suite 101
St. John's, NL
Canada A1B 4C1

Report Date: 2019/05/30
Report #: R5731739
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9D4005
Received: 2019/05/18, 15:22

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

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

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

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

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

(1) This test was performed by Campo to Calgary - Offsite

(2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.

(3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key



Kyle Reinhart
Project Manager
30 May 2019 13:32:51

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

Kyle Reinhart, Project Manager

Email: kreinhart@maxxam.ca

Phone# (905)817-5802

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

O.REG 153 PHCS IN SOIL (SOIL)

Maxxam ID		JTI647			JTI647			JTI648		
Sampling Date		2019/05/13 10:30			2019/05/13 10:30			2019/05/15 12:40		
COC Number		716854-01-01			716854-01-01			716854-01-01		
	UNITS	MW19-01-01	RDL	QC Batch	MW19-01-01 Lab-Dup	RDL	QC Batch	MW19-01-06	RDL	QC Batch
Moisture	%	16	1.0	6134192	17	1.0	6134192	5.2	1.0	6134192
Benzene	ug/g	<0.020	0.020	6136164						
Toluene	ug/g	<0.020	0.020	6136164						
Ethylbenzene	ug/g	<0.020	0.020	6136164						
o-Xylene	ug/g	<0.020	0.020	6136164						
p+m-Xylene	ug/g	<0.040	0.040	6136164						
Total Xylenes	ug/g	<0.040	0.040	6136164						
F1 (C6-C10)	ug/g	<10	10	6136164				<10	10	6136164
F1 (C6-C10) - BTEX	ug/g	<10	10	6136164				<10	10	6136164
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	6137808				58	10	6137808
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	6137808				86	50	6137808
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	6137808				<50	50	6137808
Reached Baseline at C50	ug/g	Yes		6137808				Yes		6137808
Extraction										
Surrogate Recovery (%)										
D10-Ethylbenzene	%	93		6136164				95		6136164
o-Terphenyl	%	86		6137808				88		6137808
Instrument										
Surrogate Recovery (%)										
1,4-Difluorobenzene	%	100		6136164				104		6136164
4-Bromofluorobenzene	%	97		6136164				99		6136164
D4-1,2-Dichloroethane	%	90		6136164				93		6136164
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										

O.REG 153 PHCS IN SOIL (SOIL)

Maxxam ID		JTI648			JTI650	JTI651	JTI652		
Sampling Date		2019/05/15 12:40			2019/05/15 14:00	2019/05/16 10:00	2019/05/16 11:00		
COC Number		716854-01-01			716854-01-01	716854-01-01	716854-01-01		
	UNITS	MW19-01-06 Lab-Dup	RDL	QC Batch	MW19-02-08	MW19-03-05	MW19-05-05	RDL	QC Batch
Moisture	%				6.9	10	4.7	1.0	6134192
F1 (C6-C10)	ug/g	11	10	6136164	<10	160	54	10	6136164
F1 (C6-C10) - BTEX	ug/g	11	10	6136164	<10	140	53	10	6136164
F2 (C10-C16 Hydrocarbons)	ug/g				36	110	120	10	6137808
F3 (C16-C34 Hydrocarbons)	ug/g				58	93	140	50	6137808
F4 (C34-C50 Hydrocarbons)	ug/g				<50	<50	<50	50	6137808
Reached Baseline at C50	ug/g				Yes	Yes	Yes		6137808
Extraction Surrogate Recovery (%)									
D10-Ethylbenzene	%	98		6136164	104	104	103		6136164
o-Terphenyl	%				87	90	90		6137808
Instrument Surrogate Recovery (%)									
1,4-Difluorobenzene	%	103		6136164	102	105	105		6136164
4-Bromofluorobenzene	%	98		6136164	99	100	99		6136164
D4-1,2-Dichloroethane	%	91		6136164	90	93	94		6136164
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate									

O.REG 153 PAHS (SOIL)

Maxxam ID		JTI648	JTI650	JTI651		JTI652		
Sampling Date		2019/05/15 12:40	2019/05/15 14:00	2019/05/16 10:00		2019/05/16 11:00		
COC Number		716854-01-01	716854-01-01	716854-01-01		716854-01-01		
	UNITS	MW19-01-06	MW19-02-08	MW19-03-05	RDL	MW19-05-05	RDL	QC Batch
Methylnaphthalene, 2-(1-)	ug/g	0.024	0.044	1.1	0.0071	0.086	0.0071	6131874
Acenaphthene	ug/g	<0.0050	<0.0050	0.013	0.0050	<0.0050	0.0050	6137815
Acenaphthylene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	6137815
Anthracene	ug/g	0.0088	0.012	0.022	0.0050	0.016	0.0050	6137815
Benzo(a)anthracene	ug/g	<0.0050	0.025	0.018	0.0050	<0.0050	0.0050	6137815
Benzo(a)pyrene	ug/g	<0.0050	0.024	0.013	0.0050	<0.0050	0.0050	6137815
Benzo(b/j)fluoranthene	ug/g	<0.0050	0.034	0.021	0.0050	<0.0050	0.0050	6137815
Benzo(g,h,i)perylene	ug/g	0.0055	0.017	0.016	0.0050	0.0058	0.0050	6137815
Benzo(k)fluoranthene	ug/g	<0.0050	0.012	0.0064	0.0050	<0.0050	0.0050	6137815
Chrysene	ug/g	0.014	0.028	0.026	0.0050	0.017	0.0050	6137815
Dibenz(a,h)anthracene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	6137815
Fluoranthene	ug/g	0.0051	0.054	0.035	0.0050	0.0067	0.0050	6137815
Fluorene	ug/g	0.011	0.012	0.029	0.0050	0.021	0.0050	6137815
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	0.015	0.0071	0.0050	<0.0050	0.0050	6137815
1-Methylnaphthalene	ug/g	0.011	0.019	0.48	0.0050	0.039	0.0050	6137815
2-Methylnaphthalene	ug/g	0.013	0.024	0.61	0.0050	0.047	0.0050	6137815
Naphthalene	ug/g	<0.0050	0.0092	0.65	0.0050	<0.020 (1)	0.020	6137815
Phenanthrene	ug/g	0.066	0.074	0.11	0.0050	0.083	0.0050	6137815
Pyrene	ug/g	0.011	0.048	0.063	0.0050	0.012	0.0050	6137815
Extraction Surrogate Recovery (%)								
D10-Anthracene	%	112	111	118		108		6137815
D14-Terphenyl (FS)	%	99	103	111		98		6137815
D8-Acenaphthylene	%	96	93	102		92		6137815
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) DL was raised due to matrix interference.								

O.REG 153 VOCs BY HS (SOIL)

Maxxam ID		JTI648	JTI650		JTI651		JTI652		
Sampling Date		2019/05/15 12:40	2019/05/15 14:00		2019/05/16 10:00		2019/05/16 11:00		
COC Number		716854-01-01	716854-01-01		716854-01-01		716854-01-01		
	UNITS	MW19-01-06	MW19-02-08	RDL	MW19-03-05	RDL	MW19-05-05	RDL	QC Batch
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6131875
Acetone (2-Propanone)	ug/g	<0.50	<0.50	0.50	<1.0	1.0	<0.50	0.50	6133043
Benzene	ug/g	<0.020	<0.020	0.020	2.1	0.040	<0.020	0.020	6133043
Bromodichloromethane	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
Bromoform	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
Bromomethane	ug/g	<0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	6133043
Carbon Tetrachloride	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
Chlorobenzene	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
Chloroform	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
Dibromochloromethane	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
1,2-Dichlorobenzene	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
1,3-Dichlorobenzene	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
1,4-Dichlorobenzene	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
1,1-Dichloroethane	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
1,2-Dichloroethane	ug/g	<0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	6133043
1,1-Dichloroethylene	ug/g	<0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	6133043
cis-1,2-Dichloroethylene	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
trans-1,2-Dichloroethylene	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
1,2-Dichloropropane	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
cis-1,3-Dichloropropene	ug/g	<0.030	<0.030	0.030	<0.060	0.060	<0.030	0.030	6133043
trans-1,3-Dichloropropene	ug/g	<0.040	<0.040	0.040	<0.080	0.080	<0.040	0.040	6133043
Ethylbenzene	ug/g	<0.020	<0.020	0.020	6.9	0.040	0.023	0.020	6133043
Ethylene Dibromide	ug/g	<0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	6133043
Hexane	ug/g	0.13	0.10	0.050	1.7	0.10	0.44	0.050	6133043
Methylene Chloride(Dichloromethane)	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	<0.50	0.50	<1.0	1.0	<0.50	0.50	6133043
Methyl Isobutyl Ketone	ug/g	<0.50	<0.50	0.50	<1.0	1.0	<0.50	0.50	6133043
Methyl t-butyl ether (MTBE)	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
Styrene	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
1,1,1,2-Tetrachloroethane	ug/g	<0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	6133043
1,1,1,2-Tetrachloroethane	ug/g	<0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	6133043
Tetrachloroethylene	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
Toluene	ug/g	0.025	<0.020	0.020	9.8	0.040	0.021	0.020	6133043
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

O.REG 153 VOCs BY HS (SOIL)

Maxxam ID		JTI648	JTI650		JTI651		JTI652		
Sampling Date		2019/05/15 12:40	2019/05/15 14:00		2019/05/16 10:00		2019/05/16 11:00		
COC Number		716854-01-01	716854-01-01		716854-01-01		716854-01-01		
	UNITS	MW19-01-06	MW19-02-08	RDL	MW19-03-05	RDL	MW19-05-05	RDL	QC Batch
1,1,1-Trichloroethane	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
1,1,2-Trichloroethane	ug/g	<0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	6133043
Trichloroethylene	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	6133043
Vinyl Chloride	ug/g	<0.020	<0.020	0.020	<0.020	0.020	<0.020	0.020	6133043
p+m-Xylene	ug/g	0.027	0.046	0.020	23	0.040	0.095	0.020	6133043
o-Xylene	ug/g	<0.020	<0.020	0.020	4.8	0.040	0.065	0.020	6133043
Total Xylenes	ug/g	0.027	0.046	0.020	28	0.040	0.16	0.020	6133043
Extraction Surrogate Recovery (%)									
D10-o-Xylene	%	109	104		93		102		6133043
Instrument Surrogate Recovery (%)									
4-Bromofluorobenzene	%	97	95		96		98		6133043
D4-1,2-Dichloroethane	%	94	94		94		92		6133043
D8-Toluene	%	100	101		97		103		6133043
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

RESULTS OF ANALYSES OF SOIL

Maxxam ID		JTI647			JTI648			JTI649		
Sampling Date		2019/05/13 10:30			2019/05/15 12:40			2019/05/13 11:00		
COC Number		716854-01-01			716854-01-01			716854-01-01		
	UNITS	MW19-01-01	RDL	QC Batch	MW19-01-06	RDL	QC Batch	MW19-02-02	RDL	QC Batch
Fraction of Organic Carbon	g/g				0.022	0.00050	6131331			
Sodium Adsorption Ratio	N/A	0.32		6132150				0.25		6132150
Conductivity	mS/cm	0.10	0.002	6138121				0.18	0.002	6138121
Moisture	%							7.0	1.0	6134192
Total Organic Carbon	mg/kg				22000	500	6139139			
Available (CaCl2) pH	pH	7.66		6135911				7.84		6135911
Grain Size	%							COARSE	N/A	6135575
Sieve - #200 (<0.075mm)	%							15	1	6135575
Sieve - #200 (>0.075mm)	%							85	1	6135575
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable										

Maxxam ID		JTI650			JTI651			JTI652		
Sampling Date		2019/05/15 14:00			2019/05/16 10:00			2019/05/16 11:00		
COC Number		716854-01-01			716854-01-01			716854-01-01		
	UNITS	MW19-02-08	RDL	QC Batch	MW19-03-05	RDL	QC Batch	MW19-05-05	RDL	QC Batch
Sodium Adsorption Ratio	N/A				0.23		6132150	0.33		6132150
Conductivity	mS/cm				0.38	0.002	6138121	0.70	0.002	6138121
Available (CaCl2) pH	pH				7.73		6135911	7.68		6135911
Grain Size	%	COARSE	N/A	6135575	FINE	N/A	6135575			
Sieve - #200 (<0.075mm)	%	25	1	6135575	66	1	6135575			
Sieve - #200 (>0.075mm)	%	75	1	6135575	34	1	6135575			
Dry Bulk Density	g/cm3							1.8	0.010	6147923
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable										

RESULTS OF ANALYSES OF SOIL

Maxxam ID		JTI653		
Sampling Date		2019/05/14 11:30		
COC Number		716854-01-01		
	UNITS	MW19-08-01	RDL	QC Batch
Fraction of Organic Carbon	g/g	0.015	0.00050	6131331
Total Organic Carbon	mg/kg	15000	500	6139139
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

GLYCOLS BY GC-FID (SOIL)

Maxxam ID		JTI652		
Sampling Date		2019/05/16 11:00		
COC Number		716854-01-01		
	UNITS	MW19-05-05	RDL	QC Batch
Propylene Glycol	mg/kg	<10	10	6134964
Ethylene Glycol	mg/kg	<10	10	6134964
Diethylene Glycol	mg/kg	<10	10	6134964
Total Glycol	mg/kg	<10	10	6134964
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JTI647	JTI649	JTI651	JTI652		
Sampling Date		2019/05/13 10:30	2019/05/13 11:00	2019/05/16 10:00	2019/05/16 11:00		
COC Number		716854-01-01	716854-01-01	716854-01-01	716854-01-01		
	UNITS	MW19-01-01	MW19-02-02	MW19-03-05	MW19-05-05	RDL	QC Batch
Acid Extractable Antimony (Sb)	ug/g	<0.20	<0.20	0.64	0.70	0.20	6138274
Acid Extractable Arsenic (As)	ug/g	<1.0	2.8	8.9	12	1.0	6138274
Acid Extractable Barium (Ba)	ug/g	86	140	76	76	0.50	6138274
Acid Extractable Beryllium (Be)	ug/g	0.29	0.41	0.96	1.1	0.20	6138274
Acid Extractable Boron (B)	ug/g	<5.0	8.2	9.2	9.9	5.0	6138274
Acid Extractable Cadmium (Cd)	ug/g	<0.10	0.10	0.46	0.47	0.10	6138274
Acid Extractable Chromium (Cr)	ug/g	18	16	23	24	1.0	6138274
Acid Extractable Cobalt (Co)	ug/g	6.5	11	19	24	0.10	6138274
Acid Extractable Copper (Cu)	ug/g	12	19	48	57	0.50	6138274
Acid Extractable Lead (Pb)	ug/g	3.2	13	16	21	1.0	6138274
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	1.4	8.4	10	0.50	6138274
Acid Extractable Nickel (Ni)	ug/g	11	21	63	80	0.50	6138274
Acid Extractable Selenium (Se)	ug/g	<0.50	<0.50	1.9	2.6	0.50	6138274
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	<0.20	<0.20	0.20	6138274
Acid Extractable Thallium (Tl)	ug/g	0.12	0.26	0.34	0.27	0.050	6138274
Acid Extractable Uranium (U)	ug/g	0.50	0.85	3.4	3.7	0.050	6138274
Acid Extractable Vanadium (V)	ug/g	33	27	39	40	5.0	6138274
Acid Extractable Zinc (Zn)	ug/g	26	31	76	74	5.0	6138274
RDL = Reportable Detection Limit QC Batch = Quality Control Batch							

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		JT1649		
Sampling Date		2019/05/13 11:00		
COC Number		716854-01-01		
	UNITS	MW19-02-02	RDL	QC Batch
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	6137808
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	6137808
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	6137808
Reached Baseline at C50	ug/g	Yes		6137808
Extraction				
Surrogate Recovery (%)				
o-Terphenyl	%	85		6137808
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

TEST SUMMARY

Maxxam ID: JTI647
Sample ID: MW19-01-01
Matrix: Soil

Collected: 2019/05/13
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	6138121	2019/05/24	2019/05/24	Kazzandra Adeva
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6136164	N/A	2019/05/23	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6137808	2019/05/23	2019/05/24	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6138274	2019/05/24	2019/05/24	Daniel Teclu
Moisture	BAL	6134192	N/A	2019/05/22	Min Yang
pH CaCl2 EXTRACT	AT	6135911	2019/05/23	2019/05/23	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6132150	N/A	2019/05/24	Automated Statchk

Maxxam ID: JTI647 Dup
Sample ID: MW19-01-01
Matrix: Soil

Collected: 2019/05/13
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	6134192	N/A	2019/05/22	Min Yang

Maxxam ID: JTI648
Sample ID: MW19-01-06
Matrix: Soil

Collected: 2019/05/15
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6131874	N/A	2019/05/27	Automated Statchk
1,3-Dichloropropene Sum	CALC	6131875	N/A	2019/05/23	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6136164	N/A	2019/05/23	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6137808	2019/05/23	2019/05/24	Prabhjot Gulati
Fraction Organic Carbon in Soil		6131331	N/A	2019/05/27	Automated Statchk
Moisture	BAL	6134192	N/A	2019/05/22	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6137815	2019/05/23	2019/05/26	Mitesh Raj
Total Organic Carbon in Soil	COMB	6139139	N/A	2019/05/27	Dhruvik Modh
Volatile Organic Compounds in Soil	GC/MS	6133043	N/A	2019/05/23	Chandni Khawas

Maxxam ID: JTI648 Dup
Sample ID: MW19-01-06
Matrix: Soil

Collected: 2019/05/15
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6136164	N/A	2019/05/23	Abdikarim Ali

Maxxam ID: JTI649
Sample ID: MW19-02-02
Matrix: Soil

Collected: 2019/05/13
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	6138121	2019/05/24	2019/05/24	Kazzandra Adeva
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6137808	2019/05/23	2019/05/24	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6138274	2019/05/24	2019/05/24	Daniel Teclu

TEST SUMMARY

Maxxam ID: JTI649
Sample ID: MW19-02-02
Matrix: Soil

Collected: 2019/05/13
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	6134192	N/A	2019/05/22	Min Yang
pH CaCl2 EXTRACT	AT	6135911	2019/05/23	2019/05/23	Gnana Thomas
Sieve, 75um	SIEV	6135575	N/A	2019/05/23	Min Yang
Sodium Adsorption Ratio (SAR)	CALC/MET	6132150	N/A	2019/05/24	Automated Statchk

Maxxam ID: JTI650
Sample ID: MW19-02-08
Matrix: Soil

Collected: 2019/05/15
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6131874	N/A	2019/05/27	Automated Statchk
1,3-Dichloropropene Sum	CALC	6131875	N/A	2019/05/23	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6136164	N/A	2019/05/24	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6137808	2019/05/23	2019/05/24	Prabhjot Gulati
Moisture	BAL	6134192	N/A	2019/05/22	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6137815	2019/05/23	2019/05/26	Mitesh Raj
Sieve, 75um	SIEV	6135575	N/A	2019/05/23	Min Yang
Volatile Organic Compounds in Soil	GC/MS	6133043	N/A	2019/05/23	Chandni Khawas

Maxxam ID: JTI651
Sample ID: MW19-03-05
Matrix: Soil

Collected: 2019/05/16
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6131874	N/A	2019/05/27	Automated Statchk
1,3-Dichloropropene Sum	CALC	6131875	N/A	2019/05/24	Automated Statchk
Conductivity	AT	6138121	2019/05/24	2019/05/24	Kazzandra Adeva
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6136164	N/A	2019/05/24	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6137808	2019/05/23	2019/05/24	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6138274	2019/05/24	2019/05/24	Daniel Teclu
Moisture	BAL	6134192	N/A	2019/05/22	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6137815	2019/05/23	2019/05/26	Mitesh Raj
pH CaCl2 EXTRACT	AT	6135911	2019/05/23	2019/05/23	Gnana Thomas
Sieve, 75um	SIEV	6135575	N/A	2019/05/23	Min Yang
Sodium Adsorption Ratio (SAR)	CALC/MET	6132150	N/A	2019/05/24	Automated Statchk
Volatile Organic Compounds in Soil	GC/MS	6133043	N/A	2019/05/23	Chandni Khawas

Maxxam ID: JTI652
Sample ID: MW19-05-05
Matrix: Soil

Collected: 2019/05/16
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6131874	N/A	2019/05/27	Automated Statchk
1,3-Dichloropropene Sum	CALC	6131875	N/A	2019/05/23	Automated Statchk
Conductivity	AT	6138121	2019/05/24	2019/05/24	Kazzandra Adeva

Maxxam Job #: B9D4005
Report Date: 2019/05/30

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1906

TEST SUMMARY

Maxxam ID: JTI652
Sample ID: MW19-05-05
Matrix: Soil

Collected: 2019/05/16
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6136164	N/A	2019/05/24	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6137808	2019/05/23	2019/05/24	Prabhjot Gulati
Glycols in Soil by GC-FID	GC/FID	6134964	N/A	2019/05/23	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6138274	2019/05/24	2019/05/24	Daniel Teclu
Bulk Density	BAL	6147923	N/A	2019/05/27	Muhammad Naeem
Moisture	BAL	6134192	N/A	2019/05/22	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6137815	2019/05/23	2019/05/26	Mitesh Raj
pH CaCl2 EXTRACT	AT	6135911	2019/05/23	2019/05/23	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6132150	N/A	2019/05/24	Automated Statchk
Volatile Organic Compounds in Soil	GC/MS	6133043	N/A	2019/05/23	Chandni Khawas

Maxxam ID: JTI653
Sample ID: MW19-08-01
Matrix: Soil

Collected: 2019/05/14
Relinquished: 2019/05/17
Received: 2019/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Fraction Organic Carbon in Soil		6131331	N/A	2019/05/27	Automated Statchk
Total Organic Carbon in Soil	COMB	6139139	N/A	2019/05/27	Dhruvik Modh

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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F1/ BTEX analysis: The BTEX results used for the F1/BTEX calculation were obtained from Headspace-GC analysis.

Sample JTI647 [MW19-01-01] : SAR Analysis: Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

Sample JTI649 [MW19-02-02] : SAR Analysis: Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

Sample JTI651 [MW19-03-05] : VOC Analysis: Due to high concentrations of target analytes, sample required dilution. Detection limits were adjusted accordingly. In order to meet required regulatory criteria or to achieve lower reporting limits, results for selected compounds (obtained by a separate analysis using an appropriate low dilution) are included in the report.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6133043	CKH	Method Blank	4-Bromofluorobenzene	2019/05/22		97	%	60 - 140	
			D10-o-Xylene	2019/05/22		97	%	60 - 130	
			D4-1,2-Dichloroethane	2019/05/22		102	%	60 - 140	
			D8-Toluene	2019/05/22		96	%	60 - 140	
			Acetone (2-Propanone)	2019/05/22	<0.50		ug/g		
			Benzene	2019/05/22	<0.020		ug/g		
			Bromodichloromethane	2019/05/22	<0.050		ug/g		
			Bromoform	2019/05/22	<0.050		ug/g		
			Bromomethane	2019/05/22	<0.050		ug/g		
			Carbon Tetrachloride	2019/05/22	<0.050		ug/g		
			Chlorobenzene	2019/05/22	<0.050		ug/g		
			Chloroform	2019/05/22	<0.050		ug/g		
			Dibromochloromethane	2019/05/22	<0.050		ug/g		
			1,2-Dichlorobenzene	2019/05/22	<0.050		ug/g		
			1,3-Dichlorobenzene	2019/05/22	<0.050		ug/g		
			1,4-Dichlorobenzene	2019/05/22	<0.050		ug/g		
			Dichlorodifluoromethane (FREON 12)	2019/05/22	<0.050		ug/g		
			1,1-Dichloroethane	2019/05/22	<0.050		ug/g		
			1,2-Dichloroethane	2019/05/22	<0.050		ug/g		
			1,1-Dichloroethylene	2019/05/22	<0.050		ug/g		
			cis-1,2-Dichloroethylene	2019/05/22	<0.050		ug/g		
			trans-1,2-Dichloroethylene	2019/05/22	<0.050		ug/g		
			1,2-Dichloropropane	2019/05/22	<0.050		ug/g		
			cis-1,3-Dichloropropene	2019/05/22	<0.030		ug/g		
			trans-1,3-Dichloropropene	2019/05/22	<0.040		ug/g		
			Ethylbenzene	2019/05/22	<0.020		ug/g		
			Ethylene Dibromide	2019/05/22	<0.050		ug/g		
			Hexane	2019/05/22	<0.050		ug/g		
			Methylene Chloride(Dichloromethane)	2019/05/22	<0.050		ug/g		
			Methyl Ethyl Ketone (2-Butanone)	2019/05/22	<0.50		ug/g		
			Methyl Isobutyl Ketone	2019/05/22	<0.50		ug/g		
			Methyl t-butyl ether (MTBE)	2019/05/22	<0.050		ug/g		
			Styrene	2019/05/22	<0.050		ug/g		
			1,1,1,2-Tetrachloroethane	2019/05/22	<0.050		ug/g		
			1,1,2,2-Tetrachloroethane	2019/05/22	<0.050		ug/g		
			Tetrachloroethylene	2019/05/22	<0.050		ug/g		
			Toluene	2019/05/22	<0.020		ug/g		
			1,1,1-Trichloroethane	2019/05/22	<0.050		ug/g		
			1,1,2-Trichloroethane	2019/05/22	<0.050		ug/g		
			Trichloroethylene	2019/05/22	<0.050		ug/g		
Trichlorofluoromethane (FREON 11)	2019/05/22	<0.050		ug/g					
Vinyl Chloride	2019/05/22	<0.020		ug/g					
p+m-Xylene	2019/05/22	<0.020		ug/g					
o-Xylene	2019/05/22	<0.020		ug/g					
Total Xylenes	2019/05/22	<0.020		ug/g					
6134964	GUL	Method Blank	Propylene Glycol	2019/05/22	<10		mg/kg		
			Ethylene Glycol	2019/05/22	<10		mg/kg		
			Diethylene Glycol	2019/05/22	<10		mg/kg		
			Total Glycol	2019/05/22	<10		mg/kg		
6136164	AAI	Method Blank	1,4-Difluorobenzene	2019/05/23		103	%	60 - 140	
			4-Bromofluorobenzene	2019/05/23		98	%	60 - 140	
			D10-Ethylbenzene	2019/05/23		95	%	60 - 140	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			D4-1,2-Dichloroethane	2019/05/23		90	%	60 - 140
			Benzene	2019/05/23	<0.020		ug/g	
			Toluene	2019/05/23	<0.020		ug/g	
			Ethylbenzene	2019/05/23	<0.020		ug/g	
			o-Xylene	2019/05/23	<0.020		ug/g	
			p+m-Xylene	2019/05/23	<0.040		ug/g	
			Total Xylenes	2019/05/23	<0.040		ug/g	
			F1 (C6-C10)	2019/05/23	<10		ug/g	
			F1 (C6-C10) - BTEX	2019/05/23	<10		ug/g	
6137808	GUL	Method Blank	o-Terphenyl	2019/05/24		89	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/05/24	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2019/05/24	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2019/05/24	<50		ug/g	
6137815	RAJ	Method Blank	D10-Anthracene	2019/05/25		104	%	50 - 130
			D14-Terphenyl (FS)	2019/05/25		92	%	50 - 130
			D8-Acenaphthylene	2019/05/25		88	%	50 - 130
			Acenaphthene	2019/05/25	<0.0050		ug/g	
			Acenaphthylene	2019/05/25	<0.0050		ug/g	
			Anthracene	2019/05/25	<0.0050		ug/g	
			Benzo(a)anthracene	2019/05/25	<0.0050		ug/g	
			Benzo(a)pyrene	2019/05/25	<0.0050		ug/g	
			Benzo(b/j)fluoranthene	2019/05/25	<0.0050		ug/g	
			Benzo(g,h,i)perylene	2019/05/25	<0.0050		ug/g	
			Benzo(k)fluoranthene	2019/05/25	<0.0050		ug/g	
			Chrysene	2019/05/25	<0.0050		ug/g	
			Dibenz(a,h)anthracene	2019/05/25	<0.0050		ug/g	
			Fluoranthene	2019/05/25	<0.0050		ug/g	
			Fluorene	2019/05/25	<0.0050		ug/g	
			Indeno(1,2,3-cd)pyrene	2019/05/25	<0.0050		ug/g	
			1-Methylnaphthalene	2019/05/25	<0.0050		ug/g	
			2-Methylnaphthalene	2019/05/25	<0.0050		ug/g	
			Naphthalene	2019/05/25	<0.0050		ug/g	
			Phenanthrene	2019/05/25	<0.0050		ug/g	
			Pyrene	2019/05/25	<0.0050		ug/g	
6138121	KAD	Method Blank	Conductivity	2019/05/24	<0.002		mS/cm	
6138274	DT1	Method Blank	Acid Extractable Antimony (Sb)	2019/05/24	<0.20		ug/g	
			Acid Extractable Arsenic (As)	2019/05/24	<1.0		ug/g	
			Acid Extractable Barium (Ba)	2019/05/24	<0.50		ug/g	
			Acid Extractable Beryllium (Be)	2019/05/24	<0.20		ug/g	
			Acid Extractable Boron (B)	2019/05/24	<5.0		ug/g	
			Acid Extractable Cadmium (Cd)	2019/05/24	<0.10		ug/g	
			Acid Extractable Chromium (Cr)	2019/05/24	<1.0		ug/g	
			Acid Extractable Cobalt (Co)	2019/05/24	<0.10		ug/g	
			Acid Extractable Copper (Cu)	2019/05/24	<0.50		ug/g	
			Acid Extractable Lead (Pb)	2019/05/24	<1.0		ug/g	
			Acid Extractable Molybdenum (Mo)	2019/05/24	<0.50		ug/g	
			Acid Extractable Nickel (Ni)	2019/05/24	<0.50		ug/g	
			Acid Extractable Selenium (Se)	2019/05/24	<0.50		ug/g	
			Acid Extractable Silver (Ag)	2019/05/24	<0.20		ug/g	
			Acid Extractable Thallium (Tl)	2019/05/24	<0.050		ug/g	
			Acid Extractable Uranium (U)	2019/05/24	<0.050		ug/g	
			Acid Extractable Vanadium (V)	2019/05/24	<5.0		ug/g	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6139139	DM1	Method Blank	Acid Extractable Zinc (Zn)	2019/05/24	<5.0		ug/g	
6134192	CYN	RPD [JT1647-02]	Total Organic Carbon	2019/05/27	<500		mg/kg	
6136164	AAI	RPD [JT1648-03]	Moisture	2019/05/22	2.4		%	20
6136164	AAI	Matrix Spike [JT1648-03]	F1 (C6-C10)	2019/05/23	6.8		%	30
6136164	AAI	Matrix Spike [JT1648-03]	F1 (C6-C10) - BTEX	2019/05/23	6.8		%	30
			1,4-Difluorobenzene	2019/05/23		102	%	60 - 140
			4-Bromofluorobenzene	2019/05/23		99	%	60 - 140
			D10-Ethylbenzene	2019/05/23		105	%	60 - 140
			D4-1,2-Dichloroethane	2019/05/23		90	%	60 - 140
			Benzene	2019/05/23		100	%	60 - 140
			Toluene	2019/05/23		103	%	60 - 140
			Ethylbenzene	2019/05/23		102	%	60 - 140
			o-Xylene	2019/05/23		98	%	60 - 140
			p+m-Xylene	2019/05/23		99	%	60 - 140
			F1 (C6-C10)	2019/05/23		137	%	60 - 140
6133043	CKH	LCS	4-Bromofluorobenzene	2019/05/22		99	%	60 - 140
			D10-o-Xylene	2019/05/22		96	%	60 - 130
			D4-1,2-Dichloroethane	2019/05/22		100	%	60 - 140
			D8-Toluene	2019/05/22		104	%	60 - 140
			Acetone (2-Propanone)	2019/05/22		92	%	60 - 140
			Benzene	2019/05/22		91	%	60 - 130
			Bromodichloromethane	2019/05/22		90	%	60 - 130
			Bromoform	2019/05/22		93	%	60 - 130
			Bromomethane	2019/05/22		94	%	60 - 140
			Carbon Tetrachloride	2019/05/22		90	%	60 - 130
			Chlorobenzene	2019/05/22		91	%	60 - 130
			Chloroform	2019/05/22		91	%	60 - 130
			Dibromochloromethane	2019/05/22		95	%	60 - 130
			1,2-Dichlorobenzene	2019/05/22		92	%	60 - 130
			1,3-Dichlorobenzene	2019/05/22		92	%	60 - 130
			1,4-Dichlorobenzene	2019/05/22		94	%	60 - 130
			Dichlorodifluoromethane (FREON 12)	2019/05/22		93	%	60 - 140
			1,1-Dichloroethane	2019/05/22		92	%	60 - 130
			1,2-Dichloroethane	2019/05/22		92	%	60 - 130
			1,1-Dichloroethylene	2019/05/22		88	%	60 - 130
			cis-1,2-Dichloroethylene	2019/05/22		92	%	60 - 130
			trans-1,2-Dichloroethylene	2019/05/22		91	%	60 - 130
			1,2-Dichloropropane	2019/05/22		94	%	60 - 130
			cis-1,3-Dichloropropene	2019/05/22		95	%	60 - 130
			trans-1,3-Dichloropropene	2019/05/22		97	%	60 - 130
			Ethylbenzene	2019/05/22		92	%	60 - 130
			Ethylene Dibromide	2019/05/22		95	%	60 - 130
			Hexane	2019/05/22		92	%	60 - 130
			Methylene Chloride(Dichloromethane)	2019/05/22		100	%	60 - 130
			Methyl Ethyl Ketone (2-Butanone)	2019/05/22		98	%	60 - 140
			Methyl Isobutyl Ketone	2019/05/22		100	%	60 - 130
			Methyl t-butyl ether (MTBE)	2019/05/22		92	%	60 - 130
			Styrene	2019/05/22		95	%	60 - 130
			1,1,1,2-Tetrachloroethane	2019/05/22		93	%	60 - 130
			1,1,2,2-Tetrachloroethane	2019/05/22		95	%	60 - 130
			Tetrachloroethylene	2019/05/22		92	%	60 - 130
			Toluene	2019/05/22		93	%	60 - 130

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				1,1,1-Trichloroethane	2019/05/22		90	%	60 - 130
				1,1,2-Trichloroethane	2019/05/22		95	%	60 - 130
				Trichloroethylene	2019/05/22		90	%	60 - 130
				Trichlorofluoromethane (FREON 11)	2019/05/22		89	%	60 - 130
				Vinyl Chloride	2019/05/22		93	%	60 - 130
				p+m-Xylene	2019/05/22		92	%	60 - 130
				o-Xylene	2019/05/22		91	%	60 - 130
6134964		GUL	LCS	Propylene Glycol	2019/05/22		93	%	60 - 140
				Ethylene Glycol	2019/05/22		92	%	60 - 140
				Diethylene Glycol	2019/05/22		92	%	60 - 140
6135911		GTO	LCS	Available (CaCl2) pH	2019/05/23		100	%	97 - 103
6136164		AAI	LCS	1,4-Difluorobenzene	2019/05/23		102	%	60 - 140
				4-Bromofluorobenzene	2019/05/23		99	%	60 - 140
				D10-Ethylbenzene	2019/05/23		93	%	60 - 140
				D4-1,2-Dichloroethane	2019/05/23		89	%	60 - 140
				Benzene	2019/05/23		91	%	60 - 140
				Toluene	2019/05/23		93	%	60 - 140
				Ethylbenzene	2019/05/23		93	%	60 - 140
				o-Xylene	2019/05/23		86	%	60 - 140
				p+m-Xylene	2019/05/23		90	%	60 - 140
				F1 (C6-C10)	2019/05/23		92	%	80 - 120
6137808		GUL	LCS	o-Terphenyl	2019/05/24		87	%	60 - 130
				F2 (C10-C16 Hydrocarbons)	2019/05/24		91	%	80 - 120
				F3 (C16-C34 Hydrocarbons)	2019/05/24		89	%	80 - 120
				F4 (C34-C50 Hydrocarbons)	2019/05/24		89	%	80 - 120
6137815		RAJ	LCS	D10-Anthracene	2019/05/25		111	%	50 - 130
				D14-Terphenyl (FS)	2019/05/25		98	%	50 - 130
				D8-Acenaphthylene	2019/05/25		93	%	50 - 130
				Acenaphthene	2019/05/25		100	%	50 - 130
				Acenaphthylene	2019/05/25		100	%	50 - 130
				Anthracene	2019/05/25		101	%	50 - 130
				Benzo(a)anthracene	2019/05/25		107	%	50 - 130
				Benzo(a)pyrene	2019/05/25		102	%	50 - 130
				Benzo(b/j)fluoranthene	2019/05/25		102	%	50 - 130
				Benzo(g,h,i)perylene	2019/05/25		70	%	50 - 130
				Benzo(k)fluoranthene	2019/05/25		99	%	50 - 130
				Chrysene	2019/05/25		86	%	50 - 130
				Dibenz(a,h)anthracene	2019/05/25		97	%	50 - 130
				Fluoranthene	2019/05/25		107	%	50 - 130
				Fluorene	2019/05/25		100	%	50 - 130
				Indeno(1,2,3-cd)pyrene	2019/05/25		82	%	50 - 130
				1-Methylnaphthalene	2019/05/25		112	%	50 - 130
				2-Methylnaphthalene	2019/05/25		104	%	50 - 130
				Naphthalene	2019/05/25		96	%	50 - 130
				Phenanthrene	2019/05/25		103	%	50 - 130
				Pyrene	2019/05/25		107	%	50 - 130
6138121		KAD	LCS	Conductivity	2019/05/24		102	%	90 - 110
6138274		DT1	LCS	Acid Extractable Antimony (Sb)	2019/05/24		104	%	80 - 120
				Acid Extractable Arsenic (As)	2019/05/24		105	%	80 - 120
				Acid Extractable Barium (Ba)	2019/05/24		106	%	80 - 120
				Acid Extractable Beryllium (Be)	2019/05/24		104	%	80 - 120
				Acid Extractable Boron (B)	2019/05/24		104	%	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Cadmium (Cd)	2019/05/24		103	%	80 - 120
			Acid Extractable Chromium (Cr)	2019/05/24		105	%	80 - 120
			Acid Extractable Cobalt (Co)	2019/05/24		105	%	80 - 120
			Acid Extractable Copper (Cu)	2019/05/24		104	%	80 - 120
			Acid Extractable Lead (Pb)	2019/05/24		108	%	80 - 120
			Acid Extractable Molybdenum (Mo)	2019/05/24		102	%	80 - 120
			Acid Extractable Nickel (Ni)	2019/05/24		105	%	80 - 120
			Acid Extractable Selenium (Se)	2019/05/24		109	%	80 - 120
			Acid Extractable Silver (Ag)	2019/05/24		103	%	80 - 120
			Acid Extractable Thallium (Tl)	2019/05/24		104	%	80 - 120
			Acid Extractable Uranium (U)	2019/05/24		108	%	80 - 120
			Acid Extractable Vanadium (V)	2019/05/24		105	%	80 - 120
			Acid Extractable Zinc (Zn)	2019/05/24		106	%	80 - 120
6135575	GYA	SRM	Sieve - #200 (>0.075mm)	2019/05/23		45	%	42 - 47
			Sieve - #200 (<0.075mm)	2019/05/23		55	%	53 - 58
6139139	DM1	SRM	Total Organic Carbon	2019/05/27		108	%	75 - 125

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.

LCS: 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.

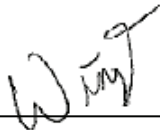
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

VALIDATION SIGNATURE PAGE

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



Brad Newman, Scientific Service Specialist



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

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

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: May 13 to 16, 2019

Location: 2 Montreal Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 18113796-1485

Sample Submission Number: B9D4005

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:

Yes

Has lab warranted all tests were in statistical control in CoA (Yes/No)?:

Yes

Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:

Yes

Were all samples analyzed within hold times (Yes/No)?:

Yes

All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:

Yes

Is Chain of Custody completed and signed (Yes/No)?:

Yes

Were sample temperatures acceptable when they reached lab (Yes/No)?:

Yes

Is data considered to be reliable (Yes/No/Suspect)?:

Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): *Amanda Newberry*

Date: May 30, 2019

Task Order#: 18113796-1485-7777
 Site#: N/A
 Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
 Project #: 18113796-1485-1906
 Your C.O.C. #: 716854-15-01

Attention: Chris Vettorazzo

Golder Associates Ltd
 11 Austin St.
 Suite 101
 St. John's, NL
 Canada A1B 4C1

Report Date: 2019/05/29
 Report #: R5730283
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9D5790
Received: 2019/05/22, 10:30

Sample Matrix: Soil
 # Samples Received: 3

Analyses	Quantity	Laboratory Method	Primary Reference
Methylnaphthalene Sum	3	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum	3		EPA 8260C m
Conductivity	3	CAM SOP-00414	OMOE E3530 v1 m
Petroleum Hydro. CCME F1 & BTEX in Soil (1)	3	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (2)	3	CAM SOP-00316	CCME CWS m
Glycols in Soil by GC-FID	3	CAM SOP-00322	EPA 8015 m
Strong Acid Leachable Metals by ICPMS	3	CAM SOP-00447	EPA 6020B m
Moisture	3	CAM SOP-00445	Carter 2nd ed 51.2 m
OC Pesticides (Selected) & PCB (3)	1	CAM SOP-00307	SW846 8081, 8082
OC Pesticides Summed Parameters	1	CAM SOP-00307	EPA 8081/8082 m
PAH Compounds in Soil by GC/MS (SIM)	3	CAM SOP-00318	EPA 8270D m
pH CaCl2 EXTRACT	3	CAM SOP-00413	EPA 9045 D m
Sodium Adsorption Ratio (SAR)	3	CAM SOP-00102	EPA 6010C
SAR - ICP Metals	3	CAM SOP-00408	EPA 6010D m
Volatile Organic Compounds in Soil	3	CAM SOP-00228	EPA 8260C m

Remarks:

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

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

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

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

Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1906
Your C.O.C. #: 716854-15-01

Attention: Chris Vettorazzo

Golder Associates Ltd
11 Austin St.
Suite 101
St. John's, NL
Canada A1B 4C1

Report Date: 2019/05/29
Report #: R5730283
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9D5790
Received: 2019/05/22, 10:30

dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, 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) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.
- (2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.
- (3) Chlordane (Total) = Alpha Chlordane + Gamma Chlordane

Encryption Key



Kyle Reinhart
Project Manager
29 May 2019 14:54:14

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: kreinhart@maxxam.ca
Phone# (905)817-5802

=====

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

O.REG 153 PHCS IN SOIL (SOIL)

Maxxam ID		JTU250	JTU251	JTU252			JTU252		
Sampling Date		2019/05/17 11:00	2019/05/17 13:00	2019/05/21 11:15			2019/05/21 11:15		
COC Number		716854-15-01	716854-15-01	716854-15-01			716854-15-01		
	UNITS	MW19-04-05	MW19-09-05	MW19-08-05	RDL	QC Batch	MW19-08-05 Lab-Dup	RDL	QC Batch
F1 (C6-C10)	ug/g	21	62	140	10	6138139	150	10	6138139
F1 (C6-C10) - BTEX	ug/g	21	62	140	10	6138139	150	10	6138139
F2 (C10-C16 Hydrocarbons)	ug/g	41	51	78	10	6138470			
F3 (C16-C34 Hydrocarbons)	ug/g	82	62	120	50	6138470			
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	50	6138470			
Reached Baseline at C50	ug/g	Yes	Yes	Yes		6138470			
Extraction Surrogate Recovery (%)									
D10-Ethylbenzene	%	97	101	101		6138139	103		6138139
o-Terphenyl	%	79	79	81		6138470			
Instrument Surrogate Recovery (%)									
1,4-Difluorobenzene	%	102	101	102		6138139	102		6138139
4-Bromofluorobenzene	%	97	97	101		6138139	97		6138139
D4-1,2-Dichloroethane	%	104	104	108		6138139	103		6138139
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate									

O.REG 153 OC PESTICIDES (SOIL)

Maxxam ID		JTU250		
Sampling Date		2019/05/17 11:00		
COC Number		716854-15-01		
	UNITS	MW19-04-05	RDL	QC Batch
Chlordane (Total)	ug/g	<0.0020	0.0020	6135770
o,p-DDD + p,p-DDD	ug/g	<0.0020	0.0020	6135770
o,p-DDE + p,p-DDE	ug/g	<0.0020	0.0020	6135770
o,p-DDT + p,p-DDT	ug/g	<0.0020	0.0020	6135770
Total Endosulfan	ug/g	<0.0020	0.0020	6135770
Total PCB	ug/g	<0.015	0.015	6135770
Aldrin	ug/g	<0.0020	0.0020	6143615
a-Chlordane	ug/g	<0.0020	0.0020	6143615
g-Chlordane	ug/g	<0.0020	0.0020	6143615
o,p-DDD	ug/g	<0.0020	0.0020	6143615
p,p-DDD	ug/g	<0.0020	0.0020	6143615
o,p-DDE	ug/g	<0.0020	0.0020	6143615
p,p-DDE	ug/g	<0.0020	0.0020	6143615
o,p-DDT	ug/g	<0.0020	0.0020	6143615
p,p-DDT	ug/g	<0.0020	0.0020	6143615
Dieldrin	ug/g	<0.0020	0.0020	6143615
Lindane	ug/g	<0.0020	0.0020	6143615
Endosulfan I (alpha)	ug/g	<0.0020	0.0020	6143615
Endosulfan II (beta)	ug/g	<0.0020	0.0020	6143615
Endrin	ug/g	<0.0020	0.0020	6143615
Heptachlor	ug/g	<0.0020	0.0020	6143615
Heptachlor epoxide	ug/g	<0.0020	0.0020	6143615
Hexachlorobenzene	ug/g	<0.0020	0.0020	6143615
Hexachlorobutadiene	ug/g	<0.0020	0.0020	6143615
Hexachloroethane	ug/g	<0.0020	0.0020	6143615
Methoxychlor	ug/g	<0.0050	0.0050	6143615
Aroclor 1242	ug/g	<0.015	0.015	6143615
Aroclor 1248	ug/g	<0.015	0.015	6143615
Aroclor 1254	ug/g	<0.015	0.015	6143615
Aroclor 1260	ug/g	<0.015	0.015	6143615
Extraction Surrogate Recovery (%)				
2,4,5,6-Tetrachloro-m-xylene	%	52		6143615
Decachlorobiphenyl	%	106		6143615
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				

O.REG 153 PAHS (SOIL)

Maxxam ID		JTU250		JTU251		JTU252		
Sampling Date		2019/05/17 11:00		2019/05/17 13:00		2019/05/21 11:15		
COC Number		716854-15-01		716854-15-01		716854-15-01		
	UNITS	MW19-04-05	RDL	MW19-09-05	RDL	MW19-08-05	RDL	QC Batch
Methylnaphthalene, 2-(1-)	ug/g	<0.0094	0.0094	<0.021	0.021	<0.040	0.040	6135602
Acenaphthene	ug/g	<0.0050	0.0050	<0.0050	0.0050	0.0065	0.0050	6143148
Acenaphthylene	ug/g	<0.0050	0.0050	<0.0050	0.0050	<0.0070 (1)	0.0070	6143148
Anthracene	ug/g	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6143148
Benzo(a)anthracene	ug/g	<0.0050	0.0050	0.0082	0.0050	0.0058	0.0050	6143148
Benzo(a)pyrene	ug/g	<0.0050	0.0050	0.0082	0.0050	0.0065	0.0050	6143148
Benzo(b/j)fluoranthene	ug/g	<0.0050	0.0050	0.013	0.0050	0.011	0.0050	6143148
Benzo(g,h,i)perylene	ug/g	0.0056	0.0050	0.0093	0.0050	0.011	0.0050	6143148
Benzo(k)fluoranthene	ug/g	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6143148
Chrysene	ug/g	0.015	0.0050	0.016	0.0050	0.027	0.0050	6143148
Dibenz(a,h)anthracene	ug/g	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6143148
Fluoranthene	ug/g	<0.0050	0.0050	0.015	0.0050	0.0098	0.0050	6143148
Fluorene	ug/g	<0.0060 (1)	0.0060	<0.0070 (1)	0.0070	<0.030 (1)	0.030	6143148
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	0.0050	0.0064	0.0050	<0.0050	0.0050	6143148
1-Methylnaphthalene	ug/g	0.0077	0.0050	0.011	0.0050	0.033	0.0050	6143148
2-Methylnaphthalene	ug/g	<0.0080 (1)	0.0080	<0.020 (1)	0.020	<0.040 (1)	0.040	6143148
Naphthalene	ug/g	<0.0050	0.0050	<0.0050	0.0050	0.015	0.0050	6143148
Phenanthrene	ug/g	0.080	0.0050	0.044	0.0050	0.14	0.0050	6143148
Pyrene	ug/g	0.012	0.0050	0.018	0.0050	0.024	0.0050	6143148
Extraction Surrogate Recovery (%)								
D10-Anthracene	%	114		108		116		6143148
D14-Terphenyl (FS)	%	96		92		95		6143148
D8-Acenaphthylene	%	99		92		92		6143148
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) DL was raised due to matrix interference.								

O.REG 153 VOCs BY HS (SOIL)

Maxxam ID		JTU250			JTU250			JTU251		
Sampling Date		2019/05/17 11:00			2019/05/17 11:00			2019/05/17 13:00		
COC Number		716854-15-01			716854-15-01			716854-15-01		
	UNITS	MW19-04-05	RDL	QC Batch	MW19-04-05 Lab-Dup	RDL	QC Batch	MW19-09-05	RDL	QC Batch
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	0.050	6135769				<0.050	0.050	6135769
Acetone (2-Propanone)	ug/g	<0.50	0.50	6138275	<0.50	0.50	6138275	<0.50	0.50	6138275
Benzene	ug/g	<0.020	0.020	6138275	<0.020	0.020	6138275	<0.020	0.020	6138275
Bromodichloromethane	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Bromoform	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Bromomethane	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Carbon Tetrachloride	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Chlorobenzene	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Chloroform	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Dibromochloromethane	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
1,2-Dichlorobenzene	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
1,3-Dichlorobenzene	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
1,4-Dichlorobenzene	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
1,1-Dichloroethane	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
1,2-Dichloroethane	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
1,1-Dichloroethylene	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
cis-1,2-Dichloroethylene	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
trans-1,2-Dichloroethylene	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
1,2-Dichloropropane	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
cis-1,3-Dichloropropene	ug/g	<0.030	0.030	6138275	<0.030	0.030	6138275	<0.030	0.030	6138275
trans-1,3-Dichloropropene	ug/g	<0.040	0.040	6138275	<0.040	0.040	6138275	<0.040	0.040	6138275
Ethylbenzene	ug/g	<0.020	0.020	6138275	<0.020	0.020	6138275	<0.020	0.020	6138275
Ethylene Dibromide	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Hexane	ug/g	0.065	0.050	6138275	0.067	0.050	6138275	0.10	0.050	6138275
Methylene Chloride(Dichloromethane)	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	0.50	6138275	<0.50	0.50	6138275	<0.50	0.50	6138275
Methyl Isobutyl Ketone	ug/g	<0.50	0.50	6138275	<0.50	0.50	6138275	<0.50	0.50	6138275
Methyl t-butyl ether (MTBE)	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Styrene	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
1,1,1,2-Tetrachloroethane	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
1,1,2,2-Tetrachloroethane	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Tetrachloroethylene	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275

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

O.REG 153 VOCs BY HS (SOIL)

Maxxam ID		JTU250			JTU250			JTU251		
Sampling Date		2019/05/17 11:00			2019/05/17 11:00			2019/05/17 13:00		
COC Number		716854-15-01			716854-15-01			716854-15-01		
	UNITS	MW19-04-05	RDL	QC Batch	MW19-04-05 Lab-Dup	RDL	QC Batch	MW19-09-05	RDL	QC Batch
Toluene	ug/g	0.022	0.020	6138275	0.023	0.020	6138275	<0.020	0.020	6138275
1,1,1-Trichloroethane	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
1,1,2-Trichloroethane	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Trichloroethylene	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	0.050	6138275	<0.050	0.050	6138275	<0.050	0.050	6138275
Vinyl Chloride	ug/g	<0.020	0.020	6138275	<0.020	0.020	6138275	<0.020	0.020	6138275
p+m-Xylene	ug/g	<0.020	0.020	6138275	<0.020	0.020	6138275	0.040	0.020	6138275
o-Xylene	ug/g	<0.020	0.020	6138275	<0.020	0.020	6138275	0.021	0.020	6138275
Total Xylenes	ug/g	<0.020	0.020	6138275	<0.020	0.020	6138275	0.061	0.020	6138275
Extraction Surrogate Recovery (%)										
D10-o-Xylene	%	102		6138275	104		6138275	103		6138275
Instrument Surrogate Recovery (%)										
4-Bromofluorobenzene	%	100		6138275	101		6138275	100		6138275
D4-1,2-Dichloroethane	%	96		6138275	93		6138275	94		6138275
D8-Toluene	%	99		6138275	100		6138275	100		6138275
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										

O.REG 153 VOCs BY HS (SOIL)

Maxxam ID		JTU252		
Sampling Date		2019/05/21 11:15		
COC Number		716854-15-01		
	UNITS	MW19-08-05	RDL	QC Batch
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	0.050	6135769
Acetone (2-Propanone)	ug/g	<0.50	0.50	6138275
Benzene	ug/g	<0.020	0.020	6138275
Bromodichloromethane	ug/g	<0.050	0.050	6138275
Bromoform	ug/g	<0.050	0.050	6138275
Bromomethane	ug/g	<0.050	0.050	6138275
Carbon Tetrachloride	ug/g	<0.050	0.050	6138275
Chlorobenzene	ug/g	<0.050	0.050	6138275
Chloroform	ug/g	<0.050	0.050	6138275
Dibromochloromethane	ug/g	<0.050	0.050	6138275
1,2-Dichlorobenzene	ug/g	<0.050	0.050	6138275
1,3-Dichlorobenzene	ug/g	<0.050	0.050	6138275
1,4-Dichlorobenzene	ug/g	<0.050	0.050	6138275
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	0.050	6138275
1,1-Dichloroethane	ug/g	<0.050	0.050	6138275
1,2-Dichloroethane	ug/g	<0.050	0.050	6138275
1,1-Dichloroethylene	ug/g	<0.050	0.050	6138275
cis-1,2-Dichloroethylene	ug/g	<0.050	0.050	6138275
trans-1,2-Dichloroethylene	ug/g	<0.050	0.050	6138275
1,2-Dichloropropane	ug/g	<0.050	0.050	6138275
cis-1,3-Dichloropropene	ug/g	<0.030	0.030	6138275
trans-1,3-Dichloropropene	ug/g	<0.040	0.040	6138275
Ethylbenzene	ug/g	<0.020	0.020	6138275
Ethylene Dibromide	ug/g	<0.050	0.050	6138275
Hexane	ug/g	2.8	0.050	6138275
Methylene Chloride(Dichloromethane)	ug/g	<0.050	0.050	6138275
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	0.50	6138275
Methyl Isobutyl Ketone	ug/g	<0.50	0.50	6138275
Methyl t-butyl ether (MTBE)	ug/g	<0.050	0.050	6138275
Styrene	ug/g	<0.050	0.050	6138275
1,1,1,2-Tetrachloroethane	ug/g	<0.050	0.050	6138275
1,1,2,2-Tetrachloroethane	ug/g	<0.050	0.050	6138275
Tetrachloroethylene	ug/g	<0.050	0.050	6138275
Toluene	ug/g	<0.020	0.020	6138275
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				

O.REG 153 VOCs BY HS (SOIL)

Maxxam ID		JTU252		
Sampling Date		2019/05/21 11:15		
COC Number		716854-15-01		
	UNITS	MW19-08-05	RDL	QC Batch
1,1,1-Trichloroethane	ug/g	<0.050	0.050	6138275
1,1,2-Trichloroethane	ug/g	<0.050	0.050	6138275
Trichloroethylene	ug/g	<0.050	0.050	6138275
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	0.050	6138275
Vinyl Chloride	ug/g	<0.020	0.020	6138275
p+m-Xylene	ug/g	<0.020	0.020	6138275
o-Xylene	ug/g	<0.020	0.020	6138275
Total Xylenes	ug/g	<0.020	0.020	6138275
Extraction Surrogate Recovery (%)				
D10-o-Xylene	%	96		6138275
Instrument Surrogate Recovery (%)				
4-Bromofluorobenzene	%	101		6138275
D4-1,2-Dichloroethane	%	77		6138275
D8-Toluene	%	100		6138275
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				

RESULTS OF ANALYSES OF SOIL

Maxxam ID		JTU250	JTU251	JTU252		
Sampling Date		2019/05/17 11:00	2019/05/17 13:00	2019/05/21 11:15		
COC Number		716854-15-01	716854-15-01	716854-15-01		
	UNITS	MW19-04-05	MW19-09-05	MW19-08-05	RDL	QC Batch
Sodium Adsorption Ratio	N/A	0.11	0.62	0.30		6135771
Conductivity	mS/cm	2.4	2.1	0.88	0.002	6138693
Moisture	%	7.7	9.4	8.3	1.0	6135955
Available (CaCl ₂) pH	pH	7.48	7.87	7.76		6136286
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

GLYCOLS BY GC-FID (SOIL)

Maxxam ID		JTU250	JTU250	JTU251	JTU252		
Sampling Date		2019/05/17 11:00	2019/05/17 11:00	2019/05/17 13:00	2019/05/21 11:15		
COC Number		716854-15-01	716854-15-01	716854-15-01	716854-15-01		
	UNITS	MW19-04-05	MW19-04-05 Lab-Dup	MW19-09-05	MW19-08-05	RDL	QC Batch
Propylene Glycol	mg/kg	<10	<10	<10	<10	10	6139668
Ethylene Glycol	mg/kg	<10	<10	<10	<10	10	6139668
Diethylene Glycol	mg/kg	<10	<10	<10	<10	10	6139668
Total Glycol	mg/kg	<10	<10	<10	<10	10	6139668
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							
Lab-Dup = Laboratory Initiated Duplicate							

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JTU250	JTU251	JTU252		
Sampling Date		2019/05/17 11:00	2019/05/17 13:00	2019/05/21 11:15		
COC Number		716854-15-01	716854-15-01	716854-15-01		
	UNITS	MW19-04-05	MW19-09-05	MW19-08-05	RDL	QC Batch
Acid Extractable Aluminum (Al)	ug/g	14000	13000	13000	50	6138732
Acid Extractable Antimony (Sb)	ug/g	1.2	0.49	0.99	0.20	6138732
Acid Extractable Arsenic (As)	ug/g	18	8.1	16	1.0	6138732
Acid Extractable Barium (Ba)	ug/g	84	180	92	0.50	6138732
Acid Extractable Beryllium (Be)	ug/g	1.1	0.93	0.94	0.20	6138732
Acid Extractable Bismuth (Bi)	ug/g	<1.0	<1.0	<1.0	1.0	6138732
Acid Extractable Boron (B)	ug/g	10	9.5	9.8	5.0	6138732
Acid Extractable Cadmium (Cd)	ug/g	0.69	0.68	0.77	0.10	6138732
Acid Extractable Calcium (Ca)	ug/g	41000	45000	45000	50	6138732
Acid Extractable Chromium (Cr)	ug/g	25	22	23	1.0	6138732
Acid Extractable Cobalt (Co)	ug/g	36	18	22	0.10	6138732
Acid Extractable Copper (Cu)	ug/g	65	43	54	0.50	6138732
Acid Extractable Iron (Fe)	ug/g	43000	36000	36000	50	6138732
Acid Extractable Lead (Pb)	ug/g	33	25	25	1.0	6138732
Acid Extractable Magnesium (Mg)	ug/g	8100	16000	9100	50	6138732
Acid Extractable Manganese (Mn)	ug/g	580	740	520	1.0	6138732
Acid Extractable Molybdenum (Mo)	ug/g	16	7.6	11	0.50	6138732
Acid Extractable Nickel (Ni)	ug/g	150	59	94	0.50	6138732
Acid Extractable Phosphorus (P)	ug/g	970	920	1000	50	6138732
Acid Extractable Potassium (K)	ug/g	2700	2500	2700	200	6138732
Acid Extractable Selenium (Se)	ug/g	2.5	1.1	2.1	0.50	6138732
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	<0.20	0.20	6138732
Acid Extractable Sodium (Na)	ug/g	130	300	210	50	6138732
Acid Extractable Strontium (Sr)	ug/g	72	110	100	1.0	6138732
Acid Extractable Thallium (Tl)	ug/g	1.2	0.27	0.52	0.050	6138732
Acid Extractable Tin (Sn)	ug/g	<1.0	<1.0	<1.0	1.0	6138732
Acid Extractable Uranium (U)	ug/g	7.1	3.3	5.9	0.050	6138732
Acid Extractable Vanadium (V)	ug/g	42	39	38	5.0	6138732
Acid Extractable Zinc (Zn)	ug/g	83	85	83	5.0	6138732
Acid Extractable Mercury (Hg)	ug/g	0.15	0.055	0.10	0.050	6138732
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

TEST SUMMARY

Maxxam ID: JTU250
Sample ID: MW19-04-05
Matrix: Soil

Collected: 2019/05/17
Relinquished: 2019/05/21
Received: 2019/05/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6135602	N/A	2019/05/28	Automated Statchk
1,3-Dichloropropene Sum	CALC	6135769	N/A	2019/05/28	Automated Statchk
Conductivity	AT	6138693	2019/05/24	2019/05/24	Kazzandra Adeva
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6138139	N/A	2019/05/25	Joe Paino
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6138470	2019/05/24	2019/05/24	Atoosa Keshavarz
Glycols in Soil by GC-FID	GC/FID	6139668	N/A	2019/05/24	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6138732	2019/05/24	2019/05/24	Daniel Teclu
Moisture	BAL	6135955	N/A	2019/05/23	Min Yang
OC Pesticides (Selected) & PCB	GC/ECD	6143615	2019/05/28	2019/05/28	Li Peng
OC Pesticides Summed Parameters	CALC	6135770	N/A	2019/05/23	Automated Statchk
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6143148	2019/05/27	2019/05/28	Mitesh Raj
pH CaCl2 EXTRACT	AT	6136286	2019/05/23	2019/05/23	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6135771	N/A	2019/05/27	Automated Statchk
Volatile Organic Compounds in Soil	GC/MS	6138275	N/A	2019/05/27	Blair Gannon

Maxxam ID: JTU250 Dup
Sample ID: MW19-04-05
Matrix: Soil

Collected: 2019/05/17
Relinquished: 2019/05/21
Received: 2019/05/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Glycols in Soil by GC-FID	GC/FID	6139668	N/A	2019/05/24	Prabhjot Gulati
Volatile Organic Compounds in Soil	GC/MS	6138275	N/A	2019/05/27	Blair Gannon

Maxxam ID: JTU251
Sample ID: MW19-09-05
Matrix: Soil

Collected: 2019/05/17
Relinquished: 2019/05/21
Received: 2019/05/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6135602	N/A	2019/05/28	Automated Statchk
1,3-Dichloropropene Sum	CALC	6135769	N/A	2019/05/28	Automated Statchk
Conductivity	AT	6138693	2019/05/24	2019/05/24	Kazzandra Adeva
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6138139	N/A	2019/05/25	Joe Paino
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6138470	2019/05/24	2019/05/24	Atoosa Keshavarz
Glycols in Soil by GC-FID	GC/FID	6139668	N/A	2019/05/24	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6138732	2019/05/24	2019/05/24	Daniel Teclu
Moisture	BAL	6135955	N/A	2019/05/23	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6143148	2019/05/27	2019/05/28	Mitesh Raj
pH CaCl2 EXTRACT	AT	6136286	2019/05/23	2019/05/23	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6135771	N/A	2019/05/27	Automated Statchk
Volatile Organic Compounds in Soil	GC/MS	6138275	N/A	2019/05/27	Blair Gannon

Maxxam Job #: B9D5790
Report Date: 2019/05/29

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1906

TEST SUMMARY

Maxxam ID: JTU252
Sample ID: MW19-08-05
Matrix: Soil

Collected: 2019/05/21
Relinquished: 2019/05/21
Received: 2019/05/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6135602	N/A	2019/05/28	Automated Statchk
1,3-Dichloropropene Sum	CALC	6135769	N/A	2019/05/28	Automated Statchk
Conductivity	AT	6138693	2019/05/24	2019/05/24	Kazzandra Adeva
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6138139	N/A	2019/05/24	Joe Paino
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6138470	2019/05/24	2019/05/24	Atoosa Keshavarz
Glycols in Soil by GC-FID	GC/FID	6139668	N/A	2019/05/24	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6138732	2019/05/24	2019/05/24	Daniel Teclu
Moisture	BAL	6135955	N/A	2019/05/23	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6143148	2019/05/27	2019/05/28	Mitesh Raj
pH CaCl2 EXTRACT	AT	6136286	2019/05/23	2019/05/23	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6135771	N/A	2019/05/27	Automated Statchk
Volatile Organic Compounds in Soil	GC/MS	6138275	N/A	2019/05/27	Blair Gannon

Maxxam ID: JTU252 Dup
Sample ID: MW19-08-05
Matrix: Soil

Collected: 2019/05/21
Relinquished: 2019/05/21
Received: 2019/05/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6138139	N/A	2019/05/24	Joe Paino

GENERAL COMMENTS

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

Package 1	3.7°C
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F1/BTEX Analysis: The BTEX results used for the F1-BTEX calculation were obtained from Headspace-GC analysis.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6138139	JP5	Method Blank	1,4-Difluorobenzene	2019/05/24		102	%	60 - 140
			4-Bromofluorobenzene	2019/05/24		99	%	60 - 140
			D10-Ethylbenzene	2019/05/24		88	%	60 - 140
			D4-1,2-Dichloroethane	2019/05/24		107	%	60 - 140
			F1 (C6-C10)	2019/05/24	<10	ug/g		
6138275	BG1	Method Blank	F1 (C6-C10) - BTEX	2019/05/24	<10		ug/g	
			4-Bromofluorobenzene	2019/05/27		101	%	60 - 140
			D10-o-Xylene	2019/05/27		96	%	60 - 130
			D4-1,2-Dichloroethane	2019/05/27		99	%	60 - 140
			D8-Toluene	2019/05/27		96	%	60 - 140
			Acetone (2-Propanone)	2019/05/27	<0.50	ug/g		
			Benzene	2019/05/27	<0.020	ug/g		
			Bromodichloromethane	2019/05/27	<0.050	ug/g		
			Bromoform	2019/05/27	<0.050	ug/g		
			Bromomethane	2019/05/27	<0.050	ug/g		
			Carbon Tetrachloride	2019/05/27	<0.050	ug/g		
			Chlorobenzene	2019/05/27	<0.050	ug/g		
			Chloroform	2019/05/27	<0.050	ug/g		
			Dibromochloromethane	2019/05/27	<0.050	ug/g		
			1,2-Dichlorobenzene	2019/05/27	<0.050	ug/g		
			1,3-Dichlorobenzene	2019/05/27	<0.050	ug/g		
			1,4-Dichlorobenzene	2019/05/27	<0.050	ug/g		
			Dichlorodifluoromethane (FREON 12)	2019/05/27	<0.050	ug/g		
			1,1-Dichloroethane	2019/05/27	<0.050	ug/g		
			1,2-Dichloroethane	2019/05/27	<0.050	ug/g		
			1,1-Dichloroethylene	2019/05/27	<0.050	ug/g		
			cis-1,2-Dichloroethylene	2019/05/27	<0.050	ug/g		
			trans-1,2-Dichloroethylene	2019/05/27	<0.050	ug/g		
			1,2-Dichloropropane	2019/05/27	<0.050	ug/g		
			cis-1,3-Dichloropropene	2019/05/27	<0.030	ug/g		
			trans-1,3-Dichloropropene	2019/05/27	<0.040	ug/g		
			Ethylbenzene	2019/05/27	<0.020	ug/g		
			Ethylene Dibromide	2019/05/27	<0.050	ug/g		
			Hexane	2019/05/27	<0.050	ug/g		
			Methylene Chloride(Dichloromethane)	2019/05/27	<0.050	ug/g		
			Methyl Ethyl Ketone (2-Butanone)	2019/05/27	<0.50	ug/g		
			Methyl Isobutyl Ketone	2019/05/27	<0.50	ug/g		
			Methyl t-butyl ether (MTBE)	2019/05/27	<0.050	ug/g		
Styrene	2019/05/27	<0.050	ug/g					
1,1,1,2-Tetrachloroethane	2019/05/27	<0.050	ug/g					
1,1,2,2-Tetrachloroethane	2019/05/27	<0.050	ug/g					
Tetrachloroethylene	2019/05/27	<0.050	ug/g					
Toluene	2019/05/27	<0.020	ug/g					
1,1,1-Trichloroethane	2019/05/27	<0.050	ug/g					
1,1,2-Trichloroethane	2019/05/27	<0.050	ug/g					
Trichloroethylene	2019/05/27	<0.050	ug/g					
Trichlorofluoromethane (FREON 11)	2019/05/27	<0.050	ug/g					
Vinyl Chloride	2019/05/27	<0.020	ug/g					
p+m-Xylene	2019/05/27	<0.020	ug/g					
o-Xylene	2019/05/27	<0.020	ug/g					
Total Xylenes	2019/05/27	<0.020	ug/g					
6138470	AKS	Method Blank	o-Terphenyl	2019/05/24		79	%	60 - 130

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			F2 (C10-C16 Hydrocarbons)	2019/05/24	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2019/05/24	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2019/05/24	<50		ug/g	
6138693	KAD	Method Blank	Conductivity	2019/05/24	<0.002		mS/cm	
6138732	DT1	Method Blank	Acid Extractable Aluminum (Al)	2019/05/24	<50		ug/g	
			Acid Extractable Antimony (Sb)	2019/05/24	<0.20		ug/g	
			Acid Extractable Arsenic (As)	2019/05/24	<1.0		ug/g	
			Acid Extractable Barium (Ba)	2019/05/24	<0.50		ug/g	
			Acid Extractable Beryllium (Be)	2019/05/24	<0.20		ug/g	
			Acid Extractable Bismuth (Bi)	2019/05/24	<1.0		ug/g	
			Acid Extractable Boron (B)	2019/05/24	<5.0		ug/g	
			Acid Extractable Cadmium (Cd)	2019/05/24	<0.10		ug/g	
			Acid Extractable Calcium (Ca)	2019/05/24	<50		ug/g	
			Acid Extractable Chromium (Cr)	2019/05/24	<1.0		ug/g	
			Acid Extractable Cobalt (Co)	2019/05/24	<0.10		ug/g	
			Acid Extractable Copper (Cu)	2019/05/24	<0.50		ug/g	
			Acid Extractable Iron (Fe)	2019/05/24	<50		ug/g	
			Acid Extractable Lead (Pb)	2019/05/24	<1.0		ug/g	
			Acid Extractable Magnesium (Mg)	2019/05/24	<50		ug/g	
			Acid Extractable Manganese (Mn)	2019/05/24	<1.0		ug/g	
			Acid Extractable Molybdenum (Mo)	2019/05/24	<0.50		ug/g	
			Acid Extractable Nickel (Ni)	2019/05/24	<0.50		ug/g	
			Acid Extractable Phosphorus (P)	2019/05/24	<50		ug/g	
			Acid Extractable Potassium (K)	2019/05/24	<200		ug/g	
			Acid Extractable Selenium (Se)	2019/05/24	<0.50		ug/g	
			Acid Extractable Silver (Ag)	2019/05/24	<0.20		ug/g	
			Acid Extractable Sodium (Na)	2019/05/24	<50		ug/g	
			Acid Extractable Strontium (Sr)	2019/05/24	<1.0		ug/g	
			Acid Extractable Thallium (Tl)	2019/05/24	<0.050		ug/g	
			Acid Extractable Tin (Sn)	2019/05/24	<1.0		ug/g	
			Acid Extractable Uranium (U)	2019/05/24	<0.050		ug/g	
			Acid Extractable Vanadium (V)	2019/05/24	<5.0		ug/g	
			Acid Extractable Zinc (Zn)	2019/05/24	<5.0		ug/g	
			Acid Extractable Mercury (Hg)	2019/05/24	<0.050		ug/g	
6139668	GUL	Method Blank	Propylene Glycol	2019/05/24	<10		mg/kg	
			Ethylene Glycol	2019/05/24	<10		mg/kg	
			Diethylene Glycol	2019/05/24	<10		mg/kg	
			Total Glycol	2019/05/24	<10		mg/kg	
6143148	RAJ	Method Blank	D10-Anthracene	2019/05/27		110	%	50 - 130
			D14-Terphenyl (FS)	2019/05/27		92	%	50 - 130
			D8-Acenaphthylene	2019/05/27		82	%	50 - 130
			Acenaphthene	2019/05/27	<0.0050		ug/g	
			Acenaphthylene	2019/05/27	<0.0050		ug/g	
			Anthracene	2019/05/27	<0.0050		ug/g	
			Benzo(a)anthracene	2019/05/27	<0.0050		ug/g	
			Benzo(a)pyrene	2019/05/27	<0.0050		ug/g	
			Benzo(b/j)fluoranthene	2019/05/27	<0.0050		ug/g	
			Benzo(g,h,i)perylene	2019/05/27	<0.0050		ug/g	
			Benzo(k)fluoranthene	2019/05/27	<0.0050		ug/g	
			Chrysene	2019/05/27	<0.0050		ug/g	
			Dibenz(a,h)anthracene	2019/05/27	<0.0050		ug/g	
			Fluoranthene	2019/05/27	<0.0050		ug/g	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Fluorene	2019/05/27	<0.0050		ug/g	
			Indeno(1,2,3-cd)pyrene	2019/05/27	<0.0050		ug/g	
			1-Methylnaphthalene	2019/05/27	<0.0050		ug/g	
			2-Methylnaphthalene	2019/05/27	<0.0050		ug/g	
			Naphthalene	2019/05/27	<0.0050		ug/g	
			Phenanthrene	2019/05/27	<0.0050		ug/g	
			Pyrene	2019/05/27	<0.0050		ug/g	
6143615	LPG	Method Blank	Decachlorobiphenyl	2019/05/28		106	%	50 - 130
			2,4,5,6-Tetrachloro-m-xylene	2019/05/28		68	%	50 - 130
			Aldrin	2019/05/28	<0.0020		ug/g	
			a-Chlordane	2019/05/28	<0.0020		ug/g	
			g-Chlordane	2019/05/28	<0.0020		ug/g	
			o,p-DDD	2019/05/28	<0.0020		ug/g	
			p,p-DDD	2019/05/28	<0.0020		ug/g	
			o,p-DDE	2019/05/28	<0.0020		ug/g	
			p,p-DDE	2019/05/28	<0.0020		ug/g	
			o,p-DDT	2019/05/28	<0.0020		ug/g	
			p,p-DDT	2019/05/28	<0.0020		ug/g	
			Dieldrin	2019/05/28	<0.0020		ug/g	
			Lindane	2019/05/28	<0.0020		ug/g	
			Endosulfan I (alpha)	2019/05/28	<0.0020		ug/g	
			Endosulfan II (beta)	2019/05/28	<0.0020		ug/g	
			Endrin	2019/05/28	<0.0020		ug/g	
			Heptachlor	2019/05/28	<0.0020		ug/g	
			Heptachlor epoxide	2019/05/28	<0.0020		ug/g	
			Hexachlorobenzene	2019/05/28	<0.0020		ug/g	
			Hexachlorobutadiene	2019/05/28	<0.0020		ug/g	
			Hexachloroethane	2019/05/28	<0.0020		ug/g	
			Methoxychlor	2019/05/28	<0.0050		ug/g	
			Aroclor 1242	2019/05/28	<0.015		ug/g	
			Aroclor 1248	2019/05/28	<0.015		ug/g	
			Aroclor 1254	2019/05/28	<0.015		ug/g	
			Aroclor 1260	2019/05/28	<0.015		ug/g	
6143615	LPG	RPD	Aroclor 1242	2019/05/28	200 (1)		%	40
6138275	BG1	RPD [JTU250-04]	Acetone (2-Propanone)	2019/05/27	NC		%	50
			Benzene	2019/05/27	NC		%	50
			Bromodichloromethane	2019/05/27	NC		%	50
			Bromoform	2019/05/27	NC		%	50
			Bromomethane	2019/05/27	NC		%	50
			Carbon Tetrachloride	2019/05/27	NC		%	50
			Chlorobenzene	2019/05/27	NC		%	50
			Chloroform	2019/05/27	NC		%	50
			Dibromochloromethane	2019/05/27	NC		%	50
			1,2-Dichlorobenzene	2019/05/27	NC		%	50
			1,3-Dichlorobenzene	2019/05/27	NC		%	50
			1,4-Dichlorobenzene	2019/05/27	NC		%	50
			Dichlorodifluoromethane (FREON 12)	2019/05/27	NC		%	50
			1,1-Dichloroethane	2019/05/27	NC		%	50
			1,2-Dichloroethane	2019/05/27	NC		%	50
			1,1-Dichloroethylene	2019/05/27	NC		%	50
			cis-1,2-Dichloroethylene	2019/05/27	NC		%	50
			trans-1,2-Dichloroethylene	2019/05/27	NC		%	50

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichloropropane	2019/05/27	NC		%	50
			cis-1,3-Dichloropropene	2019/05/27	NC		%	50
			trans-1,3-Dichloropropene	2019/05/27	NC		%	50
			Ethylbenzene	2019/05/27	NC		%	50
			Ethylene Dibromide	2019/05/27	NC		%	50
			Hexane	2019/05/27	3.7		%	50
			Methylene Chloride(Dichloromethane)	2019/05/27	NC		%	50
			Methyl Ethyl Ketone (2-Butanone)	2019/05/27	NC		%	50
			Methyl Isobutyl Ketone	2019/05/27	NC		%	50
			Methyl t-butyl ether (MTBE)	2019/05/27	NC		%	50
			Styrene	2019/05/27	NC		%	50
			1,1,1,2-Tetrachloroethane	2019/05/27	NC		%	50
			1,1,2,2-Tetrachloroethane	2019/05/27	NC		%	50
			Tetrachloroethylene	2019/05/27	NC		%	50
			Toluene	2019/05/27	1.7		%	50
			1,1,1-Trichloroethane	2019/05/27	NC		%	50
			1,1,2-Trichloroethane	2019/05/27	NC		%	50
			Trichloroethylene	2019/05/27	NC		%	50
			Trichlorofluoromethane (FREON 11)	2019/05/27	NC		%	50
			Vinyl Chloride	2019/05/27	NC		%	50
			p+m-Xylene	2019/05/27	NC		%	50
			o-Xylene	2019/05/27	NC		%	50
			Total Xylenes	2019/05/27	NC		%	50
6139668	GUL	RPD [JTU250-01]	Propylene Glycol	2019/05/24	NC		%	50
			Ethylene Glycol	2019/05/24	NC		%	50
			Diethylene Glycol	2019/05/24	NC		%	50
			Total Glycol	2019/05/24	NC		%	50
6138139	JP5	RPD [JTU252-03]	F1 (C6-C10)	2019/05/24	6.6		%	30
			F1 (C6-C10) - BTEX	2019/05/24	6.6		%	30
6138139	JP5	Matrix Spike [JTU252-03]	1,4-Difluorobenzene	2019/05/25		103	%	60 - 140
			4-Bromofluorobenzene	2019/05/25		100	%	60 - 140
			D10-Ethylbenzene	2019/05/25		105	%	60 - 140
			D4-1,2-Dichloroethane	2019/05/25		105	%	60 - 140
			F1 (C6-C10)	2019/05/25		NC	%	60 - 140
6138275	BG1	Matrix Spike [JTU250-04]	4-Bromofluorobenzene	2019/05/27		101	%	60 - 140
			D10-o-Xylene	2019/05/27		104	%	60 - 130
			D4-1,2-Dichloroethane	2019/05/27		97	%	60 - 140
			D8-Toluene	2019/05/27		102	%	60 - 140
			Acetone (2-Propanone)	2019/05/27		97	%	60 - 140
			Benzene	2019/05/27		99	%	60 - 140
			Bromodichloromethane	2019/05/27		96	%	60 - 140
			Bromoform	2019/05/27		90	%	60 - 140
			Bromomethane	2019/05/27		100	%	60 - 140
			Carbon Tetrachloride	2019/05/27		96	%	60 - 140
			Chlorobenzene	2019/05/27		102	%	60 - 140
			Chloroform	2019/05/27		100	%	60 - 140
			Dibromochloromethane	2019/05/27		95	%	60 - 140
			1,2-Dichlorobenzene	2019/05/27		103	%	60 - 140
			1,3-Dichlorobenzene	2019/05/27		105	%	60 - 140
			1,4-Dichlorobenzene	2019/05/27		105	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/05/27		102	%	60 - 140
			1,1-Dichloroethane	2019/05/27		99	%	60 - 140

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichloroethane	2019/05/27		97	%	60 - 140
			1,1-Dichloroethylene	2019/05/27		99	%	60 - 140
			cis-1,2-Dichloroethylene	2019/05/27		101	%	60 - 140
			trans-1,2-Dichloroethylene	2019/05/27		100	%	60 - 140
			1,2-Dichloropropane	2019/05/27		99	%	60 - 140
			cis-1,3-Dichloropropene	2019/05/27		96	%	60 - 140
			trans-1,3-Dichloropropene	2019/05/27		96	%	60 - 140
			Ethylbenzene	2019/05/27		104	%	60 - 140
			Ethylene Dibromide	2019/05/27		98	%	60 - 140
			Hexane	2019/05/27		100	%	60 - 140
			Methylene Chloride(Dichloromethane)	2019/05/27		101	%	60 - 140
			Methyl Ethyl Ketone (2-Butanone)	2019/05/27		100	%	60 - 140
			Methyl Isobutyl Ketone	2019/05/27		99	%	60 - 140
			Methyl t-butyl ether (MTBE)	2019/05/27		96	%	60 - 140
			Styrene	2019/05/27		104	%	60 - 140
			1,1,1,2-Tetrachloroethane	2019/05/27		97	%	60 - 140
			1,1,2,2-Tetrachloroethane	2019/05/27		98	%	60 - 140
			Tetrachloroethylene	2019/05/27		105	%	60 - 140
			Toluene	2019/05/27		98	%	60 - 140
			1,1,1-Trichloroethane	2019/05/27		99	%	60 - 140
			1,1,2-Trichloroethane	2019/05/27		99	%	60 - 140
			Trichloroethylene	2019/05/27		102	%	60 - 140
			Trichlorofluoromethane (FREON 11)	2019/05/27		102	%	60 - 140
			Vinyl Chloride	2019/05/27		99	%	60 - 140
			p+m-Xylene	2019/05/27		104	%	60 - 140
			o-Xylene	2019/05/27		104	%	60 - 140
6139668	GUL	Matrix Spike [JTU250-01]	Propylene Glycol	2019/05/24		100	%	60 - 140
			Ethylene Glycol	2019/05/24		94	%	60 - 140
			Diethylene Glycol	2019/05/24		96	%	60 - 140
6136286	GTO	LCS	Available (CaCl2) pH	2019/05/23		100	%	97 - 103
6138139	JP5	LCS	1,4-Difluorobenzene	2019/05/24		102	%	60 - 140
			4-Bromofluorobenzene	2019/05/24		101	%	60 - 140
			D10-Ethylbenzene	2019/05/24		90	%	60 - 140
			D4-1,2-Dichloroethane	2019/05/24		109	%	60 - 140
			F1 (C6-C10)	2019/05/24		93	%	80 - 120
6138275	BG1	LCS	4-Bromofluorobenzene	2019/05/27		101	%	60 - 140
			D10-o-Xylene	2019/05/27		99	%	60 - 130
			D4-1,2-Dichloroethane	2019/05/27		100	%	60 - 140
			D8-Toluene	2019/05/27		100	%	60 - 140
			Acetone (2-Propanone)	2019/05/27		96	%	60 - 140
			Benzene	2019/05/27		97	%	60 - 130
			Bromodichloromethane	2019/05/27		101	%	60 - 130
			Bromoform	2019/05/27		103	%	60 - 130
			Bromomethane	2019/05/27		97	%	60 - 140
			Carbon Tetrachloride	2019/05/27		100	%	60 - 130
			Chlorobenzene	2019/05/27		100	%	60 - 130
			Chloroform	2019/05/27		99	%	60 - 130
			Dibromochloromethane	2019/05/27		103	%	60 - 130
			1,2-Dichlorobenzene	2019/05/27		101	%	60 - 130
			1,3-Dichlorobenzene	2019/05/27		101	%	60 - 130
			1,4-Dichlorobenzene	2019/05/27		102	%	60 - 130
			Dichlorodifluoromethane (FREON 12)	2019/05/27		101	%	60 - 140

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1-Dichloroethane	2019/05/27		97	%	60 - 130
			1,2-Dichloroethane	2019/05/27		97	%	60 - 130
			1,1-Dichloroethylene	2019/05/27		95	%	60 - 130
			cis-1,2-Dichloroethylene	2019/05/27		99	%	60 - 130
			trans-1,2-Dichloroethylene	2019/05/27		97	%	60 - 130
			1,2-Dichloropropane	2019/05/27		99	%	60 - 130
			cis-1,3-Dichloropropene	2019/05/27		96	%	60 - 130
			trans-1,3-Dichloropropene	2019/05/27		95	%	60 - 130
			Ethylbenzene	2019/05/27		100	%	60 - 130
			Ethylene Dibromide	2019/05/27		100	%	60 - 130
			Hexane	2019/05/27		97	%	60 - 130
			Methylene Chloride(Dichloromethane)	2019/05/27		101	%	60 - 130
			Methyl Ethyl Ketone (2-Butanone)	2019/05/27		103	%	60 - 140
			Methyl Isobutyl Ketone	2019/05/27		105	%	60 - 130
			Methyl t-butyl ether (MTBE)	2019/05/27		96	%	60 - 130
			Styrene	2019/05/27		102	%	60 - 130
			1,1,1,2-Tetrachloroethane	2019/05/27		102	%	60 - 130
			1,1,2,2-Tetrachloroethane	2019/05/27		102	%	60 - 130
			Tetrachloroethylene	2019/05/27		100	%	60 - 130
			Toluene	2019/05/27		95	%	60 - 130
			1,1,1-Trichloroethane	2019/05/27		99	%	60 - 130
			1,1,2-Trichloroethane	2019/05/27		100	%	60 - 130
			Trichloroethylene	2019/05/27		99	%	60 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/27		98	%	60 - 130
			Vinyl Chloride	2019/05/27		97	%	60 - 130
			p+m-Xylene	2019/05/27		100	%	60 - 130
			o-Xylene	2019/05/27		100	%	60 - 130
6138470	AKS	LCS	o-Terphenyl	2019/05/27		86	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/05/27		91	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2019/05/27		86	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2019/05/27		98	%	80 - 120
6138693	KAD	LCS	Conductivity	2019/05/24		103	%	90 - 110
6138732	DT1	LCS	Acid Extractable Aluminum (Al)	2019/05/24		106	%	80 - 120
			Acid Extractable Antimony (Sb)	2019/05/24		102	%	80 - 120
			Acid Extractable Arsenic (As)	2019/05/24		104	%	80 - 120
			Acid Extractable Barium (Ba)	2019/05/24		105	%	80 - 120
			Acid Extractable Beryllium (Be)	2019/05/24		104	%	80 - 120
			Acid Extractable Bismuth (Bi)	2019/05/24		108	%	80 - 120
			Acid Extractable Boron (B)	2019/05/24		107	%	80 - 120
			Acid Extractable Cadmium (Cd)	2019/05/24		104	%	80 - 120
			Acid Extractable Calcium (Ca)	2019/05/24		107	%	80 - 120
			Acid Extractable Chromium (Cr)	2019/05/24		105	%	80 - 120
			Acid Extractable Cobalt (Co)	2019/05/24		107	%	80 - 120
			Acid Extractable Copper (Cu)	2019/05/24		104	%	80 - 120
			Acid Extractable Iron (Fe)	2019/05/24		106	%	80 - 120
			Acid Extractable Lead (Pb)	2019/05/24		109	%	80 - 120
			Acid Extractable Magnesium (Mg)	2019/05/24		102	%	80 - 120
			Acid Extractable Manganese (Mn)	2019/05/24		103	%	80 - 120
			Acid Extractable Molybdenum (Mo)	2019/05/24		104	%	80 - 120
			Acid Extractable Nickel (Ni)	2019/05/24		108	%	80 - 120
			Acid Extractable Phosphorus (P)	2019/05/24		100	%	80 - 120
			Acid Extractable Potassium (K)	2019/05/24		92	%	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6139668	GUL	LCS	Acid Extractable Selenium (Se)	2019/05/24		110	%	80 - 120
			Acid Extractable Silver (Ag)	2019/05/24		103	%	80 - 120
			Acid Extractable Sodium (Na)	2019/05/24		104	%	80 - 120
			Acid Extractable Strontium (Sr)	2019/05/24		101	%	80 - 120
			Acid Extractable Thallium (Tl)	2019/05/24		110	%	80 - 120
			Acid Extractable Tin (Sn)	2019/05/24		102	%	80 - 120
			Acid Extractable Uranium (U)	2019/05/24		113	%	80 - 120
			Acid Extractable Vanadium (V)	2019/05/24		106	%	80 - 120
			Acid Extractable Zinc (Zn)	2019/05/24		110	%	80 - 120
			Acid Extractable Mercury (Hg)	2019/05/24		102	%	80 - 120
6143148	RAJ	LCS	Propylene Glycol	2019/05/24		104	%	60 - 140
			Ethylene Glycol	2019/05/24		98	%	60 - 140
			Diethylene Glycol	2019/05/24		103	%	60 - 140
6143615	LPG	LCS	D10-Anthracene	2019/05/27		112	%	50 - 130
			D14-Terphenyl (FS)	2019/05/27		98	%	50 - 130
			D8-Acenaphthylene	2019/05/27		91	%	50 - 130
			Acenaphthene	2019/05/27		110	%	50 - 130
			Acenaphthylene	2019/05/27		106	%	50 - 130
			Anthracene	2019/05/27		108	%	50 - 130
			Benzo(a)anthracene	2019/05/27		117	%	50 - 130
			Benzo(a)pyrene	2019/05/27		111	%	50 - 130
			Benzo(b/j)fluoranthene	2019/05/27		106	%	50 - 130
			Benzo(g,h,i)perylene	2019/05/27		114	%	50 - 130
			Benzo(k)fluoranthene	2019/05/27		119	%	50 - 130
			Chrysene	2019/05/27		93	%	50 - 130
			Dibenz(a,h)anthracene	2019/05/27		133 (2)	%	50 - 130
			Fluoranthene	2019/05/27		114	%	50 - 130
			Fluorene	2019/05/27		110	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/05/27		121	%	50 - 130
			1-Methylnaphthalene	2019/05/27		127	%	50 - 130
			2-Methylnaphthalene	2019/05/27		115	%	50 - 130
			Naphthalene	2019/05/27		105	%	50 - 130
			Phenanthrene	2019/05/27		109	%	50 - 130
			Pyrene	2019/05/27		113	%	50 - 130
			2,4,5,6-Tetrachloro-m-xylene	2019/05/28		72	%	50 - 130
			Decachlorobiphenyl	2019/05/28		108	%	50 - 130
			Aldrin	2019/05/28		74	%	50 - 130
			a-Chlordane	2019/05/28		89	%	50 - 130
			g-Chlordane	2019/05/28		87	%	50 - 130
o,p-DDD	2019/05/28		93	%	50 - 130			
p,p-DDD	2019/05/28		84	%	50 - 130			
o,p-DDE	2019/05/28		119	%	50 - 130			
p,p-DDE	2019/05/28		101	%	50 - 130			
o,p-DDT	2019/05/28		101	%	50 - 130			
p,p-DDT	2019/05/28		114	%	50 - 130			
Dieldrin	2019/05/28		101	%	50 - 130			
Lindane	2019/05/28		73	%	50 - 130			
Endosulfan I (alpha)	2019/05/28		99	%	50 - 130			
Endosulfan II (beta)	2019/05/28		89	%	50 - 130			
Endrin	2019/05/28		93	%	50 - 130			
Heptachlor	2019/05/28		83	%	50 - 130			
Heptachlor epoxide	2019/05/28		83	%	50 - 130			

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Hexachlorobenzene	2019/05/28		103	%	50 - 130
			Hexachlorobutadiene	2019/05/28		86	%	50 - 130
			Hexachloroethane	2019/05/28		76	%	50 - 130
			Methoxychlor	2019/05/28		126	%	50 - 130

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.

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

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

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

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


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

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

(2) The recovery was above the upper control limit. This may represent a high bias in some results for this specific analyte. For results that were not detected (ND), this potential bias has no impact.

VALIDATION SIGNATURE PAGE

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



Brad Newman, Scientific Service Specialist

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



6740 Campobello Road
Mississauga, Ontario L5N 2L8
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Phone: (905) 817-5700
Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1
C of C # 716854-15-01



716854

INVOICE INFORMATION		REPORT INFORMATION													
Company Name: Imperial Oil Ltd - Golder Associates Ltd		Company Name: Golder Associates Ltd													
Contact Name: IOL Accounts Payable		Contact Name: Chris Vettorezzo													
Address: 102, 2535-3rd Avenue SE Calgary AB T2A 7W5		Address: 11 Austin St. Suite 101, St. John's Newfoundland, A1B 4C1													
Email: IOLAccounts_Payable@golder.com		Email: chris_vettorezzo@golder.com, IOL_1390@golde													
Phone: (403) 299-5600		Phone: (403) 299-5666													
Sampler Name (Print): Jeremy Eckert, Leandra Mariani		Consultant Project #: 709 722 2615													
18113796-1485-1906		18113796-1485-1906													
FIELD SAMPLE ID	MATRIX	CONTAINERS	SAMPLING DATE (YYYYMMDD)	TIME (HH:MM)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX	PAH	VOCs	Metals (Full conductivity, pH, SAR)	PCBs	Glycols	Pesticides	TURNAROUND TIME	
MW19-04-05	X	6	2019/05/17	11:00			X	X	X	X	X	X	X	Standard	5 days
MW19-09-05	X	7	2019/05/17	13:00			X	X	X	X	X	X	X	Rush	3 days
MW19-08-05	X	6	2019/05/21	11:15			X	X	X	X	X	X	X	Water	2 days
														(1 day)	1 day
														(same day)	(same day)
IOL SITE LOCATION: 2 Montreal Road, Ottawa, Ontario IOL PROJECT # (if applicable): N/A MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 18113796-1485-7777.															
REGULATORY CRITERIA / DETECTION LIMITS: REG 153 Table 3 <input type="checkbox"/> 2004 <input checked="" type="checkbox"/> 2011 <input type="checkbox"/> RSC (Please indicate which Reg. version and if RSC required) <input type="checkbox"/> ODWS <input type="checkbox"/> PWOO <input type="checkbox"/> Other															
SPECIAL INSTRUCTIONS: IES: A260 1436 SAP: 8800 5740 JE 6															
SEAL PRESENT		SEAL INTACT		COOLING MEDIA PRESENT		TEMP °C		DATE		TIME (24 HR)		LAB USE ONLY		MAXXAM JOB #	
V	V	V	V	V	V	V	V	2019/05/21	11:30	10:30	10:30	B9D5790	DSG	VERIFIED BY: URE	
* RELINQUISHED BY: Jeremy Eckert 1. Signature: [Signature] DATE: 2019/05/21 TIME: 11:30 2. Signature: [Signature] DATE: 2019/05/21 TIME: 10:30 3. Signature: [Signature] DATE: 2019/05/21 TIME: 10:30															
* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S 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.IMPERIALOIL.CA/TERRMS.															

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: May 17 and 21, 2019

Location: 2 Montreal Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 18113796-1485

Sample Submission Number: B9D5790

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:

Yes

Has lab warranted all tests were in statistical control in CoA (Yes/No)?:

Yes

Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:

Yes

Were all samples analyzed within hold times (Yes/No)?:

Yes

All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:

Yes

Is Chain of Custody completed and signed (Yes/No)?:

Yes

Were sample temperatures acceptable when they reached lab (Yes/No)?:

Yes

Is data considered to be reliable (Yes/No/Suspect)?:

Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): *Amanda Newberry*

Date: May 30, 2019



Task Order#: 18113796-1485-7777
 Site#: N/A
 Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
 Project #: 18113796-1485-1906
 Your C.O.C. #: 716854-13-01

Attention: Chris Vettorazzo

Golder Associates Ltd
 11 Austin St.
 Suite 101
 St. John's, NL
 Canada A1B 4C1

Report Date: 2019/06/04
 Report #: R5737988
 Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9D9093
Received: 2019/05/24, 10:30

Sample Matrix: Soil
 # Samples Received: 5

Analyses	Quantity	Laboratory Method	Primary Reference
Conductivity	1	CAM SOP-00414	OMOE E3530 v1 m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	4	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	4	CAM SOP-00316	CCME CWS m
Strong Acid Leachable Metals by ICPMS	1	CAM SOP-00447	EPA 6020B m
Bulk Density (1)	2	AB SOP-00050	McKeague 2nd 2.21 m
Moisture	4	CAM SOP-00445	Carter 2nd ed 51.2 m
pH CaCl2 EXTRACT	1	CAM SOP-00413	EPA 9045 D m
Sieve, 75um	1	CAM SOP-00467	Carter 2nd ed m
Sodium Adsorption Ratio (SAR)	1	CAM SOP-00102	EPA 6010C
SAR - ICP Metals	1	CAM SOP-00408	EPA 6010D 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, MDDELCC, 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. All samples were analyzed within hold time unless otherwise flagged.

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) This test was performed by Campo to Calgary - Offsite

(2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.



Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1906
Your C.O.C. #: 716854-13-01

Attention: Chris Vettorazzo

Golder Associates Ltd
11 Austin St.
Suite 101
St. John's, NL
Canada A1B 4C1

Report Date: 2019/06/04
Report #: R5737988
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9D9093

Received: 2019/05/24, 10:30

(3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Kyle Reinhart
Project Manager
04 Jun 2019 12:28:40

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

=====

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BUREAU
VERITAS

BV Labs Job #: B9D9093
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1906

O.REG 153 PHCS IN SOIL (SOIL)

BV Labs ID		JUM796		JUM797		JUM797			
Sampling Date		2019/05/22 12:15		2019/05/22 10:15		2019/05/22 10:15			
COC Number		716854-13-01		716854-13-01		716854-13-01			
	UNITS	SV19-01-07	RDL	SV19-02-09	RDL	QC Batch	SV19-02-09 Lab-Dup	RDL	QC Batch
Moisture	%	7.5	1.0	3.7	1.0	6141733			
Benzene	ug/g	3.4	0.020	8.7	0.20	6144380	8.9	0.20	6144380
Toluene	ug/g	3.8	0.020	7.6	0.20	6144380	8.2	0.20	6144380
Ethylbenzene	ug/g	0.51	0.020	6.8	0.20	6144380	7.3	0.20	6144380
o-Xylene	ug/g	0.52	0.020	5.8	0.20	6144380	6.1	0.20	6144380
p+m-Xylene	ug/g	2.8	0.040	21	0.40	6144380	22	0.40	6144380
Total Xylenes	ug/g	3.3	0.040	27	0.40	6144380	29	0.40	6144380
F1 (C6-C10)	ug/g	87	10	1200	100	6144380	1300	100	6144380
F1 (C6-C10) - BTEX	ug/g	76	10	1200	100	6144380	1200	100	6144380
F2 (C10-C16 Hydrocarbons)	ug/g	32	10	450	10	6144420			
F3 (C16-C34 Hydrocarbons)	ug/g	65	50	280	50	6144420			
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	<50	50	6144420			
Reached Baseline at C50	ug/g	Yes		Yes		6144420			
Extraction									
Surrogate Recovery (%)									
D10-Ethylbenzene	%	109		122		6144380	132		6144380
o-Terphenyl	%	95		103		6144420			
Instrument									
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	105		106		6144380	106		6144380
4-Bromofluorobenzene	%	102		99		6144380	100		6144380
D4-1,2-Dichloroethane	%	92		98		6144380	94		6144380
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate									



BUREAU
VERITAS

BV Labs Job #: B9D9093
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1906

O.REG 153 PHCS IN SOIL (SOIL)

BV Labs ID		JUM798		JUM800		
Sampling Date		2019/05/22 13:30		2019/05/22 10:15		
COC Number		716854-13-01		716854-13-01		
	UNITS	SV19-03-06	RDL	DUP B	RDL	QC Batch
Moisture	%	6.6	1.0	4.6	1.0	6141733
Benzene	ug/g	3.5	0.020	1.2	0.20	6144380
Toluene	ug/g	1.2	0.020	0.61	0.20	6144380
Ethylbenzene	ug/g	0.10	0.020	1.4	0.20	6144380
o-Xylene	ug/g	0.11	0.020	0.74	0.20	6144380
p+m-Xylene	ug/g	0.32	0.040	2.9	0.40	6144380
Total Xylenes	ug/g	0.43	0.040	3.6	0.40	6144380
F1 (C6-C10)	ug/g	29	10	720	100	6144380
F1 (C6-C10) - BTEX	ug/g	24	10	710	100	6144380
F2 (C10-C16 Hydrocarbons)	ug/g	110	10	430	10	6144420
F3 (C16-C34 Hydrocarbons)	ug/g	130	50	280	50	6144420
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	<50	50	6144420
Reached Baseline at C50	ug/g	Yes		Yes		6144420
Extraction						
Surrogate Recovery (%)						
D10-Ethylbenzene	%	89		110		6144380
o-Terphenyl	%	96		93		6144420
Instrument						
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	103		106		6144380
4-Bromofluorobenzene	%	98		99		6144380
D4-1,2-Dichloroethane	%	100		93		6144380
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						



BUREAU
VERITAS

BV Labs Job #: B9D9093
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1906

RESULTS OF ANALYSES OF SOIL

BV Labs ID		JUM796			JUM797			JUM799		
Sampling Date		2019/05/22 12:15			2019/05/22 10:15			2019/05/22 11:45		
COC Number		716854-13-01			716854-13-01			716854-13-01		
	UNITS	SV19-01-07	RDL	QC Batch	SV19-02-09	RDL	QC Batch	SV19-01-04	RDL	QC Batch
Sodium Adsorption Ratio	N/A	0.38		6140860						
Conductivity	mS/cm	2.4	0.002	6143876						
Available (CaCl2) pH	pH	7.69		6141889						
Grain Size	%							COARSE	N/A	6144121
Sieve - #200 (<0.075mm)	%							26	1	6144121
Sieve - #200 (>0.075mm)	%							74	1	6144121
Dry Bulk Density	g/cm3				1.4	0.010	6156184			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable										

BV Labs ID		JUM800		
Sampling Date		2019/05/22 10:15		
COC Number		716854-13-01		
	UNITS	DUP B	RDL	QC Batch
Dry Bulk Density	g/cm3	1.6	0.010	6156184
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9D9093
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1906

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

BV Labs ID		JUM796		
Sampling Date		2019/05/22 12:15		
COC Number		716854-13-01		
	UNITS	SV19-01-07	RDL	QC Batch
Acid Extractable Antimony (Sb)	ug/g	0.52	0.20	6142078
Acid Extractable Arsenic (As)	ug/g	6.3	1.0	6142078
Acid Extractable Barium (Ba)	ug/g	100	0.50	6142078
Acid Extractable Beryllium (Be)	ug/g	0.55	0.20	6142078
Acid Extractable Boron (B)	ug/g	6.6	5.0	6142078
Acid Extractable Cadmium (Cd)	ug/g	0.35	0.10	6142078
Acid Extractable Chromium (Cr)	ug/g	18	1.0	6142078
Acid Extractable Cobalt (Co)	ug/g	13	0.10	6142078
Acid Extractable Copper (Cu)	ug/g	31	0.50	6142078
Acid Extractable Lead (Pb)	ug/g	25	1.0	6142078
Acid Extractable Molybdenum (Mo)	ug/g	5.1	0.50	6142078
Acid Extractable Nickel (Ni)	ug/g	45	0.50	6142078
Acid Extractable Selenium (Se)	ug/g	0.73	0.50	6142078
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	6142078
Acid Extractable Thallium (Tl)	ug/g	0.55	0.050	6142078
Acid Extractable Uranium (U)	ug/g	2.3	0.050	6142078
Acid Extractable Vanadium (V)	ug/g	28	5.0	6142078
Acid Extractable Zinc (Zn)	ug/g	66	5.0	6142078
Acid Extractable Mercury (Hg)	ug/g	0.15	0.050	6142078
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9D9093
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1906

TEST SUMMARY

BV Labs ID: JUM796
Sample ID: SV19-01-07
Matrix: Soil

Collected: 2019/05/22
Relinquished: 2019/05/23
Received: 2019/05/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	6143876	2019/05/28	2019/05/28	Kazzandra Adeva
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6144380	N/A	2019/05/28	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6144420	2019/05/28	2019/05/29	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6142078	2019/05/27	2019/05/28	Viviana Canzonieri
Moisture	BAL	6141733	N/A	2019/05/27	Prgya Panchal
pH CaCl2 EXTRACT	AT	6141889	2019/05/27	2019/05/27	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	6140860	N/A	2019/05/29	Automated Statchk

BV Labs ID: JUM797
Sample ID: SV19-02-09
Matrix: Soil

Collected: 2019/05/22
Relinquished: 2019/05/23
Received: 2019/05/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6144380	N/A	2019/05/29	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6144420	2019/05/28	2019/05/29	Prabhjot Gulati
Bulk Density	BAL	6156184	N/A	2019/06/01	Muhammad Naeem
Moisture	BAL	6141733	N/A	2019/05/27	Prgya Panchal

BV Labs ID: JUM797 Dup
Sample ID: SV19-02-09
Matrix: Soil

Collected: 2019/05/22
Relinquished: 2019/05/23
Received: 2019/05/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6144380	N/A	2019/05/29	Abdikarim Ali

BV Labs ID: JUM798
Sample ID: SV19-03-06
Matrix: Soil

Collected: 2019/05/22
Relinquished: 2019/05/23
Received: 2019/05/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6144380	N/A	2019/05/29	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6144420	2019/05/28	2019/05/29	Prabhjot Gulati
Moisture	BAL	6141733	N/A	2019/05/27	Prgya Panchal

BV Labs ID: JUM799
Sample ID: SV19-01-04
Matrix: Soil

Collected: 2019/05/22
Relinquished: 2019/05/23
Received: 2019/05/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sieve, 75um	SIEV	6144121	N/A	2019/05/29	Chun Yan



BUREAU
VERITAS

BV Labs Job #: B9D9093

Report Date: 2019/06/04

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1906

TEST SUMMARY

BV Labs ID: JUM800
Sample ID: DUP B
Matrix: Soil

Collected: 2019/05/22
Relinquished: 2019/05/23
Received: 2019/05/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6144380	N/A	2019/05/28	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6144420	2019/05/28	2019/05/29	Prabhjot Gulati
Bulk Density	BAL	6156184	N/A	2019/06/01	Muhammad Naeem
Moisture	BAL	6141733	N/A	2019/05/27	Prgya Panchal



BUREAU
VERITAS

BV Labs Job #: B9D9093

Report Date: 2019/06/04

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1906

GENERAL COMMENTS

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

Package 1	2.7°C
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Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: B9D9093
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1906

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits			
6142078	VIV	Method Blank	Acid Extractable Antimony (Sb)	2019/05/28	<0.20			ug/g				
			Acid Extractable Arsenic (As)	2019/05/28	<1.0			ug/g				
			Acid Extractable Barium (Ba)	2019/05/28	<0.50			ug/g				
			Acid Extractable Beryllium (Be)	2019/05/28	<0.20			ug/g				
			Acid Extractable Boron (B)	2019/05/28	<5.0			ug/g				
			Acid Extractable Cadmium (Cd)	2019/05/28	<0.10			ug/g				
			Acid Extractable Chromium (Cr)	2019/05/28	<1.0			ug/g				
			Acid Extractable Cobalt (Co)	2019/05/28	<0.10			ug/g				
			Acid Extractable Copper (Cu)	2019/05/28	<0.50			ug/g				
			Acid Extractable Lead (Pb)	2019/05/28	<1.0			ug/g				
			Acid Extractable Molybdenum (Mo)	2019/05/28	<0.50			ug/g				
			Acid Extractable Nickel (Ni)	2019/05/28	<0.50			ug/g				
			Acid Extractable Selenium (Se)	2019/05/28	<0.50			ug/g				
			Acid Extractable Silver (Ag)	2019/05/28	<0.20			ug/g				
			Acid Extractable Thallium (Tl)	2019/05/28	<0.050			ug/g				
			Acid Extractable Uranium (U)	2019/05/28	<0.050			ug/g				
			Acid Extractable Vanadium (V)	2019/05/28	<5.0			ug/g				
			Acid Extractable Zinc (Zn)	2019/05/28	<5.0			ug/g				
			Acid Extractable Mercury (Hg)	2019/05/28	<0.050			ug/g				
			6143876	KAD	Method Blank	Conductivity	2019/05/28	<0.002			mS/cm	
6144380	AAI	Method Blank	1,4-Difluorobenzene	2019/05/28			103	%	60 - 140			
			4-Bromofluorobenzene	2019/05/28			98	%	60 - 140			
			D10-Ethylbenzene	2019/05/28			94	%	60 - 140			
			D4-1,2-Dichloroethane	2019/05/28			94	%	60 - 140			
			Benzene	2019/05/28	<0.020				ug/g			
			Toluene	2019/05/28	<0.020				ug/g			
			Ethylbenzene	2019/05/28	<0.020				ug/g			
			o-Xylene	2019/05/28	<0.020				ug/g			
			p+m-Xylene	2019/05/28	<0.040				ug/g			
			Total Xylenes	2019/05/28	<0.040				ug/g			
			F1 (C6-C10)	2019/05/28	<10				ug/g			
			F1 (C6-C10) - BTEX	2019/05/28	<10				ug/g			
			6144420	GUL	Method Blank	o-Terphenyl	2019/05/28			93	%	60 - 130
			6144380	AAI	RPD [JUM797-02]	F2 (C10-C16 Hydrocarbons)	2019/05/28	<10			ug/g	
F3 (C16-C34 Hydrocarbons)	2019/05/28	<50						ug/g				
F4 (C34-C50 Hydrocarbons)	2019/05/28	<50						ug/g				
Benzene	2019/05/29	2.7						%	50			
Toluene	2019/05/29	7.9						%	50			
6144380	AAI	Matrix Spike [JUM797-02]	Ethylbenzene	2019/05/29	6.7			%	50			
			o-Xylene	2019/05/29	4.7			%	50			
			p+m-Xylene	2019/05/29	5.4			%	50			
			Total Xylenes	2019/05/29	5.2			%	50			
			F1 (C6-C10)	2019/05/29	5.9			%	30			
			F1 (C6-C10) - BTEX	2019/05/29	5.9			%	30			
			1,4-Difluorobenzene	2019/05/28			106	%	60 - 140			
			4-Bromofluorobenzene	2019/05/28			101	%	60 - 140			
D10-Ethylbenzene	2019/05/28			127	%	60 - 140						
D4-1,2-Dichloroethane	2019/05/28			96	%	60 - 140						
Benzene	2019/05/28			NC	%	60 - 140						
Toluene	2019/05/28			NC	%	60 - 140						
Ethylbenzene	2019/05/28			NC	%	60 - 140						



BUREAU
VERITAS

BV Labs Job #: B9D9093
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1906

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				o-Xylene	2019/05/28		138	%	60 - 140
				p+m-Xylene	2019/05/28		NC	%	60 - 140
				F1 (C6-C10)	2019/05/28		NC	%	60 - 140
6141889	SAU	LCS		Available (CaCl2) pH	2019/05/27		101	%	97 - 103
6142078	VIV	LCS		Acid Extractable Antimony (Sb)	2019/05/28		101	%	80 - 120
				Acid Extractable Arsenic (As)	2019/05/28		103	%	80 - 120
				Acid Extractable Barium (Ba)	2019/05/28		97	%	80 - 120
				Acid Extractable Beryllium (Be)	2019/05/28		97	%	80 - 120
				Acid Extractable Boron (B)	2019/05/28		100	%	80 - 120
				Acid Extractable Cadmium (Cd)	2019/05/28		100	%	80 - 120
				Acid Extractable Chromium (Cr)	2019/05/28		99	%	80 - 120
				Acid Extractable Cobalt (Co)	2019/05/28		101	%	80 - 120
				Acid Extractable Copper (Cu)	2019/05/28		104	%	80 - 120
				Acid Extractable Lead (Pb)	2019/05/28		101	%	80 - 120
				Acid Extractable Molybdenum (Mo)	2019/05/28		100	%	80 - 120
				Acid Extractable Nickel (Ni)	2019/05/28		100	%	80 - 120
				Acid Extractable Selenium (Se)	2019/05/28		104	%	80 - 120
				Acid Extractable Silver (Ag)	2019/05/28		101	%	80 - 120
				Acid Extractable Thallium (Tl)	2019/05/28		101	%	80 - 120
				Acid Extractable Uranium (U)	2019/05/28		98	%	80 - 120
				Acid Extractable Vanadium (V)	2019/05/28		99	%	80 - 120
				Acid Extractable Zinc (Zn)	2019/05/28		109	%	80 - 120
				Acid Extractable Mercury (Hg)	2019/05/28		99	%	80 - 120
6143876	KAD	LCS		Conductivity	2019/05/28		103	%	90 - 110
6144380	AAI	LCS		1,4-Difluorobenzene	2019/05/28		103	%	60 - 140
				4-Bromofluorobenzene	2019/05/28		102	%	60 - 140
				D10-Ethylbenzene	2019/05/28		94	%	60 - 140
				D4-1,2-Dichloroethane	2019/05/28		99	%	60 - 140
				Benzene	2019/05/28		91	%	60 - 140
				Toluene	2019/05/28		93	%	60 - 140
				Ethylbenzene	2019/05/28		93	%	60 - 140
				o-Xylene	2019/05/28		88	%	60 - 140
				p+m-Xylene	2019/05/28		92	%	60 - 140
				F1 (C6-C10)	2019/05/28		103	%	80 - 120
6144420	GUL	LCS		o-Terphenyl	2019/05/28		92	%	60 - 130
				F2 (C10-C16 Hydrocarbons)	2019/05/28		100	%	80 - 120
				F3 (C16-C34 Hydrocarbons)	2019/05/28		96	%	80 - 120
				F4 (C34-C50 Hydrocarbons)	2019/05/28		95	%	80 - 120
6144121	GYA	SRM		Sieve - #200 (>0.075mm)	2019/05/29		44	%	42 - 47
				Sieve - #200 (<0.075mm)	2019/05/29		56	%	53 - 58

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.

LCS: 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)



BUREAU
VERITAS

BV Labs Job #: B9D9093

Report Date: 2019/06/04

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1906

VALIDATION SIGNATURE PAGE

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

Anastassia Hamanov, Scientific Specialist

Harry (Peng) Liang, Senior Analyst

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

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: May 22, 2019

Location: 2 Montreal Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 18113796-1485

Sample Submission Number: B9D9093

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	Samples SV19-02-09 and DUP B exceed the alert limit for benzene (152%), ethylbenzene (132%), p+m-xylene (151%) and total xylenes (153%).
Trip Blank Concentration			X	
Field Duplicate RPD		X		

Has CoA been signed off (Yes/No)?:

Yes

Has lab warranted all tests were in statistical control in CoA (Yes/No)?:

Yes

Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:

Yes

Were all samples analyzed within hold times (Yes/No)?:

Yes

All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:

Yes

Is Chain of Custody completed and signed (Yes/No)?:

Yes

Were sample temperatures acceptable when they reached lab (Yes/No)?:

Yes

Is data considered to be reliable (Yes/No/Suspect)?:

Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): *Amanda Newberry*

Date: June 6, 2019

Task Order#: 18113796-1485-7777
 Site#: N/A
 Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
 Project #: 18113796-1485-1906
 Your C.O.C. #: 716854-03-01

Attention: Chris Vettorazzo

Golder Associates Ltd
 11 Austin St.
 Suite 101
 St. John's, NL
 Canada A1B 4C1

Report Date: 2019/05/30
 Report #: R5732202
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9D9104
Received: 2019/05/24, 10:30

Sample Matrix: Soil
 # Samples Received: 1

Analyses	Quantity	Laboratory Method	Primary Reference
Mercury (TCLP Leachable) (mg/L)	1	CAM SOP-00453	EPA 7470A m
Total Metals in TCLP Leachate by ICPMS	1	CAM SOP-00447	EPA 6020B m
Ignitability of a Sample	1	CAM SOP-00432	EPA 1030 Rev. 1 m
pH CaCl2 EXTRACT	1	CAM SOP-00413	EPA 9045 D m
TCLP - % Solids	1	CAM SOP-00401	EPA 1311 Update I m
TCLP - Extraction Fluid	1	CAM SOP-00401	EPA 1311 Update I m
TCLP - Initial and final pH	1	CAM SOP-00401	EPA 1311 Update I m
TCLP Zero Headspace Extraction	1	CAM SOP-00430	EPA 1311 m
VOCs in ZHE Leachates	1	CAM SOP-00228	EPA 8260C m

Remarks:

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

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

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

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

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

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.

Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1906
Your C.O.C. #: 716854-03-01

Attention: Chris Vettorazzo

Golder Associates Ltd
11 Austin St.
Suite 101
St. John's, NL
Canada A1B 4C1

Report Date: 2019/05/30
Report #: R5732202
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9D9104
Received: 2019/05/24, 10:30

Encryption Key



Kyle Reinhart
Project Manager
30 May 2019 15:37:10

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: kreinhart@maxxam.ca
Phone# (905)817-5802

=====

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

O.REG 558 TCLP LEACHATE PREPARATION (SOIL)

Maxxam ID		JUM819		
Sampling Date		2019/05/22 14:00		
COC Number		716854-03-01		
	UNITS	TCLP	RDL	QC Batch
Final pH	pH	6.14		6144309
Initial pH	pH	8.75		6144309
TCLP - % Solids	%	100	0.2	6144298
TCLP Extraction Fluid	N/A	FLUID 1		6144308
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

O.REG 558 TCLP VOLATILE ORGANICS HS (SOIL)

Maxxam ID		JUM819		
Sampling Date		2019/05/22 14:00		
COC Number		716854-03-01		
	UNITS	TCLP	RDL	QC Batch
Amount Extracted (Wet Weight) (g)	N/A	25	N/A	6143946
Leachable Benzene	mg/L	<0.020	0.020	6146338
Leachable Carbon Tetrachloride	mg/L	<0.020	0.020	6146338
Leachable Chlorobenzene	mg/L	<0.020	0.020	6146338
Leachable Chloroform	mg/L	<0.020	0.020	6146338
Leachable 1,2-Dichlorobenzene	mg/L	<0.050	0.050	6146338
Leachable 1,4-Dichlorobenzene	mg/L	<0.050	0.050	6146338
Leachable 1,2-Dichloroethane	mg/L	<0.050	0.050	6146338
Leachable 1,1-Dichloroethylene	mg/L	<0.020	0.020	6146338
Leachable Methylene Chloride(Dichloromethane)	mg/L	<0.20	0.20	6146338
Leachable Methyl Ethyl Ketone (2-Butanone)	mg/L	<1.0	1.0	6146338
Leachable Tetrachloroethylene	mg/L	<0.020	0.020	6146338
Leachable Trichloroethylene	mg/L	<0.020	0.020	6146338
Leachable Vinyl Chloride	mg/L	<0.020	0.020	6146338
Instrument				
Surrogate Recovery (%)				
Leachable 4-Bromofluorobenzene	%	94		6146338
Leachable D4-1,2-Dichloroethane	%	108		6146338
Leachable D8-Toluene	%	92		6146338
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable				

RESULTS OF ANALYSES OF SOIL

Maxxam ID		JUM819		
Sampling Date		2019/05/22 14:00		
COC Number		716854-03-01		
	UNITS	TCLP	RDL	QC Batch
Available (CaCl2) pH	pH	7.77		6141889
Leachable Mercury (Hg)	mg/L	<0.0010	0.0010	6146554
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JUM819		
Sampling Date		2019/05/22 14:00		
COC Number		716854-03-01		
	UNITS	TCLP	RDL	QC Batch
Leachable Arsenic (As)	mg/L	<0.2	0.2	6146496
Leachable Barium (Ba)	mg/L	0.5	0.2	6146496
Leachable Boron (B)	mg/L	0.2	0.1	6146496
Leachable Cadmium (Cd)	mg/L	<0.05	0.05	6146496
Leachable Chromium (Cr)	mg/L	<0.1	0.1	6146496
Leachable Lead (Pb)	mg/L	<0.1	0.1	6146496
Leachable Selenium (Se)	mg/L	<0.1	0.1	6146496
Leachable Silver (Ag)	mg/L	<0.01	0.01	6146496
Leachable Uranium (U)	mg/L	<0.01	0.01	6146496
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				

MISCELLANEOUS (SOIL)

Maxxam ID		JUM819	JUM819	
Sampling Date		2019/05/22 14:00	2019/05/22 14:00	
COC Number		716854-03-01	716854-03-01	
	UNITS	TCLP	TCLP Lab-Dup	QC Batch
Ignitability	N/A	NF/NI	NF/NI	6144566
QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate				

TEST SUMMARY

Maxxam ID: JUM819
Sample ID: TCLP
Matrix: Soil

Collected: 2019/05/22
Relinquished: 2019/05/23
Received: 2019/05/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury (TCLP Leachable) (mg/L)	CV/AA	6146554	N/A	2019/05/29	Ron Morrison
Total Metals in TCLP Leachate by ICPMS	ICP1/MS	6146496	2019/05/29	2019/05/30	Prempal Bhatti
Ignitability of a Sample	BAL	6144566	2019/05/28	2019/05/28	Chun Yan
pH CaCl2 EXTRACT	AT	6141889	2019/05/27	2019/05/27	Surinder Rai
TCLP - % Solids	BAL	6144298	2019/05/28	2019/05/29	Jian (Ken) Wang
TCLP - Extraction Fluid		6144308	N/A	2019/05/29	Jian (Ken) Wang
TCLP - Initial and final pH	PH	6144309	N/A	2019/05/29	Jian (Ken) Wang
TCLP Zero Headspace Extraction		6143946	2019/05/28	2019/05/29	Walt Wang
VOCs in ZHE Leachates	GC/MS	6146338	2019/05/29	2019/05/29	Blair Gannon

Maxxam ID: JUM819 Dup
Sample ID: TCLP
Matrix: Soil

Collected: 2019/05/22
Relinquished: 2019/05/23
Received: 2019/05/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ignitability of a Sample	BAL	6144566	2019/05/28	2019/05/28	Chun Yan

GENERAL COMMENTS

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

Package 1	2.7°C
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Sample JUM819 [TCLP] : NF/Ni = Non Flammable and Non Ignitable

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6146338	BG1		Method Blank	Leachable 4-Bromofluorobenzene	2019/05/29		94	%	70 - 130
				Leachable D4-1,2-Dichloroethane	2019/05/29		106	%	70 - 130
				Leachable D8-Toluene	2019/05/29		92	%	70 - 130
				Leachable Benzene	2019/05/29	<0.020		mg/L	
				Leachable Carbon Tetrachloride	2019/05/29	<0.020		mg/L	
				Leachable Chlorobenzene	2019/05/29	<0.020		mg/L	
				Leachable Chloroform	2019/05/29	<0.020		mg/L	
				Leachable 1,2-Dichlorobenzene	2019/05/29	<0.050		mg/L	
				Leachable 1,4-Dichlorobenzene	2019/05/29	<0.050		mg/L	
				Leachable 1,2-Dichloroethane	2019/05/29	<0.050		mg/L	
				Leachable 1,1-Dichloroethylene	2019/05/29	<0.020		mg/L	
				Leachable Methylene Chloride(Dichloromethan	2019/05/29	<0.20		mg/L	
				Leachable Methyl Ethyl Ketone (2-Butanone)	2019/05/29	<1.0		mg/L	
				Leachable Tetrachloroethylene	2019/05/29	<0.020		mg/L	
				Leachable Trichloroethylene	2019/05/29	<0.020		mg/L	
6146496	PBA		Method Blank	Leachable Vinyl Chloride	2019/05/29	<0.020		mg/L	
				Leachable Arsenic (As)	2019/05/30	<0.2		mg/L	
				Leachable Barium (Ba)	2019/05/30	<0.2		mg/L	
				Leachable Boron (B)	2019/05/30	<0.1		mg/L	
				Leachable Cadmium (Cd)	2019/05/30	<0.05		mg/L	
				Leachable Chromium (Cr)	2019/05/30	<0.1		mg/L	
				Leachable Lead (Pb)	2019/05/30	<0.1		mg/L	
				Leachable Selenium (Se)	2019/05/30	<0.1		mg/L	
				Leachable Silver (Ag)	2019/05/30	<0.01		mg/L	
				Leachable Uranium (U)	2019/05/30	<0.01		mg/L	
6146554	RON		Method Blank	Leachable Mercury (Hg)	2019/05/29	<0.0010		mg/L	
6141889	SAU	LCS		Available (CaCl2) pH	2019/05/27		101	%	97 - 103
6146338	BG1		LCS	Leachable 4-Bromofluorobenzene	2019/05/29		103	%	70 - 130
				Leachable D4-1,2-Dichloroethane	2019/05/29		105	%	70 - 130
				Leachable D8-Toluene	2019/05/29		103	%	70 - 130
				Leachable Benzene	2019/05/29		98	%	70 - 130
				Leachable Carbon Tetrachloride	2019/05/29		101	%	70 - 130
				Leachable Chlorobenzene	2019/05/29		100	%	70 - 130
				Leachable Chloroform	2019/05/29		101	%	70 - 130
				Leachable 1,2-Dichlorobenzene	2019/05/29		98	%	70 - 130
				Leachable 1,4-Dichlorobenzene	2019/05/29		97	%	70 - 130
				Leachable 1,2-Dichloroethane	2019/05/29		103	%	70 - 130
				Leachable 1,1-Dichloroethylene	2019/05/29		97	%	70 - 130
				Leachable Methylene Chloride(Dichloromethan	2019/05/29		107	%	70 - 130
				Leachable Methyl Ethyl Ketone (2-Butanone)	2019/05/29		116	%	60 - 140
6146496	PBA		LCS	Leachable Tetrachloroethylene	2019/05/29		100	%	70 - 130
				Leachable Trichloroethylene	2019/05/29		100	%	70 - 130
				Leachable Vinyl Chloride	2019/05/29		97	%	70 - 130
				Leachable Arsenic (As)	2019/05/30		101	%	80 - 120
				Leachable Barium (Ba)	2019/05/30		100	%	80 - 120
				Leachable Boron (B)	2019/05/30		100	%	80 - 120
				Leachable Cadmium (Cd)	2019/05/30		100	%	80 - 120
				Leachable Chromium (Cr)	2019/05/30		102	%	80 - 120
				Leachable Lead (Pb)	2019/05/30		94	%	80 - 120
				Leachable Selenium (Se)	2019/05/30		102	%	80 - 120
Leachable Silver (Ag)	2019/05/30		102	%	80 - 120				
Leachable Uranium (U)	2019/05/30		96	%	80 - 120				

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6146554	RON	LCS	Leachable Mercury (Hg)	2019/05/29		99	%	80 - 120
6146496	PBA	Leachate Blank	Leachable Arsenic (As)	2019/05/30	<0.2		mg/L	
			Leachable Barium (Ba)	2019/05/30	<0.2		mg/L	
			Leachable Boron (B)	2019/05/30	<0.1		mg/L	
			Leachable Cadmium (Cd)	2019/05/30	<0.05		mg/L	
			Leachable Chromium (Cr)	2019/05/30	<0.1		mg/L	
			Leachable Lead (Pb)	2019/05/30	<0.1		mg/L	
			Leachable Selenium (Se)	2019/05/30	<0.1		mg/L	
			Leachable Silver (Ag)	2019/05/30	<0.01		mg/L	
			Leachable Uranium (U)	2019/05/30	<0.01		mg/L	
6146554	RON	Leachate Blank	Leachable Mercury (Hg)	2019/05/29	<0.0010		mg/L	

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.



LCS: 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.

VALIDATION SIGNATURE PAGE

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

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

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



INVOICE INFORMATION		REPORT INFORMATION				
Company Name: Imperial Oil Ltd. - Golder Associates Ltd		Company Name: Golder Associates Ltd				
Contact Name: IOL Accounts Payable	Contact Name: Chris Vettorazzo	Address: 11 Austin St. Suite 101 St. Johns, Nfld A1B 4C1				
Address: 102, 2535-3rd Avenue SE Calgary, AB T2A 7W5	Address: 360-2920 Victoria Way Vancouver, BC V6M 0C4	Email: chris_vettorazzo@golder.com, IOL_1390@golder.com				
Email: IOLAccounts_Payable@golder.com	Phone: (403) 299-5000	Phone: (604) 298-4200 - 709 722 2695				
Sampler Name (Print): Jeremy Eckert, Leandra Mariani	Consultant Project #: 18113796-1485-1906	LAB FILTRATION REQUIRED				
FIELD SAMPLE ID	MATRIX	SAMPLING DATE (YYYYMMDD)	TIME (24 HR)	LAB FILTRATION PRESERVED	FIELD FILTRATION PRESERVED	LAB FILTRATION REQUIRED
1	GROUND WATER	X	2019/05/22	14:00		
2	SURFACE WATER					
3	OTHER					
4						
5						
6						
7						
8						
9						
10						

IOL SITE LOCATION: 2 Montreal Road, Ottawa, Ontario	REGULATORY CRITERIA / DETECTION LIMITS: <input type="checkbox"/> REG 153 Table (Please indicate which Reg. version and if RSC required)	REG. VERSION: <input type="checkbox"/> 2004 <input type="checkbox"/> 2011 <input type="checkbox"/> RSC
IOL PROJECT # (if applicable): N/A	<input type="checkbox"/> ODWS <input type="checkbox"/> PWGO	<input checked="" type="checkbox"/> Other Reg. 558/00
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 18113796-14857771		

SEAL PRESENT	YES	NO	COOLER ID:	TEMP °C	TIME (24 HR)	RECEIVED BY:
SEAL INTACT	N		1		10:00	1. Jeremy Eckert
COOLING MEDIA PRESENT	V		2			2. Leandra Mariani
COOLING MEDIA PRESENT	V		3			3. Chris Vettorazzo

SEAL PRESENT	YES	NO	COOLER ID:	TEMP °C	TIME (24 HR)	RECEIVED BY:
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DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: May 22, 2019

Location: 2 Montreal Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 18113796-1485

Sample Submission Number: B9D9104

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within acceptance criteria.
Extraction Surrogate Recovery			X	
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:

Yes

Has lab warranted all tests were in statistical control in CoA (Yes/No)?:

Yes

Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:

Yes

Were all samples analyzed within hold times (Yes/No)?:

Yes

All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:

n/a

Is Chain of Custody completed and signed (Yes/No)?:

Yes

Were sample temperatures acceptable when they reached lab (Yes/No)?:

Yes

Is data considered to be reliable (Yes/No/Suspect)?:

Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): *Amanda Newberry*

Date: May 31, 2019



Task Order#: 18113796-1485-7777
 Site#: N/A
 Site Location: 2 Montreal Road, Ottawa, Ontario
 Project #: 18113796-1485-1907A
 Your C.O.C. #: 716856-05-01

Attention: Chris Vettorazzo

Golder Associates Ltd
 11 Austin St.
 Suite 101
 St. John's, NL
 Canada A1B 4C1

Report Date: 2019/06/04
 Report #: R5738970
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E5321
Received: 2019/05/30, 10:31

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Laboratory Method	Primary Reference
Methylnaphthalene Sum	1	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum	1		EPA 8260C m
Petroleum Hydro. CCME F1 & BTEX in Water	8	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	8	CAM SOP-00316	CCME PHC-CWS m
Glycols in Water by GC/FID	1	CAM SOP-00322	based on EPA 8015
Dissolved Metals by ICPMS	1	CAM SOP-00447	EPA 6020B m
PAH Compounds in Water by GC/MS (SIM)	1	CAM SOP-00318	EPA 8270D m
Volatile Organic Compounds in Water	1	CAM SOP-00228	EPA 8260C 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, MDDELCC, 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. All samples were analyzed within hold time unless otherwise flagged.

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) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1



Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A
Your C.O.C. #: 716856-05-01

Attention: Chris Vettorazzo

Golder Associates Ltd
11 Austin St.
Suite 101
St. John's, NL
Canada A1B 4C1

Report Date: 2019/06/04
Report #: R5738970
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E5321

Received: 2019/05/30, 10:31

Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Kyle Reinhart
Project Manager
04 Jun 2019 18:06:45

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

Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

=====

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



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		JVW413	JVW414			JVW415			JVW416		
Sampling Date		2019/05/28 12:38	2019/05/28 12:38			2019/05/28 13:23			2019/05/28 14:16		
COC Number		716856-05-01	716856-05-01			716856-05-01			716856-05-01		
	UNITS	TH210	DUP B	RDL	QC Batch	TH212	RDL	QC Batch	TH206	RDL	QC Batch
Benzene	ug/L	37	37	0.20	6153470				4.0	0.20	6153470
Toluene	ug/L	<0.20	<0.20	0.20	6153470				<0.20	0.20	6153470
Ethylbenzene	ug/L	<0.20	<0.20	0.20	6153470				<0.20	0.20	6153470
o-Xylene	ug/L	<0.20	<0.20	0.20	6153470				<0.20	0.20	6153470
p+m-Xylene	ug/L	<0.40	<0.40	0.40	6153470				<0.40	0.40	6153470
Total Xylenes	ug/L	<0.40	<0.40	0.40	6153470				<0.40	0.40	6153470
F1 (C6-C10)	ug/L	40	39	25	6153470	55	25	6153470	<25	25	6153470
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	6153470	31	25	6153470	<25	25	6153470
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	6154624	<100	100	6155162	<100	100	6154624
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	6154624	<200	200	6155162	<200	200	6154624
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	6154624	<200	200	6155162	<200	200	6154624
Reached Baseline at C50	ug/L	Yes	Yes		6154624	Yes		6155162	Yes		6154624
Extraction											
Surrogate Recovery (%)											
o-Terphenyl	%	104	104		6154624	97		6155162	105		6154624
Instrument											
Surrogate Recovery (%)											
1,4-Difluorobenzene	%	100	101		6153470	104		6153470	107		6153470
4-Bromofluorobenzene	%	99	97		6153470	101		6153470	98		6153470
D10-Ethylbenzene	%	96	99		6153470	99		6153470	101		6153470
D4-1,2-Dichloroethane	%	98	98		6153470	103		6153470	102		6153470
RDL = Reportable Detection Limit QC Batch = Quality Control Batch											



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		JVW416			JVW417	JVW418	JVW419	JVW420		
Sampling Date		2019/05/28 14:16			2019/05/28 14:41	2019/05/28 15:14	2019/05/28 15:36	2019/05/28 16:15		
COC Number		716856-05-01			716856-05-01	716856-05-01	716856-05-01	716856-05-01		
	UNITS	TH206 Lab-Dup	RDL	QC Batch	TH207	TH205A	TH201	TH203A	RDL	QC Batch
Benzene	ug/L				0.71	<0.20	<0.20	<0.20	0.20	6153470
Toluene	ug/L				<0.20	<0.20	<0.20	<0.20	0.20	6153470
Ethylbenzene	ug/L				0.30	<0.20	<0.20	<0.20	0.20	6153470
o-Xylene	ug/L				<0.20	<0.20	<0.20	<0.20	0.20	6153470
p+m-Xylene	ug/L				<0.40	<0.40	<0.40	<0.40	0.40	6153470
Total Xylenes	ug/L				<0.40	<0.40	<0.40	<0.40	0.40	6153470
F1 (C6-C10)	ug/L				<25	<25	<25	<25	25	6153470
F1 (C6-C10) - BTEX	ug/L				<25	<25	<25	<25	25	6153470
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	6154624	<100	<100	<100	<100	100	6154624
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	6154624	<200	<200	<200	210	200	6154624
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	6154624	<200	<200	<200	<200	200	6154624
Reached Baseline at C50	ug/L	Yes		6154624	Yes	Yes	Yes	Yes		6154624
Extraction Surrogate Recovery (%)										
o-Terphenyl	%	103		6154624	107	106	102	108		6154624
Instrument Surrogate Recovery (%)										
1,4-Difluorobenzene	%				98	103	103	109		6153470
4-Bromofluorobenzene	%				97	97	98	97		6153470
D10-Ethylbenzene	%				99	101	98	99		6153470
D4-1,2-Dichloroethane	%				96	97	97	103		6153470
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

GLYCOLS BY GC-FID (WATER)

BV Labs ID		JVW415	JVW415		
Sampling Date		2019/05/28 13:23	2019/05/28 13:23		
COC Number		716856-05-01	716856-05-01		
	UNITS	TH212	TH212 Lab-Dup	RDL	QC Batch
Propylene Glycol	mg/L	<5	<5	5	6152425
Ethylene Glycol	mg/L	<5	<5	5	6152425
Diethylene Glycol	mg/L	<5	<5	5	6152425
Total Glycol	mg/L	<5	<5	5	6152425
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate					



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 DISSOLVED ICPMS METALS (WATER)

BV Labs ID		JVW415		
Sampling Date		2019/05/28 13:23		
COC Number		716856-05-01		
	UNITS	TH212	RDL	QC Batch
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	6149918
Dissolved Arsenic (As)	ug/L	<1.0	1.0	6149918
Dissolved Barium (Ba)	ug/L	43	2.0	6149918
Dissolved Beryllium (Be)	ug/L	<0.50	0.50	6149918
Dissolved Boron (B)	ug/L	37	10	6149918
Dissolved Cadmium (Cd)	ug/L	<0.10	0.10	6149918
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	6149918
Dissolved Cobalt (Co)	ug/L	<0.50	0.50	6149918
Dissolved Copper (Cu)	ug/L	<1.0	1.0	6149918
Dissolved Lead (Pb)	ug/L	<0.50	0.50	6149918
Dissolved Molybdenum (Mo)	ug/L	0.68	0.50	6149918
Dissolved Nickel (Ni)	ug/L	1.7	1.0	6149918
Dissolved Selenium (Se)	ug/L	3.7	2.0	6149918
Dissolved Silver (Ag)	ug/L	<0.10	0.10	6149918
Dissolved Sodium (Na)	ug/L	150000	100	6149918
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	6149918
Dissolved Uranium (U)	ug/L	9.1	0.10	6149918
Dissolved Vanadium (V)	ug/L	<0.50	0.50	6149918
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	6149918
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 PAHS (WATER)

BV Labs ID		JVW415		
Sampling Date		2019/05/28 13:23		
COC Number		716856-05-01		
	UNITS	TH212	RDL	QC Batch
Methylnaphthalene, 2-(1-)	ug/L	<0.071	0.071	6148825
Acenaphthene	ug/L	<0.050	0.050	6155135
Acenaphthylene	ug/L	<0.050	0.050	6155135
Anthracene	ug/L	<0.050	0.050	6155135
Benzo(a)anthracene	ug/L	<0.050	0.050	6155135
Benzo(a)pyrene	ug/L	<0.010	0.010	6155135
Benzo(b/j)fluoranthene	ug/L	<0.050	0.050	6155135
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	6155135
Benzo(k)fluoranthene	ug/L	<0.050	0.050	6155135
Chrysene	ug/L	<0.050	0.050	6155135
Dibenz(a,h)anthracene	ug/L	<0.050	0.050	6155135
Fluoranthene	ug/L	<0.050	0.050	6155135
Fluorene	ug/L	<0.050	0.050	6155135
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	6155135
1-Methylnaphthalene	ug/L	<0.050	0.050	6155135
2-Methylnaphthalene	ug/L	<0.050	0.050	6155135
Naphthalene	ug/L	<0.050	0.050	6155135
Phenanthrene	ug/L	<0.030	0.030	6155135
Pyrene	ug/L	<0.050	0.050	6155135
Extraction Surrogate Recovery (%)				
D10-Anthracene	%	107		6155135
D14-Terphenyl (FS)	%	114		6155135
D8-Acenaphthylene	%	107		6155135
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 VOCs BY HS (WATER)

BV Labs ID		JVW415		
Sampling Date		2019/05/28 13:23		
COC Number		716856-05-01		
	UNITS	TH212	RDL	QC Batch
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	0.50	6149732
Acetone (2-Propanone)	ug/L	<10	10	6151080
Benzene	ug/L	24	0.20	6151080
Bromodichloromethane	ug/L	<0.50	0.50	6151080
Bromoform	ug/L	<1.0	1.0	6151080
Bromomethane	ug/L	<0.50	0.50	6151080
Carbon Tetrachloride	ug/L	<0.20	0.20	6151080
Chlorobenzene	ug/L	<0.20	0.20	6151080
Chloroform	ug/L	<0.20	0.20	6151080
Dibromochloromethane	ug/L	<0.50	0.50	6151080
1,2-Dichlorobenzene	ug/L	<0.50	0.50	6151080
1,3-Dichlorobenzene	ug/L	<0.50	0.50	6151080
1,4-Dichlorobenzene	ug/L	<0.50	0.50	6151080
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	1.0	6151080
1,1-Dichloroethane	ug/L	<0.20	0.20	6151080
1,2-Dichloroethane	ug/L	<0.50	0.50	6151080
1,1-Dichloroethylene	ug/L	<0.20	0.20	6151080
cis-1,2-Dichloroethylene	ug/L	<0.50	0.50	6151080
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	6151080
1,2-Dichloropropane	ug/L	<0.20	0.20	6151080
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	6151080
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	6151080
Ethylbenzene	ug/L	<0.20	0.20	6151080
Ethylene Dibromide	ug/L	<0.20	0.20	6151080
Hexane	ug/L	<1.0	1.0	6151080
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	6151080
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	10	6151080
Methyl Isobutyl Ketone	ug/L	<5.0	5.0	6151080
Methyl t-butyl ether (MTBE)	ug/L	5.7	0.50	6151080
Styrene	ug/L	<0.50	0.50	6151080
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	6151080
1,1,2,2-Tetrachloroethane	ug/L	<0.50	0.50	6151080
Tetrachloroethylene	ug/L	<0.20	0.20	6151080
Toluene	ug/L	<0.20	0.20	6151080
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 VOCS BY HS (WATER)

BV Labs ID		JVW415		
Sampling Date		2019/05/28 13:23		
COC Number		716856-05-01		
	UNITS	TH212	RDL	QC Batch
1,1,1-Trichloroethane	ug/L	<0.20	0.20	6151080
1,1,2-Trichloroethane	ug/L	<0.50	0.50	6151080
Trichloroethylene	ug/L	<0.20	0.20	6151080
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	6151080
Vinyl Chloride	ug/L	<0.20	0.20	6151080
p+m-Xylene	ug/L	<0.20	0.20	6151080
o-Xylene	ug/L	<0.20	0.20	6151080
Total Xylenes	ug/L	<0.20	0.20	6151080
Instrument				
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	90		6151080
D4-1,2-Dichloroethane	%	120		6151080
D8-Toluene	%	97		6151080
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

TEST SUMMARY

BV Labs ID: JVW413
Sample ID: TH210
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153470	N/A	2019/06/04	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6154624	2019/06/03	2019/06/04	Prabhjot Gulati

BV Labs ID: JVW414
Sample ID: DUP B
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153470	N/A	2019/06/04	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6154624	2019/06/03	2019/06/04	Prabhjot Gulati

BV Labs ID: JVW415
Sample ID: TH212
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6148825	N/A	2019/06/04	Automated Statchk
1,3-Dichloropropene Sum	CALC	6149732	N/A	2019/06/03	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153470	N/A	2019/06/03	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155162	2019/06/03	2019/06/04	Prabhjot Gulati
Glycols in Water by GC/FID	GC/FID	6152425	N/A	2019/05/31	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6149918	N/A	2019/05/31	Thao Nguyen
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6155135	2019/06/03	2019/06/03	Mitesh Raj
Volatile Organic Compounds in Water	GC/MS	6151080	N/A	2019/06/01	Chandni Khawas

BV Labs ID: JVW415 Dup
Sample ID: TH212
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Glycols in Water by GC/FID	GC/FID	6152425	N/A	2019/05/31	Prabhjot Gulati

BV Labs ID: JVW416
Sample ID: TH206
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153470	N/A	2019/06/01	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6154624	2019/06/03	2019/06/04	Prabhjot Gulati



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

TEST SUMMARY

BV Labs ID: JVW416 Dup
Sample ID: TH206
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6154624	2019/06/03	2019/06/04	Prabhjot Gulati

BV Labs ID: JVW417
Sample ID: TH207
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153470	N/A	2019/06/01	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6154624	2019/06/03	2019/06/04	Prabhjot Gulati

BV Labs ID: JVW418
Sample ID: TH205A
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153470	N/A	2019/06/01	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6154624	2019/06/03	2019/06/04	Prabhjot Gulati

BV Labs ID: JVW419
Sample ID: TH201
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153470	N/A	2019/06/01	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6154624	2019/06/03	2019/06/04	Prabhjot Gulati

BV Labs ID: JVW420
Sample ID: TH203A
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153470	N/A	2019/06/01	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6154624	2019/06/03	2019/06/04	Prabhjot Gulati



BUREAU
VERITAS

BV Labs Job #: B9E5321

Report Date: 2019/06/04

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: 2 Montreal Road, Ottawa, Ontario

Project #: 18113796-1485-1907A

GENERAL COMMENTS

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

Package 1	3.7°C
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Sample JVW415 [TH212] : F1 BTEX analysis :The BTEX results used for the F1-BTEX calculation were obtained from Headspace-GC analysis.

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6149918	TNG	Method Blank	Dissolved Antimony (Sb)	2019/05/31	<0.50			ug/L	
			Dissolved Arsenic (As)	2019/05/31	<1.0			ug/L	
			Dissolved Barium (Ba)	2019/05/31	<2.0			ug/L	
			Dissolved Beryllium (Be)	2019/05/31	<0.50			ug/L	
			Dissolved Boron (B)	2019/05/31	<10			ug/L	
			Dissolved Cadmium (Cd)	2019/05/31	<0.10			ug/L	
			Dissolved Chromium (Cr)	2019/05/31	<5.0			ug/L	
			Dissolved Cobalt (Co)	2019/05/31	<0.50			ug/L	
			Dissolved Copper (Cu)	2019/05/31	<1.0			ug/L	
			Dissolved Lead (Pb)	2019/05/31	<0.50			ug/L	
			Dissolved Molybdenum (Mo)	2019/05/31	<0.50			ug/L	
			Dissolved Nickel (Ni)	2019/05/31	<1.0			ug/L	
			Dissolved Selenium (Se)	2019/05/31	<2.0			ug/L	
			Dissolved Silver (Ag)	2019/05/31	<0.10			ug/L	
			Dissolved Sodium (Na)	2019/05/31	<100			ug/L	
			Dissolved Thallium (Tl)	2019/05/31	<0.050			ug/L	
			Dissolved Uranium (U)	2019/05/31	<0.10			ug/L	
Dissolved Vanadium (V)	2019/05/31	<0.50			ug/L				
6151080	CKH	Method Blank	Dissolved Zinc (Zn)	2019/05/31	<5.0			ug/L	
			4-Bromofluorobenzene	2019/05/31		93	%	70 - 130	
			D4-1,2-Dichloroethane	2019/05/31		116	%	70 - 130	
			D8-Toluene	2019/05/31		97	%	70 - 130	
			Acetone (2-Propanone)	2019/05/31	<10			ug/L	
			Benzene	2019/05/31	<0.20			ug/L	
			Bromodichloromethane	2019/05/31	<0.50			ug/L	
			Bromoform	2019/05/31	<1.0			ug/L	
			Bromomethane	2019/05/31	<0.50			ug/L	
			Carbon Tetrachloride	2019/05/31	<0.20			ug/L	
			Chlorobenzene	2019/05/31	<0.20			ug/L	
			Chloroform	2019/05/31	<0.20			ug/L	
			Dibromochloromethane	2019/05/31	<0.50			ug/L	
			1,2-Dichlorobenzene	2019/05/31	<0.50			ug/L	
			1,3-Dichlorobenzene	2019/05/31	<0.50			ug/L	
			1,4-Dichlorobenzene	2019/05/31	<0.50			ug/L	
			Dichlorodifluoromethane (FREON 12)	2019/05/31	<1.0			ug/L	
			1,1-Dichloroethane	2019/05/31	<0.20			ug/L	
			1,2-Dichloroethane	2019/05/31	<0.50			ug/L	
			1,1-Dichloroethylene	2019/05/31	<0.20			ug/L	
			cis-1,2-Dichloroethylene	2019/05/31	<0.50			ug/L	
			trans-1,2-Dichloroethylene	2019/05/31	<0.50			ug/L	
			1,2-Dichloropropane	2019/05/31	<0.20			ug/L	
			cis-1,3-Dichloropropene	2019/05/31	<0.30			ug/L	
			trans-1,3-Dichloropropene	2019/05/31	<0.40			ug/L	
			Ethylbenzene	2019/05/31	<0.20			ug/L	
			Ethylene Dibromide	2019/05/31	<0.20			ug/L	
			Hexane	2019/05/31	<1.0			ug/L	
			Methylene Chloride(Dichloromethane)	2019/05/31	<2.0			ug/L	
			Methyl Ethyl Ketone (2-Butanone)	2019/05/31	<10			ug/L	
			Methyl Isobutyl Ketone	2019/05/31	<5.0			ug/L	
			Methyl t-butyl ether (MTBE)	2019/05/31	<0.50			ug/L	
			Styrene	2019/05/31	<0.50			ug/L	
1,1,1,2-Tetrachloroethane	2019/05/31	<0.50			ug/L				



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits			
6152425	GUL	Method Blank	1,1,2,2-Tetrachloroethane	2019/05/31	<0.50		ug/L				
			Tetrachloroethylene	2019/05/31	<0.20		ug/L				
			Toluene	2019/05/31	<0.20		ug/L				
			1,1,1-Trichloroethane	2019/05/31	<0.20		ug/L				
			1,1,2-Trichloroethane	2019/05/31	<0.50		ug/L				
			Trichloroethylene	2019/05/31	<0.20		ug/L				
			Trichlorofluoromethane (FREON 11)	2019/05/31	<0.50		ug/L				
			Vinyl Chloride	2019/05/31	<0.20		ug/L				
			p+m-Xylene	2019/05/31	<0.20		ug/L				
			o-Xylene	2019/05/31	<0.20		ug/L				
			Total Xylenes	2019/05/31	<0.20		ug/L				
			Propylene Glycol	2019/05/31	<5		mg/L				
			Ethylene Glycol	2019/05/31	<5		mg/L				
6153470	ABD	Method Blank	Diethylene Glycol	2019/05/31	<5		mg/L				
			Total Glycol	2019/05/31	<5		mg/L				
			1,4-Difluorobenzene	2019/06/01		97	%	70 - 130			
			4-Bromofluorobenzene	2019/06/01		96	%	70 - 130			
			D10-Ethylbenzene	2019/06/01		98	%	70 - 130			
			D4-1,2-Dichloroethane	2019/06/01		98	%	70 - 130			
			Benzene	2019/06/01	<0.20		ug/L				
			Toluene	2019/06/01	<0.20		ug/L				
			Ethylbenzene	2019/06/01	<0.20		ug/L				
			o-Xylene	2019/06/01	<0.20		ug/L				
			p+m-Xylene	2019/06/01	<0.40		ug/L				
			Total Xylenes	2019/06/01	<0.40		ug/L				
			6154624	GUL	Method Blank	F1 (C6-C10)	2019/06/01	<25		ug/L	
F1 (C6-C10) - BTEX	2019/06/01	<25					ug/L				
o-Terphenyl	2019/06/04					101	%	60 - 130			
F2 (C10-C16 Hydrocarbons)	2019/06/04	<100					ug/L				
F3 (C16-C34 Hydrocarbons)	2019/06/04	<200					ug/L				
F4 (C34-C50 Hydrocarbons)	2019/06/04	<200					ug/L				
6155135	RAJ	Method Blank				D10-Anthracene	2019/06/03		92	%	50 - 130
						D14-Terphenyl (F5)	2019/06/03		99	%	50 - 130
						D8-Acenaphthylene	2019/06/03		91	%	50 - 130
						Acenaphthene	2019/06/03	<0.050		ug/L	
						Acenaphthylene	2019/06/03	<0.050		ug/L	
						Anthracene	2019/06/03	<0.050		ug/L	
						Benzo(a)anthracene	2019/06/03	<0.050		ug/L	
			Benzo(a)pyrene	2019/06/03	<0.010		ug/L				
			Benzo(b/j)fluoranthene	2019/06/03	<0.050		ug/L				
			Benzo(g,h,i)perylene	2019/06/03	<0.050		ug/L				
			Benzo(k)fluoranthene	2019/06/03	<0.050		ug/L				
			Chrysene	2019/06/03	<0.050		ug/L				
			Dibenz(a,h)anthracene	2019/06/03	<0.050		ug/L				
Fluoranthene	2019/06/03	<0.050		ug/L							
Fluorene	2019/06/03	<0.050		ug/L							
Indeno(1,2,3-cd)pyrene	2019/06/03	<0.050		ug/L							
1-Methylnaphthalene	2019/06/03	<0.050		ug/L							
2-Methylnaphthalene	2019/06/03	<0.050		ug/L							
Naphthalene	2019/06/03	<0.050		ug/L							
Phenanthrene	2019/06/03	<0.030		ug/L							
Pyrene	2019/06/03	<0.050		ug/L							



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	6155162	GUL	Method Blank	o-Terphenyl	2019/06/03		97	%	60 - 130
				F2 (C10-C16 Hydrocarbons)	2019/06/03	<100		ug/L	
				F3 (C16-C34 Hydrocarbons)	2019/06/03	<200		ug/L	
				F4 (C34-C50 Hydrocarbons)	2019/06/03	<200		ug/L	
	6152425	GUL	RPD [JVW415-05]	Propylene Glycol	2019/05/31	NC		%	40
				Ethylene Glycol	2019/05/31	NC		%	40
				Diethylene Glycol	2019/05/31	NC		%	40
				Total Glycol	2019/05/31	NC		%	40
	6154624	GUL	RPD [JVW416-02]	F2 (C10-C16 Hydrocarbons)	2019/06/04	NC		%	30
				F3 (C16-C34 Hydrocarbons)	2019/06/04	NC		%	30
				F4 (C34-C50 Hydrocarbons)	2019/06/04	NC		%	30
	6152425	GUL	Matrix Spike [JVW415-05]	Propylene Glycol	2019/05/31		106	%	60 - 140
				Ethylene Glycol	2019/05/31		100	%	60 - 140
				Diethylene Glycol	2019/05/31		98	%	60 - 140
	6154624	GUL	Matrix Spike [JVW413-02]	o-Terphenyl	2019/06/04		113	%	60 - 130
				F2 (C10-C16 Hydrocarbons)	2019/06/04		122	%	50 - 130
				F3 (C16-C34 Hydrocarbons)	2019/06/04		109	%	50 - 130
				F4 (C34-C50 Hydrocarbons)	2019/06/04		109	%	50 - 130
	6149918	TNG	LCS	Dissolved Antimony (Sb)	2019/05/31		102	%	80 - 120
				Dissolved Arsenic (As)	2019/05/31		101	%	80 - 120
				Dissolved Barium (Ba)	2019/05/31		99	%	80 - 120
				Dissolved Beryllium (Be)	2019/05/31		100	%	80 - 120
				Dissolved Boron (B)	2019/05/31		102	%	80 - 120
				Dissolved Cadmium (Cd)	2019/05/31		102	%	80 - 120
				Dissolved Chromium (Cr)	2019/05/31		101	%	80 - 120
				Dissolved Cobalt (Co)	2019/05/31		101	%	80 - 120
				Dissolved Copper (Cu)	2019/05/31		100	%	80 - 120
				Dissolved Lead (Pb)	2019/05/31		101	%	80 - 120
				Dissolved Molybdenum (Mo)	2019/05/31		103	%	80 - 120
				Dissolved Nickel (Ni)	2019/05/31		100	%	80 - 120
				Dissolved Selenium (Se)	2019/05/31		102	%	80 - 120
				Dissolved Silver (Ag)	2019/05/31		100	%	80 - 120
				Dissolved Sodium (Na)	2019/05/31		97	%	80 - 120
				Dissolved Thallium (Tl)	2019/05/31		100	%	80 - 120
				Dissolved Uranium (U)	2019/05/31		93	%	80 - 120
				Dissolved Vanadium (V)	2019/05/31		101	%	80 - 120
				Dissolved Zinc (Zn)	2019/05/31		101	%	80 - 120
	6151080	CKH	LCS	4-Bromofluorobenzene	2019/05/31		97	%	70 - 130
				D4-1,2-Dichloroethane	2019/05/31		116	%	70 - 130
				D8-Toluene	2019/05/31		104	%	70 - 130
				Acetone (2-Propanone)	2019/05/31		122	%	60 - 140
				Benzene	2019/05/31		95	%	70 - 130
				Bromodichloromethane	2019/05/31		102	%	70 - 130
				Bromoform	2019/05/31		97	%	70 - 130
				Bromomethane	2019/05/31		100	%	60 - 140
				Carbon Tetrachloride	2019/05/31		96	%	70 - 130
				Chlorobenzene	2019/05/31		92	%	70 - 130
				Chloroform	2019/05/31		102	%	70 - 130
				Dibromochloromethane	2019/05/31		99	%	70 - 130
				1,2-Dichlorobenzene	2019/05/31		92	%	70 - 130
				1,3-Dichlorobenzene	2019/05/31		92	%	70 - 130
				1,4-Dichlorobenzene	2019/05/31		93	%	70 - 130



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Dichlorodifluoromethane (FREON 12)	2019/05/31		90	%	60 - 140
				1,1-Dichloroethane	2019/05/31		101	%	70 - 130
				1,2-Dichloroethane	2019/05/31		110	%	70 - 130
				1,1-Dichloroethylene	2019/05/31		99	%	70 - 130
				cis-1,2-Dichloroethylene	2019/05/31		104	%	70 - 130
				trans-1,2-Dichloroethylene	2019/05/31		101	%	70 - 130
				1,2-Dichloropropane	2019/05/31		102	%	70 - 130
				cis-1,3-Dichloropropene	2019/05/31		103	%	70 - 130
				trans-1,3-Dichloropropene	2019/05/31		109	%	70 - 130
				Ethylbenzene	2019/05/31		93	%	70 - 130
				Ethylene Dibromide	2019/05/31		101	%	70 - 130
				Hexane	2019/05/31		97	%	70 - 130
				Methylene Chloride(Dichloromethane)	2019/05/31		100	%	70 - 130
				Methyl Ethyl Ketone (2-Butanone)	2019/05/31		125	%	60 - 140
				Methyl Isobutyl Ketone	2019/05/31		121	%	70 - 130
				Methyl t-butyl ether (MTBE)	2019/05/31		96	%	70 - 130
				Styrene	2019/05/31		96	%	70 - 130
				1,1,1,2-Tetrachloroethane	2019/05/31		97	%	70 - 130
				1,1,2,2-Tetrachloroethane	2019/05/31		104	%	70 - 130
				Tetrachloroethylene	2019/05/31		90	%	70 - 130
				Toluene	2019/05/31		88	%	70 - 130
				1,1,1-Trichloroethane	2019/05/31		99	%	70 - 130
				1,1,2-Trichloroethane	2019/05/31		111	%	70 - 130
				Trichloroethylene	2019/05/31		91	%	70 - 130
				Trichlorofluoromethane (FREON 11)	2019/05/31		95	%	70 - 130
				Vinyl Chloride	2019/05/31		96	%	70 - 130
				p+m-Xylene	2019/05/31		92	%	70 - 130
				o-Xylene	2019/05/31		93	%	70 - 130
6152425	GUL	LCS		Propylene Glycol	2019/05/31		104	%	60 - 140
				Ethylene Glycol	2019/05/31		96	%	60 - 140
				Diethylene Glycol	2019/05/31		97	%	60 - 140
6153470	ABD	LCS		1,4-Difluorobenzene	2019/06/01		102	%	70 - 130
				4-Bromofluorobenzene	2019/06/01		103	%	70 - 130
				D10-Ethylbenzene	2019/06/01		98	%	70 - 130
				D4-1,2-Dichloroethane	2019/06/01		105	%	70 - 130
				Benzene	2019/06/01		100	%	70 - 130
				Toluene	2019/06/01		106	%	70 - 130
				Ethylbenzene	2019/06/01		98	%	70 - 130
				o-Xylene	2019/06/01		98	%	70 - 130
				p+m-Xylene	2019/06/01		98	%	70 - 130
				F1 (C6-C10)	2019/06/01		102	%	70 - 130
6154624	GUL	LCS		o-Terphenyl	2019/06/04		114	%	60 - 130
				F2 (C10-C16 Hydrocarbons)	2019/06/04		121	%	60 - 130
				F3 (C16-C34 Hydrocarbons)	2019/06/04		112	%	60 - 130
				F4 (C34-C50 Hydrocarbons)	2019/06/04		110	%	60 - 130
6155135	RAJ	LCS		D10-Anthracene	2019/06/03		103	%	50 - 130
				D14-Terphenyl (FS)	2019/06/03		109	%	50 - 130
				D8-Acenaphthylene	2019/06/03		106	%	50 - 130
				Acenaphthene	2019/06/03		98	%	50 - 130
				Acenaphthylene	2019/06/03		95	%	50 - 130
				Anthracene	2019/06/03		98	%	50 - 130
				Benzo(a)anthracene	2019/06/03		108	%	50 - 130



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Benzo(a)pyrene	2019/06/03		104	%	50 - 130
				Benzo(b/j)fluoranthene	2019/06/03		110	%	50 - 130
				Benzo(g,h,i)perylene	2019/06/03		102	%	50 - 130
				Benzo(k)fluoranthene	2019/06/03		107	%	50 - 130
				Chrysene	2019/06/03		101	%	50 - 130
				Dibenzo(a,h)anthracene	2019/06/03		107	%	50 - 130
				Fluoranthene	2019/06/03		102	%	50 - 130
				Fluorene	2019/06/03		99	%	50 - 130
				Indeno(1,2,3-cd)pyrene	2019/06/03		112	%	50 - 130
				1-Methylnaphthalene	2019/06/03		103	%	50 - 130
				2-Methylnaphthalene	2019/06/03		91	%	50 - 130
				Naphthalene	2019/06/03		97	%	50 - 130
				Phenanthrene	2019/06/03		102	%	50 - 130
				Pyrene	2019/06/03		107	%	50 - 130
6155162		GUL	LCS	o-Terphenyl	2019/06/03		96	%	60 - 130
				F2 (C10-C16 Hydrocarbons)	2019/06/03		94	%	60 - 130
				F3 (C16-C34 Hydrocarbons)	2019/06/03		101	%	60 - 130
				F4 (C34-C50 Hydrocarbons)	2019/06/03		107	%	60 - 130

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.

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

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

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

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



BUREAU
VERITAS

BV Labs Job #: B9E5321
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

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 "Brad Newman", written over a horizontal line.

Brad Newman, Scientific Service Specialist

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



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**EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED**

Page 1 of 1
C of C # 716856-05-01
716856

INVOICE INFORMATION										REPORT INFORMATION																			
Company Name: Imperial Oil Ltd - Golder Associates Ltd					Company Name: Golder Associates Ltd					Contact Name: Chris Vettorazzo					Contact Name: Chris Vettorazzo														
IOL Accounts Payable					3007-2920 Virtual Way Vancouver-BC V6M 0G4					11 Aushp. St. S. K1L 1G1 St-John's West-Fort Langford					IOL Accounts Payable@Golder.com					chris_vettorazzo@golder.com, IOL_1390@golde									
Phone: (403) 299-5600					Phone: (604) 299-4209					Phone: (403) 682-3593					Phone: (604) 299-4209														
Sampler Name (Print): Jeremy Eckert, Beau Drieschner					Consultant Project #: 18113796-1485-7777					Consultant Project #: 709 682 3593					Consultant Project #: 18113796-1485-7777														
FIELD SAMPLE ID		MATRIX		SAMPLING		CONTAINERS		LAB FILTRATION		FIELD FILTERED & PRESERVED		LAB FILTRATION REQUIRED		Glycols		PCBs		Dissolved Metals		PAHs		VOCs		F2-F4		F1/BTEX			
1	TH210	X	X	6	2019/05/28	6	2019/05/28	12:38	X																				
2	DUPB	X	X	6	2019/05/28	6	2019/05/28	12:38	X																				
3	TH212	X	X	14	2019/05/28	14	2019/05/28	13:33	X																				
4	TH206	X	X	6	2019/05/28	6	2019/05/28	14:16	X																				
5	TH207	X	X	6	2019/05/28	6	2019/05/28	14:41	X																				
6	TH205A	X	X	6	2019/05/28	6	2019/05/28	15:14	X																				
7	TH201	X	X	6	2019/05/28	6	2019/05/28	15:36	X																				
8	TH203A	X	X	6	2019/05/28	6	2019/05/28	16:15	X																				
9																													
IOL SITE LOCATION: 2, Montreal Road, Ottawa, Ontario		REGULATORY CRITERIA / DETECTION LIMITS: REG 153 Table 3		YES		NO		COOLER ID:		TEMP °C		SEAL PRESENT		SEAL INTACT		COOLING MEDIA PRESENT		TIME (24 HR)		RECEIVED BY:		DATE:		TIME (24 HR)		DATE:			
IOL PROJECT # (if applicable): N/A		MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 18113796-1485-7777-		REG 153 Table 3		REG 153 Table 3		REG 153 Table 3		REG 153 Table 3		REG 153 Table 3		REG 153 Table 3		REG 153 Table 3		REG 153 Table 3		REG 153 Table 3		REG 153 Table 3		REG 153 Table 3		REG 153 Table 3			
SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment		SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88005740 # samples may contain headspace and/or sediment	
TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)		TURNAROUND TIME: Standard (5 days) Rush (3 days) Emer N/A for (1 day) Water (same day)	
LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321		LAB USE ONLY MAXXAM JOB # 89E5321	
Labeled By: WVL		Labeled By: WVL		Labeled By: WVL		Labeled By: WVL		Labeled By: WVL		Labeled By: WVL		Labeled By: WVL		Labeled By: WVL		Labeled By: WVL		Labeled By: WVL		Labeled By: WVL		Labeled By: WVL		Labeled By: WVL		Labeled By: WVL		Labeled By: WVL	
Verified By: DSG		Verified By: DSG		Verified By: DSG		Verified By: DSG		Verified By: DSG		Verified By: DSG		Verified By: DSG		Verified By: DSG		Verified By: DSG		Verified By: DSG		Verified By: DSG		Verified By: DSG		Verified By: DSG		Verified By: DSG		Verified By: DSG	

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: May 28, 2019

Location: 2 Montreal Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 18113796-1485

Sample Submission Number: B9E5321

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits.
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:

Yes

Has lab warranted all tests were in statistical control in CoA (Yes/No)?:

Yes

Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:

Yes

Were all samples analyzed within hold times (Yes/No)?:

Yes

All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:

n/a

Is Chain of Custody completed and signed (Yes/No)?:

Yes

Were sample temperatures acceptable when they reached lab (Yes/No)?:


Yes

Is data considered to be reliable (Yes/No/Suspect)?:

Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): 

Date: June 6, 2019



Task Order#: 18113796-1485-7777
 Site#: N/A
 Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
 Project #: 18113796-1485-1907A
 Your C.O.C. #: 716856-03-01

Attention: Chris Vettorazzo

Golder Associates Ltd
 11 Austin St.
 Suite 101
 St. John's, NL
 Canada A1B 4C1

Report Date: 2019/06/06
 Report #: R5742476
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E5558
Received: 2019/05/30, 10:31

Sample Matrix: Water
 # Samples Received: 2

Analyses	Quantity	Laboratory Method	Primary Reference
Methylnaphthalene Sum	2	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum	2		EPA 8260C m
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	CAM SOP-00316	CCME PHC-CWS m
Glycols in Water by GC/FID	2	CAM SOP-00322	based on EPA 8015
Dissolved Metals by ICPMS	2	CAM SOP-00447	EPA 6020B m
PAH Compounds in Water by GC/MS (SIM)	2	CAM SOP-00318	EPA 8270D m
Polychlorinated Biphenyl in Water	2	CAM SOP-00309	EPA 8082A m
Volatile Organic Compounds in Water	2	CAM SOP-00228	EPA 8260C 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, MDELCC, 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. All samples were analyzed within hold time unless otherwise flagged.

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) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods



Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A
Your C.O.C. #: 716856-03-01

Attention: Chris Vettorazzo

Golder Associates Ltd
11 Austin St.
Suite 101
St. John's, NL
Canada A1B 4C1

Report Date: 2019/06/06
Report #: R5742476
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E5558

Received: 2019/05/30, 10:31

September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Kyle Reinhart
Project Manager
06 Jun 2019 17:28:26

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

Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

=====

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



BUREAU
VERITAS

BV Labs Job #: B9E5558
Report Date: 2019/06/06

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		JVX873	JVX874		
Sampling Date		2019/05/28 16:30	2019/05/28 17:00		
COC Number		716856-03-01	716856-03-01		
	UNITS	FIELD BLANK	TRIP BLANK	RDL	QC Batch
F1 (C6-C10)	ug/L	<25	<25	25	6155283
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	6155283
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	6155162
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	6155162
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	6155162
Reached Baseline at C50	ug/L	Yes	Yes		6155162
Extraction					
Surrogate Recovery (%)					
o-Terphenyl	%	99	98		6155162
Instrument					
Surrogate Recovery (%)					
1,4-Difluorobenzene	%	102	101		6155283
4-Bromofluorobenzene	%	100	98		6155283
D10-Ethylbenzene	%	96	97		6155283
D4-1,2-Dichloroethane	%	98	98		6155283
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					



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VERITAS

BV Labs Job #: B9E5558

Report Date: 2019/06/06

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907A

GLYCOLS BY GC-FID (WATER)

BV Labs ID		JVX873	JVX874		
Sampling Date		2019/05/28 16:30	2019/05/28 17:00		
COC Number		716856-03-01	716856-03-01		
	UNITS	FIELD BLANK	TRIP BLANK	RDL	QC Batch
Propylene Glycol	mg/L	<5	<5	5	6156124
Ethylene Glycol	mg/L	<5	<5	5	6156124
Diethylene Glycol	mg/L	<5	<5	5	6156124
Total Glycol	mg/L	<5	<5	5	6156124
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					



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VERITAS

BV Labs Job #: B9E5558
Report Date: 2019/06/06

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

O.REG 153 DISSOLVED ICPMS METALS (WATER)

BV Labs ID		JVX873	JVX874		
Sampling Date		2019/05/28 16:30	2019/05/28 17:00		
COC Number		716856-03-01	716856-03-01		
	UNITS	FIELD BLANK	TRIP BLANK	RDL	QC Batch
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	0.50	6154497
Dissolved Arsenic (As)	ug/L	<1.0	<1.0	1.0	6154497
Dissolved Barium (Ba)	ug/L	<2.0	<2.0	2.0	6154497
Dissolved Beryllium (Be)	ug/L	<0.50	<0.50	0.50	6154497
Dissolved Boron (B)	ug/L	<10	<10	10	6154497
Dissolved Cadmium (Cd)	ug/L	<0.10	<0.10	0.10	6154497
Dissolved Chromium (Cr)	ug/L	<5.0	<5.0	5.0	6154497
Dissolved Cobalt (Co)	ug/L	<0.50	<0.50	0.50	6154497
Dissolved Copper (Cu)	ug/L	<1.0	<1.0	1.0	6154497
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	6154497
Dissolved Molybdenum (Mo)	ug/L	<0.50	<0.50	0.50	6154497
Dissolved Nickel (Ni)	ug/L	<1.0	<1.0	1.0	6154497
Dissolved Selenium (Se)	ug/L	<2.0	<2.0	2.0	6154497
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	0.10	6154497
Dissolved Sodium (Na)	ug/L	<100	<100	100	6154497
Dissolved Thallium (Tl)	ug/L	<0.050	<0.050	0.050	6154497
Dissolved Uranium (U)	ug/L	<0.10	<0.10	0.10	6154497
Dissolved Vanadium (V)	ug/L	<0.50	<0.50	0.50	6154497
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	5.0	6154497
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					



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VERITAS

BV Labs Job #: B9E5558
Report Date: 2019/06/06

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

O.REG 153 PAHS (WATER)

BV Labs ID		JVX873	JVX874		
Sampling Date		2019/05/28 16:30	2019/05/28 17:00		
COC Number		716856-03-01	716856-03-01		
	UNITS	FIELD BLANK	TRIP BLANK	RDL	QC Batch
Methylnaphthalene, 2-(1-)	ug/L	<0.071	<0.071	0.071	6153532
Acenaphthene	ug/L	<0.050	<0.050	0.050	6155135
Acenaphthylene	ug/L	<0.050	<0.050	0.050	6155135
Anthracene	ug/L	<0.050	<0.050	0.050	6155135
Benzo(a)anthracene	ug/L	<0.050	<0.050	0.050	6155135
Benzo(a)pyrene	ug/L	<0.010	<0.010	0.010	6155135
Benzo(b/j)fluoranthene	ug/L	<0.050	<0.050	0.050	6155135
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	0.050	6155135
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	0.050	6155135
Chrysene	ug/L	<0.050	<0.050	0.050	6155135
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	0.050	6155135
Fluoranthene	ug/L	<0.050	<0.050	0.050	6155135
Fluorene	ug/L	<0.050	<0.050	0.050	6155135
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	0.050	6155135
1-Methylnaphthalene	ug/L	<0.050	<0.050	0.050	6155135
2-Methylnaphthalene	ug/L	<0.050	<0.050	0.050	6155135
Naphthalene	ug/L	<0.050	<0.050	0.050	6155135
Phenanthrene	ug/L	<0.030	<0.030	0.030	6155135
Pyrene	ug/L	<0.050	<0.050	0.050	6155135
Extraction Surrogate Recovery (%)					
D10-Anthracene	%	100	93		6155135
D14-Terphenyl (FS)	%	102	94		6155135
D8-Acenaphthylene	%	98	91		6155135
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					



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VERITAS

BV Labs Job #: B9E5558

Report Date: 2019/06/06

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907A

O.REG 153 PCBS (WATER)

BV Labs ID		JVX873	JVX874		
Sampling Date		2019/05/28 16:30	2019/05/28 17:00		
COC Number		716856-03-01	716856-03-01		
	UNITS	FIELD BLANK	TRIP BLANK	RDL	QC Batch
Aroclor 1242	ug/L	<0.05	<0.05	0.05	6155018
Aroclor 1248	ug/L	<0.05	<0.05	0.05	6155018
Aroclor 1254	ug/L	<0.05	<0.05	0.05	6155018
Aroclor 1260	ug/L	<0.05	<0.05	0.05	6155018
Total PCB	ug/L	<0.05	<0.05	0.05	6155018
Extraction Surrogate Recovery (%)					
Decachlorobiphenyl	%	64	95		6155018
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					



BUREAU
VERITAS

BV Labs Job #: B9E5558
Report Date: 2019/06/06

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

O.REG 153 VOCS BY HS (WATER)

BV Labs ID		JVX873	JVX874		
Sampling Date		2019/05/28 16:30	2019/05/28 17:00		
COC Number		716856-03-01	716856-03-01		
	UNITS	FIELD BLANK	TRIP BLANK	RDL	QC Batch
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	<0.50	0.50	6153468
Acetone (2-Propanone)	ug/L	<10	<10	10	6154205
Benzene	ug/L	<0.20	<0.20	0.20	6154205
Bromodichloromethane	ug/L	<0.50	<0.50	0.50	6154205
Bromoform	ug/L	<1.0	<1.0	1.0	6154205
Bromomethane	ug/L	<0.50	<0.50	0.50	6154205
Carbon Tetrachloride	ug/L	<0.20	<0.20	0.20	6154205
Chlorobenzene	ug/L	<0.20	<0.20	0.20	6154205
Chloroform	ug/L	<0.20	<0.20	0.20	6154205
Dibromochloromethane	ug/L	<0.50	<0.50	0.50	6154205
1,2-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	6154205
1,3-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	6154205
1,4-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	6154205
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	<1.0	1.0	6154205
1,1-Dichloroethane	ug/L	<0.20	<0.20	0.20	6154205
1,2-Dichloroethane	ug/L	<0.50	<0.50	0.50	6154205
1,1-Dichloroethylene	ug/L	<0.20	<0.20	0.20	6154205
cis-1,2-Dichloroethylene	ug/L	<0.50	<0.50	0.50	6154205
trans-1,2-Dichloroethylene	ug/L	<0.50	<0.50	0.50	6154205
1,2-Dichloropropane	ug/L	<0.20	<0.20	0.20	6154205
cis-1,3-Dichloropropene	ug/L	<0.30	<0.30	0.30	6154205
trans-1,3-Dichloropropene	ug/L	<0.40	<0.40	0.40	6154205
Ethylbenzene	ug/L	<0.20	<0.20	0.20	6154205
Ethylene Dibromide	ug/L	<0.20	<0.20	0.20	6154205
Hexane	ug/L	<1.0	<1.0	1.0	6154205
Methylene Chloride(Dichloromethane)	ug/L	<2.0	<2.0	2.0	6154205
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	<10	10	6154205
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	5.0	6154205
Methyl t-butyl ether (MTBE)	ug/L	<0.50	<0.50	0.50	6154205
Styrene	ug/L	<0.50	<0.50	0.50	6154205
1,1,1,2-Tetrachloroethane	ug/L	<0.50	<0.50	0.50	6154205
1,1,2,2-Tetrachloroethane	ug/L	<0.50	<0.50	0.50	6154205
Tetrachloroethylene	ug/L	<0.20	<0.20	0.20	6154205
Toluene	ug/L	<0.20	<0.20	0.20	6154205
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					



BUREAU
VERITAS

BV Labs Job #: B9E5558
Report Date: 2019/06/06

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

O.REG 153 VOCS BY HS (WATER)

BV Labs ID		JVX873	JVX874		
Sampling Date		2019/05/28 16:30	2019/05/28 17:00		
COC Number		716856-03-01	716856-03-01		
	UNITS	FIELD BLANK	TRIP BLANK	RDL	QC Batch
1,1,1-Trichloroethane	ug/L	<0.20	<0.20	0.20	6154205
1,1,2-Trichloroethane	ug/L	<0.50	<0.50	0.50	6154205
Trichloroethylene	ug/L	<0.20	<0.20	0.20	6154205
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	<0.50	0.50	6154205
Vinyl Chloride	ug/L	<0.20	<0.20	0.20	6154205
p+m-Xylene	ug/L	<0.20	<0.20	0.20	6154205
o-Xylene	ug/L	<0.20	<0.20	0.20	6154205
Total Xylenes	ug/L	<0.20	<0.20	0.20	6154205
Instrument					
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	97	96		6154205
D4-1,2-Dichloroethane	%	109	110		6154205
D8-Toluene	%	96	96		6154205
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					



BUREAU
VERITAS

BV Labs Job #: B9E5558
Report Date: 2019/06/06

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

TEST SUMMARY

BV Labs ID: JVX873
Sample ID: FIELD BLANK
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6153532	N/A	2019/06/04	Automated Statchk
1,3-Dichloropropene Sum	CALC	6153468	N/A	2019/06/05	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6155283	N/A	2019/06/04	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155162	2019/06/03	2019/06/04	Prabhjot Gulati
Glycols in Water by GC/FID	GC/FID	6156124	N/A	2019/06/04	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6154497	N/A	2019/06/03	Thao Nguyen
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6155135	2019/06/03	2019/06/03	Mitesh Raj
Polychlorinated Biphenyl in Water	GC/ECD	6155018	2019/06/03	2019/06/03	Svitlana Shaula
Volatile Organic Compounds in Water	GC/MS	6154205	N/A	2019/06/03	Rebecca McClean

BV Labs ID: JVX874
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6153532	N/A	2019/06/04	Automated Statchk
1,3-Dichloropropene Sum	CALC	6153468	N/A	2019/06/05	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6155283	N/A	2019/06/04	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155162	2019/06/03	2019/06/04	Prabhjot Gulati
Glycols in Water by GC/FID	GC/FID	6156124	N/A	2019/06/04	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6154497	N/A	2019/06/03	Thao Nguyen
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6155135	2019/06/03	2019/06/03	Mitesh Raj
Polychlorinated Biphenyl in Water	GC/ECD	6155018	2019/06/03	2019/06/03	Svitlana Shaula
Volatile Organic Compounds in Water	GC/MS	6154205	N/A	2019/06/04	Rebecca McClean



BUREAU
VERITAS

BV Labs Job #: B9E5558

Report Date: 2019/06/06

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907A

GENERAL COMMENTS

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

Package 1	3.7°C
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Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: B9E5558
Report Date: 2019/06/06

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	6154205	RSC	Method Blank	4-Bromofluorobenzene	2019/06/03		98	%	70 - 130
				D4-1,2-Dichloroethane	2019/06/03		106	%	70 - 130
				D8-Toluene	2019/06/03		97	%	70 - 130
				Acetone (2-Propanone)	2019/06/03	<10		ug/L	
				Benzene	2019/06/03	<0.20		ug/L	
				Bromodichloromethane	2019/06/03	<0.50		ug/L	
				Bromoform	2019/06/03	<1.0		ug/L	
				Bromomethane	2019/06/03	<0.50		ug/L	
				Carbon Tetrachloride	2019/06/03	<0.20		ug/L	
				Chlorobenzene	2019/06/03	<0.20		ug/L	
				Chloroform	2019/06/03	<0.20		ug/L	
				Dibromochloromethane	2019/06/03	<0.50		ug/L	
				1,2-Dichlorobenzene	2019/06/03	<0.50		ug/L	
				1,3-Dichlorobenzene	2019/06/03	<0.50		ug/L	
				1,4-Dichlorobenzene	2019/06/03	<0.50		ug/L	
				Dichlorodifluoromethane (FREON 12)	2019/06/03	<1.0		ug/L	
				1,1-Dichloroethane	2019/06/03	<0.20		ug/L	
				1,2-Dichloroethane	2019/06/03	<0.50		ug/L	
				1,1-Dichloroethylene	2019/06/03	<0.20		ug/L	
				cis-1,2-Dichloroethylene	2019/06/03	<0.50		ug/L	
				trans-1,2-Dichloroethylene	2019/06/03	<0.50		ug/L	
				1,2-Dichloropropane	2019/06/03	<0.20		ug/L	
				cis-1,3-Dichloropropene	2019/06/03	<0.30		ug/L	
				trans-1,3-Dichloropropene	2019/06/03	<0.40		ug/L	
				Ethylbenzene	2019/06/03	<0.20		ug/L	
				Ethylene Dibromide	2019/06/03	<0.20		ug/L	
				Hexane	2019/06/03	<1.0		ug/L	
				Methylene Chloride(Dichloromethane)	2019/06/03	<2.0		ug/L	
				Methyl Ethyl Ketone (2-Butanone)	2019/06/03	<10		ug/L	
				Methyl Isobutyl Ketone	2019/06/03	<5.0		ug/L	
				Methyl t-butyl ether (MTBE)	2019/06/03	<0.50		ug/L	
				Styrene	2019/06/03	<0.50		ug/L	
				1,1,1,2-Tetrachloroethane	2019/06/03	<0.50		ug/L	
				1,1,2,2-Tetrachloroethane	2019/06/03	<0.50		ug/L	
				Tetrachloroethylene	2019/06/03	<0.20		ug/L	
				Toluene	2019/06/03	<0.20		ug/L	
				1,1,1-Trichloroethane	2019/06/03	<0.20		ug/L	
				1,1,2-Trichloroethane	2019/06/03	<0.50		ug/L	
				Trichloroethylene	2019/06/03	<0.20		ug/L	
				Trichlorofluoromethane (FREON 11)	2019/06/03	<0.50		ug/L	
				Vinyl Chloride	2019/06/03	<0.20		ug/L	
				p+m-Xylene	2019/06/03	<0.20		ug/L	
				o-Xylene	2019/06/03	<0.20		ug/L	
				Total Xylenes	2019/06/03	<0.20		ug/L	
	6154497	TNG	Method Blank	Dissolved Antimony (Sb)	2019/06/03	<0.50		ug/L	
				Dissolved Arsenic (As)	2019/06/03	<1.0		ug/L	
				Dissolved Barium (Ba)	2019/06/03	<2.0		ug/L	
				Dissolved Beryllium (Be)	2019/06/03	<0.50		ug/L	
				Dissolved Boron (B)	2019/06/03	<10		ug/L	
				Dissolved Cadmium (Cd)	2019/06/03	<0.10		ug/L	
				Dissolved Chromium (Cr)	2019/06/03	<5.0		ug/L	
				Dissolved Cobalt (Co)	2019/06/03	<0.50		ug/L	



BUREAU
VERITAS

BV Labs Job #: B9E5558
Report Date: 2019/06/06

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6155018	SVS	Method Blank	Dissolved Copper (Cu)	2019/06/03	<1.0		ug/L	
			Dissolved Lead (Pb)	2019/06/03	<0.50		ug/L	
			Dissolved Molybdenum (Mo)	2019/06/03	<0.50		ug/L	
			Dissolved Nickel (Ni)	2019/06/03	<1.0		ug/L	
			Dissolved Selenium (Se)	2019/06/03	<2.0		ug/L	
			Dissolved Silver (Ag)	2019/06/03	<0.10		ug/L	
			Dissolved Sodium (Na)	2019/06/03	<100		ug/L	
			Dissolved Thallium (Tl)	2019/06/03	<0.050		ug/L	
			Dissolved Uranium (U)	2019/06/03	<0.10		ug/L	
			Dissolved Vanadium (V)	2019/06/03	<0.50		ug/L	
			Dissolved Zinc (Zn)	2019/06/03	<5.0		ug/L	
6155135	RAJ	Method Blank	Decachlorobiphenyl	2019/06/03		96	%	60 - 130
			Aroclor 1242	2019/06/03	<0.05		ug/L	
			Aroclor 1248	2019/06/03	<0.05		ug/L	
			Aroclor 1254	2019/06/03	<0.05		ug/L	
			Aroclor 1260	2019/06/03	<0.05		ug/L	
			Total PCB	2019/06/03	<0.05		ug/L	
			D10-Anthracene	2019/06/03		92	%	50 - 130
D14-Terphenyl (FS)	2019/06/03		99	%	50 - 130			
D8-Acenaphthylene	2019/06/03		91	%	50 - 130			
6155162	GUL	Method Blank	Acenaphthene	2019/06/03	<0.050		ug/L	
			Acenaphthylene	2019/06/03	<0.050		ug/L	
			Anthracene	2019/06/03	<0.050		ug/L	
			Benzo(a)anthracene	2019/06/03	<0.050		ug/L	
			Benzo(a)pyrene	2019/06/03	<0.010		ug/L	
			Benzo(b/j)fluoranthene	2019/06/03	<0.050		ug/L	
			Benzo(g,h,i)perylene	2019/06/03	<0.050		ug/L	
			Benzo(k)fluoranthene	2019/06/03	<0.050		ug/L	
			Chrysene	2019/06/03	<0.050		ug/L	
			Dibenz(a,h)anthracene	2019/06/03	<0.050		ug/L	
			Fluoranthene	2019/06/03	<0.050		ug/L	
			Fluorene	2019/06/03	<0.050		ug/L	
			Indeno(1,2,3-cd)pyrene	2019/06/03	<0.050		ug/L	
			1-Methylnaphthalene	2019/06/03	<0.050		ug/L	
			2-Methylnaphthalene	2019/06/03	<0.050		ug/L	
			Naphthalene	2019/06/03	<0.050		ug/L	
			Phenanthrene	2019/06/03	<0.030		ug/L	
Pyrene	2019/06/03	<0.050		ug/L				
6155283	H_W	Method Blank	o-Terphenyl	2019/06/03		97	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/06/03	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2019/06/03	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2019/06/03	<200		ug/L	
6156124	GUL	Method Blank	1,4-Difluorobenzene	2019/06/04		101	%	70 - 130
			4-Bromofluorobenzene	2019/06/04		97	%	70 - 130
			D10-Ethylbenzene	2019/06/04		95	%	70 - 130
			D4-1,2-Dichloroethane	2019/06/04		98	%	70 - 130
			F1 (C6-C10)	2019/06/04	<25		ug/L	
6156124	GUL	Method Blank	F1 (C6-C10) - BTEX	2019/06/04	<25		ug/L	
			Propylene Glycol	2019/06/03	<5		mg/L	
			Ethylene Glycol	2019/06/03	<5		mg/L	
			Diethylene Glycol	2019/06/03	<5		mg/L	
6156124	GUL	Method Blank	Total Glycol	2019/06/03	<5		mg/L	



BUREAU
VERITAS

BV Labs Job #: B9E5558
Report Date: 2019/06/06

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC		QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
Batch	Init							
6154205	RSC	LCS	4-Bromofluorobenzene	2019/06/03		98	%	70 - 130
			D4-1,2-Dichloroethane	2019/06/03		105	%	70 - 130
			D8-Toluene	2019/06/03		100	%	70 - 130
			Acetone (2-Propanone)	2019/06/03		106	%	60 - 140
			Benzene	2019/06/03		99	%	70 - 130
			Bromodichloromethane	2019/06/03		102	%	70 - 130
			Bromoform	2019/06/03		104	%	70 - 130
			Bromomethane	2019/06/03		98	%	60 - 140
			Carbon Tetrachloride	2019/06/03		106	%	70 - 130
			Chlorobenzene	2019/06/03		98	%	70 - 130
			Chloroform	2019/06/03		103	%	70 - 130
			Dibromochloromethane	2019/06/03		103	%	70 - 130
			1,2-Dichlorobenzene	2019/06/03		98	%	70 - 130
			1,3-Dichlorobenzene	2019/06/03		98	%	70 - 130
			1,4-Dichlorobenzene	2019/06/03		98	%	70 - 130
			Dichlorodifluoromethane (FREON 12)	2019/06/03		107	%	60 - 140
			1,1-Dichloroethane	2019/06/03		101	%	70 - 130
			1,2-Dichloroethane	2019/06/03		107	%	70 - 130
			1,1-Dichloroethylene	2019/06/03		99	%	70 - 130
			cis-1,2-Dichloroethylene	2019/06/03		100	%	70 - 130
			trans-1,2-Dichloroethylene	2019/06/03		98	%	70 - 130
			1,2-Dichloropropane	2019/06/03		97	%	70 - 130
			cis-1,3-Dichloropropene	2019/06/03		95	%	70 - 130
			trans-1,3-Dichloropropene	2019/06/03		98	%	70 - 130
			Ethylbenzene	2019/06/03		96	%	70 - 130
			Ethylene Dibromide	2019/06/03		102	%	70 - 130
			Hexane	2019/06/03		100	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/06/03		94	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2019/06/03		108	%	60 - 140
			Methyl Isobutyl Ketone	2019/06/03		107	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/06/03		99	%	70 - 130
			Styrene	2019/06/03		98	%	70 - 130
			1,1,1,2-Tetrachloroethane	2019/06/03		105	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/06/03		100	%	70 - 130
			Tetrachloroethylene	2019/06/03		100	%	70 - 130
			Toluene	2019/06/03		97	%	70 - 130
			1,1,1-Trichloroethane	2019/06/03		104	%	70 - 130
			1,1,2-Trichloroethane	2019/06/03		103	%	70 - 130
			Trichloroethylene	2019/06/03		91	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/06/03		105	%	70 - 130
Vinyl Chloride	2019/06/03		100	%	70 - 130			
p+m-Xylene	2019/06/03		95	%	70 - 130			
o-Xylene	2019/06/03		96	%	70 - 130			
6154497	TNG	LCS	Dissolved Antimony (Sb)	2019/06/03		102	%	80 - 120
			Dissolved Arsenic (As)	2019/06/03		103	%	80 - 120
			Dissolved Barium (Ba)	2019/06/03		106	%	80 - 120
			Dissolved Beryllium (Be)	2019/06/03		107	%	80 - 120
			Dissolved Boron (B)	2019/06/03		104	%	80 - 120
			Dissolved Cadmium (Cd)	2019/06/03		102	%	80 - 120
			Dissolved Chromium (Cr)	2019/06/03		103	%	80 - 120
			Dissolved Cobalt (Co)	2019/06/03		102	%	80 - 120
Dissolved Copper (Cu)	2019/06/03		105	%	80 - 120			



BUREAU
VERITAS

BV Labs Job #: B9E5558
Report Date: 2019/06/06

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Dissolved Lead (Pb)	2019/06/03		97	%	80 - 120
				Dissolved Molybdenum (Mo)	2019/06/03		105	%	80 - 120
				Dissolved Nickel (Ni)	2019/06/03		101	%	80 - 120
				Dissolved Selenium (Se)	2019/06/03		105	%	80 - 120
				Dissolved Silver (Ag)	2019/06/03		102	%	80 - 120
				Dissolved Sodium (Na)	2019/06/03		103	%	80 - 120
				Dissolved Thallium (Tl)	2019/06/03		99	%	80 - 120
				Dissolved Uranium (U)	2019/06/03		90	%	80 - 120
				Dissolved Vanadium (V)	2019/06/03		103	%	80 - 120
				Dissolved Zinc (Zn)	2019/06/03		102	%	80 - 120
6155018		SVS	LCS	Decachlorobiphenyl	2019/06/03		99	%	60 - 130
				Aroclor 1260	2019/06/03		86	%	60 - 130
				Total PCB	2019/06/03		86	%	60 - 130
6155135		RAJ	LCS	D10-Anthracene	2019/06/03		103	%	50 - 130
				D14-Terphenyl (FS)	2019/06/03		109	%	50 - 130
				D8-Acenaphthylene	2019/06/03		106	%	50 - 130
				Acenaphthene	2019/06/03		98	%	50 - 130
				Acenaphthylene	2019/06/03		95	%	50 - 130
				Anthracene	2019/06/03		98	%	50 - 130
				Benzo(a)anthracene	2019/06/03		108	%	50 - 130
				Benzo(a)pyrene	2019/06/03		104	%	50 - 130
				Benzo(b/j)fluoranthene	2019/06/03		110	%	50 - 130
				Benzo(g,h,i)perylene	2019/06/03		102	%	50 - 130
				Benzo(k)fluoranthene	2019/06/03		107	%	50 - 130
				Chrysene	2019/06/03		101	%	50 - 130
				Dibenz(a,h)anthracene	2019/06/03		107	%	50 - 130
				Fluoranthene	2019/06/03		102	%	50 - 130
				Fluorene	2019/06/03		99	%	50 - 130
				Indeno(1,2,3-cd)pyrene	2019/06/03		112	%	50 - 130
				1-Methylnaphthalene	2019/06/03		103	%	50 - 130
				2-Methylnaphthalene	2019/06/03		91	%	50 - 130
				Naphthalene	2019/06/03		97	%	50 - 130
				Phenanthrene	2019/06/03		102	%	50 - 130
				Pyrene	2019/06/03		107	%	50 - 130
6155162		GUL	LCS	o-Terphenyl	2019/06/03		96	%	60 - 130
				F2 (C10-C16 Hydrocarbons)	2019/06/03		94	%	60 - 130
				F3 (C16-C34 Hydrocarbons)	2019/06/03		101	%	60 - 130
				F4 (C34-C50 Hydrocarbons)	2019/06/03		107	%	60 - 130
6155283		H_W	LCS	1,4-Difluorobenzene	2019/06/04		101	%	70 - 130
				4-Bromofluorobenzene	2019/06/04		100	%	70 - 130
				D10-Ethylbenzene	2019/06/04		95	%	70 - 130
				D4-1,2-Dichloroethane	2019/06/04		98	%	70 - 130
				F1 (C6-C10)	2019/06/04		99	%	70 - 130
6156124		GUL	LCS	Propylene Glycol	2019/06/03		106	%	60 - 140
				Ethylene Glycol	2019/06/03		103	%	60 - 140
				Diethylene Glycol	2019/06/03		99	%	60 - 140

LCS: 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.



BUREAU
VERITAS

BV Labs Job #: B9E5558
Report Date: 2019/06/06

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

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 'Brad Newman', written over a horizontal line.

Brad Newman, Scientific Service Specialist

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

INVOICE INFORMATION		REPORT INFORMATION	
Company Name: Imperial Oil Ltd - Golder Associates Ltd		Company Name: Golder Associates Ltd	
Contact Name: IOLA Accounts Payable		Contact Name: Chris Vettorazzo	
Address: 102, 2535-3rd Avenue SE Calgary AB T2A 7W5		Address: 11 Austin St, Suite 101, St. Johns Vancouver BC V6M 0C9	
Email: IOLAaccounts_payable@golbdr.com		Email: chris_vettorazzo@golder.com, IOL_1359@golbdr	
Phone: (403) 299-5600		Phone: (604) 295-4700	
Sampler Name (Print): Jeremy Eged, Beau Drexler		Consultant Project #: 18113795-1485-1006 FIOA	

FIELD SAMPLE ID	MATRIX			SAMPLING			LAB FILTRATION REQUIRED
	GROUND WATER	SURFACE WATER	SOIL	DATE (YYYYMMDD)	TIME (24 HR)	FIELD FILTERED & PRESERVED	
1				X 16	2019/05/29 16:30		
2				X 8	2019/05/28 17:00		
3							
4							
5							
6							
7							
8							
9							
10							

IOL SITE LOCATION 2, Montreal Road, Ottawa, Ontario	REGULATORY CRITERIA / DETECTION LIMITS: REG 153 Table 3 (Please indicate which Reg. version and if RSC required)	REG 153 Table 3 <input type="checkbox"/> 2004 <input checked="" type="checkbox"/> 2011 <input type="checkbox"/> RSC	SPECIAL INSTRUCTIONS IES: A2601436 SAP: 88005740 # Samples may contain headspace and/or sediment	# JARS USED AND NOT SUBMITTED Enter N/A for Water N/A	TURNAROUND TIME Standard (5 days) Rush (3 days) (1 day) (same day) Date Required
--	--	--	---	---	--

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM 18113795-1485-7777	REG 153 Table 3 <input checked="" type="checkbox"/> REG 153 Table 3 (Please indicate which Reg. version and if RSC required)	REG 153 Table 3 <input type="checkbox"/> 2004 <input checked="" type="checkbox"/> 2011 <input type="checkbox"/> RSC	SPECIAL INSTRUCTIONS IES: A2601436 SAP: 88005740 # Samples may contain headspace and/or sediment	# JARS USED AND NOT SUBMITTED Enter N/A for Water N/A	TURNAROUND TIME Standard (5 days) Rush (3 days) (1 day) (same day) Date Required
--	--	--	---	---	--

SEAL PRESENT	SEAL INTACT	COOLING MEDIA PRESENT	TEMP °C	DATE	RECEIVED BY:	TIME (24 HR)
✓	✓	✓		2019/05/29	Jeremy Eged	07:30
SEAL PRESENT	SEAL INTACT	COOLING MEDIA PRESENT	TEMP °C	DATE	RECEIVED BY:	TIME (24 HR)
				2019/05/30	MAKAS P. P. P.	10:13

LAB USE ONLY	MAXXAM JOB #	SAMPLES	LABELED BY	VERIFIED BY
	B9E5558		GID	

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: May 28, 2019

Location: 2 Montreal Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 18113796-1485

Sample Submission Number: B9E5558

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within alert limits.
Trip Blank Concentration	X			
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:

Yes

Has lab warranted all tests were in statistical control in CoA (Yes/No)?:

Yes

Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:

Yes

Were all samples analyzed within hold times (Yes/No)?:

Yes

All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:

n/a

Is Chain of Custody completed and signed (Yes/No)?:

Yes

Were sample temperatures acceptable when they reached lab (Yes/No)?:

Yes

Is data considered to be reliable (Yes/No/Suspect)?:

Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): 

Date: June 7, 2019



Task Order#: 18113796-1485-7777
 Site#: N/A
 Site Location: 2 Montreal Road, Ottawa, Ontario
 Project #: 18113796-1485-1907A
 Your C.O.C. #: 716856-01-01

Attention: Chris Vettorazzo

Golder Associates Ltd
 11 Austin St.
 Suite 101
 St. John's, NL
 Canada A1B 4C1

Report Date: 2019/06/04
 Report #: R5738977
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E5580
Received: 2019/05/30, 10:31

Sample Matrix: Water
 # Samples Received: 4

Analyses	Quantity	Laboratory Method	Primary Reference
Methylnaphthalene Sum	4	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum	4		EPA 8260C m
Petroleum Hydro. CCME F1 & BTEX in Water	4	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	4	CAM SOP-00316	CCME PHC-CWS m
Glycols in Water by GC/FID	4	CAM SOP-00322	based on EPA 8015
Dissolved Metals by ICPMS	4	CAM SOP-00447	EPA 6020B m
PAH Compounds in Water by GC/MS (SIM)	4	CAM SOP-00318	EPA 8270D m
Volatile Organic Compounds in Water	4	CAM SOP-00228	EPA 8260C 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, MDDELCC, 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. All samples were analyzed within hold time unless otherwise flagged.

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) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1



Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A
Your C.O.C. #: 716856-01-01

Attention: Chris Vettorazzo

Golder Associates Ltd
11 Austin St.
Suite 101
St. John's, NL
Canada A1B 4C1

Report Date: 2019/06/04
Report #: R5738977
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E5580

Received: 2019/05/30, 10:31

Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Kyle Reinhart
Project Manager
04 Jun 2019 18:09:02

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

Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

=====

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



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VERITAS

BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		JVX997	JVX998			JVX998			JVX999		
Sampling Date		2019/05/28 14:23	2019/05/28 13:48			2019/05/28 13:48			2019/05/28 12:23		
COC Number		716856-01-01	716856-01-01			716856-01-01			716856-01-01		
	UNITS	MW19-05	MW19-07	RDL	QC Batch	MW19-07 Lab-Dup	RDL	QC Batch	MW19-08	RDL	QC Batch
F1 (C6-C10)	ug/L	40	<25	25	6153470				33	25	6153470
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	6153470				<25	25	6153470
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	6155162	<100	100	6155162	<100	100	6155162
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	6155162	<200	200	6155162	<200	200	6155162
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	6155162	<200	200	6155162	<200	200	6155162
Reached Baseline at C50	ug/L	Yes	Yes		6155162	Yes		6155162	Yes		6155162
Extraction											
Surrogate Recovery (%)											
o-Terphenyl	%	100	97		6155162	100		6155162	98		6155162
Instrument											
Surrogate Recovery (%)											
1,4-Difluorobenzene	%	105	103		6153470				102		6153470
4-Bromofluorobenzene	%	98	95		6153470				99		6153470
D10-Ethylbenzene	%	100	102		6153470				97		6153470
D4-1,2-Dichloroethane	%	102	99		6153470				97		6153470
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate											



BUREAU
VERITAS

BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		JVY000		
Sampling Date		2019/05/28 13:18		
COC Number		716856-01-01		
	UNITS	MW19-09	RDL	QC Batch
F1 (C6-C10)	ug/L	<25	25	6153470
F1 (C6-C10) - BTEX	ug/L	<25	25	6153470
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	6155162
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	6155162
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	6155162
Reached Baseline at C50	ug/L	Yes		6155162
Extraction				
Surrogate Recovery (%)				
o-Terphenyl	%	98		6155162
Instrument				
Surrogate Recovery (%)				
1,4-Difluorobenzene	%	111		6153470
4-Bromofluorobenzene	%	97		6153470
D10-Ethylbenzene	%	99		6153470
D4-1,2-Dichloroethane	%	104		6153470
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



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VERITAS

BV Labs Job #: B9E5580

Report Date: 2019/06/04

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: 2 Montreal Road, Ottawa, Ontario

Project #: 18113796-1485-1907A

GLYCOLS BY GC-FID (WATER)

BV Labs ID		JVX997	JVX998	JVX999	JVY000		
Sampling Date		2019/05/28 14:23	2019/05/28 13:48	2019/05/28 12:23	2019/05/28 13:18		
COC Number		716856-01-01	716856-01-01	716856-01-01	716856-01-01		
	UNITS	MW19-05	MW19-07	MW19-08	MW19-09	RDL	QC Batch
Propylene Glycol	mg/L	<5	<5	<5	<5	5	6152425
Ethylene Glycol	mg/L	<5	<5	<5	<5	5	6152425
Diethylene Glycol	mg/L	<5	<5	<5	<5	5	6152425
Total Glycol	mg/L	<5	<5	<5	<5	5	6152425
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							



BUREAU
VERITAS

BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 DISSOLVED ICPMS METALS (WATER)

BV Labs ID		JVX997	JVX998		JVX999	JVY000		
Sampling Date		2019/05/28 14:23	2019/05/28 13:48		2019/05/28 12:23	2019/05/28 13:18		
COC Number		716856-01-01	716856-01-01		716856-01-01	716856-01-01		
	UNITS	MW19-05	MW19-07	RDL	MW19-08	MW19-09	RDL	QC Batch
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	0.50	<0.50	<0.50	0.50	6149918
Dissolved Arsenic (As)	ug/L	1.5	<1.0	1.0	2.0	<1.0	1.0	6149918
Dissolved Barium (Ba)	ug/L	72	68	2.0	35	26	2.0	6149918
Dissolved Beryllium (Be)	ug/L	<0.50	<0.50	0.50	<0.50	<0.50	0.50	6149918
Dissolved Boron (B)	ug/L	75	73	10	110	90	10	6149918
Dissolved Cadmium (Cd)	ug/L	<0.10	<0.10	0.10	<0.10	<0.10	0.10	6149918
Dissolved Chromium (Cr)	ug/L	<5.0	<5.0	5.0	<5.0	<5.0	5.0	6149918
Dissolved Cobalt (Co)	ug/L	<0.50	<0.50	0.50	<0.50	1.7	0.50	6149918
Dissolved Copper (Cu)	ug/L	<1.0	<1.0	1.0	<1.0	<1.0	1.0	6149918
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	<0.50	<0.50	0.50	6149918
Dissolved Molybdenum (Mo)	ug/L	<0.50	<0.50	0.50	1.9	2.4	0.50	6149918
Dissolved Nickel (Ni)	ug/L	1.3	1.4	1.0	3.5	14	1.0	6149918
Dissolved Selenium (Se)	ug/L	2.1	4.1	2.0	<2.0	2.5	2.0	6149918
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	0.10	<0.10	<0.10	0.10	6149918
Dissolved Sodium (Na)	ug/L	840000	1100000	500	190000	370000	100	6149918
Dissolved Thallium (Tl)	ug/L	<0.050	<0.050	0.050	<0.050	<0.050	0.050	6149918
Dissolved Uranium (U)	ug/L	7.1	5.5	0.10	25	14	0.10	6149918
Dissolved Vanadium (V)	ug/L	<0.50	<0.50	0.50	<0.50	<0.50	0.50	6149918
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	5.0	<5.0	6.1	5.0	6149918
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								



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BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 PAHS (WATER)

BV Labs ID		JVX997	JVX998			JVX998			JVX999		
Sampling Date		2019/05/28 14:23	2019/05/28 13:48			2019/05/28 13:48			2019/05/28 12:23		
COC Number		716856-01-01	716856-01-01			716856-01-01			716856-01-01		
	UNITS	MW19-05	MW19-07	RDL	QC Batch	MW19-07 Lab-Dup	RDL	QC Batch	MW19-08	RDL	QC Batch
Methylnaphthalene, 2-(1-)	ug/L	<0.071	<0.071	0.071	6148825				<0.071	0.071	6148825
Acenaphthene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
Acenaphthylene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
Anthracene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
Benzo(a)anthracene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
Benzo(a)pyrene	ug/L	<0.010	<0.010	0.010	6155135	<0.010	0.010	6155135	<0.010	0.010	6155135
Benzo(b,j)fluoranthene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
Chrysene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
Fluoranthene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
Fluorene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
1-Methylnaphthalene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
2-Methylnaphthalene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
Naphthalene	ug/L	<0.050	0.056	0.050	6155135	0.069	0.050	6155135	<0.050	0.050	6155135
Phenanthrene	ug/L	<0.030	<0.030	0.030	6155135	<0.030	0.030	6155135	<0.030	0.030	6155135
Pyrene	ug/L	<0.050	<0.050	0.050	6155135	<0.050	0.050	6155135	<0.050	0.050	6155135
Extraction Surrogate Recovery (%)											
D10-Anthracene	%	96	98		6155135	106		6155135	94		6155135
D14-Terphenyl (FS)	%	96	94		6155135	99		6155135	92		6155135
D8-Acenaphthylene	%	96	97		6155135	106		6155135	93		6155135

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



BUREAU
VERITAS

BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 PAHS (WATER)

BV Labs ID		JVY000		
Sampling Date		2019/05/28 13:18		
COC Number		716856-01-01		
	UNITS	MW19-09	RDL	QC Batch
Methylnaphthalene, 2-(1-)	ug/L	<0.071	0.071	6148825
Acenaphthene	ug/L	<0.050	0.050	6155135
Acenaphthylene	ug/L	<0.050	0.050	6155135
Anthracene	ug/L	<0.050	0.050	6155135
Benzo(a)anthracene	ug/L	<0.050	0.050	6155135
Benzo(a)pyrene	ug/L	<0.010	0.010	6155135
Benzo(b/j)fluoranthene	ug/L	<0.050	0.050	6155135
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	6155135
Benzo(k)fluoranthene	ug/L	<0.050	0.050	6155135
Chrysene	ug/L	<0.050	0.050	6155135
Dibenz(a,h)anthracene	ug/L	<0.050	0.050	6155135
Fluoranthene	ug/L	<0.050	0.050	6155135
Fluorene	ug/L	<0.050	0.050	6155135
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	6155135
1-Methylnaphthalene	ug/L	<0.050	0.050	6155135
2-Methylnaphthalene	ug/L	<0.050	0.050	6155135
Naphthalene	ug/L	<0.050	0.050	6155135
Phenanthrene	ug/L	<0.030	0.030	6155135
Pyrene	ug/L	<0.050	0.050	6155135
Extraction Surrogate Recovery (%)				
D10-Anthracene	%	99		6155135
D14-Terphenyl (FS)	%	95		6155135
D8-Acenaphthylene	%	99		6155135
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 VOCS BY HS (WATER)

BV Labs ID		JVX997	JVX998	JVX999	JVY000		
Sampling Date		2019/05/28 14:23	2019/05/28 13:48	2019/05/28 12:23	2019/05/28 13:18		
COC Number		716856-01-01	716856-01-01	716856-01-01	716856-01-01		
	UNITS	MW19-05	MW19-07	MW19-08	MW19-09	RDL	QC Batch
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6149732
Acetone (2-Propanone)	ug/L	<10	<10	<10	<10	10	6151089
Benzene	ug/L	13	7.2	24	<0.20	0.20	6151089
Bromodichloromethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
Bromoform	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6151089
Bromomethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
Carbon Tetrachloride	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6151089
Chlorobenzene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6151089
Chloroform	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6151089
Dibromochloromethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,2-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,3-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,4-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6151089
1,1-Dichloroethane	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6151089
1,2-Dichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,1-Dichloroethylene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6151089
cis-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
trans-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,2-Dichloropropane	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6151089
cis-1,3-Dichloropropene	ug/L	<0.30	<0.30	<0.30	<0.30	0.30	6151089
trans-1,3-Dichloropropene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	6151089
Ethylbenzene	ug/L	0.49	0.47	<0.20	<0.20	0.20	6151089
Ethylene Dibromide	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6151089
Hexane	ug/L	1.0	<1.0	<1.0	<1.0	1.0	6151089
Methylene Chloride(Dichloromethane)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	6151089
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	<10	<10	<10	10	6151089
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	6151089
Methyl t-butyl ether (MTBE)	ug/L	15	12	43	20	0.50	6151089
Styrene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,1,1,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,1,2,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
Tetrachloroethylene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6151089
Toluene	ug/L	0.53	0.42	<0.20	<0.20	0.20	6151089
RDL = Reportable Detection Limit QC Batch = Quality Control Batch							



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VERITAS

BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 VOCs BY HS (WATER)

BV Labs ID		JVX997	JVX998	JVX999	JVY000		
Sampling Date		2019/05/28 14:23	2019/05/28 13:48	2019/05/28 12:23	2019/05/28 13:18		
COC Number		716856-01-01	716856-01-01	716856-01-01	716856-01-01		
	UNITS	MW19-05	MW19-07	MW19-08	MW19-09	RDL	QC Batch
1,1,1-Trichloroethane	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6151089
1,1,2-Trichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
Trichloroethylene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6151089
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6151089
Vinyl Chloride	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6151089
p+m-Xylene	ug/L	0.68	0.86	<0.20	<0.20	0.20	6151089
o-Xylene	ug/L	0.45	0.52	<0.20	<0.20	0.20	6151089
Total Xylenes	ug/L	1.1	1.4	<0.20	<0.20	0.20	6151089
Instrument							
Surrogate Recovery (%)							
4-Bromofluorobenzene	%	93	93	92	90		6151089
D4-1,2-Dichloroethane	%	112	113	111	113		6151089
D8-Toluene	%	90	91	90	88		6151089
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							



BUREAU
VERITAS

BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

TEST SUMMARY

BV Labs ID: JVX997
Sample ID: MW19-05
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6148825	N/A	2019/06/04	Automated Statchk
1,3-Dichloropropene Sum	CALC	6149732	N/A	2019/06/04	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153470	N/A	2019/06/03	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155162	2019/06/03	2019/06/04	Prabhjot Gulati
Glycols in Water by GC/FID	GC/FID	6152425	N/A	2019/05/31	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6149918	N/A	2019/06/03	Thao Nguyen
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6155135	2019/06/03	2019/06/03	Mitesh Raj
Volatile Organic Compounds in Water	GC/MS	6151089	N/A	2019/06/03	Chandni Khawas

BV Labs ID: JVX998
Sample ID: MW19-07
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6148825	N/A	2019/06/04	Automated Statchk
1,3-Dichloropropene Sum	CALC	6149732	N/A	2019/06/04	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153470	N/A	2019/06/03	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155162	2019/06/03	2019/06/04	Prabhjot Gulati
Glycols in Water by GC/FID	GC/FID	6152425	N/A	2019/05/31	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6149918	N/A	2019/06/03	Thao Nguyen
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6155135	2019/06/03	2019/06/03	Mitesh Raj
Volatile Organic Compounds in Water	GC/MS	6151089	N/A	2019/06/03	Chandni Khawas

BV Labs ID: JVX998 Dup
Sample ID: MW19-07
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155162	2019/06/03	2019/06/04	Prabhjot Gulati
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6155135	2019/06/03	2019/06/03	Mitesh Raj

BV Labs ID: JVX999
Sample ID: MW19-08
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6148825	N/A	2019/06/04	Automated Statchk
1,3-Dichloropropene Sum	CALC	6149732	N/A	2019/06/04	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153470	N/A	2019/06/04	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155162	2019/06/03	2019/06/04	Prabhjot Gulati
Glycols in Water by GC/FID	GC/FID	6152425	N/A	2019/05/31	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6149918	N/A	2019/05/31	Thao Nguyen
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6155135	2019/06/03	2019/06/03	Mitesh Raj
Volatile Organic Compounds in Water	GC/MS	6151089	N/A	2019/06/03	Chandni Khawas



BUREAU
VERITAS

BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

TEST SUMMARY

BV Labs ID: JY000
Sample ID: MW19-09
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6148825	N/A	2019/06/04	Automated Statchk
1,3-Dichloropropene Sum	CALC	6149732	N/A	2019/06/04	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153470	N/A	2019/06/01	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155162	2019/06/03	2019/06/04	Prabhjot Gulati
Glycols in Water by GC/FID	GC/FID	6152425	N/A	2019/05/31	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6149918	N/A	2019/05/31	Thao Nguyen
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6155135	2019/06/03	2019/06/03	Mitesh Raj
Volatile Organic Compounds in Water	GC/MS	6151089	N/A	2019/06/03	Chandni Khawas



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VERITAS

BV Labs Job #: B9E5580

Report Date: 2019/06/04

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: 2 Montreal Road, Ottawa, Ontario

Project #: 18113796-1485-1907A

GENERAL COMMENTS

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

Package 1	3.7°C
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Sample JVX997 [MW19-05] : The BTEX results used for the F1-BTEX calculation were obtained from Headspace-GC analysis.

Sample JVX999 [MW19-08] : The BTEX results used for the F1-BTEX calculation were obtained from Headspace-GC analysis.

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6149918	TNG	Method Blank	Dissolved Antimony (Sb)	2019/05/31	<0.50			ug/L	
			Dissolved Arsenic (As)	2019/05/31	<1.0			ug/L	
			Dissolved Barium (Ba)	2019/05/31	<2.0			ug/L	
			Dissolved Beryllium (Be)	2019/05/31	<0.50			ug/L	
			Dissolved Boron (B)	2019/05/31	<10			ug/L	
			Dissolved Cadmium (Cd)	2019/05/31	<0.10			ug/L	
			Dissolved Chromium (Cr)	2019/05/31	<5.0			ug/L	
			Dissolved Cobalt (Co)	2019/05/31	<0.50			ug/L	
			Dissolved Copper (Cu)	2019/05/31	<1.0			ug/L	
			Dissolved Lead (Pb)	2019/05/31	<0.50			ug/L	
			Dissolved Molybdenum (Mo)	2019/05/31	<0.50			ug/L	
			Dissolved Nickel (Ni)	2019/05/31	<1.0			ug/L	
			Dissolved Selenium (Se)	2019/05/31	<2.0			ug/L	
			Dissolved Silver (Ag)	2019/05/31	<0.10			ug/L	
			Dissolved Sodium (Na)	2019/05/31	<100			ug/L	
			Dissolved Thallium (Tl)	2019/05/31	<0.050			ug/L	
			Dissolved Uranium (U)	2019/05/31	<0.10			ug/L	
			Dissolved Vanadium (V)	2019/05/31	<0.50			ug/L	
6151089	CKH	Method Blank	Dissolved Zinc (Zn)	2019/05/31	<5.0			ug/L	
			4-Bromofluorobenzene	2019/06/03		96	%	70 - 130	
			D4-1,2-Dichloroethane	2019/06/03		116	%	70 - 130	
			D8-Toluene	2019/06/03		88	%	70 - 130	
			Acetone (2-Propanone)	2019/06/03	<10			ug/L	
			Benzene	2019/06/03	<0.20			ug/L	
			Bromodichloromethane	2019/06/03	<0.50			ug/L	
			Bromoform	2019/06/03	<1.0			ug/L	
			Bromomethane	2019/06/03	<0.50			ug/L	
			Carbon Tetrachloride	2019/06/03	<0.20			ug/L	
			Chlorobenzene	2019/06/03	<0.20			ug/L	
			Chloroform	2019/06/03	<0.20			ug/L	
			Dibromochloromethane	2019/06/03	<0.50			ug/L	
			1,2-Dichlorobenzene	2019/06/03	<0.50			ug/L	
			1,3-Dichlorobenzene	2019/06/03	<0.50			ug/L	
			1,4-Dichlorobenzene	2019/06/03	<0.50			ug/L	
			Dichlorodifluoromethane (FREON 12)	2019/06/03	<1.0			ug/L	
			1,1-Dichloroethane	2019/06/03	<0.20			ug/L	
			1,2-Dichloroethane	2019/06/03	<0.50			ug/L	
			1,1-Dichloroethylene	2019/06/03	<0.20			ug/L	
			cis-1,2-Dichloroethylene	2019/06/03	<0.50			ug/L	
			trans-1,2-Dichloroethylene	2019/06/03	<0.50			ug/L	
			1,2-Dichloropropane	2019/06/03	<0.20			ug/L	
			cis-1,3-Dichloropropene	2019/06/03	<0.30			ug/L	
			trans-1,3-Dichloropropene	2019/06/03	<0.40			ug/L	
			Ethylbenzene	2019/06/03	<0.20			ug/L	
			Ethylene Dibromide	2019/06/03	<0.20			ug/L	
			Hexane	2019/06/03	<1.0			ug/L	
			Methylene Chloride(Dichloromethane)	2019/06/03	<2.0			ug/L	
			Methyl Ethyl Ketone (2-Butanone)	2019/06/03	<10			ug/L	
Methyl Isobutyl Ketone	2019/06/03	<5.0			ug/L				
Methyl t-butyl ether (MTBE)	2019/06/03	<0.50			ug/L				
Styrene	2019/06/03	<0.50			ug/L				
1,1,1,2-Tetrachloroethane	2019/06/03	<0.50			ug/L				



BUREAU
VERITAS

BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6152425	GUL	Method Blank	1,1,2,2-Tetrachloroethane	2019/06/03	<0.50		ug/L	
			Tetrachloroethylene	2019/06/03	<0.20		ug/L	
			Toluene	2019/06/03	<0.20		ug/L	
			1,1,1-Trichloroethane	2019/06/03	<0.20		ug/L	
			1,1,2-Trichloroethane	2019/06/03	<0.50		ug/L	
			Trichloroethylene	2019/06/03	<0.20		ug/L	
			Trichlorofluoromethane (FREON 11)	2019/06/03	<0.50		ug/L	
			Vinyl Chloride	2019/06/03	<0.20		ug/L	
			p+m-Xylene	2019/06/03	<0.20		ug/L	
			o-Xylene	2019/06/03	<0.20		ug/L	
			Total Xylenes	2019/06/03	<0.20		ug/L	
			Propylene Glycol	2019/05/31	<5		mg/L	
			Ethylene Glycol	2019/05/31	<5		mg/L	
			Diethylene Glycol	2019/05/31	<5		mg/L	
			Total Glycol	2019/05/31	<5		mg/L	
6153470	ABD	Method Blank	1,4-Difluorobenzene	2019/06/01		97	%	70 - 130
			4-Bromofluorobenzene	2019/06/01		96	%	70 - 130
			D10-Ethylbenzene	2019/06/01		98	%	70 - 130
			D4-1,2-Dichloroethane	2019/06/01		98	%	70 - 130
			F1 (C6-C10)	2019/06/01	<25		ug/L	
6155135	RAJ	Method Blank	F1 (C6-C10) - BTEX	2019/06/01	<25		ug/L	
			D10-Anthracene	2019/06/03		92	%	50 - 130
			D14-Terphenyl (FS)	2019/06/03		99	%	50 - 130
			D8-Acenaphthylene	2019/06/03		91	%	50 - 130
			Acenaphthene	2019/06/03	<0.050		ug/L	
			Acenaphthylene	2019/06/03	<0.050		ug/L	
			Anthracene	2019/06/03	<0.050		ug/L	
			Benzo(a)anthracene	2019/06/03	<0.050		ug/L	
			Benzo(a)pyrene	2019/06/03	<0.010		ug/L	
			Benzo(b/j)fluoranthene	2019/06/03	<0.050		ug/L	
			Benzo(g,h,i)perylene	2019/06/03	<0.050		ug/L	
			Benzo(k)fluoranthene	2019/06/03	<0.050		ug/L	
			Chrysene	2019/06/03	<0.050		ug/L	
			Dibenz(a,h)anthracene	2019/06/03	<0.050		ug/L	
			Fluoranthene	2019/06/03	<0.050		ug/L	
			Fluorene	2019/06/03	<0.050		ug/L	
			Indeno(1,2,3-cd)pyrene	2019/06/03	<0.050		ug/L	
			1-Methylnaphthalene	2019/06/03	<0.050		ug/L	
			2-Methylnaphthalene	2019/06/03	<0.050		ug/L	
			Naphthalene	2019/06/03	<0.050		ug/L	
Phenanthrene	2019/06/03	<0.030		ug/L				
Pyrene	2019/06/03	<0.050		ug/L				
6155162	GUL	Method Blank	o-Terphenyl	2019/06/03		97	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/06/03	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2019/06/03	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2019/06/03	<200		ug/L	
6155135	RAJ	RPD [JVX998-03]	Acenaphthene	2019/06/03	NC		%	30
			Acenaphthylene	2019/06/03	NC		%	30
			Anthracene	2019/06/03	NC		%	30
			Benzo(a)anthracene	2019/06/03	NC		%	30
			Benzo(a)pyrene	2019/06/03	NC		%	30
Benzo(b/j)fluoranthene	2019/06/03	NC		%	30			



BUREAU
VERITAS

BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Benzo(g,h,i)perylene	2019/06/03	NC		%	30
				Benzo(k)fluoranthene	2019/06/03	NC		%	30
				Chrysene	2019/06/03	NC		%	30
				Dibenz(a,h)anthracene	2019/06/03	NC		%	30
				Fluoranthene	2019/06/03	NC		%	30
				Fluorene	2019/06/03	NC		%	30
				Indeno(1,2,3-cd)pyrene	2019/06/03	NC		%	30
				1-Methylnaphthalene	2019/06/03	NC		%	30
				2-Methylnaphthalene	2019/06/03	NC		%	30
				Naphthalene	2019/06/03	21		%	30
				Phenanthrene	2019/06/03	NC		%	30
				Pyrene	2019/06/03	NC		%	30
6155162	GUL		RPD [JVX998-03]	F2 (C10-C16 Hydrocarbons)	2019/06/04	NC		%	30
				F3 (C16-C34 Hydrocarbons)	2019/06/04	NC		%	30
				F4 (C34-C50 Hydrocarbons)	2019/06/04	NC		%	30
6155135	RAJ		Matrix Spike [JVX997-03]	D10-Anthracene	2019/06/03		102	%	50 - 130
				D14-Terphenyl (FS)	2019/06/03		105	%	50 - 130
				D8-Acenaphthylene	2019/06/03		106	%	50 - 130
				Acenaphthene	2019/06/03		95	%	50 - 130
				Acenaphthylene	2019/06/03		91	%	50 - 130
				Anthracene	2019/06/03		93	%	50 - 130
				Benzo(a)anthracene	2019/06/03		100	%	50 - 130
				Benzo(a)pyrene	2019/06/03		98	%	50 - 130
				Benzo(b/j)fluoranthene	2019/06/03		104	%	50 - 130
				Benzo(g,h,i)perylene	2019/06/03		96	%	50 - 130
				Benzo(k)fluoranthene	2019/06/03		96	%	50 - 130
				Chrysene	2019/06/03		96	%	50 - 130
				Dibenz(a,h)anthracene	2019/06/03		99	%	50 - 130
				Fluoranthene	2019/06/03		98	%	50 - 130
				Fluorene	2019/06/03		95	%	50 - 130
				Indeno(1,2,3-cd)pyrene	2019/06/03		105	%	50 - 130
				1-Methylnaphthalene	2019/06/03		103	%	50 - 130
				2-Methylnaphthalene	2019/06/03		90	%	50 - 130
				Naphthalene	2019/06/03		95	%	50 - 130
				Phenanthrene	2019/06/03		97	%	50 - 130
				Pyrene	2019/06/03		101	%	50 - 130
6155162	GUL		Matrix Spike [JVX999-03]	o-Terphenyl	2019/06/03		101	%	60 - 130
				F2 (C10-C16 Hydrocarbons)	2019/06/03		101	%	50 - 130
				F3 (C16-C34 Hydrocarbons)	2019/06/03		104	%	50 - 130
				F4 (C34-C50 Hydrocarbons)	2019/06/03		112	%	50 - 130
6149918	TNG		LCS	Dissolved Antimony (Sb)	2019/05/31		102	%	80 - 120
				Dissolved Arsenic (As)	2019/05/31		101	%	80 - 120
				Dissolved Barium (Ba)	2019/05/31		99	%	80 - 120
				Dissolved Beryllium (Be)	2019/05/31		100	%	80 - 120
				Dissolved Boron (B)	2019/05/31		102	%	80 - 120
				Dissolved Cadmium (Cd)	2019/05/31		102	%	80 - 120
				Dissolved Chromium (Cr)	2019/05/31		101	%	80 - 120
				Dissolved Cobalt (Co)	2019/05/31		101	%	80 - 120
				Dissolved Copper (Cu)	2019/05/31		100	%	80 - 120
				Dissolved Lead (Pb)	2019/05/31		101	%	80 - 120
				Dissolved Molybdenum (Mo)	2019/05/31		103	%	80 - 120
				Dissolved Nickel (Ni)	2019/05/31		100	%	80 - 120



BUREAU
VERITAS

BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Dissolved Selenium (Se)	2019/05/31		102	%	80 - 120
				Dissolved Silver (Ag)	2019/05/31		100	%	80 - 120
				Dissolved Sodium (Na)	2019/05/31		97	%	80 - 120
				Dissolved Thallium (Tl)	2019/05/31		100	%	80 - 120
				Dissolved Uranium (U)	2019/05/31		93	%	80 - 120
				Dissolved Vanadium (V)	2019/05/31		101	%	80 - 120
				Dissolved Zinc (Zn)	2019/05/31		101	%	80 - 120
6151089		CKH	LCS	4-Bromofluorobenzene	2019/06/03		104	%	70 - 130
				D4-1,2-Dichloroethane	2019/06/03		106	%	70 - 130
				D8-Toluene	2019/06/03		104	%	70 - 130
				Acetone (2-Propanone)	2019/06/03		109	%	60 - 140
				Benzene	2019/06/03		104	%	70 - 130
				Bromodichloromethane	2019/06/03		111	%	70 - 130
				Bromoform	2019/06/03		119	%	70 - 130
				Bromomethane	2019/06/03		107	%	60 - 140
				Carbon Tetrachloride	2019/06/03		112	%	70 - 130
				Chlorobenzene	2019/06/03		104	%	70 - 130
				Chloroform	2019/06/03		109	%	70 - 130
				Dibromochloromethane	2019/06/03		112	%	70 - 130
				1,2-Dichlorobenzene	2019/06/03		102	%	70 - 130
				1,3-Dichlorobenzene	2019/06/03		98	%	70 - 130
				1,4-Dichlorobenzene	2019/06/03		101	%	70 - 130
				Dichlorodifluoromethane (FREON 12)	2019/06/03		115	%	60 - 140
				1,1-Dichloroethane	2019/06/03		105	%	70 - 130
				1,2-Dichloroethane	2019/06/03		110	%	70 - 130
				1,1-Dichloroethylene	2019/06/03		100	%	70 - 130
				cis-1,2-Dichloroethylene	2019/06/03		110	%	70 - 130
				trans-1,2-Dichloroethylene	2019/06/03		104	%	70 - 130
				1,2-Dichloropropane	2019/06/03		105	%	70 - 130
				cis-1,3-Dichloropropene	2019/06/03		94	%	70 - 130
				trans-1,3-Dichloropropene	2019/06/03		98	%	70 - 130
				Ethylbenzene	2019/06/03		96	%	70 - 130
				Ethylene Dibromide	2019/06/03		112	%	70 - 130
				Hexane	2019/06/03		102	%	70 - 130
				Methylene Chloride(Dichloromethane)	2019/06/03		116	%	70 - 130
				Methyl Ethyl Ketone (2-Butanone)	2019/06/03		117	%	60 - 140
				Methyl Isobutyl Ketone	2019/06/03		118	%	70 - 130
				Methyl t-butyl ether (MTBE)	2019/06/03		99	%	70 - 130
				Styrene	2019/06/03		107	%	70 - 130
				1,1,1,2-Tetrachloroethane	2019/06/03		114	%	70 - 130
				1,1,2,2-Tetrachloroethane	2019/06/03		112	%	70 - 130
				Tetrachloroethylene	2019/06/03		107	%	70 - 130
				Toluene	2019/06/03		97	%	70 - 130
				1,1,1-Trichloroethane	2019/06/03		109	%	70 - 130
				1,1,2-Trichloroethane	2019/06/03		107	%	70 - 130
				Trichloroethylene	2019/06/03		108	%	70 - 130
				Trichlorofluoromethane (FREON 11)	2019/06/03		109	%	70 - 130
				Vinyl Chloride	2019/06/03		105	%	70 - 130
				p+m-Xylene	2019/06/03		99	%	70 - 130
				o-Xylene	2019/06/03		100	%	70 - 130
6152425		GUL	LCS	Propylene Glycol	2019/05/31		104	%	60 - 140
				Ethylene Glycol	2019/05/31		96	%	60 - 140



BUREAU
VERITAS

BV Labs Job #: B9E5580
Report Date: 2019/06/04

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6153470	ABD	LCS	Diethylene Glycol	2019/05/31		97	%	60 - 140
			1,4-Difluorobenzene	2019/06/01		102	%	70 - 130
			4-Bromofluorobenzene	2019/06/01		103	%	70 - 130
			D10-Ethylbenzene	2019/06/01		98	%	70 - 130
			D4-1,2-Dichloroethane	2019/06/01		105	%	70 - 130
6155135	RAJ	LCS	F1 (C6-C10)	2019/06/01		102	%	70 - 130
			D10-Anthracene	2019/06/03		103	%	50 - 130
			D14-Terphenyl (FS)	2019/06/03		109	%	50 - 130
			D8-Acenaphthylene	2019/06/03		106	%	50 - 130
			Acenaphthene	2019/06/03		98	%	50 - 130
			Acenaphthylene	2019/06/03		95	%	50 - 130
			Anthracene	2019/06/03		98	%	50 - 130
			Benzo(a)anthracene	2019/06/03		108	%	50 - 130
			Benzo(a)pyrene	2019/06/03		104	%	50 - 130
			Benzo(b/j)fluoranthene	2019/06/03		110	%	50 - 130
			Benzo(g,h,i)perylene	2019/06/03		102	%	50 - 130
			Benzo(k)fluoranthene	2019/06/03		107	%	50 - 130
			Chrysene	2019/06/03		101	%	50 - 130
			Dibenz(a,h)anthracene	2019/06/03		107	%	50 - 130
			Fluoranthene	2019/06/03		102	%	50 - 130
			Fluorene	2019/06/03		99	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/06/03		112	%	50 - 130
			1-Methylnaphthalene	2019/06/03		103	%	50 - 130
			2-Methylnaphthalene	2019/06/03		91	%	50 - 130
			Naphthalene	2019/06/03		97	%	50 - 130
			Phenanthrene	2019/06/03		102	%	50 - 130
			Pyrene	2019/06/03		107	%	50 - 130
			6155162	GUL	LCS	o-Terphenyl	2019/06/03	
F2 (C10-C16 Hydrocarbons)	2019/06/03					94	%	60 - 130
F3 (C16-C34 Hydrocarbons)	2019/06/03					101	%	60 - 130
F4 (C34-C50 Hydrocarbons)	2019/06/03					107	%	60 - 130

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.

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

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

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

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



BUREAU
VERITAS

BV Labs Job #: B9E5580

Report Date: 2019/06/04

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: 2 Montreal Road, Ottawa, Ontario

Project #: 18113796-1485-1907A

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 'Brad Newman', written over a horizontal line.

Brad Newman, Scientific Service Specialist

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

INVOICE INFORMATION		REPORT INFORMATION									
Company Name: Imperial Oil Ltd - Goldier Associates Ltd		Company Name: Goldier Associates Ltd									
Contact Name: Chris Vettorazzo		Contact Name: Chris Vettorazzo									
Address: 11 Austin St. Suite 101, St. John's Newfoundland A1B 4C1		Address: 11 Austin St. Suite 101, St. John's Newfoundland A1B 4C1									
Phone: (403) 299-5600		Phone: (403) 299-5600									
Email: IDLAccounts_Payable@goldier.com		Email: chris_vettorazzo@goldier.com, IDL_1990@goldier.com									
Consultant Project #: 18113796-1485-1907A		Consultant Project #: 18113796-1485-1907A									

FIELD SAMPLE ID	MATRIX			CONTAINERS			SAMPLING			LAB FILTRATION REQUIRED	FIELD IN TERS & PRESERVED	TIME (24 HR)	GLYCOLS	PCBS	Dissolved Metals	PAHS	VOCs	F-FA	F-BTEX	SPECIAL INSTRUCTIONS:	# JARS USED AND NOT SUBMITTED	TURNAROUND TIME
	GROUND WATER	SURFACE WATER	SOIL	OTHER	DATE (YYYYMMDD)	TIME (24 HR)	DATE (YYYYMMDD)	TIME (24 HR)	Standard (5 days)													
MW19-05	X			14	2019/05/28	14:23	X					X								IES A 2601436		
MW19-07	X			14		13:48	X					X								SAP: 88005740		
MW19-08	X			14		12:23	X					X								* samples may contain heads piece and/or sediment		
MW19-09	X			14		13:18	X					X										

IOL SITE LOCATION: 2 Montreal Road, Ottawa, Ontario		REGULATORY CRITERIA / DETECTION LIMITS: REG 153 Table 3		YES		NO		COOLER ID:		TEMP °C		RECEIVED BY:		DATE:		TIME (24 HR)		LAB USE ONLY	
IOL PROJECT # (if applicable): N/A		REG 153 Table 3		3		2011		RSC		1		2		3		10:37		MAXXAM JOB # 89E5580	
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 18113796-1485-1777-		REG 153 Table 3		3		2011		RSC		1		2		3		10:37		SAMPLES LABELED BY: GSD	
RELINQUISHED BY: Jeremy Eckert		DATE: 2019/05/29		07:30		2019/05/20		10:37		DATE: 2019/05/20		10:37		TIME (24 HR)		LABELED BY: GSD		VERIFIED BY: MAK	

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: May 28, 2019

Location: 2 Montreal Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 18113796-1485

Sample Submission Number: B9E5580

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:

Yes

Has lab warranted all tests were in statistical control in CoA (Yes/No)?:

Yes

Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:

Yes

Were all samples analyzed within hold times (Yes/No)?:

Yes

All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:

n/a

Is Chain of Custody completed and signed (Yes/No)?:

Yes

Were sample temperatures acceptable when they reached lab (Yes/No)?:

Yes

Is data considered to be reliable (Yes/No/Suspect)?:

Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): *Amanda Newberry*

Date: June 6, 2019



Task Order#: 18113796-1485-7777
 Site#: N/A
 Site Location: 2 Montreal Road, Ottawa, Ontario
 Project #: 18113796-1485-1907A
 Your C.O.C. #: 716856-02-01

Attention: Chris Vettorazzo

Golder Associates Ltd
 11 Austin St.
 Suite 101
 St. John's, NL
 Canada A1B 4C1

Report Date: 2019/06/07
 Report #: R5744313
 Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E5637

Received: 2019/05/30, 10:31

Sample Matrix: Water
 # Samples Received: 5

Analyses	Quantity	Laboratory Method	Primary Reference
Methylnaphthalene Sum	5	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum	5		EPA 8260C m
Petroleum Hydro. CCME F1 & BTEX in Water	5	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	5	CAM SOP-00316	CCME PHC-CWS m
Glycols in Water by GC/FID	2	CAM SOP-00322	based on EPA 8015
Dissolved Metals by ICPMS	5	CAM SOP-00447	EPA 6020B m
PAH Compounds in Water by GC/MS (SIM)	5	CAM SOP-00318	EPA 8270D m
Polychlorinated Biphenyl in Water	2	CAM SOP-00309	EPA 8082A m
Volatile Organic Compounds in Water	5	CAM SOP-00228	EPA 8260C 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, MDELCC, 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. All samples were analyzed within hold time unless otherwise flagged.

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) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods



Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A
Your C.O.C. #: 716856-02-01

Attention: Chris Vettorazzo

Golder Associates Ltd
11 Austin St.
Suite 101
St. John's, NL
Canada A1B 4C1

Report Date: 2019/06/07
Report #: R5744313
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E5637

Received: 2019/05/30, 10:31

September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Kyle Reinhart
Project Manager
07 Jun 2019 17:13:40

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

Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

=====

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



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		JVY214	JVY215	JVY216	JVY217	JVY218		
Sampling Date		2019/05/28 16:09	2019/05/28 15:48	2019/05/28 15:03	2019/05/28 16:38	2019/05/28 16:38		
COC Number		716856-02-01	716856-02-01	716856-02-01	716856-02-01	716856-02-01		
	UNITS	MW19-01	MW19-02	MW19-03	MW19-04	DUPA	RDL	QC Batch
F1 (C6-C10)	ug/L	<25	160	370	110	100	25	6153410
F1 (C6-C10) - BTEX	ug/L	<25	68	120	62	48	25	6153410
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	<100	<100	100	6155162
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	200	6155162
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	200	6155162
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes	Yes		6155162
Extraction Surrogate Recovery (%)								
o-Terphenyl	%	97	99	99	98	100		6155162
Instrument Surrogate Recovery (%)								
1,4-Difluorobenzene	%	103	103	102	102	104		6153410
4-Bromofluorobenzene	%	99	103	102	102	101		6153410
D10-Ethylbenzene	%	102	104	102	101	101		6153410
D4-1,2-Dichloroethane	%	97	97	99	99	99		6153410
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								



BUREAU
VERITAS

BV Labs Job #: B9E5637

Report Date: 2019/06/07

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: 2 Montreal Road, Ottawa, Ontario

Project #: 18113796-1485-1907A

GLYCOLS BY GC-FID (WATER)

BV Labs ID		JVY217	JVY218		
Sampling Date		2019/05/28 16:38	2019/05/28 16:38		
COC Number		716856-02-01	716856-02-01		
	UNITS	MW19-04	DUPA	RDL	QC Batch
Propylene Glycol	mg/L	<5	<5	5	6152425
Ethylene Glycol	mg/L	<5	<5	5	6152425
Diethylene Glycol	mg/L	<5	<5	5	6152425
Total Glycol	mg/L	<5	<5	5	6152425
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 DISSOLVED ICPMS METALS (WATER)

BV Labs ID		JVY214	JVY215	JVY216	JVY217	JVY218		
Sampling Date		2019/05/28 16:09	2019/05/28 15:48	2019/05/28 15:03	2019/05/28 16:38	2019/05/28 16:38		
COC Number		716856-02-01	716856-02-01	716856-02-01	716856-02-01	716856-02-01		
	UNITS	MW19-01	MW19-02	MW19-03	MW19-04	DUPA	RDL	QC Batch
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6150633
Dissolved Arsenic (As)	ug/L	<1.0	<1.0	1.0	1.7	1.8	1.0	6150633
Dissolved Barium (Ba)	ug/L	62	69	52	60	58	2.0	6150633
Dissolved Beryllium (Be)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6150633
Dissolved Boron (B)	ug/L	44	63	62	53	51	10	6150633
Dissolved Cadmium (Cd)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6150633
Dissolved Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	6150633
Dissolved Cobalt (Co)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6150633
Dissolved Copper (Cu)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6150633
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6150633
Dissolved Molybdenum (Mo)	ug/L	3.3	3.2	<0.50	<0.50	<0.50	0.50	6150633
Dissolved Nickel (Ni)	ug/L	6.4	1.4	1.1	24	1.3	1.0	6150633
Dissolved Selenium (Se)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6150633
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6150633
Dissolved Sodium (Na)	ug/L	350000	280000	200000	180000	180000	100	6150633
Dissolved Thallium (Tl)	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6150633
Dissolved Uranium (U)	ug/L	8.3	12	11	13	13	0.10	6150633
Dissolved Vanadium (V)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6150633
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	6150633
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 PAHS (WATER)

BV Labs ID		JVY214	JVY215	JVY216	JVY217	JVY218		
Sampling Date		2019/05/28 16:09	2019/05/28 15:48	2019/05/28 15:03	2019/05/28 16:38	2019/05/28 16:38		
COC Number		716856-02-01	716856-02-01	716856-02-01	716856-02-01	716856-02-01		
	UNITS	MW19-01	MW19-02	MW19-03	MW19-04	DUPA	RDL	QC Batch
Methylnaphthalene, 2-(1-)	ug/L	<0.071	0.36	0.45	<0.071	0.072	0.071	6148825
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6155135
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6155135
Anthracene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6155135
Benzo(a)anthracene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6155135
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6155135
Benzo(b/j)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6155135
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6155135
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6155135
Chrysene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6155135
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6155135
Fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6155135
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6155135
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6155135
1-Methylnaphthalene	ug/L	<0.050	0.26	0.38	0.070	0.072	0.050	6155135
2-Methylnaphthalene	ug/L	<0.050	0.095	0.075	<0.050	<0.050	0.050	6155135
Naphthalene	ug/L	<0.050	0.86	0.51	0.076	0.078	0.050	6155135
Phenanthrene	ug/L	<0.030	<0.030	<0.030	<0.030	<0.030	0.030	6155135
Pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6155135
Extraction Surrogate Recovery (%)								
D10-Anthracene	%	95	97	88	91	100		6155135
D14-Terphenyl (FS)	%	98	92	92	95	103		6155135
D8-Acenaphthylene	%	96	95	87	94	101		6155135
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 PCBS (WATER)

BV Labs ID		JVY217	JVY218		
Sampling Date		2019/05/28 16:38	2019/05/28 16:38		
COC Number		716856-02-01	716856-02-01		
	UNITS	MW19-04	DUPA	RDL	QC Batch
Aroclor 1242	ug/L	<0.5	<0.5	0.5	6163187
Aroclor 1248	ug/L	<0.5	<0.5	0.5	6163187
Aroclor 1254	ug/L	<0.5	<0.5	0.5	6163187
Aroclor 1260	ug/L	<0.5	<0.5	0.5	6163187
Total PCB	ug/L	<0.5	<0.5	0.5	6163187
Extraction Surrogate Recovery (%)					
Decachlorobiphenyl	%	95	92		6163187
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 VOCs BY HS (WATER)

BV Labs ID		JVY214	JVY215	JVY216	JVY217	JVY218		
Sampling Date		2019/05/28 16:09	2019/05/28 15:48	2019/05/28 15:03	2019/05/28 16:38	2019/05/28 16:38		
COC Number		716856-02-01	716856-02-01	716856-02-01	716856-02-01	716856-02-01		
	UNITS	MW19-01	MW19-02	MW19-03	MW19-04	DUPA	RDL	QC Batch
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6149732
Acetone (2-Propanone)	ug/L	<10	<10	<10	<10	<10	10	6151089
Benzene	ug/L	0.41	27	180	45	46	0.20	6151089
Bromodichloromethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
Bromoform	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6151089
Bromomethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
Carbon Tetrachloride	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6151089
Chlorobenzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6151089
Chloroform	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6151089
Dibromochloromethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,2-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,3-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,4-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6151089
1,1-Dichloroethane	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6151089
1,2-Dichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,1-Dichloroethylene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6151089
cis-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
trans-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,2-Dichloropropane	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6151089
cis-1,3-Dichloropropene	ug/L	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	6151089
trans-1,3-Dichloropropene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6151089
Ethylbenzene	ug/L	0.23	11	23	2.4	2.3	0.20	6151089
Ethylene Dibromide	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6151089
Hexane	ug/L	<1.0	1.1	1.8	1.6	1.7	1.0	6151089
Methylene Chloride(Dichloromethane)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6151089
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	<10	<10	<10	<10	10	6151089
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	6151089
Methyl t-butyl ether (MTBE)	ug/L	<0.50	2.3	33	3.6	3.6	0.50	6151089
Styrene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,1,1,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
1,1,2,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
Tetrachloroethylene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6151089
Toluene	ug/L	0.23	9.3	14	2.1	2.1	0.20	6151089
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

O.REG 153 VOCS BY HS (WATER)

BV Labs ID		JVY214	JVY215	JVY216	JVY217	JVY218		
Sampling Date		2019/05/28 16:09	2019/05/28 15:48	2019/05/28 15:03	2019/05/28 16:38	2019/05/28 16:38		
COC Number		716856-02-01	716856-02-01	716856-02-01	716856-02-01	716856-02-01		
	UNITS	MW19-01	MW19-02	MW19-03	MW19-04	DUPA	RDL	QC Batch
1,1,1-Trichloroethane	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6151089
1,1,2-Trichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
Trichloroethylene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6151089
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6151089
Vinyl Chloride	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6151089
p+m-Xylene	ug/L	0.50	24	15	3.4	3.3	0.20	6151089
o-Xylene	ug/L	0.36	15	31	1.7	1.7	0.20	6151089
Total Xylenes	ug/L	0.87	39	46	5.1	5.0	0.20	6151089
Instrument								
Surrogate Recovery (%)								
4-Bromofluorobenzene	%	92	100	101	94	93		6151089
D4-1,2-Dichloroethane	%	116	112	112	109	110		6151089
D8-Toluene	%	88	88	91	92	91		6151089
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

TEST SUMMARY

BV Labs ID: JY214
Sample ID: MW19-01
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6148825	N/A	2019/06/04	Automated Statchk
1,3-Dichloropropene Sum	CALC	6149732	N/A	2019/06/04	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153410	N/A	2019/06/01	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155162	2019/06/03	2019/06/04	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6150633	N/A	2019/05/31	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6155135	2019/06/03	2019/06/03	Mitesh Raj
Volatile Organic Compounds in Water	GC/MS	6151089	N/A	2019/06/03	Chandni Khawas

BV Labs ID: JY215
Sample ID: MW19-02
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6148825	N/A	2019/06/04	Automated Statchk
1,3-Dichloropropene Sum	CALC	6149732	N/A	2019/06/04	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153410	N/A	2019/06/01	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155162	2019/06/03	2019/06/04	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6150633	N/A	2019/05/31	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6155135	2019/06/03	2019/06/04	Mitesh Raj
Volatile Organic Compounds in Water	GC/MS	6151089	N/A	2019/06/03	Chandni Khawas

BV Labs ID: JY216
Sample ID: MW19-03
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6148825	N/A	2019/06/04	Automated Statchk
1,3-Dichloropropene Sum	CALC	6149732	N/A	2019/06/04	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153410	N/A	2019/06/03	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155162	2019/06/03	2019/06/04	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6150633	N/A	2019/05/31	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6155135	2019/06/03	2019/06/04	Mitesh Raj
Volatile Organic Compounds in Water	GC/MS	6151089	N/A	2019/06/03	Chandni Khawas

BV Labs ID: JY217
Sample ID: MW19-04
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6148825	N/A	2019/06/04	Automated Statchk
1,3-Dichloropropene Sum	CALC	6149732	N/A	2019/06/04	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153410	N/A	2019/06/03	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155162	2019/06/03	2019/06/04	Prabhjot Gulati
Glycols in Water by GC/FID	GC/FID	6152425	N/A	2019/05/31	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6150633	N/A	2019/05/31	Arefa Dabhad



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

TEST SUMMARY

BV Labs ID: JVY217
Sample ID: MW19-04
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6155135	2019/06/03	2019/06/04	Mitesh Raj
Polychlorinated Biphenyl in Water	GC/ECD	6163187	2019/06/06	2019/06/07	Svitlana Shaula
Volatile Organic Compounds in Water	GC/MS	6151089	N/A	2019/06/03	Chandni Khawas

BV Labs ID: JVY218
Sample ID: DUPA
Matrix: Water

Collected: 2019/05/28
Relinquished: 2019/05/29
Received: 2019/05/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6148825	N/A	2019/06/04	Automated Statchk
1,3-Dichloropropene Sum	CALC	6149732	N/A	2019/06/04	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6153410	N/A	2019/06/03	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155162	2019/06/03	2019/06/04	Prabhjot Gulati
Glycols in Water by GC/FID	GC/FID	6152425	N/A	2019/05/31	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6150633	N/A	2019/05/31	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6155135	2019/06/03	2019/06/04	Mitesh Raj
Polychlorinated Biphenyl in Water	GC/ECD	6163187	2019/06/06	2019/06/07	Svitlana Shaula
Volatile Organic Compounds in Water	GC/MS	6151089	N/A	2019/06/03	Chandni Khawas



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

GENERAL COMMENTS

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

Package 1	4.7°C
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F1/BTEX analysis: The BTEX results used for the F1-BTEX calculation were obtained from Headspace-GC analysis.

Sample JY217 [MW19-04] : PCB Analysis: Due to the nature of the sample matrix, a smaller portion of the sample was extracted. DLs were adjusted accordingly.

Sample JY218 [DUPA] : PCB Analysis: Due to the nature of the sample matrix, a smaller portion of the sample was extracted. DLs were adjusted accordingly.

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT

QA/QC		QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
Batch	Init							
6150633	ADA	Method Blank	Dissolved Antimony (Sb)	2019/05/31	<0.50		ug/L	
			Dissolved Arsenic (As)	2019/05/31	<1.0		ug/L	
			Dissolved Barium (Ba)	2019/05/31	<2.0		ug/L	
			Dissolved Beryllium (Be)	2019/05/31	<0.50		ug/L	
			Dissolved Boron (B)	2019/05/31	<10		ug/L	
			Dissolved Cadmium (Cd)	2019/05/31	<0.10		ug/L	
			Dissolved Chromium (Cr)	2019/05/31	<5.0		ug/L	
			Dissolved Cobalt (Co)	2019/05/31	<0.50		ug/L	
			Dissolved Copper (Cu)	2019/05/31	<1.0		ug/L	
			Dissolved Lead (Pb)	2019/05/31	<0.50		ug/L	
			Dissolved Molybdenum (Mo)	2019/05/31	<0.50		ug/L	
			Dissolved Nickel (Ni)	2019/05/31	<1.0		ug/L	
			Dissolved Selenium (Se)	2019/05/31	<2.0		ug/L	
			Dissolved Silver (Ag)	2019/05/31	<0.10		ug/L	
			Dissolved Sodium (Na)	2019/05/31	<100		ug/L	
			Dissolved Thallium (Tl)	2019/05/31	<0.050		ug/L	
			Dissolved Uranium (U)	2019/05/31	<0.10		ug/L	
Dissolved Vanadium (V)	2019/05/31	<0.50		ug/L				
			Dissolved Zinc (Zn)	2019/05/31	<5.0		ug/L	
6151089	CKH	Method Blank	4-Bromofluorobenzene	2019/06/03		96	%	70 - 130
			D4-1,2-Dichloroethane	2019/06/03		116	%	70 - 130
			D8-Toluene	2019/06/03		88	%	70 - 130
			Acetone (2-Propanone)	2019/06/03	<10		ug/L	
			Benzene	2019/06/03	<0.20		ug/L	
			Bromodichloromethane	2019/06/03	<0.50		ug/L	
			Bromoform	2019/06/03	<1.0		ug/L	
			Bromomethane	2019/06/03	<0.50		ug/L	
			Carbon Tetrachloride	2019/06/03	<0.20		ug/L	
			Chlorobenzene	2019/06/03	<0.20		ug/L	
			Chloroform	2019/06/03	<0.20		ug/L	
			Dibromochloromethane	2019/06/03	<0.50		ug/L	
			1,2-Dichlorobenzene	2019/06/03	<0.50		ug/L	
			1,3-Dichlorobenzene	2019/06/03	<0.50		ug/L	
			1,4-Dichlorobenzene	2019/06/03	<0.50		ug/L	
			Dichlorodifluoromethane (FREON 12)	2019/06/03	<1.0		ug/L	
			1,1-Dichloroethane	2019/06/03	<0.20		ug/L	
			1,2-Dichloroethane	2019/06/03	<0.50		ug/L	
			1,1-Dichloroethylene	2019/06/03	<0.20		ug/L	
			cis-1,2-Dichloroethylene	2019/06/03	<0.50		ug/L	
			trans-1,2-Dichloroethylene	2019/06/03	<0.50		ug/L	
			1,2-Dichloropropane	2019/06/03	<0.20		ug/L	
			cis-1,3-Dichloropropene	2019/06/03	<0.30		ug/L	
			trans-1,3-Dichloropropene	2019/06/03	<0.40		ug/L	
			Ethylbenzene	2019/06/03	<0.20		ug/L	
			Ethylene Dibromide	2019/06/03	<0.20		ug/L	
			Hexane	2019/06/03	<1.0		ug/L	
Methylene Chloride(Dichloromethane)	2019/06/03	<2.0		ug/L				
Methyl Ethyl Ketone (2-Butanone)	2019/06/03	<10		ug/L				
Methyl Isobutyl Ketone	2019/06/03	<5.0		ug/L				
Methyl t-butyl ether (MTBE)	2019/06/03	<0.50		ug/L				
Styrene	2019/06/03	<0.50		ug/L				
1,1,1,2-Tetrachloroethane	2019/06/03	<0.50		ug/L				



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6152425	GUL	Method Blank	1,1,2,2-Tetrachloroethane	2019/06/03	<0.50		ug/L	
			Tetrachloroethylene	2019/06/03	<0.20		ug/L	
			Toluene	2019/06/03	<0.20		ug/L	
			1,1,1-Trichloroethane	2019/06/03	<0.20		ug/L	
			1,1,2-Trichloroethane	2019/06/03	<0.50		ug/L	
			Trichloroethylene	2019/06/03	<0.20		ug/L	
			Trichlorofluoromethane (FREON 11)	2019/06/03	<0.50		ug/L	
			Vinyl Chloride	2019/06/03	<0.20		ug/L	
			p+m-Xylene	2019/06/03	<0.20		ug/L	
			o-Xylene	2019/06/03	<0.20		ug/L	
			Total Xylenes	2019/06/03	<0.20		ug/L	
			Propylene Glycol	2019/05/31	<5		mg/L	
			Ethylene Glycol	2019/05/31	<5		mg/L	
			Diethylene Glycol	2019/05/31	<5		mg/L	
6153410	ABD	Method Blank	Total Glycol	2019/05/31	<5		mg/L	
			1,4-Difluorobenzene	2019/06/01		100	%	70 - 130
			4-Bromofluorobenzene	2019/06/01		100	%	70 - 130
			D10-Ethylbenzene	2019/06/01		96	%	70 - 130
			D4-1,2-Dichloroethane	2019/06/01		98	%	70 - 130
6155135	RAJ	Method Blank	F1 (C6-C10)	2019/06/01	<25		ug/L	
			F1 (C6-C10) - BTEX	2019/06/01	<25		ug/L	
			D10-Anthracene	2019/06/03		92	%	50 - 130
			D14-Terphenyl (FS)	2019/06/03		99	%	50 - 130
			D8-Acenaphthylene	2019/06/03		91	%	50 - 130
			Acenaphthene	2019/06/03	<0.050		ug/L	
			Acenaphthylene	2019/06/03	<0.050		ug/L	
			Anthracene	2019/06/03	<0.050		ug/L	
			Benzo(a)anthracene	2019/06/03	<0.050		ug/L	
			Benzo(a)pyrene	2019/06/03	<0.010		ug/L	
			Benzo(b/j)fluoranthene	2019/06/03	<0.050		ug/L	
			Benzo(g,h,i)perylene	2019/06/03	<0.050		ug/L	
			Benzo(k)fluoranthene	2019/06/03	<0.050		ug/L	
			Chrysene	2019/06/03	<0.050		ug/L	
			Dibenz(a,h)anthracene	2019/06/03	<0.050		ug/L	
			Fluoranthene	2019/06/03	<0.050		ug/L	
			Fluorene	2019/06/03	<0.050		ug/L	
			Indeno(1,2,3-cd)pyrene	2019/06/03	<0.050		ug/L	
			1-Methylnaphthalene	2019/06/03	<0.050		ug/L	
			2-Methylnaphthalene	2019/06/03	<0.050		ug/L	
			Naphthalene	2019/06/03	<0.050		ug/L	
Phenanthrene	2019/06/03	<0.030		ug/L				
Pyrene	2019/06/03	<0.050		ug/L				
6155162	GUL	Method Blank	o-Terphenyl	2019/06/03		97	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/06/03	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2019/06/03	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2019/06/03	<200		ug/L	
6163187	SVS	Method Blank	Decachlorobiphenyl	2019/06/07		87	%	60 - 130
			Aroclor 1242	2019/06/07	<0.05		ug/L	
			Aroclor 1248	2019/06/07	<0.05		ug/L	
			Aroclor 1254	2019/06/07	<0.05		ug/L	
			Aroclor 1260	2019/06/07	<0.05		ug/L	
			Total PCB	2019/06/07	<0.05		ug/L	



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC		QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
Batch	Init							
6163187	SVS	RPD	Aroclor 1260	2019/06/07	16		%	30
			Total PCB	2019/06/07	16		%	40
6150633	ADA	LCS	Dissolved Antimony (Sb)	2019/05/31		99	%	80 - 120
			Dissolved Arsenic (As)	2019/05/31		98	%	80 - 120
			Dissolved Barium (Ba)	2019/05/31		100	%	80 - 120
			Dissolved Beryllium (Be)	2019/05/31		102	%	80 - 120
			Dissolved Boron (B)	2019/05/31		98	%	80 - 120
			Dissolved Cadmium (Cd)	2019/05/31		100	%	80 - 120
			Dissolved Chromium (Cr)	2019/05/31		94	%	80 - 120
			Dissolved Cobalt (Co)	2019/05/31		102	%	80 - 120
			Dissolved Copper (Cu)	2019/05/31		96	%	80 - 120
			Dissolved Lead (Pb)	2019/05/31		97	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/05/31		100	%	80 - 120
			Dissolved Nickel (Ni)	2019/05/31		97	%	80 - 120
			Dissolved Selenium (Se)	2019/05/31		100	%	80 - 120
			Dissolved Silver (Ag)	2019/05/31		93	%	80 - 120
			Dissolved Sodium (Na)	2019/05/31		98	%	80 - 120
			Dissolved Thallium (Tl)	2019/05/31		99	%	80 - 120
			Dissolved Uranium (U)	2019/05/31		103	%	80 - 120
			Dissolved Vanadium (V)	2019/05/31		99	%	80 - 120
			Dissolved Zinc (Zn)	2019/05/31		97	%	80 - 120
6151089	CKH	LCS	4-Bromofluorobenzene	2019/06/03		104	%	70 - 130
			D4-1,2-Dichloroethane	2019/06/03		106	%	70 - 130
			D8-Toluene	2019/06/03		104	%	70 - 130
			Acetone (2-Propanone)	2019/06/03		109	%	60 - 140
			Benzene	2019/06/03		104	%	70 - 130
			Bromodichloromethane	2019/06/03		111	%	70 - 130
			Bromoform	2019/06/03		119	%	70 - 130
			Bromomethane	2019/06/03		107	%	60 - 140
			Carbon Tetrachloride	2019/06/03		112	%	70 - 130
			Chlorobenzene	2019/06/03		104	%	70 - 130
			Chloroform	2019/06/03		109	%	70 - 130
			Dibromochloromethane	2019/06/03		112	%	70 - 130
			1,2-Dichlorobenzene	2019/06/03		102	%	70 - 130
			1,3-Dichlorobenzene	2019/06/03		98	%	70 - 130
			1,4-Dichlorobenzene	2019/06/03		101	%	70 - 130
			Dichlorodifluoromethane (FREON 12)	2019/06/03		115	%	60 - 140
			1,1-Dichloroethane	2019/06/03		105	%	70 - 130
			1,2-Dichloroethane	2019/06/03		110	%	70 - 130
			1,1-Dichloroethylene	2019/06/03		100	%	70 - 130
			cis-1,2-Dichloroethylene	2019/06/03		110	%	70 - 130
			trans-1,2-Dichloroethylene	2019/06/03		104	%	70 - 130
			1,2-Dichloropropane	2019/06/03		105	%	70 - 130
			cis-1,3-Dichloropropene	2019/06/03		94	%	70 - 130
			trans-1,3-Dichloropropene	2019/06/03		98	%	70 - 130
			Ethylbenzene	2019/06/03		96	%	70 - 130
			Ethylene Dibromide	2019/06/03		112	%	70 - 130
			Hexane	2019/06/03		102	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/06/03		116	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2019/06/03		117	%	60 - 140
			Methyl Isobutyl Ketone	2019/06/03		118	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/06/03		99	%	70 - 130



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Styrene	2019/06/03		107	%	70 - 130
			1,1,1,2-Tetrachloroethane	2019/06/03		114	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/06/03		112	%	70 - 130
			Tetrachloroethylene	2019/06/03		107	%	70 - 130
			Toluene	2019/06/03		97	%	70 - 130
			1,1,1-Trichloroethane	2019/06/03		109	%	70 - 130
			1,1,2-Trichloroethane	2019/06/03		107	%	70 - 130
			Trichloroethylene	2019/06/03		108	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/06/03		109	%	70 - 130
			Vinyl Chloride	2019/06/03		105	%	70 - 130
			p+m-Xylene	2019/06/03		99	%	70 - 130
			o-Xylene	2019/06/03		100	%	70 - 130
6152425	GUL	LCS	Propylene Glycol	2019/05/31		104	%	60 - 140
			Ethylene Glycol	2019/05/31		96	%	60 - 140
			Diethylene Glycol	2019/05/31		97	%	60 - 140
6153410	ABD	LCS	1,4-Difluorobenzene	2019/06/01		102	%	70 - 130
			4-Bromofluorobenzene	2019/06/01		102	%	70 - 130
			D10-Ethylbenzene	2019/06/01		97	%	70 - 130
			D4-1,2-Dichloroethane	2019/06/01		99	%	70 - 130
			F1 (C6-C10)	2019/06/01		102	%	70 - 130
6155135	RAJ	LCS	D10-Anthracene	2019/06/03		103	%	50 - 130
			D14-Terphenyl (FS)	2019/06/03		109	%	50 - 130
			D8-Acenaphthylene	2019/06/03		106	%	50 - 130
			Acenaphthene	2019/06/03		98	%	50 - 130
			Acenaphthylene	2019/06/03		95	%	50 - 130
			Anthracene	2019/06/03		98	%	50 - 130
			Benzo(a)anthracene	2019/06/03		108	%	50 - 130
			Benzo(a)pyrene	2019/06/03		104	%	50 - 130
			Benzo(b/j)fluoranthene	2019/06/03		110	%	50 - 130
			Benzo(g,h,i)perylene	2019/06/03		102	%	50 - 130
			Benzo(k)fluoranthene	2019/06/03		107	%	50 - 130
			Chrysene	2019/06/03		101	%	50 - 130
			Dibenz(a,h)anthracene	2019/06/03		107	%	50 - 130
			Fluoranthene	2019/06/03		102	%	50 - 130
			Fluorene	2019/06/03		99	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/06/03		112	%	50 - 130
			1-Methylnaphthalene	2019/06/03		103	%	50 - 130
			2-Methylnaphthalene	2019/06/03		91	%	50 - 130
			Naphthalene	2019/06/03		97	%	50 - 130
			Phenanthrene	2019/06/03		102	%	50 - 130
			Pyrene	2019/06/03		107	%	50 - 130
6155162	GUL	LCS	o-Terphenyl	2019/06/03		96	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/06/03		94	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2019/06/03		101	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2019/06/03		107	%	60 - 130
6163187	SVS	LCS	Decachlorobiphenyl	2019/06/07		87	%	60 - 130
			Aroclor 1260	2019/06/07		93	%	60 - 130



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC									
Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits	
			Total PCB	2019/06/07		93	%	60 - 130	

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

LCS: 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.



BUREAU
VERITAS

BV Labs Job #: B9E5637
Report Date: 2019/06/07

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: 2 Montreal Road, Ottawa, Ontario
Project #: 18113796-1485-1907A

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 'Brad Newman', written over a horizontal line.

Brad Newman, Scientific Service Specialist

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

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: May 28, 2019

Location: 2 Montreal Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 18113796-1485

Sample Submission Number: B9E5637

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits.
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:

Yes

Has lab warranted all tests were in statistical control in CoA (Yes/No)?:

Yes

Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:

Yes

Were all samples analyzed within hold times (Yes/No)?:

Yes

All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:

n/a

Is Chain of Custody completed and signed (Yes/No)?:

Yes

Were sample temperatures acceptable when they reached lab (Yes/No)?:

Yes

Is data considered to be reliable (Yes/No/Suspect)?:

Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature) *Amanda Newberry*

Date: June 10, 2019



Task Order#: 18113796-1485-7777
 Site#: N/A
 Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
 Project #: 18113796-1485-1907A
 Your C.O.C. #: 80517

Attention: Chris Vettorazzo

Golder Associates Ltd
 11 Austin St.
 Suite 101
 St. John's, NL
 Canada A1B 4C1

Report Date: 2019/07/25
 Report #: R5812935
 Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: B9E6836
Received: 2019/05/31, 10:10

Sample Matrix: Air
 # Samples Received: 5

Analyses	Quantity	Laboratory Method	Primary Reference
BTEX and CCME Compounds in Air(TO-15mod)	5	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	5	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	5	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	5	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	5	BRL SOP-00304	EPA TO-15 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, MDDELCC, 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. All samples were analyzed within hold time unless otherwise flagged.

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) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.



Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A
Your C.O.C. #: 80517

Attention: Chris Vettorazzo

Golder Associates Ltd
11 Austin St.
Suite 101
St. John's, NL
Canada A1B 4C1

Report Date: 2019/07/25
Report #: R5812935
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: B9E6836
Received: 2019/05/31, 10:10

Encryption Key

Kyle Reinhart
Project Manager
25 Jul 2019 15:45:39

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

=====

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.



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

RESULTS OF ANALYSES OF AIR

BV Labs ID		JWF065	JWF066	JWF067	JWF068		JWF069	
Sampling Date		2019/05/29 15:55	2019/05/29 14:31	2019/05/29 14:28	2019/05/29 15:22		2019/05/29 11:34	
COC Number		80517	80517	80517	80517		80517	
	UNITS	SV19-01	SV19-03	DUPA	SV19-02	QC Batch	SV19-04	QC Batch
Pressure on Receipt	psig	(-3.1)	(-2.3)	(-2.9)	(-2.6)	6159302	(-2.2)	6161421
QC Batch = Quality Control Batch								



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		JWF065	JWF065		JWF066		JWF067		JWF068		
Sampling Date		2019/05/29 15:55	2019/05/29 15:55		2019/05/29 14:31		2019/05/29 14:28		2019/05/29 15:22		
COC Number		80517	80517		80517		80517		80517		
	UNITS	SV19-01	SV19-01 Lab-Dup	RDL	SV19-03	RDL	DUPA	RDL	SV19-02	RDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ppbv	0.47	0.50	0.20	2.7	2.0	2.1	2.0	<12	12	6156915
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<0.17	0.17	<1.7	1.7	<1.7	1.7	<10	10	6156915
Chloromethane	ppbv	0.49	0.51	0.30	<3.0	3.0	<3.0	3.0	<18	18	6156915
Vinyl Chloride	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
Chloroethane	ppbv	<0.30	<0.30	0.30	<3.0	3.0	<3.0	3.0	<18	18	6156915
1,3-Butadiene	ppbv	<0.50	<0.50	0.50	<5.0	5.0	<5.0	5.0	<29	29	6156915
Trichlorofluoromethane (FREON 11)	ppbv	0.21	0.22	0.20	<2.0	2.0	<2.0	2.0	<12	12	6156915
Ethanol (ethyl alcohol)	ppbv	2.2	1.6	1.0	<10	10	<10	10	<59	59	6156915
Trichlorotrifluoroethane	ppbv	<0.15	<0.15	0.15	<1.5	1.5	<1.5	1.5	<8.8	8.8	6156915
2-propanol	ppbv	<1.0	<1.0	1.0	<10	10	<10	10	<59	59	6156915
2-Propanone	ppbv	3.65	3.79	0.60	<9.2	9.2	<9.0	9.0	<35	35	6156915
Methyl Ethyl Ketone (2-Butanone)	ppbv	1.02	1.03	0.20	<2.0	2.0	<2.0	2.0	<12	12	6156915
Methyl Isobutyl Ketone	ppbv	<0.20	<0.20	0.20	<2.0	2.0	<2.0	2.0	<12	12	6156915
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<1.0	1.0	<10	10	<10	10	<59	59	6156915
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.20	0.20	<77	77	<61	61	<12	12	6156915
Ethyl Acetate	ppbv	<1.0	<1.0	1.0	<10	10	<10	10	<59	59	6156915
1,1-Dichloroethylene	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
Methylene Chloride(Dichloromethane)	ppbv	<0.60	<0.60	0.60	<6.0	6.0	<6.0	6.0	<35	35	6156915
Chloroform	ppbv	<0.10	<0.10	0.10	<5.2	5.2	<4.2	4.2	<5.9	5.9	6156915
Carbon Tetrachloride	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
1,1-Dichloroethane	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
1,2-Dichloroethane	ppbv	<0.10	<0.10	0.10	3.8	1.0	3.1	1.0	<10	10	6156915
Ethylene Dibromide	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
1,1,1-Trichloroethane	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
1,1,2-Trichloroethane	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
cis-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
trans-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
1,2-Dichloropropane	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
Bromomethane	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
Bromoform	ppbv	<0.20	<0.20	0.20	<2.0	2.0	<2.0	2.0	<12	12	6156915
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate											



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		JWF065	JWF065		JWF066		JWF067		JWF068		
Sampling Date		2019/05/29 15:55	2019/05/29 15:55		2019/05/29 14:31		2019/05/29 14:28		2019/05/29 15:22		
COC Number		80517	80517		80517		80517		80517		
	UNITS	SV19-01	SV19-01 Lab-Dup	RDL	SV19-03	RDL	DUPA	RDL	SV19-02	RDL	QC Batch
Bromodichloromethane	ppbv	<0.20	<0.20	0.20	<2.0	2.0	<2.0	2.0	<12	12	6156915
Dibromochloromethane	ppbv	<0.20	<0.20	0.20	<2.0	2.0	<2.0	2.0	<12	12	6156915
Trichloroethylene	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
Tetrachloroethylene	ppbv	0.27	0.27	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
Benzene	ppbv	0.17	0.16	0.10	192	1.0	151	1.0	416	5.9	6156915
Toluene	ppbv	0.26	0.25	0.10	63.3	1.0	48.5	1.0	627	5.9	6156915
Ethylbenzene	ppbv	<0.10	<0.10	0.10	9.9	1.0	7.7	1.0	239	5.9	6156915
p+m-Xylene	ppbv	0.26	0.27	0.20	24.2	2.0	18.2	2.0	773	12	6156915
o-Xylene	ppbv	<0.10	<0.10	0.10	8.2	1.0	6.3	1.0	320	5.9	6156915
Styrene	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<12	12	6156915
4-ethyltoluene	ppbv	<0.50	<0.50	0.50	<5.0	5.0	<5.0	5.0	59	29	6156915
1,3,5-Trimethylbenzene	ppbv	<0.50	<0.50	0.50	<5.0	5.0	<5.0	5.0	73	29	6156915
1,2,4-Trimethylbenzene	ppbv	<0.50	<0.50	0.50	<5.0	5.0	<5.0	5.0	128	29	6156915
Chlorobenzene	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
Benzyl chloride	ppbv	<0.50	<0.50	0.50	<5.0	5.0	<5.0	5.0	<29	29	6156915
1,3-Dichlorobenzene	ppbv	<0.40	<0.40	0.40	<4.0	4.0	<4.0	4.0	<23	23	6156915
1,4-Dichlorobenzene	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
1,2-Dichlorobenzene	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
1,2,4-Trichlorobenzene	ppbv	<0.50	<0.50	0.50	<5.0	5.0	<5.0	5.0	<29	29	6156915
Hexachlorobutadiene	ppbv	<0.50	<0.50	0.50	<5.0	5.0	<5.0	5.0	<29	29	6156915
Hexane	ppbv	<0.20	<0.20	0.20	230	2.0	183	2.0	2800	12	6156915
Heptane	ppbv	<0.30	<0.30	0.30	46.2	3.0	35.7	3.0	2200	18	6156915
Cyclohexane	ppbv	<0.20	<0.20	0.20	115	2.0	91.0	2.0	2390	12	6156915
Tetrahydrofuran	ppbv	<0.40	<0.40	0.40	<4.0	4.0	<4.0	4.0	<23	23	6156915
1,4-Dioxane	ppbv	<1.0	<1.0	1.0	<10	10	<10	10	<59	59	6156915
Naphthalene	ppbv	<0.20	<0.20	0.20	<2.0	2.0	<2.0	2.0	<12	12	6156915
Total Xylenes	ppbv	<0.30	<0.30	0.30	32.4	3.0	24.5	3.0	1090	18	6156915
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	<1.0	1.0	<1.0	1.0	<5.9	5.9	6156915
Vinyl Bromide	ppbv	<0.20	<0.20	0.20	<2.0	2.0	<2.0	2.0	<12	12	6156915
Propene	ppbv	<0.50	<0.50	0.50	<770	770	<620	620	<29	29	6156915
2,2,4-Trimethylpentane	ppbv	<0.20	<0.20	0.20	912	2.0	704	2.0	<490	490	6156915
Carbon Disulfide	ppbv	<0.50	<0.50	0.50	<5.0	5.0	<5.0	5.0	42	29	6156915
Vinyl Acetate	ppbv	<0.20	<0.20	0.20	<2.0	2.0	<2.0	2.0	<12	12	6156915

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



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		JWF065	JWF065		JWF066		JWF067		JWF068		
Sampling Date		2019/05/29 15:55	2019/05/29 15:55		2019/05/29 14:31		2019/05/29 14:28		2019/05/29 15:22		
COC Number		80517	80517		80517		80517		80517		
	UNITS	SV19-01	SV19-01 Lab-Dup	RDL	SV19-03	RDL	DUPA	RDL	SV19-02	RDL	QC Batch
Instrument											
Surrogate Recovery (%)											
Bromochloromethane	%	105	104		107		107		104		6156915
D5-Chlorobenzene	%	102	102		101		101		98		6156915
Difluorobenzene	%	103	103		101		102		101		6156915
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate											



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		JWF069		
Sampling Date		2019/05/29 11:34		
COC Number		80517		
	UNITS	SV19-04	RDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ppbv	24.0	0.40	6159384
1,2-Dichlorotetrafluoroethane	ppbv	<0.34	0.34	6159384
Chloromethane	ppbv	<0.60	0.60	6159384
Vinyl Chloride	ppbv	<0.20	0.20	6159384
Chloroethane	ppbv	<0.60	0.60	6159384
1,3-Butadiene	ppbv	<1.0	1.0	6159384
Trichlorofluoromethane (FREON 11)	ppbv	<0.40	0.40	6159384
Ethanol (ethyl alcohol)	ppbv	2.2	2.0	6159384
Trichlorotrifluoroethane	ppbv	<0.30	0.30	6159384
2-propanol	ppbv	<2.0	2.0	6159384
2-Propanone	ppbv	18.9	1.2	6159384
Methyl Ethyl Ketone (2-Butanone)	ppbv	<12	12	6159384
Methyl Isobutyl Ketone	ppbv	0.87	0.40	6159384
Methyl Butyl Ketone (2-Hexanone)	ppbv	<2.0	2.0	6159384
Methyl t-butyl ether (MTBE)	ppbv	<4.0	4.0	6159384
Ethyl Acetate	ppbv	<2.0	2.0	6159384
1,1-Dichloroethylene	ppbv	<0.20	0.20	6159384
cis-1,2-Dichloroethylene	ppbv	<0.20	0.20	6159384
trans-1,2-Dichloroethylene	ppbv	<0.20	0.20	6159384
Methylene Chloride(Dichloromethane)	ppbv	<1.5	1.5	6159384
Chloroform	ppbv	<2.8	2.8	6159384
Carbon Tetrachloride	ppbv	<0.20	0.20	6159384
1,1-Dichloroethane	ppbv	<0.20	0.20	6159384
1,2-Dichloroethane	ppbv	1.83	0.20	6159384
Ethylene Dibromide	ppbv	<0.20	0.20	6159384
1,1,1-Trichloroethane	ppbv	<0.20	0.20	6159384
1,1,2-Trichloroethane	ppbv	<0.20	0.20	6159384
1,1,2,2-Tetrachloroethane	ppbv	<0.20	0.20	6159384
cis-1,3-Dichloropropene	ppbv	<0.20	0.20	6159384
trans-1,3-Dichloropropene	ppbv	<0.20	0.20	6159384
1,2-Dichloropropane	ppbv	<0.20	0.20	6159384
Bromomethane	ppbv	<0.20	0.20	6159384
Bromoform	ppbv	<0.40	0.40	6159384
Bromodichloromethane	ppbv	<0.40	0.40	6159384
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		JWF069		
Sampling Date		2019/05/29 11:34		
COC Number		80517		
	UNITS	SV19-04	RDL	QC Batch
Dibromochloromethane	ppbv	<0.40	0.40	6159384
Trichloroethylene	ppbv	<0.20	0.20	6159384
Tetrachloroethylene	ppbv	0.31	0.20	6159384
Benzene	ppbv	87.6	0.20	6159384
Toluene	ppbv	29.8	0.20	6159384
Ethylbenzene	ppbv	6.71	0.20	6159384
p+m-Xylene	ppbv	12.1	0.40	6159384
o-Xylene	ppbv	5.34	0.20	6159384
Styrene	ppbv	<0.40	0.40	6159384
4-ethyltoluene	ppbv	<1.0	1.0	6159384
1,3,5-Trimethylbenzene	ppbv	<1.0	1.0	6159384
1,2,4-Trimethylbenzene	ppbv	3.1	1.0	6159384
Chlorobenzene	ppbv	<0.20	0.20	6159384
Benzyl chloride	ppbv	<1.0	1.0	6159384
1,3-Dichlorobenzene	ppbv	<0.80	0.80	6159384
1,4-Dichlorobenzene	ppbv	<0.20	0.20	6159384
1,2-Dichlorobenzene	ppbv	<0.20	0.20	6159384
1,2,4-Trichlorobenzene	ppbv	<1.0	1.0	6159384
Hexachlorobutadiene	ppbv	<1.0	1.0	6159384
Hexane	ppbv	155	0.40	6159384
Heptane	ppbv	55.4	0.60	6159384
Cyclohexane	ppbv	73.1	0.40	6159384
Tetrahydrofuran	ppbv	<0.80	0.80	6159384
1,4-Dioxane	ppbv	<2.0	2.0	6159384
Naphthalene	ppbv	<0.40	0.40	6159384
Total Xylenes	ppbv	17.5	0.60	6159384
1,1,1,2-Tetrachloroethane	ppbv	<0.20	0.20	6159384
Vinyl Bromide	ppbv	<0.40	0.40	6159384
Propene	ppbv	<130	130	6159384
2,2,4-Trimethylpentane	ppbv	158	0.40	6159384
Carbon Disulfide	ppbv	7.4	1.0	6159384
Vinyl Acetate	ppbv	<0.40	0.40	6159384
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E6836

Report Date: 2019/07/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		JWF069		
Sampling Date		2019/05/29 11:34		
COC Number		80517		
	UNITS	SV19-04	RDL	QC Batch
Instrument				
Surrogate Recovery (%)				
Bromochloromethane	%	108		6159384
D5-Chlorobenzene	%	103		6159384
Difluorobenzene	%	103		6159384
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		JWF065	JWF065		JWF066		JWF067		JWF068		
Sampling Date		2019/05/29 15:55	2019/05/29 15:55		2019/05/29 14:31		2019/05/29 14:28		2019/05/29 15:22		
COC Number		80517	80517		80517		80517		80517		
	UNITS	SV19-01	SV19-01 Lab-Dup	RDL	SV19-03	RDL	DUPA	RDL	SV19-02	RDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ug/m3	2.35	2.48	0.99	13.4	9.9	10.6	9.9	<58	58	6153504
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	1.2	<12	12	<12	12	<70	70	6153504
Chloromethane	ug/m3	1.01	1.06	0.62	<6.2	6.2	<6.2	6.2	<36	36	6153504
Vinyl Chloride	ug/m3	<0.26	<0.26	0.26	<2.6	2.6	<2.6	2.6	<15	15	6153504
Chloroethane	ug/m3	<0.79	<0.79	0.79	<7.9	7.9	<7.9	7.9	<46	46	6153504
1,3-Butadiene	ug/m3	<1.1	<1.1	1.1	<11	11	<11	11	<65	65	6153504
Trichlorofluoromethane (FREON 11)	ug/m3	1.2	1.2	1.1	<11	11	<11	11	<66	66	6153504
Ethanol (ethyl alcohol)	ug/m3	4.1	3.1	1.9	<19	19	<19	19	<110	110	6153504
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	1.2	<12	12	<12	12	<67	67	6153504
2-propanol	ug/m3	<2.5	<2.5	2.5	<25	25	<25	25	<140	140	6153504
2-Propanone	ug/m3	8.7	9.0	1.4	<22	22	<21	21	<84	84	6153504
Methyl Ethyl Ketone (2-Butanone)	ug/m3	3.00	3.05	0.59	<5.9	5.9	<5.9	5.9	<35	35	6153504
Methyl Isobutyl Ketone	ug/m3	<0.82	<0.82	0.82	<8.2	8.2	<8.2	8.2	<48	48	6153504
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	4.1	<41	41	<41	41	<240	240	6153504
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	0.72	<280	280	<220	220	<42	42	6153504
Ethyl Acetate	ug/m3	<3.6	<3.6	3.6	<36	36	<36	36	<210	210	6153504
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<4.0	4.0	<4.0	4.0	<23	23	6153504
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<4.0	4.0	<4.0	4.0	<23	23	6153504
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<4.0	4.0	<4.0	4.0	<23	23	6153504
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	<2.1	2.1	<21	21	<21	21	<120	120	6153504
Chloroform	ug/m3	<0.49	<0.49	0.49	<25	25	<21	21	<29	29	6153504
Carbon Tetrachloride	ug/m3	<0.63	<0.63	0.63	<6.3	6.3	<6.3	6.3	<37	37	6153504
1,1-Dichloroethane	ug/m3	<0.40	<0.40	0.40	<4.0	4.0	<4.0	4.0	<24	24	6153504
1,2-Dichloroethane	ug/m3	<0.40	<0.40	0.40	15.3	4.0	12.6	4.0	<40	40	6153504
Ethylene Dibromide	ug/m3	<0.77	<0.77	0.77	<7.7	7.7	<7.7	7.7	<45	45	6153504
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	0.55	<5.5	5.5	<5.5	5.5	<32	32	6153504
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	0.55	<5.5	5.5	<5.5	5.5	<32	32	6153504
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<6.9	6.9	<6.9	6.9	<40	40	6153504
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<4.5	4.5	<4.5	4.5	<27	27	6153504
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<4.5	4.5	<4.5	4.5	<27	27	6153504
1,2-Dichloropropane	ug/m3	<0.46	<0.46	0.46	<4.6	4.6	<4.6	4.6	<27	27	6153504
Bromomethane	ug/m3	<0.39	<0.39	0.39	<3.9	3.9	<3.9	3.9	<23	23	6153504
Bromoform	ug/m3	<2.1	<2.1	2.1	<21	21	<21	21	<120	120	6153504

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



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		JWF065	JWF065		JWF066		JWF067		JWF068		
Sampling Date		2019/05/29 15:55	2019/05/29 15:55		2019/05/29 14:31		2019/05/29 14:28		2019/05/29 15:22		
COC Number		80517	80517		80517		80517		80517		
	UNITS	SV19-01	SV19-01 Lab-Dup	RDL	SV19-03	RDL	DUPA	RDL	SV19-02	RDL	QC Batch
Bromodichloromethane	ug/m3	<1.3	<1.3	1.3	<13	13	<13	13	<79	79	6153504
Dibromochloromethane	ug/m3	<1.7	<1.7	1.7	<17	17	<17	17	<100	100	6153504
Trichloroethylene	ug/m3	<0.54	<0.54	0.54	<5.4	5.4	<5.4	5.4	<32	32	6153504
Tetrachloroethylene	ug/m3	1.85	1.86	0.68	<6.8	6.8	<6.8	6.8	<40	40	6153504
Benzene	ug/m3	0.55	0.53	0.32	611	3.2	482	3.2	1330	19	6153504
Toluene	ug/m3	0.96	0.96	0.38	238	3.8	183	3.8	2360	22	6153504
Ethylbenzene	ug/m3	<0.43	<0.43	0.43	43.1	4.3	33.3	4.3	1040	25	6153504
p+m-Xylene	ug/m3	1.11	1.18	0.87	105	8.7	79.0	8.7	3360	51	6153504
o-Xylene	ug/m3	<0.43	<0.43	0.43	35.7	4.3	27.5	4.3	1390	25	6153504
Styrene	ug/m3	<0.43	<0.43	0.43	<4.3	4.3	<4.3	4.3	<51	51	6153504
4-ethyltoluene	ug/m3	<2.5	<2.5	2.5	<25	25	<25	25	292	140	6153504
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	2.5	<25	25	<25	25	358	140	6153504
1,2,4-Trimethylbenzene	ug/m3	<2.5	<2.5	2.5	<25	25	<25	25	627	140	6153504
Chlorobenzene	ug/m3	<0.46	<0.46	0.46	<4.6	4.6	<4.6	4.6	<27	27	6153504
Benzyl chloride	ug/m3	<2.6	<2.6	2.6	<26	26	<26	26	<150	150	6153504
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	2.4	<24	24	<24	24	<140	140	6153504
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	<6.0	6.0	<6.0	6.0	<35	35	6153504
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	<6.0	6.0	<6.0	6.0	<35	35	6153504
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	3.7	<37	37	<37	37	<220	220	6153504
Hexachlorobutadiene	ug/m3	<5.3	<5.3	5.3	<53	53	<53	53	<310	310	6153504
Hexane	ug/m3	<0.70	<0.70	0.70	809	7.0	646	7.0	9870	41	6153504
Heptane	ug/m3	<1.2	<1.2	1.2	189	12	146	12	9030	72	6153504
Cyclohexane	ug/m3	<0.69	<0.69	0.69	395	6.9	313	6.9	8210	40	6153504
Tetrahydrofuran	ug/m3	<1.2	<1.2	1.2	<12	12	<12	12	<69	69	6153504
1,4-Dioxane	ug/m3	<3.6	<3.6	3.6	<36	36	<36	36	<210	210	6153504
Naphthalene	ug/m3	<1.0	<1.0	1.0	<10	10	<10	10	<62	62	6153504
Total Xylenes	ug/m3	<1.3	<1.3	1.3	141	13	107	13	4750	76	6153504
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<6.9	6.9	<6.9	6.9	<40	40	6153504
Vinyl Bromide	ug/m3	<0.87	<0.87	0.87	<8.7	8.7	<8.7	8.7	<51	51	6153504
Propene	ug/m3	<0.86	<0.86	0.86	<1300	1300	<1100	1100	<51	51	6153504
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	0.93	4260	9.3	3290	9.3	<2300	2300	6153504
Carbon Disulfide	ug/m3	<1.6	<1.6	1.6	<16	16	<16	16	130	91	6153504
Vinyl Acetate	ug/m3	<0.70	<0.70	0.70	<7.0	7.0	<7.0	7.0	<41	41	6153504

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



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		JWF069		
Sampling Date		2019/05/29 11:34		
COC Number		80517		
	UNITS	SV19-04	RDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ug/m3	119	2.0	6153504
1,2-Dichlorotetrafluoroethane	ug/m3	<2.4	2.4	6153504
Chloromethane	ug/m3	<1.2	1.2	6153504
Vinyl Chloride	ug/m3	<0.51	0.51	6153504
Chloroethane	ug/m3	<1.6	1.6	6153504
1,3-Butadiene	ug/m3	<2.2	2.2	6153504
Trichlorofluoromethane (FREON 11)	ug/m3	<2.2	2.2	6153504
Ethanol (ethyl alcohol)	ug/m3	4.1	3.8	6153504
Trichlorotrifluoroethane	ug/m3	<2.3	2.3	6153504
2-propanol	ug/m3	<4.9	4.9	6153504
2-Propanone	ug/m3	44.9	2.9	6153504
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<35	35	6153504
Methyl Isobutyl Ketone	ug/m3	3.6	1.6	6153504
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<8.2	8.2	6153504
Methyl t-butyl ether (MTBE)	ug/m3	<14	14	6153504
Ethyl Acetate	ug/m3	<7.2	7.2	6153504
1,1-Dichloroethylene	ug/m3	<0.79	0.79	6153504
cis-1,2-Dichloroethylene	ug/m3	<0.79	0.79	6153504
trans-1,2-Dichloroethylene	ug/m3	<0.79	0.79	6153504
Methylene Chloride(Dichloromethane)	ug/m3	<5.2	5.2	6153504
Chloroform	ug/m3	<14	14	6153504
Carbon Tetrachloride	ug/m3	<1.3	1.3	6153504
1,1-Dichloroethane	ug/m3	<0.81	0.81	6153504
1,2-Dichloroethane	ug/m3	7.39	0.81	6153504
Ethylene Dibromide	ug/m3	<1.5	1.5	6153504
1,1,1-Trichloroethane	ug/m3	<1.1	1.1	6153504
1,1,2-Trichloroethane	ug/m3	<1.1	1.1	6153504
1,1,2,2-Tetrachloroethane	ug/m3	<1.4	1.4	6153504
cis-1,3-Dichloropropene	ug/m3	<0.91	0.91	6153504
trans-1,3-Dichloropropene	ug/m3	<0.91	0.91	6153504
1,2-Dichloropropane	ug/m3	<0.92	0.92	6153504
Bromomethane	ug/m3	<0.78	0.78	6153504
Bromoform	ug/m3	<4.1	4.1	6153504
Bromodichloromethane	ug/m3	<2.7	2.7	6153504
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		JWF069		
Sampling Date		2019/05/29 11:34		
COC Number		80517		
	UNITS	SV19-04	RDL	QC Batch
Dibromochloromethane	ug/m3	<3.4	3.4	6153504
Trichloroethylene	ug/m3	<1.1	1.1	6153504
Tetrachloroethylene	ug/m3	2.1	1.4	6153504
Benzene	ug/m3	280	0.64	6153504
Toluene	ug/m3	112	0.75	6153504
Ethylbenzene	ug/m3	29.1	0.87	6153504
p+m-Xylene	ug/m3	52.7	1.7	6153504
o-Xylene	ug/m3	23.2	0.87	6153504
Styrene	ug/m3	<1.7	1.7	6153504
4-ethyltoluene	ug/m3	<4.9	4.9	6153504
1,3,5-Trimethylbenzene	ug/m3	<4.9	4.9	6153504
1,2,4-Trimethylbenzene	ug/m3	15.1	4.9	6153504
Chlorobenzene	ug/m3	<0.92	0.92	6153504
Benzyl chloride	ug/m3	<5.2	5.2	6153504
1,3-Dichlorobenzene	ug/m3	<4.8	4.8	6153504
1,4-Dichlorobenzene	ug/m3	<1.2	1.2	6153504
1,2-Dichlorobenzene	ug/m3	<1.2	1.2	6153504
1,2,4-Trichlorobenzene	ug/m3	<7.4	7.4	6153504
Hexachlorobutadiene	ug/m3	<11	11	6153504
Hexane	ug/m3	547	1.4	6153504
Heptane	ug/m3	227	2.5	6153504
Cyclohexane	ug/m3	252	1.4	6153504
Tetrahydrofuran	ug/m3	<2.4	2.4	6153504
1,4-Dioxane	ug/m3	<7.2	7.2	6153504
Naphthalene	ug/m3	<2.1	2.1	6153504
Total Xylenes	ug/m3	75.9	2.6	6153504
1,1,1,2-Tetrachloroethane	ug/m3	<1.4	1.4	6153504
Vinyl Bromide	ug/m3	<1.8	1.8	6153504
Propene	ug/m3	<220	220	6153504
2,2,4-Trimethylpentane	ug/m3	740	1.9	6153504
Carbon Disulfide	ug/m3	23.0	3.1	6153504
Vinyl Acetate	ug/m3	<1.4	1.4	6153504
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		JWF065	JWF065		JWF066	JWF067		JWF068		
Sampling Date		2019/05/29 15:55	2019/05/29 15:55		2019/05/29 14:31	2019/05/29 14:28		2019/05/29 15:22		
COC Number		80517	80517		80517	80517		80517		
	UNITS	SV19-01	SV19-01 Lab-Dup	RDL	SV19-03	DUPA	RDL	SV19-02	RDL	QC Batch
F1-BTEX, C6-C10 (as Toluene)	ug/m3	53.0	53.2	5.0	11800	9160	50	257000	290	6159721
F2, C10-C16 (as Decane)	ug/m3	114	124	5.0	158	102	50	8930	290	6159721
Aliphatic >C5-C6	ug/m3	<5.0	<5.0	5.0	3390	2690	50	12200	290	6162282
Aliphatic >C6-C8	ug/m3	6.6	6.9	5.0	18300	14100	50	74200	290	6162282
Aliphatic >C8-C10	ug/m3	8.6	8.8	5.0	363	297	50	32900	290	6162282
Aliphatic >C10-C12	ug/m3	43.6	43.0	5.0	214	179	50	3180	290	6162282
Aliphatic >C12-C16	ug/m3	53.7	56.1	5.0	<50	<50	50	<290	290	6162282
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	5.0	<50	<50	50	<290	290	6162282
Aromatic >C8-C10	ug/m3	<5.0	<5.0	5.0	62	<50	50	2490	290	6162282
Aromatic >C10-C12	ug/m3	<5.0	<5.0	5.0	<50	<50	50	2050	290	6162282
Aromatic >C12-C16	ug/m3	<5.0	<5.0	5.0	<50	<50	50	<290	290	6162282

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

BV Labs ID		JWF069		
Sampling Date		2019/05/29 11:34		
COC Number		80517		
	UNITS	SV19-04	RDL	QC Batch
F1-BTEX, C6-C10 (as Toluene)	ug/m3	5710	10	6165142
F2, C10-C16 (as Decane)	ug/m3	185	10	6165142
Aliphatic >C5-C6	ug/m3	1620	10	6165169
Aliphatic >C6-C8	ug/m3	5520	10	6165169
Aliphatic >C8-C10	ug/m3	671	10	6165169
Aliphatic >C10-C12	ug/m3	89	10	6165169
Aliphatic >C12-C16	ug/m3	21	10	6165169
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<10	10	6165169
Aromatic >C8-C10	ug/m3	39	10	6165169
Aromatic >C10-C12	ug/m3	39	10	6165169
Aromatic >C12-C16	ug/m3	<10	10	6165169

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

TEST SUMMARY

BV Labs ID: JWF065
Sample ID: SV19-01
Matrix: Air

Collected: 2019/05/29
Relinquished: 2019/05/29
Received: 2019/05/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6159721	N/A	2019/06/04	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	6162282	N/A	2019/06/04	Nicholas Smith
Canister Pressure (TO-15)	PRES	6159302	N/A	2019/06/04	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	6153504	N/A	2019/06/05	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6156915	N/A	2019/06/04	Nicholas Smith

BV Labs ID: JWF065 Dup
Sample ID: SV19-01
Matrix: Air

Collected: 2019/05/29
Relinquished: 2019/05/29
Received: 2019/05/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6159721	N/A	2019/06/04	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	6162282	N/A	2019/06/04	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	6153504	N/A	2019/06/07	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6156915	N/A	2019/06/04	Nicholas Smith

BV Labs ID: JWF066
Sample ID: SV19-03
Matrix: Air

Collected: 2019/05/29
Relinquished: 2019/05/29
Received: 2019/05/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6159721	N/A	2019/06/04	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	6162282	N/A	2019/06/04	Nicholas Smith
Canister Pressure (TO-15)	PRES	6159302	N/A	2019/06/04	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	6153504	N/A	2019/06/05	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	6156915	N/A	2019/06/04	Nicholas Smith

BV Labs ID: JWF067
Sample ID: DUPA
Matrix: Air

Collected: 2019/05/29
Relinquished: 2019/05/29
Received: 2019/05/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6159721	N/A	2019/06/04	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	6162282	N/A	2019/06/04	Nicholas Smith
Canister Pressure (TO-15)	PRES	6159302	N/A	2019/06/04	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	6153504	N/A	2019/06/05	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	6156915	N/A	2019/06/04	Nicholas Smith

BV Labs ID: JWF068
Sample ID: SV19-02
Matrix: Air

Collected: 2019/05/29
Relinquished: 2019/05/29
Received: 2019/05/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6159721	N/A	2019/06/04	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	6162282	N/A	2019/06/04	Nicholas Smith



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

TEST SUMMARY

BV Labs ID: JWF068
Sample ID: SV19-02
Matrix: Air

Collected: 2019/05/29
Relinquished: 2019/05/29
Received: 2019/05/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	6159302	N/A	2019/06/04	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	6153504	N/A	2019/06/05	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	6156915	N/A	2019/06/04	Nicholas Smith

BV Labs ID: JWF069
Sample ID: SV19-04
Matrix: Air

Collected: 2019/05/29
Relinquished: 2019/05/29
Received: 2019/05/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6165142	N/A	2019/06/05	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	6165169	N/A	2019/06/05	Nicholas Smith
Canister Pressure (TO-15)	PRES	6161421	N/A	2019/06/05	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	6153504	N/A	2019/06/07	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	6159384	N/A	2019/06/05	Nicholas Smith



GENERAL COMMENTS

Revised Report (2019/07/25): Sample IDs switched for SV19-02 and SV19-03 as per request from L. Mariani.

Vinyl acetate was less than 60% recovery in the reference standard. There were no positives found for this compound therefore the data should not be affected.

Sample JWF066 [SV19-03] : Sample was analyzed at a 10X dilution. The DL's were adjusted accordingly.
Increased DL for propene due to interference from propane.
Increased DL for 2-propanone, MTBE, and chloroform due to hydrocarbon interference.

Sample JWF067 [DUPA] : Sample was analyzed at a 10X dilution. The DL's were adjusted accordingly.
Increased DL for propene due to interference from propane.
Increased DL for 2-propanone, MTBE, and chloroform due to hydrocarbon interference.

Sample JWF068 [SV19-02] : Sample was analyzed at a 58.7X dilution. The DL's were adjusted accordingly.
Increased DL for 2,2,4-trimethylpentane due to hydrocarbon interference.
Increased DL for 1,2-dichloroethane due to interference from benzene.
Increased DL for styrene due to interference from o-xylene.

Sample JWF069 [SV19-04] : Sample was analyzed at a 2X dilution. The DL's were adjusted accordingly.
Increased DL for propene due to interference from propane.
Increased DL for dichloromethane, MTBE, 2-butanone, and chloroform due to hydrocarbon interference.
Increased DL for styrene due to interference from o-xylene.

Vinyl acetate was less than 60% recovery in the reference standard. There were no positives found for this compound therefore the data should not be affected.

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	6156915	NS2	Method Blank	Bromochloromethane	2019/06/04		107	%	60 - 140
				D5-Chlorobenzene	2019/06/04		104	%	60 - 140
				Difluorobenzene	2019/06/04		105	%	60 - 140
				Dichlorodifluoromethane (FREON 12)	2019/06/04	<0.20		ppbv	
				1,2-Dichlorotetrafluoroethane	2019/06/04	<0.17		ppbv	
				Chloromethane	2019/06/04	<0.30		ppbv	
				Vinyl Chloride	2019/06/04	<0.10		ppbv	
				Chloroethane	2019/06/04	<0.30		ppbv	
				1,3-Butadiene	2019/06/04	<0.50		ppbv	
				Trichlorofluoromethane (FREON 11)	2019/06/04	<0.20		ppbv	
				Ethanol (ethyl alcohol)	2019/06/04	<1.0		ppbv	
				Trichlorotrifluoroethane	2019/06/04	<0.15		ppbv	
				2-propanol	2019/06/04	<1.0		ppbv	
				2-Propanone	2019/06/04	<0.60		ppbv	
				Methyl Ethyl Ketone (2-Butanone)	2019/06/04	<0.20		ppbv	
				Methyl Isobutyl Ketone	2019/06/04	<0.20		ppbv	
				Methyl Butyl Ketone (2-Hexanone)	2019/06/04	<1.0		ppbv	
				Methyl t-butyl ether (MTBE)	2019/06/04	<0.20		ppbv	
				Ethyl Acetate	2019/06/04	<1.0		ppbv	
				1,1-Dichloroethylene	2019/06/04	<0.10		ppbv	
				cis-1,2-Dichloroethylene	2019/06/04	<0.10		ppbv	
				trans-1,2-Dichloroethylene	2019/06/04	<0.10		ppbv	
				Methylene Chloride(Dichloromethane)	2019/06/04	<0.60		ppbv	
				Chloroform	2019/06/04	<0.10		ppbv	
				Carbon Tetrachloride	2019/06/04	<0.10		ppbv	
				1,1-Dichloroethane	2019/06/04	<0.10		ppbv	
				1,2-Dichloroethane	2019/06/04	<0.10		ppbv	
				Ethylene Dibromide	2019/06/04	<0.10		ppbv	
				1,1,1-Trichloroethane	2019/06/04	<0.10		ppbv	
				1,1,2-Trichloroethane	2019/06/04	<0.10		ppbv	
				1,1,2,2-Tetrachloroethane	2019/06/04	<0.10		ppbv	
				cis-1,3-Dichloropropene	2019/06/04	<0.10		ppbv	
				trans-1,3-Dichloropropene	2019/06/04	<0.10		ppbv	
				1,2-Dichloropropane	2019/06/04	<0.10		ppbv	
				Bromomethane	2019/06/04	<0.10		ppbv	
				Bromoform	2019/06/04	<0.20		ppbv	
				Bromodichloromethane	2019/06/04	<0.20		ppbv	
				Dibromochloromethane	2019/06/04	<0.20		ppbv	
				Trichloroethylene	2019/06/04	<0.10		ppbv	
				Tetrachloroethylene	2019/06/04	<0.10		ppbv	
				Benzene	2019/06/04	<0.10		ppbv	
				Toluene	2019/06/04	<0.10		ppbv	
				Ethylbenzene	2019/06/04	<0.10		ppbv	
				p+m-Xylene	2019/06/04	<0.20		ppbv	
				o-Xylene	2019/06/04	<0.10		ppbv	
				Styrene	2019/06/04	<0.10		ppbv	
				4-ethyltoluene	2019/06/04	<0.50		ppbv	
				1,3,5-Trimethylbenzene	2019/06/04	<0.50		ppbv	
				1,2,4-Trimethylbenzene	2019/06/04	<0.50		ppbv	
				Chlorobenzene	2019/06/04	<0.10		ppbv	
				Benzyl chloride	2019/06/04	<0.50		ppbv	
				1,3-Dichlorobenzene	2019/06/04	<0.40		ppbv	



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,4-Dichlorobenzene	2019/06/04	<0.10		ppbv	
			1,2-Dichlorobenzene	2019/06/04	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2019/06/04	<0.50		ppbv	
			Hexachlorobutadiene	2019/06/04	<0.50		ppbv	
			Hexane	2019/06/04	<0.20		ppbv	
			Heptane	2019/06/04	<0.30		ppbv	
			Cyclohexane	2019/06/04	<0.20		ppbv	
			Tetrahydrofuran	2019/06/04	<0.40		ppbv	
			1,4-Dioxane	2019/06/04	<1.0		ppbv	
			Naphthalene	2019/06/04	<0.20		ppbv	
			Total Xylenes	2019/06/04	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2019/06/04	<0.10		ppbv	
			Vinyl Bromide	2019/06/04	<0.20		ppbv	
			Propene	2019/06/04	<0.50		ppbv	
			2,2,4-Trimethylpentane	2019/06/04	<0.20		ppbv	
			Carbon Disulfide	2019/06/04	<0.50		ppbv	
			Vinyl Acetate	2019/06/04	<0.20		ppbv	
6159384	NS2	Method Blank	Bromochloromethane	2019/06/05		111	%	60 - 140
			D5-Chlorobenzene	2019/06/05		105	%	60 - 140
			Difluorobenzene	2019/06/05		106	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/06/05	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2019/06/05	<0.17		ppbv	
			Chloromethane	2019/06/05	<0.30		ppbv	
			Vinyl Chloride	2019/06/05	<0.10		ppbv	
			Chloroethane	2019/06/05	<0.30		ppbv	
			1,3-Butadiene	2019/06/05	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2019/06/05	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2019/06/05	<1.0		ppbv	
			Trichlorotrifluoroethane	2019/06/05	<0.15		ppbv	
			2-propanol	2019/06/05	<1.0		ppbv	
			2-Propanone	2019/06/05	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2019/06/05	<0.20		ppbv	
			Methyl Isobutyl Ketone	2019/06/05	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2019/06/05	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2019/06/05	<0.20		ppbv	
			Ethyl Acetate	2019/06/05	<1.0		ppbv	
			1,1-Dichloroethylene	2019/06/05	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2019/06/05	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2019/06/05	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2019/06/05	<0.60		ppbv	
			Chloroform	2019/06/05	<0.10		ppbv	
			Carbon Tetrachloride	2019/06/05	<0.10		ppbv	
			1,1-Dichloroethane	2019/06/05	<0.10		ppbv	
			1,2-Dichloroethane	2019/06/05	<0.10		ppbv	
			Ethylene Dibromide	2019/06/05	<0.10		ppbv	
			1,1,1-Trichloroethane	2019/06/05	<0.10		ppbv	
			1,1,2-Trichloroethane	2019/06/05	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2019/06/05	<0.10		ppbv	
			cis-1,3-Dichloropropene	2019/06/05	<0.10		ppbv	
			trans-1,3-Dichloropropene	2019/06/05	<0.10		ppbv	
			1,2-Dichloropropane	2019/06/05	<0.10		ppbv	
			Bromomethane	2019/06/05	<0.10		ppbv	



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BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Bromoform	2019/06/05	<0.20		ppbv	
			Bromodichloromethane	2019/06/05	<0.20		ppbv	
			Dibromochloromethane	2019/06/05	<0.20		ppbv	
			Trichloroethylene	2019/06/05	<0.10		ppbv	
			Tetrachloroethylene	2019/06/05	<0.10		ppbv	
			Benzene	2019/06/05	<0.10		ppbv	
			Toluene	2019/06/05	<0.10		ppbv	
			Ethylbenzene	2019/06/05	<0.10		ppbv	
			p+m-Xylene	2019/06/05	<0.20		ppbv	
			o-Xylene	2019/06/05	<0.10		ppbv	
			Styrene	2019/06/05	<0.10		ppbv	
			4-ethyltoluene	2019/06/05	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2019/06/05	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2019/06/05	<0.50		ppbv	
			Chlorobenzene	2019/06/05	<0.10		ppbv	
			Benzyl chloride	2019/06/05	<0.50		ppbv	
			1,3-Dichlorobenzene	2019/06/05	<0.40		ppbv	
			1,4-Dichlorobenzene	2019/06/05	<0.10		ppbv	
			1,2-Dichlorobenzene	2019/06/05	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2019/06/05	<0.50		ppbv	
			Hexachlorobutadiene	2019/06/05	<0.50		ppbv	
			Hexane	2019/06/05	<0.20		ppbv	
			Heptane	2019/06/05	<0.30		ppbv	
			Cyclohexane	2019/06/05	<0.20		ppbv	
			Tetrahydrofuran	2019/06/05	<0.40		ppbv	
			1,4-Dioxane	2019/06/05	<1.0		ppbv	
			Naphthalene	2019/06/05	<0.20		ppbv	
			Total Xylenes	2019/06/05	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2019/06/05	<0.10		ppbv	
			Vinyl Bromide	2019/06/05	<0.20		ppbv	
			Propene	2019/06/05	<0.50		ppbv	
			2,2,4-Trimethylpentane	2019/06/05	<0.20		ppbv	
			Carbon Disulfide	2019/06/05	<0.50		ppbv	
			Vinyl Acetate	2019/06/05	<0.20		ppbv	
6159721	NS2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2019/06/04	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2019/06/04	<5.0		ug/m3	
6162282	NS2	Method Blank	Aliphatic >C5-C6	2019/06/04	<5.0		ug/m3	
			Aliphatic >C6-C8	2019/06/04	<5.0		ug/m3	
			Aliphatic >C8-C10	2019/06/04	<5.0		ug/m3	
			Aliphatic >C10-C12	2019/06/04	<5.0		ug/m3	
			Aliphatic >C12-C16	2019/06/04	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2019/06/04	<5.0		ug/m3	
			Aromatic >C8-C10	2019/06/04	<5.0		ug/m3	
			Aromatic >C10-C12	2019/06/04	<5.0		ug/m3	
			Aromatic >C12-C16	2019/06/04	<5.0		ug/m3	
6165142	NS2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2019/06/05	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2019/06/05	<5.0		ug/m3	
6165169	NS2	Method Blank	Aliphatic >C5-C6	2019/06/05	<5.0		ug/m3	
			Aliphatic >C6-C8	2019/06/05	<5.0		ug/m3	
			Aliphatic >C8-C10	2019/06/05	<5.0		ug/m3	
			Aliphatic >C10-C12	2019/06/05	<5.0		ug/m3	
			Aliphatic >C12-C16	2019/06/05	<5.0		ug/m3	



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BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6153504	ASC	RPD [JWF065-01]	Aromatic >C7-C8 (TEX Excluded)	2019/06/05	<5.0		ug/m3	
			Aromatic >C8-C10	2019/06/05	<5.0		ug/m3	
			Aromatic >C10-C12	2019/06/05	<5.0		ug/m3	
			Aromatic >C12-C16	2019/06/05	<5.0		ug/m3	
			Dichlorodifluoromethane (FREON 12)	2019/06/07	5.5	%	25	
			1,2-Dichlorotetrafluoroethane	2019/06/07	NC	%	25	
			Chloromethane	2019/06/07	5.5	%	25	
			Vinyl Chloride	2019/06/07	NC	%	25	
			Chloroethane	2019/06/07	NC	%	25	
			1,3-Butadiene	2019/06/07	NC	%	25	
			Trichlorofluoromethane (FREON 11)	2019/06/07	5.4	%	25	
			Ethanol (ethyl alcohol)	2019/06/07	NC	%	25	
			Trichlorotrifluoroethane	2019/06/07	NC	%	25	
			2-propanol	2019/06/07	NC	%	25	
			2-Propanone	2019/06/07	3.8	%	25	
			Methyl Ethyl Ketone (2-Butanone)	2019/06/07	1.6	%	25	
			Methyl Isobutyl Ketone	2019/06/07	NC	%	25	
			Methyl Butyl Ketone (2-Hexanone)	2019/06/07	NC	%	25	
			Methyl t-butyl ether (MTBE)	2019/06/07	NC	%	25	
			Ethyl Acetate	2019/06/07	NC	%	25	
			1,1-Dichloroethylene	2019/06/07	NC	%	25	
			cis-1,2-Dichloroethylene	2019/06/07	NC	%	25	
			trans-1,2-Dichloroethylene	2019/06/07	NC	%	25	
			Methylene Chloride(Dichloromethane)	2019/06/07	NC	%	25	
			Chloroform	2019/06/07	NC	%	25	
			Carbon Tetrachloride	2019/06/07	NC	%	25	
			1,1-Dichloroethane	2019/06/07	NC	%	25	
			1,2-Dichloroethane	2019/06/07	NC	%	25	
			Ethylene Dibromide	2019/06/07	NC	%	25	
			1,1,1-Trichloroethane	2019/06/07	NC	%	25	
			1,1,2-Trichloroethane	2019/06/07	NC	%	25	
			1,1,2,2-Tetrachloroethane	2019/06/07	NC	%	25	
			cis-1,3-Dichloropropene	2019/06/07	NC	%	25	
			trans-1,3-Dichloropropene	2019/06/07	NC	%	25	
			1,2-Dichloropropane	2019/06/07	NC	%	25	
			Bromomethane	2019/06/07	NC	%	25	
			Bromoform	2019/06/07	NC	%	25	
			Bromodichloromethane	2019/06/07	NC	%	25	
			Dibromochloromethane	2019/06/07	NC	%	25	
			Trichloroethylene	2019/06/07	NC	%	25	
Tetrachloroethylene	2019/06/07	0.17	%	25				
Benzene	2019/06/07	4.0	%	25				
Toluene	2019/06/07	0.38	%	25				
Ethylbenzene	2019/06/07	NC	%	25				
p+m-Xylene	2019/06/07	6.5	%	25				
o-Xylene	2019/06/07	NC	%	25				
Styrene	2019/06/07	NC	%	25				
4-ethyltoluene	2019/06/07	NC	%	25				
1,3,5-Trimethylbenzene	2019/06/07	NC	%	25				
1,2,4-Trimethylbenzene	2019/06/07	NC	%	25				
Chlorobenzene	2019/06/07	NC	%	25				
Benzyl chloride	2019/06/07	NC	%	25				



BUREAU
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BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,3-Dichlorobenzene	2019/06/07	NC		%	25
			1,4-Dichlorobenzene	2019/06/07	NC		%	25
			1,2-Dichlorobenzene	2019/06/07	NC		%	25
			1,2,4-Trichlorobenzene	2019/06/07	NC		%	25
			Hexachlorobutadiene	2019/06/07	NC		%	25
			Hexane	2019/06/07	NC		%	25
			Heptane	2019/06/07	NC		%	25
			Cyclohexane	2019/06/07	NC		%	25
			Tetrahydrofuran	2019/06/07	NC		%	25
			1,4-Dioxane	2019/06/07	NC		%	25
			Naphthalene	2019/06/07	NC		%	25
			Total Xylenes	2019/06/07	NC		%	25
			1,1,1,2-Tetrachloroethane	2019/06/07	NC		%	25
			Vinyl Bromide	2019/06/07	NC		%	25
			Propene	2019/06/07	NC		%	25
			2,2,4-Trimethylpentane	2019/06/07	NC		%	25
			Carbon Disulfide	2019/06/07	NC		%	25
			Vinyl Acetate	2019/06/07	NC		%	25
6156915	NS2	RPD [JWF065-01]	Dichlorodifluoromethane (FREON 12)	2019/06/04	5.5		%	25
			1,2-Dichlorotetrafluoroethane	2019/06/04	NC		%	25
			Chloromethane	2019/06/04	5.5		%	25
			Vinyl Chloride	2019/06/04	NC		%	25
			Chloroethane	2019/06/04	NC		%	25
			1,3-Butadiene	2019/06/04	NC		%	25
			Trichlorofluoromethane (FREON 11)	2019/06/04	5.4		%	25
			Ethanol (ethyl alcohol)	2019/06/04	NC		%	25
			Trichlorotrifluoroethane	2019/06/04	NC		%	25
			2-propanol	2019/06/04	NC		%	25
			2-Propanone	2019/06/04	3.8		%	25
			Methyl Ethyl Ketone (2-Butanone)	2019/06/04	1.6		%	25
			Methyl Isobutyl Ketone	2019/06/04	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2019/06/04	NC		%	25
			Methyl t-butyl ether (MTBE)	2019/06/04	NC		%	25
			Ethyl Acetate	2019/06/04	NC		%	25
			1,1-Dichloroethylene	2019/06/04	NC		%	25
			cis-1,2-Dichloroethylene	2019/06/04	NC		%	25
			trans-1,2-Dichloroethylene	2019/06/04	NC		%	25
			Methylene Chloride(Dichloromethane)	2019/06/04	NC		%	25
			Chloroform	2019/06/04	NC		%	25
			Carbon Tetrachloride	2019/06/04	NC		%	25
			1,1-Dichloroethane	2019/06/04	NC		%	25
			1,2-Dichloroethane	2019/06/04	NC		%	25
			Ethylene Dibromide	2019/06/04	NC		%	25
			1,1,1-Trichloroethane	2019/06/04	NC		%	25
			1,1,2-Trichloroethane	2019/06/04	NC		%	25
			1,1,2,2-Tetrachloroethane	2019/06/04	NC		%	25
			cis-1,3-Dichloropropene	2019/06/04	NC		%	25
			trans-1,3-Dichloropropene	2019/06/04	NC		%	25
			1,2-Dichloropropane	2019/06/04	NC		%	25
			Bromomethane	2019/06/04	NC		%	25
			Bromoform	2019/06/04	NC		%	25
			Bromodichloromethane	2019/06/04	NC		%	25



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VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dibromochloromethane	2019/06/04	NC		%	25
			Trichloroethylene	2019/06/04	NC		%	25
			Tetrachloroethylene	2019/06/04	0.17		%	25
			Benzene	2019/06/04	4.0		%	25
			Toluene	2019/06/04	0.38		%	25
			Ethylbenzene	2019/06/04	NC		%	25
			p+m-Xylene	2019/06/04	6.5		%	25
			o-Xylene	2019/06/04	NC		%	25
			Styrene	2019/06/04	NC		%	25
			4-ethyltoluene	2019/06/04	NC		%	25
			1,3,5-Trimethylbenzene	2019/06/04	NC		%	25
			1,2,4-Trimethylbenzene	2019/06/04	NC		%	25
			Chlorobenzene	2019/06/04	NC		%	25
			Benzyl chloride	2019/06/04	NC		%	25
			1,3-Dichlorobenzene	2019/06/04	NC		%	25
			1,4-Dichlorobenzene	2019/06/04	NC		%	25
			1,2-Dichlorobenzene	2019/06/04	NC		%	25
			1,2,4-Trichlorobenzene	2019/06/04	NC		%	25
			Hexachlorobutadiene	2019/06/04	NC		%	25
			Hexane	2019/06/04	NC		%	25
			Heptane	2019/06/04	NC		%	25
			Cyclohexane	2019/06/04	NC		%	25
			Tetrahydrofuran	2019/06/04	NC		%	25
			1,4-Dioxane	2019/06/04	NC		%	25
			Naphthalene	2019/06/04	NC		%	25
			Total Xylenes	2019/06/04	NC		%	25
			1,1,1,2-Tetrachloroethane	2019/06/04	NC		%	25
			Vinyl Bromide	2019/06/04	NC		%	25
			Propene	2019/06/04	NC		%	25
			2,2,4-Trimethylpentane	2019/06/04	NC		%	25
			Carbon Disulfide	2019/06/04	NC		%	25
			Vinyl Acetate	2019/06/04	NC		%	25
6159721	NS2	RPD [JWF065-01]	F1-BTEX, C6-C10 (as Toluene)	2019/06/04	0.38		%	25
			F2, C10-C16 (as Decane)	2019/06/04	8.4		%	25
6162282	NS2	RPD [JWF065-01]	Aliphatic >C5-C6	2019/06/04	NC		%	25
			Aliphatic >C6-C8	2019/06/04	3.9		%	25
			Aliphatic >C8-C10	2019/06/04	1.8		%	25
			Aliphatic >C10-C12	2019/06/04	1.4		%	25
			Aliphatic >C12-C16	2019/06/04	4.3		%	25
			Aromatic >C7-C8 (TEX Excluded)	2019/06/04	NC		%	25
			Aromatic >C8-C10	2019/06/04	NC		%	25
			Aromatic >C10-C12	2019/06/04	NC		%	25
			Aromatic >C12-C16	2019/06/04	NC		%	25
6156915	NS2	LCS	Bromochloromethane	2019/06/04		107	%	60 - 140
			D5-Chlorobenzene	2019/06/04		105	%	60 - 140
			Difluorobenzene	2019/06/04		105	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/06/04		99	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2019/06/04		98	%	70 - 130
			Chloromethane	2019/06/04		87	%	70 - 130
			Vinyl Chloride	2019/06/04		95	%	70 - 130
			Chloroethane	2019/06/04		93	%	70 - 130
			1,3-Butadiene	2019/06/04		96	%	70 - 130



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BV Labs Job #: B9E6836
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Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Trichlorofluoromethane (FREON 11)	2019/06/04		102	%	70 - 130
			Ethanol (ethyl alcohol)	2019/06/04		99	%	70 - 130
			Trichlorotrifluoroethane	2019/06/04		104	%	70 - 130
			2-propanol	2019/06/04		83	%	70 - 130
			2-Propanone	2019/06/04		96	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2019/06/04		88	%	70 - 130
			Methyl Isobutyl Ketone	2019/06/04		90	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2019/06/04		91	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/06/04		106	%	70 - 130
			Ethyl Acetate	2019/06/04		112	%	70 - 130
			1,1-Dichloroethylene	2019/06/04		99	%	70 - 130
			cis-1,2-Dichloroethylene	2019/06/04		95	%	70 - 130
			trans-1,2-Dichloroethylene	2019/06/04		100	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/06/04		87	%	70 - 130
			Chloroform	2019/06/04		102	%	70 - 130
			Carbon Tetrachloride	2019/06/04		107	%	70 - 130
			1,1-Dichloroethane	2019/06/04		94	%	70 - 130
			1,2-Dichloroethane	2019/06/04		105	%	70 - 130
			Ethylene Dibromide	2019/06/04		105	%	70 - 130
			1,1,1-Trichloroethane	2019/06/04		105	%	70 - 130
			1,1,2-Trichloroethane	2019/06/04		97	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/06/04		102	%	70 - 130
			cis-1,3-Dichloropropene	2019/06/04		102	%	70 - 130
			trans-1,3-Dichloropropene	2019/06/04		103	%	70 - 130
			1,2-Dichloropropane	2019/06/04		92	%	70 - 130
			Bromomethane	2019/06/04		101	%	70 - 130
			Bromoform	2019/06/04		113	%	70 - 130
			Bromodichloromethane	2019/06/04		108	%	70 - 130
			Dibromochloromethane	2019/06/04		111	%	70 - 130
			Trichloroethylene	2019/06/04		111	%	70 - 130
			Tetrachloroethylene	2019/06/04		109	%	70 - 130
			Benzene	2019/06/04		95	%	70 - 130
			Toluene	2019/06/04		103	%	70 - 130
			Ethylbenzene	2019/06/04		103	%	70 - 130
			p+m-Xylene	2019/06/04		105	%	70 - 130
			o-Xylene	2019/06/04		105	%	70 - 130
			Styrene	2019/06/04		109	%	70 - 130
			4-ethyltoluene	2019/06/04		102	%	70 - 130
			1,3,5-Trimethylbenzene	2019/06/04		106	%	70 - 130
			1,2,4-Trimethylbenzene	2019/06/04		108	%	70 - 130
			Chlorobenzene	2019/06/04		105	%	70 - 130
			Benzyl chloride	2019/06/04		106	%	70 - 130
			1,3-Dichlorobenzene	2019/06/04		113	%	70 - 130
			1,4-Dichlorobenzene	2019/06/04		113	%	70 - 130
			1,2-Dichlorobenzene	2019/06/04		113	%	70 - 130
			1,2,4-Trichlorobenzene	2019/06/04		133 (1)	%	70 - 130
			Hexachlorobutadiene	2019/06/04		126	%	70 - 130
			Hexane	2019/06/04		93	%	70 - 130
			Heptane	2019/06/04		92	%	70 - 130
			Cyclohexane	2019/06/04		94	%	70 - 130
			Tetrahydrofuran	2019/06/04		88	%	70 - 130
			1,4-Dioxane	2019/06/04		104	%	70 - 130



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Naphthalene	2019/06/04		129	%	70 - 130
				Total Xylenes	2019/06/04		105	%	70 - 130
				1,1,1,2-Tetrachloroethane	2019/06/04		103	%	70 - 130
				Vinyl Bromide	2019/06/04		111	%	70 - 130
				Propene	2019/06/04		90	%	70 - 130
				2,2,4-Trimethylpentane	2019/06/04		93	%	70 - 130
				Carbon Disulfide	2019/06/04		103	%	70 - 130
				Vinyl Acetate	2019/06/04		58 (1)	%	70 - 130
6159384		NS2	LCS	Bromochloromethane	2019/06/05		111	%	60 - 140
				D5-Chlorobenzene	2019/06/05		105	%	60 - 140
				Difluorobenzene	2019/06/05		105	%	60 - 140
				Dichlorodifluoromethane (FREON 12)	2019/06/05		96	%	70 - 130
				1,2-Dichlorotetrafluoroethane	2019/06/05		96	%	70 - 130
				Chloromethane	2019/06/05		84	%	70 - 130
				Vinyl Chloride	2019/06/05		92	%	70 - 130
				Chloroethane	2019/06/05		90	%	70 - 130
				1,3-Butadiene	2019/06/05		92	%	70 - 130
				Trichlorofluoromethane (FREON 11)	2019/06/05		100	%	70 - 130
				Ethanol (ethyl alcohol)	2019/06/05		96	%	70 - 130
				Trichlorotrifluoroethane	2019/06/05		100	%	70 - 130
				2-propanol	2019/06/05		80	%	70 - 130
				2-Propanone	2019/06/05		93	%	70 - 130
				Methyl Ethyl Ketone (2-Butanone)	2019/06/05		88	%	70 - 130
				Methyl Isobutyl Ketone	2019/06/05		90	%	70 - 130
				Methyl Butyl Ketone (2-Hexanone)	2019/06/05		91	%	70 - 130
				Methyl t-butyl ether (MTBE)	2019/06/05		102	%	70 - 130
				Ethyl Acetate	2019/06/05		111	%	70 - 130
				1,1-Dichloroethylene	2019/06/05		95	%	70 - 130
				cis-1,2-Dichloroethylene	2019/06/05		94	%	70 - 130
				trans-1,2-Dichloroethylene	2019/06/05		97	%	70 - 130
				Methylene Chloride(Dichloromethane)	2019/06/05		84	%	70 - 130
				Chloroform	2019/06/05		100	%	70 - 130
				Carbon Tetrachloride	2019/06/05		107	%	70 - 130
				1,1-Dichloroethane	2019/06/05		92	%	70 - 130
				1,2-Dichloroethane	2019/06/05		102	%	70 - 130
				Ethylene Dibromide	2019/06/05		104	%	70 - 130
				1,1,1-Trichloroethane	2019/06/05		105	%	70 - 130
				1,1,2-Trichloroethane	2019/06/05		97	%	70 - 130
				1,1,2,2-Tetrachloroethane	2019/06/05		102	%	70 - 130
				cis-1,3-Dichloropropene	2019/06/05		102	%	70 - 130
				trans-1,3-Dichloropropene	2019/06/05		102	%	70 - 130
				1,2-Dichloropropane	2019/06/05		92	%	70 - 130
				Bromomethane	2019/06/05		100	%	70 - 130
				Bromoform	2019/06/05		112	%	70 - 130
				Bromodichloromethane	2019/06/05		107	%	70 - 130
				Dibromochloromethane	2019/06/05		110	%	70 - 130
				Trichloroethylene	2019/06/05		110	%	70 - 130
				Tetrachloroethylene	2019/06/05		108	%	70 - 130
				Benzene	2019/06/05		95	%	70 - 130
				Toluene	2019/06/05		102	%	70 - 130
				Ethylbenzene	2019/06/05		102	%	70 - 130
				p+m-Xylene	2019/06/05		104	%	70 - 130



BUREAU
VERITAS

BV Labs Job #: B9E6836
Report Date: 2019/07/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			o-Xylene	2019/06/05		105	%	70 - 130
			Styrene	2019/06/05		108	%	70 - 130
			4-ethyltoluene	2019/06/05		101	%	70 - 130
			1,3,5-Trimethylbenzene	2019/06/05		105	%	70 - 130
			1,2,4-Trimethylbenzene	2019/06/05		108	%	70 - 130
			Chlorobenzene	2019/06/05		105	%	70 - 130
			Benzyl chloride	2019/06/05		105	%	70 - 130
			1,3-Dichlorobenzene	2019/06/05		112	%	70 - 130
			1,4-Dichlorobenzene	2019/06/05		112	%	70 - 130
			1,2-Dichlorobenzene	2019/06/05		112	%	70 - 130
			1,2,4-Trichlorobenzene	2019/06/05		131 (1)	%	70 - 130
			Hexachlorobutadiene	2019/06/05		125	%	70 - 130
			Hexane	2019/06/05		91	%	70 - 130
			Heptane	2019/06/05		91	%	70 - 130
			Cyclohexane	2019/06/05		93	%	70 - 130
			Tetrahydrofuran	2019/06/05		87	%	70 - 130
			1,4-Dioxane	2019/06/05		103	%	70 - 130
			Naphthalene	2019/06/05		129	%	70 - 130
			Total Xylenes	2019/06/05		104	%	70 - 130
			1,1,1,2-Tetrachloroethane	2019/06/05		103	%	70 - 130
			Vinyl Bromide	2019/06/05		108	%	70 - 130
			Propene	2019/06/05		87	%	70 - 130
			2,2,4-Trimethylpentane	2019/06/05		93	%	70 - 130
			Carbon Disulfide	2019/06/05		100	%	70 - 130
			Vinyl Acetate	2019/06/05		59 (1)	%	70 - 130

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

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

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

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

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

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



BUREAU
VERITAS

BV Labs Job #: B9E6836

Report Date: 2019/07/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907A

VALIDATION SIGNATURE PAGE

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

Maureen Smith, Supervisor, Volatiles

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.

INVOICE INFORMATION		REPORT INFORMATION		ANALYSIS REQUESTED															
Company Name: <input checked="" type="checkbox"/> Imperial Oil <input type="checkbox"/> ExxonMobil		Company Name: <u>Golder Associates Ltd.</u>		Sample Collection		Media Type		Length of Sampling (minutes)		Flow Rate (ml/min.)		Aromatic/Aliphatic Hydrocarbon Fractionations		F1 (C6-C10) - F2 (C10-C16)		PAH (Naphthalene)		VOCs (full)	
Contact Name: <u>10L Accounts Payable</u>		Contact Name: <u>Chris Vetterazzo</u>		DATE (YYYYMMDD)	TIME (24 HR)	Flow Regulator Serial #	Canister Serial #	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX
Address: <u>102, 2535-3rd Ave SE</u>		Address: <u>11 Austin St. Suite 101</u>		DATE (YYYYMMDD)	TIME (24 HR)	Flow Regulator Serial #	Canister Serial #	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX
City: <u>Calgary, AB, T2A 7W5</u>		City: <u>St. Johns Nfld A1B 4C1</u>		DATE (YYYYMMDD)	TIME (24 HR)	Flow Regulator Serial #	Canister Serial #	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX
Email: <u>10LAccountsPayable@golder.com</u>		Email: <u>Chris.Vetterazzo@golder.com</u>		DATE (YYYYMMDD)	TIME (24 HR)	Flow Regulator Serial #	Canister Serial #	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX
Ph: <u>(403) 249-5600</u>		Ph: <u>(709) 682-8593</u>		DATE (YYYYMMDD)	TIME (24 HR)	Flow Regulator Serial #	Canister Serial #	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX
Sampler Name (Print): <u>Jeremy Eckert, Beau Drieschner</u>		Consultant Project #: <u>18113796-1485-1907A</u>		DATE (YYYYMMDD)	TIME (24 HR)	Flow Regulator Serial #	Canister Serial #	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX	BTX
1	SV19-01	1538	FX0273	2019/05/29	15:55	S	S	9	X	X	X	X	X	X	X	X	X	X	X
2	SV19-02	1353	FX1437	2019/05/29	14:31	S	S	8	X	X	X	X	X	X	X	X	X	X	X
3	DUPA	364	FX1638	2019/05/29	14:28	S	S	5	X	X	X	X	X	X	X	X	X	X	X
4	SV19-03	1309	FX1635	2019/05/29	15:22	S	S	5	X	X	X	X	X	X	X	X	X	X	X
5	SV19-04	1800	FX1432	2019/05/29	11:34	S	S	7	X	X	X	X	X	X	X	X	X	X	X
6																			
7																			
8																			
9																			
10																			
11																			

IOL SITE LOCATION: <u>2 Montreal Rd, Ottawa, Ontario</u>	REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): <u>N/A</u>	SPECIAL INSTRUCTIONS: <u>IES: A2601436</u> <u>SAP: 88005740</u> <u>Samples shipped with used sampling equipment</u>	LEGEND S - Summa Can T - Tube TB - Tedlar Bag O - Other(Specify) *TEMP N/A for SUMMA-CAN	TURNAROUND TIME Standard (10 days) <input checked="" type="checkbox"/> Rush (9 days) <input type="checkbox"/> (6 days) <input type="checkbox"/> (3 days) <input type="checkbox"/>
IOL PROJECT # (if applicable): <u>NA</u>	MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: <u>18113796-1485-7777</u>	DATE RECEIVED BY: <u>Jeremy Eckert</u>	DATE: <u>2019/05/29</u>	DATE: <u>2019/05/31</u>
SEAL PRESENT <input checked="" type="checkbox"/>	SEAL INTACT <input checked="" type="checkbox"/>	SEAL PRESENT <input checked="" type="checkbox"/>	SEAL INTACT <input checked="" type="checkbox"/>	SEAL PRESENT <input checked="" type="checkbox"/>
COOLING MEDIA PRESENT <input checked="" type="checkbox"/>	COOLING MEDIA PRESENT <input checked="" type="checkbox"/>	COOLING MEDIA PRESENT <input checked="" type="checkbox"/>	COOLING MEDIA PRESENT <input checked="" type="checkbox"/>	COOLING MEDIA PRESENT <input checked="" type="checkbox"/>
RELINQUISHED BY: <u>Jeremy Eckert</u>	RECEIVED BY: <u>Jeremy Eckert</u>	DATE: <u>2019/05/29</u>	DATE: <u>2019/05/31</u>	DATE: <u>2019/05/31</u>
LAB USE ONLY MAXXAM JOB # <u>896836</u>	SAMPLES LABELED BY: <u>KKY</u>	VERIFIED BY: <u>LOR</u>	DATE: <u>2019/05/31</u>	DATE: <u>2019/05/31</u>

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: May 29, 2019

Location: 2 Montreal Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 18113796-1485

Sample Submission Number: B9E6836

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery (133 and 131%) outside
Extraction Surrogate Recovery			X	acceptance range of 70-130% for 1,2,4-trichloro-
Method Blank Concentration	X			benzene. Lab control sample recovery (59 and 58%)
Matrix Duplicate RPD	X			outside acceptance range of 70-130% for vinyl acetate.
Matrix Spike Recovery			X	All remaining laboratory QC results are within
Lab Control Sample Recovery		X		acceptance criteria.

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:

Yes

Has lab warranted all tests were in statistical control in CoA (Yes/No)?:

Yes

Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:

Yes

Were all samples analyzed within hold times (Yes/No)?:

Yes

All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:

n/a

Is Chain of Custody completed and signed (Yes/No)?:

Yes

Were sample temperatures acceptable when they reached lab (Yes/No)?:


n/a

Is data considered to be reliable (Yes/No/Suspect)?:

Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): 

Date: June 18, 2019



Task Order#: 18113796-1485-7777
 Site#: N/A
 Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
 Project #: 18113796-1485-1907A
 Your C.O.C. #: 80516

Attention: Chris Vettorazzo

Golder Associates Ltd
 11 Austin St.
 Suite 101
 St. John's, NL
 Canada A1B 4C1

Report Date: 2019/06/11
 Report #: R5748550
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E6843
Received: 2019/05/31, 10:10

Sample Matrix: Air
 # Samples Received: 1

Analyses	Quantity	Laboratory Method	Primary Reference
BTEX and CCME Compounds in Air(TO-15mod)	1	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	1	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	1	BRL SOP-00304	EPA TO-15 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, MDDELCC, 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. All samples were analyzed within hold time unless otherwise flagged.

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) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.



Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A
Your C.O.C. #: 80516

Attention: Chris Vettorazzo

Golder Associates Ltd
11 Austin St.
Suite 101
St. John's, NL
Canada A1B 4C1

Report Date: 2019/06/11
Report #: R5748550
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E6843
Received: 2019/05/31, 10:10

Encryption Key

Kyle Reinhart
Project Manager
11 Jun 2019 17:10:26

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

=====

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



BUREAU
VERITAS

BV Labs Job #: B9E6843

Report Date: 2019/06/11

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907A

RESULTS OF ANALYSES OF AIR

BV Labs ID		JWF093	
Sampling Date		2019/05/29 15:23	
COC Number		80516	
	UNITS	FIELD BLANK	QC Batch
Pressure on Receipt	psig	(-4.2)	6155092
QC Batch = Quality Control Batch			



BUREAU
VERITAS

BV Labs Job #: B9E6843
Report Date: 2019/06/11

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		JWF093		
Sampling Date		2019/05/29 15:23		
COC Number		80516		
	UNITS	FIELD BLANK	RDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ppbv	0.51	0.20	6155082
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	6155082
Chloromethane	ppbv	0.56	0.30	6155082
Vinyl Chloride	ppbv	<0.10	0.10	6155082
Chloroethane	ppbv	<0.30	0.30	6155082
1,3-Butadiene	ppbv	<0.50	0.50	6155082
Trichlorofluoromethane (FREON 11)	ppbv	0.25	0.20	6155082
Ethanol (ethyl alcohol)	ppbv	2.6	1.0	6155082
Trichlorotrifluoroethane	ppbv	<0.15	0.15	6155082
2-propanol	ppbv	<1.0	1.0	6155082
2-Propanone	ppbv	3.28	0.60	6155082
Methyl Ethyl Ketone (2-Butanone)	ppbv	<0.20	0.20	6155082
Methyl Isobutyl Ketone	ppbv	<0.20	0.20	6155082
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	6155082
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	6155082
Ethyl Acetate	ppbv	<1.0	1.0	6155082
1,1-Dichloroethylene	ppbv	<0.10	0.10	6155082
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	6155082
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	6155082
Methylene Chloride(Dichloromethane)	ppbv	<0.60	0.60	6155082
Chloroform	ppbv	<0.10	0.10	6155082
Carbon Tetrachloride	ppbv	<0.10	0.10	6155082
1,1-Dichloroethane	ppbv	<0.10	0.10	6155082
1,2-Dichloroethane	ppbv	<0.10	0.10	6155082
Ethylene Dibromide	ppbv	<0.10	0.10	6155082
1,1,1-Trichloroethane	ppbv	<0.10	0.10	6155082
1,1,2-Trichloroethane	ppbv	<0.10	0.10	6155082
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	6155082
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	6155082
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	6155082
1,2-Dichloropropane	ppbv	<0.10	0.10	6155082
Bromomethane	ppbv	<0.10	0.10	6155082
Bromoform	ppbv	<0.20	0.20	6155082
Bromodichloromethane	ppbv	<0.20	0.20	6155082
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E6843
Report Date: 2019/06/11

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		JWF093		
Sampling Date		2019/05/29 15:23		
COC Number		80516		
	UNITS	FIELD BLANK	RDL	QC Batch
Dibromochloromethane	ppbv	<0.20	0.20	6155082
Trichloroethylene	ppbv	<0.10	0.10	6155082
Tetrachloroethylene	ppbv	<0.10	0.10	6155082
Benzene	ppbv	0.12	0.10	6155082
Toluene	ppbv	0.21	0.10	6155082
Ethylbenzene	ppbv	<0.10	0.10	6155082
p+m-Xylene	ppbv	<0.20	0.20	6155082
o-Xylene	ppbv	<0.10	0.10	6155082
Styrene	ppbv	<0.10	0.10	6155082
4-ethyltoluene	ppbv	<0.50	0.50	6155082
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	6155082
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	6155082
Chlorobenzene	ppbv	<0.10	0.10	6155082
Benzyl chloride	ppbv	<0.50	0.50	6155082
1,3-Dichlorobenzene	ppbv	<0.40	0.40	6155082
1,4-Dichlorobenzene	ppbv	<0.10	0.10	6155082
1,2-Dichlorobenzene	ppbv	<0.10	0.10	6155082
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	6155082
Hexachlorobutadiene	ppbv	<0.50	0.50	6155082
Hexane	ppbv	<0.20	0.20	6155082
Heptane	ppbv	<0.30	0.30	6155082
Cyclohexane	ppbv	<0.20	0.20	6155082
Tetrahydrofuran	ppbv	<0.40	0.40	6155082
1,4-Dioxane	ppbv	<1.0	1.0	6155082
Naphthalene	ppbv	<0.20	0.20	6155082
Total Xylenes	ppbv	<0.30	0.30	6155082
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	6155082
Vinyl Bromide	ppbv	<0.20	0.20	6155082
Propene	ppbv	<1.9	1.9	6155082
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	6155082
Carbon Disulfide	ppbv	<0.50	0.50	6155082
Vinyl Acetate	ppbv	<0.20	0.20	6155082
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E6843
Report Date: 2019/06/11

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		JWF093		
Sampling Date		2019/05/29 15:23		
COC Number		80516		
	UNITS	FIELD BLANK	RDL	QC Batch
Instrument				
Surrogate Recovery (%)				
Bromochloromethane	%	78		6155082
D5-Chlorobenzene	%	71		6155082
Difluorobenzene	%	77		6155082
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E6843
Report Date: 2019/06/11

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		JWF093		
Sampling Date		2019/05/29 15:23		
COC Number		80516		
	UNITS	FIELD BLANK	RDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ug/m3	2.53	0.99	6153504
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	6153504
Chloromethane	ug/m3	1.15	0.62	6153504
Vinyl Chloride	ug/m3	<0.26	0.26	6153504
Chloroethane	ug/m3	<0.79	0.79	6153504
1,3-Butadiene	ug/m3	<1.1	1.1	6153504
Trichlorofluoromethane (FREON 11)	ug/m3	1.4	1.1	6153504
Ethanol (ethyl alcohol)	ug/m3	4.9	1.9	6153504
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	6153504
2-propanol	ug/m3	<2.5	2.5	6153504
2-Propanone	ug/m3	7.8	1.4	6153504
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<0.59	0.59	6153504
Methyl Isobutyl Ketone	ug/m3	<0.82	0.82	6153504
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	6153504
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	6153504
Ethyl Acetate	ug/m3	<3.6	3.6	6153504
1,1-Dichloroethylene	ug/m3	<0.40	0.40	6153504
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6153504
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6153504
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	2.1	6153504
Chloroform	ug/m3	<0.49	0.49	6153504
Carbon Tetrachloride	ug/m3	<0.63	0.63	6153504
1,1-Dichloroethane	ug/m3	<0.40	0.40	6153504
1,2-Dichloroethane	ug/m3	<0.40	0.40	6153504
Ethylene Dibromide	ug/m3	<0.77	0.77	6153504
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	6153504
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	6153504
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	6153504
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	6153504
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	6153504
1,2-Dichloropropane	ug/m3	<0.46	0.46	6153504
Bromomethane	ug/m3	<0.39	0.39	6153504
Bromoform	ug/m3	<2.1	2.1	6153504
Bromodichloromethane	ug/m3	<1.3	1.3	6153504
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E6843
Report Date: 2019/06/11

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		JWF093		
Sampling Date		2019/05/29 15:23		
COC Number		80516		
	UNITS	FIELD BLANK	RDL	QC Batch
Dibromochloromethane	ug/m3	<1.7	1.7	6153504
Trichloroethylene	ug/m3	<0.54	0.54	6153504
Tetrachloroethylene	ug/m3	<0.68	0.68	6153504
Benzene	ug/m3	0.40	0.32	6153504
Toluene	ug/m3	0.79	0.38	6153504
Ethylbenzene	ug/m3	<0.43	0.43	6153504
p+m-Xylene	ug/m3	<0.87	0.87	6153504
o-Xylene	ug/m3	<0.43	0.43	6153504
Styrene	ug/m3	<0.43	0.43	6153504
4-ethyltoluene	ug/m3	<2.5	2.5	6153504
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	6153504
1,2,4-Trimethylbenzene	ug/m3	<2.5	2.5	6153504
Chlorobenzene	ug/m3	<0.46	0.46	6153504
Benzyl chloride	ug/m3	<2.6	2.6	6153504
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	6153504
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	6153504
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	6153504
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	6153504
Hexachlorobutadiene	ug/m3	<5.3	5.3	6153504
Hexane	ug/m3	<0.70	0.70	6153504
Heptane	ug/m3	<1.2	1.2	6153504
Cyclohexane	ug/m3	<0.69	0.69	6153504
Tetrahydrofuran	ug/m3	<1.2	1.2	6153504
1,4-Dioxane	ug/m3	<3.6	3.6	6153504
Naphthalene	ug/m3	<1.0	1.0	6153504
Total Xylenes	ug/m3	<1.3	1.3	6153504
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	6153504
Vinyl Bromide	ug/m3	<0.87	0.87	6153504
Propene	ug/m3	<3.3	3.3	6153504
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	6153504
Carbon Disulfide	ug/m3	<1.6	1.6	6153504
Vinyl Acetate	ug/m3	<0.70	0.70	6153504
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		JWF093		
Sampling Date		2019/05/29 15:23		
COC Number		80516		
	UNITS	FIELD BLANK	RDL	QC Batch
F1-BTEX, C6-C10 (as Toluene)	ug/m3	9.1	5.0	6155525
F2, C10-C16 (as Decane)	ug/m3	<5.0	5.0	6155525
Aliphatic >C5-C6	ug/m3	<5.0	5.0	6155519
Aliphatic >C6-C8	ug/m3	<5.0	5.0	6155519
Aliphatic >C8-C10	ug/m3	<5.0	5.0	6155519
Aliphatic >C10-C12	ug/m3	<5.0	5.0	6155519
Aliphatic >C12-C16	ug/m3	<5.0	5.0	6155519
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	5.0	6155519
Aromatic >C8-C10	ug/m3	<5.0	5.0	6155519
Aromatic >C10-C12	ug/m3	<5.0	5.0	6155519
Aromatic >C12-C16	ug/m3	<5.0	5.0	6155519
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9E6843
Report Date: 2019/06/11

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

TEST SUMMARY

BV Labs ID: JWF093
Sample ID: FIELD BLANK
Matrix: Air

Collected: 2019/05/29
Relinquished: 2019/05/29
Received: 2019/05/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6155525	N/A	2019/06/03	Mahshad Najafi Ragheb
BTEX Fractionation in Air (TO-15mod)	GC/MS	6155519	N/A	2019/06/03	Mahshad Najafi Ragheb
Canister Pressure (TO-15)	PRES	6155092	N/A	2019/06/03	Mahshad Najafi Ragheb
Volatile Organics in Air (ug/m3)	GC/MS	6153504	N/A	2019/06/06	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6155082	N/A	2019/06/03	Mahshad Najafi Ragheb



**BUREAU
VERITAS**

BV Labs Job #: B9E6843

Report Date: 2019/06/11

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907A

GENERAL COMMENTS

Sample JWF093 [FIELD BLANK] : Increased DL for propene due to interference from propane.

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: B9E6843
Report Date: 2019/06/11

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	6155082	MNB	Method Blank	Bromochloromethane	2019/06/03		97	%	60 - 140
				D5-Chlorobenzene	2019/06/03		87	%	60 - 140
				Difluorobenzene	2019/06/03		96	%	60 - 140
				Dichlorodifluoromethane (FREON 12)	2019/06/03	<0.20		ppbv	
				1,2-Dichlorotetrafluoroethane	2019/06/03	<0.17		ppbv	
				Chloromethane	2019/06/03	<0.30		ppbv	
				Vinyl Chloride	2019/06/03	<0.10		ppbv	
				Chloroethane	2019/06/03	<0.30		ppbv	
				1,3-Butadiene	2019/06/03	<0.50		ppbv	
				Trichlorofluoromethane (FREON 11)	2019/06/03	<0.20		ppbv	
				Ethanol (ethyl alcohol)	2019/06/03	<1.0		ppbv	
				Trichlorotrifluoroethane	2019/06/03	<0.15		ppbv	
				2-propanol	2019/06/03	<1.0		ppbv	
				2-Propanone	2019/06/03	<0.60		ppbv	
				Methyl Ethyl Ketone (2-Butanone)	2019/06/03	<0.20		ppbv	
				Methyl Isobutyl Ketone	2019/06/03	<0.20		ppbv	
				Methyl Butyl Ketone (2-Hexanone)	2019/06/03	<1.0		ppbv	
				Methyl t-butyl ether (MTBE)	2019/06/03	<0.20		ppbv	
				Ethyl Acetate	2019/06/03	<1.0		ppbv	
				1,1-Dichloroethylene	2019/06/03	<0.10		ppbv	
				cis-1,2-Dichloroethylene	2019/06/03	<0.10		ppbv	
				trans-1,2-Dichloroethylene	2019/06/03	<0.10		ppbv	
				Methylene Chloride(Dichloromethane)	2019/06/03	<0.60		ppbv	
				Chloroform	2019/06/03	<0.10		ppbv	
				Carbon Tetrachloride	2019/06/03	<0.10		ppbv	
				1,1-Dichloroethane	2019/06/03	<0.10		ppbv	
				1,2-Dichloroethane	2019/06/03	<0.10		ppbv	
				Ethylene Dibromide	2019/06/03	<0.10		ppbv	
				1,1,1-Trichloroethane	2019/06/03	<0.10		ppbv	
				1,1,2-Trichloroethane	2019/06/03	<0.10		ppbv	
				1,1,2,2-Tetrachloroethane	2019/06/03	<0.10		ppbv	
				cis-1,3-Dichloropropene	2019/06/03	<0.10		ppbv	
				trans-1,3-Dichloropropene	2019/06/03	<0.10		ppbv	
				1,2-Dichloropropane	2019/06/03	<0.10		ppbv	
				Bromomethane	2019/06/03	<0.10		ppbv	
				Bromoform	2019/06/03	<0.20		ppbv	
				Bromodichloromethane	2019/06/03	<0.20		ppbv	
				Dibromochloromethane	2019/06/03	<0.20		ppbv	
				Trichloroethylene	2019/06/03	<0.10		ppbv	
				Tetrachloroethylene	2019/06/03	<0.10		ppbv	
				Benzene	2019/06/03	<0.10		ppbv	
				Toluene	2019/06/03	<0.10		ppbv	
				Ethylbenzene	2019/06/03	<0.10		ppbv	
				p+m-Xylene	2019/06/03	<0.20		ppbv	
				o-Xylene	2019/06/03	<0.10		ppbv	
				Styrene	2019/06/03	<0.10		ppbv	
				4-ethyltoluene	2019/06/03	<0.50		ppbv	
				1,3,5-Trimethylbenzene	2019/06/03	<0.50		ppbv	
				1,2,4-Trimethylbenzene	2019/06/03	<0.50		ppbv	
				Chlorobenzene	2019/06/03	<0.10		ppbv	
				Benzyl chloride	2019/06/03	<0.50		ppbv	
				1,3-Dichlorobenzene	2019/06/03	<0.40		ppbv	



BUREAU
VERITAS

BV Labs Job #: B9E6843
Report Date: 2019/06/11

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				1,4-Dichlorobenzene	2019/06/03	<0.10		ppbv	
				1,2-Dichlorobenzene	2019/06/03	<0.10		ppbv	
				1,2,4-Trichlorobenzene	2019/06/03	<0.50		ppbv	
				Hexachlorobutadiene	2019/06/03	<0.50		ppbv	
				Hexane	2019/06/03	<0.20		ppbv	
				Heptane	2019/06/03	<0.30		ppbv	
				Cyclohexane	2019/06/03	<0.20		ppbv	
				Tetrahydrofuran	2019/06/03	<0.40		ppbv	
				1,4-Dioxane	2019/06/03	<1.0		ppbv	
				Naphthalene	2019/06/03	<0.20		ppbv	
				Total Xylenes	2019/06/03	<0.30		ppbv	
				1,1,1,2-Tetrachloroethane	2019/06/03	<0.10		ppbv	
				Vinyl Bromide	2019/06/03	<0.20		ppbv	
				Propene	2019/06/03	<0.50		ppbv	
				2,2,4-Trimethylpentane	2019/06/03	<0.20		ppbv	
				Carbon Disulfide	2019/06/03	<0.50		ppbv	
				Vinyl Acetate	2019/06/03	<0.20		ppbv	
6155519	MNB		Method Blank	Aliphatic >C5-C6	2019/06/03	<5.0		ug/m3	
				Aliphatic >C6-C8	2019/06/03	<5.0		ug/m3	
				Aliphatic >C8-C10	2019/06/03	<5.0		ug/m3	
				Aliphatic >C10-C12	2019/06/03	<5.0		ug/m3	
				Aliphatic >C12-C16	2019/06/03	<5.0		ug/m3	
				Aromatic >C7-C8 (TEX Excluded)	2019/06/03	<5.0		ug/m3	
				Aromatic >C8-C10	2019/06/03	<5.0		ug/m3	
				Aromatic >C10-C12	2019/06/03	<5.0		ug/m3	
				Aromatic >C12-C16	2019/06/03	<5.0		ug/m3	
6155525	MNB		Method Blank	F1-BTEX, C6-C10 (as Toluene)	2019/06/03	<5.0		ug/m3	
				F2, C10-C16 (as Decane)	2019/06/03	<5.0		ug/m3	
6155082	MNB	LCS		Bromochloromethane	2019/06/03		109	%	60 - 140
				D5-Chlorobenzene	2019/06/03		105	%	60 - 140
				Difluorobenzene	2019/06/03		109	%	60 - 140
				Dichlorodifluoromethane (FREON 12)	2019/06/03		104	%	70 - 130
				1,2-Dichlorotetrafluoroethane	2019/06/03		110	%	70 - 130
				Chloromethane	2019/06/03		109	%	70 - 130
				Vinyl Chloride	2019/06/03		113	%	70 - 130
				Chloroethane	2019/06/03		103	%	70 - 130
				1,3-Butadiene	2019/06/03		119	%	70 - 130
				Trichlorofluoromethane (FREON 11)	2019/06/03		98	%	70 - 130
				Ethanol (ethyl alcohol)	2019/06/03		103	%	70 - 130
				Trichlorotrifluoroethane	2019/06/03		99	%	70 - 130
				2-propanol	2019/06/03		87	%	70 - 130
				2-Propanone	2019/06/03		105	%	70 - 130
				Methyl Ethyl Ketone (2-Butanone)	2019/06/03		108	%	70 - 130
				Methyl Isobutyl Ketone	2019/06/03		106	%	70 - 130
				Methyl Butyl Ketone (2-Hexanone)	2019/06/03		107	%	70 - 130
				Methyl t-butyl ether (MTBE)	2019/06/03		113	%	70 - 130
				Ethyl Acetate	2019/06/03		136 (1)	%	70 - 130
				1,1-Dichloroethylene	2019/06/03		104	%	70 - 130
				cis-1,2-Dichloroethylene	2019/06/03		105	%	70 - 130
				trans-1,2-Dichloroethylene	2019/06/03		108	%	70 - 130
				Methylene Chloride(Dichloromethane)	2019/06/03		95	%	70 - 130
				Chloroform	2019/06/03		103	%	70 - 130



BUREAU
VERITAS

BV Labs Job #: B9E6843
Report Date: 2019/06/11

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Carbon Tetrachloride	2019/06/03		102	%	70 - 130
			1,1-Dichloroethane	2019/06/03		101	%	70 - 130
			1,2-Dichloroethane	2019/06/03		103	%	70 - 130
			Ethylene Dibromide	2019/06/03		105	%	70 - 130
			1,1,1-Trichloroethane	2019/06/03		102	%	70 - 130
			1,1,2-Trichloroethane	2019/06/03		101	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/06/03		106	%	70 - 130
			cis-1,3-Dichloropropene	2019/06/03		109	%	70 - 130
			trans-1,3-Dichloropropene	2019/06/03		110	%	70 - 130
			1,2-Dichloropropane	2019/06/03		104	%	70 - 130
			Bromomethane	2019/06/03		104	%	70 - 130
			Bromoform	2019/06/03		108	%	70 - 130
			Bromodichloromethane	2019/06/03		110	%	70 - 130
			Dibromochloromethane	2019/06/03		107	%	70 - 130
			Trichloroethylene	2019/06/03		106	%	70 - 130
			Tetrachloroethylene	2019/06/03		104	%	70 - 130
			Benzene	2019/06/03		104	%	70 - 130
			Toluene	2019/06/03		107	%	70 - 130
			Ethylbenzene	2019/06/03		107	%	70 - 130
			p+m-Xylene	2019/06/03		109	%	70 - 130
			o-Xylene	2019/06/03		108	%	70 - 130
			Styrene	2019/06/03		116	%	70 - 130
			4-ethyltoluene	2019/06/03		119	%	70 - 130
			1,3,5-Trimethylbenzene	2019/06/03		109	%	70 - 130
			1,2,4-Trimethylbenzene	2019/06/03		112	%	70 - 130
			Chlorobenzene	2019/06/03		102	%	70 - 130
			Benzyl chloride	2019/06/03		108	%	70 - 130
			1,3-Dichlorobenzene	2019/06/03		109	%	70 - 130
			1,4-Dichlorobenzene	2019/06/03		107	%	70 - 130
			1,2-Dichlorobenzene	2019/06/03		109	%	70 - 130
			1,2,4-Trichlorobenzene	2019/06/03		117	%	70 - 130
			Hexachlorobutadiene	2019/06/03		119	%	70 - 130
			Hexane	2019/06/03		105	%	70 - 130
			Heptane	2019/06/03		111	%	70 - 130
			Cyclohexane	2019/06/03		114	%	70 - 130
			Tetrahydrofuran	2019/06/03		110	%	70 - 130
			1,4-Dioxane	2019/06/03		106	%	70 - 130
			Naphthalene	2019/06/03		116	%	70 - 130
			Total Xylenes	2019/06/03		109	%	70 - 130
			1,1,1,2-Tetrachloroethane	2019/06/03		96	%	70 - 130
			Vinyl Bromide	2019/06/03		115	%	70 - 130
			Propene	2019/06/03		105	%	70 - 130
			2,2,4-Trimethylpentane	2019/06/03		115	%	70 - 130
			Carbon Disulfide	2019/06/03		106	%	70 - 130
			Vinyl Acetate	2019/06/03		70	%	70 - 130

LCS: 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.

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



BUREAU
VERITAS

BV Labs Job #: B9E6843
Report Date: 2019/06/11

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907A

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 cursive script that reads 'Melanie Mabini'.

Melanie Mabini, VOC Analyst

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

INVOICE INFORMATION		REPORT INFORMATION		ANALYSIS REQUESTED																			
Company Name: <input checked="" type="checkbox"/> Imperial Oil <input type="checkbox"/> ExxonMobil		Company Name: <u>Golden Associates Ltd.</u>																					
Contact Name: <u>10L Accounts Payable</u>		Contact Name: <u>Chris Vetterazzo</u>																					
Address: <u>102, 2535 - 3rd Ave SE</u>		Address: <u>11 Austin St., Suite 101</u>																					
City: <u>Calgary, AB, T2A 7W5</u>		City: <u>St. John's, NL A1B 4C1</u>																					
Email: <u>10LAccountsPayable@golden.com</u>		Email: <u>chrsvetterazzo@golder.com</u>																					
Ph: <u>(403) 299-5600</u>		Ph: <u>(709) 682-8593</u>																					
Sampler Name (Print): <u>Jeremy Eckert, Beau Drieschrod</u>		Consultant Project #: <u>18113796-1485-1907A</u>																					
FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	DATE (YYYY/MM/DD)	TIME (24 HR)	Media Type (See Legend)	FLOW RATE (ml/min)	LENGTH OF SAMPLING (minutes)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractions	F1 (C6-C10) - F2 (C10-C16)	PAH (Naphthalene)	VOCs (Full)											
1 Field Blank	1773	FX 0665	2019/05/29	15:23	S	280	5	X	X	X	X	X											
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							

IOL SITE LOCATION: <u>2 Montreal Rd, Ottawa, Ontario</u>	REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): <u>N/A</u>	SPECIAL INSTRUCTIONS: <u>IES: A2601436</u> <u>SAP: 88005740</u> <u>Sample shipped with used equipment.</u>	LEGEND S - Summa Can <input checked="" type="checkbox"/> T - Tube <input type="checkbox"/> TB - Tedlar Bag <input type="checkbox"/> O - Other (Specify) <input type="checkbox"/> *TEMP N/A for SUMMA CAN	TURNAROUND TIME Standard (10 days) <input checked="" type="checkbox"/> Rush (9 days) <input type="checkbox"/> (6 days) <input type="checkbox"/> (3 days) <input type="checkbox"/>
---	--	---	---	---

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: <u>18113796-1485-777</u>	YES NO COOLER ID # SEAL PRESENT <input checked="" type="checkbox"/> <input type="checkbox"/> SEAL INTACT <input checked="" type="checkbox"/> <input type="checkbox"/> COOLING MEDIA PRESENT <input checked="" type="checkbox"/> <input type="checkbox"/>	YES NO COOLER ID # SEAL PRESENT <input type="checkbox"/> <input type="checkbox"/> SEAL INTACT <input type="checkbox"/> <input type="checkbox"/> COOLING MEDIA PRESENT <input type="checkbox"/> <input type="checkbox"/>	DATE: <u>2019/05/29</u> TIME (24 HR): <u>17:30</u>	RECEIVED BY: <u>Jeremy Eckert</u>	DATE: <u>2019/05/29</u> TIME (24 HR): <u>10:10</u>
---	---	--	--	--------------------------------------	--

RELINQUISHED BY: Signature: <u>[Signature]</u> printed name: <u>Jeremy Eckert</u>	Signature: <u>[Signature]</u> printed name: <u>Chris Vetterazzo</u>	Signature: <u>[Signature]</u> printed name: <u>Beau Drieschrod</u>	Signature: <u>[Signature]</u> printed name: <u>Jeremy Eckert</u>
---	--	---	---

LAB USE ONLY MAXXAM JOB # <u>69E6843</u>	Date Required
--	---------------

SAMPLES LABELED BY: <u>KKY</u> VERIFIED BY: <u>LOR</u>
--

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: May 29, 2019

Location: 2 Montreal Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 18113796-1485

Sample Submission Number: B9E6843

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery (136%) outside acceptance range of 70-130% for ethyl acetate. All remaining laboratory QC results are within acceptance criteria.
Extraction Surrogate Recovery			X	
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within alert limits.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:

Yes

Has lab warranted all tests were in statistical control in CoA (Yes/No)?:

Yes

Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:

Yes

Were all samples analyzed within hold times (Yes/No)?:

Yes

All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:

n/a

Is Chain of Custody completed and signed (Yes/No)?:

Yes

Were sample temperatures acceptable when they reached lab (Yes/No)?:

n/a

Is data considered to be reliable (Yes/No/Suspect)?:

Suspect

If answer is "No", describe and provide rationale: Please see QA/QC appendix.

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): *Amanda Newberry*

Date: June 18, 2019



Task Order#: 18113796-1485-7777
 Site#: N/A
 Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
 Project #: 18113796-1485-1907B
 Your C.O.C. #: 78310

Attention: Chris Vettorazzo

Golder Associates Ltd
 683 Innovation Dr
 Kingston, ON
 Canada K7K 7E6

Report Date: 2019/11/25
 Report #: R5978671
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9V9704
Received: 2019/11/13, 12:00

Sample Matrix: Air
 # Samples Received: 5

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	5	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	5	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	5	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	5	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	5	BRL SOP-00304	EPA TO-15 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. All samples were analyzed within hold time unless otherwise flagged.

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) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.



Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B
Your C.O.C. #: 78310

Attention: Chris Vettorazzo

Golder Associates Ltd
683 Innovation Dr
Kingston, ON
Canada K7K 7E6

Report Date: 2019/11/25
Report #: R5978671
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9V9704
Received: 2019/11/13, 12:00

Encryption Key

Kyle Reinhart
Project Manager
25 Nov 2019 09:49:45

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

=====
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.



BUREAU
VERITAS

BV Labs Job #: B9V9704

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

RESULTS OF ANALYSES OF AIR

BV Labs ID		LHI603	LHI604	LHI605	LHI606	LHI607	
Sampling Date		2019/11/11 16:23	2019/11/11 15:57	2019/11/11 15:57	2019/11/11 14:34	2019/11/11 11:33	
COC Number		78310	78310	78310	78310	78310	
	UNITS	SV19-01	SV19-02	DUPA	SV19-03	SV19-04	QC Batch
Pressure on Receipt	psig	(-2.2)	(-1.6)	(-1.6)	(-0.5)	(-3.3)	6449645
QC Batch = Quality Control Batch							



BUREAU
VERITAS

BV Labs Job #: B9V9704

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI603		LHI604	LHI604	LHI605		LHI606		
Sampling Date		2019/11/11 16:23		2019/11/11 15:57	2019/11/11 15:57	2019/11/11 15:57		2019/11/11 14:34		
COC Number		78310		78310	78310	78310		78310		
	UNITS	SV19-01	RDL	SV19-02	SV19-02 Lab-Dup	DUPA	RDL	SV19-03	RDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ppbv	0.46	0.20	4.92	5.15	5.29	0.20	0.56	0.20	6449646
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<0.17	<0.17	<0.17	0.17	<0.17	0.17	6449646
Chloromethane	ppbv	0.34	0.30	<0.30	<0.30	<0.30	0.30	<0.30	0.30	6449646
Vinyl Chloride	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
Chloroethane	ppbv	<0.30	0.30	<0.30	<0.30	<0.30	0.30	<0.30	0.30	6449646
1,3-Butadiene	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	6449646
Trichlorofluoromethane (FREON 11)	ppbv	0.22	0.20	0.24	0.26	0.24	0.20	<0.20	0.20	6449646
Ethanol (ethyl alcohol)	ppbv	2.0	1.0	1.4	1.5	<1.0	1.0	<1.0	1.0	6449646
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<0.15	<0.15	<0.15	0.15	<0.15	0.15	6449646
2-propanol	ppbv	<1.0	1.0	<1.0	<1.0	<1.0	1.0	<1.0	1.0	6449646
2-Propanone	ppbv	1.94	0.60	1.11	1.07	0.99	0.60	<0.60	0.60	6449646
Methyl Ethyl Ketone (2-Butanone)	ppbv	0.36	0.20	<0.20	<0.20	<0.20	0.20	<0.20	0.20	6449646
Methyl Isobutyl Ketone	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	<0.20	0.20	6449646
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<1.0	<1.0	<1.0	1.0	<1.0	1.0	6449646
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	<0.20	0.20	6449646
Ethyl Acetate	ppbv	<1.0	1.0	<1.0	<1.0	<1.0	1.0	<1.0	1.0	6449646
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
Methylene Chloride(Dichloromethane)	ppbv	<0.60	0.60	<0.60	<0.60	<0.60	0.60	<0.60	0.60	6449646
Chloroform	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
Ethylene Dibromide	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.25	<0.25	<0.25	0.25	<0.10	0.10	6449646
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
Bromomethane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
Bromoform	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	<0.20	0.20	6449646
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
Lab-Dup = Laboratory Initiated Duplicate										



BUREAU
VERITAS

BV Labs Job #: B9V9704

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI603		LHI604	LHI604	LHI605		LHI606		
Sampling Date		2019/11/11 16:23		2019/11/11 15:57	2019/11/11 15:57	2019/11/11 15:57		2019/11/11 14:34		
COC Number		78310		78310	78310	78310		78310		
	UNITS	SV19-01	RDL	SV19-02	SV19-02 Lab-Dup	DUPA	RDL	SV19-03	RDL	QC Batch
Bromodichloromethane	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	<0.20	0.20	6449646
Dibromochloromethane	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	<0.20	0.20	6449646
Trichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
Tetrachloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
Benzene	ppbv	0.13	0.10	0.25	0.26	0.25	0.10	<0.10	0.10	6449646
Toluene	ppbv	0.46	0.10	0.29	0.30	0.30	0.10	<0.10	0.10	6449646
Ethylbenzene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
p+m-Xylene	ppbv	<0.20	0.20	0.35	0.34	0.37	0.20	<0.20	0.20	6449646
o-Xylene	ppbv	<0.10	0.10	0.13	0.13	0.14	0.10	<0.10	0.10	6449646
Styrene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
4-ethyltoluene	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	6449646
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	6449646
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	6449646
Chlorobenzene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
Benzyl chloride	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	6449646
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<0.40	<0.40	<0.40	0.40	<0.40	0.40	6449646
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	6449646
Hexachlorobutadiene	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	6449646
Hexane	ppbv	0.23	0.20	0.31	0.35	0.36	0.20	<0.20	0.20	6449646
Heptane	ppbv	<0.30	0.30	0.34	0.32	0.35	0.30	<0.30	0.30	6449646
Cyclohexane	ppbv	<0.20	0.20	<0.35	<0.35	<0.35	0.35	<0.20	0.20	6449646
Tetrahydrofuran	ppbv	<0.40	0.40	<0.70	<0.70	<0.70	0.70	<0.40	0.40	6449646
1,4-Dioxane	ppbv	<1.0	1.0	<1.0	<1.0	<1.0	1.0	<1.0	1.0	6449646
Naphthalene	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	<0.20	0.20	6449646
Total Xylenes	ppbv	<0.30	0.30	0.48	0.47	0.50	0.30	<0.30	0.30	6449646
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	6449646
Vinyl Bromide	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	<0.20	0.20	6449646
Propene	ppbv	<0.50	0.50	<0.65	<0.65	<0.65	0.65	<0.50	0.50	6449646
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.20	0.20	0.21	0.20	<0.20	0.20	6449646
Carbon Disulfide	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	6449646
Vinyl Acetate	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	<0.20	0.20	6449646
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
Lab-Dup = Laboratory Initiated Duplicate										



BUREAU
VERITAS

BV Labs Job #: B9V9704
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI603		LHI604	LHI604	LHI605		LHI606		
Sampling Date		2019/11/11 16:23		2019/11/11 15:57	2019/11/11 15:57	2019/11/11 15:57		2019/11/11 14:34		
COC Number		78310		78310	78310	78310		78310		
	UNITS	SV19-01	RDL	SV19-02	SV19-02 Lab-Dup	DUPA	RDL	SV19-03	RDL	QC Batch
Instrument										
Surrogate Recovery (%)										
Bromochloromethane	%	91		91	88	91		88		6449646
D5-Chlorobenzene	%	78		83	80	80		76		6449646
Difluorobenzene	%	90		90	85	89		87		6449646
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										



VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI607		
Sampling Date		2019/11/11 11:33		
COC Number		78310		
	UNITS	SV19-04	RDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ppbv	29.3	0.20	6449646
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	6449646
Chloromethane	ppbv	<0.30	0.30	6449646
Vinyl Chloride	ppbv	<0.10	0.10	6449646
Chloroethane	ppbv	<0.30	0.30	6449646
1,3-Butadiene	ppbv	<0.50	0.50	6449646
Trichlorofluoromethane (FREON 11)	ppbv	0.33	0.20	6449646
Ethanol (ethyl alcohol)	ppbv	1.9	1.0	6449646
Trichlorotrifluoroethane	ppbv	<0.15	0.15	6449646
2-propanol	ppbv	<1.0	1.0	6449646
2-Propanone	ppbv	1.62	0.60	6449646
Methyl Ethyl Ketone (2-Butanone)	ppbv	<0.20	0.20	6449646
Methyl Isobutyl Ketone	ppbv	<0.20	0.20	6449646
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	6449646
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	6449646
Ethyl Acetate	ppbv	<1.0	1.0	6449646
1,1-Dichloroethylene	ppbv	<0.10	0.10	6449646
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	6449646
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	6449646
Methylene Chloride(Dichloromethane)	ppbv	<0.60	0.60	6449646
Chloroform	ppbv	<0.10	0.10	6449646
Carbon Tetrachloride	ppbv	<0.10	0.10	6449646
1,1-Dichloroethane	ppbv	<0.10	0.10	6449646
1,2-Dichloroethane	ppbv	<0.10	0.10	6449646
Ethylene Dibromide	ppbv	<0.10	0.10	6449646
1,1,1-Trichloroethane	ppbv	<0.10	0.10	6449646
1,1,2-Trichloroethane	ppbv	<0.10	0.10	6449646
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	6449646
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	6449646
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	6449646
1,2-Dichloropropane	ppbv	<0.10	0.10	6449646
Bromomethane	ppbv	<0.10	0.10	6449646
Bromoform	ppbv	<0.20	0.20	6449646
Bromodichloromethane	ppbv	<0.20	0.20	6449646
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9V9704

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI607		
Sampling Date		2019/11/11 11:33		
COC Number		78310		
	UNITS	SV19-04	RDL	QC Batch
Dibromochloromethane	ppbv	<0.20	0.20	6449646
Trichloroethylene	ppbv	<0.10	0.10	6449646
Tetrachloroethylene	ppbv	<0.10	0.10	6449646
Benzene	ppbv	0.20	0.10	6449646
Toluene	ppbv	0.56	0.10	6449646
Ethylbenzene	ppbv	0.11	0.10	6449646
p+m-Xylene	ppbv	<0.20	0.20	6449646
o-Xylene	ppbv	<0.10	0.10	6449646
Styrene	ppbv	<0.10	0.10	6449646
4-ethyltoluene	ppbv	<0.50	0.50	6449646
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	6449646
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	6449646
Chlorobenzene	ppbv	<0.10	0.10	6449646
Benzyl chloride	ppbv	<0.50	0.50	6449646
1,3-Dichlorobenzene	ppbv	<0.40	0.40	6449646
1,4-Dichlorobenzene	ppbv	<0.10	0.10	6449646
1,2-Dichlorobenzene	ppbv	<0.10	0.10	6449646
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	6449646
Hexachlorobutadiene	ppbv	<0.50	0.50	6449646
Hexane	ppbv	0.23	0.20	6449646
Heptane	ppbv	<0.30	0.30	6449646
Cyclohexane	ppbv	<0.20	0.20	6449646
Tetrahydrofuran	ppbv	<0.40	0.40	6449646
1,4-Dioxane	ppbv	<1.0	1.0	6449646
Naphthalene	ppbv	<0.20	0.20	6449646
Total Xylenes	ppbv	<0.30	0.30	6449646
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	6449646
Vinyl Bromide	ppbv	<0.20	0.20	6449646
Propene	ppbv	<0.85	0.85	6449646
2,2,4-Trimethylpentane	ppbv	0.60	0.20	6449646
Carbon Disulfide	ppbv	<0.50	0.50	6449646
Vinyl Acetate	ppbv	<0.20	0.20	6449646
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9V9704

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI607		
Sampling Date		2019/11/11 11:33		
COC Number		78310		
	UNITS	SV19-04	RDL	QC Batch
Instrument				
Surrogate Recovery (%)				
Bromochloromethane	%	86		6449646
D5-Chlorobenzene	%	73		6449646
Difluorobenzene	%	83		6449646
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9V9704

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		LHI603		LHI604	LHI604	LHI605		LHI606		
Sampling Date		2019/11/11 16:23		2019/11/11 15:57	2019/11/11 15:57	2019/11/11 15:57		2019/11/11 14:34		
COC Number		78310		78310	78310	78310		78310		
	UNITS	SV19-01	RDL	SV19-02	SV19-02 Lab-Dup	DUPA	RDL	SV19-03	RDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ug/m3	2.29	0.99	24.4	25.5	26.1	0.99	2.78	0.99	6441779
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	<1.2	<1.2	<1.2	1.2	<1.2	1.2	6441779
Chloromethane	ug/m3	0.70	0.62	<0.62	<0.62	<0.62	0.62	<0.62	0.62	6441779
Vinyl Chloride	ug/m3	<0.26	0.26	<0.26	<0.26	<0.26	0.26	<0.26	0.26	6441779
Chloroethane	ug/m3	<0.79	0.79	<0.79	<0.79	<0.79	0.79	<0.79	0.79	6441779
1,3-Butadiene	ug/m3	<1.1	1.1	<1.1	<1.1	<1.1	1.1	<1.1	1.1	6441779
Trichlorofluoromethane (FREON 11)	ug/m3	1.2	1.1	1.4	1.5	1.3	1.1	<1.1	1.1	6441779
Ethanol (ethyl alcohol)	ug/m3	3.8	1.9	2.7	2.9	<1.9	1.9	<1.9	1.9	6441779
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	<1.2	<1.2	<1.2	1.2	<1.2	1.2	6441779
2-propanol	ug/m3	<2.5	2.5	<2.5	<2.5	<2.5	2.5	<2.5	2.5	6441779
2-Propanone	ug/m3	4.6	1.4	2.6	2.5	2.4	1.4	<1.4	1.4	6441779
Methyl Ethyl Ketone (2-Butanone)	ug/m3	1.06	0.59	<0.59	<0.59	<0.59	0.59	<0.59	0.59	6441779
Methyl Isobutyl Ketone	ug/m3	<0.82	0.82	<0.82	<0.82	<0.82	0.82	<0.82	0.82	6441779
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	<4.1	<4.1	<4.1	4.1	<4.1	4.1	6441779
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	<0.72	<0.72	<0.72	0.72	<0.72	0.72	6441779
Ethyl Acetate	ug/m3	<3.6	3.6	<3.6	<3.6	<3.6	3.6	<3.6	3.6	6441779
1,1-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	<0.40	<0.40	0.40	<0.40	0.40	6441779
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	<0.40	<0.40	0.40	<0.40	0.40	6441779
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	<0.40	<0.40	0.40	<0.40	0.40	6441779
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	2.1	<2.1	<2.1	<2.1	2.1	<2.1	2.1	6441779
Chloroform	ug/m3	<0.49	0.49	<0.49	<0.49	<0.49	0.49	<0.49	0.49	6441779
Carbon Tetrachloride	ug/m3	<0.63	0.63	<0.63	<0.63	<0.63	0.63	<0.63	0.63	6441779
1,1-Dichloroethane	ug/m3	<0.40	0.40	<0.40	<0.40	<0.40	0.40	<0.40	0.40	6441779
1,2-Dichloroethane	ug/m3	<0.40	0.40	<0.40	<0.40	<0.40	0.40	<0.40	0.40	6441779
Ethylene Dibromide	ug/m3	<0.77	0.77	<0.77	<0.77	<0.77	0.77	<0.77	0.77	6441779
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	<0.55	<0.55	<0.55	0.55	<0.55	0.55	6441779
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	<0.55	<0.55	<0.55	0.55	<0.55	0.55	6441779
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	<1.7	<1.7	<1.7	1.7	<0.69	0.69	6441779
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	<0.45	<0.45	0.45	<0.45	0.45	6441779
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	<0.45	<0.45	0.45	<0.45	0.45	6441779
1,2-Dichloropropane	ug/m3	<0.46	0.46	<0.46	<0.46	<0.46	0.46	<0.46	0.46	6441779
Bromomethane	ug/m3	<0.39	0.39	<0.39	<0.39	<0.39	0.39	<0.39	0.39	6441779
Bromoform	ug/m3	<2.1	2.1	<2.1	<2.1	<2.1	2.1	<2.1	2.1	6441779
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
Lab-Dup = Laboratory Initiated Duplicate										



BUREAU
VERITAS

BV Labs Job #: B9V9704
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		LHI603		LHI604	LHI604	LHI605		LHI606		
Sampling Date		2019/11/11 16:23		2019/11/11 15:57	2019/11/11 15:57	2019/11/11 15:57		2019/11/11 14:34		
COC Number		78310		78310	78310	78310		78310		
	UNITS	SV19-01	RDL	SV19-02	SV19-02 Lab-Dup	DUPA	RDL	SV19-03	RDL	QC Batch
Bromodichloromethane	ug/m3	<1.3	1.3	<1.3	<1.3	<1.3	1.3	<1.3	1.3	6441779
Dibromochloromethane	ug/m3	<1.7	1.7	<1.7	<1.7	<1.7	1.7	<1.7	1.7	6441779
Trichloroethylene	ug/m3	<0.54	0.54	<0.54	<0.54	<0.54	0.54	<0.54	0.54	6441779
Tetrachloroethylene	ug/m3	<0.68	0.68	<0.68	<0.68	<0.68	0.68	<0.68	0.68	6441779
Benzene	ug/m3	0.41	0.32	0.81	0.83	0.79	0.32	<0.32	0.32	6441779
Toluene	ug/m3	1.72	0.38	1.10	1.12	1.15	0.38	<0.38	0.38	6441779
Ethylbenzene	ug/m3	<0.43	0.43	<0.43	<0.43	<0.43	0.43	<0.43	0.43	6441779
p+m-Xylene	ug/m3	<0.87	0.87	1.52	1.47	1.59	0.87	<0.87	0.87	6441779
o-Xylene	ug/m3	<0.43	0.43	0.56	0.58	0.60	0.43	<0.43	0.43	6441779
Styrene	ug/m3	<0.43	0.43	<0.43	<0.43	<0.43	0.43	<0.43	0.43	6441779
4-ethyltoluene	ug/m3	<2.5	2.5	<2.5	<2.5	<2.5	2.5	<2.5	2.5	6441779
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	<2.5	<2.5	<2.5	2.5	<2.5	2.5	6441779
1,2,4-Trimethylbenzene	ug/m3	<2.5	2.5	<2.5	<2.5	<2.5	2.5	<2.5	2.5	6441779
Chlorobenzene	ug/m3	<0.46	0.46	<0.46	<0.46	<0.46	0.46	<0.46	0.46	6441779
Benzyl chloride	ug/m3	<2.6	2.6	<2.6	<2.6	<2.6	2.6	<2.6	2.6	6441779
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	<2.4	<2.4	<2.4	2.4	<2.4	2.4	6441779
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	<0.60	<0.60	0.60	<0.60	0.60	6441779
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	<0.60	<0.60	0.60	<0.60	0.60	6441779
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	<3.7	<3.7	<3.7	3.7	<3.7	3.7	6441779
Hexachlorobutadiene	ug/m3	<5.3	5.3	<5.3	<5.3	<5.3	5.3	<5.3	5.3	6441779
Hexane	ug/m3	0.82	0.70	1.08	1.22	1.27	0.70	<0.70	0.70	6441779
Heptane	ug/m3	<1.2	1.2	1.4	1.3	1.4	1.2	<1.2	1.2	6441779
Cyclohexane	ug/m3	<0.69	0.69	<1.2	<1.2	<1.2	1.2	<0.69	0.69	6441779
Tetrahydrofuran	ug/m3	<1.2	1.2	<2.1	<2.1	<2.1	2.1	<1.2	1.2	6441779
1,4-Dioxane	ug/m3	<3.6	3.6	<3.6	<3.6	<3.6	3.6	<3.6	3.6	6441779
Naphthalene	ug/m3	<1.0	1.0	<1.0	<1.0	<1.0	1.0	<1.0	1.0	6441779
Total Xylenes	ug/m3	<1.3	1.3	2.1	2.0	2.2	1.3	<1.3	1.3	6441779
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	<0.69	<0.69	0.69	<0.69	0.69	6441779
Vinyl Bromide	ug/m3	<0.87	0.87	<0.87	<0.87	<0.87	0.87	<0.87	0.87	6441779
Propene	ug/m3	<0.86	0.86	<1.1	<1.1	<1.1	1.1	<0.86	0.86	6441779
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	<0.93	0.94	0.98	0.93	<0.93	0.93	6441779
Carbon Disulfide	ug/m3	<1.6	1.6	<1.6	<1.6	<1.6	1.6	<1.6	1.6	6441779
Vinyl Acetate	ug/m3	<0.70	0.70	<0.70	<0.70	<0.70	0.70	<0.70	0.70	6441779
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										



BUREAU
VERITAS

BV Labs Job #: B9V9704
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		LHI607		
Sampling Date		2019/11/11 11:33		
COC Number		78310		
	UNITS	SV19-04	RDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ug/m3	145	0.99	6441779
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	6441779
Chloromethane	ug/m3	<0.62	0.62	6441779
Vinyl Chloride	ug/m3	<0.26	0.26	6441779
Chloroethane	ug/m3	<0.79	0.79	6441779
1,3-Butadiene	ug/m3	<1.1	1.1	6441779
Trichlorofluoromethane (FREON 11)	ug/m3	1.8	1.1	6441779
Ethanol (ethyl alcohol)	ug/m3	3.6	1.9	6441779
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	6441779
2-propanol	ug/m3	<2.5	2.5	6441779
2-Propanone	ug/m3	3.8	1.4	6441779
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<0.59	0.59	6441779
Methyl Isobutyl Ketone	ug/m3	<0.82	0.82	6441779
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	6441779
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	6441779
Ethyl Acetate	ug/m3	<3.6	3.6	6441779
1,1-Dichloroethylene	ug/m3	<0.40	0.40	6441779
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6441779
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6441779
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	2.1	6441779
Chloroform	ug/m3	<0.49	0.49	6441779
Carbon Tetrachloride	ug/m3	<0.63	0.63	6441779
1,1-Dichloroethane	ug/m3	<0.40	0.40	6441779
1,2-Dichloroethane	ug/m3	<0.40	0.40	6441779
Ethylene Dibromide	ug/m3	<0.77	0.77	6441779
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	6441779
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	6441779
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	6441779
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	6441779
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	6441779
1,2-Dichloropropane	ug/m3	<0.46	0.46	6441779
Bromomethane	ug/m3	<0.39	0.39	6441779
Bromoform	ug/m3	<2.1	2.1	6441779
Bromodichloromethane	ug/m3	<1.3	1.3	6441779
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9V9704

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		LHI607		
Sampling Date		2019/11/11 11:33		
COC Number		78310		
	UNITS	SV19-04	RDL	QC Batch
Dibromochloromethane	ug/m3	<1.7	1.7	6441779
Trichloroethylene	ug/m3	<0.54	0.54	6441779
Tetrachloroethylene	ug/m3	<0.68	0.68	6441779
Benzene	ug/m3	0.64	0.32	6441779
Toluene	ug/m3	2.12	0.38	6441779
Ethylbenzene	ug/m3	0.49	0.43	6441779
p+m-Xylene	ug/m3	<0.87	0.87	6441779
o-Xylene	ug/m3	<0.43	0.43	6441779
Styrene	ug/m3	<0.43	0.43	6441779
4-ethyltoluene	ug/m3	<2.5	2.5	6441779
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	6441779
1,2,4-Trimethylbenzene	ug/m3	<2.5	2.5	6441779
Chlorobenzene	ug/m3	<0.46	0.46	6441779
Benzyl chloride	ug/m3	<2.6	2.6	6441779
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	6441779
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	6441779
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	6441779
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	6441779
Hexachlorobutadiene	ug/m3	<5.3	5.3	6441779
Hexane	ug/m3	0.82	0.70	6441779
Heptane	ug/m3	<1.2	1.2	6441779
Cyclohexane	ug/m3	<0.69	0.69	6441779
Tetrahydrofuran	ug/m3	<1.2	1.2	6441779
1,4-Dioxane	ug/m3	<3.6	3.6	6441779
Naphthalene	ug/m3	<1.0	1.0	6441779
Total Xylenes	ug/m3	<1.3	1.3	6441779
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	6441779
Vinyl Bromide	ug/m3	<0.87	0.87	6441779
Propene	ug/m3	<1.5	1.5	6441779
2,2,4-Trimethylpentane	ug/m3	2.82	0.93	6441779
Carbon Disulfide	ug/m3	<1.6	1.6	6441779
Vinyl Acetate	ug/m3	<0.70	0.70	6441779
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		LHI603	LHI604	LHI604	LHI605	LHI606	LHI607		
Sampling Date		2019/11/11 16:23	2019/11/11 15:57	2019/11/11 15:57	2019/11/11 15:57	2019/11/11 14:34	2019/11/11 11:33		
COC Number		78310	78310	78310	78310	78310	78310		
	UNITS	SV19-01	SV19-02	SV19-02 Lab-Dup	DUPA	SV19-03	SV19-04	RDL	QC Batch
F1-BTEX, C6-C10 (as Toluene)	ug/m3	21.8	431	447	473	29.2	62.3	5.0	6453213
F2, C10-C16 (as Decane)	ug/m3	9.9	103	110	110	<5.0	6.3	5.0	6453213
Aliphatic >C5-C6	ug/m3	<5.0	5.1	<5.0	<5.0	<5.0	<5.0	5.0	6453219
Aliphatic >C6-C8	ug/m3	<5.0	25.6	24.2	27.4	<5.0	11.5	5.0	6453219
Aliphatic >C8-C10	ug/m3	<5.0	64.3	67.1	69.7	<5.0	<5.0	5.0	6453219
Aliphatic >C10-C12	ug/m3	<5.0	14.5	14.8	15.7	<5.0	<5.0	5.0	6453219
Aliphatic >C12-C16	ug/m3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	6453219
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	6453219
Aromatic >C8-C10	ug/m3	<5.0	8.6	8.9	8.8	<5.0	<5.0	5.0	6453219
Aromatic >C10-C12	ug/m3	<5.0	6.8	7.2	6.6	<5.0	<5.0	5.0	6453219
Aromatic >C12-C16	ug/m3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	6453219
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate									



BUREAU
VERITAS

BV Labs Job #: B9V9704
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

TEST SUMMARY

BV Labs ID: LHI603
Sample ID: SV19-01
Matrix: Air

Collected: 2019/11/11
Relinquished: 2019/11/12
Received: 2019/11/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6453213	N/A	2019/11/19	Dany Marqass
BTEX Fractionation in Air (TO-15mod)	GC/MS	6453219	N/A	2019/11/19	Dany Marqass
Canister Pressure (TO-15)	PRES	6449645	N/A	2019/11/19	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6441779	N/A	2019/11/22	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6449646	N/A	2019/11/19	Dany Marqass

BV Labs ID: LHI604
Sample ID: SV19-02
Matrix: Air

Collected: 2019/11/11
Relinquished: 2019/11/12
Received: 2019/11/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6453213	N/A	2019/11/19	Dany Marqass
BTEX Fractionation in Air (TO-15mod)	GC/MS	6453219	N/A	2019/11/19	Dany Marqass
Canister Pressure (TO-15)	PRES	6449645	N/A	2019/11/19	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6441779	N/A	2019/11/22	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	6449646	N/A	2019/11/19	Dany Marqass

BV Labs ID: LHI604 Dup
Sample ID: SV19-02
Matrix: Air

Collected: 2019/11/11
Relinquished: 2019/11/12
Received: 2019/11/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6453213	N/A	2019/11/19	Dany Marqass
BTEX Fractionation in Air (TO-15mod)	GC/MS	6453219	N/A	2019/11/19	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6441779	N/A	2019/11/22	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	6449646	N/A	2019/11/19	Dany Marqass

BV Labs ID: LHI605
Sample ID: DUPA
Matrix: Air

Collected: 2019/11/11
Relinquished: 2019/11/12
Received: 2019/11/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6453213	N/A	2019/11/19	Dany Marqass
BTEX Fractionation in Air (TO-15mod)	GC/MS	6453219	N/A	2019/11/19	Dany Marqass
Canister Pressure (TO-15)	PRES	6449645	N/A	2019/11/19	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6441779	N/A	2019/11/22	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	6449646	N/A	2019/11/19	Dany Marqass

BV Labs ID: LHI606
Sample ID: SV19-03
Matrix: Air

Collected: 2019/11/11
Relinquished: 2019/11/12
Received: 2019/11/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6453213	N/A	2019/11/19	Dany Marqass



BUREAU
VERITAS

BV Labs Job #: B9V9704
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

TEST SUMMARY

BV Labs ID: LHI606
Sample ID: SV19-03
Matrix: Air

Collected: 2019/11/11
Relinquished: 2019/11/12
Received: 2019/11/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX Fractionation in Air (TO-15mod)	GC/MS	6453219	N/A	2019/11/19	Dany Marqass
Canister Pressure (TO-15)	PRES	6449645	N/A	2019/11/19	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6441779	N/A	2019/11/22	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6449646	N/A	2019/11/19	Dany Marqass

BV Labs ID: LHI607
Sample ID: SV19-04
Matrix: Air

Collected: 2019/11/11
Relinquished: 2019/11/12
Received: 2019/11/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6453213	N/A	2019/11/19	Dany Marqass
BTEX Fractionation in Air (TO-15mod)	GC/MS	6453219	N/A	2019/11/19	Dany Marqass
Canister Pressure (TO-15)	PRES	6449645	N/A	2019/11/19	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6441779	N/A	2019/11/22	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	6449646	N/A	2019/11/19	Dany Marqass



BUREAU
VERITAS

BV Labs Job #: B9V9704
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

GENERAL COMMENTS

WS# 6449646: Vinyl Acetate was less than 60% recovery in the reference standard. There were no positives found for Vinyl Acetate therefore there should be no effect on the data.

Sample LHI604 [SV19-02] : Increased DL for propene due to propane interference.

Increased DL for Tetrahydrofuran, Cyclohexane, and 1,1,2,2-Tetrachloroethane due to interference.

Sample LHI605 [DUPA] : Increased DL for propene due to propane interference.

Increased DL for Tetrahydrofuran, Cyclohexane, and 1,1,2,2-Tetrachloroethane due to interference.

Sample LHI607 [SV19-04] : Increased DL for propene due to propane interference.

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: B9V9704

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	6449646	DM2	Method Blank	Bromochloromethane	2019/11/19		102	%	60 - 140
				D5-Chlorobenzene	2019/11/19		87	%	60 - 140
				Difluorobenzene	2019/11/19		101	%	60 - 140
				Dichlorodifluoromethane (FREON 12)	2019/11/19	<0.20		ppbv	
				1,2-Dichlorotetrafluoroethane	2019/11/19	<0.17		ppbv	
				Chloromethane	2019/11/19	<0.30		ppbv	
				Vinyl Chloride	2019/11/19	<0.10		ppbv	
				Chloroethane	2019/11/19	<0.30		ppbv	
				1,3-Butadiene	2019/11/19	<0.50		ppbv	
				Trichlorofluoromethane (FREON 11)	2019/11/19	<0.20		ppbv	
				Ethanol (ethyl alcohol)	2019/11/19	<1.0		ppbv	
				Trichlorotrifluoroethane	2019/11/19	<0.15		ppbv	
				2-propanol	2019/11/19	<1.0		ppbv	
				2-Propanone	2019/11/19	<0.60		ppbv	
				Methyl Ethyl Ketone (2-Butanone)	2019/11/19	<0.20		ppbv	
				Methyl Isobutyl Ketone	2019/11/19	<0.20		ppbv	
				Methyl Butyl Ketone (2-Hexanone)	2019/11/19	<1.0		ppbv	
				Methyl t-butyl ether (MTBE)	2019/11/19	<0.20		ppbv	
				Ethyl Acetate	2019/11/19	<1.0		ppbv	
				1,1-Dichloroethylene	2019/11/19	<0.10		ppbv	
				cis-1,2-Dichloroethylene	2019/11/19	<0.10		ppbv	
				trans-1,2-Dichloroethylene	2019/11/19	<0.10		ppbv	
				Methylene Chloride(Dichloromethane)	2019/11/19	<0.60		ppbv	
				Chloroform	2019/11/19	<0.10		ppbv	
				Carbon Tetrachloride	2019/11/19	<0.10		ppbv	
				1,1-Dichloroethane	2019/11/19	<0.10		ppbv	
				1,2-Dichloroethane	2019/11/19	<0.10		ppbv	
				Ethylene Dibromide	2019/11/19	<0.10		ppbv	
				1,1,1-Trichloroethane	2019/11/19	<0.10		ppbv	
				1,1,2-Trichloroethane	2019/11/19	<0.10		ppbv	
				1,1,2,2-Tetrachloroethane	2019/11/19	<0.10		ppbv	
				cis-1,3-Dichloropropene	2019/11/19	<0.10		ppbv	
				trans-1,3-Dichloropropene	2019/11/19	<0.10		ppbv	
				1,2-Dichloropropane	2019/11/19	<0.10		ppbv	
				Bromomethane	2019/11/19	<0.10		ppbv	
				Bromoform	2019/11/19	<0.20		ppbv	
				Bromodichloromethane	2019/11/19	<0.20		ppbv	
				Dibromochloromethane	2019/11/19	<0.20		ppbv	
				Trichloroethylene	2019/11/19	<0.10		ppbv	
				Tetrachloroethylene	2019/11/19	<0.10		ppbv	
				Benzene	2019/11/19	<0.10		ppbv	
				Toluene	2019/11/19	<0.10		ppbv	
				Ethylbenzene	2019/11/19	<0.10		ppbv	
				p+m-Xylene	2019/11/19	<0.20		ppbv	
				o-Xylene	2019/11/19	<0.10		ppbv	
				Styrene	2019/11/19	<0.10		ppbv	
				4-ethyltoluene	2019/11/19	<0.50		ppbv	
				1,3,5-Trimethylbenzene	2019/11/19	<0.50		ppbv	
				1,2,4-Trimethylbenzene	2019/11/19	<0.50		ppbv	
				Chlorobenzene	2019/11/19	<0.10		ppbv	



BUREAU
VERITAS

BV Labs Job #: B9V9704
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2019/11/19	<0.50		ppbv	
			1,3-Dichlorobenzene	2019/11/19	<0.40		ppbv	
			1,4-Dichlorobenzene	2019/11/19	<0.10		ppbv	
			1,2-Dichlorobenzene	2019/11/19	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2019/11/19	<0.50		ppbv	
			Hexachlorobutadiene	2019/11/19	<0.50		ppbv	
			Hexane	2019/11/19	<0.20		ppbv	
			Heptane	2019/11/19	<0.30		ppbv	
			Cyclohexane	2019/11/19	<0.20		ppbv	
			Tetrahydrofuran	2019/11/19	<0.40		ppbv	
			1,4-Dioxane	2019/11/19	<1.0		ppbv	
			Naphthalene	2019/11/19	<0.20		ppbv	
			Total Xylenes	2019/11/19	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2019/11/19	<0.10		ppbv	
			Vinyl Bromide	2019/11/19	<0.20		ppbv	
			Propene	2019/11/19	<0.50		ppbv	
			2,2,4-Trimethylpentane	2019/11/19	<0.20		ppbv	
			Carbon Disulfide	2019/11/19	<0.50		ppbv	
			Vinyl Acetate	2019/11/19	<0.20		ppbv	
6453213	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2019/11/19	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2019/11/19	<5.0		ug/m3	
6453219	DM2	Method Blank	Aliphatic >C5-C6	2019/11/19	<5.0		ug/m3	
			Aliphatic >C6-C8	2019/11/19	<5.0		ug/m3	
			Aliphatic >C8-C10	2019/11/19	<5.0		ug/m3	
			Aliphatic >C10-C12	2019/11/19	<5.0		ug/m3	
			Aliphatic >C12-C16	2019/11/19	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2019/11/19	<5.0		ug/m3	
			Aromatic >C8-C10	2019/11/19	<5.0		ug/m3	
			Aromatic >C10-C12	2019/11/19	<5.0		ug/m3	
			Aromatic >C12-C16	2019/11/19	<5.0		ug/m3	
6441779	ASC	RPD [LHI604-01]	Dichlorodifluoromethane (FREON 12)	2019/11/22	4.6		%	25
			1,2-Dichlorotetrafluoroethane	2019/11/22	NC		%	25
			Chloromethane	2019/11/22	NC		%	25
			Vinyl Chloride	2019/11/22	NC		%	25
			Chloroethane	2019/11/22	NC		%	25
			1,3-Butadiene	2019/11/22	NC		%	25
			Trichlorofluoromethane (FREON 11)	2019/11/22	5.8		%	25
			Ethanol (ethyl alcohol)	2019/11/22	8.1		%	25
			Trichlorotrifluoroethane	2019/11/22	NC		%	25
			2-propanol	2019/11/22	NC		%	25
			2-Propanone	2019/11/22	3.9		%	25
			Methyl Ethyl Ketone (2-Butanone)	2019/11/22	NC		%	25
			Methyl Isobutyl Ketone	2019/11/22	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2019/11/22	NC		%	25
			Methyl t-butyl ether (MTBE)	2019/11/22	NC		%	25
			Ethyl Acetate	2019/11/22	NC		%	25
			1,1-Dichloroethylene	2019/11/22	NC		%	25
			cis-1,2-Dichloroethylene	2019/11/22	NC		%	25
			trans-1,2-Dichloroethylene	2019/11/22	NC		%	25
			Methylene Chloride(Dichloromethane)	2019/11/22	NC		%	25



BUREAU
VERITAS

BV Labs Job #: B9V9704
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Chloroform	2019/11/22	NC		%	25
			Carbon Tetrachloride	2019/11/22	NC		%	25
			1,1-Dichloroethane	2019/11/22	NC		%	25
			1,2-Dichloroethane	2019/11/22	NC		%	25
			Ethylene Dibromide	2019/11/22	NC		%	25
			1,1,1-Trichloroethane	2019/11/22	NC		%	25
			1,1,2-Trichloroethane	2019/11/22	NC		%	25
			1,1,2,2-Tetrachloroethane	2019/11/22	NC		%	25
			cis-1,3-Dichloropropene	2019/11/22	NC		%	25
			trans-1,3-Dichloropropene	2019/11/22	NC		%	25
			1,2-Dichloropropane	2019/11/22	NC		%	25
			Bromomethane	2019/11/22	NC		%	25
			Bromoform	2019/11/22	NC		%	25
			Bromodichloromethane	2019/11/22	NC		%	25
			Dibromochloromethane	2019/11/22	NC		%	25
			Trichloroethylene	2019/11/22	NC		%	25
			Tetrachloroethylene	2019/11/22	NC		%	25
			Benzene	2019/11/22	3.0		%	25
			Toluene	2019/11/22	1.5		%	25
			Ethylbenzene	2019/11/22	NC		%	25
			p-m-Xylene	2019/11/22	3.4		%	25
			o-Xylene	2019/11/22	3.7		%	25
			Styrene	2019/11/22	NC		%	25
			4-ethyltoluene	2019/11/22	NC		%	25
			1,3,5-Trimethylbenzene	2019/11/22	NC		%	25
			1,2,4-Trimethylbenzene	2019/11/22	NC		%	25
			Chlorobenzene	2019/11/22	NC		%	25
			Benzyl chloride	2019/11/22	NC		%	25
			1,3-Dichlorobenzene	2019/11/22	NC		%	25
			1,4-Dichlorobenzene	2019/11/22	NC		%	25
			1,2-Dichlorobenzene	2019/11/22	NC		%	25
			1,2,4-Trichlorobenzene	2019/11/22	NC		%	25
			Hexachlorobutadiene	2019/11/22	NC		%	25
			Hexane	2019/11/22	12		%	25
			Heptane	2019/11/22	8.4		%	25
			Cyclohexane	2019/11/22	NC		%	25
			Tetrahydrofuran	2019/11/22	NC		%	25
			1,4-Dioxane	2019/11/22	NC		%	25
			Naphthalene	2019/11/22	NC		%	25
			Total Xylenes	2019/11/22	1.5		%	25
			1,1,1,2-Tetrachloroethane	2019/11/22	NC		%	25
			Vinyl Bromide	2019/11/22	NC		%	25
			Propene	2019/11/22	NC		%	25
			2,2,4-Trimethylpentane	2019/11/22	0.77		%	25
			Carbon Disulfide	2019/11/22	NC		%	25
			Vinyl Acetate	2019/11/22	NC		%	25
6449646	DM2	RPD [LHI604-01]	Dichlorodifluoromethane (FREON 12)	2019/11/19	4.6		%	25
			1,2-Dichlorotetrafluoroethane	2019/11/19	NC		%	25
			Chloromethane	2019/11/19	NC		%	25
			Vinyl Chloride	2019/11/19	NC		%	25



BUREAU
VERITAS

BV Labs Job #: B9V9704
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Chloroethane	2019/11/19	NC		%	25
			1,3-Butadiene	2019/11/19	NC		%	25
			Trichlorofluoromethane (FREON 11)	2019/11/19	5.8		%	25
			Ethanol (ethyl alcohol)	2019/11/19	8.1		%	25
			Trichlorotrifluoroethane	2019/11/19	NC		%	25
			2-propanol	2019/11/19	NC		%	25
			2-Propanone	2019/11/19	3.9		%	25
			Methyl Ethyl Ketone (2-Butanone)	2019/11/19	NC		%	25
			Methyl Isobutyl Ketone	2019/11/19	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2019/11/19	NC		%	25
			Methyl t-butyl ether (MTBE)	2019/11/19	NC		%	25
			Ethyl Acetate	2019/11/19	NC		%	25
			1,1-Dichloroethylene	2019/11/19	NC		%	25
			cis-1,2-Dichloroethylene	2019/11/19	NC		%	25
			trans-1,2-Dichloroethylene	2019/11/19	NC		%	25
			Methylene Chloride(Dichloromethane)	2019/11/19	NC		%	25
			Chloroform	2019/11/19	NC		%	25
			Carbon Tetrachloride	2019/11/19	NC		%	25
			1,1-Dichloroethane	2019/11/19	NC		%	25
			1,2-Dichloroethane	2019/11/19	NC		%	25
			Ethylene Dibromide	2019/11/19	NC		%	25
			1,1,1-Trichloroethane	2019/11/19	NC		%	25
			1,1,2-Trichloroethane	2019/11/19	NC		%	25
			1,1,2,2-Tetrachloroethane	2019/11/19	NC		%	25
			cis-1,3-Dichloropropene	2019/11/19	NC		%	25
			trans-1,3-Dichloropropene	2019/11/19	NC		%	25
			1,2-Dichloropropane	2019/11/19	NC		%	25
			Bromomethane	2019/11/19	NC		%	25
			Bromoform	2019/11/19	NC		%	25
			Bromodichloromethane	2019/11/19	NC		%	25
			Dibromochloromethane	2019/11/19	NC		%	25
			Trichloroethylene	2019/11/19	NC		%	25
			Tetrachloroethylene	2019/11/19	NC		%	25
			Benzene	2019/11/19	3.0		%	25
			Toluene	2019/11/19	1.5		%	25
			Ethylbenzene	2019/11/19	NC		%	25
			p+m-Xylene	2019/11/19	3.4		%	25
			o-Xylene	2019/11/19	3.7		%	25
			Styrene	2019/11/19	NC		%	25
			4-ethyltoluene	2019/11/19	NC		%	25
			1,3,5-Trimethylbenzene	2019/11/19	NC		%	25
			1,2,4-Trimethylbenzene	2019/11/19	NC		%	25
			Chlorobenzene	2019/11/19	NC		%	25
			Benzyl chloride	2019/11/19	NC		%	25
			1,3-Dichlorobenzene	2019/11/19	NC		%	25
			1,4-Dichlorobenzene	2019/11/19	NC		%	25
			1,2-Dichlorobenzene	2019/11/19	NC		%	25
			1,2,4-Trichlorobenzene	2019/11/19	NC		%	25
			Hexachlorobutadiene	2019/11/19	NC		%	25
			Hexane	2019/11/19	12		%	25



BUREAU
VERITAS

BV Labs Job #: B9V9704
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Heptane	2019/11/19	8.4		%	25
			Cyclohexane	2019/11/19	NC		%	25
			Tetrahydrofuran	2019/11/19	NC		%	25
			1,4-Dioxane	2019/11/19	NC		%	25
			Naphthalene	2019/11/19	NC		%	25
			Total Xylenes	2019/11/19	1.5		%	25
			1,1,1,2-Tetrachloroethane	2019/11/19	NC		%	25
			Vinyl Bromide	2019/11/19	NC		%	25
			Propene	2019/11/19	NC		%	25
			2,2,4-Trimethylpentane	2019/11/19	0.77		%	25
			Carbon Disulfide	2019/11/19	NC		%	25
			Vinyl Acetate	2019/11/19	NC		%	25
6453213	DM2	RPD [LHI604-01]	F1-BTEX, C6-C10 (as Toluene)	2019/11/19	3.6		%	25
			F2, C10-C16 (as Decane)	2019/11/19	6.4		%	25
6453219	DM2	RPD [LHI604-01]	Aliphatic >C5-C6	2019/11/19	1.4		%	25
			Aliphatic >C6-C8	2019/11/19	5.4		%	25
			Aliphatic >C8-C10	2019/11/19	4.3		%	25
			Aliphatic >C10-C12	2019/11/19	2.2		%	25
			Aliphatic >C12-C16	2019/11/19	NC		%	25
			Aromatic >C7-C8 (TEX Excluded)	2019/11/19	NC		%	25
			Aromatic >C8-C10	2019/11/19	2.6		%	25
			Aromatic >C10-C12	2019/11/19	6.4		%	25
			Aromatic >C12-C16	2019/11/19	NC		%	25
6449646	DM2	LCS	Bromochloromethane	2019/11/19		107	%	60 - 140
			D5-Chlorobenzene	2019/11/19		106	%	60 - 140
			Difluorobenzene	2019/11/19		108	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/11/19		100	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2019/11/19		93	%	70 - 130
			Chloromethane	2019/11/19		87	%	70 - 130
			Vinyl Chloride	2019/11/19		89	%	70 - 130
			Chloroethane	2019/11/19		86	%	70 - 130
			1,3-Butadiene	2019/11/19		92	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/11/19		107	%	70 - 130
			Ethanol (ethyl alcohol)	2019/11/19		104	%	70 - 130
			Trichlorotrifluoroethane	2019/11/19		93	%	70 - 130
			2-propanol	2019/11/19		71	%	70 - 130
			2-Propanone	2019/11/19		98	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2019/11/19		84	%	70 - 130
			Methyl Isobutyl Ketone	2019/11/19		89	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2019/11/19		89	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/11/19		101	%	70 - 130
			Ethyl Acetate	2019/11/19		106	%	70 - 130
			1,1-Dichloroethylene	2019/11/19		95	%	70 - 130
			cis-1,2-Dichloroethylene	2019/11/19		93	%	70 - 130
			trans-1,2-Dichloroethylene	2019/11/19		94	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/11/19		84	%	70 - 130
			Chloroform	2019/11/19		102	%	70 - 130
			Carbon Tetrachloride	2019/11/19		114	%	70 - 130
			1,1-Dichloroethane	2019/11/19		89	%	70 - 130
			1,2-Dichloroethane	2019/11/19		106	%	70 - 130



BUREAU
VERITAS

BV Labs Job #: B9V9704
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Ethylene Dibromide	2019/11/19		102	%	70 - 130
			1,1,1-Trichloroethane	2019/11/19		110	%	70 - 130
			1,1,2-Trichloroethane	2019/11/19		97	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/11/19		89	%	70 - 130
			cis-1,3-Dichloropropene	2019/11/19		100	%	70 - 130
			trans-1,3-Dichloropropene	2019/11/19		107	%	70 - 130
			1,2-Dichloropropane	2019/11/19		84	%	70 - 130
			Bromomethane	2019/11/19		95	%	70 - 130
			Bromoform	2019/11/19		108	%	70 - 130
			Bromodichloromethane	2019/11/19		109	%	70 - 130
			Dibromochloromethane	2019/11/19		114	%	70 - 130
			Trichloroethylene	2019/11/19		106	%	70 - 130
			Tetrachloroethylene	2019/11/19		107	%	70 - 130
			Benzene	2019/11/19		91	%	70 - 130
			Toluene	2019/11/19		100	%	70 - 130
			Ethylbenzene	2019/11/19		95	%	70 - 130
			p+m-Xylene	2019/11/19		97	%	70 - 130
			o-Xylene	2019/11/19		98	%	70 - 130
			Styrene	2019/11/19		104	%	70 - 130
			4-ethyltoluene	2019/11/19		106	%	70 - 130
			1,3,5-Trimethylbenzene	2019/11/19		101	%	70 - 130
			1,2,4-Trimethylbenzene	2019/11/19		105	%	70 - 130
			Chlorobenzene	2019/11/19		96	%	70 - 130
			Benzyl chloride	2019/11/19		92	%	70 - 130
			1,3-Dichlorobenzene	2019/11/19		106	%	70 - 130
			1,4-Dichlorobenzene	2019/11/19		104	%	70 - 130
			1,2-Dichlorobenzene	2019/11/19		106	%	70 - 130
			1,2,4-Trichlorobenzene	2019/11/19		130	%	70 - 130
			Hexachlorobutadiene	2019/11/19		114	%	70 - 130
			Hexane	2019/11/19		88	%	70 - 130
			Heptane	2019/11/19		88	%	70 - 130
			Cyclohexane	2019/11/19		89	%	70 - 130
			Tetrahydrofuran	2019/11/19		85	%	70 - 130
			1,4-Dioxane	2019/11/19		100	%	70 - 130
			Naphthalene	2019/11/19		134 (1)	%	70 - 130
			Total Xylenes	2019/11/19		97	%	70 - 130
			1,1,1,2-Tetrachloroethane	2019/11/19		100	%	70 - 130
			Vinyl Bromide	2019/11/19		109	%	70 - 130
			Propene	2019/11/19		85	%	70 - 130
			2,2,4-Trimethylpentane	2019/11/19		92	%	70 - 130
			Carbon Disulfide	2019/11/19		94	%	70 - 130



BUREAU
VERITAS

BV Labs Job #: B9V9704
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Vinyl Acetate	2019/11/19		49 (1)	%	70 - 130

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

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

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

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

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

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



BUREAU
VERITAS

BV Labs Job #: B9V9704

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

VALIDATION SIGNATURE PAGE

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

Maureen Smith, Supervisor, Volatiles

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.

INVOICE INFORMATION		REPORT INFORMATION				ANALYSIS REQUESTED																		
Company Name: <input checked="" type="checkbox"/> Imperial Oil <input type="checkbox"/> ExxonMobil		Company Name: <u>Galder Associates Ltd.</u>				Aromatic/Aliphatic Hydrocarbon Fractions BTEX Length of Sampling (minutes) Flow Rate (mL/min) F1 (C8-C10) - F2 (C10-C16) PAHs VOCs (full)																		
Contact Name: <u>10L Accounts Payable</u>		Contact Name: <u>Chris Vettorezzo</u>																						
Address: <u>102-2555-3rd Ave SE</u>		Address: <u>683 Innovation Drive Unit 11, Kingston, ON, K7K 7E6</u>																						
Email: <u>10LAccounts_Payable@exxonmobil.com</u>		Email: <u>Chris.vettorezzo@galder.com</u>																						
Ph: <u>(403) 299-5600</u>		Ph: <u>709-682-8593</u>				SPECIAL INSTRUCTIONS: IES: 88005740 <u>A2601436</u> SAF: <u>88005740</u> *regulators included in shipment																		
Sampler Name (Print): <u>Jeremy Eckert, Shikhan Choudhury</u>		Consultant Project #: <u>18113796-1485-1907B</u>																						
FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection		Media Type (See Legend)	REGULATORY CRITERIA / DETECTION LIMITS:																		
			DATE (YYYYMMDD)	TIME (24 HR)		REGULATORY CRITERIA / DETECTION LIMITS:			SPECIAL INSTRUCTIONS:			LEGEND			TURNAROUND TIME									
1 SV19-01	1231	FX1428	2019/11/16	16:23	S	YES	NO	COOLER ID #	TEMP °C	SEAL PRESENT	SEAL INTACT	COOLING MEDIA PRESENT	DATE	TIME (24 HR)	1	2	3	Standard (10 days) <input checked="" type="checkbox"/>	Rush (9 days) <input type="checkbox"/>	(6 days) <input type="checkbox"/>	(3 days) <input type="checkbox"/>			
2 SV19-02	257	FX1442		15:57	S								2019/11/13	12:00										
3 DUQA	343	FX1442		15:57	S																			
4 SV19-03	6673	FX0339		14:34	S																			
5 SV19-04	1760	FX0508		11:33	S																			
6																								
7																								
8																								
9																								
10																								
11																								
IOL SITE LOCATION: <u>2 Montreal Rd, Ottawa, ON</u>		REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): <u>N/A</u>				SPECIAL INSTRUCTIONS: IES: 88005740 <u>A2601436</u> SAF: <u>88005740</u> *regulators included in shipment																		
IOL PROJECT # (if applicable): <u>N/A</u>																								
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: <u>18113796-1485-777</u>																								
SEAL PRESENT	YES	NO	COOLER ID #	TEMP °C	SEAL PRESENT	SEAL INTACT	COOLING MEDIA PRESENT	DATE	TIME (24 HR)	RECEIVED BY:	1. <u>Jeremy Eckert</u>	2019/11/12	16:00	1. <u>Shikhan Choudhury</u>	2019/11/13	12:00	LAB USE ONLY	MAXXAM JOB #	<u>BAV9704</u>	SAMPLES	LABELLED BY:	<u>KK4</u>	VERIFIED BY:	<u>LOR</u>
SEAL INTACT	<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																	
COOLING MEDIA PRESENT	<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																	

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: November 11, 2019

Location: 2 Montreal Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 18113796-1485

Sample Submission Number: B9V9704

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery (134%) outside acceptance range of 70-130% for naphthalene. Lab control sample recovery (49%) outside acceptance range of 70-130% for vinyl acetate. All remaining laboratory QC results are within acceptance criteria.
Extraction Surrogate Recovery			X	
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery			X	
Lab Control Sample Recovery		X		

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits.
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:

Yes

Has lab warranted all tests were in statistical control in CoA (Yes/No)?:

Yes

Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:

Yes

Were all samples analyzed within hold times (Yes/No)?:

Yes

All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:

n/a

Is Chain of Custody completed and signed (Yes/No)?:

Yes

Were sample temperatures acceptable when they reached lab (Yes/No)?:


n/a

Is data considered to be reliable (Yes/No/Suspect)?:

Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): 

Date: November 29, 2019



Task Order#: 18113796-1485-7777
 Site#: N/A
 Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
 Project #: 18113796-1485-1907B
 Your C.O.C. #: 78311

Attention: Chris Vettorazzo

Golder Associates Ltd
 683 Innovation Dr
 Kingston, ON
 Canada K7K 7E6

Report Date: 2019/11/25
 Report #: R5978672
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9V9708
Received: 2019/11/13, 12:00

Sample Matrix: Air
 # Samples Received: 1

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	1	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	1	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	1	BRL SOP-00304	EPA TO-15 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. All samples were analyzed within hold time unless otherwise flagged.

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) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.



Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B
Your C.O.C. #: 78311

Attention: Chris Vettorazzo

Golder Associates Ltd
683 Innovation Dr
Kingston, ON
Canada K7K 7E6

Report Date: 2019/11/25
Report #: R5978672
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9V9708
Received: 2019/11/13, 12:00

Encryption Key

Kyle Reinhart
Project Manager
25 Nov 2019 09:42:28

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

=====
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.



BUREAU
VERITAS

BV Labs Job #: B9V9708

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

RESULTS OF ANALYSES OF AIR

BV Labs ID		LHI675	
Sampling Date		2019/11/11 16:23	
COC Number		78311	
	UNITS	FIELD BLANK	QC Batch
Pressure on Receipt	psig	(-1.1)	6449645
QC Batch = Quality Control Batch			



BUREAU
VERITAS

BV Labs Job #: B9V9708

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI675		
Sampling Date		2019/11/11 16:23		
COC Number		78311		
	UNITS	FIELD BLANK	RDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ppbv	0.49	0.20	6449646
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	6449646
Chloromethane	ppbv	0.32	0.30	6449646
Vinyl Chloride	ppbv	<0.10	0.10	6449646
Chloroethane	ppbv	<0.30	0.30	6449646
1,3-Butadiene	ppbv	<0.50	0.50	6449646
Trichlorofluoromethane (FREON 11)	ppbv	0.23	0.20	6449646
Ethanol (ethyl alcohol)	ppbv	2.8	1.0	6449646
Trichlorotrifluoroethane	ppbv	<0.15	0.15	6449646
2-propanol	ppbv	<1.0	1.0	6449646
2-Propanone	ppbv	1.48	0.60	6449646
Methyl Ethyl Ketone (2-Butanone)	ppbv	<0.20	0.20	6449646
Methyl Isobutyl Ketone	ppbv	<0.20	0.20	6449646
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	6449646
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	6449646
Ethyl Acetate	ppbv	<1.0	1.0	6449646
1,1-Dichloroethylene	ppbv	<0.10	0.10	6449646
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	6449646
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	6449646
Methylene Chloride(Dichloromethane)	ppbv	<0.60	0.60	6449646
Chloroform	ppbv	<0.10	0.10	6449646
Carbon Tetrachloride	ppbv	<0.10	0.10	6449646
1,1-Dichloroethane	ppbv	<0.10	0.10	6449646
1,2-Dichloroethane	ppbv	<0.10	0.10	6449646
Ethylene Dibromide	ppbv	<0.10	0.10	6449646
1,1,1-Trichloroethane	ppbv	<0.10	0.10	6449646
1,1,2-Trichloroethane	ppbv	<0.10	0.10	6449646
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	6449646
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	6449646
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	6449646
1,2-Dichloropropane	ppbv	<0.10	0.10	6449646
Bromomethane	ppbv	<0.10	0.10	6449646
Bromoform	ppbv	<0.20	0.20	6449646
Bromodichloromethane	ppbv	<0.20	0.20	6449646
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9V9708
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI675		
Sampling Date		2019/11/11 16:23		
COC Number		78311		
	UNITS	FIELD BLANK	RDL	QC Batch
Dibromochloromethane	ppbv	<0.20	0.20	6449646
Trichloroethylene	ppbv	<0.10	0.10	6449646
Tetrachloroethylene	ppbv	<0.10	0.10	6449646
Benzene	ppbv	0.12	0.10	6449646
Toluene	ppbv	0.53	0.10	6449646
Ethylbenzene	ppbv	<0.10	0.10	6449646
p+m-Xylene	ppbv	<0.20	0.20	6449646
o-Xylene	ppbv	<0.10	0.10	6449646
Styrene	ppbv	<0.10	0.10	6449646
4-ethyltoluene	ppbv	<0.50	0.50	6449646
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	6449646
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	6449646
Chlorobenzene	ppbv	<0.10	0.10	6449646
Benzyl chloride	ppbv	<0.50	0.50	6449646
1,3-Dichlorobenzene	ppbv	<0.40	0.40	6449646
1,4-Dichlorobenzene	ppbv	<0.10	0.10	6449646
1,2-Dichlorobenzene	ppbv	<0.10	0.10	6449646
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	6449646
Hexachlorobutadiene	ppbv	<0.50	0.50	6449646
Hexane	ppbv	<0.20	0.20	6449646
Heptane	ppbv	<0.30	0.30	6449646
Cyclohexane	ppbv	<0.20	0.20	6449646
Tetrahydrofuran	ppbv	<0.40	0.40	6449646
1,4-Dioxane	ppbv	<1.0	1.0	6449646
Naphthalene	ppbv	<0.20	0.20	6449646
Total Xylenes	ppbv	<0.30	0.30	6449646
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	6449646
Vinyl Bromide	ppbv	<0.20	0.20	6449646
Propene	ppbv	<0.50	0.50	6449646
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	6449646
Carbon Disulfide	ppbv	<0.50	0.50	6449646
Vinyl Acetate	ppbv	<0.20	0.20	6449646
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9V9708
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI675		
Sampling Date		2019/11/11 16:23		
COC Number		78311		
	UNITS	FIELD BLANK	RDL	QC Batch
Instrument				
Surrogate Recovery (%)				
Bromochloromethane	%	89		6449646
D5-Chlorobenzene	%	78		6449646
Difluorobenzene	%	88		6449646
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9V9708
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		LHI675		
Sampling Date		2019/11/11 16:23		
COC Number		78311		
	UNITS	FIELD BLANK	RDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ug/m3	2.42	0.99	6441779
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	6441779
Chloromethane	ug/m3	0.65	0.62	6441779
Vinyl Chloride	ug/m3	<0.26	0.26	6441779
Chloroethane	ug/m3	<0.79	0.79	6441779
1,3-Butadiene	ug/m3	<1.1	1.1	6441779
Trichlorofluoromethane (FREON 11)	ug/m3	1.3	1.1	6441779
Ethanol (ethyl alcohol)	ug/m3	5.3	1.9	6441779
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	6441779
2-propanol	ug/m3	<2.5	2.5	6441779
2-Propanone	ug/m3	3.5	1.4	6441779
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<0.59	0.59	6441779
Methyl Isobutyl Ketone	ug/m3	<0.82	0.82	6441779
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	6441779
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	6441779
Ethyl Acetate	ug/m3	<3.6	3.6	6441779
1,1-Dichloroethylene	ug/m3	<0.40	0.40	6441779
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6441779
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6441779
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	2.1	6441779
Chloroform	ug/m3	<0.49	0.49	6441779
Carbon Tetrachloride	ug/m3	<0.63	0.63	6441779
1,1-Dichloroethane	ug/m3	<0.40	0.40	6441779
1,2-Dichloroethane	ug/m3	<0.40	0.40	6441779
Ethylene Dibromide	ug/m3	<0.77	0.77	6441779
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	6441779
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	6441779
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	6441779
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	6441779
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	6441779
1,2-Dichloropropane	ug/m3	<0.46	0.46	6441779
Bromomethane	ug/m3	<0.39	0.39	6441779
Bromoform	ug/m3	<2.1	2.1	6441779
Bromodichloromethane	ug/m3	<1.3	1.3	6441779
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9V9708
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		LHI675		
Sampling Date		2019/11/11 16:23		
COC Number		78311		
	UNITS	FIELD BLANK	RDL	QC Batch
Dibromochloromethane	ug/m3	<1.7	1.7	6441779
Trichloroethylene	ug/m3	<0.54	0.54	6441779
Tetrachloroethylene	ug/m3	<0.68	0.68	6441779
Benzene	ug/m3	0.38	0.32	6441779
Toluene	ug/m3	2.01	0.38	6441779
Ethylbenzene	ug/m3	<0.43	0.43	6441779
p+m-Xylene	ug/m3	<0.87	0.87	6441779
o-Xylene	ug/m3	<0.43	0.43	6441779
Styrene	ug/m3	<0.43	0.43	6441779
4-ethyltoluene	ug/m3	<2.5	2.5	6441779
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	6441779
1,2,4-Trimethylbenzene	ug/m3	<2.5	2.5	6441779
Chlorobenzene	ug/m3	<0.46	0.46	6441779
Benzyl chloride	ug/m3	<2.6	2.6	6441779
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	6441779
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	6441779
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	6441779
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	6441779
Hexachlorobutadiene	ug/m3	<5.3	5.3	6441779
Hexane	ug/m3	<0.70	0.70	6441779
Heptane	ug/m3	<1.2	1.2	6441779
Cyclohexane	ug/m3	<0.69	0.69	6441779
Tetrahydrofuran	ug/m3	<1.2	1.2	6441779
1,4-Dioxane	ug/m3	<3.6	3.6	6441779
Naphthalene	ug/m3	<1.0	1.0	6441779
Total Xylenes	ug/m3	<1.3	1.3	6441779
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	6441779
Vinyl Bromide	ug/m3	<0.87	0.87	6441779
Propene	ug/m3	<0.86	0.86	6441779
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	6441779
Carbon Disulfide	ug/m3	<1.6	1.6	6441779
Vinyl Acetate	ug/m3	<0.70	0.70	6441779
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9V9708
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		LHI675		
Sampling Date		2019/11/11 16:23		
COC Number		78311		
	UNITS	FIELD BLANK	RDL	QC Batch
F1-BTEX, C6-C10 (as Toluene)	ug/m3	22.5	5.0	6453213
F2, C10-C16 (as Decane)	ug/m3	<5.0	5.0	6453213
Aliphatic >C5-C6	ug/m3	<5.0	5.0	6453219
Aliphatic >C6-C8	ug/m3	<5.0	5.0	6453219
Aliphatic >C8-C10	ug/m3	<5.0	5.0	6453219
Aliphatic >C10-C12	ug/m3	<5.0	5.0	6453219
Aliphatic >C12-C16	ug/m3	<5.0	5.0	6453219
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	5.0	6453219
Aromatic >C8-C10	ug/m3	<5.0	5.0	6453219
Aromatic >C10-C12	ug/m3	<5.0	5.0	6453219
Aromatic >C12-C16	ug/m3	<5.0	5.0	6453219
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: B9V9708
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

TEST SUMMARY

BV Labs ID: LHI675
Sample ID: FIELD BLANK
Matrix: Air

Collected: 2019/11/11
Relinquished: 2019/11/12
Received: 2019/11/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6453213	N/A	2019/11/19	Dany Marqass
BTEX Fractionation in Air (TO-15mod)	GC/MS	6453219	N/A	2019/11/19	Dany Marqass
Canister Pressure (TO-15)	PRES	6449645	N/A	2019/11/19	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6441779	N/A	2019/11/22	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6449646	N/A	2019/11/19	Dany Marqass



BUREAU
VERITAS

BV Labs Job #: B9V9708

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

GENERAL COMMENTS

WS# 6449646: Vinyl Acetate was less than 60% recovery in the reference standard. There were no positives found for Vinyl Acetate therefore there should be no effect on the data.

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: B9V9708

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	6449646	DM2	Method Blank	Bromochloromethane	2019/11/19		102	%	60 - 140
				D5-Chlorobenzene	2019/11/19		87	%	60 - 140
				Difluorobenzene	2019/11/19		101	%	60 - 140
				Dichlorodifluoromethane (FREON 12)	2019/11/19	<0.20		ppbv	
				1,2-Dichlorotetrafluoroethane	2019/11/19	<0.17		ppbv	
				Chloromethane	2019/11/19	<0.30		ppbv	
				Vinyl Chloride	2019/11/19	<0.10		ppbv	
				Chloroethane	2019/11/19	<0.30		ppbv	
				1,3-Butadiene	2019/11/19	<0.50		ppbv	
				Trichlorofluoromethane (FREON 11)	2019/11/19	<0.20		ppbv	
				Ethanol (ethyl alcohol)	2019/11/19	<1.0		ppbv	
				Trichlorotrifluoroethane	2019/11/19	<0.15		ppbv	
				2-propanol	2019/11/19	<1.0		ppbv	
				2-Propanone	2019/11/19	<0.60		ppbv	
				Methyl Ethyl Ketone (2-Butanone)	2019/11/19	<0.20		ppbv	
				Methyl Isobutyl Ketone	2019/11/19	<0.20		ppbv	
				Methyl Butyl Ketone (2-Hexanone)	2019/11/19	<1.0		ppbv	
				Methyl t-butyl ether (MTBE)	2019/11/19	<0.20		ppbv	
				Ethyl Acetate	2019/11/19	<1.0		ppbv	
				1,1-Dichloroethylene	2019/11/19	<0.10		ppbv	
				cis-1,2-Dichloroethylene	2019/11/19	<0.10		ppbv	
				trans-1,2-Dichloroethylene	2019/11/19	<0.10		ppbv	
				Methylene Chloride(Dichloromethane)	2019/11/19	<0.60		ppbv	
				Chloroform	2019/11/19	<0.10		ppbv	
				Carbon Tetrachloride	2019/11/19	<0.10		ppbv	
				1,1-Dichloroethane	2019/11/19	<0.10		ppbv	
				1,2-Dichloroethane	2019/11/19	<0.10		ppbv	
				Ethylene Dibromide	2019/11/19	<0.10		ppbv	
				1,1,1-Trichloroethane	2019/11/19	<0.10		ppbv	
				1,1,2-Trichloroethane	2019/11/19	<0.10		ppbv	
				1,1,2,2-Tetrachloroethane	2019/11/19	<0.10		ppbv	
				cis-1,3-Dichloropropene	2019/11/19	<0.10		ppbv	
				trans-1,3-Dichloropropene	2019/11/19	<0.10		ppbv	
				1,2-Dichloropropane	2019/11/19	<0.10		ppbv	
				Bromomethane	2019/11/19	<0.10		ppbv	
				Bromoform	2019/11/19	<0.20		ppbv	
				Bromodichloromethane	2019/11/19	<0.20		ppbv	
				Dibromochloromethane	2019/11/19	<0.20		ppbv	
				Trichloroethylene	2019/11/19	<0.10		ppbv	
				Tetrachloroethylene	2019/11/19	<0.10		ppbv	
				Benzene	2019/11/19	<0.10		ppbv	
				Toluene	2019/11/19	<0.10		ppbv	
				Ethylbenzene	2019/11/19	<0.10		ppbv	
				p+m-Xylene	2019/11/19	<0.20		ppbv	
				o-Xylene	2019/11/19	<0.10		ppbv	
				Styrene	2019/11/19	<0.10		ppbv	
				4-ethyltoluene	2019/11/19	<0.50		ppbv	
				1,3,5-Trimethylbenzene	2019/11/19	<0.50		ppbv	
				1,2,4-Trimethylbenzene	2019/11/19	<0.50		ppbv	
				Chlorobenzene	2019/11/19	<0.10		ppbv	



BUREAU
VERITAS

BV Labs Job #: B9V9708
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2019/11/19	<0.50		ppbv	
			1,3-Dichlorobenzene	2019/11/19	<0.40		ppbv	
			1,4-Dichlorobenzene	2019/11/19	<0.10		ppbv	
			1,2-Dichlorobenzene	2019/11/19	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2019/11/19	<0.50		ppbv	
			Hexachlorobutadiene	2019/11/19	<0.50		ppbv	
			Hexane	2019/11/19	<0.20		ppbv	
			Heptane	2019/11/19	<0.30		ppbv	
			Cyclohexane	2019/11/19	<0.20		ppbv	
			Tetrahydrofuran	2019/11/19	<0.40		ppbv	
			1,4-Dioxane	2019/11/19	<1.0		ppbv	
			Naphthalene	2019/11/19	<0.20		ppbv	
			Total Xylenes	2019/11/19	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2019/11/19	<0.10		ppbv	
			Vinyl Bromide	2019/11/19	<0.20		ppbv	
			Propene	2019/11/19	<0.50		ppbv	
			2,2,4-Trimethylpentane	2019/11/19	<0.20		ppbv	
			Carbon Disulfide	2019/11/19	<0.50		ppbv	
			Vinyl Acetate	2019/11/19	<0.20		ppbv	
6453213	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2019/11/19	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2019/11/19	<5.0		ug/m3	
6453219	DM2	Method Blank	Aliphatic >C5-C6	2019/11/19	<5.0		ug/m3	
			Aliphatic >C6-C8	2019/11/19	<5.0		ug/m3	
			Aliphatic >C8-C10	2019/11/19	<5.0		ug/m3	
			Aliphatic >C10-C12	2019/11/19	<5.0		ug/m3	
			Aliphatic >C12-C16	2019/11/19	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2019/11/19	<5.0		ug/m3	
			Aromatic >C8-C10	2019/11/19	<5.0		ug/m3	
			Aromatic >C10-C12	2019/11/19	<5.0		ug/m3	
			Aromatic >C12-C16	2019/11/19	<5.0		ug/m3	
6449646	DM2	LCS	Bromochloromethane	2019/11/19		107	%	60 - 140
			D5-Chlorobenzene	2019/11/19		106	%	60 - 140
			Difluorobenzene	2019/11/19		108	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/11/19		100	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2019/11/19		93	%	70 - 130
			Chloromethane	2019/11/19		87	%	70 - 130
			Vinyl Chloride	2019/11/19		89	%	70 - 130
			Chloroethane	2019/11/19		86	%	70 - 130
			1,3-Butadiene	2019/11/19		92	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/11/19		107	%	70 - 130
			Ethanol (ethyl alcohol)	2019/11/19		104	%	70 - 130
			Trichlorotrifluoroethane	2019/11/19		93	%	70 - 130
			2-propanol	2019/11/19		71	%	70 - 130
			2-Propanone	2019/11/19		98	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2019/11/19		84	%	70 - 130
			Methyl Isobutyl Ketone	2019/11/19		89	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2019/11/19		89	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/11/19		101	%	70 - 130
			Ethyl Acetate	2019/11/19		106	%	70 - 130
			1,1-Dichloroethylene	2019/11/19		95	%	70 - 130



BUREAU
VERITAS

BV Labs Job #: B9V9708
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 18113796-1485-7777
Site#: N/A
Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO
Project #: 18113796-1485-1907B

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			cis-1,2-Dichloroethylene	2019/11/19		93	%	70 - 130
			trans-1,2-Dichloroethylene	2019/11/19		94	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/11/19		84	%	70 - 130
			Chloroform	2019/11/19		102	%	70 - 130
			Carbon Tetrachloride	2019/11/19		114	%	70 - 130
			1,1-Dichloroethane	2019/11/19		89	%	70 - 130
			1,2-Dichloroethane	2019/11/19		106	%	70 - 130
			Ethylene Dibromide	2019/11/19		102	%	70 - 130
			1,1,1-Trichloroethane	2019/11/19		110	%	70 - 130
			1,1,2-Trichloroethane	2019/11/19		97	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/11/19		89	%	70 - 130
			cis-1,3-Dichloropropene	2019/11/19		100	%	70 - 130
			trans-1,3-Dichloropropene	2019/11/19		107	%	70 - 130
			1,2-Dichloropropane	2019/11/19		84	%	70 - 130
			Bromomethane	2019/11/19		95	%	70 - 130
			Bromoform	2019/11/19		108	%	70 - 130
			Bromodichloromethane	2019/11/19		109	%	70 - 130
			Dibromochloromethane	2019/11/19		114	%	70 - 130
			Trichloroethylene	2019/11/19		106	%	70 - 130
			Tetrachloroethylene	2019/11/19		107	%	70 - 130
			Benzene	2019/11/19		91	%	70 - 130
			Toluene	2019/11/19		100	%	70 - 130
			Ethylbenzene	2019/11/19		95	%	70 - 130
			p+m-Xylene	2019/11/19		97	%	70 - 130
			o-Xylene	2019/11/19		98	%	70 - 130
			Styrene	2019/11/19		104	%	70 - 130
			4-ethyltoluene	2019/11/19		106	%	70 - 130
			1,3,5-Trimethylbenzene	2019/11/19		101	%	70 - 130
			1,2,4-Trimethylbenzene	2019/11/19		105	%	70 - 130
			Chlorobenzene	2019/11/19		96	%	70 - 130
			Benzyl chloride	2019/11/19		92	%	70 - 130
			1,3-Dichlorobenzene	2019/11/19		106	%	70 - 130
			1,4-Dichlorobenzene	2019/11/19		104	%	70 - 130
			1,2-Dichlorobenzene	2019/11/19		106	%	70 - 130
			1,2,4-Trichlorobenzene	2019/11/19		130	%	70 - 130
			Hexachlorobutadiene	2019/11/19		114	%	70 - 130
			Hexane	2019/11/19		88	%	70 - 130
			Heptane	2019/11/19		88	%	70 - 130
			Cyclohexane	2019/11/19		89	%	70 - 130
			Tetrahydrofuran	2019/11/19		85	%	70 - 130
			1,4-Dioxane	2019/11/19		100	%	70 - 130
			Naphthalene	2019/11/19		134 (1)	%	70 - 130
			Total Xylenes	2019/11/19		97	%	70 - 130
			1,1,1,2-Tetrachloroethane	2019/11/19		100	%	70 - 130
			Vinyl Bromide	2019/11/19		109	%	70 - 130
			Propene	2019/11/19		85	%	70 - 130
			2,2,4-Trimethylpentane	2019/11/19		92	%	70 - 130
			Carbon Disulfide	2019/11/19		94	%	70 - 130



BUREAU
VERITAS

BV Labs Job #: B9V9708

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A;2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC									
Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits	
			Vinyl Acetate	2019/11/19		49 (1)	%	70 - 130	

LCS: 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.

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



BUREAU
VERITAS

BV Labs Job #: B9V9708

Report Date: 2019/11/25

Golder Associates Ltd

Task Order#: 18113796-1485-7777

Site#: N/A

Site Location: N/A; 2 MONTREAL ROAD, OTTAWA, ONTARIO

Project #: 18113796-1485-1907B

VALIDATION SIGNATURE PAGE

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

Maureen Smith, Supervisor, Volatiles

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.

INVOICE INFORMATION				REPORT INFORMATION				ANALYSIS REQUESTED											
Company Name: <input checked="" type="checkbox"/> Imperial Oil <input type="checkbox"/> ExxonMobil Contact Name: 10L Accounts Payable Address: 102-2555-3rd Ave SE Calgary, AB T2A 7W5 Email: 10LAccounts-Payable@imperial.com Ph: 403-299-5600				Company Name: Gelder Associates Ltd. Contact Name: Chris Vetrozza Address: 683 Innovation Dr, Unit 1, Kingston, ON, K7K 7E6 Email: Chris.Vetrozza@gelder.com Ph: 709-682-8593				Length of Sampling (minutes): Flow Rate (mL/min): BTEX Aromatic/Aliphatic Hydrocarbon Fractions F1 (C6-C10) - F2 (C10-C16) PAHs (Full)											
SAMPLER INFORMATION				SPECIAL INSTRUCTIONS				REGULATORY CRITERIA / DETECTION LIMITS											
Sampler Name (Print): Jeremy Eckert, Shihari Chaudhury				Consultant Project #: 18113796-1485-1907B				SPECIAL INSTRUCTIONS: YES: A260/436 SAF: 88005740 N/A											
FIELD SAMPLE ID				REGULATORY CRITERIA / DETECTION LIMITS (PLEASE SPECIFY):				SPECIAL INSTRUCTIONS											
Canister Serial #	Flow Regulator Serial #	DATE (M/M/YY)	TIME (24 HR)	Media Type (See Legend)	LENGTH OF SAMPLING (minutes)	FLOW RATE (mL/min)	REGULATORY CRITERIA / DETECTION LIMITS (PLEASE SPECIFY):	SPECIAL INSTRUCTIONS											
396	FX1546	2019/11/12	16:23	5	8	175	N/A	YES: A260/436 SAF: 88005740 N/A											
1	Field Blank																		
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			

IOL SITE LOCATION: 2 Montreal Rd, Ottawa, ON		IOL PROJECT # (if applicable): N/A		MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 18113796-1485-7777	
SEAL PRESENT SEAL INTACT COOLING MEDIA PRESENT	YES <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	NO <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	COOLER ID # 18113796-1485-7777	TEMP °C /	DATE: 2019/11/12 RECEIVED BY: Jeremy Eckert
RELINQUISHED BY:	DATE: 2019/11/12 RECEIVED BY: Jeremy Eckert		SEAL PRESENT SEAL INTACT COOLING MEDIA PRESENT	YES <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	NO <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
1.	DATE: 2019/11/13 RECEIVED BY: Khushboo Kapoor		SEAL PRESENT SEAL INTACT COOLING MEDIA PRESENT	YES <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	NO <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.	DATE: 2019/11/13 RECEIVED BY: Khushboo Kapoor		SEAL PRESENT SEAL INTACT COOLING MEDIA PRESENT	YES <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	NO <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
3.	DATE: 2019/11/13 RECEIVED BY: Khushboo Kapoor		SEAL PRESENT SEAL INTACT COOLING MEDIA PRESENT	YES <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	NO <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

TURNAROUND TIME Standard (10 days) <input checked="" type="checkbox"/> Rush (9 days) <input type="checkbox"/> (6 days) <input type="checkbox"/> (3 days) <input type="checkbox"/>		DATE REQUIRED LAB USE ONLY MAXXAM JOB # 89V9708	
Labeled BY: KY4		Verified BY: LOR	

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: November 11, 2019

Location: 2 Montreal Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 18113796-1485

Sample Submission Number: B9V9708

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery (134%) outside acceptance range of 70-130% for naphthalene. Lab control sample recovery (49%) outside acceptance range of 70-130% for vinyl acetate. All remaining laboratory QC results are within acceptance criteria.
Extraction Surrogate Recovery			X	
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration		X		Field blank sample exceeded alert limits for toluene.
Trip Blank Concentration			X	All remaining field QC samples are within alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:

Yes

Has lab warranted all tests were in statistical control in CoA (Yes/No)?:

Yes

Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:

Yes

Were all samples analyzed within hold times (Yes/No)?:

Yes

All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:

n/a

Is Chain of Custody completed and signed (Yes/No)?:

Yes

Were sample temperatures acceptable when they reached lab (Yes/No)?:

n/a

Is data considered to be reliable (Yes/No/Suspect)?:

Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): *Amanda Newberry*

Date: November 29, 2019

APPENDIX D

Quality Assurance/Quality Control

QUALITY ASSURANCE/QUALITY CONTROL

In conjunction with the field investigations completed to date, a Quality Assurance/Quality Control (QA/QC) program was implemented to ensure the integrity of the soil, groundwater and/or soil vapour sampling and analytical testing results.

1.0 FIELD PROGRAM

All sampling activities were completed in accordance with Golder's Technical Field Procedures by trained Golder personnel. All field activities were documented in field notes and results were recorded on standard field forms. All reusable field equipment involved in the sampling and monitoring of soil, soil vapour and groundwater was decontaminated between sampling locations in accordance with Golder's Technical Procedures. Soil samples were collected using appropriate handling protocols and were placed in sample containers provided by Bureau Veritas Laboratories (BVL).

Soil samples are not directly contacted by hand. To help prevent cross-contamination, stainless steel sampling instruments and a new pair of clean nitrile gloves are used for the collection of each sample. Soil samples that were collected for field methanol preservation were collected using a dedicated, disposable soil sampling device. Dedicated fluorinated ethylene propylene (Teflon®), nylon (Nylaflo®) or stainless steel is used for each soil vapour sample to avoid cross contamination. A helium leak tracer test is conducted on each soil vapour probe prior to verify that there is no ambient air penetrating the ground surface along the outside of the tubing and mixing with the soil vapours during sampling.

All soil, soil vapour and groundwater samples are placed in laboratory-supplied container suitable for the analytes, and where applicable, the appropriate laboratory-supplied preservative is added to the samples, as outlined in the following table.

Analyte	Laboratory Containers	Preservative	Field Filtered
Soil samples			
BTEX, PHC Fractions F1 to F4	1 x 120 mL jars plus 2 x 40 mL clear glass vials	No preservative Methanol	n/a
PAHs	1 x 120 mL jars	No preservative	n/a
Metals	1 x 250 mL jar	No preservative	n/a
Particle size distribution	1 x 250 mL jar	No preservative	n/a
TCLP	1 x 250 mL jar plus 1 x 60 mL jar	No preservative No preservative	n/a
VOCs	1 x 120 mL jars plus 2 x 40 mL clear glass vials	No preservative Methanol	n/a
Fraction organic carbon	1 x 120 mL jar	No preservative	n/a
PCBs	1 x 120 mL jar	No preservative	n/a
Glycols	1 x 120 mL jar	No preservative	n/a

Analyte	Laboratory Containers	Preservative	Field Filtered
Groundwater samples			
BTEX and PHC Fraction F1	2 x 40 mL clear glass vials	Sodium bisulphate	No
PHC Fractions F2, F3, F4	2 x 100 mL amber glass	Sodium bisulphate	No
Dissolved metals	120 mL HDPE	Nitric acid	Yes
PAHs	2 x 100 mL amber glass	Sodium bisulphate	No
VOCs	2 x 40 mL clear glass vials	Sodium bisulphate	No
PCBs	2 x 500 mL amber glass	No preservative	No
Glycols	2 x 40 mL amber glass vials	Sodium bisulphate	No
Soil vapour samples			
BTEX, PHC Fractions F1 and F2, aromatic and aliphatic hydrocarbons, and naphthalene	1.4 L SUMMA canister	No preservative	n/a

Notes: BTEX - benzene, toluene, ethylbenzene, xylenes; HDPE - high density polyethylene; PAHs - polycyclic aromatic hydrocarbons; PCBs - polychlorinated biphenyls; PHC F1, F2, F3, F4 – petroleum hydrocarbon fractions F1, F2, F3, and F4; TCLP - toxicity characteristic leachate procedure; VOCs - volatile organic carbons

Soil, soil vapour and groundwater samples were given unique identification numbers and the soil and groundwater sampling containers were preserved in ice-filled coolers to maintain temperatures below 10°C. Samples were logged onto formal chain-of-custody documents and transported to BVL for chemical analysis. BVL is accredited by the Standards Council of Canada.

Blind field duplicate soil, soil vapour and groundwater samples are submitted for analysis. Trip and field blanks are submitted for analysis, as necessary, to evaluate the potential for cross contamination during the sampling and transportation of the samples. Submission of blind field duplicate QC samples was at a minimum rate of 10% of total samples.

2.0 LABORATORY PROGRAM

The laboratory QA/QC program included adherence to laboratory sampling and analysis protocols (e.g., hold times, sample containers, preservatives, detection limits and approved methodology) and the analysis of laboratory method blanks, laboratory control sample (blank spike), laboratory sample duplicates, surrogate recovery and matrix spikes.

Laboratory method blank samples are free of the target analytes and are analyzed through the same analytical method than the test samples. Method blank results are used to detect interferences or impurities introduced by the laboratory equipment, reagents, or solvents.

Laboratory control samples are fortified with a known concentration of the select target analytes and then analyzed through the same analytical method than the test samples. Laboratory control samples are used to monitor the analyte recovery and validate the calibration of the instrumentation.

For laboratory duplicate samples, a second aliquot from a randomly selected sample within an analytical batch is processed through the same analytical method. Laboratory duplicate sample results are used to evaluate the reproducibility of the analytical method.

Surrogate recovery is analyzed for organics parameters by spiking samples with known quantities of surrogate chemicals which have similar chemical properties to the parameters being analyzed. The reported recovery provides an indication of the analytical method accuracy for that sample.

Matrix spikes were conducted by adding known concentrations of the analyte of interest to a sample to evaluate the effects of the sample matrix on the analytical method.

3.0 DATA RECEPTION

Once laboratory analytical results were received, Golder completed a review of field and laboratory quality. This included review of laboratory QC performance to confirm results are within acceptance criteria, as well as evaluation of field duplicate and blank results to confirm they were within alert limits. Upon receipt of the analytical results, Relative Percent Difference (RPD) values between the original samples and their blind field duplicates were calculated as follows:

$$\text{RPD}\% = \frac{|S - D|}{\frac{1}{2}(S + D)} \times 100$$

Where: RPD = relative percent difference
S = sample value
D = blind field duplicate or replicate value

Since analytical error increases near the Reportable Detection Limit (RDL), an RPD was only calculated where the concentrations of both the original and blind field duplicate samples were greater than five times the RDL. The calculated RPDs were then compared to parameter specific alert limits.

Exceedances of the QC acceptance or alert criteria were investigated with the laboratory and, if warranted, a corrective action report was requested from the laboratory.

4.0 DATA QUALITY REVIEW RESULTS

Results of the data quality review are summarized in Table D1. The RPD calculations and QC results are presented in Tables D2 to D14.

Two field duplicate soil samples were collected and submitted to the laboratory as part of the soil investigation. Two field duplicate and two field blank soil vapour samples were collected and submitted to the laboratory as part of the soil vapour QC program. Two field duplicates, one field blank and one trip blank were also submitted to the laboratory as part of the groundwater QC program.

Based on the data quality review, 14 data quality issues have been identified. Two issues resulted in select toluene and 2-propanone soil vapour results to be considered suspect. These issues did not have a material effect on the conclusions presented in this report. The issues are discussed in detail in Table D1.

5.0 SUMMARY OF RESULTS

Based on the review of the laboratory and field QA/QC results, the data presented in this report are considered to be reliable.

Table D1
Summary of Quality Control Sample Results
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
B9D4002	Soil	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B9D4005	Soil	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B9D5790	Soil	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B9D9093	Soil	JUM797 and JUM800	Benzene	Field duplicate samples SV19-02-09 and DUP B exceed the alert limit for benzene (152%).	A quality check of the data yielded similar results. Sample non-homogeneity is believed to be the root cause. Benzene concentrations in both the sample and the field duplicate were above the regulatory standards, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the benzene data reported can be considered reliable.
			Ethylbenzene	Field duplicate samples SV19-02-09 and DUP B exceed the alert limit for ethylbenzene (132%).	A quality check of the data yielded similar results. Sample non-homogeneity is believed to be the root cause. Ethylbenzene concentrations in both the sample and the field duplicate were below the regulatory standard, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the ethylbenzene data reported can be considered reliable.
			Total Xylenes	Field duplicate samples SV19-02-09 and DUP B exceed the alert limit for total xylenes (153%).	A quality check of the data yielded similar results. Sample non-homogeneity is believed to be the root cause. Total xylenes concentrations in the parent sample were above the regulatory standard and xylene concentrations in the field duplicate were below the regulatory standard. This sample location is considered to have xylene concentrations above the regulatory standard. This sample also exceeded regulatory standards for other petroleum hydrocarbon parameters, indicating that there will not be a material effect on the interpretation of the results in this report. Under these circumstances, the total xylenes data reported can be considered reliable.
B9D9104	Soil	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B9E5321	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B9E5558	Water	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B9E5580	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B9E5637	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B9E6836	Soil Vapour	JWF065, JWF066, JWF067 and JWF068	1,2,4-Trichlorobenzene	Lab control sample recovery (133%) outside acceptance range of 70-130% for 1,2,4-trichlorobenzene for batch 6156915.	This data quality issue may represent a potential high bias for this sample. 1,2,4-Trichlorobenzene concentrations in all of the samples and the lab/field duplicates were below the regulatory standard and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the 1,2,4-trichlorobenzene data reported can be considered reliable.
			Vinyl Acetate	Lab control sample recovery (58%) outside acceptance range of 70-130% for vinyl acetate for batch 6156915.	This data quality issue may represent a low bias for this sample. Vinyl acetate has no standards and the concentrations in all of the samples and the lab/field duplicates were below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vinyl acetate data reported can be considered reliable.
		JWF069	1,2,4-Trichlorobenzene	Lab control sample recovery (131%) outside acceptance range of 70-130% for 1,2,4-trichlorobenzene for batch 6159384.	This data quality issue may represent a potential high bias for this sample. 1,2,4-Trichlorobenzene concentrations in the sample was below the regulatory standard and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the 1,2,4-trichlorobenzene data reported can be considered reliable.
			Vinyl Acetate	Lab control sample recovery (59%) outside acceptance range of 70-130% for vinyl acetate for batch 6159384.	This data quality issue may represent a low bias for this sample. Vinyl acetate has no standards and the concentrations in all of the samples and the lab/field duplicates were below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vinyl acetate data reported can be considered reliable.

Notes:

BVL - Bureau Veritas Laboratories

n/a - not applicable

Table D1
Summary of Quality Control Sample Results
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
B9E6843	Soil Vapour	JWF093	Ethyl Acetate	Lab control sample recovery (136%) outside acceptance range of 70-130% for ethyl acetate for batch 6155082.	This data quality issue may represent a potential high bias for this sample. Ethyl acetate concentrations in the sample and the lab duplicate was below the regulatory standard and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the ethyl acetate data reported can be considered reliable.
			2-Propanone	Field blank sample exceeded alert limits for 2-propanone.	The field blank sample was prepared from ambient air present on site. Therefore, the concentrations are likely present from variables associated with the site. All samples associated with with this field blank may be biased high for 2-propanone. Thus, this 2-propanone data associated should be considered suspect. The soil vapour samples associated with this field blank had concentrations of 2-propanone below regulatory criteria, indicating there will not be a material effect on the conclusions of this report.
B9V9704	Soil Vapour	LHI603, LHI604, LHI605, LHI606 and LHI607	Naphthalene	Lab control sample recovery (134%) outside acceptance range of 70-130% for naphthalene for batch 6449646.	This data quality issue may represent a potential high bias for this sample. Naphthalene concentrations in all of the samples and the lab/field duplicates were below the regulatory standard and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the naphthalene data reported can be considered reliable.
			Vinyl Acetate	Lab control sample recovery (49%) outside acceptance range of 70-130% for vinyl acetate for batch 6449646.	This data quality issue may represent a low bias for this sample. Vinyl acetate has no standards and the concentrations in all of the samples and the lab/field duplicates were below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vinyl acetate data reported can be considered reliable.
B9V9708	Soil Vapour	LHI675	Naphthalene	Lab control sample recovery (134%) outside acceptance range of 70-130% for naphthalene for batch 6449646.	This data quality issue may represent a potential high bias for this sample. Naphthalene concentrations in the sample was below the regulatory standard and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the naphthalene data reported can be considered reliable.
B9V9708	Soil Vapour	LHI675	Toluene	Field blank sample exceeded alert limits for toluene.	The field blank sample was prepared from ambient air present on site. Therefore, the concentrations are likely present from variables associated with the site. All samples associated with with this field blank may be biased high for toluene. Thus, this toluene data associated should be considered suspect. The soil vapour samples associated with this field blank had concentrations of toluene below regulatory criteria, indicating there will not be a material effect on the conclusions of this report.
			Vinyl Acetate	Lab control sample recovery (49%) outside acceptance range of 70-130% for vinyl acetate for batch 6449646.	This data quality issue may represent a low bias for this sample. Vinyl acetate has no standards and the concentrations in all of the samples and the lab/field duplicates were below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vinyl acetate data reported can be considered reliable.

Notes:

BVL - Bureau Veritas Laboratories
n/a - not applicable

Table D2
Summary of Field Duplicate Sample Results - Soil Petroleum Hydrocarbons
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	MW19-06-04	DUP A	RPD %	RDL	SV19-02-09	DUP B	RPD %
Sample Depth (mbgs)				2.10 - 2.70	2.10 - 2.70			6.0 - 6.7	6.0 - 6.7	
Sample Collection Date				16-May-19	16-May-19			22-May-19	22-May-19	
BVL Sample ID				JTI626	JTI627			JUM797	JUM800	
F1 (C ₆ -C ₁₀)	µg/g	>100%	10	14	28	n/c	100	1200	720	50
F1 (C ₆ -C ₁₀) - BTEX	µg/g	>100%	10	14	28	n/c	100	1200	710	51
F2 (C ₁₀ -C ₁₆)	µg/g	>100%	10	56	41	n/c	10	450	430	5
F3 (C ₁₆ -C ₃₄)	µg/g	>100%	50	56	<50	n/c	50	280	280	0
F4 (C ₃₄ -C ₅₀)	µg/g	>100%	50	<50	<50	n/c	50	<50	<50	n/c

Notes:**Bold/Underline** - RPD exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

mbgs - metres below ground surface

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/g - microgram per gram

< - less than

> - greater than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table D3
Summary of Field Duplicate Sample Results - Soil Volatile Organic Compounds
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	MW19-06-04	DUP A	RPD %	RDL	SV19-02-09	DUP B	RPD %
Sample Depth (mbgs)				2.10 - 2.70	2.10 - 2.70			6.0 - 6.7	6.0 - 6.7	
Sample Collection Date				16-May-19	16-May-19			22-May-19	22-May-19	
BVL Sample ID				JTI626	JTI627			JUM797	JUM800	
1,3-Dichloropropene (cis+trans)	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Acetone (2-Propanone)	µg/g	>100%	0.50	<0.50	<0.50	n/c	NA	NA	NA	n/c
Benzene	µg/g	>100%	0.020	<0.020	<0.020	n/c	0.20	8.7	1.2	<u>152</u>
Bromodichloromethane	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Bromoform	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Bromomethane	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Carbon Tetrachloride	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Chlorobenzene	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Chloroform	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Dibromochloromethane	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
1,2-Dichlorobenzene	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
1,3-Dichlorobenzene	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
1,4-Dichlorobenzene	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Dichlorodifluoromethane (FREON 12)	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
1,1-Dichloroethane	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
1,2-Dichloroethane	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
1,1-Dichloroethylene	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
cis-1,2-Dichloroethylene	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
trans-1,2-Dichloroethylene	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
1,2-Dichloropropane	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
cis-1,3-Dichloropropene	µg/g	>100%	0.030	<0.030	<0.030	n/c	NA	NA	NA	n/c
trans-1,3-Dichloropropene	µg/g	>100%	0.040	<0.040	<0.040	n/c	NA	NA	NA	n/c
Ethylbenzene	µg/g	>100%	0.020	<0.020	<0.020	n/c	0.20	6.8	1.4	<u>132</u>
Ethylene Dibromide	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Hexane	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c

Notes:**Bold/Underline** - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

NA - not applicable

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/g - microgram per gram

< - less than

> - greater than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table D3
Summary of Field Duplicate Sample Results - Soil Volatile Organic Compounds
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	MW19-06-04	DUP A	RPD %	RDL	SV19-02-09	DUP B	RPD %
Sample Depth (mbgs)				2.10 - 2.70	2.10 - 2.70			6.0 - 6.7	6.0 - 6.7	
Sample Collection Date				16-May-19	16-May-19			22-May-19	22-May-19	
BVL Sample ID				JTI626	JTI627			JUM797	JUM800	
Methylene Chloride(Dichloromethane)	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Methyl Ethyl Ketone (2-Butanone)	µg/g	>100%	0.50	<0.50	<0.50	n/c	NA	NA	NA	n/c
Methyl Isobutyl Ketone	µg/g	>100%	0.50	<0.50	<0.50	n/c	NA	NA	NA	n/c
Methyl t-butyl ether (MTBE)	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Styrene	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
1,1,1,2-Tetrachloroethane	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
1,1,2,2-Tetrachloroethane	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Tetrachloroethylene	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Toluene	µg/g	>100%	0.020	<0.020	<0.020	n/c	0.20	7.6	0.61	n/c
1,1,1-Trichloroethane	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
1,1,2-Trichloroethane	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Trichloroethylene	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Trichlorofluoromethane (FREON 11)	µg/g	>100%	0.050	<0.050	<0.050	n/c	NA	NA	NA	n/c
Vinyl Chloride	µg/g	>100%	0.020	<0.020	<0.020	n/c	NA	NA	NA	n/c
p+m-Xylene	µg/g	>100%	0.020	<0.020	<0.020	n/c	0.40	21	2.9	151
o-Xylene	µg/g	>100%	0.020	<0.020	<0.020	n/c	0.20	5.8	0.74	n/c
Total Xylenes	µg/g	>100%	0.020	<0.020	<0.020	n/c	0.40	27	3.6	153

Notes:**Bold/Underline** - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

NA - not applicable

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/g - microgram per gram

< - less than

> - greater than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table D4
Summary of Field Duplicate Sample Results - Soil Polycyclic Aromatic Hydrocarbons
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	MW19-06-04	DUP A	RPD %
Sample Depth (mbgs)				2.10 - 2.70	2.10 - 2.70	
Sample Collection Date				16-May-19	16-May-19	
BVL Sample ID				JTI626	JTI627	
Methylnaphthalene, 2-(1-)	µg/g	>100%	0.0071	0.039	0.028	n/c
Acenaphthene	µg/g	>100%	0.0050	<0.0050	<0.0050	n/c
Acenaphthylene	µg/g	>100%	0.0050	<0.0050	<0.0050	n/c
Anthracene	µg/g	>100%	0.0050	<0.0050	<0.0050	n/c
Benzo(a)anthracene	µg/g	>100%	0.0050	<0.0050	<0.0050	n/c
Benzo(a)pyrene	µg/g	>100%	0.0050	<0.0050	<0.0050	n/c
Benzo(b/j)fluoranthene	µg/g	>100%	0.0050	<0.0050	<0.0050	n/c
Benzo(g,h,i)perylene	µg/g	>100%	0.0050	<0.0050	<0.0050	n/c
Benzo(k)fluoranthene	µg/g	>100%	0.0050	<0.0050	<0.0050	n/c
Chrysene	µg/g	>100%	0.0050	0.011	0.0076	n/c
Dibenz(a,h)anthracene	µg/g	>100%	0.0050	<0.0050	<0.0050	n/c
Fluoranthene	µg/g	>100%	0.0050	<0.0050	<0.0050	n/c
Fluorene	µg/g	>100%	0.0050	<0.0050	<0.0050	n/c
Indeno(1,2,3-cd)pyrene	µg/g	>100%	0.0050	<0.0050	<0.0050	n/c
1-Methylnaphthalene	µg/g	>100%	0.0050	0.019	0.013	n/c
2-Methylnaphthalene	µg/g	>100%	0.0050	0.019	0.015	n/c
Naphthalene	µg/g	>100%	0.0050	<0.0070	<0.0050	n/c
Phenanthrene	µg/g	>100%	0.0050	0.053	0.036	38
Pyrene	µg/g	>100%	0.0050	0.0062	<0.0050	n/c

Notes:**Bold/Underline** - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

NA - not applicable

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/g - microgram per gram

< - less than

> - greater than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table D5
Summary of Field Duplicate Sample Results - Soil Metals
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	MW19-06-04	DUP A	RPD %
Sample Depth (mbgs)				2.10 - 2.70	2.10 - 2.70	
Sample Collection Date				16-May-19	16-May-19	
BVL Sample ID				JTI626	JTI627	
Acid Extractable Antimony (Sb)	µg/g	>100%	0.20	0.63	0.78	n/c
Acid Extractable Arsenic (As)	µg/g	>100%	1.0	14	15	7
Acid Extractable Barium (Ba)	µg/g	>100%	0.50	100	100	0
Acid Extractable Beryllium (Be)	µg/g	>100%	0.20	1.1	1.1	0
Acid Extractable Boron (B)	µg/g	>100%	5.0	6.2	6.4	n/c
Acid Extractable Cadmium (Cd)	µg/g	>100%	0.10	0.68	0.64	6
Acid Extractable Chromium (Cr)	µg/g	>100%	1.0	28	27	4
Acid Extractable Cobalt (Co)	µg/g	>100%	0.10	27	28	4
Acid Extractable Copper (Cu)	µg/g	>100%	0.50	57	58	2
Acid Extractable Lead (Pb)	µg/g	>100%	1.0	21	22	5
Acid Extractable Molybdenum (Mo)	µg/g	>100%	0.50	6.8	6.3	8
Acid Extractable Nickel (Ni)	µg/g	>100%	0.50	92	95	3
Acid Extractable Selenium (Se)	µg/g	>100%	0.50	0.7	0.74	n/c
Acid Extractable Silver (Ag)	µg/g	>100%	0.20	<0.20	<0.20	n/c
Acid Extractable Thallium (Tl)	µg/g	>100%	0.050	0.81	0.83	2
Acid Extractable Uranium (U)	µg/g	>100%	0.050	2.8	2.9	4
Acid Extractable Vanadium (V)	µg/g	>100%	5.0	43	44	2
Acid Extractable Zinc (Zn)	µg/g	>100%	5.0	94	92	2

Notes:**Bold/Underline** - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

NA - not applicable

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/g - microgram per gram

< - less than

> - greater than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table D6
Summary of Field Duplicate Sample Results - Soil Polychlorinated Biphenyls and Glycols
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	MW19-06-04	DUP A	RPD %
Sample Depth (mbgs)				2.10 - 2.70	2.10 - 2.70	
Sample Collection Date				16-May-19	16-May-19	
BVL Sample ID				JTI626	JTI627	
Aroclor 1242	µg/g	>100%	0.01	<0.010	<0.010	n/c
Aroclor 1248	µg/g	>100%	0.01	<0.010	<0.010	n/c
Aroclor 1254	µg/g	>100%	0.01	<0.010	<0.010	n/c
Aroclor 1260	µg/g	>100%	0.01	<0.010	<0.010	n/c
Total PCB	µg/g	>100%	0.01	<0.010	<0.010	n/c
Propylene Glycol	mg/kg	>100%	10	<10	<10	n/c
Ethylene Glycol	mg/kg	>100%	10	<10	<10	n/c
Diethylene Glycol	mg/kg	>100%	10	<10	<10	n/c
Total Glycol	mg/kg	>100%	10	<10	<10	n/c

Notes:**Bold/Underline** - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

mbgs - metres below ground surface

NA - not applicable

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/g - microgram per gram

< - less than

> - greater than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table D7
Summary of Field Duplicate Sample Results - Groundwater Petroleum Hydrocarbon Parameters
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	MW19-04	DUP A	RPD %	TH210	DUP B	RPD %
Sample Collection Date				28-May-19	28-May-19		28-May-19	28-May-19	
BVL Sample ID				JVY217	JVY218		JVW413	JVW414	
F1 (C6-C10)	µg/L	>80%	25	110	100	n/c	<25	<25	n/c
F1 (C6-C10) - BTEX	µg/L	>80%	25	62	48	n/c	<25	<25	n/c
F2 (C10-C16 Hydrocarbons)	µg/L	>80%	100	<100	<100	n/c	<100	<100	n/c
F3 (C16-C34 Hydrocarbons)	µg/L	>80%	200	<200	<200	n/c	<200	<200	n/c
F4 (C34-C50 Hydrocarbons)	µg/L	>80%	200	<200	<200	n/c	<200	<200	n/c

Notes:**Bold/Underlined** - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/L - micrograms per litre

< - less than

> - greater than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table D8
Summary of Field Duplicate Sample Results - Groundwater Volatile Organic Compounds
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	MW19-04	DUP A	RPD %
Sample Collection Date				28-May-19	28-May-19	
BVL Sample ID				JVY217	JVY218	
1,3-Dichloropropene (cis+trans)	µg/L	>80%	0.5	<0.50	<0.50	n/c
Acetone (2-Propanone)	µg/L	>80%	10	<10	<10	n/c
Benzene	µg/L	>80%	0.2	45	46	2
Bromodichloromethane	µg/L	>80%	0.5	<0.50	<0.50	n/c
Bromoform	µg/L	>80%	1	<1.0	<1.0	n/c
Bromomethane	µg/L	>80%	0.5	<0.50	<0.50	n/c
Carbon Tetrachloride	µg/L	>80%	0.2	<0.20	<0.20	n/c
Chlorobenzene	µg/L	>80%	0.2	<0.20	<0.20	n/c
Chloroform	µg/L	>80%	0.2	<0.20	<0.20	n/c
Dibromochloromethane	µg/L	>80%	0.5	<0.50	<0.50	n/c
1,2-Dichlorobenzene	µg/L	>80%	0.5	<0.50	<0.50	n/c
1,3-Dichlorobenzene	µg/L	>80%	0.5	<0.50	<0.50	n/c
1,4-Dichlorobenzene	µg/L	>80%	0.5	<0.50	<0.50	n/c
Dichlorodifluoromethane (FREON 12)	µg/L	>80%	1	<1.0	<1.0	n/c
1,1-Dichloroethane	µg/L	>80%	0.2	<0.20	<0.20	n/c
1,2-Dichloroethane	µg/L	>80%	0.5	<0.50	<0.50	n/c
1,1-Dichloroethylene	µg/L	>80%	0.2	<0.20	<0.20	n/c
cis-1,2-Dichloroethylene	µg/L	>80%	0.5	<0.50	<0.50	n/c
trans-1,2-Dichloroethylene	µg/L	>80%	0.5	<0.50	<0.50	n/c
1,2-Dichloropropane	µg/L	>80%	0.2	<0.20	<0.20	n/c
cis-1,3-Dichloropropene	µg/L	>80%	0.3	<0.30	<0.30	n/c
trans-1,3-Dichloropropene	µg/L	>80%	0.4	<0.40	<0.40	n/c
Ethylbenzene	µg/L	>80%	0.2	2.4	2.3	4
Ethylene Dibromide	µg/L	>80%	0.2	<0.20	<0.20	n/c
Hexane	µg/L	>80%	1	1.6	1.7	n/c
Methylene Chloride(Dichloromethane)	µg/L	>80%	2	<2.0	<2.0	n/c
Methyl Ethyl Ketone (2-Butanone)	µg/L	>80%	10	<10	<10	n/c
Methyl Isobutyl Ketone	µg/L	>80%	5	<5.0	<5.0	n/c
Methyl t-butyl ether (MTBE)	µg/L	>80%	0.5	3.6	3.6	0
Styrene	µg/L	>80%	0.5	<0.50	<0.50	n/c
1,1,1,2-Tetrachloroethane	µg/L	>80%	0.5	<0.50	<0.50	n/c
1,1,2,2-Tetrachloroethane	µg/L	>80%	0.5	<0.50	<0.50	n/c
Tetrachloroethylene	µg/L	>80%	0.2	<0.20	<0.20	n/c
Toluene	µg/L	>80%	0.2	2.1	2.1	0
1,1,1-Trichloroethane	µg/L	>80%	0.2	<0.20	<0.20	n/c
1,1,2-Trichloroethane	µg/L	>80%	0.5	<0.50	<0.50	n/c
Trichloroethylene	µg/L	>80%	0.2	<0.20	<0.20	n/c
Trichlorofluoromethane (FREON 11)	µg/L	>80%	0.5	<0.50	<0.50	n/c
Vinyl Chloride	µg/L	>80%	0.2	<0.20	<0.20	n/c
p+m-Xylene	µg/L	>80%	0.2	3.4	3.3	3
o-Xylene	µg/L	>80%	0.2	1.7	1.7	0
Total Xylenes	µg/L	>80%	0.2	5.1	5	2

Notes:**Bold/Underlined** - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/L - micrograms per litre

< - less than

> - greater than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table D9
Summary of Field Duplicate Sample Results - Groundwater Polycyclic Aromatic Hydrocarbons
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	MW19-04	DUP A	RPD %
Sample Collection Date				28-May-19	28-May-19	
Bureau Veritas Sample ID				JVY217	JVY218	
Methylnaphthalene, 2-(1-)	µg/L	>80%	0.071	<0.071	0.072	n/c
Acenaphthene	µg/L	>80%	0.050	<0.050	<0.050	n/c
Acenaphthylene	µg/L	>80%	0.050	<0.050	<0.050	n/c
Anthracene	µg/L	>80%	0.050	<0.050	<0.050	n/c
Benzo(a)anthracene	µg/L	>80%	0.050	<0.050	<0.050	n/c
Benzo(a)pyrene	µg/L	>80%	0.010	<0.010	<0.010	n/c
Benzo(b/j)fluoranthene	µg/L	>80%	0.050	<0.050	<0.050	n/c
Benzo(g,h,i)perylene	µg/L	>80%	0.050	<0.050	<0.050	n/c
Benzo(k)fluoranthene	µg/L	>80%	0.050	<0.050	<0.050	n/c
Chrysene	µg/L	>80%	0.050	<0.050	<0.050	n/c
Dibenz(a,h)anthracene	µg/L	>80%	0.050	<0.050	<0.050	n/c
Fluoranthene	µg/L	>80%	0.050	<0.050	<0.050	n/c
Fluorene	µg/L	>80%	0.050	<0.050	<0.050	n/c
Indeno(1,2,3-cd)pyrene	µg/L	>80%	0.050	<0.050	<0.050	n/c
1-Methylnaphthalene	µg/L	>80%	0.050	0.07	0.072	n/c
2-Methylnaphthalene	µg/L	>80%	0.050	<0.050	<0.050	n/c
Naphthalene	µg/L	>80%	0.050	0.076	0.078	n/c
Phenanthrene	µg/L	>80%	0.030	<0.030	<0.030	n/c
Pyrene	µg/L	>80%	0.050	<0.050	<0.050	n/c

Notes:**Bold/Underlined** - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/L - micrograms per litre

< - less than

> - greater than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table D10
Summary of Field Duplicate Sample Results - Groundwater Dissolved Metals
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	MW19-04	DUP A	RPD %
Sample Collection Date				28-May-19	28-May-19	
BVL Sample ID				JVY217	JVY218	
Dissolved Antimony (Sb)	µg/L	>50%	0.50	<0.50	<0.50	n/c
Dissolved Arsenic (As)	µg/L	>50%	1.0	1.7	1.8	n/c
Dissolved Barium (Ba)	µg/L	>50%	2.0	60	58	3
Dissolved Beryllium (Be)	µg/L	>50%	0.50	<0.50	<0.50	n/c
Dissolved Boron (B)	µg/L	>50%	10.0	53	51	4
Dissolved Cadmium (Cd)	µg/L	>50%	0.10	<0.10	<0.10	n/c
Dissolved Chromium (Cr)	µg/L	>50%	5.0	<5.0	<5.0	n/c
Dissolved Cobalt (Co)	µg/L	>50%	0.50	<0.50	<0.50	n/c
Dissolved Copper (Cu)	µg/L	>50%	1.0	<1.0	<1.0	n/c
Dissolved Lead (Pb)	µg/L	>50%	0.50	<0.50	<0.50	n/c
Dissolved Molybdenum (Mo)	µg/L	>50%	0.50	<0.50	<0.50	n/c
Dissolved Nickel (Ni)	µg/L	>50%	1.0	24	1.3	n/c
Dissolved Selenium (Se)	µg/L	>50%	2.0	<2.0	<2.0	n/c
Dissolved Silver (Ag)	µg/L	>50%	0.10	<0.10	<0.10	n/c
Dissolved Sodium (Na)	µg/L	>50%	100.0	180,000	180,000	0
Dissolved Thallium (Tl)	µg/L	>50%	0.050	<0.050	<0.050	n/c
Dissolved Uranium (U)	µg/L	>50%	0.10	13	13	0
Dissolved Vanadium (V)	µg/L	>50%	0.50	<0.50	<0.50	n/c
Dissolved Zinc (Zn)	µg/L	>50%	5.0	<5.0	<5.0	n/c

Notes:**Bold/Underlined** - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/L - micrograms per litre

< - less than

> - greater than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table D11
Summary of Field Duplicate Sample Results - Groundwater Polychlorinated Biphenyls and Glycols
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	MW19-04	DUP A	RPD %
Sample Collection Date				28-May-19	28-May-19	
BVL Sample ID				JVY217	JVY218	
Aroclor 1242	µg/L	>80%	0.5	<0.5	<0.5	n/c
Aroclor 1248	µg/L	>80%	0.5	<0.5	<0.5	n/c
Aroclor 1254	µg/L	>80%	0.5	<0.5	<0.5	n/c
Aroclor 1260	µg/L	>80%	0.5	<0.5	<0.5	n/c
Total PCB	µg/L	>80%	5	<0.5	<0.5	n/c
Propylene Glycol	mg/L	>80%	5	<5	<5	n/c
Ethylene Glycol	mg/L	>80%	5	<5	<5	n/c
Diethylene Glycol	mg/L	>80%	5	<5	<5	n/c
Total Glycol	mg/L	>80%	5	<5	<5	n/c

Notes:**Bold/Underlined** - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

mg/L - milligrams per litre

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/L - micrograms per litre

< - less than

> - greater than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table D12
Summary of Groundwater Field Blank and Trip Blank Sample Results
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Trip Blank
Sample Collection Date				28-May-19	28-May-19
BVL Sample ID				JVX873	JVX874
Hydrocarbons					
F1 (C6-C10)	µg/L	>5X RDL	25	<25	<25
F1 (C6-C10) - BTEX	µg/L	>5X RDL	25	<25	<25
F2 (C10-C16 Hydrocarbons)	µg/L	>5X RDL	100	<100	<100
F3 (C16-C34 Hydrocarbons)	µg/L	>5X RDL	200	<200	<200
F4 (C34-C50 Hydrocarbons)	µg/L	>5X RDL	200	<200	<200
Glycols					
Propylene Glycol	mg/L	>5X RDL	5	<5	<5
Ethylene Glycol	mg/L	>5X RDL	5	<5	<5
Diethylene Glycol	mg/L	>5X RDL	5	<5	<5
Total Glycol	mg/L	>5X RDL	5	<5	<5
Metals					
Dissolved Antimony (Sb)	µg/L	>5X RDL	0.50	<0.50	<0.50
Dissolved Arsenic (As)	µg/L	>5X RDL	1.0	<1.0	<1.0
Dissolved Barium (Ba)	µg/L	>5X RDL	2.0	<2.0	<2.0
Dissolved Beryllium (Be)	µg/L	>5X RDL	0.50	<0.50	<0.50
Dissolved Boron (B)	µg/L	>5X RDL	10	<10	<10
Dissolved Cadmium (Cd)	µg/L	>5X RDL	0.10	<0.10	<0.10
Dissolved Chromium (Cr)	µg/L	>5X RDL	5.0	<5.0	<5.0
Dissolved Cobalt (Co)	µg/L	>5X RDL	0.50	<0.50	<0.50
Dissolved Copper (Cu)	µg/L	>5X RDL	1.0	<1.0	<1.0
Dissolved Lead (Pb)	µg/L	>5X RDL	0.50	<0.50	<0.50
Dissolved Molybdenum (Mo)	µg/L	>5X RDL	0.50	<0.50	<0.50
Dissolved Nickel (Ni)	µg/L	>5X RDL	1.0	<1.0	<1.0
Dissolved Selenium (Se)	µg/L	>5X RDL	2.0	<2.0	<2.0
Dissolved Silver (Ag)	µg/L	>5X RDL	0.10	<0.10	<0.10
Dissolved Sodium (Na)	µg/L	>5X RDL	100	<100	<100
Dissolved Thallium (Tl)	µg/L	>5X RDL	0.050	<0.050	<0.050
Dissolved Uranium (U)	µg/L	>5X RDL	0.10	<0.10	<0.10
Dissolved Vanadium (V)	µg/L	>5X RDL	0.50	<0.50	<0.50
Dissolved Zinc (Zn)	µg/L	>5X RDL	5.0	<5.0	<5.0

Notes:**Bold/Underlined** - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

mg/L - milligrams per litre

RDL - reportable detection limit

µg/L - microgram per litre

< - less than

> - greater than

Alert limit is 5X the RDL for BTEX and 2X the RDL for F1 and F2

Table D12
Summary of Groundwater Field Blank and Trip Blank Sample Results
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Trip Blank
Sample Collection Date				28-May-19	28-May-19
BVL Sample ID				JVX873	JVX874
Polycyclic Aromatics					
Methylnaphthalene, 2-(1-)	µg/L	>5X RDL	0.071	<0.071	<0.071
Acenaphthene	µg/L	>5X RDL	0.050	<0.050	<0.050
Acenaphthylene	µg/L	>5X RDL	0.050	<0.050	<0.050
Anthracene	µg/L	>5X RDL	0.050	<0.050	<0.050
Benzo(a)anthracene	µg/L	>5X RDL	0.050	<0.050	<0.050
Benzo(a)pyrene	µg/L	>5X RDL	0.010	<0.010	<0.010
Benzo(b/j)fluoranthene	µg/L	>5X RDL	0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/L	>5X RDL	0.050	<0.050	<0.050
Benzo(k)fluoranthene	µg/L	>5X RDL	0.050	<0.050	<0.050
Chrysene	µg/L	>5X RDL	0.050	<0.050	<0.050
Dibenz(a,h)anthracene	µg/L	>5X RDL	0.050	<0.050	<0.050
Fluoranthene	µg/L	>5X RDL	0.050	<0.050	<0.050
Fluorene	µg/L	>5X RDL	0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene	µg/L	>5X RDL	0.050	<0.050	<0.050
1-Methylnaphthalene	µg/L	>5X RDL	0.050	<0.050	<0.050
2-Methylnaphthalene	µg/L	>5X RDL	0.050	<0.050	<0.050
Naphthalene	µg/L	>5X RDL	0.050	<0.050	<0.050
Phenanthrene	µg/L	>5X RDL	0.030	<0.030	<0.030
Pyrene	µg/L	>5X RDL	0.050	<0.050	<0.050
PCBs					
Aroclor 1242	µg/L	>5X RDL	0.05	<0.05	<0.05
Aroclor 1248	µg/L	>5X RDL	0.05	<0.05	<0.05
Aroclor 1254	µg/L	>5X RDL	0.05	<0.05	<0.05
Aroclor 1260	µg/L	>5X RDL	0.05	<0.05	<0.05
Total PCB	µg/L	>5X RDL	0.05	<0.05	<0.05

Notes:**Bold/Underlined** - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

mg/L - milligrams per litre

RDL - reportable detection limit

µg/L - microgram per litre

< - less than

> - greater than

Alert limit is 5X the RDL for BTEX and 2X the RDL for F1 and F2

Table D12
Summary of Groundwater Field Blank and Trip Blank Sample Results
2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Trip Blank
Sample Collection Date				28-May-19	28-May-19
BVL Sample ID				JVX873	JVX874
VOC					
1,3-Dichloropropene (cis+trans)	µg/L	>5X RDL	0.50	<0.50	<0.50
Acetone (2-Propanone)	µg/L	>5X RDL	10	<10	<10
Benzene	µg/L	>5X RDL	0.20	<0.20	<0.20
Bromodichloromethane	µg/L	>5X RDL	0.50	<0.50	<0.50
Bromoform	µg/L	>5X RDL	1.0	<1.0	<1.0
Bromomethane	µg/L	>5X RDL	0.50	<0.50	<0.50
Carbon Tetrachloride	µg/L	>5X RDL	0.20	<0.20	<0.20
Chlorobenzene	µg/L	>5X RDL	0.20	<0.20	<0.20
Chloroform	µg/L	>5X RDL	0.20	<0.20	<0.20
Dibromochloromethane	µg/L	>5X RDL	0.50	<0.50	<0.50
1,2-Dichlorobenzene	µg/L	>5X RDL	0.50	<0.50	<0.50
1,3-Dichlorobenzene	µg/L	>5X RDL	0.50	<0.50	<0.50
1,4-Dichlorobenzene	µg/L	>5X RDL	0.50	<0.50	<0.50
Dichlorodifluoromethane (FREON 12)	µg/L	>5X RDL	1.0	<1.0	<1.0
1,1-Dichloroethane	µg/L	>5X RDL	0.20	<0.20	<0.20
1,2-Dichloroethane	µg/L	>5X RDL	0.50	<0.50	<0.50
1,1-Dichloroethylene	µg/L	>5X RDL	0.20	<0.20	<0.20
cis-1,2-Dichloroethylene	µg/L	>5X RDL	0.50	<0.50	<0.50
trans-1,2-Dichloroethylene	µg/L	>5X RDL	0.50	<0.50	<0.50
1,2-Dichloropropane	µg/L	>5X RDL	0.20	<0.20	<0.20
cis-1,3-Dichloropropene	µg/L	>5X RDL	0.30	<0.30	<0.30
trans-1,3-Dichloropropene	µg/L	>5X RDL	0.40	<0.40	<0.40
Ethylbenzene	µg/L	>5X RDL	0.20	<0.20	<0.20
Ethylene Dibromide	µg/L	>5X RDL	0.20	<0.20	<0.20
Hexane	µg/L	>5X RDL	1.0	<1.0	<1.0
Methylene Chloride(Dichloromethane)	µg/L	>5X RDL	2.0	<2.0	<2.0
Methyl Ethyl Ketone (2-Butanone)	µg/L	>5X RDL	10	<10	<10
Methyl Isobutyl Ketone	µg/L	>5X RDL	5.0	<5.0	<5.0
Methyl t-butyl ether (MTBE)	µg/L	>5X RDL	0.50	<0.50	<0.50
Styrene	µg/L	>5X RDL	0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	µg/L	>5X RDL	0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	µg/L	>5X RDL	0.50	<0.50	<0.50
Tetrachloroethylene	µg/L	>5X RDL	0.20	<0.20	<0.20
Toluene	µg/L	>5X RDL	0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	>5X RDL	0.20	<0.20	<0.20
1,1,2-Trichloroethane	µg/L	>5X RDL	0.50	<0.50	<0.50
Trichloroethylene	µg/L	>5X RDL	0.20	<0.20	<0.20
Trichlorofluoromethane (FREON 11)	µg/L	>5X RDL	0.50	<0.50	<0.50
Vinyl Chloride	µg/L	>5X RDL	0.20	<0.20	<0.20
p+m-Xylene	µg/L	>5X RDL	0.20	<0.20	<0.20
o-Xylene	µg/L	>5X RDL	0.20	<0.20	<0.20
Total Xylenes	µg/L	>5X RDL	0.20	<0.20	<0.20

Notes:**Bold/Underlined** - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

mg/L - milligrams per litre

RDL - reportable detection limit

µg/L - microgram per litre

< - less than

> - greater than

Alert limit is 5X the RDL for BTEX and 2X the RDL for F1 and F2

Table D13
Summary of Field Duplicate Sample Results - Soil Vapour
Former Retail Fuel Outlet - 2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV19-03	DUP A	RPD %	SV19-02	DUP A	RPD %
Sample Collection Date				29-May-19	29-May-19		11-Nov-19	11-Nov-19	
BVL Sample ID				JWF066	JWF067		LHI604	LHI605	
Dichlorodifluoromethane (FREON 12)	µg/m ³	>50%	9.9	13.4	10.6	n/c	24.4	26.1	n/c
1,2-Dichlorotetrafluoroethane	µg/m ³	>50%	12	<12	<12	n/c	<1.2	<1.2	n/c
Chloromethane	µg/m ³	>50%	6.2	<6.2	<6.2	n/c	<0.62	<0.62	n/c
Vinyl Chloride	µg/m ³	>50%	2.6	<2.6	<2.6	n/c	<0.26	<0.26	n/c
Chloroethane	µg/m ³	>50%	7.9	<7.9	<7.9	n/c	<0.79	<0.79	n/c
1,3-Butadiene	µg/m ³	>50%	11	<11	<11	n/c	<1.1	<1.1	n/c
Trichlorofluoromethane (FREON 11)	µg/m ³	>50%	11	<11	<11	n/c	1.4	1.3	n/c
Ethanol (ethyl alcohol)	µg/m ³	>50%	19	<19	<19	n/c	2.7	<1.9	n/c
Trichlorotrifluoroethane	µg/m ³	>50%	12	<12	<12	n/c	<1.2	<1.2	n/c
2-propanol	µg/m ³	>50%	25	<25	<25	n/c	<2.5	<2.5	n/c
2-Propanone	µg/m ³	>50%	22	<22	<21	n/c	2.6	2.4	n/c
Methyl Ethyl Ketone (2-Butanone)	µg/m ³	>50%	5.9	<5.9	<5.9	n/c	<0.59	<0.59	n/c
Methyl Isobutyl Ketone	µg/m ³	>50%	8.2	<8.2	<8.2	n/c	<0.82	<0.82	n/c
Methyl Butyl Ketone (2-Hexanone)	µg/m ³	>50%	41	<41	<41	n/c	<4.1	<4.1	n/c
Methyl t-butyl ether (MTBE)	µg/m ³	>50%	280	<280	<220	n/c	<0.72	<0.72	n/c
Ethyl Acetate	µg/m ³	>50%	36	<36	<36	n/c	<3.6	<3.6	n/c
1,1-Dichloroethylene	µg/m ³	>50%	4	<4.0	<4.0	n/c	<0.40	<0.40	n/c
cis-1,2-Dichloroethylene	µg/m ³	>50%	4	<4.0	<4.0	n/c	<0.40	<0.40	n/c
trans-1,2-Dichloroethylene	µg/m ³	>50%	4	<4.0	<4.0	n/c	<0.40	<0.40	n/c
Methylene Chloride(Dichloromethane)	µg/m ³	>50%	21	<21	<21	n/c	<2.1	<2.1	n/c
Chloroform	µg/m ³	>50%	25	<25	<21	n/c	<0.49	<0.49	n/c
Carbon Tetrachloride	µg/m ³	>50%	6.3	<6.3	<6.3	n/c	<0.63	<0.63	n/c
1,1-Dichloroethane	µg/m ³	>50%	4	<4.0	<4.0	n/c	<0.40	<0.40	n/c
1,2-Dichloroethane	µg/m ³	>50%	4	15.3	12.6	n/c	<0.40	<0.40	n/c
Ethylene Dibromide	µg/m ³	>50%	7.7	<7.7	<7.7	n/c	<0.77	<0.77	n/c
1,1,1-Trichloroethane	µg/m ³	>50%	5.5	<5.5	<5.5	n/c	<0.55	<0.55	n/c
1,1,2-Trichloroethane	µg/m ³	>50%	5.5	<5.5	<5.5	n/c	<0.55	<0.55	n/c
1,1,2,2-Tetrachloroethane	µg/m ³	>50%	6.9	<6.9	<6.9	n/c	<1.7	<1.7	n/c
cis-1,3-Dichloropropene	µg/m ³	>50%	4.5	<4.5	<4.5	n/c	<0.45	<0.45	n/c
trans-1,3-Dichloropropene	µg/m ³	>50%	4.5	<4.5	<4.5	n/c	<0.45	<0.45	n/c
1,2-Dichloropropane	µg/m ³	>50%	4.6	<4.6	<4.6	n/c	<0.46	<0.46	n/c

Notes:**Bold/Underlined** - RPD exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m³ - micrograms per cubed meter

< - less than

> - greater than

RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table D13
Summary of Field Duplicate Sample Results - Soil Vapour
Former Retail Fuel Outlet - 2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV19-03	DUP A	RPD %	SV19-02	DUP A	RPD %
Sample Collection Date				29-May-19	29-May-19		11-Nov-19	11-Nov-19	
BVL Sample ID				JWF066	JWF067		LHI604	LHI605	
Bromomethane	µg/m ³	>50%	3.9	<3.9	<3.9	n/c	<0.39	<0.39	n/c
Bromoform	µg/m ³	>50%	21	<21	<21	n/c	<2.1	<2.1	n/c
Bromodichloromethane	µg/m ³	>50%	13	<13	<13	n/c	<1.3	<1.3	n/c
Dibromochloromethane	µg/m ³	>50%	17	<17	<17	n/c	<1.7	<1.7	n/c
Trichloroethylene	µg/m ³	>50%	5.4	<5.4	<5.4	n/c	<0.54	<0.54	n/c
Tetrachloroethylene	µg/m ³	>50%	6.8	<6.8	<6.8	n/c	<0.68	<0.68	n/c
Benzene	µg/m ³	>50%	3.2	611	482	24	0.81	0.79	n/c
Toluene	µg/m ³	>50%	3.8	238	183	26	1.1	1.15	n/c
Ethylbenzene	µg/m ³	>50%	4.3	43.1	33.3	26	<0.43	<0.43	n/c
p+m-Xylene	µg/m ³	>50%	8.7	105	79	28	1.52	1.59	n/c
o-Xylene	µg/m ³	>50%	4.3	35.7	27.5	26	0.56	0.6	n/c
Styrene	µg/m ³	>50%	4.3	<4.3	<4.3	n/c	<0.43	<0.43	n/c
4-ethyltoluene	µg/m ³	>50%	25	<25	<25	n/c	<2.5	<2.5	n/c
1,3,5-Trimethylbenzene	µg/m ³	>50%	25	<25	<25	n/c	<2.5	<2.5	n/c
1,2,4-Trimethylbenzene	µg/m ³	>50%	25	<25	<25	n/c	<2.5	<2.5	n/c
Chlorobenzene	µg/m ³	>50%	4.6	<4.6	<4.6	n/c	<0.46	<0.46	n/c
Benzyl chloride	µg/m ³	>50%	26	<26	<26	n/c	<2.6	<2.6	n/c
1,3-Dichlorobenzene	µg/m ³	>50%	24	<24	<24	n/c	<2.4	<2.4	n/c
1,4-Dichlorobenzene	µg/m ³	>50%	6	<6.0	<6.0	n/c	<0.60	<0.60	n/c
1,2-Dichlorobenzene	µg/m ³	>50%	6	<6.0	<6.0	n/c	<0.60	<0.60	n/c
1,2,4-Trichlorobenzene	µg/m ³	>50%	37	<37	<37	n/c	<3.7	<3.7	n/c
Hexachlorobutadiene	µg/m ³	>50%	53	<53	<53	n/c	<5.3	<5.3	n/c
Hexane	µg/m ³	>50%	7	809	646	22	1.08	1.27	n/c
Heptane	µg/m ³	>50%	12	189	146	26	1.4	1.4	n/c
Cyclohexane	µg/m ³	>50%	6.9	395	313	23	<1.2	<1.2	n/c
Tetrahydrofuran	µg/m ³	>50%	12	<12	<12	n/c	<2.1	<2.1	n/c
1,4-Dioxane	µg/m ³	>50%	36	<36	<36	n/c	<3.6	<3.6	n/c
Naphthalene	µg/m ³	>50%	10	<10	<10	n/c	<1.0	<1.0	n/c
Total Xylenes	µg/m ³	>50%	13	141	107	27	2.1	2.2	n/c
1,1,1,2-Tetrachloroethane	µg/m ³	>50%	6.9	<6.9	<6.9	n/c	<0.69	<0.69	n/c
Vinyl Bromide	µg/m ³	>50%	8.7	<8.7	<8.7	n/c	<0.87	<0.87	n/c
Propene	µg/m ³	>50%	1300	<1300	<1100	n/c	<1.1	<1.1	n/c
2,2,4-Trimethylpentane	µg/m ³	>50%	9.3	4260	3290	26	<0.93	0.98	n/c
Carbon Disulfide	µg/m ³	>50%	16	<16	<16	n/c	<1.6	<1.6	n/c
Vinyl Acetate	µg/m ³	>50%	7	<7.0	<7.0	n/c	<0.70	<0.70	n/c

Notes:**Bold/Underlined** - RPD exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m³ - micrograms per cubed meter

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Table D13
Summary of Field Duplicate Sample Results - Soil Vapour
Former Retail Fuel Outlet - 2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV19-03	DUP A	RPD %	SV19-02	DUP A	RPD %
Sample Collection Date				29-May-19	29-May-19		11-Nov-19	11-Nov-19	
BVL Sample ID				JWF066	JWF067		LHI604	LHI605	
F1-BTEX, C6-C10 (as Toluene)	µg/m ³	>50%	50	11800	9160	25	431	473	9
F2, C10-C16 (as Decane)	µg/m ³	>50%	50	158	102	n/c	103	110	7
Aliphatic >C5-C6	µg/m ³	>50%	50	3390	2690	23	5.1	<5.0	n/c
Aliphatic >C6-C8	µg/m ³	>50%	50	18300	14100	26	25.6	27.4	7
Aliphatic >C8-C10	µg/m ³	>50%	50	363	297	20	64.3	69.7	8
Aliphatic >C10-C12	µg/m ³	>50%	50	214	179	n/c	14.5	15.7	n/c
Aliphatic >C12-C16	µg/m ³	>50%	50	<50	<50	n/c	<5.0	<5.0	n/c
Aromatic >C7-C8 (TEX Excluded)	µg/m ³	>50%	50	<50	<50	n/c	<5.0	<5.0	n/c
Aromatic >C8-C10	µg/m ³	>50%	50	62	<50	n/c	8.6	8.8	n/c
Aromatic >C10-C12	µg/m ³	>50%	50	<50	<50	n/c	6.8	6.6	n/c
Aromatic >C12-C16	µg/m ³	>50%	50	<50	<50	n/c	<5.0	<5.0	n/c

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Former Retail Fuel Outlet - 2 Montreal Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Do the results exceed the Alert Limit?	Field Blank	Do the results exceed the Alert Limit?
Sample Collection Date				28-May-19		11-Nov-19	
BVL Sample ID				JVX873		LHI675	
Dichlorodifluoromethane (FREON 12)	µg/m ³	>5X RDL	0.99	2.53	no	2.42	no
1,2-Dichlorotetrafluoroethane	µg/m ³	>5X RDL	1.2	<1.2	no	<1.2	no
Chloromethane	µg/m ³	>5X RDL	0.62	1.15	no	0.65	no
Vinyl Chloride	µg/m ³	>5X RDL	0.26	<0.26	no	<0.26	no
Chloroethane	µg/m ³	>5X RDL	0.79	<0.79	no	<0.79	no
1,3-Butadiene	µg/m ³	>5X RDL	1.1	<1.1	no	<1.1	no
Trichlorofluoromethane (FREON 11)	µg/m ³	>5X RDL	1.1	1.4	no	1.3	no
Ethanol (ethyl alcohol)	µg/m ³	>5X RDL	1.9	4.9	no	5.3	no
Trichlorotrifluoroethane	µg/m ³	>5X RDL	1.2	<1.2	no	<1.2	no
2-propanol	µg/m ³	>5X RDL	2.5	<2.5	no	<2.5	no
2-Propanone	µg/m ³	>5X RDL	1.4	7.8	yes	3.5	no
Methyl Ethyl Ketone (2-Butanone)	µg/m ³	>5X RDL	0.59	<0.59	no	<0.59	no
Methyl Isobutyl Ketone	µg/m ³	>5X RDL	0.82	<0.82	no	<0.82	no
Methyl Butyl Ketone (2-Hexanone)	µg/m ³	>5X RDL	4.1	<4.1	no	<4.1	no
Methyl t-butyl ether (MTBE)	µg/m ³	>5X RDL	0.72	<0.72	no	<0.72	no
Ethyl Acetate	µg/m ³	>5X RDL	3.6	<3.6	no	<3.6	no
1,1-Dichloroethylene	µg/m ³	>5X RDL	0.4	<0.40	no	<0.40	no
cis-1,2-Dichloroethylene	µg/m ³	>5X RDL	0.4	<0.40	no	<0.40	no
trans-1,2-Dichloroethylene	µg/m ³	>5X RDL	0.4	<0.40	no	<0.40	no
Methylene Chloride(Dichloromethane)	µg/m ³	>5X RDL	2.1	<2.1	no	<2.1	no
Chloroform	µg/m ³	>5X RDL	0.49	<0.49	no	<0.49	no
Carbon Tetrachloride	µg/m ³	>5X RDL	0.63	<0.63	no	<0.63	no
1,1-Dichloroethane	µg/m ³	>5X RDL	0.4	<0.40	no	<0.40	no
1,2-Dichloroethane	µg/m ³	>5X RDL	0.4	<0.40	no	<0.40	no
Ethylene Dibromide	µg/m ³	>5X RDL	0.77	<0.77	no	<0.77	no
1,1,1-Trichloroethane	µg/m ³	>5X RDL	0.55	<0.55	no	<0.55	no
1,1,2-Trichloroethane	µg/m ³	>5X RDL	0.55	<0.55	no	<0.55	no
1,1,2,2-Tetrachloroethane	µg/m ³	>5X RDL	0.69	<0.69	no	<0.69	no
cis-1,3-Dichloropropene	µg/m ³	>5X RDL	0.45	<0.45	no	<0.45	no
trans-1,3-Dichloropropene	µg/m ³	>5X RDL	0.45	<0.45	no	<0.45	no
1,2-Dichloropropane	µg/m ³	>5X RDL	0.46	<0.46	no	<0.46	no

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Sample Collection Date				28-May-19		11-Nov-19	
BVL Sample ID				JVX873		LHI675	
Bromomethane	µg/m ³	>5X RDL	0.39	<0.39	no	<0.39	no
Bromoform	µg/m ³	>5X RDL	2.1	<2.1	no	<2.1	no
Bromodichloromethane	µg/m ³	>5X RDL	1.3	<1.3	no	<1.3	no
Dibromochloromethane	µg/m ³	>5X RDL	1.7	<1.7	no	<1.7	no
Trichloroethylene	µg/m ³	>5X RDL	0.54	<0.54	no	<0.54	no
Tetrachloroethylene	µg/m ³	>5X RDL	0.68	<0.68	no	<0.68	no
Benzene	µg/m ³	>5X RDL	0.32	0.4	no	0.38	no
Toluene	µg/m ³	>5X RDL	0.38	0.79	no	2.01	yes
Ethylbenzene	µg/m ³	>5X RDL	0.43	<0.43	no	<0.43	no
p+m-Xylene	µg/m ³	>5X RDL	0.87	<0.87	no	<0.87	no
o-Xylene	µg/m ³	>5X RDL	0.43	<0.43	no	<0.43	no
Styrene	µg/m ³	>5X RDL	0.43	<0.43	no	<0.43	no
4-ethyltoluene	µg/m ³	>5X RDL	2.5	<2.5	no	<2.5	no
1,3,5-Trimethylbenzene	µg/m ³	>5X RDL	2.5	<2.5	no	<2.5	no
1,2,4-Trimethylbenzene	µg/m ³	>5X RDL	2.5	<2.5	no	<2.5	no
Chlorobenzene	µg/m ³	>5X RDL	0.46	<0.46	no	<0.46	no
Benzyl chloride	µg/m ³	>5X RDL	2.6	<2.6	no	<2.6	no
1,3-Dichlorobenzene	µg/m ³	>5X RDL	2.4	<2.4	no	<2.4	no
1,4-Dichlorobenzene	µg/m ³	>5X RDL	0.6	<0.60	no	<0.60	no
1,2-Dichlorobenzene	µg/m ³	>5X RDL	0.6	<0.60	no	<0.60	no
1,2,4-Trichlorobenzene	µg/m ³	>5X RDL	3.7	<3.7	no	<3.7	no
Hexachlorobutadiene	µg/m ³	>5X RDL	5.3	<5.3	no	<5.3	no
Hexane	µg/m ³	>5X RDL	0.7	<0.70	no	<0.70	no
Heptane	µg/m ³	>5X RDL	1.2	<1.2	no	<1.2	no
Cyclohexane	µg/m ³	>5X RDL	0.69	<0.69	no	<0.69	no
Tetrahydrofuran	µg/m ³	>5X RDL	1.2	<1.2	no	<1.2	no
1,4-Dioxane	µg/m ³	>5X RDL	3.6	<3.6	no	<3.6	no
Naphthalene	µg/m ³	>5X RDL	1	<1.0	no	<1.0	no
Total Xylenes	µg/m ³	>5X RDL	1.3	<1.3	no	<1.3	no
1,1,1,2-Tetrachloroethane	µg/m ³	>5X RDL	0.69	<0.69	no	<0.69	no
Vinyl Bromide	µg/m ³	>5X RDL	0.87	<0.87	no	<0.87	no
Propene	µg/m ³	>5X RDL	3.3	<3.3	no	<0.86	no
2,2,4-Trimethylpentane	µg/m ³	>5X RDL	0.93	<0.93	no	<0.93	no
Carbon Disulfide	µg/m ³	>5X RDL	1.6	<1.6	no	<1.6	no
Vinyl Acetate	µg/m ³	>5X RDL	0.7	<0.70	no	<0.70	no

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Sample Collection Date				28-May-19		11-Nov-19	
BVL Sample ID				JVX873		LHI675	
F1-BTEX, C6-C10 (as Toluene)	$\mu\text{g}/\text{m}^3$	>5X RDL	5	9.1	no	22.5	no
F2, C10-C16 (as Decane)	$\mu\text{g}/\text{m}^3$	>5X RDL	5	<5.0	no	<5.0	no
Aliphatic >C5-C6	$\mu\text{g}/\text{m}^3$	>5X RDL	5	<5.0	no	<5.0	no
Aliphatic >C6-C8	$\mu\text{g}/\text{m}^3$	>5X RDL	5	<5.0	no	<5.0	no
Aliphatic >C8-C10	$\mu\text{g}/\text{m}^3$	>5X RDL	5	<5.0	no	<5.0	no
Aliphatic >C10-C12	$\mu\text{g}/\text{m}^3$	>5X RDL	5	<5.0	no	<5.0	no
Aliphatic >C12-C16	$\mu\text{g}/\text{m}^3$	>5X RDL	5	<5.0	no	<5.0	no
Aromatic >C7-C8 (TEX Excluded)	$\mu\text{g}/\text{m}^3$	>5X RDL	5	<5.0	no	<5.0	no
Aromatic >C8-C10	$\mu\text{g}/\text{m}^3$	>5X RDL	5	<5.0	no	<5.0	no
Aromatic >C10-C12	$\mu\text{g}/\text{m}^3$	>5X RDL	5	<5.0	no	<5.0	no
Aromatic >C12-C16	$\mu\text{g}/\text{m}^3$	>5X RDL	5	<5.0	no	<5.0	no

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